Lees Ferry Management Objectives and Monitoring Metrics

Presented to Glen Canyon Dam Adaptive Management Program Technical Work Group
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Presentation:

- Goal 4 and Management Objectives (MOs)
- Brief history of fishery and MOs
- Description of attributes for MOs
- Description of metrics
- Are we monitoring MOs and meeting MOs ?
- Report card (SCORE?)
- Other concerns
- Take Home

Goal 4

- Maintain a wild reproducing population of rainbow trout above the Paria River, to the extent practicable and consistent with the maintenance of viable populations of native fish.

Management Objective 4.1

- Maintain or attain RBT abundance, proportional stock density, length at age, condition, spawning habitat, natural recruitment, and prevent or control whirling disease and other parasitic infections.

Management Objective 4.2

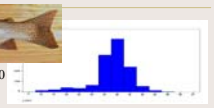
- Limit Lee's Ferry RBT distribution in the Colorado River below the Paria River.

History of Fishery

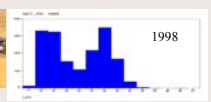
- 1964 – 1971: Put-and-take Era
- 1972 – 1978: Trophy Fishing Era
- 1978 – 1984: Quality Fishing Era
- 1985 – Present: Something Less Than Quality but Not Put-and-take.

LF Length Frequencies 1990, 1998

1990

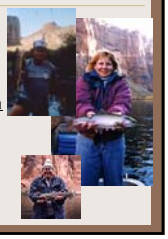


1998

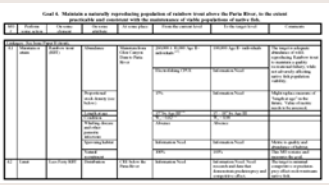


LF Management Concepts

- Blue Ribbon Fishery (AZGFD)
  - Self sustaining
  - Larger fish
  - Higher catch rate
  - Meet the desires of the angler
- Adaptive Management Program 2001 Strategic Plan
  - Natural Reproduction
  - Population of 100,000 age II+ trout
  - Relative condition > 0.9
  - 18 inches by age III



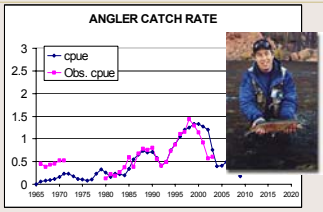
2001 Strategic Plan



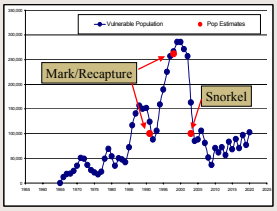
Attributes/ Measures

- Abundance (100,000 Age II+)
- Growth & Size Structure:
  - PSD (not specified)
  - Length at age (18 “ by Age III)
  - Condition (Wr/ Kn = 0.90)
- Natural recruitment (yes)
  - Spawning habitat (available)
- Whirling disease (free)

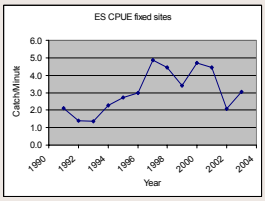
SA Model & Angler Catch Rates



ABUNDANCE
Model, M/R, and snorkel estimates



ABUNDANCE
Electrofishing Catch Rates

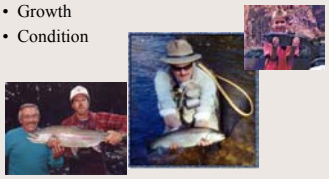


Electrofishing (ES) and Angler CPUE Power

- ES CPUE fixed sites only:
  - Can detect 23% positive and 19% negative linear change in CPUE over 5 years.
- ES CPUE fixed and random sites:
  - Can detect 6 – 10% change in CPUE over 5 years.
- Angler CPUE
  - Can detect 10-20% change in CPUE over 5 years, however number of samples is decreasing ($), power may decline slightly.

Size Structure

- Proportional stock density (PSD)
- Growth
- Condition



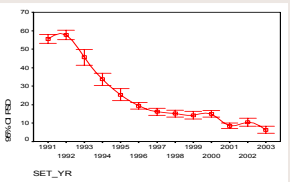
PSD Value

- PSD values within the target range indicate a balanced population. Values less than the target range indicate a population dominated by small fish and values greater than the target range indicate a population comprised mainly of large fish.

Common PSD Targets:

- largemouth bass – 40-70
- bluegill – 20-40
- yellow perch – 30-50
- walleye – 30-60

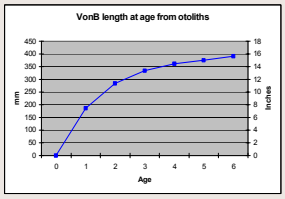
PSD



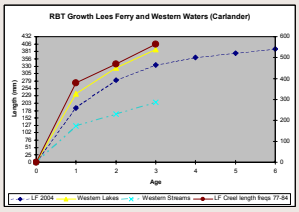
Growth (18 inches by age III)

- May not be realistic objective at high density.
  - 16 inches by age III may be attainable at density of 100,000 fish.
- Difficult to measure without marked fish.
  - PIT tags may be more useful in future as more tags are implanted.
- Otoliths may be useful for determining ages, methods still being refined and validated

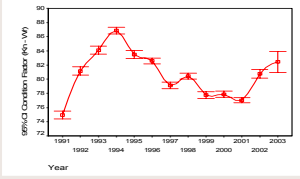
Estimated Growth (Otoliths)



Growth Comparisons (LF and Carlander)



Condition Factor



Size Structure Power

• PSD	Unknown power
• Growth	Low power, high variability
• Condition	High power (many lengths and weights)

Natural Recruitment:

• Spawning habitat	• Undetermined metric. "Available and sufficient"
• Natural recruitment	• ~100 % (no stocking)

Natural Recruitment

HOW TO DETERMINE THE SEX OF A FISH

PARASITES/DISEASE

- External parasites (Learnea)
  - Cursory evaluation as part of monitoring
    - (no EXTERNAL parasites present)
  - Detailed Health Assessment Index during mid 90's showed no external parasites, no significant internal concerns other than nematodes; more time and effort to collect data than value added at that time.
- Internal parasites
  - (nematodes)
    - Evaluated as part of diet analysis
- Whirling Disease
  - Annual evaluation

Are We Meeting MO 4.1?

Attribute	Target	Present	Grade
Abundance	>100,000 Age II	~100,000 Age II	**B** CPUE indices and model seem to accurately reflect abundance. Improvements in sampling design and abundance estimates are ongoing.

Are We Meeting MO 4.1?

Attribute	Target	Present	Grade
GROWTH	18 inches by Age III	14 inches by Age III	**C-/D+** Target may be unrealistic at present density. Suggest target be evaluated over time.
PSD	To Be Determined 30-60%	<10%	**D** Need to establish target and value of attribute.
Condition	0.90	0.85	B

Are We Meeting MO 4.1?

Attribute	Target	Present	Score
Natural recruitment	100%	100%	**A**
Spawning habitat	Sufficient	Sufficient for natural recruitment	**Incomplete** **This is not being measured on a regular basis.**
Whirling Disease	Free of WD	Free of WD	**A** Monitored annually by AGFD fish health lab.

Attributes/ Measures

- ⇔ Abundance (100,000 age II+)
- ⇓ Growth & size structure:
  - PSD (not specified – 40-60%)
  - Length at age (18 " by age III)
  - Condition (W_r/ K_n = 0.90)
- ⇑ Natural recruitment (yes)
  - Spawning habitat (available)
- ⇑ Whirling disease (free)

Concerns:

- Linkage between fish and foodbase is not being investigated.
- Recreational use (visitation) is not being evaluated by AMP. Should it be reported as part of this effort?
- Brown trout seem to be increasing in the LF reach.
- Need monitoring program for "other" (non RBT) species in the reach, especially with warming water.
- Abundance estimates and SA model need to be continuously improved.
- Mo 4.2 (downstream movement of LF fish) is not being addressed ($$$).