



# GCMRC Science Updates

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# Outline

- **Rainbow Trout and Humpback Chub Updates**
- **Integrated Tribal/Stakeholder Trip Fish Sampling**
- **Gold King Mine Release**
- **Green Sunfish in Glen Canyon**
- **Sandbar and Sediment Update**

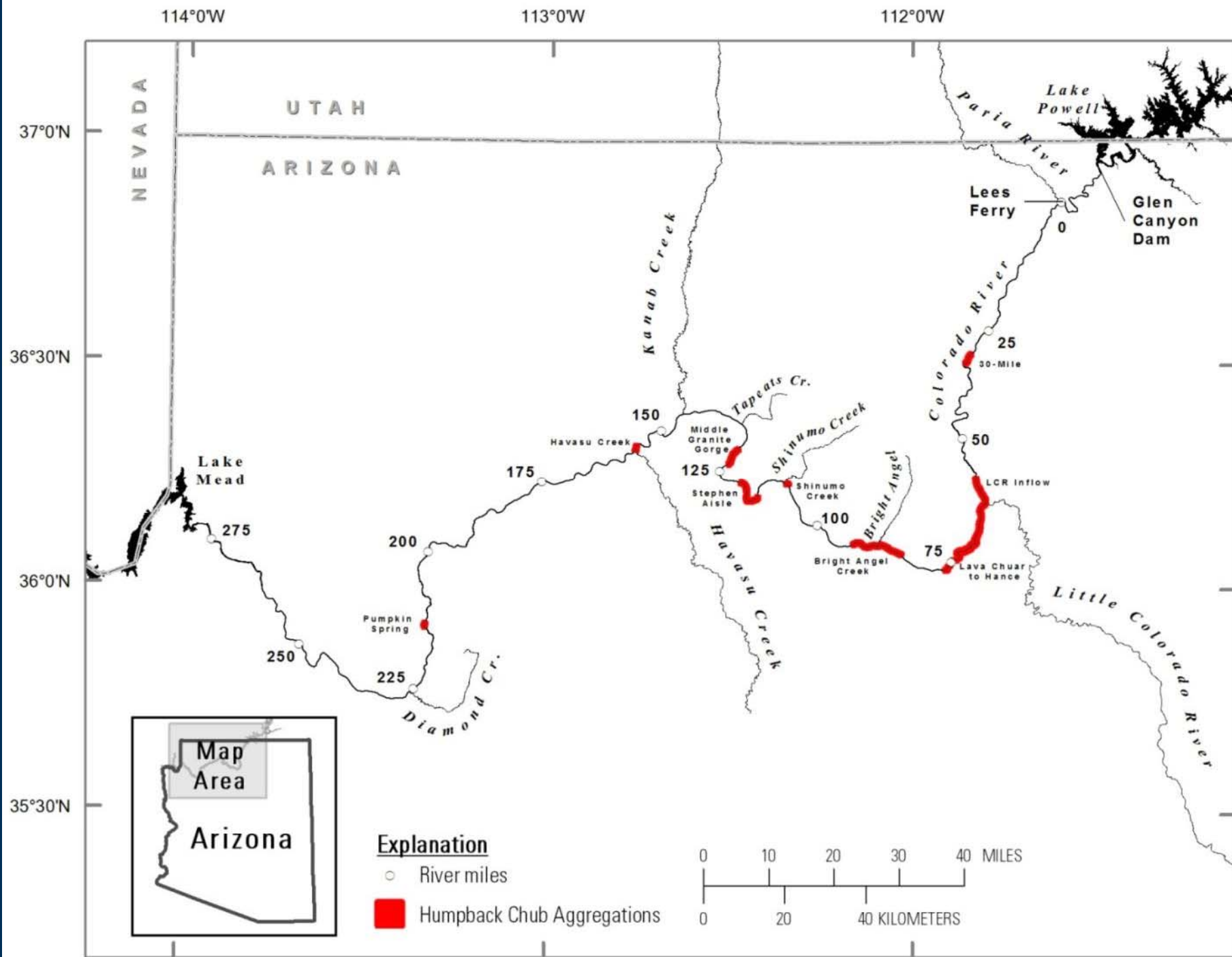
# Rainbow Trout and Humpback Chub Updates



Photo: George Andrejko



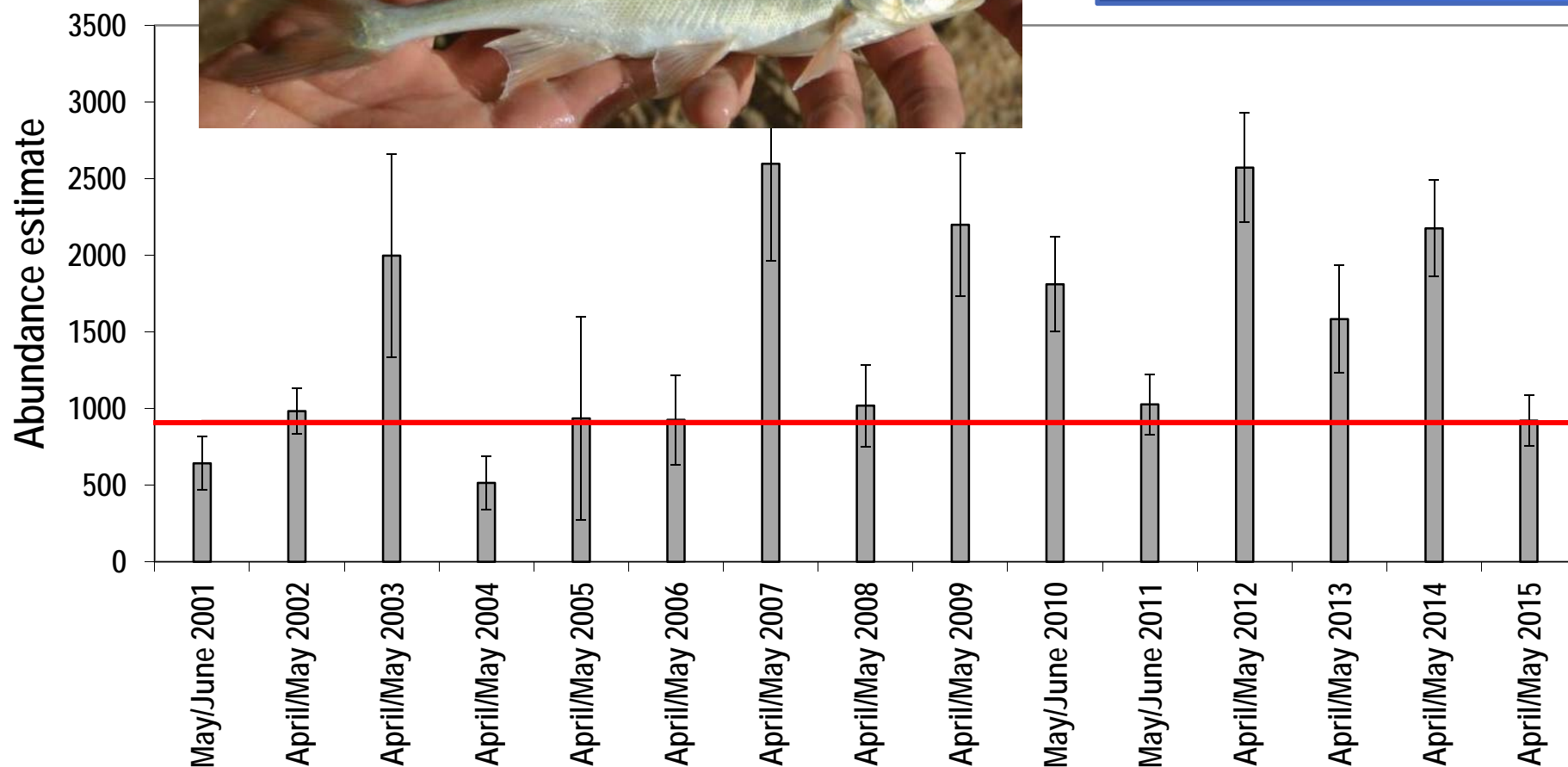
Photo: Randall Babb





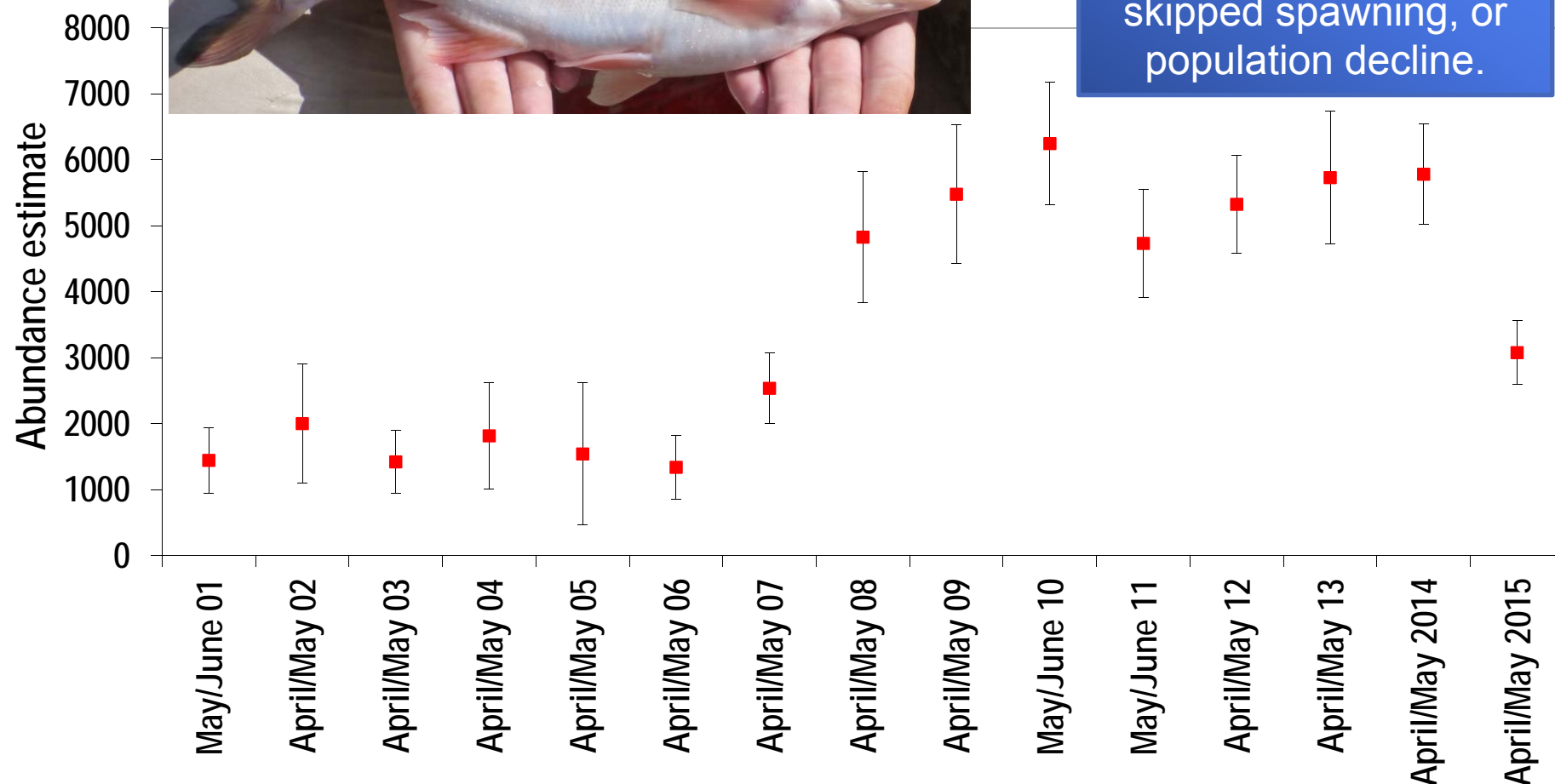
# Spring LCR 150-199 mm Humpback Chub abundance estimates

2015 spring abundance  
estimate of 150-199 mm  
HBC = 921  
(95% CI: 756 to 1086).



# Annual spring abundances of Humpback Chub $\geq 200$ mm in lower 13.6 km of LCR

2015 spring estimates considerably lower than recent years. Potentially due to early run timing, skipped spawning, or population decline.



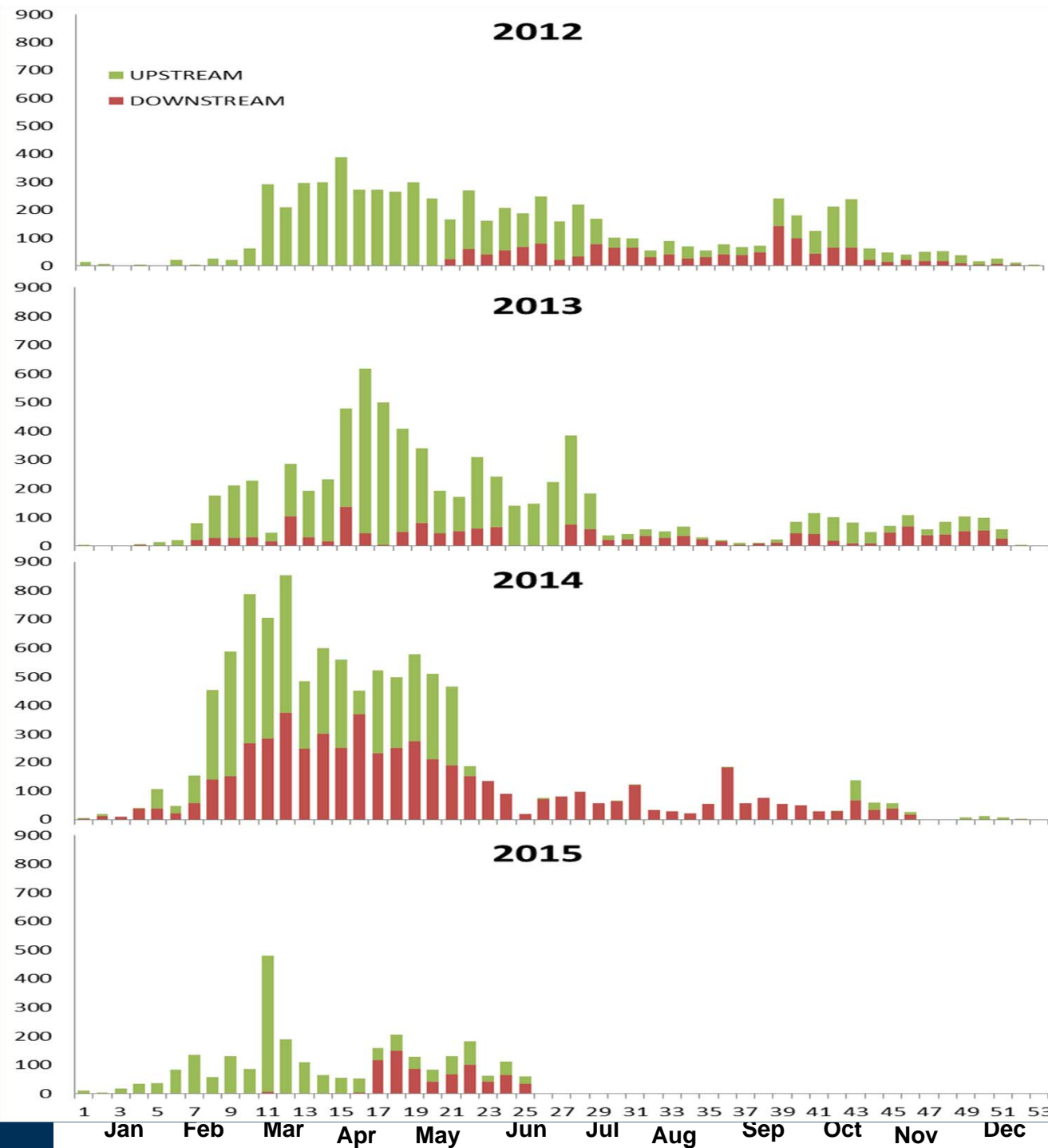
# Humpback Chub detections on Little Colorado River PIT- tag arrays

2015 run timing  
similar to 2014.  
Lower detections  
could be due to  
skipped spawning or  
population decline.

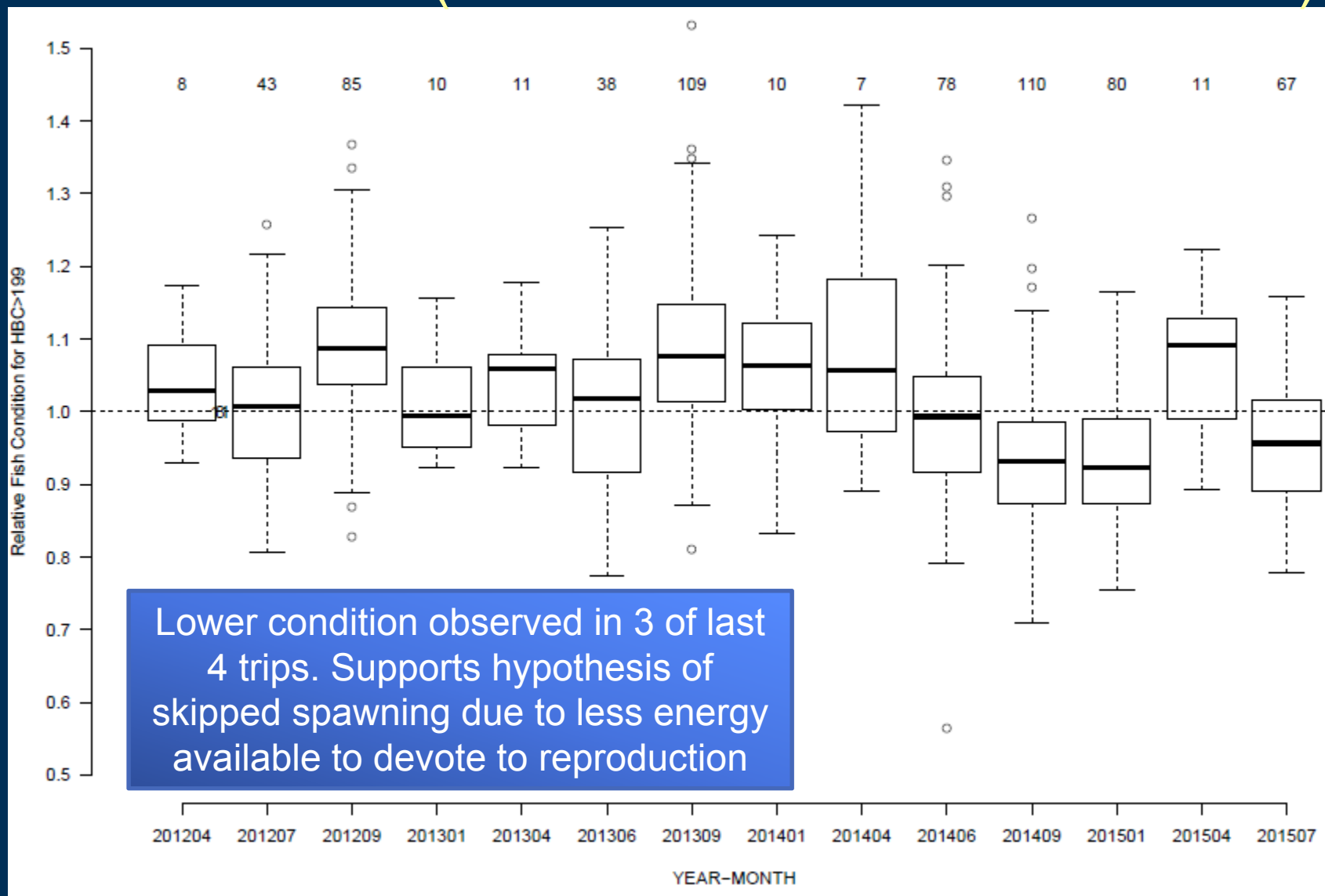
(Preliminary data from Avery  
2015. Do Not Cite.)



Number of Unique Fish Detected



# Condition factor of Humpback Chub in JCM reach (downstream of LCR confluence)



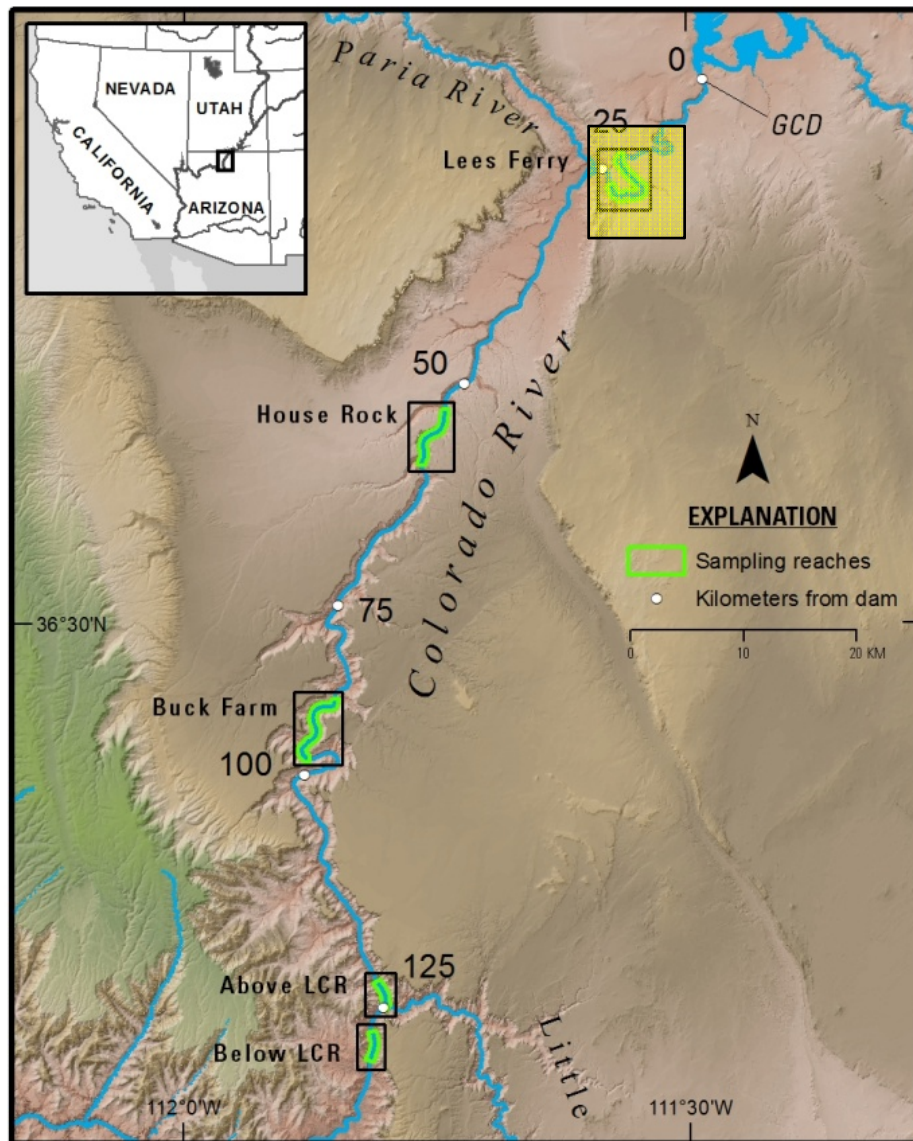






# Rainbow Trout Natal Origins Study Sampling Design

- Annual age-0 marking trips from dam to Lees Ferry
  - Length >75 mm
  - ~ 10,000 marked/yr
  - Nov. 2011, Oct & Dec 2012, 2013, and 2014
- Quarterly trips for marking and tag recovery by reach
  - Jan, Apr, Jul, and Sept
  - LEES FERRY (I, -5.5 to -2.1 RM)
  - HOUSE ROCK (II, 17.2-20.6 RM)
  - BUCK FARM (III, 38.2 to 41.6 RM)
  - ABOVE LCR (IVa, 60.2 to 61.2 RM)
  - BELOW LCR (IVb, 63.4 to 64.9 RM)



# Rainbow Trout Abundance Estimates By Reach

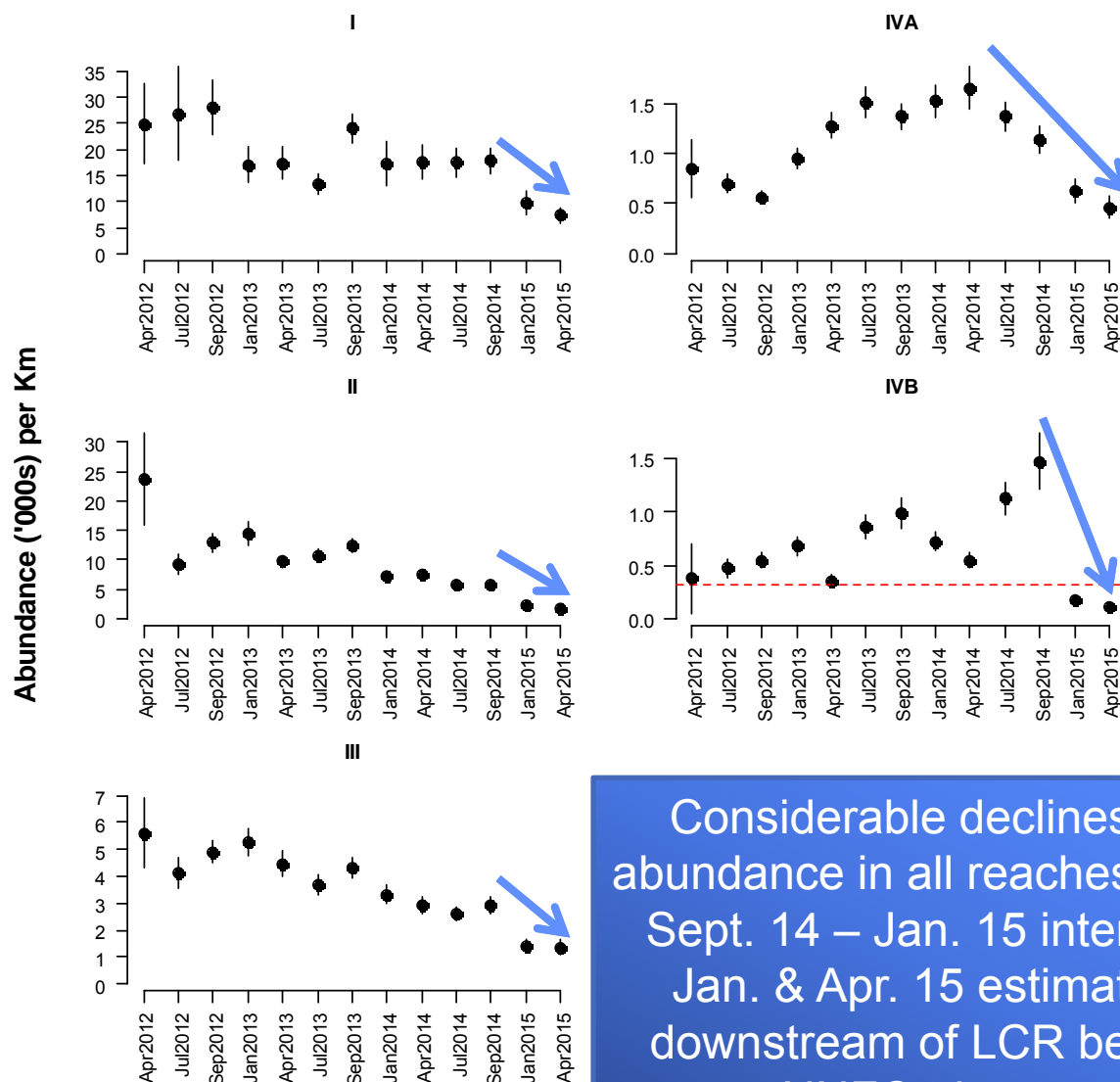
I – Glen Canyon/Lees Ferry

II – House Rock

III – Buck Farm

IVa – Upstream of LCR

IVb – Downstream of LCR



Considerable declines in abundance in all reaches over Sept. 14 – Jan. 15 interval. Jan. & Apr. 15 estimates downstream of LCR below NNFC trigger.

# Integrated Tribal/Stakeholder Trip Fish Sampling

- Baited hoop net set at midday for ~ 45 min at RM 61.5
- Results
  - 2 Rainbow Trout – 1 recapture
  - 4 Humpback Chub – 3 recaptures





# Integrated Tribal/Stakeholder Trip Fish Sampling

## Capture History

### Rainbow Trout

3DD.003BCAB35B

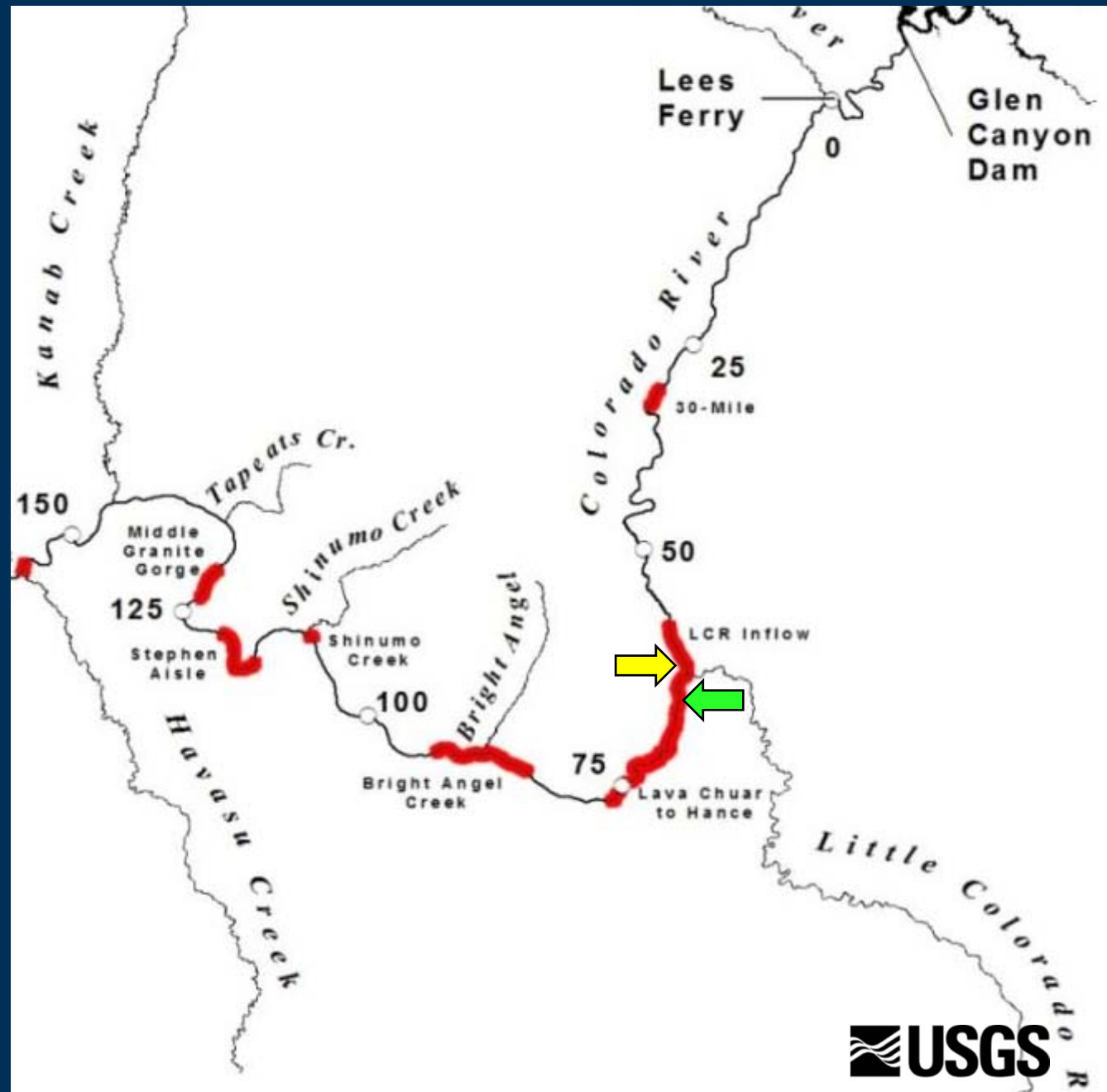
### Recaptures

- 7/20/2015 – RM 61.5

### Tagged

- 4/16/2015 – RM 63.4

Months since tagging  
3.1



# Integrated Tribal/Stakeholder Trip Fish Sampling

## Capture History

### Humpback Chub

384.1B796A446E

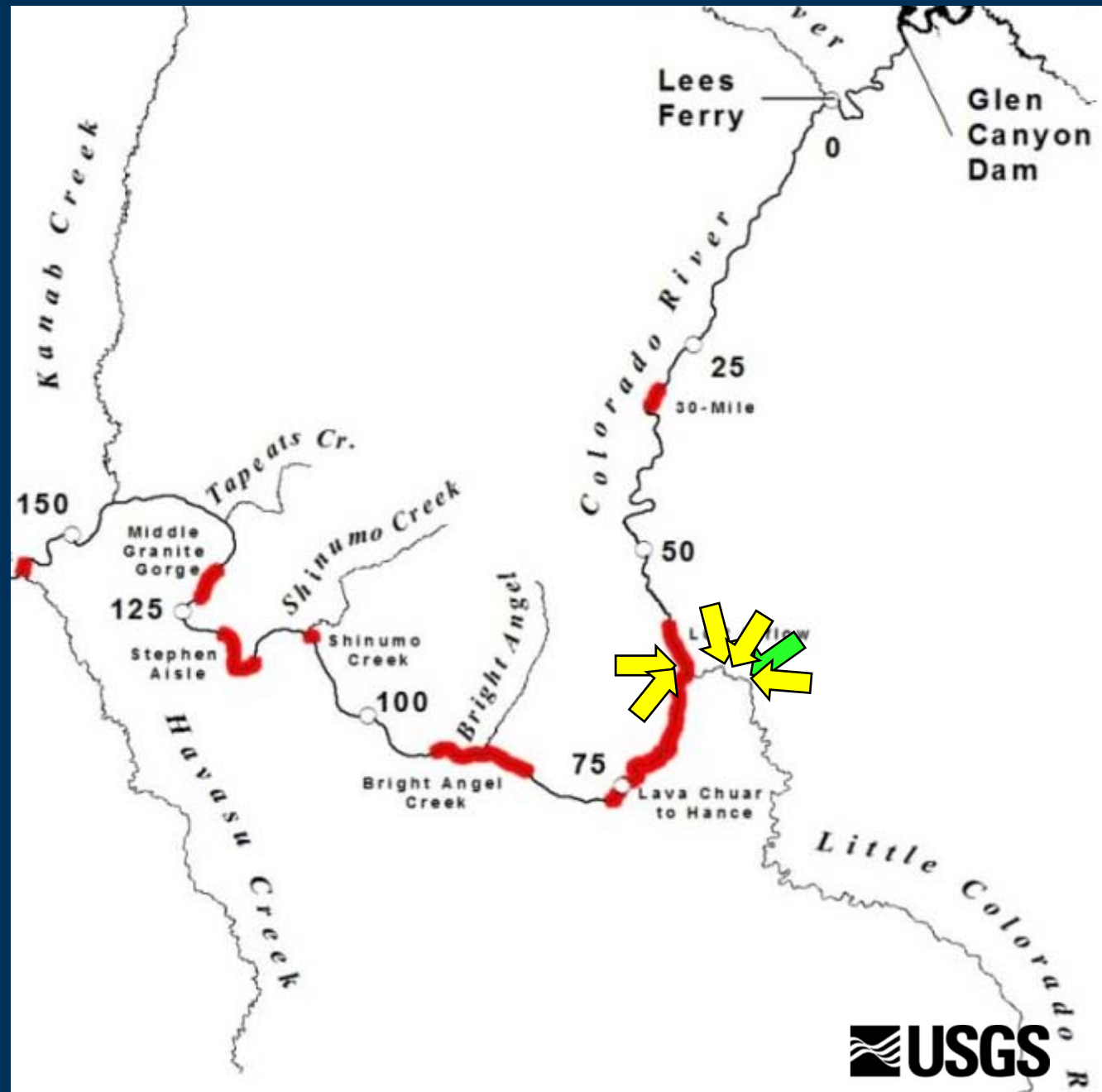
#### Recaptures

- 7/20/2015 – RM 61.5
- 9/16/2014 – MUX
- 2/17/2014 – MUX
- 9/11/2011 – RM 61.5
- 9/22/2002 – LCR 2.0

#### Tagged

- 9/21/2002 – LCR 2.0

Years since tagging  
12.9





# Integrated Tribal/Stakeholder Trip Fish Sampling

## Capture History

### Humpback Chub

3D9.1BF256030E

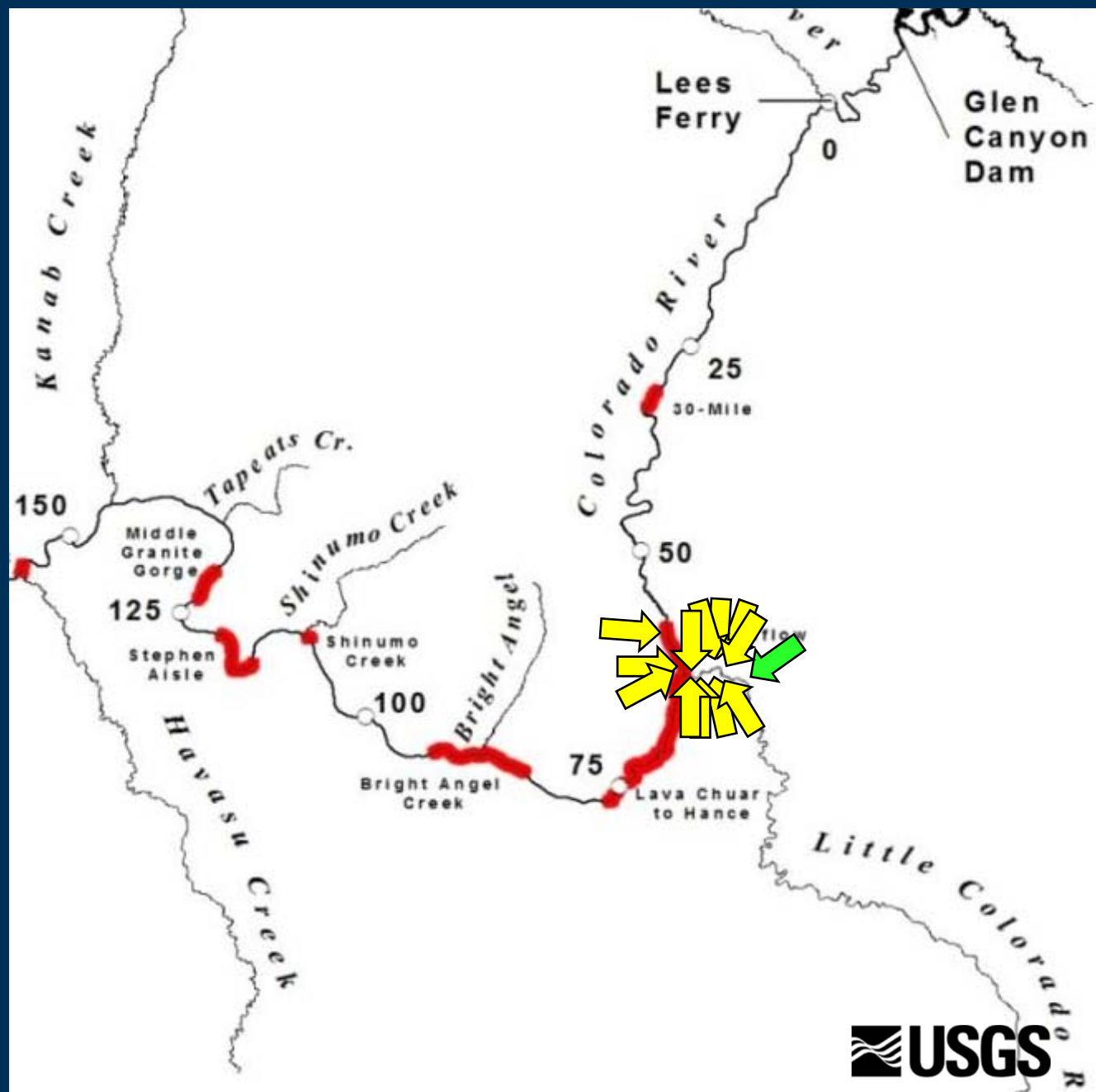
### Recaptures

- 7/20/2015 – RM 61.5
- 3/23/2014 – MUX
- 4/20/2012 – LCR 1.9
- 3/16/2012 – MUX
- 11/21/2011 – MUX
- 9/14/2010 – RM 61.5
- 5/12/2009 – RM ~60
- 9/27/2006 – LCR 0.8
- 4/12/2006 – MUX
- 4/22/2003 – LCR 0.3
- 4/18/2003 – LCR 0.1
- 9/24/2002 – LCR 1.2

### Tagged

- 10/2/2001 – LCR 2.3

Years since tagging  
13.8



# Integrated Tribal/Stakeholder Trip Fish Sampling

## Capture History

### Humpback Chub

7F7F041A2A

3D9.1BF1D86BEF

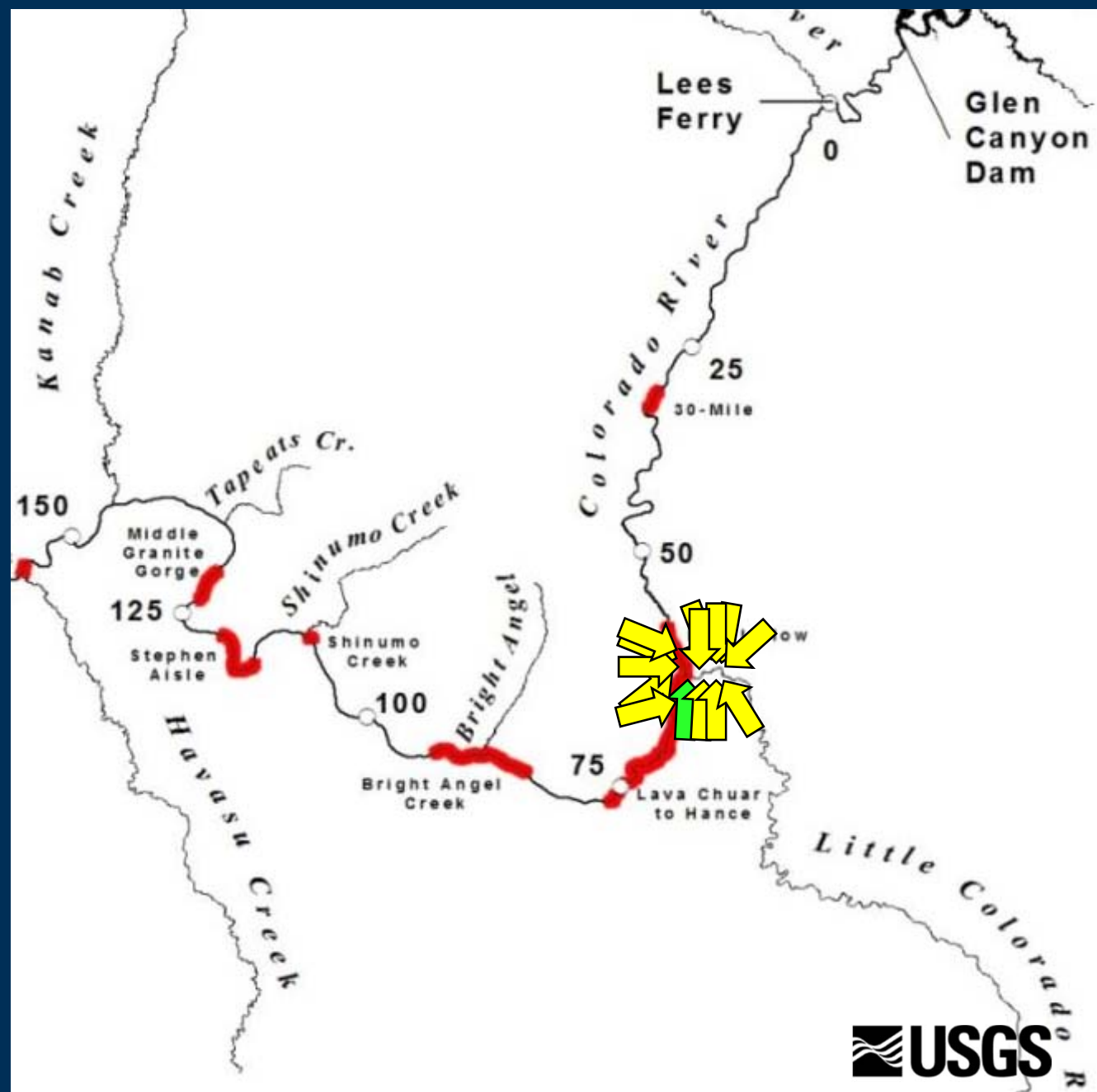
### Recaptures

- 7/20/2015 – RM 61.5
- 9/11/2012 – RM 61.3
- 5/31/2011 – MUX
- 5/30/2011 – MUX
- 9/15/2010 – RM 61.6
- 6/14/2005 – RM 61.1
- 4/5/2004 – LCR 0.8
- 2/15/1995 – LCR 1.3
- 4/18/1994 – LCR 1.3
- 3/7/1994 – LCR 1.2
- 6/13/1993 – RM 62.7
- 5/13/1993 – LCR 0.9
- 3/10/1992 – LCR 0.2

### Tagged

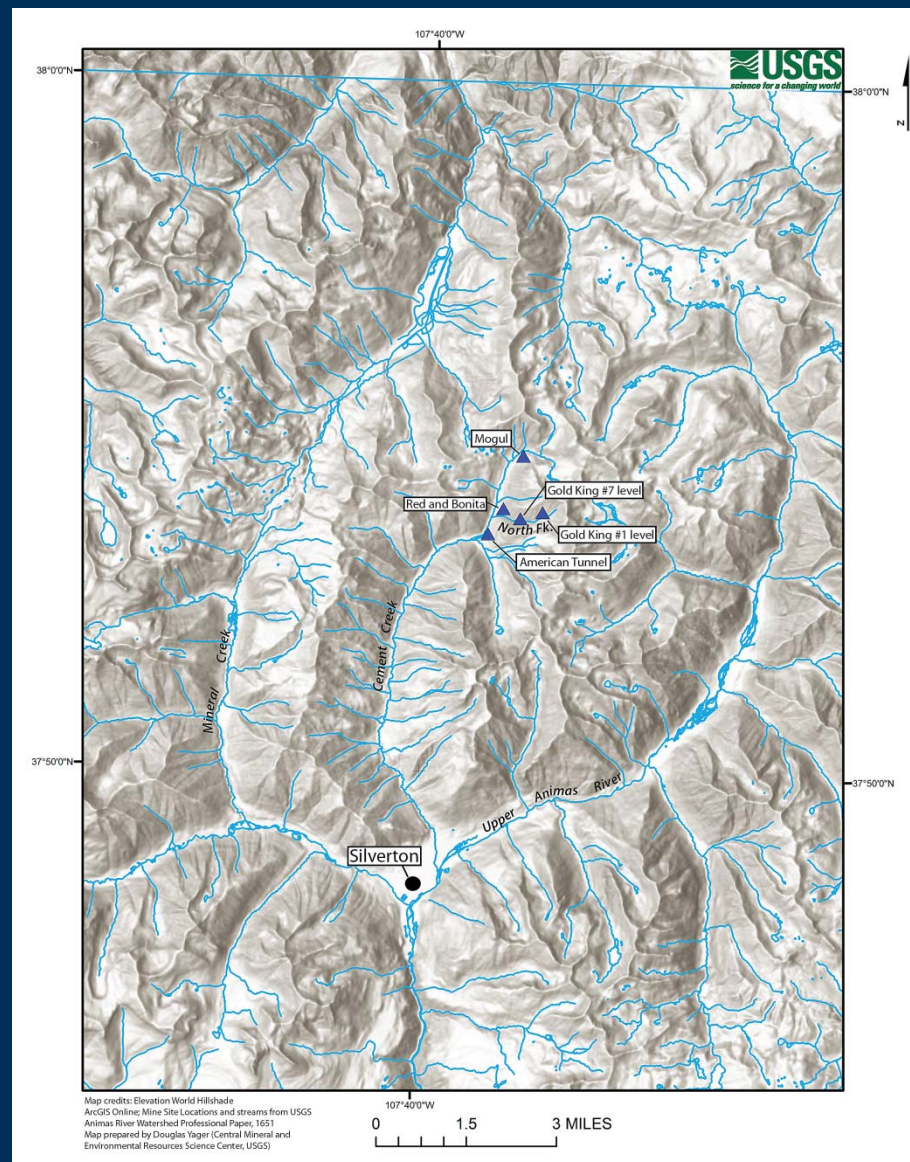
- 5/21/1989 – LCR 0.8

Years since tagging  
26.2



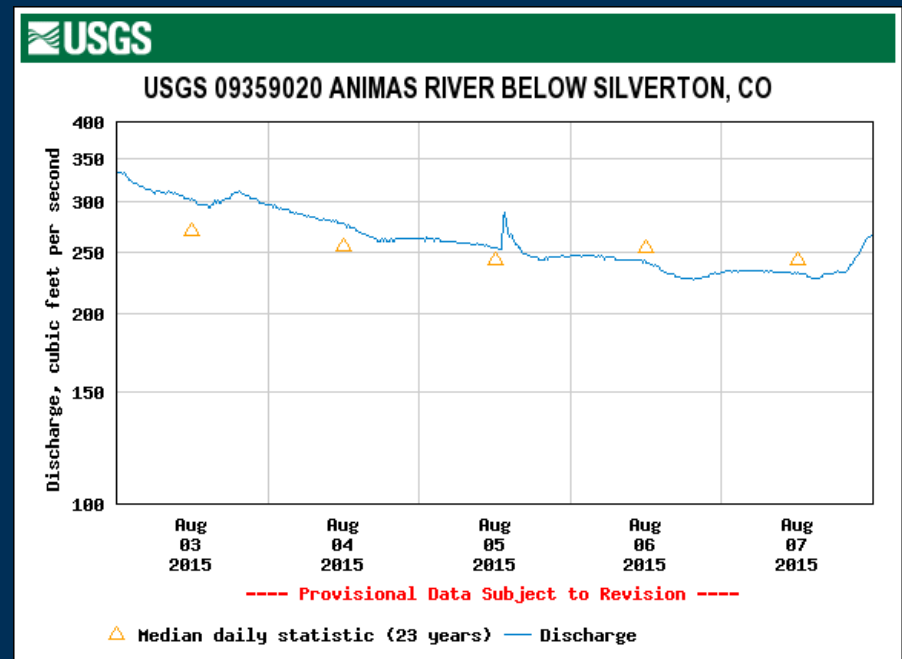
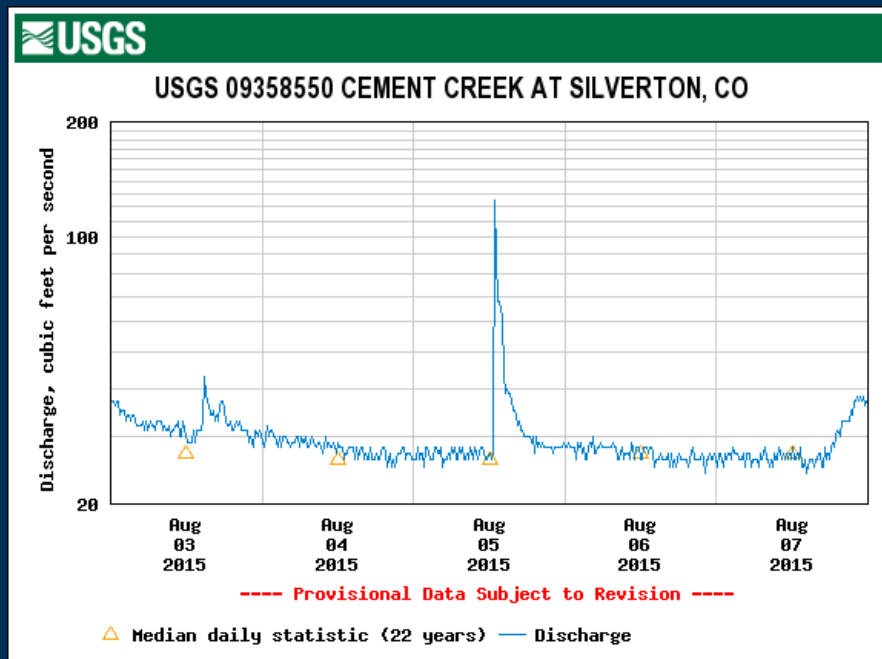


# Gold King Mine Release into Cement Creek and the Animas River



# Gold King Mine Release into Cement Creek and the Animas River

- Aug. 5 - Accidental release of ~3 million gallons of acidic, metal-rich mine wastewater into Cement Creek.



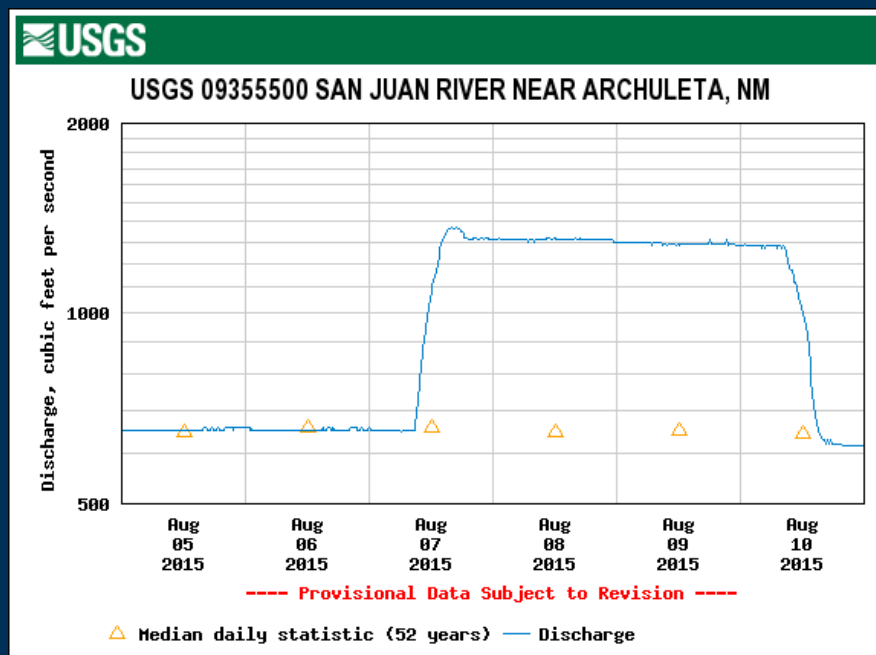


# Gold King Mine Release into Cement Creek and the Animas River

- Aug. 6 – Plume reaches Animas River and Durango, CO. Reclamation doubles flow out of Navajo Dam on the San Juan River.



Photo: Jerry McBride/The Durango Herald/AP





# **Gold King Mine Release into Cement Creek and the Animas River**

- **Aug. 8 – Plume reaches confluence of San Juan River.**
- **Aug. 9 or 10 – Plume estimated to have reached Utah, but no indication of water quality effects (pH)**
- **Aug. 15 – Plume estimated to have reached Lake Powell**
- **Aug. 19 – Metal tracers (aluminum & iron) in San Juan R. peaked 12-24 hours after plume detected and returned to background levels.**

# Gold King Mine Release into Cement Creek and the Animas River

- San Juan River – “even at peak concentrations, the observable increase in metals from the Gold King Mine release have posed minimal threat to:
  - Drinking Water
  - Recreation
  - Fish and Wildlife
  - Agriculture”
- Lake Powell – Metals will be deposited and likely covered by San Juan River sediment. High sediment load and long reservoir residence time (~ 7 years) should reduce downstream effects

# Gold King Mine Release into Cement Creek and the Animas River

- More information available at:
  - <http://www2.epa.gov/goldkingmine>
  - <http://www.deq.utah.gov/Topics/Water/goldkingmine/index.htm>  
<https://www.colorado.gov/pacific/cdphe/animas-river-spill>
  - <https://www.env.nm.gov/riverwatersafety/>
  - <http://www.azdeq.gov/>
  - <http://www.nps.gov/glca/learn/news/gold-king-mine-spill-update.htm>

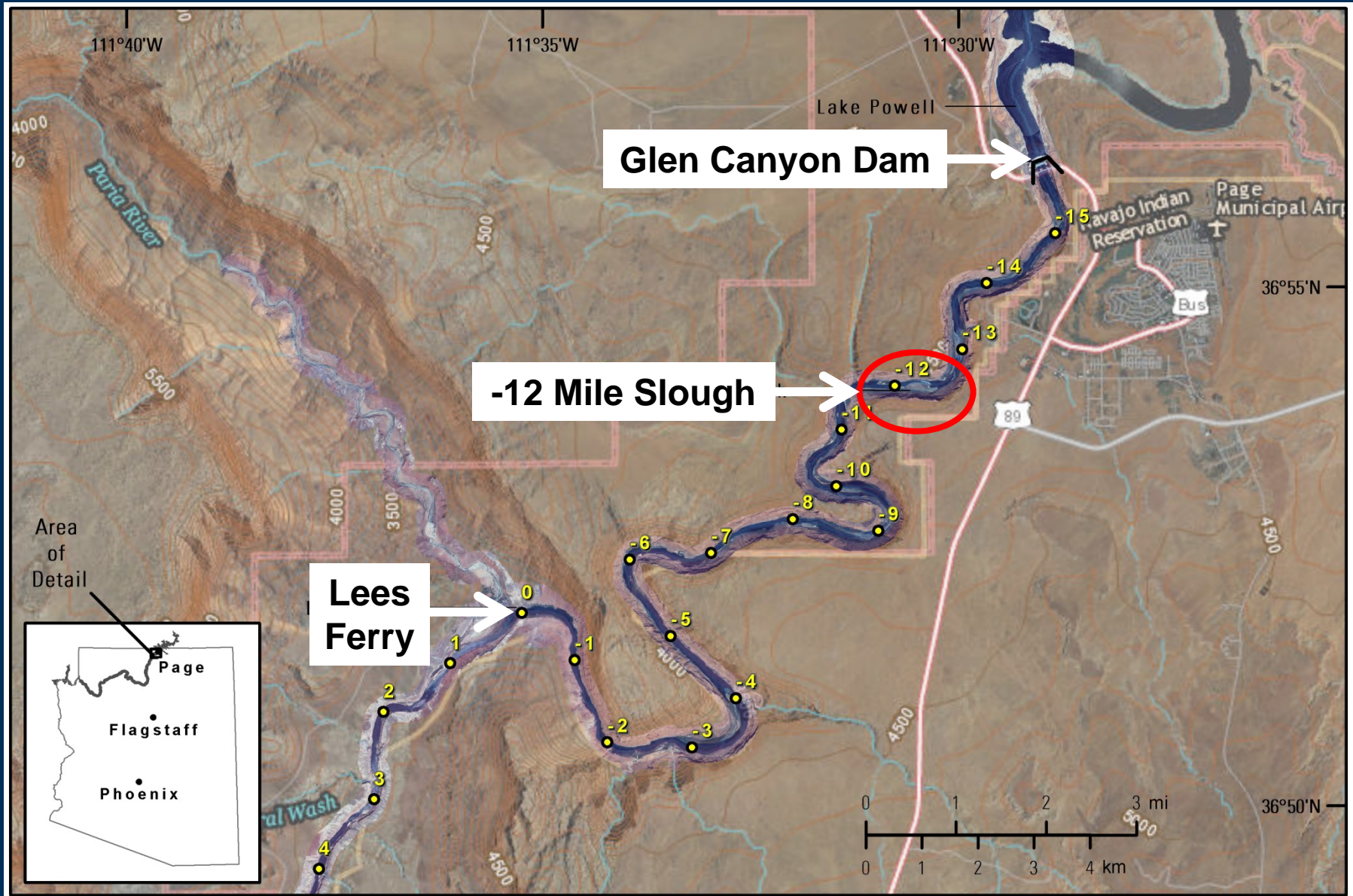
# Green Sunfish in Glen Canyon



Photos courtesy Lisa Winters

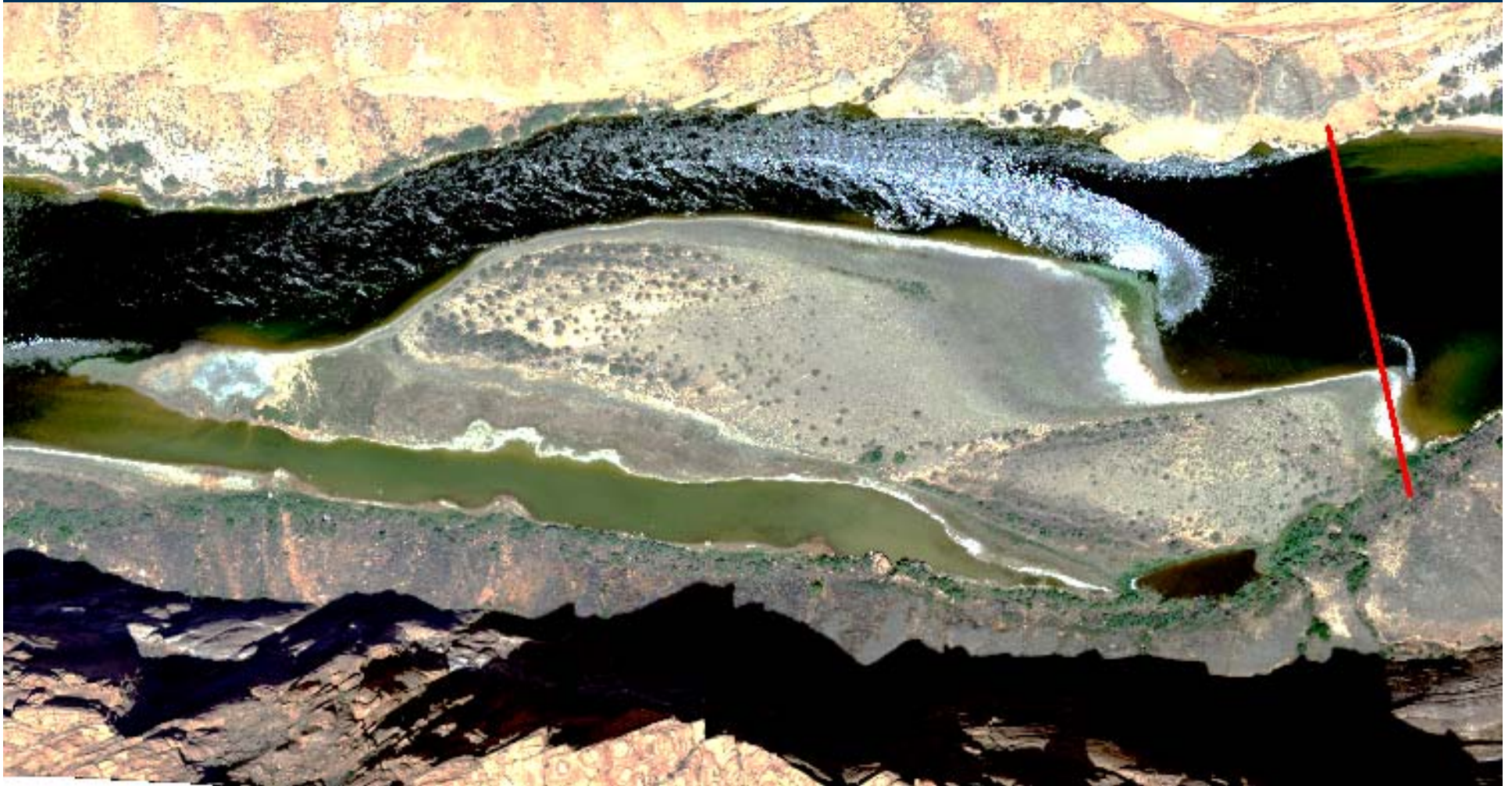


# Green Sunfish in Glen Canyon





# Green Sunfish in Glen Canyon



# Green Sunfish in Glen Canyon

- July 6 – AZG&FD captures 43 green sunfish at -12 mile in Glen Canyon
- August 4 – Call with biologists from AZG&FD, NPS, Reclamation, and USGS-GCMRC
- August 5-6 – NPS approval granted & request to take action sent to Reclamation, DOI, NPS, USFWS and AZG&FD
- August 7 – Notification sent to Tribes
- August 12-14 – First removal effort by AZG&FD, NPS, and USGS-GCMRC biologists

# Green Sunfish in Glen Canyon

- 954 green sunfish captured
  - Electrofishing
    - Boat – 689 [4 passes: 70, 168, 330, 121 (partial)]
    - Backpack – 233 (1 pass)
  - Hoop nets – 32 (2 sets of 22 baited nets)
- Captured fish preserved for beneficial use
  - To be delivered to the Pueblo of Zuni eagle aviary



# Green Sunfish in Glen Canyon

- August 24 – Call with biologists from AZG&FD, NPS, Reclamation, and USGS-GCMRC
- Second removal trip scheduled for August 27-29
- August 25 – Notification sent to Tribes and others