Hydro Power Feasibility Study

Hoopa Valley Tribe

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There are over 1200 miles of major streams within the Hoopa Valley Reservation many of which support Salmon, Steelhead and Rainbow trout. 50-60 inches of rainfall /year.
In the beginning

In FY 2005 the Hoopa Tribal EPA received a grant from DOE to conduct a 2 year feasibility study for small scale hydropower on 7 major tributaries of the Reservation that flow into the Trinity River.
Concept of Approach

• Road access to streams
  – Intake sites, pipeline construction and turbine sites
• Distance to Valley
  – produce enough power to get down to the valley and still have plenty for the community to use
• Proximity to power lines – connectivity
• Location for turbine
  – relatively flat, close to power lines
• Adequate head and majority of stream flows at intake site
Salmon are the lifeblood of the Hupa and Yurok and Karuk people.
Issue(s)

In 2003 the Tribe won it’s case for 30% more water from the Lewiston dam to support Salmon fisheries in the Trinity and Klamath Rivers. Negotiations annually for water.

Lewiston Dam – Trinity River
Potential watersheds

- Pine Creek 31,413 acres
- Mill Creek 30,810 acres
- Tish Tang Creek 19,131 acres
- Supply Creek 10,254 acres
- Hostler Creek 6,657 acres
- Soctish Creek 5,924 acres
- Campbell Creek 4,355 acres
Campbell Creek Sediments
Hostler Creek

- Gross head, 39 feet
- Length of pipe, 375 feet
- Design flow, 10 cfs
- Flow duration 217 days
- Recommended pipe diameter, 16"
- Calculated net head, 35 feet
- Expected power, 19KW
- Revenue ~$6,000 annually
Mill Creek

- Gross head, 72 feet
- Length of pipe, 6350 feet
- Flow range, 100 cfs
- Flow duration 182 days
- Recommended pipe diameter, 60"
- Calculated net head, 65 feet
- Expected power, 470KW
- Annual Revenue ~ $150,000
Pine Creek

- Gross head, 66 feet
- Length of pipe, 4500 feet
- Flow range, 50 cfs
- Duration 50 cfs for 141 days
- Recommended pipe diameter, 48"
- Calculated net head, 62 feet
- Expected power, 220KW
- Annual Revenue ~ $58,000
Instability
# Bottom Line
## Hoopa Tribe Hydro Projects

<table>
<thead>
<tr>
<th></th>
<th>KW Size of Turbine</th>
<th>Power Purchase / KWH</th>
<th>Annual Revenue</th>
<th>Total Cost of Installation</th>
<th>25% Down payment or Cost share</th>
<th>Loan Amt (Total Cost less down payment)</th>
<th>6% Note, amortized over 10 yr., annual payments</th>
<th>Revenue - Cost</th>
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</thead>
<tbody>
<tr>
<td>Soctish Creek</td>
<td>1300</td>
<td>0.092</td>
<td>310,003</td>
<td>1,739,960</td>
<td>$434,990</td>
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<td>Supply Creek Option</td>
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<td>$385,486</td>
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</tbody>
</table>
Supply Creek

Total Flow
Supply Creek

Diversion Flow
Base Flow


Total Flow
Diversion Flow
Base Flow
Soctish Creek

Critical Depth 1.5 stage 7cfs
Nov 13, 2009
### Characteristics of Hydropower for Soctish Creek

- **Design Flow**: 32 CFS
- **Base Flow for Fish**: 65 CFS
- **Static head**: 80ft
- **Net Head**: 57 ft
- **Intake width**: 10ft
- **Intake length**: 55ft
- **Pipeline length**: 2350ft
- **Pipe Diameter**: 24 inches
- **Pipeline type – Epoxy Lined Steel (ELS)**
- **Turbine size**: 120kW
- **Generator output**: 110kW
- **Annual Revenue**: $61,000
- **Project costs**: $1.514M
- **Simple payback**: 25 years
Looking downstream
### Characteristics of Hydropower Supply Creek

- **Design flow**: 50 cfs
- **Base flow for fish**: 32 cfs
- **Intake width**: 15 ft
- **Intake length**: 55 ft
- **Static head**: 165 ft
- **Net head**: 146 ft
- **Pipeline diameter**: 30 in
- **Pipeline length**: 3400 ft
- **ELS pipe**
- **Turbine size**: 508 kW
- **Generator**: 475 kW
- **Annual revenue**: $164,400
- **Project cost**: $2.347M
- **Simple payback**: 14 years
Supply Creek Intake location
Landscape obstacle
Along pipeline route
Supply Creek 1.5 ft stage 27 cfs
Nov 13, 2008
CONCEPTUAL INTAKE PLAN WITH VERTICAL FLAT PANEL SCREEN

CYLINDRICAL TEE SCREEN ARRAY

ROTARY DRUM SCREEN

SUPPLY CREEK CONCEPT INTAKE STRUCTURE
FISH SCREEN ALTERNATIVES
HOOPA VALLEY TRIBE SMALL HYDROELECTRIC FEASIBILITY ANALYSIS
Fish Screen Specs

- 0.3 feet/sec flow through
- 1.7 feet/sec over flow
Ossberger Crossflow
Environmental Review

EIS for all projects
• comprehensive
• water quality/ quantity issues

Biological Assessment for Coho Salmon
- Endangered species

FERC license
Questions