Grand Canyon Long-term Non-native Fish Monitoring

Grand Canyon long-term electroshocking monitoring

- Special emphasis on Rainbow trout (RBT), Brown trout (BNT), and Carp (CRP).
- In 2000 (N=313) RBT and BNT. PIT tag BNT First long term monitoring trip. Allocation of effort determined by sample.exe. (600 sec effort / sample).
- 2001(N=164) second term monitoring (inadequate number of samples).
- 2002 (N=818) continuation of long term monitoring with expanded effort (sample.exe) (300 sec effort / sample). re-sampled 2000-2002 data to better understand our ability to meet monitoring requirements and special monitoring concerns.
- 2003 (N=800) continuation of long term monitoring. PIT tag all CRP.

Long term monitoring 5-year (800 samples/year)

trends shareware (Gerrodette 1987)

http://swfsc.nmfs.noaa.gov/prd/software/Trends.html

Species	CV	min detectable yearly rate of change (linear)	Min detectable overall change (5 years linear)
RBT	.04	6%	24%
BNT	.07	9%	34%
CRP	.09	12%	47%

Special monitoring concerns

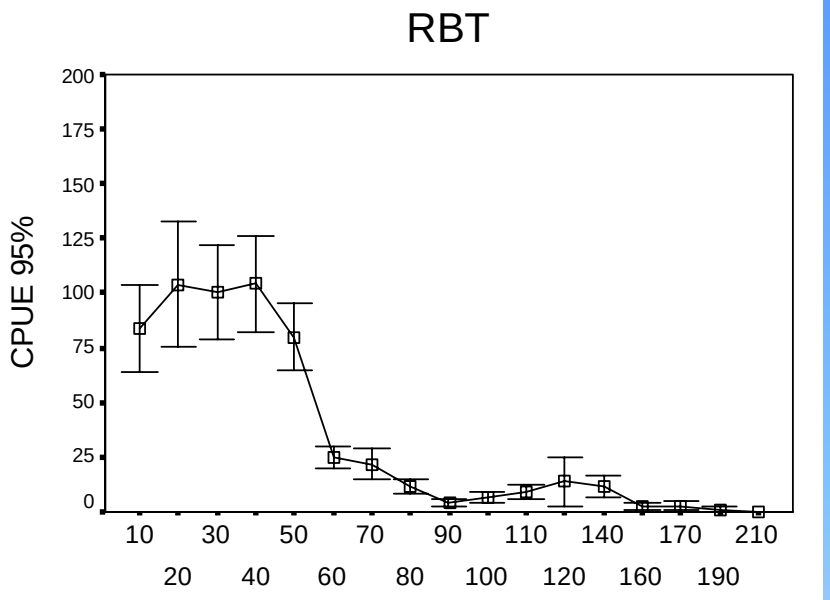
- Detection of change in RBT density near the Little Colorado River (LCR) because of experimental removal of trout (electroshocking)
- Detection of change in BNT density near Bright Angel Creek (BAC) due to removal of spawning fish from the creek (weir)
- Detection of change RBT recruitment with experimental flows

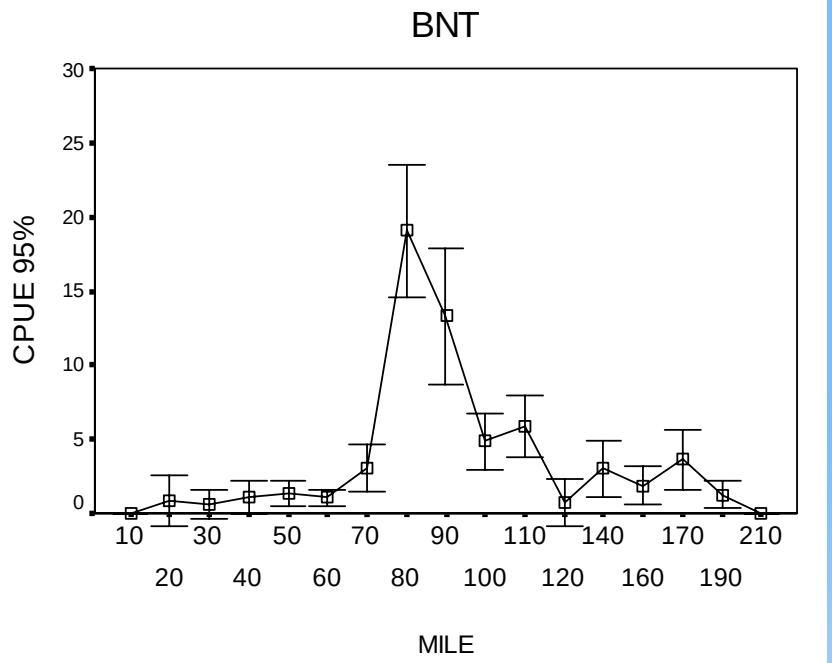
Sensitivity of monitoring in areas of special concern

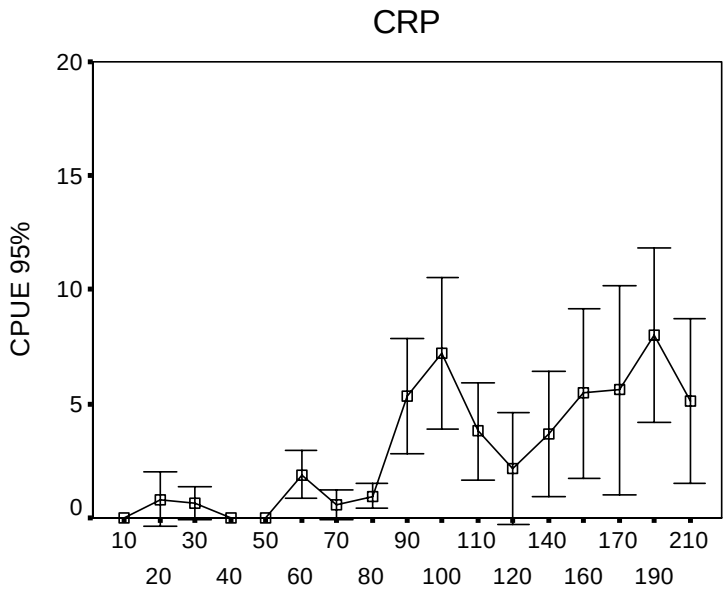
Species	CV	min detectable yearly rate of change over 5 years (linear)	Min detectable overall change (5 years linear)	Bootstrapped Yearly min detectable overall change
RBT (LCR) N=120	.08	14%	56%	30%
BNT (BAC) N= 168	.08	14%	56%	30%

We may be unable to detect immediate yearly changes to YOY RBT densities in the Grand Canyon. However, data from our Lees Ferry monitoring should give an excellent indication. Long-term data will give index of recruitment.

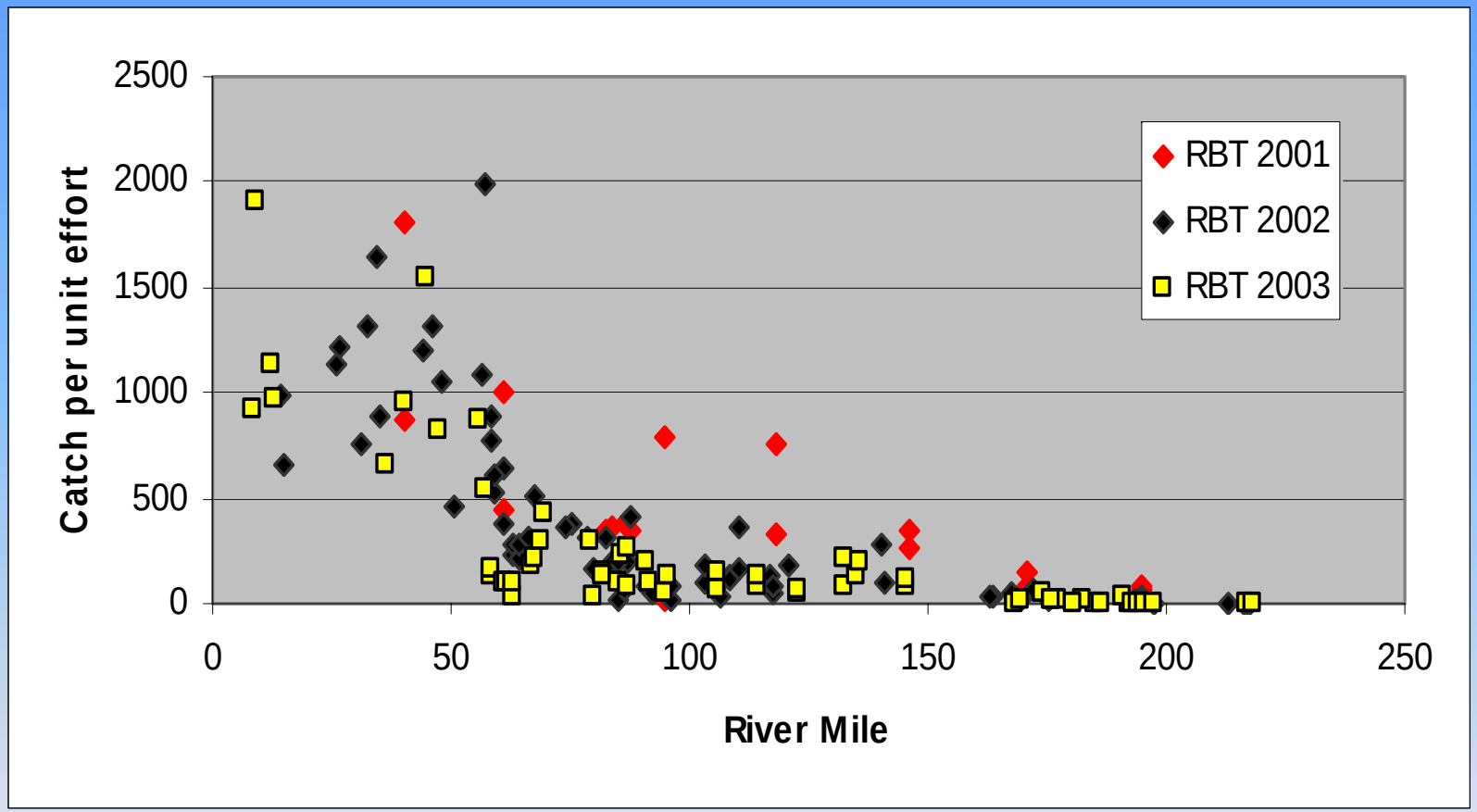
Distribution (RBT, BNT, CRP) 2002



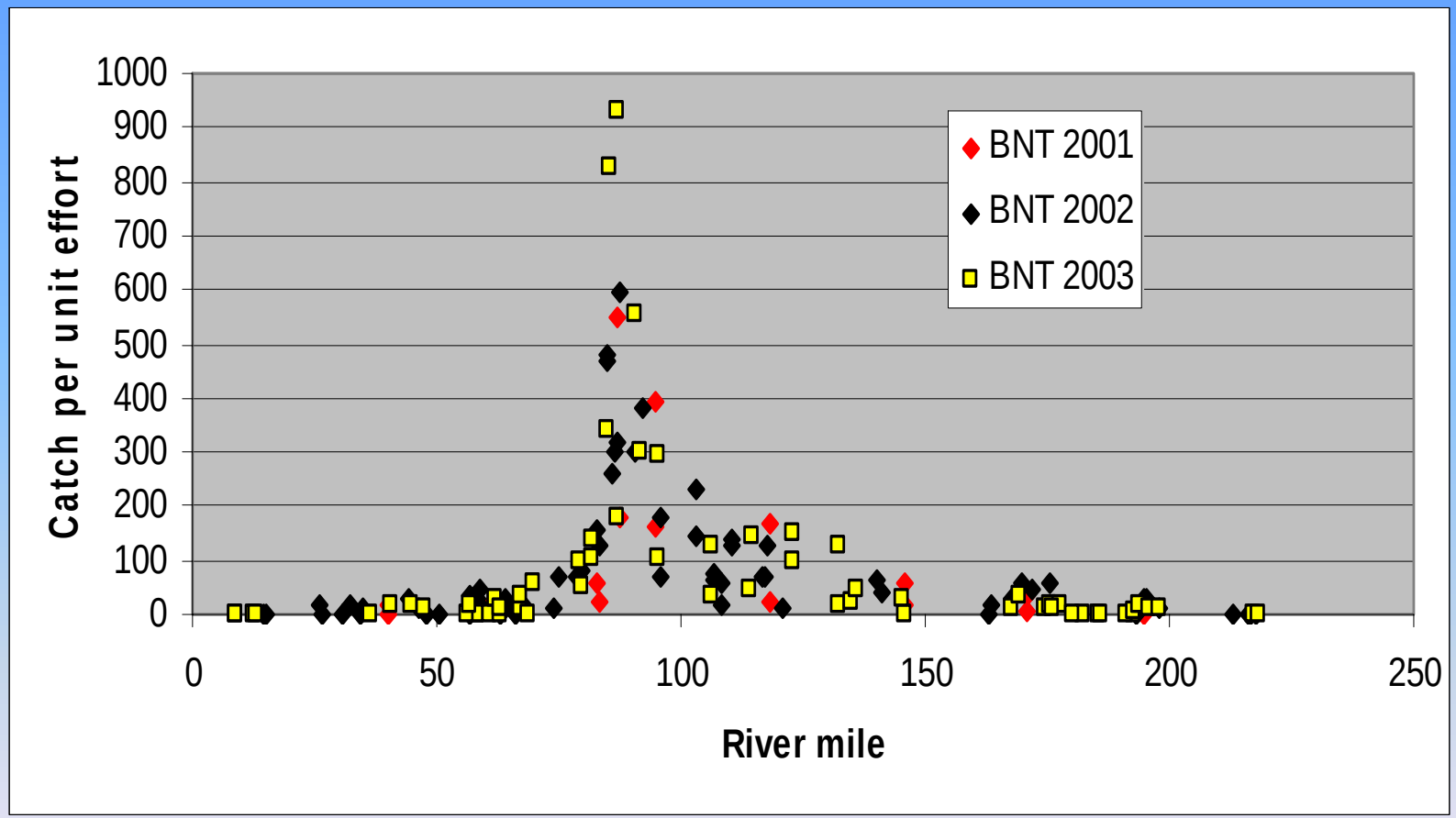




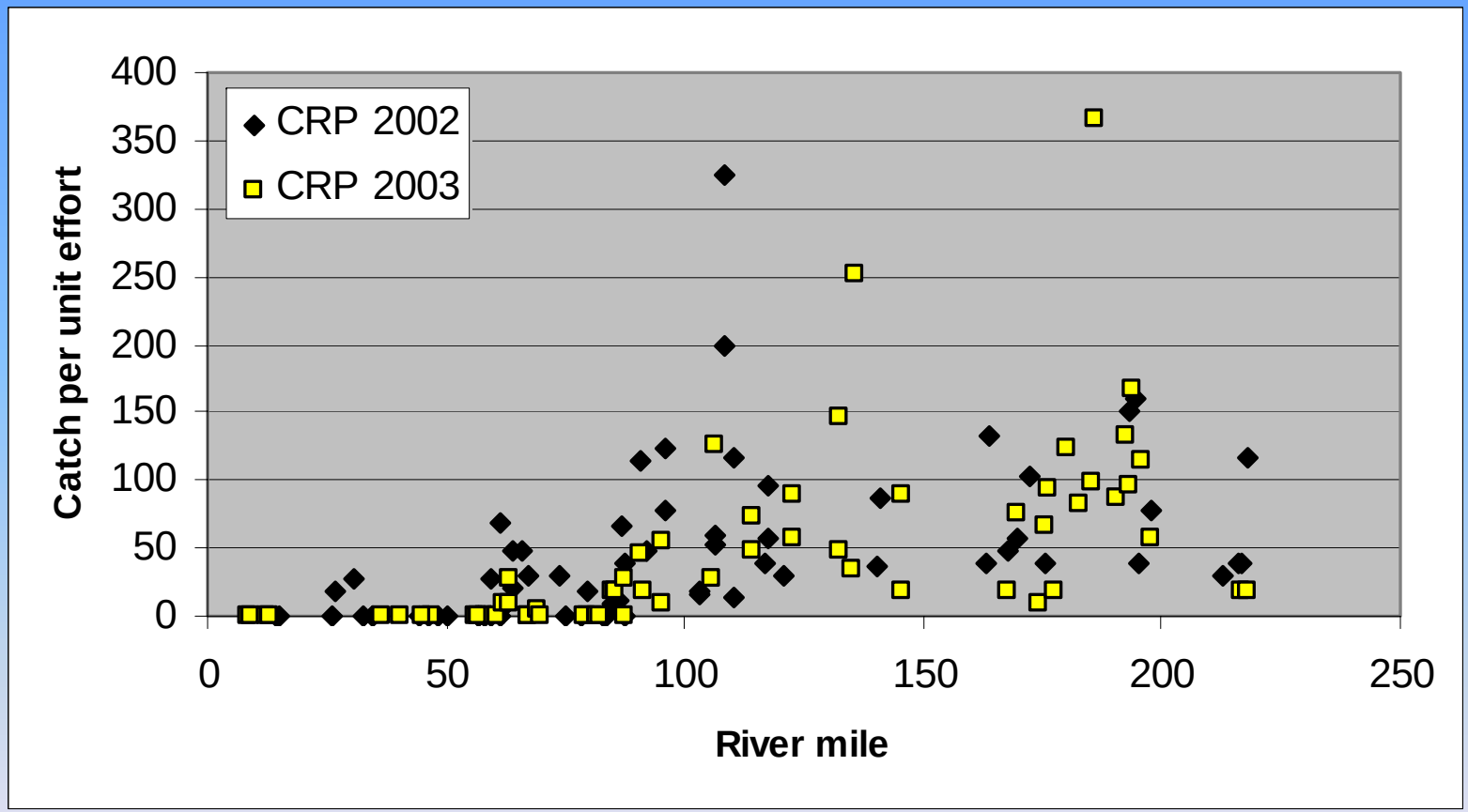
Rainbow trout catch per unit effort 2001-2003



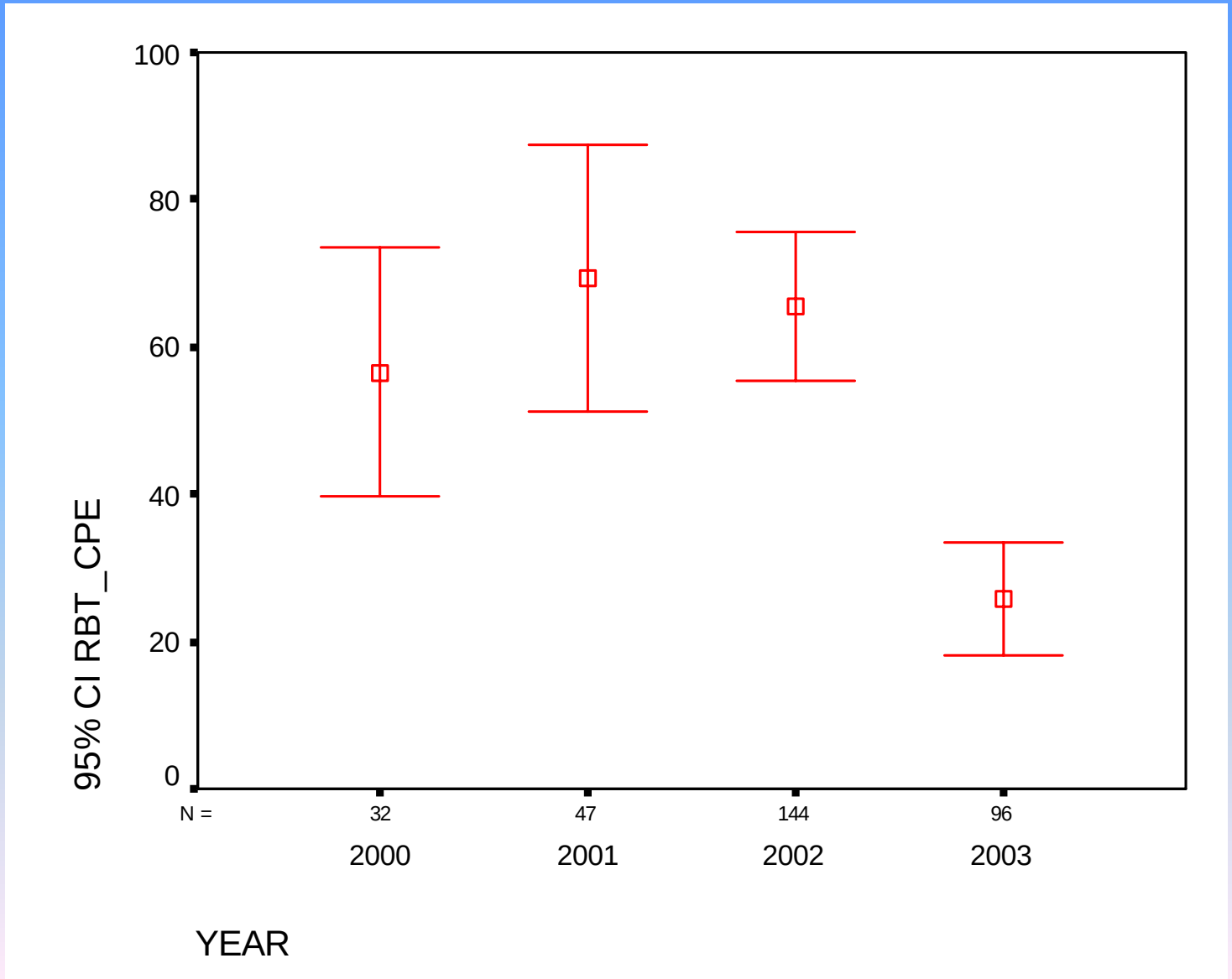
Brown trout catch per unit effort 2001-2003



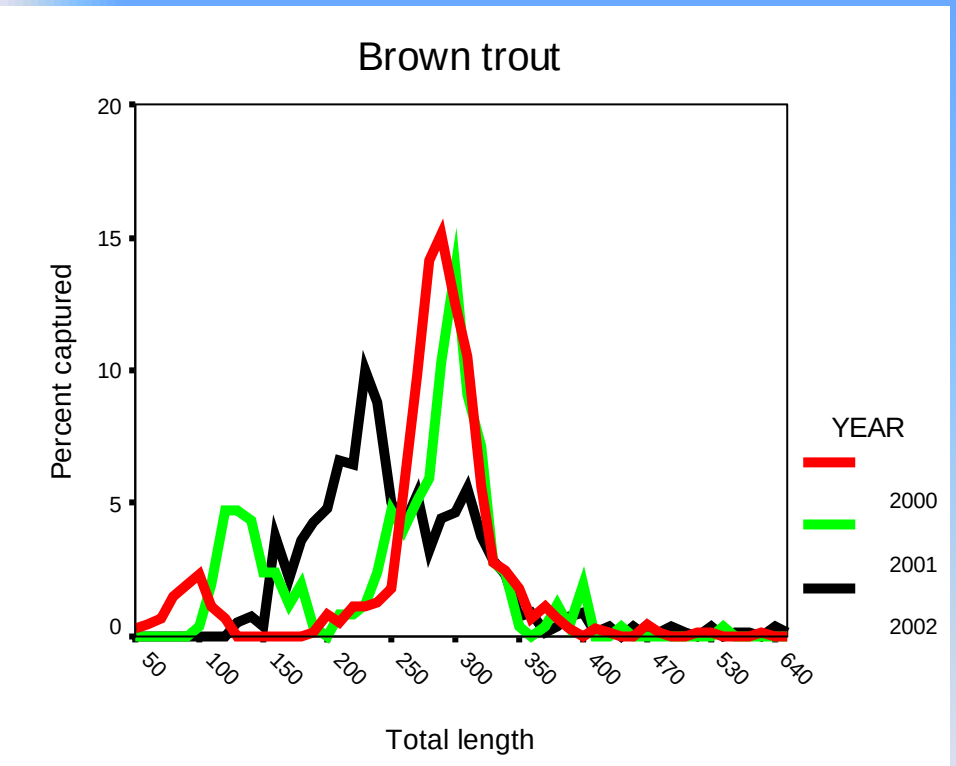
Carp catch per unit effort 2002-2003

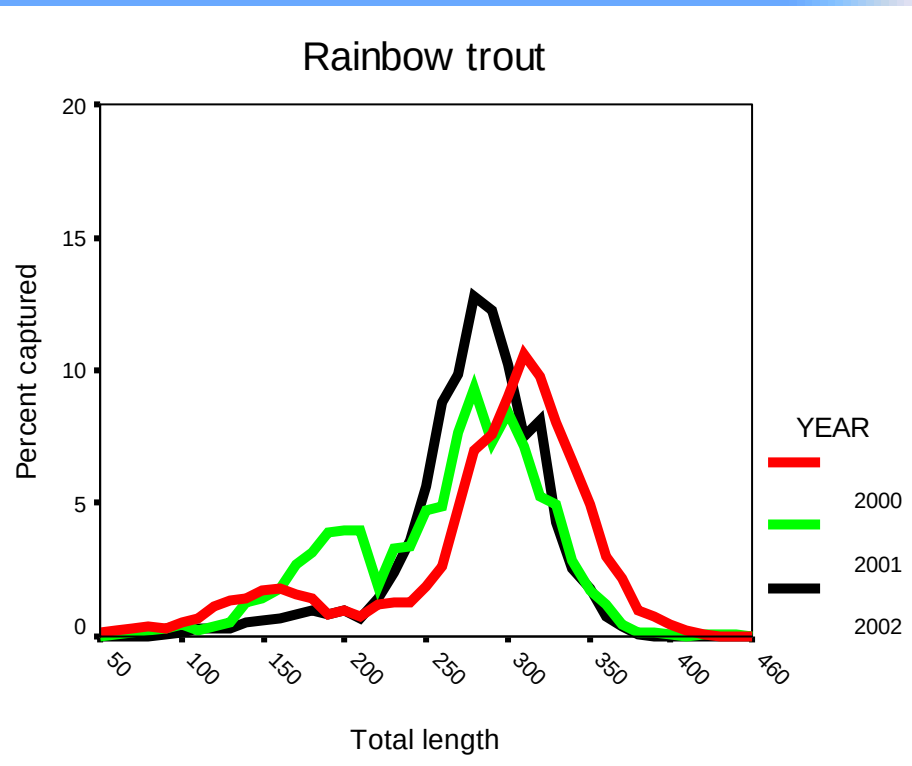


RBT LCR Depletion reach



Brown trout and rainbow trout percent capture by year 2000-2002





Robust long-term monitoring of aquatic populations is important to adaptive management programs because it characterizes a “baseline” or antecedent context in which response of biota to changing management policies—or experiments—can be interpreted.

(Walters and Holling 1990; Thomas 1996; Walters 1997).

2003 Summary

- 798 samples randomly sampled within 10 geomorphic reaches

2002

RBT	BNT	CRP	HBC	FMS	SPD	FHM	RSH	CCF	STB	BBH	BHS
2786	562	314	8	71	13	10	2	2	1	1	4

2003

RBT	BNT	CRP	HBC	FMS	SPD	FHM	RSH	CCF	STB	BBH	BHS
1662	560	352	3	110	12	5	0	4	0	0	17

2003 Samples

- 840 samples (300 sec) proposed
- 798 completed
- Distribution of sampling effort similar to 2002. Disproportional effort in LCR and BAC reaches. Less effort in upper reach than 2002 more effort in lower river to detect changes in CRP

RBT LCR Depletion reach