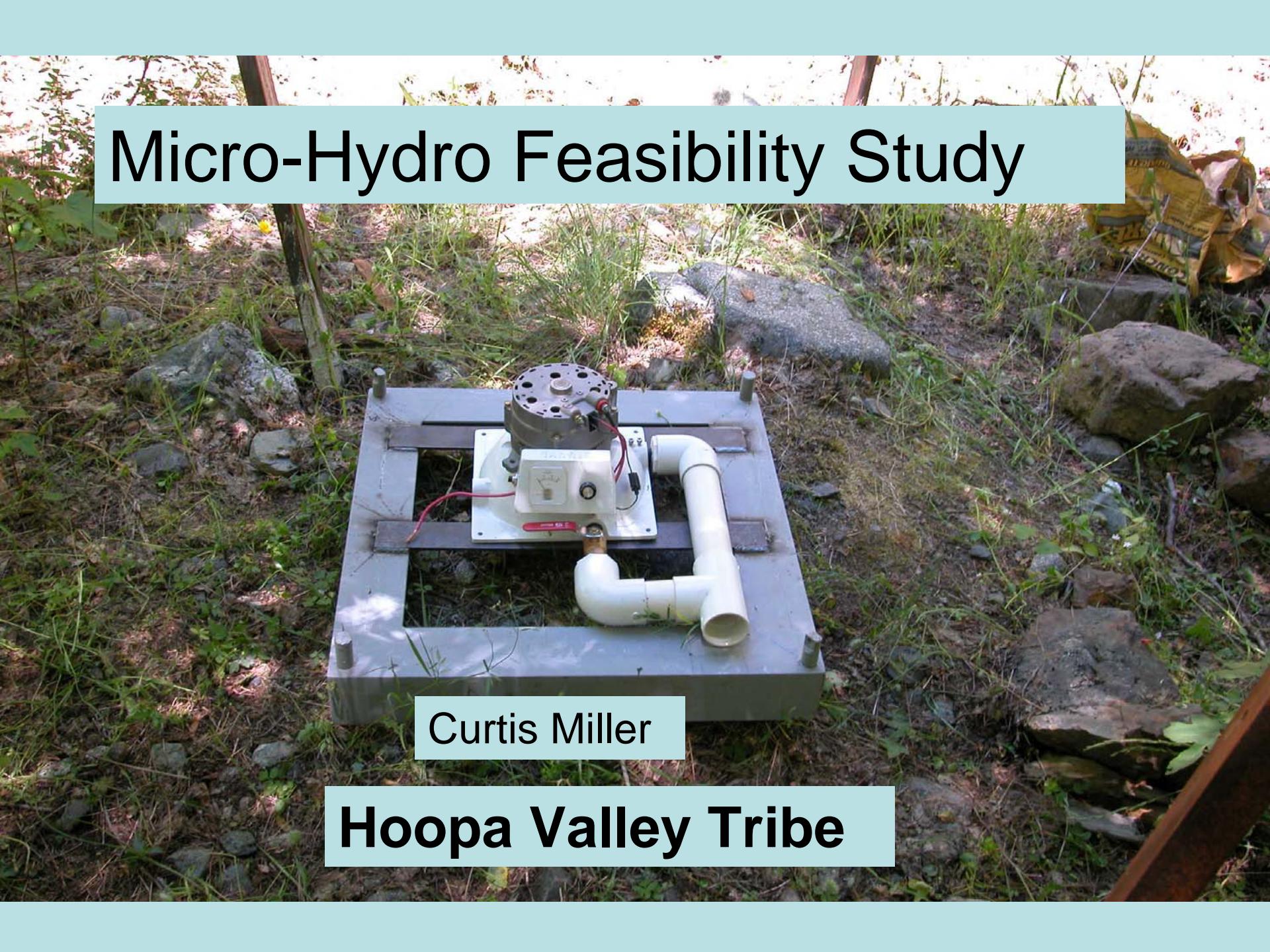


Micro-Hydro Feasibility Study



Curtis Miller

Hoopa Valley Tribe

The Hoopa Valley Reservation was established in 1868 by executive order of Ulysses S. Grant and contains the aboriginal homeland of the Hupa People. It encompasses approximately 100,000 acres and is 96% owned by the Hoopa Tribe.

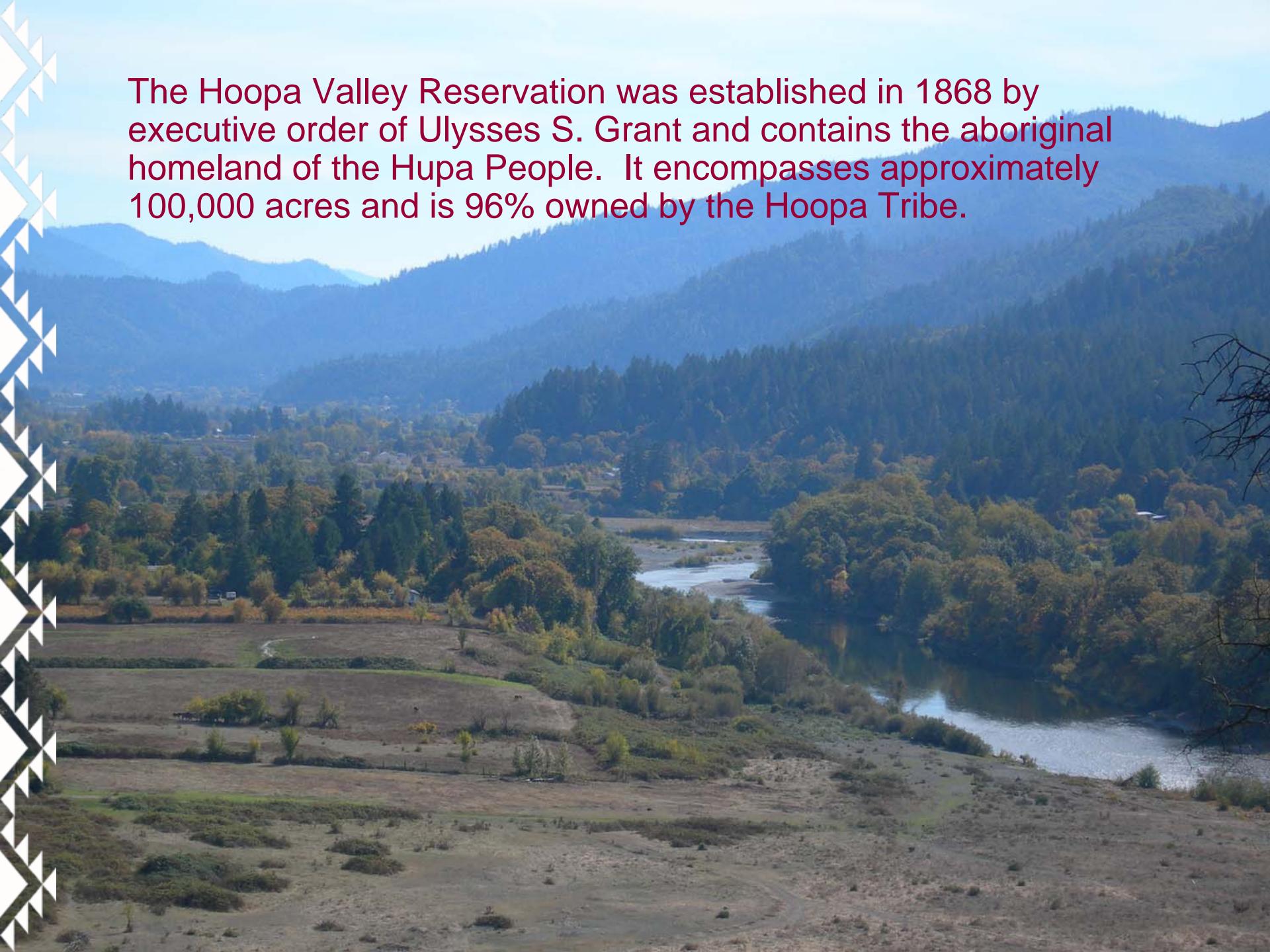
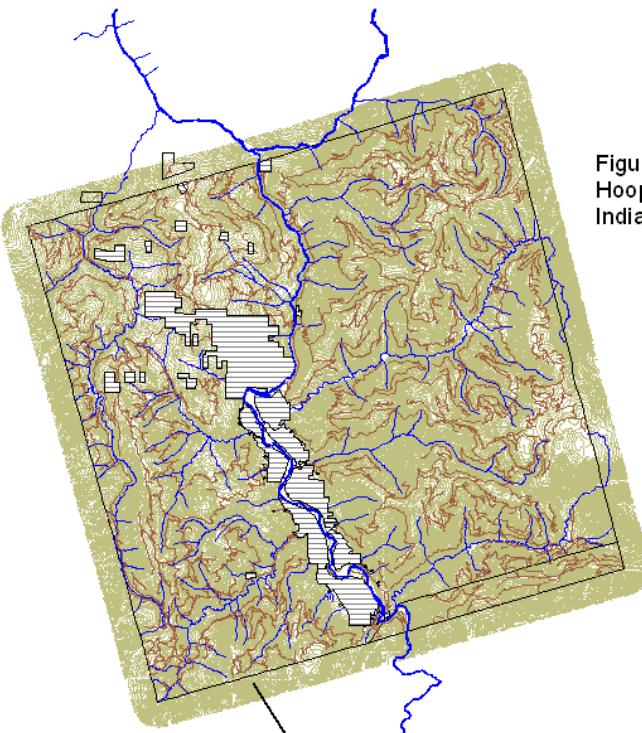


Figure 1. Location of the
Hoopa Valley
Indian Reservation



California

Hoopa Valley
Indian Reservation



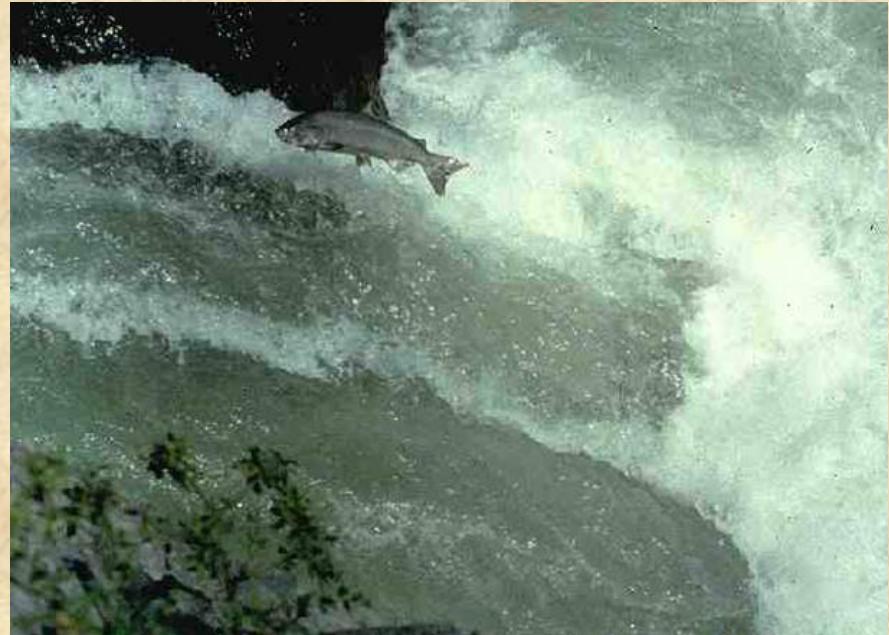
San Francisco

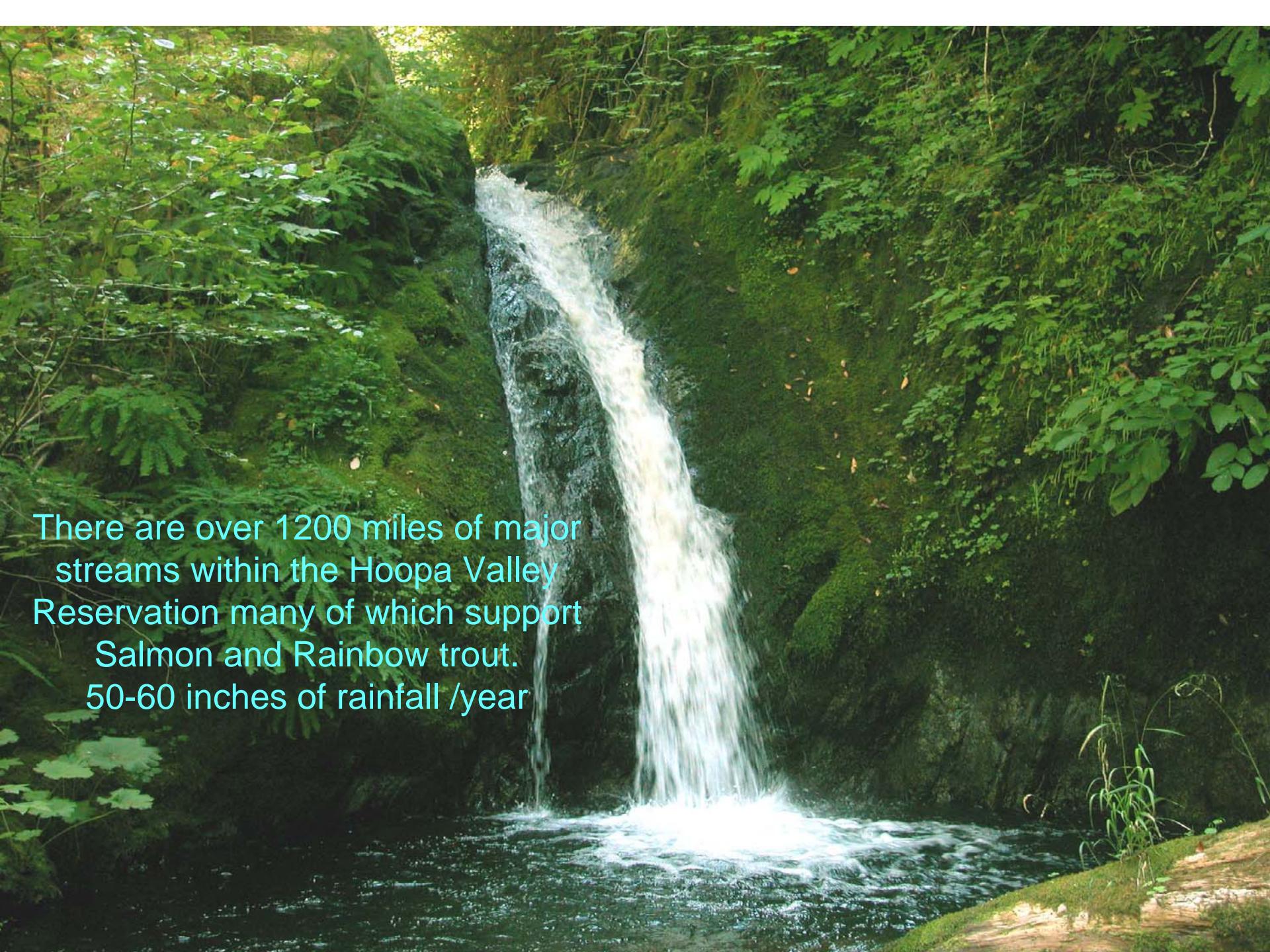
G-10 IMG 16 MAY 06 TIME=17:450TG RES=01.00KM NWS/WR-SSD

Hoopa Valley Indian Reservation ■

20002 G-10 IMG 1 16 MAY 06136 174500 03780 16129 01.00

Salmon are the life blood of the Hupa and Yurok and Karuk people



A photograph of a waterfall in a dense forest. The waterfall flows down a steep, mossy cliff face covered in various shades of green foliage and ferns. The water creates a white, foamy pool at the bottom. The surrounding environment is dark and shaded by the dense canopy of trees.

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

Why Hydro?

- Most common renewable energy
- Well developed technology
- Most efficient means of producing electricity
- Multiple uses of water resource
- Ideal for distributed generation
- Least expensive power in US



Hydro Efficiency

- Generates between 205-267 times the amount of energy to build and maintain the facility
- Windpower is 37x
- Nuclear is 16x
- Coal is 11x



In FY06 the Hoopa Valley Tribe received a grant from the DOE to conduct a hydro-power feasibility study on 7 major streams of the Reservation



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



Issue(s)

The Hoopa Valley Tribe has been involved in legal battles with upstream dams for over 10 years

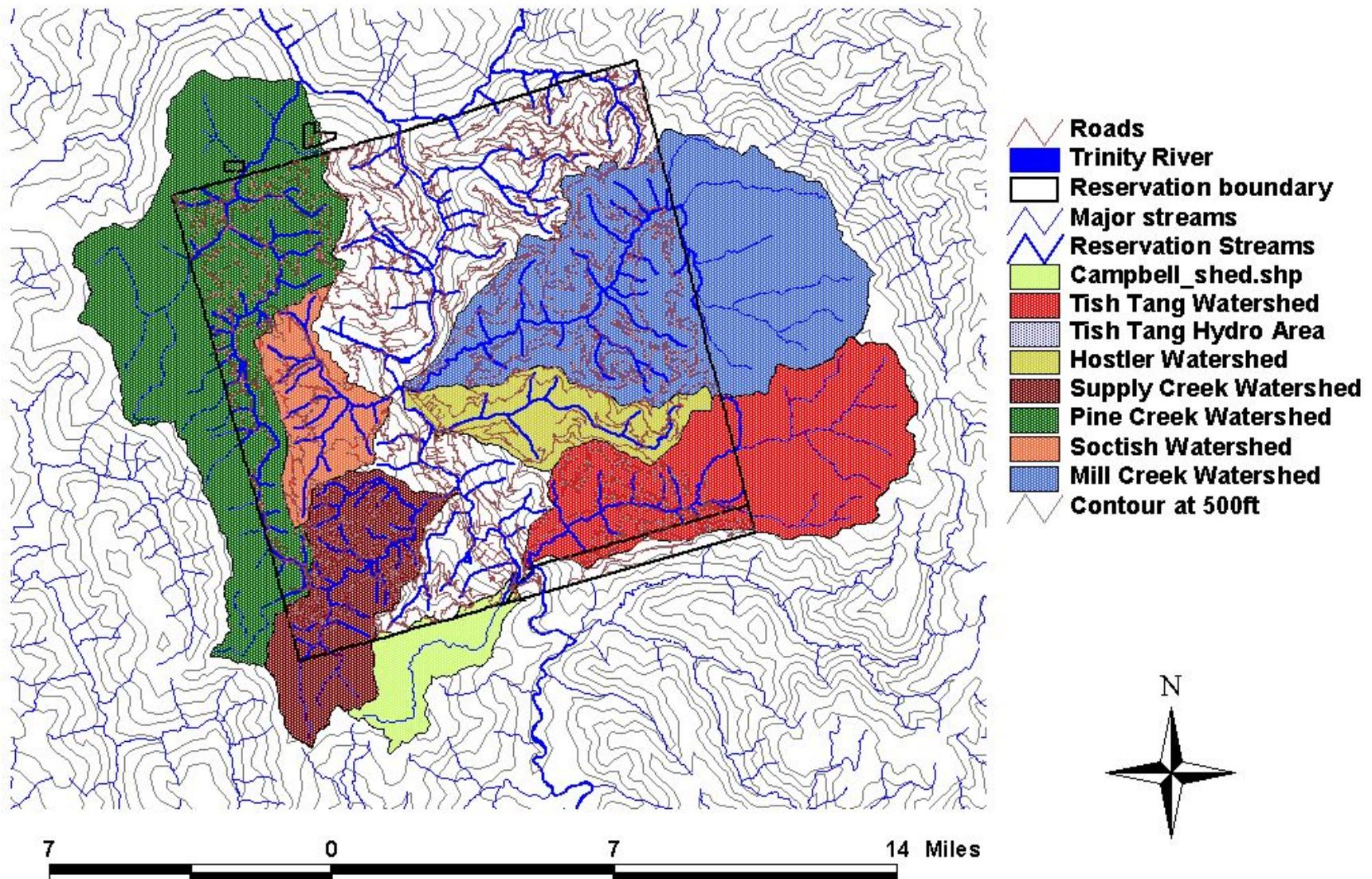
In 2003 the Tribe won it's case for 30% more water from the Lewiston dam to support Salmon fisheries in the Trinity and Klamath Rivers



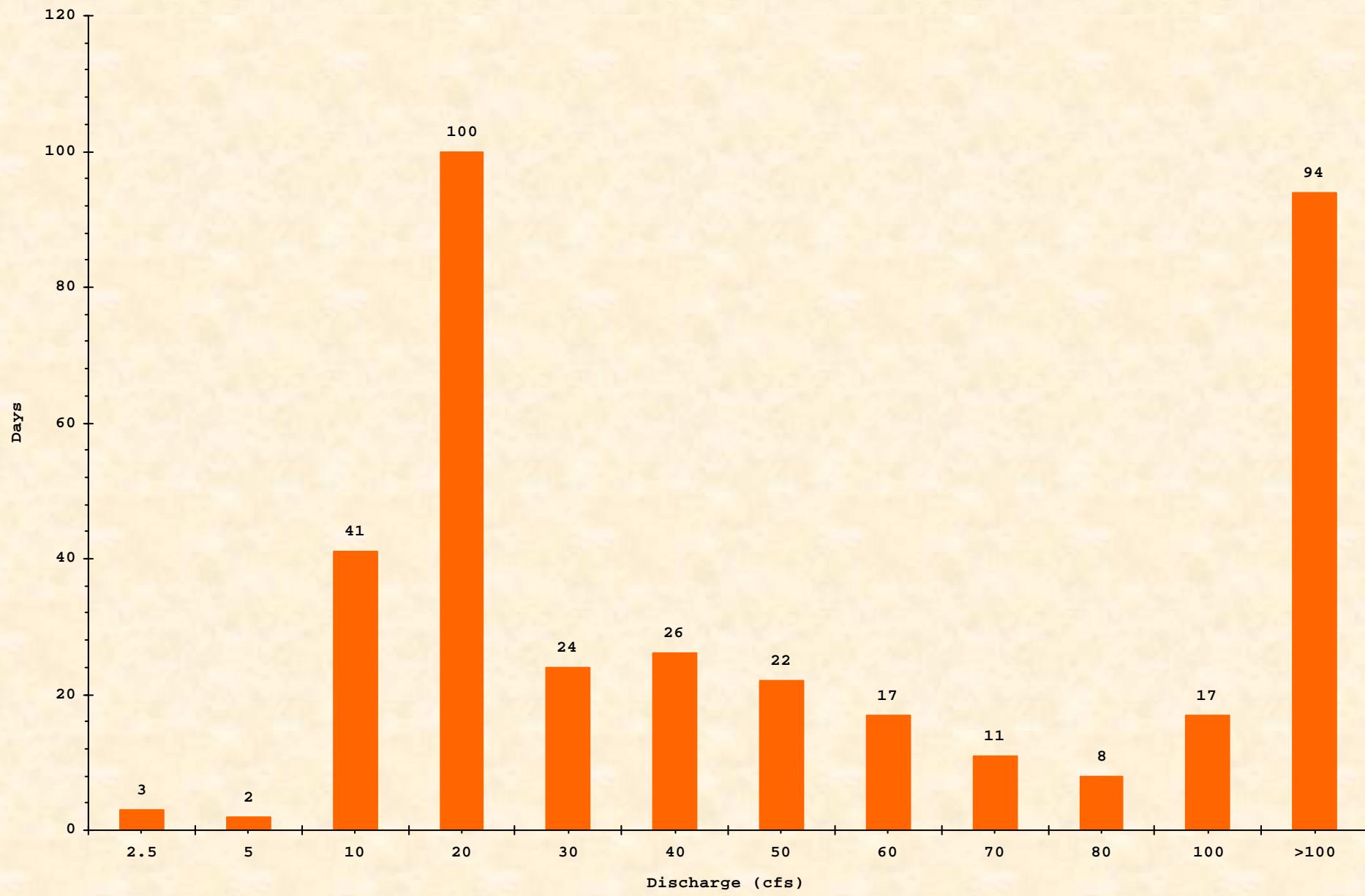
Lewiston Dam – Trinity River



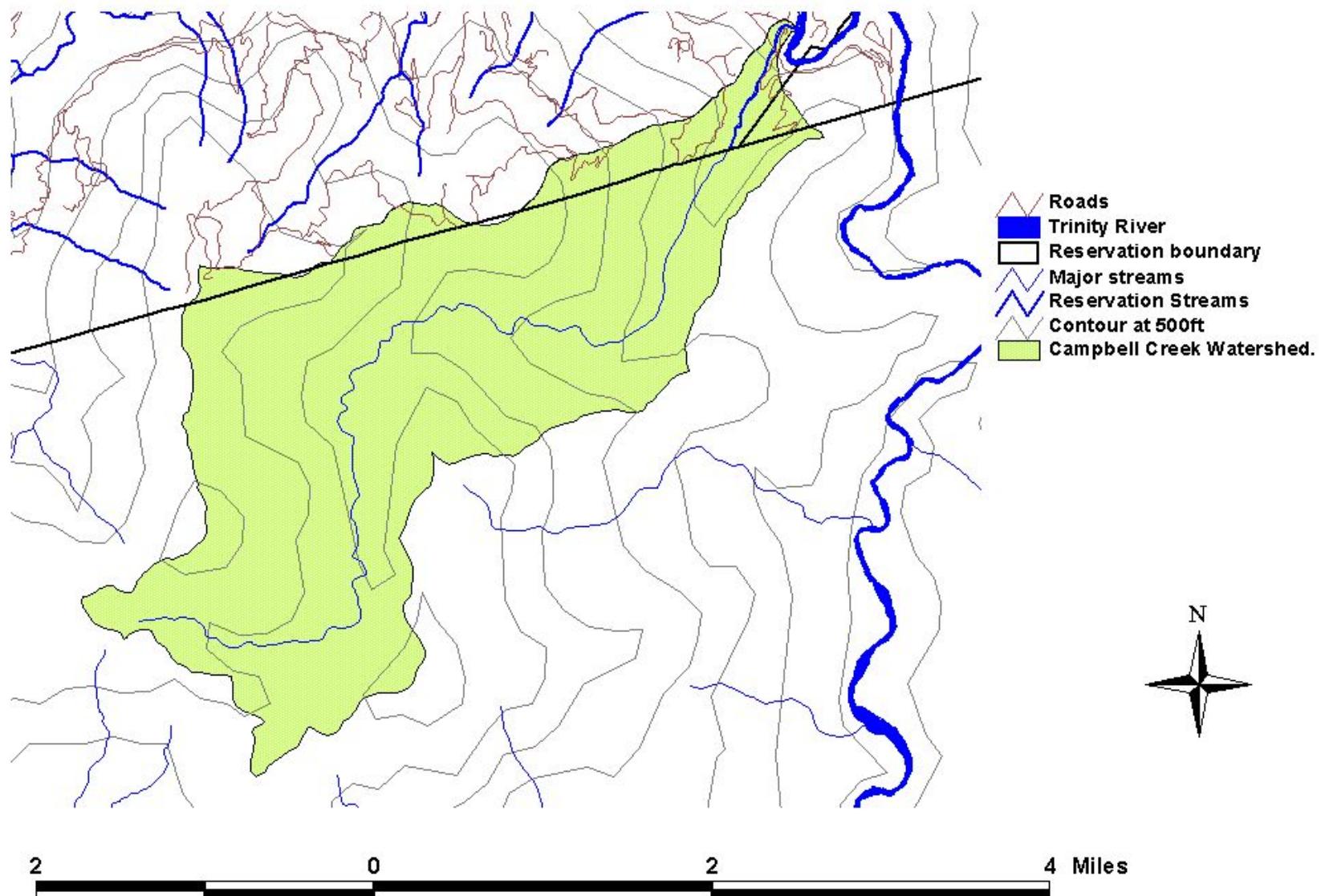
Hoopa Valley Hydrosheeds



Lower Supply Creek Discharge Frequency
365 days, Water Year 2005



Campbell Creek Watershed



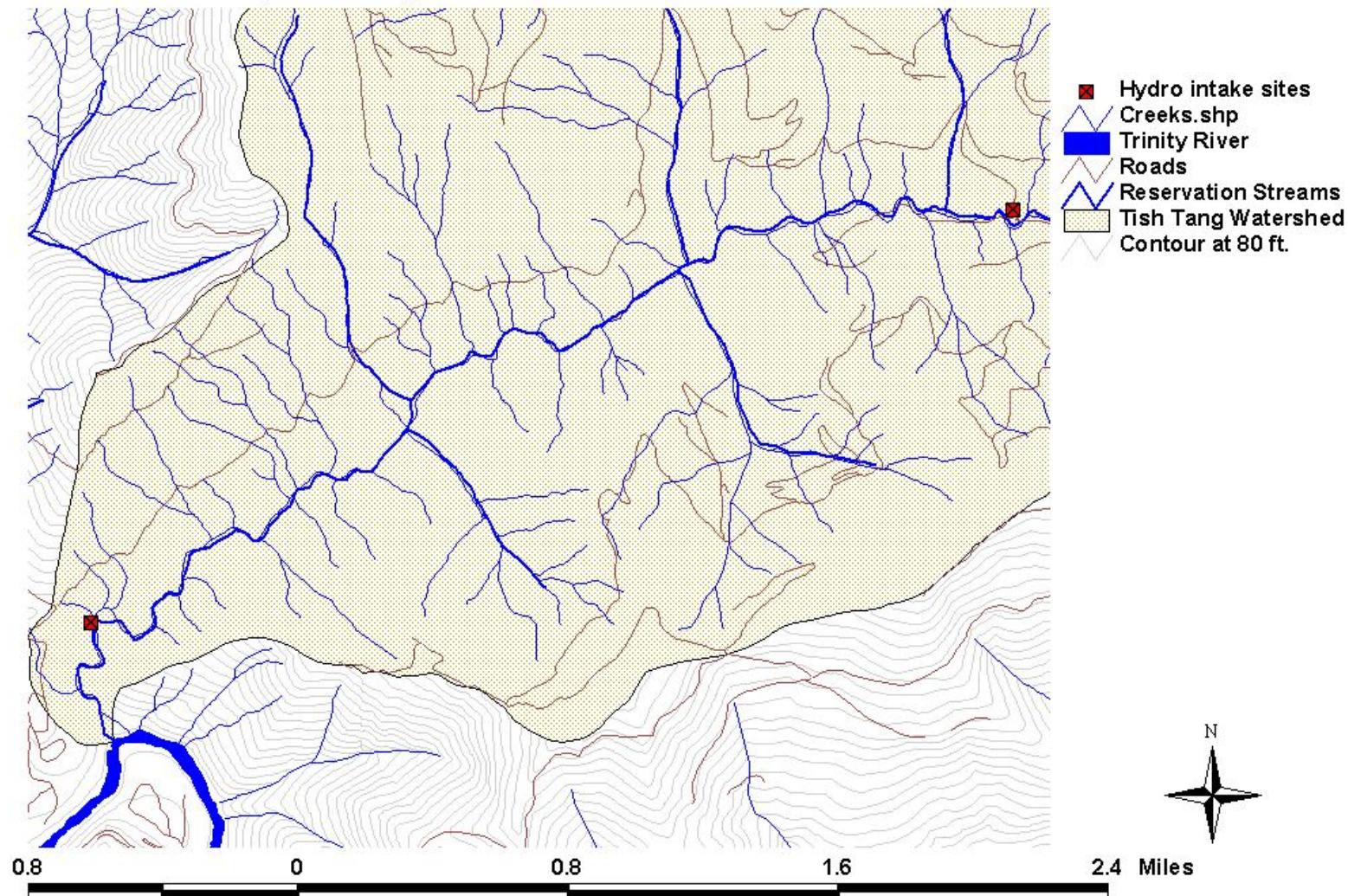
Upper Campbell Creek Landslide Off Reservation Impacts



Campbell Creek Sediments



Lower Tish Tang Creek Hoopa Valley

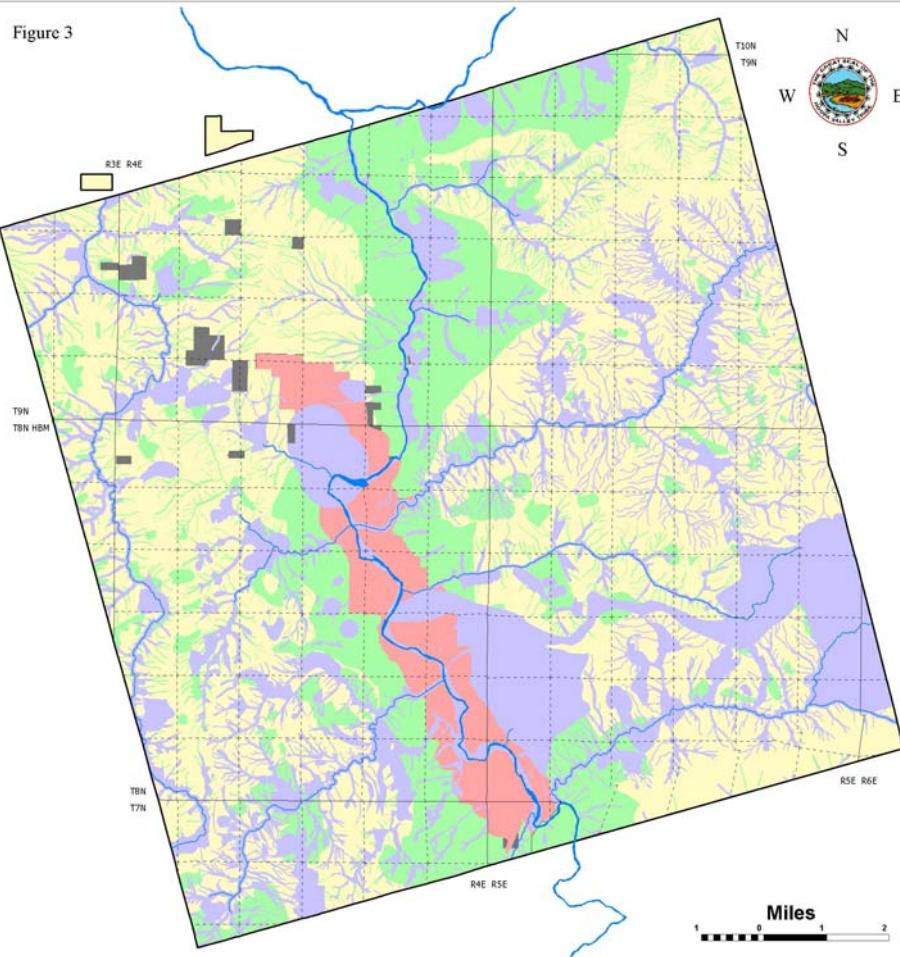


Problems with Tish Tang

- Very gradual gradient 5-10%
- Unstable slopes
- Timber set asides
- Cultural sites
- Lack of low elevation site for turbine



Figure 3



HOOPA VALLEY INDIAN RESERVATION Harvest Restrictions

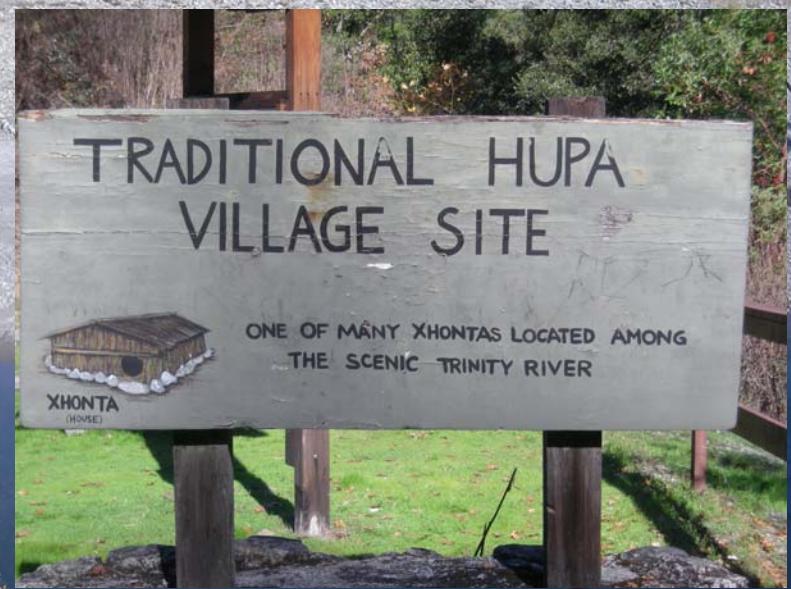
Harvest Restrictions

Non-Urban Fee and Allotted	Intensive	Partial Cut	Section	Streams
No Cut	Urban		Township	River

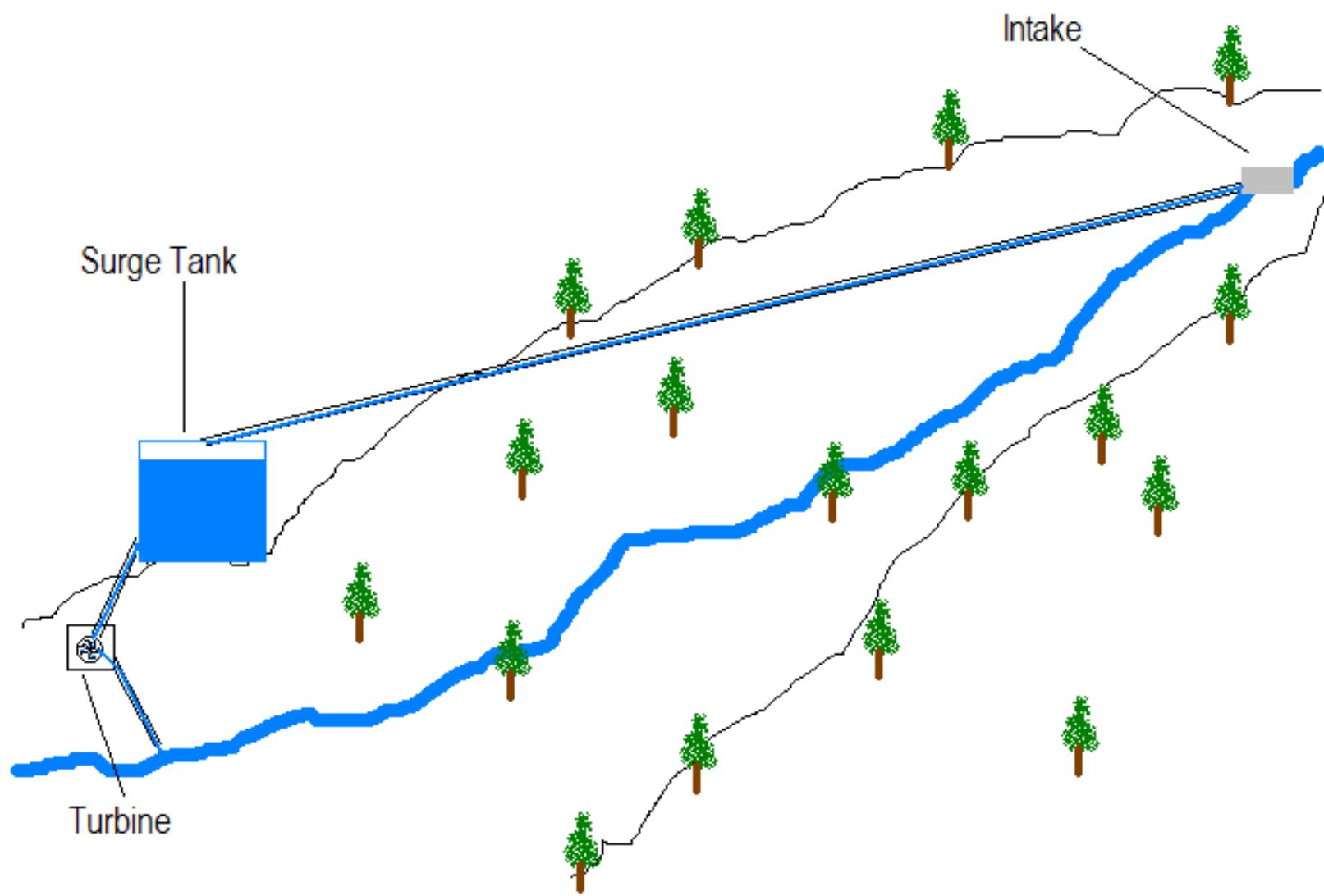


Instability

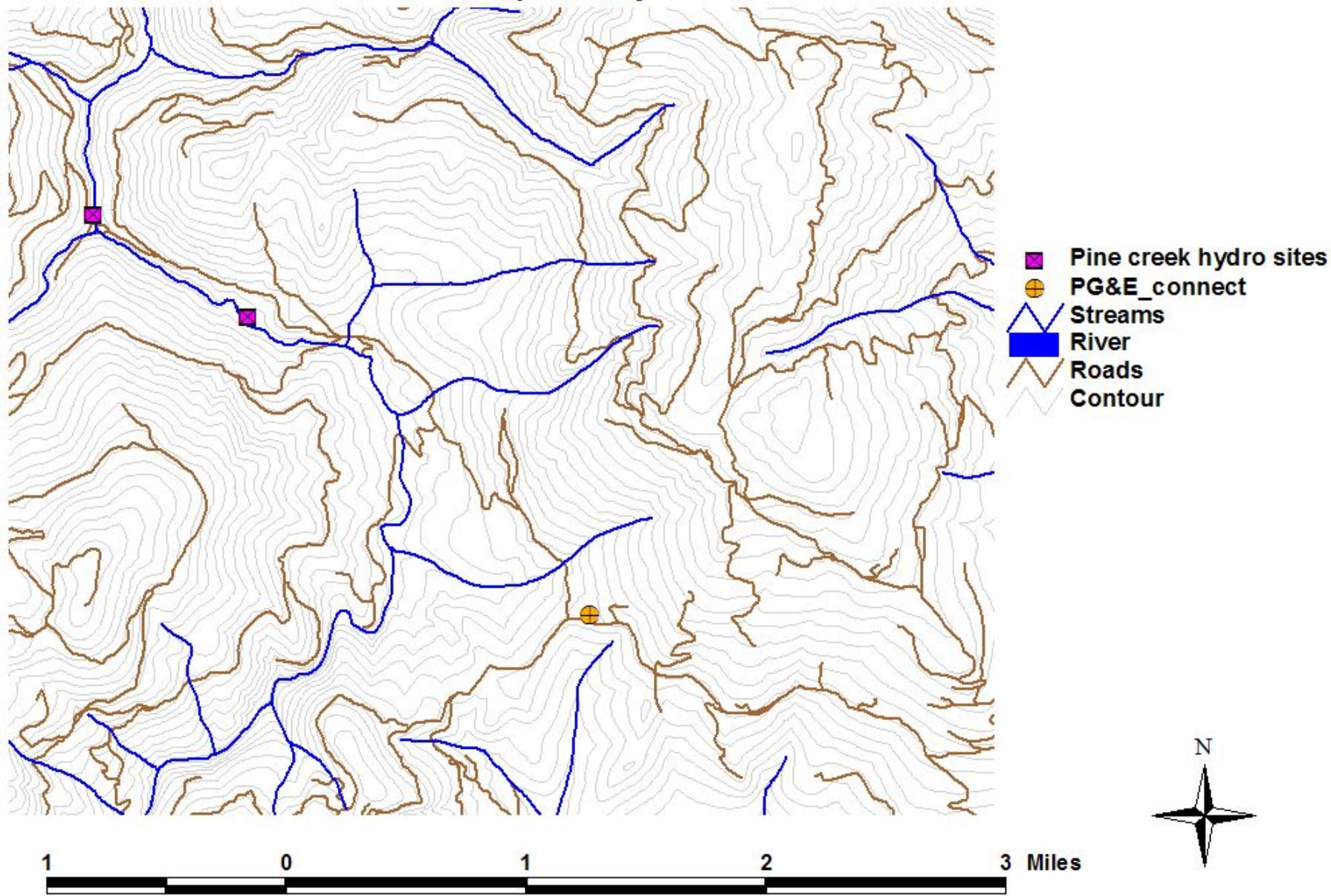




Alternative Concept



Pine Creek Hydro Sites Hoopa Valley

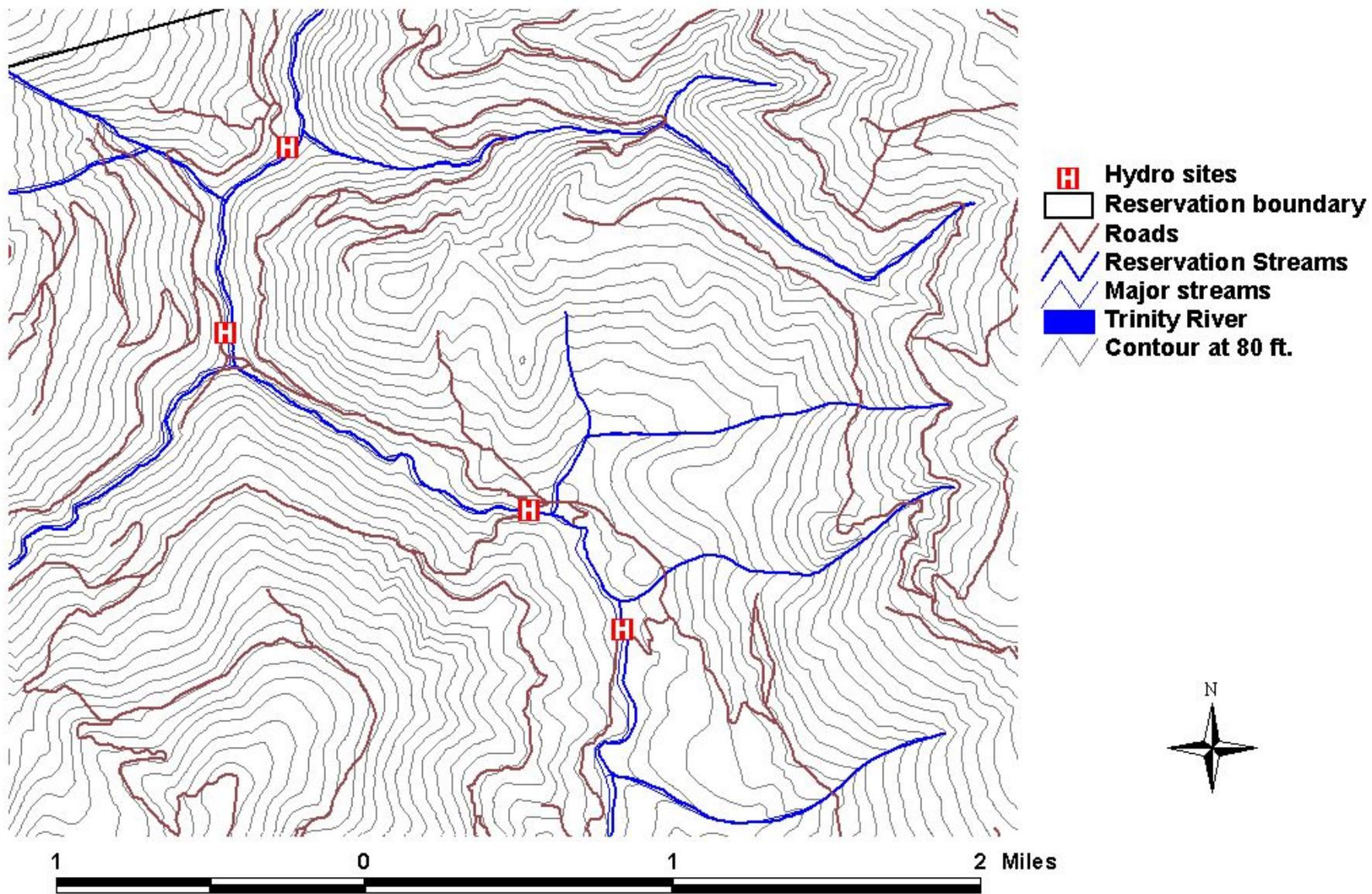




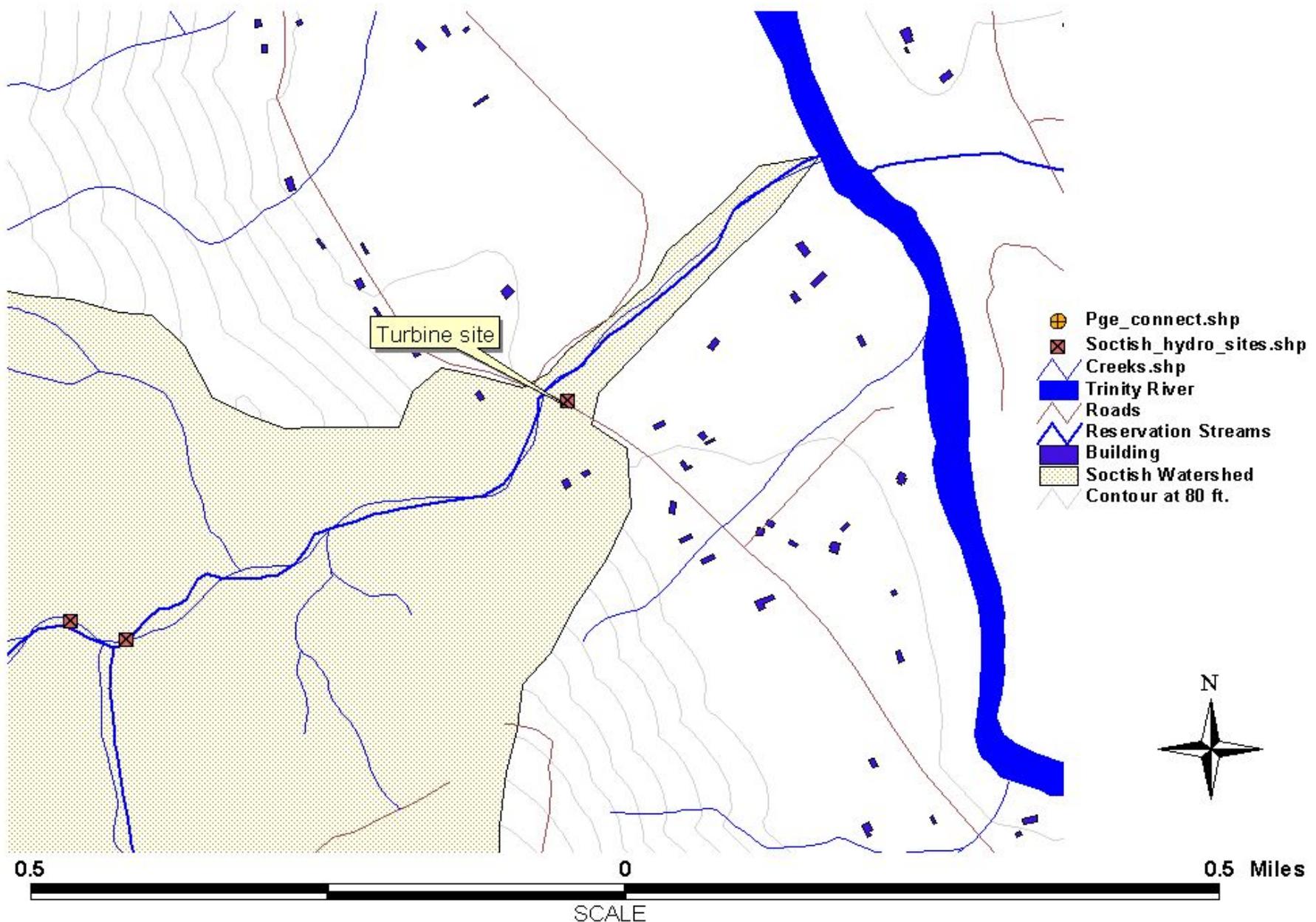
Pine Creek

- 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

Pine Creek Hydro Sites



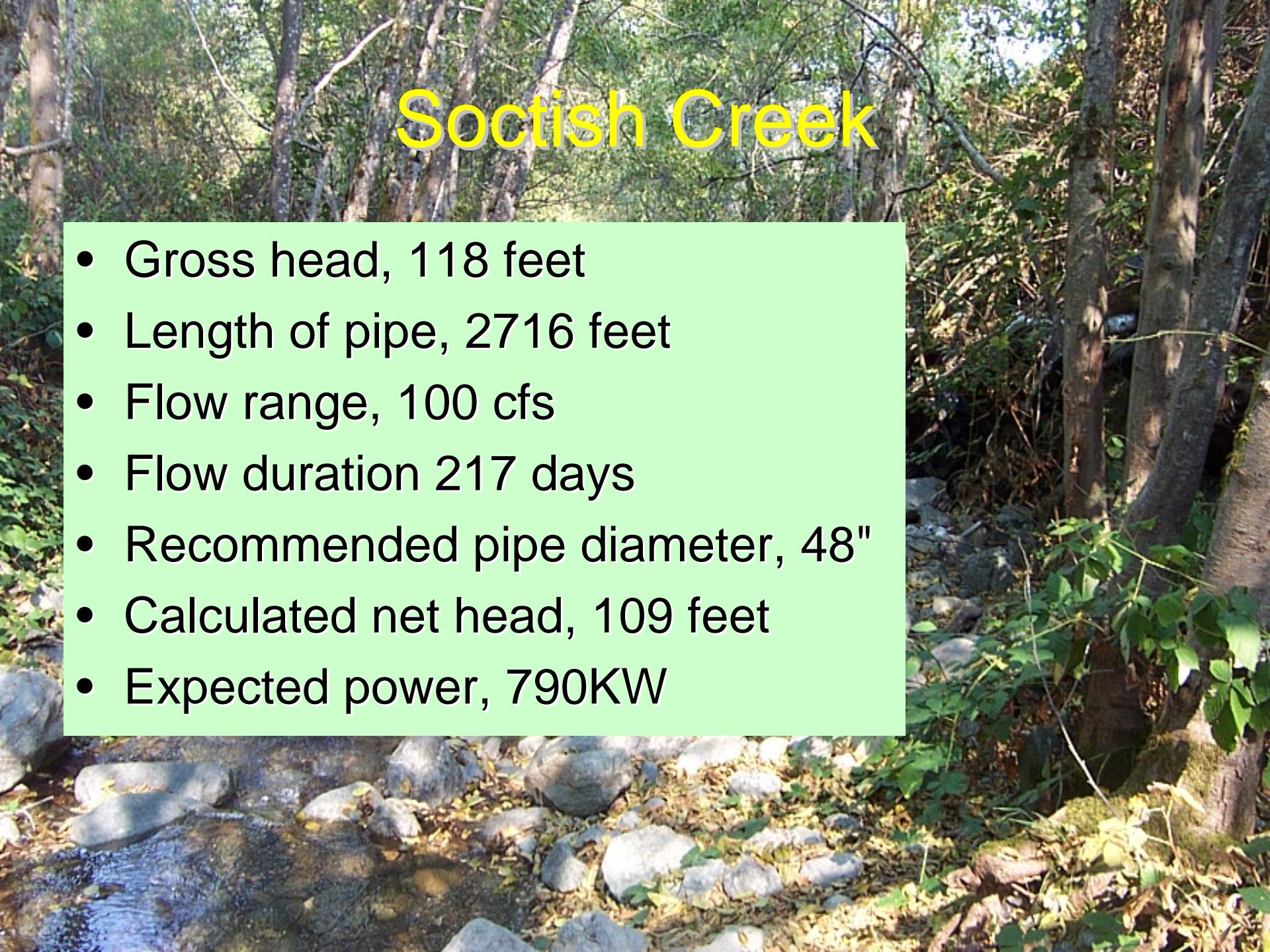
Soctish Creek Hydro Sites



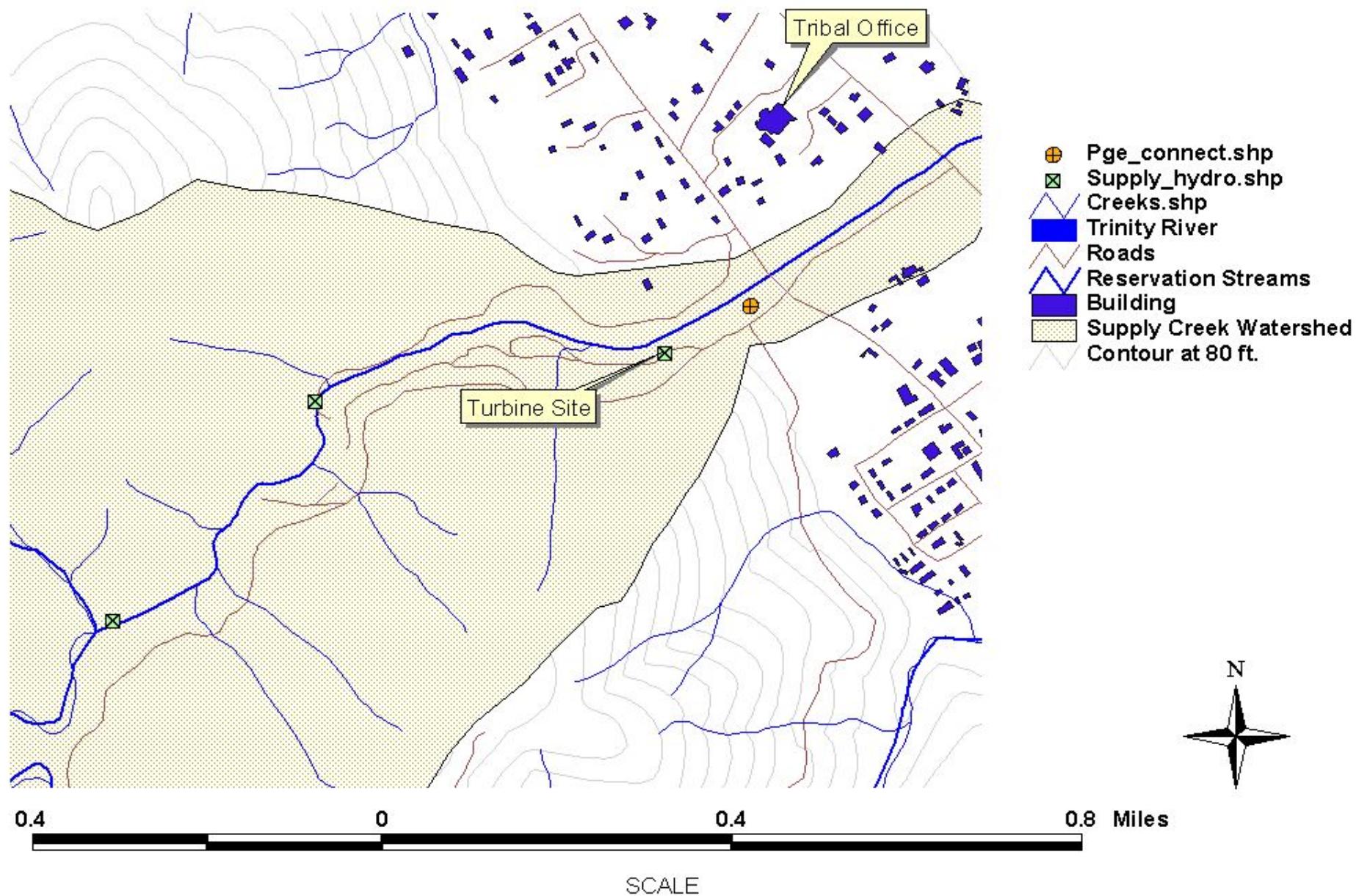


Soctish Creek

- Gross head, 118 feet
- Length of pipe, 2716 feet
- Flow range, 100 cfs
- Flow duration 217 days
- Recommended pipe diameter, 48"
- Calculated net head, 109 feet
- Expected power, 790KW



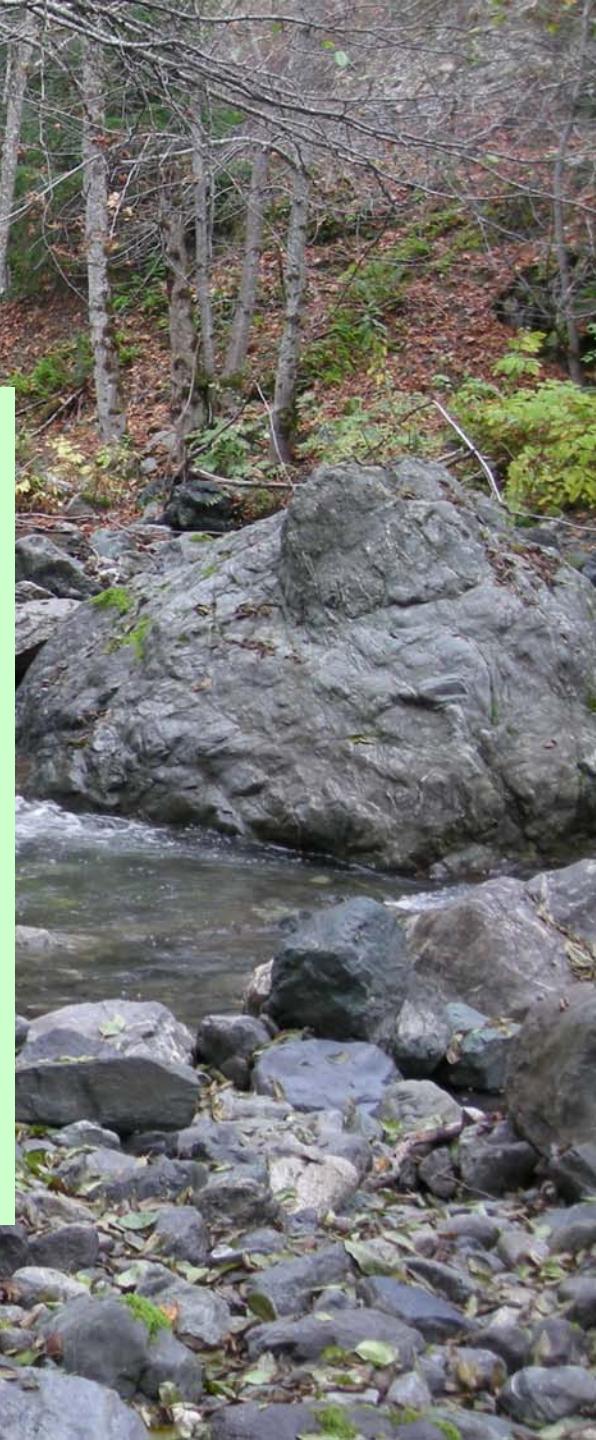
Supply creek hydro sites



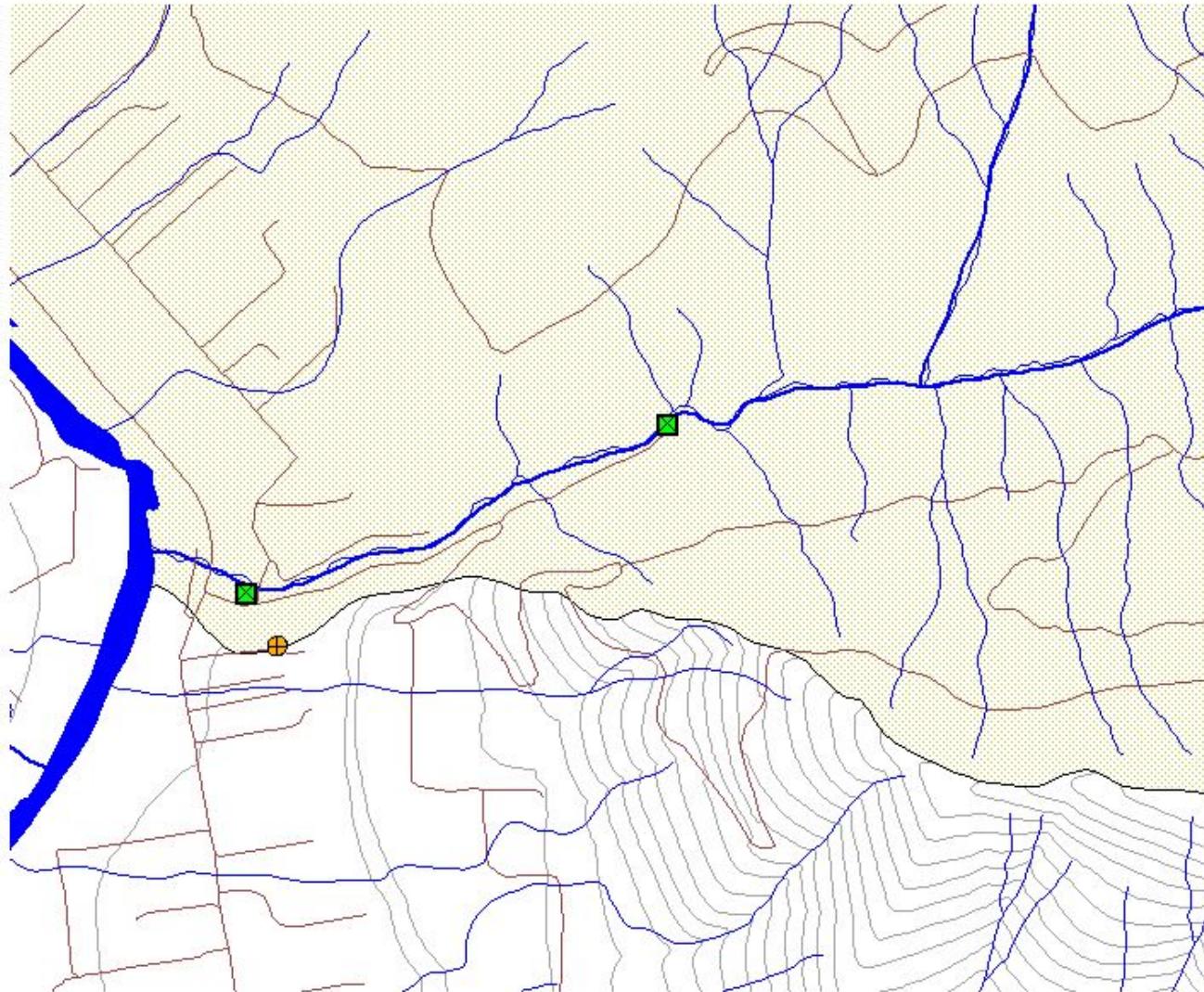


Supply Creek

- Gross head, 233 feet
- Length of pipe, 4169 feet
- Flow range, 50 cfs
- Flow duration of 170 days
- Recommended pipe diameter, 40"
- Calculated net head, 223 feet
- Expected power, 800KW



Hostler Creek Hydro Sites



- Pge_connect.shp
- Hostler Creek Hydro Sites
- Creeks.shp
- Trinity River
- Roads
- Reservation Streams
- Hostler Watershed
- Mill Creek Watershed
- Contour at 80 ft.



1

0

1 Miles

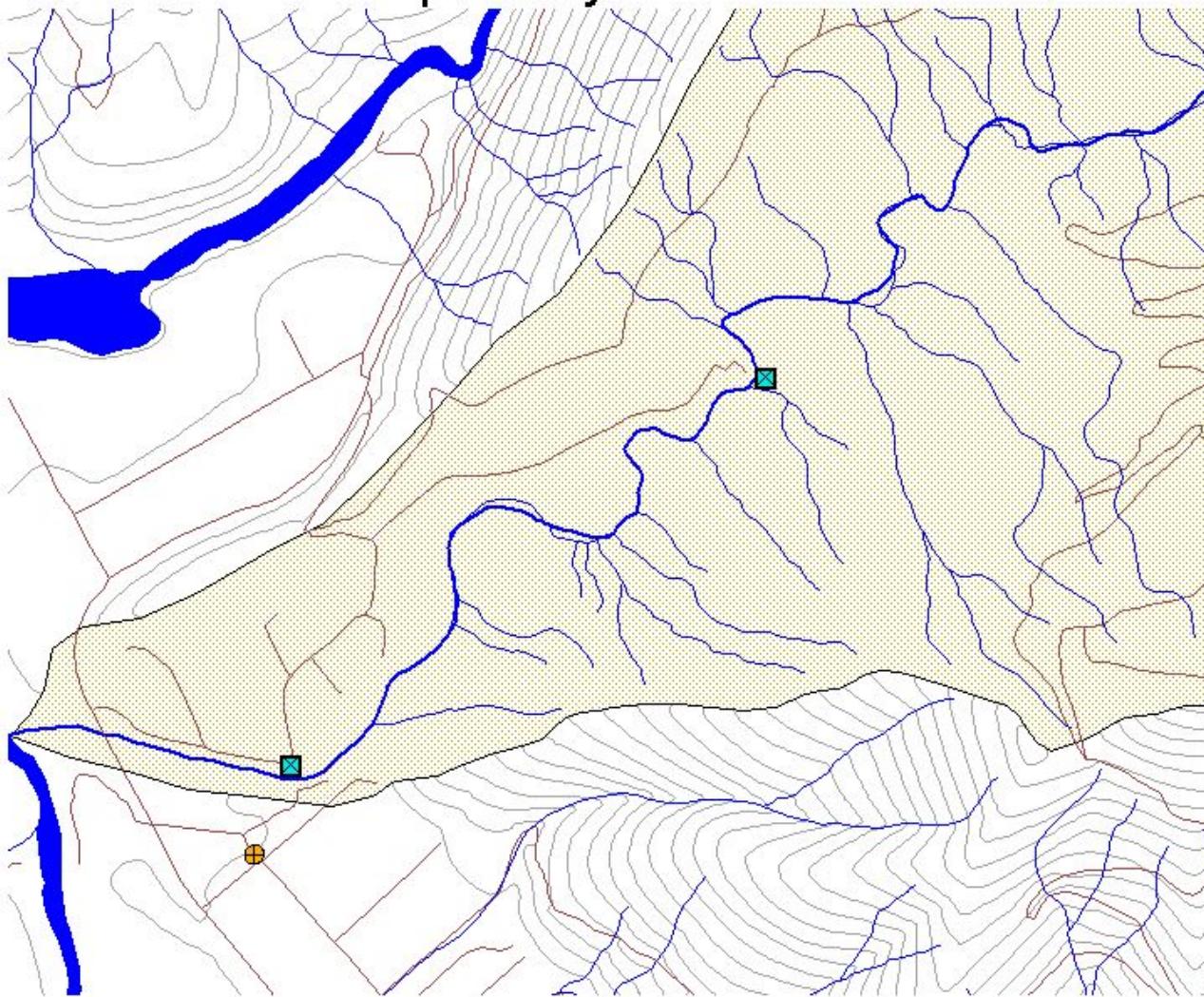


Hostler Creek

- Gross head, 39 feet
- Length of pipe, 375 feet
- Flow range, 10 cfs
- Flow duration 317 days
- Recommended pipe diameter, 16"
- Calculated net head, 35 feet
- Expected power, 19KW



Mill Creek Hydro Power Sites Hoopa Valley



- Pge_connect.shp
- Mill Creek hydro sites
- Creeks.shp
- Trinity River
- Roads
- Reservation Streams
- Mill Creek Watershed
- Contour at 80 ft



1

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1 Miles

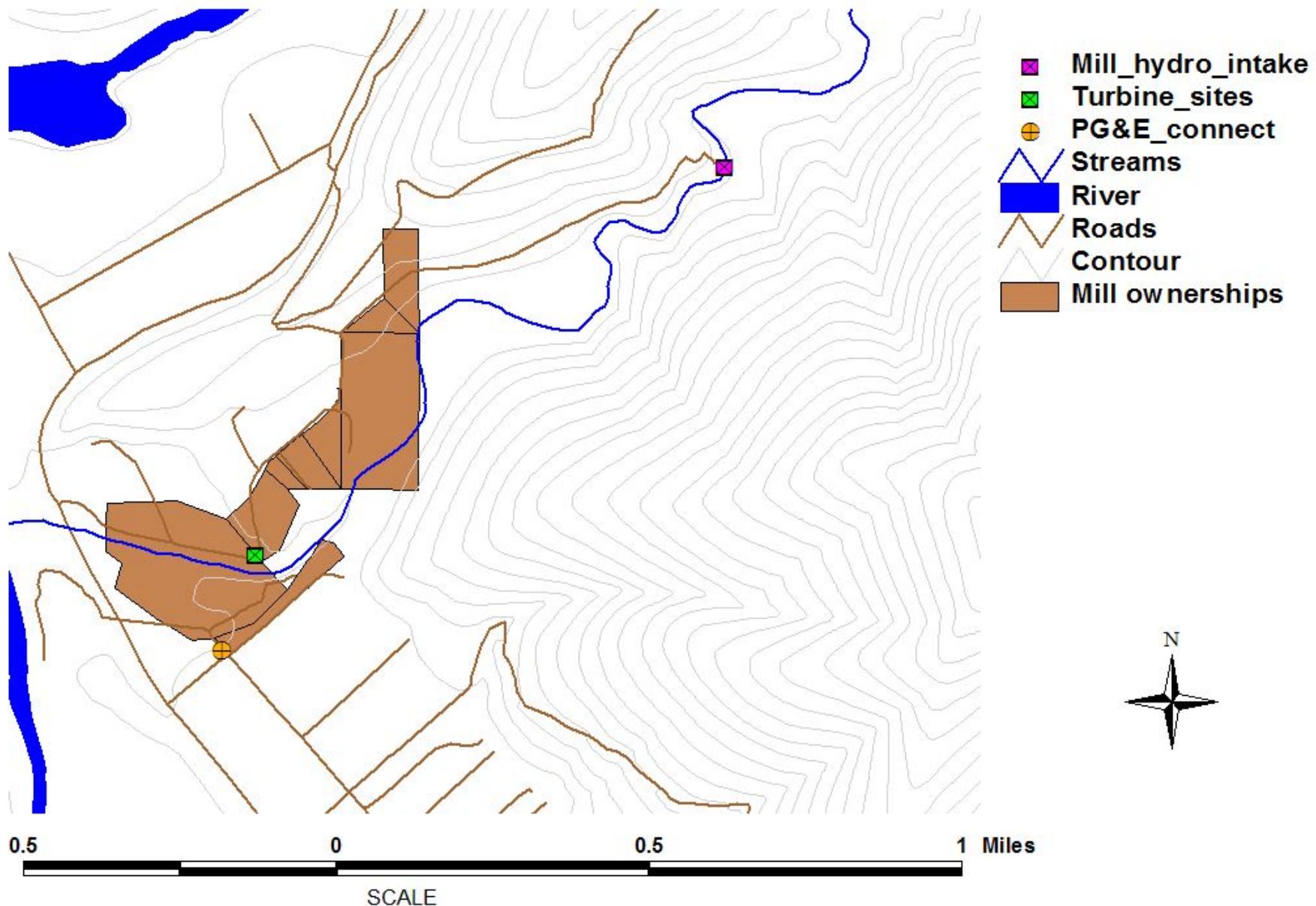


Mill Creek

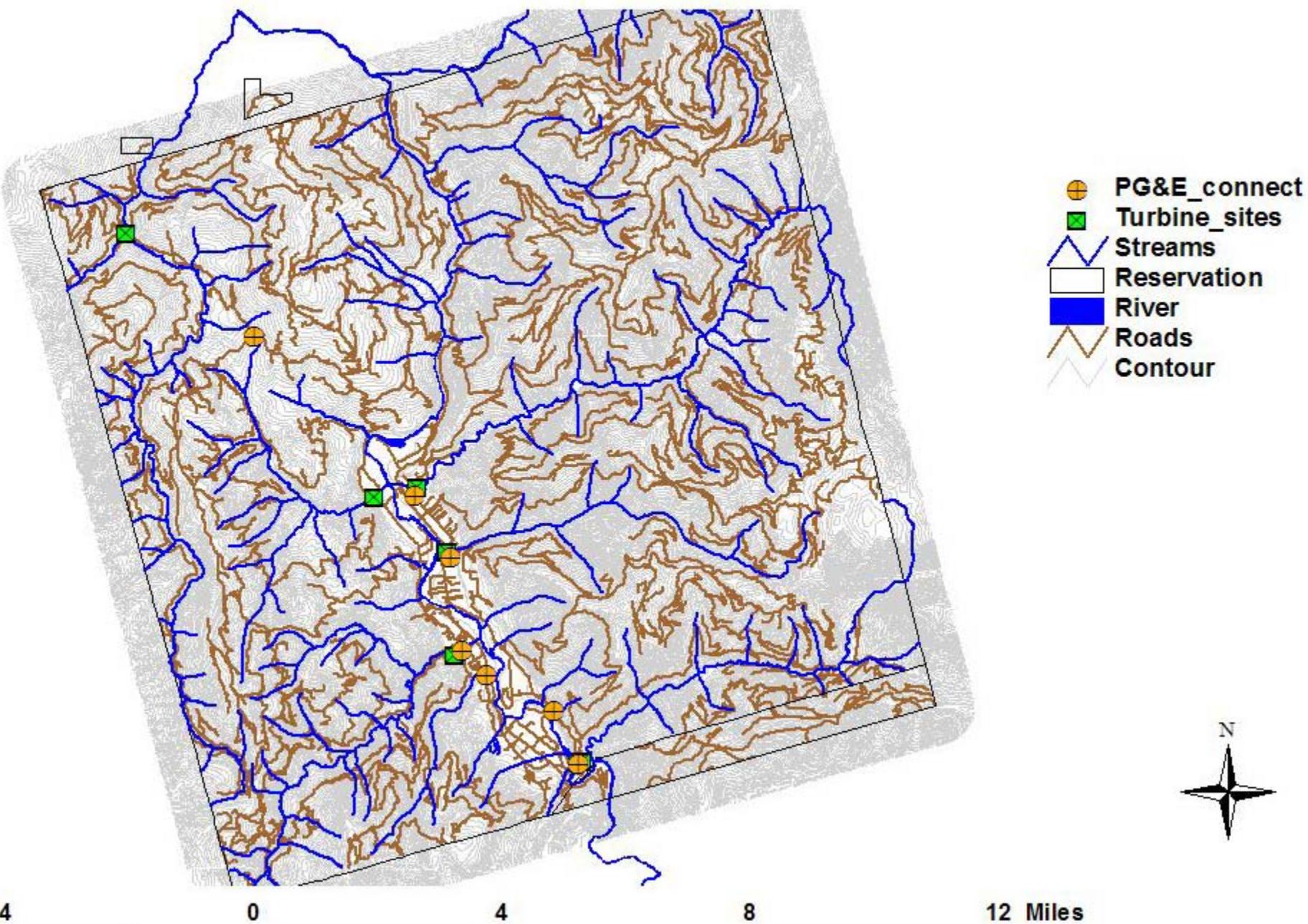
- Gross head, 72 feet
- Length of pipe, 6350 feet
- Flow range, 100 cfs
- Flow duration 182 days
- Recommended pipe diameter, 60"
- Calculated net head, 65 feet
- Expected power, 470KW

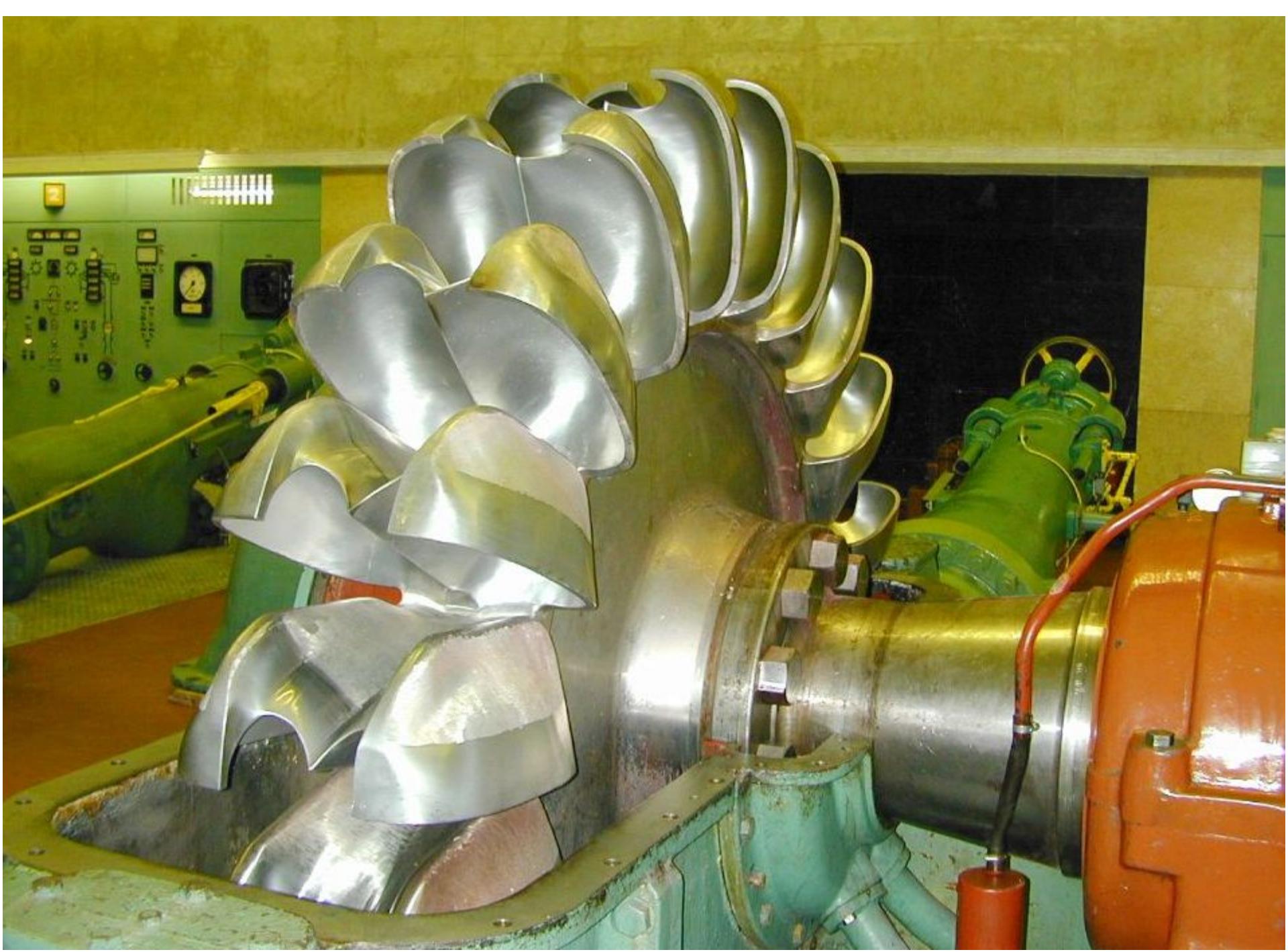


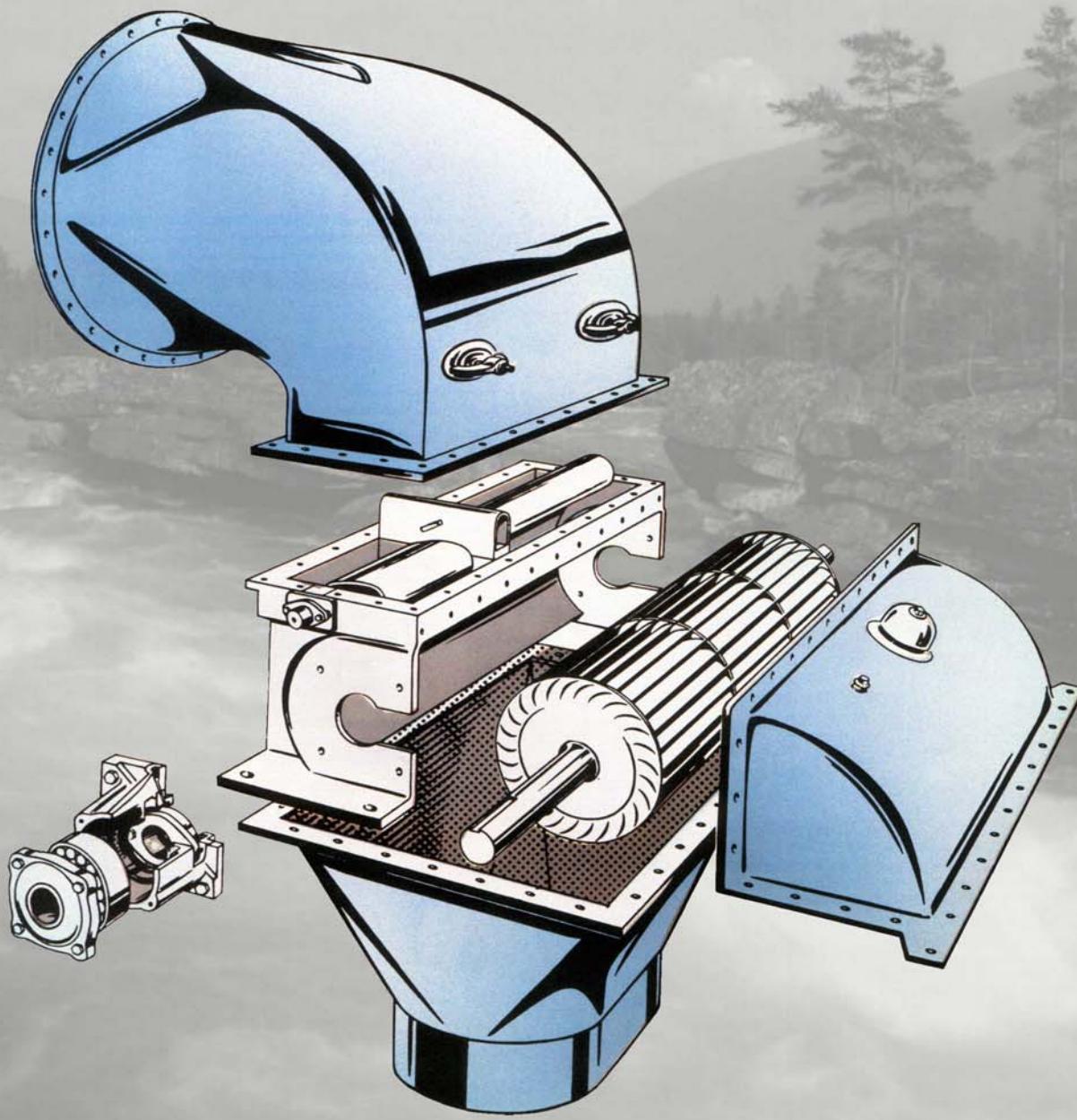
Lower Mill Creek Ownerships

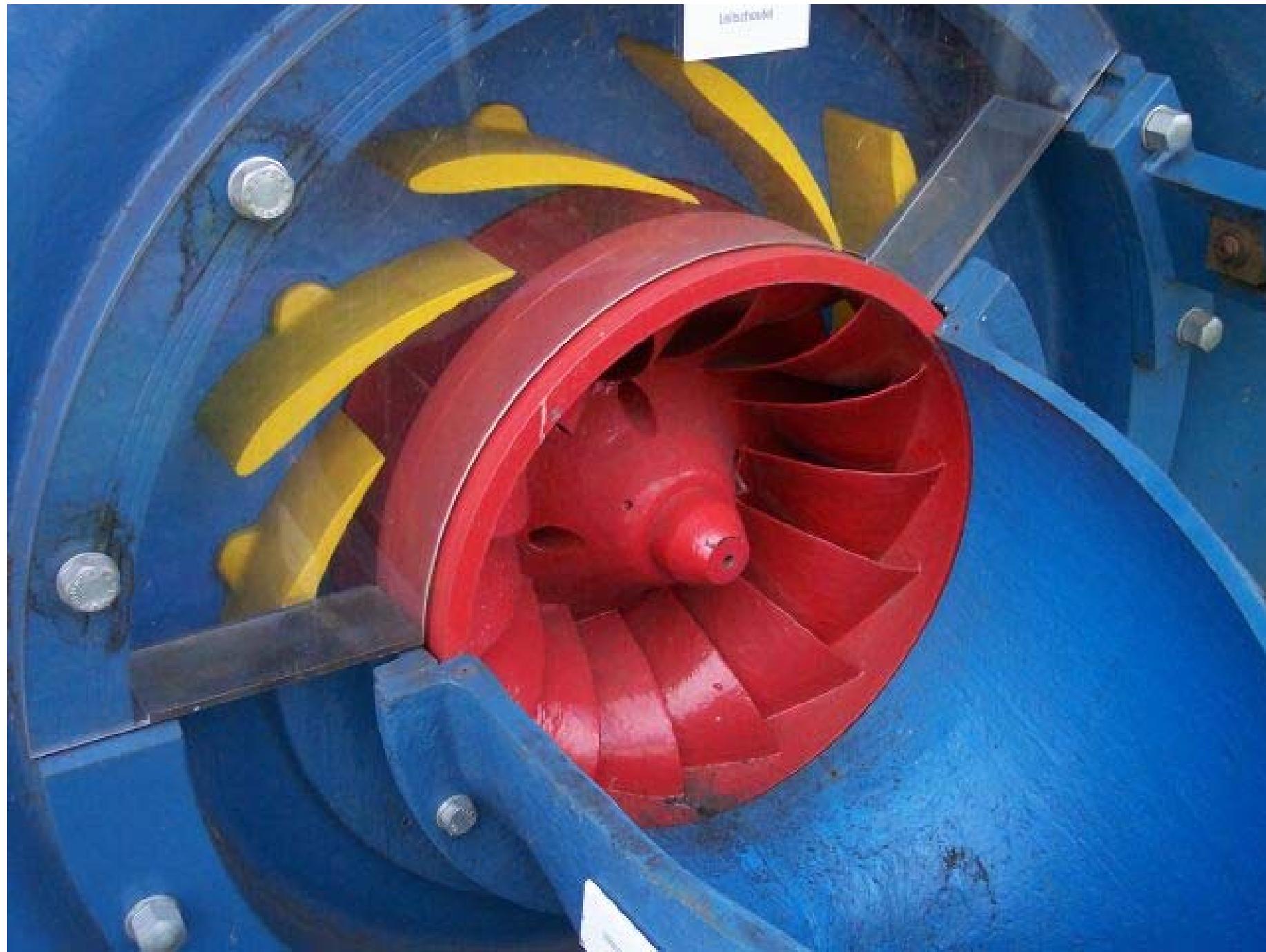


PG&E Connections









Hoopa Tribe Detail

	KW Size of Turbine	Power Purchase / KWH	Annual Revenue	Total Cost of Installation	25% Down Payment	Loan Amt (Total Cost less down payment)	9% Note, amortized over 10 yr., annual payments	Revenue - Cost
Lower Pine Creek	220	0.092	68,492	1,864,800	\$466,200	1,398,600	212,602	-144,110
Soctish Creek	790	0.092	378,517	1,608,000	\$402,000	1,206,000	183,325	195,192
Supply Creek Option 1	335	0.092	125,746	1,364,900	\$341,225	1,023,675	155,610	-29,864
Supply Creek Option 2	800	0.092	300,288	1,712,020	\$428,005	1,284,015	195,184	105,104
Hostler Creek	19	0.092	13,299	251,500	\$62,875	188,625	28,673	-15,374
Mill Creek	470	0.092	188,872	2,690,220	\$672,555	2,017,665	306,707	-117,835

Questions

