

# Tongass National Forest Fish Passage Prioritization Approach

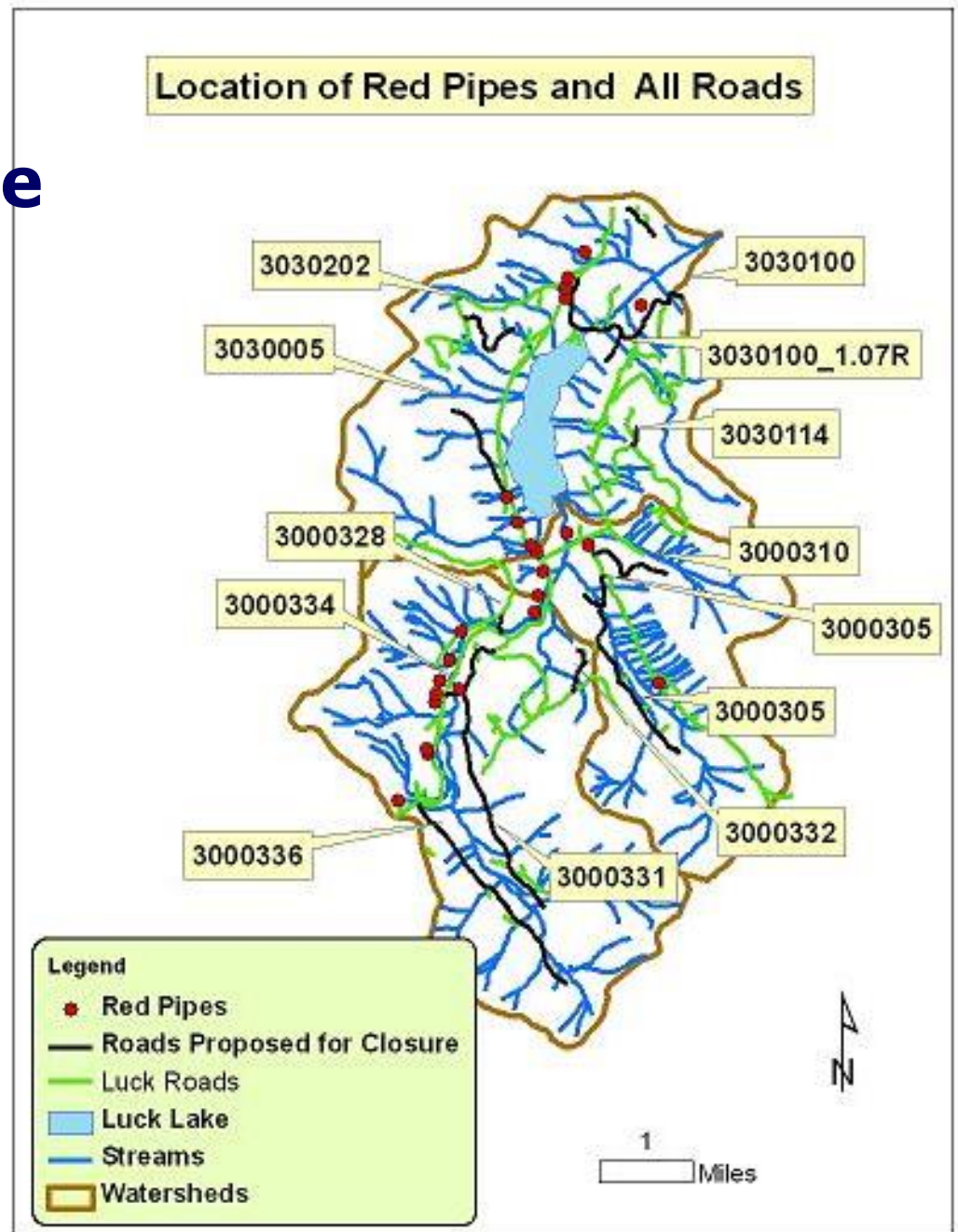
--Integrating the Biological Significance Index and Management

Recommendation Process at Various Scales--

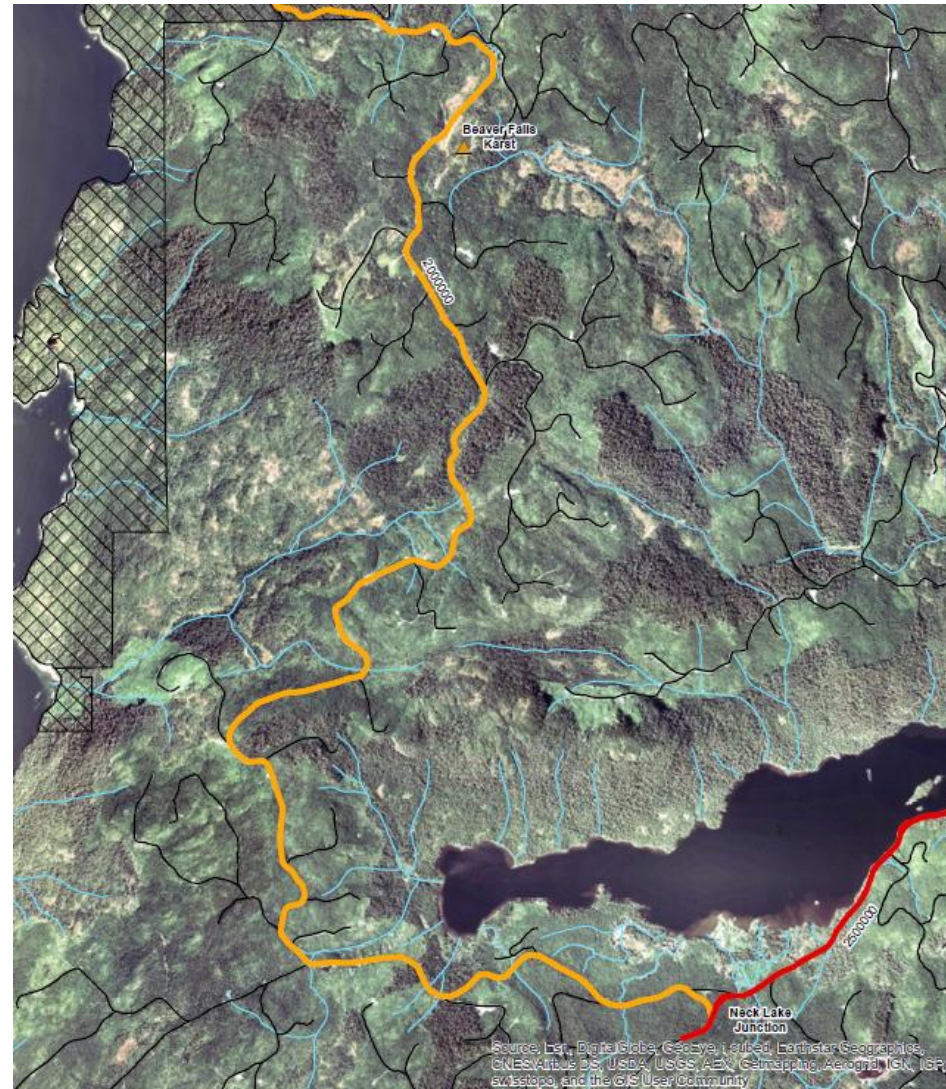
Julianne Thompson, USFS



# Watershed Scale



# Project Scale



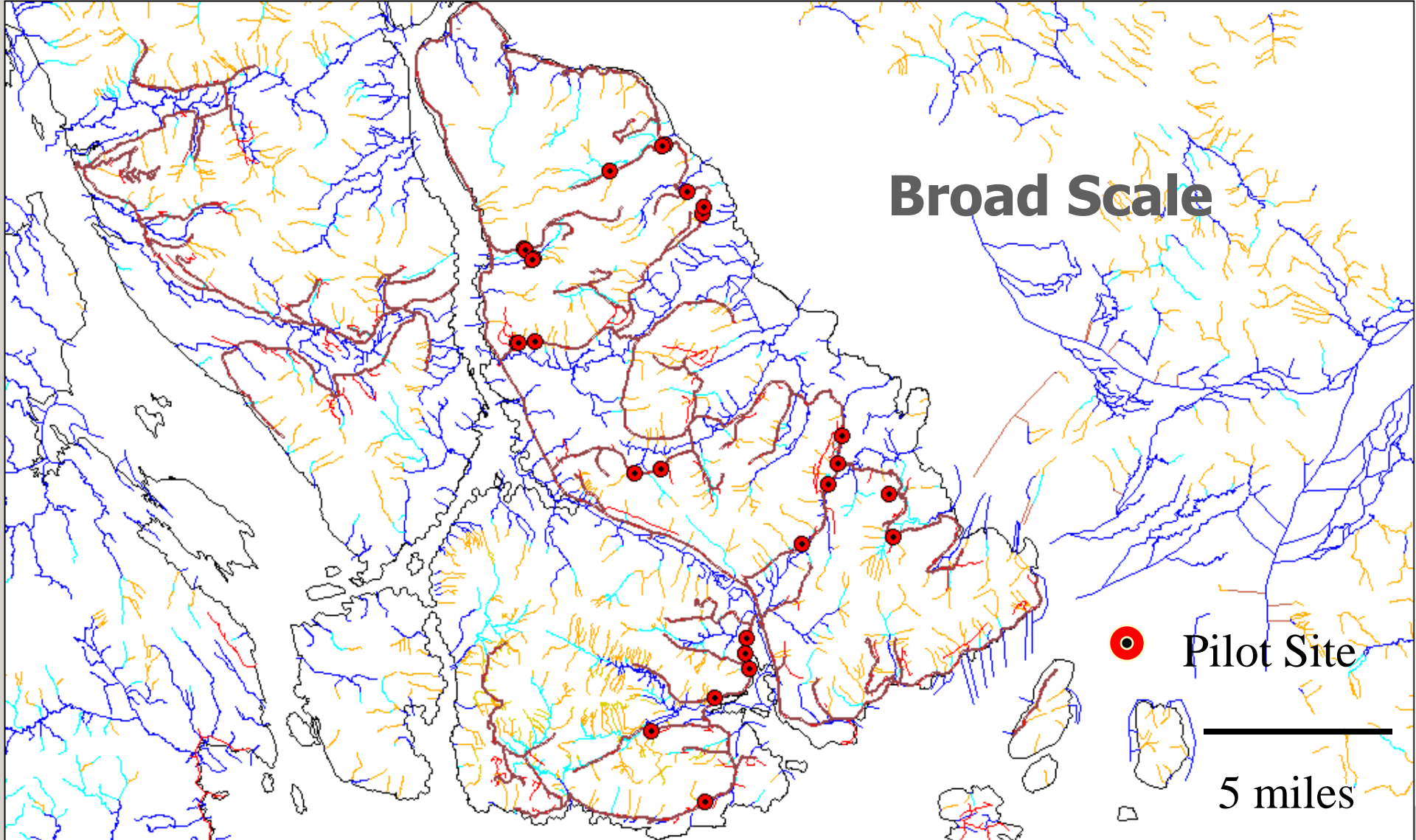
- ▲ Existing Recreation Facility Site
- Existing Road
- Proposed Action
- Segment 1
- Segment 3
- Stream
- ⊠ Non-National Forest Land

0 0.25 0.5 1 Miles

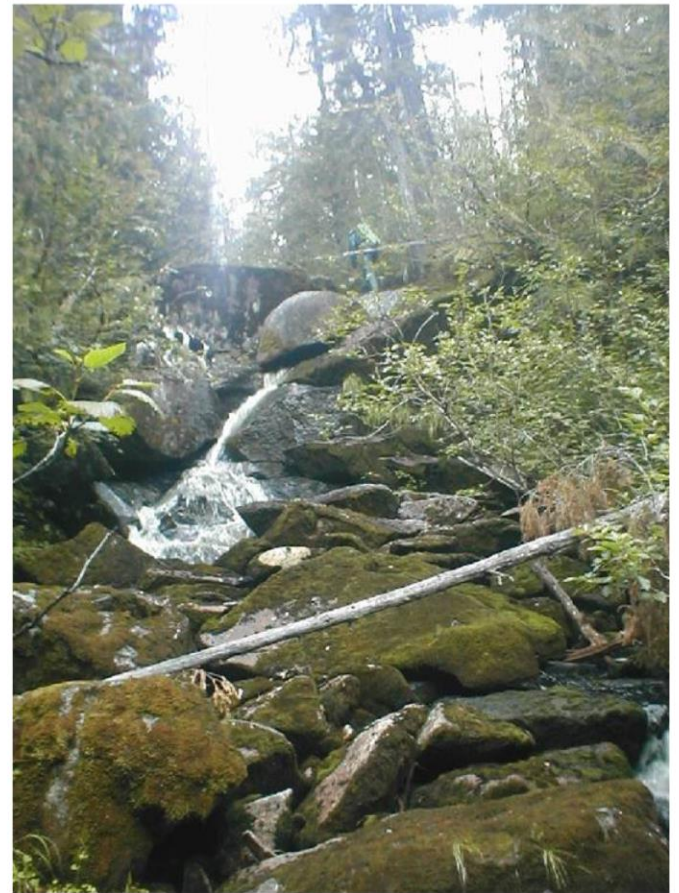


# Site Scale





Biological significance?



# Biological Significance Index

B.S.I is .....a measure of the biological risk, or biological significance, of not providing fish passage remediation at a road crossing.

# Prioritization Algorithm

Area of Fish  
Habitat  
Upstream  
of Culvert

x

Channel  
Gradient of  
Upstream  
Habitat Coeff

x

Pool  
Frequency of  
Upstream  
Habitat Coeff

x

Culvert  
Barrierity  
Coeff

x

Total Amount of  
Fish Habitat in  
Watershed  
Obstructed Coeff

x

Culvert's  
Proportion of  
Total Amount of  
Fish Habitat in  
Watershed  
Obstructed Coeff

=

Cost of  
Remediation

**B.S.I. Score**

**Priority Ranking**





# Data Sources



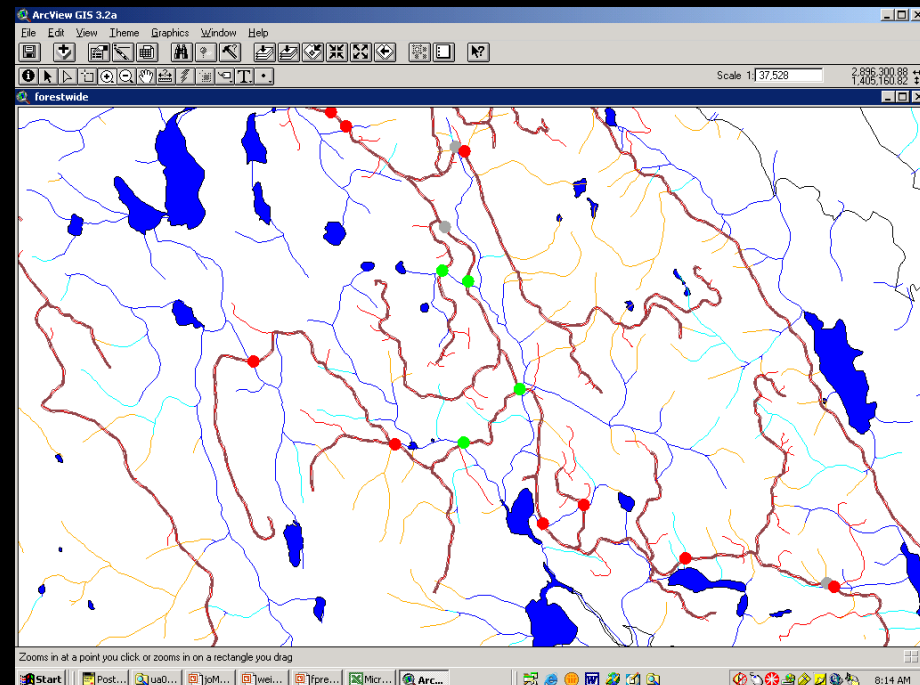
## Surveys

Gradient  
Pool frequency  
Quantity of habitat  
Barrierity

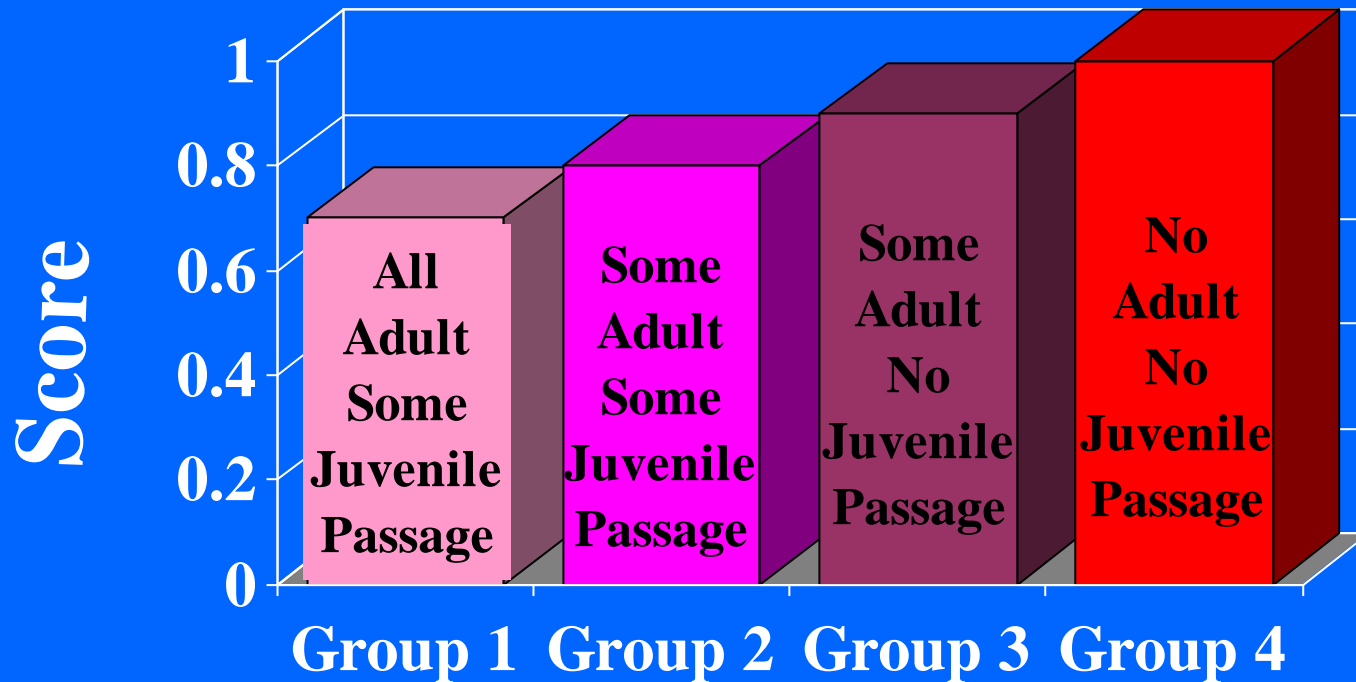
## GIS

Proportion of the watershed's  
Class I and II habitat that is  
obstructed

Fish refugia



# Barrierity Score



## Barrierity Group

\*Passage refers to passage within design flow

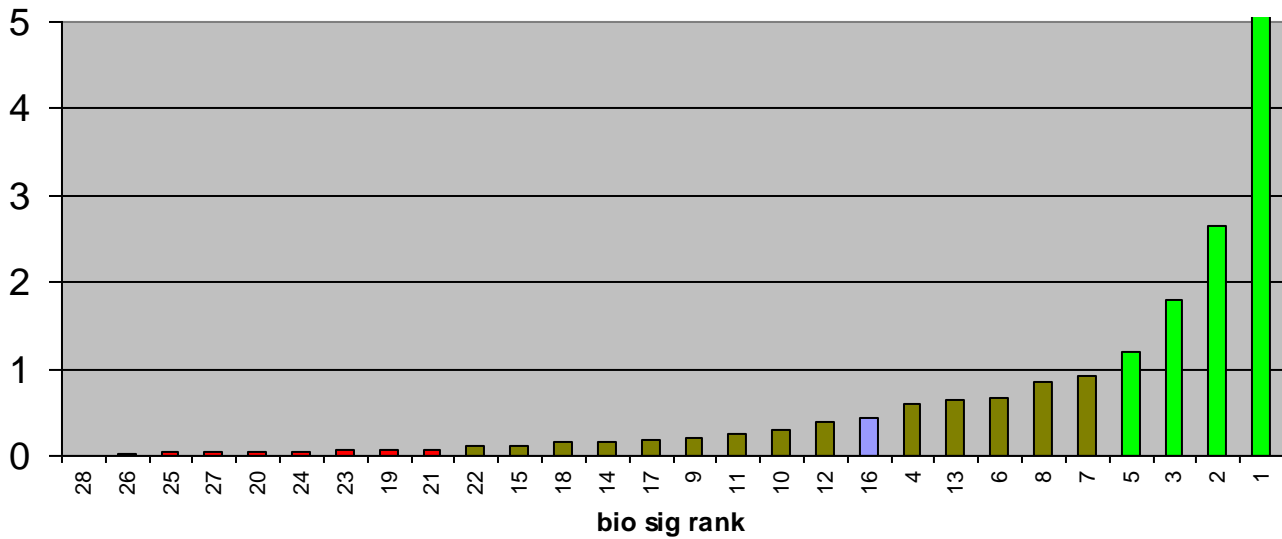
Suggested replacement structure, cost?



Xing_ID	bio sig score	suggested replacement structure	cost	cost in thousands	COST FACTOR: bio sig score divided by cost in thousands
6235_19.290	672	40ft glulam	\$132,803	\$133	5.06
6245_0.800	126	84" cmp str sim	\$47,483	\$47	2.65
40000_2.956	81	81x 59 arch str sim	\$44,715	\$45	1.80
6282_1.686	65	95x67" arch	\$54,613	\$55	1.19
6212_0.708	54	132" cmp	\$58,340	\$58	0.92
6204_5.895	50	132" btmless arch	\$58,341	\$58	0.86
6212_0.106	61	144" btmless	\$89,401	\$89	0.68
6235_17.227	22	60" cmp	\$34,252	\$34	0.65
6282_1.678	74	40ft modular	\$125,000	\$125	0.59
6200_0.273	15	60" str sim	\$34,252	\$34	0.44
...					



# Cost Factors



# Management Recommendation 1

Objective: Remediate to provide full passage for aquatic organisms, subject to available funding and prioritization within the MR1s.

- This differs from MR-2 in that proposed action should be developed prior to the end of the service life, recognizing the high priority need to remediate MR1s.

# Management Recommendation 2 & 3

Objective: accept the existing passage for the service life of the structure. Achieve full passage ultimately, at the end of service life; in the meantime, avoid irreversible impacts to the population.

- MR2a: No action is necessary to meet the objective
- MR2b: May require temporary action, before end of service life, to achieve partial passage.

These MR may be used in instances where the cost of full passage is high, and some temporary loss of productivity can be tolerated while still meeting the management objective.

# Management Recommendation 4

Objective: Accept existing condition forever, with mitigation.

- MR4a – In situations without full blockage, maintain or improve existing passage conditions on-site when feasible and prudent. If not feasible and prudent, use offsite mitigation.
- MR4b – Accept full blockage and mitigate.



