Hydro Power Feasibility Study

Hoopa Valley Tribe

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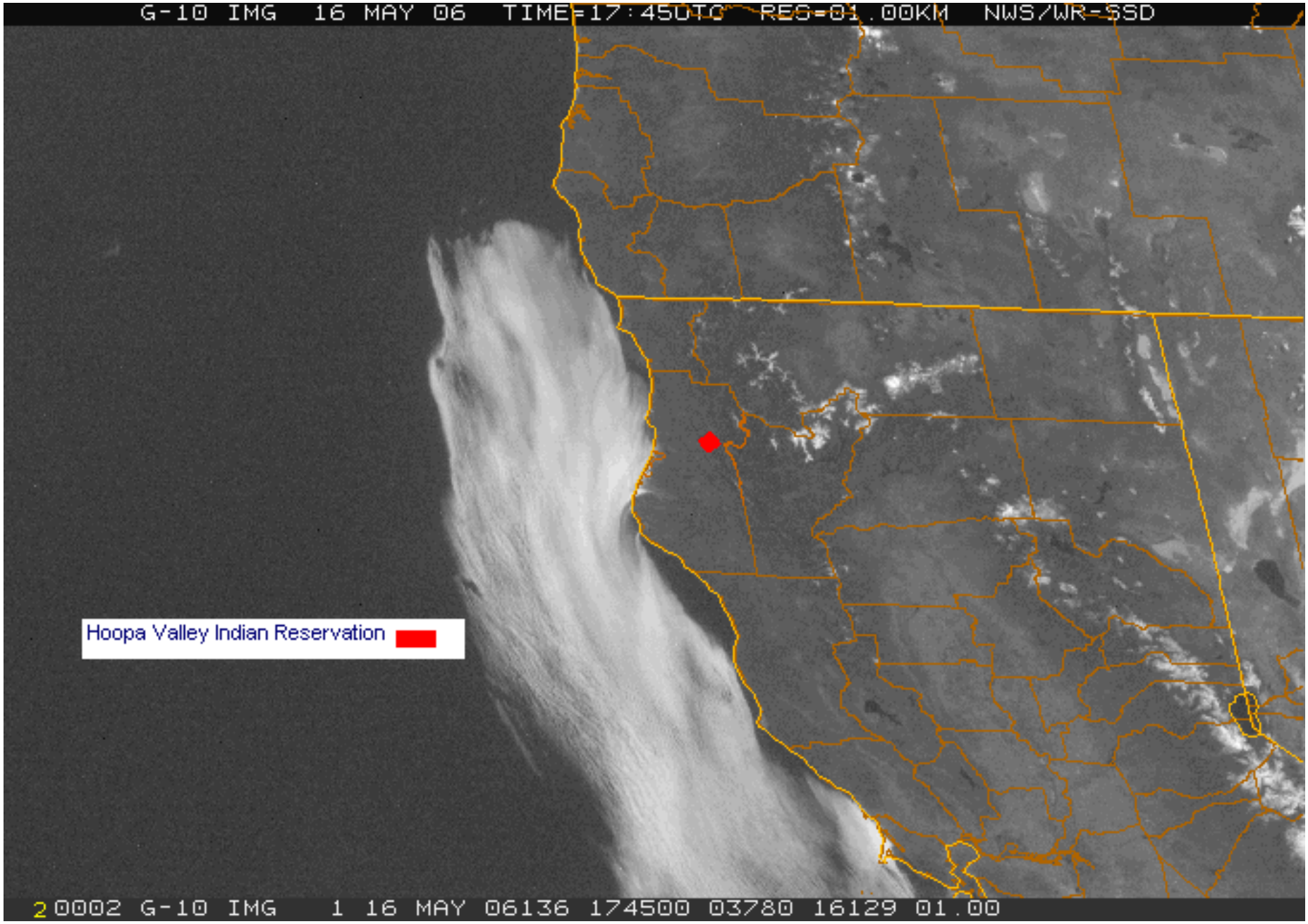
Figure 1. Location of the
Hoopa Valley
Indian Reservation
California
Hoopa Valley
Indian Reservation
N
San Francisco


G-10 IMG 16 MAY 06 TIME=17:45UTC RES=01.00KM NWS/WR-SSD
Hoopa Valley Indian Reservation
20002 G-10 IMG 1 16 MAY 06136 174500 03780 16129 01.00


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 life blood 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

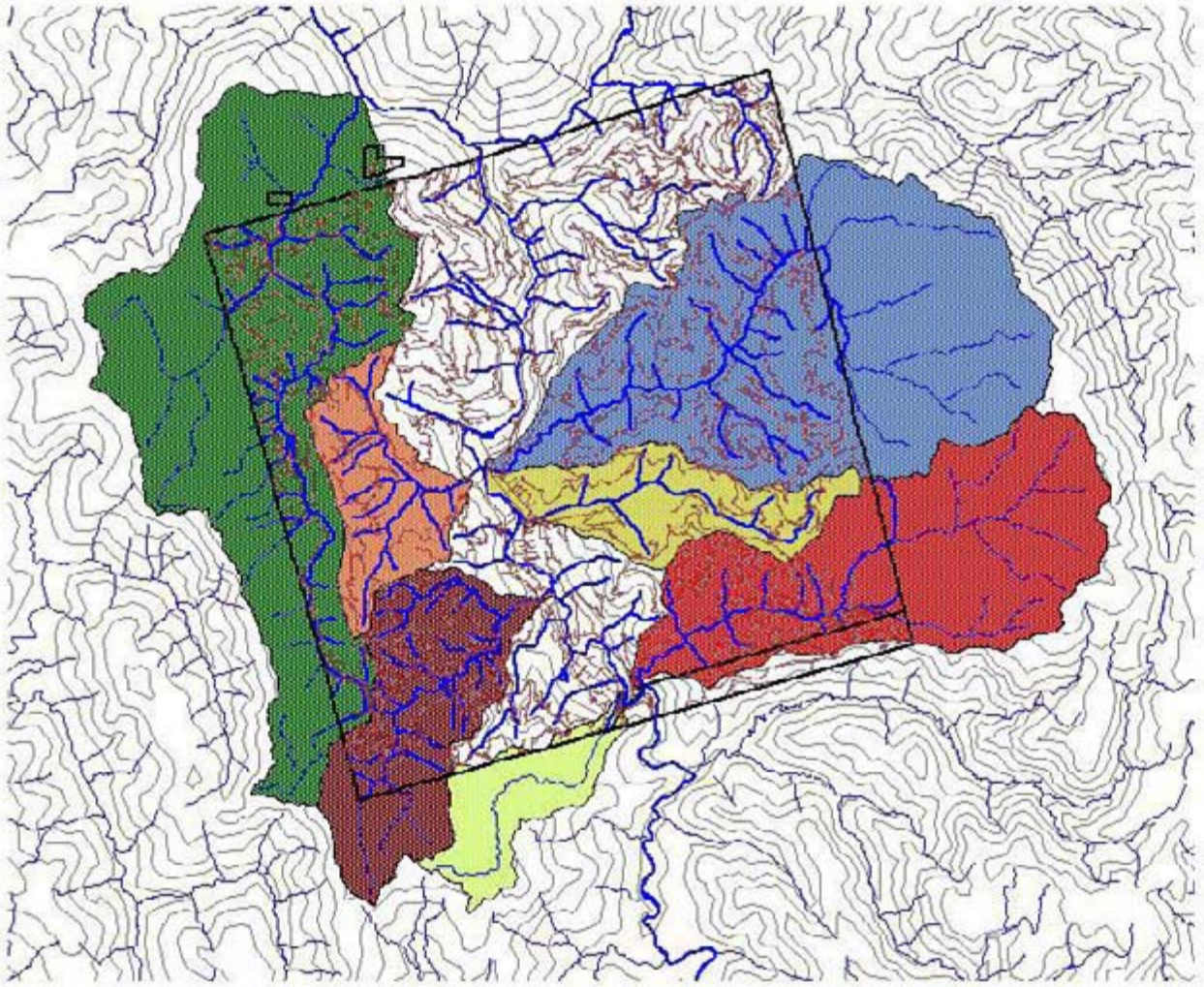
Negotiations annually for water

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

Hoopa Valley Hydrosheds



Upper Campbell Creek Landslide
Off Reservation Impacts


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

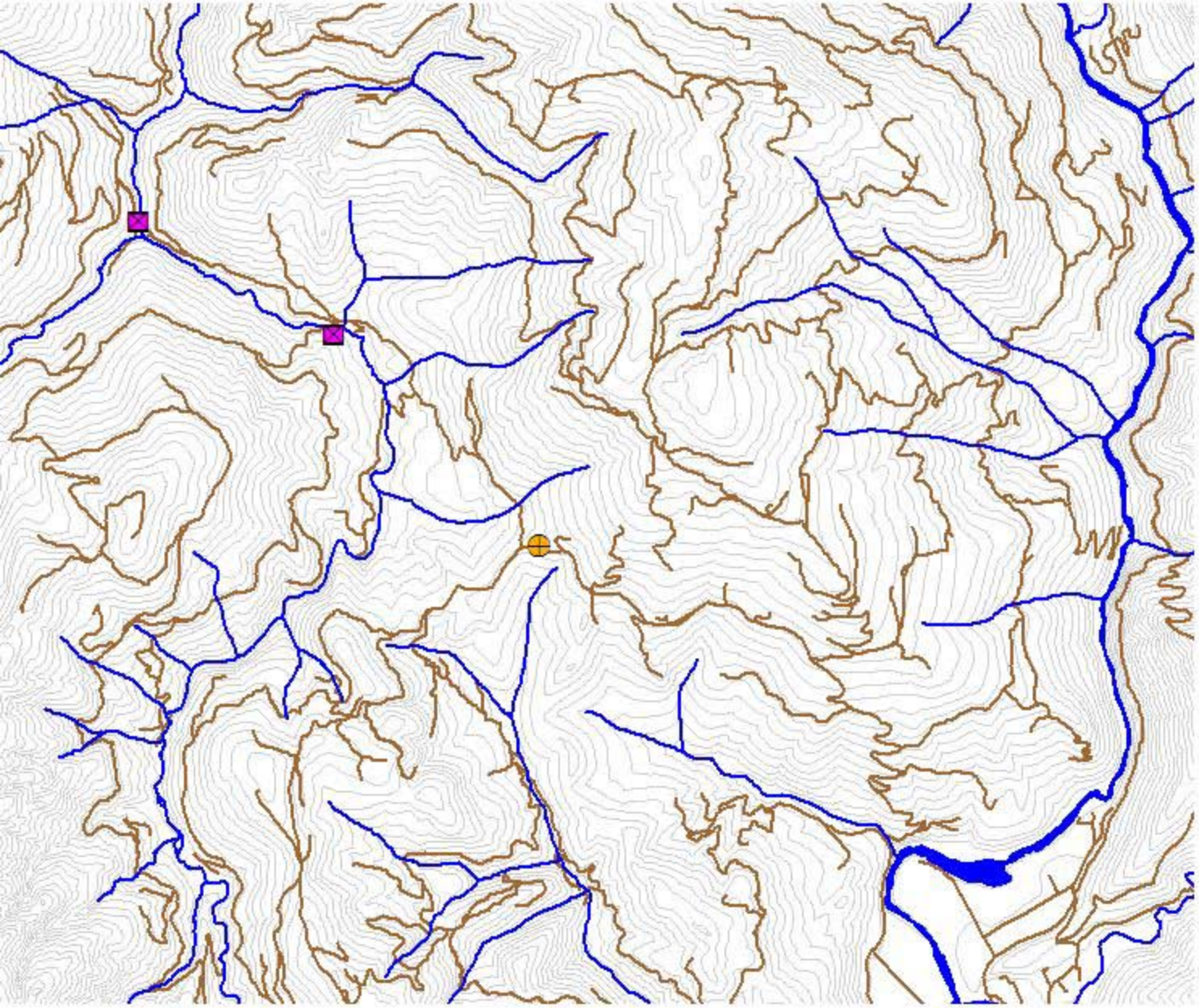
Mill Creek

- 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

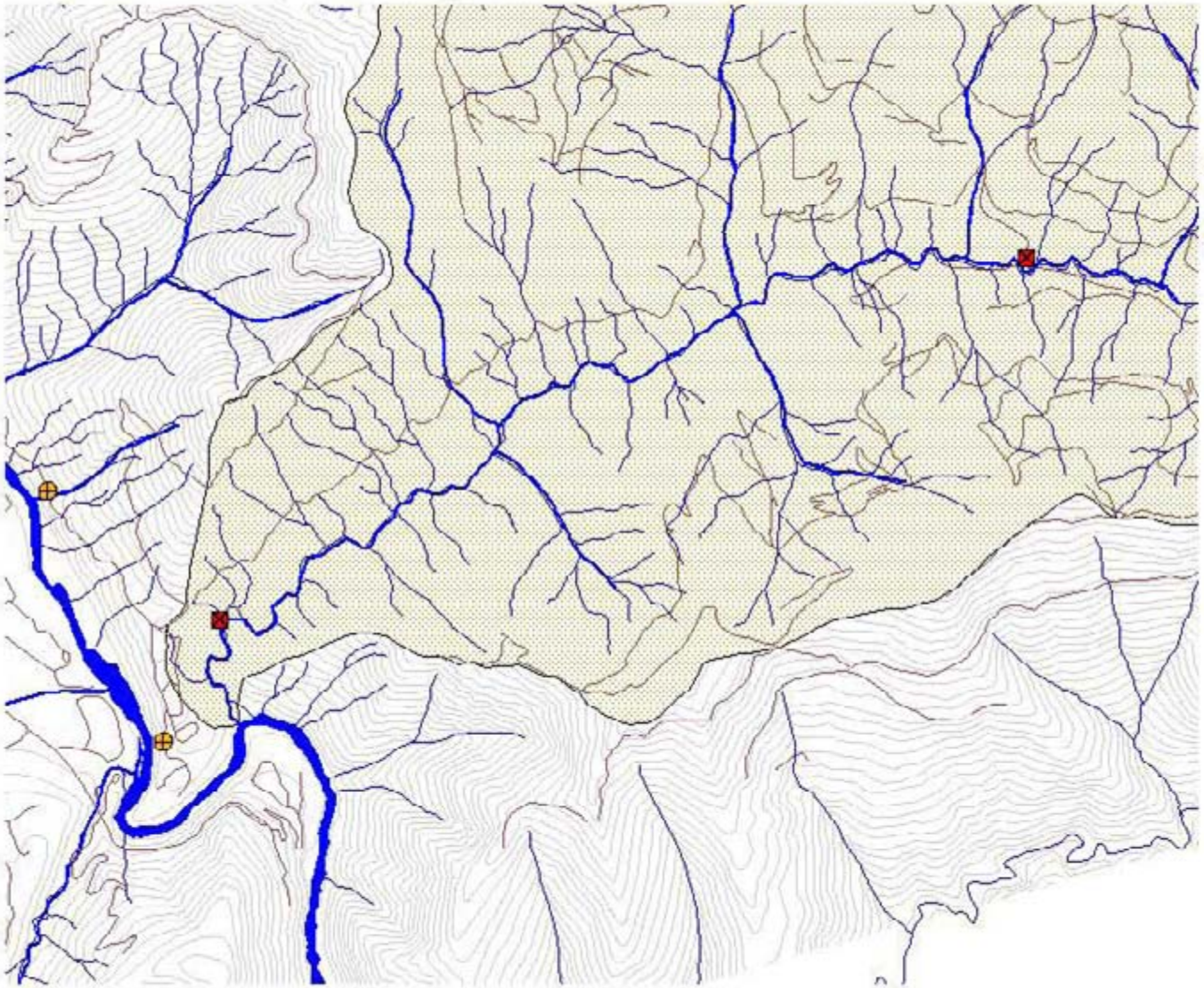
Pine Creek

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

Pine Creek Hydropower



Lower Tish Tang Creek
Hoopa Valley



Pge_connect.shp
Tish Tang Hydro sites
Creeks.shp
Trinity River
Roads
Reservation Streams
Tish Tang Watershed
Contour at 80 ft

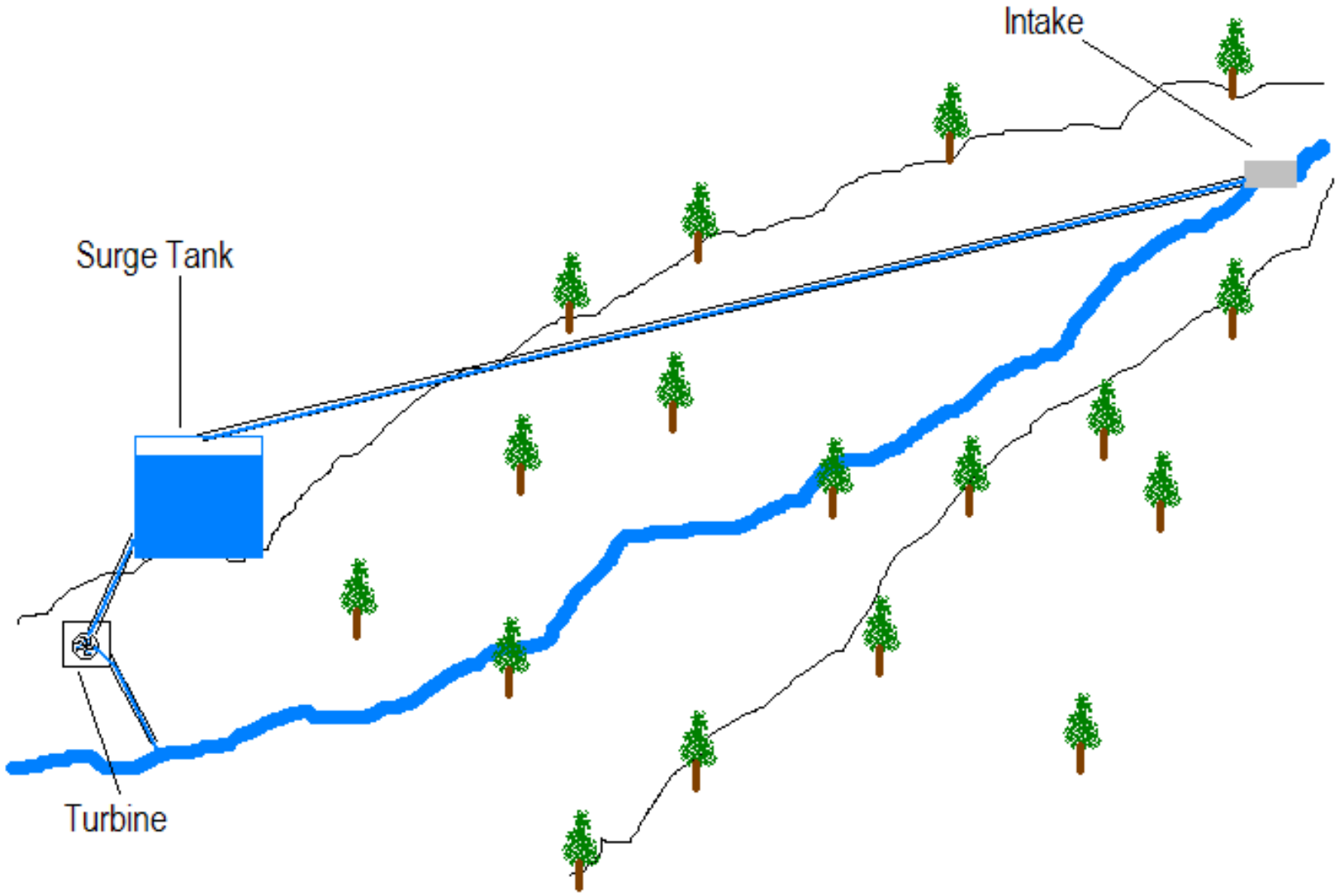
N

1 0 1 2 3 Miles


Instability


TRADITIONAL HUPA
VILLAGE SITE
ONE OF MANY XHONTAS LOCATED AMONG
THE SCENIC TRINITY RIVER
XHONTA

Alternative Concept



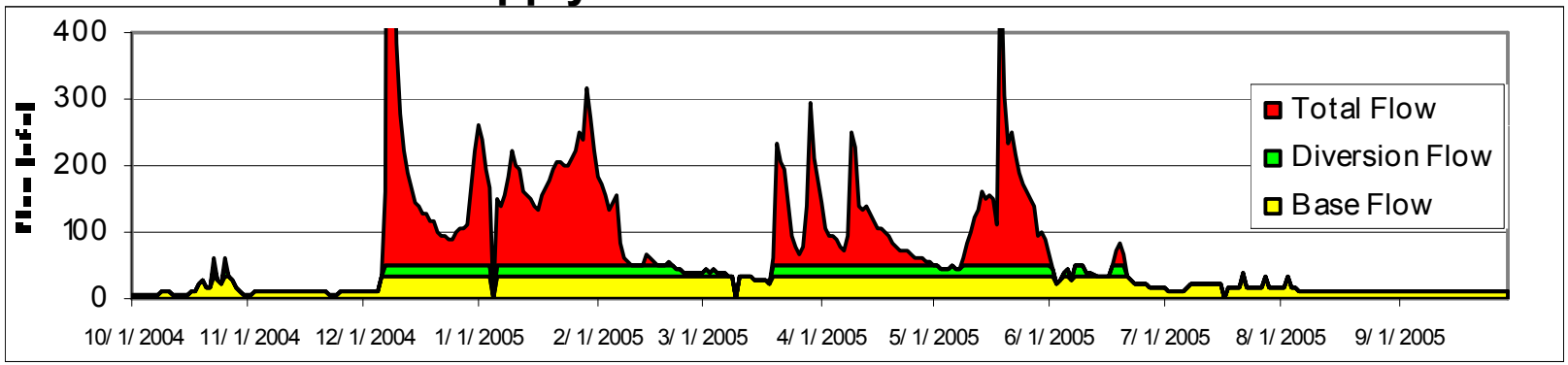
Bottom Line
Hoopa Tribe Hydro Projects

	KW Size of Turbine	Power Purchase / KWH	Annual Revenue	Total Cost of Installation	25% Down payment or Cost share	Loan Amt (Total Cost less down payment)	6% Note, amortized over 10 yr., annual payments	Revenue - Cost
Soctish Creek	1300	0.092	310,003	1,739,960	$434,990	1,304,970	173,854	136,149
Supply Creek Option	1100	0.092	262,310	1,541,825	$385,486	1,156,369	154,057	108,253

Collecting stream flow data

Supply Creek

18”



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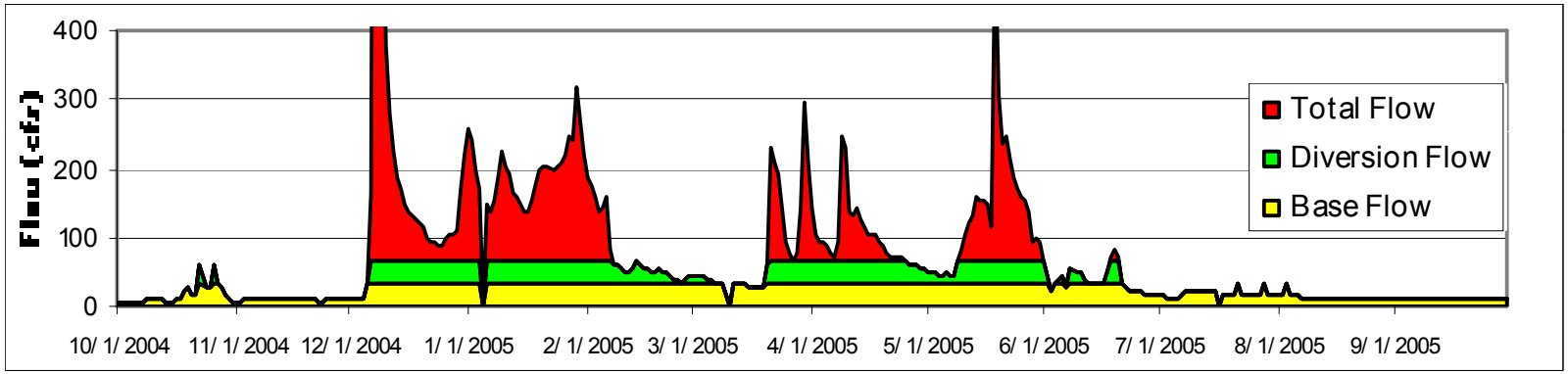

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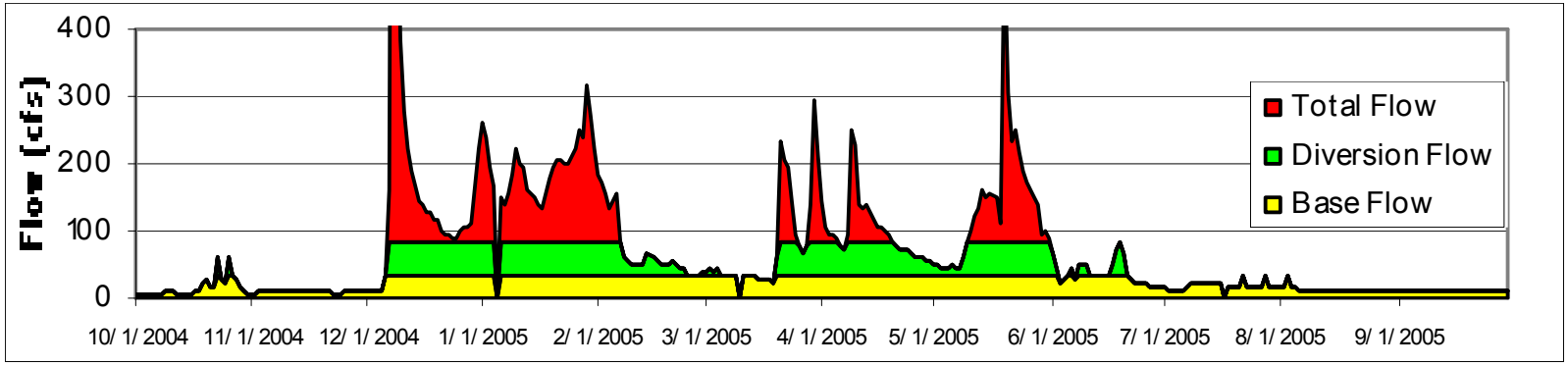

Supply Creek

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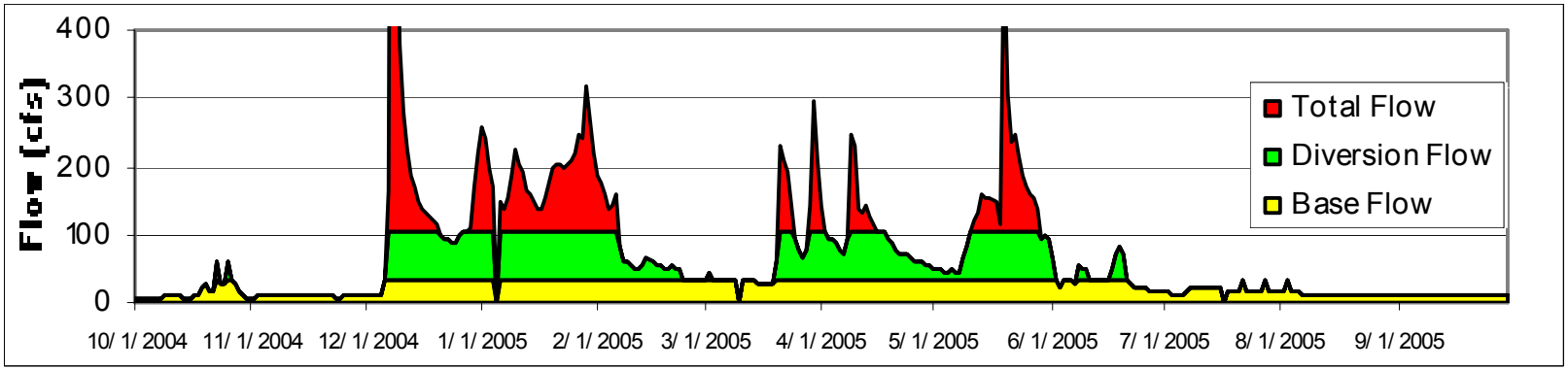

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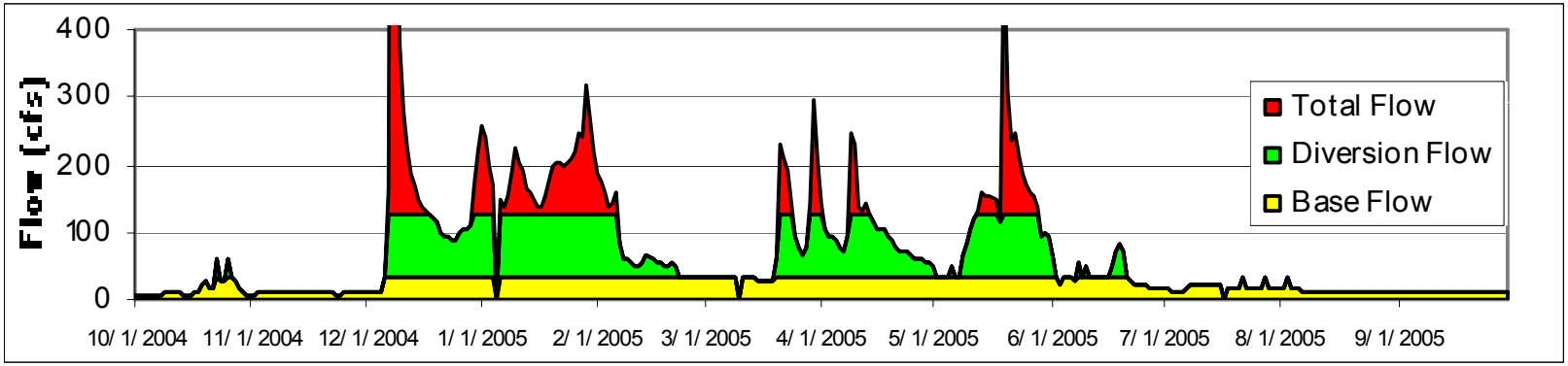

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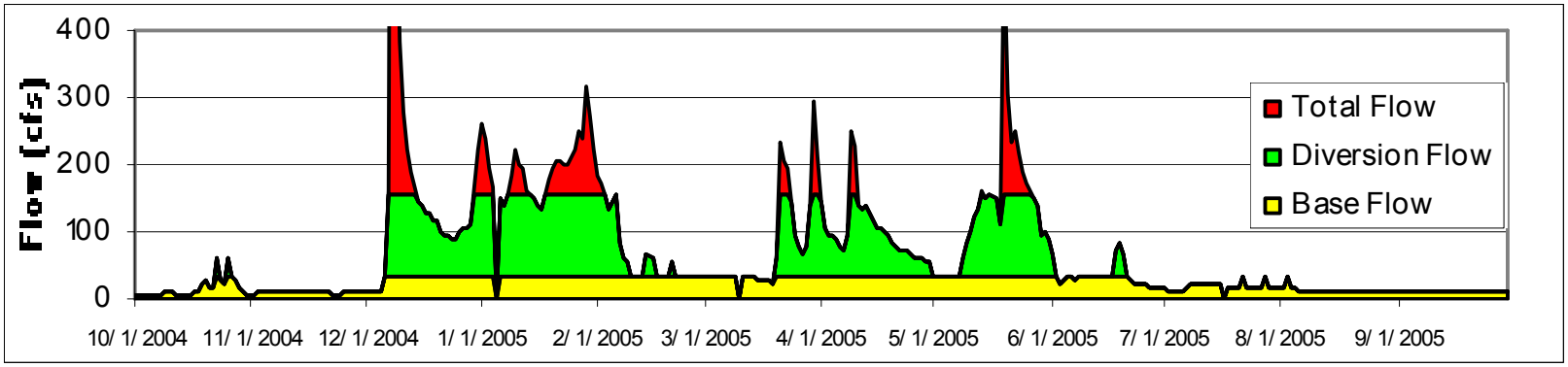

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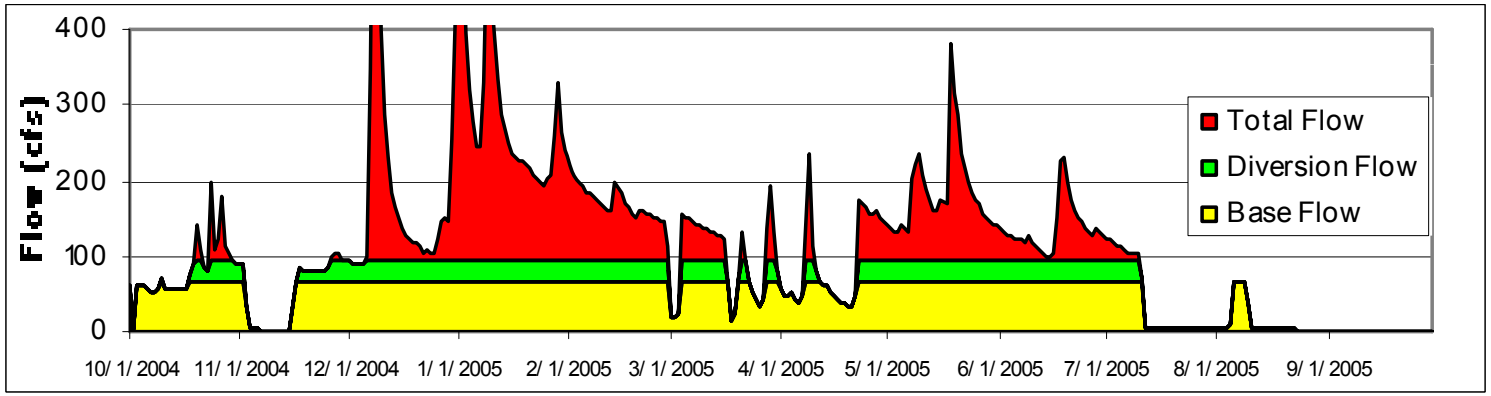

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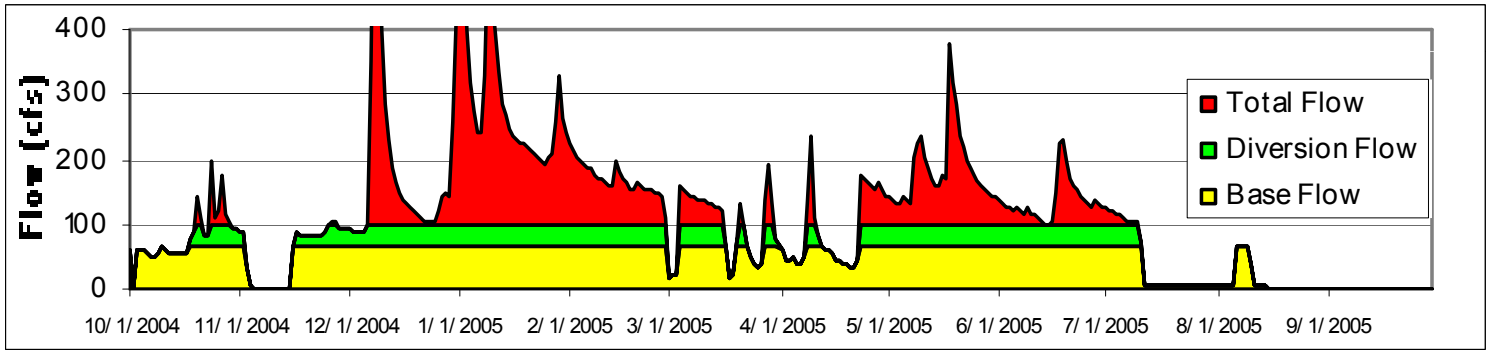

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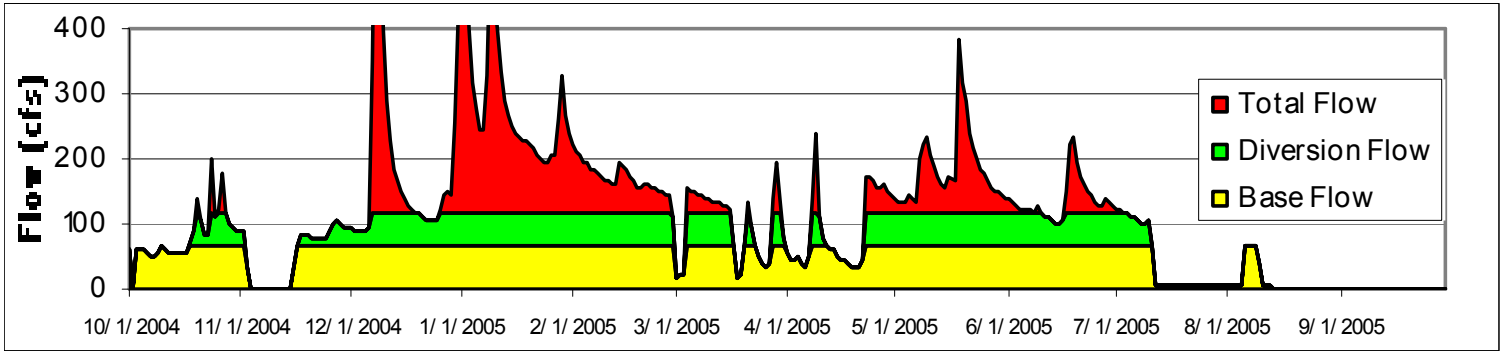

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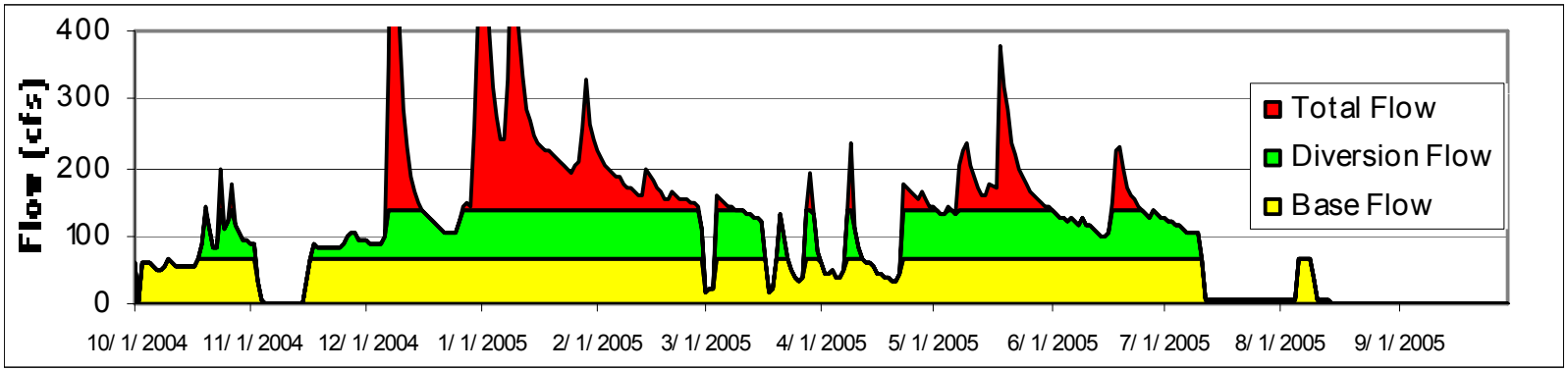

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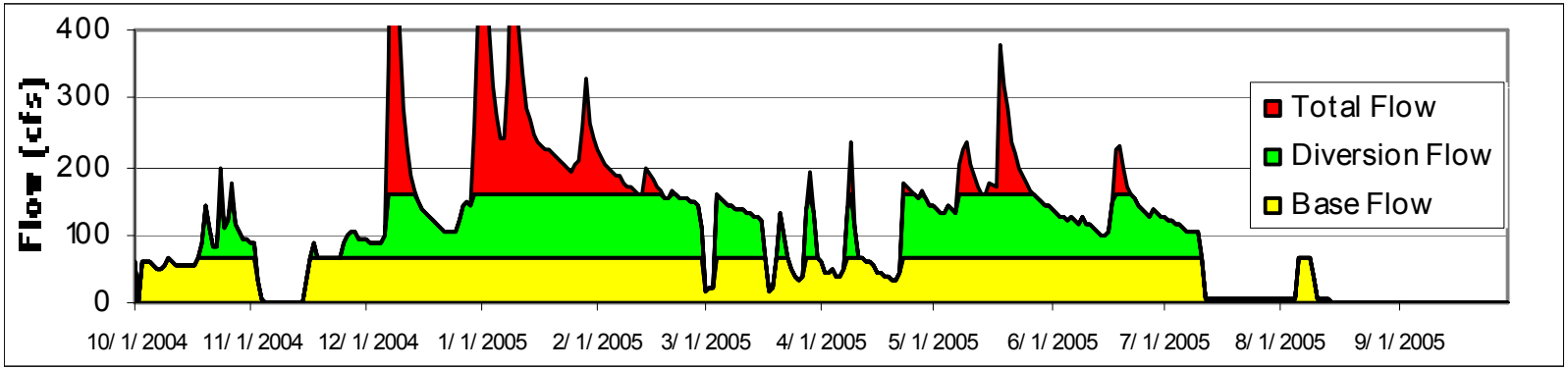

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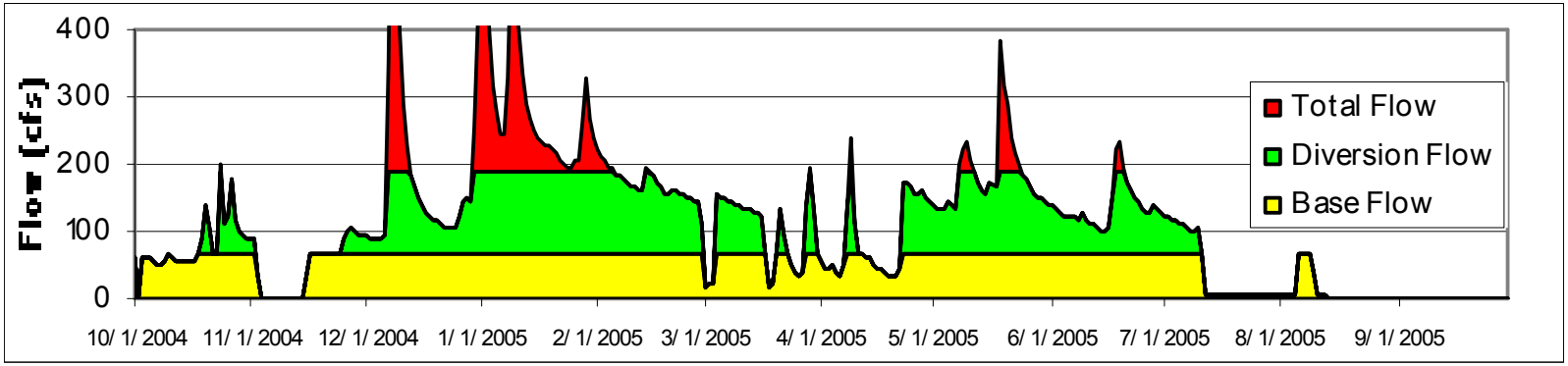
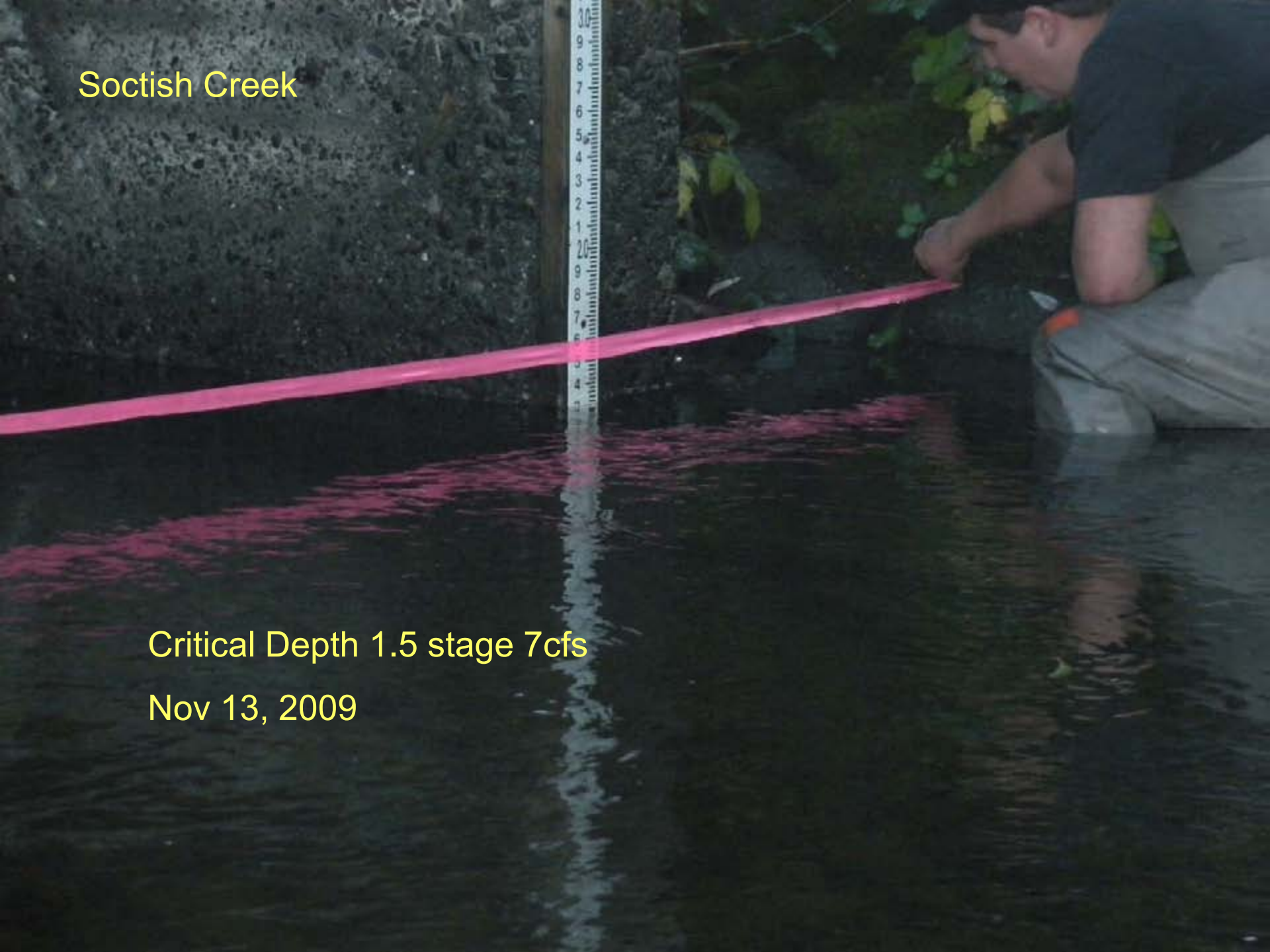
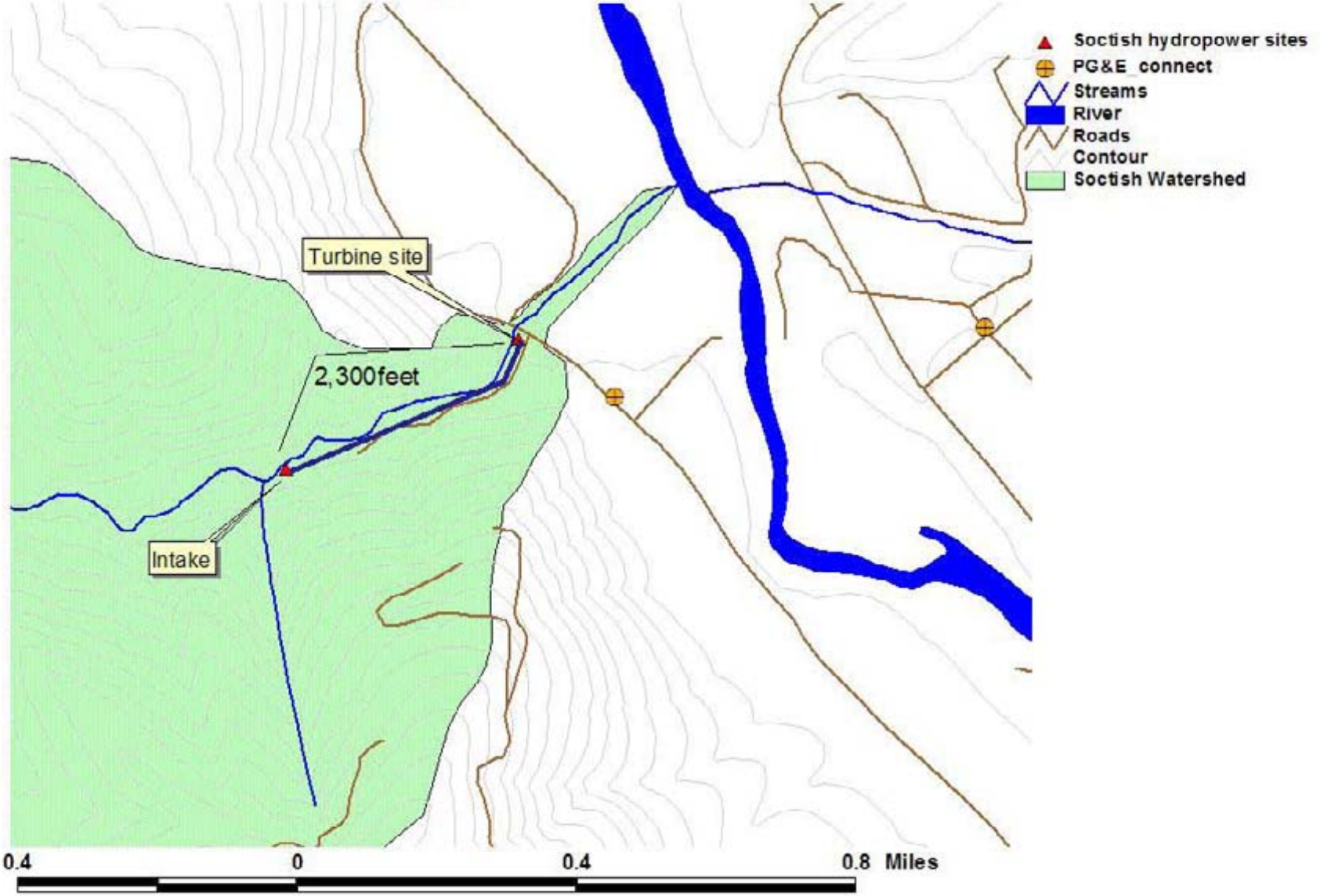



Soctish Creek
Critical Depth 1.5 stage 7cfs
Nov 13, 2009

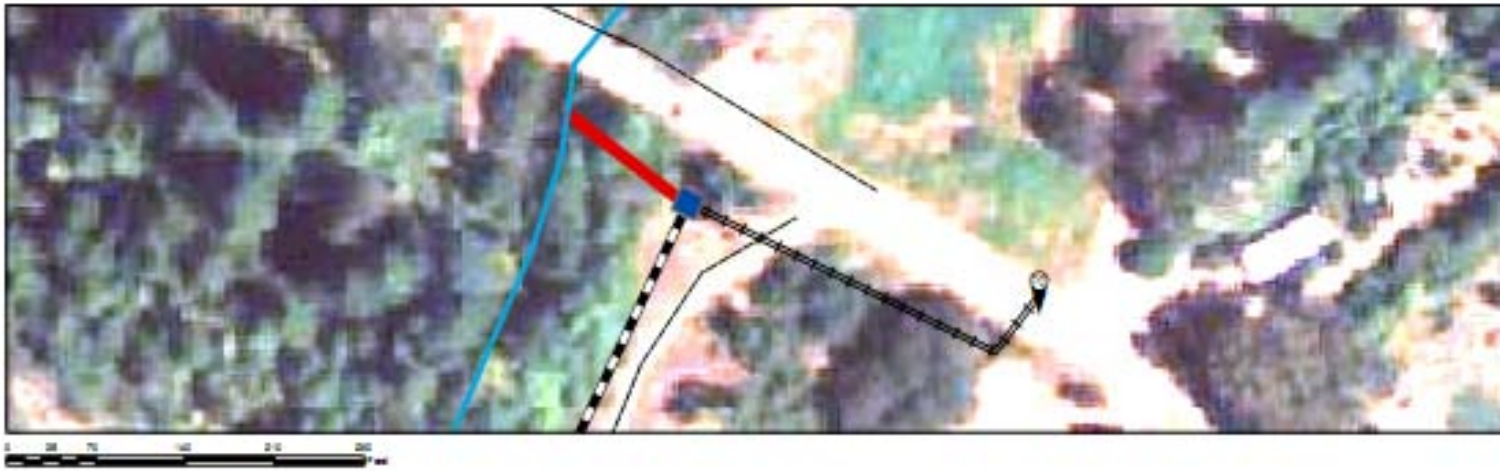
Soctish Hydropower site



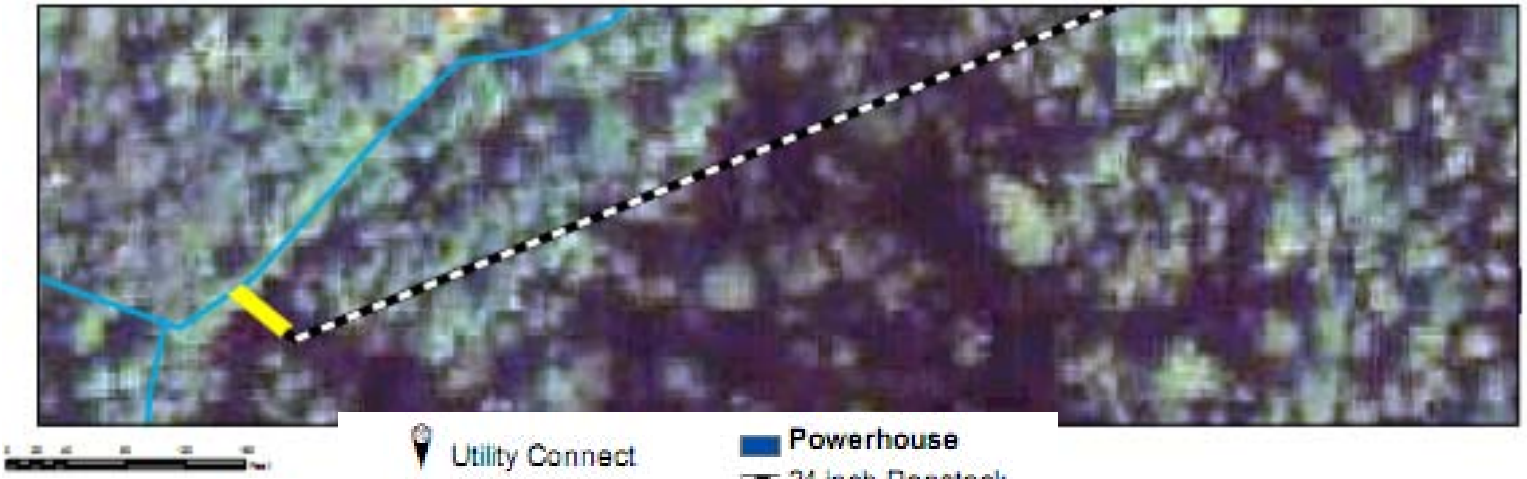
Concept Schematic for Soctish Creek

Soctish Creek

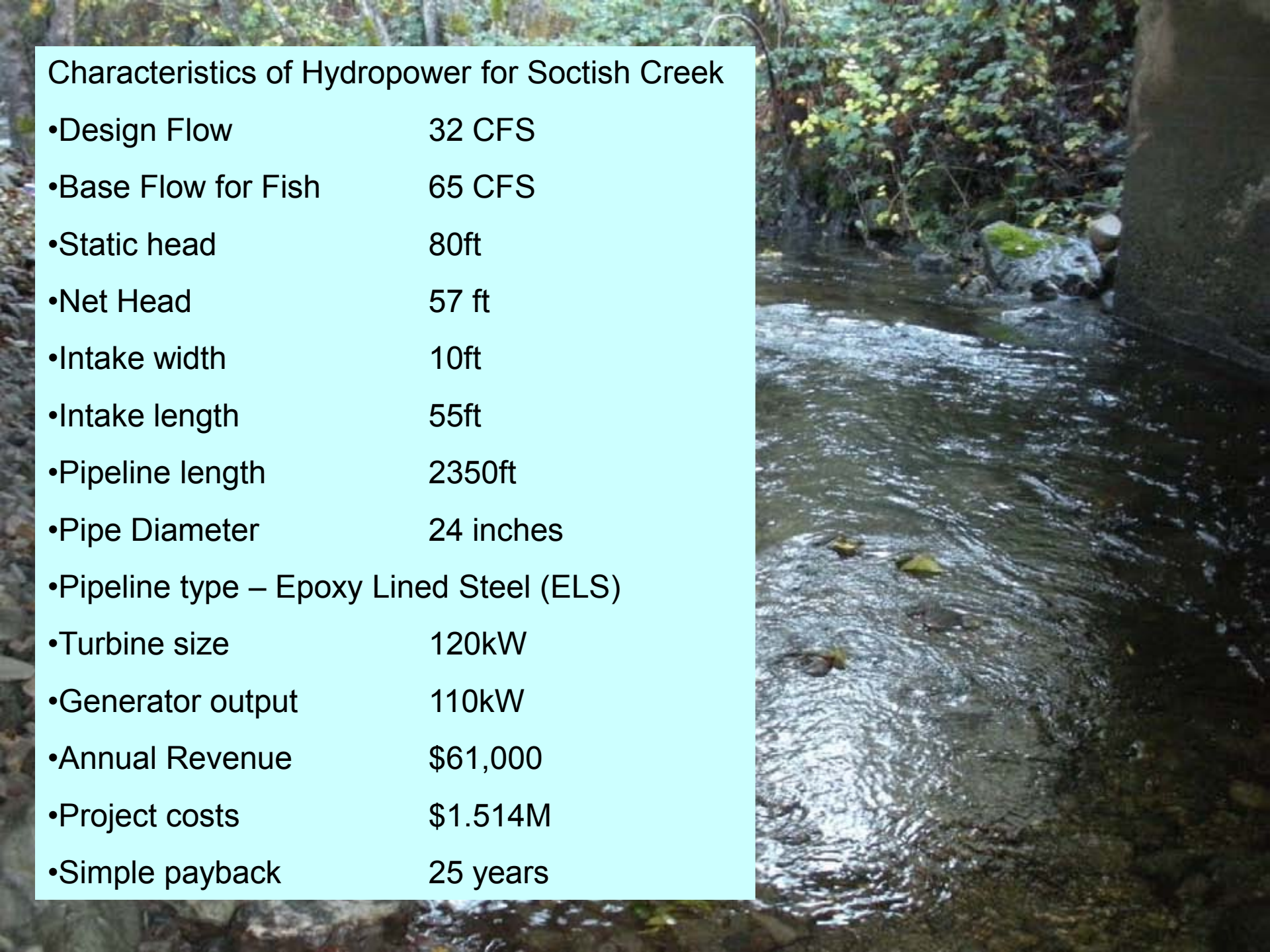
Power House and Spillway Locations



Intake Structure Location



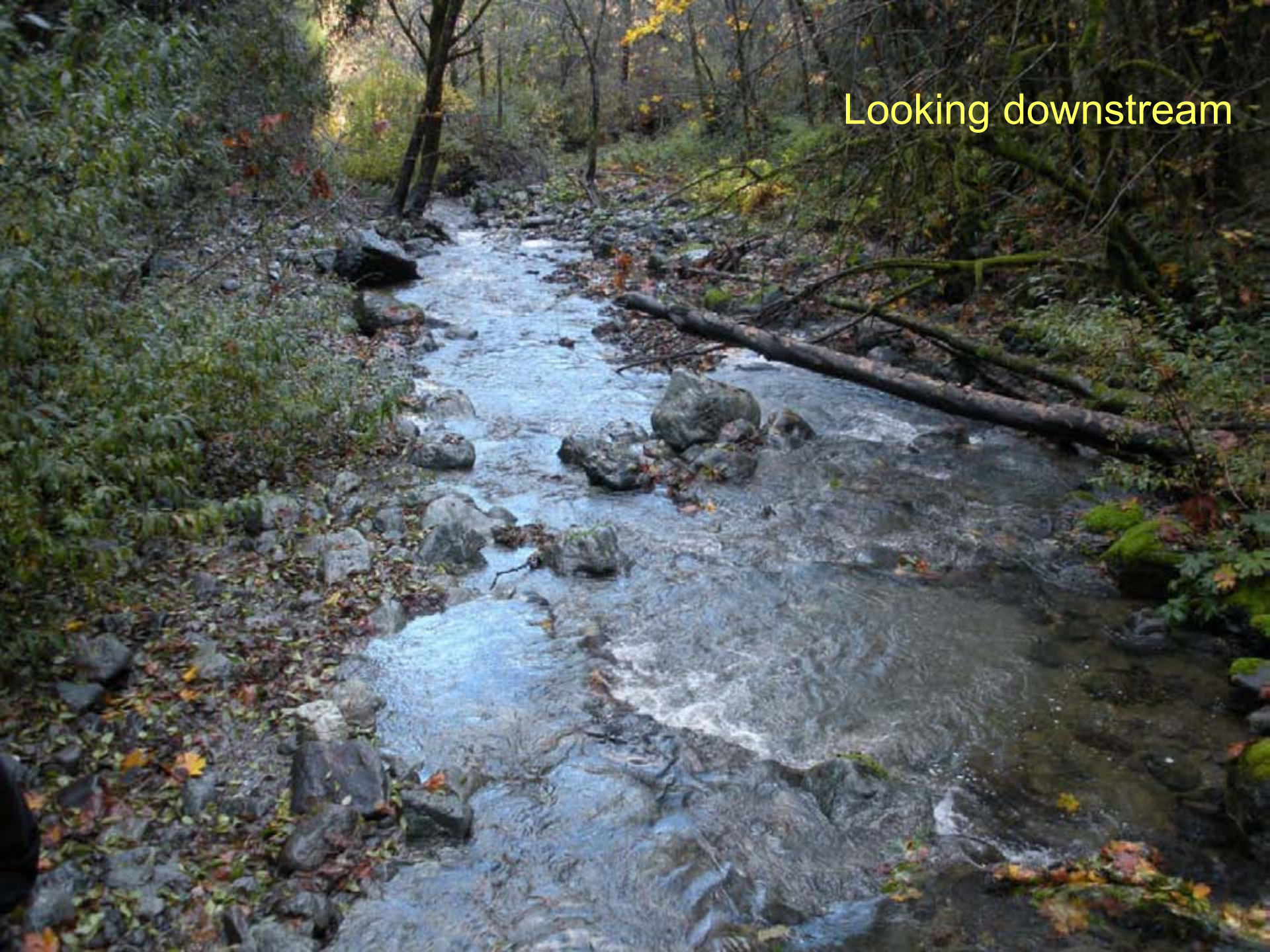
Soctish Creek



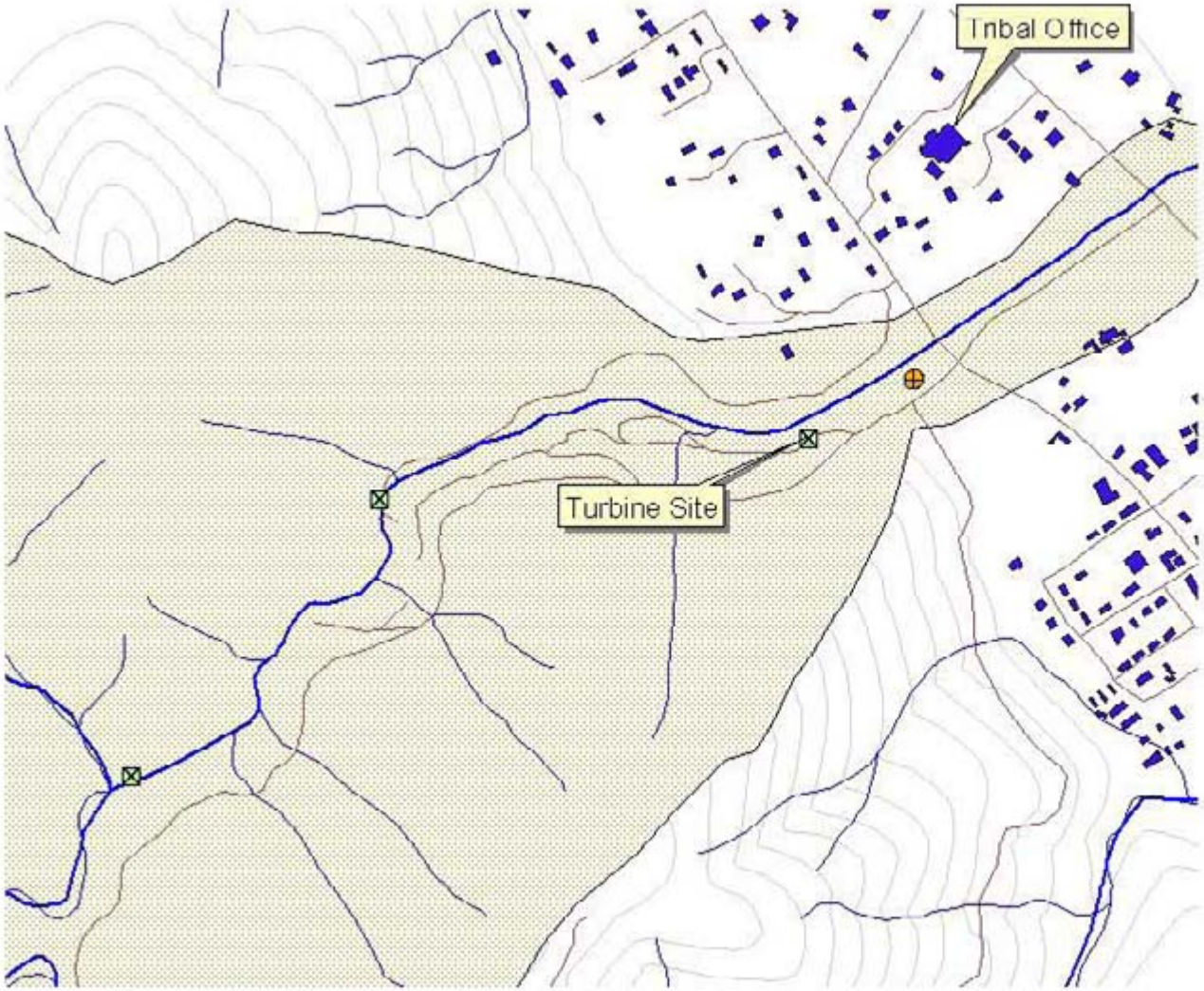
Characteristics of Hydropower for Soctish Creek

•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


Intake Location - Soctish Creek


Looking downstream

Supply creek hydro sites



Pge_connect.shp
Supply_hydro.shp
Creeks.shp
Trinity River
Roads
Reservation Streams
Building
Supply Creek Watershed
Contour at 80 ft.

N

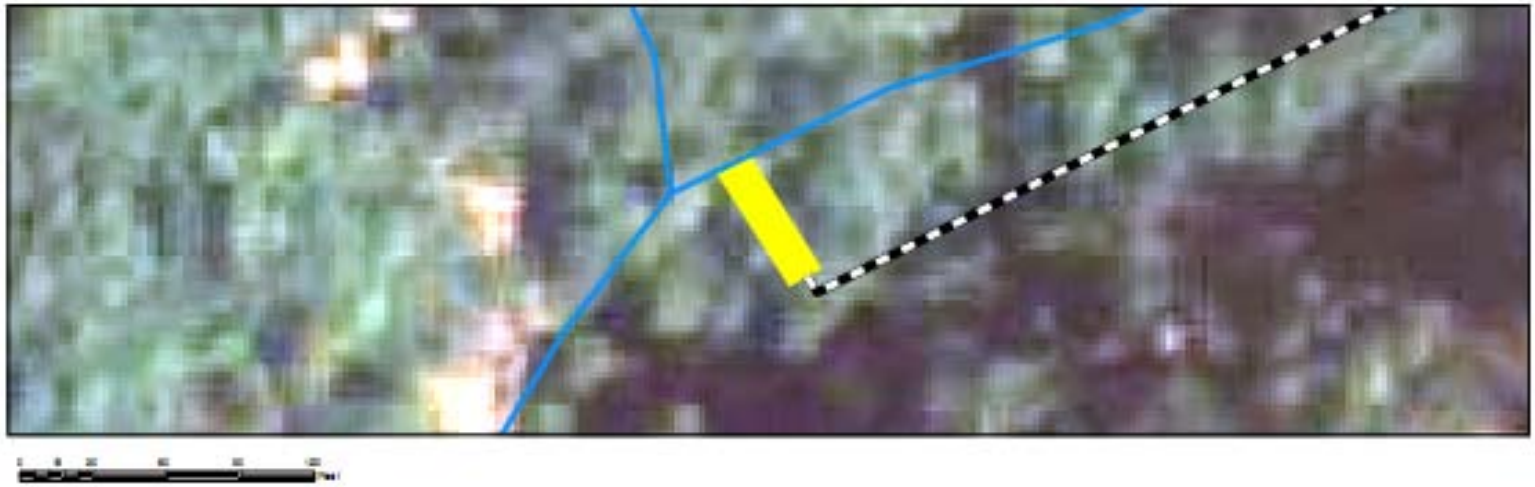
0.4 0 0.4 0.8 Miles

SCALE

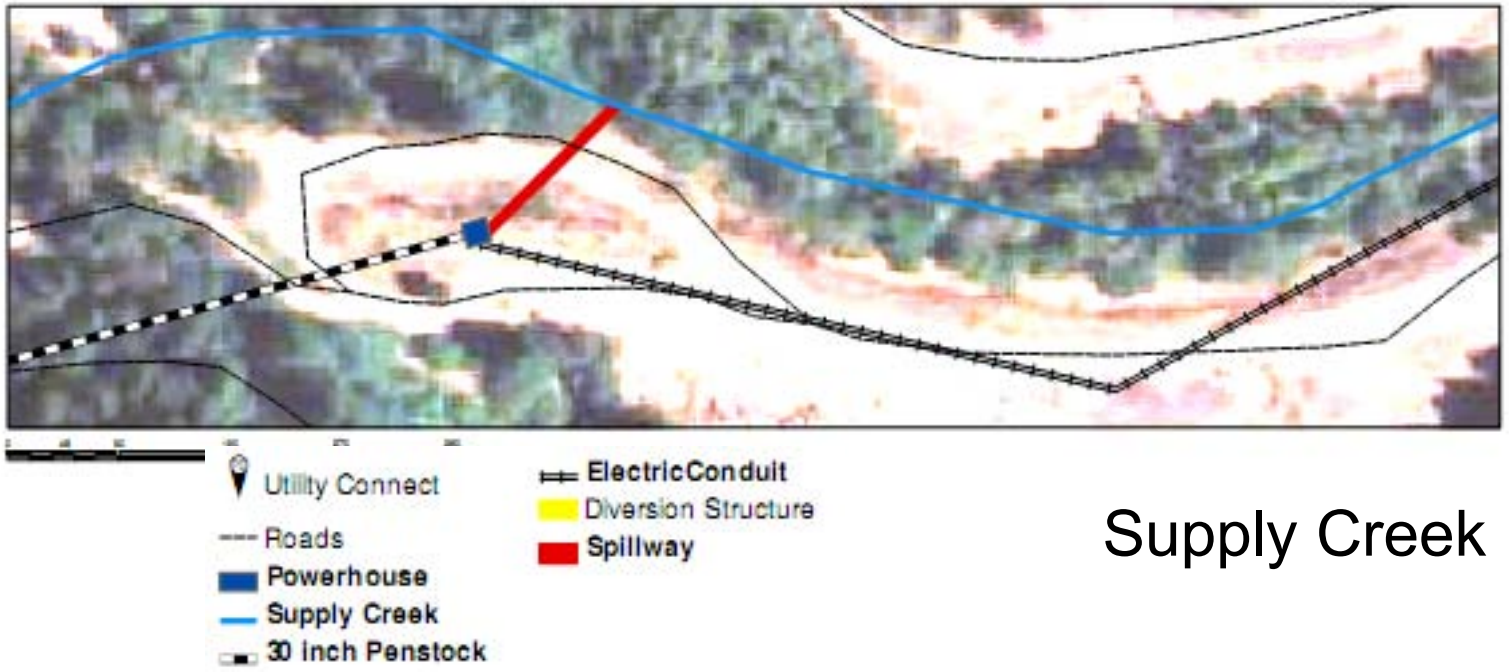
Concept Schematic for Supply Creek

Supply Creek

Intake Structure Location



Power House and Spillway Locations



Supply Creek

Characteristics of Hydropower Supply Creek

- Design flow 50cfs
- Base flow for fish 32cfs
- Intake width 15ft
- Intake length 55ft
- Static head 165ft
- Net head 146ft
- Pipeline diameter 30in
- Pipeline length 3400ft
- ELS pipe
- Turbine size 508kW
- Generator 475kW
- Annual revenue $164,400
- Project cost $2.347M
- Simple payback 14 years

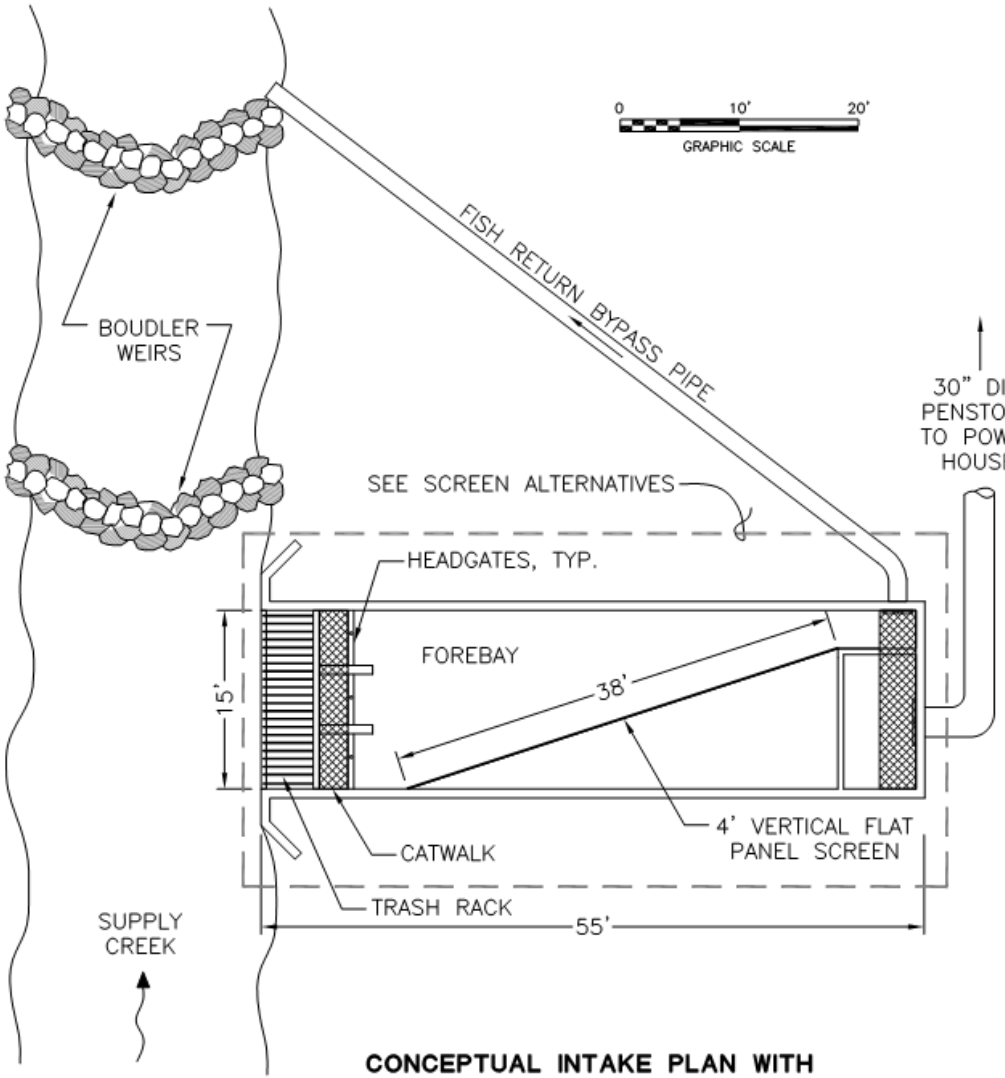

Supply Creek Intake location


Landscape obstacle


Along pipeline route

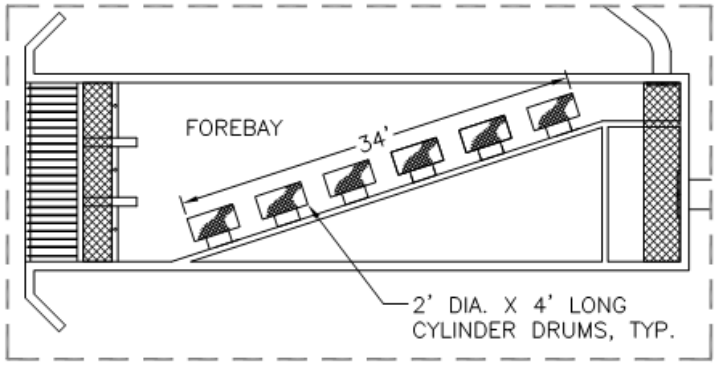

Turbine site


Supply Creek 1.5 ft stage 27cfs
Nov 13, 2008



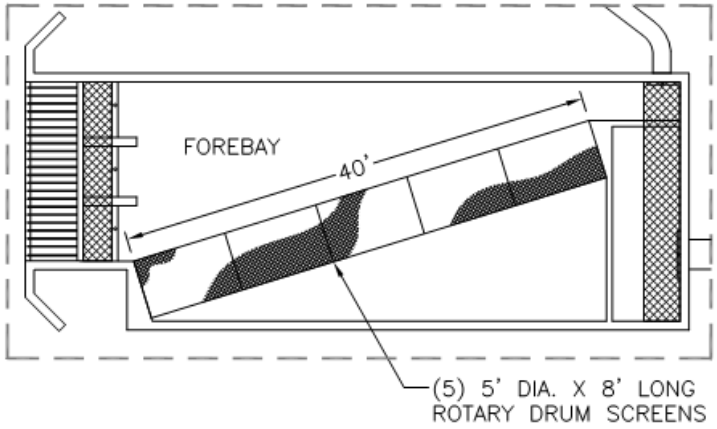
CONCEPTUAL INTAKE PLAN WITH VERTICAL FLAT PANEL SCREEN

SCALE: SEE SCALE BAR



CYLINDRICAL TEE SCREEN ARRAY

SCALE: SEE SCALE BAR



ROTARY DRUM SCREEN

SCALE: SEE SCALE BAR

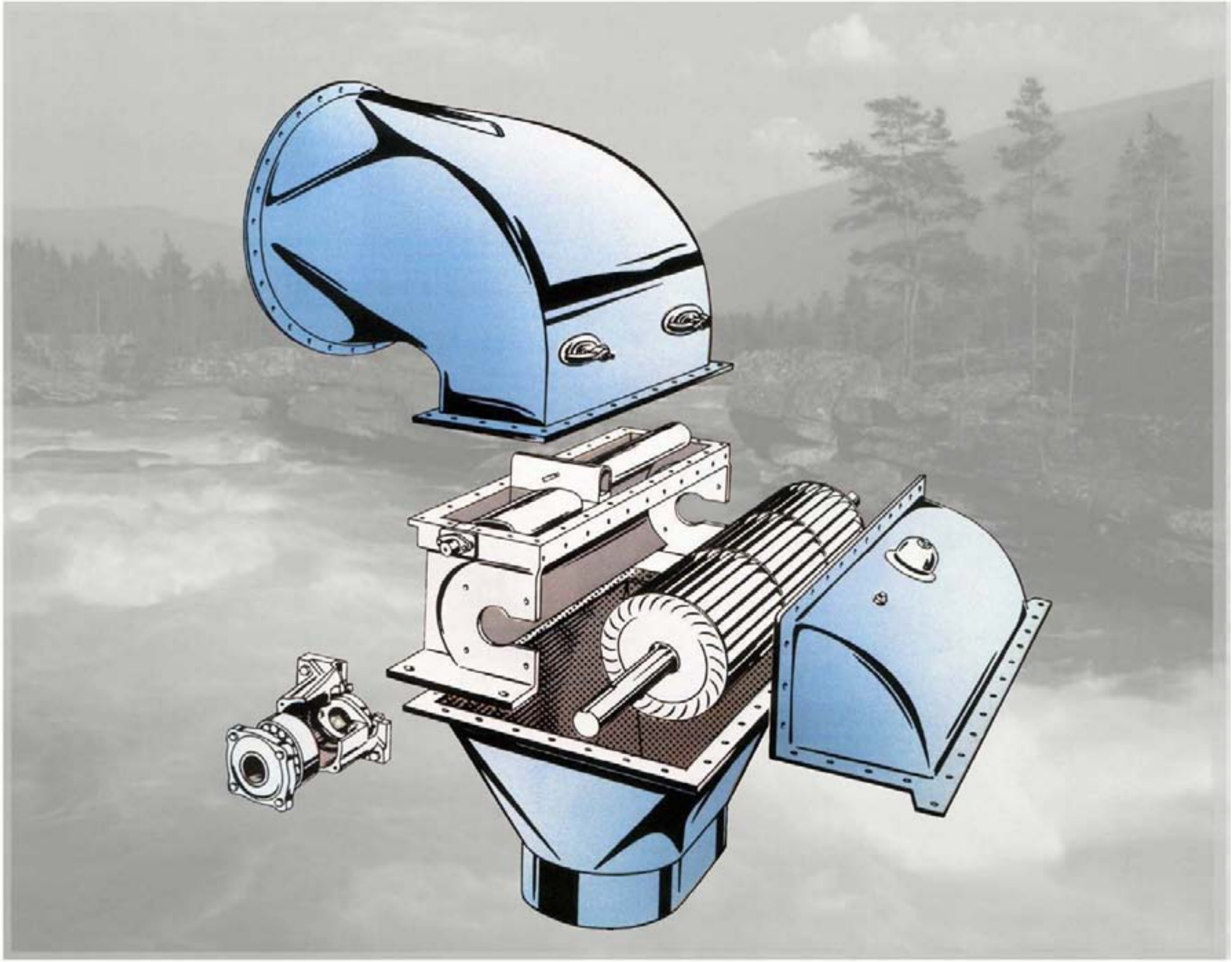
SUPPLY CREEK
CONCEPT INTAKE STRUCTURE
FISH SCREEN ALTERNATIVES
HOOPA VALLEY TRIBE SMALL HYDROELECTRIC
FEASIBILITY ANALYSIS

WINZLER & KELLY

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