

Brown Trout telemetry at Lees Ferry and Grand Canyon, Arizona

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- 3 Bio-West, Logan, Utah**
- 4 Arizona Game and Fish Department, Research Branch, Flagstaff, AZ**



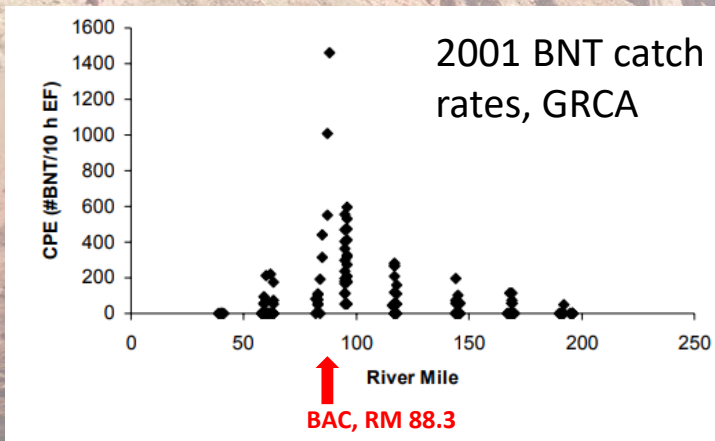
**Funded by Reclamation,
NPS, and GCA**



**Grand
Canyon
Association**

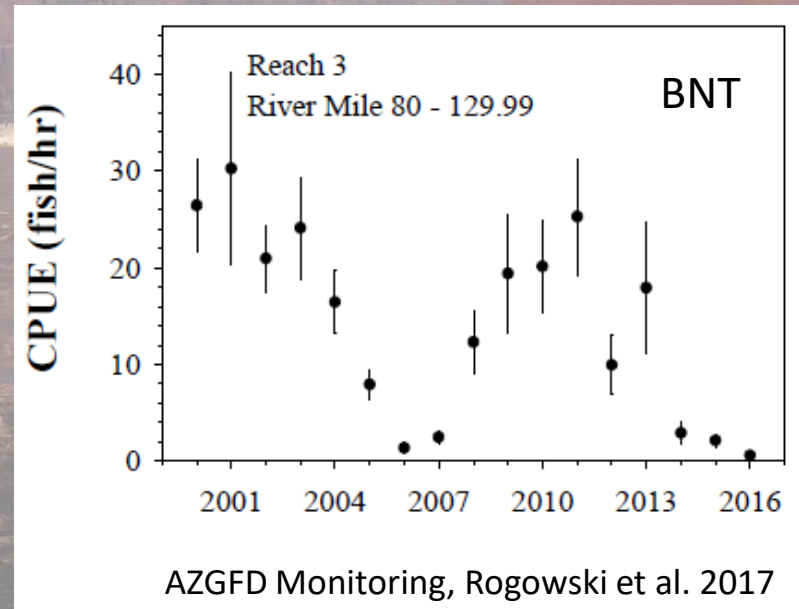
History of Brown Trout in Grand Canyon:

- Brown Trout introduced as eyed eggs into Shinumo, Garden, and Bright Angel Creeks between 1926-34
- Glen Canyon Dam completed 1963, providing cold, clear tailwater and downstream habitat suitable for trout
- Greater predation threat from Brown Trout than Rainbow Trout
- In recent decades, highest main-channel Brown Trout captures have centered on Bright Angel Creek



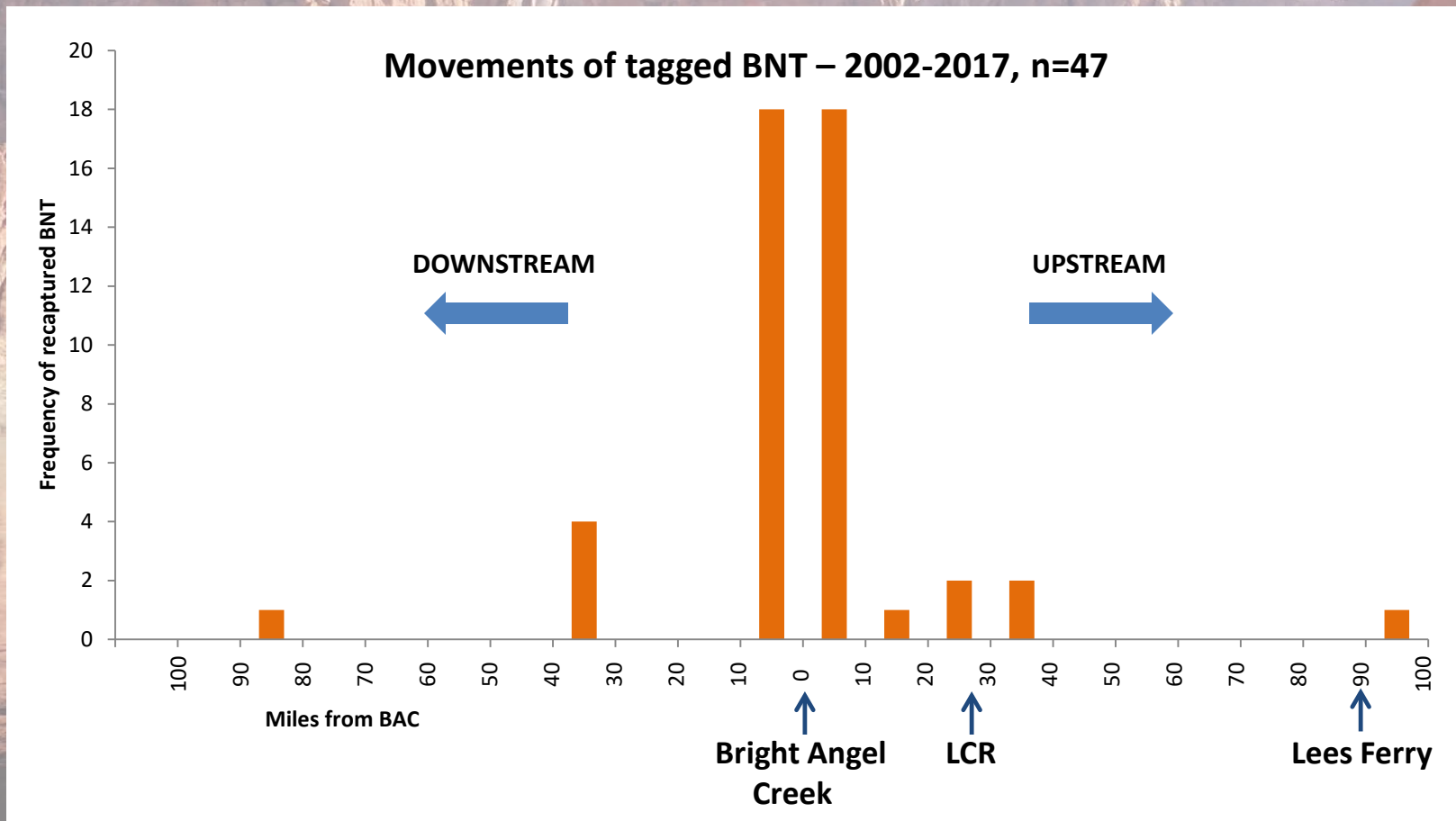
Joseph R. Tomelleri

6 seasons of Bright Angel Creek trout removals: electrofishing and weir



Bright Angel Creek weir Brown Trout recaptures - Movement

- small percentage of PIT tagged fish moved up to 92 mi



Source: PIT tag #'s cross-checked against GCMRC Master Database for original tagging information



Lees Ferry
RM 0

Little Colorado River
RM 61.7

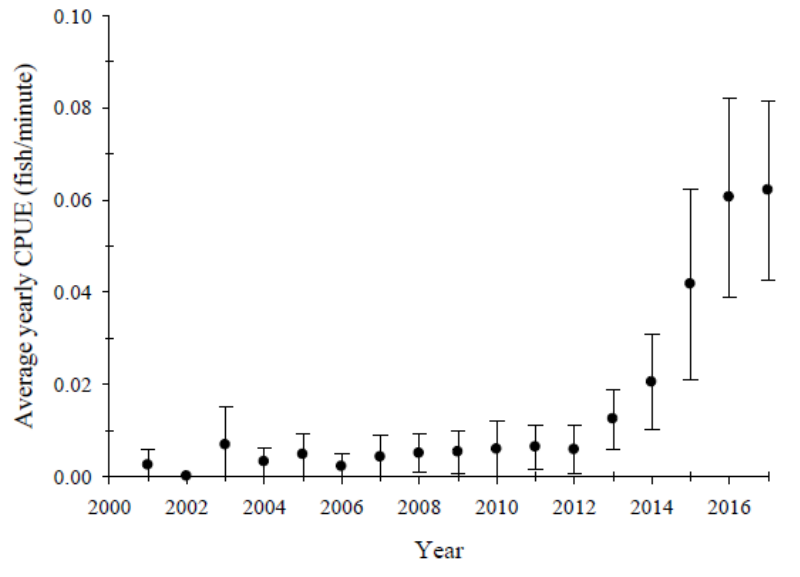
Bright Angel Creek
RM 88.3

Image Landsat / Copernicus

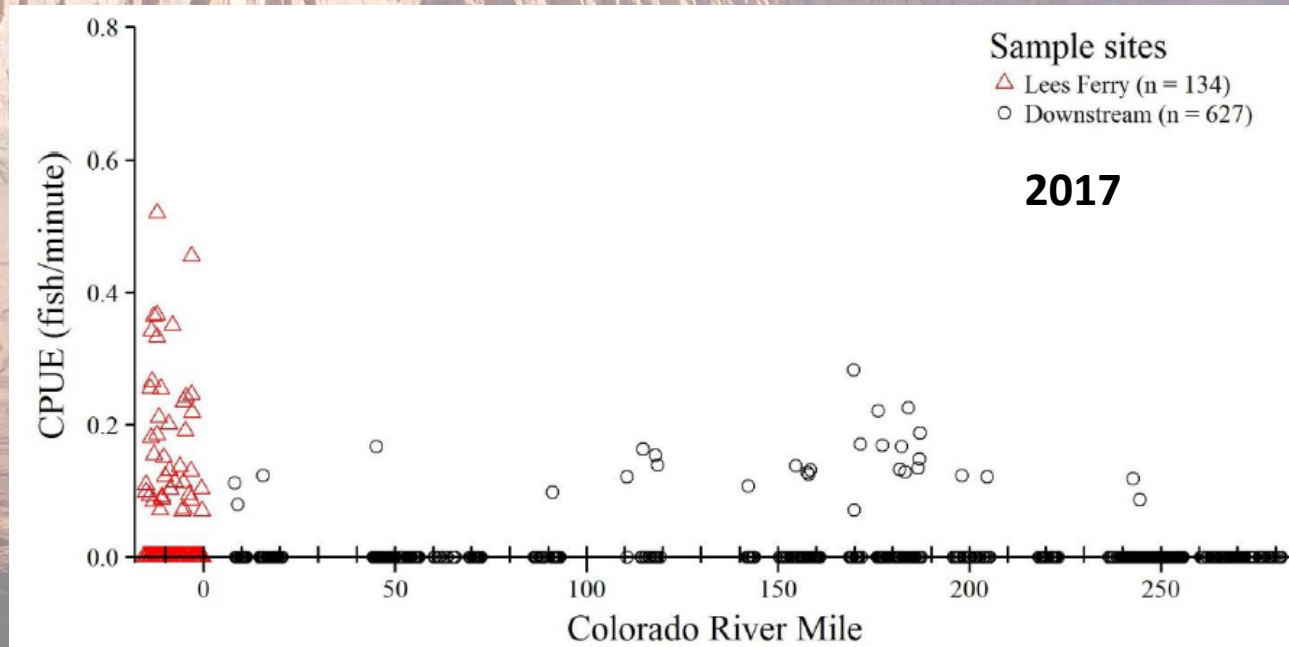
12 S 427463.99 m E 4038528.01 m

Lees Ferry

Recent increased captures of Brown Trout and observations of spawning

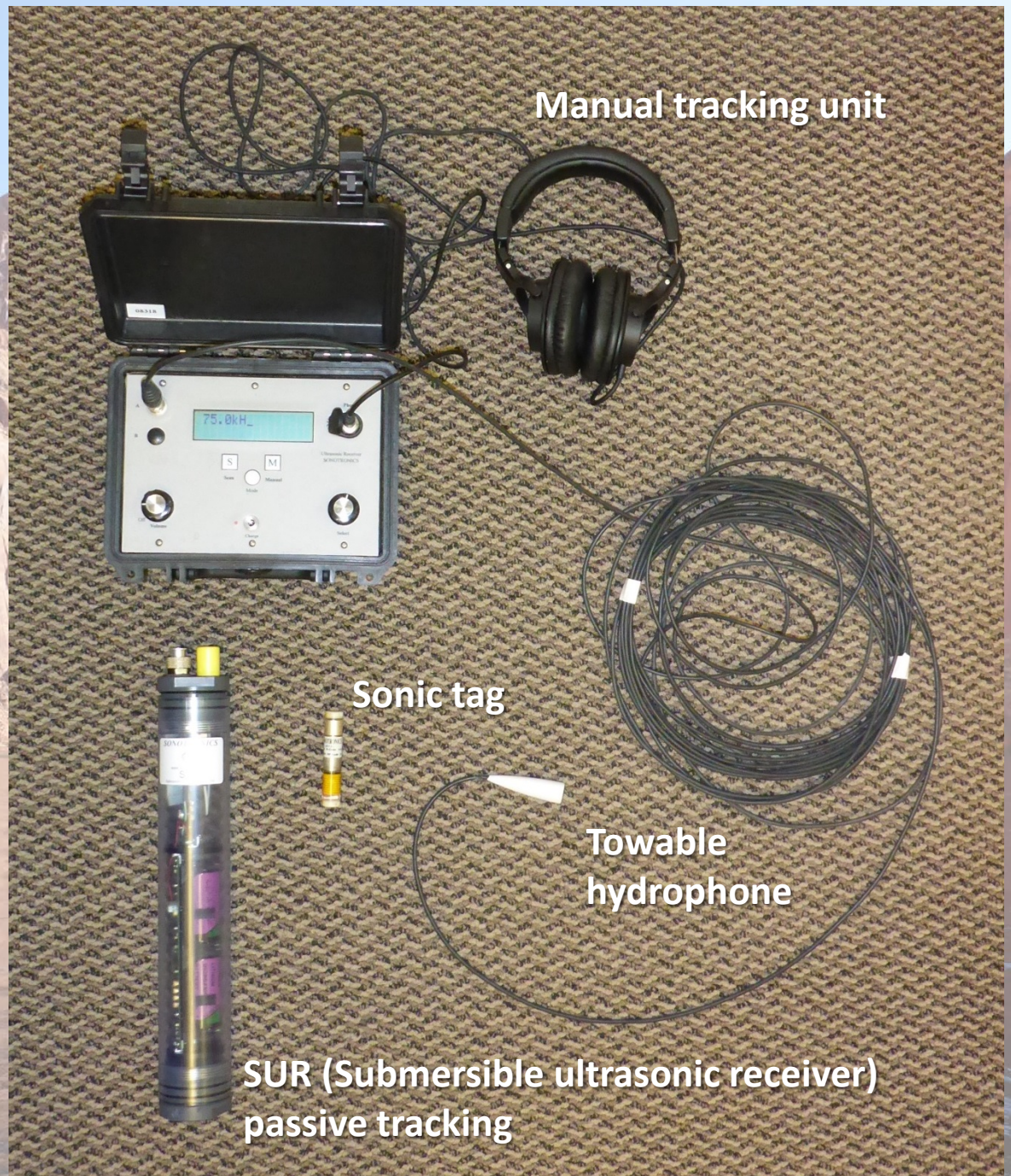


AZGFD preliminary results, prepared by Jan Boyer



Brown Trout telemetry project objectives:

- **Gather data on movements and habitat preferences, both daily and seasonally, and better identify spawning period**
- **Identify periods of vulnerability and invulnerability to electrofishing (shallow nearshore vs. deep habitats)**
- **Improve understanding of rates of adult migration downstream from Lees Ferry**
- **Potentially identify new spawning aggregations**



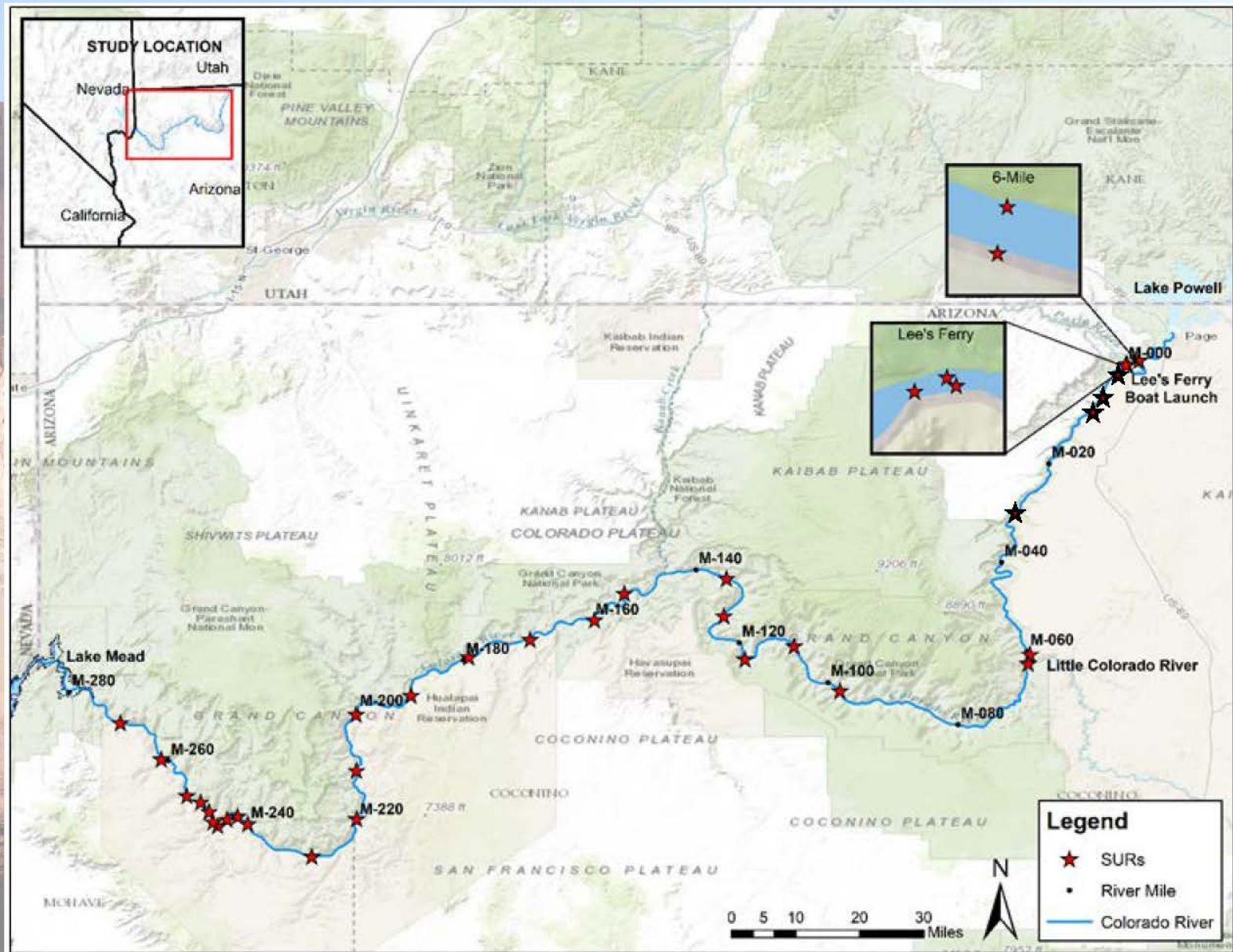
Lees Ferry Brown Trout Telemetry Pilot Study

- 10 Brown Trout implanted with dual sonic / RF tags on Feb 1, 2017 at -4 mi bar (9 males, 1 female)
- 2 active telemetry passes/day for 1st week (boat with towable hydrophone from Glen Canyon Dam to Lees Ferry)
- Weekly passes for first month
- Monthly passes through present

Expanded in winter 2017-2018

- 12/19/2017 – additional 14 Brown Trout tagged (4 males, 9 females, 1 unknown)
- 1/9/2018 – additional 15 Brown Trout tagged (11 males, 4 females)
- Grand total of 39 fish tagged over 3 tagging events

The map displays the Colorado River and its tributaries, including the Little Colorado River. Key locations marked include Lake Mead, Lake Powell, and Lee's Ferry. The river is divided into segments labeled M-000 through M-280. The map also shows the Kaibab Plateau, Shivwits Plateau, Kanab Plateau, Colorado Plateau, Coconino Plateau, and San Francisco Plateau. The Grand Canyon is visible in the center. The map includes a legend for SURs (red stars), River Mile (black dots), and Colorado River (blue line). A scale bar indicates distances from 0 to 30 miles. A north arrow is also present.





Scan for PIT tag (fish with adipose clips might have just a PIT tag, or both a PIT tag and sonic tag. Surgery scars from February 2017 had healed)



CO₂ used to
anesthetize fish



Incision



Stuff in sonic tag and
PIT tag



Suture, clip adipose
fin, and release



Results after year of tracking 10 fish:

- **In the 2-3 months following Feb tagging, most contacts remained within ~1 mi up or downstream of -4 mi bar**
- **Utility of day / night telemetry passes reconsidered; hydrophone too imprecise to identify small movements**
- **Diminishing contacts through time**
- **Of initial 10 fish, 3 tags were found to have stopped transmitting upon recapture this season**
- **2 fish were angled, and tags returned**
- **2 or 3 individuals spent summer months in deep, electrofishing invulnerable eddy at -2.5 mi (including the 1 female tagged in Feb)**
- **2 outmigrations from Ferry, with detections again next season**



Lees Ferry
RM 0



Little Colorado River
RM 61.7

Bright Angel Creek
RM 88.3

Image Landsat / Copernicus

12 S 427463.99 m E 4038528.01 m



5/30/2013

Google earth

Image date: 5/30/2013 12 S 452453.37 m E 4082741.07 m N elev 1167 m eye alt 17.74 km



5/2013

Lees Ferry
0 mi

-4 mi spawning bar

Google earth

A photograph of a massive, layered red rock cliff face, likely a butte or mesa, with a flat top. The rock has a reddish-brown hue and shows vertical erosion patterns. The cliff is reflected in a calm body of water in the foreground. The sky is clear and blue. The text "BNT 3148" and "Male" is overlaid in the center of the image.

BNT 3148
Male



BNT 3085
Male

BNT 3085: Upgraded to 100% migrator for payshier 10/24/2017; contact at -4.2 mi on 11/6/2017



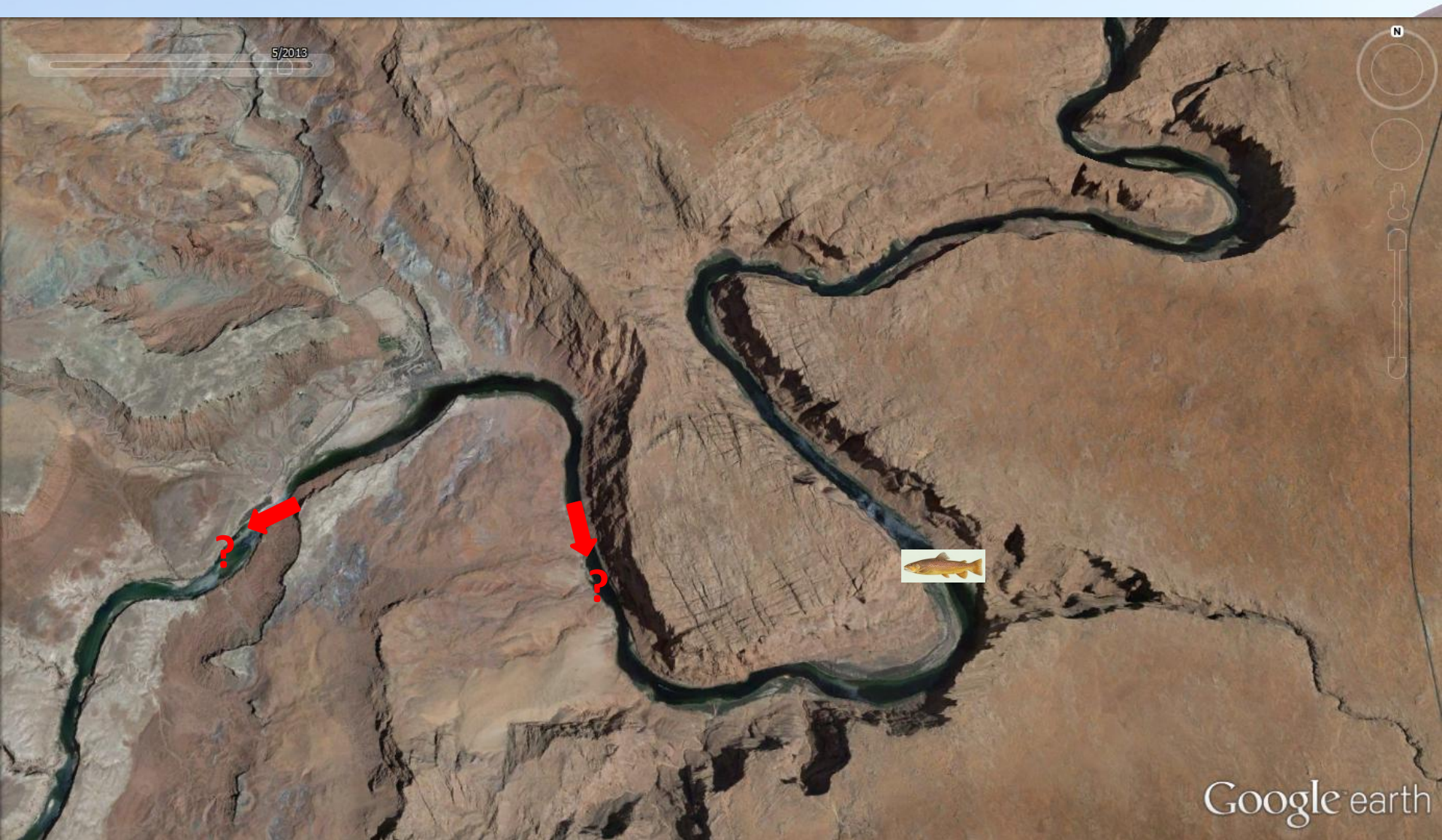
BNT 3085: Downstream passage for juvenile Chinook salmon





BNT 3091
Male

BNT 3091: Downstream aret past after 20/31-19:53-21:00/12/22/2017



(very) Preliminary results of winter 2017-18 tagging:

- **Many contacts still in vicinity of -4 mi bar (some signal interference), with 3 contacts further upstream, as far as -11.9 mi (unique #'s not obtained)**
- **3 unique newly tagged fish detected on Lees Ferry SURs in late December – early January, all possible outmigration downstream**
- **Tagging events in December and early January fell earlier in spawning period, captured a more balanced female:male ratio**
- **Continuous expansion of Marble Canyon SUR network should help to precisely describe distance and timing of downstream movements**

Questions?

