PIT Tag Antenna Update

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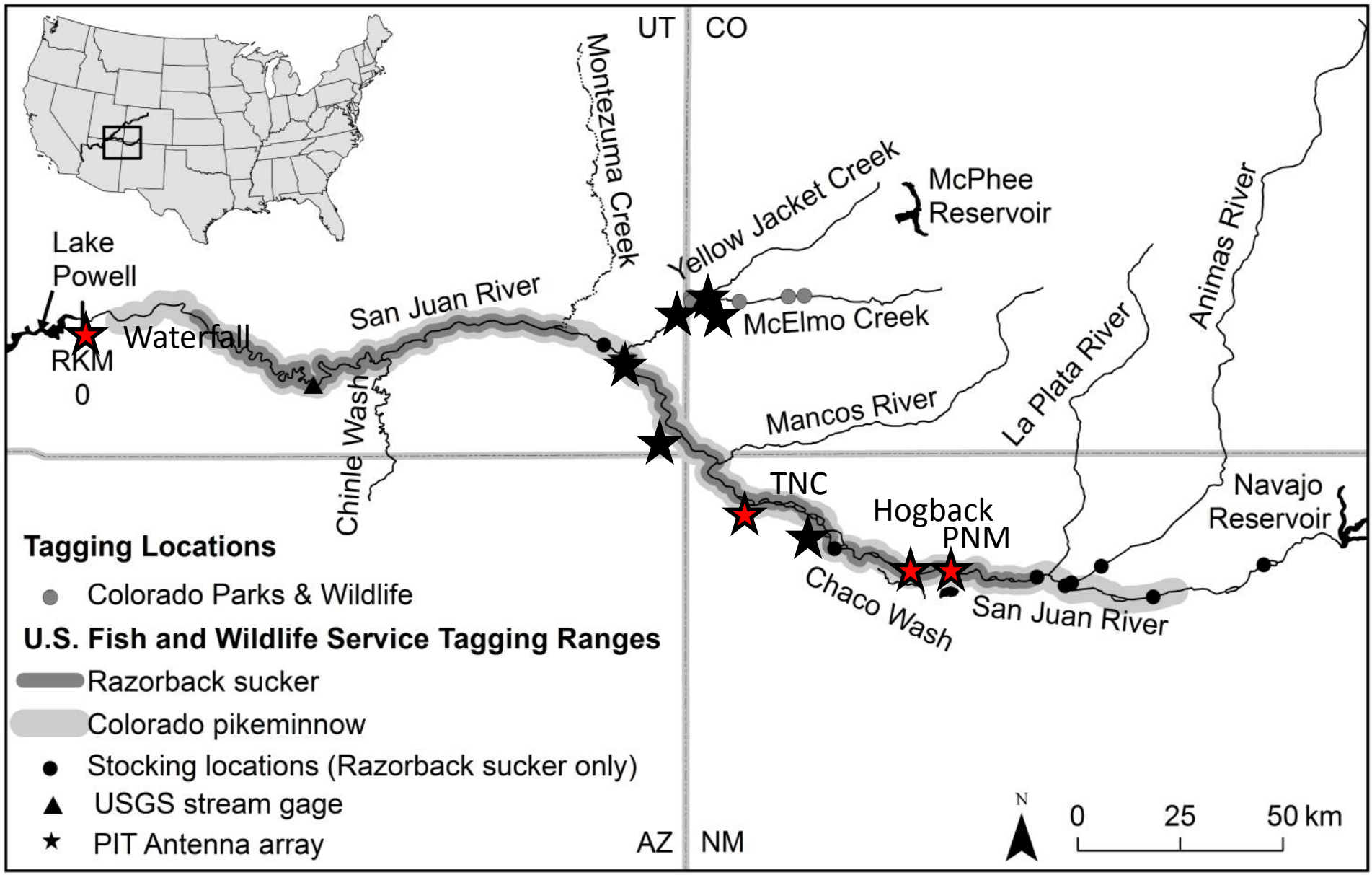
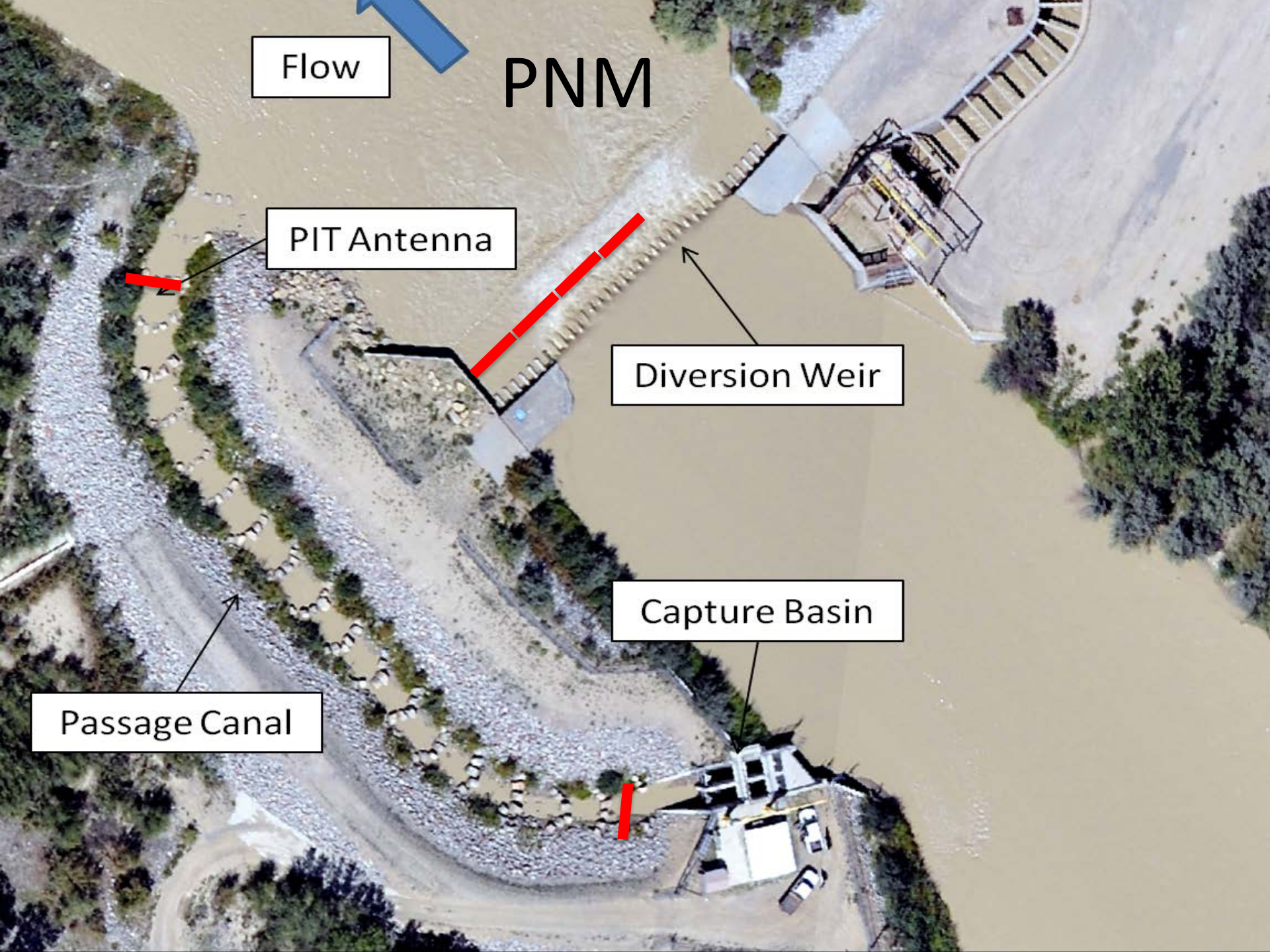
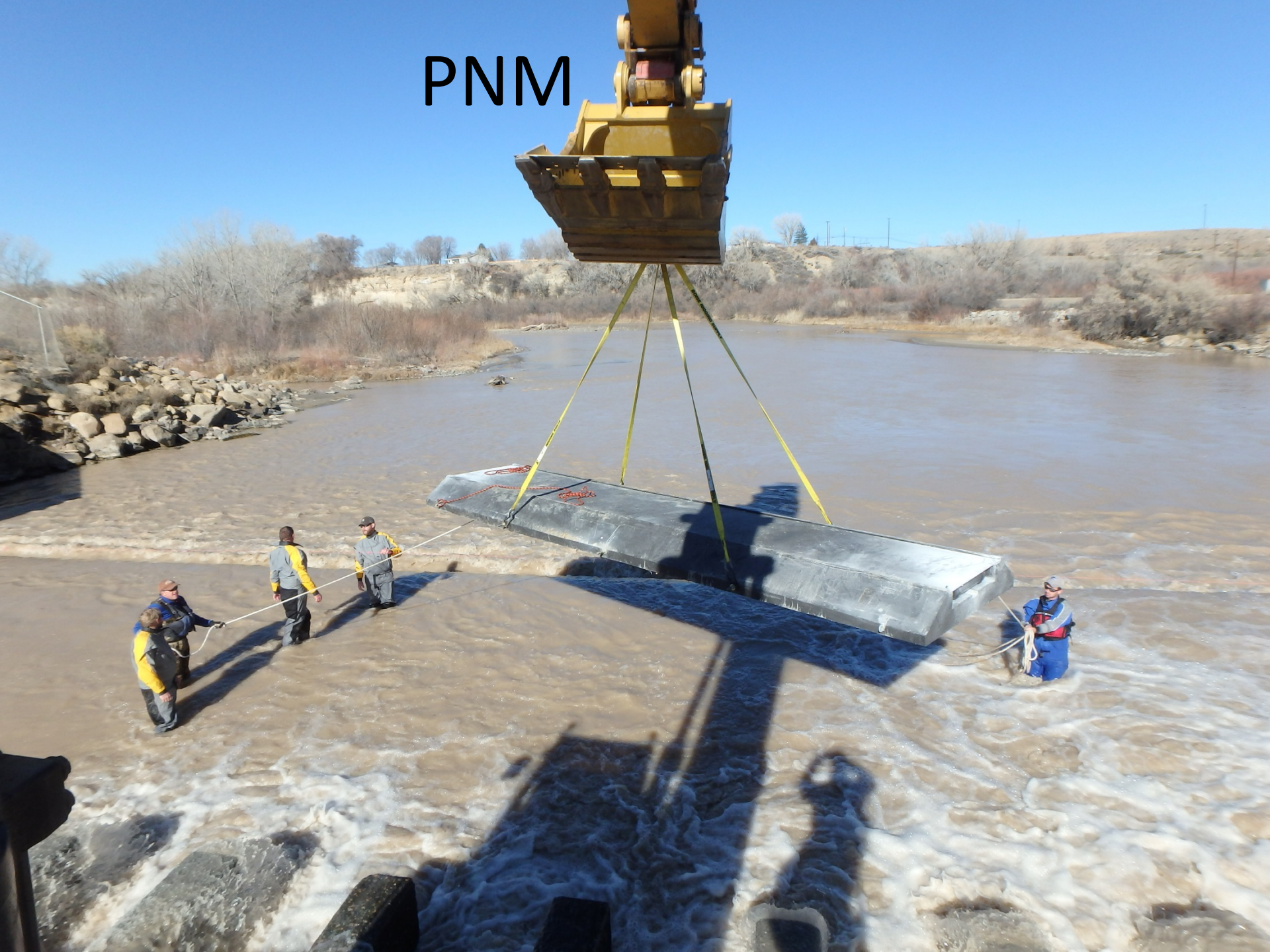
PIT antenna investigations in SJR




Flow
PNM
PIT Antenna
Diversion Weir
Capture Basin
Passage Canal

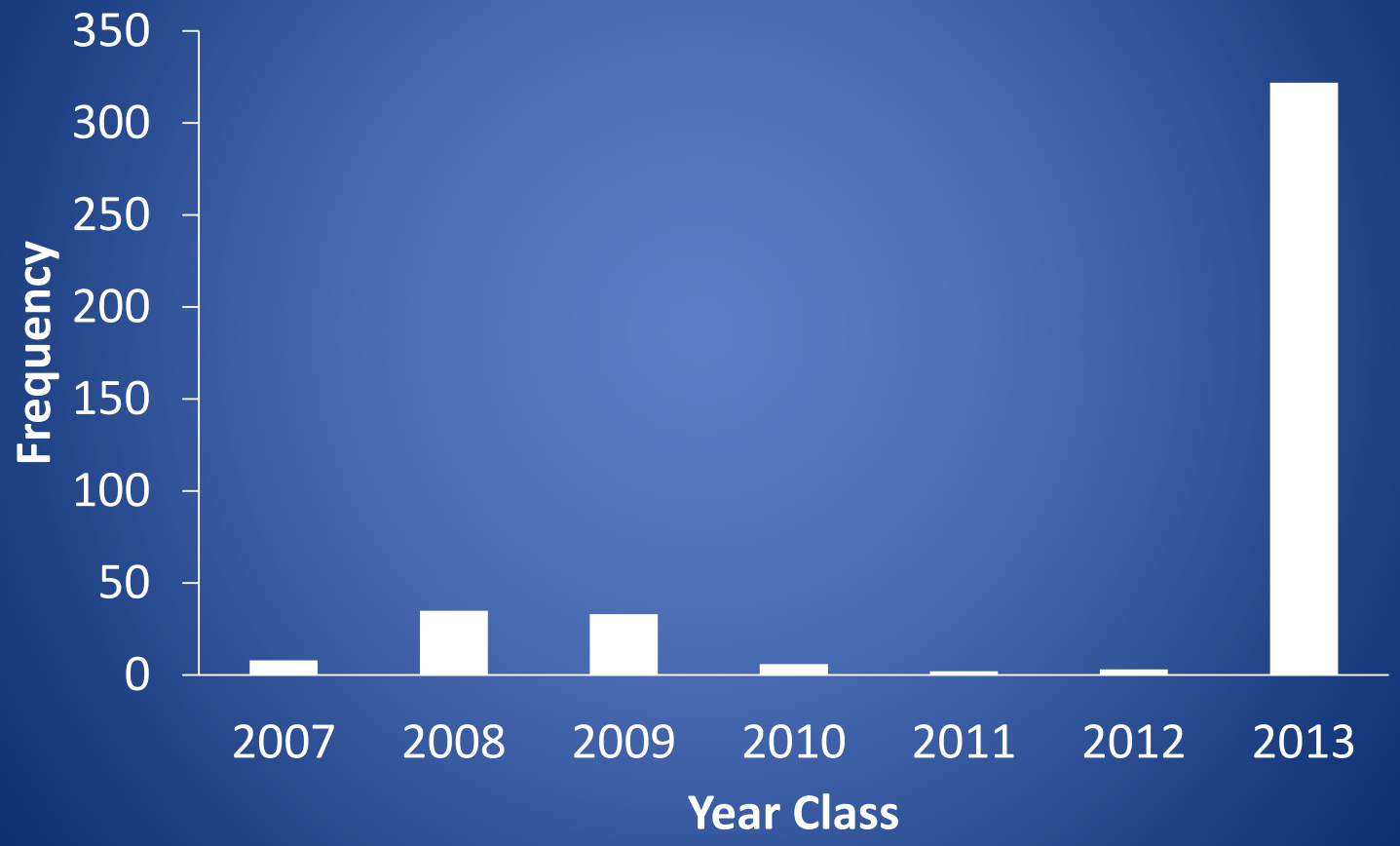

PNM

PNM Antenna
February 11-May 11, 2015

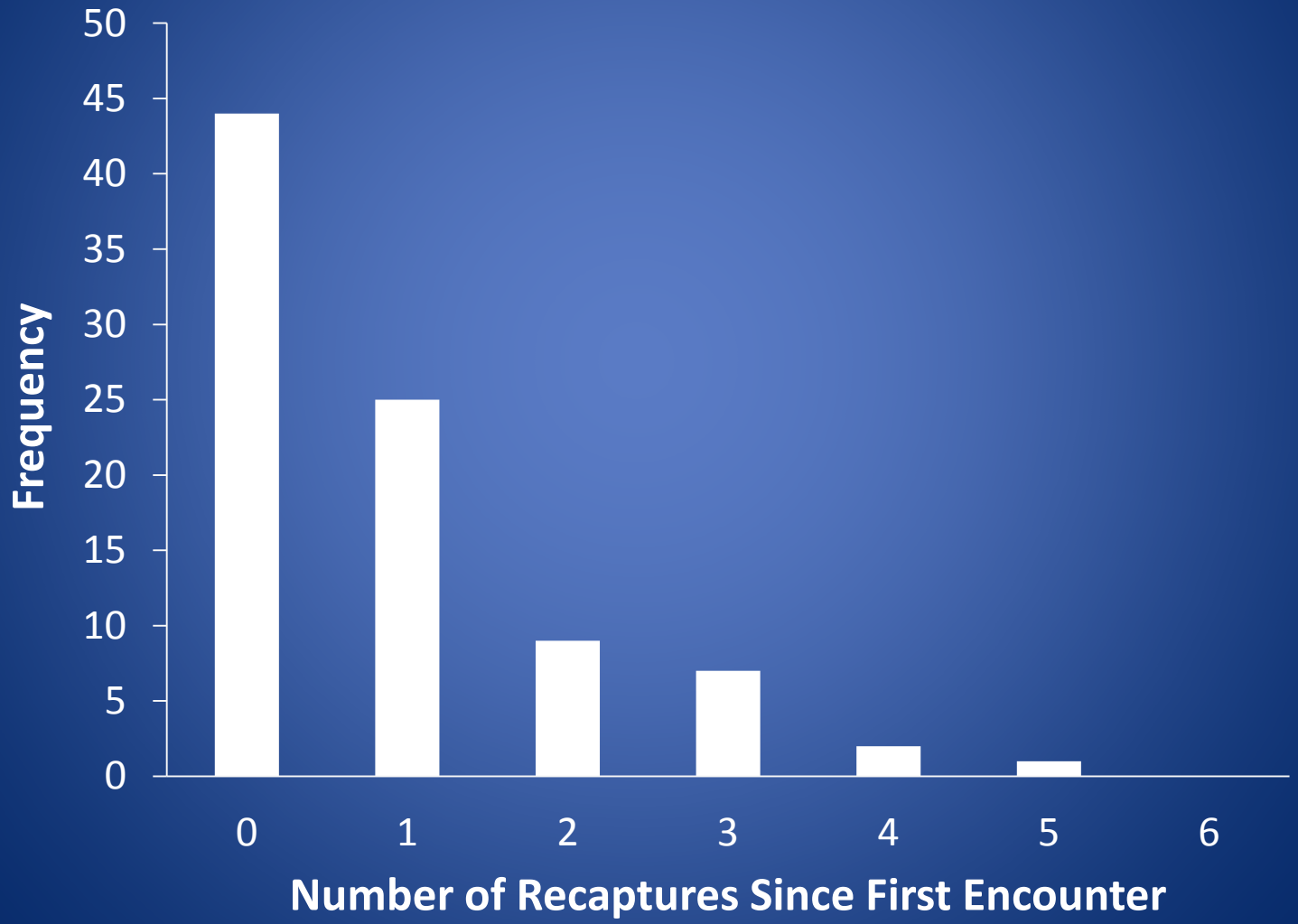
Species	Unique Detections
Razorback Sucker 2014	323
Razorback Sucker <2014	88
Colorado Pikeminnow	6
HB Experimental Stocking (BHS and FMS)	161
Flannelmouth Sucker	32
Bluehead Sucker	2
Channel Catfish	1
Unknown	112
Total	719

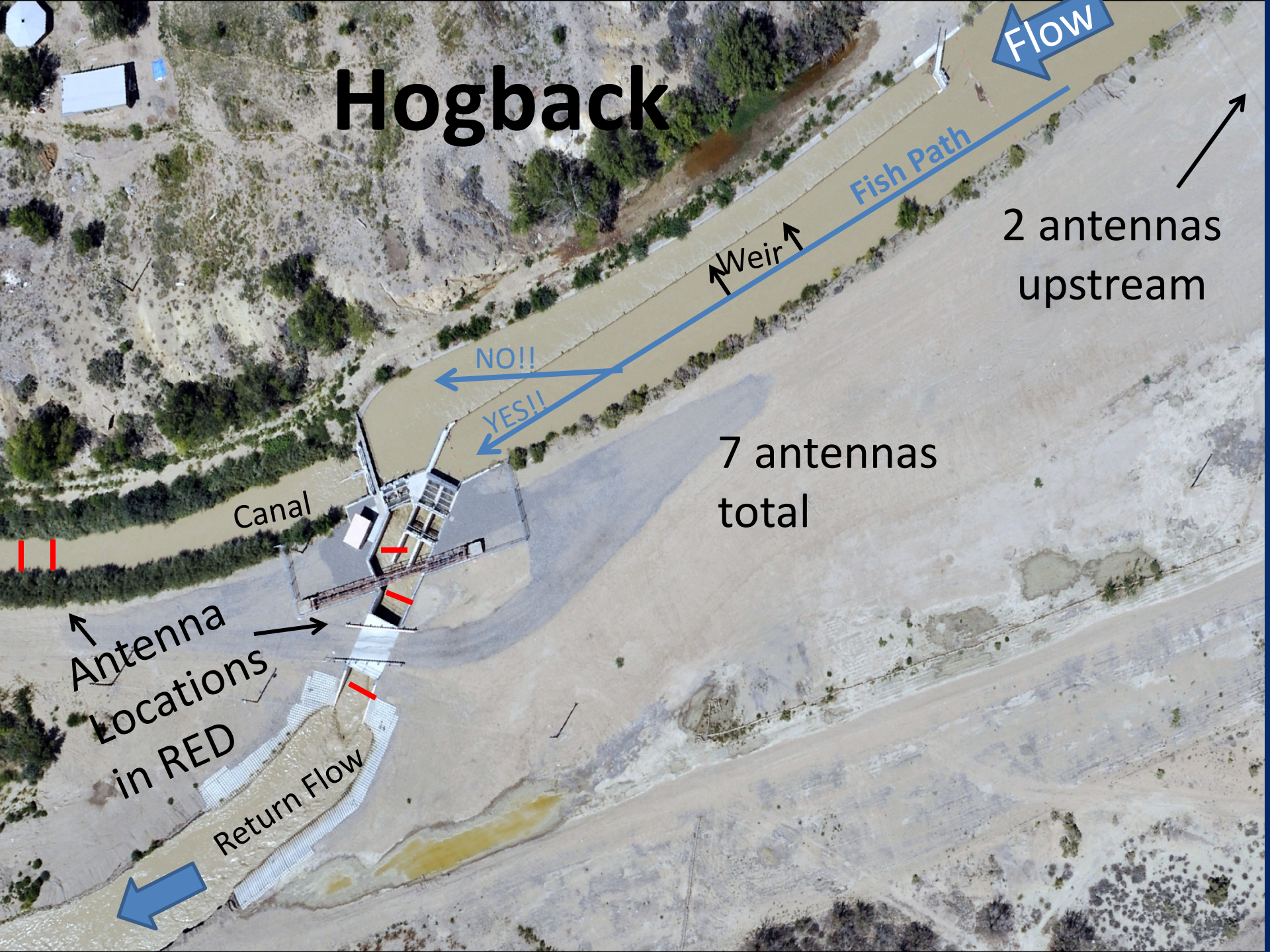
- 84,968 detections, 719 unique

Razorback Sucker Year Class at PNM



Razorback Sucker Recaptures at PNM




Hogback
Flow
Fish Path
Weir
2 antennas
upstream
NO!!
YES!!
7 antennas
total
Canal
Antenna
Locations
in RED
Return Flow

Hogback Antenna Array November 2014-May 6, 2015

Species	Number Detected (Experimental Stocking)
Razorback Sucker	276 (240)
Colorado Pikeminnow	166 (161)
Experimental Stocking (FMS and BHS)	(196)
Channel Catfish	2
Flannelmouth Sucker	2
Bluehead Sucker	2
Total	644

TNC Restoration Site
November 2014

TNC Restoration Site
May 2015

Restoration Site PIT Tag Detections

Species	Detections
Razorback Sucker	19
Flannelmouth Sucker	2
Colorado Pikeminnow	1
Total	22

- All Razorback Sucker were from stockings between 2009-2014 upstream of restoration sites
- 1 Flannelmouth from Chaco Wash (2013)
- 1 Flannelmouth from McElmo Creek (2014)
- 1 Colorado Pikeminnow (tagged upstream 2014)

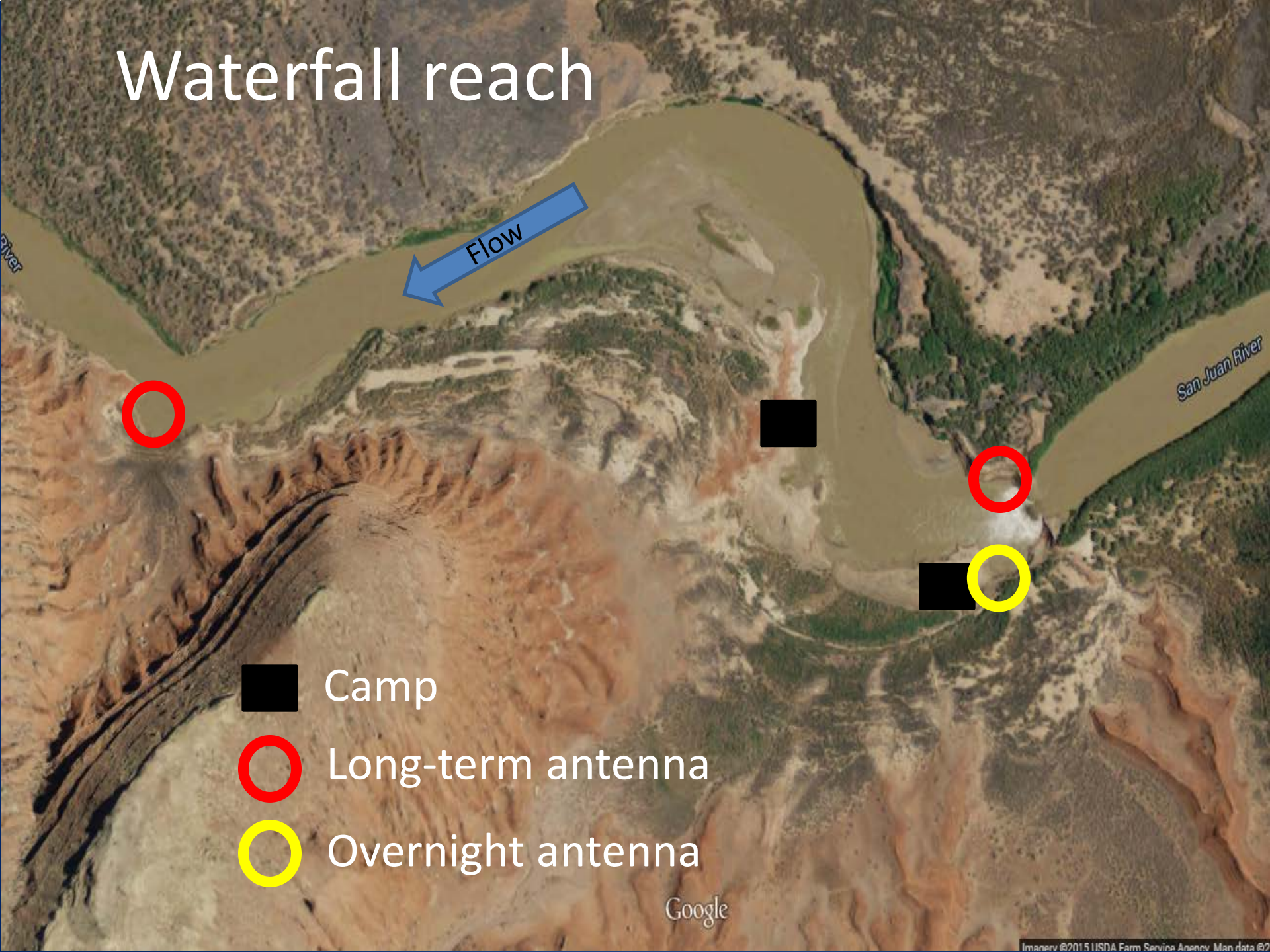
PIT Tag Antennas Downstream of Waterfall

Background and question

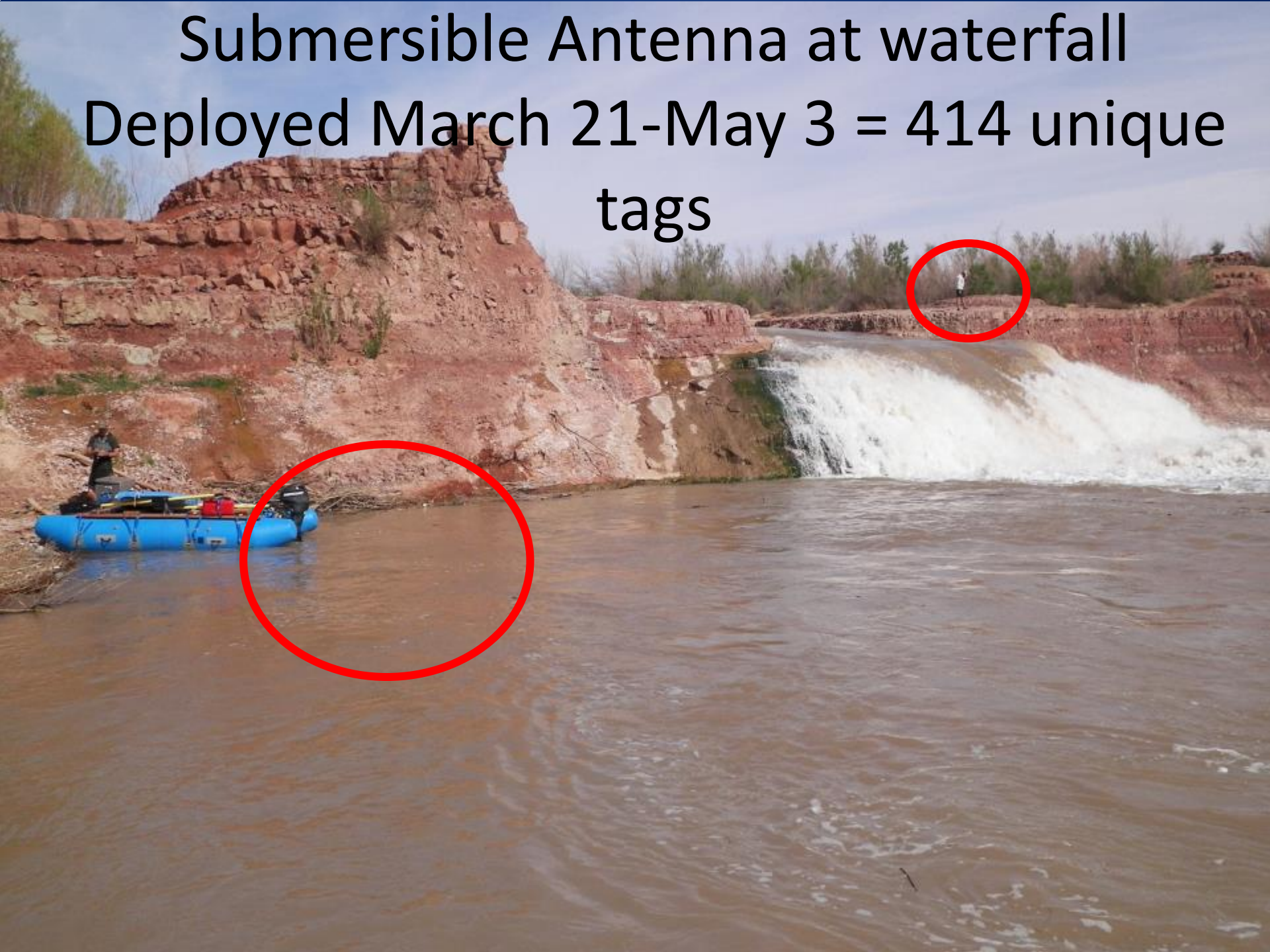
- The waterfall has divided the San Juan River and Lake Powell since 2003
- Barrier to nonnative invasions
- Prevents fishes from returning to the San Juan River if they move downstream over the waterfall
- What is down there?

Methods

- Submersible PIT antennas were deployed 43 days from March 21-May 3, 2015—still deployed
- Floating Antenna 3 days
- Sampling with cast net, seines, and fyke net
- Identify fishes, tagging records, and characteristics of the detected population


Waterfall reach
Flow
San Juan River
Camp
Long-term antenna
Overnight antenna
Google


Submersible Antenna 0.75 mi Downstream of Waterfall
22 Unique Fish (March 21-May 3)


Submersible Antenna at waterfall
Deployed March 21-May 3 = 414 unique tags

March 22 overnight submersible antenna

60 Razorback Suckers

FYKE NET = 0

Antenna = 60


Floating Antenna April 9 - 11
123 Razorbacks + 1 Pikeminnow

Continuous antenna data (43 days).

Species	Detections
Razorback Sucker	400
Colorado Pikeminnow	10
Flannelmouth Sucker[2]	2
Bonytail*	1
Channel Catfish[2]	1
Total	414

*Tag distributed in 2005 but maybe not used until last year.

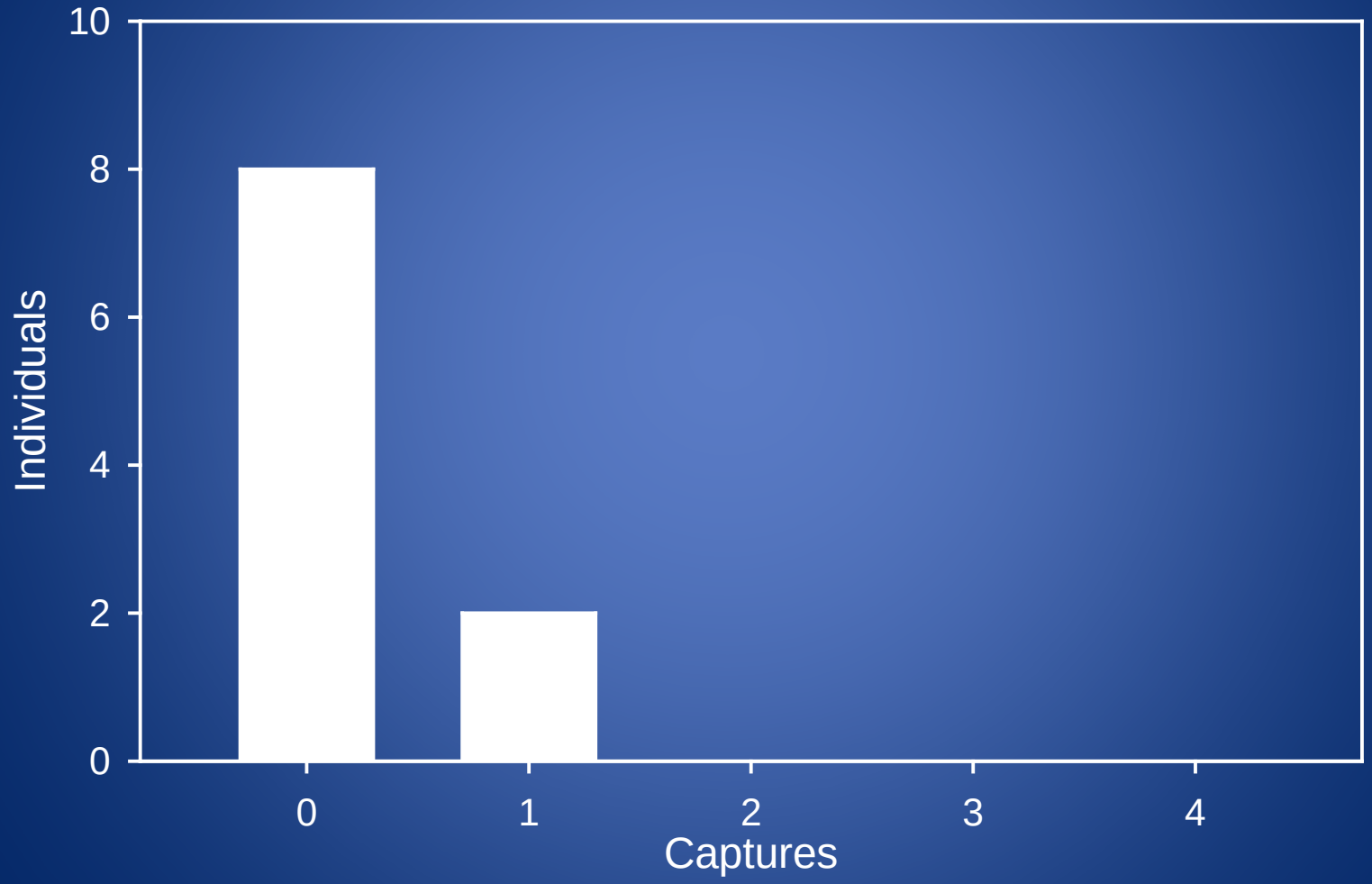
[2]Tagged in McElmo Creek

Year Class	Pikeminnow	Razorback
2000		1
2001		10
2002		7
2004		7
2005		2
2006	2	4
2007	1	1
2008	1	6
2009		22
2010	1	4
2011	1	4
2012	2	255
2013	2	27

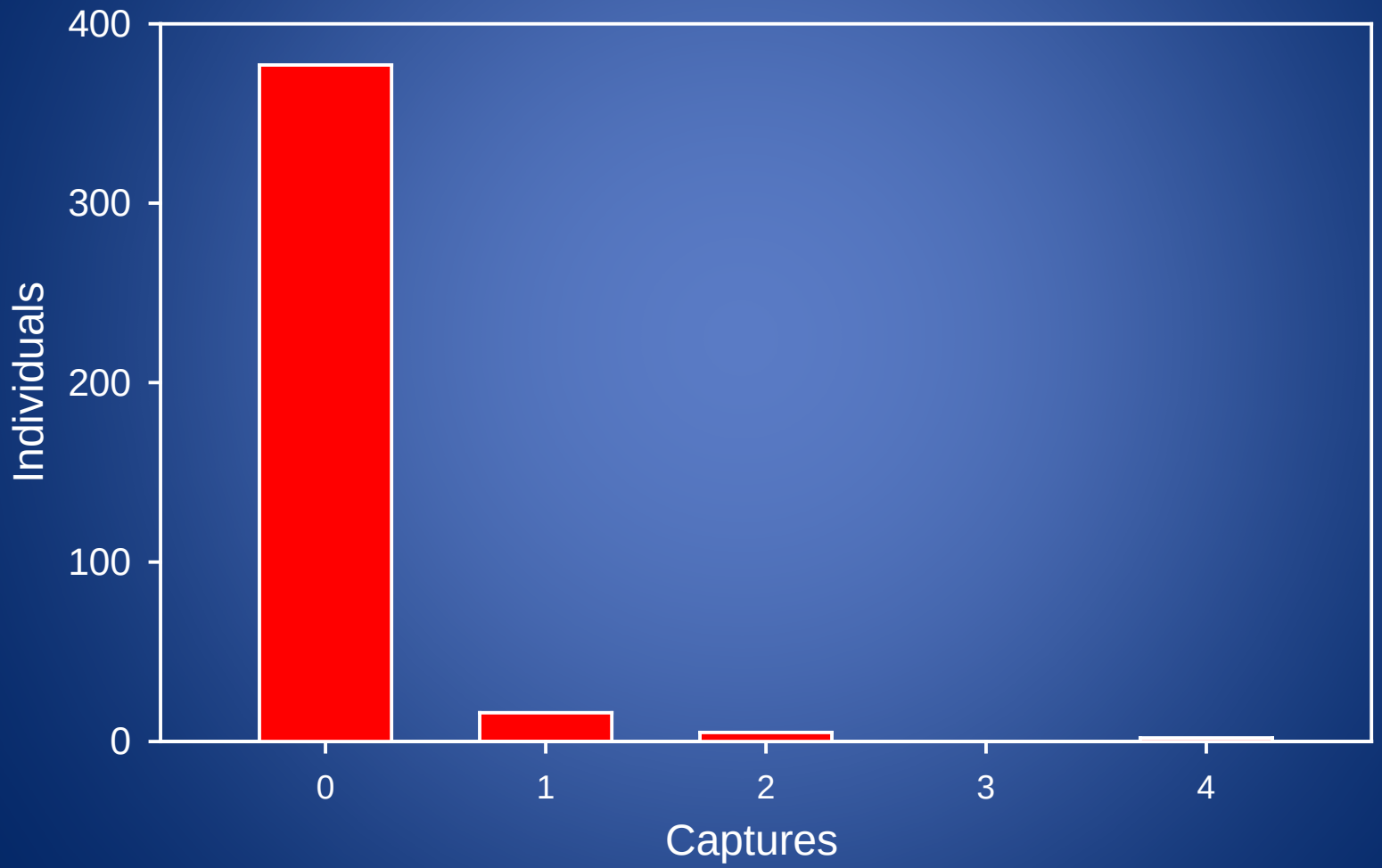
Razorback Sucker tagging Locations outside of San Juan River (River mile of stocking shown in parentheses)

	Lake Powell	Waterfall	Animas (1-5)	Green (120-255)	Colorado (152)
Detected	3	3	19	5	1
Year Classes	2012	2015	2011, 2013, 2014	2009 2010 2011	2005

Captures of Colorado Pikeminnow detected below waterfall.



Razorback Suckers below waterfall have rarely been captured in SJR.



Untagged Razorback Suckers at Waterfall

4 Untagged Razorback Suckers captured using cast net at waterfall.

Tagged:Untagged ratio in Lake Powell is ~55:45

Probability of capturing 4 untagged fish is 4.1%

Conclusions from Waterfall

- Razorback Sucker have highest abundances of tagged fish.
- Stocked fishes are moving between basins.
- Entire fish community affected by waterfall.
- Submersible antennas collect lots of data.
  - Even 12 hours
- Sampling below waterfall?

Conclusions

- PIT Antenna Arrays provide lots of DATA
- Information from PIT antennas is more elusive—no dedicated project or person
- 24/7/365 detections
- Operation & Maintenance?