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Uncertainty Regarding Effects of MLFF and Other Experimental Actions on Fisheries Resources in Grand Canyon

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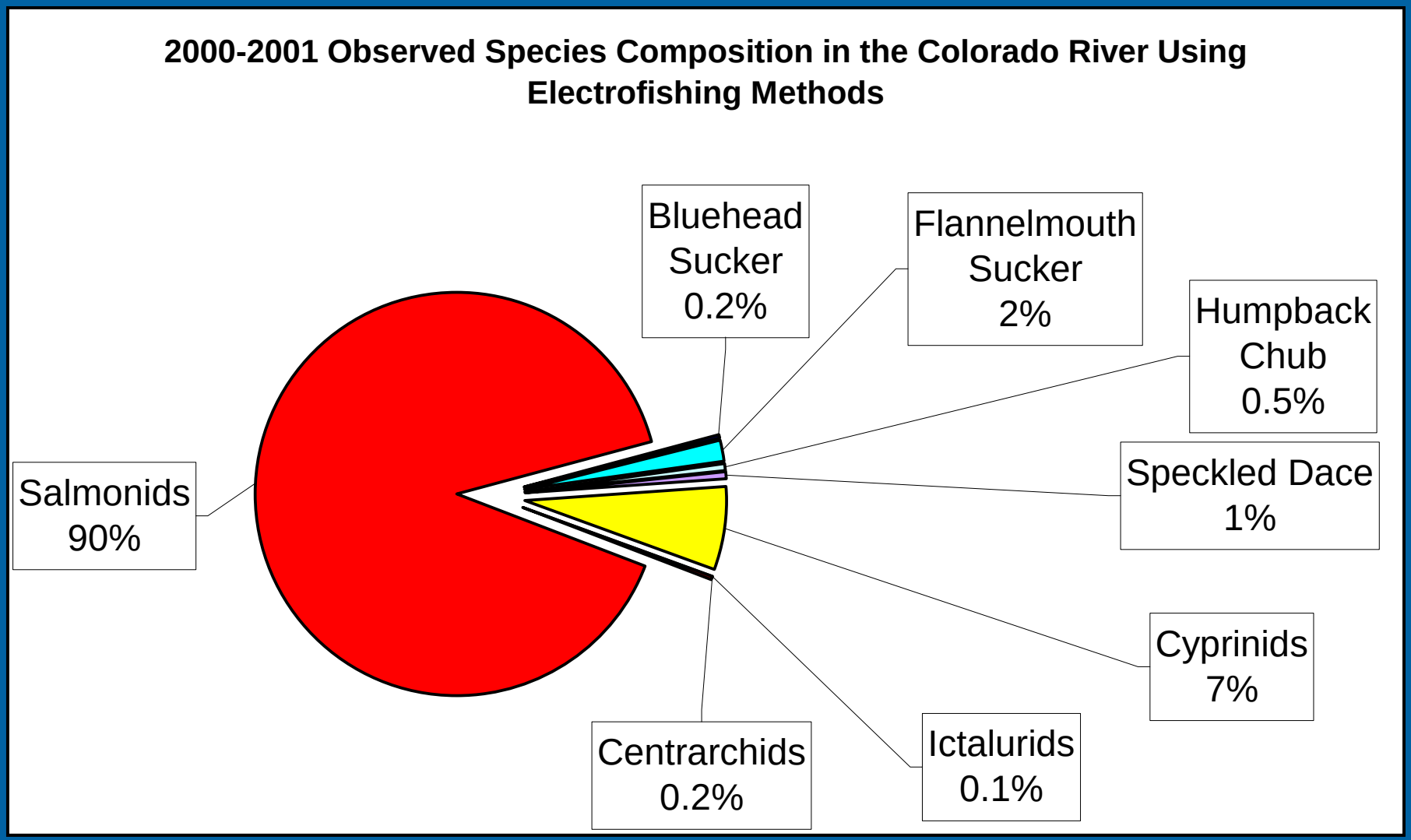
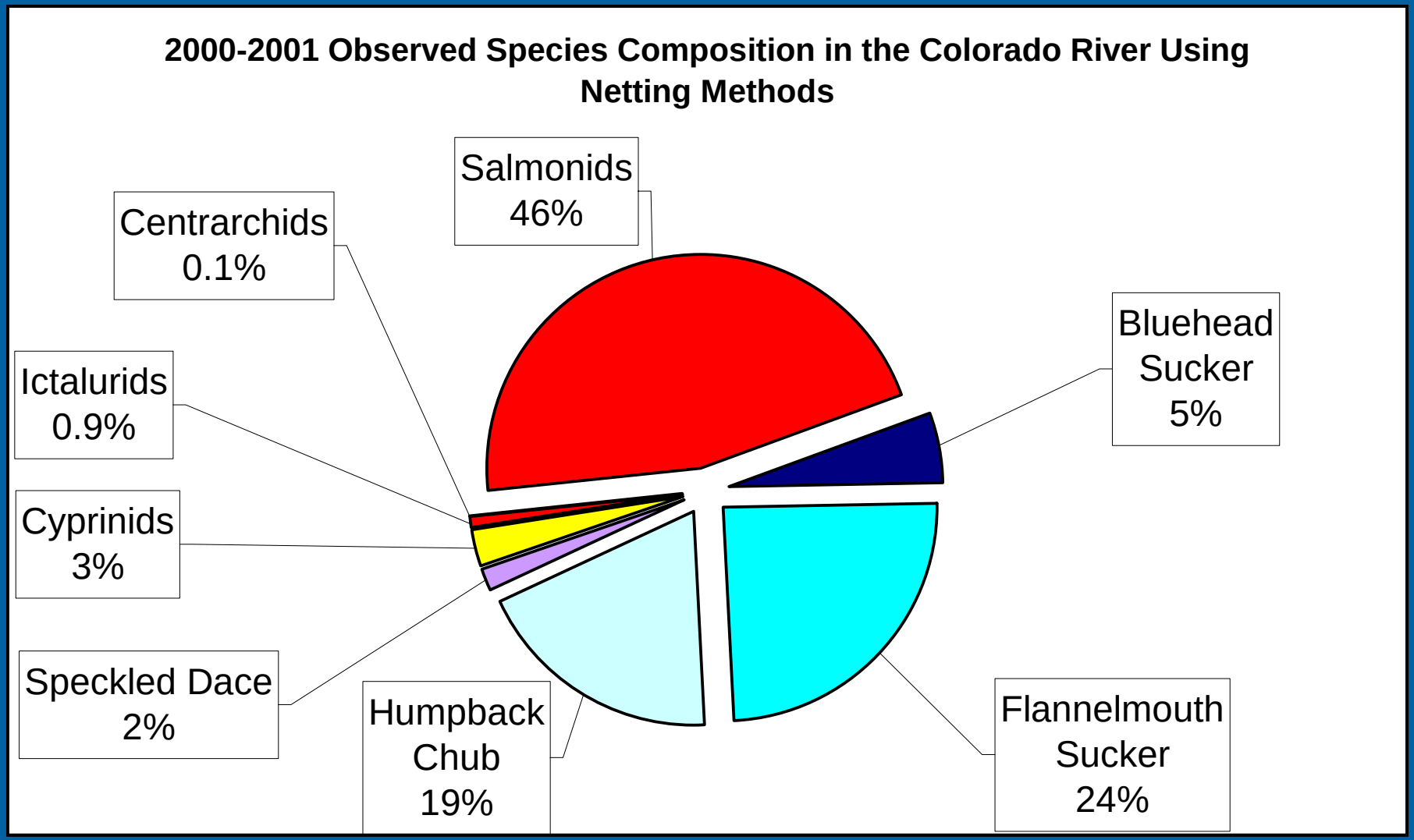
Recent Trends in Fishery Resources
Mainstem Electrofishing Species Composition



Recent Trends in Fishery Resources

Mainstem Netting (Trammel and Hoop) Species Composition

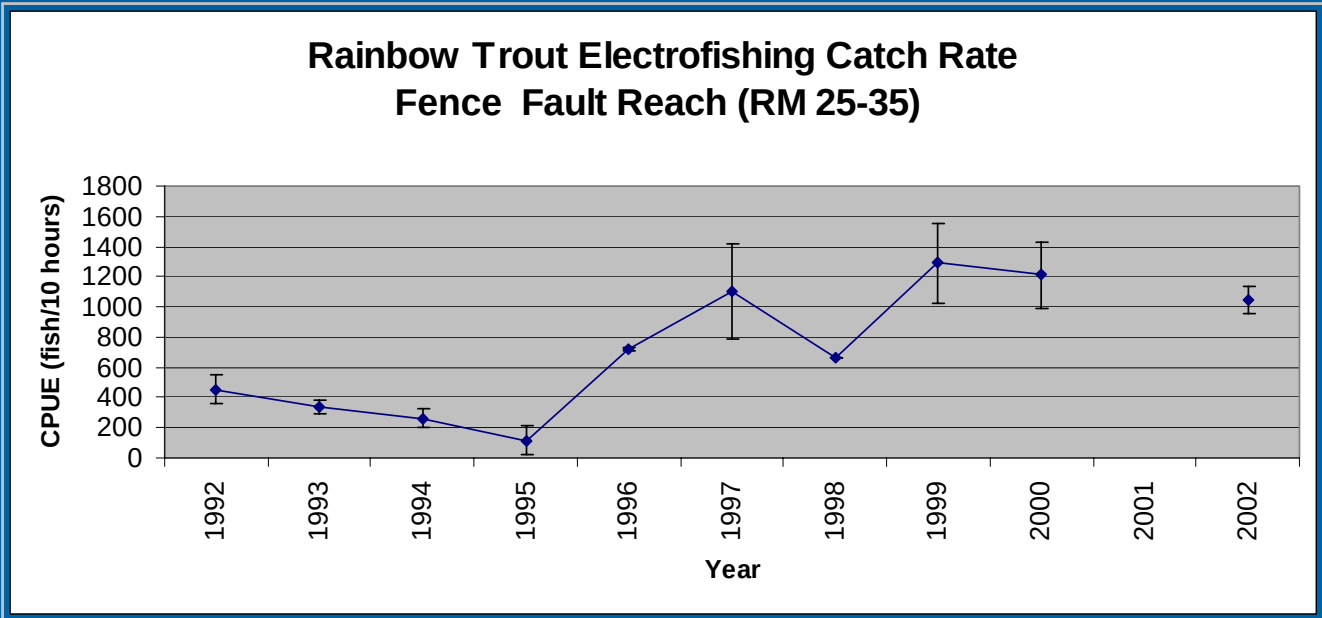


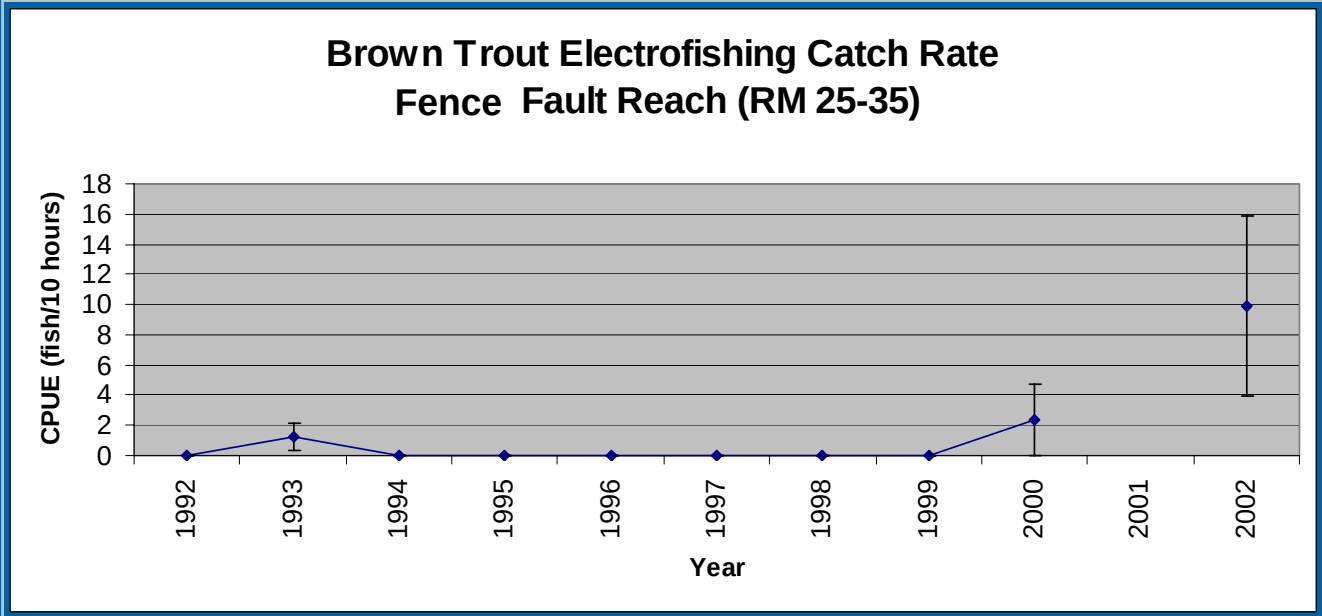
Recent Trends in Fishery Resources

- Lees Ferry
  - Update by Bill Persons after lunch
  - Overall Patterns
    - Increase in abundance, particularly in mid to late 1990's
    - Increase in angler catch-rate, particularly in mid to late 1990's
    - Decrease in average size, and proportional stock density.
    - Decrease in condition factor
    - Cessation of stocking owing to adequate natural reproduction

Recent Trends in Fishery Resources

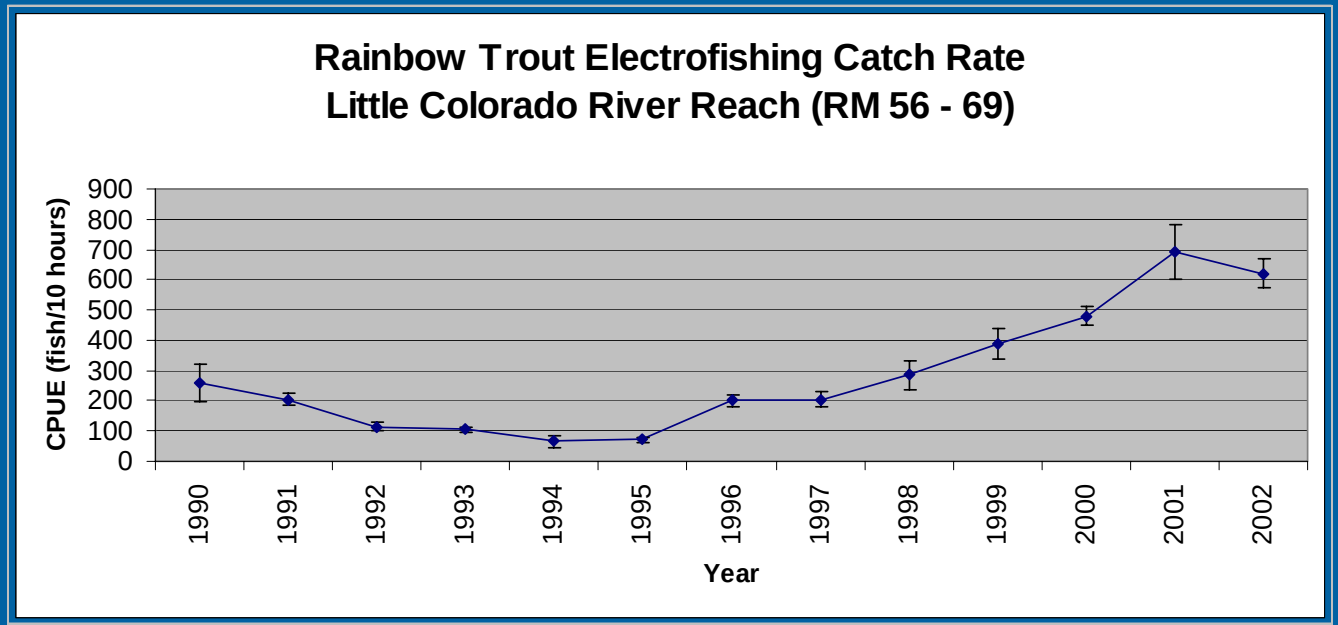
Fence Fault Reach Trout Abundance

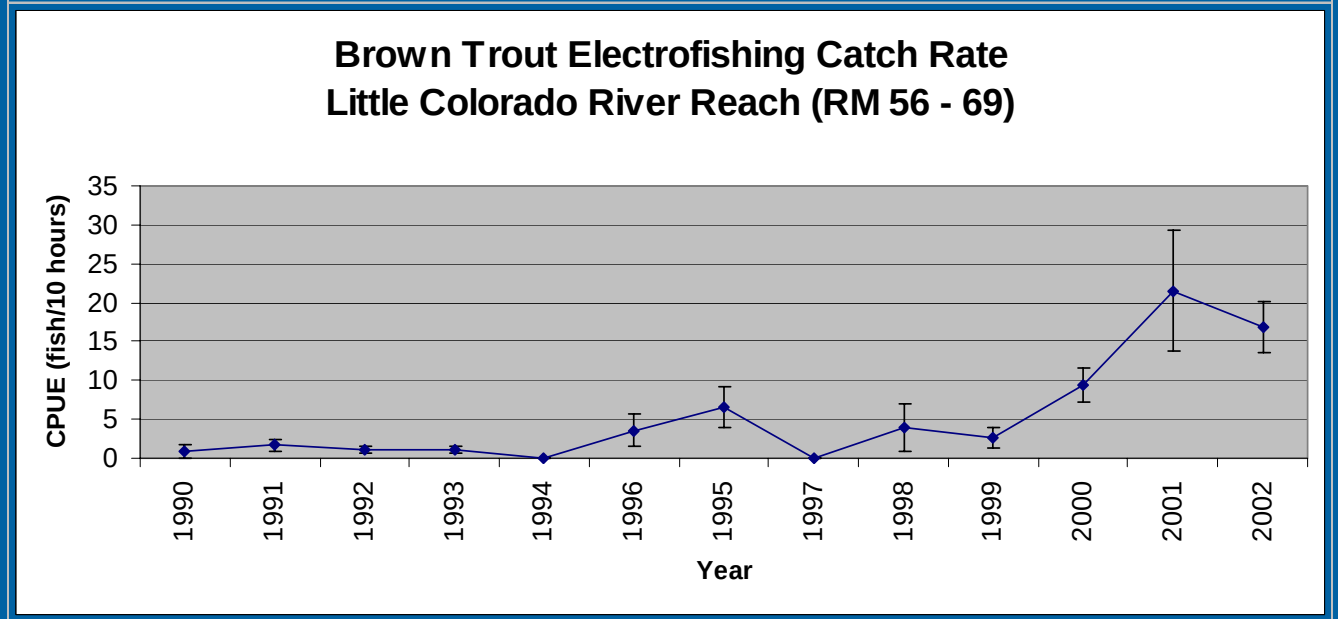




Recent Trends in Fishery Resources

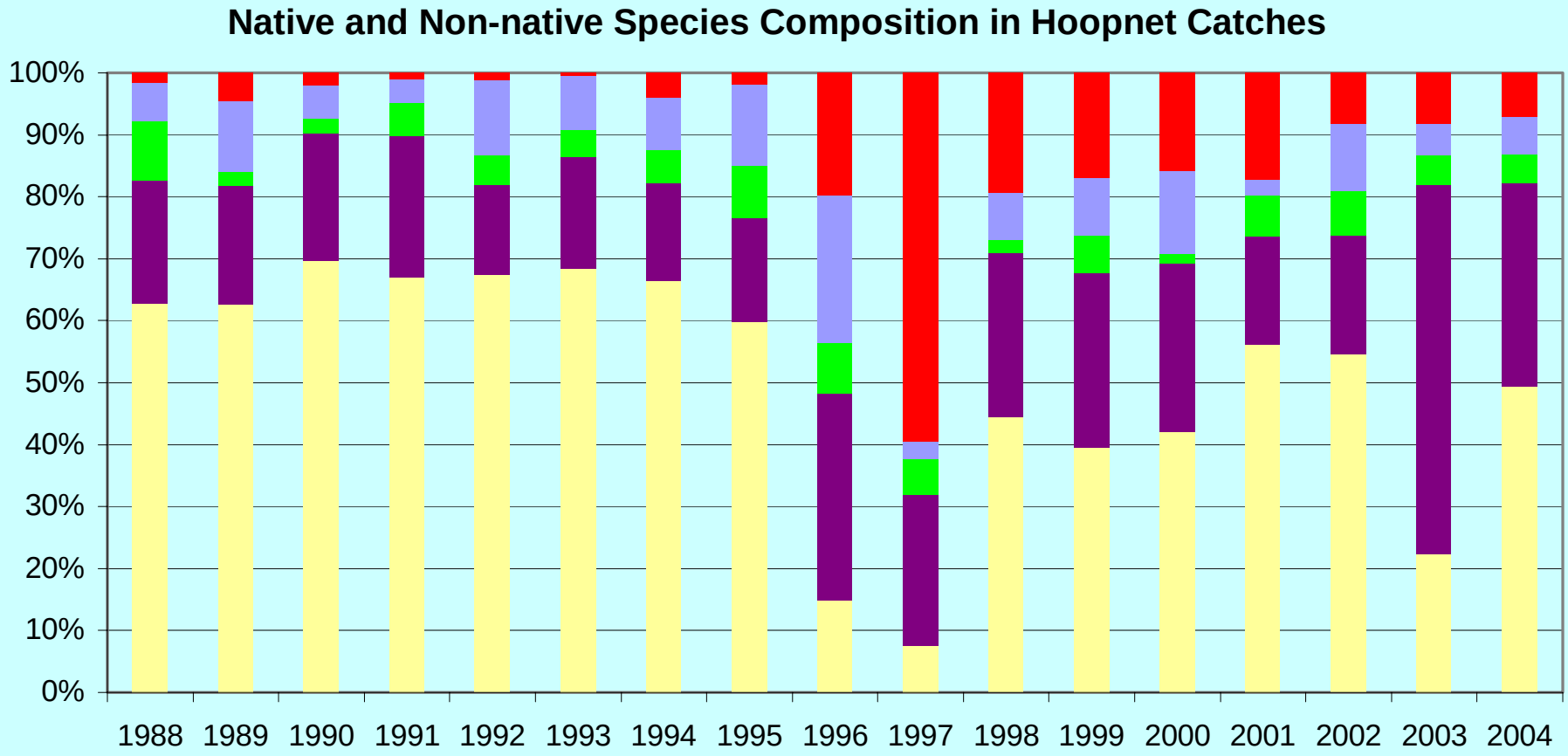
Little Colorado River Inflow Trout Abundance





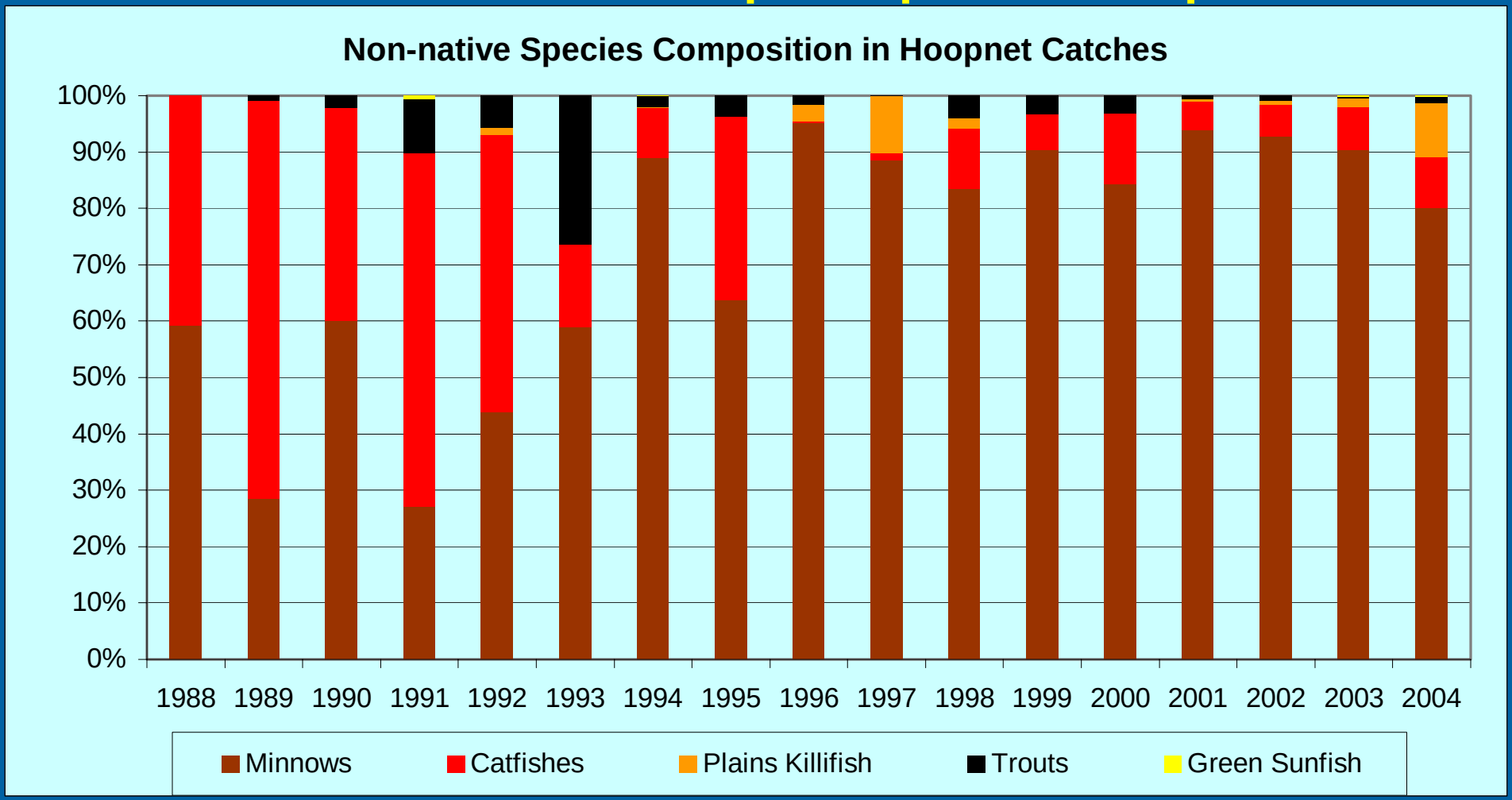
Recent Trends in Fishery Resources

Little Colorado River Hoopnet Species Composition



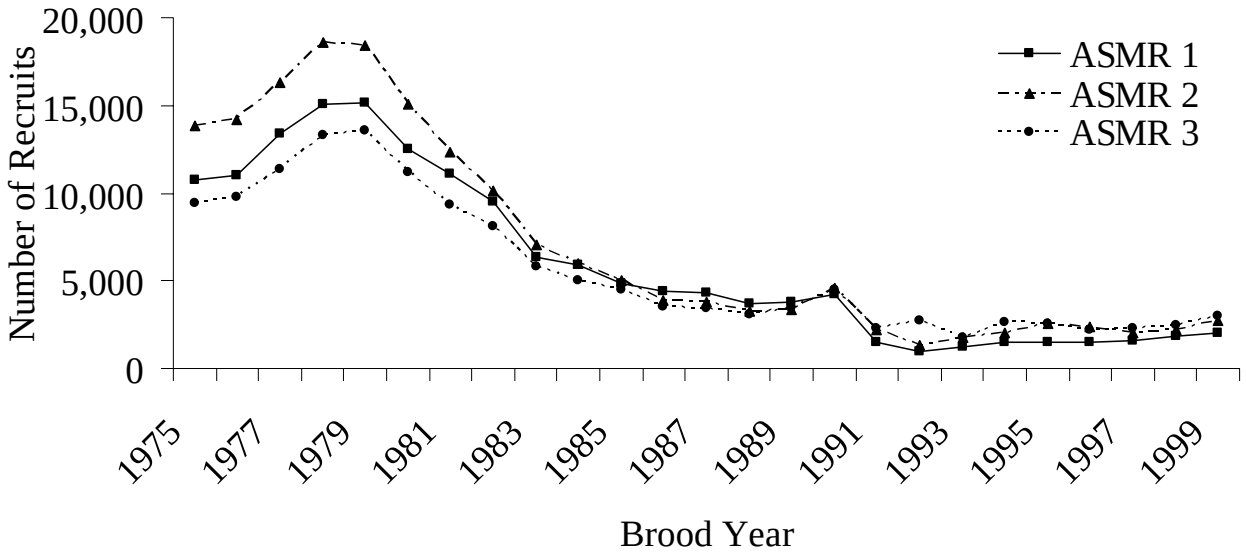
Recent Trends in Fishery Resources

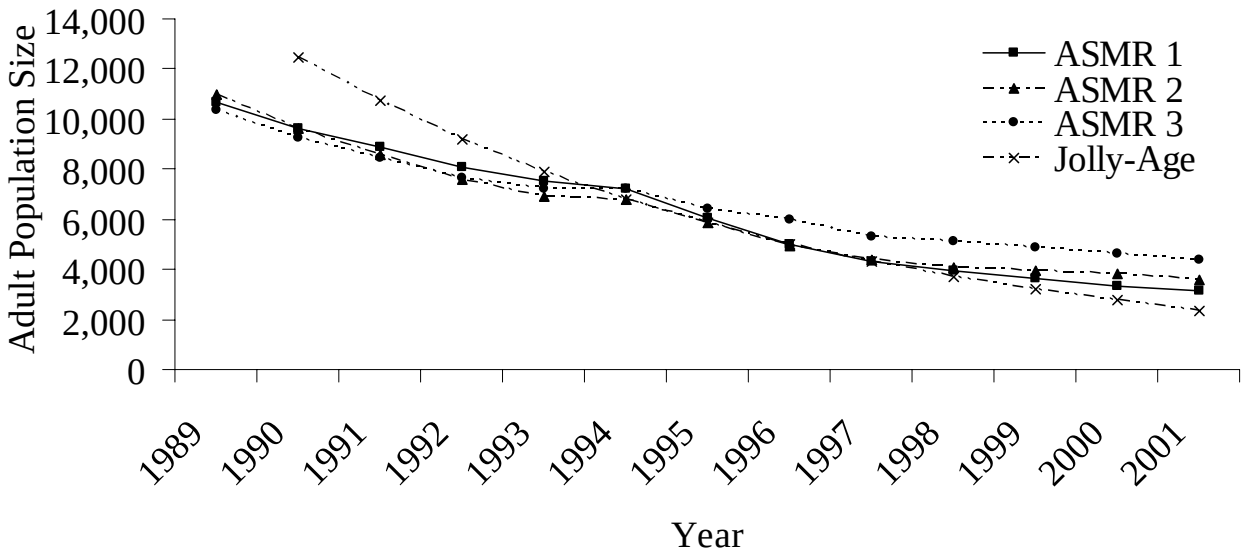
Little Colorado River Hoopnet Species Composition



Recent Trends in Fishery Resources

Little Colorado River Humpback Chub Abundance





Overall Trends during the MLFF Period

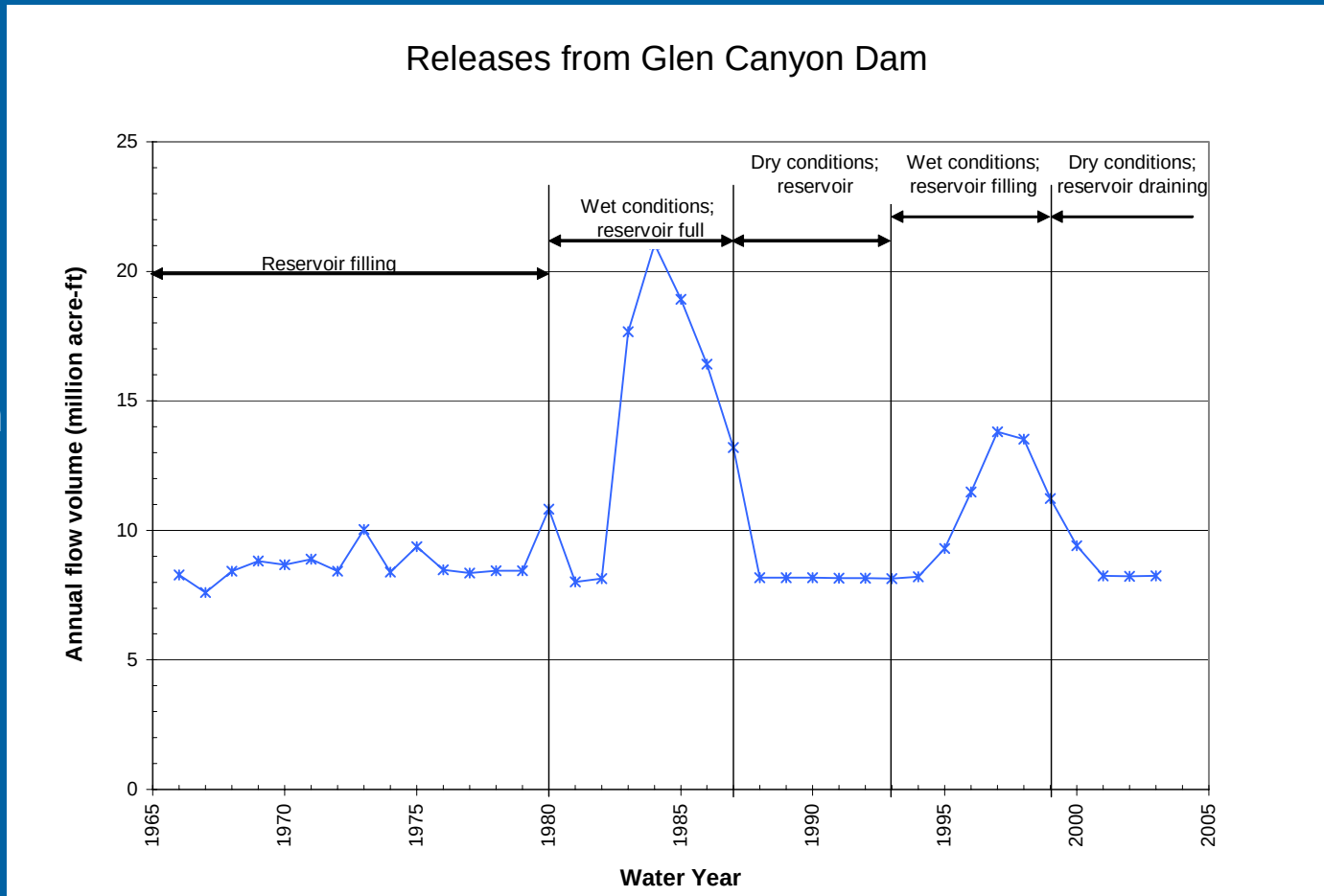
- Rainbow trout abundance increased throughout the CRE
- Brown trout abundance increased, particularly in upstream (critical) areas near LCR confluence and Fence Fault
- Humpback chub abundance and recruitment continued to decline
- LCR species composition remained essentially static
- Items 1-3 are contrary to the expectations from the EIS
  - Not a surprising result… reinforces the need for active adaptive management.

Do We Know With Any Certainty What Caused These Patterns in Fishery Resources?

- Not really, can only speculate on most.
- Why?
  - Lack of experimental design
  - Lack of contrast in Dam Operations
    - Interim and Rod Flows for last 14 years
    - 1996 BHBF and 2000 LSSF (and 2005 fall flows) were of insufficient duration to provide much of a biological signal or to rule out a spurious trend caused by an uncontrolled factor. Possible exception is 2000 RBT cohort in Lees Ferry, but spurious trend is still a possibility.
  - We would be in a much better position to evaluate MLFF if there had been a 3-4 year block of some other operation (e.g., No Action, LSSF, high spring ponding flows) mid-way through Rod Implementation.

Speculations!!!

- Lees Ferry
  - Became a self-sustaining fishery with multiple strong year classes increasing overall abundance.
  - Changes in annual volume likely had an overall affect on carrying capacity allowing fish to flourish in the mid-late 1990's and forcing an adjustment in early 2000's.
  - Suggests management for a quality fishery should be tied to annual volumes.



Speculations!!!

- Downstream Non-native Fish
  - Salmonids demonstrating similar pattern as Lees Ferry with major period of expansion occurring in mid to late 1990's
  - If annual water volume affecting RBT at downstream locations, expect decreases in RBT abundance.
  - Brown trout? Increased water temperature could allow continued upstream expansion of brown trout. However, they could experience a decline due to lowered carrying capacity similar to rainbow trout.

Speculations!!!

- **Humpback chub**
  - **MLFF does not seem to have reversed HBC decline**
    - **However, we do not know if HBC would have suffered less, more, or the same under some other type of operation… suggests active adaptive management is needed**
  - **We do not know which of multiple factors (competing hypotheses) are drivers for HBC recruitment dynamics… see next talk**
- **From Korman et al. 2004**
  - **"*The interaction between habitat and ecosystem processes like competition and predation remain highly uncertain. Ultimately, questions regarding the effects of dam operations on juvenile humpback chub must be addressed by monitoring the response of critical population parameters to flow manipulations conducted within a sound experimental design.*"**