The Natal Origins of Rainbow Trout in Grand Canyon:
A Lines of Evidence Review

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Why investigate natal origins?

- Supports management efforts
  - Recreational fishery in Lees Ferry reach
  - Native fishes conservation
- Supports work plan prioritization
Available lines of evidence

- Mechanical removal project data
- Spawning habitat availability
- Geographic distribution patterns
- Length-frequency distribution patterns
- Correlated temporal patterns
Mechanical Removal Project Data

Control Reach

Mechanical Removal Reach
RBT immigration following removals

Coggins
2008
RBT immigration following removals

Coggins 2008
Figure 1-3. Estimated abundance of spawning rainbow trout during the 1990 and 1991 study periods in the lowermost 600 m of Nankoweap Creek, Grand Canyon, Arizona.
Spawning Habitat Availability 2004

- Korman et al. 2005 estimated Nankoweap Creek had capacity for 2000 spawning rainbow trout in 2004
- Observed: 12 adults, 2 redds, 0 YOY
Mainstem Spawning Habitat Availability 2004

Korman et al. 2005
Figure 3. Catch-per-effort (# fish/10 h EF) of brown trout by river mile, Colorado River in Grand Canyon, March 2001.
Figure 2. Mean brown trout catch per hour of electrofishing by sampling reach during 2000-2003 (Colorado River, Grand Canyon).
Figure 2. Catch-per-effort (# fish/10 h EF) of rainbow trout by river mile, Colorado River in Grand Canyon, March 2001.
Geographic Distribution Patterns - RBT

Rainbow trout catch per hour, 2000-2003

![Graph showing rainbow trout catch per hour from 2000 to 2003 for different sampling reaches.](image)

Rogers et al. 2006

Figure 1. Mean rainbow trout catch per unit effort (fish per hour) by sampling reach during 2000-2003 (Colorado River, Grand Canyon).
Length Frequency Distributions

RM -15 to RM -10

Total Length (mm)

Frequency

n = 17033

RM -10 to RM 0

Total Length (mm)

Frequency

n = 31798

RM 0 to RM 10

Total Length (mm)

Frequency

n = 1364

RM 10 to RM 20

Total Length (mm)

Frequency

n = 1272

RM 20 to RM 30

Total Length (mm)

Frequency

n = 950

RM 30 to RM 40

Total Length (mm)

Frequency

n = 2365

RM 40 to RM 50

Total Length (mm)

Frequency

n = 6477

RM 50 to RM 56

Total Length (mm)

Frequency

n = 2341
Length Frequency Distributions

- Possible factors leading to observed distributions (Korman et al. 2005):
  - Survival of YOY RBT in Marble Canyon is 2.5-3 times greater than in Glen Canyon
  - Juvenile production in Marble Canyon is lower than in Glen Canyon
  - Second possibility is more plausible
Correlated Temporal Patterns

Rainbow Trout Electrofishing Catch Rate

AZGFD data

Year

CPUE (Fish/Hour)

Lees Ferry
Marble Canyon
Little Colorado River Inflow

USGS
Conclusion and Recommendation

- **Conclusion:** Most likely that majority of rainbow trout in Colorado River in Glen, Marble, and Grand Canyons is produced in Glen Canyon/Lees Ferry reach
- **Recommendation:** Do not pursue additional research into natal origin of rainbow trout at this time