Survey Time: Start 0815 End 1530
Intensive Nest Search Time: Start – End –
Temperature (°F): Begin 55 End 70

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 1 (including maps)

Survey Area/Project Area: SDS **Crew:** WJB **Month:** 6 **Day:** 26, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover:** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G23	0823	0829	2	CL	1	2	NC															
	G21	0844	0850	2	Cl	1	1																
	G15.5	0911	0917	2	Cl	1	1																
	G16	0928	0934	2	Cl	1	1																
	G18	0947	0953	2	Cl	1	1																
	G19	1009	1015	5	Cl	2	1																
	G28	1044	1050	3	Cl	1	1	NC															
062609-1I								V	BT	1	U	U	TUVU	1047	1047	48	400	3N	9E	18	NW	10T 0608247	5067337
	G26	1112	1118	2	Cl	1	1	NC															
	G27	1130	1136	2	Cl	1	1																
	G29	1147	1153	2	Cl	1	1																
	G34	1211	1218	2	Cl	1	1																
	G30	1233	1239	2	Cl	1	1																
	G31	1255	1301	3	Cl	1	1																
	G32	1316	1322	3	Cl	1	1																
	G33	1342	1348	3	Cl	1	1																
	G34	1354	1400	3	Cl	1	1																
	G35	1407	1513	4	Cl	1	1	NC															
062609-2I								V	BT	1	U	A	TUVU	1416	1416	160	150	3N	9E	7	SW	10T 0608841	5068402
	G36	1422	1428	4	Cl	1	1	NC															
	G53	1457	1503	4	Cl	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1; 061208-2, ect) **Time:** Military format.
Comments:

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 1 (including maps)

Survey Time: Start 0910 End____
Intensive Nest Search Time: Start – End –
Temperature (°F): Begin 64 End 72
Survey Area/Project Area: SNS **Crew:** WCB **Month:** 6 **Day:** 29, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	677	0922	0928	3	CL	1	1	NC															
	676	0943	0949	1	Cl	1	1																
	674	0958	1004	3	Cl	1	1																
	673	1014	1020	2	Cl	1	1																
	675	1041	1047	3	Cl	1	1																
	664	1109	1115	2	Cl	1	1																
	665	1131	1137	2	Cl	1	1																
	670	1145	1151	2	Cl	1	1																
	669	1158	1204	2	Cl	1	1																
	666	1214	1220	2	Cl	1	1																
	667	1229	1235	3	Cl	1	1																
	668	1245	1251	4	Cl	2	1	NC															
✓ 062909-1i								V	BT	4	U	U	TUVU	1254	1254	312	400	3N	10E	7	NE	10T 0609611	5069036
	690	1312	1318	4	Cl	2	1	NC															
✓ 026909-2i								V	BT	1	U	A	TUVU	1312	1312	52	20	3N	10E	7	NE	10T 0609148	5069217
	6921	1337	1343	3	Cl	1	1	NC															
	691	1408	1412	4	Cl	2	1	NC															
✓ 062909-3i								V	BT	1	U	U	TUVU	1411	1411	0	0	3N	10E	6	SE	10T 0609453	50693[illegible]
	688	1429	1435	4	Cl	2	1	NC															
	687	1447	1453	3	Cl	1	1																
	671	1458	1504	3	Cl	1	1																
	672	1514	1520	3	Cl	1	1																
	6120	1625	1631	3	Cl	2	1																
	6128	1640	1646	2	Cl	1	1																
	6125	1658	1704	2	Cl	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:
NC = No Contact

✓

Survey Time: Start 0910 End 1710

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 1 (including maps)

Intensive Nest Search Time: Start_____ End_____

Temperature (°F): Begin 64° End 72°

Survey Area/Project Area: SDS **Crew:** TDG **Month:** 06 **Day:** 25, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st / 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX	UTMY
																						NAD83-GPS data only	
	G83	0918	0926	3	CL	1	1	NC															
	G82	0938	0945	3	CL	1	1																
	G81	0957	1004	3	CL	1	1																
	G84	1018	1026	3	CL	1	1																
	G98	1045	1053	3	CL	1	1																
	G80	1112	1119	3	CL	1	1																
	G79	1130	1138	3	CL	1	1																
	G85	1147	1155	3	CL	1	1																
	G96	1209	1216	3	CL	1	1																
	G100	1241	1249	3	CL	1	1																
	G95	1306	1314	4	CL	1	1																
	G101	1330	1337	4	CL	1	1																
	G94	1355	1403	4	CL	1	1																
	G86	1418	1425	4	CL	1	1																
	G92	1445	1453	4	CL	1	1																
	G93	1504	1512	4	CL	1	1																
	G123	1635	1643	4	CL	2	1																
	G121	1647	1654	4	CL	2	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = no contact

Survey Time: Start 0715 End 0900

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 65 End 70

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 6 **Day:** 30, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	661	0735	0741	3	CL	2	1	NC															
	662	0749	0755	3	CL	2	1	NC															
	663	0806	0812	2	CL	1	1	NC															
	664	0821	0827	2	CL	1	1	NC															
	678	0845	0851	3	CL	2	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

NC = NO Contact

Survey Time: Start 0710 End 0915

Turnstone Environmental Consultants

Goshawk Survey Form

Intensive Nest Search Time: Start _____ End _____

Temperature (°F): Begin 55° End _____

Survey Area/Project Area: SDS **Crew:** TDG **Month:** 06 **Day:** 30, 2009 **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st / 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: _____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G52	0724	0731	2	CL	1	1	NC															
	G56	0738	0745	2	CL	1	1																
	G55	0750	0758	2	CL	1	1																
	G54	0806	0813	2	CL	1	1																
✓ 063009-1	G60.5	0819	0827	3	CL	2	1	V	AT	1	U	A	RTHA	0830	0830	270°	100	3N	10E	8	SW	610224	5068[illegible]
	G60	0835	0843	3	CL	2	1	NC															
	G51	0857	0905	2	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

Survey Time: Start 1145 End 1615

Intensive Nest Search Time: Start – End –

Temperature (°F): Begin 62 End 70

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WCB **Month:** 7 **Day:** 9, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY
	G75	1156	1202	3	PC	2	3	NC															
	G77	1209	1215	3	PC	2	3																
	G78	1223	1229	3	PC	2	3																
	G76	1245	1251	2	PC	1	3																
	G74	1258	1304	2	PC	1	3																
	G83	1315	1321	3	PC	1	3																
	G82	1335	1341	2	PC	1	3																
	G81	1349	1355	3	PC	2	3																
	G84	1413	1419	2	PC	1	3																
	G98	1440	1446	2	PC	1	3																
	G96	1506	1512	2	PC	1	3																
	G80	1525	1531	3	PC	1	3																
	G85	1544	1550	2	PC	1	3																
	G86	1600	1606	2	PC	1	3	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

NC = No Contact

✓

Survey Time: Start 1134 End 1704

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 61° End 78°

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** J. Votos **Month:** 7 **Day:** 9, 2009 **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

	Sta. Time			Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town.	Range	Sect	¼	NAD83-GPS data only	
	G122	1154	1200	4	PC	1	2	NC															
	G140	1220	1227	4	PC	1	2																
	G141	1230	1237	4	PC	1	2																
	G121	1315	1322	4	PC	1	2																
	G125	1330	1337	4	PC	1	2																
	G139	1348	1356	4	PC	2	2																
	G126	1400	1407	4	PC	2	2																
	G127	1414	1421	4	PC	2	2																
	G128	1447	1454	4	PC	2	2																
	G120	1501	1507	4	PC	2	2																
	G129	1514	1521	4	PC	2	2																
	G138	1529	1536	4	PC	2	2																
	G137	1545	1552	4	PC	2	2																
	G136	1555	1602	4	PC	2	2																
	G130	1607	1615	4	PC	2	2																
	G118	1624	1631	4	PC	2	2																
	G119	1639	1646	4	PC	2	2																
	G124	1648	1654	4	PC	2	2																
	G123	1657	1704	4	PC	2	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

NC = No Contact

Survey Time: Start 0745 End 1415
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 57 End ____

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 7 **Day:** 10, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover:** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G95	0802	0808	1	PC	1	3	NC															
	G94	0821	0827	1	PC	1	3																
	G93	0841	0847	1	PC	1	3																
	G92	0901	0907	1	PC	1	3																
	G91	0917	0923	1	PC	1	4																
	G90	0942	0948	2	PC	1	4																
	G88	1003	1009	2	PC	1	4																
	G92	1022	1028	2	PC	1	4																
	G87	1041	1047	1	PC	1	4																
	G71	1052	1058	1	PC	1	4																
	G72	1106	1112	1	PC	1	4																
	G79	1118	1124	2	PC	1	2																
	G73	1131	1137	2	PC	1	2																
071009-1i			.	2	PC	1	2	V	BT	1	u	u	TUVU	1136	1136	340°	300	3N	10E	8	NE		
	G64.1	1155	1201	2	PC	1	2	NC															
	G64	1208	1214	2	PC	1	2																
	G63	1223	1229	2	PC	1	2																
	G62	1235	1241	2	PC	1	2																
	G61	1251	1257	2	PC	1	2																
	G67	1305	1311	1	PC	1	2																
	G68	1318	1324	2	PC	1	2																
	G69	1329	1335	2	PC	1	2																
	G66	1341	1347	2	PC	1	2																
	G65	1350	1356	2	PC	1	2																
	G70	1359	1405	3	PC	1	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = NO Contact

Survey Time: Start 0717 End 1322

Intensive Nest Search Time: Start - End -

Temperature (°F): Begin 57 End 78

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 1 (including maps)

Survey Area/Project Area: SDS Whistling Ridge **Crew:** J. Voros **Month:** 7 **Day:** 10, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town.	Range	Sect	¼	NAD83-GPS data only	
	G103	0748	0754	1	PC	1	3	NC															
	G105	0803	0810	1	PC	1	3																
	G109	0823	0830	1	PC	1	3																
	G117	0835	0842	1	PC	1	4																
	G110	0845	0852	1	PC	1	4																
	G105.5	0857	0904	1	PC	1	4																
	G102	0913	0920	1	PC	1	4																
	G101	0924	0930	1	PC	1	5																
	G106	0933	0940	1	PC	1	5																
	G111	0945	0952	1	PC	1	6																
	G112	0958	1005	1	PC	1	6																
	G107	1028	1035	1	PC	1	6																
	G100	1041	1047	1	PC	1	6																
	G99.5	1049	1056	1	PC	1	4																
	G99	1102	1109	1	PC	1	4																
	G113	1118	1125	1	PC	1	4																
	G114	1114	1142	1	PC	1	4																
	G133	1154	1201	1	PC	1	4																
	G132	1211	1218	1	PC	1	4																
	G134	1224	1231	1	PC	1	5																
	G135	1240	1247	1	OC	1	6																
	G131	1252	1259	1	OC	1	6																
	G131.1	1303	1310	1	PC	1	5																
	G115	1315	1322	1	PC	1	5																
	G107.5	1336	1344	1	PC	1	5	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = NO CONTACT

Survey Time: Start 1552 End 1902

Intensive Nest Search Time: Start — End

Temperature (°F): Begin 84° End 82°

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 1 (including maps)

Survey Area/Project Area: SDS WHISTLING RIDGE **Crew:** J. YOTOS **Month:** 7 **Day:** 15, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town.	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY
	G22	1552	1559	1	CL	1	1	NC															
	G226	1603	1610	1	CL	1	1																
	G23	1628	1635	1	CL	1	1																
	G21	1644	1651	1	CL	1	1																
	G24	1658	1704	1	CL	1	1																
	G25	1714	1721	1	CL	1	1																
	G58	1733	1740	1	CL	1	1																
	G59	1745	1752	1	CL	1	1																
	G57	1802	1809	1	CL	3	1																
	G56	1818	1825	1	CL	2	1																
	G55	1830	1837	1	CL	3	1																
	G54	1853	1900	1	CL	3	1																
	G38	1902	1909	1	CL	3	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

✓ NC = No Contact

Survey Time: Start 1545 End 1930

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 84 End 78

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 7 **Day:** 15, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover:** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	G54	1557	1603	2	CL	1	1	NL															
	G60.5	1614	1620	3	CL	2	1																
	G60	1626	1632	2	CL	1	1																
	G53	1641	1647	2	CL	2	1																
	G52	1654	1700	2	CL	2	1																
	G51	1710	1706	1	CL	1	1																
	G50	1725	1731	2	CL	1	1																
	G48	1739	1745	3	CL	1	1	NL															
071509-1i				3	CL	1	1	V		2	u	u	TUVU	1740	1741	174	100	3N	10E	8	SW	10T 0609457	5067966
	G47	1752	1758	1	CL	1	1	NL															
	G46	1806	1812	3	CL	1	1	NL															
071509-2i				3	CL	1	1	V		1	A	u	TUVU	1807	1808	300	200	3N	10E	8	SW	10T 0609409	5068351
	G44	1820	1826	3	CL	1	1	NL															
	G43	1834	1840	2	CL	1	1																
	G36	1900	1906	2	CL	1	1																
	G35	1910	1916	2	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

NL = No Contact

Survey Time: Start 0841 End 1252

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 1 (including maps)

Intensive Nest Search Time: Start – End –
Temperature (°F): Begin 68° End 91°

Survey Area/Project Area: SDS Whistling Ridge **Crew:** J. Votos **Month:** 7 **Day:** 16, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town.	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	G20	0841	0848	1	CL	1	1	NC															
	G19	0854	0901	1	CL	1	1																
	G18	0912	0919	1	CL	1	1																
	G12	0940	0947	1	CL	1	1																
	G11	0954	1001	1	CL	1	1																
	G8	1010	1017	1	CL	1	1																
	G9	1024	1031	1	CL	1	1																
	G10	1040	1050	1	CL	1	1																
	G9.5	1058	1105	1	CL	1	1																
	G13	1121	1128	1	CL	1	1																
	G17	1137	1144	1	CL	1	1																
	G14	1158	1205	1	CL	1	1																
	G14.5	1212	1219	1	CL	1	1																
	G15	1221	1228	1	CL	1	1																
	G15.5	1231	1238	1	CL	1	1																
	G16	1245	1252	1	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Time: Start 0845 End 1330

Page 1 of 1 (including maps)

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 63° End 80°

Survey Area/Project Area: SDS **Crew:** WLB **Month:** 7 **Day:** 16, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY
	G32	0850	0856	2	CL	1	1	NC															
	G31	0911	0917	1	CL	1	1																
	G31.1	0929	0935	1	CL	1	1																
	G30	0948	0954	1	CL	1	1																
	G29	1008	1014	1	CL	1	1																
	G27	1022	1028	1	CL	1	1																
	G26	1036	1042	1	CL	1	1																
	G1	1103	1109	1	CL	1	1																
	G2	1112	1118	1	CL	1	1																
	G3	1122	1128	2	CL	1	1																
	G5	1133	1139	1	CL	1	1																
	G4	1150	1156	1	CL	1	1																
	G6	1209	1215	1	CL	1	1																
	G7	1223	1229	1	CL	1	1																
	G28	1309	1315	2	CL	1	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier, date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments:

NC = No Contact

Survey Time: Start 1000 End 2050

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin UNK. End UNK.

Survey Area/Project Area: WHISTLING RIDGE

Turnstone Environmental Consultants

Goshawk Survey Form

Crew: J. WATTS / W. BEARD D. DAHL / T. GILLEN **Month:** 06 **Day:** 30, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det_ID	ST#	Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
		Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	A1	1000	1046	3	CL	/	1	NC															
	B1	1000	1046	3	CL	/	1																
	C1	1000	1046	3	CL	/	1																
	A2	1056	1138	2	CL	/	1																
	B2	1056	1138	2	CL	/	1																
NO	C3	T-SECT																					
*	A3	1146	1242	3	PC	/	2																
*	B3	1146	1242	3	PC	/	2																
*	C3	1146	1242	3	PC	/	2																
	A4	1250	1321	3	PC	/	2																
	B4	1250	1321	3	PC	/	2																
	C4	1250	1321	3	PC	/	2																
	A5	1350	1417	3	PC	/	2																
	B5	1350	1417	3	PC	/	2																
	C5	1350	1417	3	PC	/	2																
*	A6	1423	1458	2	PC	/	2																
*	B6	1423	1458	2	PC	/	2																
*	C6	1423	1458	2	PC	/	2																
	A7	1510	1520	2	PC	/	2																
	B7	1510	1520	2	PC	/	2																
	C7	1510	1520	2	PC	/	2																
	A8	1526	1537	3	PC	/	2																
	B8	1526	1537	3	PC	/	2																
	C8	1526	1537	3	PC	/	2																
*	A9	1545	1602	3	PC	/	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* = All 3 OBSERVERS Broadcast Calls on transect

NC = NO contact

Survey Time: Start 1000 End 2050

Turnstone Environmental Consultants
Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin UNK. End UNK.

Survey Area/Project Area: Whistling Ridge Crew: D. SAHL / T. GILLEO J. Woods / W. BEARD Month: 06 Day: 30, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y N (if yes attach Search Form) Nest Found: Y N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ________ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
*	B9	1545	1602	3	PC	/	2	NC															
*	C9	1545	1602	3	PC	/	2																
	A10	1623	1715	3	PC	/	2																
	B10	1623	1715	3	PC	/	2																
	C10	1623	1715	3	PC	/	2																
	A11	1721	1806	3	PC	/	2																
	B11	1721	1806	3	PC	/	2																
	C11	1721	1806	3	PC	/	2																
*	A53	1849	2009	2	PC	/	2																
*	B53	1849	2009	2	PC	/	2																
*	C53	1849	2009	2	PC	/	2																
	A54	2012	2023	2	PC	/	2																
	B54	2012	2023	2	PC	/	2																
	C54	2012	2023	2	PC	/	2																
	A55	2030	2041	2	PC	/	2																
	B55	2030	2041	2	PC	/	2																
	C55	2030	2041	2	PC	/	2	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier: date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 observers Broadcast Calls NC = No contact
Wild Turkey observed on B54 t-sect

Survey Time: Start 0755 End 1635

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 2 (including maps)

Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 62 End 80
Survey Area/Project Area: WHISTLING RIDGE   Crew: T. Gillen, J. Votos, W. Beard   Month: 07 Day: 01, 2009 Visit # 1

Period: Nestling / Fledgling   Call(s) Used: ~~Alarm / Wail~~ / Begging   Survey Year: 1st 2nd   Nest Search: Y / N (if yes attach Search Form)   Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search or Dawn Acoustical, Other: ____   Cloud Cover: 1 = <5%, 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow   Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX	UTMY NAD83-GPS data only
*	A12	0755	0852	1	CL	/	1	NC															
*	B12	↓	↓	1	CL	/	1	↓															
*	C12	↓	↓	1	CL	/	1																
	A13	0855	0941	1	CL	/	1																
	B13	↓	↓	1	CL	/	1																
	C13	↓	↓	1	CL	/	1																
	A14	0956	1102	1	CL	/	1																
	B14	↓	↓	1	CL	/	1																
	C14	↓	↓	1	CL	/	1																
*	A15	1118	1214	1	CL	/	1																
*	B15	↓	↓	1	CL	/	1																
*	C15	↓	↓	1	CL	/	1																
	A16	1241	1324	2	CL	/	1																
	B16	↓	↓	2	CL	/	1																
	C16	↓	↓	2	CL	/	1																
	A17	1345	1436	1	CL	/	1																
	B17	↓	↓	1	CL	/	1																
	C17	↓	↓	1	CL	/	1																
*	A18	1438	1459	1	CL	/	1																
*	B18	↓	↓	1	CL	/	1																
*	C18	↓	↓	1	CL	/	1																
	A19	1502	1512	1	CL	/	1																
	B19	↓	↓	1	CL	/	1																
	C19	↓	↓	1	CL	/	1	↓															
	A20	1516	1530	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown   Sex: (M)ale, (F)emale, (U)nknown   Det. Code: (A)udio, (V)isual, (B)oth   Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected   Det._ID: unique detection identifier, date and sequential det. # for the day. (061208-1, 061208-2, ect)   Time: Military format.
Comments: * = All 3 OBSERVERS Broad cast Calls   NC = NO Contact

Survey Time: Start 0755 End 1635

Intensive Nest Search Time: Start – End –

Temperature (*F): Begin 62 End 80

Survey Area/Project Area: WHISTLING RIDGE

Turnstone Environmental Consultants

Goshawk Survey Form

Crew: T. Gilken, J. Oates, W. BEARD Month: 07 Day: 01, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other ______ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%, 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det_ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	B20	1516	1530	1	CL	/	1	NC															
	C20	↓	↓	1	CL	/	1																
*	A21	1534	1544	1	CL	/	1																
*	B21	↓	↓	1	CL	/	1																
*	C21	↓	↓	1	CL	/	1																
	A22	1549	1600	1	CL	/	1	↓															
	B22	↓	↓	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 observers Broadcast calls at Intervals

NC = No Contact

Survey Time: Start 0915 End 1820

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 59 End 69

Survey Area/Project Area: Whistling Ridge Crew: D. Sahil, W. Beard, J. Votos Month: 07 Day: 13, 2009 Visit # 1

Turnstone Environmental Consultants

Goshawk Survey Form

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover:** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%, 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY
*	A23	0935	0949	3	DR	1	4	NC															
*	B23	↓	↓	3	DR	1	4																
*	C23	↓	↓	3	DR	1	4																
	A23-1	0949	1010	3	DR	1	4																
	B23-1	↓	↓	3	DR	1	4																
	C23-1	↓	↓	3	DR	1	4																
	A23-2	1016	1039	3	DR	1	4																
	B23-2	↓	↓	3	DR	1	4																
	C23-2	↓	↓	3	DR	1	4																
*	A23-3	1041	1056	3	DR	1	4																
*	B23-3	↓	↓	3	DR	1	4																
*	C23-3	↓	↓	3	DR	1	4																
	A24-4	1101	1114	3	DR	1	4																
	B24-4	↓	↓	3	DR	1	4																
	C24-4	↓	↓	3	DR	1	4																
	A24-3	1115	1130	3	DR	1	3																
	B24-3	↓	↓	3	DR	1	3																
	C24-3	↓	↓	3	DR	1	3																
*	A24-2	1131	1145	3	DR	1	3																
*	B24-2	↓	↓	3	DR	1	3																
*	C24-2	↓	↓	3	DR	1	3																
*	A24-1	1146	1300	3	DR	2	5																
*	B24-1	↓	↓	3	DR	2	5	↓															
071309-1 *	C24-1	↓	↓	3	DR	2	5	V	BT	1	U	A	STVA	1154	1155	097	15	4N	10E	32	SW	0609743	5071371
	A25	1310	1355	3	OC	/	6	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* All 3 observers broadcast calls @ intervals

C24-1 = very skittish Barred owl observed flying through stand, would only perch briefly before flying off when observers approached. Broadcast STOC calls in case there was another Strix in the stand. there was no [illegible] to the STOC calls or additional observations of of the original STVA. NC = No contact

Survey Time: Start 0915 End 1820

Intensive Nest Search Time: Start____ End____

Temperature (°F): Begin 59 End 69

Survey Area/Project Area: Whistling Ridge

Turnstone Environmental Consultants

Goshawk Survey Form

Crew: P. SAHL, W. BEARD, J. VOKS Month: 07 Day: 13, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ________ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY
	B25	1310	1355	3	OC	/	6	NC															
	C25	↓	↓	3	OC	/	6																
*	A25-1	1400	1410	3	OC	/	6																
*	B25-1	↓	↓	3	OC	/	6																
*	C25-1	↓	↓	3	OC	/	6																
	A25-2	1411	1444	3	OC	/	6																
	B25-2	↓	↓	3	OC	/	6																
	C25-2	↓	↓	3	OC	/	6																
	A25-3	1446	1510	3	OC	/	6																
	B25-3	↓	↓	3	OC	/	6																
	C25-3	↓	↓	3	OC	/	6																
*	A26-2	1512	1524	3	OC	/	4																
*	B26-3	↓	↓	3	OC	/	4																
*	C26-2	↓	↓	3	OC	/	4																
	A26-1	1527	1600	3	OC	/	4																
	B26-2	↓	↓	3	OC	/	4																
	C26-2	↓	↓	3	OC	/	4																
	A27	1601	1643	3	OC	/	4																
	B27	↓	↓	3	OC	/	4																
	C27	↓	↓	3	OC	/	4																
*	A27-1	1649	1719	3	OC	/	4																
*	B27-1	↓	↓	3	OC	/	4																
*	C27-1	↓	↓	3	OC	/	4																
TO END *	A28-1	1729	1748	3	OC	/	4	↓															
TO END *	B28-1	1731	1741	3	OC	/	4	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier, date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:

* All 3 OBSERVERS Broadcast Calls @ Intervals NC = NO Contact

Survey Time: Start 0950 End 1400

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 77

Survey Area/Project Area: Whistling Ridge

Turnstone Environmental Consultants
Goshawk Survey Form

Crew: P.Stahl / W.Beard / Fiotos Month: 07 Day: 14, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____ Cloud Cover : 1 = <5%, 2 = 5-20%; 3 = 21-40%; 4 = 41-60%, 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	A29	0925	0948	1	CL	–	1	NC															
	B29	↓	↓	1	CL	–	1																
	C29	↓	↓	1	CL	–	1																
	A30	0952	1015	1	CL	–	1																
	B30	↓	↓	1	CL	–	1																
	C30	↓	↓	1	CL	–	1																
*	A31-1	1016	1100	1	CL	–	1																
*	B31-1	↓	↓	1	CL	–	1																
*	C31-1	↓	↓	1	CL	–	1																
	A32	1110	1138	1	CL	–	1																
	B32	↓	↓	1	CL	–	1																
	C32	↓	↓	1	CL	–	1																
	A32-1	1140	1245	1	CL	–	1																
	B32-1	↓	↓	1	CL	–	1																
	C32-1	↓	↓	1	CL	–	1																
*	38-1	1330	1400	1	CL	–	1																
*	B38-1	↓	↓	1	CL	–	1																
*	C38-1	↓	↓	1	CL	–	1		No Habitat														
	A39-1	↓	↓	1	CL	–	1																
	B39-1	↓	↓	1	CL	–	1																
	C39-1	↓	↓	1	CL	–	1																
	A41-1	1410	1427	1	CL	–	1																
	B41-1	↓	↓	1	CL	–	1																
	C41-1	↓	↓	1	CL	–	1	↓															
*	A36-1	1439		2	CL	–	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: 29-34 = Good NOGO Habitat Tsects * = All 3 observers Broadcast Calls. for round 2 and adjust the #41 tsect,

38-1 → 39-1 : AREA has little to No Potential NOGO Habitat, Drop Area (~3 Acres)

NC = NO Contact

Survey Time: Start 0930 End 1900

Intensive Nest Search Time: Start — End —

Temperature (*F): Begin 62 End 77

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: Whistling Ridge **Crew:** R. Sohl/W. Beard/J. Wolfe **Month:** 07 **Day:** 14, **2009** **Visit #** 1

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det_ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
*	B36-1	1439	1540	2	CL	/	1	NC															
*	C36-1	↓	↓	2	CL	/	1																
	A33	1550	1614	3	CL	/	1																
	B33			3	CL	/	1																
	C33	↓	↓	3	CL	/	1																
*	A34	1615	1625	3	CL	/	1																
*	B34			3	CL	/	1																
*	C34	↓	↓	3	CL	/	1																
	A35	1645	1716	3	CL	–	1																
	B35			3	CL	/	1	↓															
	C35	↓	↓	3	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format

Comments: * = All 3 observers Broadcast Calls @ Intervals

Beware of cliffs South of C36-1 Area.

NC = No Contact

Survey Time: Start 0845 End

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 72 End 90

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Area/Project Area: Whistling Ridge Crew: D.Sol/W.Beard/J.Votos Month: 07 Day: 15, 2009 Visit # 1

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ________ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	A43	0915	0938	1	CL	/	1	NC															
	B43	↓	↓	1	CL	/	1																
	C43	↓	↓	1	CL	/	1																
*	A45-1	0941	1021	1	CL	/	1																
*	B45-1	↓	↓	1	CL	/	1																
*	C45-1	↓	↓	1	CL	/	1																
	A46	1025	1110	1	CL	/	1																
	B46	↓	↓	1	CL	/	1																
	C46	↓	↓	1	CL	/	1																
	A47-1	1115	1200	1	CL	/	1																
	B47-1	↓	↓	1	CL	/	1																
	C47-1	↓	↓	1	CL	/	1	↓															
*	A48	1210	1250	1	CL	/	1	NC															
071509-1 *	B48	↓	↓	1	CL	/	1	A	BT	U	U	A	SSHA	1238	1239	87°	100	3N	9E	1	NE	0608030	5070108
*	C48	↓	↓	1	CL	/	1	NC															
	A49-1	1300	1336	1	CL	/	1																
	B49-1	↓	↓	1	CL	/	1																
	C49-1	↓	↓	1	CL	/	1																
*	A52	1342	1407	1	CL	/	1																
*	B52	↓	↓	1	CL	/	1																
	B42	1435	1453	1	CL	/	1	↓															
	B42	↓	↓	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments: * = All 3 observers Broadcast Calls @ intervals

Note: Area East (upslope) of the A/B 52 Tsects is not NOGO Habitat. Area is predominately shrubby non-conifer until it intersects with area covered by the Broadcast Acoustic survey effort. NC = No Contact

Survey Time: Start 0920 End 1452

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 62 End 74

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: Whistling RIDGE **Crew:** D.Sohl / W. BEARD / Jitos **Month:** 07 **Day:** 23, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, **FG** = Fog, **PC** = Partly Cloudy, **OC** = Overcast, **DR** = Drizzle, **RN** = Rain, **SN** = Snow **Weather Intensity (WI): 1**=light, **2**=moderate, **3**=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX	UTMY
	A1	1000	1028	3	PC	/	2	NC															
	B1	↓	↓	3	PC	/	2																
	C1	↓	↓	3	PC	/	2																
	A1-2	1035	1054	3	PC	/	2																
	B1-2	↓	↓	3	PC	/	2																
*	A3	1057	1133	3	PC	/	2																
*	B3	↓	↓	3	PC	/	2																
*	C3	↓	↓	3	PC	/	2																
	A4-1	1201	1236	3	PC	/	2																
	B4-1	↓	↓	3	PC	/	2																
	C4-1	↓	↓	3	PC	/	2																
	A5	1241	1305	3	PC	/	2																
	B5	↓	↓	3	PC	/	2																
	C5	↓	↓	3	PC	/	2																
*	A6-1	1310	1334	3	PC	/	2																
*	B6-1	↓	↓	3	PC	/	2																
*	C6-1	↓	↓	3	PC	/	2																
	A7	1334	1352	3-4	PC	/	2																
	B7	↓	↓	3-4	PC	/	2																
	C7	↓	↓	3-4	PC	/	2																
	A8-1	1355	1412	3-4	PC	/	2																
	B8-1	↓	↓	3-4	PC	/	2																
	C8-1	↓	↓	3-4	PC	/	2																
*	A9	1417	1452	2	PC	/	2	↓															
*	B9	↓	↓	2	PC	/	2	NC															

Age: (A)dult, **(F)**ledgling, **(N)**estling, **(U)**nknown **Sex: (M)**ale, **(F)**emale, **(U)**nknown **Det. Code: (A)**udio, **(V)**isual, **(B)**oth **Det. Location: (AT)** station, **(BT)** between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments: * = All 3 OBSERVERS Broadcast Calls NC = No Contact

Survey Time: Start 0920 End 1852

Turnstone Environmental Consultants
Goshawk Survey Form

Page 2 of 2 (including maps)

Intensive Nest Search Time: Start — End —
Temperature (*F): Begin 62 End 74
Survey Area/Project Area: Whistling RIDGE **Crew:** P.Sahl/W.Beard/J.Voros **Month:** 07 **Day:** 23, 2009 **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical / Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX	UTMY NAD83-GPS data only
*	C9	1417	1452	2	PC	/	2	NL															
*	A10	1500	1556	1	PC	/	2	↓															
	B10	↓	↓	1	PC	/	2																
	C10	↓	↓	1	PC	/	2																
	A11-1	1600	1641	1	PC	/	2																
	B11-1	↓	↓	1	PC	/	2																
	C11-1	↓	↓	1	PC	/	2																
*	A53	1738	1801	1	PC	/	2																
	B53	↓	↓	1	PC	/	2																
	C53	↓	↓	1	PC	/	2																
	A54	1806	1815	1	PC	/	2																
	B54	↓	↓	1	PC	/	2																
	C54	↓	↓	1	PC	/	2																
	A55	1822	1830	1	PC	/	2																
	B55	↓	↓	1	PC	/	2	↓															
	C55	↓	↓	1	PC	/	2	NL															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments: * = All 3 observers Broadcast calls @ intervals
NL = No Contact

Survey Time: Start 0810 End 1800
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 72 End 90

Turnstone Environmental Consultants
Goshawk Survey Form

Page 1 of 2 (including maps)

Survey Area/Project Area: ______ **Crew:** D. Sahl / J. Votos / W. Beard **Month:** 07 **Day:** 24, 2009 **Visit #** 2

Period: Nestling/Fledgling **Call(s) Used:** Alarm/Wail/Begging **Survey Year** 1st 2nd **Nest Search:** Y N (if yes attach Search Form) **Nest Found:** Y N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX	UTMY NAD83-GPS data only
	A12	0850	0930	1	PC	–	2	NC															
	B12	↓	↓	1	PC	–	2																
	C12	↓	↓	1	PC	–	2																
*	A13	0940	1050	1	PC	–	2																
*	B13	↓	↓	1	PC	–	2																
*	C13	↓	↓	1	PC	–	2																
	A14-1	1100	1147	1	PC	–	2																
	B14-1	↓	↓	1	PC	–	2																
	C14-1	↓	↓	1	PC	–	2																
	A15	1155	1240	1	PC	–	1																
	B15			1	PC	–	1																
	C15	↓	↓	1	PC	–	1																
*	A16-1	1259	1400	1	PC	–	1																
*	B16-1	↓	↓	1	PC	–	1																
*	C16-1	↓	↓	1	PC	–	1																
	A17	1405	1450	1	PC	–	1																
	B17			1	PC	–	1																
	C17	↓	↓	1	PC	–	1																
	A18-1	1456	1536	1	PC	–	1																
	B18-1	↓	↓	1	PC	–	1																
	C18-1	↓	↓	1	PC	–	1																
*	A19	1554	1624	1	PC	–	1																
*	B19	↓	↓	1	PC	–	1																
*	C19	↓	↓	1	PC	–	1	↓															
	A20-1	1632	1652	1	PC	–	1	NC															

Age: (A)dult, **(F)**ledgling, **(N)**estling, **(U)**nknown **Sex: (M)**ale, **(F)**emale, **(U)**nknown **Det. Code: (A)**udio, **(V)**isual, **(B)**oth **Det. Location: (AT)** station, **(BT)** between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments: * = All 3 observers Broadcast Calls @ Intervals
NC = NO Contact

Survey Time: Start 0810 End 1400

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 72 End 90

Turnstone Environmental Consultants

Goshawk Survey Form

Page 1 of 2 (including maps)

Survey Area/Project Area: Whistling RIDGE **Crew:** D.SAHL/J.Ubtos/W.BEARD **Month:** 07 **Day:** 24, 2009 **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age	Species	Contact Time		Bearing	Dist	Location				UTMX	UTMY
		Begin	End	Code	WC	WI	Cover	Code	Location					Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
	B20-1	1632	1652	1	PC	/	1	NC															
	C20-1	↓	↓	1	PC	/	1																
*	A21	1700	1713	1	PC	/	1																
*	B21	↓	↓	1	PC	/	1																
*	C21	↓	↓	1	PC	/	1																
	A22-1	1710	1727	1	PC	/	1	↓															
	B22-1	↓	↓	1	PC	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments: *= All 3 observers Broadcast Calls @ intervals

NC = NO Contact

Survey Time: Start 1027 End 1640

Intensive Nest Search Time: Start — End —

Temperature (°F): Begin 78 End 95

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Area/Project Area: WHISTLING RIDGE **Crew:** W. BEARD, K. Rostad, J. Votos **Month:** 7 **Day:** 27, 2009 **Visit #** 2

Period: Nestling, Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y N (if yes attach Search Form) **Nest Found:** Y N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ______ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
K	A23	1033	1054	1	CL	-	1	NC															
W	B23	↓	↓	1	CL	-	1																
J	C23	↓	↓	1	CL	-	1																
K	A23-1	1058	1119	1	CL	-	1																
W	B23-1	↓	↓	1	CL	-	1																
J	C23-1	↓	↓	1	CL	-	1																
* K	A23-2	1122	1151	1	CL	-	1																
* W	B23-2	↓	↓	1	CL	-	1																
* J	C23-2	↓	↓	1	CL	-	1																
K	A23-3	1154	1207	1	CL	-	1																
W	B23-3	↓	↓	1	CL	-	1																
J	C23-3	↓	↓	2	CL	-	1																
K	A24-4	1229	1242	2	CL	-	1																
J	B24-4	↓	↓	2	CL	-	1																
W	C24-4	↓	↓	2	CL	-	1																
* K	A24-3	1243	1303	2	CL	-	1																
* J	B24-3	↓	↓	2	CL	-	1																
* W	C24-3	↓	↓	2	CL	-	1																
K	A24-2	1304	1316	2	CL	-	1																
J	B24-2	↓	↓	2	CL	-	1																
W	C24-2	↓	↓	2	CL	-	1																
K	A24-1	1317	1352	2	CL	-	1																
J	B24-1	↓	↓	2	CL	-	1	↓															
W	C24-1	↓	↓	2	CL	-	1	NC															

Age: (A)dult, **(F)**ledgling, **(N)**estling, **(U)**nknown **Sex: (M)**ale, **(F)**emale, **(U)**nknown **Det. Code: (A)**udio, **(V)**isual, **(B)**oth **Det. Location: (AT)** station, **(BT)** between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

* = All 3 surveyors Broadcast calls @ intervals

NC = No Contact

Survey Time: Start 1610 End 1640

Intensive Nest Search Time: Start – End –

Temperature (*F): Begin 78 End 95

Survey Area/Project Area: WHISTLING RIDGE

Turnstone Environmental Consultants

Goshawk Survey Form

Crew: J. Votos, W. Beard, K. Rostad Month: 7 Day: 27, 2009 Visit # 2

Period: Nestling, Fledgling, Call(s) Used: Alarm, Wail, Begging Survey Year: 1st 2nd Nest Search: Y N (if yes attach Search Form) Nest Found: Y N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ Cloud Cover: 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)

Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
*J	A25 *	1411	1452	2	CL	/	1	NC															
*K	B25	↓	↓	2	CL	/	1	↓															
*W	C25	↓	↓	2	CL	/	1																
J	A25-1	1454	1502	2	CL	/	1																
K	B25-1	↓	↓	2	CL	/	1																
W	C25-1	↓	↓	2	CL	/	1																
J	A25-2	1504	1521	2	CL	/	1																
K	B25-2		↓	2	CL	/	1																
W	C25-2	↓	↓	2	CL	/	1																
*J	A25-3	522	1610	2	CL	/	1																
*K	B25-3	↓	↓	2	CL	/	1	↓															
*W	C25-3	↓	↓	2	CL	/	1	NC															
	END																						

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations

#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:

* = All 3 OBSERVERS Broadcast calls

NC = NO Contact

Survey Time: Start 0651 End 1345

Turnstone Environmental Consultants
Goshawk Survey Form

Intensive Nest Search Time: Start — End —

Temperature (*F): Begin 70 End 100

Survey Area/Project Area: WHISTLING RIDGE **Crew:** J. Kotos/W. BEARD K. ROSTAD **Month:** 7 **Day:** 28, **2009** **Visit #** 2

Period: Nestling (Fledgling) **Call(s) Used:** Alarm / (Wail) (Begging) **Survey Year:** (1st) 2nd **Nest Search:** Y / (N) (if yes attach Search Form) **Nest Found:** Y / (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search) or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town	Range	Sect	¼	NAD83-GPS data only	
*	A29	0725	0750	1	CL	/	1	NC															
*	B29	0725	0750	1	CL	/	1																
*	A30-1	0800	0810	1	CL	/	1																
	B30-1	0800	0810	1	CL	/	1																
	C30-1	0800	0810	1	CL	/	1																
	A31	0838	0906	1	CL	/	1																
	B31	0838	0906	1	CL	/	1																
	C31	0838	0906	1	CL	/	1																
*	A32	0943	1000	1	CL	/	1																
*	B32	0943	1000	1	CL	/	1																
*	C32	0943	1000	1	CL	/	1																
	A32-1	1001	1028	1	CL	/	1																
	B32-1	1001	1028	1	CL	/	1																
	C32-1	1001	1028	1	CL	/	1																
	A35-1	1034	1059	1	CL	/	1																
	B35-1	1034	1059	1	CL	/	1																
	C35-1	1034	1059	1	CL	/	1																
*	A41-1	1110	1120	2	CL	/	1																
*	B41-1	1110	1120	2	CL	/	1																
*	C41-1	1110	1120	2	CL	/	1																
	A36-1	1132	1145	1	CL	/	1																
	B36-1	1132	1145	1	CL	/	1																
	C36-1	1132	1145	1	CL	/	1																
	A36	1203	1250	1	CL	/	1																
	B36	1203	1250	1	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Comments:
* = All 3 observers Broadcast Calls @ Intervals
NC = No Contact

Survey Time: Start 0651 End 1345
Intensive Nest Search Time: Start – End –
Temperature (°F): Begin 70 End 100
Survey Area/Project Area: Whistling Ridge

Turnstone Environmental Consultants
Goshawk Survey Form

Crew: J. Vates, W. Beard, K. Rostad Month: 7 Day: 28, 2009 Visit # 2

Period: Nestling / Fledgling Call(s) Used: Alarm / Wail / Begging Survey Year: 1st 2nd Nest Search: Y / N (if yes attach Search Form) Nest Found: Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ Cloud Cover : 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow Weather Intensity (WI): 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	¼	UTMX NAD83-GPS data only	UTMY
	C32	1257	1320	1	CL	–	1	NC															
*	A33	1257	1320	1	CL	–	1	NC															
072809-1 *	B33	1257	1320	1	CL	–	1	V	BT	2	U	A	RTHA	1315	1317	190	30m	4N	9E	36	SE	0627656	5070958
*	A34	1327	1337	1	CL	–	1	NC															
*	B34	1327	1337	1	CL	–	1	V															
*	C34	1327	1337	1	CL	–	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown Sex: (M)ale, (F)emale, (U)nknown . Det. Code: (A)udio, (V)isual, (B)oth Det. Location: (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected Det._ID: unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) Time: Military format.

Comments:
* = ALL 3 observers Broadcast Calls @ Intervals
NC = NO Contact

Turnstone Environmental Consultants
Goshawk Survey Form

Survey Time: Start 0530 End 1430
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 78 End 100
Survey Area/Project Area: Whistling Ridge **Crew:** J. Votos, K. Rosted, W. Beard **Month:** 7 **Day:** 29, 2009 **Visit #** 2

Period: Nestling (Fledgling) **Call(s) Used:** Alarm (Wail / Begging) **Survey Year:** (1st) 2nd **Nest Search:** Y (N) (if yes attach Search Form) **Nest Found:** Y (N) (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, (Intensive Search), or Dawn Acoustical, Other: ____________ **Cloud Cover:** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 = Light Wind (8-12 mph), 5 = Wind (12-15 mph), 6 = Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

Det._ID	ST#	Sta. Time Begin	Sta. Time End	Wind Code	Weather WC	Weather WI	Cloud Cover	Detection Code	Detection Location	#	Sex	Age	Species	Contact Time Initial	Contact Time Final	Bearing (Azimuth)	Dist (meters)	Location Town	Location Range	Location Sect	Location ¼	UTMX NAD83-GPS data only	UTMY NAD83-GPS data only
	A26-3	0537	0550	1	CL	/	/	NC															
	B26-3	0537	0550	1	CL	/	/																
	C26-3	0537	0550	1	CL	/	/																
	*A26-2	0552	0606	1	CL	/	/																
	*B26-2	0552	0606	1	CL	/	/																
	*C26-2	0552	0606	1	CL	/	/																
	A26-1	0608	0647	1	CL	/	/																
	B26-1	0608	0647	1	CL	/	/																
	C26-1	0608	0647	1	CL	/	/																
	A27	0658	0725	2	CL	/	/																
	B27	0658	0725	2	CL	/	/																
	C27	0658	0725	2	CL	/	/																
	*A27-1	0726	0736	1	CL	/	/																
	*B27-1	0726	0736	1	CL	/	/																
	*C27-1	0726	0736	1	CL	/	/																
	A+B28	0738	0738	1	CL	/	/																
	A49	0935	1000	1	CL	/	/																
	B49	0935	1000	1	CL	/	/																
	C49	0935	1000	1	CL	/	/																
072909-1i	—	—	—	1	CL	/	/	V	OUTSIDE	3	U	J/2UNK	SSHA	1000	1015	90	0	3N	9E	1	NE	0608126	5069997
	*A48-1	1028	1045	1	CL	/	/	NC															
	*B48-1	1028	1045	1	CL	/	/																
	*C48-1	1028	1045	1	CL	/	/	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.

Plucking post 10M from this point

Comments: * = All 3 observers broadcast calls @ intervals
NC = No Contact
C49: 3 SSHA individuals observed, one was a juvenile the other 2 were likely adults but observer was unable to determine for sure. Birds were observed ~50m outside of the survey polygon.

Turnstone Environmental Consultants

Goshawk Survey Form

Survey Time: Start 0530 End 1430
Intensive Nest Search Time: Start — End —
Temperature (°F): Begin 78 End 100
Survey Area/Project Area: Whistling Ridge **Crew:** J. VOTAS, K. ROSTAD, W. BEARD **Month:** 7 **Day:** 29, **2009** **Visit #** 2

Period: Nestling / Fledgling **Call(s) Used:** Alarm / Wail / Begging **Survey Year:** 1st 2nd **Nest Search:** Y / N (if yes attach Search Form) **Nest Found:** Y / N (if yes attach Nest Loc. Form)

Survey Method: Broadcast Acoustical, Intensive Search, or Dawn Acoustical, Other: ____________ **Cloud Cover :** 1 = <5%; 2 = 5-20%; 3 = 21-40%; 4 = 41-60%; 5 = 61-80%; 6 = 81-100%

Wind Codes: 1 = Light air (>1mph), 2 = Light breeze (1-3 mph), 3 = Gentle breeze (4-7 mph), 4 =Light Wind (8-12 mph), 5 =Wind (12-15 mph), 6 =Gusty (>15 mph)
Weather Codes (WC): CL = Clear, FG = Fog, PC = Partly Cloudy, OC = Overcast, DR = Drizzle, RN = Rain, SN = Snow **Weather Intensity (WI):** 1=light, 2=moderate, 3=heavy

		Sta. Time		Wind	Weather		Cloud	Detection	Detection	#	Sex	Age		Contact Time		Bearing	Dist	Location				UTMX	UTMY
Det._ID	ST#	Begin	End	Code	WC	WI	Cover	Code	Location				Species	Initial	Final	(Azimuth)	(meters)	Town.	Range	Sect	¼	NAD83-GPS data only	
	A47	1100	1125	1	CL	/	1	NC															
	B47	1100	1125	1	CL	/	1																
	C47	1100	1125	1	CL	/	1																
	A46-1	1128	1155	2	CL	/	1																
	B46-1	1128	1155	2	CL	/	1																
	C46-1	1128	1155	2	CL	/	1																
*	A45	1157	1215	1	CL	/	1																
*	B45	1157	1215	1	CL	/	1																
*	C45	1157	1215	1	CL	/	1																
	A44	1219	1238	2	CL	/	1																
	B44	1219	1238	2	CL	/	1																
	A43	1244	1300	3	CL	/	1																
	B43	1244	1300	3	CL	/	1																
	C43	1244	1300	3	CL	/	1																
*	A42-1	1310	1315	3	CL	/	1																
*	B42-1	1310	1315	3	CL	/	1																
*	A52-1	1340	1408	3	CL	/	1	NC															

Age: (A)dult, (F)ledgling, (N)estling, (U)nknown **Sex:** (M)ale, (F)emale, (U)nknown **Det. Code:** (A)udio, (V)isual, (B)oth **Det. Location:** (AT) station, (BT) between stations
#= number of goshawks or other raptor observed/detected **Det._ID:** unique detection identifier; date and sequential det. # for the day, (061208-1, 061208-2, ect) **Time:** Military format.
Comments: * = All 3 OBSERVERS Broadcast Calls @ Intervals
NC = No contact

Appendix D - Western Gray Squirrel Survey Forms

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: A1,A2, B1,B2

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 4N **R** 10E **S** 31 **County:** Skamania

T 3N **R** 10E **S** 6 **County:** Skamania

Date(s) Surveyed: 3/11/09

Start/Stop time(s): 0930-1215

Surveyor Names and Affiliations: D. Sahl, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant PSME >70 years. Slopes within the polygon boundaries vary between ~0% to 30%. The aspect of each polygon also varies. The A1, A2, B1 and B2 polygons have a predominantly southern aspect. No areas of standing water were observed in any of the polygons during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. Several bird nests were observed and numerous douglas squirrels were heard and a few were observed. Several Rabbits were observed in the A2 polygon.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A3

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 6 **County:** Skamania

T 3N **R** 9E **S** 1 **County:** Skamania

Date(s) Surveyed: 3/11/09

Start/Stop time(s): 0915-1220

Surveyor Names and Affiliations: D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

All polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >15 years of age, with some scattered remnant PSME >70 years. A few small patches of Quercus SPP (likely Quercus Garryana), were observed within the boundaries of the A3 polygon. The trees were not > than 15ft. in height and growing in a few steep, rocky, open areas with a westerly aspect. In Polygons A3 there were numerous ACMA and ACCI present, especially towards the toe of the slope and along drainages. Slopes within the polygon boundary vary but are generally steep, with a few rocky cliff areas, between ~0% to 85%. The A3 polygon has a predominantly western aspect and several active incised drainages. Water was present in seasonally intermittent streams in polygon A3 on the north end of the polygon at the time of survey. No areas of non-flowing, standing water were observed in the polygon during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed. Recent Bract piles were observed in several locations all were presumed to be created by douglas squirrels.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: A5,B5

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5,6,8 **County:** Skamania

T **R** **S** **County:**

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 0935-1210

Surveyor Names and Affiliations: D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

Both polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant PSME >70 years. No patches of Quercus SPP. were observed within the boundaries of the A5 or B5 polygons. In both Polygons there were ACMA present. Slopes within the polygon boundaries vary between ~0% to 30%. Both polygons have predominantly north to NNE aspects. Their was a small section of active drainage in B5.Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. Numerous douglas squirrels were heard and observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: A6,B4

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 6 **County:** Skamania

T 4N **R** 10E **S** 31 **County:** Skamania

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 0930-1215

Surveyor Names and Affiliations: W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

Both polygons surveyed were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, with some scattered remnant PSME >70 years. No patches of Quercus SPP. were observed within the boundaries of the A6 or B4 polygons. In both Polygons there were ACMA present. Slopes within the polygon boundaries vary between ~0% to 45%. The A6 polygon has a predominantly southwestern aspect, the B4 polygon has several aspects that include;, NW, NE and S. Both polygons had had active drainages. Their were 2 small active drainages in B4 and a larger active drainage and a pond in the A6 polygon. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey. The pond that was present in A6 was roundish in shape and appeared to be shallow (>10' deep and ~50 feet across at time of survey), it was difficult to determine the exact extent of the pond area due to the snowpack. Water in the pond is present year round as observed in mid August of this year. No Western Gray squirrels, or their nest structures were observed during the survey. Numerous douglas squirrels were heard and observed. Several large bract piles were encountered in the A6 polygon which were attributed to the douglas squirrels observed. A coyote was also observed on the edge of the A6 polygon.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A10, A9

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7,8 **County:** Skamania

T **R** **S** **County:**

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 1300-1520

Surveyor Names and Affiliations: D Sahl, W. Perkins, D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A10 and A9 polygons were surveyed in a leapfrog fashion by 3 surveyors walking adjacent meandering transects. The A10 and A9 polygons are composed of mixed conifer/hardwoods, primarily PSME with some scattered TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. Both polygons are fairly flat with slopes within the polygon boundaries that vary between ~0% to 5%. There were no drainages or areas of standing water present within the polygons. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed. Bract piles were observed in several areas within the survey polygons, they were attributed to the numerous douglas squirrels observed during the survey.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A12, A13, A14

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7 **County:** Skamania

T ____ **R** ____ **S** ____ **County:** ____

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 0940-1200

Surveyor Names and Affiliations: D Sahl, W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A12 and A13 polygons were composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. Both polygons are very flat with slopes within the polygon boundaries vary between ~0% to 5%. Both polygons had very marginal potential WGS habitat. There were no drainages or areas of standing water present within the polygons. The A14 polygon was composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >25 years of age, stand appeared to be even aged. No patches of Quercus SPP. were observed within the boundaries of the polygon. There was some ACMA and ACCI present within the polygon. Slopes within the polygon boundaries vary between ~0% to 60%. The A14 polygon has a westerly aspect and one seasonal drainage. The drainage was dry at the time of the survey. No areas of non-flowing, standing water were observed in the polygon during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey. No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons:A17,A18,B6,B7, B8, C1

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7,18 **County:** Skamania

T 3N **R** 9E **S** 13 **County:** Skamania

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 1330-1740

Surveyor Names and Affiliations: D. Bolen, D. Sahl and W. Perkins with Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A18, A17, B6, B7, B8 and C1 polygons were surveyed by 3 surveyors walking concurrent, adjacent meandering transects. All of the survey polygons are along the top or flanks of a ridge running almost north/south. The B6, B7 and B8 polygons are small extension of the A17 and A18 polygons that were added to the survey area after the the boundaries of the original polygons were determined. The habitat type in the B polygons is similar to their adjacent A polygon. The survey polygons are composed of mixed conifer/hardwoods, primarily PSME with some scattered TSHE and THPL in the drainages. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age. A few scattered remnant trees older than 70 years were present. No patches of Quercus SPP. were observed within the boundaries of the polygons. There were some areas ACMA and ACCI present within the polygons. All of these polygons were on the extreme southern end of the project area. A18 has a northwestern aspect on a fairly steep slope and a seasonal drainage that was wet and flowing at the time of the survey.
The A17 polygon had a south and southeast exposure and no significant drainages. It had trees older than the other polygons in the overstory and a few remnant PSME present that were greater than 70yrs of age. The A17 polygon is adjacent to the C1 polygon that had a seasonal stream present in it that was flowing at the time of survey but was obscured due to snowpack in most places. The C1 polygon had a SW aspect. Slopes within the polygon boundaries vary between ~10% to 80%. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A15

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 7,18 **County:** Skamania

T 3N **R** 9E **S** 19 **County:** Skamania

Date(s) Surveyed: 3/10/09

Start/Stop time(s): 0910-1125

Surveyor Names and Affiliations: D. Bolen, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A15 polygon is composed of mixed conifer/hardwoods, primarily PSME with some scattered TSHE. The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >25 years of age with a few older remnant trees present. No patches of Quercus SPP. were observed within the boundaries of the polygons. There was some ACMA and ACCI present within the polygon. Slopes within the polygon boundary vary between ~10% to 80%. The A15 polygon has a westerly aspect and two seasonal drainages. The drainages were wet at the time of the survey and partially obscured by snowpack. No areas of non-flowing standing water were observed at the time of survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A4, A11

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 6, 7 **County:** Skamania

T **R** **S** **County:**

Date(s) Surveyed: 3/11/09

Start/Stop time(s): 0900-1200

Surveyor Names and Affiliations: W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI

Turnstone Environmental Consultants Inc.

18000 NW lucy Reeder Rd Portland, OR 97231

503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The majority of the overstory in the stands in these polygons was PSME and appears to be mixed age, most was >20 years of age. No patches of Quercus SPP. were observed within the boundaries of the polygons. There was some ACMA and ACCI present within the polygons. Slopes within the polygon boundaries vary between ~0% to 60%. The A4 polygon had a western aspect and the A11 polygons had varying aspects that included NW, NE and easterly. The A11 polygon has multiple pieces all of which contained very marginal (primarily young tightly spaced trees) potential WGS habitat. There are two seasonal drainages within the area of the polygons and both appeared to be dry at the time of the survey, but were obscured by snowpak. No areas of non-flowing, standing water were observed in the polygon during the survey. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygon: A7

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5,6,7,8 **County:** Skamania

T **R** **S** **County:**

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 0915-1135

Surveyor Names and Affiliations: D. Sahl, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and go ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routes to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

The A7 polygon surveyed was composed of mixed conifer/hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >20 years of age, with some scattered remnant PSME >70 years. Some areas of this polygon had large amounts of vine maple. Slopes within the polygon boundary vary between ~0% to 40%. The A7 polygon has a variety of aspects, primarily eastern and northern. Water was present in 2 streams in the polygon. one stream appears to be seasonally intermittent and the other appears to have some water present all season (as observed while conducting other surveys in july/august). Both contained water at time of survey, stream banks indicate that the water level increases significantly during the wet season. No areas of non-flowing standing water were observed in the A7 polygon. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. numerous douglas squirrels were heard and a few were observed. Recent Bract piles were observed in several locations all were presumed to be created by douglas squirrels.

WESTERN GRAY SQUIRREL SURVEY - COVER SHEET

Use one cover sheet per stand surveyed. Attach the map(s) on which you mark squirrel nests and show the transect(s) or area(s) surveyed. For each map, attach one Map Label and one or more Western Gray Squirrel Survey Data Sheets. If you see or hear a western gray squirrel please fill out a wildlife observation form and attach.

Mark Water Sources and Survey Transect or Survey Polygon on Attached Map.

Name of Area Surveyed: Polygons: B3

(Use a generic geographic name like "Yahne Canyon". Add the timber sale name/number if available.)

Location (TRS): **T** 3N **R** 10E **S** 5 **County:** Skamania

T 4N **R** 10E **S** 31,32 **County:** Skamania

Date(s) Surveyed: 3/12/09

Start/Stop time(s): 1310-1535

Surveyor Names and Affiliations: D. Bolen, D. Sahl, W. Perkins, Turnstone Environmental Consultants

Contact Name, Address, & Phone:

TECI
Turnstone Environmental Consultants Inc.
18000 NW lucy Reeder Rd Portland, OR 97231
503-621-9613

Directions to Site: Be specific enough to allow someone unfamiliar with the site to find it.

From the Jct. of Cook Underwood Rd. and Knapp Rd. Go NW on Knapp Rd. for ~0.1miles to Scoggins Rd., Turn right onto Scoggins Rd. and ~100 yards to Jct. with private drive on left (Signed as CG 2930). Proceed up CG 2930 to access SDS and WDNR lands. See the polygon map for access routed to the specific survey polygons.

Description of Habitat at Site: Include approximate age/size (dbh) of stand, dominant overstory species, percent oak in stand, slope position and aspect, and distance to nearest water.

This polygon was surveyed by 3 surveyors simultaneously. The polygon is composed of mixed conifer/ hardwoods, primarily PSME with some scattered THPL/TSHE. The majority of the overstory PSME appears to be >30 years of age, with some scattered remnant PSME >80 years. No patches of Quercus SPP. were observed within the boundaries of the polygon. In Scattered ACMA was present throughout the polygon. Slopes within the polygon boundaries vary between ~0% to 70%. The polygon has a predominant north to NE aspect. Their were a few seep areas that appeared to be active seasonally in the bottom of a few of the small drainages present in the polygon. Most areas within the survey polygon had some snow cover varying from a trace to several feet in depth at the time of the survey.

No Western Gray squirrels, or their nest structures were observed during the survey. Several douglas squirrels were heard and observed while surveying the polygon.

C-8

Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, August 20 – October 21, 2007. Prepared for SDS Lumber Company.

WEST, Inc. 2007

Final Report

Bat Acoustic Studies for the Saddleback Wind Energy Project Skamania County, Washington

August 20th – October 21st, 2007

Prepared for:

SDS Lumber Company

Prepared by:

Donald Solick, Greg Johnson and Jerry Baker
Western **E**co**S**ystems **T**echnology, Inc.
2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

February 14, 2008

EXECUTIVE SUMMARY

In August 2007 Western EcoSystems Technology, Inc. initiated surveys designed to assess bat use within the proposed Saddleback Wind Energy Project, Skamania County, Washington. Passive AnaBat® II echolocation detectors were used to perform acoustic surveys for bats from August 20 through October 21, 2007. Three survey stations were established in the study area and each Anabat surveyed continuously during the night time hours over the study period.

The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the study area by bats. Two Anabat echolocation detectors were used to periodically monitor bat use at the study during the period August 20 - October 21, 2007. A total of 348 bat passes were recorded during 45 detector nights. Just over half (55%) of the calls were < 35 kHz in frequency (e.g., big brown bat, hoary bat), and the remaining calls were > 35 kHz (e.g., *Myotis* bat species). Species identification was only possible for the hoary bat, which made up 5% of all passes. Activity levels for bat passes peaked in late August/early September. Activity levels for hoary bats were highest in mid-September, suggesting this species migrates through the study area at this time of year. However, equipment failures prevented data collection between September 17 and October 14, so bat activity during this period is unknown.

The mean number of bat passes per detector per night was compared to existing data at five wind-energy facilities where both bat activity and mortality levels have been measured. The level of bat activity documented at the Saddleback Wind Resource Area was higher than that at wind-energy facilities in Minnesota and Wyoming, where reported bat mortalities are low, but was much lower than at facilities in the eastern US, where reported bat mortality is highest. Based on the available data it is likely that some bat mortality will occur in the study area, but the mortality is not expected to be as high as other facilities, and most casualties may occur late-August to mid-September, during likely migration periods. Assuming that a relationship between bat activity and bat mortality exists, and that it extends to the western US, the rate of bat mortality at the Saddleback Wind Resource Area would likely be greater than the 2.2 bat fatalities/turbine/year reported at the wind-energy facility at Buffalo Ridge, Minnesota, and would likely be much lower than the 20.8 fatalities/turbine/year reported at the facility at Buffalo Mountain, Tennessee.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

SDS Lumber Company is proposing to develop a wind-energy facility, the Saddleback Wind Energy Project (SWRA), in Skamania County, Washington (Figure 1). SDS Lumber requested Western EcoSystems Technology, Inc. (WEST) to develop and implement a standardized protocol for baseline studies of bat use in the project area for the purpose of estimating the impacts of the wind-energy facility on bats, and to assist with siting turbines to minimize impacts to bats. The protocol for the baseline study is similar to protocols used at other wind-energy facilities in the US. The protocol has been developed based on WEST's experience studying wildlife and wind turbines at projects throughout the US and included passive AnaBat® II (Anabat) ultrasonic detectors sampling from fixed stations to quantify bat use in the study area.

The purpose of this report is to summarize and describe the results of Anabat surveys during the fall of 2007, and to bring any items of biological interest, such as changes in seasonal bat use, to the attention of SDS Lumber. The scope of the surveys for bats included only acoustic bat surveys at fixed stations.

STUDY AREA

The proposed project area is in southeast Skamania County, approximately four miles northwest of White Salmon, Washington (Figure 1). The specific project area is just north of Underwood Mountain and includes Sections 5, 6, 7, and 8, Township 3N, Range 10E. The project area consists of hilltops, dominated by coniferous forests with some clearcuts, and linear clearings associated with powerline rights-of-way. Elevation of the project area ranges from approximately 1,700 – 2,400 feet (ft; 518 – 732 meters (m)) above sea level..

METHODS

The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the SWRA by bats. Bats were surveyed using AnaBat® II ultrasonic detectors coupled with Zero Crossing Analysis Interface Modules (ZCAIM; Titley Electronics Pty Ltd., NSW, Australia). Bat detectors are widely used to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts has been used at several wind-energy facilities (Kunz et al. 2007a), and is a primary and economically feasible bat risk assessment tool (Arnett 2007). Bat activity was surveyed using two detectors from August 20 to October 21, 2007, a period corresponding to likely fall bat migration at this site.

Detectors were placed at two locations (Figure 1). The detector at the north location was placed on the ground at the base of a meteorological tower on August 20, but on September 7 was elevated on the tower at a height of approximately 130 ft (40 m). The detector at the south location was placed on the ground on September 7, and remained there for the duration of the study. It was placed just outside the project area, but in an area representative of the project area in terms of habitat and topography.

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of eight was used for the study. Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise. The calls were recorded via the ZCAIM, which uses a CompactFlash memory card with large storage capacity. The Anabat detectors were placed inside weather-tight containers (plastic tubs for ground units, a polypropylene dry bag for the elevated unit) with a hole cut in the side of the container for the microphone to extend through. Microphones were encased in PVC tubing with drain holes that curved vertically outside the container to minimize the potential for water damage due to weather. Anabat units situated on the ground were raised approximately 3 ft (1 m) to minimize echo interference and to elevate the unit above vegetation. The elevated Anabat unit was raised approximately 130 ft (40 m) up the meteorological tower using a pulley system. All units were programmed to turn on approximately ½ hour before sunset and turn off approximately ½ hour after sunrise each night.

Incoming echolocation calls were digitally processed by the detector and passed to the ZCAIM for further processing and data storage. Each series of echolocation calls was saved to a file on a high-capacity CompacFlash card, and these files were then transferred to a computer for analysis. Computer software was used to view digital "sonograms" of the echolocation calls showing change in frequency over time. During analysis, these frequency versus time displays were used to separate bat calls from other types of ultrasonic noise (e.g. wind, rain, insects, etc.) and to assign calls to a high- or low-frequency group.

The units of activity were number of bat passes (Hayes 1997). The absolute abundance of bats within a study area cannot be determined through acoustic sampling, and bat pass data represent levels of bat activity rather than numbers of individuals. A pass was defined as a continuous series of two or more call notes produced by an individual bat, with no pauses between call notes of more than one second (White and Gehrt 2001; Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights. Bat passes were classified as either high-frequency calls (≥ 35 kHz), which are generally given by small bats (e.g. *Myotis* spp. and western red bat (*Lasiurus blossevillii*)), or low-frequency (< 35 kHz), which are generally given by larger bats (e.g. Townsend's big-eared bat (*Corynorhinus townsendii*), and hoary bat (*Lasiurus cinereus*)). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis. To establish which species may have produced the high- and low-frequency calls recorded, a list of species expected to occur in the study area was compiled from range maps (Harvey et al. 1999; BCI website).

The total number of bat passes per detector night was used as an index for bat use at the SWRA. Bat pass data represent levels of bat activity, rather than the numbers of individuals present, because individuals cannot be differentiated by their calls. Bat activity was summarized by location and by weekly and nightly intervals from August 20 to October 21, 2007. To predict potential for bat mortality (i.e. low, moderate, high), the mean number of bat passes per detector night across locations (i.e., the mean of ratios) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

RESULTS

Bat activity was monitored at three sampling locations on a total of 63 nights during the period August 20 – October 21, 2007. Equipment failures compromised data collection for the northern unit between September 17 and October 14, and for the southern unit between September 17 and October 21. Anabat units were operable for 24% of the sampling period, recording 348 bat passes on 45 detector-nights (Table 1). Averaging bat passes per detector-night across locations gave a mean of 7.91 bat passes per detector-night.

Spatial Variation

Bat activity was similar between the ground Anabat units in the north (mean = 11.67 ± 2.0 bat passes per detector-night) and south (mean = 9.60 ± 4.1; Figure 2a) locations. At both locations, the number of high-frequency (HF) bat passes per detector-night was approximately one and a half times greater than the number of low-frequency (LF) passes. Bat activity was much lower at the north elevated location (mean = 2.47 ± 1.1), and LF bat passes greatly outnumbered HF bat passes. Patterns of nightly activity were similar among detector locations (Figure 2b), although data from the north ground detector were not collected concurrently with data from the other two detectors, making direct comparisons difficult.

Seasonal Variation

From the start of the acoustic bat surveys on August 20, bat activity increased to a peak on September 1, and then decreased through September 13, 2007 (Figure 3). Bat detectors were largely inoperable past September 17, preventing detection of bats for the entire duration of the study, except for a one-week period at the end of the study for the north elevated station, during which no bats were detected. Patterns of activity for HF and LF bats were congruent with the overall trend (Figure 4a), with the number of HF bat passes per detector-night peaking between August 30 and September 1 (26% of all HF passes), and LF bat activity at its highest on September 6 and 9 (29% of all LF passes; Figure 4b).

Species Composition

Species identification for specific bat passes was possible for the hoary bat; therefore, passes by this species could be separated from passes by all other low-frequency bats. Hoary bats comprised 5.7% of the total passes detected within the SWRA (20 of 348 bat passes; Table 1). Most passes by hoary bats occurred at the south location (mean = 1.2 ± 0.7 passes per detector-night), with several being detected at the north elevated location (mean = 0.2 ± 0.1) as well. No hoary bat passes were detected at the north ground location. Activity for hoary bats was highest on September 9 (44% of total hoary passes; Figure 5).

DISCUSSION

Potential Impacts

Assessing the potential impacts of wind energy development to bats at the SWRA is complicated by our current lack of understanding of why bats collide with wind turbines (Kunz et al. 2007b), combined with the inherent difficulties of monitoring elusive, night-flying animals (O'Shea et al. 2003). To date, monitoring studies of wind-energy facilities suggest that a) migratory tree-roosting species (eastern red bat (*Lasiurus borealis*), hoary bat, and silver-haired bat (*Lasionycteris noctivagans*)) comprise almost 75% of reported bats killed (Kunz et al. 2007b); b) the majority of collisions occur during the post-breeding or fall migration season (roughly August and September; Gruver 2002; Johnson et al. 2003); and c) the highest reported fatalities occur at wind facilities located along forested ridge tops in the eastern US (Kunz et al. 2007b), although recent studies report relatively high fatalities as well in agricultural regions of Iowa (Jain 2005) and Alberta, Canada (Baerwald 2006).

Some studies at wind-energy facilities have recorded both pre-construction Anabat detections per night and bat mortality once the facility is operational (Table 2). The number of bat calls per night as determined from bat detectors shows a rough correlation with bat mortality, but may be misleading because effort, timing of sampling, species recorded, and detector settings (equipment and locations) varies among studies (Kunz et al. 2007b). The best available estimate of mortality levels at a proposed wind-energy facility involves the evaluation of on-site acoustic bat data, in terms of activity levels, seasonal variation, and species composition, and the topographic features of the project area.

Activity

Bat activity at the SWRA (mean = 7.91 bat passes per detector-night; Table 1) was relatively high compared to that observed at wind-energy facilities in Minnesota and Wyoming, where bat collision mortality was low, but it was much lower than activity recorded at facilities in West Virginia and Tennessee, where bat mortality rates were high (Table 2). Based on the presumed relationship between pre-construction bat activity and post-construction fatalities, we expect bat mortality rates at the SWRA to be greater than the 2.2 bat fatalities/turbine/year reported at Buffalo Ridge, Minnesota, but much lower than the 20.8 fatalities/turbine/year reported at Buffalo Mountain, Tennessee.

Seasonal Variation

The number of bat calls detected per night at the SWRA peaked in late-August/early-September. Activity by hoary bats appeared to peak in mid-September, suggesting that migration of this species through the area occurs at this time of year. However, given the lack of Anabat coverage between September 17 and October 14, it is unknown whether bat activity would continue to abate, or whether subsequent pulses of activity were missed. The absence of bat calls from the detector at the north elevated station between October 15 and 21 suggests that bat activity is low at this time of year. Fatality studies of bats at wind-energy facilities in the US have shown a peak in mortality in August and September, and generally lower mortality earlier in the summer

(Johnson 2005). While survey efforts vary among different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007b). Based on the available data, it is expected that bat mortality at the SWRA will be highest in late August/early September, with an undetermined potential for mortality in late September/early October.

Species Composition

Of the fourteen species of bat likely to occur in the study area, five are known fatalities at wind-energy facilities (Table 3). Acoustic bat surveys were unable to determine bat species present in the study area (except for hoary bat), but they were able to distinguish high-frequency from low-frequency species. Bat passes at the SWRA were fairly evenly distributed between high- and low-frequency species. Fifty-five percent of passes were by high-frequency bats, suggesting higher relative abundance of species such as western red bat and *Myotis* species. High-frequency species were detected more often than low-frequency species at the ground stations, whereas the reverse was true at the north elevated station. This pattern may reflect different foraging strategies among species. Many of the low-frequency species likely to be present at the SWRA (e.g., hoary bat, silver-haired bat, and big brown bat (*Eptesicus fuscus*)) tend to forage at higher altitudes than most high-frequency species, due to their wing morphology and echolocation call structure (Norberg and Rayner 1987). Hoary bats made up 10% of all low-frequency passes at the SWRA, and were most active in mid-September, suggesting fall migration through the area.

REFERENCES

Arnett, E.B. 2007. Report from BWEC on Collaborative Work & Plans. Presentation at the NWCC Wildlife Workgroup Meeting, Boulder Colorado. November 14th, 2007. Conservation International. Information available at [www.nationwind.org].

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships Between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Prepared for the Bats and Wind Energy Cooperative. March 2005.

Baerwald, E. 2006. Bat Fatalities in Southern Alberta. Presented at the Wildlife Research Meeting VI, San Antonio, Texas. National Wind Coordinating Collaborative. November 2006.

Bat Conservation International, Inc. (BCI). 2002. Bat Species: U.S. Bats. Bat Conservation International, Inc., Austin, Texas. Information available at [www.batcon.org].

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. Thesis. University of Tennessee, Knoxville, Tennessee.

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gruver, J.C. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game & Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis., Iowa State University, Aimes, Iowa.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2003. Mortality of Bats at a Large-Scale Wind Power Development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150: 332-342.

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Koford, R., A. Jain, G. Zenner. 2005. Avian Mortality Associated with the Top of Iowa Wind Farm. Progress Report, Calendar Year 2004. Iowa State University and Iowa Department of Natural Resources.

Kunz, T. H., E. B. Arnett, B. M. Cooper, W. P. Erickson, R. P. Larkin, T. Mabee, M. L. Morrison, M. D. Strickland, and J. M. Szewczak. 2007a. Assessing Impacts of Wind-energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71:2449-2486.

Kunz, T. H., E.B Arnett, W P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5:315-324.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia: Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London B 316:335-427.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the United States and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31:16-29.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Table 1. Results of bat acoustic surveys conducted at SWRA, August 20 – October 21, 2007.

Anabat Location	# of HF Bat Passes	# of LF Bat Passes*	# of Hoary Bat Passes	Total Bat Passes	Detector-Nights	Bat Passes/ Night
North ground	126	84	0	210	18	11.67
North elevated	4	38	4	42	17	2.47
South ground	60	36	16	96	10	9.60
Total	**126**	**239**	**66**	**348**	**45**	**7.91**

*Passes by hoary bats are included in low-frequency numbers

Table 2. Wind-energy facilities in the US with both pre-construction Anabat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007b).

Wind-Energy Facility	Activity (#/Detector Night)	Mortality (Bats/Turbine/Year)	Reference
Saddleback, WA	7.91		This study
Foote Creek Rim, WY	2.2	1.3	Gruver 2002
Buffalo Ridge, MN	2.1	2.2	Johnson et al 2004
Buffalo Mountain, TN	23.7	20.8	Fiedler 2004
Top of Iowa, IA	34.9	10.2	Koford et al. 2005
Mountaineer, WV	38.3	38.0	Arnett et al. 2005

Table 3. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the SWRA, sorted by call frequency.

High-Frequency (≥ 35 kHz)		Low Frequency (< 35 kHz)	
western red bat†	*Lasiurus blossevillii*	pallid bat	*Antrozous pallidus*
California bat	*Myotis californicus*	Townsend's big-eared bat	*Corynorhinus townsendii*
western small-footed bat	*Myotis ciliolabrum*	big brown bat†	*Eptesicus fuscus*
western long-eared bat	*Myotis evotis*	hoary bat*†	*Lasiurus cinereus*
Keen's bat	*Myotis keenii*	silver-haired bat*†	*Lasionycteris noctivagans*
little brown bat†	*Myotis lucifugus*		
fringed bat	*Myotis thysanodes*		
long-legged bat	*Myotis volans*		
Yuma bat	*Myotis yumanensis*		

*long-distance migrant; †species known to have been killed at wind-energy facilities

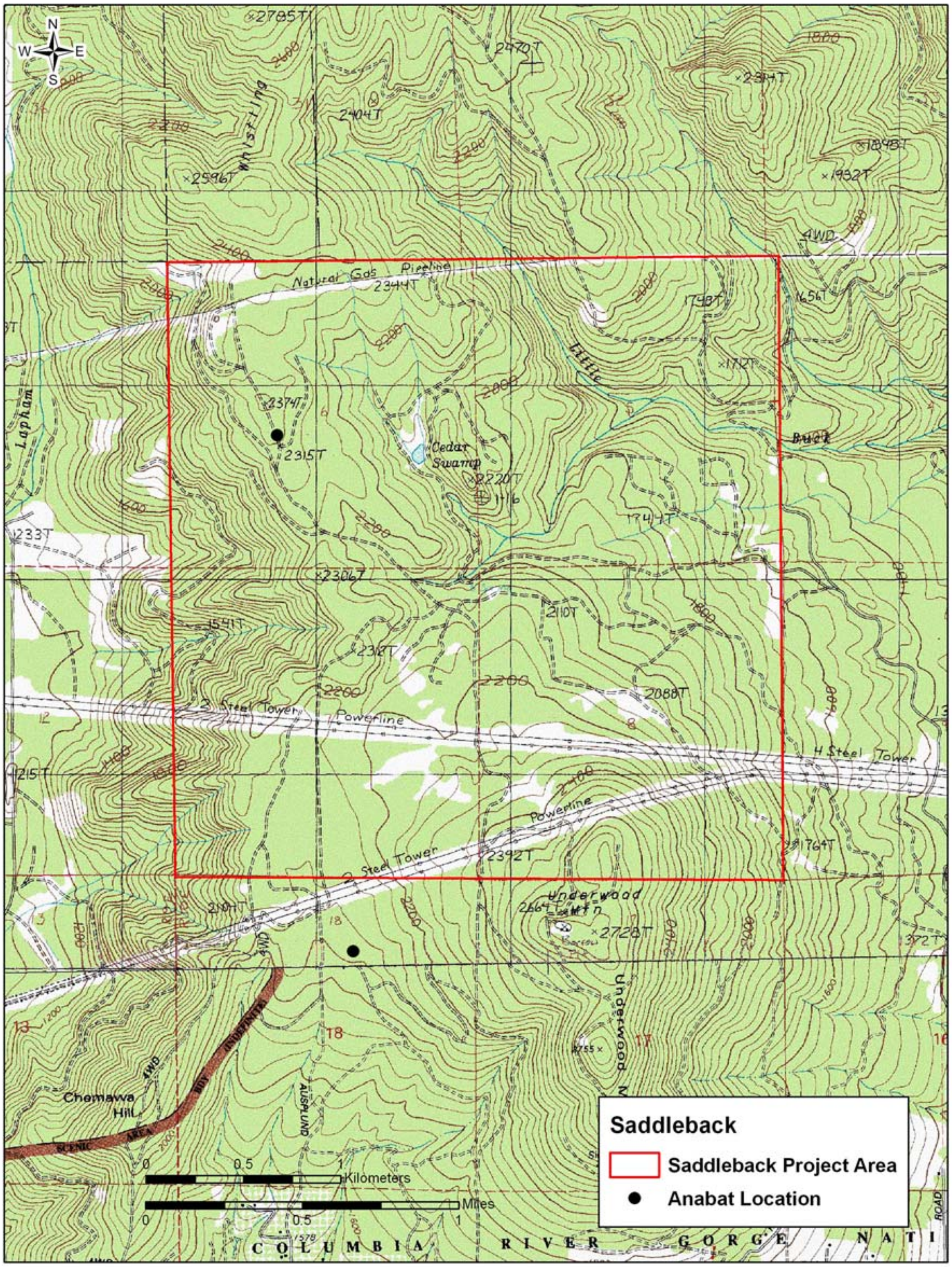


Figure 1. Study area map showing project area and Anabat sampling stations at the SWRA.

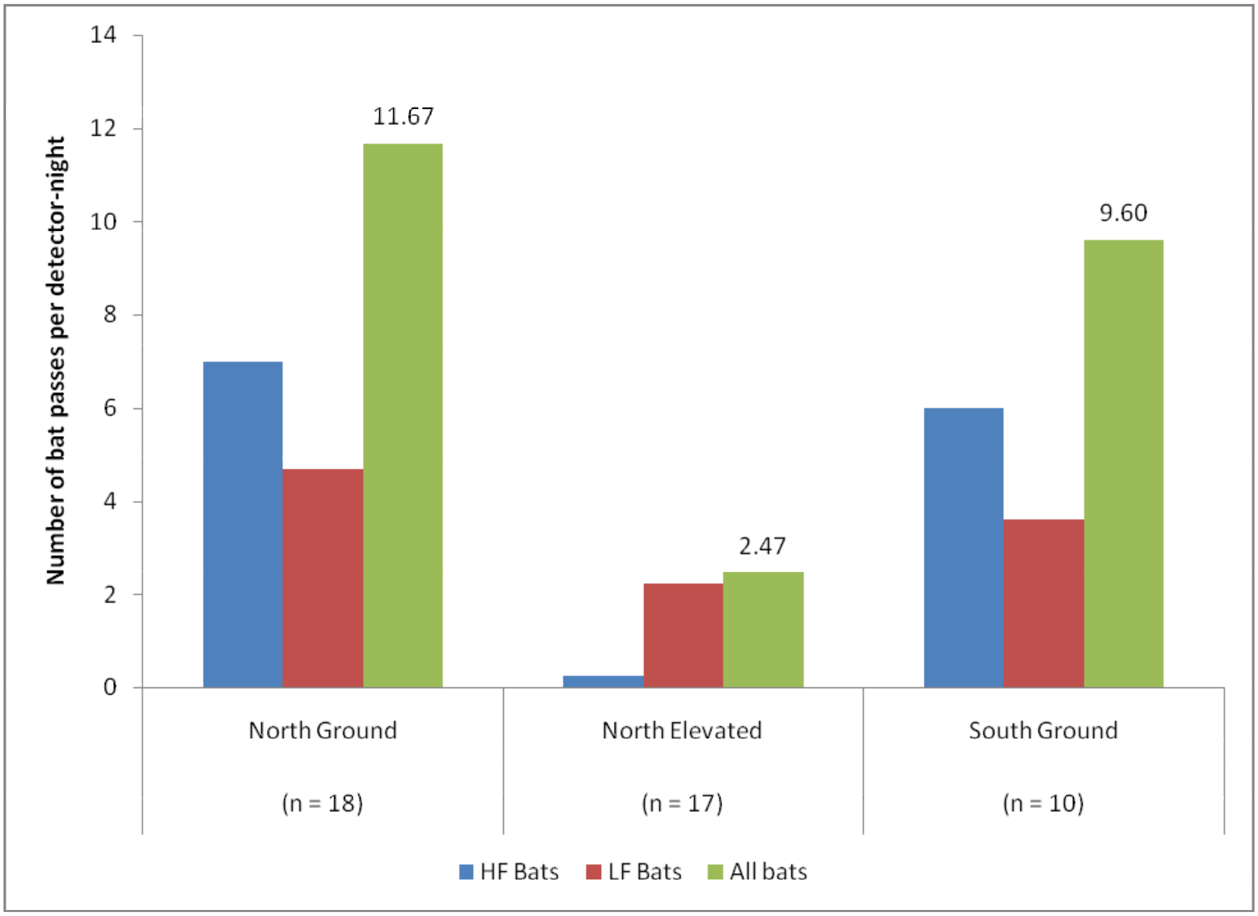


Figure 2a. Number of bat passes per detector-night by location at the SWRA.

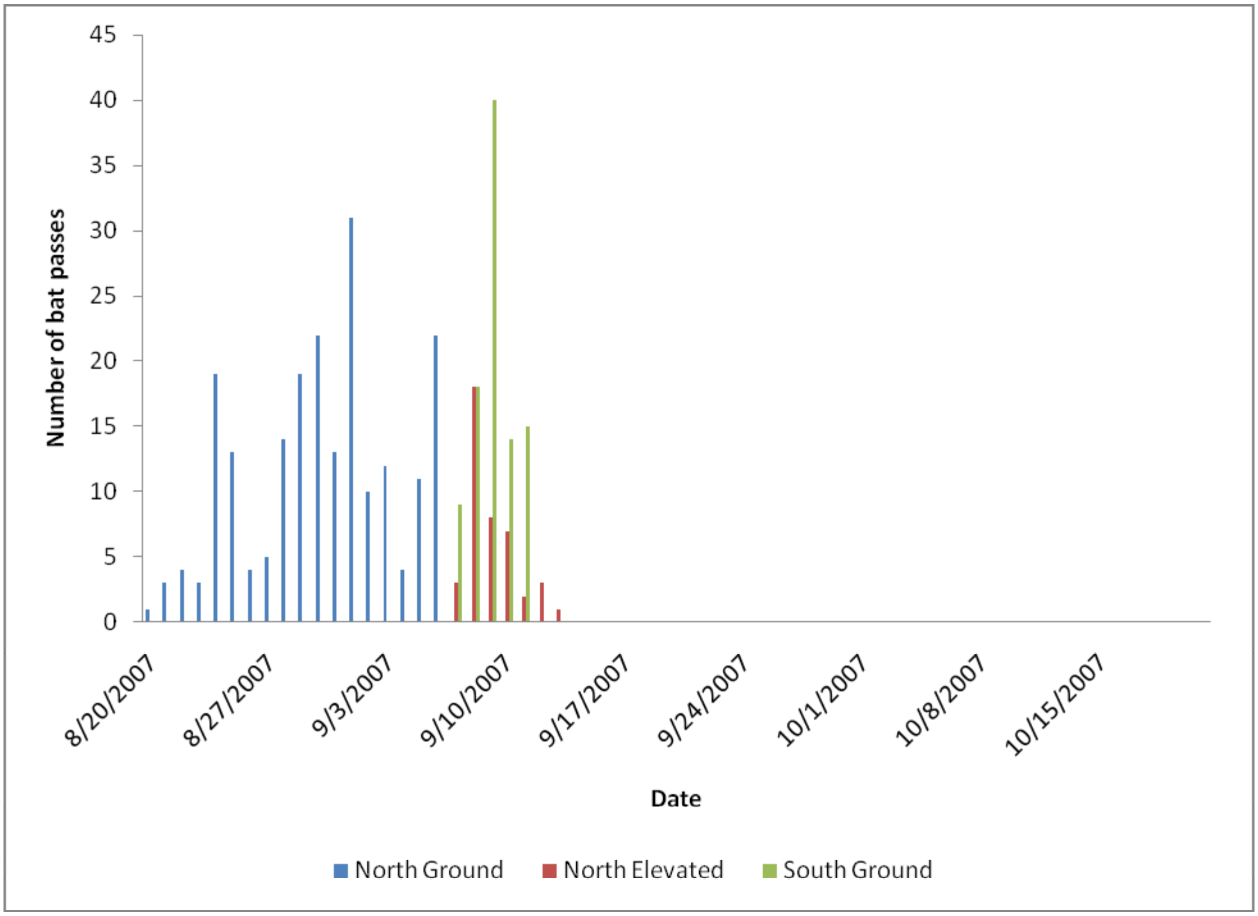


Figure 2b. Number of nightly bat passes, grouped by Anabat location, at the SWRA.

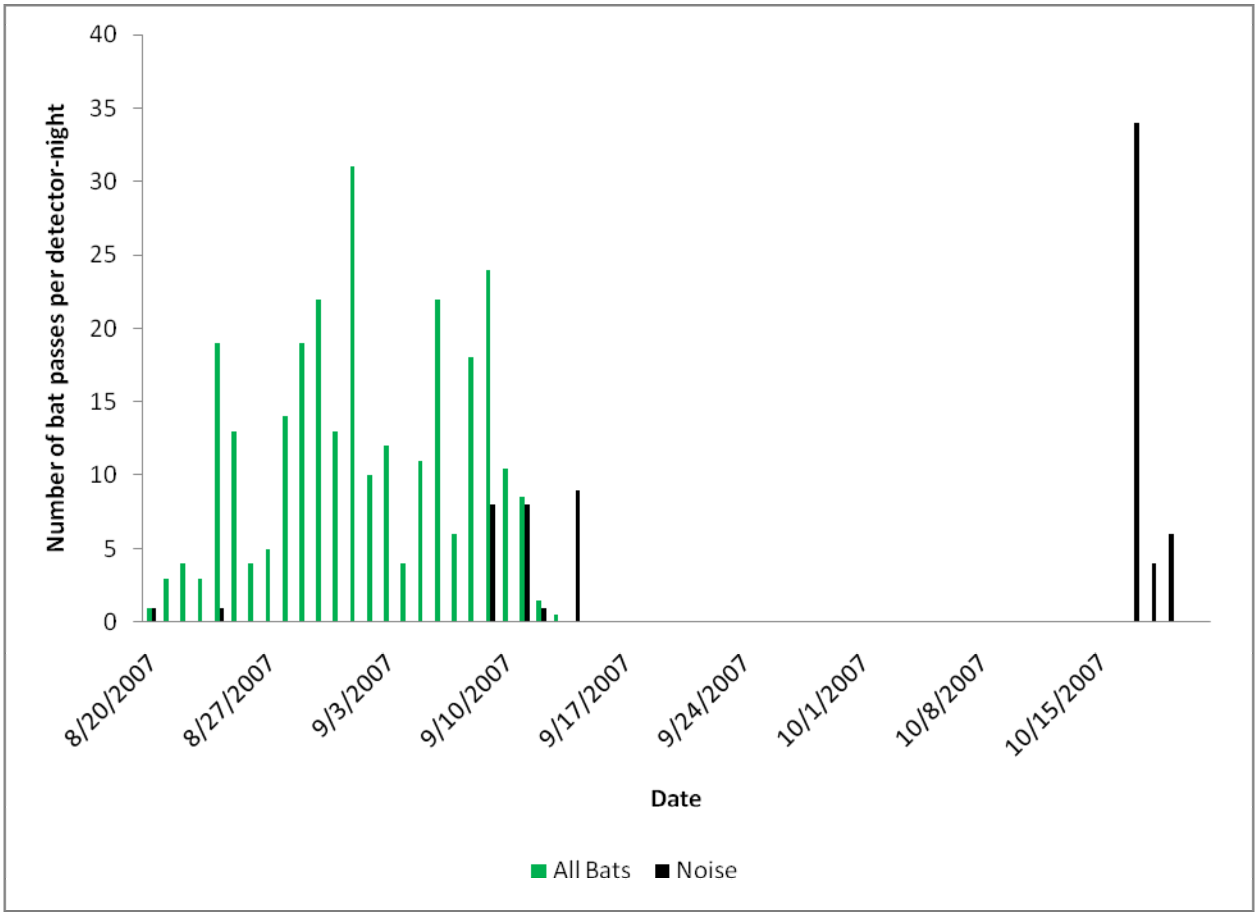


Figure 3. Number of bat passes and noise files detected per detector–night, presented nightly, at the SWRA.

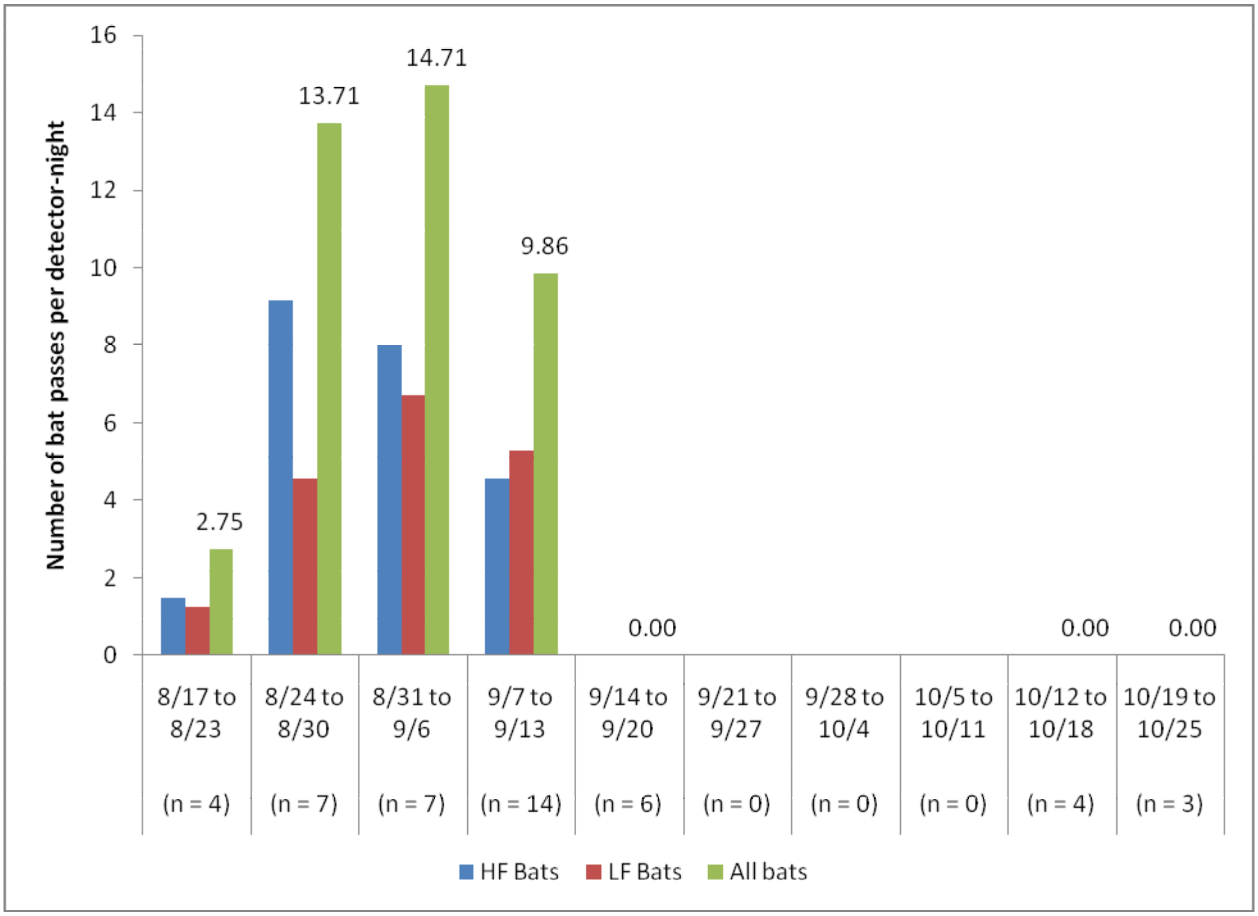


Figure 4a. Weekly activity by high- and low-frequency bats at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.)

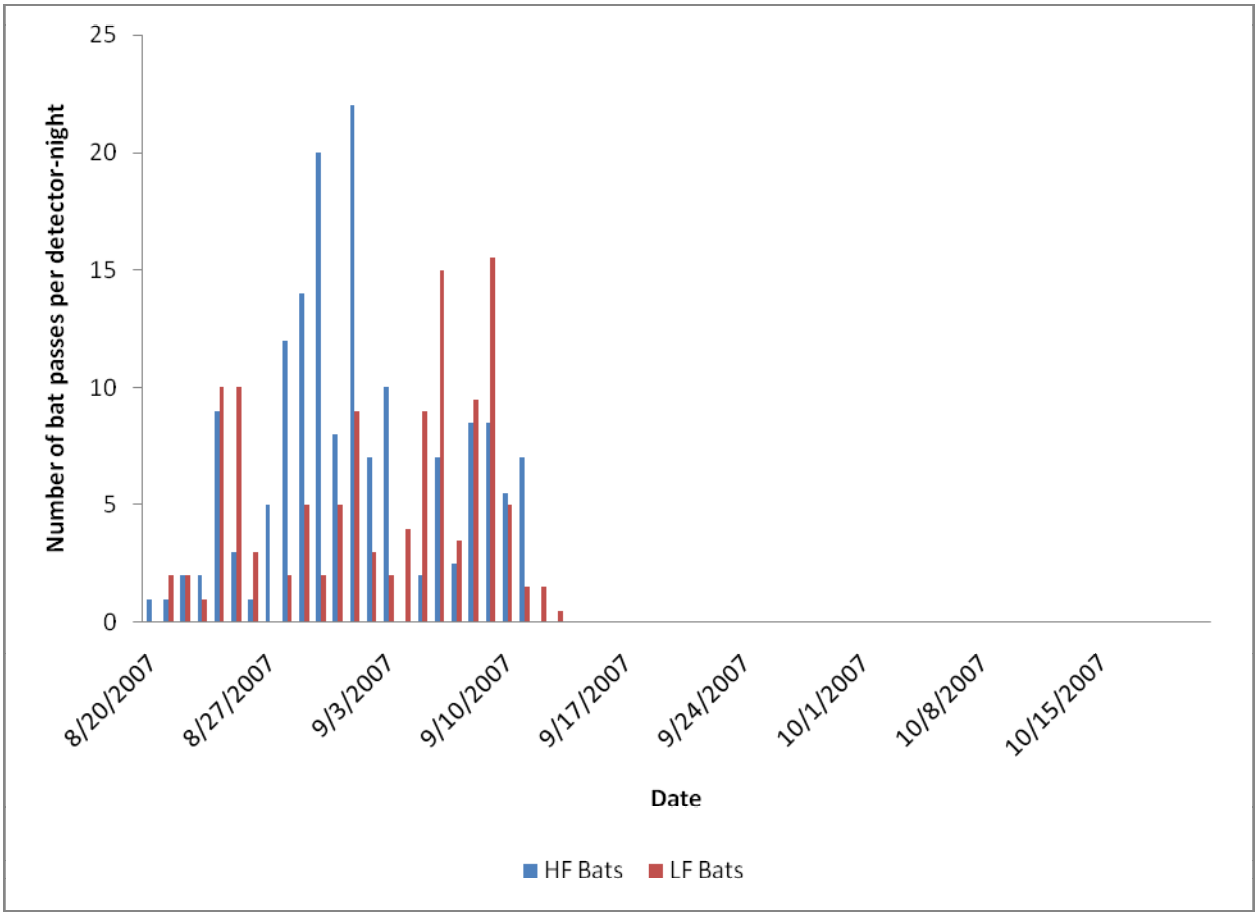


Figure 4b. Nightly activity by high- and low-frequency bats at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.)

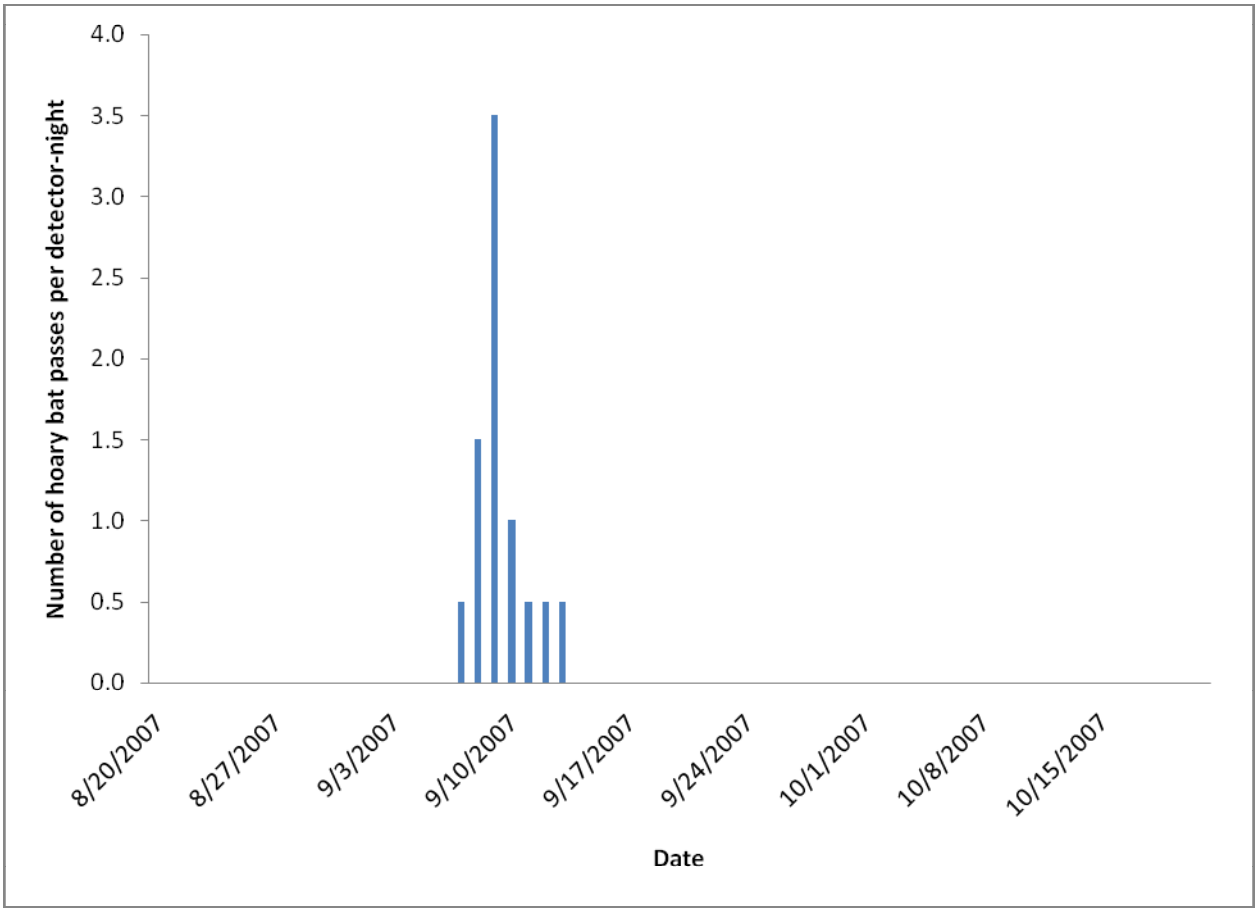


Figure 5. Number of passes per detector–night by hoary bats, presented nightly, at the SWRA. (Equipment failures prevented data collection between September 17 and October 14, 2007.)

C-9

Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, July 3 – October 7, 2008. Prepared for SDS Lumber Company

WEST, Inc. 2009.

Final Report

Bat Acoustic Studies for the Saddleback Wind Resource Area Skamania County, Washington

July 3 – October 7th, 2008

Prepared for:

SDS Lumber Company
P.O. Box 266
Bingen, WA 98605

Prepared by:

Greg Johnson, Jeff Gruver, Tamara Enz and Jerry Baker

Western **E**co**S**ystems **T**echnology, Inc.
2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

January 28, 2009

EXECUTIVE SUMMARY

Western EcoSystems Technology, Inc. initiated surveys in July 2008 designed to assess bat use within the proposed Saddleback Wind Resource Area, Skamania County, Washington. Acoustic surveys for bats using Anabat® SD-1 ultrasonic detectors at four fixed stations were conducted from July 3 to October 7, 2008. The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the study area by bats. A total of 56,595 bat passes were recorded during 97 detector nights. Averaging bat passes per detector-night across locations, we detected a mean of 148.34 bat passes per detector-night across all stations.

Three stations were placed in upland areas typical of those likely to contain wind turbines. Data from these three detectors were used to assess risk of bat collision mortality. A fourth detector was placed adjacent to a pond in the local area to assess levels bat activity and composition of primarily breeding bats in the project area.

At the three upland stations, over 65% of the calls were <35 kHz in frequency (e.g., big brown bat, silver-haired bat, hoary bat), and the remaining calls were >35 kHz (e.g., *Myotis* bat species). Species identification was only possible for the hoary bat, which made up 6.0% of all passes at the upland stations. At the wetland station (SB2), 69.7% of all passes were >35 kHz and hoary bats composed 2.0% of all recorded bat passes. Activity levels for bat passes both the upland stations and wetland station peaked in July and early August. Activity levels for hoary bats were highest in July, suggesting the project area is used more for breeding by this species than as a migration corridor.

The mean number of bat passes per detector per night was compared to existing data at five wind-energy facilities where both bat activity and mortality levels have been measured. The level of bat activity documented at the Saddleback Wind Resource Area was considerably higher than that at wind facilities in Minnesota and Wyoming, where reported bat mortalities are low, and was also higher than at facilities in the eastern US, where reported bat mortality is highest.

Although high bat activity levels were recorded at the Saddleback Wind Resource Area, the available evidence indicates that these data do not necessarily imply that bat fatality levels will be high. Numerous factors, including the timing of the activity, differences in call rates among the various habitats, and composition of the bat calls suggest that bat mortality may be lower than indicated by the high bat activity recorded. No data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the Saddleback Wind Resource Area. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

SDS Lumber Company is proposing to develop a wind-energy facility in Skamania County, Washington. SDS Lumber requested Western EcoSystems Technology, Inc. (WEST) to develop and implement a standardized protocol for baseline studies of bat use in the project area for the purpose of estimating the impacts of the wind-energy facility on bats, and to assist with siting turbines to minimize impacts to bats. The protocol for the baseline study is similar to protocols used at other wind-energy facilities in the United States. The protocol has been developed based on WEST's experience studying wildlife and wind turbines at projects throughout the US and included passive acoustic sampling using Anabat bat detectors at fixed stations to quantify bat use in the study area.

STUDY AREA

The proposed project area is in southeast Skamania County approximately four miles northwest of White Salmon, Washington (Figure 1). The specific project area is just north of Underwood Mountain and includes Sections 5, 6, 7, & 8, Township 3N, Range 10E. The project area consists of hilltops dominated by coniferous forests with some clearcuts and linear clearings associated with powerline rights-of-way. Elevation of the project area ranges from approximately 1700′ – 2400′.

METHODS

Bat Acoustic Surveys

The objective of the bat use surveys was to estimate the seasonal and spatial use of the SWRA by bats. Bats were surveyed using Anabat® SD-1 bat detectors (Titley Electronics Pty Ltd., NSW, Australia). Bat detectors are a recommended method to index and compare habitat use by bats. The use of bat detectors for calculating an index to bat impacts has been used at several wind-energy facilities (Kunz et al. 2007*a*), and is a primary and economically feasible bat risk assessment tool (Arnett 2007). Bat activity was surveyed using four detectors from July 3 to October 7, 2008, a period corresponding to summer breeding and fall bat migration at this site. Detectors were placed at four locations (Figure 1).

One detector (SB2) was placed at a wetland in the project area to assess activity levels and composition of local, breeding bats in the project area. This is a standard practice for evaluating local bat use of a project area when bat concentration areas such as wetlands or ponds are present. These data were not, however, used to assess risk to bats of collision mortality. The other three detectors were placed in upland areas typical of proposed turbine locations in the project area. One of these detectors (SB3) was placed at a linear clearing created for a road through coniferous forest, and the other two (SB1 and SB4) were placed within clear cuts in the project area.

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of 16 was used for the study. Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise. Calls were recorded to a compact flash memory card with large storage capacity. The Anabat detectors were placed inside plastic weather-tight containers with a hole cut in the side of the container for the microphone to extend through. Microphones were encased in PVC tubing with drain holes that curved skyward at 45 degrees outside the container to minimize the potential for water damage due to rain. Containers were raised approximately 1 m off the ground to minimize echo interference and lift the unit above vegetation. All units were programmed to turn on each night approximately one half-hour before sunset and to turn off approximately one half-hour after sunrise.

Statistical Analysis

Bat Acoustic Surveys

The units of activity were number of bat passes (Hayes, 1997). A pass was defined as a continuous series of less than or equal to two call notes produced by an individual bat with no pauses between call notes of less than one second (White and Gehrt 2001, Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights. Bat calls were classified as either high-frequency calls (≥ 35 kHz) that are generally given by small bats (e.g. *Myotis* spp.) or low-frequency calls (< 35 kHz) that are generally given by larger bats (e.g. silver-haired bat [*Lasionycteris noctivagans*], big brown bat [*Eptesicus fuscus*], hoary bat [*Lasiurus cinereus*]). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis. To establish which species may have produced the high- and low-frequency calls recorded, a list of species expected to occur in the study area was compiled from range maps (Table 1; Harvey et al. 1999, BCI website).

The total number of bat passes per detector night was used as an index of bat use in the SWRA. Bat pass data represented levels of bat activity rather than the numbers of individuals present because individuals could not be differentiated by their calls. To predict potential for bat mortality (i.e. low, moderate, high), the mean number of bat passes per detector night (averaged across those monitoring stations placed in upland habitats) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

RESULTS

Bat Acoustic Surveys

For the combined upland locations, bat activity was monitored at three sampling locations over a total of 97 nights during the period July 3 to October 7, 2008. Anabat units were operable for 95.5% of the sampling period (Figure 2), recording 39,326 bat passes on 278 detector-nights (Table 2). Bat activity at the wetland location (SB2) was also monitored for a total of 97 nights during the period of July 3 to October7, 2008. This unit was operable for 100% of the sample period (Figure 3), recording 17,269 bat passes on 97 detector nights (Table 3). Averaging bat passes per detector-night across the upland locations (SB1, SB3, and SB4), we detected a mean of 138.44 bat passes per detector-night. The wetland station (SB2) recorded an average of 178.03 bat passes per detector-night.

Spatial Variation

Bat activity varied among upland Anabat units SB1, SB3 and SB4 in the SWRA (mean = 138.44 bat passes per detector-night; Figures 1, 4). A total of 80.7% of all bat passes (mean = 327.25 bat passes per detector-night) was recorded at station SB3, located along a linear clearing in a forested situation, while activity recorded at stations SB1 and SB4, located in clear cuts, comprised only 19.1% of all bat passes (mean = 14.30 and 73.76, respectively). AnaBat wetland station SB2 recorded a mean of 178.03 bat passes per detector-night (Figures 1, 5).

Temporal Variation

Bat activity was highest at the three upland stations throughout the months of July and August, with peak activity occurring between July 10 and July 16 (Figure 6). The greatest activity on a single night occurred on August 4 (1,445 passes). After the third week of August, activity dropped off to much lower levels and remained low for the duration of the study period. Temporal patterns were largely consistent among stations SB3 (road clearing) and SB4 (clear-cut), although SB3 recorded much greater levels of bat activity (Figure 6). The level of bat activity at station SB1 (clear-cut) was relatively consistent across the entire study period. Bat activity at wetland station SB2 was highest during the month of July (Figure 7), with an activity peak on July 5. Bat activity from July 3 through mid-August (mean = 218.6/detector night) was over four times higher than activity from mid-August through October 7 (mean = 52.3; Figures 10 and 11).

Species Composition

At the combined upland stations, passes by low-frequency bats (LF; 67.0%) outnumbered passes by high-frequency bats (HF; 33.0%). The proportion of HF and LF bat passes was similar among Anabat stations (Figure 8). At wetland station SB2, passes by HF bats (69.7%) outnumbered passes by LF bats (30.3%; Figure 9).

Species identification for specific passes was possible only for the hoary bat; therefore, passes by this species could be separated from passes by other low-frequency bats. Hoary bats comprised 6.0% of total passes detected at the combined upland points, and use among the three stations was similar (Figure 12). Hoary bats comprised 2.0% of total bat passes at the wetland station SB2 (Figure 13). Patterns of hoary bat activity were similar to other bats, with most bat passes occurring in July and early August (Figures 14 and 15).

DISCUSSION

Potential Impacts

Assessing the potential impacts of wind energy development to bats at the SWRA is complicated by our current lack of understanding of why bats die at wind turbines (Kunz et al. 2007b; Baerwald et al. 2008), combined with the inherent difficulties of monitoring elusive, night-flying animals (O'Shea et al. 2003). To date, monitoring studies of wind projects suggest that a) migratory tree-roosting species (eastern red, hoary, and silver-haired bats) comprise almost 75% of reported bats killed, b) the majority of fatalities occur during the post-breeding or fall migration season (roughly August and September), and c) the highest reported fatalities occur at wind facilities located along forested ridge tops in the eastern US (Arnett et al. 2008, Gruver 2002, Johnson et al. 2003, Kunz et al. 2007b), although recent studies in agricultural regions of Iowa and Alberta, Canada, report relatively high fatalities as well (Jain 2005, Baerwald 2006).

Some studies of wind projects have recorded both Anabat detections per night and bat mortality (Tables 4 and 5). The number of bat calls per night as determined from bat detectors shows a rough correlation with bat mortality, but may be misleading because effort, timing of sampling, species recorded, and detector settings (equipment and locations) varies among studies (Kunz et al. 2007*b*). Thus, our best available estimate of mortality levels at a proposed wind project involves evaluation of our on-site bat acoustic data in terms of activity levels, seasonal variation, species composition, and topographic features of the project area.

Activity

Bat activity within the SWRA (mean = 138.4 bat passes per detector-night at combined upland points, 178.0 at the wetland site) was very high compared to that observed at facilities in Minnesota and Wyoming, where bat mortality was low, and it was higher than activity recorded at sites in West Virginia and Tennessee, where bat mortality rates were high (Tables 4 and 5). Thus, based solely on the presumed relationship between pre-construction bat activity and post-construction fatalities, bat mortality rates at SWRA may be higher than many other wind resource areas in the U.S.

Spatial Variation

The proposed wind-energy facility is not located near any large, known bat colonies or other features that are likely to attract large numbers of bats. The nearest known bat hibernaculum is near Trout Lake, located nearly 20 miles north of the SWRA (B. Weiler, WDFW, pers. commun.). The SWRA also does not contain unique topographic features that may funnel migrating bats. The highest bat mortality rates documented at wind energy facilities have been on forested ridgetops in the eastern US. However, the relatively large numbers of bat fatalities recently reported in northern Iowa (Jain 2005) and southwestern Alberta (Baerwald 2006) indicate that an open landscape is also no guarantee of low mortality.

Activity was relatively high at stations SD2 and SD3 compared to other stations, accounting for the majority of the calls recorded during this study. Station SD2 was located adjacent to a wetland, which likely attracts bats for drinking and foraging opportunities. Station SD3 was located in a road clearing through coniferous forest. The linear clearing is likely used as a travel corridor by local bats in the project area. Bat activity was much lower at the two stations placed within clear cuts.

Temporal Variation

The number of bat calls detected per night at the SWRA was highest during July and early August, with activity peaks between July 10 and July 16. Activity in July and early August likely reflects use of the SWRA by local bats during the reproductive season, when pups are being weaned and foraging rates are high. Activity beyond mid-August likely represents movement of migrating bats through the area. Activity by hoary bats was also substantially higher in July, and dropped off significantly beginning in early August. After August 31, activity for all bats was very low relative to earlier dates, indicating that most bats had left the area for winter hibernacula or warmer climates. This suggests higher use of the project area by resident populations of hoary bats as well as other bats, rather than bats migrating through the area. Based on these data, it does not appear that migratory bats are concentrating in the project area.

Fatality studies of bats at wind projects in the US have shown a peak in mortality in August and September and generally lower mortality earlier in the summer (Johnson 2005; Arnett et al. 2008). While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the fall (Kunz et al. 2007*b*). The highest use of the SWRA occurred in July and early August, prior to the time that most bat mortality occurs at wind resource areas in the Pacific Northwest as well as throughout the US.

Species Composition

Of the fourteen species of bat likely to occur in the study area, three are known fatalities at wind-energy facilities (Table 1). Acoustic bat surveys were unable to determine bat species present in the study area (except for hoary bats), but they were able to distinguish high frequency from low-frequency species. Roughly 65% percent of passes at the combined upland stations were by low-frequency bats, suggesting higher relative abundance of species such as hoary bat, silver-haired bat, or big brown bat, while nearly 70% of bat passes at the wetland station were by high-frequency bats, suggesting a higher relative abundance of species such as *Myotis* spp.

CONCLUSIONS

Although the data collected during this study indicate relatively high use of the project area by bats, bat activity at the SWRA is not uniquely high among wind resource areas. During a recent Anabat echolocation study conducted at the proposed Grayland Wind Resource Area in Pacific County, Washington during the period August 26 – September 12, 2008, a mean of 219.8 bat passes were recorded per detector night (McGraw et al. 2008). At a proposed wind energy facility at Maple Ridge, New York, Reynolds (2004) recorded an average of approximately 165 bat passes per detector night from late June through early July. The Grayland wind energy project has not been constructed, so post-construction fatality estimates are not available. Bat mortality at the Maple Ridge, New York project was estimated at 11.23/MW/year (Jain et al. 2008), much lower than the pre-construction bat activity levels would suggest. The highest bat mortality recorded at a wind energy facility in North America was at Mountaineer, West Virginia, where it averaged 38 bats/turbine/year. Pre-construction bat activity levels at Mountaineer as determined by Anabat sampling averaged 38.3 bat passes per detector night. These data suggest that high bat activity levels as determined by Anabat sampling may not necessarily equate to high bat mortality levels.

There are several other factors to suggest that even though bat activity is relatively high at the SWRA, this does not necessarily equate to high risk of bat mortality at the site. No turbines will be constructed near wetlands or ponds, and the cleared corridors along turbine strings will not resemble the narrow road path through the timber that also had high bat activity levels. Bat activity levels recorded at clear cuts in the project area were the lowest, averaging 14.3 and 73.8 bat passes/detector-night at these two locations. These areas most closely resemble what the habitat adjacent to turbines will resemble, because vegetation removal would occur in forested areas where the proposed roadway and turbine alignment is planned. The cleared area would extend 50 feet in all directions from each turbine. From a distance of 50 feet to 150 feet from the base of the turbines, tree heights will be limited to 15 feet above the elevation of the base of the turbine. Areas where trees are permanently removed would be replanted with native grasses and low-growing shrubs, and would therefore resemble habitat at existing clear cuts in the project area.

A substantial proportion of the bat calls recorded at the SWRA were made by high frequency species, including 33% of passes at the upland stations and 69.7% of passes at the wetland station. Although some of these calls may have been made by western red bat (*Lasiurus blossevillii*), most of these calls were likely made by *Myotis* species. *Myotis* species are rarely killed at wind energy facilities. At numerous wind resource areas throughout the US, these species have comprised from 0-13.5% of the fatalities, except at one site each in Iowa and Canada, where little brown bats (*Myotis lucifugus*) made up nearly 25% of the fatalities (Arnett et al. 2008). *Myotis* species are rarely found at other projects in the Pacific Northwest. Of 337 bat fatalities collected at existing wind-energy facilities in eastern Oregon and Washington, 320 (95.8%) were low frequency species, including 152 hoary bats, 163 silver-haired bats, and five big brown bats. Only one species that emits high frequency calls, the little brown bat, has been found as a turbine fatality in the Pacific Northwest, and the eight little brown bats found comprised only 2.4% of the fatalities (Johnson and Erickson 2008). These data indicate that *Myotis* bats are much less susceptible to turbine collisions than species that emit low frequency calls, which are primarily the foliage roosting long-distance migrants (i.e., hoary bat and silver-haired bat).

Another important factor to take into consideration is the timing of bat activity recorded at the SWRA. Bat activity from early July through mid-August 2008 was over four times higher than activity from mid-August through early October. Bat activity was also monitored at three sampling locations in the SWRA during the period August 20 – October 21, 2007 (Solick et al. 2008). Anabat units recorded 348 bat passes on 45 detector-nights, resulting in a mean of 7.91 bat passes per detector-night. Both of these stations were located in upland habitats characteristic of proposed turbine locations. These data support the conclusion that bat activity in the SWRA is low from mid August through October. Therefore, much lower activity levels were documented during the time frame that most bat mortality occurs at wind energy facilities in the Pacific Northwest, where the peak mortality levels occur from mid-August through September. This time period corresponds with fall migration of the tree bats and dispersal from summer breeding areas to hibernacula for the other species. Bat mortality at wind energy projects throughout the US during the breeding season has been low, as only 4.1% of the fatalities have occurred between May 15 and July 15 (Johnson 2005). At several wind farms studied, low mortality has been documented during the breeding season even though relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003). These data suggest that high bat activity levels during the breeding season do not equate to high bat fatality rates.

Although high bat activity levels were recorded at the SWRA, the available evidence indicates that these data do not necessarily imply that bat fatality levels will be high. Numerous factors, including the timing of the activity, differences in call rates among the various habitats, and species composition of the bat calls suggest that bat mortality may be lower than indicated by the high bat activity recorded. No data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the SWRA. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests.

REFERENCES

Anderson, R.L., M. Morrison, K. Sinclair, and M.D. Strickland. 1999. Studying Wind Energy/Bird Interactions: A Guidance Document. Prepared for Bird Subcommittee and National Wind Coordinating Committee. December 1999 [online]. Available: http://www.nationalwind.org/publications/wildlife/bird99/Bird_booklet.pdf.

Arnett, E. 2007. Report from BWEC on Collaborative Work & Plans. Presentation at the NWCC Wildlife Workgroup Meeting, Boulder Colorado. November 14th, 2007. Conservation International. Information at www.nationwind.org.

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships Between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Prepared for the Bats and Wind Energy Cooperative. March 2005.

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fieldler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Koford, C.P. Nicholson, T.J. O'Connell, M.D. Piorkowski, and R.D. Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management* 72(1):61-78.

Baerwald, E. 2006. Bat Fatalities in Southern Alberta. Presented at the Wildlife Research Meeting VI, San Antonio, Texas. National Wind Coordinating Collaborative. November 2006.

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Current Biology 18(16): R695-R696.

Bat Conservation International, Inc. (BCI). 2002. Bat Species: US Bats. Bat Conservation International, Inc., Austin, Texas. www.batcon.org.

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. Thesis. University of Tennessee, Knoxville, Tennessee.

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gruver, J.C. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game & Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis., Iowa State University, Aimes, Iowa.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2008. Annual report for the Maple Ridge Wind Power Project: Postconstruction bird and bat fatality study – 2007. Prepared for PPM Energy and Horizon Energy by Curry and Kerlinger, LLC.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D. and W.P. Erickson. 2008. Final report: Avian and bat cumulative impacts associated with wind energy development in the Columbia Plateau Ecoregion of eastern Washington and Oregon. Prepared by WEST, Inc. for the Klickitat County Planning Department, Goldendale, WA.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2003. Mortality of Bats at a Large-Scale Wind Power Development at Buffalo Ridge, Minnesota. The American Midland Naturalist 150: 332-342.

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Koford, R., A. Jain, G. Zenner. 2005. Avian Mortality Associated with the Top of Iowa Wind Farm. Progress Report, Calendar Year 2004. Iowa State University and Iowa Department of Natural Resources.

Kunz, T. H., E. B. Arnett, B. M. Cooper, W. P. Erickson, R. P. Larkin, T. Mabee, M. L. Morrison, M. D. Strickland, and J. M. Szewczak. 2007a. Assessing Impacts of Wind-energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management, 71:2449-2486.

Kunz, T. H., E.B Arnett, W P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5:315-324.

McGraw, M., T. Dennis, and W. Erickson. 2008. Wildlife baseline study for Grayland Wind Power Project, Pacific County, Washington. Prepared for Coastal Community Action Program by Ecological Land Services and WEST, Inc.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia: Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London B 316:335-427.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the United States and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31:16-29.

Reynolds, D.S. 2004. Draft report for bat activity and population survey, summer 2004, Flat Rock Wind Power Project. North East Ecological Services, Concord, New Hampshire

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center site environmental assessment: bird and bat use and fatalities – final report NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado. 21pp.

Solick, D., G. Johnson and J. Baker. 2008. Bat Acoustic Studies for the Saddleback Wind Energy Project, Skamania County, Washington, August 20th – October 21st, 2007. Prepared by WEST, Inc. for SDS Lumber Company.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Table 1. Bat species determined from range-maps (Harvey et al. 1999; BCI website) as likely to occur within the SWRA, sorted by call frequency.

High-frequency (≥ 35 kHz)		Low-frequency (< 35 kHz)	
western red bat	*Lasiurus blossevillii*	big brown bat†	*Eptesicus fuscus*
western long-eared bat	*Myotis evotis*	silver-haired bat*†	*Lasionycteris noctivagans*
long-legged bat	*Myotis volans*	hoary bat*†	*Lasiurus cinereus*
little brown bat†	*Myotis lucifugus*	pallid bat	*Antrozous pallidus*
western pipistrelle	*Parastrellus hesperus*	Townsend's big-eared bat	*Corynorhinus townsendii*
Yuma myotis	*Myotis yumanensis*	fringed myotis**	*Myotis thysanodes*
western small-footed bat**	*Myotis ciliolabrum*		
California bat	*Myotis californicus*		

*long-distance migrant
†species known to have been killed at wind-energy facilities
**species distribution on the edge or just outside project area

Table 2. Results of bat acoustic surveys conducted at SWRA, July 3, 2008 - October 7, 2008.

AnaBat Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
SB1	677	710	31	1,387	97	14.30
SB3	12,273	19,470	1,856	31,743	97	327.25
SB4	23	6,173	489	6,196	84	73.76
Total	**12,973**	**26,353**	**2,376**	**39,326**	**278**	**138.44**

***Data for hoary bat passes is included in LF bat passes**

Table 3. Results of bat acoustic surveys conducted at SWRA, July 3, 2008 - October 7, 2008.

AnaBat Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
SB2	12,030	5,239	338	17,269	97	178.03
Total	**12,030**	**5,239**	**338**	**17,269**	**97**	**178.03**

*Data for hoary bat passes is included in LF bat passes

Table 4. Wind-energy facilities in the U.S. with both pre-construction AnaBat sampling data and post-construction mortality data for bat species (adapted from Kunz et al. 2007*b*).

Wind-Energy Facility	Activity (#/detector night)	Mortality (bats/turbine/year)	Reference
Saddleback, WA (upland stations)	138.4		This study
Foote Creek Rim, WY	2.2	1.3	Gruver 2002
Buffalo Ridge, MN	2.1	2.2	Johnson et al 2004
Buffalo Mountain, TN	23.7	20.8	Fiedler 2004
Top of Iowa, IA	34.9	10.2	Jain 2005
Mountaineer, WV	38.3	38	Arnett et al. 2005

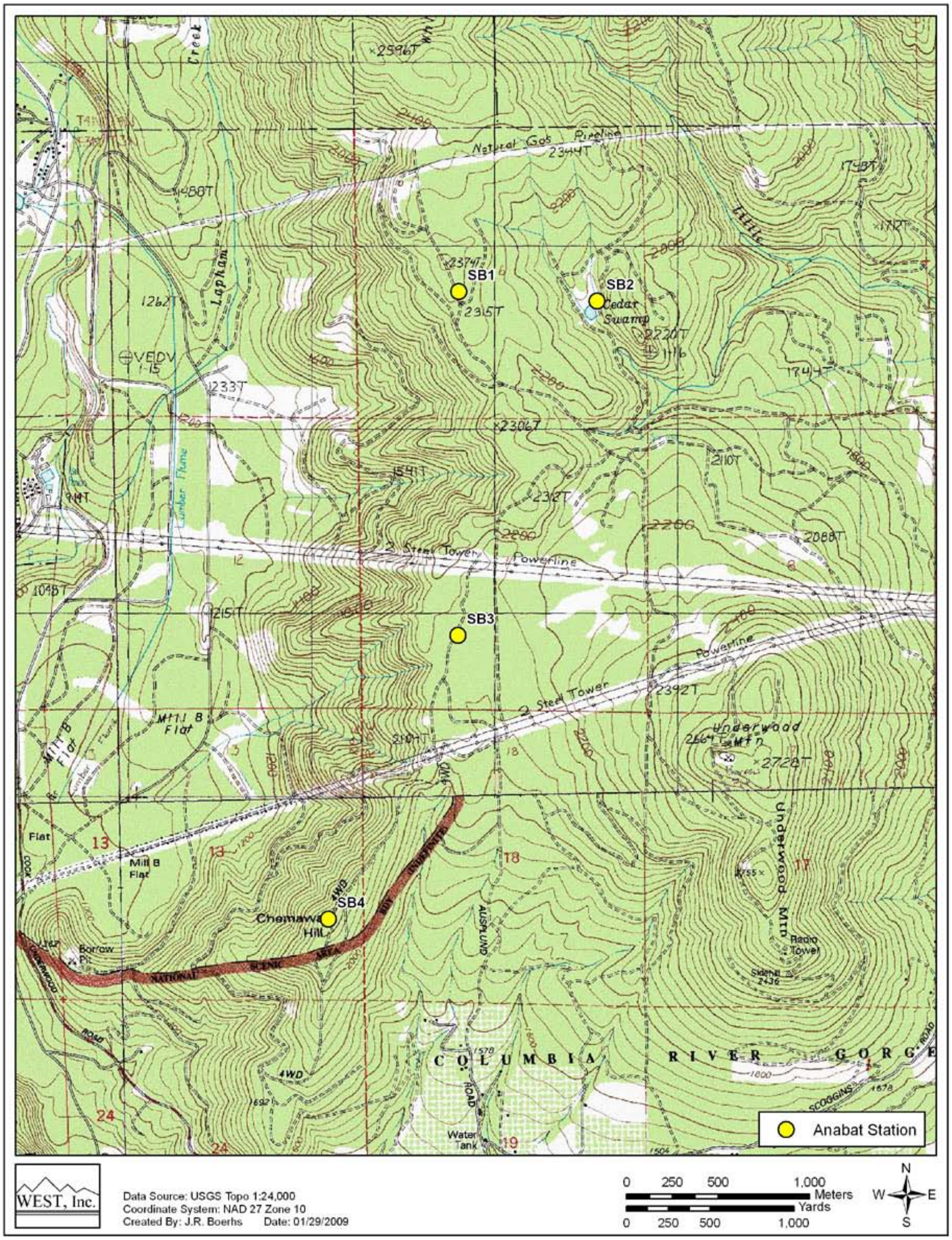


Figure 1. Anabat sampling locations at the Saddleback Wind Resource Area.

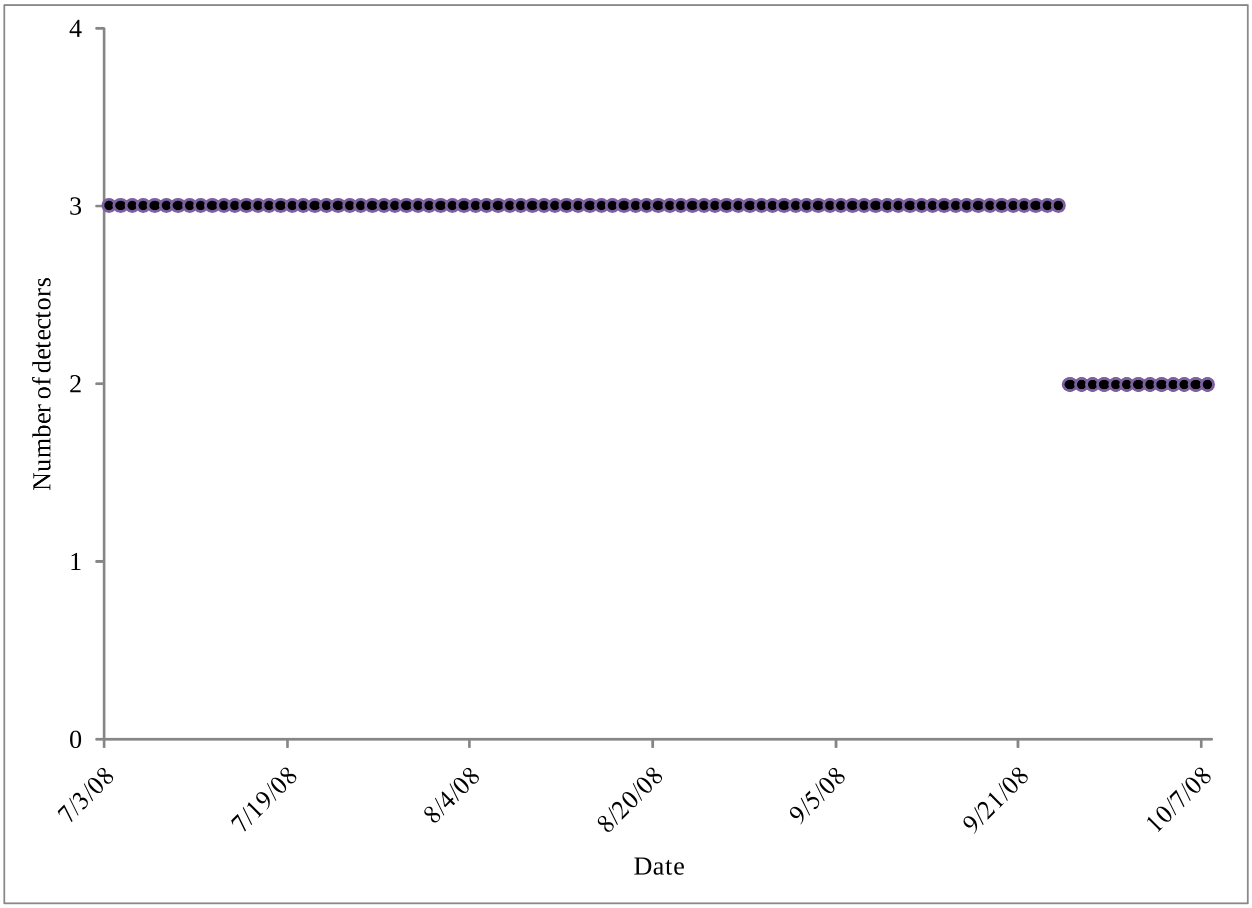


Figure 2. Number of Anabat detectors (n = 3) at the Saddleback Wind Resource Area operating during each night of the study period July 3 – October 7, 2008.

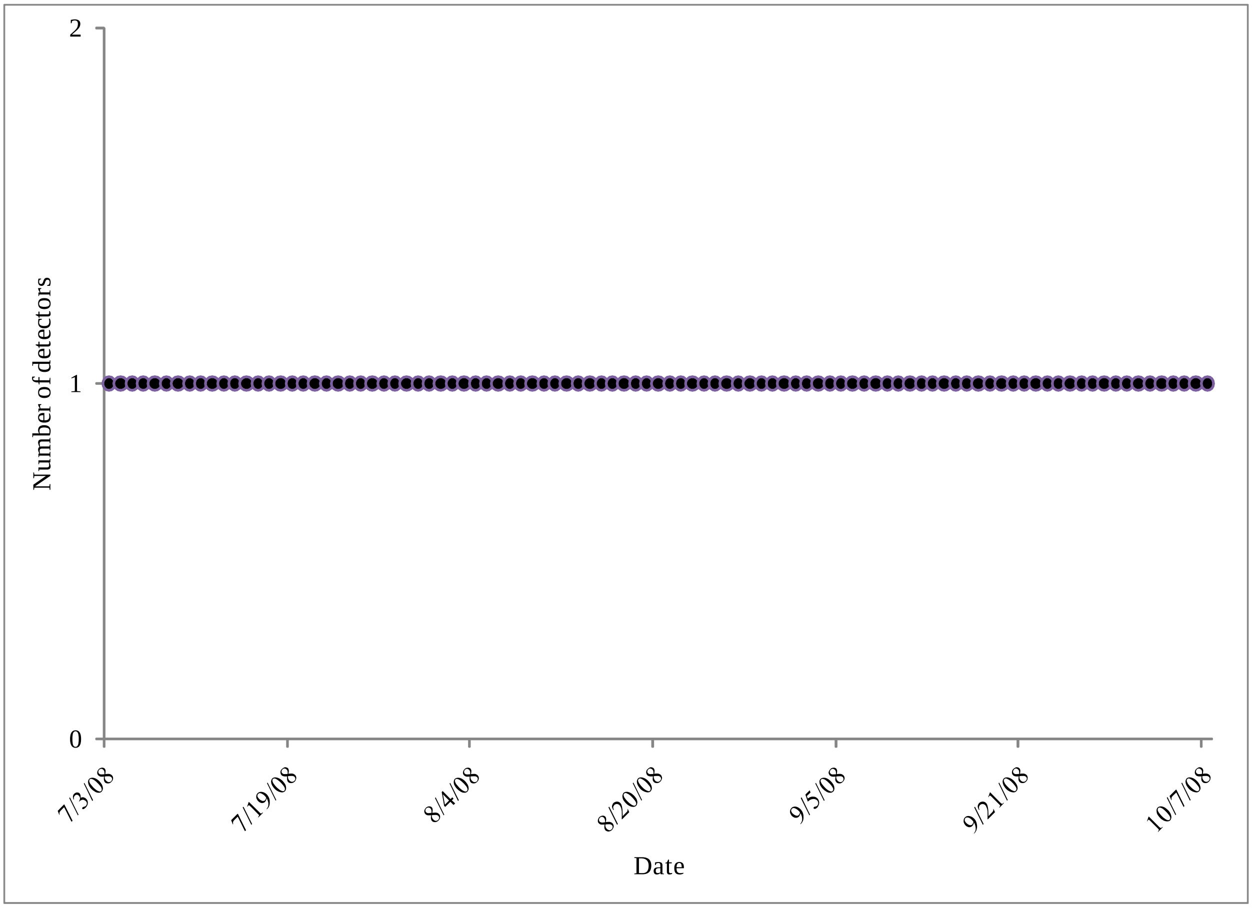


Figure 3. Number of Anabat detectors at wetland station SB2, operating during each night of the study period July 3 – October 7, 2008.

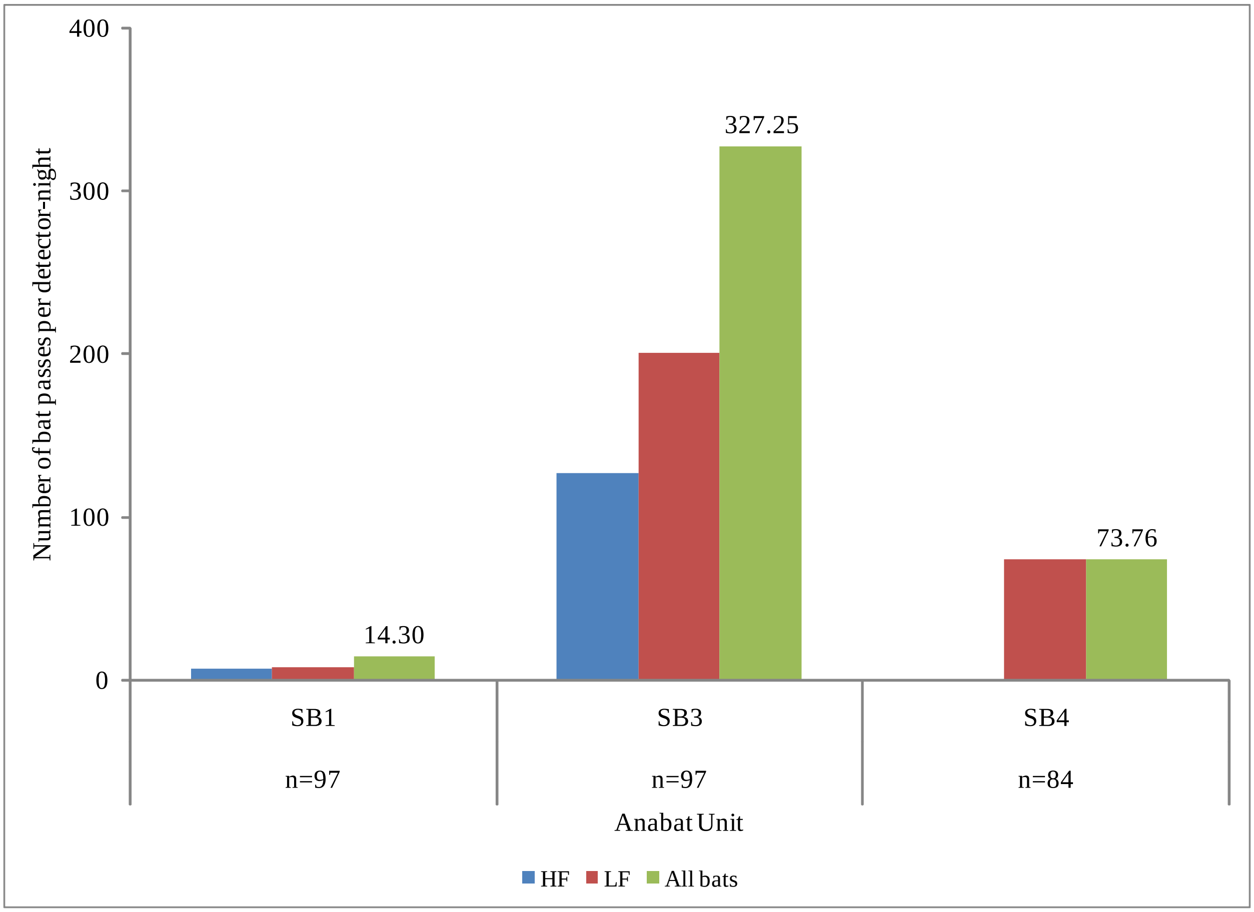


Figure 4. Number of bat passes per detector-night at upland Anabat locations at the Saddleback Wind Resource Area for the study period July 3 – October 7, 2008.

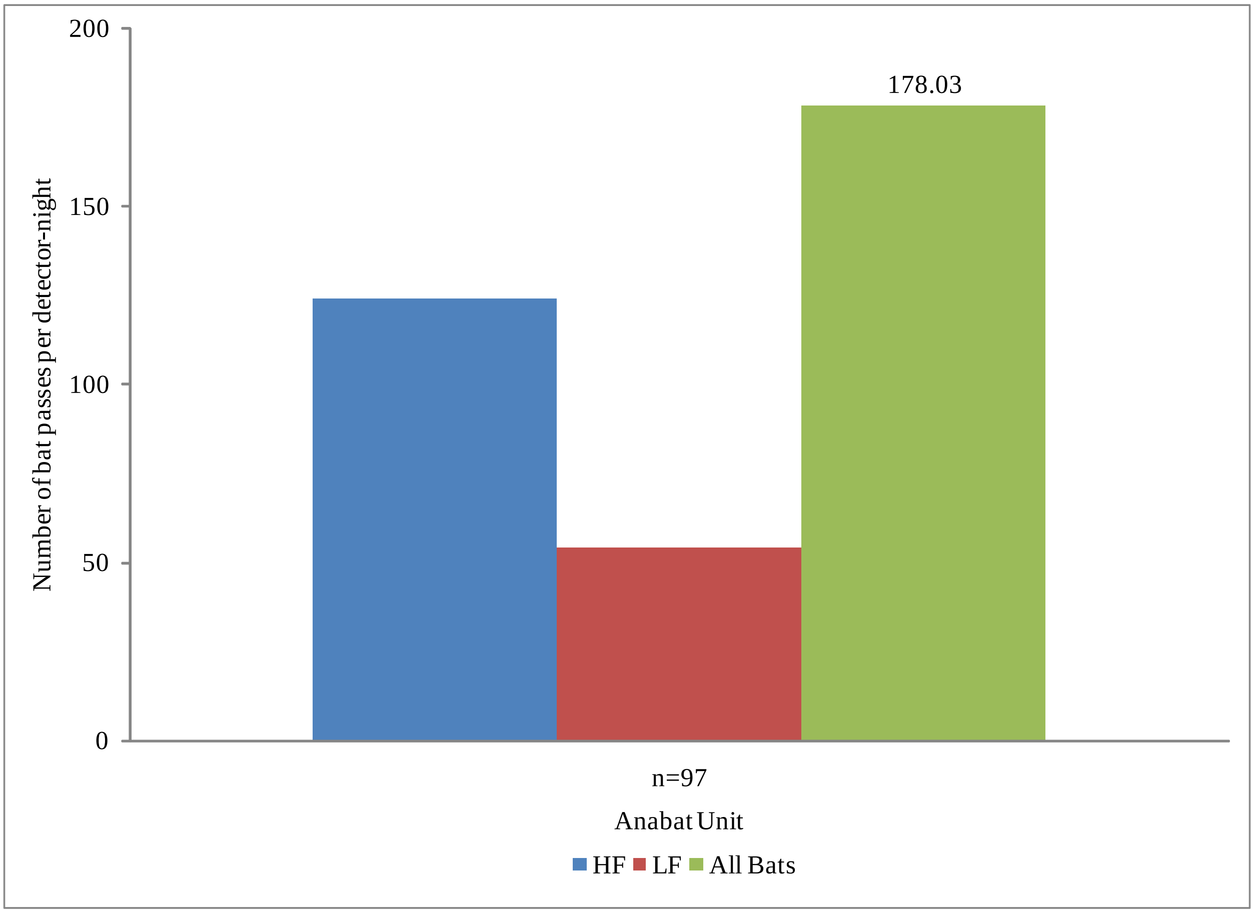


Figure 5. Number of bat passes per detector-night at Anabat wetland location SB2 for the study period July 3 – October 7, 2008.

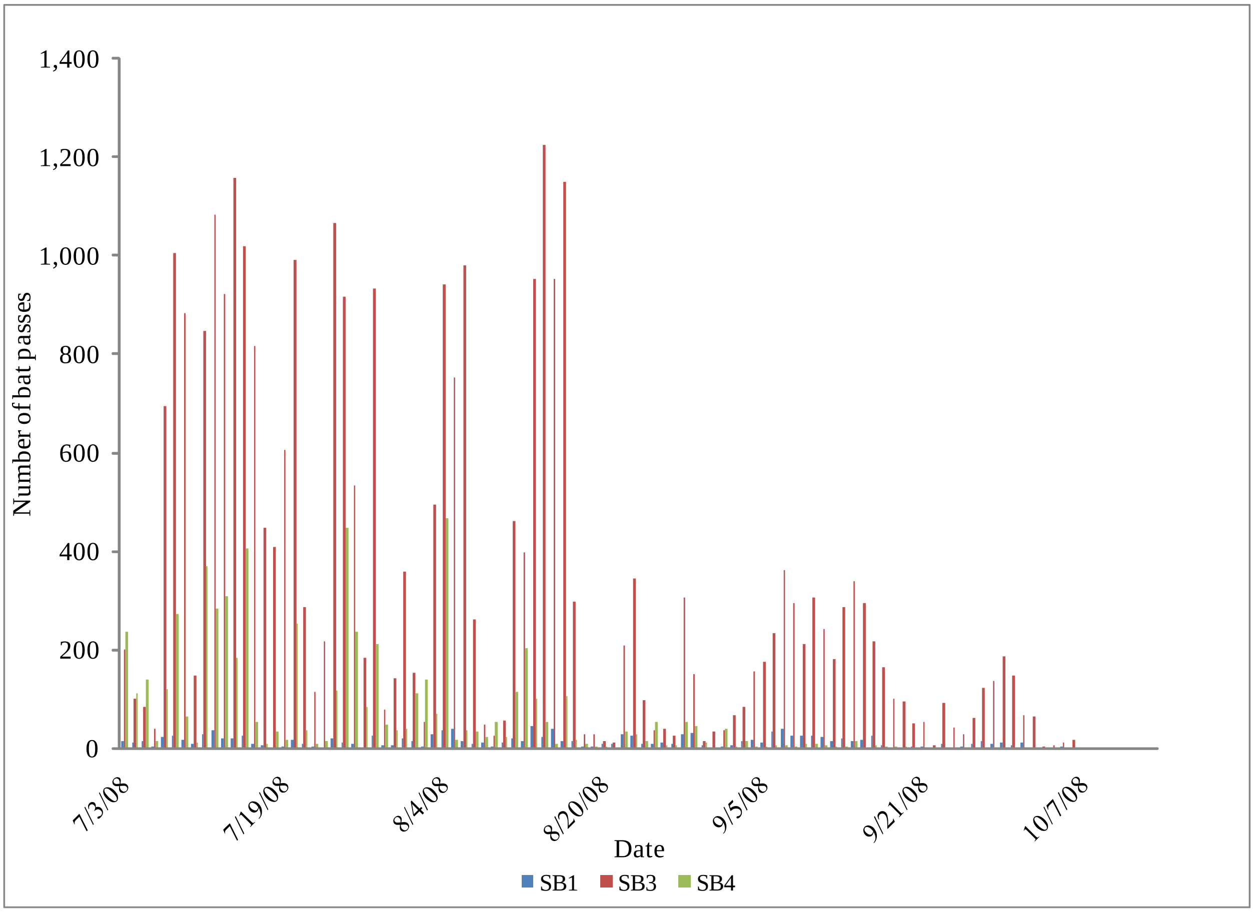


Figure 6. Number of nightly bat passes by station for the study period July 3 – October 7, 2008.

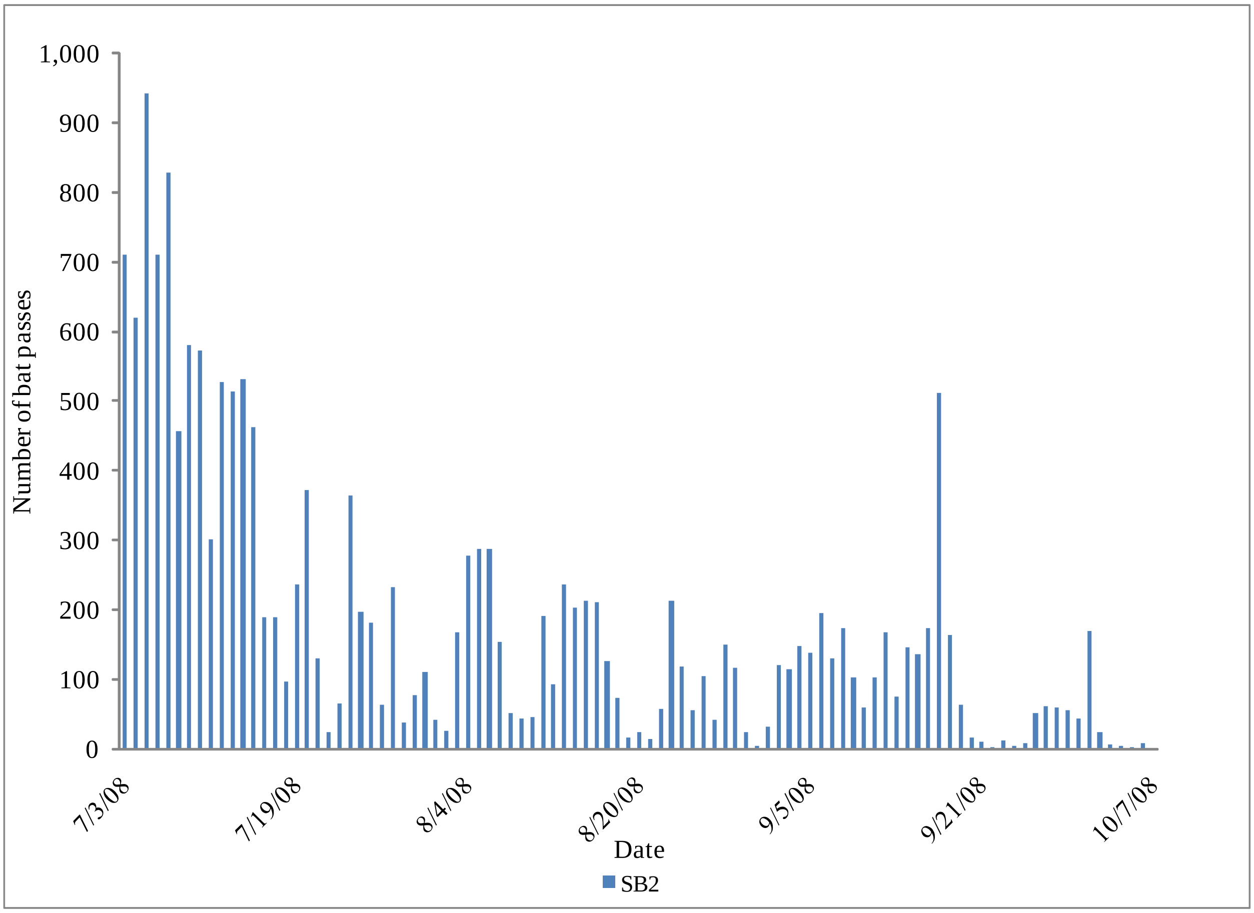


Figure 7. Number of nightly bat passes at wetland station SB2 for the study period July 3 – October 7, 2008.

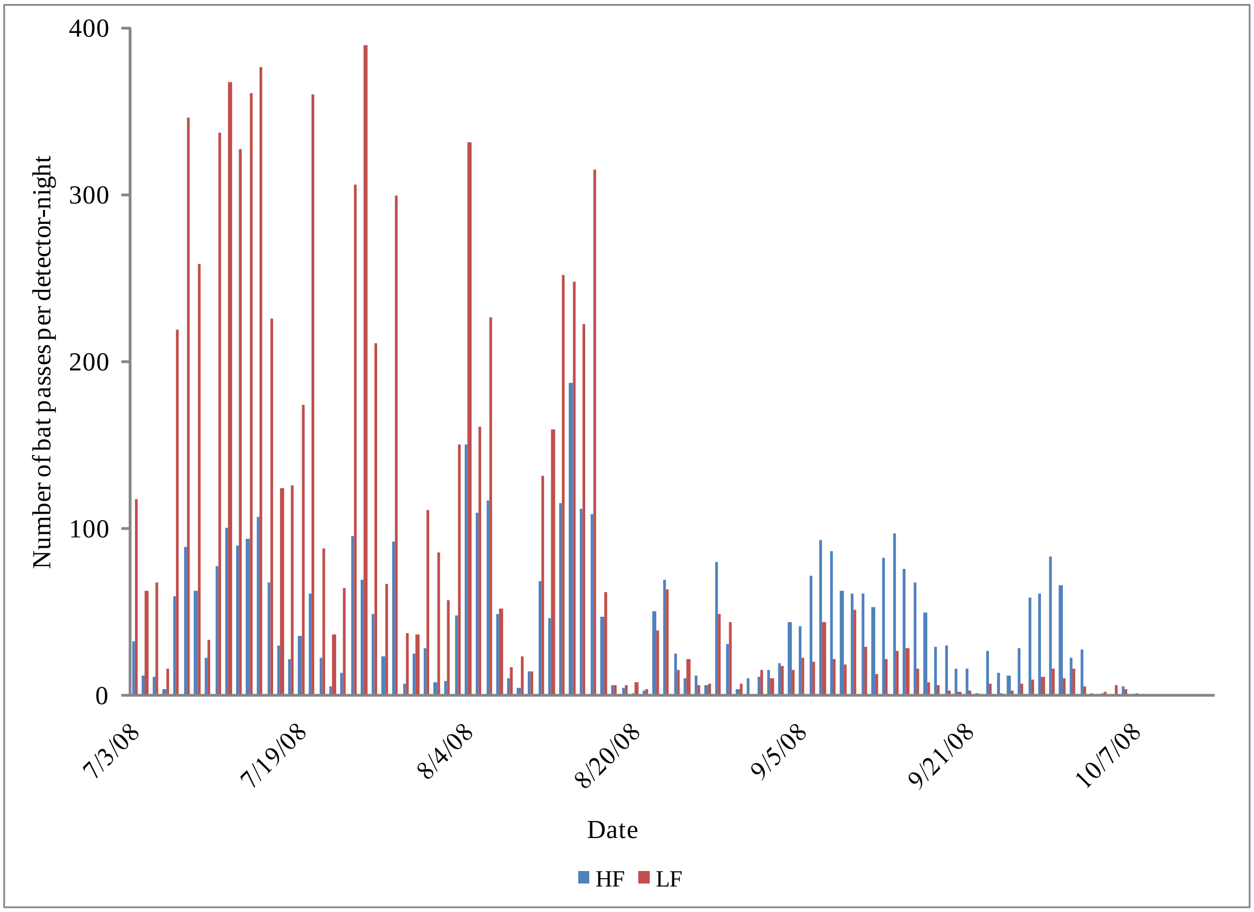


Figure 8. Nightly activity by high-frequency (HF) and low-frequency (LF) bats at upland stations at the Saddleback Wind Resource Area for the study period July 3 – October 7, 2008.

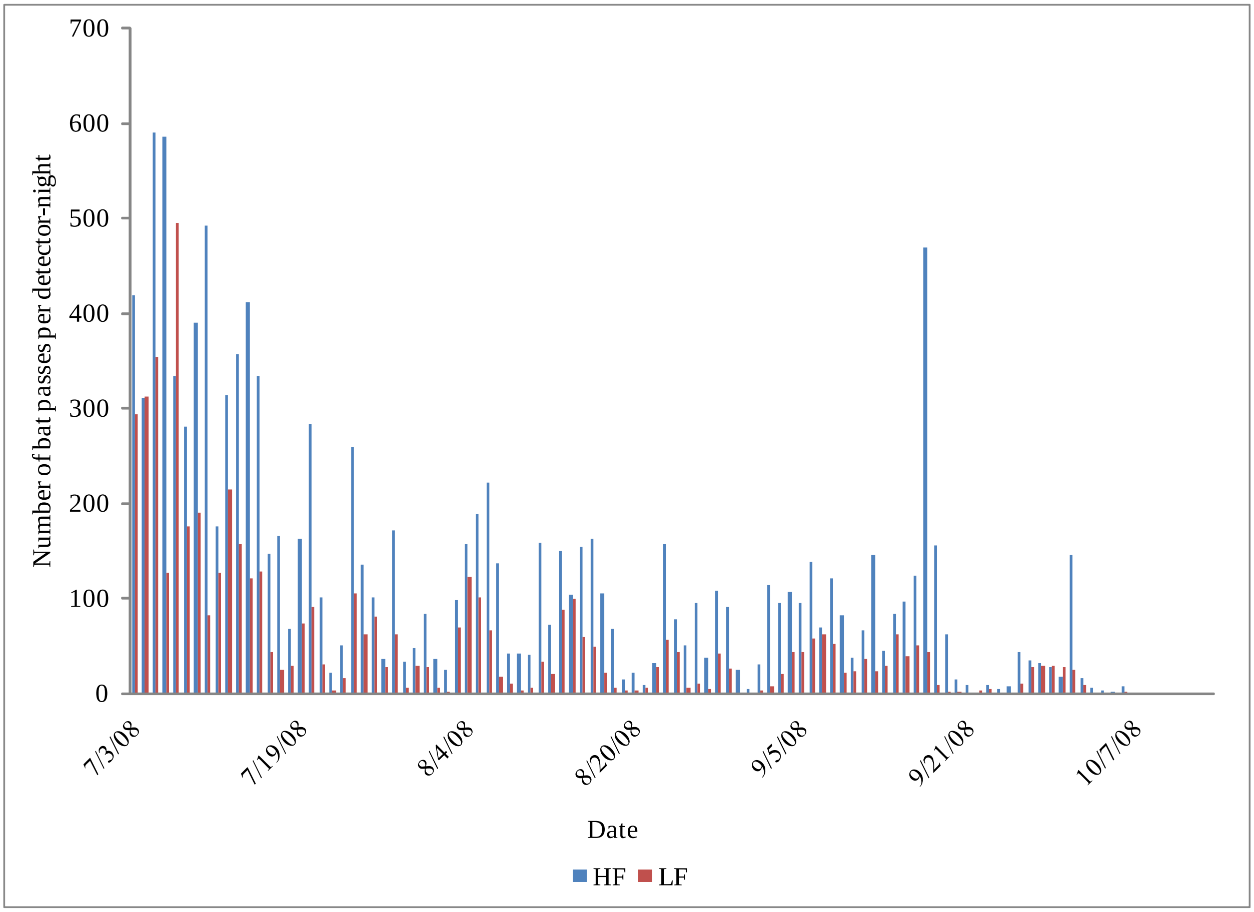


Figure 9. Nightly activity by high-frequency (HF) and low-frequency (LF) bats at wetland station SB2 for the study period July 3 – October 7, 2008.

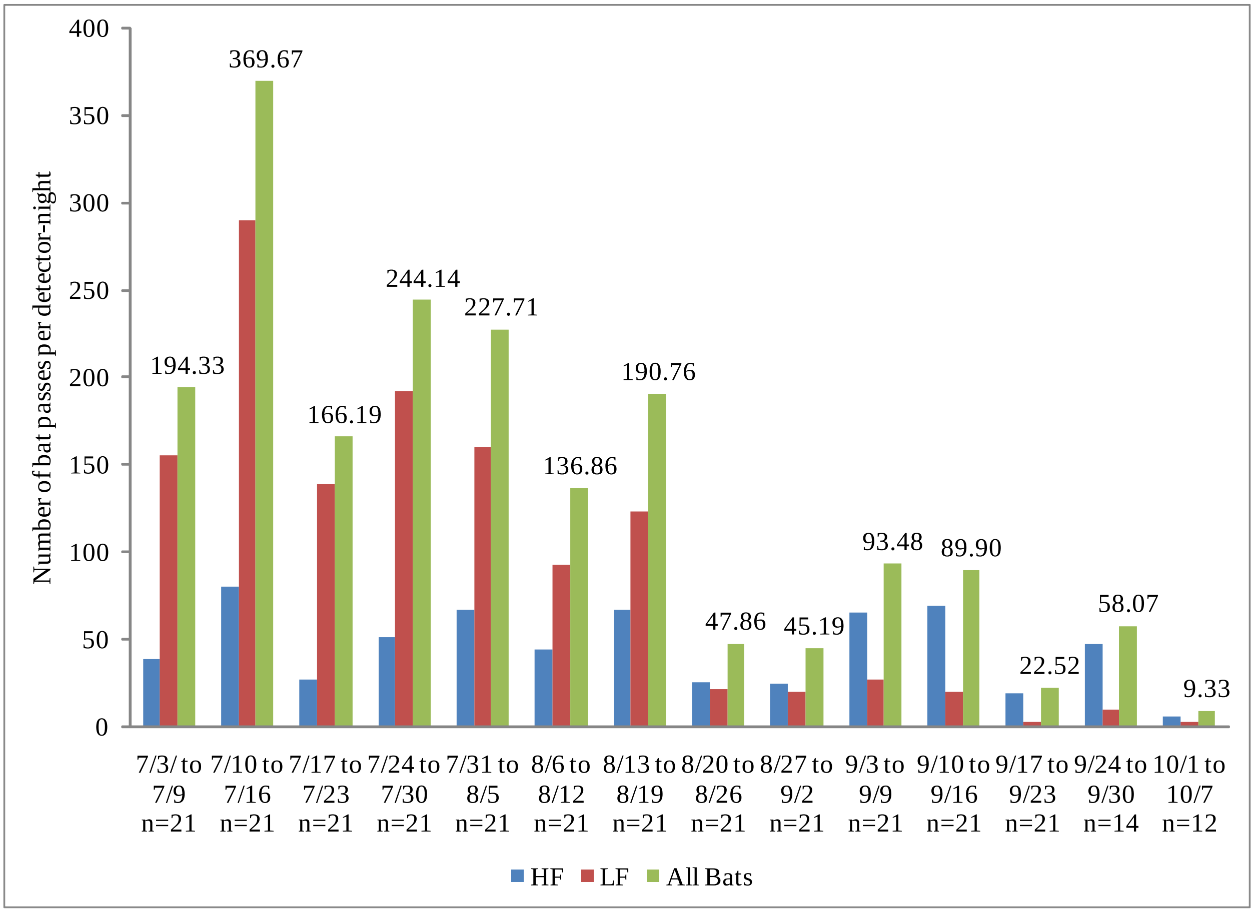


Figure 10. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at upland stations for the study period July 3 – October 7, 2008.

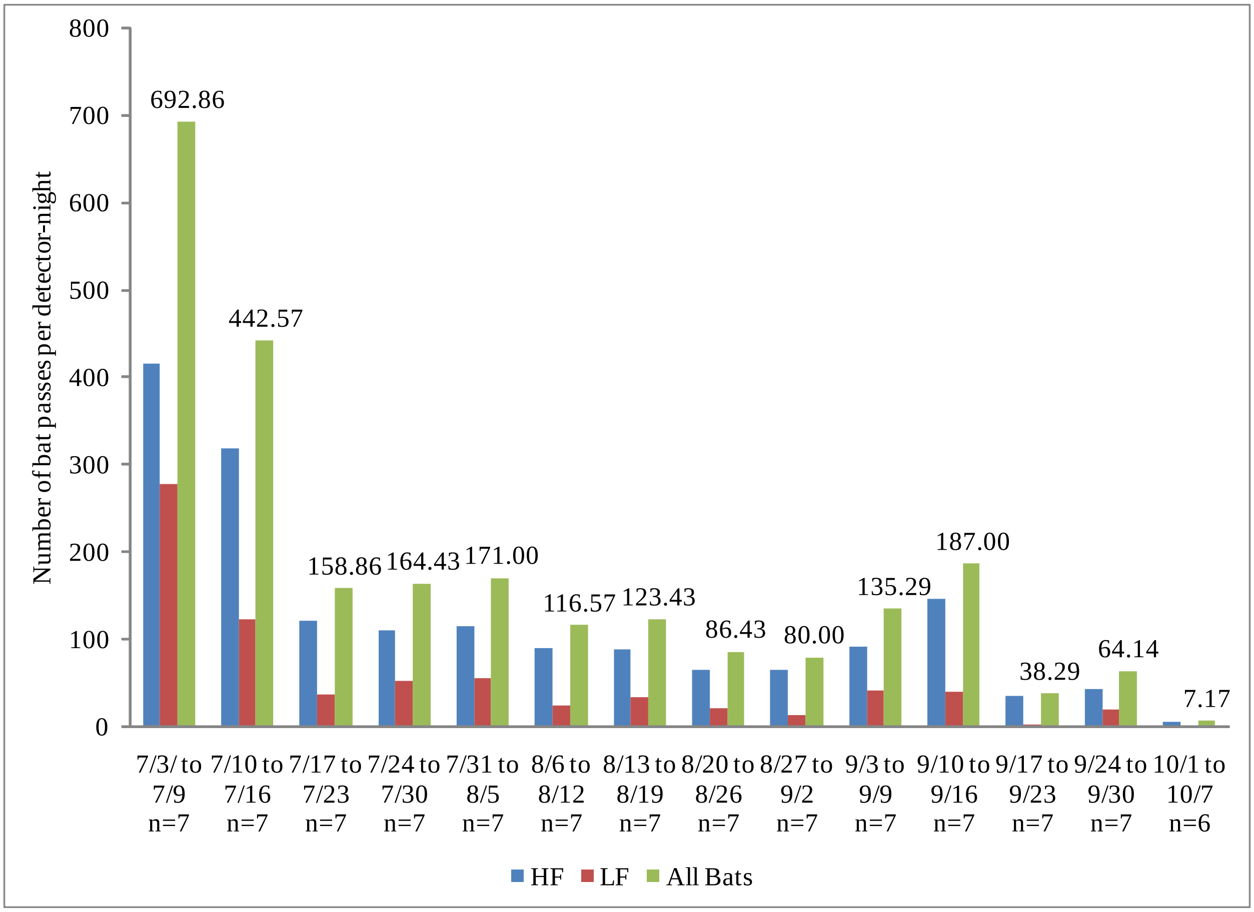


Figure 11. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at wetland station SB2 for the study period July 3 – October 7, 2008.

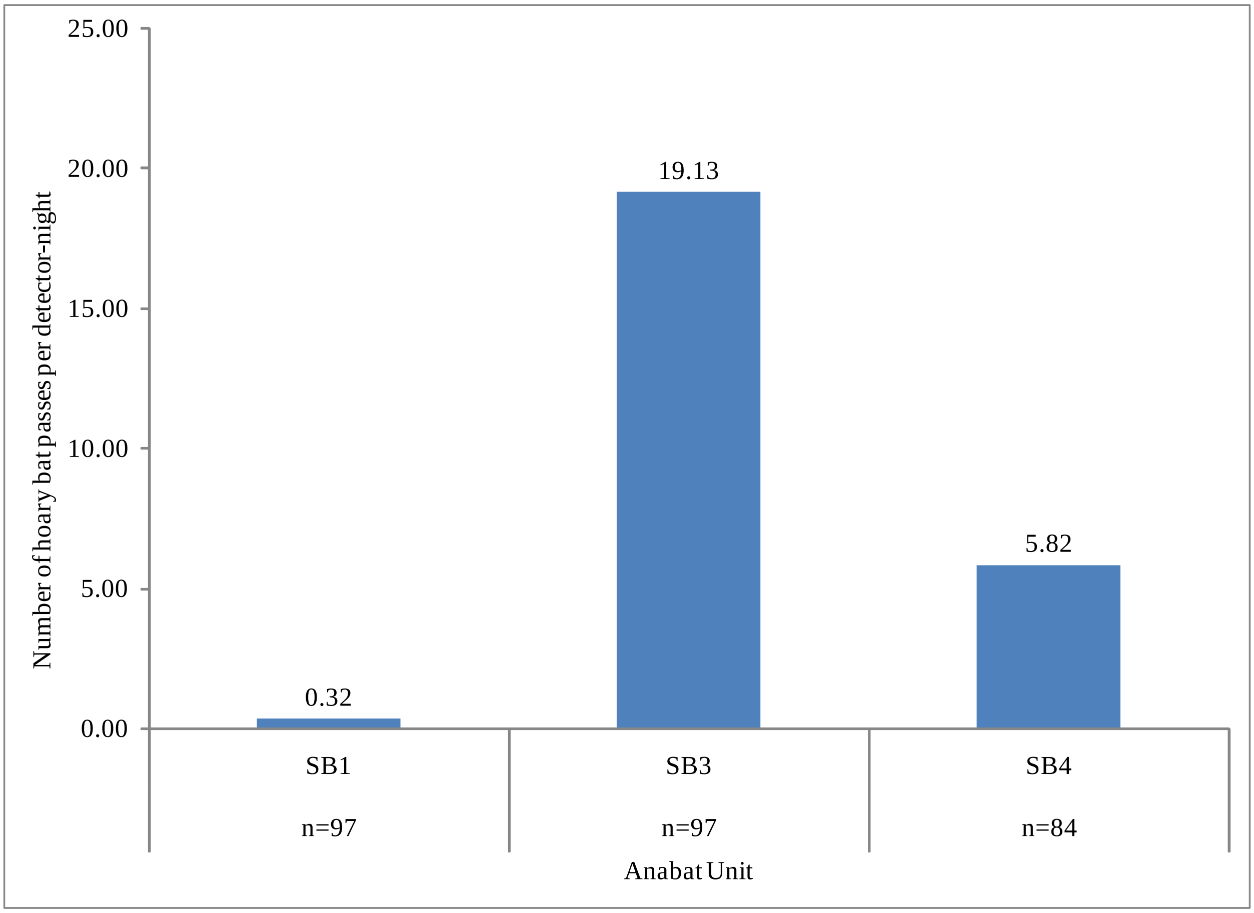


Figure 12. Number of passes per detector–night by hoary bats at upland Anabat stations at the Saddleback Wind Resource Area, for the study period July 3 – October 7, 2008.

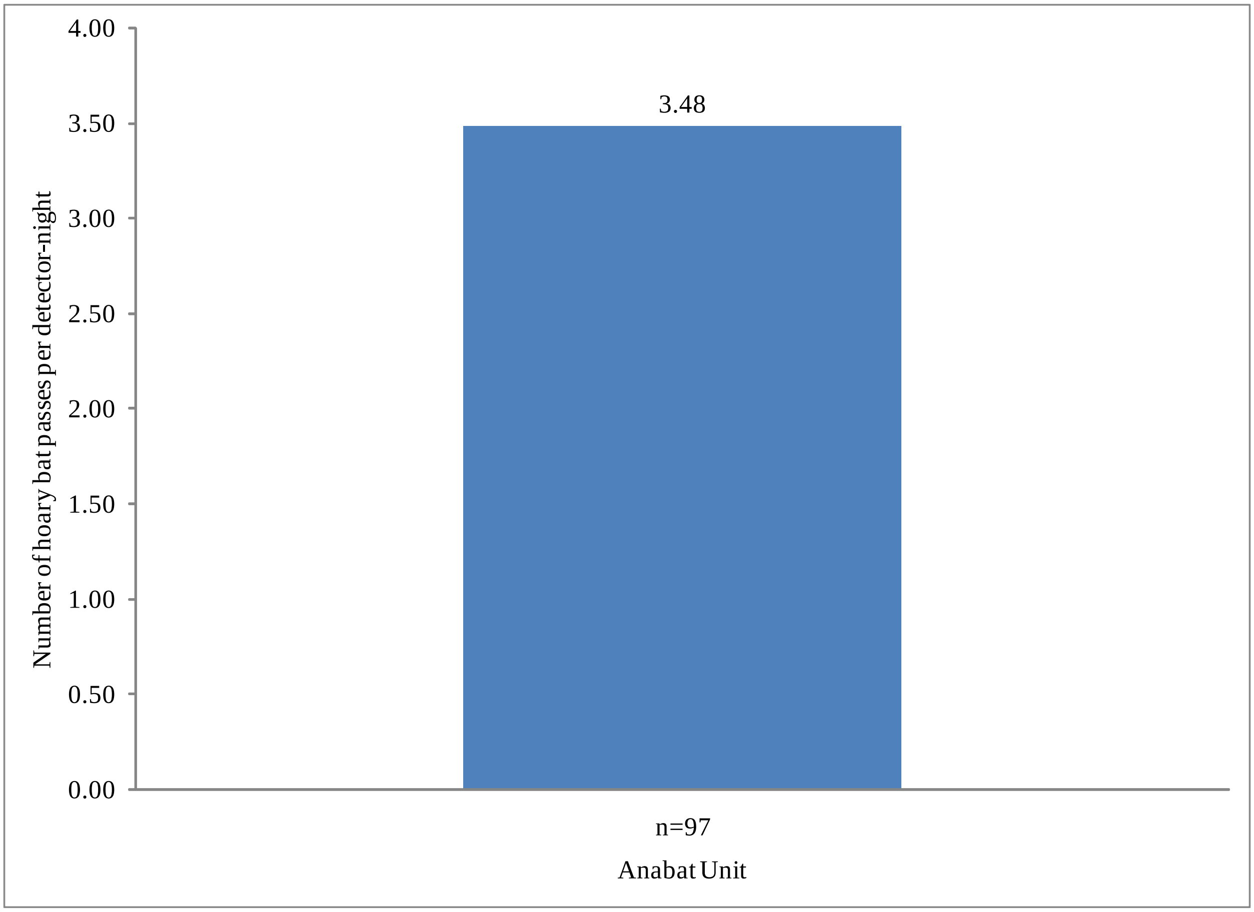


Figure 13. Number of passes per detector–night by hoary bats at Anabat wetland station SB2 for the study period July 3 – October 7, 2008.

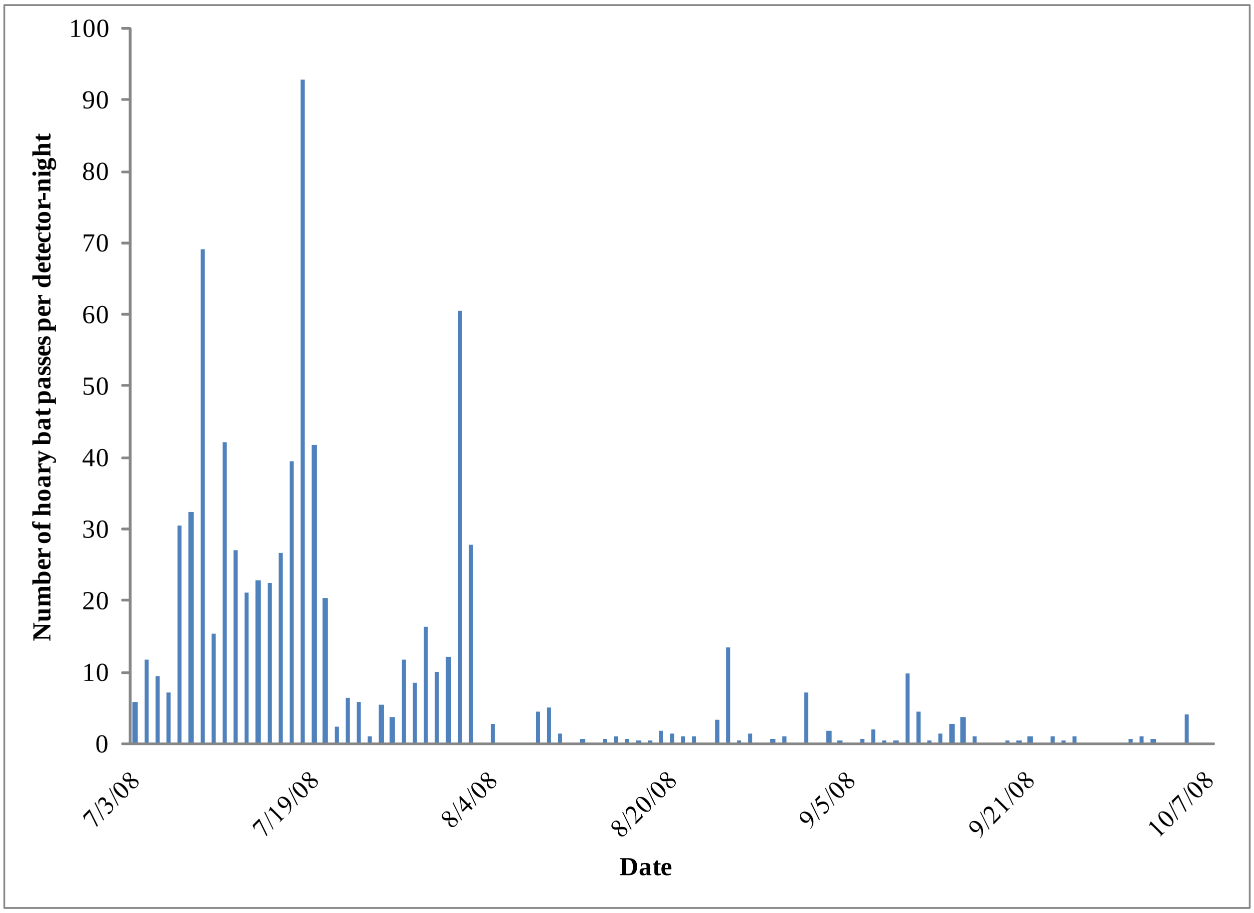


Figure 14. Number of passes per detector–night by hoary bats at upland stations at the Saddleback Wind Resource Area, presented nightly for the study period July 3 – October 7, 2008.

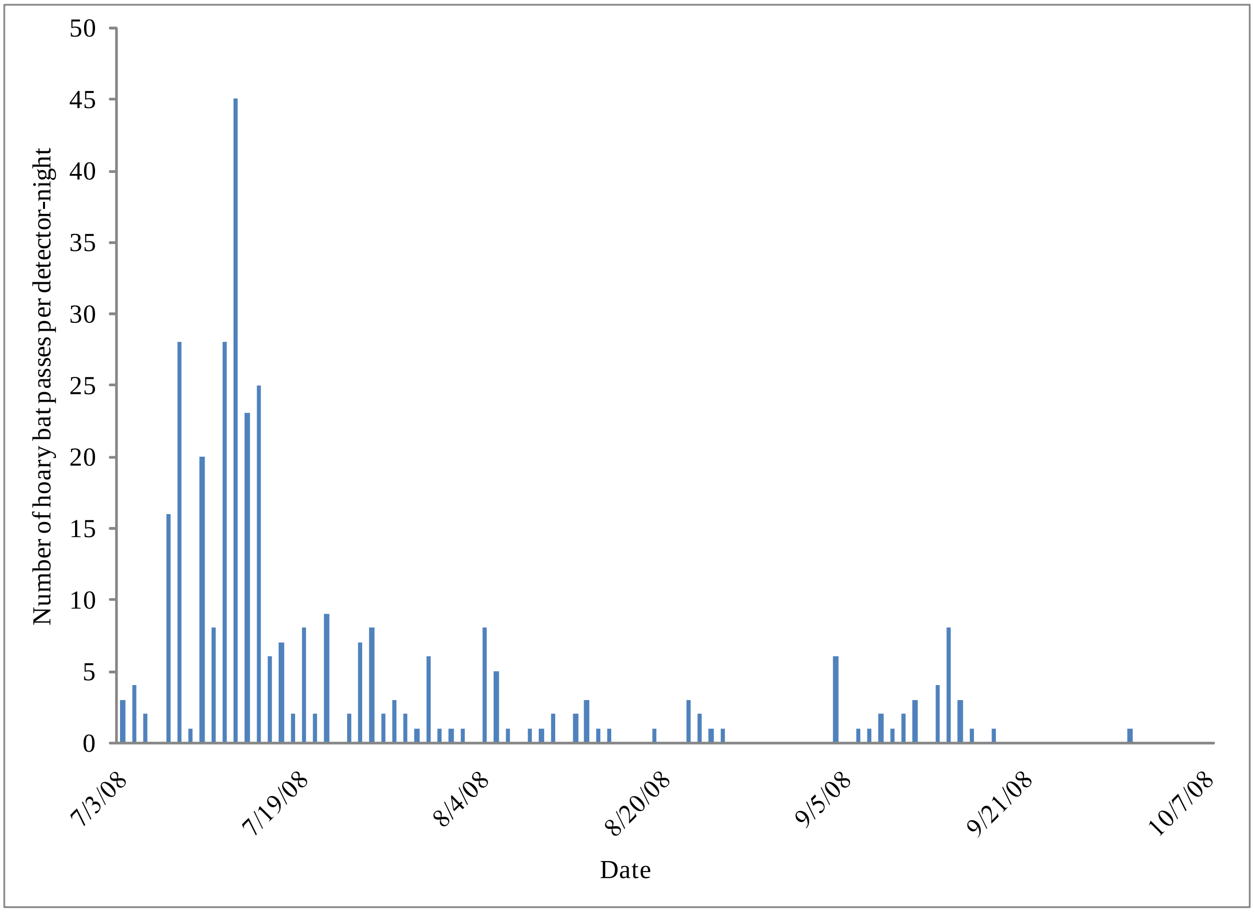


Figure 15. Number of passes per detector–night by hoary bats at wetland station SB2, presented nightly for the study period July 3 – October 7, 2008.

C-10

Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, June 4 – October 25, 2009. Prepared for SDS Lumber Company

WEST, Inc. 2009.

Bat Acoustic Studies for the Whistling Ridge Wind Resource Area Skamania County, Washington

June 4th – October 25th, 2009

Prepared for:

SDS Lumber Company

P.O. Box 266
Bingen, Washington 98605

Prepared by:

Greg Johnson, Jeff Gruver, Tamara Enz, Jerry Baker and Kimberly Bay

Western **E**co**S**ystems **T**echnology, Inc.

2003 Central Avenue
Cheyenne, Wyoming

WEST, Inc.

December 1, 2009

EXECUTIVE SUMMARY

Western EcoSystems Technology, Inc. initiated surveys in June 2009 designed to assess bat use within the proposed Whistling Ridge Wind Resource Area, Skamania County, Washington. Acoustic surveys for bats using Anabat™ SD1 ultrasonic detectors at three fixed paired (ground and elevated) stations were conducted from June 4 to October 25, 2009. The objective of the acoustic bat surveys was to estimate the seasonal and spatial use of the Whistling Ridge Wind Resource Area by bats. Anabat units recorded 6,805 bat passes during 770 detector nights. Averaging bat passes per detector-night across locations, a mean of 8.09 bat passes per detector-night was recorded.

The majority (71.6%) of the calls were less than 35 kilohertz in frequency (e.g., big brown bat, silver-haired bat, hoary bat), and the remaining calls were greater than 35 kilohertz (e.g., *Myotis* bat species). Species identification was only possible for the hoary bat, which made up 5.9% of all passes. Activity levels for bat passes peaked in early July, and again in mid-August. Activity levels for hoary bats were highest in mid-August, suggesting this species migrates through the Whistling Ridge Wind Resource Area at this time of year.

The mean number of bat passes per detector per night was compared to existing data from six wind-energy facilities where both bat activity and mortality levels have been measured. The level of bat activity documented at the Whistling Ridge Wind Resource Area was higher than that at wind-energy facilities in Minnesota and Wyoming, where reported bat mortalities are low, but was much lower than at facilities in the eastern US, where reported bat mortality is highest. Assuming that a relationship between bat activity and bat mortality exists, and that it extends to the northwestern US, relatively low levels of bat mortality would be expected to occur in the Whistling Ridge Wind Resource Area; most likely during early July to mid-August.

Based on fatality rates at wind-energy facilities in the western US, the bat call rates observed at this project and habitat of the project area, we expect that the potential risk to bats from turbine operations to be somewhat higher than the rates observed at other western facilities placed in non-forested environments, but not nearly as high as the rates observed at eastern ridgeline facilities. The post-construction monitoring program should be designed to accurately estimate the level of bat mortality.

STUDY PARTICIPANTS

Western EcoSystems Technology

Greg Johnson	Senior Project Manager
Tamara Enz	Project Manager
Jeff Gruver	Bat Biologist
Andrea Chatfield	Bat Data Compiler
Kimberly Bay	Data Analyst and Report Manager
Saif Nomani	Statistician
JR Boehrs	GIS Technician
Melissa Nicholas	Report Compiler
Andrea Palochak	Technical Editor
Jerry Baker	Field Technician

REPORT REFERENCE

Johnson, G.D., J. Gruver, T. Enz, J. Baker and K. Bay. Bat Acoustic Studies for the Whistling Ridge Wind Resource Area, Skamania County, Washington: June 4th – October 25th, 2009. Prepared for SDS Lumber Company, Bingen, Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

SDS Lumber Company is proposing to develop a wind-energy facility in Skamania County, Washington. SDS Lumber requested that Western EcoSystems Technology, Inc. (WEST) develop and implement a standardized protocol for baseline studies of bat use in the Whistling Ridge Wind Resource Area (WRWRA) for the purpose of estimating the impacts of the wind-energy facility on bats, and to assist with siting turbines to minimize impacts to bats. The protocol for the baseline study is similar to protocols used at other wind-energy facilities in the United States. The protocol has been developed based on WEST's experience studying wildlife and wind turbines at projects throughout the US and included passive acoustic sampling using Anabat™ bat detectors to quantify bat use in the WRWRA.

The following is a final report describing the results of Anabat surveys during the 2009 study season within the proposed WRWRA. This represents the third consecutive year that bat acoustical studies have been conducted at the WRWRA. We are not aware of any other proposed wind energy facilities with this extensive level of pre-construction bat activity monitoring. In addition to site-specific data, this report presents existing information and results of bat monitoring studies conducted at other wind-energy facilities. Where possible, comparisons with regional and local studies were made.

STUDY AREA

The proposed WRWRA is in southeast Skamania County approximately four miles (6.44 kilometers [km]) northwest of White Salmon, Washington (Figure 1). The specific project area is just north of Underwood Mountain and includes Sections 5, 6, 7, & 8, Township 3N, Range 10E. The project is located in a forested environment managed for commercial timber production. Topography of the WRWRA consists of hilltops dominated by coniferous forests with some clear cuts and linear clearings associated with power line rights-of-way. Elevation ranges from approximately 1700 – 2400 feet (ft; 518 – 732 meters [m]).

METHODS

Bat Acoustic Surveys

The objective of the bat use surveys was to estimate the seasonal and spatial use of the WRWRA by bats. Bats were surveyed using Anabat™ SD1 bat detectors (Titley Scientific™, Australia). Bat detectors are a recommended method to index and compare use by bats. The use of bat detectors for calculating an index to bat impacts is a primary bat risk assessment tool for baseline wind development surveys (Arnett 2007, Kunz et al. 2007a). Bat activity was surveyed using six detectors from June 4 to October 25, 2009, a period corresponding to summer breeding and fall bat migration at this site. Detectors were placed near the ground at three fixed stations (Figure 1). At each of these stations, ground detectors (WR1, WR3, and WR5) were paired with detectors raised (WR2, WR4, and WR6) on meteorological (met) towers to compare bat activity at different heights (ground versus raised) and monitor bat activity in the rotor-swept zone. Pair

WR1 and WR2 were placed next to an area where timber was being harvested, WR3 and WR4 were placed in an area of regeneration, and WR5 and WR6 were in a clear cut on a ridge with open water at the base of the ridge.

Anabat detectors record bat echolocation calls with a broadband microphone. The echolocation sounds are then translated into frequencies audible to humans by dividing the frequencies by a predetermined ratio. A division ratio of 16 was used for the study (Messina 2004). Bat echolocation detectors also detect other ultrasonic sounds made by insects, raindrops hitting vegetation, and other sources. A sensitivity level of six was used to reduce interference from these other sources of ultrasonic noise. Calls were recorded to a compact flash memory card with large storage capacity. The detection range of Anabat detectors depends on a number of factors (e.g., echolocation call characteristics, microphone sensitivity, habitat, the orientation of the bat, atmospheric conditions; Limpens and McCracken 2004), but is generally less than 30 m (98 ft) due to atmospheric absorption on echolocation pulses (Fenton 1991). To ensure similar detection ranges among detectors, microphone sensitivities were calibrated using a BatChirp (Tony Messina, Las Vegas, Nevada) ultrasonic emitter as described in Larson and Hayes (2000). All units were programmed to turn on each night approximately one half-hour before sunset and to turn off approximately one half-hour after sunrise.

Anabat detectors were placed inside plastic weather-tight containers with a hole cut in the side of the container through which the microphone extended. Microphones were encased in PVC tubing with drain holes that curved skyward at 45 degrees outside the container to minimize the potential for water damage due to rain. Ground units were raised approximately 3.3 ft (one m) off the ground to minimize echo interference and lift the unit above vegetation. Raised Anabat microphones were elevated 147.6 ft (45 m) on meteorological towers using a pulley system. Microphones were encased in a Bat-Hat weatherproof housing (EME Systems, Berkeley, California), and attached to a coaxial cable that transmitted ultrasonic sounds to an Anabat unit at the base of the tower. The Bat-Hat weatherproof housing was modified by replacing the Plexiglas reflector plate with a 45-degree angle PVC elbow, for better comparability with data collected by detectors on the ground.

Statistical Analysis

The units of activity were number of bat passes (Hayes 1997). A pass was defined as a continuous series of two or more call notes produced by an individual bat with no pauses between call notes of more than one second (White and Gehrt 2001, Gannon et al. 2003). In this report, the terms bat pass and bat call are used interchangeably. The number of bat passes was determined by downloading the data files to a computer and tallying the number of echolocation passes recorded. Total number of passes was corrected for effort by dividing by the number of detector nights.

For each station, bat calls were sorted into two groups, based on their minimum frequency, that correspond roughly to species groups of interest. For example, species such as western red bat (*Lasiurus blossevillii*) and those in the genus *Myotis* generally echolocate at frequencies above 40 kilohertz (kHz), whereas species such as big brown bat (*Eptesicus fuscus*), silver-haired bat (*Lasionycteris noctivagans*) and hoary bat (*Lasiurus cinereus*) have echolocation frequencies that fall below 35 kHz. Therefore, we classified calls as high-frequency (HF; > 35 kHz) and low-frequency (LF; <35 kHz) calls. To establish which species may have produced calls in each category, a list of species expected to occur in the study area was compiled from range maps (Table 1; Harvey et al. 1999, BCI website). Data determined to be noise (produced by a source other than a bat) or call notes that did not meet the pre-specified criteria to be termed a pass were removed from the analysis.

Within these categories, an attempt was made to identify calls made by hoary bats. Calls that had a distinct U-shape and that exhibited variability in the minimum frequency across the call sequence were identified as belonging to the *Lasiurus* genus (C. Corben, pers comm.). Hoary bats were distinguished based on minimum frequency; hoary bats typically produce calls with minimum frequencies between 18 and 24 kHz (J. Szewczak, pers comm.). Only sequences containing three or more calls were used for species identification. Given the high intraspecific variability of *Lasiurus* calls, and the number of call files that were too fragmented for proper identification, it is likely that more hoary bat calls were recorded than were positively identified.

The total number of bat passes per detector night was used as an index of bat use in the WRWRA. Bat pass data represented levels of bat activity rather than the numbers of individuals present because individuals could not be differentiated by their calls. To assess potential for bat mortality, the mean number of bat passes per detector night (averaged across ground-based monitoring stations) was compared to existing data from wind-energy facilities where both bat activity and mortality levels have been measured.

RESULTS

Bat Acoustic Surveys

Bat activity was monitored at three fixed, paired sampling locations over a total of 144 nights during the period June 4 to October 25, 2009. Anabat units operated correctly for the entire night for 89.1% of the sampling period (Figure 2). Levels of wind and insect noise were relatively low throughout the study period (Figure 3). Anabat units recorded 6,805 bat passes on 770 detector-nights (Table 2). Averaging bat passes per detector-night across the locations, a mean of 8.09 ± 0.55 bat passes per detector-night was recorded. The average pass rate was 11.58 ± 0.70 bat passes per detector-night for ground stations and 4.59 ± 0.43 bat passes per detector-night for stations raised on met towers to a height of 45 m.

Spatial Variation

Bat activity varied among the Anabat unit pairs in the WRWRA (mean of 8.09 bat passes per detector-night; Figures 1 and 4; Table 2). Most (59.0%) bat calls were recorded at stations WR1 and WR2 (mean of 17.28 and 10.59 bat passes per detector-night, respectively), which were located at the southern-most met tower. Detections were lowest at paired stations WR5 and WR6 (mean of 6.43 and 1.64, respectively), located at the eastern-most met tower. Detections at stations WR3 and WR4, located at the northern-most met tower, were moderate (mean 11.40 and 1.59, respectively; Figure 1 and 4; Table 2).

Comparing paired stations on just the nights that both ground and raised detectors were operating, bat activity was consistently higher at ground stations (Figure 5). The difference in bat activity levels between ground and raised units was much less between WR5 and WR6 than at other detector pairs.

Temporal Variation
Bat activity increased from early June through early July, and then peaked during early- to mid-July and again in mid-August (Table 3, Figure 6). Activity decreased through September and October, with small spikes in activity occurred in some weeks. Bat passes were recorded during every week of the survey period, but over half (54.1%) of all bat passes were recorded between July 2 and August 19 (Table 3).

Bat activity levels over time were similar at ground and raised stations (Figure 7). Raised and ground stations recorded similar levels of activity through late June, but ground stations recorded much more activity through the remainder of the study period.

Species Composition
Overall, passes by low-frequency bats (LF; 71.6% of all bat passes) outnumbered passes by high-frequency bats (HF; 28.4%; Table 2). Ground units had a similar pattern, with 62.0% of all passes being LF (Table 2; Figures 4 and 5). Among raised stations, LF bats comprised about 98% of all bat passes (Table 2; Figures 4 and 5). Patterns of activity varied slightly between species groups, with the majority (70.0%) of passes by LF species occurring between June 25 and August 26, whereas most (70.7%) passes by HF species occurred between July 23 and September 23 (Table 3; Figures 6 and 7).

Hoary bats comprised 5.9% of total passes detected within the WRWRA, and 8.2% of all low frequency passes (Table 2). Eighty-seven percent of hoary bat passes were detected at raised stations (Table 2; Figure 8). Station WR2 recorded most of the hoary bat activity (77.9% of 399 hoary bat passes). Most of the hoary bat activity was recorded between August 6 and August 26 (Figure 9).

DISCUSSION

Potential Impacts

Assessing the potential impacts of wind-energy development to bats at the WRWRA is complicated by the current lack of understanding of why bats die at wind turbines (Kunz et al. 2007b, Baerwald et al. 2008), combined with the inherent difficulties of monitoring elusive, night-flying animals (O’Shea et al. 2003). In addition, while installed capacity for wind energy has increased rapidly in recent years, the availability of well-designed studies from existing projects lags development of proposed projects (Kunz et al. 2007b). To date, monitoring studies of wind projects suggest that:

a) bat mortality shows a rough correlation with bat activity as measured by Anabat units (Table 4);

b) the majority of fatalities occur during the post-breeding or fall migration season (roughly August and September);

c) migratory tree-roosting species (eastern red, hoary, and silver-haired bats) comprise almost 75% of reported bat fatalities, and;

d) the highest reported numbers of fatalities occur at wind-energy facilities located along forested ridge tops in the eastern and northeastern US; however, recent studies in agricultural regions of Iowa and Alberta, Canada, report relatively high fatalities as well (Table 4).

Based on these patterns, current guidance to estimate potential mortality levels at a proposed wind project involves evaluation of the on-site bat acoustic data in terms of activity levels, seasonal variation, and species composition (Kunz et al. 2007b), as well as comparison to regional patterns.

Overall Activity
To date, six studies of wind energy projects have concurrently recorded both Anabat detections per night and bat mortality (Table 4). Because these concurrent studies show correlation between bat activity and fatality rates, it is assumed that a similar relationship holds for pre-construction activity and post-construction fatalities. The addition of data sets like this one will contribute to our understanding of the relationship between bat activity near wind turbines and bat fatalities. To our knowledge, data for those studies in Table 4 were collected using Anabat detectors placed near the ground (i.e., none raised on metrological towers) and none of the detectors were located near features attractive to bats. Thus, this report relies on the mean activity rate for ground-based detectors placed near metrological towers and/or potential turbine locations to assess potential risk of bat fatality at the WRWRA relative to the six studies with similar data.

Bat activity recorded by ground detectors within the WRWRA (11.58 bat passes per detector-night) was somewhat higher than that observed at facilities in Minnesota and Wyoming, where bat mortality was relatively low, but was much lower than activity levels recorded at sites in West Virginia, Iowa, and Tennessee, where bat mortality rates were higher (Table 3). Thus, based solely on the expected relationship between pre-construction bat activity and post-construction fatalities, bat mortality rates at the WRWRA would be expected to be greater than the 2.4 bat fatalities/MW/year reported at Buffalo Ridge Minnesota, but much lower than the 31.5 fatalities/MW/year reported at Buffalo Mountain, Tennessee.

Spatial Variation
The proposed WRWRA is not located near any large, known bat colonies. However, the proposed project is located on forested ridges. In the eastern US, the highest bat fatality rates have been recorded at wind-energy facilities located on forested ridges (Table 4). However, the relatively large numbers of bat fatalities recently reported in northern Iowa (Jain 2005) and southwestern Alberta (Baerwald 2006) indicate that an open landscape does not guarantee low mortality.

Activity at the southern-most met tower (stations WR1 and WR2) was relatively higher compared to other stations, accounting for the majority (59.0%) of the calls recorded during this study. These stations were located next to an area currently being cut, which may have offered bats more foraging opportunities, relative to Anabats stationed in an area undergoing regeneration or in a previously clear cut area. Bat activity was lowest at the paired stations (WR5 and WR6) placed in a clear cut.

Temporal Variation

The number of bat calls detected per night at the WRWRA was highest from early June through mid-August. Activity in July likely corresponds with the reproductive season, when pups are being weaned and foraging rates are high. August activity may represent movement of migrating bats through the area. By October, activity dropped to lower rates though a small spike in late October suggests a late migratory wave during that time period.

Fatality studies of bats at wind-energy facilities in the US have shown a peak in mortality in August and September, with generally lower mortality levels earlier in the summer (Johnson 2005, Arnett et al. 2008). Bat mortality at wind energy projects throughout the US during the breeding season has been low, as only 4.1% of the fatalities have occurred between May 15 and July 15 (Johnson 2005). At several wind farms studied, low mortality has been documented during the breeding season even though relatively large bat populations were present in the area (Fiedler 2004, Gruver 2002, Howe et al. 2002, Johnson et al. 2004, Schmidt et al. 2003). These data suggest that high bat activity levels during the breeding season do not equate to high bat fatality rates.

While the survey effort varies among the different studies, the studies that combine Anabat surveys and fatality surveys show a general association between the timing of increased bat call rates and timing of mortality, with both call rates and mortality peaking during the late summer and early fall.

Species Composition

Of the 14 species of bat likely to occur in the study area, four are known fatalities at wind-energy facilities (Table 1). Acoustic bat surveys were able to classify bat calls to frequency groups that roughly correspond to groups of relative risk. Approximately 72% of passes were by low-frequency bats, suggesting higher relative abundance of species such as big brown and silver-haired bats, and hoary bats made up 8.2% of all low-frequency passes. These species are known to occur as fatalities at wind turbine operations in the Pacific Northwest and elsewhere (Table 1). Based on data from 10 wind energy facilities in the Pacific Northwest, hoary bats and silver-haired bats have comprised the majority (93.5%) of fatalities, while big brown bats are relatively uncommon wind turbine fatalities, comprising only 1.5% of the fatalities (Johnson and Erickson 2008).

Passes by LF species were more common than those by HF species every week of the study except for a two-week period in mid-September. The relative increase in HF passes at this time may reflect movement of HF species through the area. The high-frequency group at WRWRA would be comprised of the *Myotis* bats, western red bats (*Lasiurus blossevillii*), and the canyon bat (*Parastrellus hesperus*). Bats in the HF group are not typically found during fatality studies, although little brown bat (*Myotis lucifugus*) fatalities were as common as red bat fatalities in Iowa, 1.7 times as common as silver-haired bats in Alberta, and comprised 10% of fatalities discovered at the Vansycle facility in Oregon (Arnett et al. 2008).

At raised stations, low-frequency passes greatly outnumbered high-frequency passes, which most likely reflects different migration flight heights or foraging patterns among species. Generally, low-frequency species tend to forage in less cluttered conditions (e.g., at greater heights) than high-frequency species due to their wing morphology and echolocation call structure (Norberg and Rayner 1987). To date, hoary and silver-haired bats have been found as fatalities in higher relative proportions than have big brown bats, and are therefore considered to be at greater risk for collision with wind turbines (e.g., Arnett et al. 2008).

Regional Fatality Studies

Bat mortality studies at wind-energy facilities across North America show a wide range of bat mortality rates, ranging from none to 39.70 bat fatalities/MW/year (Table 4). In general, fatality rates have been highest in the Northeast and lowest in the Northwest, although a high degree of variation in fatality rates is present for most regions. To date, bat fatality estimates in the Northwest region have ranged from 0.39 to 2.46 bat fatalities/MW/year, and averaged 1.18 (Johnson and Erickson 2008). However, all of these projects are located in the more arid eastern portions of the region, and it is not clear if similar results can be expected in the more forested western parts of the region.

CONCLUSIONS

The data collected in 2009 represent the third year of bat acoustical studies conducted at the WRWRA. In 2007, bat activity was monitored at two ground stations and one elevated station on a met tower during the period August 20 – October 21 (Solick et al. 2008). Both of these stations were located in upland habitats characteristic of proposed turbine locations. Bat activity levels were similar to those measured in 2009, as the mean number of bat passes per detector night was 7.91. In 2008, Anabat surveys were conducted at four ground stations from July 3 to October 7 (Johnson et al. 2009). Two stations were placed in clear cuts, one was placed along a logging road through a forest, and the fourth was placed adjacent to a pond in the study area to assess levels of bat activity and composition of primarily breeding bats in the project area. For all four units combined, a mean of 148.34 bat passes per detector-night was recorded. However, 80.7% of all calls were recorded at the detector set on the logging road, which was likely used as a travel corridor by bats and was not representative of cleared areas where turbines would be placed. The detector placed near the pond also recorded relatively high activity levels (178.03 bat passes/detector night). Bat activity at the two stations placed in clear cuts comprised only 19.1% of all bat passes recorded during the study (14.30 and 73.76 bat passes/detector night, respectively).

The data collected in 2009 were collected entirely at met tower locations, which were most representative of proposed turbine locations. In addition, the three units elevated on the met towers to a height of 45 m, within the rotor swept zone, likely provide the best data for assessing risk to bats in the project area (Baerwald 2008). Based on results of the 2009 study, it does not appear that construction of a wind energy facility at the WRWRA would result in high bat mortality levels. However, no data on bat mortality levels associated with wind energy developments in western coniferous forests are available to help predict risk to bats at the WRWRA. Bat fatality patterns may differ from those in open habitats as well as in eastern deciduous forests. Post-construction monitoring of the Whistling Ridge wind energy facility would provide valuable data on bat collision mortality in this environment that would be useful for assessing risk to bats of future proposed wind energy developments in western coniferous forests.

REFERENCES

Arnett, E. 2007. Report from the Bats and Wind Energy Cooperative (BWEC) on Collaborative Work and Plans. Presentation at the NWCC Wildlife Workgroup Meeting, Boulder Colorado. Conservation International. November 14th, 2007. Information available at www.nationwind.org

Arnett, E.B., K. Brown, W.P. Erickson, J. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Kolford, C.P. Nicholson, T. O'Connell, M. Piorkowski, and R. Tankersley, Jr. 2008. Patterns of Fatality of Bats at Wind Energy Facilities in North America. Journal of Wildlife Management 72: 61-78.

Arnett, E.B., W.P. Erickson, J. Kerns, and J. Horn. 2005. Relationships between Bats and Wind Turbines in Pennsylvania and West Virginia: An Assessment of Fatality Search Protocols, Patterns of Fatality, and Behavioral Interactions with Wind Turbines. Prepared for the Bats and Wind Energy Cooperative. March 2005.

Arnett, E.B., M. Schirmacher, M.M.P. Huso, and J.P. Hayes. 2009. Effectiveness of Changing Wind Turbine Cut-in Speed to Reduce Bat Fatalities at Wind Facilities: 2008 Annual Report. Prepared for the Bats and Wind Energy Cooperative (BWEC) and the Pennsylvania Game Commission. April 2009. http://www.batsandwind.org/pdf/Curtailment_2008_Final_Report.pdf

Baerwald, E. 2006. Bat Fatalities in Southern Alberta. Presented at the Wildlife Research Meeting VI, San Antonio, Texas. National Wind Coordinating Collaborative. November 2006.

Baerwald, E.F. 2008. Variation in the Activity and Fatality of Migratory Bats at Wind Energy Facilities in Southern Alberta: Causes and Consequences. Thesis. University of Calgary, Alberta, Canada.

Baerwald, E.F., G.H. D'Amours, B.J. Klug, and R.M.R. Barclay. 2008. Barotrauma is a Significant Cause of Bat Fatalities at Wind Turbines. Current Biology 18(16): R695-R696.

Bat Conservation International (BCI) website. Bat Species: US Bats. Bat Conservation International, Inc., Austin, Texas. Accessed 2009. Homepage: http://www.batcon.org Species Profiles: http://batcon.org/index.php/education/article-and-information/species-profiles.html

Brown, W.K. and B.L. Hamilton. 2006. Monitoring of Bird and Bat Collisions with Wind Turbines at the Summerview Wind Power Project, Alberta: 2005-2006. Prepared for Vision Quest Windelectric, Calgary, Alberta by TEAM Ltd., Calgary, Alberta, and BLH Environmental Services, Pincher Creek, Alberta. September 2006. http://www.batsandwind.org/pdf/Brown2006.pdf

Burba, E.A., G.D. Schnell, and J.A. Grzybowski. 2008. Post-Construction Avian/Bat Fatality Study for the Blue Canyon II Wind Power Project, Oklahoma: Summary of Preliminary Findings for 2006-2007. Interim Report to Horizon Wind Energy. Sam Noble Oklahoma Museum of Natural History, University of Oklahoma, Norman, Oklahoma. August 2004.

Derby, C., A. Dahl, W. Erickson, K. Bay, and J. Hoban. 2007. Post-Construction Monitoring Report for Avian and Bat Mortality at the NPPD Ainsworth Wind Farm. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, for the Nebraska Public Power District.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report: July 2001 - December 2003. Technical report for and peer-reviewed by FPL Energy, Stateline Technical Advisory Committee, and the Oregon Energy Facility Siting Council, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Walla Walla, Washington, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. December 2004. http://www.west-inc.com

Erickson, W.P., J. Jeffrey, and V.K. Poulton. 2008. Avian and Bat Monitoring: Year 1 Report. Puget Sound Energy Wild Horse Wind Project, Kittitas County, Washington. Prepared for Puget Sound Energy, Ellensburg, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. January 2008.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and Bat Mortality Associated with the Vansycle Wind Project, Umatilla County, Oregon: 1999 Study Year. Technical report prepared by WEST, Inc. for Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 21pp. http://www.west-inc.com/reports/vansyclereportnet.pdf

Erickson, W.P., K. Kronner, and B. Gritski. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report. September 2002 – August 2003. Prepared for the Nine Canyon Technical Advisory Committee and Energy Northwest by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants (NWC), Pendleton, Oregon. October 2003. http://www.west-inc.com/reports/nine_canyon_monitoring_final.pdf

Fenton, M.B. 1991. Seeing in the Dark. BATS (Bat Conservation International) 9(2): 9-13.

Fiedler, J.K. 2004. Assessment of Bat Mortality and Activity at Buffalo Mountain Windfarm, Eastern Tennessee. Thesis. University of Tennessee, Knoxville, Tennessee.

Fiedler, J.K., T.H. Henry, R.D. Tankersley, and C.P. Nicholson. 2007. Results of Bat and Bird Mortality Monitoring at the Expanded Buffalo Mountain Windfarm, 2005. Tennessee Valley Authority, Knoxville, Tennessee. https://www.tva.gov/environment/bmw_report/results.pdf

Gannon, W.L., R.E. Sherwin, and S. Haymond. 2003. On the Importance of Articulating Assumptions When Conducting Acoustic Studies of Habitat Use by Bats. Wildlife Society Bulletin 31: 45-61.

Gruver, J.C. 2002. Assessment of Bat Community Structure and Roosting Habitat Preferences for the Hoary Bat (Lasiurus cinereus) near Foote Creek Rim, Wyoming. M.S. Thesis. University of Wyoming, Laramie, Wyoming.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States. Arkansas Game and Fish Commission and US Fish and Wildlife Service, Arkansas.

Hayes, J.P. 1997. Temporal Variation in Activity of Bats and the Design of Echolocation-Monitoring Studies. Journal of Mammalogy 78: 514-524.

Howe, R.W., W. Evans, and A.T. Wolf. 2002. Effects of wind turbines on birds and bats in northeastern Wisconsin. Wisconsin Public Service Corporation, Madison, Wisconsin.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2007. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study – 2006. Final Report. Prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, and L. Slobodnik. 2008. Annual Report for the Maple Ridge Wind Power Project: Post-Construction Bird and Bat Fatality Study - 2007. Final report prepared for PPM Energy and Horizon Energy and Technical Advisory Committee (TAC) for the Maple Ridge Project Study.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, A. Fuerst, and C. Hansen. 2009a. Annual Report for the Noble Ellenburg Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Histed, and J. Meacham. 2009b. Annual Report for the Noble Clinton Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

Jain, A., P. Kerlinger, R. Curry, L. Slobodnik, J. Quant, and D. Pursell. 2009c. Annual Report for the Noble Bliss Windpark, LLC, Postconstruction Bird and Bat Fatality Study - 2008. Prepared for Noble Environmental Power, LLC by Curry and Kerlinger, LLC. April 13, 2009.

James, R.D. 2008. Erie Shores Wind Farm Port Burwell, Ontario: Fieldwork Report for 2006 and 2007 During the First Two Years of Operation. Report to Environment Canada, Ontario Ministry of Natural Resources, Erie Shores Wind Farm LP - McQuarrie North American and AIM PowerGen Corporation. January 2008.

Johnson, G.D. 2005. A Review of Bat Mortality at Wind-Energy Developments in the United States. Bat Research News 46(2): 45-49.

Johnson, G.D. and W.P. Erickson. 2008. Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Final Report prepared for Klickitat County Planning Department, Goldendale Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. October 30, 2008.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, and D.A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-Year Study. Final report prepared for Northern States Power Company, Minneapolis, Minnesota, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. September 22, 2000. 212 pp. http://www.west-inc.com

Johnson, G.D., W.P. Erickson, and J. White. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Project, Sherman County, Oregon. March 2003. Technical report prepared for Northwestern Wind Power, Goldendale, Washington, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. http://www.west-inc.com

Johnson, G.D., M.K. Perlik, W.P. Erickson, and M.D. Strickland. 2004. Bat Activity, Composition and Collision Mortality at a Large Wind Plant in Minnesota. Wildlife Society Bulletin 32: 1278-1288.

Johnson, G., J. Gruver, T. Enz and J. Baker. 2009. Bat Acoustic Studies for the Saddleback Wind Resource Area, Skamania County, Washington, July 3 – October 7th, 2008. Unpublished report prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Kerlinger, P. 2002. An Assessment of the Impacts of Green Mountain Power Corporation's Wind Power Facility on Breeding and Migrating Birds in Searsburg, Vermont: July 1996-July 1998. NREL/SR-500-28591. Prepared for Vermont Public Service, Montpelier, Vermont. US Department of Energy, National Renewable Energy Laboratory, Golden, Colorado. March 2002. 95 pp. http://www.nrel.gov/docs/fy02osti/28591.pdf

Kerlinger, P., R. Curry, L. Culp, A. Jain, C. Wilkerson, B. Fischer, and A. Hasch. 2006. Post-Construction Avian and Bat Fatality Monitoring for the High Winds Wind Power Project, Solano County, California: Two Year Report. Prepared for High Winds LLC, FPL Energy by Curry and Kerlinger, LLC. April 2006.

Kerlinger, P., R. Curry, A. Hasch, and J. Guarnaccia. 2007. Migratory Bird and Bat Monitoring Study at the Crescent Ridge Wind Power Project, Bureau County, Illinois: September 2005 - August 2006. Final draft prepared for Orrick Herrington and Sutcliffe, LLP. May 2007.

Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collisions at the Mountaineer Wind Energy Facility, Tucker County, West Virginia: Annual Report for 2003. Prepared for FPL Energy and the Mountaineer Wind Energy Center Technical Review Committee. February 14, 2004. Technical report prepared by Curry and Kerlinger, LLC. for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. Curry and Kerlinger, LLC. 39 pp. http://www.wvhighlands.org/Birds/MountaineerFinalAvianRpt-%203-15-04PKJK.pdf

Kronner, K., B. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Fatality Monitoring Study: 2006−2007. Final report prepared for PPM Energy and the Big Horn Wind Project Technical Advisory Committee by Northwest Wildlife Consultants, Inc. (NWC), Mid-Columbia Field Office, Goldendale, Washington. June 1, 2008.

Kunz, T.H., E.B. Arnett, B.M. Cooper, W.P. Erickson, R.P. Larkin, T. Mabee, M.L. Morrison, M.D. Strickland, and J.M. Szewczak. 2007a. Assessing Impacts of Wind-Energy Development on Nocturnally Active Birds and Bats: A Guidance Document. Journal of Wildlife Management 71(8): 2449-2486.

Kunz, T.H., E.B. Arnett, W.P. Erickson, A.R. Hoar, G.D. Johnson, R.P. Larkin, M.D. Strickland, R.W. Thresher, and M.D. Tuttle. 2007b. Ecological Impacts of Wind Energy Development on Bats: Questions, Research Needs, and Hypotheses. Frontiers in Ecology and the Environment 5(6): 315-324.

Larson, D.J. and J.P. Hayes. 2000. Variability in Sensitivity of Anabat II Detectors and a Method of Calibration. Acta Chiropterologica 2: 209-213.

Limpens, H.J.G.A. and G.F. McCracken. 2004. Choosing a Bat Detector: Theoretical and Practical Aspects. *In*: Bat Echolocation Research: Tools, Techniques, and Analysis. R. M. Brigham, E. K. V. Kalko, G. Jones, S. Parsons, and H. J. G. A. Limpens, eds. Bat Conservation International, Austin, Texas. Pp. 28-37.

Messina, T. 2004. The Nevada Bat Technical Notes Archive: Remote Transducers for Anabats.

Nicholson, C.P., J. R.D. Tankersley, J.K. Fiedler, and N.S. Nicholas. 2005. Assessment and Prediction of Bird and Bat Mortality at Wind Energy Facilities in the Southeastern United States. Final Report. Tennessee Valley Authority, Knoxville, Tennessee.

Norberg, U.M. and J.M.V. Rayner. 1987. Ecological Morphology and Flight in Bats (Mammalia; Chiroptera): Wing Adaptations, Flight Performance, Foraging Strategy and Echolocation. Philosophical Transactions of the Royal Society of London 316: 335-427.

Northwest Wildlife Consultants, Inc. (NWC) and Western EcoSystems Technology, Inc. (WEST). 2007. Avian and Bat Monitoring Report for the Klondike II Wind Power Project. Sherman County, Oregon. Prepared for PPM Energy, Portland, Oregon. Managed and conducted by NWC, Pendleton, Oregon. Analysis conducted by WEST, Cheyenne, Wyoming. July 17, 2007.

O'Shea, T.J., M.A. Bogan, and L.E. Ellison. 2003. Monitoring Trends in Bat Populations of the US and Territories: Status of the Science and Recommendations for the Future. Wildlife Society Bulletin 31: 16-29.

Piorkowski, M.D. 2006. Breeding Bird Habitat Use and Turbine Collisions of Birds and Bats Located at a Wind Farm in Oklahoma Mixed-Grass Prairie. M.S. Thesis. Oklahoma State University, Stillwater, Oklahoma. 112 pp. July 2006. http://www.batsandwind.org/pdf/Piorkowski_2006.pdf

Schmidt, E., A.J. Piaggio, C.E. Bock, and D.M. Armstrong. 2003. National Wind Technology Center site environmental assessment: bird and bat use and fatalities – final report NREL/SR-500-32981, National Renewable Energy Laboratory, Golden, Colorado. 21pp.

Solick, D., G. Johnson and J. Baker. 2008. Bat Acoustic Studies for the Saddleback Wind Energy Project, Skamania County, Washington, August 20th – October 21st, 2007. Prepared by WEST, Inc. for SDS Lumber Company.

Stantec Consulting Inc. (Stantec). 2008. 2007 Spring, Summer, and Fall Post-Construction Bird and Bat Mortality Study at the Mars Hill Wind Farm, Maine. Prepared for UPC Wind Management, LLC, Cumberland, Maine, by Stantec Consulting, formerly Woodlot Alternatives, Inc., Topsham, Maine. January, 2008.

Stantec Consulting Inc. (Stantec). 2009. Post-Construction Monitoring at the Mars Hill Wind Farm, Maine - Year 2, 2008. Prepared for First Wind Management, LLC, Portland, Maine. Prepared by Stantec Consulting, Topsham, Maine. January 2009.

Tierney, R. 2007. Buffalo Gap I Wind Farm Avian Mortality Study: February 2006-January 2007. Final Survey Report. Prepared for AES SeaWest, Inc. TRC, Albuquerque, New Mexico.TRC Report No. 110766-C-01. May 2007.

TRC Environmental Corporation. 2008. Post-Construction Avian and Bat Fatality Monitoring and Grassland Bird Displacement Surveys at the Judith Gap Wind Energy Project, Wheatland County, Montana. Prepared for Judith Gap Energy, LLC, Chicago, Illinois. TRC Environmental Corporation, Laramie, Wyoming. TRC Project 51883-01 (112416). January 2008. http://www.newwest.net/pdfs/AvianBatFatalityMonitoring.pdf

URS, W.P. Erickson, and L. Sharp. 2005. Phase 1 and Phase 1A Avian Mortality Monitoring Report for 2004-2005 for the SMUD Solano Wind Project. Prepared for Sacramento Municipal Utility District (SMUD), Sacramento, California. Co-Authors: Wally Erickson, Western EcoSystems Technology, Inc. (WEST) and Lynn Sharp, Environmental Consultant. August 2005.

White, E.P. and S.D. Gehrt. 2001. Effects of Recording Media on Echolocation Data from Broadband Bat Detectors. Wildlife Society Bulletin 29: 974-978.

Young, D.P. Jr., W.P. Erickson, K. Bay, S. Nomani, and W. Tidhar. 2009. Mount Storm Wind Energy Facility, Phase 1 Post-Construction Avian and Bat Monitoring, July - October 2008. Prepared for NedPower Mount Storm, LLC, Houston, Texas, by Western EcoSystems Technology (WEST), Inc., Cheyenne, Wyoming.

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Avian and Bat Mortality Associated with the Initial Phase of the Foote Creek Rim Windpower Project, Carbon County, Wyoming, Final Report, November 1998 - June 2002. Prepared for PacifiCorp, Inc. Portland, Oregon, SeaWest Windpower Inc. San Diego, California, and Bureau of Land Management, Rawlins District Office, Rawlins, Wyoming.

Young, D.P. Jr., W.P. Erickson, J. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Western EcoSystems Technology, Inc. (WEST) Cheyenne, Wyoming, and Walla Walla, Washington. 25 pp.

Young, D.P. Jr., J. Jeffrey, W.P. Erickson, K. Bay, and V.K. Poulton. 2006. Eurus Combine Hills Turbine Ranch. Phase 1 Post Construction Wildlife Monitoring First Annual Report. Technical report prepared for Eurus Energy America Corporation, San Diego, California, and the Combine Hills Technical Advisory Committee, Umatilla County, Oregon. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming, and Northwest Wildlife Consultants, Inc. (NWC), Pendleton, Oregon.

Table 1. Bat species determined from range-maps (Harvey et al. 1999, BCI website) as likely to occur within the Whistling Ridge Wind Resource Area, sorted by call frequency.

Common Name	Scientific Name
High Frequency (HF; ≥ 35 kHz)	
western red bat	*Lasiurus blossevillii*
California bat	*Myotis californicus*
western small-footed bat[3]	*Myotis ciliolabrum*
western long-eared bat	*Myotis evotis*
little brown bat[2]	*Myotis lucifugus*
long-legged bat	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
canyon bat	*Parastrellus hesperus*
Low Frequency (LF; < 35 kHz)	
pallid bat	*Antrozous pallidus*
Townsend's big-eared bat	*Corynorhinus townsendii*
big brown bat[2]	*Eptesicus fuscus*
silver-haired bat[1,2]	*Lasionycteris noctivagans*
hoary bat[1,2]	*Lasiurus cinereus*
fringed myotis[3]	*Myotis thysanodes*

[1]long-distance migrant
[2]species known to have been killed at wind-energy facilities
[3]species occurrence based upon a single source

Table 2. Results of bat acoustic surveys conducted at the Whistling Ridge Wind Resource Area, June 4, 2009 - October 25, 2009.

AnaBat Station	Location	# of HF Bat Passes	# of LF Bat Passes	# of Hoary Bat Passes*	Total Bat Passes	Detector-Nights	Bat Passes/ Night
WR1	ground	762	1,726	38	2,488	144	17.28±1.65
WR2	raised	20	1,505	311	1,525	144	10.59±1.15
WR3	ground	763	827	7	1,590	144	11.04±0.75
WR4	raised	13	186	23	199	130	1.53±0.17
WR5	ground	364	524	9	888	138	6.43±0.61
WR6	raised	10	105	11	115	70	1.64±0.22
Total Ground		**1,889**	**3,077**	**54**	**4,966**	**426**	**11.58±0.7**
Total Raised		**43**	**1,796**	**345**	**1,839**	**344**	**4.59±0.43**
Grand Total		**1,932**	**4,873**	**399**	**6,805**	**770**	**8.09±0.55**

*Passes by hoary bat passes is included in low frequency (LF) numbers

Table 3. Weekly bat activity and the contribution of each week (%) to total recorded activity for high-frequency (HF), low-frequency (LF), and all bats within the Whistling Ridge Wind Resource Area.

Week	HF Pass Rate	HF % Composition	LF Pass Rate	LF % Composition	All Bats Pass Rate	All Bats % Composition	Cumulative % Composition
06/04/09 to 06/10/09	0.52	1.0	2.95	2.2	3.48	1.9	1.9
06/11/09 to 06/17/09	1.07	2.0	5.90	4.4	6.98	3.8	5.6
06/18/09 to 06/24/09	1.81	3.4	4.47	3.4	6.28	3.4	9.0
06/25/09 to 07/01/09	2.89	5.5	7.31	5.5	10.20	5.5	14.5
07/02/09 to 07/08/09	2.46	4.6	15.97	12.0	18.43	9.9	24.4
07/09/09 to 07/15/09	2.20	4.2	12.00	9.0	14.20	7.6	32.0
07/16/09 to 07/22/09	2.66	5.0	15.83	11.9	18.49	9.9	41.9
07/23/09 to 07/29/09	3.86	7.3	7.51	5.6	11.37	6.1	48.0
07/30/09 to 08/05/09	3.36	6.3	7.17	5.4	10.52	5.7	53.7
08/06/09 to 08/12/09	2.38	4.5	9.79	7.4	12.17	6.5	60.2
08/13/09 to 08/19/09	5.69	10.8	9.74	7.3	15.43	8.3	68.5
08/20/09 to 08/26/09	5.10	9.6	7.87	5.9	12.97	7.0	75.5
08/27/09 to 09/02/09	3.53	6.7	4.90	3.7	8.43	4.5	80.0
09/03/09 to 09/09/09	3.86	7.3	4.17	3.1	8.02	4.3	84.3
09/10/09 to 09/16/09	5.83	11.0	4.17	3.1	10.00	5.4	89.7
09/17/09 to 09/23/09	3.83	7.2	2.69	2.0	6.51	3.5	93.2
09/24/09 to 09/30/09	0.76	1.4	2.00	1.5	2.76	1.5	94.7
10/01/09 to 10/07/09	0.45	0.9	2.50	1.9	2.95	1.6	96.3
10/08/09 to 10/14/09	0.14	0.3	0.77	0.6	0.91	0.5	96.8
10/15/09 to 10/21/09	0.49	0.9	4.20	3.2	4.69	2.5	99.3
10/22/09 to 10/25/09	0.05	0.1	1.25	0.9	1.30	0.7	100.0

Table 4. Wind-energy facilities in North America, with both Anabat sampling and bat mortality data, grouped by geographic region. To date, no results from southwestern or southeastern wind-energy facilities have been made public.

Geographic Region	Wind-Energy Facility	Activity (#/detector night)	Mortality (bats/MW/year)	Number of Turbines	Total Site MW	Reference
Northwestern	**Whistling Ridge, WA**	**8.09**				**This study**
	Nine Canyon, WA		2.47	37	48	Erickson et al. 2003
	High Winds, CA		2.02	90	162	Kerlinger et al. 2006
	Big Horn, WA		1.90	133	199.5	Kronner et al. 2008
	Combine Hills, OR		1.88	41	41	Young et al. 2006
	Stateline, WA/OR		1.70	454	300	Erickson et al. 2004
	Vansycle, OR		1.12	38	24.9	Erickson et al. 2000
	Klondike, OR		0.77	16	24	Johnson et al. 2003
	Hopkins Ridge, WA		0.63	83	150	Young et al. 2007
	Klondike II, WA		0.41	50	75	NWC and WEST 2007
	Wild Horse, WA		0.39	127	229	Erickson et al. 2008
	SMUD, CA		0.07		15	URS et al. 2005
Midwest & Rocky Mountains	Summerview, Alberta (2007/2008)		11.42	39	70.2	Baerwald 2008
	Summerview, Alberta (2005/2006)		10.27	39	70.2	Brown and Hamilton 2006
	Judith Gap, MT		8.93	90	135	TRC 2008
	Blue Canyon II, OK (2006/2007)		3.71	84	151.2	Burba et al. 2008
	Crescent Ridge, OK		3.27	33	49.5	Kerlinger et al. 2007
	Foote Creek Rim, WY (Phase I)	2.2	2.23	69	41.4	Young et al. 2003
	NPPD Ainsworth, NE		1.16	36	59.4	Derby et al. 2007
	Oklahoma Wind Energy Center, OK		0.53	68	102	Piorkowski 2006
	Buffalo Gap, TX		0.10	67	134	Tierney 2007
Upper Midwest	Top of Iowa, IA (2004)	34.9	10.27	89	80	Jain 2005
	Top of Iowa, IA (2003)		7.16	89	80	Jain 2005
	Buffalo Ridge, MN (Phase III)		2.72	138	103.5	Johnson et al. 2000
	Buffalo Ridge, MN (Phase II)	2.1	2.37	143	107.25	Johnson et al. 2000
	Buffalo Ridge, MN (Phase I)		0.76	73	25	Johnson et al. 2000

	Buffalo Mountain, TN (Phase II)		39.70	18	29	Fiedler et al. 2007
	Mountaineer, WV	38.3	31.69	44	66	Kerns and Kerlinger 2004
	Buffalo Mountain TN (Phase I)	23.7	31.54	3	2	Nicholson et al. 2005
	Casselman, PA		15.66	23	34.5	Arnett et al. 2009
	Maple Ridge, NY 2006		15.00	195	321.75	Jain et al. 2007
	Mount Storm, WV	35.2	12.21	82	164	Young et al. 2009
	Meyersdale, PA		10.93	20	30	Arnett et al. 2005
Eastern	Maple Ridge, NY 2007		9.42	195	321.75	Jain et al. 2008
	Noble Ellensburg, NY		5.45	54	80	Jain et al. 2009a
	Noble Bliss, NY		5.05	67	100	Jain et al. 2009c
	Noble Clinton, NY		3.63	67	100.5	Jain et al. 2009b
	Mars Hill, ME 2007		2.91	28	42	Stantec 2008
	Erie Shores, Ont.		1.51	66	99	James 2008
	Mars Hill, NY 2008		0.45	28	42	Stantec 2009
	Searsburg, NY		0.00	11	7	Kerlinger 2002

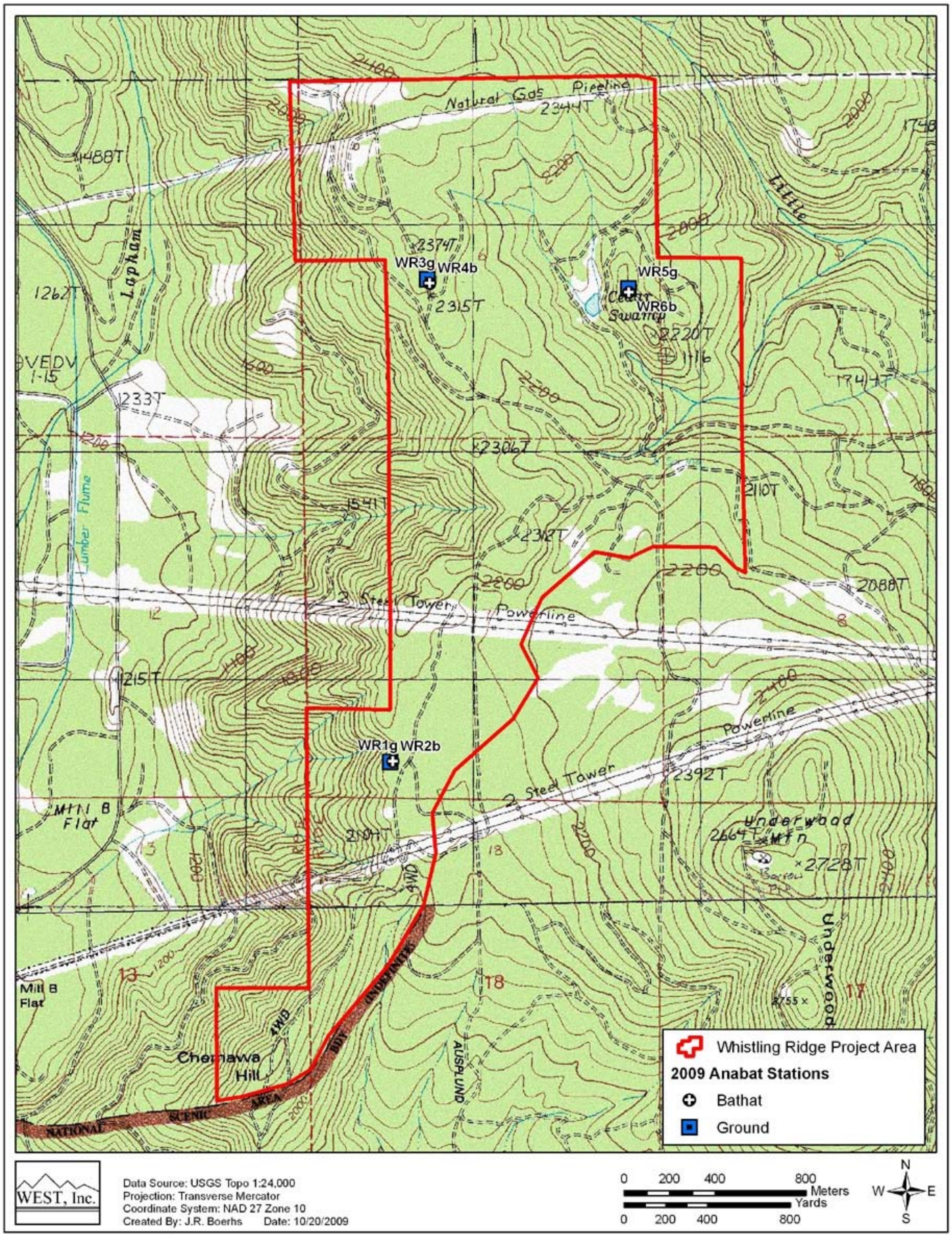


Figure 1. Study area map and Anabat sampling stations at the Whistling Ridge Wind Resource Area.

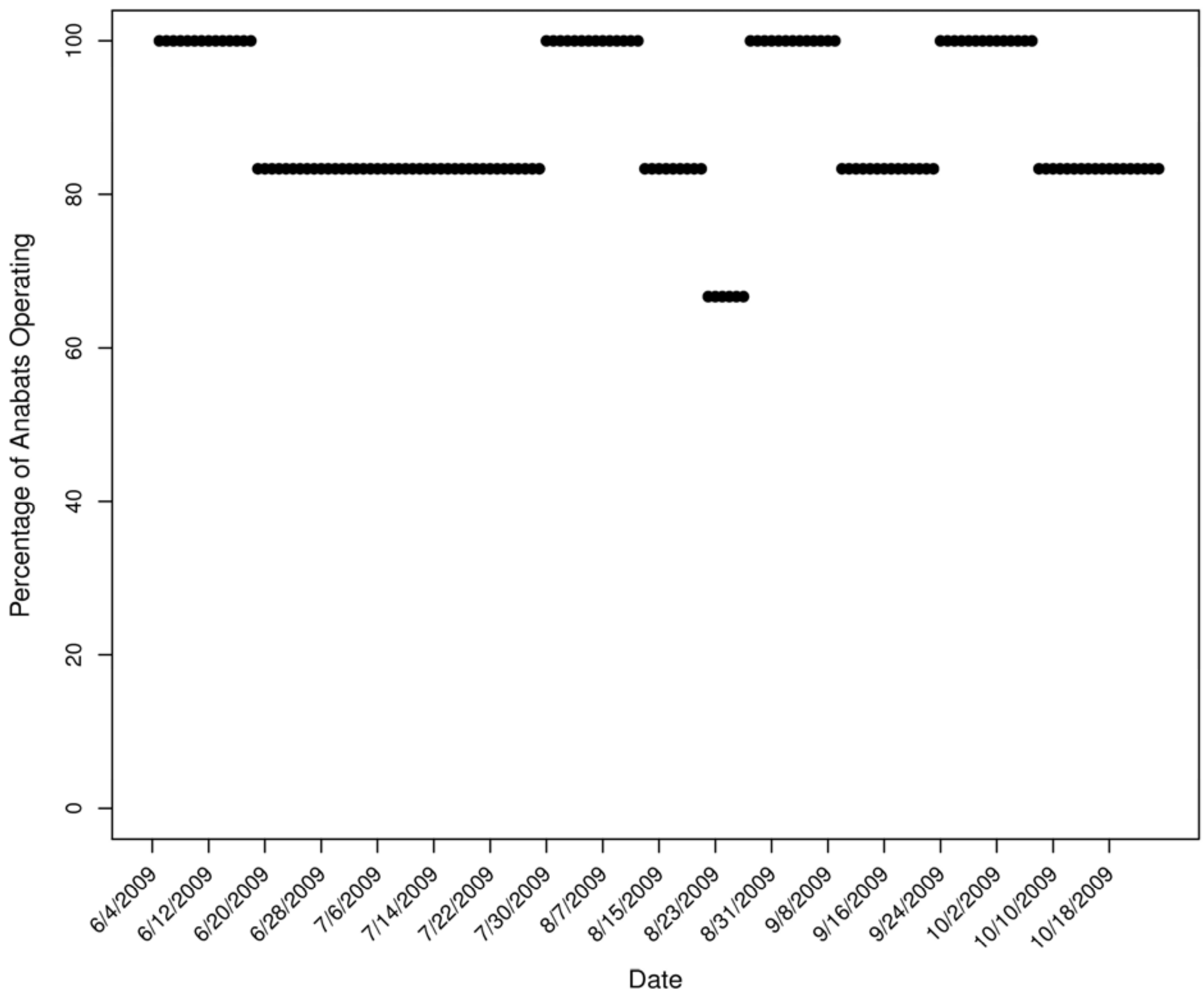


Figure 2. Number of Anabat detectors (n = 6) at the Whistling Ridge Wind Resource Area operating during each night of the study period, June 4 – October 25, 2009.

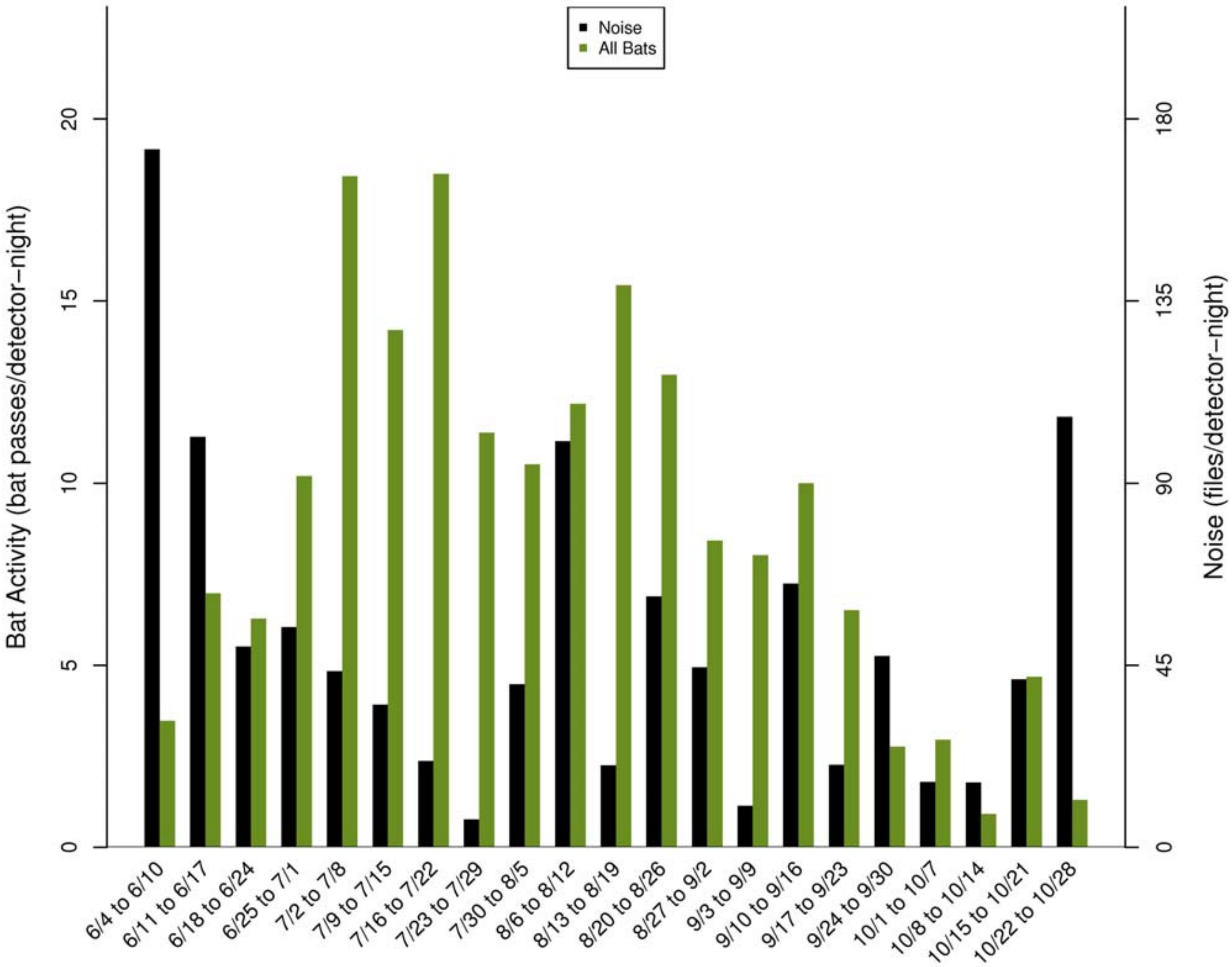


Figure 3. Number of bat passes and noise files detected per detector-night at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009, presented nightly. Noise files are indicated on the second axis.

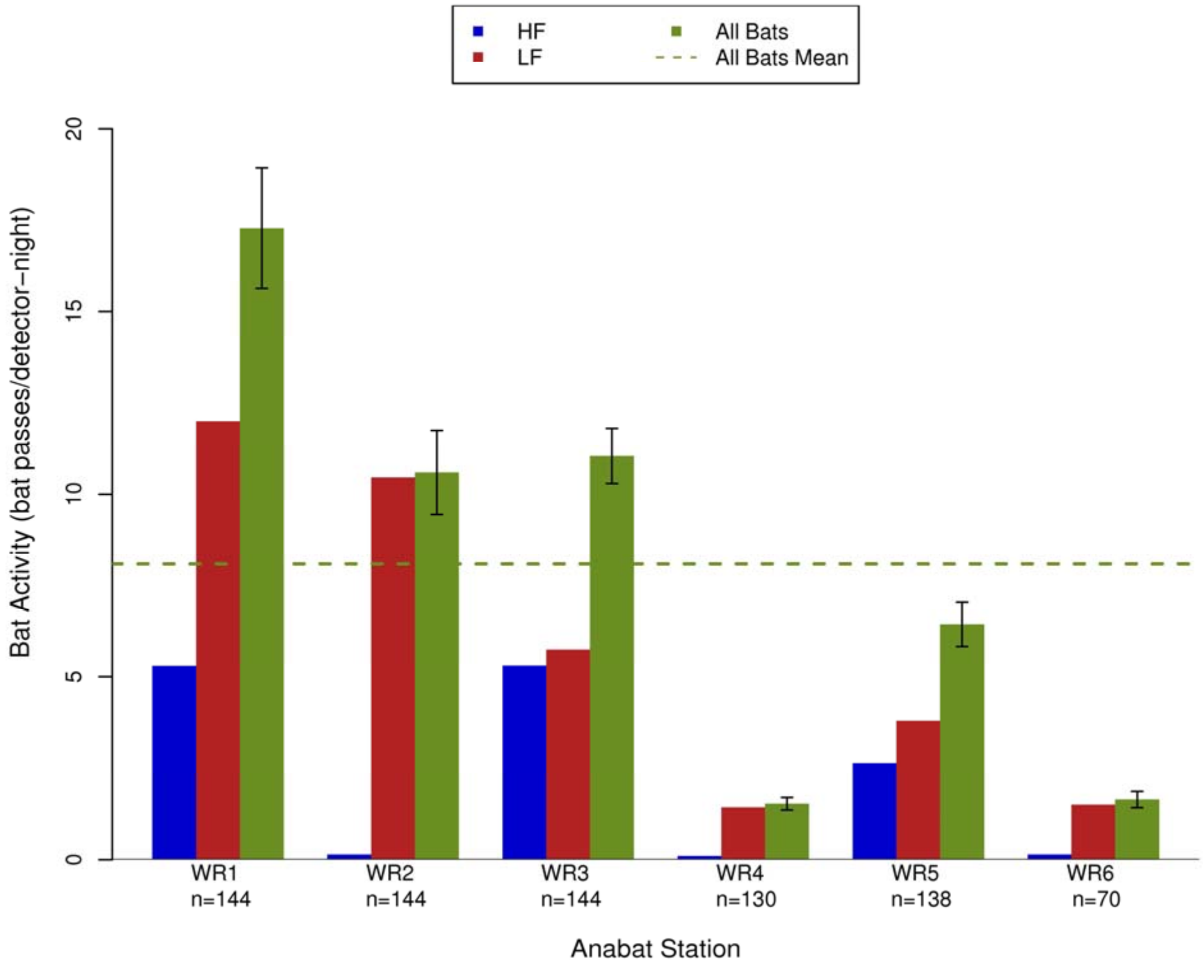


Figure 4. Number of bat passes per detector-night by Anabat location at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

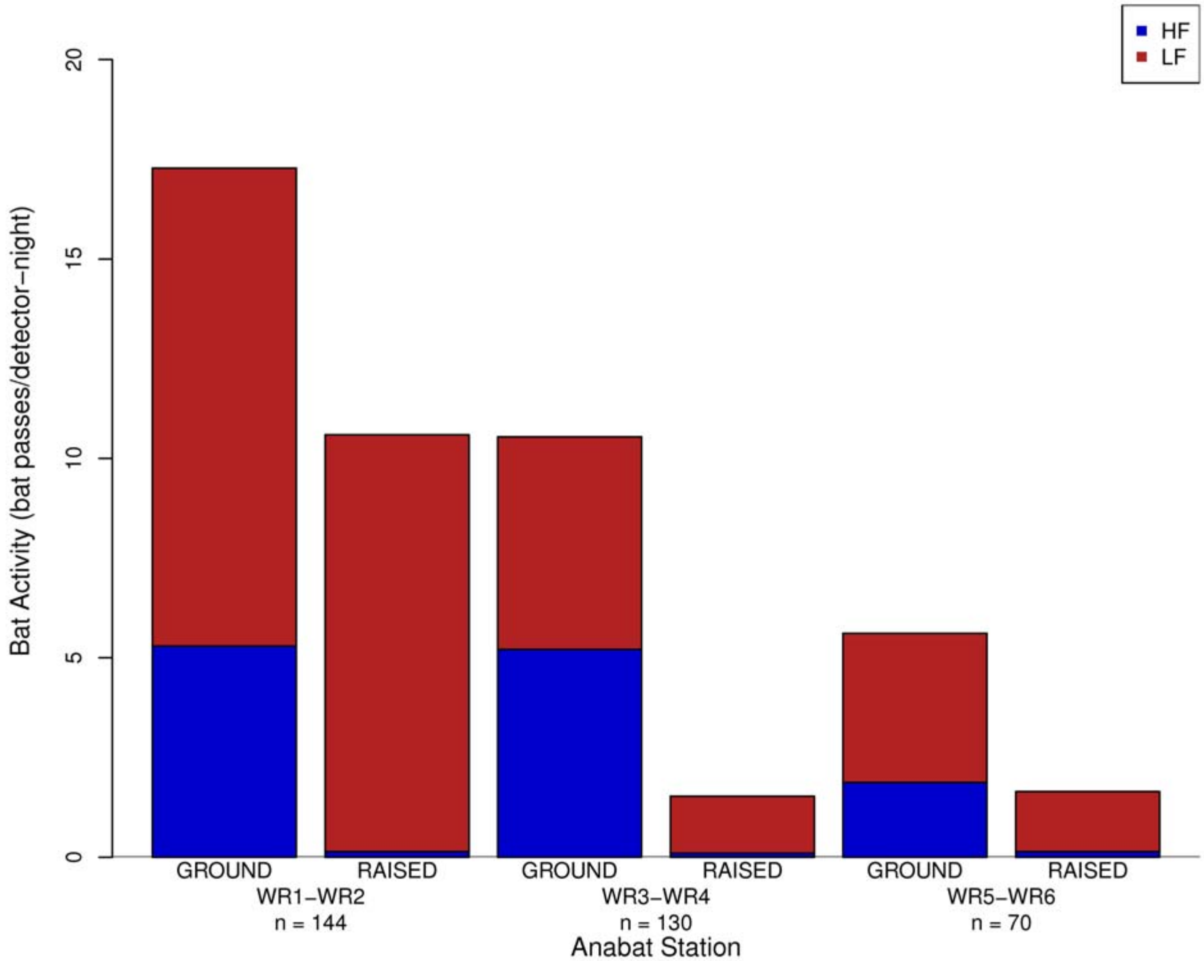


Figure 5. Number of high-frequency (HF) and low-frequency (LF) bat passes per detector-night recorded at paired ground and high Anabat unit stations at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

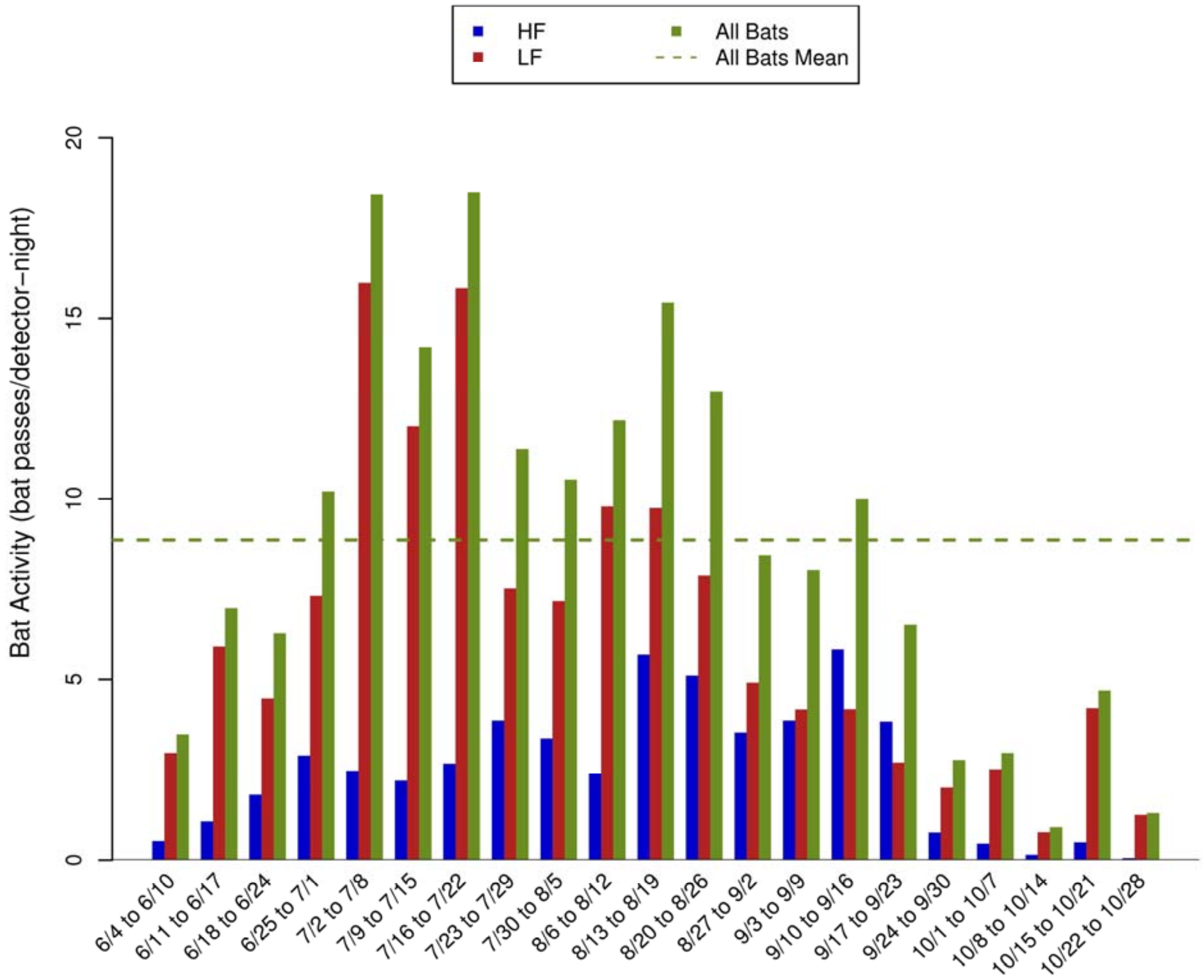


Figure 6. Weekly activity by high-frequency (HF) and low-frequency (LF) bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

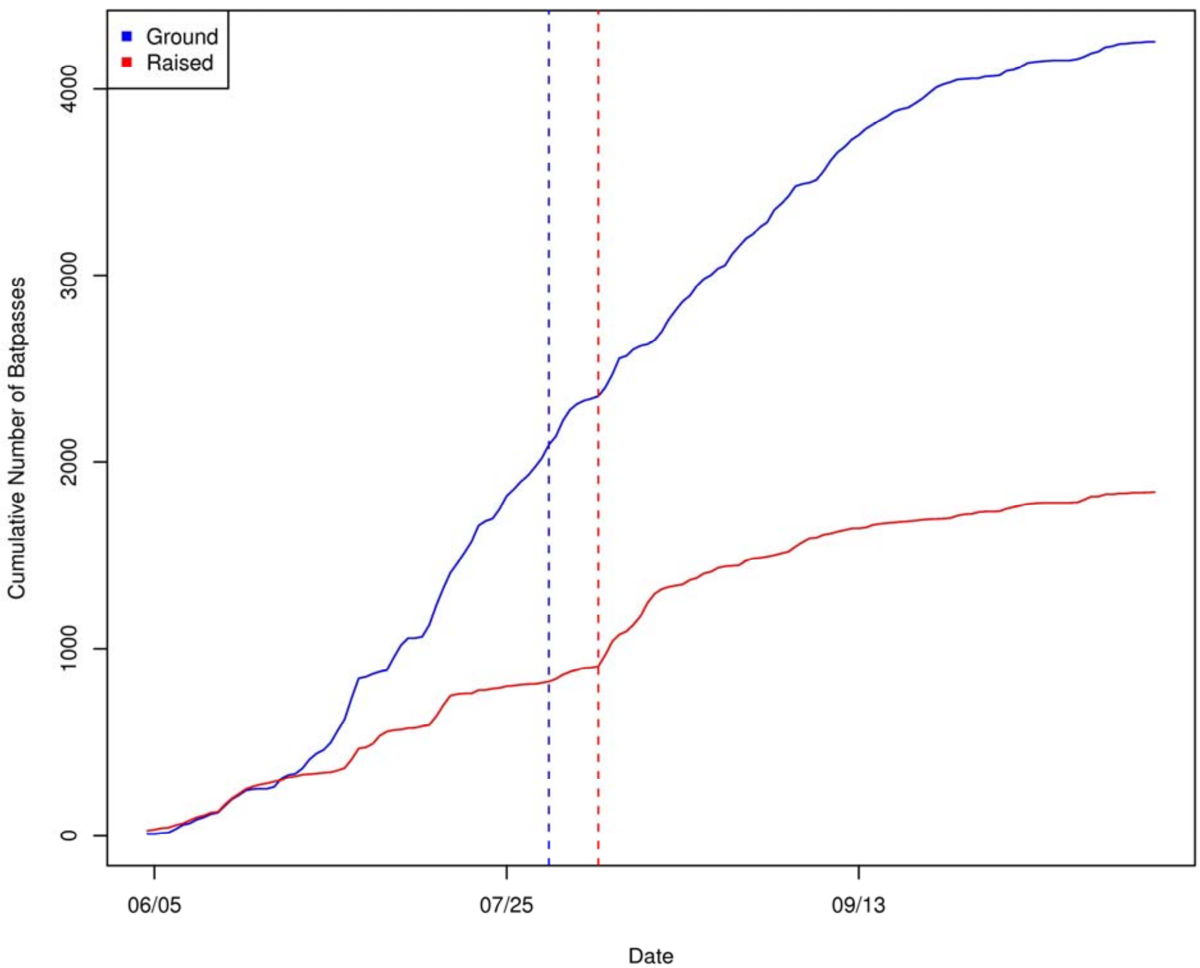


Figure 7. Empirical cumulative distribution of bat passes at ground and raised stations within the Whistling Ridge Wind Resource Area, June 4 – October 25, 2009. Dashed vertical lines indicate the point at which 50% of the calls occurred, an indication of the median date of bat activity.

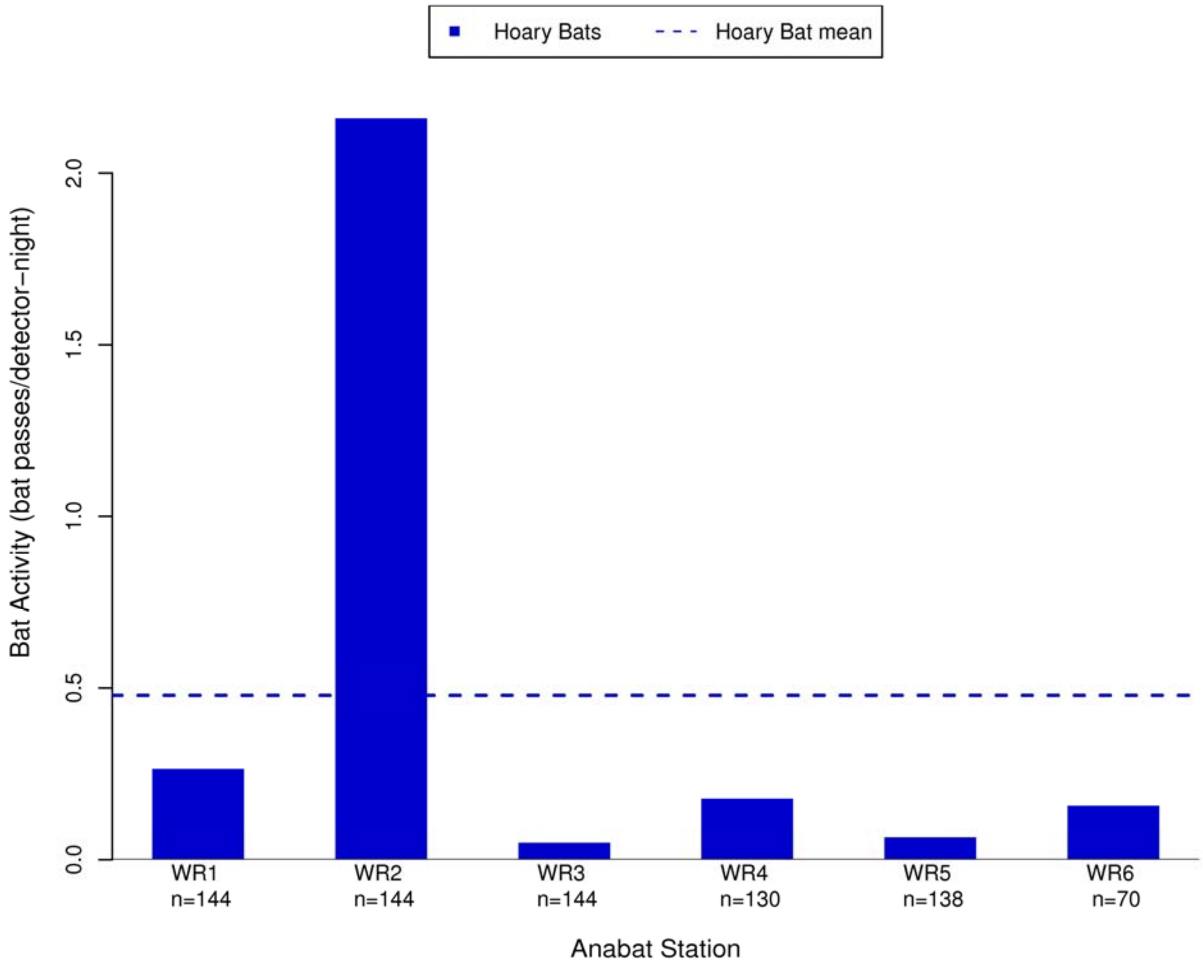


Figure 8. Number of passes per detector–night by hoary bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

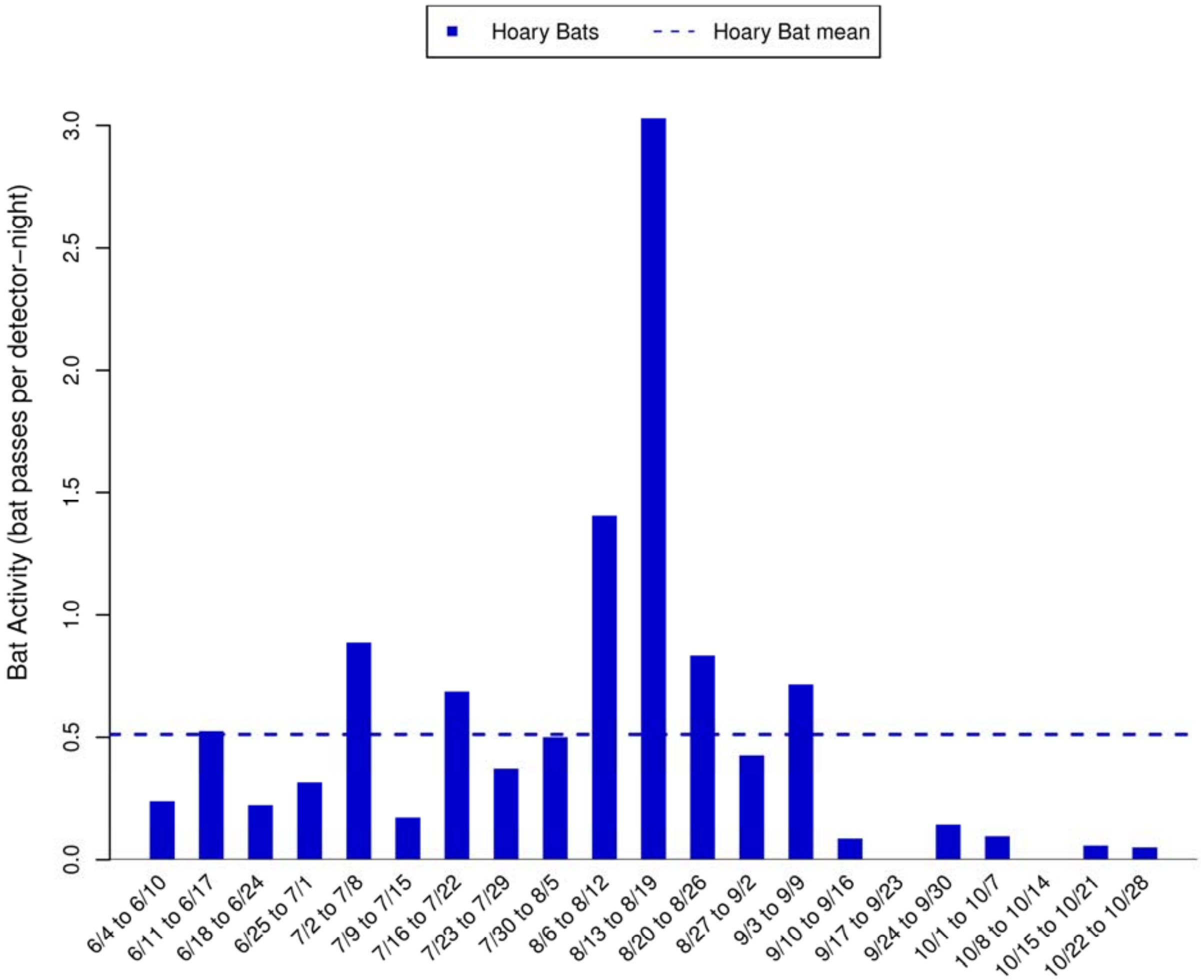


Figure 9. Weekly number of passes per detector–night by hoary bats at the Whistling Ridge Wind Resource Area for the study period June 4 – October 25, 2009.

C-11

Revised Final Report. Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon.

Prepared for Klickitat County Planning Department.

WEST, Inc. 2010.

AVIAN, BAT AND HABITAT CUMULATIVE IMPACTS ASSOCIATED WITH WIND ENERGY DEVELOPMENT IN THE COLUMBIA PLATEAU ECOREGION OF EASTERN WASHINGTON AND OREGON

Prepared For:

Klickitat County Planning Department

Prepared By:

Gregory D. Johnson and Wallace P. Erickson

Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, Wyoming 82001

WEST, Inc.

Specializing in Ecological Field Studies

February 2010

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION AND BACKGROUND

Over the last decade, wind energy development has been occurring in Oregon and Washington within the Columbia Plateau physiographic region (ecoregion). With this development comes the potential for direct impacts to birds and bats through collision mortality and for indirect effects through habitat fragmentation or displacement of birds and other wildlife. Proposals for wind energy developments are commonly reviewed by natural resource agencies, private conservation groups, permitting authorities and other stakeholders. Frequently, baseline studies are conducted to estimate bird and bat abundance at proposed development sites for use in impact assessments and siting project features, followed by post-construction monitoring studies to measure actual impacts from the wind-energy facility.

With the possible exception of golden eagles (*Aquila chrysaetos*) at the Altamont Pass wind-energy facility, California, where an estimated 40–70 golden eagles are killed each year (Hunt 2002, Smallwood and Thelander 2004), no wind-energy facilities have been documented to cause population declines of any species (Johnson and Stephens 2010). The purpose of this report is to estimate cumulative impacts associated with all existing, permitted, and currently proposed wind-energy facilities within the Columbia Plateau Ecoregion (CPE) of eastern Washington and Oregon. This report updates a previous version (Johnson and Erickson 2008) to account for additional bird and bat fatality estimates from the Leaning Juniper and Klondike III wind energy projects in Oregon, as well as additional raw data on species composition of turbine fatalities from the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon. For the purpose of this analysis, we assumed that for cumulative impacts to occur, there must be a potential for a long-term reduction in the size of a population of birds or bats. When assessing the potential for cumulative impacts, it is necessary to first define the population potentially affected by wind energy development. Because birds and other animals do not recognize geopolitical boundaries, we have defined the affected population as those birds and bats of each species that breed, winter, or migrate through the CPE.

ANALYSIS AREA AND WIND ENERGY PROJECTS

As of September 2009, there were 4159 MW of wind energy either built or under construction in Washington and Oregon (AWEA 2009), most of which has been within the Columbia Plateau Level III Ecoregion (Thorson et al. 2003; Figure 1). In the earlier version of this cumulative effects analysis (Johnson and Erickson 2008), we attempted to contact every county within the CPE in an effort to estimate future wind energy development based on existing permit applications, which resulted in an estimate of 6700 MW of wind energy development in the CPE. However, past experience indicates that not all of the projects that are proposed will ultimately be issued permits for the size originally proposed and not all permitted projects are built, or fully built-out. Consequently, this method can result in significantly over-estimating future wind energy development. However, for consistency, for the purpose of this analysis, we assumed that 6700 MW of wind power would be present in the CPE. We also calculated the numbers of fatalities that reflect Northwest Power and Conservation Council (NPCC) estimates, which recognize constraints on wind development, such as transmission capacity. NPCC projects that 5,577 MW of wind energy development will be installed by the year 2013 (Jeff King, Senior Resource Analyst, presentation to the Northwest Wind Integration Forum Steering Committee, January 7, 2010).

The Columbia Plateau was historically characterized by open, arid shrub-steppe and grassland-steppe habitats. The current predominant land use of the Ecoregion is dryland agriculture, land enrolled in the Conservation Reserve Program (CRP), and rangeland (Figure 2). Precipitation through the region is 6 to 12 inches (about 15-30 centimeters) per year (Thorson et al. 2003). Surrounding ecoregions are more mountainous, receive more precipitation, and are more forested than the Columbia Plateau.

METHODS

This report provides a broad, qualitative analysis using existing public information about existing and proposed wind-energy facilities in the region, estimated population sizes of birds in the CPE, results of fatality monitoring studies, and published literature to compile a cumulative impact analysis for bird and bat resources. The general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind-energy facilities within the CPE, and use those results to estimate impacts for all constructed and proposed wind-energy facilities within the same ecoregion. Habitat and land use throughout the entire CPE are similar.

This cumulative effects analysis relies heavily on data from 12 wind-energy facilities in the CPE where at least one full year of monitoring for fatalities has occurred. Most of the operating facilities have had or will have some sort of bird or casualty monitoring associated with them, and post-construction fatality monitoring data are available from 12 operational wind energy facilities in the CPE (Table 1). For each of the individual study areas from which fatality results are available, the predominant land use was a mosaic of agriculture, mainly dryland wheat farming, and grassland or shrub- steppe rangeland used for livestock grazing. In general, the region where future wind-energy facilities are being planned is similar in vegetation types (Quigley and Arbelbeide 1997), although, for any given facility, the amount of each type varies. It is assumed for the analysis that results from the existing studies would be applicable to new proposed facilities.

With the exception of the Condon, Oregon, wind-energy facility, where no scavenging or searcher efficiency trials were conducted to estimate total mortality, the 11 data sets used in this report were collected using similar methods, where observed fatality rates, calculated from standardized carcass searches, were adjusted for searcher efficiency and carcass removal biases. The analysis operates under the assumption that the bird and bat communities are similar across all wind-energy facilities because of habitat and land use similarities throughout the ecoregion, and thus are applicable to proposed facilities in this same ecoregion. Details about results, methods, and estimates of potential bird and bat impacts from each individual wind-energy facility are available in the referenced facility reports.

To define population sizes of those species most likely to be affected by wind energy development in the CPE, we used data from a recent publication that estimates breeding size of bird species by Bird Conservation Region, and then by that portion of each state within the Bird Conservation Region (see Blancher et al. 2007). Those portions of Washington and Oregon within the Great Basin Bird Conservation Region (see US NABCI Committee (2000) for a description) essentially comprise the same area that we have defined as the CPE. To our knowledge these are the only population estimates available for the entire CPE.

Raptors

Raptor use estimates and post-construction raptor fatality estimates are available for 12 facilities in eastern Washington and Oregon. Based on available data, it is likely that raptor mortality throughout the CPE would be on the same order of magnitude as other wind-energy facilities in the western US outside California, where it ranges from none to 0.15/MW/year (Johnson and Stephens 2010). Raptor use (raptors/survey) at wind resource areas (WRAs) in the CPE ranges from 0.26 to 1.64, and averages 0.68 observations per 20-min survey (Table 2). This use is substantially lower than that at Altamont Pass and High Winds, two facilities in California that have had relatively high levels of raptor mortality. Similar levels of raptor mortality in the CPE would not be expected. To predict raptor mortality for all existing and proposed wind-energy facilities in the CPE, we assumed it would be similar to the other existing wind-energy facilities in the CPE. Mean annual raptor mortality (fatalities/MW/year) at the 12 existing wind-energy facilities in eastern Washington and Oregon ranges from 0 to 0.21/MW/year, with a mean of 0.077/MW/year. Because the 1.5–3.0 MW turbines constructed or proposed for most new-generation wind-energy facilities are larger than turbines used at most of the existing wind-energy facilities, it is likely not appropriate to predict raptor mortality in the CPE using per turbine estimates from the other wind-energy facilities, as several of the existing facilities used smaller turbines, ranging from 0.66 – 1.5 MW in size. Therefore, we used per megawatt estimates of raptor mortality for extrapolating the estimated numbers of raptor fatalities in the CPE. To estimate cumulative mortality of individual species, we assumed that species composition of bird and bat fatalities associated with 6700 MW of wind energy would be similar to species composition of fatalities found at the 16 existing facilities in the CPE, including 12 with quantified fatality estimates and four with raw data on species composition and number of fatalities. For example, American kestrels (*Falco sparverius*) composed 31.4% of the raptor fatalities found at existing wind-energy facilities. To estimate the total number of American kestrel fatalities associated with 6700 MW of wind energy development, we assumed that they would also compose 31.4% of the total cumulative number of raptor fatalities per year.

All Birds

Compared with raptors, there is little correlation between total numbers of birds (all species) observed during pre-construction surveys (most of which are song birds) and post-construction mortality, presumably because many of the collision fatalities are nocturnal migrants (see Table 1), which are not accounted for during diurnal surveys. In addition, the survey methods for quantifying use are more relevant for large birds than for small birds. Total bird use at 24 wind-energy facilities in the CPE has ranged from 5–23.6 birds/survey and averaged 13.4 birds/survey (Table 2). Total bird use at the 12 wind-energy facilities in eastern Washington and Oregon with post-construction fatality data ranged from 5.0 birds/survey at Wild Horse to 23.6 birds/survey at Leaning Juniper, and averaged 12.0 birds/survey (Table 1). Because total bird use at proposed wind-energy facilities with pre-construction bird use data is within the range of similar bird use values for existing wind-energy facilities in the CPE, it is reasonable to assume that mortality of all birds combined at CPE wind-energy facilities would be similar to that observed at the 12 existing wind-energy facilities in the CPE. Therefore, we multiplied the total number of MW by 2.5 fatalities/MW/year (the mean among the 12 CPE wind-energy facilities) to estimate total bird mortality. To estimate total cumulative mortality by bird type and/or species, we assumed the fatalities associated with 6700 MW of wind energy would have the same group and species composition as fatalities found at existing wind-energy facilities in the CPE.

Bats

To estimate cumulative bat mortality for all projects in the CPE, we assumed that bat mortality would be similar to the existing wind-energy facilities located in the CPE. Therefore, we multiplied the total number of MW by the mean number of bat fatalities/MW/year at the other CPE Projects (1.20/MW/year). We estimated the total number of fatalities by species assuming species composition would be similar to the species composition of bat fatalities found at existing wind-energy facilities in the CPE.

RESULTS

Existing Data for CPE Projects

Raptors

Raptor use estimates and post-construction raptor fatality estimates are available for 12 wind-energy facilities in eastern Washington and Oregon. Pre-construction raptor use estimates at these wind-energy facilities have ranged from 0.26 raptors/survey at Nine Canyon, to 0.90 raptors/survey at Bighorn I, and averaged 0.52/survey (Table 2). Raptor mortality was not documented at four of these wind-energy facilities (Klondike I, Klondike III, Vansycle and Combine Hills) during one-year post-construction mortality surveys, and was relatively low at the other eight, ranging from 0.05/MW/year at Nine Canyon, Washington to 0.21/MW/year at Leaning Juniper, Oregon. Quantitative mortality estimates were not made for Condon, but only one raptor fatality was documented at that facility.

The 70 raptor fatalities found at CPE wind-energy facilities have composed 8.4% of the total bird mortality. Most of the raptor fatalities have been American kestrels (22 fatalities; 31.4%), red-tailed hawks (*Buteo jamaicensis*; 14 fatalities; 20.0%) and short-eared owls (*Asio flammeus*; 7 fatalities; 10.0%). Other raptors found as fatalities at CPE wind-energy facilities include six Swainson's hawks (*Buteo swainsonii*), four ferruginous hawks (*Buteo regalis*), three rough-legged hawks (*Buteo lagopus*), two of each of the following: great horned owl (*Bubo virginianus*), long-eared owl (*Asio otus*), northern harrier (*Circus cyaneus*), unidentified buteo, and one each of the following: golden eagle (*Aquila chrysaetos*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), barn owl (*Tyto alba*), unidentified owl, and unidentified accipiter (Table 3).

All Birds

Eighty-nine species have occurred as fatalities at existing wind energy facilities in the CPE. Passerines (songbirds) have been the most abundant bird fatality at modern wind-energy facilities in western North America, comprising 59.3% of total bird fatalities (Johnson and Stephens 2010). Passerines are also the most commonly observed birds during pre-construction fixed-point bird use surveys at all of these sites. Both migrant and resident passerine fatalities have been observed. Songbird mortality at wind-energy facilities in eastern Oregon and Washington has been reasonably consistent among sites. Songbirds have composed 67.1% of the bird mortality at CPE wind-energy facilities. Horned larks (*Eremophila alpestris*) have been the most commonly observed songbird fatality in the CPE, composing 29.7% of all bird fatalities (Table 3), and have been the most abundant songbird observed during pre-construction fixed point bird use surveys at these sites. Based on long term Breeding Bird Survey (BBS) data, horned larks are likely one of the most common birds in the Columbia Plateau. No other resident songbird species comprised a large proportion of the fatalities observed at the wind-energy facilities in the CPE (Table 3). The one apparent migrant with the highest number of fatalities is the golden-crowned kinglet (*Regulus satrapa*; 47 fatalities; 5.6% of all fatalities).

Mourning doves (*Zenaida macroura*) and rock pigeons (*Columba livia*) have composed 4.3% of the mortality at CPE wind-energy facilities. Waterfowl, waterbirds and shorebirds have composed only 2.1% of the fatalities. Mortality compared to use by these groups is very low. For example, only two Canada goose fatalities were documented at the Klondike, Oregon wind-energy facility (Johnson et al. 2003a), even though 43 flocks totaling 4845 individual Canada geese were observed during pre-construction fixed-point bird use surveys (Johnson et al. 2002a). Shorebird use of wind-energy facilities in the CPE has been low, with the most common species being killdeer. Shorebirds as a group are rarely killed at wind-energy facilities; of 1247 avian fatalities collected at modern wind-energy facilities in western North America and summarized in Johnson and Stephens (2010), only three (0.2%) were shorebirds. Low shorebird mortality has occurred even though shorebirds have been recorded at virtually every wind-energy facility evaluated. Some waterfowl, shorebird and other waterbird mortality will occur at CPE wind-energy facilities, but based on all available data from other facilities, the numbers are expected to be low relative to the use of each area. Upland gamebirds documented during surveys of CPE wind-energy facilities include ring-necked pheasant (*Phasianus colchicus*), gray partridge (*Perdix perdix*), chukar (*Alectoris chukar*), and California quail (*Callipepla californica*). Upland gamebird mortality is fairly common, as upland gamebirds have comprised 9.6% of all fatalities at modern wind energy facilities in western North America, behind only passerines and raptors (Johnson and Stephens 2010). In the CPE, upland gamebirds are one of the most common fatalities, composing 12.6% of all identified fatalities (Table 4). Based on habitat present, results from other regional wind-energy facilities, and the presence of upland gamebirds during baseline surveys, some mortality of upland gamebirds is expected to occur at nearly all wind-energy facilities in the CPE.

Bats

Bat mortality estimates have been made for 11 existing wind-energy facilities in the CPE, where they ranged from 0.23–2.46 fatalities/MW/year, and averaged 1.20 fatalities/MW/year (Table 5). Bat mortality patterns at wind-energy facilities in Washington and Oregon have followed patterns similar to the rest of the country. Of 390 bat fatalities collected at existing wind-energy facilities in eastern Oregon and Washington, 364 (93.4%) have been the two migratory species that occur in the CPE, including 180 hoary bats (*Lasiurus cinereus*) and 184 silver-haired bats (*Lasionycteris noctivagans*). The other mortalities have consisted of small numbers of big brown bats (*Eptesicus fuscus*), little brown bats (*Myotis lucifugus*), and unidentified bats (Table 6). Virtually all of the mortality has occurred in late summer and early fall, during the fall migration period for hoary and silver-haired bats.

Mortality Estimates and Population Consequences

Birds (Excluding Raptors)

For all birds combined, we estimate that total annual mortality in the CPE would be 16,750 birds/year. Despite several thousand bird fatalities from 6700 MW of wind power, these impacts are spread across numerous species and bird groups, as well as across seasons. Therefore, the overall impact to any given species or population of a species is substantially less. Based on species composition of fatalities at existing CPE wind-energy facilities (Table 3), passerines would compose approximately 67.1% of the fatalities, upland gamebirds would compose 12.6%, doves/pigeons would compose 4.3%, waterfowl/waterbirds/shorebirds would compose 2.1% and other bird types, such as woodpeckers, nighthawks and swifts, would compose 3.0%. Approximately 4.5% of the mortality would be composed of non-protected European starlings (*Sturnus vulgaris*), rock pigeons and house sparrows (*Passer domesticus*).

Raptors

Using raptor mortality estimates from existing wind energy facilities in the CPE, we estimate total raptor mortality in the CPE would be 516 fatalities per year. . American kestrels account for 31.4%, red-tailed hawks account for 20.0% and short-eared owls account for 10.0% of the raptor fatalities recorded at the regional wind projects studied (see Table 3). Assuming this trend holds true for all proposed wind-energy facilities in the CPE, and assuming there would be 516 raptor fatalities per year, it would be expected that on average 162 American kestrels, 103 red-tailed hawks and 52 short-eared owls would be killed each year.

The other species of raptors occurring in the CPE have had no or few fatalities at existing wind-energy facilities, and would likely represent a much smaller number of fatalities. For example, no peregrine falcon (*Falcon peregrinus*) or prairie falcon (*Falco mexicanus*) fatalities have been reported to date; therefore, our mortality estimate for this species is necessarily zero. Although one prairie falcon was found in the parking lot of the White Creek wind energy facility, it was not considered turbine related and was therefore not included in this analysis. Three species of concern in the region, golden eagle, ferruginous hawk and Swainson's hawk, have all been found as turbine collision victims in the CPE. Ferruginous hawks have composed 5.7% of the raptor fatalities, Swainson's hawks have composed 8.6%, and golden eagles have composed 1.4%. Assuming a total of 516 raptor fatalities could occur each year in the CPE, this would result in 29 ferruginous hawk, 44 Swainson's hawk, and seven golden eagle fatalities per year.

The three species of raptors with the largest expected numbers of fatalities due to wind energy development in the CPE are American kestrel, red-tailed hawk and short-eared owl. Raptor fatalities in the CPE have occurred throughout the year, with 23.1% in the spring, 43.1% in the summer, 21.5% in the fall, and 10.8% in the winter (Table 7). Approximately 56.9% of the raptor fatalities have occurred during the spring and fall migration, and during winter periods, when the affected population could contain birds from numerous local breeding populations in the Pacific Northwest as well as further north in Canada. Assuming approximately 43.1% of the mortality would occur during the breeding season, it would be expected that approximately 70 American kestrel, 44 red-tailed hawk and 22 short-eared owl fatalities would occur during the breeding season. An estimate of the breeding population in the Columbia Plateau, based on the BBS long-term average data, is approximately 170,000 breeding American kestrels, 77,000 breeding red-tailed hawks and 21,000 breeding short-eared owls (Blancher et al. 2007). Annual collision mortality in the CPE would represent approximately 0.04% of the breeding population of American kestrels, 0.06% of the breeding population of red-tailed hawks and 0.10% of the breeding population of short-eared owls. Even if we assumed all mortality (instead of 43.1%) would occur to adult breeding birds, this would still represent only 0.10%, 0.13% and 0.25% of the breeding American kestrels, red-tailed hawks and short-eared owls, respectively, in the CPE. Background mortality for these species is much higher than this estimate and the additional wind energy related mortality is likely insignificant from a population standpoint. Typical annual mortality rates for red-tailed hawks are 54% of juveniles, 20% of subadults, and 20% of adults. American kestrels suffer even higher mortality, as the annual mortality rate is 69% of juveniles and 45% of adults (Millsap and Allen 2006). Annual survival data are not available for short-eared owls (Wiggins et al. 2006). Given these numbers, plus the fact that most raptor populations can withstand additional harvest of nestlings and migrating birds by falconers of 10-20% or even higher (Millsap and Allen 2006), it is unlikely that the additional mortality of <0.30% associated with projected wind power development in the CPE would lead to measurable population effects for American kestrels, red-tailed hawks and short-eared owls. Based on an analysis of population sizes and survival rates, the US Fish & Wildlife Service conservatively estimates that falconers could harvest 13,216 juvenile red-tailed hawks and 19,575 juvenile American kestrels each year in the US without any consequences to populations (Millsap and Allen 2006). Actual harvest by falconers in 2004 was only 1062 raptors comprised of 15 species (Milsap and Allen 2006). Given these estimates of a sustainable harvest and the actual number of birds harvested, the number of birds killed in 2004 by wind turbines in North America should have fallen into a range of sustainable mortality.

Even though only four ferruginous hawk, six Swainson's hawk, and one golden eagle fatalities have been found at existing wind energy facilities in the CPE, these raptors are species of concern and warrant additional analysis. The ferruginous hawk is listed as threatened by the Washington Department of Fish and Wildlife (WDFW) and as "critical" by the Oregon Department of Fish and Wildlife (ODFW), while the Swainson's hawk is listed as "vulnerable" by the ODFW. The estimated breeding population in the CPE is 1000 ferruginous hawks (Blancher et al. 2007). Ferruginous hawks may occur in the CPE throughout the year and their populations include breeders, migrants and winter residents, as well as juveniles and adults. Given our estimate of 29 ferruginous hawk fatalities on an annual basis, even if all turbine mortality occurred to resident breeding adult birds, this would represent 2.9% of the breeding ferruginous hawks in the CPE. Because mortality would likely be spread out among migrants, winter residents, resident breeders, and juveniles as well as adults, mortality of adult ferruginous hawks actually breeding in the CPE would be less than 2.9%, likely on the order of 1–2%. According to Millsap and Allen (2006), ferruginous hawk populations can sustain 1% harvest rates (limited to juveniles) without affecting populations. This harvest rate was considered conservative because it was modeled using data obtained from red-tailed hawk banding or marking studies, which typically greatly underestimate survival in raptors compared to telemetry studies. Therefore, the sustainable harvest rate is likely greater than 1%. To put a 1-2% mortality rate into perspective, we examined existing mortality rates of ferruginous hawks. A study of ferruginous hawks in Washington State found that annual adult mortality was 24%, and mortality of juvenile ferruginous hawks was 57% between the first and second year (Watson 2003). A ferruginous hawk banding study in Alberta, Canada found that first year mortality was 60% (Schmutz and Fyfe 1987), and a study of ferruginous hawks in Utah found that annual mortality was 25% for adults and 66% for juveniles the first year (Woffinden and Murphy 1989). Another study in Canada (Alberta and Saskatchewan) found that annual adult mortality was 29.2%, and first year mortality of nestlings was 45.5%. Despite annual adult mortality of 29.2%, the authors concluded that adult survival was not limiting the population; abundance of ground squirrels, which affected nesting success, appeared to be the primary factor regulating population size (Schmutz et al. 2008). Given published annual mortality rates for adult ferruginous hawks of 24–30%, additional losses of 1–2% of resident breeders associated with 6700 MW of wind energy development in the CPE would not likely have measurable population consequences.

The above analysis is for the entire population of 1000 ferruginous hawks in the CPE. It assumes that wind energy development and ferruginous hawk populations are spread uniformly across the entire CPE, which is not the case. Given the actual locations of existing and proposed wind energy facilities and ferruginous hawk population centers, actual impacts are likely lower. For example, the existing and proposed wind energy development in Klickitat County, Washington is approximately 1902 MW, or 28% of the 6700 MW of all currently existing and proposed wind energy development in the CPE. However, only three breeding pairs of ferruginous hawk are known to occur in the county (Jim Watson, Wildlife Research Scientist, Washington Department of Fish and Wildlife, pers. commun). Therefore, the county with the largest amount of wind energy development has a low breeding population of ferruginous hawks, which reduces the potential for significant impacts to this species across its entire range in the CPE. There is consequently little overlap between areas of intensive wind energy development and core breeding areas for ferruginous hawk, which further reduces the potential for cumulative impacts to this species. Although local populations of ferruginous hawk may be reduced in areas of intensive wind energy development, the evidence suggests that this impact is not likely to affect the ferruginous hawk population in the entire CPE.

Breeding Bird Survey data collected over the last 27 years (1980–2007) show a negative trend in population growth for ferruginous hawks in the CPE (Sauer et al. 2008), but the negative trend is not statistically significantly due to low sample sizes and uncertainty (Sauer et al. 2008). If ferruginous hawk populations are declining in the region, and wind energy development continues at its current rate of growth in the CPE, ferruginous hawk collision mortality could eventually reach a point that populations may begin to decline without some form of mitigation. Mitigation could include establishing conservation easements around ferruginous hawk breeding territories, erecting artificial nest structures, or otherwise improving habitat for ferruginous hawks in the CPE (Johnson et al. 2007).

The estimated Swainson's hawk breeding population in the CPE is 10,000 (Blancher et al. 2007). Unlike ferruginous hawks, Swainson's hawks occur in the CPE only during summer and most are resident breeders. Given our mortality estimate of 44 Swainson's hawks per year, this would represent only 0.44% of the Swainson's hawks in the CPE. Compared to many other raptor species, there is little data on annual survival of Swainson's hawks (England et al. 1997). The annual mortality rate of Swainson's hawks was reported in one study from western Canada, where it was estimated to be 15.7%, and nestling mortality rates ranged from 56–81% over the multi-year study (Schmutz et al. 2006). Given these mortality rates, additional losses of <0.5% would be considered sustainable and would not have measurable population consequences.

The golden eagle is federally protected by the Bald and Golden Eagle Protection Act and is listed as a candidate species by the WDFW, but does not have any special status in Oregon. The estimated breeding population in the CPE is 1770 (Blancher et al. 2007). Golden eagles may occur in the CPE throughout the year and their populations include breeders, migrants and winter residents, as well as juveniles and adults. Given our annual estimate of seven golden eagle fatalities, even if all turbine mortality occurred to resident breeding adult birds, this would represent 0.4% of the breeding golden eagles in the CPE. Because mortality would likely be spread out among migrants, winter residents, resident breeders, and juveniles as well as adults, mortality of adult golden eagles that breed in the CPE would be less than 0.4%. Mortality of golden eagles the first year after independence ranges from 54% to 82% (Kochert et al. 2002). At the Altamont Pass Wind Resource Area in California, mortality of radio-marked golden eagles was 16% the first year, 21% for floating birds one to three years old, and 9% for adult breeders (Hunt 2002). Based on a regression analysis of banding data, Harmata (2002) estimated that only 50% of golden eagles survive to the age of three years. Given these published mortality rates for golden eagles, additional losses of <0.4% of the population associated with 6700 MW of wind energy development in the CPE would not likely have measurable population consequences for golden eagles.

Upland Gamebirds

Upland gamebirds represent a higher percentage (12.6%) of the bird fatalities in the Columbia Plateau than in other regions in the US. No native upland gamebirds have been found as fatalities at wind-energy facilities in the CPE. All of the fatalities have been ring-necked pheasant, gray partridge, and chukar, which are all introduced species. Given our total bird mortality estimate of 16,750, approximately 2110 upland gamebird fatalities would be expected to occur on an annual basis.

The species most impacted, ring-necked pheasant, gray partridge, and chukar, are all common in mixed agricultural native grass/steppe habitats. Habitats throughout the Columbia Plateau are highly suitable for these species and the large populations likely influence the higher mortality rate for the regional wind-energy facilities. The total estimated population size of these three species combined in the CPE of Oregon and Washington is 370,900 (Blancher et al. 2007); therefore, wind energy fatalities would compose approximately 0.57% of the population. As with non-native (non-protected) passerine species, there is generally lower concern over impacts to exotic upland gamebirds. Given the vast amount of suitable habitat and the ability of these species to withstand harvest rates substantially higher than 0.57%, it is unlikely that additional fatalities from wind energy development would be significant from a population standpoint.

Waterfowl, Waterbirds and Shorebirds

Waterfowl, waterbirds and shorebirds represent a very small percentage (2.1%) of all fatalities at existing wind energy projects in the CPE. Based on our total bird mortality estimate of 16,750, approximately 352 fatalities could result on an annual basis.

Populations of waterfowl, waterbirds and shorebirds in the CPE are considerable. In addition, members of these groups are present year-round in the form of resident breeders, migrants, and winter residents. Given that we estimate only a few hundred individuals will be killed by turbine collisions on an annual basis, no cumulative impacts on these species are likely. In addition to killdeer, another shorebird commonly associated with upland habitats where wind-energy facilities are placed, is long-billed curlew. To date, however, only one fatality of this sensitive species has been documented at existing wind-energy facilities in the CPE.

Passerines

For projects in the CPE, approximately 67.1% of the bird fatalities have been passerines (Table 5). Assuming that 67.1% of all bird mortality would be composed of passerines, approximately 11,239 passerine fatalities would occur annually in the CPE. Of all passerine fatalities recorded during the regional monitoring studies, horned lark made up nearly half (44.3%) of the fatalities. Assuming this pattern holds for all CPE wind-energy facilities, it could be expected that on average there would be 4975 horned lark fatalities per year. Another common grassland breeder in the CPE, western meadowlark (*Sturnella neglecta*), composed approximately 4.8% of the passerine fatalities at wind-energy facilities, and therefore total annual mortality of this species related to wind turbine collisions would be approximately 540 individuals. At wind-energy facilities in the CPE, migrant passerines of several species generally composed approximately 30% of the bird fatalities (Table 1). Assuming these estimates are representative of all CPE wind-energy facilities, approximately 5025 nocturnal migrant fatalities would be expected per year if 6700 MW of wind power were constructed. The most common migrant fatality at existing wind-energy facilities in the CPE was golden-crowned kinglet (Table 3). Approximately 5.6% of the passerine fatalities were of this species; therefore, estimated annual mortality for this species would be approximately 938 individuals.

According to Blancher et al. (2007), the estimated size of the breeding population of horned larks in that portion of the CPE in Washington and Oregon is 2.2 million. Given our estimate of 4975 horned lark fatalities, and if it is assumed that the horned lark fatalities are spread equally over the year, then roughly 25% (~1244) of these fatalities would be during the breeding season. This represents approximately 0.06% of the breeding horned lark population. Given that most of the mortality will be composed of common species with widespread distribution and large populations, that annual mortality rates of song birds typically range from 30–70% (Lack 1966; Welty 1982), losses amounting to less than one percent are impacts to individuals, and therefore not significant from a population standpoint.

While this example represents a plausible means of addressing potential population impacts under a number of assumptions, it illustrates the low level of effect on the common grassland/agricultural species that comprise the largest portion of the fatalities. Similar examples could be used for the other species that illustrate lower effects. For example, the BBS data indicate the breeding population of western meadowlarks in the CPE of Oregon and Washington is one million (Blancher et al. 2007). Given our estimate of 540 western meadowlark fatalities, the impact on the western meadowlark breeding population in the Columbia Plateau would be minor and insignificant. The number of fatalities from other species are even fewer (see Table 3) and unlikely to have any population effects.

In general, while modern turbines are getting taller, new wind-energy facilities do not appear to have a large impact on migrant birds. Results of marine radar surveys for proposed wind-energy facilities have indicated that the vast majority of nocturnal migrants fly at altitudes that do not put them at risk of collision with turbines (Young and Erickson 2006). Also, there have been only two multiple individual mortality events during a migration season reported at newer wind-energy facilities in the US. At Buffalo Ridge, Minnesota, fourteen migrating passerine fatalities (vireos, warblers, flycatchers) were observed at two turbines during a single night in May 2002 (Johnson et al. 2002b), and 33 migrating passerine fatalities (mostly warblers) were observed near one turbine and a well-lit substation at the Mountaineer, West Virginia, wind-energy facility in May 2004 (Kerns and Kerlinger 2004). At wind-energy facilities in the CPE, migrant passerines of several species generally composed approximately 30% of the bird fatalities. Some impacts are expected for nocturnal migrating species; however, impacts are not expected to be great for the CPE. The apparent migrant with the greatest number of collision fatalities is golden-crowned kinglet. Our annual mortality estimate for golden-crowned kinglet was 938, which would represent 0.13% of the estimated breeding population size of this species in the CPE of Oregon and Washington, which is 720,000 (Blancher et al. 2007). Golden-crowned kinglets are typically associated with forested habitats during the breeding season, so it is assumed that many of the impacted individuals were from surrounding mountainous ecoregions or populations further north (e.g., Canada), rather than from the CPE. As with horned lark, estimating the potential population size from which these birds came requires a number of assumptions. However, while the potential population size is unknown, it is possible that the individual fatalities came from several populations in surrounding or more northern ecoregions, thus further diluting the impacts on any one population. Other potential migrant species were found in lower numbers. Cumulatively the impacts to migrants would be spread over a much larger population base and are not considered significant.

Sensitive Bird Species

In addition to golden eagle and ferruginous and Swainson's hawks discussed above, other species classified as sensitive species by the WDFW and/or ODFW have been found as fatalities at CPE wind energy projects. These include long-billed curlew (*Numenius americanus*), Lewis's woodpecker (*Melanerpes lewis*), grasshopper sparrow (*Ammodramus savannarum*), sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*) and Vaux's swift (*Chaetura vauxi*). Only one fatality of each of the above species has been found at CPE wind energy projects. Given that 837 bird fatalities have been found at these projects and estimated total bird mortality is 16,750, the estimated mortality for each of these species would be approximately 20 fatalities per year. The estimated population sizes of each of these species in the CPE based on Blancher et al. (2007) is 25,000 Lewis's woodpeckers, 149,000 grasshopper sparrows, 1,060,000 sage thrashers, 314,000 sage sparrows, and 110,000 Vaux's swifts; no estimate was provided for long-billed curlew. Given these estimated populations sizes, the loss of 20 individuals per year would not have measurable population consequences.

<u>Bats</u>

Based on bat mortality estimates at the other regional wind-energy facilities, total bat mortality in the CPE was estimated at 8040 per year. Based on species composition of bat fatalities found at CPE wind-energy facilities, approximately 3795 silver-haired and 3714 hoary bat fatalities would occur in the CPE on an annual basis.

Unlike birds, there is little information available about population sizes of most bat species, especially the non-hibernating, solitary tree-roosting species that compose most of the wind-energy facility related mortality in North America. Results of monitoring studies across the US and Canada have found similar trends in impacts. Risk to bats from wind turbines is unequal across species and across seasons. The majority of bat fatalities at wind projects in western North America have been tree roosting bats that are long-distance migrants (Johnson and Stephens 2010). Silver-haired bats throughout the US and species in the *Lasiurus* genus, the hoary bat in the western U.S. and the eastern red bat (*L. borealis*) in the Midwest and eastern U.S., are the most abundant fatalities found at wind-energy facilities. Less common fatalities include big brown bats and *Myotis* species (Arnett et al. 2008, Johnson 2005, Johnson and Stephens 2010). The highest mortality occurs during the fall migration period for bats, from roughly late-July through September (Arnett et al. 2008, Johnson 2005). Much lower mortality rates occur in the spring and summer, particularly in the CPE.

More recently, studies at different locations in the US and Canada appear to indicate that bat mortality is not related to site features or habitat, and dissimilar results for ecologically similar facilities have been found (Baerwarld and Barclay 2009). While it is hypothesized that eastern deciduous forests in mountainous areas may be the highest risk areas, relatively high bat mortality has also occurred at wind-energy facilities in prairie/agricultural settings (Alberta, Canada; Baerwald 2008) and row crop agricultural settings in the Midwestern US (Jain 2005, Gruver et al. 2010). Bat mortality in the CPE would involve primarily silver-haired and hoary bats. Most mortality is observed during the fall migration period. The regional monitoring studies suggest resident bats do not appear to be significantly affected because very low numbers of resident bat species have been observed as fatalities. One species of potential concern is the Townsend’s big-eared bat (*Corynorhinus townsendii*), a state candidate species in Washington. Very little is known about the current distribution of Townsend’s big-eared bat in Washington. According to Marshall et al. (1996) the subspecies *Corynorhinus townsendii pallescens* occurs east of the Cascade Range, within the CPE. A Biological Assessment prepared to address the potential for a wind-energy facility in West Virginia to impact the federally endangered Virginia big-eared bat (*Corynorhinus townsendii virginianus*), a subspecies of Townsend’s big-eared bat, concluded that the collision risk to this species is very low because it is non-migratory and forages well below the space occupied by turbine blades (Johnson and Strickland 2003). These conclusions are also likely applicable to Townsend’s big-eared bat, and to date no fatalities of this species have been found at any wind energy facility in the CPE.

Hoary bats and silver-haired bats occupy forested habitats during the breeding season – habitat distinctly lacking and localized throughout the CPE. The significance of wind energy impacts on hoary and silver-haired bat populations is difficult to predict, as there is no information available on the overall population sizes of these bats. However, hoary and silver-haired bats are widely distributed throughout North America. Most concern over impacts to bats is with wind-energy facilities built on ridgetops in the Appalachian Mountains, where mortality levels have been as high as 39.7 bat fatalities/MW/year (Kerns et al. 2005), substantially higher than the average of 1.20 bat fatalities/MW/year observed in the Pacific Northwest.

In general, mortality levels on the order of one to two bats per MW are likely not significant to populations, although cumulative effects may have greater consequences for long-lived, low-fecundity species such as bats. Unlike many bird species that may have multiple clutches of multiple young per year, bats are long-lived species with relatively low reproductive rates. For example, hoary and silver-haired bats typically produce only two young per year (Shump and Shump 1982, Kunz 1982). As such, their populations are much slower to recover from large fatality events than other species, such as most birds, that have much higher reproductive rates. Bats tend to live longer than birds, however, and may have a longer breeding lifespan. The impact of the loss of breeding individuals to populations such as these may have greater consequences.

Because migratory tree bats are primarily solitary tree dwellers that do not hibernate, it has not been possible to develop any suitable field methods to estimate their population sizes (Carter et al. 2003). As a result, impacts on these bat species caused by wind energy development cannot be put into perspective from a population impact standpoint. To help solve this problem, population genetic analyses of DNA sequence and microsatellite data are being conducted to provide effective population size estimates, to determine if populations are growing or declining, and to see if these populations are comprised of one large population or several discrete subpopulations that use spatially segregated migration routes (Amy L. Russell, Assistant Professor, Grand Valley State University, Allendale, Michigan, pers. commun.).

Since it is most likely breeding populations from surrounding mountainous/forested ecoregions or from more northern areas (e.g., Canada) are affected at the Columbia Plateau wind-energy facilities during the fall migration, the dynamics of these populations would need to be known to predict population effects. For large and stable populations the level of impact is not expected to be significant, although impacts could be more pronounced for less stable populations. Bat Conservation International (BCI), the American Wind Energy Association (AWEA), the US Fish & Wildlife Service (USFWS), and the US Department of Energy National Renewable Energy Laboratory (NREL) have initiated a research effort termed the Bat Wind Energy Cooperative to conduct research and further understand bat and wind turbine interactions and how to prevent or minimize bat fatalities at wind energy facilities.

Indirect Effects

Grassland and shrub-steppe communities are the most abundant native communities in the CPE, but they are also highly subjected to development and conversion to agriculture (Johnson and O’Neil 2001). In addition to potentially thousands of new vertical structures, added wind energy generation in the region will result in more roads (mostly dirt and gravel) and increased human activity due to turbine construction and maintenance. A substantial portion of these impacts will be to already heavily-disturbed agricultural fields and moderately disturbed rangeland used for livestock grazing. The percent of direct impacts actually occurring in native grassland or shrub-steppe habitat are difficult to predict and would be based on individual facility design and layout. However, based on the community types that existing wind-energy facilities are located in, we assume that approximately 25% of the existing and proposed facilities would be in cultivated cropland. Based on terrestrial vegetative communities in the CPE (Figure 2), only seven of the 47 existing or proposed wind energy facilities as of late 2008 were in communities classified as shrub steppe, with two additional facilities in areas classified as grasslands. The remaining facilities were all within vegetative communities classified by Quigley and Arbelbeide (1997) as agricultural lands. These lands include croplands as well as rangelands used for cattle grazing, but are apparently degraded such that they are no longer classified as shrublands or grasslands. Therefore, most of the wind energy facilities in the CPE are in areas already degraded to some extent from conversion to pastures and cultivated cropland.

Assuming that on average the permanent impacts associated with a turbine and the associated access roads are 1.5 acres per turbine, and that 1.5-3.0 MW turbines are used for all new projects in the foreseeable future, then approximately 5000 acres (7.8 mi^2) of non-agricultural vegetation types, primarily grassland shrub-steppe vegetation, would be lost in the CPE with 6700 MW of wind energy. These impacts would be spread over a large area geographically (see Figure 1). Given that the CPE is 32,096 mi^2 in size, permanent impacts associated with 6700 MW of wind energy development would represent only 0.02% of the area.

While the CPE covers a large area, and characteristic grassland shrub-steppe habitat is widespread, it is also heavily fragmented by agricultural activities. Species that depend on native habitat face physical and ecological barriers within the region and at the region’s edges. The Columbia River, and other smaller rivers in the area, cut deep canyons and present linear alteration to the general physiography and potential barriers to some animal species movement. Large swaths of agricultural land are less obvious, but may pose significant obstacles to small or less mobile animals. While many birds are not impeded by such physical barriers, some smaller, habitat-specific birds that depend on brushy habitats for cover could be affected by such habitat fragmentation. Habitat specialists and obligates such as greater sage-grouse (*Centrocercus urophasianus*) and sage sparrow (*Amphispiza belli*) require large tracts of continuous sage habitat (Johnson and O’Neil 2001), which is largely missing from the Columbia Plateau, and the range for these species in the Columbia Plateau is already severely restricted. Assuming that agricultural vegetation types are not important wildlife habitat, habitat loss impacts are not expected to be a significant loss to any given species within the entire CPE. However, because existing and proposed wind-energy facilities tend to be concentrated within certain regions within the CPE (see Figure 1), habitat loss may lead to localized population declines of some species.

In addition to direct effects through collision mortality, wind-energy development results in direct loss of habitat where infrastructure is placed and indirect loss of habitat through behavioral avoidance and habitat fragmentation. Direct loss of habitat associated with wind-energy development is relatively minor compared to most other forms of energy development. Although wind-energy facilities can cover substantial areas, the permanent footprint of facilities such as the turbines, access roads, maintenance buildings, substations and overhead transmission lines, generally occupies only 5 to 10% of the entire development area (Bureau of Land Management [BLM] 2005). Estimates of temporary construction impacts range from 0.2 to 1.0 ha (0.5 to 2.5 ac) per turbine (AWEA 2009). Behavioral avoidance, however, may reduce habitat suitability over much larger areas for some species of wildlife, depending on how far a species is displaced from wind-energy facilities. The greatest concern with displacement impacts in western North America has been where facilities were constructed in native habitats such as grasslands or shrublands (Leddy et al. 1999, Mabey and Paul 2007).

Most studies on raptors at wind-energy facilities indicate displacement effects to be negligible. A before-after/control impact study of avian use at the Buffalo Ridge wind-energy facility in Minnesota found evidence that northern harriers (*Circus cyaneus*) avoided turbines on a small scale (< 100 m [328 ft] from turbines) and large scales (range of 105 - 5,364 m [345 – 17,598 ft]) in the year following construction (Johnson et al. 2000a). Two years following construction, however, no large-scale displacement was detected. The only published report of avoidance of wind turbines by nesting raptors occurred at the Buffalo Ridge facility, where raptor nest density on 101 mi^2 (261.6 km^2) of land surrounding the facility was 5.94 nests/39 mi^2 (5.94 nests/101.0 km^2) yet no nests were present in the 12 mi^2 (31.1 km^2) facility itself, even though habitat was similar (Usgaard et al. 1997). At a facility in eastern Washington, raptors still nested in the study area at approximately the same levels after construction, and several nests were located within a half-mile (0.8 km) of turbines (Erickson et al. 2004). Howell and Noone (1992) found similar numbers of raptor nests before and after construction of Phase 1 of the Montezuma Hills facility in California, and anecdotal evidence indicates that raptor use of the Altamont Pass wind resource area in California may have increased since installation of wind turbines (Orloff and Flannery 1992, AWEA 1995). At the Foote Creek Rim wind-energy facility in southern Wyoming, one pair of red-tailed hawks nested within 0.3 miles (0.5 km) of the nearest turbine, and seven red-tailed hawk nests, one great horned owl (*Bubo virginianus*) nest, and one golden eagle nest located within one mile (1.6 km) of the facility successfully fledged young (Johnson et al. 2000b, Western EcoSystems Technology, Inc. [WEST] unpublished data). The golden eagle pair successfully nested a half-mile (0.8 km) from the facility for three different years after the project became operational.

Studies in western North America concerning displacement of non-raptor species have concentrated on grassland passerines and waterfowl. Wind-energy facility construction appears to cause small-scale local displacement of some grassland passerines and is likely due to the birds avoiding turbine noise and maintenance activities. Construction also reduces habitat effectiveness because of the presence of access roads and large gravel pads surrounding turbines (Leddy 1996, Johnson et al. 2000a). Leddy et al. (1999) surveyed bird densities in Conservation Reserve Program (CRP) grasslands at the Buffalo Ridge wind-energy facility in Minnesota, and found mean densities of 10 grassland bird species were four times higher at areas >180 m (591 ft) from turbines than they were at grasslands nearer turbines. Johnson et al. (2000a) found reduced use of habitat within 100 m of turbines by seven of 22 grassland-breeding birds following construction of the Buffalo Ridge facility. At the Stateline wind-energy facility in Oregon and Washington, use of areas <50 m from turbines by grasshopper sparrow (*Ammodramus savannarum*) was reduced by approximately 60%, with no reduction in use >50 m from turbines (Erickson et al. 2004). At the Combine Hills facility in Oregon, use of areas within 150 m of turbines by western meadowlark was reduced by 86%, compared to a 12.6% reduction in use of reference areas over the same time period (Young et al. 2005a). Horned larks, however, showed significant increases in use of areas near turbines at both of these facilities, likely because this species prefers areas of bare ground such as those created by turbine pads and access roads (Beason 1995).

Shaffer and Johnson (2008) examined displacement of grassland birds at two wind energy facilities in the northern Great Plains. Intensive transect surveys were conducted on plots with and without turbines. The study focused on five species at two study sites, one in South Dakota and one in North Dakota. Based on this analysis, killdeer (*Charadrius vociferous*), western meadowlark, and chestnut-collared longspur (*Calcarius ornatus*) showed no avoidance of wind turbines. However, grasshopper sparrow and clay-colored sparrow (*Spizella pallida*) showed avoidance out to 200 m (656 ft).

At the Buffalo Ridge facility, the abundance of several bird types including shorebirds and waterfowl was significantly lower at survey plots with turbines than at reference plots without turbines, indicating that the area of reduced use was limited primarily to areas within 100 m of the turbines (Johnson et al. 2000a). These results are similar to those of Osborn et al. (1998), who reported that birds at Buffalo Ridge avoided flying in areas with turbines.

Populations of mountain plovers (*Charadrius montanus*) at the Foote Creek Rim wind-energy facility in Wyoming declined during construction but have slowly increased since, although not to the same level present prior to construction. It is not known if the initial decline or subsequent increase was due to presence of the wind-energy facility or to regional changes in mountain plover populations. Nevertheless, some mountain plovers have apparently become habituated to the turbines, as 11 of 28 nests found during surveys (39%) were located within 75 m (246 ft) of turbines (Young et al. 2005b).

Breeding dabbling ducks (mallard, blue-winged-teal [*Anas discors*], gadwall [*A. strepera*], northern pintail [*A. acuta*], and northern shoveler [*A. clypeata*]) were counted on wetland complexes at two wind-energy facilities and similar reference areas in North and South Dakota during the 2008 breeding season (Walker et al. 2008, unpublished report). Breeding duck numbers were similar between developed and undeveloped areas. The study is continuing through 2010 to further assess response of breeding ducks to wind-energy development.

The CPE wind energy facilities will be sited in vegetation communities common to the region, and other similar vegetation types are abundant. Furthermore, the actual area occupied by turbines and other infrastructure in a typical modern wind energy facility is only 5-10% of the total project area (BLM 2005). However, it is not known if displaced individuals simply move somewhere else and breed successfully, have reduced breeding success, do not breed at all, or some combination of the above. In addition, habitat fragmentation and disturbance from turbines and maintenance activities may make the entire wind-energy facility unsuitable for some species. If this occurs, a reduction in the number of breeding birds within the wind-energy facility and adjacent areas may occur, and the effect may be more pronounced in areas with concentrated facilities in circumstances where habitat is a limiting factor. However, the total area occupied by wind-energy facilities is only a small fraction of the CPE (see Figure 1), and measurable population impacts are not likely for the entire region.

DISCUSSION

Mortality estimates for this analysis were based on species composition of fatalities found at 16 existing wind energy facilities in the CPE. Sample sizes for this analysis were relatively small for some groups. For example, we estimated ferruginous hawk mortality assuming that they would compose 5.7% of all raptor fatalities based on four ferruginous hawk fatalities out of 70 raptor fatalities found at the existing wind energy facilities. This ratio could easily change as additional fatality data are collected at new wind energy facilities in the CPE.

Our cumulative mortality estimates should be considered tentative, as no comparable fatality data exist for the large 2.0-3.0 MW turbines proposed for many of the future wind-energy facilities in the CPE. These estimates assume bird and bat fatality rates for a 3.0-MW turbine would be twice as high as a 1.5-MW turbine, which may not be accurate. Although the 2.0-3.0 MW turbines have a larger rotor diameter, which may increase collision risk to raptors, the rotor-swept area is higher off the ground and the turbine rotates at slower speeds, which may actually reduce risk to some raptors. Based on an analysis of avian fatality data at wind farms with turbines ranging in size from 0.04–1.8 MW, tower heights ranging from 24–94 m and rotor diameters ranging from 15–80 m, Barclay et al. (2007) concluded that avian fatality rates were not affected by any of these parameters. Therefore, inflating our estimates to account for larger turbines may lead to over-estimates of avian mortality.

This cumulative effects analysis was based largely on results of existing studies of wind-energy facilities in the region, and in particular monitoring studies that estimated the direct impacts of a particular wind-energy project. The overall design for these studies incorporates several assumptions or factors that affect the results of the fatality estimates. First, all bird casualties found within the standardized search plots during the study periods were included in the analyses. It is assumed that carcass found incidentally within a search plot during other activities would have been found during a standardized carcass search. Second, it was assumed that all carcasses found during the studies were due to collision with wind turbines. True cause of death is unknown for most of the fatalities. It is highly likely that some of the casualties included in the data pool for the various projects were due to natural causes or background mortality such as predation, disease, other natural causes, or manmade causes such as farming activity or vehicles on county/project roads. The overall effect of these assumptions is that the analyses provide a conservative estimate (an overestimate) of mortality.

This cumulative impacts analysis assumed that up to 6700 MW of wind energy could be developed in the CPE. However, based on recent estimates by the Northwest Power and Conservation Council (NPCC), which recognize constraints on wind development, such as transmission capacity, the NPCC projects that 5577 MW of wind energy development will be installed by the year 2013 (Jeff King, Senior Resource Analyst, presentation to the Northwest Wind Integration Forum Steering Committee, January 7, 2010). Because our estimates of bird and bat fatalities assuming that 6700 MW of wind energy would be developed are likely overestimates, for comparison purposes we also derived estimates assuming that 5577 MW of wind energy would be developed (Table 8).

A few studies of wind-energy facilities in other regions of the country have provided information on background mortality. During a four-year study at Buffalo Ridge, Minnesota, 2482 fatality searches were conducted on study plots without turbines to estimate reference mortality in the study area. Thirty-one bird fatalities comprising 15 species were found (Johnson et al. 2000a). Reference mortality adjusted for searcher efficiency and carcass removal for the study was estimated to average 1.1 fatalities per plot per year. At a second study, pre-project carcass searches were conducted at a proposed wind-energy facility in Montana (Harmata et al. 1998). Three bird fatalities were found during eight searches of five transects, totaling 10.94 miles (17.61 km) per search. On average, approximately 1.12 miles (1.8 km) of transect are searched within each turbine plot in the referenced studies for the CPE (Table 2). The amount of transect searched at the Montana site per search was equivalent to searching approximately seven to nine turbines for the regional studies. The background estimate for observed mortality would be approximately 0.33 per turbine plot per year, unadjusted for scavenging and searcher efficiency. The background mortality information from the Minnesota and Montana studies suggests that the estimates of bird mortality include some fatalities not related to turbine collision, and this factor alone would lead to an over-estimate of actual bird collision mortality for wind-energy facilities.

Avian population estimates used in this analysis relied on breeding bird survey (BBS) data, and some of these estimates had relatively large standard errors. Thogmartin et al. (2006) reviewed the population estimation approach used by Blancher et al. (2007) and concluded that because BBS data were designed to detect long-term population trends, use of these data for estimating population sizes may be questionable. Regardless of these concerns, in order to estimate cumulative impacts, information on sizes of affected populations is required, and the population estimates provided by Blancher et al. (2007) are the only ones available for the CPE.

Finally, this cumulative impacts assessment only examined cumulative impacts of birds and bats due to wind energy development in the CPE. Wind energy development is only one factor affecting wildlife populations in the CPE, and is likely minor compared to other past, present, and future actions in the CPE, including large-scale conversion of native shrublands and grasslands to crop land; expansion of urban areas and rural subdivisions; road and highway construction; energy development, including dams for hydropower; and increases in other infrastructure, such as communication towers and power lines. For example, a review conducted by Erickson et al. (2001) found that wind energy contributes only a minor fraction of the overall avian collision mortality in the US due to powerlines, roads, communication towers and other structures. The ability to estimate wind energy development impacts on wildlife is unique because several studies have been conducted in the CPE to quantify bird and bat impacts. Similar estimates of bird and bat impacts due to direct mortality and loss or fragmentation of habitat caused by other activities are not available.

REFERENCES

American Wind Energy Association (AWEA). 1995. Avian Interactions with Wind Energy Facilities: a Summary. Prepared by Colson & Associates for AWEA, Washington, D.C.

American Wind Energy Association (AWEA). 2009. AWEA Website. Home page: http://www.awea.org/; Current U.S. wind energy capacity by state (updated September 2009): http://www.awea.org/projects/

Arnett, E.B., W.K. Brown, W.P. Erickson, J.K. Fiedler, B.L. Hamilton, T.H. Henry, A. Jain, G.D. Johnson, J. Kerns, R.R. Koford, C.P. Nicholson, T. O'Connell, M.D. Piorkowski, and R.D Tankersley, Jr. 2008. Patterns of bat fatalities at wind energy facilities in North America. *Journal of Wildlife Management* 72: 61-78.

Baerwald, E.F. 2008. Variation in the Activity and Fatality of Migratory Bats at Wind Energy Facilities in Southern Alberta: Causes and Consequences. Thesis. University of Calgary, Calgary, Alberta, Canada.

Baerwald, E.F. and R. M. R. Barclay. 2009. Geographic variation in activity and fatality of migratory bats at wind energy facilities. Journal of Mammalogy 90:1341–1349.

Barclay, R.M.R., E.F. Baerwald, and J.C. Gruver. 2007. Variation in bat and bird fatalities at wind energy facilities: assessing the effects of rotor size and tower height. Canadian Journal of Zoology 85:381-387.

Beason, R. C. 1995. Horned Lark (*Eremophila alpestris*). *In* The Birds of North America, No. 195 (A. Poole and F. Gill, Eds.). The Birds of North America, Inc., Philadelphia, PA.

Blancher, P.J., K.V. Rosenberg, A.O. Panjabi, B. Altman, J. Bart, C.J. Beardmore, G.S. Butcher, D. Demarest, R. Dettmers, E.H. Dunn, W. Easton, W.C. Hunter, E.E. Inigo-Elias, D.N. Pashley, C.J. Ralph, T.D. Rich, C.M. Rustay, J.M. Ruth, and T.C. Will. 2007. Guide to the Partners in Flight Population Estimates Database. Version: North American Landbird Conservation Plan 2004. Partners in Flight Technical Series No. 5. http://www.partnersinflight.org/

Bureau of Land Management (BLM). 2005. Final Programmatic Environmental Impact Statement on Wind Energy Development on BLM Administered Land in the Western United States. U.S. Department of the Interior (USDOI), BLM, Washington, D.C. http://windeis.anl.gov/

Carter, T.C., M.A. Menzel, and D.A. Saugey. 2003. Population Trends of Solitary Foliage-Roosting Bats. *In*: Monitoring Trends in Bat Populations of the United States and Territories: Problems and Prospects. Biological Resources Discipline, Information, and Technology Report. U.S. Geological Survey (USGS). USGS/BRD/ITR-2003-003. T. J. O'Shea and M. A. Bogan, eds. Pp. 41-47. http://www.fort.usgs.gov/products/publications/21329/21329.pdf

England, A. Sidney, Marc J. Bechard and C. Stuart Houston. 1997. Swainson's Hawk (Buteo swainsoni), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/265doi:10.2173/bna.265

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and bat mortality associated with the Vansycle Wind Plant, Umatilla County Oregon. 1999 study year. Technical report submitted to Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 22 pp.

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, Jr., K.J. Sernka and R.E. Good. 2001. Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee Publication. http://www.nationalwind.org/pubs/default.htm

Erickson, W.P., B. Gritski, and K. Kronner. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report, September 2002 – August 2003. Technical report submitted to Energy Northwest and the Nine Canyon Technical Advisory Committee.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Erickson, W.P., K. Kronner, and K.J. Bay. 2007. Stateline II Wind Project Wildlife Monitoring Report, January – December 2006. Technical report submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Erickson, W.P., J.D. Jeffrey, and V.K. Poulton. 2008. Puget Sound Energy Wild Horse Wind Facility Post-Construction Avian and Bat Monitoring: First Annual Report, January – December 2007. Prepared by WEST, Inc. for Puget Sound Energy, Ellensburg, WA.

Fishman Ecological Services, LLC. 2003. Carcass survey results for SeaWest Windpower, Inc., Condon Site, 2002-2003. Prepared for SeaWest WindPower, Inc., Condon Wind Project, Gilliam County, Oregon.

Gill, J.P., M. Townsley, and G.P. Mudge. 1996. Review of the Impacts of Wind Farms and Other Aerial Structures Upon Birds. Scottish Natural Heritage Review No. 21. Scottish Natural Heritage. Battleby, United Kingdom.

Gritski, B., K. Kronner, and S. Downes. 2008. Leaning Juniper Wind Power Project, 2006 – 2008 Wildlife Monitoring Final Report. Unpublished Report *Prepared for* PacifiCorp Energy by Northwest Wildlife Consultants, Inc., Pendleton, OR.

Gritski, B., S. Downes, and K. Kronner. 2009. Klondike IIIa (Phase 2) Wind Power Project Wildlife Monitoring Year One Summary: August 2008–August 2009. Unpublished report prepared for Iberdrola Renewables by Northwest Wildlife Consultants.

Gruver, J., M. Sonnenburg, K. Bay and W. Erickson. 2010. Post-Construction Bat and Bird Fatality Study at the Blue Sky Green Field Wind Energy Center, Fond du Lac County, Wisconsin July 21, 2008 – October 31, 2008 and March 15, 2009 – June 4, 2009. Unpublished report prepared by WEST, Inc., Cheyenne, Wyoming.

Harmata, A. R. 2002. Encounters of Golden Eagles banded in the Rocky Mountain West. J. Field Ornithol. 73:23-32.

Harmata, A., K. Podruzny, and J. Zelenak. 1998. Avian Use of Norris Hill Wind Resource Area, Montana. National Renewable Energy Laboratory, Golden, CO. NREL/SR-500-23822

Howell, J.A. and J. Noone. 1992. Examination of Avian Use and Mortality at a U.S. Windpower Wind Energy Development Site, Montezuma Hills, Solano County, California. Final Report to Solano County Department of Environmental Management, Fairfield, California. 41pp.

Hunt, G. 2002. Golden eagles in a perilous landscape: predicting the effects of mitigation for wind turbine blade-strike mortality. California Energy Commission Report P500-02-043F.

Jain, A. 2005. Bird and Bat Behavior and Mortality at a Northern Iowa Windfarm. M.S. Thesis. Iowa State University, Ames, Iowa.

Johnson, D.H. and T.A. O'Neil (managing editors). 2001. *Wildlife-Habitat Relationships in Oregon and Washington.* Oregon State University Press, Corvallis, OR. 768 pp.

Johnson, G.D. 2005. A review of bat collision mortality at wind-energy developments in the United States. Bat Research News 46:45-49.

Johnson, G.D. and W.P. Erickson. 2008. Avian and Bat Cumulative Impacts Associated with Wind Energy Development in the Columbia Plateau Ecoregion of Eastern Washington and Oregon. Final Report prepared for Klickitat County Planning Department, Goldendale Washington. Prepared by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. October 30, 2008.

Johnson, G.D. and S. Stephens. 2010. Wind Power and Bio Fuels: A Green Dilemma for Wildlife Conservation. Chapter 9 *In*: Energy Development and Wildlife Conservation in Western North America. D. E. Naugle, Ed., Island Press, Washington, D.C. In Press.

Johnson, G.D. and M.D. Strickland. 2003. Biological Assessment for the Federally Endangered Indiana Bat (*Myotis sodalis*) and Virginia Big-Eared Bat (*Corynorhinus townsendii virginianus*), Nedpower Mount Storm Wind Project, Grant County, West Virginia. Unpublished report prepared for NedPower Mount Storm LLC, Chantilly, Virginia, by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming. October 8, 2003. http://www.west-inc.com.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd and D.A. Shepherd. 2000a. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year study. Technical report prepared by WEST, Inc. for Northern States Power Co., Minneapolis, MN. 212pp.

Johnson, G. D., D. P. Young, Jr., C. E. Derby, W. P. Erickson, M. D. Strickland, and J. W. Kern. 2000b. Wildlife monitoring studies, SeaWest Windpower Plant, Carbon County, Wyoming, 1995-1999. Technical Report prepared by WEST, Inc. for SeaWest Energy Corporation and Bureau of Land Management. 195pp.

Johnson, G.D., W.P. Erickson, and K. Bay. 2002a. Baseline Ecological Studies For the Klondike Wind Project, Sherman County, Oregon; Final Report prepared for Northwest Wind Power, Goldendale, Washington.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002b. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30: 879-887.

Johnson, G., W. Erickson, J. White, R. McKinney. 2003a. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Plant, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington. March 2003.

Johnson, G.D., M.D. Strickland, W.P. Erickson, and D.P. Young, Jr. 2007. Use of data to develop mitigation measures for wind power development impacts to birds. Pages 241-257 *In* Birds and Wind Farms, Risk Assessment and Mitigation. M. de Lucas, G.F.E. Janss, and M. Ferrer, (eds.). Quercus Press, Madrid, Spain.

Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual Report for 2003. Technical Report prepared for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. Curry and Kerlinger, LLC. 39 pp.

Kerns, J., W.P. Erickson, and E.B. Arnett. 2005. Bat and Bird fatality at wind energy facilities in Pennsylvania and West Virginia. Pages 24-95 *in* E.B. Arnett, technical editor, Relationships between bats and wind turbines in Pennsylvania and West Virginia: an assessment of bat fatality search protocols, patterns of fatality, and behavioral interactions with wind turbines. A final report submitted to the Bats and Wind Energy Cooperative. Bat Conservation International. Austin, Texas, USA.

Kochert, M. N., K. Steenhof, C. L. Mcintyre and E. H. Craig. 2002. Golden Eagle (Aquila chrysaetos), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/684doi:10.2173/bna.684

Kronner, K., R. Gritski, and S. Downes. 2008. Big Horn Wind Power Project Wildlife Monitoring Final Report, 2006-2007. Technical report prepared by Northwest Wildlife Consultants, Inc., Goldendale, WA. Prepared for PPM Energy and the Big Horn Technical Advisory Committee.

Kunz, T.H. 1982. Silver-haired Bat, *Lasionycteris noctivagans*. Mammalian Species 172:1-5.

Lack, D. 1966. Population Studies of Birds. Clarendon Press, Oxford.

Leddy, K.L. 1996. Effects of wind turbines on nongame birds in Conservation Reserve Program grasslands in southwestern Minnesota. M.S. Thesis, South Dakota State Univ., Brookings. 61pp.

Leddy, K.L., K.F. Higgins, and D.E. Naugle. 1999. Effects of wind turbines on upland nesting birds in Conservation Reserve Program grasslands. Wilson Bull. 111:100-104.

Mabey, S. and E. Paul. 2007. Impact of Wind Energy and Related Human Activities on Grassland and Shrub-Steppe Birds. A Critical Literature Review Prepared for the National Wind Coordinating Committee (NWCC) and The Ornithological Council. 183 pp. http://www.nationalwind.org/pdf/IMPACTOFWINDENERGYANDRELATEDHUMANACTIVITIESONGRASSLANDANDSHRUB-STEPPEBIRDS.pdf

Marshall, D.B., M.W. Chilcote, and H. Weeks. 1996. Species at risk: sensitive, threatened and endangered vertebrates of Oregon. 2nd edition. Oregon Department of Fish and Wildlife, Portland, Oregon.

Millsap, B.A. and G.T. Allen. 2006. Effects of falconry harvest on wild raptor populations in the United States: Theoretical considerations and management recommendations. Wildlife Society Bulletin 34:1392-1400.

NWC and WEST, 2007. Avian and bat monitoring report for the Klondike II Wind Power Project, Sherman County, Oregon. Unpubl. report prepared by Northwest Wildlife Consultants and WEST, Inc. for PPM Energy, Portland, OR.

Orloff, S. and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final Report P700-92-001 to Alameda, Contra Costa, and Solano Counties, and the California Energy Commission, Sacramento, California, by Biosystems Analysis, Inc., Tiburon, California. March 1992.

Osborn, R.G., C.D. Dieter, K.F. Higgins, and R.E. Usgaard. 1998. Bird flight characteristics near wind turbines in Minnesota. Am. Midl. Nat. 139:29-38.

Quigley, T.M.; Arbelbeide, S.J., tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: Vol 2. Gen. Tech. Rep. PNWGTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Vol 1-4. (Quigley, Thomas M., tech. ed.; The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Sauer, J. R., J. E. Hines, and J. Fallon. 2008. The North American Breeding Bird Survey, Results and Analysis 1966 - 2007. Version 5.15.2008. USGS Patuxent Wildlife Research Center, Laurel, MD.

Schmutz, J.K. and R.W. Fyfe. 1987. Migration and mortality of Alberta ferruginous hawks. Condor 89:169-174.

Schmutz, J.K., D.T.T. Flockhart, C.S. Houston, and P.D. McLoughlin. 2008. Demography of ferruginous hawks breeding in western Canada. Journal of Wildlife Management 72:1352-1359.

Schmutz, J.K., P.D. McLoughlin, and C.S. Houston. 2006. Demography of Swainson's hawks breeding in western Canada. Journal of Wildlife Management 70:1455-1460.

Shaffer, J.A. and D.H. Johnson. 2008. Displacement Effects of Wind Developments on Grassland Birds in the Northern Great Plains. Presented at the Wind Wildlife Research Meeting VII, Milwaukee, Wisconsin. Wind Wildlife Research Meeting VII Plenary. October 28-29, 2008. http://www.nationalwind.org/pdf/ShafferJill.pdf

Shump, Jr., K.A. and A.U. Shump. 1982. Hoary bat, *Lasiurus cinereus*. Mammalian Species 185:1-5.

Smallwood, K.S. and C.G. Thelander. 2004. Bird Mortality at the Altamont Pass Wind Resource Area: March 1998 - September 2001. Final report to the National Renewable Energy Laboratory (NREL), Golden, Colorado, Subcontract No. TAT-8-18209-01 with BioResource Consultants, Ojai, California. In review.

Thogmartin, W.E, F.P. Howe, F.C. James, D.H. Johnson, E.T. Reed, J.R. Sauer, and F.R. Thompson, III. 2006. A review of the population estimation approach of the North American Landbird Conservation Plan. The Auk 123:892-904.

Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Usgaard, R.E., D.E. Naugle, R.G. Osborn, and K.F. Higgins. 1997. Effects of wind turbines on nesting raptors at Buffalo Ridge in southwestern Minnesota. Proceedings of the South Dakota Academy of Science 76: 113-117.

U.S. NABCI Committee. 2000. North American Bird Conservation Initiative: Bird Conservation Region Descriptions. A Supplement to the North American Bird Conservation Initiative Bird Conservation Regions Map. U.S. Fish and Wildlife Service, Arlington, VA.

Walker, J., S.E. Stephens, N.D. Niemuth, C.R. Loesch, R.E. Reynolds, J.S. Gleason, and M.A. Erickson. 2008. Assessing Potential Impacts of Wind Energy Development on Abundance of Breeding Duck Pairs in the Prairie Pothole Region of North and South Dakota. Unpublished report, Ducks Unlimited, Bismarck, North Dakota.

Watson, J.W. 2003. Migration and winter ranges of ferruginous hawks from Washington. Final Report. Washington Department of Fish and Wildlife, Olympia, Washington, USA.

Welty, J.C. 1982. The Life of Birds, 3rd Edition. Saunders College Publishing, Philadelphia.

Wiggins, D. A., D. W. Holt and S. M. Leasure. 2006. Short-eared Owl (Asio flammeus), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/062doi:10.2173/bna.62.

Woofinden, N.D. and J.R. Murphy. 1989. Decline of a ferruginous hawk population: A 20-year summary. Journal of Wildlife Management 53:1127-1132.

Young, Jr., D.P. and W. P. Erickson. 2006. Wildlife Issue Solutions: What Have Marine Radar Surveys Taught Us About Avian Risk Assessment? Proceedings of the American Wind Energy Association Windpower 2006 Conference and Exhibition, Pittsburgh, Pennsylvania, June 4-7, 2006.

Young, Jr., D.P., J.D. Jeffrey, W.P. Erickson, K. Bay, K. Kronner, B Gritski, and J. Baker. 2005a. Combine Hills Turbine Ranch Wildlife Monitoring First Annual Report, March 2004-March 2005. Technical report prepared for Eurus Energy America Corporation, Umatilla County, and the Combine Hills Technical Advisory Committee.

Young, D.P. Jr., W.P. Erickson, and J.P. Eddy. 2005b. Mountain Plover (*Charadrius montanus*) Surveys, Foote Creek Rim Wind Plant, Carbon County, Wyoming, 1995-2005. Unpublished report prepared for PacifiCorp and SeaWest Windpower, Inc. by Western EcoSystems Technology, Inc. (WEST), Cheyenne, Wyoming.

Young, Jr., D.P., W.P. Erickson, J.D. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. **W**estern **E**co**S**ystems Technology, Inc. Cheyenne, Wyoming, and Walla Walla, Washington. 25pp.

Table 1. Avian use estimates and avian fatality estimates for existing wind energy projects in the Columbia Plateau Ecoregion[a].

Project	Mean annual avian use (#/20-min survey)		Mean annual mortality (#/MW/year)			Source
	Raptors	All birds	Raptors	All birds	Nocturnal Migrants	
Combine Hills, OR	0.60	6.0	0	2.6	0.27	Young et al. 2005a
Klondike, I OR	0.47	17.5	0	0.9	0.35	Johnson et al. 2003a
Klondike II, OR	0.47	17.5	0.11	3.1	2.11	NWC and WEST, 2007
Klondike III, OR	0.78 [b]	8.18 [b]	0	2.5	0.51	Gritski et al. 2009
Vansycle, OR	0.41	13.1	0	1.0	0.32	Erickson et al. 2000
Stateline, WA/OR	0.41	13.1	0.10	2.4	0.78	Erickson et al. 2004, 2007
Hopkins Ridge, WA	0.64	8.7	0.14	1.2	0.46	Young et al. 2007
Nine Canyon, WA	0.26	9.4	0.05	2.8	0.45	Erickson et al. 2003
Wild Horse, WA	0.40	5.0	0.09	1.6	0.88	Erickson et al. 2008
Bighorn I, WA	0.90	16.6	0.15	2.6	0.57	Kronner et al. 2008
Leaning Juniper, OR	0.52	23.6	0.21	6.7	1.56	Gritski et al. 2008
Condon, OR	0.37	5.8	0.02[c]	0.05[c]	NR	Fishman Ecological Services 2003
Mean	**0.52**	**12.0**	**0.077**	**2.5**	**0.75**	

[a] Quantitative fatality estimates are not yet available for the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon

[b] Surveys were 10 minutes long; estimates provided were multiplied by 2 to estimate use during a 20-minute interval

[c] not adjusted for searcher efficiency or scavenger removal; study methods differed from other projects and were not as rigorous; therefore this estimate should be regarded as a minimum mortality estimate and it was not used in calculation of the mean values.

Table 2. Avian use estimates (# observed per 20 minutes per plot with 800-m radius viewshed) for Wind Resource Areas in the Columbia Plateau Ecoregion.

		Mean avian use	
Wind Resource Area	**Location**	**Raptors**	**All birds**
Hopkins Ridge	Columbia Co., WA	0.64	8.7
Nine Canyon	Benton Co., WA	0.26	9.4
Desert Claim	Kittitas Co., WA	0.77	15.3
Kittitas Valley	Kittitas Co., WA	0.90	12
Wild Horse	Kittitas Co., WA	0.40	5
Big Horn I	Klickitat Co., WA	0.90	16.6
White Creek	Klickitat Co., WA	0.66	11.9
Linden Ranch	Klickitat Co., WA	1.64	11.1
Hoctor Ridge	Klickitat Co., WA	1.38	15.3
Imrie	Klickitat Co., WA	0.70	19.2
Windy Point	Klickitat Co., WA	0.77	16.0
Windy Flats	Klickitat Co., WA	0.83	19.9
Reardan	Lincoln Co., WA	0.90	13
Zintel Canyon	Benton Co., WA	0.44	19
Maiden	Benton/Yakima Co., WA	0.38	11.6
Combine Hills	Umatilla Co., OR	0.60	6
Klondike	Sherman Co., OR	0.47	17.5
Biglow	Sherman Co., OR	0.30	9.1
Vansycle	Umatilla Co., OR	0.41	13.1
Elkhorn	Union Co., OR	1.05	21.7
Shepherd’s Ridge	Morrow Co., OR	0.61	6.5
Leaning Juniper	Gilliam Co., OR	0.52	23.6
Condon	Gilliam Co., OR	0.37	5.8
Stateline	Walla Walla Co., WA/Umatilla Co., OR	0.41	13.1
Mean		**0.68**	**13.4**
Range		**0.26 – 1.64**	**5 – 23.6**

Table 3. Number and species composition of bird fatalities found at the existing Columbia Plateau Ecoregion wind energy projects [a].

Species	Number fatalities	% composition
horned lark	249	29.7
golden-crowned kinglet	47	5.6
ring-necked pheasant	45	5.4
gray partridge	36	4.3
unidentified passerine	32	3.8
western meadowlark	27	3.2
European starling	25	3.0
mourning dove	24	2.9
chukar	23	2.7
American kestrel	22	2.6
dark-eyed junco	21	2.5
unidentified bird	20	2.4
white-crowned sparrow	17	2.0
red-tailed hawk	14	1.7
rock pigeon	12	1.4
yellow-rumped warbler	11	1.3
ruby-crowned kinglet	10	1.2
winter wren	10	1.2
American robin	8	1.0
Brewer’s sparrow	7	0.8
northern flicker	7	0.8
short-eared owl	7	0.8
common nighthawk	6	0.7
house wren	6	0.7
Swainson’s hawk	6	0.7
Townsend’s warbler	6	0.7
unidentified sparrow	6	0.7
unidentified kinglet	6	0.7
black-billed magpie	5	0.6
red-breasted nuthatch	5	0.6
golden-crowned sparrow	5	0.6
spotted towhee	4	0.5
Canada goose	4	0.5
ferruginous hawk	4	0.5
common raven	3	0.2
rough-legged hawk	3	0.4
song sparrow	3	0.4
vesper sparrow	3	0.4
white-throated swift	3	0.4
acorn woodpecker	2	0.2

American coot	2	0.2
Cassin's vireo	2	0.2
chipping sparrow	2	0.2
great blue heron	2	0.2
great horned owl	2	0.2
house finch	2	0.2
long-eared owl	2	0.2
Macgillivray's warbler	2	0.2
mallard	2	0.2
mountain bluebird	2	0.2
northern harrier	2	0.2
northern rough-winged swallow	2	0.2
pine siskin	2	0.2
sage thrasher	2	0.2
savannah sparrow	2	0.2
unidentified buteo	2	0.2
unidentified warbler	2	0.2
Vaux's swift	2	0.2
western tanager	2	0.2
American goldfinch	1	0.1
American pipit	1	0.1
Barn owl	1	0.1
black-throated sparrow	1	0.1
brown-headed cowbird	1	0.1
bufflehead	1	0.1
California quail	1	0.1
Cooper's hawk	1	0.1
downy woodpecker	1	0.1
golden eagle	1	0.1
grasshopper sparrow	1	0.1
gray catbird	1	0.1
hairy woodpecker	1	0.1
horned grebe	1	0.1
house sparrow	1	0.1
killdeer	1	0.1
Lewis's woodpecker	1	0.1
long-billed curlew	1	0.1
northern pintail	1	0.1
orange-crowned warbler	1	0.1
red-winged blackbird	1	0.1
sage sparrow	1	0.1
sharp-shinned hawk	1	0.1
Swainson's thrush	1	0.1
Townsend's solitaire	1	0.1
tree swallow	1	0.1

turkey vulture	1	0.1
unidentified accipiter	1	0.1
unidentified duck	1	0.1
unidentified empidonax	1	0.1
unidentified gamebird	1	0.1
unidentified nuthatch	1	0.1
unidentified owl	1	0.1
unidentified thrush	1	0.1
unidentified vireo	1	0.1
unidentified woodpecker	1	0.1
varied thrush	1	0.1
Virginia rail	1	0.1
warbling vireo	1	0.1
western grebe	1	0.1
western kingbird	1	0.1
western wood-pewee	1	0.1
Williamson's sapsucker	1	0.1
Wilson's warbler	1	0.1
yellow warbler	1	0.1
Total	837	100

[a] Species composition of bird fatalities is based on the data provided in those studies included in Table 1 as well as raw fatality data (species and numbers) for the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon

Table 4. Percent composition of avian fatalities by species group for existing Columbia Plateau Ecoregion wind energy projects.

Species	Number of Fatalities	Percent Composition
Passerines	562	67.1
Upland gamebirds	106	12.6
Raptors	70	8.5
Doves/pigeons	36	4.3
Waterbirds/waterfowl/shorebirds	18	2.1
Other birds[a]	25	3.0
Unidentified birds	20	2.4
Totals	**837**	**100**

[a] woodpeckers, nighthawks, swifts

Table 5. Summary of bat mortality at existing wind energy projects in the Columbia Plateau Ecoregion.

Project Name [state]	Bats per MW[a]	Reference
Stateline [OR/WA]	1.44	Erickson et al. 2004, 2007
Vansycle [OR]	1.12	Erickson et al. 2000
Klondike [OR]	0.77	Johnson et al. 2003b
Klondike II [OR]	0.41	NWC and WEST, Inc. 2007
Klondike III [OR]	0.23	Gritski et al. 2009
Hopkins Ridge [WA]	0.63	Young et al 2007
Wild Horse [WA]	0.39	Erickson et al. 2008
Nine Canyon [WA]	2.46	Erickson et al. 2003
Leaning Juniper [OR]	1.98	Gritski et al. 2008
Big Horn I [WA]	1.90	Kronner et al. 2008
Combine Hills [OR]	1.88	Young et al. 2005a
Average	**1.20**	

[a] Most reports do not provide number per MW of energy produced so this number was calculated based on the mortality per turbine and capacity of turbines studied.

Table 6. Number and species composition of bat fatalities found at eight existing Columbia Plateau wind energy projects[a].

Species	Number of Fatalities	Percent Composition
silver-haired bat	184	47.2
hoary bat	180	46.2
unidentified bat	13	3.3
little brown bat	8	2.1
big brown bat	5	1.3
Totals (4 species)	**390**	**100**

[a] Species composition of bat fatalities is based on the data provided in those studies included in Table 5 as well as raw fatality data (species and numbers) for the Goodnoe and White Creek wind energy facilities in Klickitat County, Washington and the Pebble and Hay Canyon wind energy facilities in Oregon

Table 7. Seasonal timing of raptor fatalities at existing wind energy facilities in the Columbia Plateau.

	Season				
Wind Energy Project	**Spring**	**Summer**	**Fall**	**Winter**	**Overall**
Combine Hills, OR	0	0	0	0	0
Klondike I, OR	0	0	0	0	0
Klondike II, OR	0	1	1	0	2
Klondike III, OR	0	0	0	0	0
Vansycle, OR	0	0	0	0	0
Stateline, WA/OR	3	8	6	1	18
Hopkins Ridge, WA	1	3	1	1	6
Nine Canyon, WA	1	0	0	0	1
Wild Horse, WA	1	5	0	0	6
Bighorn I, WA	4	5	2	5	16
Leaning Juniper, OR	4	3	4	0	11
Condon, OR	1	0	0	0	1
Totals	**15**	**28**	**14**	**7**	**65**
Percent	**23.1**	**43.1**	**21.5**	**10.8**	**100**

Table 8. Comparison of avian and bat fatality estimates presented in this report between 6700 and 5577 megawatts of wind energy development in the Columbia Plateau ecoregion.

	MW of installed Capacity	
Fatality estimates by avian or bat species/group	**5577**	**6700**
All birds	13,942	16,750
All raptors	430	516
American kestrel	135	162
Red-tailed hawk	86	103
Short-eared owl	43	52
Ferruginous hawk	24	29
Swainson’s hawk	37	44
Golden eagle	6	7
Upland gamebirds	1756	2110
Waterfowl/waterbirds/shorebirds	293	352
Passerines	9351	11,239
Horned lark	4139	4975
Western meadowlark	449	540
Nocturnal migrants	4181	5025
Golden-crowned kinglet	780	938
Long-billed curlew	17	20
Lewis’s woodpecker	17	20
Grasshopper sparrow	17	20
Sage thrasher	17	20
Sage sparrow	17	20
Vaux’s swift	17	20
All bats	6689	8040
Silver-haired bat	3157	3795
Hoary bat	3090	3714

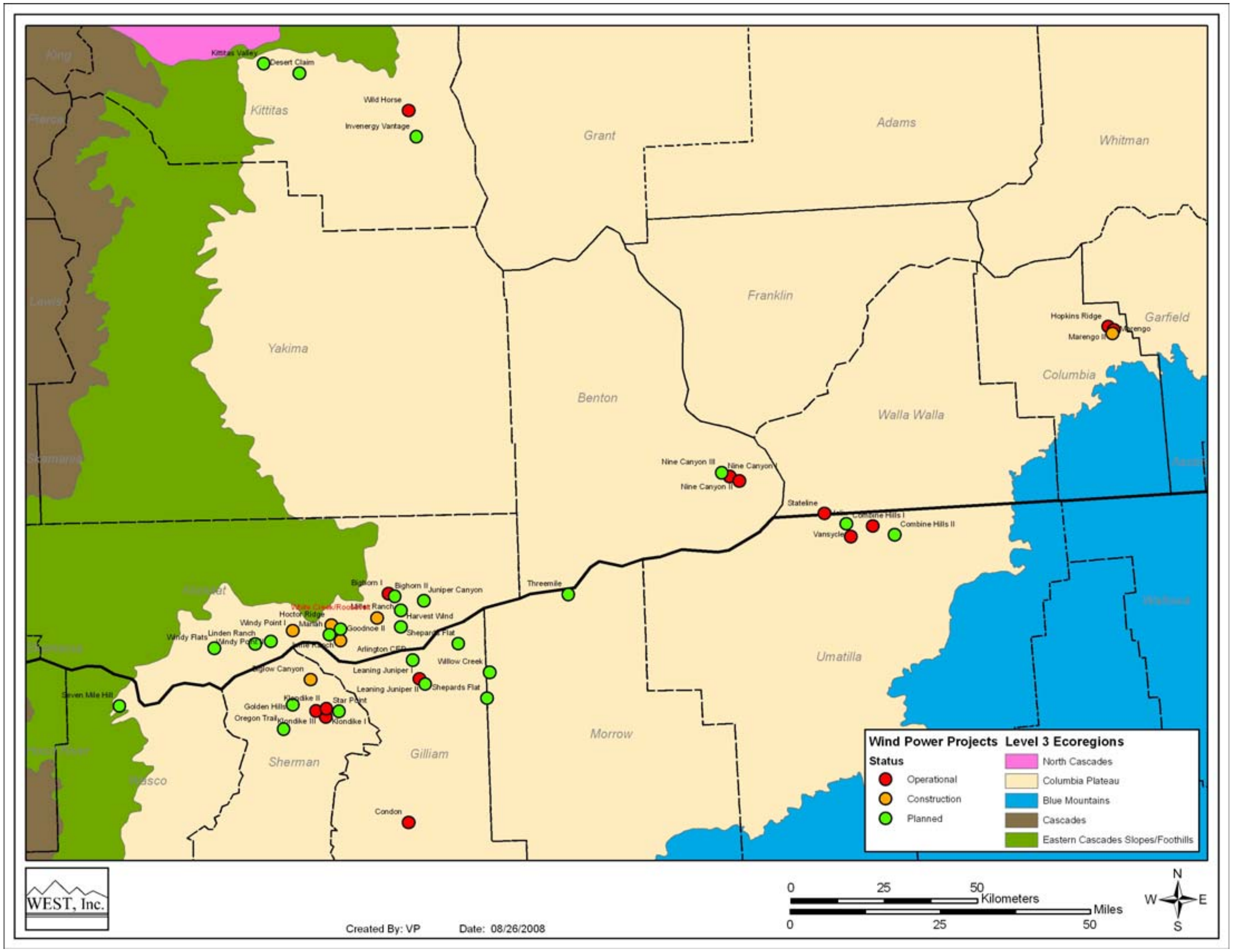


Figure 1. Location of existing and proposed wind energy facilities in the Columbia Plateau Ecoregion of southeastern Washington and northeastern Oregon, October 2008.

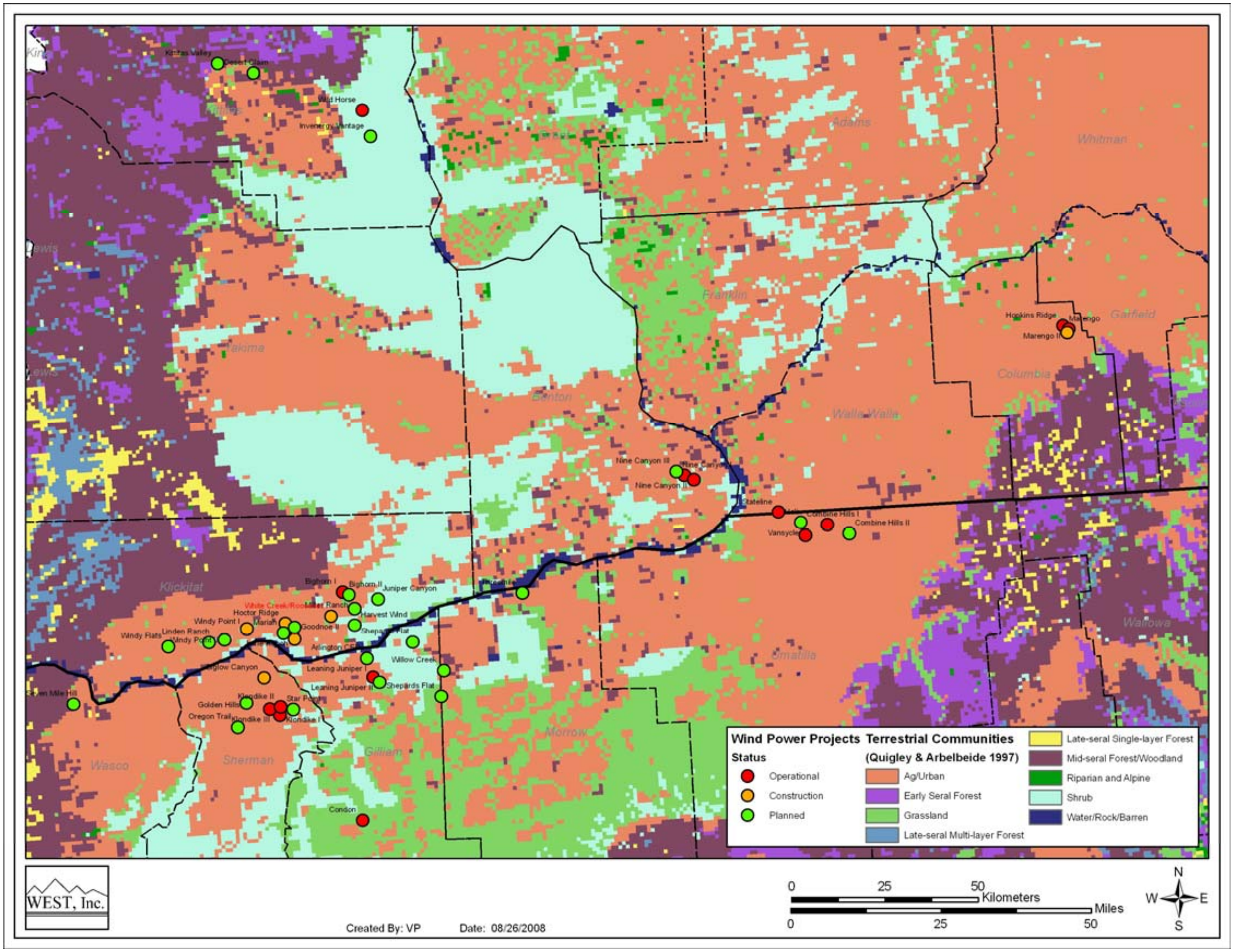


Figure 2. Terrestrial vegetative communities within the Columbia Plateau Ecoregion.

C-12

Avian and Bat Cumulative Impacts Analysis. Shepherds Flat Wind Project. Gilliam and Morrow Counties, Oregon. Prepared for LifeLine Renewable Energy, Inc.

David P. Young, Jr. and Victoria K. Poulton, WEST, Inc. 2007.

AVIAN AND BAT
CUMULATIVE IMPACTS ANALYSIS
SHEPHERDS FLAT WIND PROJECT
GILLIAM AND MORROW COUNTIES, OREGON

March 2007

Prepared For:

LifeLine Renewable Energy, Inc

Prepared By:

David P. Young, Jr. and Victoria K. Poulton
Western EcoSystems Technology, Inc.
2003 Central Avenue
Cheyenne, Wyoming 82001

WEST, Inc.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 INTRODUCTION AND BACKGROUND

Over the last decade, there has been a surge of interest in wind power development in Oregon and Washington along the Columbia River corridor and within the Columbia Plateau physiographic region (ecoregion). A central issue for wind power developments is the potential impacts to avian and bat resources, and in particular direct impacts such as avian or bat fatalities. Wind power proposals are commonly reviewed by natural resource agencies, private conservation groups, permitting authorities and other stakeholders. Frequently, baseline studies are conducted that are designed to estimate avian presence and abundance at proposed development sites for use in the impact assessment and siting of the project followed by monitoring studies post construction which are designed to measure impacts from the project. As more wind power projects are constructed along the Columbia River and surrounding region, cumulative impacts from multiple projects have become a concern and are important to consider.

The proposed Shepherds Flat wind power project is located in Gilliam and Morrow Counties, in north-central Oregon. The proposed project would have from 300-326 turbines, each with a capacity of 2.3-2.5 megawatts (MW), for an overall project capacity of 750 MW. The total proposed project area using the lease area boundaries is approximately 31,270 acres (48.9 mi^2). The project boundary comes within 1 mile of the Columbia River to the north. Land use is typical of other existing and proposed wind projects in the region and consists primarily of dryland agriculture, of which small amounts have been converted to Conservation Reserve Program (CRP) lands, and areas of native grassland rangeland.

Most wind power development in northern Oregon and southern Washington has been within the Columbia Plateau Level III Ecoregion (Thorson et al. 2003; Figure 1). The Columbia Plateau was historically characterized by open, arid shrub-steppe and grassland-steppe habitats. The current predominant land use of the Ecoregion is dryland agriculture, CRP lands, and rangeland. Precipitation through the region is 6-12 inches per year (Thorson et al. 2003). Surrounding ecoregions are more mountainous, receive more precipitation, and are more forested than the Columbia Plateau. While the Columbia Plateau has less vegetative strata than surrounding ecoregions, and is an excellent place for wind power development, plant and animals species that are specialized for this type of habitat may be recipient of a larger portion of the cumulative impacts from wind development.

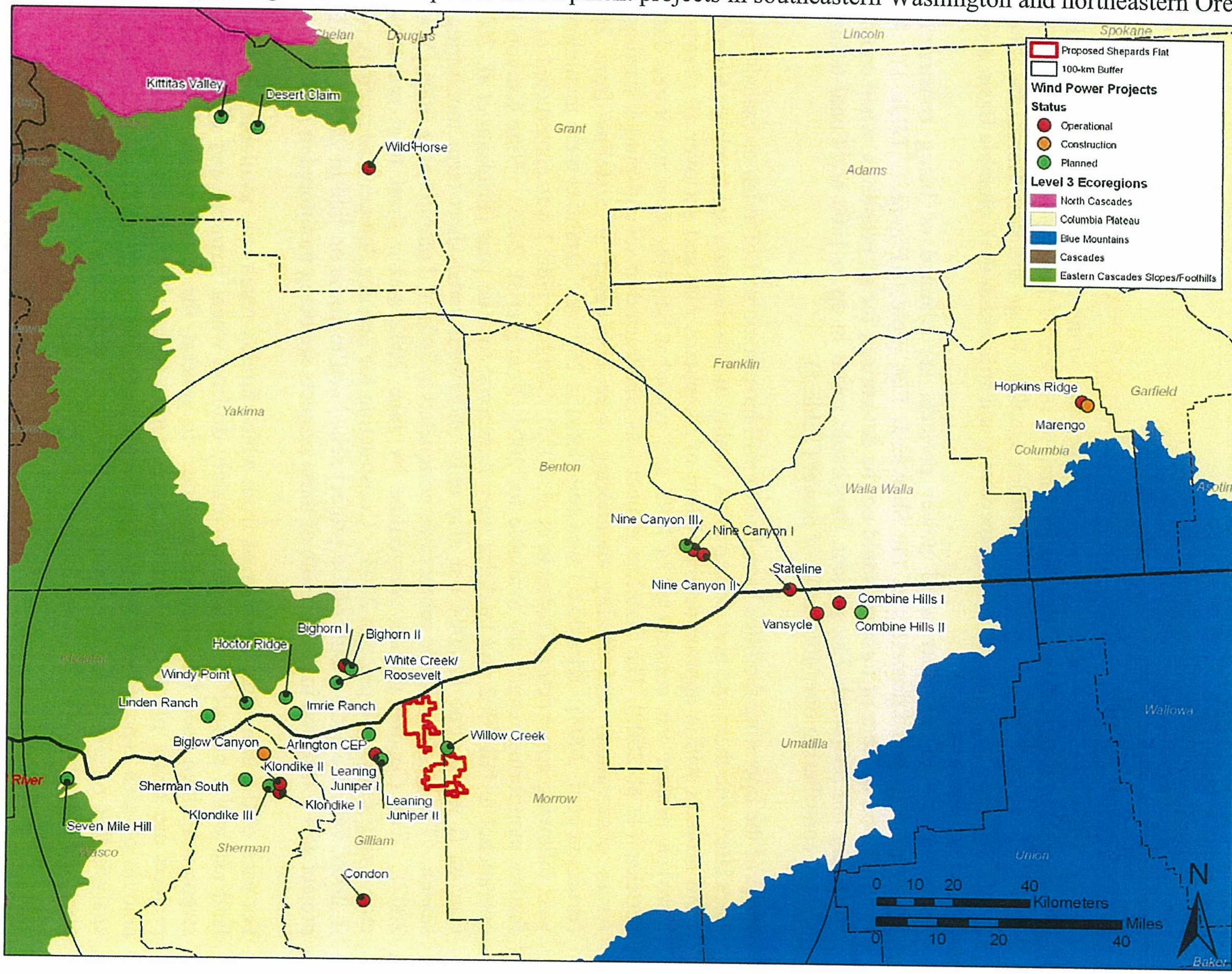
2.0 METHODS

This report is intended to provide a broad, qualitative analysis using existing public information about existing wind projects and wind project proposals in the region and results of monitoring (fatality) studies to compile a cumulative impact analysis for avian and bat resources. The analysis relies heavily on existing information from studies in the Columbia Plateau Ecoregion. Information about wind project proposals was gathered from a variety of sources such as federal and state agencies (e.g., BPA, Oregon EFSC), permitting agencies (e.g., Kickitat County), nonprofit renewable energy advocates (e.g. Renewable Northwest Project), and other public sources such as internet resources. Basic information such as the proposed capacity, turbine size and number, and location about each project identified was gathered and summarized to the extent possible. In many cases the actual boundary of the proposal could not be identified and only a general location was known.

The general approach to the cumulative effects analysis was to summarize results of fatality monitoring studies at operational wind projects within the same ecoregion, and then use the results to estimate impacts for all constructed and proposed wind projects within approximately 100 km of the proposed Shepherds Flat project (Figure 1). The 100km buffer is somewhat arbitrary but due to similarities of habitat and land use throughout the whole Columbia Plateau ecoregion the resources potentially impacted by wind projects are similar for all projects. The Vansycle and Combine Hills wind projects occur just outside a 100km distance from Shepherds Flat and are included in the analysis (Figure 1).

This cumulative effects analysis considers data from seven projects in the Columbia Plateau ecoregion where monitoring for fatalities has occurred. Predominant vegetation type and land use for all the projects where monitoring occurred is similar (dryland agriculture, grassland and shrub-steppe rangeland), and the fatality and avian survey data were all collected using similar methods. The data sets used in this report were collected using similar methods, where observed fatality rates calculated from standardized carcass searches were adjusted for searcher efficiency and carcass removal biases. The analysis operates under the assumption that the avian and bat communities are similar across all projects because of habitat and land use similarities throughout the ecoregion, and thus applicable to the new proposed projects in this same ecoregion. Details about results, methods, and estimates of potential avian impacts from each individual project are available in the referenced project reports.

Figure 1. Level III ecological regions and wind power development projects in southeastern Washington and northeastern Oregon.



3.0 RESULTS

3.1 Study Area and Wind Projects

As of early 2007, 12 wind projects were in operation in the Columbia Plateau Ecoregion and 10 of these were in operation within approximately 100 km of the proposed Shepherds Flat project (Figure 1, Table 1). Two operating facilities, Hopkins Ridge and Wild Horse, are about 180 km to the east and 140 km to the north respectively and still within the Columbia Basin ecoregion.

Currently, up to 19 other wind power projects are planned or being constructed within approximately 100 kilometers of the Shepherds Flat project (Figure 1, Table 1). While the capacity and number of turbines could not be determined for all proposals, when completed and including the Shepherds Flat project, they could result in up to 1600 additional turbines in the region, contributing over 4060 MW of power (Table 1).

Most of the operating facilities have had or will have some sort of avian or casualty monitoring associated with them and post-construction fatality monitoring data are available from five of the wind projects within approximately 100km of Shepherds Flat and six over all (Table 2). The Vansycle project was constructed in 1998 and avian/bat fatalities were monitored during 1999 (Erickson et al. 2000). The Stateline project was constructed in several phases starting in 2001. Avian observations and fatality monitoring were conducted at Stateline from 2001-2003 (Erickson et al. 2004). Klondike I was completed in 2001 and fatalities were monitored for one year following construction (Johnson et al. 2003) Combine Hills I was constructed in 2003 and fatality monitoring results are available for 2004 (Young et al. 2005). Nine Canyon I became operational in fall 2002 and fatalities were monitored for one year (Erickson et al. 2003). Nine Canyon II was online in 2004 but also only underwent some short term monitoring for one season. The Hopkins Ridge project was completed in 2005 and monitored in 2006 (Young et al. 2007). The Condon project was online by June 2002 and a short term non-standardized monitoring study took place in 2003[1]. Construction for Leaning Juniper was partially completed in 2006, with the second half of the project scheduled to come on line in 2007. The Big Horn project was completed in 2006. Both of these projects are being monitored in 2007.

For each of the individual study areas from which fatality results are available, the predominant land use was a mosaic of agriculture, mainly dryland wheat farming, and grassland or shrub-steppe rangeland used for livestock grazing. In general, the region where future wind power projects are being planned is similar in vegetation types although for any given project the amount of each type varies (Quigley and Arbelbeide 1997, Figure 2). It is assumed for the analysis that results from the existing studies, which are similar, would be applicable to new proposed projects.

[1] Monitoring at the Condon wind project took place for less than one year in 2002-2003 (Fishman 2003). This study did not use similar methods to the other studies and was not as rigorous. No searcher efficiency or carcass removal surveys were conducted so the reported results are simply observed number of fatalities for the study and not comparable to the other studies.

Table 1. Wind power projects constructed or planed in the Columbia Plateau ecological region of Washington and Oregon.

Project	Max. Capacity (MW)	No. Turbines	Turbine Size (MW)	General Habitat and Land Use	Dist. To Shepherds Flat (km)	Project Information Source
Existing						
Combine Hills I (Umatilla Co., OR)	41	41	1	dryland ag, grazed shrub steppe	105	http://www.rnp.org/News/pr_EurusCombineJun03.html
Vansycle Ridge (Umatilla Co., OR)	25	38	0.66	dryland ag,	100	http://www.rnp.org/Projects/vansycle.html
Stateline (Umatilla Co., OR)	300	399	0.66	dryland ag, grazing, shrub steppe	95	http://www.ppmenergy.com/cs_stateline.html
Klondike I (Sherman Co., OR)	24	16	1.5	dryland ag	35	http://www.rnp.org/Resources/Klondike%201%20pager.pdf
Klondike II (Sherman Co., OR)	75	50	1.5	dryland ag	35	http://www.portlandgeneral.com/about_pgc/ current_issues/klondikeII/Default.asp?bhcp=1
Condon (Gilliam Co., OR)	50	83	0.6	farming, grazing	30	http://www.efw.bpa.gov/environmental_services/ Document_Library/Condon_Wind/RODwMAP.pdf
Leaning Juniper I (Gilliam Co., OR)	104	63	1.5	farming, grazing	5	http://www.efw.bpa.gov/environmental_services/ Document_Library/Arlington_PPM/ROD031105.pdf
Nine Canyon I (Benton Co., WA)	64	49	1.3	farming, steppe	80	http://www.energy-northwest.com/downloads/ninecan.pdf
Nine Canyon II (Benton Co., WA)	16	12	1.3	farming, steppe	80	http://www.energy-northwest.com/downloads/9Canyon.pdf
Hopkins Ridge (Columbia Co., WA)	150	83	1.8	farming, crp, grazing, steppe	180	http://www.rnp.org/News/pr_PSEHopkinsDec05.htm
Big Horn I (Klickitat Co., WA)	250	167	1.5	drylnd ag, crp, lithosol-grassland	13	http://www.efw.bpa.gov/environmental_services/ Document_Library/Big_Horn/BigHornROD03242005.pdf
Wild Horse (Kittitas Co., WA)	230	127	1.8	lithosol, shrub steppe	140	http://www.res-ltd.com/wind-farms/wf-wildhorse/htm
Under Construction						
Biglow Canyon (Sherman Co., OR)	450	211	1.65	farming, grazing	30	http://www.bpa.gov/corporate/pubs/ RODS/2006/RODKlondikeIIIBiglowCanyon.pdf
Marengo (Columbia Co., WA)	140	78	1.8	dryland ag, shrub steppe	180	http://www.pacificpower.net/Homepage/Homepage35750.html
Proposed						
Seven Mile Hill (Wasco Co., OR)	50				~90	http://www.oregon.gov/ENERGY/SITING/ review.shtml#Seven_Mile_Hill_Wind_Project

Project	Max. Capacity (MW)	No. Turbines	Turbine Size (MW)	General Habitat and Land Use	Dist. To Shepherds Flat (km)	Project Information Source
Klondike III (Sherman Co., OR)	272	165	1.8	farming, grazing	30	http://egov.oregon.gov/ENERGY/SITING/docs/ KWPPublicFilingNotice.pdf
Leaning Juniper II (Gilliam Co., OR)	279			farming, grazing	~5	http://www.oregon.gov/ENERGY/SITING/ review.shtml#Leaning_Juniper_Wind_Power
Arlington CEP (Gilliam Co., OR)	104	63	1.65	grazed shrub-steppe	6.5	http://www.bpa.gov/corporate/pubs/rods/2005/EFW/ Arlington-Wind-Interconnection-ROD-1-14-05.pdf
Shepherds Flat (Gilliam Co., OR)	750	300-326	2.3-2.5		0	Data provided by BPA
Willow Creek (Morrow Co., OR)	180			farming, grazing	<1	http://www.transmission.bpa.gov/PlanProj/Wind/willow.cfm
Combine Hills II (Umatilla Co., OR)	63	41	1.5	dryland ag, grazed shrub steppe	~105	http://www.efw.bpa.gov/environmental_services/ Document_Library/Combine_Hills/Combine_Hills_Cx.pdf
Big Horn II (Klickitat Co., WA)	150			agriculture, crp	~15	
White Creek/Roosevelt (Klickitat Co., WA)	205	166-200	1.5-1.8	farming, grazing	13	http://www.efw.bpa.gov/environmental_services/ Document_Library/Rock_Creek/RockCreekSubstationROD.pdf
Windy Point (Klickitat Co., WA)	242.5	97	2.5	farming, grazing	~32	http://www.bpa.gov/corporate/pubs/RODS/2006/ WindyPointI_IIRODFINAL.pdf
Hoctor Ridge (Klickitat Co., WA)	60			ag/grazing, woodland	31	
Linden Ranch/DNR (Klickitat Co., WA)	56			agriculture, grazing	52	
Imrie Ranch (Klickitat Co., WA)	100	35	2.8	agriculture, grazing	31	
Windtricity (Klickitat Co., WA)	12					
Mariah Energy (Klickitat Co., WA)	4					
Nine Canyon III (Benton Co., WA)	32	14	2.3	dryland wheat	~80	http://www.energy-northwest.com/news/2006/06_07.php
Desert Claim (Kittitas Co., WA)	180	90	2.0	grassland, agriculture shrub steppe	160	
Kittitas Valley (Kittitas Co., WA)	130	65	2.0	grassland, grazing	170	
Totals	~4800	~2950				

Figure 2. Terrestrial vegetative communities in southeastern Washington and northeastern Oregon.

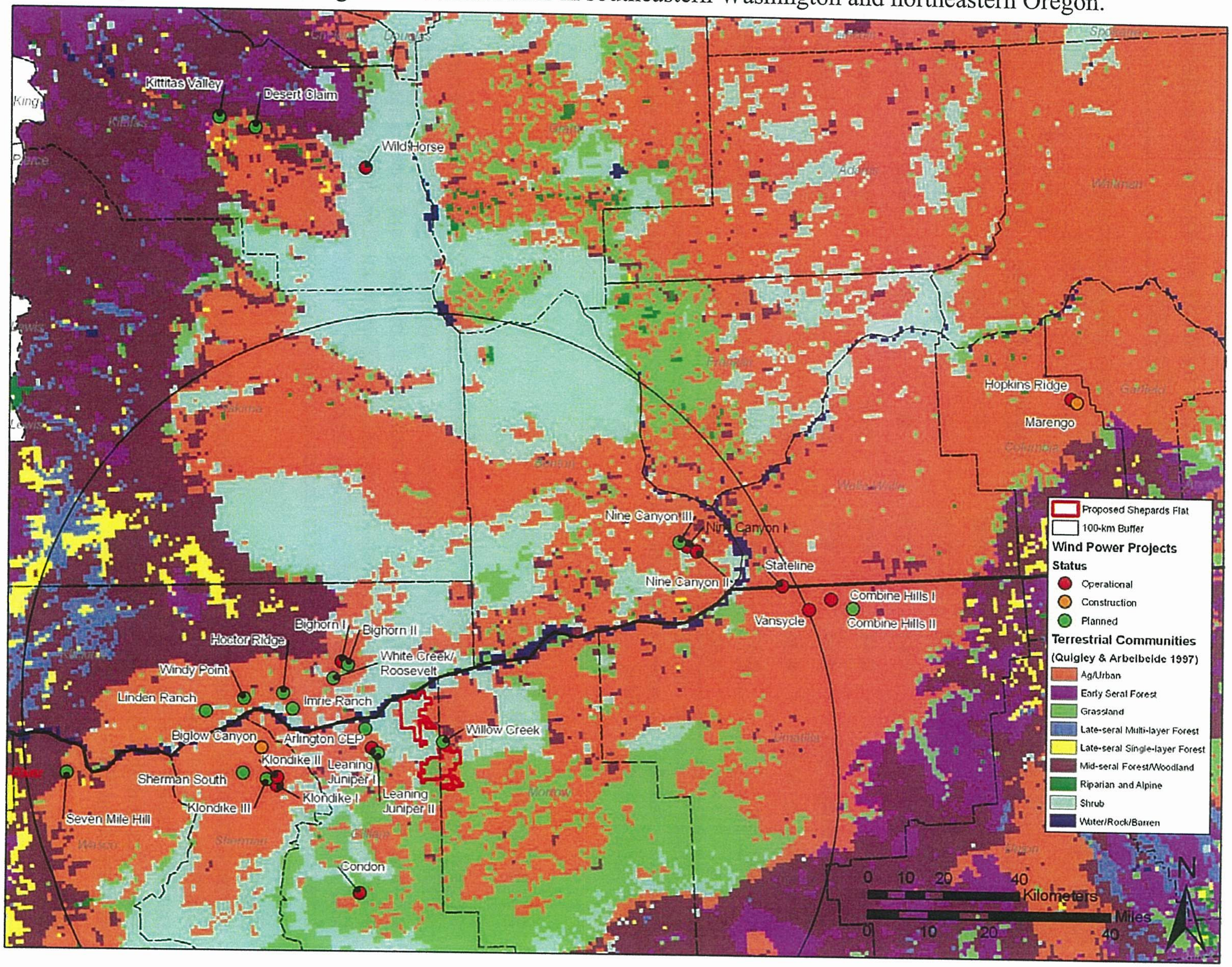


Table 2. Avian use estimates and avian fatality estimates for wind power projects in the Columbia Plateau Ecoregion.

Project	Mean annual avian use (#/20-min survey)		Mean annual mortality (#/MW/year)			Source
	Raptors	All birds	Raptors	All birds	Nocturnal Migrants	
Combine Hills, OR	0.60	6.0	0	2.6	0.27	Young et al. 2005
Klondike, OR	0.47	17.5	0	0.9	0.35	Johnson et al. 2003
Vansycle, OR	0.41	13.1	0	1.0	0.32	Erickson et al. 2000
Stateline, WA/OR	0.41	13.1	0.09	2.9	0.73	Erickson et al. 2004
Hopkins Ridge, WA	0.64	8.7	0.14	1.2	0.46	Young et al. 2007
Nine Canyon, WA	0.26	9.4	0.05	2.8	0.45	Erickson et al. 2001
Condon, OR	0.37	5.8	0.02[a]	0.05[a]	NR	Fishman 2003
Mean	**0.45**	**10.5**	**0.05**	**1.9**	**0.43**	

[a] not adjusted for searcher efficiency or scavenger removal; study methods differed from other projects and were not as rigorous; therefore this estimate should be regarded as a minimum mortality estimate and it was not used in calculation of the mean values.

3.2 Direct Impacts to Birds

Annual avian mortality estimates at wind farms in the Columbia Plateau Ecoregion ranged from 0.9 to 2.9 birds per MW (Table 2). The average for six projects with comparable data collection methods was 1.9 avian deaths/MW/year. All constructed, planned, and under construction projects within 100km and including Shepherds Flat would contribute about 4060 MW of power. Assuming that mortality rates are representative of the region, new wind power generation could cause between approximately 3,650 and 11,775 and on average 7,715 avian deaths per year in the region.

Raptors

At modern wind power projects in the Columbia Plateau Ecoregion, raptor species generally constitute only a small portion of avian use, ranging from 0.26 to 0.64 observation per 20-min survey. Raptor mortality has also been low ranging from 0 to 0.14 raptor fatalities per MW per year. An added 4060 MW of capacity in the region could result in between 0 and 568, and on average about 200 raptor deaths per year.

Red-tailed hawk, American kestrel, and northern harrier account for most of the raptor use at other projects where avian use was studied (see Erickson et al 2001, 2002). In the winter, rough-legged hawk and red-tailed hawk account for majority of the raptor use. If it is assumed that raptor use is correlated with mortality, these species are expected to be the raptor species with the highest collision risk across the projects. The potential exists for other species to collide with turbines, including Swainson's hawk, ferruginous hawk, turkey vulture, golden eagle, Cooper's hawk, sharp-shinned hawk, prairie falcon, and bald eagle; however, the mortality risk associated with these species is expected to be lower than the mortality for red-tailed hawks and American kestrel due to the lower use by these species in general. In addition, American kestrel and red-tailed hawk have been the most common fatality at regional wind projects (Table 3; Erickson et al. 2001, 2004, Young et al. 2007). Common owl species such as great-horned, which are typically not effectively surveyed during the day, may also be at risk of collision, although short-eared owl has been the only owl species fatality recorded at the regional wind projects (Table 3). While use is often high for turkey vultures, they appear less susceptible to collision than most other raptors (see Orloff and Flannery 1992, Erickson et al. 2001). In addition, there have been very few northern harrier, ferruginous hawk, rough-legged hawk, and *Accipiter* species fatalities recorded at wind projects (Table 3, Erickson et al. 2001, 2002).

Passerines

Passerines have been the most abundant avian fatality at wind projects studied (see Erickson et al. 2000, 2001, 2002, Johnson et al. 2002, Young et al. 2003, 2005, 2007), often representing more than 80% of the avian fatalities. For projects in the Columbia Plateau Ecoregion on average approximately 69% of the avian fatalities have been passerines (Table 4). Both migrant and resident passerine fatalities have been observed, with migrants generally making up 20-30% of the avian fatalities. Assuming that 69% of all bird mortality would be passerine fatalities between approximately 2,518 and 8,125 and on average 5,323 passerine deaths per year in the region would occur. Some impacts are expected for nocturnal migrating species, however, impacts are not expected to be great for the Columbia Plateau Ecoregion. Estimates for nocturnal migrant mortality at the regional wind projects have ranged from 0.27 to 0.73 per MW per year (Table 2). Assuming these estimates are representative of Columbia Plateau wind projects, between approximately 1,090 and 2,960 nocturnal migrant fatalities would be expected if 4060 MW of wind power were constructed.

Passerine species most common to the project sites will likely be most at risk, including horned lark, western meadowlark, and European starling, however, there is generally little concern over potential mortality of this non-native, non-protected species. Horned larks have been the most commonly observed fatality at several wind projects, including Vansycle, Combine Hills, and Stateline (Table 3, Erickson et al. 2003, Young et al. 2005, Erickson et al. 2004) and represent approximately 35% of the avian fatalities in the Columbia Plateau ecoregion at wind projects. Golden crowned kinglet, a tree/forest dwelling species, have been recorded as fatalities at a few projects and are generally considered migrants.

Table 3. Number and species composition of bird fatalities found at the seven Pacific Northwest regional wind projects.

Species	Number of Fatalities	Percent Composition
Horned lark	128	35.2
Ring-necked pheasant *(n)*	35	9.6
Golden-crowned kinglet	23	6.3
Chukar *(n)*	17	4.7
Western meadowlark	15	4.1
European starling *(n)*	15	4.1
Gray partridge *(n)*	14	3.8
White-crowned sparrow	12	3.3
Red-tailed hawk	9	2.5
American kestrel	9	2.5
Unidentified passerine	8	2.2
Yellow-rumped warbler	6	1.6
Winter wren	5	1.4
Rock dove *(n)*	5	1.4
Canada goose	4	1.1
Dark-eyed junco	4	1.1
Unidentified bird	4	1.1
House wren	3	0.8
Red-breasted nuthatch	3	0.8
Black-billed magpie	3	0.8
Northern flicker	3	0.8
Golden-crowned sparrow	3	0.8
Unidentified sparrow	2	0.5
Short-eared owl	2	0.5
Savannah sparrow	2	0.5
Ruby-crowned kinglet	2	0.5
Vesper sparrow	2	0.5
White-throated swift	2	0.5
Rough-legged hawk	2	0.5
Great blue heron	2	0.5
Red-winged blackbird	1	0.3
Ferruginous hawk	1	0.3
Grasshopper sparrow	1	0.3
American pipit	1	0.3
Mallard	1	0.3
Swainson's thrush	1	0.3
Swainson's hawk	1	0.3
Spotted towhee	1	0.3
Lewis's woodpecker	1	0.3
American robin	1	0.3
Macgillivray's warbler	1	0.3

Species	Number of Fatalities	Percent Composition
House finch	1	0.3
Virginia rail	1	0.3
American coot	1	0.3
Cooper's hawk	1	0.3
Gray catbird	1	0.3
Northern harrier	1	0.3
Townsend's warbler	1	0.3
Unidentified flycatcher	1	0.3
Totals (47 species)	363	100

n = non-native species

Table 4. Percent composition of avian fatalities by species group for the seven Pacific Northwest regional wind project monitoring studies.

Species	Number of Fatalities	Percent Composition
Passerines	251	69.1
Upland gamebirds *(n)*	66	18.2
Raptors	26	7.2
Other birds[a]	20	5.5
Totals	363	100
Non-protected species[b]	20	5.5

[a] Waterbirds, waterfowl, rails, doves, woodpeckers, swifts
[b] European starling and rock dove

Upland gamebirds

For projects in the Columbia Plateau Ecoregion, upland gamebirds have composed a higher percentage of avian fatalities than in other regions of the U.S., approximately 18% of all avian fatalities (Table 4). Three introduced species, ring-necked pheasant, chukar, and gray (Hungarian) partridge are the most commonly found non-passerine fatalities (Table 3). Estimates for upland game bird mortality in the Columbia Plateau Ecoregion have varied from 0.27 to 0.47 per MW per year. Provided these estimates are representative, between 1,090 and 1,910 upland gamebird fatalities would be expected per year for 4060 MW of wind power.

3.3 Direct Impacts to Bats

Results of fatality monitoring for the Columbia Plateau Ecoregion wind projects indicate mortality ranges of approximately 0.63 to 2.46 bats per MW per year (Table 5). Based on these results, and considering the similarities in the characteristics of the project areas and other regional projects, a conservative estimate of total bat mortality would be between 2,550 and 9,990 bats per year, assuming 4060 MW of wind power is constructed.

Table 5. Summary of Bat Mortality at newer generation wind project monitoring studies in the Columbia Plateau ecoregion.

Project Name [state]	No. Bats /turbine/year	Bats per MW[1]	Reference
Stateline [OR/WA]	1.12	1.70	Erickson et al. 2004
Vansycle [OR]	0.74	1.12	Erickson et al. 2000
Klondike [OR]	1.16	0.77	Johnson et al. 2003
Hopkins Ridge [WA]	1.13	0.63	Young et al 2007
Nine Canyon [WA]	3.21	2.46	Erickson et al. 2001b
Combine Hills [OR]	1.88	1.88	Young et al. 2005
Average	1.54	1.43	

[1] Most reports do not provide number per MW of energy produced so this number was calculated based on the mortality per turbine and capacity of turbines studied.

Only four species of bat fatalities have been documented for six wind projects monitored in the Columbia Plateau Ecoregion (Table 6). The vast majority of the fatalities were composed of two species: silver-haired bat (48%) and hoary bat (46%), two species of foliage (tree) dwelling migratory bats (see Erickson et al. 2003, 2004; Young et al. 2005, Johnson et al. 2003, Young et al 2007). Monitoring studies at other wind projects nationwide have documented impacts to bats with some common results for all regions (Johnson 2005). The species at highest risk appear to be foliage dwelling (forest, trees) fall migratory species. The annual period when most bat fatalities occur is in August and September. Hoary and silver-haired bats are wide spread across North America and breed into the boreal forests regions of Canada and migrate south to winter in the southern U.S., Mexico, and potentially further south in Central America. Many bats will migrate short distances to suitable hibernacula for the winter; however, short distance migrant species do not appear to be at as great a risk based on the monitoring studies results.

Table 6. Number and species composition of bat fatalities found at six Pacific Northwest regional wind projects.

Species	Number of Fatalities	Percent Composition
Silver-haired bat	115	48.3
Hoary bat	110	46.2
Unidentified bat	7	2.9
Little brown bat	3	1.3
Big brown bat	3	1.3
Totals (4 species)	238	100

Bat foraging areas such as riparian zones, shrublands, streams, and other water sources are generally limited in the Columbia Plateau Ecoregion and usually confined to river and stream corridors. The sites chosen for wind development in the ecoregion generally have few bat foraging or concentration areas. At several wind projects studied in the U.S., bat collision mortality during the breeding season was far less, despite the fact that relatively large populations of resident bats of several species were documented in proximity to the wind plant (see Gruver 2002; Johnson et al., 2002; Johnson 2005). Based on these studies, it appears that wind projects, especially those in open habitats, pose little risk to non-migratory bat populations.

3.4 Habitat Impacts

Grassland and shrub-steppe habitat is one of the most abundant habitat types in Eastern Oregon and Washington, but it is also highly subjected to development and conversion to agriculture (Johnson and O'Neil 2001). In addition to potentially thousands of new vertical structures, added wind generation in the region will result in more roads (mostly dirt and gravel) and increased human activity due to turbine construction and maintenance. Most habitat impacts will be to already heavily disturbed agriculture fields and moderately disturbed grazing/rangeland. The percent of direct impacts actually occurring in grassland or shrub-steppe habitat are difficult to predict and would be based on individual project design and layout.

Because of the location of the proposed wind projects (Figure 2, Table 1), it is expected that the majority of habitat impacts will occur in dryland agriculture vegetation. Under a set of assumptions about impacts and project location, the amount of cumulative impacts to vegetation communities can be estimated. Assuming that: (1) on average the permanent impacts associated with a turbine and the associated roads are between 1.5 and 2.5 acres per turbine; (2) 25% of a project layout occurs in non-agricultural vegetation types, which in many cases is a drastic overestimate; and (3) 1.5-2.5 MW turbines are used for the proposed build out identified (Table 1), then between 630 and 1750 acres of non-agricultural vegetation type, primarily grassland shrub-steppe vegetation, would be lost in the Columbia Plateau Ecoregion with 4060 MW of wind projects. These impacts would be spread over a large area geographically (see Figure 1) and are considered an overestimate because of efforts to locate projects in agricultural vegetation types. On a local (project) scale, these impacts are generally on the edge of native vegetation areas where they abut agriculture fields.

While the Columbia Plateau covers a large area, and characteristic grassland shrub-steppe habitat is widespread, it is also heavily fragmented by agricultural activities. Species that depend on native habitat face physical and ecological barriers within the region and at the region's edges. The Columbia River and other smaller rivers in the area cut deep canyons and present linear alteration to the general physiography and potential barriers to some animal species movement. Large swaths of agricultural land are less obvious, but may pose significant obstacles to small or less mobile animals. While many birds are not impeded by such physical barriers, some smaller, habitat specific birds that depend on brushy habitats for cover could be affected by such habitat fragmentation. Habitat specialists and obligates such as sage-grouse (*Centrocercus urophasianus*) and sage sparrow (*Amphispiza belli*) require large tracts of continuous sage habitat (Johnson and O'Neil 2001), which is largely missing from the Columbia Plateau, and the range for these species in the Columbia Plateau is already severely restricted. Assuming that agricultural vegetation types are not critical wildlife habitat, habitat loss impacts are not expected to be a significant loss to any given species.

4.0 DISCUSSION

This cumulative effects analysis was based largely on results of other studies of wind projects in the region and in particular monitoring studies that estimated the direct impacts of a particular wind project. The overall design for these studies incorporates several assumptions or factors that affect the results of the fatality estimates. First, all bird casualties found within the standardized search plots during the study periods were included in the analyses. It is assumed that carcass found incidentally within a search plot during other activities would have been found during a standardized carcass search. Second, it was assumed that all carcasses found during the studies were due to collision with wind turbines. True cause of death is unknown for most of the fatalities. It is highly likely that some of the casualties included in the data pool for the various projects were due to natural causes or background mortality such as predation, disease, other natural causes, or manmade causes such as farming activity or vehicles on county/project roads. The overall effect of these assumption is that the analyses provide a conservative estimate (an over estimate) of mortality due to the studied wind project.

A few wind studies in other regions of the country have provided information on background mortality. During a four-year study at Buffalo Ridge, Minnesota, 2,482 fatality searches were conducted on study plots without turbines to estimate reference mortality in the study area. Thirty-one (31) avian fatalities comprising 15 species were found (Johnson *et al.* 2000). Reference mortality adjusted for searcher efficiency and carcass removal for the study was estimated to average 1.1 fatalities per plot per year. At a second study, pre-project carcass searches were conducted at a proposed wind project in Montana (Harmata *et al.* 1998). Three bird fatalities were found during 8 searches of 5 transects, totaling 17.61 km per search. On average, approximately 1.8 km of transect is searched within the turbine plots in the referenced studies for the Columbia Plateau region (Table 2). The amount of transect searched at the Montana site per search was equivalent to searching approximately 7-9 turbines for the regional studies. The background estimate for observed mortality would be approximately 0.33 per turbine plot per year, unadjusted for scavenging and searcher efficiency. The background mortality information from the Minnesota and Montana studies suggests that the estimates of bird mortality include some avian fatalities not related to turbine collision, and this factor alone would lead to an over-estimate of true avian collision mortality for wind projects.

It should also be noted that the fatality estimates may vary from the expected range based on many factors that may influence bird and bat use of a project site such as habitat, topography, foraging areas, migratory patterns, as well as project characteristics such as turbine size, met towers, proximity to high bird use areas and other site specific and/or weather variables. It is difficult to determine the influence these parameters have on impacts from wind projects; however, because of the general similarities of results from the monitoring studies within the Columbia Plateau Ecoregion (see Table 2) it is generally believed that future direct impacts from new wind development in the region are also likely to be similar.

4.1 Significance of Impacts to Birds

Despite several thousand bird fatalities from 4060 MW of wind power, these impacts are divided across numerous species and groups of species and also across seasons, and thus the overall mortality to any given species or population of a species is substantially less and not expected to be significant.

Passerines

For most studies that have occurred in agricultural settings, a few common species make up the majority of bird observations and fatalities at the site, however, a variety of other species, including migrants, have been recorded as fatalities but typically in low numbers and frequency. The majority of avian deaths (69%) due to wind power facilities in the Columbia Plateau region were of common passerines in mixed agriculture and grassland habitat (see Table 3). Horned larks are the most common fatality at most of the projects studied. For example at the Stateline, Combine Hills, Nine Canyon I, horned larks were 39%, 41%, and 47% of all avian fatalities, respectively and a much higher percentage of the passerine fatalities. Other shrub-steppe and open country passerines such as western meadowlarks and European starling were also found regularly. For example, European starling made up 18% of the fatalities at the Hopkins Ridge project (Young et al. 2007).

Given that most of the mortality will be common species with widespread distribution and large populations, impacts are expected to be to individuals and not populations. For example, over all passerines recorded during the regional monitoring studies, horned lark made up over half (51%) of the fatalities. Assuming this pattern holds for the regional wind development, it could be expected that on average there would be 2,715 horned lark fatalities per year. Local populations of horned larks are difficult to define because of the vast amount of suitable habitat for this species in the Columbia Plateau. Based on data from the USGS Breeding Bird Survey routes in the Columbia Plateau, the long term average was 50.3 horned larks detected for 71 routes in the ecoregion (Saur et al. 2005). Each BBS route covers 25 miles with a survey plot radius of 0.25 mile for a total survey area of roughly 12.5 square miles or 8,000 acres. The total area surveyed in the 71 routes (~568,000 acres) represent ~2.8% of the 20,280,000 acre Columbia Plateau. The annual average observed number of horned larks for the 71 routes was approximately 3,573. Assuming this represents 2.8% of the breeding horned lark population in the Columbia Plateau, the total would be approximately 127,500 horned larks. This is a likely a minimum estimate because horned larks are a small bird that is detected with relatively low probability beyond 200 m. If it is further assumed that the 2,715 horned lark fatalities are spread equally over the year, then roughly one-quarter of these (~679) would be during the breeding season. This represents approximately 0.5% of the breeding horned larks and is not considered significant. It is likely that other background mortality of breeding horned larks is greater than this estimate.

While this example represents a plausible means of addressing potential population impacts under a number of assumptions, it illustrates the low level of effect on the common grassland/agricultural species that have been the most impacted. Similar examples could be used for the other species which illustrate lower effects. For example the BBS data indicates a long term average of 77.61 western meadowlarks for routes in the Columbia Plateau (Saur et al. 2005). Western meadowlark represents approximately 6% of the passerine fatalities at wind projects. Based on similar calculations the impact on the western meadowlark breeding population in the Columbia Plateau would be minor and insignificant. The number of fatalities from other species are even fewer (see Table 3) and unlikely to have any population effects.

Nocturnal Migrants

In general, while modern turbines are getting taller, new wind projects do not appear to have a large impact on migrant birds. Results of marine radar surveys for proposed wind projects have indicated that the vast majority of nocturnal migrants fly at altitudes that do not put them at risk of collision with turbines (Young and Erickson 2006). Also, there have been only two multiple individual mortality events during a migration season reported at newer wind projects in the U.S. At Buffalo Ridge, Minnesota, fourteen migrating passerine fatalities (vireos, warblers, flycatchers) were observed at two turbines during a single night in May 2002 (Johnson et al. 2002), and 33 migrating passerine fatalities (mostly warblers) were observed near one turbine and a well-lit substation at the Mountaineer, West Virginia, wind project in May 2004 (Kerns and Kerlinger 2004). In general for wind projects in the Columbia Plateau, approximately 25% of the fatalities have been considered migrants spread over many species. The most common migrant fatality was golden-crowned kinglet (Table 3). Approximately 9% of the passerine fatalities were of this species. Golden-crowned kinglets are typically associated with tree or wooded habitats during the breeding season so it is assumed that many of the impacted individuals were from surrounding more mountainous ecoregions or populations further north (e.g., Canada). As with horned lark, estimating the potential population size from which these birds came requires a number of assumptions. However, while it is unknown, it is possible that the individual fatalities came from multiple populations in surrounding or more northern ecoregions, thus diluting the impacts on any one population. Other potential migrant species were found in lower numbers. Cumulatively the impacts to migrants would be spread over a much larger population base and are not considered significant.

Raptors

Red-tailed hawk and American kestrel account for more than 69% of the raptor fatalities recorded at the regional wind projects studied (see Table 3). Assuming this trend holds true for all proposed wind projects in the Columbia Plateau, it would be expected that on average 70 red-tailed hawk and 70 American kestrels would be killed each year. Following a similar analysis as that used for horned lark (above) it would be expected that approximately 18 red-tails and kestrels fatalities would occur during the breeding season. An estimate of the breeding population in the Columbia Plateau based on the BBS long-term average data is approximately 6820 breeding red-tailed hawks and 6288 breeding American kestrels. The impact to the breeding population would represent approximately 0.26% and 0.28% respectively. Background mortality for these species is likely higher than this estimate and it is considered insignificant. The other species of raptors have been impacted far less and would represent a much smaller number of fatalities.

Upland Gamebirds

Upland gamebird species represent a higher percentage (18%) of the avian fatality pool in the Columbia Plateau than in other regions in the U.S., although it is believed that many of the fatalities that are recorded are not wind turbine related. A large percentage of the upland gamebird fatalities are feather spots, suggesting the possible cause of death was predation or other non-turbine related cause. The species impacted, ring-necked pheasant, gray partridge, and chukar are introduced species common in mixed agricultural native grass/steppe habitats. Habitat throughout the Columbia Plateau is highly suitability for these species and the large populations likely influence the higher mortality rate for the regional wind projects. As with non-native (non-protected) passerine species, there is generally low concern over impacts to upland gamebirds. These species are regulated by state agencies as game species. Impacts to these species are not expected to be significant and given the vast amounts of suitable habitat and other impacts to these species (i.e., hunting) it is unlikely that fatalities from wind development to these species would be significant.

4.2 Significance of Impacts to Bats

Unlike with birds, there is little information available about populations of bat species. For most species that are not threatened or endangered and have large distributions, very little is known about potential numbers that exist. Results of monitoring studies across the U.S. and Canada have found similar trends in impacts such as risk to bats from wind turbines is unequal across species and across seasons. The majority of bat fatalities at wind projects in the U.S. and Canada have been foliage/tree or forest dwelling long-distance migrant species. Species in the *Lasiurus* genus, hoary bat (*L. cinereus*) in the west and red bat (*L. borealis*) in the east, and silver-haired bats (*Lasionycteris noctivagans*) are the most abundant fatalities found at wind projects. Less common fatalities are of big brown bats and *Myotis* species. Numerous studies across the U.S. and Canada have shown this trend (see Johnson 2005). The highest mortality occurs during what is believed to be the fall migration period for bats from roughly late-July through September. Numerous studies across the U.S. and Canada have also shown this trend (see Johnson 2005). Much lower mortality rates, and particular in the Columbia Plateau Ecoregion, occur in the spring and summer.

More recently however, studies at different location in the U.S. and Canada, appear to indicate that bat mortality is not related to site features or habitat and dissimilar results for ecologically similar projects have been found. While it is hypothesized that eastern deciduous forests in mountainous areas may be the highest risk areas, higher bat mortality has also occurred at wind projects in prairie/agricultural settings (Alberta, Canada) and mixed deciduous woods and agricultural settings (Maple Ridge, New York). For example, a wind project in dryland agricultural prairie type habitats in southern Alberta has reported fairly high observed bat mortality (not corrected for searcher and carcass removal biases) of 12-15 bats per turbine per year or 7-8 bats per MW per year (Baerwald 2006). In contrast, other nearby (within 25 km) wind projects to that site have reported similar bat mortality (1-2 bats per MW per year) to the wind projects studied in the Columbia Plateau Ecoregion (Baerwald, pers. comm.).

Bat mortality in the Columbia Plateau Ecoregion would involve primarily silver-haired and hoary bats (see Table 6), and no impacts to threatened or endangered bat species are anticipated. The regional monitoring studies suggest resident bats do not appear to be significantly affected because in general, very low numbers of resident bat species have been observed fatalities. Hoary bats and silver-haired bats generally occupy forested or treed habitats during the breeding season – habitat distinctly lacking and localized in the Columbia Plateau Ecoregion. Most mortality is observed during the fall migration period and of these migrant species. The significance of this impact on hoary and silver-haired bat populations is difficult to predict, as there is very little information available regarding the overall population size and distribution of the bats potentially affected. Hoary bat and silver-haired bats are widely distributed in North America. In general, mortality levels on the order of 1-2 bats per turbine or per MW are thought to be on individuals and not significant to populations, however, cumulative effects may have greater consequences for long-lived low-fecundity species such as bats. Unlike many avian species that may have multiple clutches of multiple young per year, hoary bats and silver-haired bats likely only raise one or two young per year and only breed once per year (Shump and Shump 1982, Kunz 1982). Bats tend to live longer than birds, however, and may have a long breeding lifespan. The impact of the loss of breeding individuals to populations such as these is generally unknown but may have greater consequences.

Since it is most likely breeding populations from surrounding mountainous/forested ecoregions or from more northern area (e.g., Canada) that are affected at the Columbia Plateau wind projects during the fall migration, the dynamics of these populations would need to be know to predict population effects. If these populations are large and stable the level of impact is not expected to be significant. However, if population trends are decreasing the added impact from wind development may continue to cause population declines. This information is generally unknown and future study is needed before the significance of the impacts can be estimated.

5.0 REFERENCES

Baerwald, E. 2007. Bat Fatalities in Southern Alberta. Proceeding of the Wildlife Research Meeting VI, November 2006, San Antonio, Texas. National Wind Coordinating Collaborative.

Erickson, W.P., G.D. Johnson, M.D. Strickland, and K. Kronner. 2000. Avian and bat mortality associated with the Vansycle Wind Plant, Umatilla County Oregon. 1999 study year. Technical report submitted to Umatilla County Department of Resource Services and Development, Pendleton, Oregon. 22 pp.

Erickson, W.P., G.D. Johnson, M.D. Strickland, D.P. Young, Jr., K.J. Sernka and R.E. Good. 2001. Avian collisions with wind turbines: A summary of existing studies and comparisons to other sources of avian collision mortality in the United States. National Wind Coordinating Committee Publication. http://www.nationalwind.org/pubs/default.htm

Erickson, W.P., G.D. Johnson, D.P. Young, Jr., M.D. Strickland, R.E. Good, M. Bourassa, K. Bay. 2002. Synthesis and comparison of baseline avian and bat use, raptor nesting and mortality information from proposed and existing wind developments. Technical Report prepared for Bonneville Power Administration, Portland, Oregon.

Erickson, W.P., B. Gritski, and K. Kronner. 2003. Nine Canyon Wind Power Project Avian and Bat Monitoring Report, September 2002 – August 2003. Technical report submitted to Energy Northwest and the Nine Canyon Technical Advisory Committee.

Erickson, W.P., J. Jeffrey, K. Kronner, and K. Bay. 2004. Stateline Wind Project Wildlife Monitoring Final Report, July 2001 – December 2003. Technical report peer-reviewed by and submitted to FPL Energy, the Oregon Energy Facility Siting Council, and the Stateline Technical Advisory Committee.

Fishman Ecological Services, LLC. 2003. Carcass survey results for SeaWest Windpower, Inc., Condon Site, 2002-2003. Prepared for SeaWest WindPower, Inc., Condon Wind Project, Gilliam County, Oregon.

Gruver, J.C. 2002. Assessment of bat community structure and roosting habitat preferences for the hoary bat (*Lasiurus cinereus*) near Foote Creek Rim, Wyoming. M.S. Thesis, University of Wyoming, Laramie. 149pp.

Johnson, D.H. and T.A. O'Neil (managing editors). 2001. *Wildlife-Habitat Relationships in Oregon and Washington.* Oregon State University Press, Corvallis, OR. 768 pp.

Johnson, G.D. 2005. A review of bat collision mortality at wind-energy developments in the United States. Bat Research News 46:45-49.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd and D.A. Shepherd. 2000. Avian Monitoring Studies at the Buffalo Ridge Wind Resource Area, Minnesota: Results of a 4-year study. Technical report prepared by WEST, Inc. for Northern States Power Co., Minneapolis, MN. 212pp.

Johnson, G.D., W.P. Erickson, M.D. Strickland, M.F. Shepherd, D.A. Shepherd, and S.A. Sarappo. 2002. Collision mortality of local and migrant birds at a large-scale wind power development on Buffalo Ridge, Minnesota. *Wildlife Society Bulletin* 30: 879-887.

Johnson, G., W. Erickson, J. White, R. McKinney. 2003. Avian and Bat Mortality During the First Year of Operation at the Klondike Phase I Wind Plant, Sherman County, Oregon. Technical report prepared for Northwestern Wind Power, Goldendale, Washington. March 2003.

Kerns, J. and P. Kerlinger. 2004. A Study of Bird and Bat Collision Fatalities at the Mountaineer Wind Energy Center, Tucker County, West Virginia: Annual Report for 2003. Technical Report prepared for FPL Energy and Mountaineer Wind Energy Center Technical Review Committee. Curry and Kerlinger, LLC. 39 pp.

Kunz, T.H. 1982. Silver-haired Bat, *Lasionycteris noctivagans*. Mammalian Species 172:1-5.

Orloff, S., and A. Flannery. 1992. Wind Turbine Effects on Avian Activity, Habitat Use, and Mortality in Altamont Pass and Solano County Wind Resource Areas, 1989-1991. Final report to Alameda, Costra Costa, and Solano Counties and the California Energy Commission. Biosystems Analysis, Inc. Tiburon, CA.

Quigley, T.M.; Arbelbeide, S.J., tech. eds. 1997. An assessment of ecosystem components in the interior Columbia basin and portions of the Klamath and Great Basins: Vol 2. Gen. Tech. Rep. PNWGTR-405. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. Vol 1-4. (Quigley, Thomas M., tech. ed.; The Interior Columbia Basin Ecosystem Management Project: Scientific Assessment).

Sauer, J. R., J. E. Hines, and J. Fallon. 2005. *The North American Breeding Bird Survey, Results and Analysis 1966 - 2005. Version 6.2.2006, USGS Patuxent Wildlife Research Center, Laurel, MD*

Shump, Jr., K.A. and A.U. Shump. 1982. Hoary bat, *Lasiurus cinereus*. Mammalian Species 185:1-5.

Thorson, T.D., Bryce, S.A., Lammers, D.A., Woods, A.J., Omernik, J.M., Kagan, J., Pater, D.E., and Comstock, J.A., 2003. Ecoregions of Oregon (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,500,000).

Young, D.P. Jr., W.P. Erickson, R.E. Good, M.D. Strickland, and G.D. Johnson. 2003. Avian and bat mortality associated with the initial phase of the Foote Creek Rim Wind Power Project, Carbon County, Wyoming: November 1998 - June 2002. Technical Report prepared by WEST, Inc. for Pacificorp, Inc., SeaWest Windpower, Inc. and Bureau of Land Management. 35 pp.

Young, Jr., D.P., J.D. Jeffrey, W.P. Erickson, K. Bay, K. Kronner, B Gritski, and J. Baker. 2005. Combine Hills Turbine Ranch Wildlife Monitoring First Annual Report, March 2004-March 2005. Technical report prepared for Eurus Energy America Corporation, Umatilla County, and the Combine Hills Technical Advisory Committee.

Young, Jr., D.P. and W. P. Erickson. 2006. Wildlife Issue Solutions: What Have Marine Radar Surveys Taught Us About Avian Risk Assessment? Proceedings of the American Wind Energy Association Windpower 2006 Conference and Exhibition, Pittsburgh, Pennsylvania, June 4-7, 2006.

Young, Jr., D.P., W.P. Erickson, J.D. Jeffrey, and V.K. Poulton. 2007. Puget Sound Energy Hopkins Ridge Wind Project Phase 1 Post-Construction Avian and Bat Monitoring First Annual Report, January - December 2006. Technical report for Puget Sound Energy, Dayton, Washington and Hopkins Ridge Wind Project Technical Advisory Committee, Columbia County, Washington. Western EcoSystems Technology, Inc. Cheyenne, Wyoming, and Walla Walla, Washington. 25pp.

Appendix D-1
Land Use Consistency Determination
Skamania County, May 2009

Skamania County
Community Development Department

Skamania County Courthouse Annex
Post Office Box 790
Stevenson, Washington 98648
Phone: 509-427-3900 FAX: 509 427-3907

May 4, 2009

Allen Fiksdal, Manager
Energy Facility Site Evaluation Council
905 Plum Street SE, 3rd Floor
PO Box 43172
Olympia, WA 98504-3172

Subject: Certificate of Land Use Consistency Review for Whistling Ridge Wind Energy Project

Dear Mr. Fiksdal:

Skamania County has reviewed the Application for Site Certification that was submitted to the Washington State Energy Facility Site Evaluation Council on March 10, 2009 for the Whistling Ridge Energy Project. The application was reviewed to determine if the project was consistent or inconsistent with applicable County land use plans and zoning ordinances.

If the application had been submitted to the County, the project would require the following county issued reviews and permits: a SEPA Review, a Conditional Use Permit (only for the portion of the project located within the zoned area), a National Scenic Area (NSA) Permit (only for the portion of the project related to road and intersection widening that is located within the NSA), Building Permits, Critical Area Review (outside of the NSA), On-site Septic Permit, Well Drilling Inspection, and a Water Availability Verification Evaluation (W.A.V.E) Application. However, the final requirements and conditions of approval for the project would be determined by EFSEC during their review process.

Zoning Update:

In December 2007, the County began work to revise Title 21, the current Zoning Ordinance. Part of the update process was to try and incorporate small and large-scale energy facilities into the County regulations. The County's SEPA decision (A Determination of Non-Significance) for the zoning draft was appealed by two organizations. In their appeal, the organizations were requesting the County to prepare an EIS for non-project actions that may lead to significant adverse impacts. On February 19, 2009, the Hearing Examiner decided in favor of the appellants, the Determination of Non-Significance was reversed, and remanded to the County for preparation of an EIS. Since this decision, the map and text updates for the Zoning Ordinance project have permanently been placed on hold. It has not been decided whether or not the County will continue with this project or start from scratch when the zoning update process resumes. There is no scheduled time to return to the zoning project. The current adopted zoning is what applies to this project, drafts of "proposed" or "future" zoning ordinances or any Hearing Examiner review of such documents have no basis or bearing on this application before EFSEC. Only 7 of the potential 50 turbines are even located within an area that has a zoning classification. The remainder of the project area is unzoned.

Consistency Review:

After reviewing the location of the proposed Whistling Ridge Wind Energy Facility project I find that the project is consistent with the following land use codes and maps: SCC Title 21 Zoning Code, SCC 21A Critical Areas, Title 24 Clearing and Grading, the Comprehensive Plan, and resource maps. The project is not within SCC Title 20 (Shorelines) jurisdiction.

After reviewing the location of the proposed road improvements, SCC Title 22 Columbia River Gorge National Scenic Area Ordinance, and the resource maps, I find the road improvement portion of the application consistent with SCC Title 22 with conditions of approval. I further find that similar road improvement projects (road widening, realignments, etc.) have been found consistent with SCC Title 22 in the past.

For more detailed findings see the attached staff reports.

Sincerely,

Karen A. Witherspoon, AICP,
Community Development Department Director

cc: Jason Spadaro, SDS Lumber
Board of County Commissioners

Attachments: Staff Report
Zoning Map

RESOLUTION 2009-22

(Certification of Land Use Consistency Review for Whistling Ridge Wind Energy Project)

WHEREAS, Whistling Ridge Energy Project, LLC ("Applicant") filed an Application for Site Certification ("ASC") to the Washington Energy Facility Site Evaluation Council ("EFSEC") on March 10, 2009 for the Whistling Ridge Energy Project ("Project") pursuant to RCW 80.50; and

WHEREAS, EFSEC has assumed lead agency status pursuant to the State Environmental Policy Act, RCW 43.21C for the environmental review of this Project. Skamania County anticipates participating in the SEPA process; and

WHEREAS, the Skamania County Community Development Director reviewed the ASC to determine the project's consistency with applicable County land use plans and zoning ordinances and prepared a Certificate of Land Use Consistency; and

WHEREAS, the Board of County Commissioners have reviewed the Community Development Director's Certification of Land Use Consistency; and

WHEREAS, the Board of County Commissioners on May 5, 2009 considered the Community Development Director's determination at a regularly scheduled, public meeting; and

WHEREAS, due notice of the Commissioner's meeting set forth above has been given as required by law; and

WHEREAS, the development of the Whistling Ridge Energy Project, if approved, will be specifically governed by a Site Certification Agreement signed by the Governor and the Applicant, including conditions of approval developed through the upcoming public process, including SEPA review; and

WHEREAS, more detailed findings of consistency are included in the Community Development Director's Certificate of Land Use Consistency, which is attached hereto and is incorporated herein by reference as if set forth in full; and

NOW THEREFORE, BE IT RESOLVED, the Board of County Commissioners, after due deliberation, adopts the Certificate of Land Use Consistency and resolves that the Whistling Ridge Energy Project is consistent with the Skamania County land use plans and applicable zoning ordinances. A representative for Skamania County appointed by the Board of Commissioners is serving as a member of the Siting Council. Consequently, Skamania County does not, at this time, make any findings or determination regarding compliance with any other regulatory requirements or siting standards, and any potential conditions of approval recommended by Skamania County will be made at such time as the SEPA review is completed and after public meetings and hearings have been duly conducted by EFSEC, in accordance with Chapter 80.50 RCW.

PASSED IN REGULAR SESSION this 5th day of May 2009.

SKAMANIA COUNTY WASHINGTON
BOARD OF COMMISSIONERS
CLERK OF THE BOARD

BOARD OF COUNTY COMMISSIONERS
SKAMANIA COUNTY, WASHINGTON

Chairman

Commissioner

Commissioner

ATTEST:

Clerk of the Board

APPROVE AS TO FORM ONLY:

Prosecuting Attorney

Skamania County
Community Development Department

Skamania County Courthouse Annex
Post Office Box 790
Stevenson, Washington 98648
509 427-3900 FAX: 509 427-3907

STAFF REPORT FOR LAND USE CONSISTENCY REVIEW

I. SUMMARY OF PROPOSED ACTION (Project description)

This Land Use Consistency Review Staff Report is to address the application for the Whistling Ridge Energy Project to the Washington State Energy Facility Site Evaluation Council.

As proposed by the application submitted March 10, 2009 to the Energy Facility Site Evaluation Council (EFSEC), Jason Spadaro President of SDS Lumber Co, and of Whistling Ridge Energy LLC, is proposing a facility, collectively called the Whistling Ridge Energy Project, of up to 50 1.2- to 2.5- MW wind turbines with a total capacity of 75 MW of electricity. The project would be located on a 1,152-acre site in unincorporated Skamania County owned by SDS Co, LLC and Broughton Lumber Company, on the forested ridges of Saddleback Mountain. Each turbine would be up to approximately 426 feet tall to the tops of the blades extended over the tower of the wind turbine. In addition to the turbines, the planned facility would include: electrical transformers, 34.5 kilovolt collector lines and systems (primarily underground), permanent meteorological towers, an Operations and Maintenance facility (including bathrooms and kitchen), a new well for potable water, an on-site septic system, a substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and approximately 2.4 miles of newly-constructed and 7.2 miles of improved roads to provide access to the wind turbine locations during construction and for Operations and Maintenance.

The proposal states that several wind turbines will be placed in a Residential 10 (R10) zoning designation on the project site. While researching the parcels using the County's Geographic Information System (GIS), legal descriptions and official zoning maps, no R10 zoning designation was found within the project site. The proposal states that roughly 400 acres of the project site is located within FOR/AG 20 zoning and Residential 10 zoning designations. However, Community Development staff research of the County's GIS and assessor maps show that approximately 1,036 acres of the project site is unzoned, and approximately 127 acres of the project site is zoned FOR/AG 20. County GIS and assessor maps show the project area to be approximately 1,163 acres, however, this is just an approximation based on legal descriptions since no boundary survey was conducted. This information does not affect the consistency review of the project, rather it is a clarification of the project based on County's consistency review.

The proposal further includes improvements to roads and intersections within the National Scenic Area in order to provide access to the project site. The roadways affected include Cook Underwood Road, Kollock-Knapp Road, Scoggins Road and private road logging CG2930. Improvements to the county roadways and the private logging road would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components from SR 14 to the proposed project site. These improvements may include 1) Rebuilding large sections of the existing roadway network, 2) Widening certain sections of the existing roadway network, 3) Flattening and/or rebuilding existing roadway topography both horizontally and vertically, and 4) Placing asphalt in select areas for equipment access.

II. GENERAL INFORMATION

Owner(s):	SDS Lumber Co PO Box 266 Bingen, WA 98605 Broughton Lumber Co 92 Office Road Underwood, WA 98651
Applicant(s)/Applicant(s) Representative:	Jason Spadaro, President, SDS Lumber Co and Whistling Ridge Energy, LLC PO Box 266 Bingen, WA 98605
Tax Parcel Number(s):	03-10-00-0-0-0300-00 (portion) 03-10-00-0-0-0400-00 (full) 03-10-00-0-0-0800-00 (portion) 03-10-00-0-0-1100-00 (portion) 03-09-00-0-0-2990-00 (portion) Skamania County Road Right-of-Way
Location:	The subject parcels are located in the eastern portion of Skamania T3N, R10E & T3N, R9E, W.M.
Zoning:	127 acres of the proposed project area is zoned FA20. The remaining 1,036 acres is un-zoned. NSA: the roadways within the NSA are zoned General Management Area, Large-Scale Agriculture (Ag-1), Commercial Forest (F-1), Small Woodland (F-3), Residential, and Open Space (OS).
Comprehensive Plan Designation	Conservancy (outside NSA)
Square Footage/Acreage:	The entire project area is located outside of the NSA and is 1,152 acres (1,163 acres by County calculations), spanning portions of five parcels. Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.
Proposed Use	Semi-public utility facility Road Improvements (w/in NSA)
Number of Lots:	The project area spans portions of five parcels.
Density:	N/A

Sanitary Sewer District:	Individual On-Site Septic System for proposed Operations and Maintenance Facility
Domestic Water Supplies:	Applicant is proposing an individual well to serve the kitchen and bathroom facilities in the Operations and Maintenance Building.
Fire District:	Fire District #3
School District:	#31 Mill A and White Salmon School Districts
Drainage Basin:	Wind / White Salmon
WRIA:	29B
WRIA Number	29B

III. HISTORY/BACKGROUND:

Skamania County is one of ten counties in Washington State that is not required to fully plan under the Growth Management Act. The County is not required to establish zoning classifications on all the land within its jurisdiction.

The 2007 Comprehensive Plan applies to all unincorporated land within Skamania County. The National Scenic Area is a sub-area which uses the Columbia River Gorge Management Plan as its Comprehensive Plan. Not all of unincorporated Skamania County has a zoning classification. The critical area regulations only apply outside of the NSA. Within the NSA there is a comprehensive land use application that reviews projects for Scenic, Natural, Cultural, and Recreational resources. The project area is outside of the NSA. The only potential work to be conducted within the NSA is improvements to existing roads which is an allowable review use in the NSA Land Use classification.

SDS Co. LLC submitted their application for the Whistling Ridge Energy Project on March 10, 2009. Skamania County Community Development Department is providing EFSEC with a consistency review of all county regulations that apply to the project.

IV. SEPA THRESHOLD DETERMINATION:

EFSEC issued a scoping notice on April 6, 2009 to begin the EIS review process. A revised notice was issued April 21, 2009.

V. PUBLIC HEARING NOTICE:

EFSEC published all required notices.

VI. NATURAL ENVIRNOMENT

A. Topography:

The resource maps indicate that the subject parcels within the project area, have slopes ranging from zero percent to over 40%. Under Skamania County's Critical Areas Ordinance (Title 21A), the subject parcels are located in a Class II Landslide Hazard Area. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. a description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. an evaluation of the analysis area's inherent erosion hazards;
c. a site plan of the area delineating all areas of the site subject to erosion hazard; and
d. proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

B. Soils:
According to the Natural Resources Conservation Service (NRCS) Soil Survey of Skamania County, the soil types of the parcels are: McElroy gravelly loam (types 66, 67, 68), Timberhead gravelly loam (types 135. 136), Underwood loam (type 144). Each of these soils has a T Factor of 5. Under Skamania County's Critical Areas Ordinance, Title 21A, the subject parcels are located in a Class I Erosion Hazard Area.

C. Surface Water:
Within the proposed project area there is: One (1) Class 4N stream; 19 Class 5N streams; and five (5) unclassified streams.

The proposal states that one stream, a Class V, will be crossed. This stream is located outside of the project area (see review in NSA Title 22) within the National Scenic Area boundary. The proposal states that no new construction will occur within any stream or its associated buffer that is located within the project area (outside of the NSA).

D. Vegetation:
The project area is covered by second and third growth commercial timber stands.

E. Wildlife:
The entire project area is within Elk winter range habitat. No other habitat was found on resource maps.

F. Sensitive Areas:
No Sensitive Areas were found on the Resource maps within the proposed project area. No known cultural or archaeological resources were found within the project area.

VII. NEIGHBORHOOD CHARACTERISTICS

The Comprehensive Plan designation of this project area is Conservancy. Some of the surrounding area is Rural Lands II, with the majority being Conservancy.

The southern project boundary line (including the southeast project line) borders the Columbia River Gorge National Scenic Area.

VIII. TRANSPORATION PLANS

Access of the proposed site would be provided from State Route 14 to Cook-Underwood Road, Kollack-Knapp Road, Scoggins Road and a private logging road listed as CG2930, located on SDS Lumber Company and Broughton Lumber Company property. These access roads are located within the National Scenic Area.

IX. UTILITIES

A. Stormwater:

Discharge of stormwater runoff would be regulated by EFSEC based on the Department of Ecology's stormwater pollution control program. The proposal indicates mitigation measures by Best Management Practices and by implementing a Stormwater Pollution Prevention Plan (SWPPP) during and after construction. The final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC.

B. Wastewater Disposal:

The Applicant is required to apply for an On-Site Septic System permit as the Operations and Maintenance Building will include bathroom and kitchen facilities. Prior to issuance of any building permit, the applicant is required to have an approved On-Site Septic System Design.

C. Potable Water:

Prior to the issuance of a building permit for the proposed Operations and Maintenance Building, the applicant is required to have an approved Water Availability Verification Evaluation (WAVE).

X. COMPREHENSIVE PLAN

The following Goals and Policies of the Skamania County Comprehensive Plan are applicable to the proposed project.

Chapter 2: Land Use Element
Goals and Policies
Conservancy Designation

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possibly by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.

Finding:

The project area lies within the Conservancy Comprehensive Plan Designation. Within the conservation designation, public facilities and utilities, and utility substations are allowed.

Conclusion:
The project is considered a semi-public utility facility and would therefore be consistent with the Conservancy Designation.

Goal LU.3: To coordinate public and private interests in land development.

Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.

Finding:
The project area is located outside of the Columbia River Gorge National Scenic Area boundary. The turbines would be painted gray to minimize aesthetic effects. The proposed project would be located within an area where roadways and high voltage regional transmission lines already exist, which would minimize the need for new disturbances.

Conclusion:
The project is consist with this goal and policy.

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.

Finding:
High-voltage regional transmission lines, owned and operated by Bonneville Power Administration (BPA) are located on the project site. Access roadways already exist. The project uses existing patterns in Land Use which helps to minimize the public costs of providing services and new infrastructure.

Conclusion:
The project is consistent with this goal and policy.

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.

Policy LU.5.7: Adequate on-site wells and septic systems should be properly installed, monitored and maintained in accordance with local and state health departments.

Finding:
The proposed project is located in the Conservancy Designation, which allows for public utility facilities and utility stations. The surrounding areas are Conservancy Designation, as well as Rural Lands II Designation, which also allows for utility facilities and utility substations. The project site has been previously logged by forestry activities and the proposal would allow the forestry activities to continue.

High-voltage transmission lines, cell towers and rock quarries currently exist in the area, so the project would be compatible with these uses.

The proposed Operations and Maintenance Building would include bathroom and kitchen facilities and would therefore be required to have an approved on-site septic system as well as an adequate potable water supply. This would be a condition of approval.

Conclusion:
The project is consistent with the goals and policies. A valid OSS and proof of potable water should be a condition of approval.

Chapter 3: Environmental Element
Goals and Policies

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water and energy resources.

Policy E.1.4: Implement and preserve critical area buffers based on Best Available Science adjacent to critical areas to adequately protect such areas from development and land use impacts.

Finding:
Several streams exist on the proposed project site, with buffers ranging from 25' to 50', which must be maintained at all times unless exemptions are met or variances are granted.

Conclusion:
This proposal is consistent with the goals and policies.

Goal E.3: To minimize the loss of life and property from landslides, seismic, volcanic or other naturally occurring events, and minimize or eliminate land use impacts on geologically hazardous areas.

Policy E.3.4: Require geotechnical studies to determine construction methods and technologies necessary to further public safety in geologically hazardous areas. The development design and construction technology used shall be appropriate to the soil limitations on the particular site.

Finding:
The project should require a geotechnical assessment report and soil borings to be conducted on-site. The report should be reviewed and accepted by Skamania County prior to issuing any building permits. Any and all setbacks determined within the report must be followed.

Conclusion:
The project is consistent with these goals and policies.

Chapter 4: Transportation Element

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Finding:
All roadways that will be used for this proposal are existing and some improvement will be necessary for the transportation of the equipment and construction materials. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant should consult with the Skamania County Public Works Department regarding the sufficiency of roads. Turbine equipment would likely be transported to either the Port of Longview or the Port of Vancouver, and much of it transported by barge up the Columbia River to the Applicant's existing barge and dock facilities in Bingen, Washington. If rail is used, it will be by existing rail lines.

Conclusion:
This proposal is consist with these goals and policies. The road improvements will enhance the level of service on these roads and benefit the community.

Chapter 5: Archaeology and Historic Preservation Element

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance:

Policy AHP.1.3: Coordinate county inventory efforts with Native American groups and governmental efforts.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging. No known archaeological or cultural resources were found on the Washington State Department of Archaeological and Historic Preservation (DAHP) resource maps which staff used to research the project area.

Further, if the project would have applied for a Conditional Use permit, the application would have been sent to various state agencies, federal agencies, and Native American Governments, allowing the opportunity to comment on the project. EFSEC should consult with these groups during the process.

Conclusion:
This project is consistent with these goals and policies.

Goal AHP.3: Protect historic, archaeological, and cultural resources through a comprehensive planning approach.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging.

Conclusion:
This project is consistent with these goals and policies.

XI. STATUTES/CODES:

Skamania County Code Title 21 – Zoning

Chapter 21.64 – Unmapped Classification (UNM)

21.64.020 – Allowable Uses

In the areas classified as Unmapped, all uses which have not been declared a nuisance by statute, resolution, ordinance, or court of jurisdiction are allowable. The standards, provisions, and conditions of this title shall not apply to unmapped areas.

Finding:
1,036 acres of this project is unzoned and therefore there are no restricted uses. Utility facilities and utility substations have not been declared a nuisance by a known Washington State Court or by local ordinance or resolution or by any known state or federal statutes.

Conclusion:
The project is consistent with the zoning designation of UNM.

Chapter 21.56 – Resource Production Zone Classification (FOR/AG 10 & 20)
21.56.030 – Conditional Uses
(C) Semi-public facilities and utilities

Finding:
Approximately 127 acres of this project is located within the FOR/AG 20 zoning classification. The "A" string of the project within this zoning classification. The "A" string includes seven turbines. All other proposed turbines are outside of the zoned area. Semi-public facilities and utilities are a conditional use within this zoning designation. The applicant would need to submit a conditional use application for review by the Hearing Examiner for

approval of this project if the County was conducting the project review. Conditional use permits are reviewed and issued by the County Hearing Examiner.

21.16.070 - Hearing Examiner - Duties and Responsibilities

The Hearing Examiner shall hear and decide:

A. *Applications for conditional uses. Conditional uses are those uses, which may or may not be compatible with permitted uses in a specific zoning designation. If the Hearing Examiner determines the use is not compatible with permitted or existing uses in the specific area of the proposed use then the proposed use shall be denied. Alternatively, if the Hearing Examiner determines that the proposed use is compatible with permitted and existing uses in the specific area of the proposed use then the proposed use then the proposed use may be approved or approved with conditions to make it make it compatible with the area.*
    1. *In determining whether the use is compatible with the area, the proposed use shall:*
        a. *Be either compatible with other uses in the surrounding area or is no more incompatible than are other outright permitted uses in the applicable zoning district;*

Finding:

The proposal is to install up to 50 wind turbines on a parcel of land in unincorporated Skamania County, 1,036 acres are unzoned, and 127 acres are zoned FOR/AG 20. The entire proposal is located within the Conservancy Comprehensive Plan Designation.

Unzoned areas of Skamania County and the Conservancy Comprehensive Plan Designation allow for public utility facilities and utility substations. The FOR/AG 20 zoning district lists semi-public utility facilities and utility substations as a conditional use and allows public facilities outright with no additional zoning review being required.

The surrounding areas are located within the Conservancy Designation, as well as the Rural Lands II Designation, both of which allow public utility facilities and utility substations. The property is currently uses for commercial forestry activities, and these activities will be allowed to continue once the turbines are constructed. Cell towers, high-voltage transmission lines and rock quarries exist in the area. There is a small portion of the project site that abuts Residential 10 (R10) zoning, which also lists semi-public utilities as conditional use.

Conclusion:

The proposal is compatible with other uses within the area, both within the Comprehensive plan designation and the zoning designation.

b. *Not materially endanger the health, safety, and welfare of the surrounding community to an extent greater than that associated with other permitted uses in the applicable zoning district.*

Finding:

The subject parcel is located in a geological hazard area due to the slope and soil type and requires a geotechnical assessment report.

The applicant is required to show proof of potable water and obtain an on-site septic system permit from the Skamania County Community Development Department through the building permit process. The proposal includes bathroom and kitchen facilities located in the Operation and Maintenance Building.

EFSEC has required an EIS to be prepared and will ultimately decide what conditions of approval would be necessary for the project to be found to not materially endanger the health, safety and welfare of the surrounding community. By obtaining the water, septic and building permits, conducting the geotechnical analysis and best management practices during construction, the project could be found consistent with this provision.

Conclusion:
The proposal will not materially endanger the health, safety, and welfare of the surrounding community.

> c. *Not cause the pedestrian and vehicular traffic associated with the use to conflict with existing and anticipated traffic in the neighborhood to an extent greater than that associated with other permitted uses in the applicable zoning district.*

Finding:
Access of the proposed site would be provided from State Route 14 to Cook-Underwood Road, Kollack-Knapp Road, Scoggins Road and a private logging road listed as CG2930, located on SDS Lumber Company and Broughton Lumber Company property.

All roadways that will be used for this proposal are existing and some improvement will be necessary for the transportation of the equipment and construction materials. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant will consult with the Skamania County Public Works Department regarding the sufficiency of roads and road upgrade requirement. Other permitted uses include: single family residences in conjunction with forest or farm management, recreational facilities, semi-public facilities and utilities, saw mills, shake and shingle mills, chippers, pole and log yards, geothermal energy facilities, aircraft landing fields, cluster developments, child mini day care centers, and child day care centers.

Conclusion:
The proposal will not cause a conflict with existing pedestrian and vehicular traffic.

> d. *Be supported by adequate service facilities and would not adversely affect public services to the surrounding area.*

Finding:
The proposal states that an Engineering, Procurement, and Construction (EPC) contractor will prepare a safety plan that would apply to all personnel working on-site. The plan would ensure compliance will all laws, ordinances, regulations

and standards concerning health and safety. An Environmental Compliance Program would cover avoidance of sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by State and County regulations. An Emergency Response Plan would be established to ensure employee safety from the following: medical emergency, major power loss, fire, extreme weather, earthquake, volcano, and bomb threat. This plan would be established prior to construction.

Condition:
All safety plans and programs are required to be in place prior to construction. These plans and programs should be included as a conditional of approval.

> e. *Not hinder or discourage the development of permitted uses on neighboring properties in the applicable zoning district as a result of the location, size, or height of the buildings, structures, walls, or required fences or screening vegetation to a greater extent than other permitted uses in the applicable zoning district.*

Finding:
The proposal is to install up to 50 wind turbine structures on a project site spanning portions of five parcels. This use is classified as a semi-public utility facility within the FOR/AG 20 zoning designation.

Other uses in the FOR/AG 20 zoning designation include, among others: forestry practices and associated management activities of forest crop, commercial and domestic agriculture, water resource management facilities, log sorting and storage areas, etc.

Surrounding zoning includes FOR/AG 20, as well as R10 (Residential 10) outside of the NSA. To the south of the project area, inside the NSA, the surrounding area is zoned Large Scale Agriculture, Commercial Forest, Small Woodland and Open Space. Current uses surrounding the project site include commercial forestry uses, agriculture including pear and apple orchards, and three small, unincorporated residential communities and other agriculture related dwellings.

Conclusion:
The proposal is compatible with other uses in the region and will not effect the allowed uses on those parcels. The proposal states commercial forestry activities will likely continue on the project site parcels as well.

> f. *Not be in conflict with the goals and policies expressed in the current version of the County's comprehensive plan.*

Finding:
As discussed above, the proposal is consistent with the Skamania County Comprehensive Plan.

> 2. *Criteria for determining conditions to be imposed on conditional uses shall be based on the health, safety, and general welfare of the public, any environmental standards in force in Skamania County,*

other applicable provisions set forth in this Title and shall be subject to conditions which may include, but are not limited to the following;

a. *Limiting the manner in which the use is conducted including restricting the time an activity may take place, and restraints to minimize such environmental effects as noise, vibration, air pollution, glare, and odor.*

Finding:
The EIS and EFSEC will determine what conditions, if any, are required to be implemented for this project.

b. *Establishing a special yard, open space, lot area or lot dimensions.*

Finding:
Not applicable

c. *Limiting the height, size, or location of a building or other structure.*

Finding:
127 acres of this project site, which includes seven proposed turbines, is located within FOR/AG 20 zoning designation. Under the current FOR/AG 20 zoning designation, the required front yard setback is 35-feet from the centerline of the private road or 20-feet from the front property line with the front defined as the line which parallels a public road right-of-way or a private road easement, or that line where a road, driveway, or access panhandle enters a lot. The required rear setback under the current regulations is 20-feet from the rear lot line with the rear defined as the lot line which is opposite and farthest away from the front lot line

The remainder of this parcel, 1,036 acres, is unzoned and therefore has setbacks as determined by the Building code list from Title 15. Building Code setback requirements for un-zoned lots 12,500 square feet or larger is:
Front Yard: No building or accessory building shall be constructed closer than 45 feet from the centerline of the public road right-of-way or 35 feet from the centerline of the private road (note including private driveways), or road or 15 feet from the front property line, whichever is greater;
Side Yard: On each side of the building or accessory building a side yard shall be provided for not less than 5 feet; and
Rear Yard: A rear yard shall be provided of not less than 15 feet, including accessory buildings.

Conclusion:
Under the current regulations, the proposed location meets the minimum requirements. However, EFSEC may require additional setbacks or micro-siting of turbines.

d. *Designating the size, number, location, and nature of vehicle access points.*

Finding:
No new roads are proposed at this time. The EIS traffic studies and road design plan will determine any requirements for vehicle access points.

e. Increasing the amount of street dedication, roadway width, or improvements within the street right-of-way.

Finding:
The EIS traffic studies and road design plans will determine the necessary road improvements. No new roads are proposed at this time.

f. Limiting or otherwise designating the number, size, location, height, and lighting of signs.

Finding:
Non-applicable

g. Limiting the location and intensity of outdoor lighting and requiring it to be shielded.

Finding:
Lighting of turbine strings will need to meet Federal Aviation Administration (FAA) requirements. Lighting on buildings are requested to be hooded and shielded. This is a request and not currently a requirement in the County zoning code.

h. Requiring berming, screening, landscaping, or another facility to protect adjacent or nearby properties and designating standards for its installation and maintenance.

Finding:
The residences closest to the project site are located approximately 0.48 mile and 0.8 mile from proposed turbine locations. A new homesite location has been applied for, and would be approximately 2,000 feet (0.38 Mile) from the south property line. The unincorporated community of Willard is located approximately 2.25 miles northwest of the project site. The unincorporated community of Mill A is also located near the project site, approximately 1.5 miles west of the site. The homes near the project site are rural, primarily single family, between 30 and 50 years old, and low- to medium-density.

Conclusion:
In order to protect adjacent and nearby properties, the applicant should only excavate the minimum needed to install the wind turbines and accessory structures, and the Operations and Maintenance facility, maintain existing trees, and re-vegetate all undeveloped disturbed areas with native trees and shrubs along the west and south lot lines. However, since this land is being used for Commercial Forestry, the removal of timber in conjunction with this operation should not be restricted.

i. Designating the height, location, and materials for a fence.

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic

reasons.

j. Protecting and preserving existing trees, vegetation, water resources, wildlife habitat, or other significant natural, historic, or cultural resources.

Finding:
The proposed project is located within a Class II Landslide Hazard Area and a Class I Erosion Hazard Area due to the soil type and requires a geotechnical assessment report. The entire project site is also located within elk winter range habitat. Several streams exist on site, which would require buffers ranging between 25' to 50'. There are no current County requirements to preserve trees or vegetation outside of critical resource stream buffers. No cultural or historic resources found in database research.

Conclusion:
In order to prevent possible wind and water erosion, the applicant should use Best Management Practices during all phases of construction and replant all undeveloped disturbed areas with native vegetation. The project requires a geotechnical assessment report to address the landslide hazard on the property.

Skamania County Code Title 21A – Critical Areas

21A.04.010 - General Provisions

A. RELATIONSHIP TO SHORELINES MANAGEMENT MASTER PLAN AND SHORELINES MANAGEMENT ACT PERMITS ORDINANCE.

In event of any conflict between this Title and regulations contained in the Shorelines Ordinance, those regulations that provide greater protection of Critical Areas shall apply.

Finding:
There are several streams located on the subject parcel. The proposal is to erect up to 50 wind turbine structures. No stream located on-site is a Shoreline of Countywide or Statewide significance and therefore the Skamania County Shoreline Management Program does not apply.

Conclusion:
Skamania County Critical Areas Ordinance, Title 21A, provides the greatest protection to the critical areas and only applies outside of the National Scenic Area.

21A.04.030 - STREAMS, CREEKS AND RIVERS

(4) Buffer Widths

(b) ... undisturbed buffers shall be preserved around all regulated streams, creeks and rivers.

(c) The required width of undisturbed buffer areas shall depend upon the class of water represented by the stream, creek or river protected, the type or scale of use or development proposed by an applicant and the vegetative community adjacent to the water body.

(iv) For Class IV streams, creeks and rivers, the standard buffer zone width shall be 50 feet.
(v) For Class V streams, creeks and rivers, the standard buffer zone width shall be 25 feet.

Finding:
The proposed project area includes several streams ranging from a 25' to 50' undisturbed buffer requirement. The proposal states that no new construction would occur within wetlands, streams, or associated buffers. The existing road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold (100% or less of the original footprint).

The only existing roadway to receive improvements crosses a Class V stream within the National Scenic Area. (See Title 22 below)

Conclusion:
Maintaining critical areas buffers should be a condition of approval.

21A.05.050 – Fences in Deer and Elk Winter Range

(A) New development permits issued by the County shall include a requirement that, in deer and elk winter range, construction of new and replacement fences shall be subject to the following:

1. *New fences in deer and elk winter range shall be allowed only when necessary to control livestock or pets or to exclude wildlife from specified areas, such as gardens or orchards. Fenced areas shall be the minimum necessary to meet the needs of the project applicant.*
2. *New and replacement fences in winter range shall comply with the following, unless the applicant demonstrates the need for an alternative design:*
    a. *The top wire shall not be more than 42 inches high to make it easier for deer to jump over the fence.*
    b. *The distance between the top two wires shall be at least 10 inches to make it easier for deer and to free themselves if they become entangled.*
    c. *The bottom wire shall be at least 16 inches above the ground to allow fawns to crawl under the fence. It should consist of smooth wire because barbs often injure animals as they crawl under the fence.*
    d. *Stays or braces placed between strands of wire shall be positioned between fence posts where deer are most likely to cross. Stays create a more rigid fence, which allows deer a better change to wiggle free if their hind legs become caught between the top two wires.*
3. *Woven wire fences may be authorized only when a project applicant clearly demonstrates that such a fence is required to meet his or her specific needs, such as controlling hogs and sheep.*

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic reasons.

Conclusion:
If EFSEC requires fencing, a condition of approval should be to follow the above guidelines for fencing within deer and elk winter range.

21.A.06 Geologically Hazardous Areas

21A.06.010 Erosion Hazard Areas

A. *Class I Erosion Hazard Areas:*

Class I Erosion Hazard Areas (EHAs) area areas that are subject to severe development constraints due to a site's susceptibility to erosion from wind and/or water.

Class I EHAs are identified in the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service, as having an index of greater than or equal to 3.75

21A.06.020 Landslide Hazard Areas

A. *Class II Landslide Hazard Areas (LHAs) are areas with slopes 20% and 30% that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30%.*

Class II LHAs shall be identified using the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service. Department personnel shall make a preliminary determination of percentage of slope. The applicant shall verify soil type and precise percentage of slope.

Finding:
The proposed project site is located within a Class I Erosion Hazard Area and a Class II Landslide Hazard Area under Skamania County Critical Areas Ordinance Title 21A. The resource maps indicate that the subject parcels have slopes ranging from zero percent to over 40%. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. a description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. an evaluation of the analysis area's inherent erosion hazards;
c. a site plan of the area delineating all areas of the site subject to erosion hazard; and
d. proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

Conclusion:
The proposal discusses submitting a geotechnical assessment report and performing soil borings on site. This report must be reviewed and approved by Skamania County and will be a condition of approval.

Skamania County Code Title 22 – Columbia River Gorge National Scenic Area

ADMINISTRATION

SCC Section 22.06.020, states that "No building, structure or parcel of land shall be used, and no building or structure shall be hereafter erected, altered or enlarged, including those proposed by local, state or federal agencies, in that portion of the County lying within the Columbia River Gorge National Scenic Area in any manner that is inconsistent with the provisions of this Title."

ZONING

The subject roadways are in the General Management Area (GMA), on lands zoned Large-Scale Agriculture (Ag-1), Commercial Forest (F-1), Small Woodland (F-3), Residential, and Open Space (OS). The following sections of Skamania County Code Title 22 are what the proposed road modifications would be reviewed under within each land use designation:

SCC Section 22.14.010(C) Large-Scale Agricultural (Ag-1) Zone Review Uses:
(h) Construction, reconstruction or modifications of roads, not in conjunction with agriculture or with forest use or forest practices.

SCC Section 22.14.030(E) Commercial Forest (F-1) Zone Review Uses:
(h) Construction, reconstruction or modifications of roads, not in conjunction with agriculture or with forest use or forest practices.

SCC Section 22.14.050(E) Small Woodland (F-3) Zone Review Uses:
(h) Construction, reconstruction or modifications of roads, not in conjunction with agriculture or with forest use or forest practices.

SCC Section 22.14.060(D) Residential Zone Review Uses:
(c) Construction, reconstruction or modifications of roads.

SCC Section 22.14.110(C) Open Space (OS) Zone Review Uses:
(c) Repair, maintenance, operation and improvement of existing structures, trails, roads, railroads, utility facilities and hydroelectric facilities.

Finding:
The proposed Whistling Ridge Energy Project will require the improvement of roads and intersections within the National Scenic Area in order to provide access to a semi public utility facility. The roads that would require improvement are within five different land use designations within the General Management Area of the National Scenic Area. Each of these five designations allows for the modification or improvement of existing road as a review use. Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge

National Scenic Area Ordinance Title 22 that is in effect at the time of the application.

SCENIC RESOURCE PROTECTION

TOPOGRAPHIC VISIBILITY

The road improvement project within the National Scenic Area is topographically visible from the following key viewing areas from the approximate distances:

KEY VIEWING AREA	**DISTANCE ZONE** FOREGROUND 0-1/4 Mile	MIDDLEGROUND 1/4 to 3 Miles	BACKGROUND Over 3 Miles
Columbia River	X	X	X
SR-14	X	X	X
I-84		X	X
Historic Columbia River Hwy		X	X
Cook-Underwood Road	X	X	X
Sandy River			
Pacific Crest Trail			
Portland Women's Forum			
Crown Point			
Rooster Rock State Park			
Larch Mountain			
Cape Horn			
Bridal Veil State Park			
Multnomah Falls			
Bonneville Dam Visitor Center			
Beacon Rock			
Dog Mtn. Trail			X
Oregon Highway 35		X	X
Panorama Point Park			X
SR-141		X	X
SR-142			
Rowena Plateau and Nature Conservancy Viewpoint			

The improvements to the existing roads within the National Scenic Area will require review for consistency with the provisions for the protection of scenic resources. Projects within the National Scenic Area are reviewed to ensure that the development will be visually subordinate as seen from twenty-two (22) key viewing areas within the National Scenic Area. **The criteria for Scenic Resource Protection (in Chapter 22.18) cannot be used as grounds to deny a proposed use, but may affect the siting, location, size and other design features of proposed developments (see Section 22.18.010(A)).**

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. Conditions may be applied to various elements of the proposed development to ensure they are visually subordinate to their setting as seen from key viewing areas.

NATURAL RESOURCE PROTECTION
The existing logging road CG2930 includes the crossing of one stream. This crossing will require road expansion. SCC Section 22.20.020(A)(2) allows for the modification, expansion, replacement or reconstruction of serviceable structures, if the actions would not:

a. Increase the size of an existing structure by more than 100 percent,
b. Result in a loss of wetlands acreage or functions, or cause a loss of water quality, natural drainage, and fish and wildlife habitat in streams, ponds, lakes and riparian areas, or
c. Intrude further into a water resource zone. Structures shall be considered intruding further into a water resource zone if any portion of the modified, expanded, replaced, or reconstructed structure is located closer to the water resource than the existing structure.

In order to allow for the expansion of the crossing of the one seasonal stream, the project will be required to meet the Practicable Alternative Test found in SCC Section 22.20.010:

A) An alternative site for a proposed use shall be considered practicable if it is available and the proposed use can be undertaken on that site after taking into consideration cost, technology, logistics, and overall project purposes. A practicable alternative does not exist if a project applicant satisfactorily demonstrates all of the following:

1) The basic purpose of the use cannot be reasonably accomplished using one or more other sites in the vicinity that would avoid or result in less adverse effects on wetlands, ponds, lakes, riparian areas, wildlife or plant areas and/ or sites;
2) The basic purpose of the use cannot be reasonably accomplished by reducing its proposed size, scope, configuration, or density, or by changing the design of the use in a way that would result in less adverse effects on wetlands, ponds, lakes, riparian areas, wildlife or plant areas and/ or sites; and;
3) Reasonable attempts were made to remove or accommodate constraints that caused a project applicant to reject alternatives

to the proposed use. Such constraints include inadequate infrastructure, parcel size, and land use designations. If a land use designation or recreation intensity class is a constraint, an applicant must request a Management Plan amendment to demonstrate that practicable alternatives do not exist.

If these conditions are met, the stream crossing expansion will require best management practices, must not alter or destroy stream function and water quality, and the applicant will need to rehabilitate the area to the maximum extent practicable.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. Conditions may be applied to various elements of the proposed development to ensure that the project meets the above-mentioned requirement.

The following sensitive wildlife areas or sites may occur within 1,000 feet of the project:
Mule, Blacktail Deer and Elk habitat, Cliffs/Bluffs habitat, Osprey nest site, Ringneck snake, Larch Mountain Salamander Hood Area and sites, Western Gray Squirrel nest sites, California Mountain Kingsnake, and Waterfowl Wintering Area.

SCC Section 22.20.030 requires that all projects within the National Scenic Area that are located within 1,000 feet of any known wildlife area or sites require review for wildlife habitat protection. The project is located within 1,000 feet of known wildlife areas and sites within the National Scenic Area. Skamania County Community Development would work with the Washington State Department of Fish and Wildlife (WDFW) to determine if the applicant would be required to hire a wildlife biologist to prepare a Wildlife Management Plan.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. The applicant may be required to hire a wildlife biologist in order to determine the impact the proposed road improvements of the project would have on wildlife areas and sites and how those impacts could be mitigated. Mitigation measures would be included as conditions of approval.

The following sensitive plant areas or sites may occur within 1,000 feet of the project:

Oregon White Oak/ Idaho Fescue, Douglas fir / Common Snowberry – Oceanspray, Diffuse Stickseed.

SCC Section 22.20.040 requires that all projects within the National Scenic Area that are located within 1,000 feet of any known sensitive plants require review for sensitive plant protection. The project is located within 1,000 feet of known sensitive plants within the National Scenic Area. Skamania County Community Development would work with the Washington Natural Heritage Program (WNHP) to determine if the applicant would be required to hire a person with recognized expertise in botany or plant ecology to conduct a field survey. If this is required, buffers or protection and rehabilitation plans may be required.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. The applicant may be required to hire a person with recognized expertise in botany or plant ecology to conduct a field survey. If this is required, buffers or protection and rehabilitation plans may be required. Mitigation measures would be included as conditions of approval

CULTURAL RESOURCE PROTECTION

Upon the submittal of a National Scenic Area Land Use Application the proposed road improvement project would be reviewed in accordance with SCC Chapter 22.22, Cultural Resource Protection. The application materials would be forwarded to Marge Dryden, Heritage Resources Program Manager for the Columbia River Gorge National Scenic Area. Ms. Dryden will determine if the proposed project requires Reconnaissance and Historic Survey reports. The proposed road improvement project would be considered a large-scale use, as SCC Section 22.22.010(E)(1)(e)(iii) includes public transportation facilities as a large-scale use. The applicant will be responsible for hiring a qualified professional to conduct a Reconnaissance Survey and prepare a report on their findings.

Finding:
Prior to implementation of any road improvements a National Scenic Area Land Use Application should be submitted to the Skamania County Community Development Department. It would be reviewed with the Columbia River Gorge National Scenic Area Ordinance Title 22 that is in effect at the time of the application. The applicant will be responsible for hiring a qualified professional to conduct a Reconnaissance Survey and prepare a report on their findings. Sections 22.22.060 Cultural Resources Discovered After Construction Begins and 22.22.070 Discovery of Human Remains as conditions of approval. These conditions will act as an Inadvertent Discovery Plan.

RECREATIONAL RESOURCE PROTECTION

SCC Section 22.24.010 Applicability of Chapter – Maps.
Proposed resource-based recreation facilities or uses shall be consistent with recreation intensity classes as set out on the Recreation Intensity Class maps adopted by the Columbia River Gorge National Scenic Area.

Skamania County Code Title 24 – Clearing & Grading

24.02.50 Applicability

Unless exempted under SCC Section 24.02.060, no person shall perform any grading activity without having first obtained a permit from the Department. Exemption from the permit process shall not relieve any person the requirement *for installation of appropriate erosion control measures for their project. No permit or exemption granted pursuant to this title shall remove an applicant's obligation to comply in all respects with the applicable provisions of any other federal, state, or local law or regulation.*

24.02.060 Exemptions

The following activities are exempt from the permit requirements of this title. Materials from exempted excavations may require a separate permit for placement as fill.

A. Mining, quarrying, excavating, processing, or stockpiling activities of rock, sand, gravel, or clay if such operations are authorized by a valid Department of Natural Resources Surface Mine Reclamation Permit or Skamania County Conditional Use Permit or other provision of Skamania County Code.

B. All State Department of Natural Resources regulated Class I, II, III, or IV special forest practice activity conducted in accordance with Chapter 76.09 RCW and WAC Title 222.

C. Grading, clearing, filling or excavation of less than 500 cubic yards, only if located outside Critical Areas (SCC Title 21A) and regulated Shorelines (SCC Title 20).

D. Emergency actions which must be undertaken immediately or for which there is insufficient time for full compliance with this title in the event that:

   1. There is an imminent threat to public health or safety.
   2. There is imminent danger to public or private property;
   3. There is an imminent threat of serious environmental degradation;
      a. A person or agency determines that the need to take emergency action is so urgent that there is not sufficient time for review by the Department; such emergency action may be taken immediately. Any person or agency undertaking such action shall notify the Department within one working day following the commencement of the emergency action. Following such notification the Department shall determine if the action taken was within the scope of the emergency actions allowed in this subsection. If the Department determines that the action taken or part of the action taken is beyond the scope of allowed emergency action, enforcement action is authorized, as outlined in SCC Section 24.02.120.
      b. If the action taken qualifies as an emergency, and would have otherwise required a grading permit under this Title, then an application for a grading permit will be submitted with in 30 days following the emergency event. The application requirements, review, issuance, and inspections will be conditioned as outlined in this Title.

E. All exemptions as enumerated in the Critical Area and Shoreline Ordinances.

F. Nothing herein may interfere or overrule the Right to Farm Ordinance.

G. Nothing in this ordinance shall be retroactive and all current projects are hereby vested

Finding:

The proposal will include excavation work to install concrete foundations with a diameter of up to approximately 60 feet for each wind turbine. The Collector System will disturb an area approximately 30 feet in width, with 8.5 miles of underground collector cable trenches proposed. Approximately 2.4 miles of new gravel access roads will be constructed as part of the proposal.

Conclusion:
As the volume and area of the clearing activities exceeds the exemption amount of volume and/or area, the applicant/property owner is required to obtain a Clearing and Grading Permit under SCC Section 24.02.050. EFSEC will make a determination on what conditions of approval are necessary.

24.02.070 Application Requirements

Unless exempted under SCC Section 24.02.060, all persons proposing to conduct grading and/or clearing activity within the jurisdictional boundaries of unincorporated Skamania County shall first apply for a grading permit. The applicant shall obtain a grading permit in conformance with this title prior to any grading activity.

A. The permit application shall at a minimum include the following:
   1. *A completed application, signed by the property owner and the applicant, a vicinity map, environmental checklist (if required), and any relevant supplemental information required by the Director.*
   2. *Grading plans as described in SCC Section 24.02.080.*
   3. *A full identification and written description of the work to be covered by the permit for which the application is made.*
   4. *A timeline for completion of the project.*
   5. *Non-refundable application fee as determined by resolution of the Board of County Commissioners.*

Finding:
The applicant/property owner does not meet the exempt criteria for a Clearing and grading permit and is therefore required to submit a Clearing and Grading permit application.

Conclusion:
The proposed project will require a Clear and Grading permit application which should be a condition of approval.

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

A. Granting of Permits
   1. *After an application has been filed and reviewed the Director shall ascertain whether such proposed grading work complies with the provisions of this title. If the application and plans so comply, or if they are corrected or amended so as to comply, and the proposal is consistent with all other relevant county codes, the Director shall issue a grading permit.*
   2. *The applicant/property owner shall maintain the approved grading plans and permit available on the site, and provide an individual copy to any grading contractor who will be working at the site.*

3. *A grading permit shall be valid for a period of two years from the date of permit issuance, only for the grading work applied for. An extension may be granted for an additional 12 months for special circumstances. Request for extensions shall be submitted in writing to the Department prior to expiration of the current permit, setting forth the reasons and justification for the request. No permit may be extended more than once. Renewal of permits may be accomplished with existing plans and reports, if no changes are being made to the proposal, and no new significant issues are raised during the review.*

Conclusion:
In order to be in compliance with this section of the Clearing and Grading Ordinance, a condition of approval shall be that the permit and grading plans are available on site and that the grading permit is valid for two years.

24.02.080 Grading Plan

An application for clearing and grading shall be accompanied by a grading plan. If the clearing and grading project involves engineered grading, than an engineered grading plan based on an engineering report or an engineering geology report shall be submitted with the application. Engineered grading plans shall be prepared and stamped by an engineering geologist, geotechnical engineer and/or civil engineer licensed to work in the State of Washington. Grading within a geological hazard critical area may require a geotechnical assessment report in compliance with the Critical Area Protection Ordinance (SCC Title 21A). A grading plan shall include:

- *A. An easily reproducible drawing at a scale of appropriate size to show location and details of all cuts and all fills including depth and finished slopes of all cuts and all fills.*
- *B. A general vicinity map of the area and site plan of the project.*
- *C. North arrow.*
- *D. Dimensions and location of subject property boundary lines, location of the permit area boundary, existing and proposed roads, or driveways, easements, natural or man made bodies of water and drainages, critical areas, shorelines, and any existing or proposed structures, wells or septic systems on the site, and the distance between such features.*
- *E. Bodies of water, critical areas, structures, wells and septic systems on adjacent property and lying within 50 feet of the subject grading activity boundary that could be affected by the proposed grading operations.*
- *F. Location and dimensions of buffer areas to be maintained or established, and location and description of proposed erosion-control devices or structures.*
- *G. Map drawn with contour intervals (5 foot or less) that adequately depict existing and proposed slope for the proposal.*
- *H. Total quantities, in cubic yards, and type of cut and fill material, including on-site grading material, and imported material. Cross section drawings that include:*
    1. *Maximum depth of fill and maximum height of cuts.*
    2. *Existing and proposed buildings and their setbacks from cut or fill slopes.*
    3. *Existing grades extending a minimum of 20 feet beyond the scope of work.*

4. *Finished grades of cuts and fills extending a minimum of 20 feet beyond the scope of work.*
5. *Retaining walls and the adjacent grade at least 20 feet on either side of the wall(s).*
6. *Grades of all existing cut and fill areas expressed as a ratio of horizontal to vertical slope.*

I. *The disposal site for excavated material. Off-site disposal may require a separate grading permit.*

J. *The location of proposed erosion and sedimentation control measures showing compliance with the requirements of SCC Section 24.02.090.*

K. *Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams, berms, settling ponds, or other water or erosion control devices to be utilized as a part of the proposed work.*

L. *Any recommendations included in an engineering geology or geotechnical assessment or report for grading or developing the property. If required, assessment and reports shall be completed in compliance with SCC Title 21A prior to issuance of a clearing and grading permit.*

Finding:
Under Skamania County's Critical Area Ordinance (Title 21A), the subject parcel is designated as a Class I Erosion Hazard Area due to the soil susceptibility to wind and water erosion and a portion of the subject parcel is designated as a Class II Landslide Hazard Area due to 20% slopes underlain with clay type soils. A geotechnical assessment report is required for the proposed project. The project is further required to have effective erosion control measures in place during all phases of the project.

Conclusion:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

24.02.090 Grading Standards

Unless otherwise recommended in an approved soils engineering or engineering geology report, grading shall conform to the following standards. Erosion control measures may be installed as outlined in this title, unless otherwise recommended by a project engineer.

A. *Appropriate erosion control measures shall be installed prior to any grading activity. All erosion control measures shall be maintained in place until vegetation is established for suitable erosion and sedimentation control. No sediment from grading operations shall be permitted to leave the site or enter any surface waters or wetlands. If the grading activity timeline includes winter months, then a "winter shutdown" standard for site erosion control will be provided by the applicant.*

B. *Sites shall have a finished grade that drains away from structural foundations for a minimum of 10 feet.*

C. *All sites shall be cleaned upon project completion, including installation of permanent native grass seeding, landscaping, or other organic means of erosion control.*

D. *Cuts or fills of five feet in depth or greater shall be set back from property lines by a minimum of 25 feet. This can be decreased with appropriate* *engineering. Setback dimensions shall be horizontal distances measured perpendicular to the site boundary.*

- *E. The top of cut slopes shall not be made nearer to a permit area boundary line than one fifth of the vertical height of cut with a minimum of two feet and a maximum of 10 feet. The setback needs to be increased for any required interceptor drains.*
- *F. The toe to fill slopes shall be made not nearer to the permit area boundary line than one-half the height of the slope with a minimum of two feet and a maximum of 20 feet.*
- *G. The Director may approve alternate setbacks at the request of the applicant. In approving these alternate setbacks, the Director may require an investigation and recommendation by a qualified engineer or engineering geologist to demonstrate that the intent of this section has been satisfied.*
- *H. Any proposed finished slope that is steeper than two horizontal to one vertical shall be engineered.*
- *I. The ground surface shall be prepared to receive fill by removing all organic material, non-complying fill, and scarifying topsoil.*
- *J. Solid Waste as defined in this chapter, and detrimental amounts of organic material shall not be used as fill materials.*
- *K. Fill slopes shall not be constructed on natural or cut slopes steeper than two units horizontal in one unit vertical (50 percent slope) unless the permittee furnishes a geotechnical engineering or an engineering geology report or both, stating that the site has been investigated and giving an opinion that a cut at a steeper slope will be stable and not create a hazard to public or private property.*
- *L. At the request of the applicant, the Director may approve the use of alternate grading standards. These approvals shall be based on sound engineering practices and may require the submittal of additional documentation, reports, or testing.*
- *M. No grading shall obstruct or alter any existing natural drainage way, stream, or any other natural body of water.*
- *N. No grading shall alter or increase surface drainage onto any adjacent properties.*

Finding:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:
These plans will substantively comply with SCC Title 24 standards.

24.02.100 Grading Inspection

Grading projects for which a permit is required shall be subject to inspection by the Director. A licensed Washington State professional engineer shall provide professional inspections of grading operations if engineering is required elsewhere in this title. An inspection schedule shall be established for each project prior to permit issuance based on the following:

- *A. A civil engineer shall provide professional inspections within such engineer's area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of* *the development area. If revised plans are required during the course of the work, they shall be prepared by the civil engineer.*

B. *A geotechnical engineer and/or engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and testing for required compaction. The engineer shall provide sufficient observation during the preparation of the natural ground and placement in accordance with the conditions of the approved plan and the appropriate requirements of this title. He or she shall also provide professional inspection of any excavation to determine if conditions encountered are in conformance with the approved report or plan. Revised recommendations relating to conditions differing from the approved engineering geology or geotechnical reports shall be submitted to the permittee, the Department, and the civil engineer.*

C. *The permittee shall be responsible for the work being performed in accordance with the approved plans and specifications and in conformance with the provisions of the title. When approved by the Director, the permittee may engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the Department. In the event of changing conditions, the permittee shall be responsible for informing the Department of such change and shall provide revised plans for approval.*

D. *The Department may inspect the project in various stages of work.*

E. *If, in the course of fulfilling their respective duties under this title, the civil engineer, geotechnical engineer, or engineering geologist finds that the work is not being done in conformance with this title or approved grading plans, the discrepancies shall be reported in writing within three working days to the permittee and to the Department.*

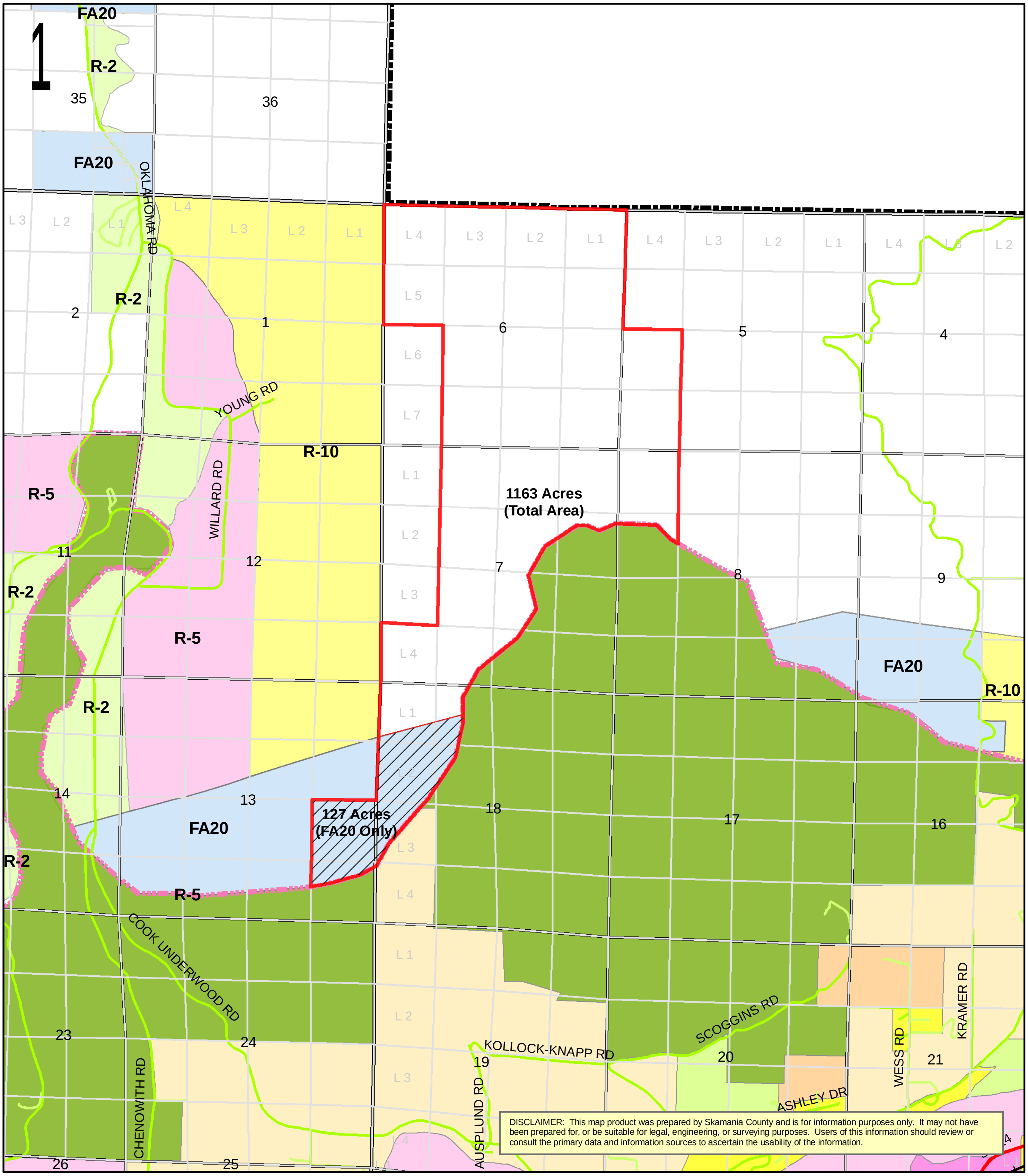
F. *If the civil engineer, geotechnical engineer, or engineering geologist of record is changed during grading, the work shall be stopped until the replacement has agreed in writing to accept the responsibility within the area of technical competence for approval upon completion of the work. It shall be the duty of the permittee to notify the Department in writing of such a change prior to the recommencement of such grading.*

Finding:

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:

These plans will substantively comply with SCC Title 24 standards.



SKAMANIA COUNTY

Department of Community Development

Project name: Whistling Ridge Wind Project

Created by: N. Hollatz

Creation date: 5/4/2009

0 0.5 1 Miles

Legend

WindPrj

Zone

- FA20
- Unzoned/FA20
- Roads - Public
- NSA_Boundary

Appendix D-2
Land Use Consistency Determination
Skamania County, December 2009

RESOLUTION 2009-54

(Certification of Land Use Consistency Review for the amended application for the Whistling Ridge Wind Energy Project. This resolution repeals Resolution 2009-22 in its entirety.)

WHEREAS, Whistling Ridge Energy Project, LLC ("Applicant") filed an Application for Site Certification ("ASC") to the Washington Energy Facility Site Evaluation Council ("EFSEC") on March 10, 2009 for the Whistling Ridge Energy Project ("Project") pursuant to RCW 80.50; and

WHEREAS, EFSEC has assumed lead agency status pursuant to the State Environmental Policy Act, RCW 43.21C for the environmental review of this Project. Skamania County anticipates participating in the SEPA process; and

WHEREAS, the Applicant filed an amended ASC to EFSEC on October 12, 2009 for the project; and

WHEREAS, said amended ASC removes all ground disturbing and review uses from any area within the National Scenic Area jurisdiction; and

WHEREAS, the Skamania County Community Development Director reviewed the amended ASC to determine the project's consistency with applicable County land use plans and zoning ordinances and prepared a Certificate of Land Use Consistency; and

WHEREAS, the Board of County Commissioners have reviewed the Community Development Director's Certification of Land Use Consistency for the amended application; and

WHEREAS, the Board of County Commissioners on December 22, 2009 considered the Community Development Director's determination at a regularly scheduled public meeting; and

WHEREAS, due notice of the Commissioner's meeting set forth above has been given as required by law; and

WHEREAS, the development of the Whistling Ridge Energy Project, if approved, will be specifically governed by a Site Certification Agreement signed by the Governor and the Applicant, including conditions of approval developed through the upcoming public process, including SEPA review; and

WHEREAS, more detailed findings of consistency are included in the Community Development Director's Certificate of Land Use Consistency, which is attached hereto and is incorporated herein by reference as if set forth in full; and

WHEREAS, this resolution repeals Resolution 2009-22 in its entirety; and

NOW THEREFORE, BE IT RESOLVED, the Board of County Commissioners, after due deliberation, adopts the Certificate of Land Use Consistency as a staff report to EFSEC, not a decision, and resolves that the Whistling Ridge Energy Project is consistent with the Skamania County land use plans and applicable zoning ordinances. A representative for Skamania County appointed by the Board of Commissioners is serving as a member of the Siting Council. Consequently, Skamania County does not, at this time, make any findings or determination regarding compliance with any other regulatory requirements or siting standards, and any potential conditions of approval recommended by Skamania County will be made at such time as the SEPA review is completed and after public meetings and hearings have been duly conducted by EFSEC, in accordance with Chapter 80.50 RCW.

PASSED IN REGULAR SESSION this 22nd day of December 2009.

BOARD OF COMMISSIONERS SKAMANIA COUNTY WASHINGTON CLERK OF THE BOARD

BOARD OF COUNTY COMMISSIONERS
SKAMANIA COUNTY, WASHINGTON

Chairman

Commissioner

Commissioner

ATTEST:

Clerk of the Board

APPROVE AS TO FORM ONLY:

Prosecuting Attorney

Skamania County
Community Development Department

Skamania County Courthouse Annex
Post Office Box 790
Stevenson, Washington 98648
509 427-3900 FAX: 509 427-3907

STAFF REPORT FOR LAND USE CONSISTENCY REVIEW

I. SUMMARY OF PROPOSED ACTION (Project description)

This Land Use Consistency Review Staff Report is to address the application for the Whistling Ridge Energy Project to the Washington State Energy Facility Site Evaluation Council. This is not a land use decision. It is a review to provide guidance to EFSEC as to the proposed project's potential consistency with Skamania County land use plans and zoning ordinances.

If the application had been submitted to the County, the project would require the following county issued reviews and permits: a SEPA Review, a Conditional Use permit (only for the portion of the project located within the zoned area), Building Permits, Critical Area Review, On-site Septic Permit, Well Drilling Inspection, and a Water Availability Verification Evaluation. Further, a Moratorium Lift application would be required as the alternative location for the Operations and Maintenance Building is located on tax parcel #03-09-00-0-0-0100-00, which currently has a Forest Practice Moratorium on the parcel. This Forest Practice Moratorium applies to the entire parcel and will expire in 2015.

The amended application would include all of the previously mentioned reviews. The project will no longer contain any ground disturbance or reviewable activities within the National Scenic Area.

As originally proposed by the application submitted March 10, 2009 to the Energy Facility Site Evaluation Council (EFSEC), Jason Spadero, President of SDS Lumber Co, and of Whistling Ridge Energy LLC, is proposing a facility, collectively called the Whistling Ridge Energy Project, of up to 50 1.2- to 2.5- MW wind turbines with a total capacity of 75 MW of electricity. The project would be located on a 1,152-acre site in unincorporated Skamania County owned by SDS Co, LLC and Broughton Lumber Company, on the forested ridges of Saddleback Mountain. Each turbine would be up to approximately 426 feet tall to the tops of the blades extended over the tower of the wind turbine. In addition to the turbines, the planned facility would include: electrical transformers, 34.5 kilovolt collector lines and systems (primarily underground), permanent meteorological towers, an Operations and Maintenance facility (including bathrooms and kitchen), a new well for potable water, an on-site septic system, a substation located adjacent to BPA's existing North Bonneville to Midway 230-kV transmission line, and approximately 2.4 miles of newly-constructed gravel roads. There are 7.9 miles of existing private logging roads and road improvements, 7.8 miles located in the project area and 2.5 miles of access roads or road improvements not in the project area, but outside of the National Scenic Area boundary. All existing, improved, and new roads will provide access to the wind turbine locations during construction and for operations and maintenance.

An amendment to this application was submitted to EFSEC on October 12, 2009. The amendment discusses an alternative location for the Operations and Maintenance Building, as well as moving the proposed access road improvements outside of the National Scenic Area boundary. The first proposed location for the Operations and Maintenance building is adjacent to the substation on the project site. The alternative location for the Operations and Maintenance building would be approximately 0.9 miles off site, located on the proposed new connection from Willard Road to West Pit Road. This parcel is owned by Broughton Lumber Co. and is zoned Residential-5 (R5). The maintenance yard was originally proposed as two acres in size as is now proposed as five acres in size.

The original proposal stated that several wind turbines would be placed in a Residential 10 (R10) zoning designation on the project site. While researching the parcels using the County's Geographic Information System (GIS), legal descriptions and official zoning maps, no R10 zoning designation was found within the project site. This has been corrected in the amended submittal.

The original proposal states that roughly 400 acres of the project site is located within FOR/AG 20 zoning and Residential 10 zoning designations. The referral to Residential 10 zoning has been corrected in the amendment. However, Community Development staff research of the County's GIS and assessor maps show that approximately 1,036 acres of the project site is unzoned, and approximately 127 acres of the project site is zoned FOR/AG 20. County GIS and assessor maps show the project area to be approximately 1,163 acres, however, this is just an approximation based on legal descriptions since no boundary survey was conducted. This information does not affect the consistency review of the project; rather it is a clarification of the project based on County's consistency review.

The original proposal further included improvements to roads and intersections within the National Scenic Area in order to provide access to the project site. The roadways affected include Cook Underwood Road, Kollock-Knapp Road, Scoggins Road and private logging road CG2930. The October 12, 2009 amendment cites changes to the access roads that would take any ground disturbing activity outside of the National Scenic Area. Access to the site would now be provided from SR-14 to Cook Underwood Road to Willard Road and through a new connection to West Pit Road. No road improvements or changes would occur within the National Scenic Area boundaries.

The amended application proposes access to the project area via SR-14 to Cook-Underwood Road to Willard Road, with a new connection to West Pit Road. West Pit Road is an existing 2.5-mile-long logging road originally 8-12 feet wide. In summer 2009, the road was widened to approximately 20-26 feet wide. This road passes over a Class V stream with a current culvert, which will need to be widened as well.

Improvements to the county roadways and the private logging road would be necessary to support the long and heavy loads that would be required for the delivery of the wind energy components from SR 14 to the proposed project site. These improvements may include 1) Rebuilding large sections of the existing roadway network, 2) Widening certain sections of the existing roadway network, 3) Flattening and/or rebuilding existing roadway topography both horizontally and vertically, and 4) Placing asphalt in select areas for equipment access. All improvements will be located outside of the National Scenic Area.

II. GENERAL INFORMATION

Owner(s):	SDS Lumber Co PO Box 266 Bingen, WA 98605	Broughton Lumber Co 92 Office Road Underwood, WA 98651
Applicant(s)/Applicant(s) Representative:	Jason Spadero, President, SDS Lumber Co and Whistling Ridge Energy, LLC PO Box 266 Bingen, WA 98605	
Tax Parcel Number(s):	03-10-00-0-0-0300-00 (portion) 03-10-00-0-0-0400-00 (full) 03-10-00-0-0-0800-00 (portion) 03-10-00-0-0-1100-00 (portion) 03-09-00-0-0-2990-00 (portion) 03-09-00-0-0-0100-00 (alternative location for the Operations & Maintenance Building) Skamania County Road Right-of-Way	
Location:	The subject parcels are located in the eastern portion of Skamania T3N, R10E & T3N, R9E, W.M.	
Zoning:	127 acres of the proposed project area is zoned FA20. The alternative location of the Operations & Maintenance Building is zoned R5. The remaining 1,036 acres is un-zoned.	
Comprehensive Plan Designation	Conservancy (outside NSA)	
Square Footage/Acreage:	The entire project area is located outside of the NSA and is 1,152 acres (1,163 acres by County calculations), spanning portions of five parcels. If the alternative location for the Operations & Maintenance Building is used, it will span six parcels. Approximately 384 acres would be developed for the wind turbine foundations, connecting roadways, and overhead and underground transmission lines.	
Proposed Use	Semi-public utility facility	
Number of Lots:	The project area spans portions of five parcels. If the alternative location for the Operations & Maintenance Building is used, it will span six parcels.	

Density:	N/A
Sanitary Sewer District:	Individual On-Site Septic System for proposed Operations and Maintenance Facility
Domestic Water Supplies:	Applicant is proposing an individual well to serve the kitchen and bathroom facilities in the Operations and Maintenance Building.
Fire District:	Fire District #3
School District:	#31 Mill A and White Salmon School Districts
Drainage Basin:	Wind / White Salmon
WRIA:	Wind / White Salmon
WRIA Number	29B

III. HISTORY/BACKGROUND:

Skamania County is one of ten counties in Washington State that is not required to fully plan under the Growth Management Act. The County is not required to establish zoning classifications on all the land within its jurisdiction.

The 2007 Comprehensive Plan applies to all unincorporated land within Skamania County. Not all of unincorporated Skamania County has a zoning classification. The critical area regulations only apply outside of the NSA.

SDS Co. LLC submitted their application for the Whistling Ridge Energy Project on March 10, 2009. SDS Co. submitted an amended application to EFSEC on October 12, 2009. Skamania County Community Development Department is providing EFSEC with a consistency review of all county regulations that apply to the project. The County is not providing a decision on this project at this time.

The original application included roadway improvements on roads located within the National Scenic Area. The amended application has removed any roadway improvements and ground disturbing activity inside of the NSA. Therefore, portions of the previous staff report relating to the NSA activity, no longer apply.

IV. SEPA THRESHOLD DETERMINATION:

EFSEC issued a scoping notice on April 6, 2009 to begin the EIS review process. A revised notice was issued April 21, 2009.

V. PUBLIC HEARING NOTICE:

EFSEC published all required notices.

VI. NATURAL ENVIRNOMENT

A. Topography:

The resource maps indicate that the subject parcels within the project area, have slopes ranging from zero percent to over 40%. Under Skamania County's Critical Areas Ordinance (Title 21A), the subject parcels are located in a Class II Landslide Hazard Area. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. A description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. An evaluation of the analysis area's inherent erosion hazards;
c. A site plan of the area delineating all areas of the site subject to erosion hazard; and
d. Proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

B. Soils:
According to the Natural Resources Conservation Service (NRCS) Soil Survey of Skamania County, the soil types of the parcels are: McElroy gravelly loam (types 66, 67, 68), Timberhead gravelly loam (types 135. 136), Underwood loam (type 144). Each of these soils has a T Factor of 5. Under Skamania County's Critical Areas Ordinance, Title 21A, the subject parcels are located in a Class I Erosion Hazard Area.

C. Surface Water:
Within the proposed project area there is: One (1) Class 4N stream; 19 Class 5N streams; and five (5) unclassified streams.

D. Vegetation:
The project area is covered by second and third growth commercial timber stands.

E. Wildlife:
The entire project area is within Elk winter range habitat. No other habitat was found on resource maps.

F. Sensitive Areas:
No Sensitive Areas were found on the Resource maps within the proposed project area. No known cultural or archaeological resources were found within the project area.

VII. NEIGHBORHOOD CHARACTERISTICS

The Comprehensive Plan designation of this project area is Conservancy. The alternative location for the Operations and Maintenance Building is within Rural Lands II Comprehensive Plan designation. Some of the surrounding area is Rural Lands II, with the majority being Conservancy.

The southern project boundary line (including the southeast project line) borders the Columbia River Gorge National Scenic Area, but is not within the National Scenic Area.

VIII. TRANSPORATION PLANS

The original proposed access was from State Route 14 to Cook-Underwood Road, to Kollock-Knapp Road to Scoggins Road. This would have required road improvements within the National Scenic Area. The amended application has access to the proposed site provided from State Route 14 to Cook- Underwood Road, to Willard Road and through a proposed new connection to existing West Pit Road, located on SDS Lumber Company and Broughton Lumber Company property. The alternative Operations & Maintenance building location would be accessed off of Willard Road.

IX. UTILITIES

A. Stormwater:

Discharge of stormwater runoff would be regulated by EFSEC based on the Department of Ecology's stormwater pollution control program. The proposal indicates mitigation measures by Best Management Practices and by implementing a Stormwater Pollution Prevention Plan (SWPPP) during and after construction. The final design would conform to the applicable Ecology Stormwater Management Manual in effect at the time or as instructed by EFSEC.

B. Wastewater Disposal:

The Applicant is required to apply for an On-Site Septic System permit as the Operations and Maintenance Building will include bathroom and kitchen facilities. Prior to issuance of any building permit, the applicant is required to have an approved On-Site Septic System Design.

C. Potable Water:

Prior to the issuance of a building permit for the proposed Operations and Maintenance Building, the applicant is required to have an approved Water Availability Verification Evaluation (WAVE).

X. COMPREHENSIVE PLAN

The following Goals and Policies of the Skamania County Comprehensive Plan are applicable to the proposed project.

Chapter 2: Land Use Element
Goals and Policies
Conservancy Designation

Goal LU.1: To integrate long-range considerations (comprehensive planning) into the determinations of short-term action (individual development applications).

Policy LU.1.2: The plan is created on the premise that the land use areas designated are each best suited for the uses proposed therein. However, it is not the intention of this plan to foreclose on future opportunities that may be made possibly by technical innovations, new ideas and changing attitudes. Therefore, other uses that are similar to the uses listed here should be allowable uses, review uses or conditional uses, only if the use is specifically listed in the official controls of Skamania County for that particular land use designation.

Finding:

The project area lies within the Conservancy Comprehensive Plan Designation. The alternative location for the Operation and Maintenance Building lies within the Rural Lands II Comprehensive Plan Designation. Within the conservation designation and the Rural Lands II designation, public facilities and utilities, and utility substations are allowed.

Conclusion:
The project is considered a semi-public utility facility and would therefore be consistent with the Conservancy Designation.

Goal LU.3: To coordinate public and private interests in land development.

Policy LU.3.3: Encourage industry that would have minimal adverse environmental or aesthetic effects.

Finding:
The project area is located outside of the Columbia River Gorge National Scenic Area boundary. The turbines would be painted gray to minimize aesthetic effects. The proposed project would be located within an area where roadways and high voltage regional transmission lines already exist, which would minimize the need for new disturbances.

Conclusion:
The project is consistent with this goal and policy.

Goal LU.4: To promote interagency cooperation and effective planning and scheduling of improvements and activities so as to avoid conflicts, duplication and waste.

Policy LU.4.3: Land use patterns, which minimize the cost of providing adequate levels of public services and infrastructure, should be encouraged.

Finding:
High-voltage regional transmission lines, owned and operated by Bonneville Power Administration (BPA) are located on the project site. Access roadways already exist, with the exception of the proposed connection from Willard Road to West Pit Road. The project uses existing patterns in Land Use, which helps to minimize the public costs of providing services and new infrastructure.

Conclusion:
The project is consistent with this goal and policy.

Goal LU.5: To promote improvements which make our communities more livable, healthy, safe and efficient.

Policy LU.5.5: Promote compatibility of industry with the surrounding area or community by fostering good quality site planning, landscaping, architectural design, and a high level of environmental standards.

Policy LU.5.7: Adequate on-site wells and septic systems should be properly installed, monitored and maintained in accordance with local and state health departments.

Finding:
The proposed project is located in the Conservancy Designation, which allows for public utility facilities and utility stations. The surrounding areas are Conservancy Designation, as well as Rural Lands II Designation, which also allows for utility facilities and utility substations. The project site has been previously logged by forestry activities and the proposal would allow the forestry activities to continue. High-voltage transmission lines, cell towers and rock quarries currently exist in the area, so the project would be compatible with these uses.

The proposed Operations and Maintenance Building is located in the Rural Lands II Designation, which allows for public utility facilities and utility stations. It would include bathroom and kitchen facilities and would therefore be required to have an approved on-site septic system as well as an adequate potable water supply. If/when an application is submitted to this department, this would be a condition of approval.

Conclusion:
The project is consistent with the goals and policies. A valid OSS and proof of potable water would be a condition of approval.

Chapter 3: Environmental Element
Goals and Policies

Goal E.1: To ensure the proper management of the natural environment to protect critical areas and conserve land, air, water and energy resources.

Policy E.1.4: Implement and preserve critical area buffers based on Best Available Science adjacent to critical areas to adequately protect such areas from development and land use impacts.

Finding:
Several streams exist on the proposed project site, with buffers ranging from 25' to 50', which must be maintained at all times unless exemptions are met or variances are granted.

Conclusion:
This proposal is consistent with the goals and policies.

Goal E.3: To minimize the loss of life and property from landslides, seismic, volcanic or other naturally occurring events, and minimize or eliminate land use impacts on geologically hazardous areas.

Policy E.3.4: Require geotechnical studies to determine construction methods and technologies necessary to further public safety in geologically hazardous areas. The development design and construction technology used shall be appropriate to the soil limitations on the particular site.

Finding:
The project should require a geotechnical assessment report and soil borings to be conducted on-site. The report should be reviewed and accepted by Skamania County prior to issuing any building permits. Any and all setbacks determined within the report must be followed.

The proponent had a geotechnical assessment report prepared for this project. At this time, the report has not been reviewed by Skamania County.

Conclusion:
The project is consistent with these goals and policies.

Chapter 4: Transportation Element

Goal T.1: Transportation – Encourage an efficient multi-modal transportation network that is based on regional priorities and coordinated with county and city comprehensive plans.

Goal T.3: Public Facilities and Services – Ensure that those public facilities and services necessary to support development should be adequate to serve the development at the time the development is available for occupancy and use without decreasing current service levels below locally established minimum standards.

Finding:
Most roadways that will be used for this proposal exist and some improvement will be necessary for the transportation of the equipment and construction materials. A short road span connecting West Pit Road to Willard Road is proposed for access to the site. Other proposed roadways for the site will be located on the project site. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant should consult with the Skamania County Public Works Department regarding the sufficiency of roads. Turbine equipment would likely be transported to either the Port of Longview or the Port of Vancouver, and much of it transported by barge up the Columbia River to the Applicant's existing barge and dock facilities in Bingen, Washington. If rail is used, it will be by existing rail lines.

Conclusion:
This proposal is consist with these goals and policies. The road improvements will enhance the level of service on these roads and benefit the community.

Chapter 5: Archaeology and Historic Preservation Element

Goal AHP.1: Identify and encourage the preservation of lands, sites, and structures that have historical or archaeological significance:

Policy AHP.1.3: Coordinate county inventory efforts with Native American groups and governmental efforts.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging. No known archaeological or cultural resources were found on the Washington State Department of Archaeological and Historic Preservation (DAHP) resource maps that staff used to research the project area.

Further, if the project proponent applies for a Conditional Use permit, the application would be sent to various state agencies, federal agencies, and Native American Governments, allowing the opportunity to comment on the project. EFSEC should consult with these groups during the process.

Conclusion:
This project is consistent with these goals and policies.

Goal AHP.3: Protect historic, archaeological, and cultural resources through a comprehensive planning approach.

Finding:
Research conducted by Skamania County Community Development found no archaeological or historical resources located on the project area. CH2M HILL conducted an intensive cultural resource inventory survey of the proposed area of potential effect in August 2003. No evidence of prehistoric activity was observed and no archaeological sites or historic properties were identified, although two historic archaeological isolates were found and documented, consisting of piled basalt cobbles and scatter of historic debris previously disturbed by power line construction and logging.

Conclusion:
This project is consistent with these goals and policies.

XI. STATUTES/CODES:

Skamania County Code Title 21 – Zoning

Chapter 21.64 – Unmapped Classification (UNM)

21.64.020 – Allowable Uses

In the areas classified as Unmapped, all uses which have not been declared a nuisance by statute, resolution, ordinance, or court of jurisdiction are allowable. The standards, provisions, and conditions of this title shall not apply to unmapped areas.

Finding:

1,036 acres of this project is unzoned and therefore there are no restricted uses. Utility facilities and utility substations have not been declared a nuisance by a known Washington State Court or by local ordinance or resolution or by any known state or federal statutes.

Conclusion:
The project is consistent with the zoning designation of UNM.

Chapter 21.56 – Resource Production Zone Classification (FOR/AG 10 & 20)
21.56.030 – Conditional Uses
(C) Semi-public facilities and utilities

Finding:
Approximately 127 acres of this project is located within the FOR/AG 20 zoning classification. The "A" string of the project within this zoning classification. The "A" string includes seven turbines. All other proposed turbines are outside of the zoned area. Semi-public facilities and utilities are a conditional use within this zoning designation. The applicant would need to submit a conditional use application for review by the Hearing Examiner for approval of this project if the County was conducting the project review. Conditional use permits are reviewed and issued by the County Hearing Examiner.

Chapter 21.36 – Residential 5 Zone Classification (R5)
21.36.031 – Conditional Uses
(G) Semi-public facilities

Finding:
The proposed alternative location for the Operations and Maintenance Building is located approximately 0.9 acres from the project site on a parcel zoned Residential 5. The proposed maintenance yard would be approximately 5 acres. Semi-public facilities are a conditional use within this zoning designation. The applicant would need to submit a conditional use application for review by the Hearing Examiner for approval of this project if the County was conducting the project review. Conditional use permits are reviewed and issued by the County Hearing Examiner.

21.16.070 - Hearing Examiner - Duties and Responsibilities
The Hearing Examiner shall hear and decide:

A. Applications for conditional uses. Conditional uses are those uses, which may or may not be compatible with permitted uses in a specific zoning designation. If the Hearing Examiner determines the use is not compatible with permitted or existing uses in the specific area of the proposed use then the proposed use shall be denied. Alternatively, if the Hearing Examiner determines that the proposed use is compatible with permitted and existing uses in the specific area of the proposed use then the proposed use then the proposed use may be approved or approved with conditions to make it make it compatible with the area.
   1. In determining whether the use is compatible with the area, the proposed use shall:

a. *Be either compatible with other uses in the surrounding area or is no more incompatible than are other outright permitted uses in the applicable zoning district;*

Finding:
The proposal is to install up to 50 wind turbines on a parcel of land in unincorporated Skamania County, 1,036 acres are unzoned, and 127 acres are zoned FOR/AG 20. The Operations and Maintenance Building will either be located on the project site adjacent to the substation or in an area off Willard Road approximately 0.9 miles from the project area and is zoned R5. The entire proposal is located within the Conservancy Comprehensive Plan Designation, with the exception of the alternative location for the Operations and Maintenance building which is located in Rural Lands II.

Unzoned areas of Skamania County and the Conservancy Comprehensive Plan Designation allow for public utility facilities and utility substations. The FOR/AG 20 and the R5 zoning districts list semi-public utility facilities and utility substations as a conditional use and allow public facilities outright with no additional zoning review being required.

The surrounding areas are located within the Conservancy Designation, as well as the Rural Lands II Designation, both of which allow public utility facilities and utility substations. The property is currently uses for commercial forestry activities, and these activities will be allowed to continue once the turbines are constructed. Cell towers, high-voltage transmission lines and rock quarries exist in the area. There is a small portion of the project site that abuts Residential 10 (R10) zoning, which also lists semi-public utilities as conditional use.

Conclusion:
The proposal is compatible with other uses within the area, both within the Comprehensive plan designation and the zoning designation.

b. *Not materially endanger the health, safety, and welfare of the surrounding community to an extent greater than that associated with other permitted uses in the applicable zoning district.*

Finding:
The subject parcel is located in a geological hazard area due to the slope and soil type and requires a geotechnical assessment report.

The applicant is required to show proof of potable water and obtain an on-site septic system permit from the Skamania County Community Development Department through the building permit process. The proposal includes bathroom and kitchen facilities located in the Operation and Maintenance Building.

EFSEC has required an EIS to be prepared and will ultimately decide what conditions of approval would be necessary for the project to be found to not materially endanger the health, safety and welfare of the surrounding community. By obtaining the water, septic and building permits, conducting the geotechnical analysis and best management practices during construction, the project could be found consistent with this provision.

Conclusion:
The proposal will not materially endanger the health, safety, and welfare of the surrounding community.

> c. *Not cause the pedestrian and vehicular traffic associated with the use to conflict with existing and anticipated traffic in the neighborhood to an extent greater than that associated with other permitted uses in the applicable zoning district.*

Finding:
Access of the proposed site would be provided from State Route 14 to Cook-Underwood Road, Willard Road and with a new connection to existing West Pit Road, located on SDS Lumber Company and Broughton Lumber Company property.

All roadways that will be used for this proposal exist, with the exception of the new connection from Willard to West Pit Road and access roads within the project site boundaries, and some improvement will be necessary for the transportation of the equipment and construction materials. Some intersection improvements are needed to allow safe turning of construction and equipment delivery vehicles. These improvements, as well as the added traffic, would not degrade the existing levels of service at nearby intersections below minimum standards. The applicant will consult with the Skamania County Public Works Department regarding the sufficiency of roads and road upgrade requirement. Other permitted uses include: single family residences in conjunction with forest or farm management, recreational facilities, semi-public facilities and utilities, saw mills, shake and shingle mills, chippers, pole and log yards, geothermal energy facilities, aircraft landing fields, cluster developments, child mini day care centers, and child day care centers.

Conclusion:
The proposal will not cause a conflict with existing pedestrian and vehicular traffic.

> d. *Be supported by adequate service facilities and would not adversely affect public services to the surrounding area.*

Finding:
The proposal states that an Engineering, Procurement, and Construction (EPC) contractor will prepare a safety plan that would apply to all personnel working on-site. The plan would ensure compliance will all laws, ordinances, regulations and standards concerning health and safety. An Environmental Compliance Program would cover avoidance of sensitive areas during construction, waste handling and storage, stormwater management, spill prevention and control, and other components required by State and County regulations. An Emergency Response Plan would be established to ensure employee safety from the

following: medical emergency, major power loss, fire, extreme weather, earthquake, volcano, and bomb threat. This plan would be established prior to construction.

Condition:
All safety plans and programs are required to be in place prior to construction. These plans and programs should be included as a conditional of approval.

> e. *Not hinder or discourage the development of permitted uses on neighboring properties in the applicable zoning district as a result of the location, size, or height of the buildings, structures, walls, or required fences or screening vegetation to a greater extent than other permitted uses in the applicable zoning district.*

Finding:
The proposal is to install up to 50 wind turbine structures on a project site spanning portions of five parcels. This use is classified as a semi-public utility facility within the FOR/AG 20 zoning designation. If the alternative location for the Operations and Maintenance building were selected, the project would span six parcels. This use is classified as a semi-public utility facility within the R5 zoning designation.

Other uses in the FOR/AG 20 zoning designation include, among others: forestry practices and associated management activities of forest crop, commercial and domestic agriculture, water resource management facilities, log sorting and storage areas, etc. Other uses in the R5 zoning designation include, among others: single-family dwellings, commercial and domestic agriculture, public facility and utilities, and accessory equipment structures, etc.

Surrounding zoning includes FOR/AG 20, as well as R10 (Residential 10) and R5 outside of the NSA. To the south of the project area, inside the NSA, the surrounding area is zoned Large Scale Agriculture, Commercial Forest, Small Woodland and Open Space. Current uses surrounding the project site include commercial forestry uses, agriculture including pear and apple orchards, and three small, unincorporated residential communities and other agriculture related dwellings.

Conclusion:
The proposal is compatible with other uses in the region and will not affect the allowed uses on those parcels. The proposal states commercial forestry activities will likely continue on the project site parcels as well.

> f. *Not be in conflict with the goals and policies expressed in the current version of the County's comprehensive plan.*

Finding:
As discussed above, the proposal is consistent with the Skamania County Comprehensive Plan.

2. *Criteria for determining conditions to be imposed on conditional uses shall be based on the health, safety, and general welfare of the public, any environmental standards in force in Skamania County, other applicable provisions set forth in this Title and shall be subject to conditions which may include, but are not limited to the following;*

   a. *Limiting the manner in which the use is conducted including restricting the time an activity may take place, and restraints to minimize such environmental effects as noise, vibration, air pollution, glare, and odor.*

Finding:
The EIS and EFSEC will determine what conditions, if any, are required to be implemented for this project.

   b. *Establishing a special yard, open space, lot area or lot dimensions.*

Finding:
Not applicable

   c. *Limiting the height, size, or location of a building or other structure.*

Finding:
127 acres of this project site, which includes seven proposed turbines, is located within FOR/AG 20 zoning designation. Under the current FOR/AG 20 zoning designation, the required front yard setback is 35-feet from the centerline of the private road or 20-feet from the front property line with the front defined as the line which parallels a public road right-of-way or a private road easement, or that line where a road, driveway, or access panhandle enters a lot. The required rear setback under the current regulations is 20-feet from the rear lot line with the rear defined as the lot line which is opposite and farthest away from the front lot line.

The alternative location for the Operations and Maintenance building is on land designated Residential 5 (R-5). Under the current R5 zoning designation, the required front yard setback is 50-feet from the centerline of the public road right-of-way or 35-feet from the centerline of a private road right-of-way, or 20-feet from the property line, whichever is greater. The required rear setback is 20-feet and the required side yard setbacks are 20-feet.

The remainder of this parcel, 1,036 acres, is unzoned and therefore has setbacks as determined by the Building code list from Title 15. Building Code setback requirements for un-zoned lots 12,500 square feet or larger is:
<u>Front Yard:</u> No building or accessory building shall be constructed closer than 45 feet from the centerline of the public road right-of-way or 35 feet from the centerline of the private road (note including private driveways), or road or 15 feet from the front property line, whichever is greater;
<u>Side Yard:</u> On each side of the building or accessory building a side yard shall be provided for not less than 5 feet; and

Rear Yard: A rear yard shall be provided of not less than 15 feet, including accessory buildings.

Conclusion:
Under the current regulations, the proposed location meets the minimum requirements. However, EFSEC may require additional setbacks or micro siting of turbines.

d. Designating the size, number, location, and nature of vehicle access points.

Finding:
No new major roads are proposed at this time. Only a small connection from Willard Road to West Pit Road will be constructed for access. Other proposed roads include access roads within project boundaries. The EIS traffic studies and road design plan will determine any requirements for vehicle access points.

e. Increasing the amount of street dedication, roadway width, or improvements within the street right-of-way.

Finding:
The EIS traffic studies and road design plans will determine the necessary road improvements. No new roads are proposed at this time, other than the short connection from Willard Road to West Pit Road and roads within project boundaries.

f. Limiting or otherwise designating the number, size, location, height, and lighting of signs.

Finding:
Non-applicable

g. Limiting the location and intensity of outdoor lighting and requiring it to be shielded.

Finding:
Lighting of turbine strings will need to meet Federal Aviation Administration (FAA) requirements. Lighting on buildings is requested to be hooded and shielded. This is a request and not currently a requirement in the County zoning code.

h. Requiring berming, screening, landscaping, or another facility to protect adjacent or nearby properties and designating standards for its installation and maintenance.

Finding:
The residences closest to the project site are located approximately 0.48 mile and 0.8 mile from proposed turbine locations. A new home site location has been applied for, and would be approximately 2,000 feet (0.38 Mile) from the south property line. The unincorporated community of Willard is located approximately

2.25 miles northwest of the project site. The unincorporated community of Mill A is also located near the project site, approximately 1.5 miles west of the site. The homes near the project site are rural, primarily single family, between 30 and 50 years old, and low- to medium-density.

The residence closest to the alternative location for the Operations and Maintenance building is approximately 0.25 miles.

Conclusion:
In order to protect adjacent and nearby properties, the applicant should only excavate the minimum needed to install the wind turbines and accessory structures, and the Operations and Maintenance facility, maintain existing trees, and re-vegetate all undeveloped disturbed areas with native trees and shrubs along the west and south lot lines. However, since this land is being used for Commercial Forestry, the removal of timber in conjunction with this operation should not be restricted.

i. Designating the height, location, and materials for a fence.

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic reasons.

j. Protecting and preserving existing trees, vegetation, water resources, wildlife habitat, or other significant natural, historic, or cultural resources.

Finding:
The proposed project is located within a Class II Landslide Hazard Area and a Class I Erosion Hazard Area due to the soil type and requires a geotechnical assessment report. The entire project site is also located within elk winter range habitat. Several streams exist on site, which would require buffers ranging between 25' to 50'. There are no current County requirements to preserve trees or vegetation outside of critical resource stream buffers. No cultural or historic resources found in database research.

Conclusion:
In order to prevent possible wind and water erosion, the applicant should use Best Management Practices during all phases of construction and replant all undeveloped disturbed areas with native vegetation. The project requires a geotechnical assessment report to address the landslide hazard on the property. The applicant has already submitted a geotechnical assessment report, which has not been reviewed by the County.

Skamania County Code Title 21A – Critical Areas

21A.04.010 - General Provisions

A. RELATIONSHIP TO SHORELINES MANAGEMENT MASTER PLAN AND SHORELINES MANAGEMENT ACT PERMITS ORDINANCE.

In event of any conflict between this Title and regulations contained in the Shorelines Ordinance, those regulations that provide greater protection of Critical Areas shall apply.

Finding:
There are several streams located on the subject parcel. The proposal is to erect up to 50 wind turbine structures. No stream located on-site is a Shoreline of Countywide or Statewide significance and therefore the Skamania County Shoreline Management Program does not apply.

Conclusion:
Skamania County Critical Areas Ordinance, Title 21A, provides the greatest protection to the critical areas and only applies outside of the National Scenic Area.

21A.04.030 - STREAMS, CREEKS AND RIVERS

(4) Buffer Widths

(b) ... undisturbed buffers shall be preserved around all regulated streams, creeks and rivers.

(c) The required width of undisturbed buffer areas shall depend upon the class of water represented by the stream, creek or river protected, the type or scale of use or development proposed by an applicant and the vegetative community adjacent to the water body.

(iv) For Class IV streams, creeks and rivers, the standard buffer zone width shall be 50 feet.

(v) For Class V streams, creeks and rivers, the standard buffer zone width shall be 25 feet.

Finding:
The proposed project area includes several streams ranging from a 25' to 50' undisturbed buffer requirement. The proposal states that no new construction would occur within wetlands, streams, or associated buffers. Most of the existing road improvements in these regulated fish and wildlife protection areas do not exceed the allowed expansion threshold (100% or less of the original footprint).

West Pit Road is an existing logging road that will be used to access the site. The road was originally 8 to 12 feet in width, and has been widened to approximately 20 to 26 feet in width. Further widening of sections of the road is proposed to 25-feet in width, with 5' shoulders on each side. Also proposed is the widening of the existing culvert across the Class V stream on West Pit Road. No Critical Areas Variance will be required if the expansion/widening is less than 100% of the original size. If the expansion is greater than 100%, a Critical Areas Variance will be required.

Conclusion:
Maintaining critical areas buffers would be a condition of approval. If any expansion of existing roadways or culverts occurs within critical area buffers that are greater than 100% of the original size, a Critical Areas Variance will be required.

The applicant has already had a wetland delineation report prepared for the project. This report has not been reviewed by Skamania County at this time.

21A.05.050 – Fences in Deer and Elk Winter Range

(A) New development permits issued by the County shall include a requirement that, in deer and elk winter range, construction of new and replacement fences shall be subject to the following:

1. *New fences in deer and elk winter range shall be allowed only when necessary to control livestock or pets or to exclude wildlife from specified areas, such as gardens or orchards. Fenced areas shall be the minimum necessary to meet the needs of the project applicant.*
2. *New and replacement fences in winter range shall comply with the following, unless the applicant demonstrates the need for an alternative design:*
   a. *The top wire shall not be more than 42 inches high to make it easier for deer to jump over the fence.*
   b. *The distance between the top two wires shall be at least 10 inches to make it easier for deer and to free themselves if they become entangled.*
   c. *The bottom wire shall be at least 16 inches above the ground to allow fawns to crawl under the fence. It should consist of smooth wire because barbs often injure animals as they crawl under the fence.*
   d. *Stays or braces placed between strands of wire shall be positioned between fence posts where deer are most likely to cross. Stays create a more rigid fence, which allows deer a better change to wiggle free if their hind legs become caught between the top two wires.*
3. *Woven wire fences may be authorized only when a project applicant clearly demonstrates that such a fence is required to meet his or her specific needs, such as controlling hogs and sheep.*

Finding:
EFSEC will determine if any fencing is required for safety and/or aesthetic reasons.

Conclusion:
If EFSEC requires fencing, a condition of approval would be to follow the above guidelines for fencing within deer and elk winter range.

The proponent has already had a wildlife survey completed. This report has not been reviewed by Skamania County at this time.

21.A.06 Geologically Hazardous Areas

21A.06.010 Erosion Hazard Areas

A. Class I Erosion Hazard Areas:

Class I Erosion Hazard Areas (EHAs) area areas that are subject to severe development constraints due to a site's susceptibility to erosion from wind and/or water.

Class I EHAs are identified in the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service, as having an index of greater than or equal to 3.75

21A.06.020 Landslide Hazard Areas

A. *Class II Landslide Hazard Areas (LHAs) are areas with slopes 20% and 30% that are underlain by soils that consist largely of silt, clay or bedrock, and all areas with slopes greater than 30%.*

   Class II LHAs shall be identified using the Soil Survey of Skamania County Areas, Washington, prepared by the United States Department of Agriculture, Soil Conservation Service. Department personnel shall make a preliminary determination of percentage of slope. The applicant shall verify soil type and precise percentage of slope.

Finding:

The proposed project site is located within a Class I Erosion Hazard Area and a Class II Landslide Hazard Area under Skamania County Critical Areas Ordinance Title 21A. The resource maps indicate that the subject parcels have slopes ranging from zero percent to over 40%. As such, this requires a geotechnical assessment report be completed for the proposed project. A geotechnical assessment report is prepared by a Washington state licensed hydrologist or geologist and requires the following, at minimum:

a. A description of the topography, surface and subsurface hydrology, soils geology, and vegetation of the site;
b. An evaluation of the analysis area's inherent erosion hazards;
c. A site plan of the area delineating all areas of the site subject to erosion hazard; and
d. Proposed mitigation measures to be implemented by the applicant, including, but not limited to, minimizing site disturbance or grading, implementing erosion control measures, such as the retention of existing vegetation and controlling surface water drainage through stormwater retention and detention systems.

Conclusion:

The proposal discusses submitting a geotechnical assessment report and performing soil borings on site. This report must be reviewed and approved by Skamania County and would be a condition of approval.

The applicant submitted a Geotechnical Assessment Report, which has not been reviewed by the County at this time.

Skamania County Code Title 22 – National Scenic Area

The original proposal included road improvements on existing roadways within the National Scenic Area. However, the amended proposal changes the access roads and road improvements to roadways not located within the National Scenic Area. Therefore, as currently proposed, no National Scenic Area review would be completed and is not required.

Skamania County Code Title 24 – Clearing & Grading

24.02.50 Applicability

Unless exempted under SCC Section 24.02.060, no person shall perform any grading activity without having first obtained a permit from the Department. Exemption from the permit process shall not relieve any person the requirement for installation of appropriate erosion control measures for their project. No permit or exemption granted pursuant to this title shall remove an applicant's obligation to comply in all respects with the applicable provisions of any other federal, state, or local law or regulation.

24.02.060 Exemptions

The following activities are exempt from the permit requirements of this title. Materials from exempted excavations may require a separate permit for placement as fill.

A. Mining, quarrying, excavating, processing, or stockpiling activities of rock, sand, gravel, or clay if such operations are authorized by a valid Department of Natural Resources Surface Mine Reclamation Permit or Skamania County Conditional Use Permit or other provision of Skamania County Code.

B. All State Department of Natural Resources regulated Class I, II, III, or IV special forest practice activity conducted in accordance with Chapter 76.09 RCW and WAC Title 222.

C. Grading, clearing, filling or excavation of less than 500 cubic yards, only if located outside Critical Areas (SCC Title 21A) and regulated Shorelines (SCC Title 20).

D. Emergency actions which must be undertaken immediately or for which there is insufficient time for full compliance with this title in the event that:

1. *There is an imminent threat to public health or safety.*
2. *There is imminent danger to public or private property;*
3. *There is an imminent threat of serious environmental degradation;*
    a. *A person or agency determines that the need to take emergency action is so urgent that there is not sufficient time for review by the Department; such emergency action may be taken immediately. Any person or agency undertaking such action shall notify the Department within one working day following the commencement of the emergency action. Following such notification the Department shall determine if the action taken was within the scope of the emergency actions allowed in this subsection. If the Department determines that the action taken or part of the action taken is beyond the scope of allowed emergency action, enforcement action is authorized, as outlined in SCC Section 24.02.120.*

b. *If the action taken qualifies as an emergency, and would have otherwise required a grading permit under this Title, then an application for a grading permit will be submitted with in 30 days following the emergency event. The application requirements, review, issuance, and inspections will be conditioned as outlined in this Title.*

E. *All exemptions as enumerated in the Critical Area and Shoreline Ordinances.*

F. *Nothing herein may interfere or overrule the Right to Farm Ordinance.*

G. *Nothing in this ordinance shall be retroactive and all current projects are hereby vested*

Finding:
The proposal will include excavation work to install concrete foundations with a diameter of up to approximately 60 feet for each wind turbine. The Collector System will disturb an area approximately 30 feet in width, with 8.5 miles of underground collector cable trenches proposed. Approximately 2.4 miles of new gravel access roads will be constructed for construction, maintenance and operation as part of the proposal.

Conclusion:
As the volume and area of the clearing activities exceeds the exemption amount of volume and/or area, the applicant/property owner is required to obtain a Clearing and Grading Permit under SCC Section 24.02.050. EFSEC will make a determination on what conditions of approval are necessary.

24.02.070 Application Requirements

Unless exempted under SCC Section 24.02.060, all persons proposing to conduct grading and/or clearing activity within the jurisdictional boundaries of unincorporated Skamania County shall first apply for a grading permit. The applicant shall obtain a grading permit in conformance with this title prior to any grading activity.

A. *The permit application shall at a minimum include the following:*

1. *A completed application, signed by the property owner and the applicant, a vicinity map, environmental checklist (if required), and any relevant supplemental information required by the Director.*
2. *Grading plans as described in SCC Section 24.02.080.*
3. *A full identification and written description of the work to be covered by the permit for which the application is made.*
4. *A timeline for completion of the project.*
5. *Non-refundable application fee as determined by resolution of the Board of County Commissioners.*

Finding:
The applicant/property owner does not meet the exempt criteria for a Clearing and grading permit and is therefore required to submit a Clearing and Grading permit application.

Conclusion:
The proposed project will require a Clear and Grading permit application, which would be a condition of approval.

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

A. Granting of Permits

1. *After an application has been filed and reviewed the Director shall ascertain whether such proposed grading work complies with the provisions of this title. If the application and plans so comply, or if they are corrected or amended so as to comply, and the proposal is consistent with all other relevant county codes, the Director shall issue a grading permit.*
2. *The applicant/property owner shall maintain the approved grading plans and permit available on the site, and provide an individual copy to any grading contractor who will be working at the site.*
3. *A grading permit shall be valid for a period of two years from the date of permit issuance, only for the grading work applied for. An extension may be granted for an additional 12 months for special circumstances. Request for extensions shall be submitted in writing to the Department prior to expiration of the current permit, setting forth the reasons and justification for the request. No permit may be extended more than once. Renewal of permits may be accomplished with existing plans and reports, if no changes are being made to the proposal, and no new significant issues are raised during the review.*

Conclusion:
In order to be in compliance with this section of the Clearing and Grading Ordinance, a condition of approval should be that the permit and grading plans are available on site and that the grading permit is valid for two years.

24.02.080 Grading Plan

An application for clearing and grading shall be accompanied by a grading plan. If the clearing and grading project involves engineered grading, than an engineered grading plan based on an engineering report or an engineering geology report shall be submitted with the application. Engineered grading plans shall be prepared and stamped by an engineering geologist, geotechnical engineer and/or civil engineer licensed to work in the State of Washington. Grading within a geological hazard critical area may require a geotechnical assessment report in compliance with the Critical Area Protection Ordinance (SCC Title 21A). A grading plan shall include:

- *A. An easily reproducible drawing at a scale of appropriate size to show location and details of all cuts and all fills including depth and finished slopes of all cuts and all fills.*
- *B. A general vicinity map of the area and site plan of the project.*
- *C. North arrow.*
- *D. Dimensions and location of subject property boundary lines, location of the permit area boundary, existing and proposed roads, or driveways, easements, natural or man made bodies of water and drainages, critical areas, shorelines, and any existing or proposed structures, wells or septic systems on the site, and the distance between such features.*

E. *Bodies of water, critical areas, structures, wells and septic systems on adjacent property and lying within 50 feet of the subject grading activity boundary that could be affected by the proposed grading operations.*

F. *Location and dimensions of buffer areas to be maintained or established, and location and description of proposed erosion-control devices or structures.*

G. *Map drawn with contour intervals (5 foot or less) that adequately depict existing and proposed slope for the proposal.*

H. *Total quantities, in cubic yards, and type of cut and fill material, including on-site grading material, and imported material. Cross section drawings that include:*

   1. *Maximum depth of fill and maximum height of cuts.*
   2. *Existing and proposed buildings and their setbacks from cut or fill slopes.*
   3. *Existing grades extending a minimum of 20 feet beyond the scope of work.*
   4. *Finished grades of cuts and fills extending a minimum of 20 feet beyond the scope of work.*
   5. *Retaining walls and the adjacent grade at least 20 feet on either side of the wall(s).*
   6. *Grades of all existing cut and fill areas expressed as a ratio of horizontal to vertical slope.*

I. *The disposal site for excavated material. Off-site disposal may require a separate grading permit.*

J. *The location of proposed erosion and sedimentation control measures showing compliance with the requirements of SCC Section 24.02.090.*

K. *Detailed plans of all surface and subsurface drainage devices, walls, cribbing, dams, berms, settling ponds, or other water or erosion control devices to be utilized as a part of the proposed work.*

L. *Any recommendations included in an engineering geology or geotechnical assessment or report for grading or developing the property. If required, assessment and reports shall be completed in compliance with SCC Title 21A prior to issuance of a clearing and grading permit.*

Finding:
Under Skamania County's Critical Area Ordinance (Title 21A), the subject parcel is designated as a Class I Erosion Hazard Area due to the soil susceptibility to wind and water erosion and a portion of the subject parcel is designated as a Class II Landslide Hazard Area due to 20% slopes underlain with clay type soils. A geotechnical assessment report is required for the proposed project. The project is further required to have effective erosion control measures in place during all phases of the project.

A geotechnical report has been prepared for this project, but has not been reviewed by Skamania County at this time.

Conclusion:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and

approval prior to the start of construction. These plans will substantively comply with SCC Title 24 standards.

24.02.090 Grading Standards

Unless otherwise recommended in an approved soils engineering or engineering geology report, grading shall conform to the following standards. Erosion control measures may be installed as outlined in this title, unless otherwise recommended by a project engineer.

A. Appropriate erosion control measures shall be installed prior to any grading activity. All erosion control measures shall be maintained in place until vegetation is established for suitable erosion and sedimentation control. No sediment from grading operations shall be permitted to leave the site or enter any surface waters or wetlands. If the grading activity timeline includes winter months, then a "winter shutdown" standard for site erosion control will be provided by the applicant.

B. Sites shall have a finished grade that drains away from structural foundations for a minimum of 10 feet.

C. All sites shall be cleaned upon project completion, including installation of permanent native grass seeding, landscaping, or other organic means of erosion control.

D. Cuts or fills of five feet in depth or greater shall be set back from property lines by a minimum of 25 feet. This can be decreased with appropriate engineering. Setback dimensions shall be horizontal distances measured perpendicular to the site boundary.

E. The top of cut slopes shall not be made nearer to a permit area boundary line than one fifth of the vertical height of cut with a minimum of two feet and a maximum of 10 feet. The setback needs to be increased for any required interceptor drains.

F. The toe to fill slopes shall be made not nearer to the permit area boundary line than one-half the height of the slope with a minimum of two feet and a maximum of 20 feet.

G. The Director may approve alternate setbacks at the request of the applicant. In approving these alternate setbacks, the Director may require an investigation and recommendation by a qualified engineer or engineering geologist to demonstrate that the intent of this section has been satisfied.

H. Any proposed finished slope that is steeper than two horizontal to one vertical shall be engineered.

I. The ground surface shall be prepared to receive fill by removing all organic material, non-complying fill, and scarifying topsoil.

J. Solid Waste as defined in this chapter, and detrimental amounts of organic material shall not be used as fill materials.

K. Fill slopes shall not be constructed on natural or cut slopes steeper than two units horizontal in one unit vertical (50 percent slope) unless the permittee furnishes a geotechnical engineering or an engineering geology report or both, stating that the site has been investigated and giving an opinion that a cut at a steeper slope will be stable and not create a hazard to public or private property.

L. At the request of the applicant, the Director may approve the use of alternate grading standards. These approvals shall be based on sound *engineering practices and may require the submittal of additional documentation, reports, or testing.*

M. *No grading shall obstruct or alter any existing natural drainage way, stream, or any other natural body of water.*

N. *No grading shall alter or increase surface drainage onto any adjacent properties.*

Finding:

The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:

These plans will substantively comply with SCC Title 24 standards.

24.02.100 Grading Inspection

Grading projects for which a permit is required shall be subject to inspection by the Director. A licensed Washington State professional engineer shall provide professional inspections of grading operations if engineering is required elsewhere in this title. An inspection schedule shall be established for each project prior to permit issuance based on the following:

A. *A civil engineer shall provide professional inspections within such engineer's area of technical specialty, which shall consist of observation and review as to the establishment of line, grade and surface drainage of the development area. If revised plans are required during the course of the work, they shall be prepared by the civil engineer.*

B. *A geotechnical engineer and/or engineering geologist shall provide professional inspection within such engineer's area of technical specialty, which shall include observation during grading and testing for required compaction. The engineer shall provide sufficient observation during the preparation of the natural ground and placement in accordance with the conditions of the approved plan and the appropriate requirements of this title. He or she shall also provide professional inspection of any excavation to determine if conditions encountered are in conformance with the approved report or plan. Revised recommendations relating to conditions differing from the approved engineering geology or geotechnical reports shall be submitted to the permittee, the Department, and the civil engineer.*

C. *The permittee shall be responsible for the work being performed in accordance with the approved plans and specifications and in conformance with the provisions of the title. When approved by the Director, the permittee may engage consultants, if required, to provide professional inspections on a timely basis. The permittee shall act as a coordinator between the consultants, the contractor and the Department. In the event of changing conditions, the permittee shall be responsible for informing the Department of such change and shall provide revised plans for approval.*

D. *The Department may inspect the project in various stages of work.*

E. *If, in the course of fulfilling their respective duties under this title, the civil engineer, geotechnical engineer, or engineering geologist finds that the* *work is not being done in conformance with this title or approved grading plans, the discrepancies shall be reported in writing within three working days to the permittee and to the Department.*

F. *If the civil engineer, geotechnical engineer, or engineering geologist of record is changed during grading, the work shall be stopped until the replacement has agreed in writing to accept the responsibility within the area of technical competence for approval upon completion of the work. It shall be the duty of the permittee to notify the Department in writing of such a change prior to the recommencement of such grading.*

Finding:
The proposal states that an Engineer licensed in the State of Washington will prepare detailed clearing and grading plans that will be submitted to EFSEC for review and approval prior to the start of construction.

Conclusion:
These plans will substantively comply with SCC Title 24 standards.

Appendix E
Agency Consultations

Appendix E-1

DAHP Concurrence on Area of Potential Effects
Applicant APE

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

February 1, 2010

Mr. James La Spina
Siting Specialist
Energy Facility Site Evaluation Council
905 Plum Street, Building 3
P.O. Box 43172
Olympia, WA 98504-3172

In future correspondence please refer to:
Log: 012610-17-EFSEC
Property: *Consultation for Area of Potential Effects Whistling Ridge Energy Project, Skamania County, Washington*
Re: Area of Potential Effects-Concurrence and Comments

Dear Mr. La Spina:

We have reviewed the material you forwarded to our office that describes the area of potential effect (APE) for the Whistling Ridge Wind Energy Project in Skamania County. We concur with the definition of the APE. We look forward to receiving any correspondence or comments from the concerned Tribes or other parties and the cultural resources survey report when it is available.

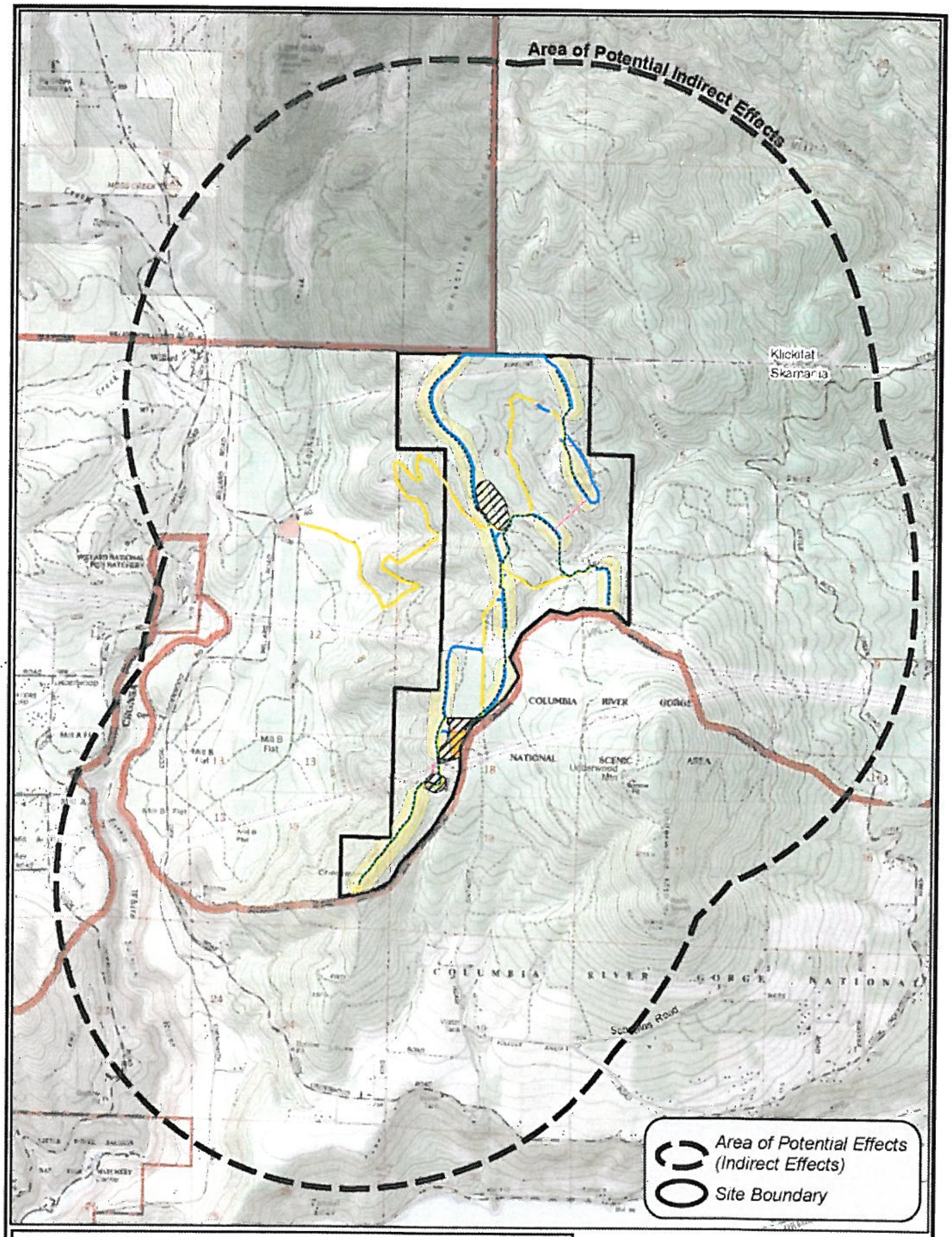
These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer. Thank you for your consultation. If you have any questions, please feel free to contact me.

Sincerely,

Gretchen A Ka

Gretchen Kaehler
Assistant State Archaeologist
(360) 586-3088
gretchen.kaehler@dahp.wa.gov

CC. Katy Chaney, URS Corporation
Jessica Lally, Wind Farm Archaeologist, Yakama Nation



Area of Potential Effects

- 650' Turbine Corridor
- Approximate Location of 5 Acre Laydown Staging Areas
- Overhead Power Line
- Buried Collector Lines - Turbines to Substation
- 5 Acre Substation Plot
- 5 Acre Operations and Maintenance Facility Alternative Locations
- Improved Existing Roads
- New Project Roads

Figure 1
Area of Potential Effects
Whistling Ridge Energy Project

N

0 0.5 1 Miles

GeoDataScape

Appendix E-2
BPA Section 106 Consultation Letters

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0256

Mr. Rob Whitlam, Ph.D.
State Archaeologist
Department of Archaeology & Historic Preservation
1063 South Capitol Way, Suite 106
Olympia WA 98501

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Dr. Whitlam:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your agency – the Washington State Office of Archeology and Historic Preservation. BPA also initiated consultation with The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, and The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for any of the contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

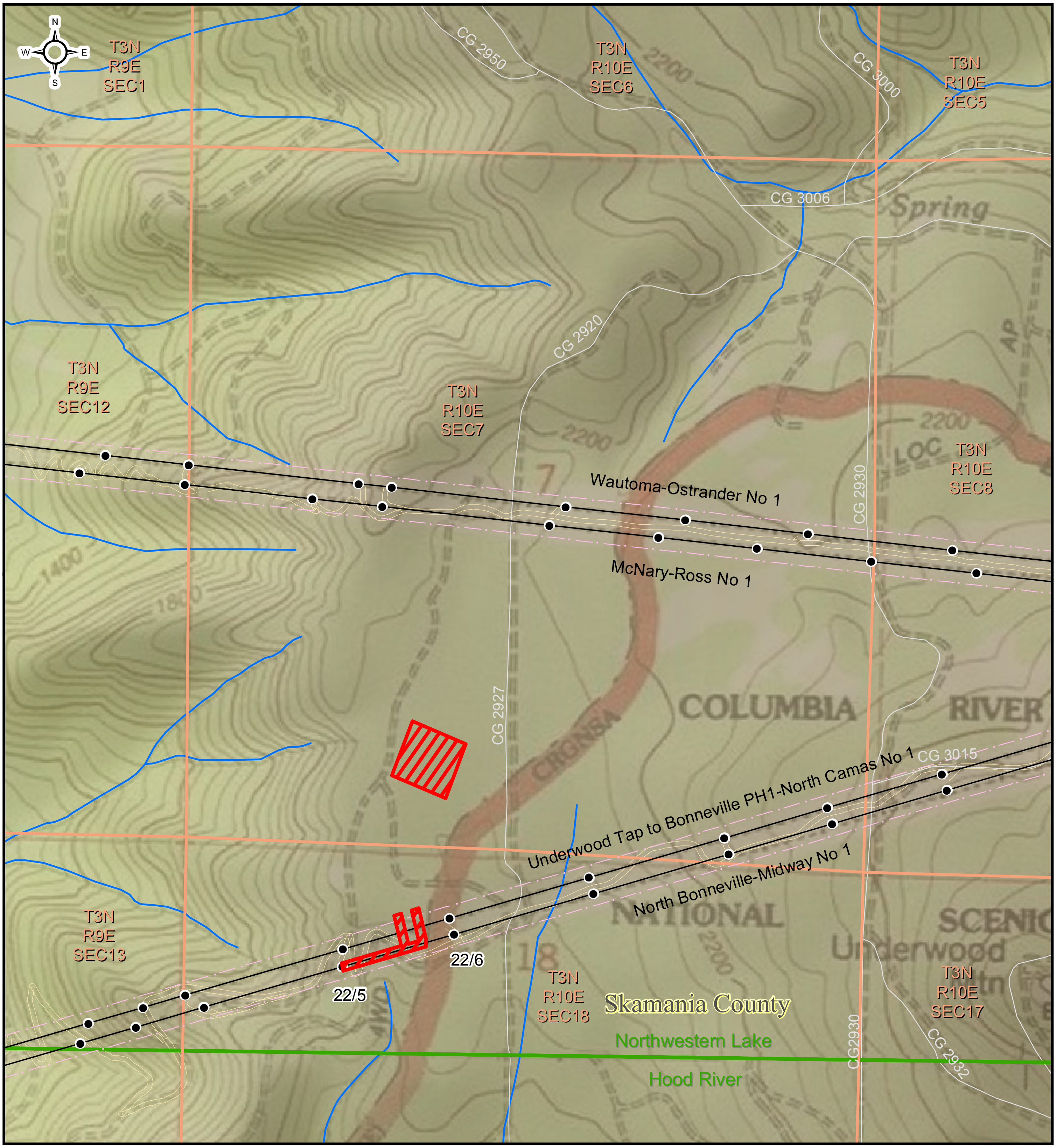
In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map



Proposed BPA Substation - Whistling Ridge Energy Project

Area of Potential Effects

- Area of Potential Effect
- Quad Name & Boundary
- Township/Range/Section
- BPA Right-of-Way Corridors
- BPA Towers
- Access Roads
- BPA Transmission Lines

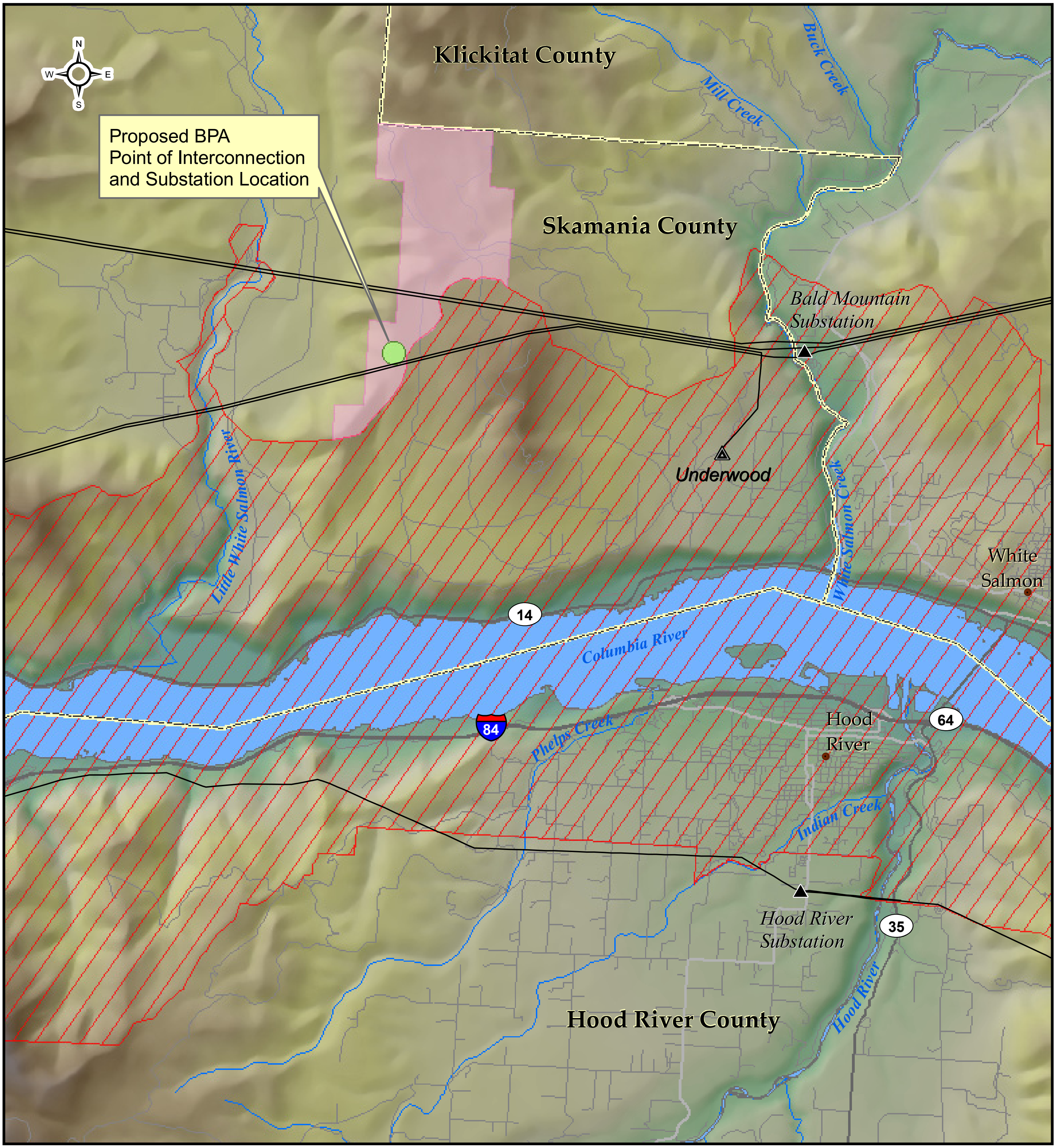
BONNEVILLE POWER ADMINISTRATION

June 28, 2010

0 500 1,000

Feet

File Path: \\bud\wg\gis\gis_data2\work\anna_h\APE\WhistlingRidge\Substation.mxd, User: AMH3994



Proposed Whistling Ridge Energy Project

Project Overview

Proposed BPA Point of Interconnection and Substation Location

Whistling Ridge Energy Project Study Area

Columbia River Gorge National Scenic Area

County Boundary

BPA Substation

Foreign Owned Substation

BPA Transmission Lines

BONNEVILLE POWER ADMINISTRATION

May 5, 2010

0 0.5 1 2

Miles

File Path: \\bud\wg\gis\gis_data2\work\anna_h\Exhibits\WhistlingRidge\Project_Overview.mxd, User: AMH3994

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

August 9, 2010

Mr. Andrew M. Montano
Environment, Fish & Wildlife
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208-3621

Re: Whistling Ridge Substation Project
Log No.: 080910-26-BPA

Dear Mr. Montano;

Thank you for contacting our department. We have reviewed the materials you provided for the Area of Potential Effect (APE) for the proposed Whistling Ridge Energy Project Substation Project near Underwood, Skamania, County, Washington.

We concur with your determination of the Area of Potential Effect (APE) as described and presented in your figures and text.

We would also appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in compliance with the Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.4.). Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and we look forward to receiving the results of the professional archaeological survey report, your consultation efforts, and your Determination of Effect.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov

cc: K. Cannell

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

December 10, 2010

In reply refer to: KEC-4

William Iyall, Chairman
Cowlitz Indian Tribe
PO Box 2547
Longview, WA 98632

Certified Mail
Return Receipt Requested
7010-1060-0000-5012-9336

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Iyall:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, December 10, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Cowlitz Indian Tribe
P.O. Box 2547 Longview, WA 98632
360.577.8140 577.7432 (f)

March 21, 2011

Andrew M. Montaño
Environmental Protection Specialist
Department of Energy
Bonneville Power Administration
PO Box 3621
Portland, OR 97208-3621

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington.

Dear Mr. Montaño:

In reference to the project stated above, the Cultural Resources Department of the Cowlitz Indian Tribe would like to state its interest.

The Cowlitz Indian Tribe recommends an Inadvertent Discovery Plan be attached to the permit; we have included language for your consideration.

Please contact us with any questions or concerns you may have. We look forward to working with you on this undertaking.

Thank you for your time and attention.

All My Relations,

dAVe burlingame
Director, Cultural Resources
360.577.6962
508.1677 [c]
577.6207 [f]

CC: Rob Whitlam, Department of Archaeology and Historic Preservation
Ed Arthur, Cowlitz Indian Tribe

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

McCoy Oatman, Chairman
Cultural Resources Director
Columbia River Inter-Tribal Fish Commission
729 NE Oregon St., Ste 200
Portland, OR 97232

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0270

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Oatman:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, and The Confederated Tribes and Bands of the Yakama Reservation pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Carey Miller, THPO
Cultural Resources Protection Program
Confederated Tribes of the Umatilla Indian Reservation
46411 Timine Way
Pendleton, OR 97801

Certified Mail
Return Receipt Requested
7009-2820-0002-3432-8888

**RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18**

Dear Ms. Miller:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

<u>/s/ Andrew M. Montaño, Aug. 2, 2010</u>
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Robert Brunoe, THPO
Confederated Tribes of the Warm Springs Reservation of Oregon
P.O. Box C
Warm Springs, OR 97761

Certified Mail
Return Receipt Requested
7009-2820-0002-3432-8895

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Brunoe:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Keith Baird
Cultural Resources Director
Nez Perce Tribe of Idaho
P.O. Box 305
Lapwai, ID 83540

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0263

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Baird:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Confederated Tribes and Bands of the Yakama Nation
Established by the Treaty of June 9, 1855

Post Office Box 151
Toppenish Washington 98948

RECEIVED
JUN 17 2010
ENVIRONMENT
FISH & WILDLIFE

5/27/2010

Stephen Posner
Compliance Manager, EFSEC
905 Plum Street SE
Olympia, Washington 98504-3172

Andrew M. Montano
Environmental Project Manager
Bonneville Power Administration
P.O. Box 14428
Portland, Oregon 97293-4428

Dear Mr. Posner and Mr. Montano,

We have reviewed the recent Draft Environmental Impact Statement (DEIS) complied for the Whistling Ridge Energy Facility. In doing so, we noted under section 3.10.2.2 no mention has been made of the finding of the Yakama Nation Cultural Resources Program study which resulted in the findings of Traditional Cultural Property within the proposed wind project lands. The DEIS states that:

> *"A field investigation by Yakama Nation cultural resources specialists occurred in December 2009. The Yakama Nation's findings, currently in preparation, will supplement the information contained in this EIS."*

However, the results of the field investigation were reported to SDS Lumber and the Department of Archaeology and Historic Preservation in December of 2009, shortly after the site visit was completed. We, therefore, are taking this opportunity to resubmit this report to the Energy Facility Siting Evaluation Council (EFSEC) and the Bonneville Power Administration (BPA). It is our directive that this report be included in the Final Environmental Impact Statement as a portion of the consultation responsibilities held by BPA and EFSEC.

Sincerely,

Ruth Jim
Chairman, Yakama Nation Roads, Irrigation, and Lands Committee

Cc: Yakama Nation Cultural Resources Program
Gretchen Kaehler, Department of Archaeology and Historic Preservation
Richard Till, Fiends of the Columbia Gorge

Confederated Tribes and Bands
of the Yakama Nation

Established by the
Treaty of June 9, 1855

RECEIVED
JUN 17 2010
ENVIRONMENT
FISH & WILDLIFE

Memorandum

To: **Andrew Montano, Manager**
Environmental Project

From: **Harry Smiskin, Chairman**
Yakama Nation Tribal Council

Date: **June 15, 2010**

Subject: **Whistling Ridge Energy Project**

I, the Chairman of Yakama Nation Tribal Council, am requesting a continuance of thirty (30) days to review and comment on the Whistling Ridge Energy Project. My staff and I have not had the chance to meet on this important matter, and we would like to provide you with our input.

Chairman Harry Smiskin
P.O. Box 151
Yakama Nation
Toppenish, Wa 98948

copy to: Tribal council
Lavina Washines
LAVINA WASHINES

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

ENVIRONMENT, FISH AND WILDLIFE

August 23, 2010

In reply refer to: KEC-4

Mr. Harry Smiskin, Chairman
Yakama Nation Tribal Council
Confederated Tribes and Bands of the Yakama Nation
P.O. Box 151
Toppenish, WA 98948

Certified Mail
Return Receipts Required
7009-2250-0000-1562-5288

Dear Mr. Smiskin:

The Bonneville Power Administration (BPA) is nearing its deadline for comments regarding the Draft Environmental Impact Statement (DEIS) issued for the Whistling Ridge Energy Project. I would be interested in hearing from the Confederated Tribes and Bands of the Yakama Nation regarding your input to this project. I hope that you have had sufficient time to look at our DEIS and welcome any suggestions you may have. Additionally, I wanted to let you know that BPA has received concurrence to the Area of Potential Effects from the Washington State Historic Preservation Office regarding the location where our interconnection would take place if this proposed project were to move forward.

I welcome any questions and/or comments that you may have regarding this project. Please feel free to contact me directly at (503) 230-4145 or at ammontano@bpa.gov at any time.

Thank you for your interest in this project.

Sincerely,

/s/Andrew Montano 08-30-2010
Andrew M. Montaño
Environmental Project Manager – KEC-4

cc:
Ms. Kate Valdez, THPO
Mr. Johnson Meninick, Cultural Resources Program Manager
Ms. Lavina Washines, Yakama Nation

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

August 2, 2010

In reply refer to: KEC-4

Ms. V. Kate Valdez, THPO
Confederated Tribes and Bands of the Yakama Reservation
P.O. Box 151
Toppenish, WA 98948

Certified Mail
Return Receipt Requested
7009-2820-0002-3433-0058

**RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18**

Dear Ms. Valdez:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Office of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effect (APE) for the proposed project has been determined and is located on the attached APE Map. Additionally, a project overview map is also being included to depict the total project area of the proposed wind facility and that of BPA's proposed action. The project will be located in T3N, R10E, Sections 7 and 18 (Northwestern Lake Quadrangle). The APE is briefly described below.

The proposed project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built.

This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

Upon receipt of comments from your office concerning the proposed project and APE, BPA will determine the appropriate action for the identification and protection of historic properties within the APE. This may include tribal input for Traditional Cultural Properties, if indicated as an area of concern for yours or any of the other contacted tribes. A field survey covering the entire APE shown on the enclosed map is planned to be conducted. Furthermore, the identification, evaluation, and mitigation activities will be conducted by an individual meeting the Secretary of the Interior' standards. Following the background research and field survey, a technical report will be prepared and submitted to your office and to any affected tribes.

In this initiation of consultation, BPA seeks your concurrence on the proposed undertaking and APE discussed above. We also seek any information that you might have on known archaeological resources in the project area. Based on the interest of time, we anticipate your immediate response to this consultation.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or email me at ammontano@bpa.gov .

Sincerely,

/s/ Andrew M. Montaño, Aug. 2, 2010
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
APE Map
Project Overview Map

Confederated Tribes and Bands of the Yakama Nation
Established by the Treaty of June 9, 1855

Post Office Box 151
Toppenish Washington 98948

Andrew M. Montano
Environmental Protection Specialist
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

9/10/2010

RE: Proposed Whistling Ridge Energy Project Skamania County, Washington

Thank you for contacting Yakama Nation regarding the Proposed Whistling Ridge Energy Project. The Project is located within the Ceded Lands of the Yakama Nation, the legal rights to which were established by the Treaty of 1855, between the Yakama Nation and the United States Government. The Treaty set forth that the Yakama Nation shall retain rights to resources upon these lands and, therefore, it is with the assistance and backing of the United States Federal Government that Yakama Nation claims authority to protect traditional resources.

Yakama Nation does not agree with the APE defined by the Bonneville Power Administration (BPA). The Whistling Ridge Energy Project Draft Environmental Impact Statement (DEIS) implies that the Whistling Ridge project is dependent upon a BPA interconnection. Page 1-6 of the DEIS states,

> "*. . . it is critical to locate projects in areas were transmission lines currently exit. The Applicant thus needs to locate near exiting high-voltage transmission, such as the FCRTS.*"

Since the Whistling Ridge Project cannot proceed without BPA interconnection, we believe this project should be reviewed under NEPA, BPA involvement creating a federal nexus. Therefore, the appropriate APE for the BPA interconnection should include the entire Whistling Ridge Project area.

Yakama Nation CRP has provided both EFSEC and BPA information regarding the existence of Traditional Cultural Properties within the Whistling Ridge Project. We trust that prior to interconnection with this facility, BPA will ensure that Yakama Nation's concerns regarding the DEIS are addressed and that consultation regarding the identified cultural resources is completed.

If you have any questions, please feel free to contact me at 509-865-5121 x4737, or Yakama Nation Archaeologist, Jessica Lally at x4766.

Sincerely,

George Colby
Attorney for the Yakama Nation Executive Committee

RECEIVED
SEP 2 1 2010
ENVIRONM...
FISH & WILDLIFE

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Robert Whitlam, PhD.
State Archaeologist
Department of Archeology and Historic Preservation
1063 S. Capitol Way, Suite 106
Olympia, WA 98501

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5501

RE: **Proposed Whistling Ridge Energy Project, Skamania County, Washington**
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18
Log No.: 080910-26-BPA

Dear Dr. Whitlam:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed interconnection is a federal undertaking that has the potential to cause effects on historic properties and initiated consultation with your agency – the Washington State Office of Archeology and Historic Preservation. BPA also initiated consultation with The Confederated Tribes of the Umatilla Indian Reservation, The Cowlitz Indian Tribe, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Nez Perce Tribe of Idaho, The Confederated Tribes and Bands of the Yakama Reservation, and The Columbia River Inter-Tribal Fish Commission pursuant to 36 CFR 800.4(a)(4).

As acknowledged by your office on August 9, 2010, the Area of Potential Effects for the proposed interconnection will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The proposed interconnection is described below.

The proposed interconnection would include the construction of a new BPA substation located within the wind development's project area, which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This proposed interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. On September 10, 2010, BPA was contacted by The Confederated Tribes and Bands of the Yakama Reservation in which the Tribe expressed that the APE should include the proposed wind development (which encompassed some culturally-sensitive areas) in addition to the proposed interconnection. BPA met with representatives of the Tribe on May 2nd, 2011, to discuss the Tribe's request for an expanded APE. BPA discussed with the Tribe that BPA has no jurisdiction over siting of wind development facilities, a matter left to Washington EFSEC, and that BPA's APE is limited to the proposed interconnection.

After reviewing the findings of the cultural survey report, BPA finds that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this interconnection, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and the appropriate Tribes will be notified of any future findings.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosure:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington.

STATE OF WASHINGTON

DEPARTMENT OF ARCHAEOLOGY & HISTORIC PRESERVATION

1063 S. Capitol Way, Suite 106 • Olympia, Washington 98501
Mailing address: PO Box 48343 • Olympia, Washington 98504-8343
(360) 586-3065 • Fax Number (360) 586-3067 • Website: www.dahp.wa.gov

June 16, 2011

Mr. Andrew M. Montano
Environment, Fish & Wildlife
Bonneville Power Administration
PO Box 3621
Portland, Oregon 97208-3621

Re: Whistling Ridge Energy Substation Project
Log No.: 080910-26-BPA

Dear Mr. Montano;

Thank you for contacting our department. We have reviewed the professional archaeological survey report you provided for the proposed Whistling Ridge Energy Substation Project, Skamania County, Washington.

We concur with your determination of No Historic Properties Affected.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 586-3080
email: rob.whitlam@dahp.wa.gov

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

dAVe Burlingame, Director
Cowlitz Indian Tribe
PO Box 2547
Longview, WA 98632

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5440

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Burlingame:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Columbia River Inter-Tribal Fish Commission (CRITFC) pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnections poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings. If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

McCoy Oatman, Chairman
Cultural Resources Director
Columbia River Inter-Tribal Fish Commission
729 NE Oregon St., Ste 200
Portland, OR 97232

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5457

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Oatman:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings.
If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Carey Miller, THPO
Cultural Resources Protection Program
Confederated Tribes of the Umatilla Indian Reservation
46411 Timine Way
Pendleton, OR 97801

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5464

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington
Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Ms. Miller:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Warm Springs Reservation of Oregon, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings.
If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Robert Brunoe, THPO
Confederated Tribes of the Warm Springs Reservation of Oregon
P.O. Box C
Warm Springs, OR 97761

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5471

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Brunoe:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes and Bands of the Yakama Reservation, The Nez Perce Tribe of Idaho, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings.
If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño , June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Keith "Patrick" Baird, THPO
Nez Perce Tribe of Idaho
P.O. Box 305
Lapwai, ID 83540

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5488

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Mr. Baird:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Umatilla Indian Reservation, The Confederated Tribes and Bands of the Yakama Reservation, The Confederated Tribes of the Warm Springs Reservation of Oregon, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The APE is described below.

The proposed Project would include the construction of a new BPA substation located within the project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line (an interconnection). The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. After reviewing the findings of the cultural survey report, the undertaking, and the APE, BPA feels that the nature and the location of this proposed interconnection poses a very minimal potential to cause effects to historic properties. Therefore, it is the opinion of the BPA Archaeologist that the undertaking should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this project, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings.
If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosures:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington. (CD and Hard Copy)

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 2, 2011

In reply refer to: KEC-4

Ms. V. Kate Valdez, THPO
Confederated Tribes and Bands of the Yakama Reservation
P.O. Box 151
Toppenish, WA 98948

Certified Mail
Return Receipt Requested
7011-0470-0002-8720-5495

RE: Proposed Whistling Ridge Energy Project, Skamania County, Washington Northwestern Lake Quad, T3N, R10E, Sections 7 and 18

Dear Ms. Valdez:

Bonneville Power Administration (BPA) is proposing to interconnect the Whistling Ridge Energy Project in Skamania County, WA. This proposed interconnection would connect up to 70 MW from the proposed wind facility consisting of up to approximately 50, 1.2- to 2.5-MW wind turbines. Pursuant to its responsibilities under Section 106 of the National Historic Preservation Act and 36 CFR 800, BPA has determined that the proposed action is a federal undertaking that has the potential to cause effects on historic properties and seeks to initiate consultation with your Tribe. BPA also initiated consultation with the Washington State Department of Archeology and Historic Preservation, as well as The Columbia River Inter-Tribal Fish Commission (CRITFC), The Confederated Tribes of the Umatilla Indian Reservation, The Nez Perce Tribe of Idaho, The Confederated Tribes of the Warm Springs Reservation of Oregon, and The Cowlitz Indian Tribe pursuant to 36 CFR 800.4(a)(4).

The Area of Potential Effects for the proposed interconnection will be limited to the following locations: T3N, R10E, Section 7 and Section 18 (Northwestern Lake Quadrangle). The proposed interconnection is described below.

The proposed interconnection would include the construction of a new BPA substation located within the wind development's project area which would assist in the transfer of the power generated from the project onto BPA's North Bonneville-Midway 230-kV transmission line. The BPA substation would cover an area of approximately 430 feet by 430 feet or approximately 4.25 acres. This area would be fenced, graded and graveled. Inside the fence, there will be a control house, six 230-kV disconnect switches, three 230-kV power circuit breakers, steel structures and towers, insulators and bus work associated with substations. There will be a graveled access road to the site as well as access roads running underneath the additional transmission line structures that will be built. This development of 4.25 acres would be sufficient for future installation of equipment if required for future development.

This proposed interconnection would be made through a loop-in of BPA's North Bonneville-Midway 230-kV transmission line to the proposed BPA substation. The loop-in would require several steel lattice and wood pole structures (some of the wood pole structures may be guyed) to be placed adjacent to both the North Bonneville-Midway 230-kV and Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV transmission lines. The Underwood Tap to Bonneville Powerhouse 1-North Camas 115-kV line adjacent to North Bonneville-Midway 230-kV transmission line would require a new steel lattice structure to raise the conductors such that the 230-kV line can cross underneath for this interconnection.

A cultural survey was performed at this location on November 9-11th, 2009, and the survey report is being included with this letter. By letter dated May 27th, 2010, the Tribe submitted its Yakama Nation Cultural Resource Review and Consultation for the Whistling Ridge Energy Project. This report identified culturally-sensitive areas within the wind development's project area. By letter dated September 10, 2010, the Tribe expressed that the APE should include the proposed wind development (which encompassed the culturally-sensitive areas) in addition to the proposed interconnection. BPA met with representatives of the Tribe on May 2nd, 2011, to discuss the Tribe's request for an expanded APE. BPA discussed with the Tribe that BPA has no jurisdiction over siting of wind development's facilities, a matter left to Washington EFSEC, and that BPA's APE is limited to the proposed interconnection. BPA and the Tribe also discussed the Tribe's concerns about the culturally-sensitive areas in the wind development project area. We discussed BPA's lack of jurisdiction of siting authority in relation to placement of turbine strings. BPA agreed that it would disclose the Tribal concerns about these culturally-sensitive areas in our Final EIS, but BPA is unable to address these concerns as a matter of Section 106 consultation under the NHPA.

BPA recognizes that there are culturally-sensitive areas within the wind development's project area. However, for purposes of the proposed interconnection APE, based on all of the survey results, it is the opinion of the BPA Archaeologist that the proposed interconnection should result in ***no historic properties affected***. In the unlikely event that archaeological materials are encountered during the implementation of this proposed interconnection, an archaeologist will immediately be notified and work halted in the vicinity of the finds until they can be inspected and assessed. Additionally, if any findings did occur, your office and any other interested parties will be notified of any future findings.

If you have any questions or concerns, please do not hesitate to contact me at (503) 230-4145 or by email at *ammontano@bpa.gov*. The BPA Archeologist, Nicole Brannan, can also be contacted at (503) 230-7579 or at *nfbrannan@bpa.gov*.

Sincerely,

/s/ Andrew M. Montaño, June 2, 2011
Andrew M. Montaño
Environmental Protection Specialist

Enclosure:
Cultural Resources Inventory Report for the Whistling Ridge Energy Project, Skamania County, Washington.

Appendix E-3

BPA Section 7(a) Consultation Letters

Department of Energy

Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Official File

ENVIRONMENT, FISH AND WILDLIFE

June 8, 2010

In reply refer to: KEC-4

Mr. James Michaels
U.S. Fish and Wildlife Service
Washington Fish and Wildlife Office
510 Desmond Drive SE
Lacey, WA 98503

Dear Mr. Michaels:

Bonneville Power Administration (BPA) is proposing to interconnect up to 70 megawatts (MW) of new wind energy from the proposed Whistling Ridge Energy Project onto the North Bonneville-Midway 230-kilovolt transmission line. This interconnection request was made by the SDS Lumber Company in Bingen, Washington, and interconnection would take place approximately five miles west of BPA's Underwood Substation in Skamania County, Washington. Subsequently, SDS Lumber Company created a new limited liability company called Whistling Ridge Energy LLC (WRE), which submitted an application with the State of Washington's Energy Facility Site Evaluation Council (EFSEC) for site certification on this wind facility project. WRE would finance, develop, own and operate the proposed wind project. The proposed wind facility would consist of up to approximately 50, 1.2- to 2.5-MW wind turbines up to 426 feet tall, as well as infrastructure such as newly-constructed and improved roads, transformers, underground collector lines, a substation, and an operations and maintenance facility.

The proposed Whistling Ridge Energy Project would be located on private land located approximately 7 miles northwest of the City of White Salmon in Skamania County, Washington (*See* Figure 1). The Project would be located on commercial forestland in an unincorporated area of Skamania County, outside of the Columbia Gorge National Scenic Area. The Project Area encompasses approximately 1,152 acres in Sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in Section 13 of Township 3 North, Range 9 East.

To inform its decision on whether to allow the proposed interconnection, BPA is preparing a joint Environmental Impact Statement with the EFSEC as required under the National Environmental Policy Act (NEPA) of 1969, as amended. A species list for Skamania County, Washington, was obtained from the U.S. Fish and Wildlife Service (USFWS) web site (*http://www.fws.gov/wafwo/speciesmap/SKAMAN.html*) on December 30, 2009. Northern spotted owl (*Strix occidentalis caurina*) is listed as threatened, and designated critical habitat exists for this species within Skamania County. None of these species have been known to occur in the vicinity of the project site and there have been extensive surveys conducted as part of the project permitting (See *Whistling Ridge Energy Project Draft Environmental Impact Statement May 2010, Chapter 3, http://www.bpa.gov/go/whistling*). BPA is seeking to initiate informal consultation under Section 7 of the Endangered Species Act (ESA) of 1973, as amended, to analyze the effects of both its actions and those of the developer on Northern spotted owl and their critical habitat because of the historic presence of Northern spotted owl core areas. Based upon collected information, BPA has determined that the proposed actions ***may affect but are not likely to adversely affect Northern spotted owl*** (*Strix occidentalis caurina)* or its critical habitat designated under the ESA. This letter provides documentation for this determination.

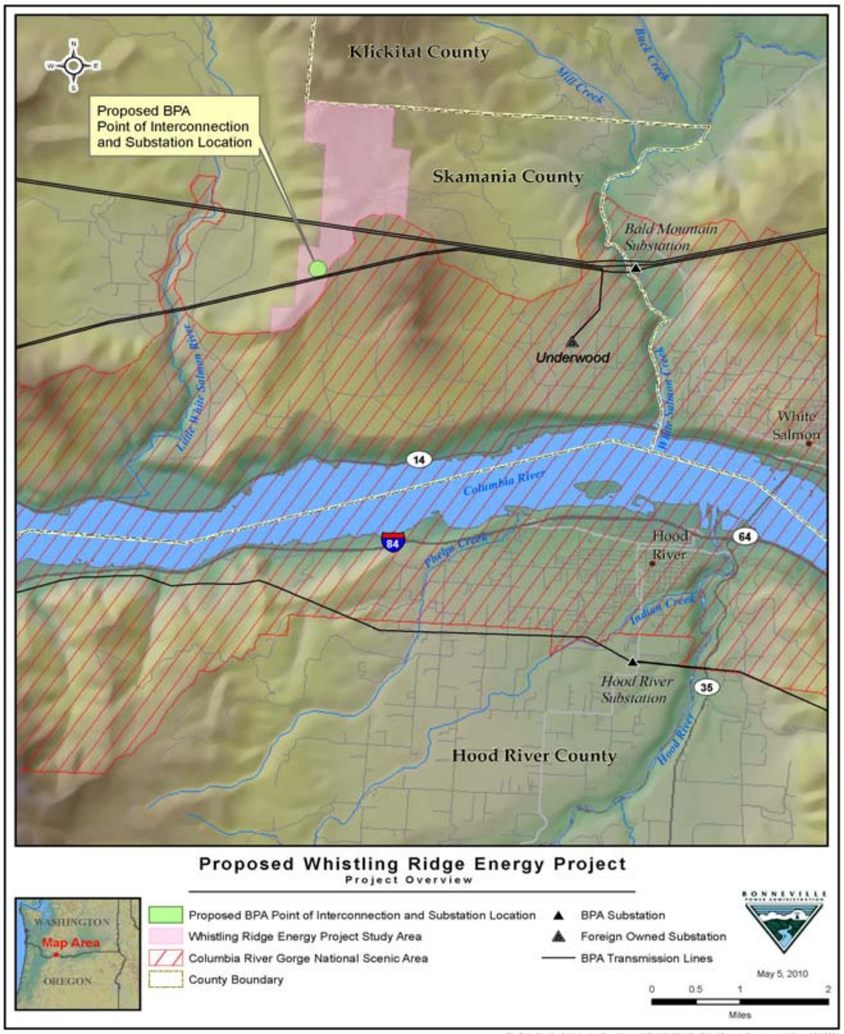


Figure 1. Whistling Ridge Energy Project Location.

EFFECTS DETERMINATION

Level of use of the Project Area by Northern spotted owl

Historically, Northern spotted owl activity cores were located on public lands (managed by Washington Department of Natural Resources (WDNR) and the U.S. Forest Service) to the north of the Project Area as seen in Figure 2. These owl cores were designated as the Mill Creek (MSNO#: 0991) and Moss Creek (MSNO#: 1003) cores and were located in Township 4 North and Range 10 East Section 28 and Township 4 North and Range 9 East Section 35, respectively. During both 2008 and 2009, surveys were conducted to these historically-used areas and no spotted owl observations or responses were recorded.

Surveys for the presence of Northern spotted owls were conducted during 2008-2009 within the Project Area. A total of 80 calling stations were established and surveyed during 2008 and no Northern spotted owl responses or observations were noted. Seven supplemental stations were added in 2009 adjacent to areas that were determined to have potential habitat. No observations or detections of Northern spotted owls at any of the 87 established calling stations were noted during 2009.

Northern spotted owl surveys were spread strategically throughout the nesting season in an attempt to see or hear spotted owls. The survey effort covered potentially suitable Northern spotted owl habitat within the approximately 22,123 acres of survey area. There were no Northern spotted owl observations or responses during any of the survey visits.

Additionally, surveys were conducted during the 2003-2004 survey periods. The project site was surveyed from March-July 2003 using the one-year survey methodology, and from March-August 2004 using the two-year survey methodology. USFWS protocol allows a six-visit survey followed by three-visit survey over two years to rule out northern spotted owls for the following two years (USFWS, 1992). No northern spotted owls were detected during the 2003-2004 surveys.

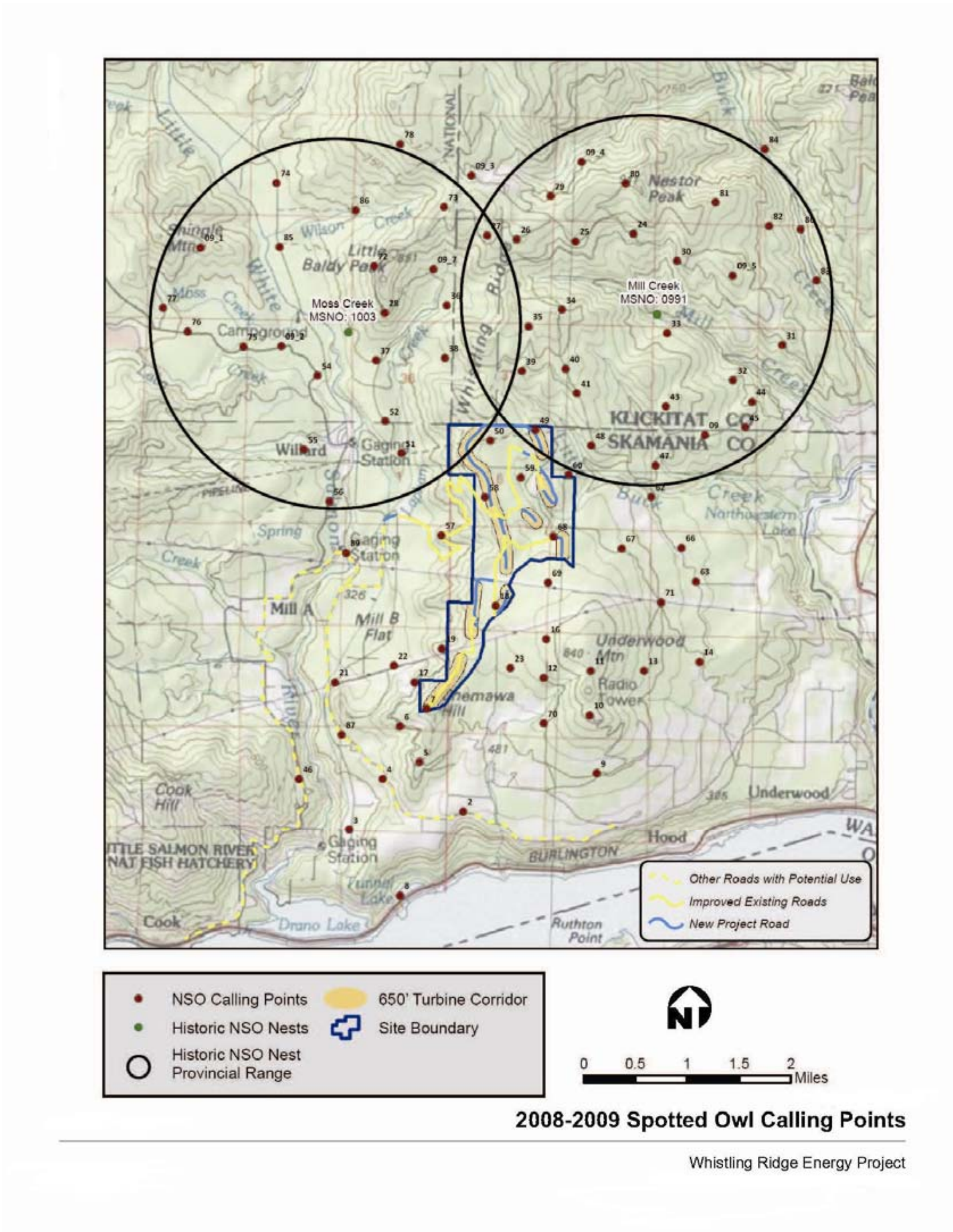


Figure 2. Locations of survey calling stations for Northern spotted owls during 2008-2009.

Effect of the Project on Northern spotted owl's primary food stocks, prey species, and foraging areas in all areas influenced by the Project

Reduction of suitable habitat poses a significant threat to the Northern spotted owl (habitat in which primary food stocks, foraging, and predation would occur). For the purposes of this Project, potentially suitable spotted owl habitat was determined to be coniferous stands with average tree DBH (diameter at breast height) greater than 12 inches and canopy closure of 60% or greater. These standards for suitable spotted owl habitat were based on the availability of forest stand classification GIS data obtained from SDS Lumber Company. The types of habitats required by spotted owls are typically not present over large areas on managed commercial forest lands. Areas that have been recently cut or areas of young conifer plantations that did not meet the minimum average DBH or canopy closure parameters were excluded from the 2008-2009 survey efforts mentioned above. The resulting designated survey areas did contain varying types of habitat that could potentially be used by spotted owls. With respect to the historical owl cores, data collected by the WDNR and by personnel from the National Council for Air and Stream Improvement (NACASI) indicated that no Northern spotted owl were detected in the Mill Creek core since the 2000 breeding season. Consequently, the Moss Creek core has not had a Northern spotted owl detected since the 2002 breeding season

During the 2008 and 2009 survey seasons, contract biologists recorded all owl species encountered and the sightings of or responses by potential Northern spotted owl predators. This included barred owls, great horned owls, northern goshawks and other raptor species. As stated above, no Northern spotted owl observations or responses were recorded. However, both of the historic Northern spotted owl cores showed an increased presence of barred owls. Based on the best available scientific information, competition from the barred owl (*Strix varia*) also poses a significant and complex threat to the Northern spotted owl.

Impacts from Project activities and implementation that may result in disturbance to Northern spotted owl and/or their avoidance of the Project Area

Whistling Ridge Energy LLC has sited its proposed project to avoid habitat areas deemed critical to the Northern spotted owl or essential to its recovery. Surveys conducted pursuant to the USFWS protocol indicate that spotted owls are not present in or near the project, and that nearby historical sites are no longer occupied pursuant to USFWS Protocol and state law. Because there are no Northern spotted owls or activity centers present in the project area, no project construction or operation impacts are expected. Finally, the project would not impact the White Salmon spotted owl special emphasis area's 40 percent suitable habitat level and therefore is not restricted by Washington's forest practice regulations. Given the extensive record and review, this project does not pose a risk of taking Northern spotted owls under Endangered Species Act Section 9.

Based on this information, BPA has determined that the proposed actions may affect, but is not likely to adversely affect the Northern spotted owl or its designated critical habitat. BPA is requesting your review on the information contained in this letter and your concurrence with our findings. Please contact me at (503) 230-4145, or e-mail ammontano@bpa.gov , if you have any questions or require additional information.

Sincerely,

/s/ Andrew M. Montaño, June 8, 2010
Andrew M. Montaño
Environmental Protection Specialist – KEC-4

Enclosure:
2009 Final Report – Results of Northern spotted owl, western grey squirrel and Northern goshawk surveys conducted for the Whistling Ridge Energy Project

Reference:
USFWS, 1992. Recovery plan for the Northern spotted owl. United States Fish and Wildlife Service.

cc: (w/o enclosure):
Jason Spadaro - SDS Lumber
SDS Lumber Company Business Office
P.O. Box 266
Bingen, WA 98605

Barbara Craig - Stoel and Rives
900 SW Fifth Avenue, Suite 2600
Portland, OR 97204

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
Lacey, Washington 98503

In Reply Refer To:
13410-2010-I-0447

JUL 19 2010

Mr. Andrew Montano
Bonneville Power Administration
P.O. Box 3621
Portland, Oregon 97208-3621

Subject: Whistling Ridge Energy Project (Your Reference: KEC-4)

Dear Mr. Montano:

This letter responds to your request for consultation under section 7(a)(2) of the Endangered Species Act of 1973, (ESA) as amended (16 U.S.C. 1531 *et seq.*) on the proposed Whistling Ridge Energy Project LLC (Project). Your biological assessment (BA), dated June 8, 2010, was received by the U.S. Fish and Wildlife Service's (Service) Washington Fish and Wildlife Office on June 9, 2010. You requested concurrence with your determination that the Project "may affect, but is not likely to adversely affect" the threatened northern spotted owl (*Strix occidentalis caurina)* (spotted owl). No designated spotted owl critical habitat occurs on or near the Project; therefore, no critical habitat will be affected.

This letter is based on information provided in the BA, the 2009 Final Report "*Results of Northern Owl, Western Gray Squirrel and Northern Goshawk Surveys Conducted for the Whistling Ridge Wind Energy Project*", the Draft Environmental Impact Statement, a field trip to the Project attended by staff of the Service and the Washington Department of Fish and Wildlife on May 14, 2009, and a meeting between Service and Washington Department of Fish and Wildlife staff on August 28, 2009.

Project Location

The proposed Project is located on private land, approximately 7 miles northwest of the city of White Salmon in Skamania County, Washington. The Project encompasses approximately 1,152 acres of land in sections 5, 6, 7, 8, and 18 of Township 3 North, Range 10 East, and in section 13 of Township 3 North, Range 9 East, Willamette Meridian.

Summary of the Proposed Action

The Bonneville Power Administration (BPA) is proposing to interconnect up to 70 megawatts (MW) of new wind energy from the proposed Project to the North Bonneville-Midway 230-kilovolt transmission line. The interconnect would occur at a new sub-station to be built about 5 miles west of BPA's Underwood Substation in Skamania County. The interconnect was requested by the Project proponent, SDS Lumber Company, in Bingen, Washington. The SDS Lumber Company has created a new limited liability company called Whistling Ridge Energy LLC (WRE) that would finance, develop, and operate the Project. The Project is expected to operate for at least 30 years. The proposed Project would consist of no more than 50, 1.2 MW- to 2.5- MW wind turbines up to 426 feet tall, as well as infrastructure such as newly constructed and improved roads, transformers, underground energy-collector lines, a substation, and an operations and maintenance facility. The Project area consists of 1,152 acres of mostly commercial forests in various age categories, of which 384 acres would be disturbed by the Project, and all but 61 acres would remain in commercial forest. Most of the property where the turbine strings are planned has been recently clear-cut harvested and will be further disturbed with the development of the turbine pads.

Status of Spotted Owls in the Project Area

Two spotted owl territories are located on Washington State Department of Natural Resources (DNR) and National Forest lands located north of and adjacent to the Project. The site center for the Mill Creek owl (MSNO#0991) is located in Township 4 North, Range 10 East, Section 28 and the site center for the Moss Creek owl (MSNO#1003) is located in Township 4 North, Range 9 East, Section 35. Both of these owl territories are within Washington State's White Salmon Spotted Owl Special Emphasis Area, which provides added protection for spotted owls located on private lands through the Washington State Forest Practices Rules. Both of the 70 acre core areas are located on DNR lands and are provided additional protection from their Habitat Conservation Plan for the State Trust Lands.

The estimated median annual home range size for the spotted owl in this physiographic province is approximately 6,657 acres, which for regulatory purposes is assumed to lie within a 1.8-mile radius circle. Best available science indicates that when the amount of suitable spotted owl habitat within a circle falls below 40 percent, there is a likelihood of "take" under section 9 of the ESA. Each of these territories contains more than 40 percent suitable spotted owl habitat (J. Spadaro pers. com. 2009). A small portion of the Moss Creek circle overlaps the northern end of the Project and contains dispersal habitat and some foraging habitat. However, removal of this small amount of habitat (2 acres) would not reduce the habitat acreage below 40 percent in either territory.

Protocol spotted owl surveys were conducted within these estimated home ranges during the 2003, 2004, 2008, and 2009 breeding seasons. Numerous barred owls *(Strix varia)* were detected, but no spotted owls were detected; however, because of the presence of barred owls with these territories, it is possible that spotted owls were present but did not vocalize. The 2009 surveys followed the Service's revised 2010 protocol to better elicit spotted owl responses in the presence of barred owls (USFWS 2010) (the consultant contacted the U.S. Fish and Wildlife

Service on May 29, 2009, how to call for spotted owls in light of the numerous barred owl detections north of the Project and was provided the changes to the 1992 surveying protocol prior to the release of the 2010 revised protocol on February 18, 2010). However, in 2010 surveys were continued in the Project area. On May 6, 2010, a single male spotted owl was detected while conducting a night visit in the far north edge of the Mill Creek provincial range on DNR property. On May 7th, the biologist conducted a follow-up visit during the daytime. The bird exhibited non-nesting behaviors. On May 29, the biologist conducted a second visit and located what appeared to be the same male owl that was detected on May 7th. The bird on both survey visits took and consumed mice, indicating that it is a single male not supporting young. Spotted owl survey protocol requires 3 sightings of a spotted owl single within the same area within the breeding season to be regarded as a territorial single. This does not change the analyses of effects of the Project to spotted owls, as addressed below, regardless of whether or not a territorial status is established.

Effects from Construction

Approximately 2 acres of spotted owl dispersal habitat (with some patches of foraging habitat) would be removed from the Moss Creek spotted owl site by the construction of the Project from the northern end of the turbine string. This habitat is located at the southern extremity of the circle and is on the edge of the Project that has already been clear-cut by SDS Lumber Company, and would not remove suitable spotted owl habitat below 40 percent in the territory (J. Spadaro pers. com. 2009). The discovery of the new owl in 2010 in the extreme north of the Moss Creek owl circle is located more than 2 miles northwest of the northern most turbine. Because of this, and since the remainder of the Project does not contain suitable spotted owl habitat, we believe that potential effects to spotted owls as a result of habitat loss or degradation is expected to be insignificant.

Effects from Maintenance

The effects of the operation and maintenance of the Project are anticipated to be minor. Maintenance of the Project would occur primarily around the turbine pads, inside the nacelle (the nacelle is the part of the turbine that houses the generator, transmission gears, and the shaft that turns the generator that, on its opposite end, bolts to the hub that the blades attach to) and the blades. In addition, because the landscape will be maintained as young second-growth forest we do not expect disturbance to nesting owls from maintenance because owls are not likely to nest in these younger forest stands (non-habitat).

Risk of Spotted Owl Collision with Wind Turbines

Bird mortality from collisions with wind turbines is well documented and varies greatly by bird species and flight behavior (Smallwood et al. 2009). Spotted owls are forest-dwelling birds that are strongly associated with older conifer forests. Spotted owls primarily use closed-canopy forested habitats throughout their entire lives for nesting, roosting, foraging, and dispersal (Forsman et al. 1984). Because spotted owls are non-migratory, forest-dwelling owls, they are at much lower risk of exposure to wind turbines than many other bird species, which typically use non-forested upland habitats for foraging and migration.

Spotted owls less commonly use recent clear-cuts or burned areas for foraging, but spotted owls do occasionally cross such areas while dispersing between patches of older forest (Forsman et al. 1984; 2002). Although spotted owls do occasionally disperse across open areas, they usually avoid crossing such areas by travelling through corridors of forested habitat (Forsman et al. 1984). The typical flight behavior of the spotted owls is described in the *Birds of North America*:

> "Quick wingbeats interspersed with gliding flight. Not a fast flier. Long flights unusual except during dispersal…Flight labored when attempting to fly to a higher perch or up to nest sites. When gaining altitude in the forest canopy, makes a series of short climbing flights rather than continuous flight. Flights above the forest canopy probably rare except during dispersal. (Gutierrez et al 1995, p. 9)."

During natal dispersal, spotted owls will occasionally cross open areas and, as noted above, may occasionally fly above the level of the forest canopy. Considering spotted owl flight behavior, above-canopy flights are most likely to occur in steep-walled valley settings, where the spotted owl may choose to fly across a valley above the level of the forest canopy on the valley floor. The Whistling Ridge site is located on a forested ridge top that will be maintained as a cleared area for the wind turbines. Spotted owls dispersing across the ridge are more likely to disperse through forested areas along the perimeter of the site, rather than crossing the open areas near the turbines. If a spotted owl were to fly through the turbine array, it would most likely cross at an altitude that is at or below the level of the adjacent forest canopy, and well below the height of the lower of the wind turbine blades (164 – 425 ft. above ground level).

To assess the risk of owl collision with the turbine blades or towers, we convened a review panel of three spotted owl biologists from this office and one spotted owl biologist from the Washington Department of Fish and Wildlife. Based on our knowledge of spotted owl flight behaviors and habitat preferences, the group concluded that the risk of spotted owl collisions with turbines at this site is low.

Considering the strong association of spotted owls with the forest canopy, and spotted owl flight behaviors, we conclude that it is unlikely that spotted owls would cross the Whistling Ridge site at an altitude that would put the owls at risk of collision with turbine blades. Therefore, the risk of a spotted owl collision at this site is considered to be discountable.

Concurrence

Considering the current status of spotted owls in the Project area, and the anticipated Project effects, we concur that the Project is not likely to adversely affect the spotted owl.

This concludes informal consultation pursuant to the regulations implementing the ESA (50 CFR 402.13). This action should be re-analyzed if new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not considered in this consultation; if the action is subsequently modified in a manner that causes an effect to a listed species or designated critical habitat that was not considered in this consultation; and/or, if a new species or critical habitat is designated that may be affected by this Project.

Other Comments

While reading through the DEIS for this Project, we found some issues that require your attention. On Page 4-4, first paragraph, last sentence "As described in Section 3.4 Biological Resources, no listed species or critical habitat are anticipated to be affected by the Project. This statement equates to a finding of no effect. To the contrary, the biological assessment prepared by BPA made a finding of "may affect, not likely to adversely affect"; hence, the need for this informal consultation.

On page 4-5, 4.5 Migratory Bird Treaty Act, both the interpretation of this Act and the effects of the Project to avian species are in error. Both avian studies and the analyses in Section 3.4 Biological Resources state that many avian species occur within the Project and that some of those individuals will be killed (collisions with blades or tower) and contrary to the statements provided in the Biological effects Section. Within this context, how is it concluded at 4.5, that impacts to migratory birds could only occur through temporary disturbance during construction?

On page 4-5, 4.7 Bald Eagle Protection Act, the last statement "Because the Project would not involve intentional acts or acts in wanton disregard of bald or golden eagles, this Project is not considered to be subject to compliance with the Act.", is an inaccurate statement. Federal Law Enforcement and the U.S Department of Justice decide whether or not an eagle killed by a project is subject to compliance under this Act.

The Service appreciates your efforts to protect listed species and the habitats on which they depend while meeting your mission to provide the public with reliable electricity. If you have any questions regarding this consultation or your responsibilities under the Act, please contact Jim Michaels of this office at (360) 753-7767.

Sincerely,

James L Michaels

fr Ken S. Berg, Manager
Washington Fish and Wildlife Office

LITERATURE CITED

Forsman, E.D., E.C. Meslow, and H.M. Wight. 1984. Distribution and biology of the spotted owl in Oregon. Wildlife Monographs 87:1-64.

Forsman, E.D., R.G. Anthony, J.A. Reid, P.J. Loschl, S.G. Sovern, M. Taylor, B.L. Biswell, A. Ellingson, E.C. Meslow, G.S. Miller, K.A. Swindle, J.A. Thrailkill, F.F. Wagner, and D.E. Seaman. 2002. Natal and breeding dispersal of northern spotted owls. Wildlife Monographs 149:1-35.

Gutierrez, R.J., A.B. Franklin, and W.S. Lahaye. 1995. Spotted owl (Strix occidentalis). In: The birds of North America, No. 179 (A. Poole and F. Gills, eds.). The Academy of Natural Sciences, Philadelphia, and the American Ornithologists' Union, Washington, D.C.

Smallwood, K.S., L. Rugge, and M.L. Morrison. 2009. Influence of behavior on bird mortality in wind energy developments. Journal of Wildlife Management 73(7) 1082-1098.

Spadaro, J. 2009. Personal Communication with Jim Michaels with USFWS at site visit, May 14, 2009.

USFWS (U.S. Fish and Wildlife Service). 2010. Draft 2010 Protocol for Surveying Proposed Management Activities That May Impact Northern Spotted Owls, Version 1.0, February 18, 2010.

Appendix F
Consultant Disclosure Statements

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Chris Watson
Signature

Chris Watson, Principal
Printed Name and Title

GeoDataScape Inc.
Company

4/20/2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Dale W Bennett
Signature

Dale W Bennett Sr Land Use Planner
Printed Name and Title

URS corporation
Company

4/13/2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ____X___ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

____
Signature

Dan B. Meier Licensed Engineering Geologist
Printed Name and Title

URS
Company

April 15, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

A. David Every
Signature

A. David Every, Principal Ecologist
Printed Name and Title

URS Corporation
Company

4-13-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

Eliza Ghitis, Geomorphologist
Printed Name and Title

Entrix, Inc.
Company

April 19, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X__ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Jeremy Pratt
Signature

Jeremy Pratt, Vice President
Printed Name and Title

ENTRIX
Company

4/13/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Jan Aarts
Signature

JAN AARTS Senior Project Scientist
Printed Name and Title

ENTRIX, INC.
Company

4/13/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

R Vaimignaux
Signature

Rachel Tamigniaux, Project Coordinator
Printed Name and Title

Cardno ENTRIX
Company

6/7/2011
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ____X____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

Melissa Klungle_____Senior Staff Scientist
Printed Name and Title

_Cardno/Entrix____________________
Company

_______06/07//11_______________
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X__ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

Deron Lawrence, Ecologist
Printed Name and Title

CH2M HILL
Company

7 June 2011
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X__ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Darcey B. Miller
Signature

Darcey B. Miller, Wetland Scientist
Printed Name and Title

Cardno ENTRIX
Company

6/7/11
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

____
Signature

Bradford L. Boyes, Sr. Air Quality Engineer
Printed Name and Title

Cardno ENTRIX
Company

June 7, 2011
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

____
Signature

Ryan Shatt - Geologist
Printed Name and Title

ENTRIX, Inc.
Company

4/13/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

David Harvey
Signature

David Harvey, Senior Project Scientist
Printed Name and Title

ENTRIX
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE Whistling Ridge Energy Project Draft Environmental Impact Statement DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Sandra J Slayton
Signature

SANDRA J. SLAYTON
Printed Name and Title

ENTRIX
Company

04-13-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Kirk Ranzetta
Signature

Kirk Ranzetta, Architectural Historian
Printed Name and Title

ENTRIX, Inc.
Company

April 12, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) __X__ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

Chelsea Ayala, Senior Project Scientist
Printed Name and Title

ENTRIX Inc.
Company

4-13-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Lucy Flynn Zuccotti
Signature

Lucy Flynn Zuccotti, Proj. Archaeologist
Printed Name and Title

ENTRIX
Company

4-14-2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) _________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Gretchen Lebednik
Signature

Gretchen Lebednik Senior Project Scientist
Printed Name and Title

ENTRIX, Inc.
Company

4/15/2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

____
Signature

Jeff Walker, Biologist
Printed Name and Title

URS
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

JEFF REAMS CEO
Printed Name and Title

TURNSTONE ECI
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Katie Carroz
Signature

Katie Carroz, Socioeconomist
Printed Name and Title

Carroz Consulting LLC
Company

4-12-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Katy Chaney
Signature

Katy Chaney, Vice President
Printed Name and Title

URS Corporation
Company

April 12, 2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

MARK STORM (SENIOR PROJ. ENGR.)
Printed Name and Title

URS CORPORATION
Company

4/14/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Signature

LOUISE KLING
Printed Name and Title

URS CORPORATION
Company

04-12-2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

DAVTIS PEARSON – PLANNER
Printed Name and Title

URS CORPORATION
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Sarah F. McDaniel
____
Signature

_________Sarah McDaniel, Archaeologist___
Printed Name and Title

_________________URS Corporation______
Company

_____________April 13, 2010_____________
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients)*." 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ___X_____ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

____
Signature

________Michael Kelly, Senior Archaeologist___
Printed Name and Title

________________URS Corporation______
Company

____________April 15, 2010____________
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Karen Kronner
Signature

President
Printed Name and Title

Northwest Wildlife Consultants, Inc
Company

4-12-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Robert Gritski
Signature

Robert Gritski
Printed Name and Title

Northwest Wildlife Consultants, Inc
Company

4-14-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ______ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Scott Downes
Signature

Scott Downes - Wildlife Biologist
Printed Name and Title

Northwest Wildlife Consultants, Inc.
Company

04-11-2010
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term “financial interest or other interest in the outcome of the project” for purposes of this disclosure is defined in the March 23, 1981 guidance “Forty Most Asked Questions Concerning CEQ’s National Environmental Policy Act Regulations,” 46 FR 8026-18038 at Question 17a and b.

“*Financial or other interest in the outcome of the project*” includes “*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm’s other clients)*.” 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ____X___ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

____
Signature

Tamara Enz, Biologist
____
Printed Name and Title

WEST, Inc.
____
Company

04/12/10
____
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) ✓ Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

Gregory Johnson Senior Manager
Printed Name and Title

Western Eco Systems Technology, Inc.
Company

4-12-10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

Kimberly J Bay
Signature

Kimberly J. Bay
Printed Name and Title

WEST Inc.
Company

4/12/10
Date

NEPA DISCLOSURE STATEMENT FOR PREPARATION OF THE
Whistling Ridge Energy Project
Draft Environmental Impact Statement
DOE/EIS-0419

CEQ Regulations at 40 CFR 1506.5(c), which have been adopted by the DOE (10 CFR 1021), require contractors who will prepare an EIS to execute a disclosure specifying that they have no financial or other interest in the outcome of the project. The term "financial interest or other interest in the outcome of the project" for purposes of this disclosure is defined in the March 23, 1981 guidance "Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations," 46 FR 8026-18038 at Question 17a and b.

"*Financial or other interest in the outcome of the project*" includes "*any financial benefit such as a promise of future construction or design work in the project, as well as indirect benefits the contractor is aware of (e.g., if the project would aid proposals sponsored by the firm's other clients).*" 46 FR 18026-18038 at 18031.

In accordance with these requirements, the offeror and any proposed subcontractors hereby certify as follows: (check either (a) or (b) to assure consideration of your proposal).

(a) X Offeror and any proposed subcontractor have no financial or other interest in the outcome of the project.

(b) ________ Offeror and any proposed subcontractor have the following financial or other interest in the outcome of the project and hereby agree to divest themselves of such interest prior to award of this contract.

Financial or Other Interests

1.
2.
3.

Certified by:

[signature]
Signature

Jeffery Gruver Research Biologist
Printed Name and Title

Western EcoSystems Technology, Inc.
Company

12 April 2010
Date

BONNEVILLE POWER ADMINISTRATION
DOE/BP-4318 ▪ August 2011