

## **Appendix C**

### **Ecological Restoration**

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## Abbreviations

AIBI	Amphibian Index of Biotic Integrity
CC	coefficient of conservatism
DBH	diameter at breast height
DOE	U.S. Department of Energy
FQAI	Floristic Quality Assessment Index
GEMS	Geospatial Environmental Mapping System
NDA	no determination available
NRRP	Natural Resource Restoration Plan
Ohio EPA	Ohio Environmental Protection Agency
OSDF	On-Site Disposal Facility
VIBI	Vegetation Index of Biotic Integrity
VIBI-FQ	Vegetation Index of Biotic Integrity “Floristic Quality

## Measurement Abbreviations

cm	centimeters
m <sup>2</sup>	square meters

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## C.1.0 Ecological Restoration Monitoring

Ecological restoration monitoring at the Fernald Preserve, Ohio, Site in 2020 included functional monitoring and wetland mitigation monitoring. Wetland, prairie, and forest communities in the southern and eastern portions of the site were evaluated as part of functional monitoring. No implementation monitoring occurred in 2020 because no projects that required extensive revegetation were implemented in 2020. Wetland mitigation monitoring consisted of amphibian surveys and hydrologic monitoring in select wetlands. Figure C-1 shows the location of 2020 ecological monitoring activities.

Ecological restoration monitoring is required as part of the natural resource damage settlement between the U.S. Department of Energy (DOE), the Ohio Environmental Protection Agency (Ohio EPA), and the U.S. Department of Interior. The Fernald Preserve Natural Resource Restoration Plan (NRRP) (State of Ohio 2008) specifies ecological restoration monitoring requirements. The *Fernald Preserve Wetland Mitigation Monitoring Report* (DOE 2012) included provisions to continue evaluation of wetland communities through the functional monitoring program. In addition to the continuation of vegetation and amphibian surveys, water elevations are monitored within select mitigation wetlands.

Vegetation goals were established in the NRRP. These include 50% native species composition and 90% total cover. Additional goals for wetland mitigation monitoring are included in the *Fernald Preserve Wetland Mitigation Monitoring Report* (DOE 2012).

The 2020 ecological monitoring program represents 6 years of monitoring restoration projects on a 3-year rotation, so each project area has been monitored twice under the current approach. This is in addition to previous ecological monitoring on projects that are up to 20 years old. Given this, the Fernald Natural Resource Trustees conducted a long-term evaluation of ecological monitoring as part of a review of the ecological restoration maintenance program. The result of this effort showed that NRRP goals for native species are mostly met, there has been much improvement over baseline conditions, and comparison to reference sites is sometimes met. The Trustees agreed that a shift from project-specific functional monitoring to a community-based approach is more appropriate. A revised approach to functional monitoring and reporting will be implemented in 2021.

## C.2.0 Functional Monitoring

In 2020, functional monitoring was performed in wetland, prairie, and forest communities within the southern and eastern portions of the site (Figure C-1). Prior to 2015, monitoring was conducted on a sitewide community basis, with wetland monitoring completed one year, prairie monitoring the next, and forest monitoring the third year. The current management-area approach is a result of the revised prairie management process that was undertaken in 2015 and ensures that restored areas are maintained on a 3-year rotation.

Functional monitoring areas for 2020 included 13 wetland basins, 8 prairie areas, and 8 forest communities. For each prairie and forested area, 15 random 1 square meter (m<sup>2</sup>) quadrats are typically surveyed for herbaceous vegetation during the growing season (April through September). Surveys are divided into three rounds of five samples to ensure coverage throughout

the growing season. Field activities were very limited in spring 2020 due the site's response to the COVID-19 pandemic. As a result, the first round of forest herbaceous monitoring was not conducted; results for forest herbaceous monitoring are based on 10 quadrats per area instead of 15.

For each quadrat, species richness and cover data were recorded for herbaceous vegetation. Additional 1,000 m<sup>2</sup> plots were used to collect woody data from each of the 8 forest communities. Species abundance and size data using diameter at breast height (DBH) measurements were collected for woody vegetation in forest communities. Wetland communities were surveyed via fixed grids as described in the *Fernald Preserve Wetland Mitigation Monitoring Plan* (DOE 2009). Processes for calculating monitoring parameters for all communities are described in the *Fernald Preserve, Fernald, Ohio, Ecological Monitoring Methods Plan and Procedures* (DOE 2019b). Quadrat and fixed grid locations within each monitoring area are identified in Figure C-1.

Prior to 2015, the Fernald Preserve Site Environmental Reports presented area-specific data summaries. Beginning in 2015, a single species list for each habitat was provided with area-specific information identified in one summary table. This presentation allows a side-by-side comparison of monitoring areas. The monitoring data for 2020 are presented as follows:

- Table C-1, “2020 Wetland Functional Monitoring Area Summary”
- Table C-2, “2020 Prairie Functional Monitoring Area Summary”
- Table C-3, “2020 Forest Herbaceous Functional Monitoring Area Summary”
- Table C-4, “2020 Forest Woody Functional Monitoring Area Summary”

Species richness data are used to calculate the percent native species, average coefficient of conservatism (CC), and Floristic Quality Assessment Index (FQAI) for each restoration area. The latest Ohio FQAI database (Gara 2013) is used to determine nativity status and CC values. Relative frequency of native species is calculated by dividing the number of quadrats in which a species was observed by the total number of quadrats surveyed. Cover class estimates were also obtained to evaluate the extent of vegetation establishment across restored areas.

Results presented in Tables C-1 through C-4 indicate that several plants could not be identified to species. Nativity and CC value designations for these plants are made on a case-by-case basis. For example, there are a wide variety of CC values for native *Carex* species, so these plants would need to be identified to species level for a CC value to be assigned. In comparison, *Vitis* (grape vines) are often identified only to genus. The Ohio FQAI database assigns a CC of 3 for each of the three likely *Vitis* species in southwest Ohio; therefore, for the purposes of FQAI and nativity calculations, *Vitis* species in Table C-3 is considered native and assigned a CC of 3. For those plants that are identified to genus and assumed to be a particular species based on distribution and site knowledge, the species is noted in parentheses in Table C-1 through C-4. This approach is applied conservatively so that there is no possibility of artificially inflating the calculations. If the plant is identified to genus level but there is uncertainty regarding CC values, the plant is not included in the calculations, and NDA (no determination available) is indicated on the table. Unknown species are counted as nonnative but are not included in calculating average CC values.

A component of the functional monitoring process is to evaluate trends over time and compare communities to baseline conditions and reference sites. Table C-5 provides a multiyear FQAI comparison for all areas surveyed in 2020. Comparisons of wetland functional monitoring, prairie functional monitoring, and forest functional monitoring are presented in Tables C-6, C-7, and C-8, respectively. Areas designated from previous Site Environmental Reports for long-term comparisons in 2020 included two areas available for wetlands (Borrow Area and Wetland Mitigation Phase I), one area for prairies (Wetland Mitigation Phase I), and one for forest communities (Southern Waste Units). Tables C-6 through C-8 show the community-specific baseline and reference site comparisons. These tables summarize the species lists from all subareas surveyed within a monitored restoration area (Tables C-1 through C-4) and compare them to baseline and reference sites that were characterized in 2002 (DOE 2002).

As discussed in Section C.1, a revised approach to functional monitoring will be implemented in 2021, shifting from project-specific monitoring to community-based monitoring. Wetland functional monitoring will take place in 2021 and will be reported in the next annual Site Environmental Report.

### **C.2.1 Wetland Functional Monitoring**

In 2013, Ohio EPA published a more streamlined approach for wetland evaluation called the Vegetation Index of Biotic Integrity “Floristic Quality” (VIBI-FQ) (Gara 2013). This index can be used in place of the traditional Vegetation Index of Biotic Integrity (VIBI) to evaluate wetland quality. The revised methodology uses a 0–100 score by combining two separate 0–50 scoring metrics. The traditional VIBI methodology used 10 separate 0–10 scores to develop a 0–100 score. Ohio EPA demonstrated that there was a strong correlation between traditional VIBI and VIBI-FQ scoring (Gara 2013). The VIBI-FQ method has been used at the Fernald Preserve since 2015 to evaluate site wetlands.

Wetland functional monitoring results for basins in the Borrow Area, the former Silos Area, and the Wetland Mitigation Phase I are summarized in Table C-1. All wetland areas met the NRRP goal for native species, with over 50% native species composition observed in all areas. All areas also met nativity goals via relative cover, except for WM1W6. Table C-1 shows high relative cover values from non-native hybrid cattail (*Typha x glauca*), ricefield bulrush (*Schoenoplectus mucronatus*), and giant reed (*Phragmites australis spp australis*). All three of these species increased in relative cover since the wetland was last monitored in 2017. Ricefield bulrush was not previously identified in this basin in 2017 (DOE 2018).

Several interesting species were observed in 2020 wetlands. Queen-of-the-prairie (*Filipendula rubra*) and water parsnip (*Sium suave*) were once again found in WM1W1. These obligate wetland species may have originated from donor soil that was supplied by Ohio EPA during the initial construction of the wetlands and were first detected on site in 2017. Field personnel noted that the water parsnip seemed to have expanded significantly since 2017, with several dozen individual plants observed throughout the basin. This is encouraging as it may indicate improved water levels following the 2017 erosion repair project in the WM1 Wetland Area that was completed to repair crayfish damage to these wetland basins. In the Borrow Area, American lotus (*Nelumbo lutea*) was discovered on site for the first time in BAPW3.

Comparison of FQAI values over time recorded in Table C-5 generally shows stable to improving wetland habitat. Compared to those of 2017, four of five basins in the Borrow Area had improved FQAI scores. Higher average CC values recorded in Table C-1 were calculated in four of five basins as well. These increases suggest that the Borrow Area wetland community is still slowly maturing. This collection of basins may have also been positively impacted by increased water levels caused by beaver activity, which is discussed later in this section. In the Wetland Mitigation Phase I wetlands FQAI scores were mixed but similar to those recorded in 2017. Three basins (WM1W2, WM1W4, WM1W7) showed small increases in FQAI score and four basins (WM1W1, WM1W3, WM1W5, WM1W6) showed small decreases in FQAI from 2017. WM1W6 showed the largest drop in FQAI, which is consistent with the increase in cover for several invasive species in that basin. Average CC was similar or slightly lower in all WM1 basins except WM1W2, which showed a modest increase in average CC. The relatively stable FQAI scores in the Wetland Mitigation Phase I wetlands may suggest these restored wetlands are plateauing in their development. The former Silos Area basin showed decreases in FQAI, as well as in FQAI components species diversity and average CC. Despite this, it still recorded the highest species diversity and FQAI score of all basins surveyed, and its average CC score was the third highest recorded scores in 2020. The declines in FQAI and its components in this basin may be due to an increase in the presence of cut-leaved teasel (*Dipsacus laciniatus*) observed in the basin.

A long-term comparison of wetland data for the Borrow Area and the Wetland Mitigation Phase I Area is shown in Table C-6. From 2017 to 2020, in both areas, there was a slight decrease in the total species and native species, but the percentage of native species increased in the Borrow Area and was similar to past findings in the Wetland Mitigation Phase I Area. Average CC and FQAI was slightly improved. The Borrow Area scored higher than any previous survey in these metrics. These community-wide improvements are encouraging. Beaver activity in this basin has raised surface water levels substantially in some parts of this basin. This may have helped eliminate some upland invasive species while promoting the growth of more emergent wetland species. The Wetland Mitigation Phase 1 wetlands showed slightly lower species diversity while native cover, average CC, and FQAI was similar to the last survey in 2017.

## C.2.2 Prairie Functional Monitoring

Prairie functional monitoring results from 2020 are summarized in Tables C-2, C-5, and C-7. All areas met the goals established in the NRRP. Native species establishment and relative frequency were more than 50% in all prairie areas surveyed in 2020 (Table C-2).

Noted observations from Table C-2 include side-oats grama grass (*Bouteloua curtipendula*), stiff goldenrod (*Solidago rigida*), rattlesnake master (*Eryngium yuccifolium*), water parsnip (*Sium suave*), and cup plant (*Silphium perfoliatum*). The presence of these conservative species are likely a result of past seeding activities rather than natural establishment, and, in the case of water parsnip, may have originated from donor soil that was supplied by Ohio EPA during the initial construction of the nearby WM1 wetlands.

The FQAI comparison in Table C-5 shows that results are variable. Five of the eight prairie monitoring areas showed lower FQAI values than previous surveys in 2017. Drops in FQAI were most prevalent in monitoring subareas with large invasive plant patches, particularly involving

teasel species (*Dispacus sp*). Management of invasive plants continues to be a priority for field personnel in the restored prairies at the Fernald preserve.

Table C-7 provides long-term prairie functional monitoring comparisons for the WM1PR1 subarea in the Wetland Mitigation Phase I Area. Results for 2020 indicate little to no change in these key metrics from 2017. This may be indicative of stability in this prairie community, which is one of the oldest restored areas on site.

### **C.2.3 Forest Functional Monitoring**

Tables C-3 and C-4 provide a summary of 2020 forest herbaceous and woody vegetation functional monitoring findings, respectively. Native species goals for herbaceous and woody vegetation were met in all areas, with both native species richness and relative frequency over 50% (Table C-3). As stated above, one round of forest herbaceous monitoring was not conducted in spring 2020, due to the COVID-19 pandemic. This resulted in only 10 random forest quadrats surveyed during 2020. Missing the first round of forest herbaceous monitoring has probably impacted results, as many species of native spring ephemeral wildflowers were not observed during this period. This group of species tends to have higher CC values compared to other plants encountered throughout the year.

Notable plants observed as a part of the forest herbaceous survey are listed on Table C-3 and include wild ginger (*Asarum canadense*), southern adder's-tongue (*Ophioglossum vulgatum*), and woodland sedge species (*Carex digitalis* and *Carex albicans*). Table C-4 lists the high-quality native woody vegetation that was recorded across all areas monitored in 2020, including blue ash (*Fraxinus quadrangulata*), mockernut hickory (*Carya tomentosa*), shellbark hickory (*Carya laciniosa*), American beech (*Fagus grandifolia*), and butternut (*Juglans cinerea*), among others. These native trees were both planted as part of restoration efforts and naturally established.

A comparison of forest area FQAI scores over time (Table C-5) shows that FQAI scores decreased in five of the eight subareas surveyed in 2020. This is most likely a result of missing the first round of forest herbaceous monitoring, and it is unlikely that many conclusions can be made by comparing these data.

A long-term comparison of forest functional monitoring results for the Southern Waste Units Area is presented in Table C-8. Total species declined in 2020, probably attributed to missing the first round of surveys in response to the COVID-19 pandemic. Percent native species increased, along with average CC and FQAI. Many of the high CC species found in these areas (Table C-3) are more often associated with prairie and wetland communities rather than forest communities. However, the woody vegetation surveys (Table C-4) show increasing total abundance, indicating younger trees and shrubs are starting to grow in these areas and early succession is progressing, albeit slowly.

### **C.3.0 Wetland Mitigation Monitoring**

Pursuant to the *Fernald Preserve Wetland Mitigation Monitoring Report* (DOE 2012), limited wetland mitigation monitoring continued in 2020. Activities included amphibian surveys to

calculate Amphibian Index of Biotic Integrity (AIBI) and hydrologic monitoring using shallow wells (piezometers).

### C.3.1 Amphibian Surveys

Amphibian monitoring was conducted in spring 2020 for selected basins within the mitigation wetlands (Figure C-1). Basins include those monitored pursuant to the *Wetland Mitigation Monitoring Plan* (DOE 2009), as well as the newer basins constructed in the Paddys Run West and Northern Woodlot Enhancement Natural Resource Trustee Project areas. Table C-9 lists the basins monitored and amphibian species observed. Table C-10 compares AIBI scores for each basin since 2011. Due to reductions in site staffing in response to the COVID-19 pandemic, one round of amphibian monitoring was not conducted in 2020; two rounds were completed (very early spring and late spring). Results presented in these tables show that mitigated wetlands established in the northern portions of the site continue to maintain overall quality and function.

The presence of ambystomatid salamanders is a key indicator of mitigation wetland success (Micacchion 2011). The proximity of restored wetlands to existing amphibian breeding ponds can greatly impact where ambystomatid salamanders select for a breeding site (Gara and Micacchion 2010). This has proven true at the Fernald Preserve over several years of amphibian monitoring.

Observations for 2020 in the North Pine Plantation restoration area, located adjacent to an established forest community, indicate a continued significant presence of the ambystomatid salamanders. As in previous years, four species of ambystomatid salamanders were identified in basin NPPW4, including 11 spotted salamanders (*Ambystoma maculatum*) and 9 marbled salamander (*Ambystoma opacum*) larvae. These numbers reflect a slight decrease from the previous year, which is likely the result of missing the mid-spring round of monitoring due to the response to the COVID-19 pandemic.

Streamside salamanders (*Ambystoma barbouri*) were found in the Wetland Mitigation Phase II wetlands in 2020 (Table C-9). This is the first time since 2017 that ambystomatid salamanders have been found in these basins. The Wetland Mitigation Phase II wetlands have been heavily impacted by beaver activity, resulting in rapid habitat change unsuitable for the salamanders over the last 3 years. The presence of streamside salamanders in 2020 indicate that the wetland community may be stabilizing.

Ambystomatid salamanders appear to be established in the Paddys Run West Natural Resource Trustee Project wetlands (Table C-9). In 2020, 12 ambystomatid salamanders were observed in basin PRTW1 indicating continued breeding activity in these relatively young wetlands.

During 2020 amphibian monitoring activities, 72 individual ambystomatid salamander observations were recorded (Table C-9). While lower than recent high counts of 104 and 100 observed in 2018 and 2019, respectively, this likely is due to the response to the COVID-19 pandemic rather than to changes to wetland quality. The presence of ambystomatids in any number indicates that mitigation efforts are providing adequate habitat for sensitive indicator species. Basin NPPW4 scored a near perfect 47 for the AIBI, indicating that mitigation efforts have resulted in a high-functioning wetland.

Observations of the northern cricket frog (*Acris crepitans*) decreased to 2 and were limited to the Northern Woodlot Enhancement Natural Resource Trustee Project wetland in 2020 (Table C-9). The decline of this species has been observed across the Fernald Preserve for several years. Cricket frogs are pioneer species and observations are expected in newly created wetlands, such as the Northern Woodlot Enhancement Natural Resource Trustee Project wetland, but as created wetlands mature, it is expected that populations would decline.

Wetlands in the Paddys Run West Natural Resource Trustee Project wetlands continued to host large numbers of toads (*Anaxyrus sp.*) and frogs (*Lithobates sp.*) as has been frequently observed in newer wetland projects at the Fernald Preserve. Three *Ambystoma* larvae were found in PRWW1 in 2020. This wetland is in close proximity to the Paddys Run Tributary project wetlands and may be an expansion of the population that appears to be establishing itself in PRTW1. The presence of ambystomatid salamanders in Paddys Run West Natural Resource Trustee Project wetlands is encouraging, as creating ambystomatid breeding habitat was a primary goal of this project.

Changes in the amphibian species discussed above are reflected in AIBI scores (Table C-10). The AIBI score for four basins increased and the score for three basins decreased when compared to those of 2019. Decreases are mostly found in the Former Production Area, most likely due to a decrease in Northern Leopard Frogs (*Lithobates pipiens*). As stated above, basin NPPW4 scored a near perfect 47 in 2020. The increase in the basin WM1W7 score is likely a return to historical patterns following poor results in 2019 that may have been due to sampling timing rather than a change in habitat type or quality. Despite missing one round of amphibian monitoring in 2020 in response to the COVID-19 pandemic, the AIBI values generally reinforce the trends that have been observed in recent years: wetlands near established forests are sustaining while wetlands in remediated areas have yet to provide a high-quality amphibian habitat.

During the preparation of this report, an error omitting a Spotted Salamander (*Ambystoma maculatum*) in the 2018 Site Environmental Report (DOE 2019a) was discovered. Correcting this error altered the AIBI score reported in 2018 for the PRTW1 wetland from 10 to 20. The corrected value is shown in Table C-10 of this report. The total ambystomatid count for 2018 was 104 rather than 103 as reported in Appendix C in 2018. The corrected total is included in the discussion above.

### **C.3.2 Hydrologic Monitoring**

Hydrologic monitoring consists of daily water level measurements from three shallow wells (i.e., piezometers) installed in 2012. Figure C-1 shows the locations of piezometers within site wetlands. Figures C-2A through C-2C provide hydrographs for each basin monitored in 2020.

Data are collected from transducers that are positioned inside the piezometers. Transducers collect data at approximately 90 centimeters (cm) below ground surface. Data are uploaded from transducers at the most on a monthly basis, and usually only several times a year. Therefore, if a transducer fails, there is the potential to miss periods of time for data collection. Significant data gaps can be observed on the hydrographs from year to year and are noted in Table C-11.

Table C-11 compares results to the performance standards established in the *Fernald Preserve Wetland Mitigation Monitoring Plan* (DOE 2009). Standards include the percent of time water is present in the root zone, the mean depth of water, and the flashiness index. The standard associated with saturation of the root zone is based on a root zone of 30 cm below ground surface where water is present a minimum of 53% of the time throughout the year. The mean depth to water must be less than 29.4 cm. The flashiness index is a measurement of how fast water elevations rise or fall and is calculated by taking the absolute value of the annual average difference between water elevations on consecutive days. For wetlands to meet the flashiness standard, the flashiness index must be less than 2.

Results were mixed in 2020, but still have not met performance standards (Table C-11). The two piezometers that recorded complete datasets throughout the year showed a pattern similar to that of previous years, with saturated conditions observed through the winter and spring, followed by drier conditions in the summer and fall. These findings are also similar to those at other emergent wetlands in Ohio. The influence of surface water is evident, as spikes in water elevations are usually observed (Mack et al. 2004) following precipitation events in summer months. Due to a transducer failure in area PRTW2 only data for December 2020 was collected, resulting in a very limited dataset for this basin (Figure C-2B). Hydrologic monitoring will continue in this area.

#### **C.4.0 Site and On-Site Disposal Facility Inspections**

The Fernald Preserve *Comprehensive Legacy Management and Institutional Controls Plan* (DOE 2019b) identifies the inspection process for the site and the On-Site Disposal Facility (OSDF). Inspections are conducted quarterly with participation from regulators. Inspections document evidence of unauthorized uses of the site, the effectiveness of institutional controls, and the need for repairs. Regulators were not able to participate in person in most 2020 inspections due to the response to the COVID-19 pandemic. DOE instead worked with Ohio EPA to implement a virtual inspection process, using livestream video to allow for participation in 2020 inspections.

Ecologically restored areas are evaluated for the presence of noxious weeds and erosion, the condition of vegetation, potentially contaminated debris, and signs of damage from nuisance animals. Section 5.0 of this Site Environmental Report provides a narrative summary of inspection results. Inspection reports are generated quarterly and are posted on the DOE Office of Legacy Management website at <https://www.lm.doe.gov/Fernald/reports/>.

Follow-up maintenance activities are conducted to address findings from site and OSDF inspections. For a number of findings, it is determined that no action or continued monitoring is required. A number of 2020 inspection findings remain to be addressed. DOE continues to resolve older findings even as new ones are generated during inspections. Updated information is presented in the quarterly inspection reports.

#### **C.4.1 Site Inspections Findings**

To more easily manage the site inspections, the site was divided into four quadrants: central, south, east, and west. The field walkdowns are conducted by quadrant. The 2020 site inspection findings, resolution detail, and date of resolution are presented by quadrant in Tables C-12



through C-15. The approximate location of each finding for which a location was identified during the inspection is presented in Figures C-3A to C-3D. Similar to recent years, site inspection findings for 2020 consisted mainly of the presence of noxious weeds, invasive vegetation, and damage to deer enclosure fencing. Site signage, fencing, and access points are also inspected quarterly. All inspection findings are included in the quarterly inspection reports.

Debris (e.g., asphalt, tile, and concrete) continues to be identified, primarily in the Former Production Area and former Waste Storage Area located in the central quadrant. The site radiological control technician performs a radiological scan of all debris identified. Table C-16 provides a comparison of debris quantities by year. In 2020, 242 pieces of debris were identified and removed, including one piece of concrete debris from along Paddys Run that had fixed radiological contamination above background levels (Inspection Finding No. 7, Table C-13, Figure C-3B). Debris is discovered through the site inspection process as well as during construction activities, site maintenance, and casual observation. It is often the case that when one piece of debris is observed during an inspection, additional debris is discovered nearby when returning to remove the debris.

Annual site inspection photographs have been taken across the site (Figure C-4) since 2007. The 2018 Site Environmental Report was the first time these photos were included as part of the Site Environmental Report. Prior to that, they were made available through the Geospatial Environmental Mapping System (GEMS), an internet-based interface that allows for public access to monitoring and inspection data. Due to changes in the internal review process for posting to this public interface, annual site photographs have not been posted on GEMS since 2015. The 2020 photo set is provided in this report. The first photograph taken at each location along with photographs from 2020 are provided in Figures C-5A through C-73. Note that the angle and perspective at some locations has shifted slightly over the years. The series of photographs show generally stable conditions across the site.

## **C.4.2 OSDF Inspection Findings**

OSDF inspections consist of a quarterly walkdown around the perimeter of the OSDF and an annual walkdown of the vegetated cap. Erosion rills, animal burrows, noxious weeds, woody vegetation, settlement cracks, and other indications that there may be an issue with the proper functioning of the cap are identified and repaired. Tables C-17 through C-20 provide the 2020 OSDF findings, resolution detail, and date of resolution, and Figure C-3E identifies the approximate location of each listed finding. In 2020, there were no signs that the integrity of the cap had been compromised. As in previous years, findings consisted mainly of woody vegetation, noxious weeds, and animal burrows. Callery pear (*Pyrus calleryana*) and other woody vegetation continue to invade the OSDF cap. Field personnel physically remove or apply herbicide to woody vegetation to keep trees from becoming established on the cap. There appeared to be a greater frequency of woody vegetation on the northern half of the OSDF than the southern half. This is attributed to the prescribed burns and spot herbicide application that took place on the southern half in 2019. The northern half of the OSDF was originally scheduled for a prescribed burn in 2020. Limitations in field activities in response to the COVID-19 pandemic prevented any prescribed burns from taking place. Removal of woody vegetation on the northern half of the OSDF will be a focus in 2021.

## C.5.0 Monitoring and Inspection Activities in 2021

As stated in Section C.1, a revised, community-based monitoring approach will be implemented in 2021. Wetland areas will be evaluated using floristic inventories. Wetland mitigation monitoring in the form of amphibian data collection will continue in 2021. Hydrologic monitoring will continue in the Paddys Run tributary wetlands.

Quarterly site inspections will continue to be used to identify issues that need to be addressed through restored area maintenance. To better access remote areas of the site, the timing of field walkdowns is focused in the winter months. This allows for greater visibility and access in densely vegetated areas. Herbaceous monitoring of the OSDF cap, which is reported through quarterly inspection reports, will continue, as well. Cell caps 4, 5, and 6 will be evaluated in 2021. DOE has proposed a 2-year burn rotation for the OSDF instead of a 3-year rotation and continues discussion with the regulators.

## C.6.0 References

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Table C-2. 2020 Prairie Functional Monitoring Area Summary

Restoration Area	Borrow Area			Former Silos Area	Non-Design Areas		Southern Waste Units	Wetland Mitigation Phase I
	BAPBA1	BAPBA2	BAPPR1	FSAPR1	NDAA14	NDABAW	SWUPR1	WM1PR1
Monitoring Subarea	44	46	31	50	37	30	48	57
Total Species	26	27	17	32	24	23	31	39
Native Species	18	20	14	18	13	7	17	18
Non-Native Species	59%	59%	55%	64%	65%	77%	65%	68%
Native Species (Percent)	66%	58%	59%	58%	59%	86%	58%	63%
Relative Frequency of Native Species (Percent)	1.7	1.4	1.2	2.1	1.5	2.5	1.5	2.0
Average Coefficient of Conservatism, range between 0-10	11.1	9.7	6.5	14.6	9.2	13.8	10.4	14.8
Floristic Quality Assessment Index	98%	98%	98%	96%	98%	94%	96%	96%
Average Cover (Percent)								

Species	Common Name	Type	CC <sup>a</sup>	Relative Frequency								
				BAPBA1	BAPBA2	BAPPR1	FSAPR1	NDAA14	NDABAW	SWUPR1	WM1PR1	
<i>Acer negundo</i>	BOX ELDER	tree	3								1%	
<i>Acer rubrum</i>	RED MAPLE	tree	2	1%								
<i>Achillea millefolium</i>	YARROW	forb	1		1%		3%		1%	1%		
<i>Agrimonia parviflora</i>	SMALL-FLOWERED AGRIMONY	forb	2									1%
<i>Ambrosia artemisiifolia</i>	COMMON RAGWEED	forb	0		1%	1%	1%	3%	1%	1%		
<i>Andropogon gerardii</i>	BIG BLUESTEM	grass	5	8%	3%	5%	3%	8%	11%	6%	3%	
<i>Apocynum cannabinum</i>	INDIAN HEMP	forb	1			5%		1%			1%	
<i>Asclepias incarnata</i>	SWAMP MILKWEED	forb	4									1%
<i>Asclepias syriaca</i>	COMMON MILKWEED	forb	1	2%	1%	4%		1%		1%	2%	
<i>Asimina triloba</i>	PAWPAW	sm tree	6									1%
<i>Aster ericoides</i>	WHITE HEATH ASTER	forb	2		1%							
<i>Aster novae-angliae</i>	NEW ENGLAND ASTER	forb	2	1%	1%			2%			1%	1%
<i>Aster pilosus</i>	AWL ASTER	forb	1			1%			1%	1%		
<i>Aster species</i>	ASTER SPECIES	forb	NDA								1%	
<i>Bidens frondosa</i>	DEVIL'S BEGGAR'S-TICK	forb	2								1%	
<i>Bouteloua curtipendula</i>	SIDE-OATS GRAMA GRASS	grass	8	1%			1%					
<i>Carex annectens</i>	YELLOW FOX SEDGE	sedge	3		1%							
<i>Carex blanda</i>	COMMON WOOD SEDGE	sedge	1								2%	
<i>Carex comosa</i>	BEARDED SEDGE	sedge	2									1%
<i>Carex frankii</i>	FRANK'S SEDGE	sedge	2		2%				1%	1%	3%	
<i>Carex granularis</i>	MEADOW SEDGE	sedge	3		2%							
<i>Carex hystericina</i>	PORCUPINE SEDGE	sedge	5				1%					
<i>Carex lurida</i>	BOTTLEBRUSH SEDGE	sedge	3									1%
<i>Carex normalis</i>	LARGE STRAW SEDGE	sedge	4		1%		1%					1%
<i>Carex shortiana</i>	SHORT'S SEDGE	sedge	2									1%
<i>Carex species</i>	SEDEGE SPECIES	sedge	NDA		3%		4%		4%			2%
<i>Carex sect. Ouales Species</i>	CAREX SPECIES SECTION OUALES	sedge	3					1%		1%	2%	
<i>Carex tribuloides</i>	BLUNT BROOM SEDGE	sedge	4									1%
<i>Carex vulpinoidea</i>	FOX SEDGE	sedge	1	1%	1%		1%	1%	1%			1%
<i>Cephalanthus occidentalis</i>	BUTTONBUSH	shrub	6									1%
<i>Cercis canadensis</i>	REDBUD	sm tree	3				1%					
<i>Cyperus species</i>	UMBRELLA-SEDEGE SPECIES	sedge	NDA		1%			1%				
<i>Desmodium species (Desmodium paniculatum)</i>	TICK-TREFOIL SPECIES	forb	3								1%	
<i>Echinacea purpurea</i>	PURPLE CONEFLOWER	forb	6				1%					
<i>Elymus canadensis</i>	CANADA WILD RYE	grass	6		1%		3%	3%	1%	1%	2%	
<i>Equisetum hyemale</i>	SCOURING-RUSH	fern	2				1%					
<i>Erigeron annuus</i>	DAISY FLEABANE	forb	0	1%	2%				1%			
<i>Erigeron species</i>	FLEABANE SPECIES	forb	NDA				1%	1%		1%		
<i>Erigeron strigosus</i>	ROUGH FLEABANE	forb	1	1%	3%	1%	1%	2%	1%			
<i>Eryngium yuccifolium</i>	RATTLESNAKE-MASTER	forb	7				1%					
<i>Eupatorium altissimum</i>	TALL BONESET	forb	0								1%	
<i>Eupatorium perfoliatum</i>	COMMON BONESET	forb	3				1%					1%
<i>Eupatorium serotinum</i>	LATE-FLOWERING BONESET	forb	2	1%			1%	1%				
<i>Euthamia graminifolia</i>	FLAT-TOPPED GOLDENROD	forb	2	1%						1%		
<i>Fraxinus pennsylvanica</i>	GREEN ASH	tree	3	1%			1%		1%			1%
<i>Galium aparine</i>	CLEAVERS	forb	0			1%	1%	1%		1%		
<i>Geum species</i>	AVENS SPECIES	forb	2				1%					
<i>Gleditsia triacanthos</i>	HONEY LOCUST	tree	4		1%							
<i>Helopsis helianthoides</i>	SMOOTH OXEYE	forb	5	1%								
<i>Juncus dudleyi</i>	DUDLEY'S RUSH	forb	3				1%					
<i>Juncus interior</i>	INLAND RUSH	forb	4				1%	1%				
<i>Juncus tenuis</i>	PATH RUSH	forb	1	2%	3%	4%				7%		2%
<i>Juniperus virginiana</i>	EASTERN RED CEDAR	tree	3									1%
<i>Leersia oryzoides</i>	RICE CUT GRASS	grass	1					1%				
<i>Lycopus americanus</i>	AMERICAN WATER-HOREHOUND	forb	3	2%								3%
<i>Mentha arvensis</i>	FIELD MINT	forb	2									1%
<i>Monarda fistulosa</i>	WILD BERGAMOT	forb	3	1%	1%	4%	2%				5%	
<i>Panicum capillare</i>	WITCH GRASS	grass	1					1%				
<i>Panicum virgatum</i>	SWITCH GRASS	grass	4	9%	9%	2%	7%	6%	1%	6%	4%	
<i>Parthenocissus quinquefolia</i>	VIRGINIA CREEPER	vine	2	3%		4%					2%	2%
<i>Penstemon digitalis</i>	FOXGLOVE BEARD-TONGUE	forb	2					1%	3%			
<i>Platanus occidentalis</i>	SYCAMORE	tree	7								1%	
<i>Prunella vulgaris</i>	SELF-HEAL	forb	0									1%
<i>Prunus serotina</i>	BLACK CHERRY	tree	3									1%
<i>Ratibida pinnata</i>	GRAY-HEADED CONEFLOWER	forb	5	1%	7%		5%	3%	3%	2%		
<i>Rubus allegheniensis</i>	COMMON BLACKBERRY	shrub	1			5%						2%

Table C-2. 2020 Prairie Functional Monitoring Area Summary (continued)

Species	Common Name	Type	CC <sup>a</sup>	Relative Frequency								
				BAPBA1	BAPBA2	BAPPR1	FSAPR1	NDA14	NDABAW	SWUPR1	WM1PR1	
<i>Rudbeckia hirta</i>	BLACK-EYED SUSAN	forb	1	1%	1%		1%				1%	
<i>Salix exigua</i>	SANDBAR WILLOW	shrub	1		1%				1%		1%	
<i>Sanicula species</i>	SNAKEROOT SPECIES	forb	3				1%					
<i>Schizachyrium littorale</i>	COASTAL LITTLE BLUESTEM	grass	10							1%		
<i>Schizachyrium scoparium</i>	LITTLE BLUESTEM	grass	5		2%		2%	3%	1%			2%
<i>Schoenoplectus tabernaemontani</i>	SOFT-STEMMED BULRUSH	sedge	2									1%
<i>Scirpus pendulus</i>	DROOPING BULRUSH	sedge	2		1%			1%				1%
<i>Silphium perfoliatum</i>	CUP-PLANT	forb	6	1%								
<i>Sium suave</i>	WATER-PARSNIP	forb	6									1%
<i>Solidago canadensis</i>	CANADA GOLDENROD	forb	1	14%	8%	16%	8%	6%	13%	12%	9%	
<i>Solidago rigida</i>	STIFF GOLDENROD	forb	8						1%			
<i>Sorghastrum nutans</i>	INDIAN GRASS	grass	5	5%		1%	2%	6%	19%	1%	1%	
<i>Spartina pectinata</i>	PRAIRIE CORD GRASS	grass	5		1%							1%
<i>Symphoricarpos orbiculatus</i>	CORALBERRY	shrub	3								1%	3%
<i>Toxicodendron radicans</i>	POISON-IVY	vine	1	1%						1%	1%	1%
<i>Tradescantia ohimensis</i>	OHIO SPIDERWORT	forb	5	1%		1%			3%			
<i>Ulmus rubra</i>	SLIPPERY ELM	tree	3								1%	
<i>Vernonia gigantea</i>	TALL IRONWEED	forb	2			1%						2%
<i>Verbena species</i>	VERVAIN SPECIES	forb	3				1%					
<i>Viola species</i>	VIOLET SPECIES	forb	NDA	1%								
<i>Vitis species</i>	GRAPEVINE SPECIES	vine	3	2%		4%	1%					1%
<i>Agrostis species</i>	BENT GRASS SPECIES	grass	0	1%	1%		3%	3%	1%			1%
<i>Allium species</i>	GARLIC SPECIES	forb	0			1%						
<i>Alopecurus pratensis</i>	MEADOW FOXTAIL	grass	0			1%						
<i>Brassicaceae species</i>	MUSTARD SPECIES	forb	0					1%				
<i>Bromus japonicus</i>	JAPANESE BROME	grass	0	1%	4%	1%	4%	1%			2%	2%
<i>Cichorium intybus</i>	CHICORY	forb	0				1%					
<i>Cirsium arvense</i>	CANADA THISTLE	forb	0	1%	1%	10%		1%	1%			3%
<i>Coronilla varia</i>	CROWN-VETCH	forb	0		1%							2%
<i>Daucus carota</i>	QUEEN-ANNE'S-LACE	forb	0	1%	2%		1%				1%	
<i>Dianthus armeria</i>	DEPTFORD-PINK	forb	0				1%					
<i>Dipsacus fullonum</i>	WILD TEASEL	forb	0	1%	1%		3%	1%	1%		2%	1%
<i>Dipsacus laciniatus</i>	CUT-LEAVED TEASEL	forb	0	7%	6%	1%	6%	6%			8%	5%
<i>Echinacea pallida</i>	PALE PURPLE CONEFLOWER	forb	0							1%		
<i>Festuca pratensis</i>	MEADOW FESCUE	grass	0	2%	1%	4%	1%	1%				3%
<i>Glechoma hederacea</i>	GROUND IVY	forb	0	1%								
<i>Lespedeza cuneata</i>	CHINESE BUSH-CLOVER	forb	0								2%	
<i>Lolium multiflorum</i>	ITALIAN RYEGRASS	grass	0			4%		2%				
<i>Lolium perenne</i>	PERENNIAL RYEGRASS	grass	0			2%						
<i>Lonicera maackii</i>	AMUR HONEYSUCKLE	shrub	0			2%	1%				2%	1%
<i>Lotus corniculatus</i>	BIRD'S-FOOT TREFOLIUM	forb	0									2%
<i>Medicago lupulina</i>	BLACK MEDICK	forb	0	1%	2%		3%	1%			4%	2%
<i>Mellilotus alba</i>	WHITE SWEET-CLOVER	forb	0		1%						1%	
<i>Mellilotus officinalis</i>	YELLOW SWEET-CLOVER	forb	0		1%		1%				3%	
<i>Phleum pratense</i>	TIMOTHY	grass	0			2%						
<i>Pinus strobus</i>	WHITE PINE	tree	0	1%								
<i>Plantago lanceolata</i>	ENGLISH PLANTAIN	forb	0				1%					
<i>Plantago species</i>	PLANTAIN SPECIES	forb	0	1%						1%	1%	
<i>Poa species</i>	BLUEGRASS SPECIES	grass	0	8%	9%	8%	7%	10%	6%		7%	9%
<i>Polygonum persicaria</i>	LADY'S THUMB	forb	0	1%								
<i>Pyrus calleryana</i>	CALLERY PEAR	sm tree	0								1%	1%
<i>Rosa multiflora</i>	MULTIFLORA ROSE	shrub	0	1%								1%
<i>Rumex species</i>	DOCK SPECIES	forb	0	1%								
<i>Saponaria officinalis</i>	SOAPWORT	forb	0			1%						
<i>Setaria glauca</i>	YELLOW FOXTAIL GRASS	grass	0		1%		1%					
<i>Setaria species</i>	FOXTAIL GRASS	grass	0		1%		1%					
<i>Solanum carolinense</i>	HORSE NETTLE	forb	0	1%							1%	1%
<i>Sorghum halepense</i>	JOHNSON GRASS	grass	0								1%	
<i>Stellaria media</i>	COMMON CHICKWEED	forb	0			1%						
<i>Tarilis arvensis</i>	FIELD HEDGE-PARSLEY	forb	0	2%	4%	1%	3%	5%			3%	2%
<i>Trifolium hybridum</i>	ALSIKE CLOVER	forb	0	1%	4%		3%	7%				
<i>Trifolium pratense</i>	RED CLOVER	forb	0		1%			1%				1%
<i>Typha x glauca</i>	HYBRID CAT-TAIL	forb	0									1%
<i>Unknown Forb</i>	UNKNOWN FORB	forb	0		2%		1%			1%	3%	
<i>Unknown Grass</i>	UNKNOWN GRASS	grass	0		1%							1%
<i>Valeriana species</i>	VALERIAN SPECIES	forb	0								1%	

Highlighted species are non-native

<sup>a</sup>NDA = No determination available; species are not included in the average CC calculation



Table C-3. 2020 Forest Herbaceous Functional Monitoring Area Summary

Community Type	Mature Forest		Pine Plantation	Restored Forest		Successional Forest	Restored Forest	
	PREF01	PREF02	PREPP1	PRERF1	PRERF2	PRESF1	SWURF1	SWURF2
Monitoring Subarea								
Total Species	52	47	35	45	21	45	34	24
Native Species	35	34	21	27	12	31	23	15
Non-Native Species	17	13	14	18	9	14	11	9
Native Species (Percent)	67%	72%	60%	60%	57%	69%	68%	63%
Relative Frequency of Native Species (Percent)	70%	77%	61%	56%	68%	73%	60%	64%
Average Coefficient of Conservatism, range between 0-10	1.8	2.0	1.5	1.5	1.4	2.1	2.4	2.2
Floristic Quality Assessment Index	12.7	13.9	9.0	10.1	6.4	13.9	14.1	10.6
Average Cover (Percent)	78%	70%	67%	80%	95%	81%	96%	96%

Species	Common Name	Type	CC <sup>2</sup>	Relative Frequency								
				PREF01	PREF02	PREPP1	PRERF1	PRERF2	PRESF1	SWURF1	SWURF2	
<i>Acer negundo</i>	BOX ELDER	tree	3	2%		2%	2%			1%		
<i>Acer saccharinum</i>	SILVER MAPLE	tree	3		1%							
<i>Achillea millefolium</i>	YARROW	forb	1									2%
<i>Aesculus glabra</i>	OHIO BUCKEYE	tree	6		1%							
<i>Ambrosia artemisiifolia</i>	COMMON RAGWEED	forb	0		1%		1%	6%		1%	2%	
<i>Andropogon gerardii</i>	BIG BLUESTEM	grass	5		2%		1%				6%	5%
<i>Asarum canadense</i>	WILD GINGER	forb	6	1%						1%		
<i>Asclepias syriaca</i>	COMMON MILKWEED	forb	1				1%					
<i>Asclepias tuberosa</i>	BUTTERFLY-WEED	forb	4								2%	2%
<i>Aster cordifolius</i>	BLUE WOOD ASTER	forb	4	1%								
<i>Aster novae-angliae</i>	NEW ENGLAND ASTER	forb	2								3%	
<i>Aster pilosus</i>	AWL ASTER	forb	1		1%		1%					
<i>Aster species</i>	ASTER SPECIES	forb	NDA					3%				
<i>Boehmeria cylindrica</i>	FALSE NETTLE	forb	4				1%					
<i>Bouteloua curtipendula</i>	SIDE-OATS GRAMA GRASS	grass	8				1%				5%	
<i>Carex albicans var. albicans</i>	OAK SEDGE	sedge	4							1%		
<i>Carex blanda</i>	COMMON WOOD SEDGE	sedge	1		2%		1%					
<i>Carex digitalis</i>	SLENDER WOOD SEDGE	sedge	4		1%							
<i>Carex frankii</i>	FRANK'S SEDGE	sedge	2								3%	
<i>Carex lurida</i>	BOTTLEBRUSH SEDGE	sedge	3								2%	
<i>Carex rosea</i>	ROSE SEDGE	sedge	3		1%		1%					
<i>Carex species</i>	SEDEGE SPECIES	sedge	NDA	3%		3%	1%	2%		1%	2%	2%
<i>Carex stricta</i>	TUSSOCK SEDGE	sedge	5								2%	
<i>Carya cordiformis</i>	BITTERNUT HICKORY	tree	5							3%		
<i>Carya laciniata</i>	SHELLBARK HICKORY	tree	7			1%						
<i>Celtis occidentalis</i>	HACKBERRY	tree	4			1%	2%					
<i>Cercis canadensis</i>	REDBUD	sm tree	3		1%					3%		
<i>Cornus drummondii</i>	ROUGH-LEAVED DOGWOOD	shrub	3		1%							
<i>Cornus species (Cornus Racemosa)</i>	DOGWOOD SPECIES	ND	1			1%						
<i>Cryptotaenia canadensis</i>	HONEWORT	forb	3	2%			1%	4%		1%		
<i>Desmodium species (Desmodium paniculatum)</i>	TICK-TREFOIL SPECIES	forb	3			2%			6%	1%	2%	
<i>Dicanthelium species</i>	ROSETTE PANIC GRASS SPECIES	grass	NDA	1%								
<i>Elymus canadensis</i>	CANADA WILD RYE	grass	6							1%		
<i>Elymus species</i>	WILD RYE SPECIES	grass	3							3%		
<i>Elymus villosus</i>	HAIRY WILD RYE	grass	4			4%						
<i>Elymus virginicus</i>	VIRGINIA WILD RYE	grass	3		1%							
<i>Equisetum hyemale</i>	SCOURING-RUSH	fern	2								2%	
<i>Eriperon species</i>	FLEABANE SPECIES	forb	NDA			1%						
<i>Eriperon strigosus</i>	ROUGH FLEABANE	forb	1								2%	
<i>Eupatorium altissimum</i>	TALL BONESET	forb	0					2%			2%	
<i>Eupatorium rugosum</i>	WHITE SNAKEROOT	forb	3		9%		7%	6%	4%		1%	
<i>Festuca subverticillata</i>	NODDING FESCUE	grass	5							5%		
<i>Fraxinus pennsylvanica</i>	GREEN ASH	tree	3		1%							
<i>Fraxinus species</i>	ASH SPECIES	tree	3		1%							
<i>Galium aparine</i>	CLEAVERS	forb	0		1%							
<i>Geum species</i>	AVENS SPECIES	forb	2		2%		1%	1%				
<i>Impatiens capensis</i>	SPOTTED TOUCH-ME-NOT	forb	2		1%							
<i>Impatiens species</i>	TOUCH-ME-NOT SPECIES	forb	2				4%	4%		1%		
<i>Juglans nigra</i>	BLACK WALNUT	tree	5			1%						
<i>Juncus interior</i>	INLAND RUSH	forb	4								2%	
<i>Juniperus virginiana</i>	EASTERN RED CEDAR	tree	3									4%
<i>Leersia virginica</i>	WHITE GRASS	grass	4			1%	1%	4%		3%		
<i>Liatris spicata</i>	SPIKED BLAZING STAR	forb	7								2%	
<i>Lobelia siphilitica</i>	GREAT BLUE LOBELIA	forb	3		1%							
<i>Maianthemum racemosum</i>	FALSE SOLOMON'S SEAL	forb	4		1%							
<i>Monarda fistulosa</i>	WILD BERGAMOT	forb	3				1%					2%
<i>Ophioglossum vulgatum</i>	SOUTHERN ADDER'S-TONGUE	fern	6				1%			1%		
<i>Oxalis stricta</i>	COMMON YELLOW WOOD-SORREL	forb	0				3%			1%		
<i>Panicum virgatum</i>	SWITCH GRASS	grass	4				1%	9%	1%	1%	6%	5%
<i>Parthenocissus quinquefolia</i>	VIRGINIA CREEPER	vine	2		6%		5%	9%	1%	6%		2%
<i>Phryma leptostachya</i>	LOPSEED	forb	5				1%					
<i>Phytolacca americana</i>	POKEWEED	forb	1					4%	1%			
<i>Pilea pumila</i>	CLEARWEED	forb	2		2%							
<i>Platanus occidentalis</i>	SYCAMORE	tree	7								2%	
<i>Prunus serotina</i>	BLACK CHERRY	tree	3				1%	1%		1%		
<i>Rhus glabra</i>	SMOOTH SUMAC	shrub	2		1%							
<i>Robinia pseudoacacia</i>	BLACK LOCUST	tree	0		1%							
<i>Rubus allegheniensis</i>	COMMON BLACKBERRY	shrub	1				4%	1%				
<i>Rubus occidentalis</i>	BLACK RASPBERRY	shrub	1				1%	1%		3%		
<i>Sanicula species</i>	SNAKEROOT SPECIES	forb	3		9%		2%			6%		
<i>Schizachyrium scoparium</i>	LITTLE BLUESTEM	grass	5								2%	5%
<i>Schoenoplectus tabernaemontani</i>	SOFT-STEMMED BULRUSH	sedge	2								2%	
<i>Scirpus pendulus</i>	DROOPING BULRUSH	sedge	2								2%	
<i>Senecio obovatus</i>	ROUND-LEAVED SQUAW-WEED	forb	4		1%					3%		
<i>Smilax hispida</i>	BRISTLY GREENBRIER	vine	3							4%		
<i>Solidago canadensis</i>	CANADA GOLDENROD	forb	1		2%		5%	6%	5%	9%	3%	6%
<i>Solidago rigida</i>	STIFF GOLDENROD	forb	8								2%	2%
<i>Solidago species</i>	GOLDENROD SPECIES	forb	1		1%		1%	2%		1%		

Table C-3. 2020 Forest Herbaceous Functional Monitoring Area Summary (continued)

Species	Common Name	Type	CC <sup>a</sup>	Relative Frequency							
				PREF01	PREF02	PREP1	PRERF1	PRERF2	PRESF1	SWURF1	SWURF2
<i>Sorghastrum nutans</i>	INDIAN GRASS	grass	5		2%		2%	3%		5%	14%
<i>Teucrium canadense</i>	AMERICAN GERMANDER	forb	3						1%		
<i>Toxicodendron radicans</i>	POISON-IVY	vine	1	2%	4%	5%	2%	12%	1%		2%
<i>Tradescantia ohioensis</i>	OHIO SPIDERWORT	forb	5								4%
<i>Ulmus rubra</i>	SLIPPERY ELM	tree	3	1%	4%	1%	1%				
<i>Verbesina alternifolia</i>	WINGSTEM	forb	5	1%		2%			3%		
<i>Vernonia gigantea</i>	TALL IRONWEED	forb	2	2%	1%			6%			
<i>Viola species</i>	VIOLET SPECIES	forb	NDA	4%	4%	2%	2%		1%		
<i>Vitis species</i>	GRAPEVINE SPECIES	vine	3	3%	4%	2%	1%		6%		4%
<i>Agrostis species</i>	BENT GRASS SPECIES	grass	0					3%	1%	2%	2%
<i>Alliaria petiolata</i>	GARLIC MUSTARD	forb	0	2%	2%	6%	1%		1%		
<i>Bromus japonicus</i>	JAPANESE BROME	grass	0		1%	1%	1%	3%	3%	2%	2%
<i>Daucus carota</i>	QUEEN-ANNE'S-LACE	forb	0				1%	3%	1%	3%	
<i>Dipsacus laciniatus</i>	CUT-LEAVED TEASEL	forb	0	1%	1%	1%	2%		1%	10%	7%
<i>Echinacea pallida</i>	PALE PURPLE CONEFLOWER	forb	0							2%	
<i>Euonymus fortunei</i>	WINTERCREEPER	vine	0	1%		1%					
<i>Festuca pratensis</i>	MEADOW FESCUE	grass	0	2%		1%	1%	3%			4%
<i>Fragaria vesca var. vesca</i>	EUR. WOODLAND STRAWBERRY	forb	0	1%		1%	2%				
<i>Galium species</i>	BEDSTRAW SPECIES	forb	0	1%							
<i>Glechoma hederacea</i>	GROUND IVY	forb	0	3%	1%	4%	4%	3%	3%		
<i>Lepidium campestre</i>	FIELD PEPPER-GRASS	forb	0				1%				
<i>Lonicera japonica</i>	JAPANESE HONEYSUCKLE	vine	0		1%	1%			1%		
<i>Lonicera maackii</i>	AMUR HONEYSUCKLE	shrub	0	4%	7%	9%	5%		4%		7%
<i>Lysimachia nummularia</i>	MONEYWORT	forb	0						1%		
<i>Medicago lupulina</i>	BLACK MEDICK	forb	0				1%		1%	10%	2%
<i>Meibotus alba</i>	WHITE SWEET-CLOVER	forb	0							2%	4%
<i>Meibotus officinalis</i>	YELLOW SWEET-CLOVER	forb	0	1%			1%		1%	2%	7%
<i>Microstegium vimineum</i>	RECLINING EULALIA	grass	0	2%		2%	4%	3%			
<i>Oxalis species</i>	WOOD-SORREL SPECIES	forb	0	1%			2%				
<i>Phalaris arundinacea</i>	REED CANARY GRASS	grass	0			1%					
<i>Phleum pratense</i>	TIMOTHY	grass	0			1%					
<i>Poa species</i>	BLUEGRASS SPECIES	grass	0	2%	2%	4%	4%	9%	4%	6%	
<i>Polygonum persicaria</i>	LADY'S THUMB	forb	0			5%	5%				2%
<i>Polygonum species</i>	SMARTWEED SPECIES	ND	0	4%	1%	2%					
<i>Pyrus calleryana</i>	CALLERY PEAR	sm tree	0								
<i>Rosa multiflora</i>	MULTIFLORA ROSE	shrub	0						3%		
<i>Schoenoplectus mucronatus</i>	RICEFIELD BULRUSH	sedge	0							2%	
<i>Setaria glauca</i>	YELLOW FOXTAIL GRASS	grass	0					3%			
<i>Solanum carolinense</i>	HORSE NETTLE	forb	0		1%						
<i>Sorghum halepense</i>	JOHNSON GRASS	grass	0				1%				
<i>Stellaria media</i>	COMMON CHICKWEED	forb	0	3%	2%		4%		1%		
<i>Taraxacum officinale</i>	COMMON DANDELION	forb	0								
<i>Torilis arvensis</i>	FIELD HEDGE-PARSLEY	forb	0	2%							
<i>Trifolium hybridum</i>	ALSIKE CLOVER	forb	0	1%	1%			3%			
<i>Trifolium species</i>	CLOVER SPECIES	forb	0		1%						
<i>Typha x glauca</i>	HYBRID CAT-TAIL	forb	0							2%	
<i>Unknown Forb</i>	UNKNOWN FORB	forb	0	1%	1%						
<i>Unknown Grass</i>	UNKNOWN GRASS	grass	0			1%					

Highlighted species are non-native

<sup>a</sup>NDA = No determination available; species are not included in the average CC calculation.



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Table C-5. Floristic Quality Assessment Index Comparison

Restoration Project Area	Community Type	Monitoring Subarea	Monitoring Year							
			Three-Year Rotation			Three-Year Rotation			Area Management Approach	
			2009	2010	2011	2012	2013	2014	2017	2020
Borrow Area	Prairie	BAPBA1						13.8	11.1	
		BAPBA2				7.7		11.0	9.7	
		BAPPR1	9.6			6.2		6.7	6.5	
	Wetland	BAPW2	15.9			17.3			17.0	16.5
		BAPW3	12.8			9.8			15.7	16.5
		BAPW4	11.7			12.3			14.3	14.7
		BAPW7	12.4			13.7			14.6	15.9
BAPW9	14.9			14.0			14.5	16.2		
Former Silos Area	Prairie	FSAPR1	11.2			9.1		16.3	14.6	
	Wetland	FSAW1						27.2	23.1	
Non-Design Area	Prairie	NDAA14	8.0			8.4		10.7	9.2	
		NDABAW	10.8			16.2		12.3	13.8	
Paddys Run East	Forest	PREFO1		10.0			14.3	17.2	12.7	
		PREFO2		17.1			9.9	16.6	13.7	
		PREPP1		14.3			6.0	6.5	9.1	
		PRERF1		10.5			8.8	9.5	10.1	
		PRERF2		8.5			6.3	11.9	6.4	
		PRESF1		12.5			17.0	15.9	13.9	
Southern Waste Units	Forest	SWURF1		10.1			11.9	10.5	14.1	
		SWURF2		12.9			12.3	13.0	10.7	
	Prairie	SWUPR1						8.7	10.4	
Wetland Mitigation Phase 1	Prairie	WM1PR1	9.0			6.3		14.8	14.8	
	Wetland	WM1W1	13.6			13.8		18.2	16.6	
		WM1W2	17.6			16.1		17.3	17.9	
		WM1W3	12.1			12.8		17.3	16.6	
		WM1W4	15.3			15.9		15.0	15.6	
		WM1W5	12.6			10.3		15.5	14.0	
		WM1W6	15.5			15.2		14.0	11.9	
		WM1W7	12.2			12.9		15.1	17.1	

Shading indicates the monitoring subarea was not monitored during time period.

Table C-6. Wetland Functional Monitoring Comparison

Parameter	Borrow Area				Wetland Mitigation Phase I					Baseline	Reference
	2009	2012	2017	2020	2003	2009	2012	2017	2020	Open Water	Open Water
<b>Total Species</b>	101	102	112	96	62	141	155	164	154	33	61
<b>Native Species</b>	75	77	82	77	49	99	111	120	114	16	55
<b>Native Species (Percent)</b>	74%	75%	73%	80%	79%	70%	72%	73%	74%	48%	90%
<b>Average Coefficient of Conservatism</b>	2.0	2.1	2.1	2.3	2.2	2.3	2.1	2.1	2.2	1.1	3.5
<b>Floristic Quality Assessment Index</b>	19.9	20.9	21.9	22.2	17.4	28.8	25.5	27.2	27.3	6.4	27.3
<b>Vegetation of Biotic Integrity-Florist Quality</b>	45.4	40.0	31.4	52.6	NA	54.4	48.4	32.3	61.1	NA	NA
<b>Hydrophytic Species (Percent)</b>	50%	57%	52%	54%	64%	50%	50%	52%	44%	24%	51%

<sup>a</sup> NA = not applicable

Table C-7. Prairie Functional Monitoring Comparison

Parameter	Wetland Mitigation Phase 1					Baseline	Reference
	2004	2010	2013	2017	2020	Grazed Pasture	Upland Prairie
<b>Total Species</b>	64	25	35	57	57	38	88
<b>Native Species</b>	31	14	16	40	39	15	81
<b>Native Species (Percent)</b>	48%	56%	46%	70%	68%	39%	92%
<b>Average Coefficient of Conservatism</b>	1.3	1.8	1.1	2.0	2.0	0.4	3.2
<b>Floristic Quality Assessment Index</b>	10.6	9.0	6.3	14.8	14.8	2.6	30.6

Table C-8. Forest Functional Monitoring Comparison<sup>a</sup>

Parameter	Southern Waste Units					Reference
	2005	2011	2014	2017	2020	Upland Forest
<b>Total Species</b>	66	74	65	70	56	62
<b>Native Species</b>	44	55	49	49	41	58
<b>Native Species (Percent)</b>	67%	74%	71%	70%	73%	94%
<b>Average Coefficient of Conservatism</b>	2.2	2.5	2.2	1.9	2.7	3.9
<b>Floristic Quality Assessment Index</b>	17.5	21.4	17.9	15.5	20.1	30.5

<sup>a</sup> A smaller dataset was collected because the first round of forest herbaceous monitoring in 2020 was not conducted due to the site's response to the COVID-19 pandemic.

Table C-9. 2020 Amphibian Monitoring Summary, Species, and Number of Individuals<sup>a</sup>

Basin	Northern Cricket Frog ( <i>Acris crepitans</i> )	Streamside Salamander ( <i>Ambystoma barbouri</i> )	Spotted Salamander ( <i>Ambystoma maculatum</i> )	Marbled Salamander ( <i>Ambystoma opacum</i> )	Salamander Species ( <i>Ambystomid</i> species)	American Toad ( <i>Anaxyrus americanus</i> )	American Bull Frog ( <i>Lithobates catesbeiana</i> )	Green Frog ( <i>Lithobates clamitans</i> )	Northern Leopard Frog ( <i>Lithobates pipiens</i> )	Frog Species ( <i>Lithobates</i> species)	Spring Peeper ( <i>Pseudacris crucifer</i> )
<b>Borrow Area</b>											
BAPW2	0	0	0	0	0	0	0	0	0	0	0
BAPW4	0	0	0	0	0	0	0	0	0	2	10
BAPW7	0	0	0	0	0	0	0	1	0	32	1
<b>Former Production Area</b>											
FPAW2	0	0	0	0	0	0	0	2	2	3	1
FPAW7	0	0	0	0	0	0	0	0	1	7	2
FPAW9	0	0	0	0	0	0	0	0	0	0	3
PREW6	0	0	0	0	0	0	0	0	0	22	0
<b>North Pine Plantation</b>											
NPPW4	0	1	11	9	15	0	0	0	0	0	0
NPPW5	0	0	0	0	0	0	0	0	0	0	1
<b>Northern Woodlot Enhancement Natural Resource Trustee Project</b>											
NWEW1	2	0	0	0	0	2	0	2	1	77	12
<b>Paddys Run West Natural Resource Trustee Project</b>											
PRTW1	0	0	0	0	12	0	0	2	0	100	20
PRWW1	0	0	0	0	3	200	0	0	0	50	16
<b>Wetland Mitigation Phase I</b>											
WM1W1	0	0	0	0	0	0	1	1	0	14	1
WM1W4	0	0	0	0	0	0	0	0	0	1	0
WM1W7	0	19	0	0	0	0	0	0	0	8	3
<b>Wetland Mitigation Phase II</b>											
WM2W1	0	0	0	0	0	30	3	0	0	20	1
WM2W2	0	0	0	0	0	0	0	0	0	9	0
WM2W3	2	0	2	0	0	0	0	0	0	0	13
<b>Totals:</b>	2	22	11	9	30	232	4	8	4	358	71

<sup>a</sup> The second round of amphibian monitoring in 2020 was not conducted in response to the COVID-19 pandemic, resulting in a smaller dataset for the year.



Table C-10. Amphibian Index of Biotic Integrity Comparison

Restoration Area	Basin	Amphibian Index of Biotic Integrity Score									
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Borrow Area	BAPW2	0	0	0	3	0	0	0	0	0	0
	BAPW4	0	0	0	3	0	0	0	0	0	0
	BAWP7	13	0	0	0	0	0	0	0	0	0
Former Production Area	FPAW2	13	0	0	0	0	0	0	0	10	3
	FPAW7	10	30	30	7	3	0	0	0	0	0
	FPAW9	10	24	24	3	3	0	0	0	0	3
	PREW6	13	3	0	0	0	3	3	10	7	0
North Pine Plantation	NPPW4	23	6	6	6	3	16	24	40	50	47
	NPPW5	0	13	13	13	0	0	0	0	3	3
Northern Woodlot Enhancement Natural Resource Trustee Project	NWEW1							0	0	3	3
Paddys Run West Natural Resource Trustee Project	PRTW1				3	27	20	16	20 <sup>a</sup>	3	3
	PRWW1						0	6	0	0	3
Wetland Mitigation Phase I	WM1W1	3	0	0	3	0	0	6	0	0	0
	WM1W4	3	3	3	0	0	0	0	3	0	0
	WM1W7	0	3	3	20	9	10	16	20	3	13
Wetland Mitigation Phase II	WM2W1	3	20	13	16	3	0	16	13	0	0
	WM2W2	6	10	10	10	6	0	7	0	0	0
	WM2W3	12	6	6	10	9	13	28	0	0	3

Shading indicates monitoring not conducted prior to construction of the basin.

<sup>a</sup> Corrected value.

Table C-11. Wetland Mitigation Hydrologic Monitoring Results

Restoration Project Area	Basin	Parameter	Performance Standard	2013	2014	2015	2016	2017	2018	2019	2020
Paddys Run	PRTW1	Water in Root Zone (percent)	>53%	21%	18%	30%	ND <sup>a</sup>	24%	38%	ND <sup>a</sup>	38%
		Mean Depth of Water (cm)	<29.4	68.9	68.7	58.5	ND <sup>a</sup>	61.8	47.6	ND <sup>a</sup>	59.5
		Flashiness Index	<2	0.07	0.08	0.06	ND <sup>a</sup>	0.04	0.03	ND <sup>a</sup>	0.02
	PRTW2	Water in Root Zone (percent)	>53%	40%	37%	48%	25%	50%	12%	37%	ND <sup>a</sup>
		Mean Depth of Water (cm)	<29.4	52.6	55.0	47.5	63.6	45.1	67.7	56.8	ND <sup>a</sup>
		Flashiness Index	<2	0.06	0.08	0.06	0.05	0.03	0.04	0.04	ND <sup>a</sup>
	PRTW3	Water in Root Zone (percent)	>53%	39%	ND <sup>b</sup>	46%	39%	46%	38%	37%	44%
		Mean Depth of Water (cm)	<29.4	55.1	ND <sup>b</sup>	44.1	46.5	47.0	47.0	63.2	57.4
		Flashiness Index	<2	0.05	ND <sup>b</sup>	0.05	0.06	0.05	0.05	0.02	0.02

Shading indicates the performance standard has been met.

<sup>a</sup> ND = not determined, partial data collected due to transducer failure.

<sup>b</sup> ND = not determined, no data collected due to transducer failure.

Table C-12. Central Quadrant Site Inspection Findings, January 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved
1	Concrete	Free released <sup>b</sup> and disposed	2/6/2020
2	Brick	Free released <sup>b</sup> and disposed	2/6/2020
3	Metal post	Removed	1/16/2020
4	Teasel	To be addressed	TBD
5	Broken fence rail	Fence repaired	2/5/2020
6	Concrete	Free released <sup>b</sup> and disposed	2/6/2020
7	Tile	Free released <sup>b</sup> and disposed	2/6/2020
8	Tile, plastic, asphalt	Free released <sup>b</sup> and disposed	2/6/2020
9	Asphalt	No action required	2/5/2020
10	Concrete	Free released <sup>b</sup> and disposed	2/6/2020
11	Wire cable	Free released <sup>b</sup> and disposed	2/6/2020
12	Concrete	Free released <sup>b</sup> and disposed	2/6/2020
13	Construction fabric exposed	Gravel added	2/5/2020
14	Tree cages	Tree cages removed	4/15/2021
15	Asphalt	Free released <sup>b</sup> and disposed	2/6/2020
16	Thistle	To be addressed	TBD
17	Erosion	To be addressed	TBD
18	Teasel	Herbicide applied	5/19/2021
19	Teasel	Herbicide applied	4/26/2021
20	Phragmites	To be addressed	TBD
21	Teasel	To be addressed	TBD
22	Concrete	No action required	2/5/2020
23	Asphalt	Free released <sup>b</sup> and disposed	2/5/2020
24	Plastic	Removed and disposed	2/5/2020
25	Plastic	Removed and disposed	2/5/2020
26	Asphalt	Free released <sup>b</sup> and disposed	2/6/2020
27	Metal	Free released <sup>b</sup> and disposed	2/6/2020
28	Asphalt	Free released <sup>b</sup> and disposed	2/6/2020

<sup>a</sup> TBD = to be determined.

<sup>b</sup> Per 10 CFR 835, "Occupational Radiation Protection."

Table C-13. South Quadrant Site Inspection Findings, March 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Pear tree	Herbicide applied	12/17/2020
2	Pear tree	Herbicide applied	12/17/2020
3	Plastic	Free released <sup>b</sup> and disposed	3/11/2020
4	Concrete, tile	Free released <sup>b</sup> and disposed	3/11/2020
5	Pear tree	Herbicide applied	12/28/2020
6	Insulation	Free released <sup>b</sup> and disposed	3/11/2020
7	Metal, concrete	Metal free released <sup>b</sup> and disposed; concrete contaminated and disposed with radiologically-contaminated items.	3/11/2020
8	Metal, styrofoam	Free released <sup>b</sup> and disposed	3/11/2020
9	Erosion	To be addressed	TBD
10	Metal post	Removed	12/28/2020
11	Fence detached	Fence repaired	6/25/2020
12	Holes in fence and unused metal posts	Hole repaired	6/25/2020
13	Pear tree, tree protection cage, and metal posts	Removed	6/25/2020
14	Fencing sliding down posts	Fence repaired	6/29/2020
15	Tree protection cages	Herbicide applied	12/30/2020
16	Split in fence	Fence repaired	6/30/2020
17	Fence sliding down posts	Fence repaired	9/1/2020
18	Fence sliding down posts, split in fence	Fence repaired	6/9/2020
19	Pear tree	Herbicide applied	12/17/2020
20	Tree protection cages	Removed	1/6/2021
21	Tree fencing	Removed	1/6/2021
22	Pear tree	Herbicide applied	12/29/2020
23	Metal pipe	Free released <sup>b</sup> and disposed	3/11/2020
24	Plastic pipe and other trash	Free released <sup>b</sup> and disposed	3/11/2020
25	Pear trees	Herbicide applied	12/29/2020
26	Pear trees	Herbicide applied	12/30/2020
27	Concrete, brick	Free released <sup>b</sup> and disposed	3/11/2020
28	Pear trees	Herbicide applied	2/3/2021
29	Metal wire fencing	Unable to locate	1/6/2021
30	Pear tree	Herbicide applied	12/28/2020
31	Pear tree	Herbicide applied	12/28/2020
32	Pear trees	Herbicide applied	12/29/2020
33	Pear tree	Herbicide applied	12/29/2020
34	Pear trees	Herbicide applied	3/12/2020
35	Pear trees	Removed	4/14/2021
36	Pear trees	Removed	4/14/2021
37	No description provided	Free released <sup>b</sup> and disposed	3/11/2020
38	No description provided	Free released <sup>b</sup> and disposed	3/11/2020
39	Pear tree	Herbicide applied	12/28/2020
40	Open fence gate	Gate closed	9/1/2020
41	Brick	Free released <sup>b</sup> and disposed	3/11/2020
42	Pear tree	Herbicide applied	12/17/2020
43	Pear tree	Herbicide applied	12/17/2020
44	Pear trees	Herbicide applied	12/17/2020
45	Pear tree	Herbicide applied	12/17/2020

Table C-13. South Quadrant Site Inspection Findings, March 2020 (continued)

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
46	Pear trees	Herbicide applied	12/17/2020
47	Tree protection cages	Removed	1/6/2021
48	Pear trees	Herbicide applied	12/17/2020
49	Concrete, erosion	Free released <sup>b</sup> and disposed, erosion will continue to be monitored	3/11/2020
50	Pear trees	Herbicide applied	12/28/2020
51	Pear trees	Herbicide applied	12/28/2020
52	Pear trees	Herbicide applied	12/30/2020
53	Pear tree	Herbicide applied	12/30/2020
54	Pear trees	Removed	4/14/2021
55	Pear trees	Herbicide applied	3/12/2020
56	Pear trees	Removed	4/14/2021
57	Pear trees	Removed	12/17/2020
58	Pear tree	Herbicide applied	2/3/2021
59	Pear trees	Herbicide applied	12/22/2020
60	Hole in fence	Repaired	4/20/2021
61	Hole in fence	Repaired	4/20/2021

<sup>a</sup> TBD = to be determined.

<sup>b</sup> Per 10 CFR 835, "Occupational Radiation Protection."

Table C-14. East Quadrant Site Inspection Findings, June 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Teasel	To be addressed	TBD
2	Pear tree	To be addressed	TBD
3	Pear trees	To be addressed	TBD
4	Teasel	To be addressed	TBD
5	Teasel	Herbicide applied	8/4/2020
6	Multiflora rose	To be addressed	TBD
7	Multiflora rose	Herbicide applied	7/2/2020
8	Pear trees, thistle	Herbicide applied	7/15/2020
9	Peat trees, thistle	To be addressed	TBD
10	Thistle	Herbicide applied	6/9/2020
11	Honeysuckle	To be addressed	TBD
12	Thistle	Herbicide applied	6/9/2020
13	Honeysuckle and pear trees	To be addressed	TBD
14	Bird box slid down post	Reattached	1/11/2021
15	Honeysuckle and pear trees	Removed	3/9/2021
16	Teasel, honeysuckle, pear tree, autumn olive	To be addressed	TBD
17	Honeysuckle and pear trees	To be addressed	TBD
18	Teasel	To be addressed	TBD
19	Phragmites	To be addressed	TBD
20	Honeysuckle	To be addressed	TBD
21	Honeysuckle, pear trees, autumn olive and teasel	To be addressed	TBD
22	Honeysuckle, pear trees, autumn olive and teasel	To be addressed	TBD
23	Phragmites	To be addressed	TBD
24	Phragmites, teasel, thistle	Herbicide applied	8/11/2020
25	Pear trees, honeysuckle	To be addressed	TBD

<sup>a</sup> TBD = to be determined.

Table C-15. West Quadrant Site Inspection Findings, December 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Hole in deer fence	To be addressed	TBD
2	Barbed wire, tree cage	Removed	
3	Honeysuckle	To be addressed	TBD
4	Honeysuckle	To be addressed	TBD
5	Scaffolding	Removed	4/15/2021
6	Deer fence pole, metal post, cages	To be addressed	TBD
7	Vehicle tracks	No action required	12/10/2020
8	Piece of deer fencing	Removed	4/21/2021
9	Pear tree	To be addressed	TBD
10	Hole in deer fence	Repaired	4/15/2021
11	Branch down on deer fence	Removed	4/15/2021
12	Pile of fencing and posts	Removed	4/7/2021
13	Hunting stand	Removed	12/8/2020
14	Pile of fencing	Removed	4/7/2021
15	Hunting stand	Removed	12/8/2020
16	Tree down on deer fence	To be addressed	TBD
17	Tree down on deer fence	To be addressed	TBD
18	Hole in deer fence	To be addressed	TBD
19	Deer fence cable broken	To be addressed	TBD
20	Hole in deer fence	To be addressed	TBD
21	Hole in deer fence, tree cages	To be addressed	TBD
22	Cable of deer fence broken, hole in fence	To be addressed	TBD

<sup>a</sup>TBD = to be determined.

Table C-16. Annual Debris Quantities

Year	Free-Release <sup>a,b</sup> Debris Count	Contaminated <sup>a</sup> Debris Count	Percent Contaminated <sup>a</sup>
2007	-	108	-
2008	-	128	-
2009	-	36	-
2010	-	21	-
2011	204	4	2.0%
2012	1,480	12	0.8%
2013	391	8	2.0%
2014	814	8	1.0%
2015	453	13	2.9%
2016	261	9	3.4%
2017	574	3	0.5%
2018	294	3	1.0%
2019	925	0	0.0%
2020	241	1	0.4%

<sup>a</sup> 10 CFR 835, "Occupational Radiation Protection."

<sup>b</sup> DOE began recording free-release debris counts in 2011.

Table C-17. OSDF Inspection Findings Including Post-Prescribed Burn Inspection Findings, March 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Cedar tree	Woody vegetation cut	6/18/2020
2	Cedar tree	Woody vegetation cut	6/18/2020
3	Cedar tree	Herbicide applied	6/18/2020
4	Brick	Free released <sup>b</sup> and disposed	4/13/2021
5	Cedar tree	Woody vegetation cut	6/18/2020
6	Cedar tree	Woody vegetation cut	6/18/2020
7	Cedar tree	Woody vegetation cut	6/18/2020
8	Cedar trees	Woody vegetation cut	6/18/2020

<sup>a</sup> TBD = to be determined.

<sup>b</sup> Per 10 CFR 835, "Occupational Radiation Protection."

Table C-18. OSDF Inspection Findings, June 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Teasel, pear tree, honeysuckle, cedar tree	Herbicide applied, cedar cut	12/3/2020
2	Honeysuckle	Herbicide applied	12/3/2020
3	Cedar, honeysuckle, pear tree	Herbicide applied, cedar cut	12/3/2020
4	Honeysuckle	Herbicide applied	12/7/2020
5	Pear tree	Herbicide applied	12/7/2020
6	Thistle and woody vegetation	Herbicide applied	6/12/2020
7	Thistle	Herbicide applied	12/7/2020
8	Pear trees	Herbicide applied	11/24/2020
9	Pear trees and honeysuckle	Herbicide applied	12/3/2020
10	Woody vegetation	To be addressed	TBD
11	Woody vegetation	To be addressed	TBD
12	Woody vegetation	To be addressed	TBD
13	Woody vegetation	To be addressed	TBD
14	Woody vegetation	To be addressed	TBD
15	Woody vegetation	Herbicide applied	11/24/2020
16	Woody vegetation	Herbicide applied	11/24/2020
17	Woody vegetation, thistle, teasel	Herbicide applied	12/3/2020
18	Teasel	Herbicide applied	7/20/2020

<sup>a</sup> TBD = to be determined.



Table C-19. OSDF Inspection Findings, September 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Honeysuckle	Herbicide applied	11/24/2020
2	Box elder	Herbicide applied	11/24/2020
3	Honeysuckle	Herbicide applied	11/24/2020
4	Pear tree	Herbicide applied	11/24/2020
5	Ragweed	To be addressed	TBD
6	Honeysuckle	Herbicide applied	11/24/2020
7	Box elder	Herbicide applied	11/24/2020
8	Honeysuckle	Herbicide applied	11/24/2020
9	Honeysuckle	Herbicide applied	11/24/2020
10	Honeysuckle	Herbicide applied	11/24/2020
11	Animal burrow	Filled and seeded	3/23/2021
12	Honeysuckle	Herbicide applied	11/24/2020
13	Cottonwood	Herbicide applied	11/24/2020
14	Pear trees	To be addressed	TBD
15	Pear tree	Herbicide applied	11/24/2020
16	Mulberry and thistle	Herbicide applied	12/3/2020
17	Cedar and cottonwood trees	Herbicide applied, cedar cut	11/24/2020
18	Honeysuckle	Herbicide applied	11/24/2020
19	Willow trees	Herbicide applied	11/24/2020
20	Honeysuckle and elm trees	Herbicide applied	11/24/2020
21	Mulberry	Herbicide applied	11/24/2020
22	Thistle and dogwood	Herbicide applied	11/24/2020
23	Mulberry	Herbicide applied	11/24/2020
24	Dogwood, multiflora rose, cedar, mulberry, honeysuckle and ash	Herbicide applied, cedar cut	11/24/2020
25	Cedar and pear	Herbicide applied, cedar cut	12/3/2020
26	Cedar tree	Tree cut	12/3/2020
27	Thistle	To be addressed	TBD
28	Willow tree	To be addressed	TBD
29	Hackberry	Herbicide applied	12/3/2020
30	Hackberry	Herbicide applied	12/3/2020
31	Honeysuckle and hackberry	Herbicide applied	12/3/2020
32	Honeysuckle	Herbicide applied	12/3/2020
33	Thistle	To be addressed	TBD
34	Ash tree	Herbicide applied	12/3/2020
35	Mulberry	Herbicide applied	12/7/2020
36	Honeysuckle and pear trees	Herbicide applied	12/7/2020
37	Dogwood	Herbicide applied	12/7/2020
38	Honeysuckle	Herbicide applied	12/7/2020
39	Woody vegetation	Herbicide applied	12/7/2020
40	Honeysuckle and dogwood	Herbicide applied	12/7/2020
41	Mulberry, thistle, and pear tree	Herbicide applied	12/7/2020

Table 19. OSDF Inspection Findings, September 2020 (continued)

<b>Map Number</b>	<b>Inspection Finding</b>	<b>Finding Resolution or Path Forward</b>	<b>Date Resolved<sup>a</sup></b>
42	Ash, cedar, dogwood, and pear trees	Herbicide applied	12/3/2020
43	Cedar trees	Herbicide applied	12/3/2020
44	Sycamore and cottonwood trees	Herbicide applied	12/3/2020
45	Ash, cottonwood, and dogwood trees	Herbicide applied	12/3/2020
46	Pear and elm trees	Herbicide applied	12/3/2020

<sup>a</sup> TBD = to be determined.

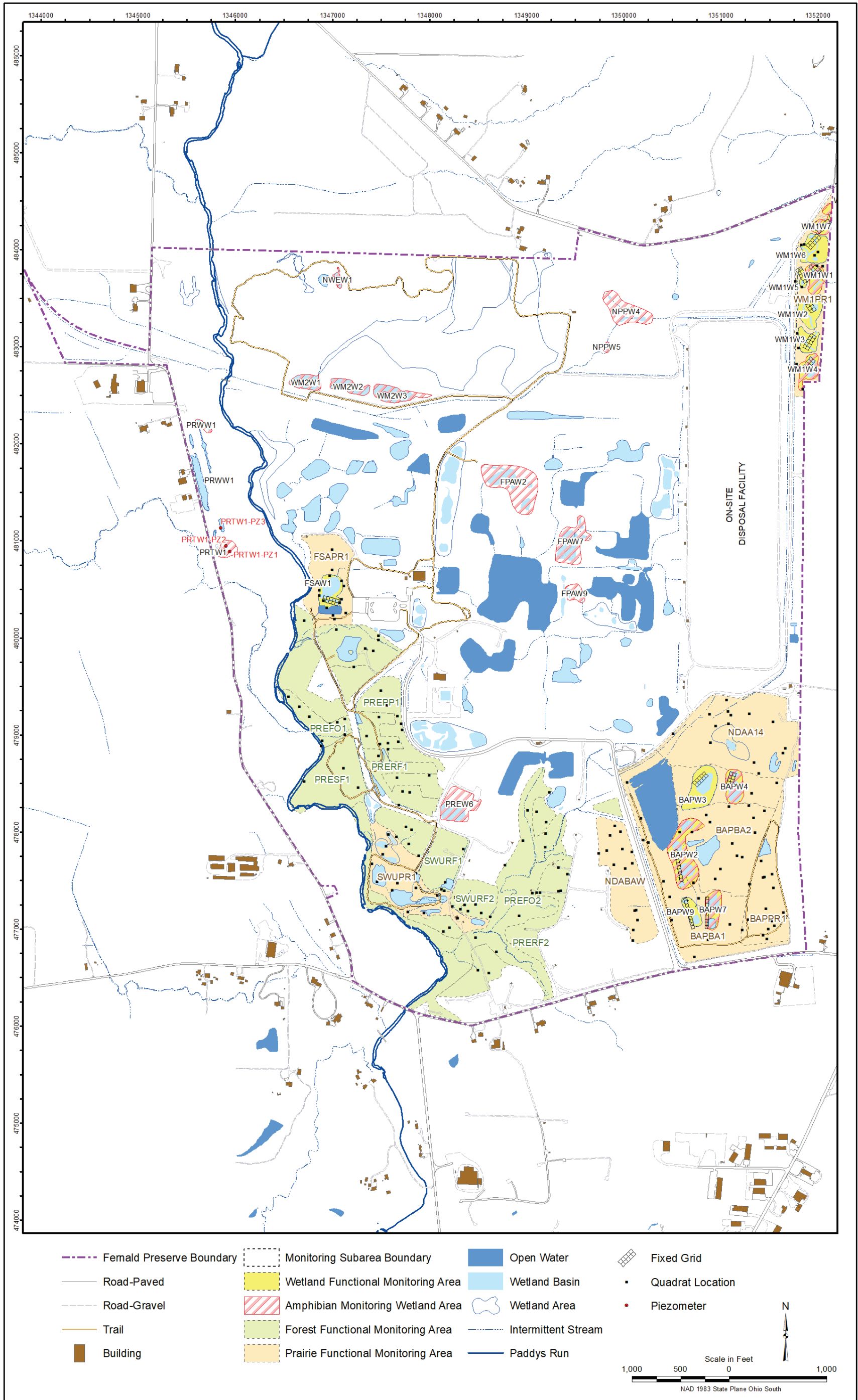
Table C-20. OSDF Inspection Findings, December 2020

Map Number	Inspection Finding	Finding Resolution or Path Forward	Date Resolved <sup>a</sup>
1	Pear tree	To be addressed	TBD
2	Pear tree	To be addressed	TBD
3	Pear tree	To be addressed	TBD
4	Pear trees	Filled and seeded	3/23/2021
5	Animal burrow	Filled and seeded	3/23/2021
6	Animal burrow	Filled and seeded	3/23/2021
7	Animal burrow	To be addressed	TBD
8	Pear trees	To be addressed	TBD
9	Pear trees	To be addressed	TBD
10	Pear trees, honeysuckle	To be addressed	TBD
11	Pear trees	To be addressed	TBD
12	Grapevine	Cut and removed	12/15/2020
13	Cedar tree, beaver activity	Cut and removed	12/15/2020
14	Cedar	Cut and removed	12/15/2020
15	Cedar trees, multi-flora rose	Cut and removed	12/15/2020
16	Dogwood	Cut and removed	12/15/2020
17	Concrete pieces	Free released <sup>b</sup> and disposed	12/15/2020
18	Sign needs reattached	Sign reattached	12/15/2020
19	Cedar	Cut	12/15/2020
20	Pear tree	To be addressed	TBD
21	Pear tree	To be addressed	TBD
22	Pear trees	To be addressed	TBD
23	Pear trees	To be addressed	TBD
24	Woody vegetation	To be addressed	TBD

<sup>a</sup> TBD = to be determined.

<sup>b</sup> Per 10 CFR 835, "Occupational Radiation Protection."

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Figure C-1. 2020 Ecological Monitoring Activities

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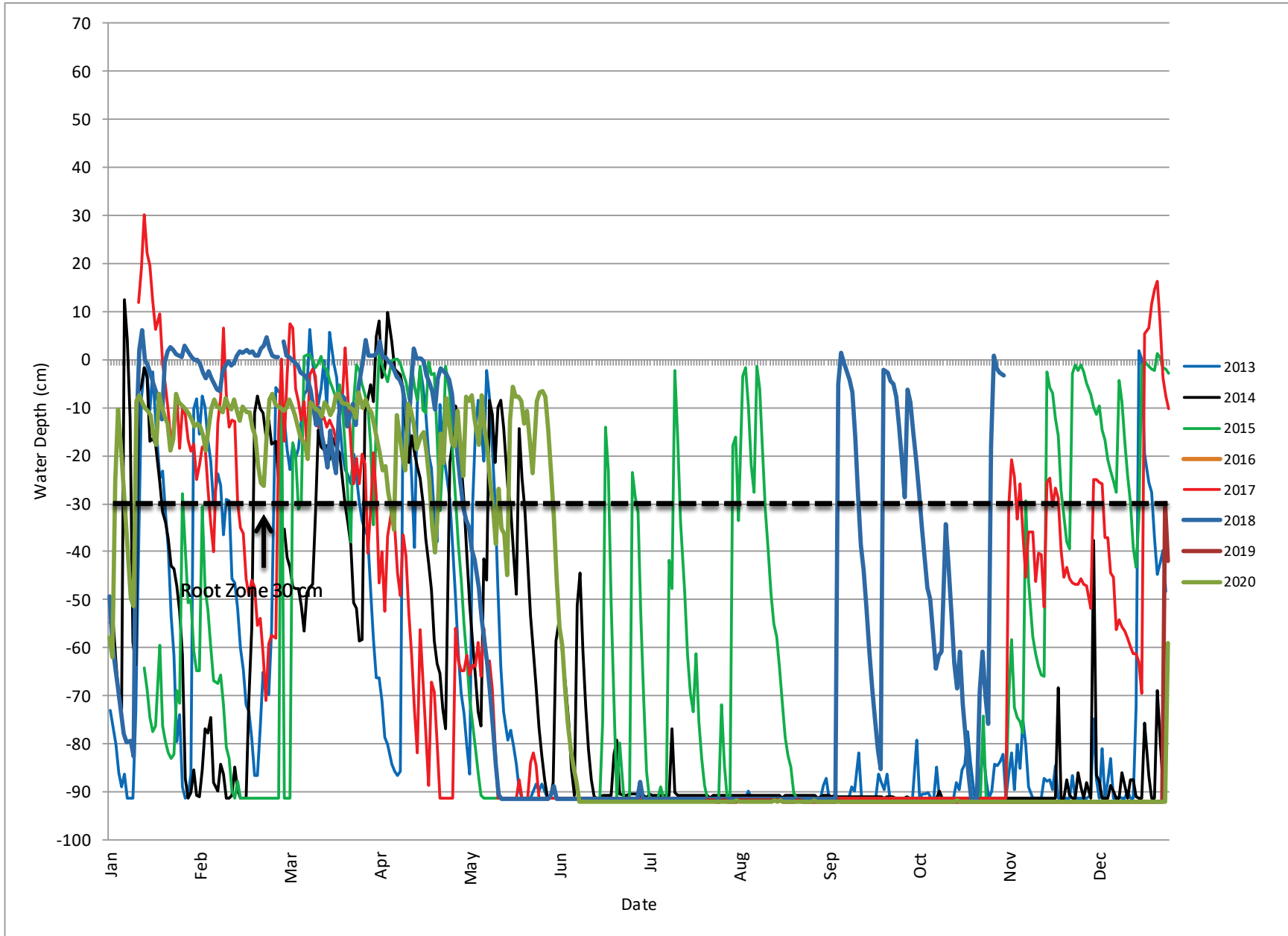


Figure C-2A. Wetland Area PRTW1 Hydrograph

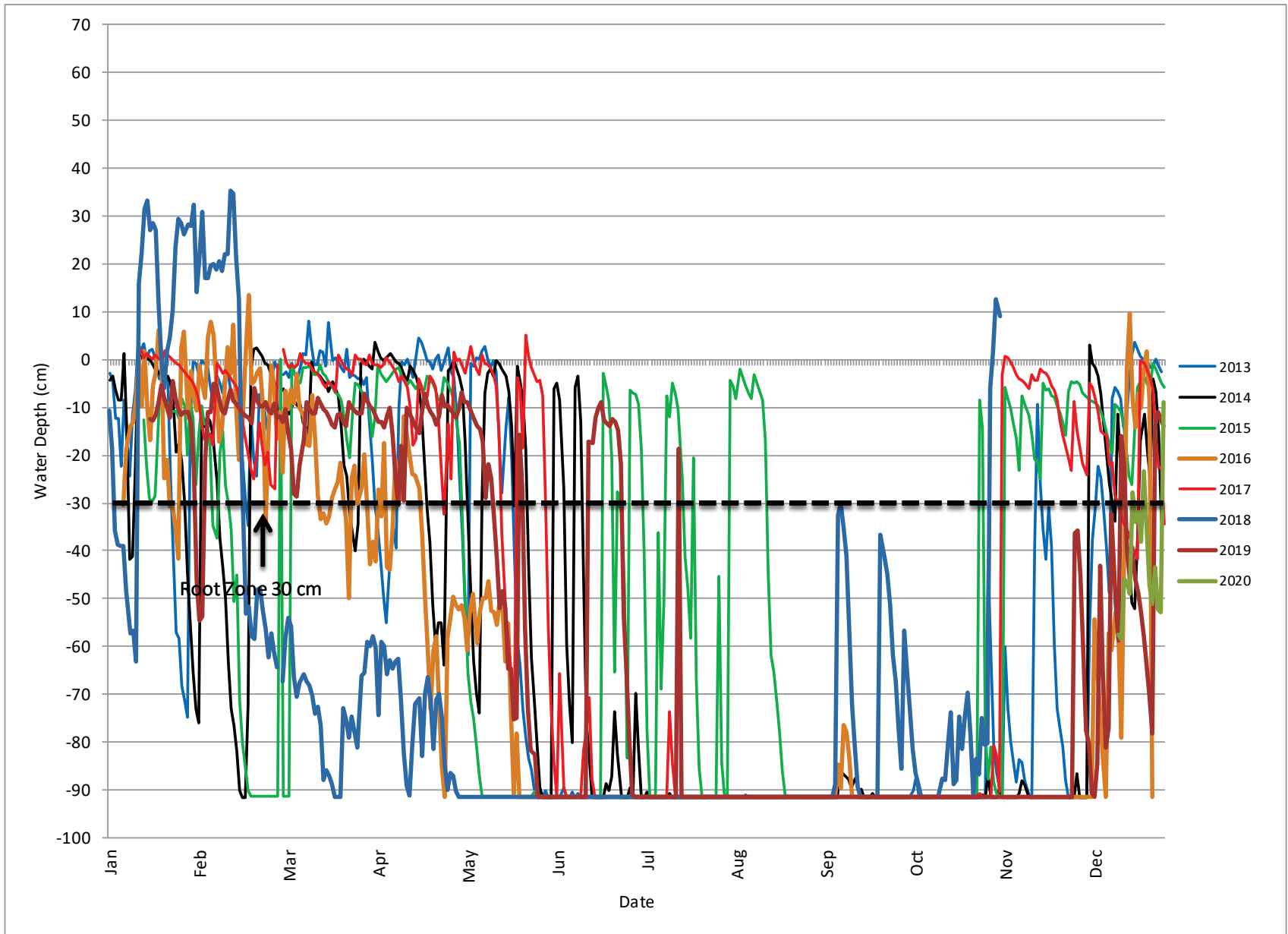


Figure C-2B. Wetland Area PRTW2 Hydrograph



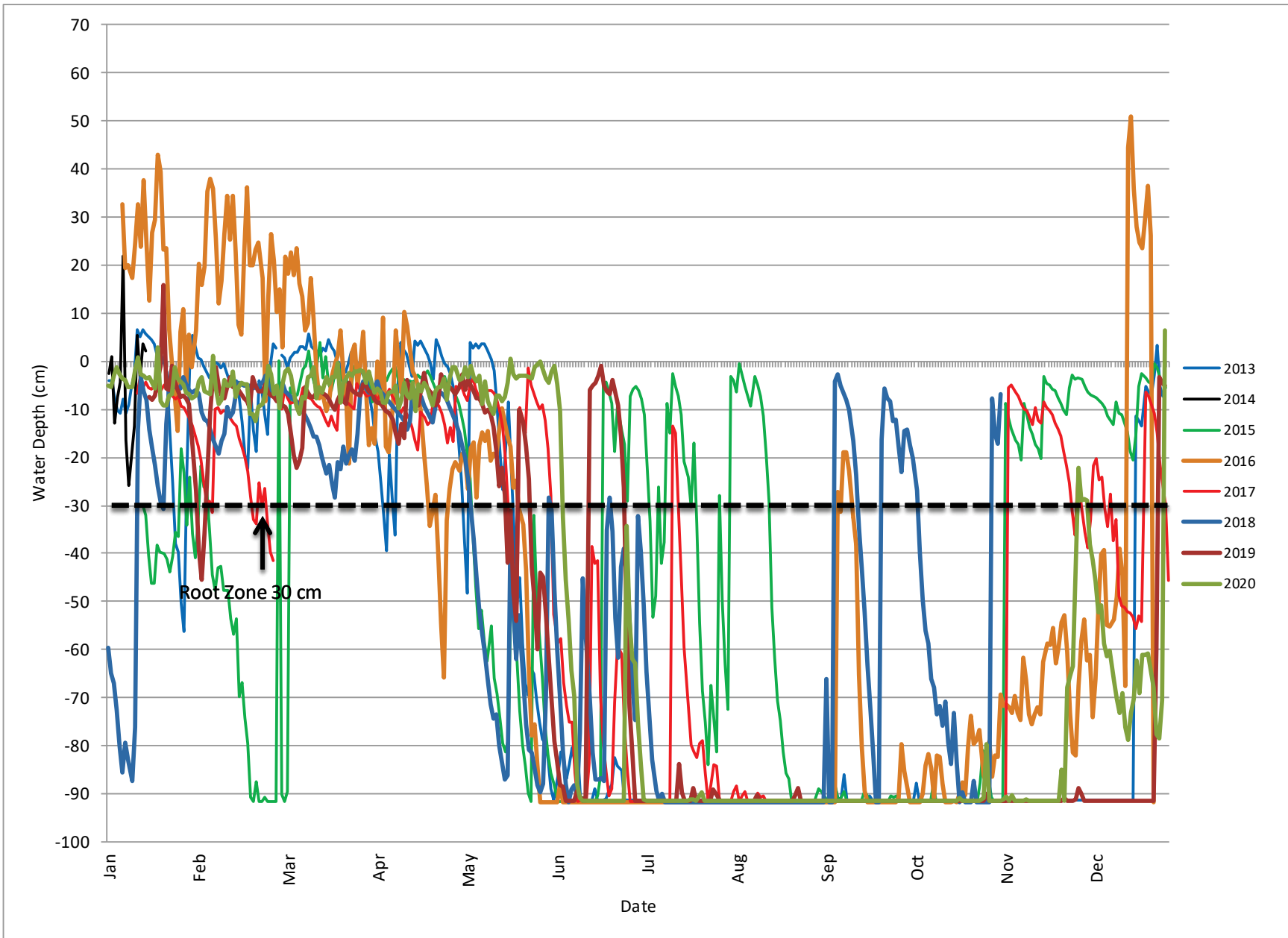


Figure C-2C. Wetland Area PRTW3 Hydrograph

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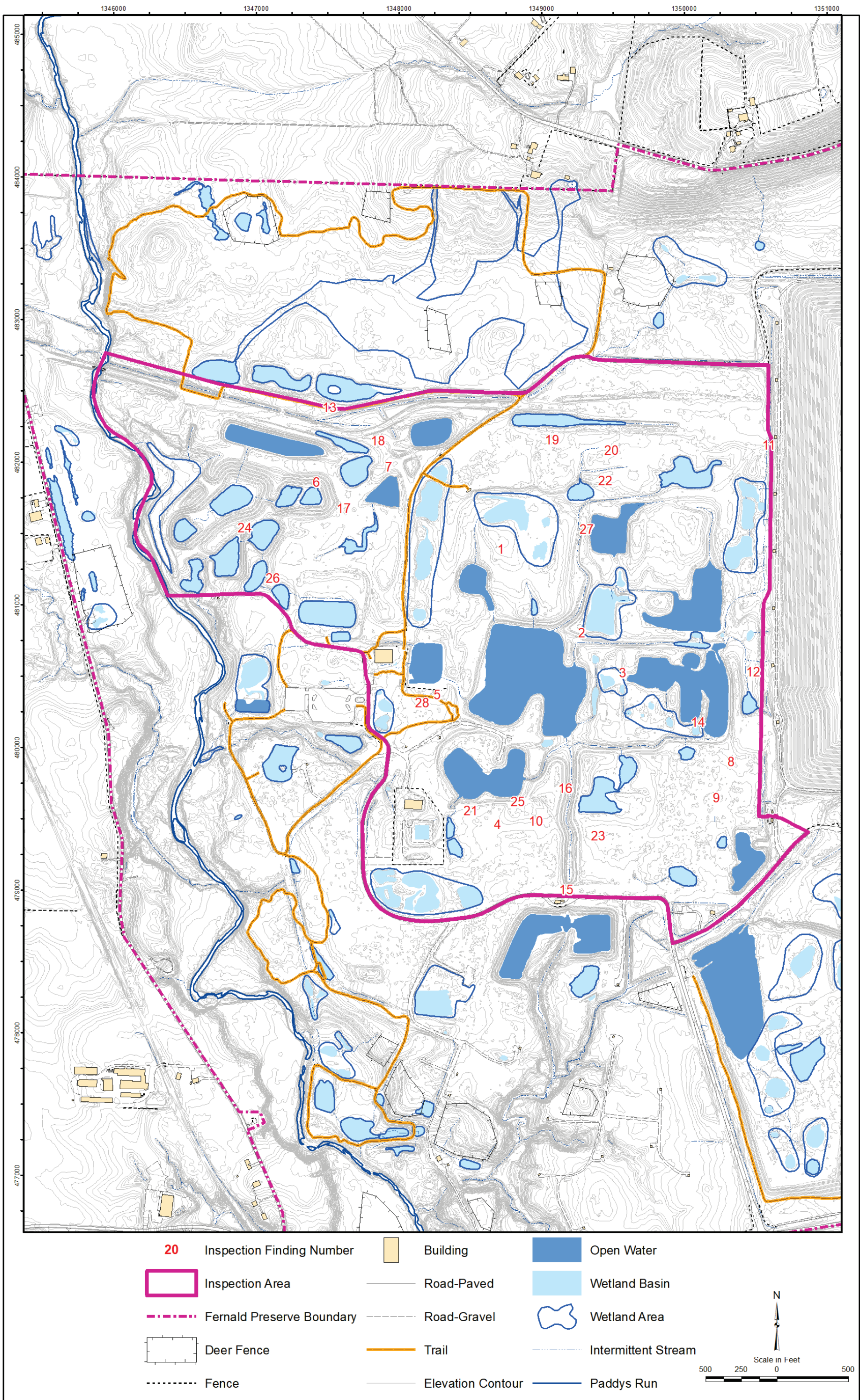


Figure C-3A. Central Quadrant Site Inspection Findings, January 2020

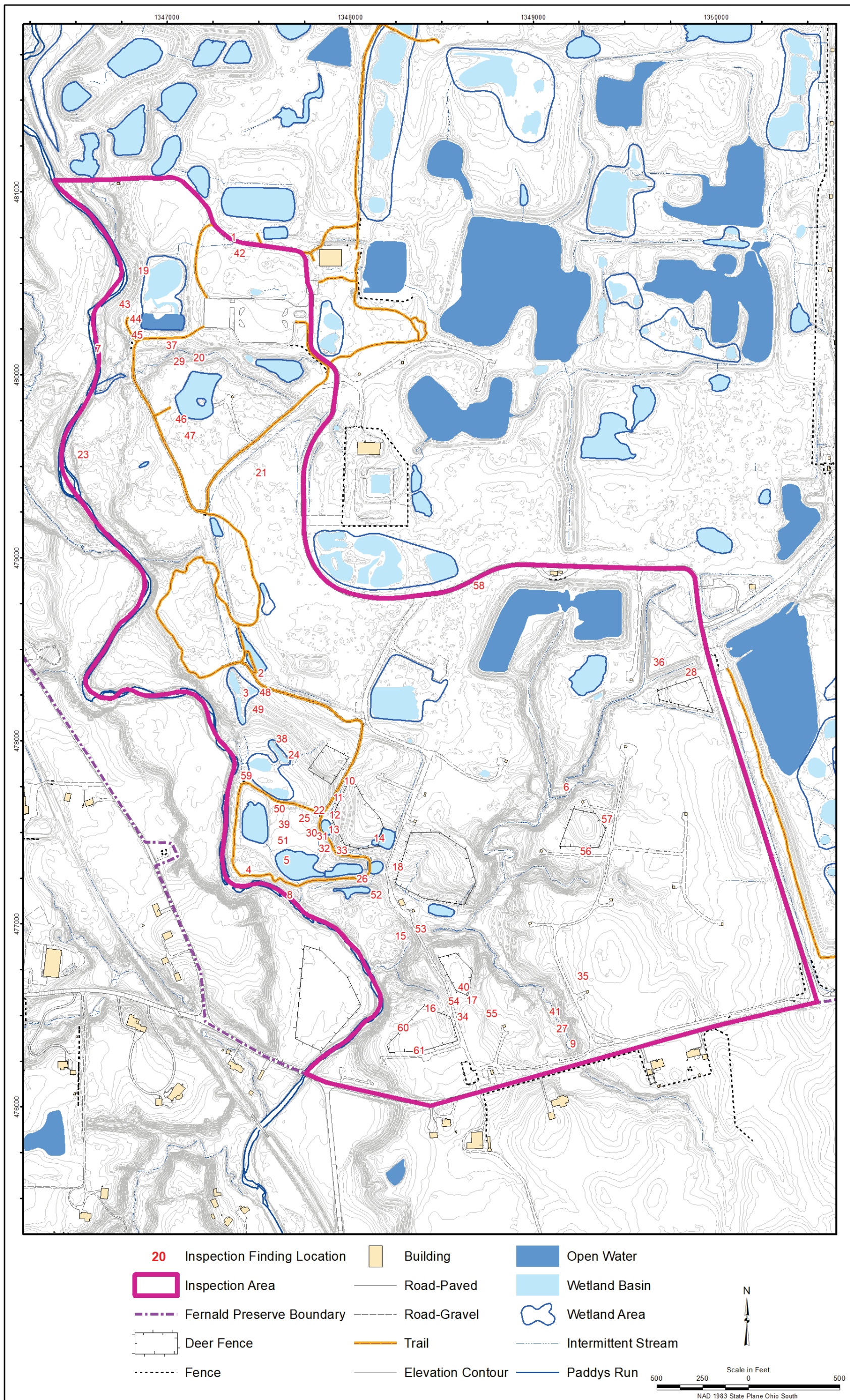
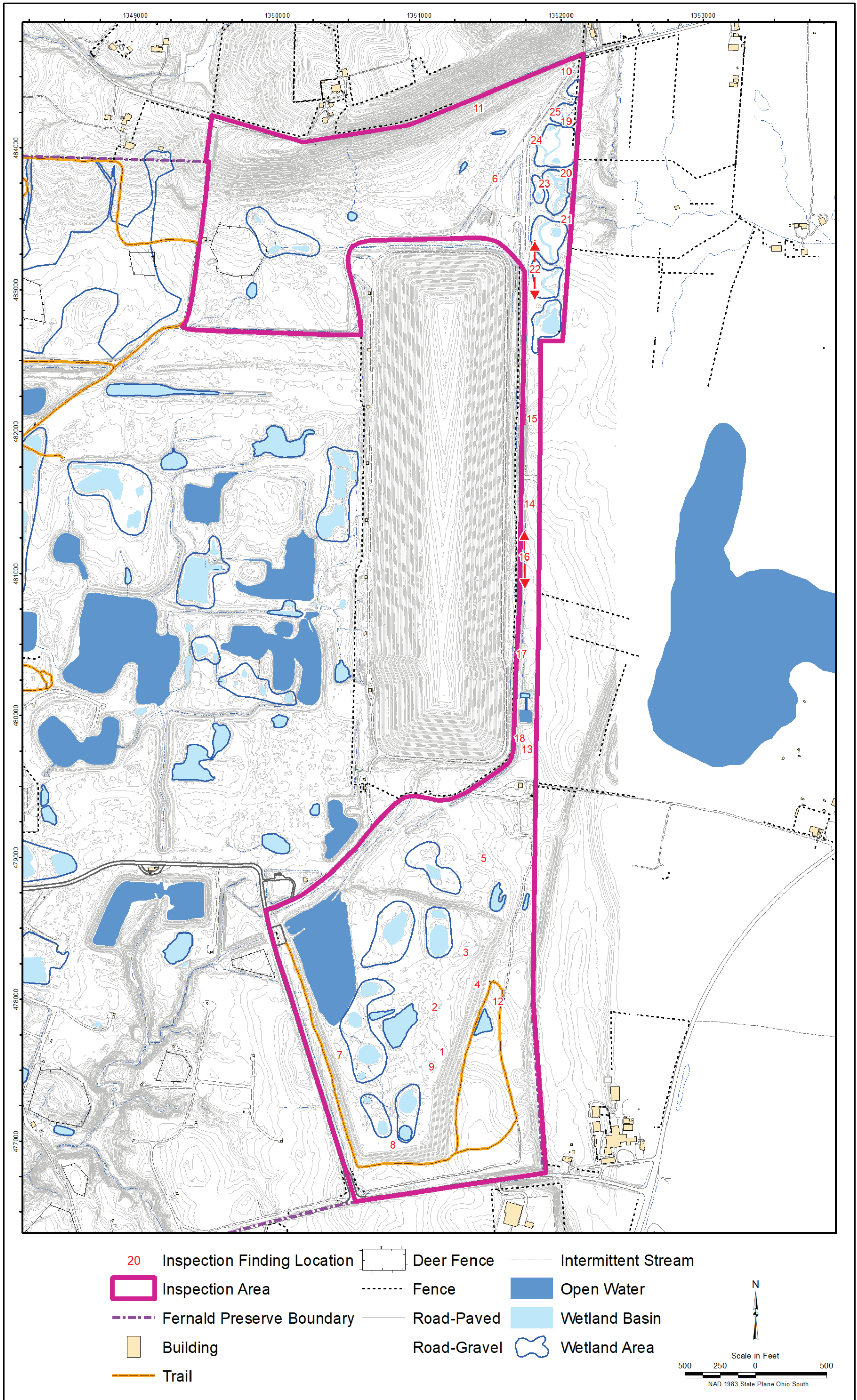
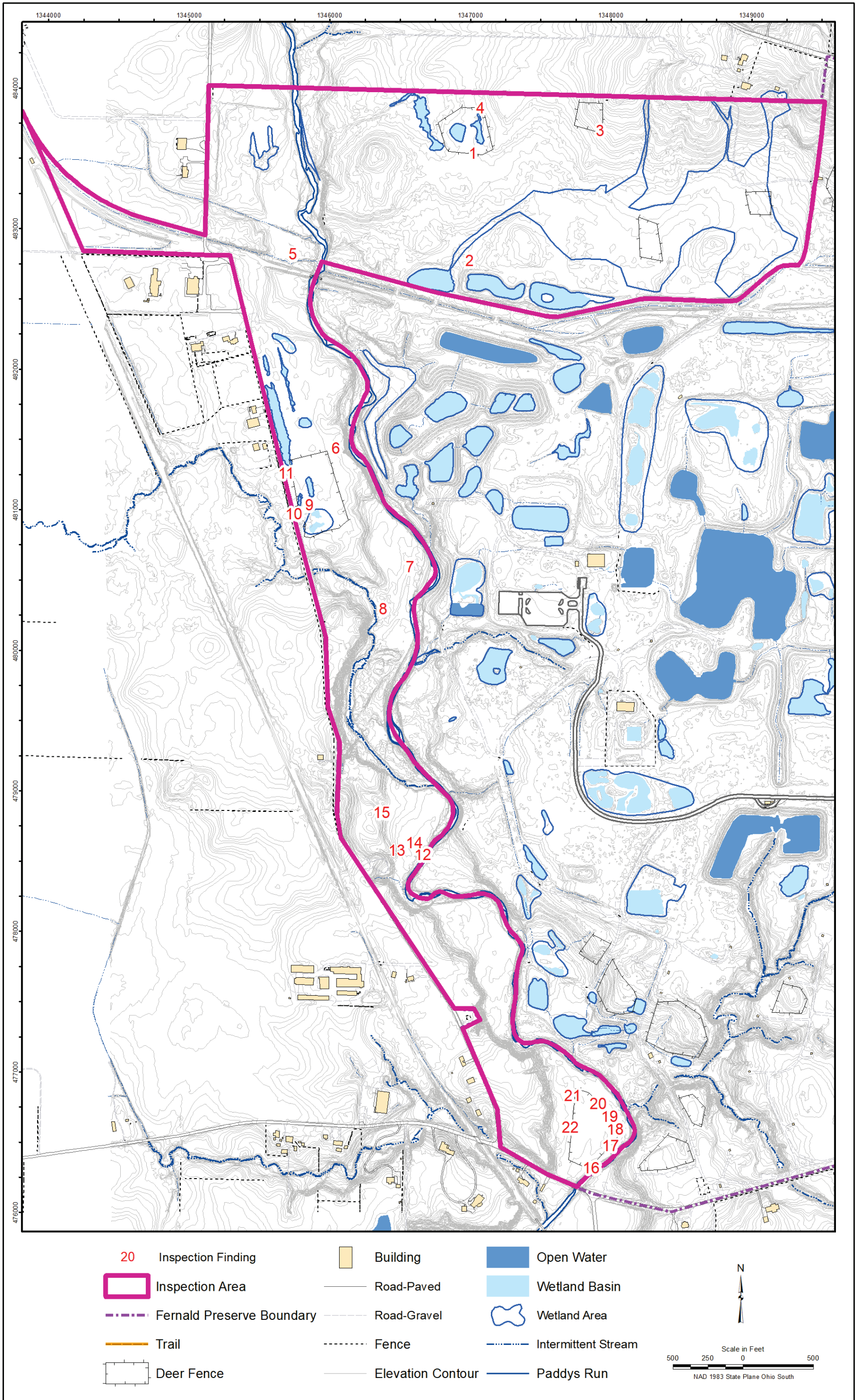


Figure C-3B. South Quadrant Site Inspection Findings, March 2020



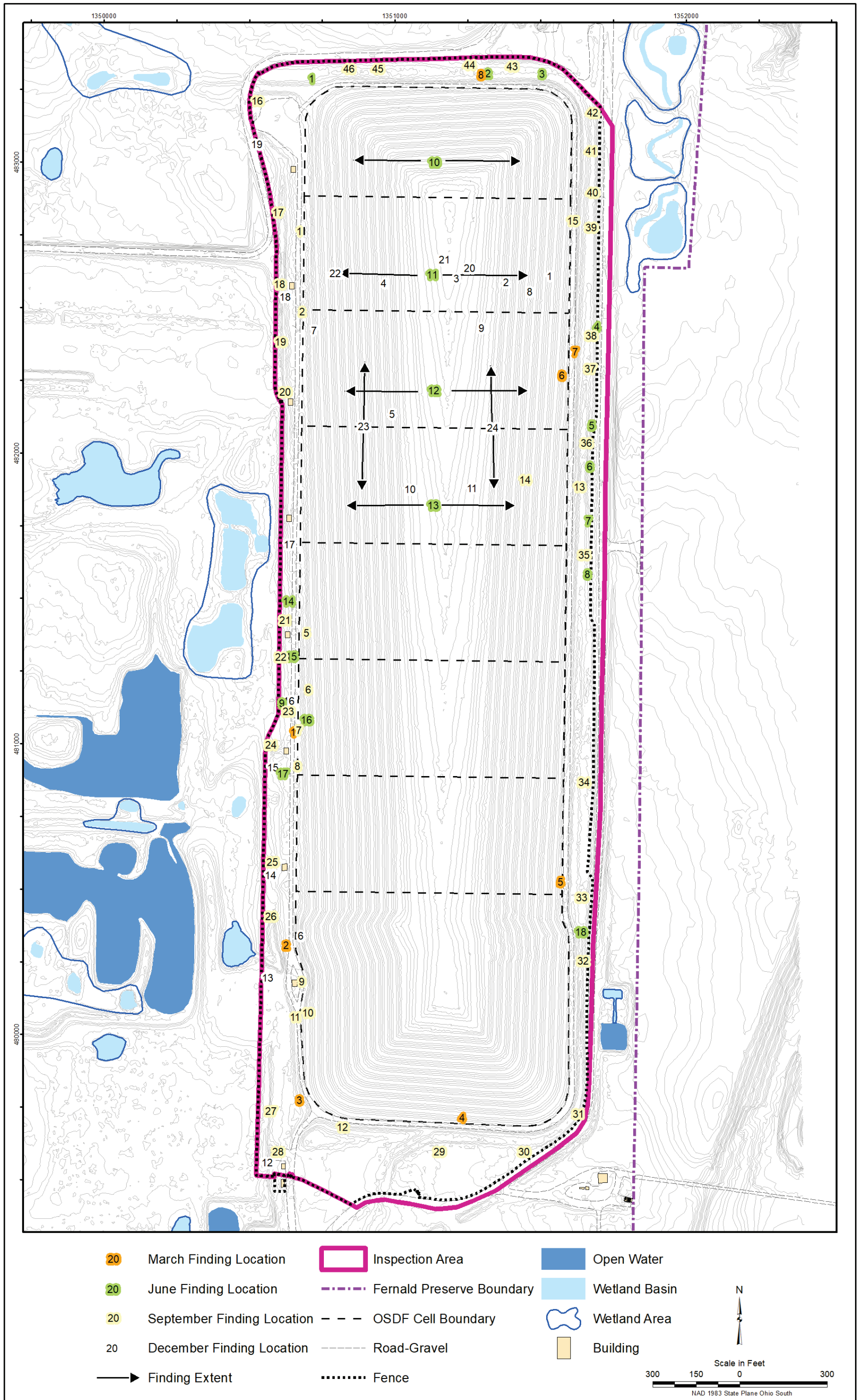
S3241200 03/16/2021 1:13:50 PM

Figure C-3C. East Quadrant Site Inspection Findings, June 2020



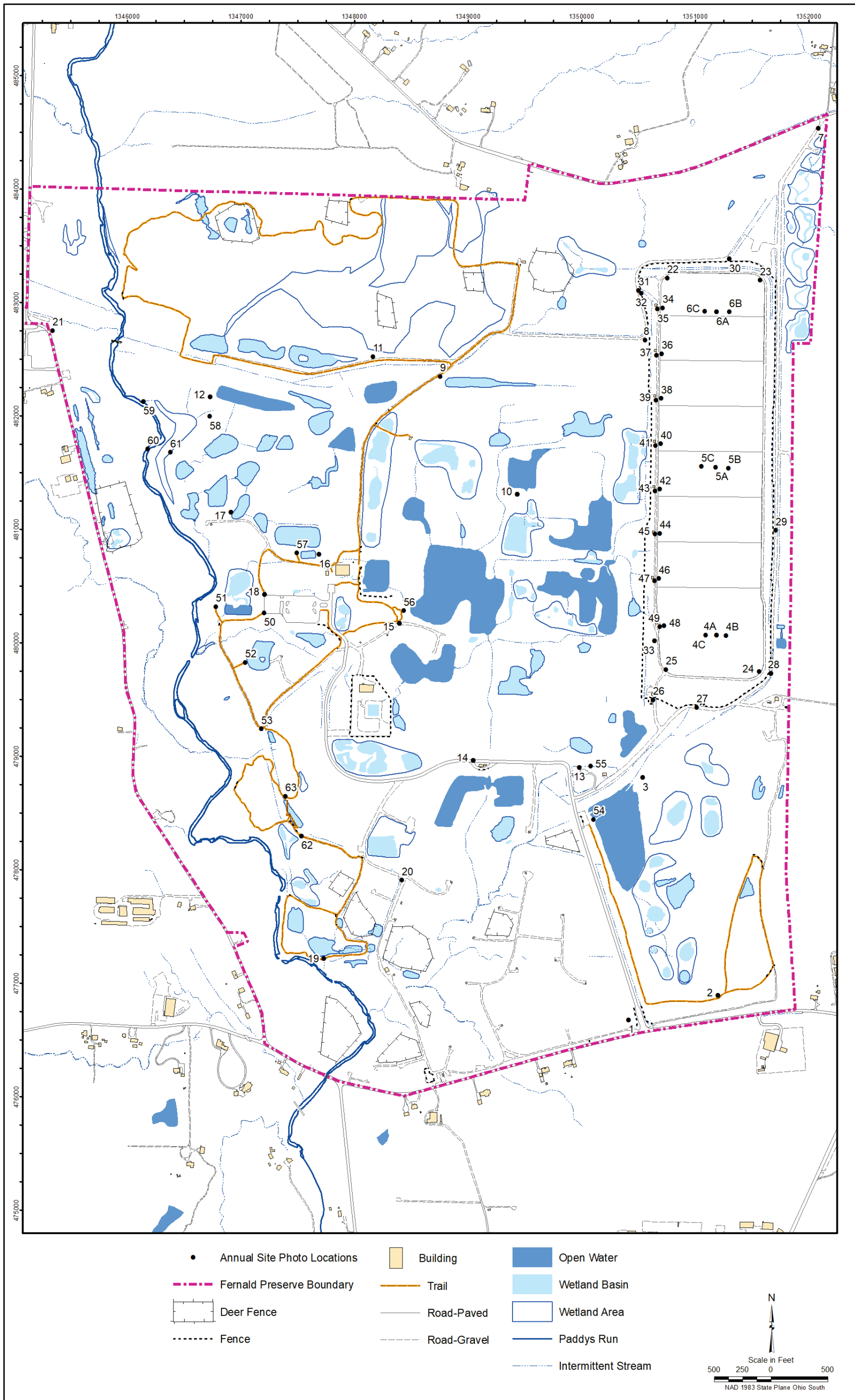
S3241300 03/16/2021 12:19:22 PM

Figure C-3D. West Quadrant Site Inspection Findings, December 2020



S3241400 03/16/2021 1:31:54 PM

Figure C-3E. 2020 OSDF Inspection Findings



S3241500 12/15/2020 2:05:19 PM

Figure C-4. Location of Site Inspection Photographs





**2007**



**2020**

*Figure C-5A. Location 1, South Well Field, West Perspective*



**2007**



**2020**

*Figure C-5B. Location 1, South Well Field, North Perspective*



2007



2020

Figure C-6A. Location 2, Borrow Area, West Perspective



2007



2020

Figure C-6B. Location 2, Borrow Area, West-Northwest Perspective



2007



2020

Figure C-6C. Location 2, Borrow Area, North Perspective



2007



2020

Figure C-7A. Location 3, Borrow Area, South Perspective



2007



2020

*Figure C-7B. Location 3, Borrow Area, West Perspective*



2007



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*Figure C-8A. Location 4A, Top of OSDF Cell 8, South Perspective*



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*Figure C-8B. Location 4A, Top of OSDF Cell 8, North Perspective*



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*Figure C-9. Location 4B, Top of OSDF Cell 8, East Perspective*



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*Figure C-10. Location 4C, Top of OSDF Cell 8, West Perspective*



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*Figure C-11A. Location 5A, Top of OSDF Cell 5, South Perspective*



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Figure C-11B. Location 5A, Top of OSDF Cell 5, North Perspective



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Figure C-12. Location 5B, Top of OSDF Cell 5, East Perspective



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*Figure C-13. Location 5C, Top of OSDF Cell 5, West Perspective*



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*Figure C-14A. Location 6A, Top of OSDF Cell 1, South Perspective*





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*Figure C-14B. Location 6A, Top of OSDF Cell 1, North Perspective.*



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*Figure C-15. Location 6B, Top of OSDF Cell 1, East Perspective*



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Figure C-16. Location 6C, Top of OSDF Cell 1, West Perspective



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Figure C-17A. Location 7, Northeast Property Corner, South Perspective



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*Figure C-17B. Location 7, Northeast Property Corner, South-Southwest Perspective*



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*Figure C-18. Location 8, Former Production Area, Southwest Perspective*



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*Figure C-19. Location 9, Former Production Area, Southeast Perspective*



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*Figure C-20A. Location 10, Former Production Area, South Perspective*



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*Figure C-20B. Location 10, Former Production Area, Southwest Perspective*



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*Figure C-20C. Location 10, Former Production Area, West Perspective*



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*Figure C-20D. Location 10, Former Production Area, Northwest Perspective*



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*Figure C-20E. Location 10, Former Production Area, North Perspective*

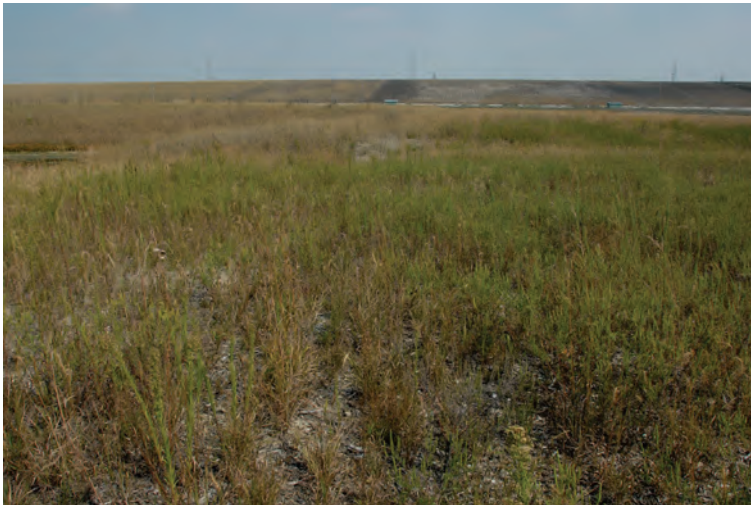


**2007**



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*Figure C-20F. Location 10, Former Production Area, Northeast Perspective*



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*Figure C-20G. Location 10, Former Production Area, East Perspective*



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*Figure C-20H. Location 10, Former Production Area, Southeast Perspective*



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*Figure C-21. Location 11, Wetland Mitigation Phase II, West Perspective*





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*Figure C-22A. Location 12, Former Waste Pits Area, East Perspective*



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*Figure C-22B. Location 12, Former Waste Pits Area, Southeast Perspective*



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**2020**

*Figure C-22C. Location 12, Former Waste Pits Area, South Perspective*



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*Figure C-23A. Location 13, Former Production Area, Northwest Perspective*



**2007**



**2020**

*Figure C-23B. Location 13, Former Production Area, Northeast Perspective*



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*Figure C-24A. Location 14, Former Production Area, North Perspective*



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Figure C-24B. Location 14, Former Production Area, East Perspective



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Figure C-24C. Location 14, Former Production Area, South Perspective



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**2020**

*Figure C-24D. Location 14, Former Production Area, West Perspective*



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*Figure C-25A. Location 15, Former Production Area, North Perspective*



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Figure C-25B. Location 15, Former Production Area, Northeast Perspective



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Figure C-25C. Location 15, Former Production Area, East Perspective



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*Figure C-25D. Location 15, Former Production Area, Southeast Perspective*



**2007**



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*Figure C-25E. Location 15, Former Production Area, South Perspective*

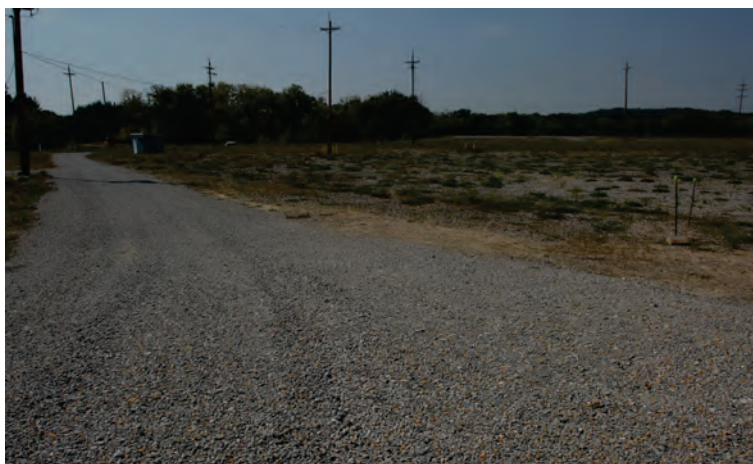


**2007**



**2020**

*Figure C-25F. Location 15, Former Production Area, Southwest Perspective*



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*Figure C-25G. Location 15, Former Production Area, West Perspective*





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Figure C-25H. Location 15, Former Production Area, Northwest Perspective



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Figure C-26A. Location 16, Biowetland, West-Northwest Perspective



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*Figure C-26B. Location 16, Biowetland, West Perspective*



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*Figure C-27A. Location 17, Former Waste Pits Area, West Perspective*



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*Figure C-27B. Location 17, Former Waste Pits Area, Northwest Perspective*



**2007**



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*Figure C-27C. Location 17, Former Waste Pits Area, North Perspective*



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*Figure C-28A. Location 18, Former Silos Area, West-Southwest Perspective*



**2007**



**2020**

*Figure C-28B. Location 18, Former Silos Area, West-Northwest Perspective*



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Figure C-28C. Location 18, Former Silos Area, North Perspective



2007



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Figure C-28D. Location 18, Former Silos Area, East Perspective



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Figure C-29A. Location 19, Southern Waste Units Area, North-Northwest Perspective



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Figure C-29B. Location 19, Former Southern Waste Units Area, North-Northeast Perspective



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*Figure C-29C. Location 19, Former Southern Waste Units Area, East-Southeast Perspective*



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*Figure C-30. Location 20, Former Southern Waste Units Area, West-Southwest Perspective*

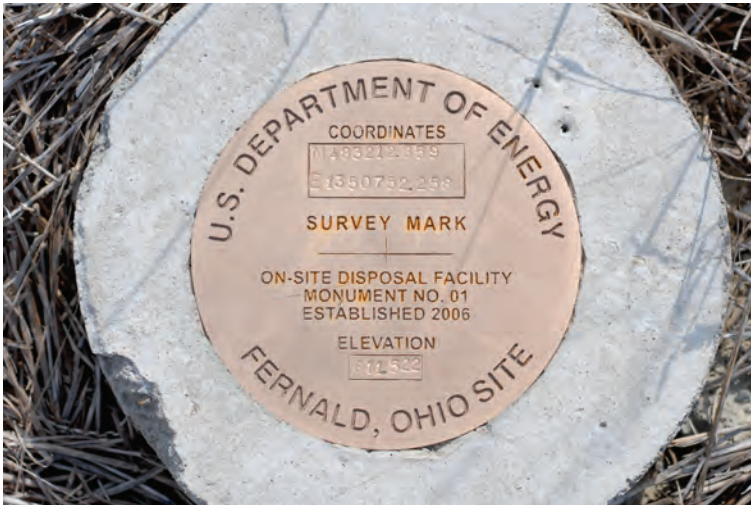


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Figure C-31. Location 21, Western Paddys Run Corridor, South-Southeast Perspective



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Figure C-32. Location 22, OSDF Survey Marker No. 01 (Northwest Corner)



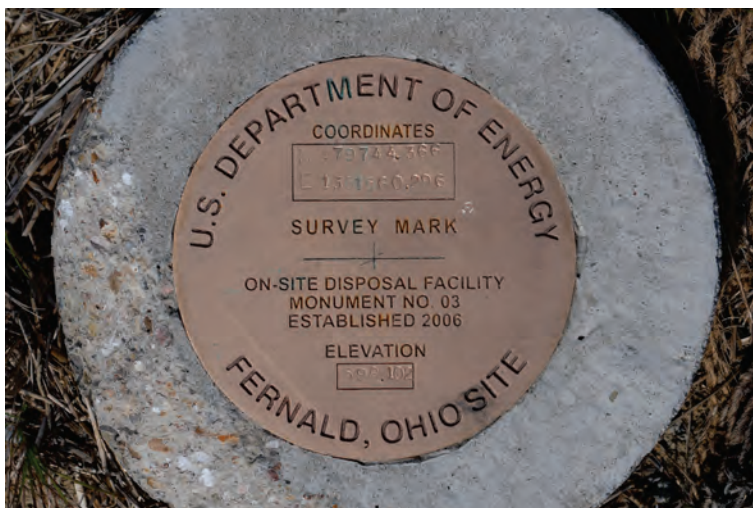


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Figure C-33. Location 23, OSDF Survey Marker No. 02 (Northeast Corner)



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Figure C-34. Location 24, OSDF Survey Marker No. 03 (Southeast Corner)



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Figure C-35. Location 25, OSDF Survey Marker No. 04 (Southwest Corner)



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Figure C-36. Location 26, OSDF Southwest Gate, North-Northeast Perspective



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Figure C-37. Location 27, OSDF South Gate, North-Northeast Perspective



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Figure C-38A. Location 28, OSDF East Fence, North Perspective



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Figure C-38B. Location 28, OSDF East Fence, North Perspective



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Figure C-38C. Location 28, OSDF East Fence Signage, West Perspective



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Figure C-38D. Location 28, OSDF East Fence Signage, North-Northwest Perspective



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Figure C-39. Location 29, OSDF East Fence, North Perspective



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Figure C-40A. Location 30, OSDF North Gate, Southwest Perspective



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Figure C-40B. Location 30, OSDF North Fence, West Perspective



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Figure C-41. Location 31, OSDF Northwest Gate, North-Northeast Perspective



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Figure C-42. Location 32, OSDF West Fence, South-Southeast Perspective



**2007**



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*Figure C-43A. Location 33, OSDF Valve Houses 7 Through 1, North Perspective*



**2007**



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*Figure C-43B. Location 33, OSDF Valve Houses 8 Through 1, North Perspective*





2007



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Figure C-44. Location 34, OSDF Valve House 1, West-Northwest Perspective



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Figure C-45. Location 35, OSDF Cell 1 Wells, Northeast Perspective



2007



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Figure C-46. Location 36, OSDF Valve House 2, West-Northwest Perspective



2007



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Figure C-47. Location 37, OSDF Cell 2 Wells, Northeast Perspective



2007



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Figure C-48. Location 38, OSDF Valve House 3, West-Northwest Perspective



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Figure C-49. Location 39, OSDF Cell 3 Wells, Northeast Perspective



2007



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Figure C-50. Location 40, OSDF Valve House 4, West-Northwest Perspective



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Figure C-51. Location 41, OSDF Cell 4 Wells, Northeast Perspective



2007



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Figure C-52. Location 42, OSDF Valve House 5, West-Northwest Perspective



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Figure C-53. Location 43, OSDF Cell 5 Wells, Northeast Perspective



2007



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Figure C-54. Location 44, OSDF Valve House 6, West-Northwest Perspective



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Figure C-55. Location 45, OSDF Cell 6 Wells, Northeast Perspective



2007



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Figure C-56. Location 46, OSDF Valve House 7, West-Northwest Perspective



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Figure C-57. Location 47, OSDF Cell 7 Wells, Northeast Perspective



2007



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Figure C-58. Location 48, OSDF Valve House 8, West-Northwest Perspective



2007



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Figure C-59. Location 49, OSDF Cell 8 Wells, Northeast Perspective





2008



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Figure C-60. Location 50, Shingle Oak Trail, West Perspective at Trailhead



2008



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Figure C-61. Location 51, Shingle Oak Trail, North Perspective at Paddys Run Overlook



**2008**



**2020**

*Figure C-62. Location 52, Shingle Oak Trail, East Perspective at Wildlife Viewing Area*



**2008**



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*Figure C-63. Location 53, Shingle Oak Trail, North Perspective at Southernmost Trail Section*



2007



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Figure C-64. Location 54, Lodge Pond Deck, East Perspective



2010



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Figure C-65. Location 55, Overlook Deck, North Perspective



2010



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Figure C-66. Location 56, Weapons-to-Wetlands Deck, East Perspective



2010



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Figure C-67. Location 57, Biowetland Deck, North Perspective



**2014**



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*Figure C-68. Location 58, Paddys Run, Streambank Stabilization Area, West Perspective*



**2014**



**2020**

*Figure C-69A. Location 59, Paddys Run, Downstream View*



2014



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Figure C-69B. Location 59, Paddys Run, Upstream View



2014



2020

Figure C-70. Location 60, Paddys Run, Streambank Stabilization Area, Upstream View of Crossvane



**2014**



**2020**

*Figure C-71. Location 61, Paddys Run, Streambank Stabilization Area, Northwest Perspective*



**2014**



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*Figure C-72A. Location 62, South End of Boardwalk, North Perspective*



**2014**



**2020**

*Figure C-72B. Location 62, South End of Boardwalk, South Perspective*



**2014**



**2020**

*Figure C-73. Location 63, North End of Boardwalk, South Perspective*