Biocriteria Development
for the
Pyramid Lake Paiute Tribe

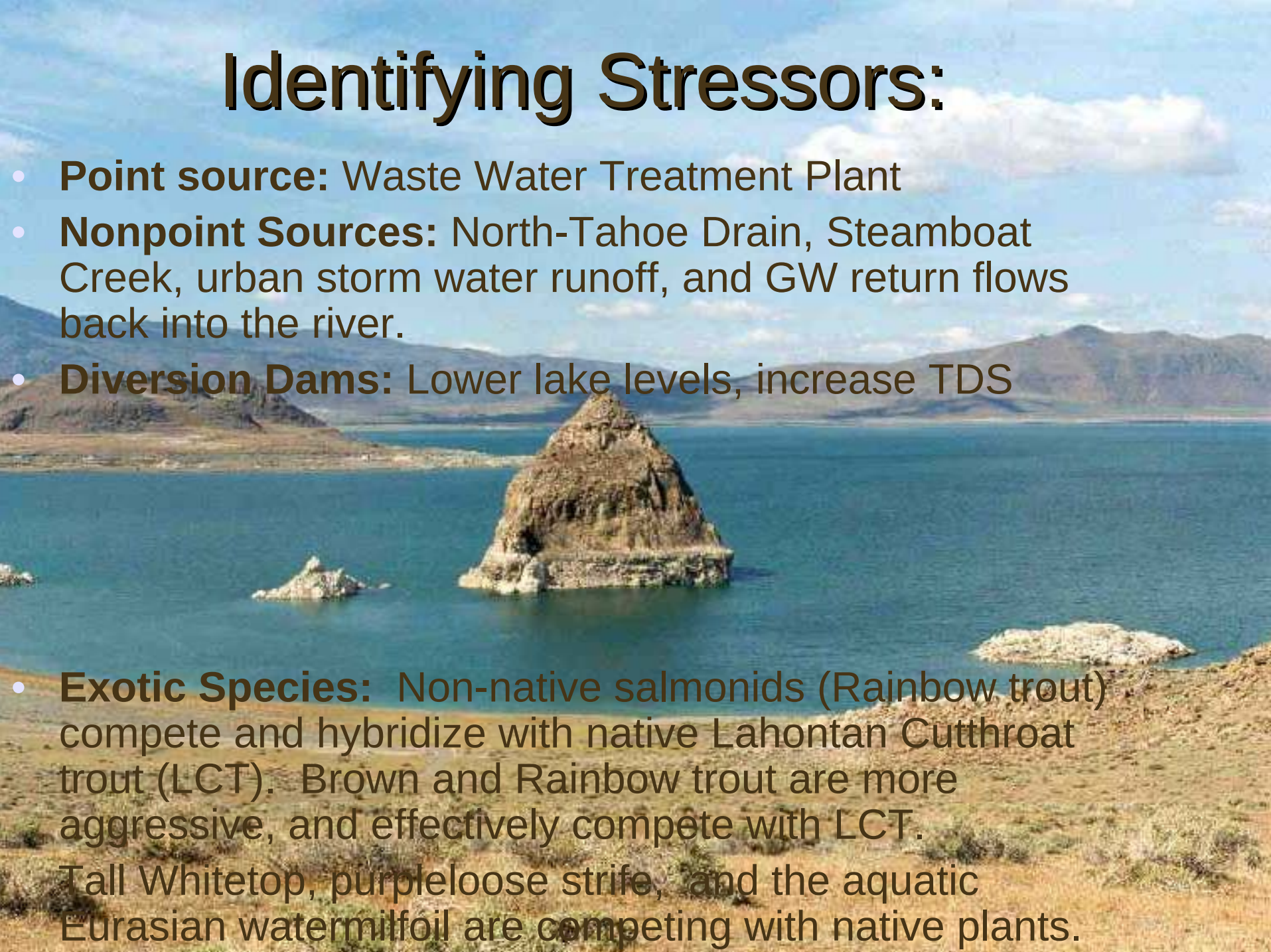
Endangered Cui-ui
(pronounced Kwee-wee)

Threatened Lahontan Cutthroat Trout


Perlodidae

Identifying Stressors:

- **Point source:** Waste Water Treatment Plant
- **Nonpoint Sources:** North-Tahoe Drain, Steamboat Creek, urban storm water runoff, and GW return flows back into the river.
- **Diversion Dams:** Lower lake levels, increase TDS



- **Exotic Species:** Non-native salmonids (Rainbow trout) compete and hybridize with native Lahontan Cutthroat trout (LCT). Brown and Rainbow trout are more aggressive, and effectively compete with LCT.

Tall Whitetop, purpleloose strife, and the aquatic Eurasian watermilfoil are competing with native plants.

Sec. 101(a) CWA. The objective of the Act is to restore and maintain the chemical, physical and Biological integrity of the Nation's waters ...

Sec. 101(a)(2). It is the national goal that **wherever attainable**, an interim goal of water quality which provides for the **protection and propagation of fish, shellfish and wildlife** and recreation in and on the water...

WQCP: Narrative Standards

Species Composition

Communities and populations of aquatic biota, including invertebrate, vertebrate and plant species, shall not be degraded as a result of point source or nonpoint source discharge. This applies to transient as well as cumulative conditions. Short-term variances from these objectives may be allowed for actions that are being taken to fulfill statutory requirements under Tribal law or the federal Endangered Species Act.

PLPT's Numeric criteria (fish)

- Temperature (Truckee River)
  - Nov to March $\leq 13^{o}C$
  - April to June $\leq 14^{o}C$
  - July to Oct. $\leq 21^{o}C$ >avg daily (over 24 hrs)
- Dissolved Oxygen
  - Nov to June ≥ 6.0
  - July to Oct. ≥ 5.0
- Total Ammonia

(presence/ absence of early life stages; salmonids)

- Total Mercury Human Health criterion:
  - 0.271ppm mercury/kg in fish tissue

IBI/ Biocriteria Process

- 1981. -LTR comprehensive survey.
- 1989 -Began using EPA RBA protocols.
- 1998 -Began attending workshops/ trainings and building working relationships with other agencies.
- 2002 -Began evaluating LTR BMI data.
- 2006 -Through EPA contractors, NDEP/ PLPT developed IBI's for algae, bmi's, fish on the TR.


Reference Sites

The PLPT Biological Index consists of 4 core metrics

Taxa Richness

Percent EPT Individuals

Percent Tolerant Individuals

Percent Dominant Taxon

Approx. Upstream Distance (miles) from MBD	Station ID	Year							Average
		1981	1989	1990	1996	1999	2000	2001*	
22.5	**I80**	63.6			39.3	43.6	47.0	51.2	48.9
20	WB		18.7	35.8	46.5				33.7
19	AH				47.0	51.2			49.1
17.5	**FJR**	52.8	25.1				59.4	51.2	47.1
14.5	SS				47.3				47.3
11.5	NW		38.9		80.8				59.9
10.5	**DO**	60.5	39.0	59.3		52.7	45.9	*	51.5
8	**CN**	34.2		50.5	51.7	45.5	47.9	*	45.9
6.5	ND				40.1				40.1
5	**LNX**	73.8		35.3		55.1	54.1	*	54.6
3.5	NB		28.3		63.3				45.8
2	**NIX**	71.0		45.4		57.6	50.1	*	56.1
0	MBD	58.2	16.3	44.7	45.5	25.6			38.1
Average		59.2	27.7	45.2	51.3	47.3	50.7	51.2	47.5

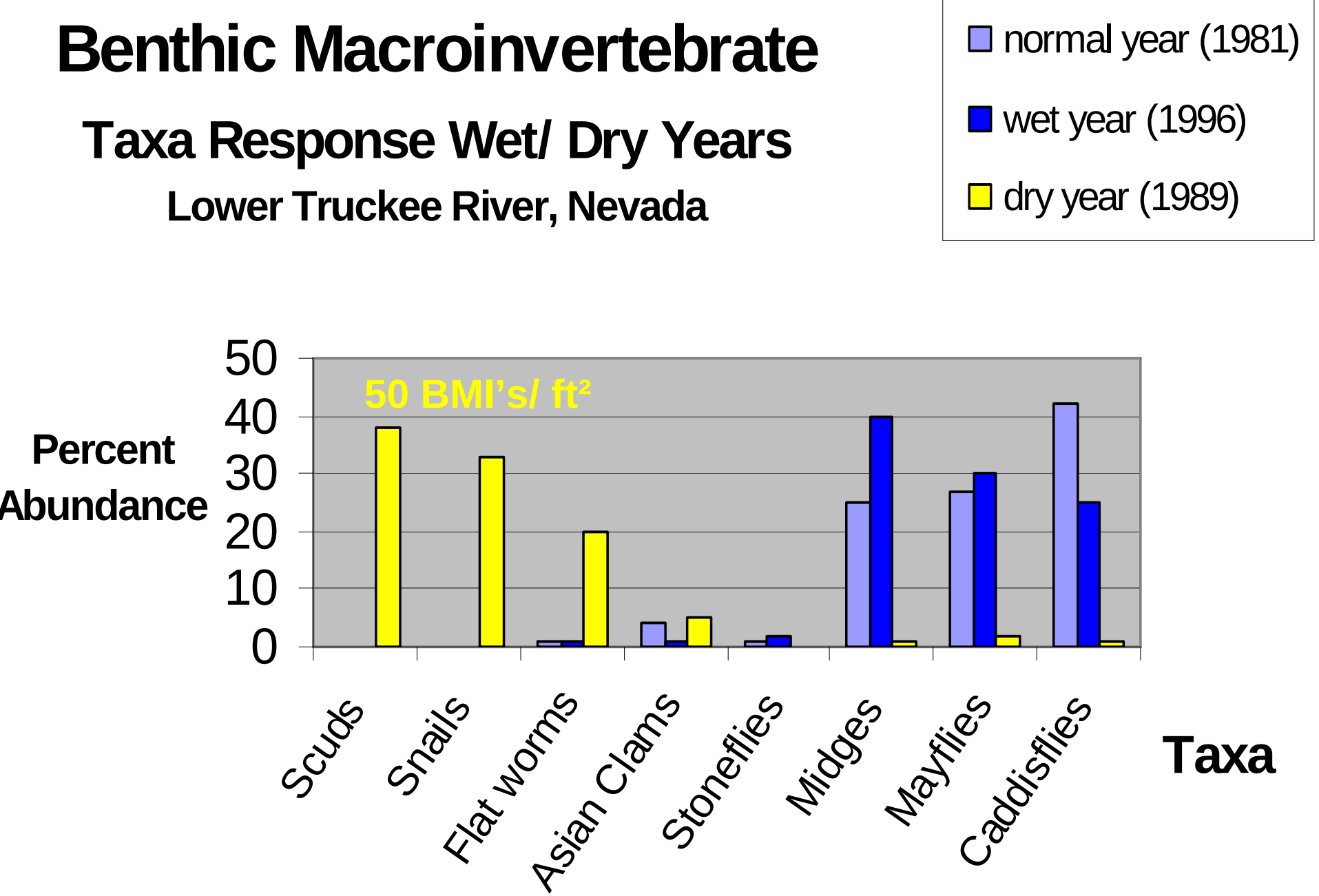
PLPT Biological Index Score and Narrative Rating

100-80	Excellent	69-60	Good	49-40	Poor
79-70	Very Good	59-50	Fair	39-0	Very Poor

Benthic Macroinvertebrate

Taxa Response Wet/ Dry Years

Lower Truckee River, Nevada



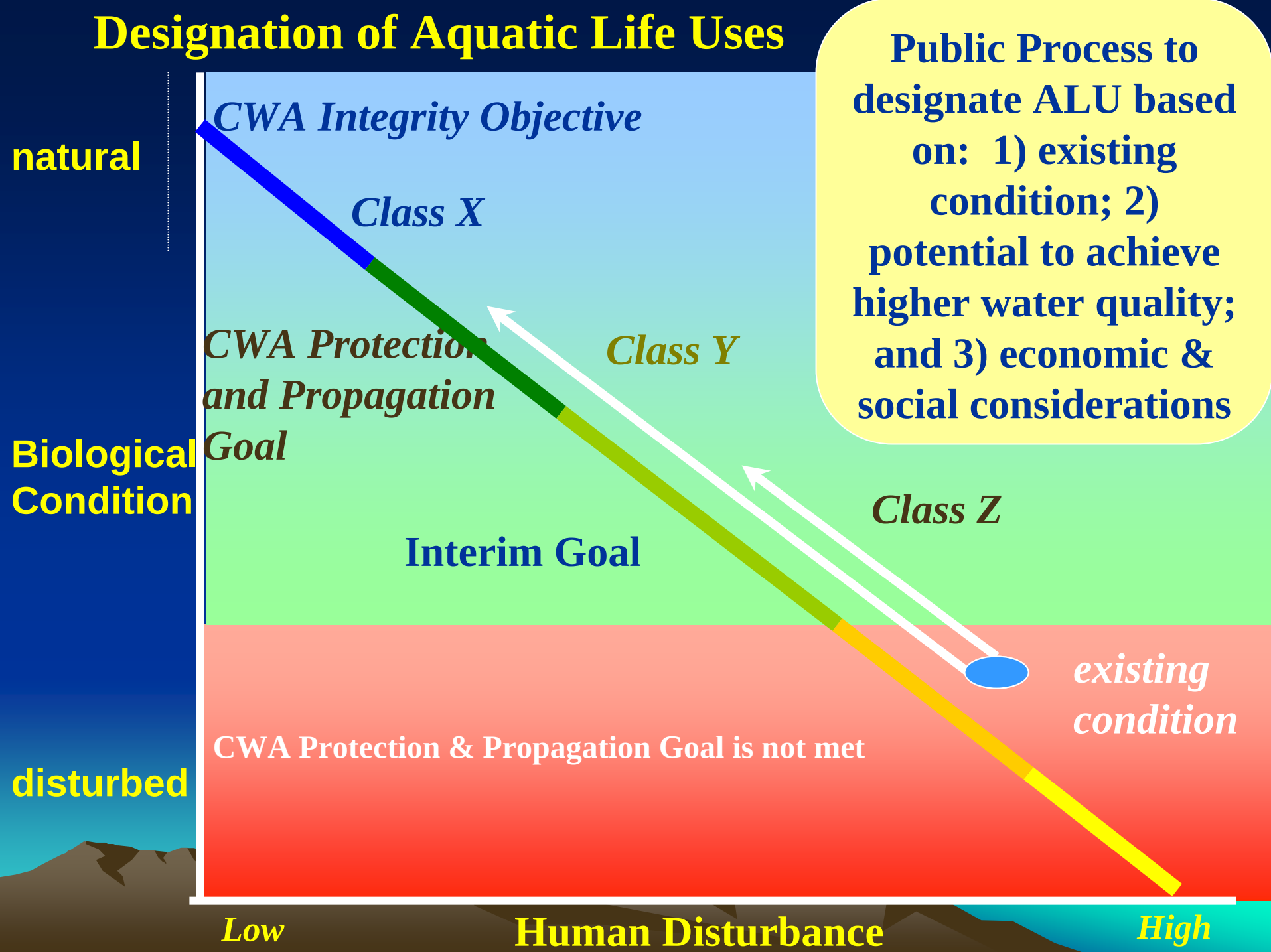
August 1994 LTR AL data (flows 0-44 cfs)

Taxa	McCarran	Lockwood	Clark	S Bar S
Ephemeroptera	Dry	0	40	49
Trichoptera	0	1	66	3
Elmidae	0	3	2	13
Chironomidae	0	109	12	64
Simulium	0	3	0	0
Planaria	0	1047	14	322
Oligochaeta	0	4	0	3
Gastropoda	0	227	0	16
Corbicula	0	6	3	6
Salmonids (LCT)	0	0	0	3 (0)
Cyprinids/ Catostomids		834/ 108	404/ 63	290/ 6
EPT %	**0%**	**0%**	**83%**	**10%**
Biotic Index	**0**	**8.57**	**5.63**	**7.75**

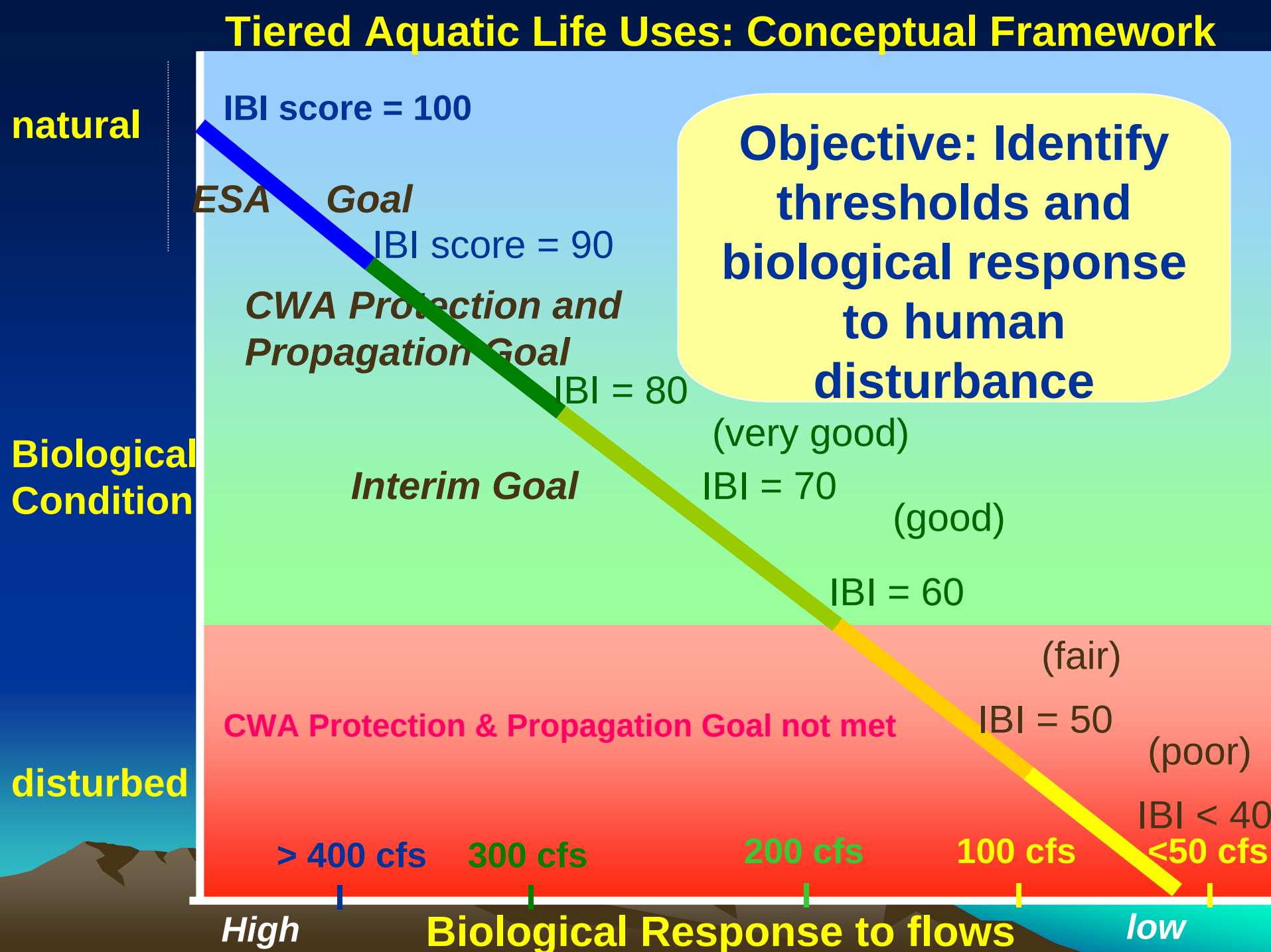
July 1999 LTR AL data (flows 350-490 cfs)

Taxa	McCarran	Lockwood	Clark	S Bar S
Ephemeroptera	45 (4)	91 (3)	467 (3)	77 (2)
Plecoptera	19 (1)	16 (2)	2 (1)	62 (1)
Trichoptera	148 (4)	183 (4)	45 (2)	177 (1)
Chironomidae	62	92	179	31
Oligochaeta	3	0	6	0
Salmonids (LCT)		28 (6)	16 (1)	27 (1)
Cyprinids/Catostomids		(high flows)	36/ 55	0/ 3
EPT %	**74%**	**76%**	**74%**	**91%**
Biotic Index	**2.76**	**4.05**	**4.55**	**3.64**

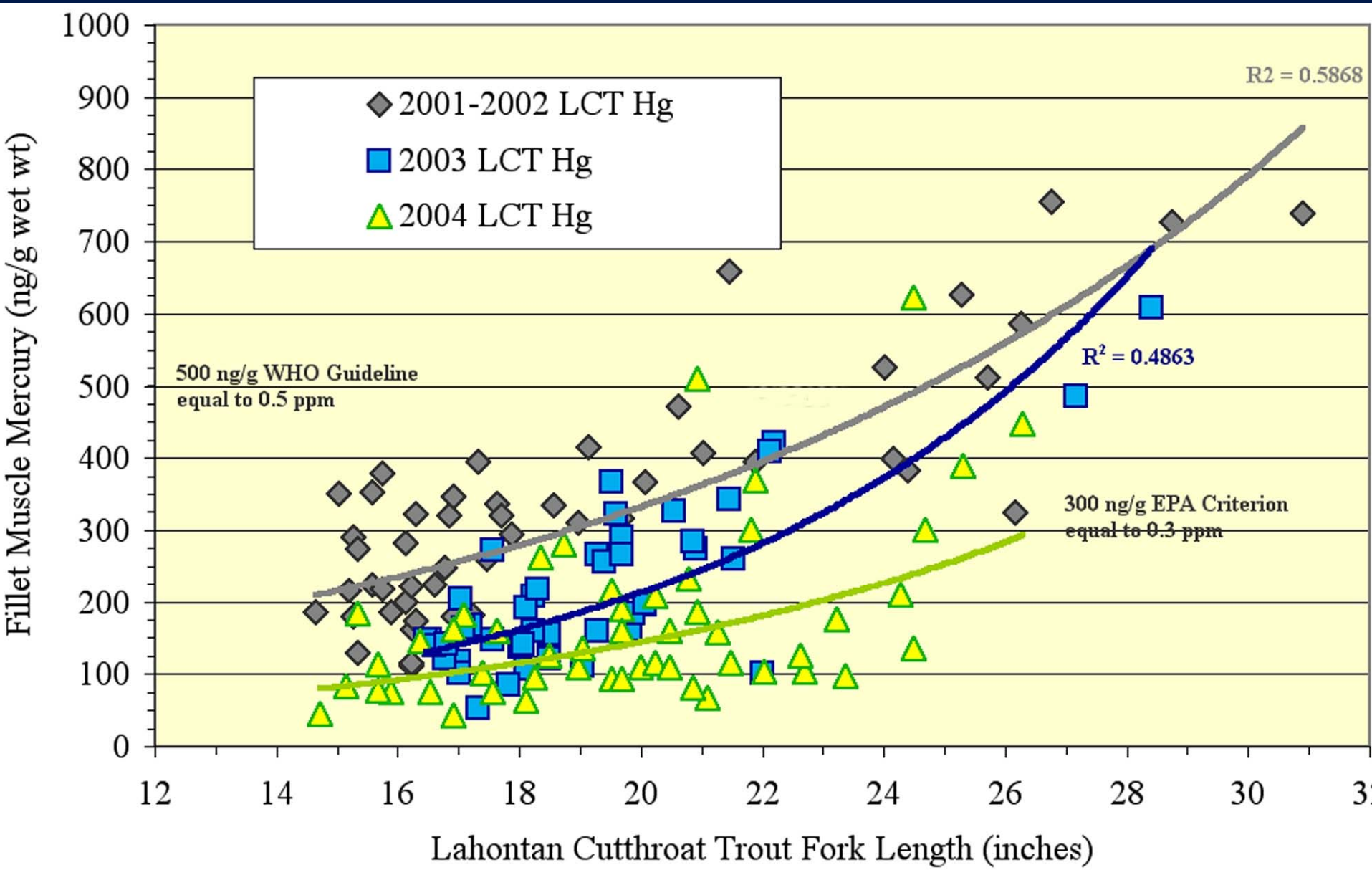
Designation of Aquatic Life Uses



Public Process to designate ALU based on: 1) existing condition; 2) potential to achieve higher water quality; and 3) economic & social considerations


Tiered Aquatic Life Uses: Conceptual Framework
natural
Biological Condition
disturbed
IBI score = 100
ESA Goal
IBI score = 90
CWA Protection and Propagation Goal
IBI = 80
(very good)
Interim Goal
IBI = 70
(good)
IBI = 60
(fair)
CWA Protection & Propagation Goal not met
IBI = 50
(poor)
IBI < 40
> 400 cfs
300 cfs
200 cfs
100 cfs
<50 cfs
High
Biological Response to flows
low
Objective: Identify thresholds and biological response to human disturbance

The PLPT will adopt a 0.271 ppm methylmercury/kg fish tissue criterion based on the subsistent life style of the people.


2001-2002 LCT Hg
2003 LCT Hg
2004 LCT Hg
R2 = 0.5868
R² = 0.4863
500 ng/g WHO Guideline
equal to 0.5 ppm
300 ng/g EPA Criterion
equal to 0.3 ppm
Fillet Muscle Mercury (ng/g wet wt)
Lahontan Cutthroat Trout Fork Length (inches)
0
100
200
300
400
500
600
700
800
900
1000
12
14
16
18
20
22
24
26
28
30

Next Steps

- Continue bioassesssment and water quality monitoring program on the Truckee River.
- Continuing working with EPA, NDEP, USFWS and others to develop a draft ALUS human disturbance model and/ or biocriteria on the Truckee River .
- Continued bioassesssment and water quality monitoring program on streams and wetlands.
- Develop IBI's for streams and wetlands on the Pyramid Lake Indian Reservation.