Small Antennas Downstream of San Juan River Waterfall

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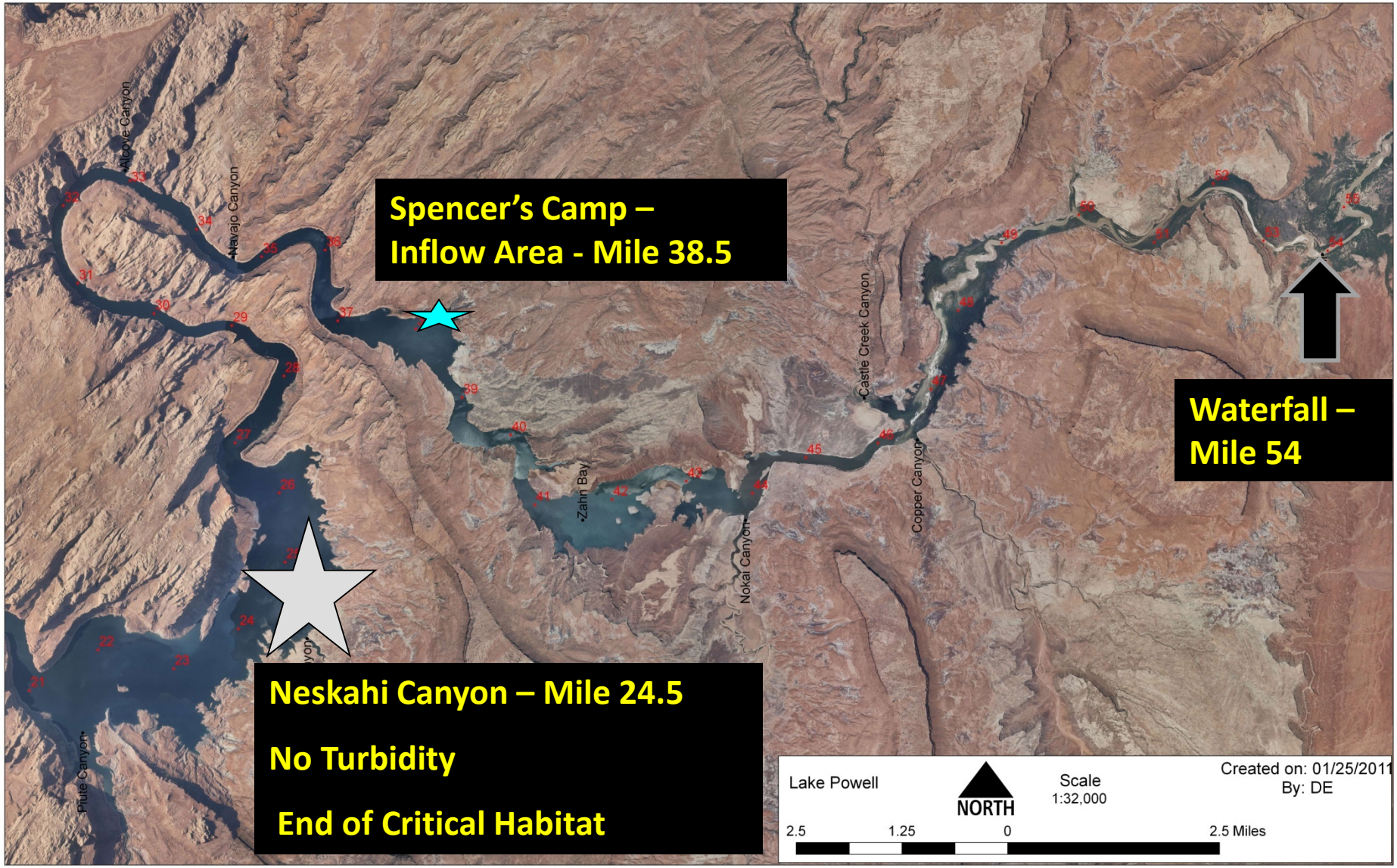
Waterfall Lake Powell Study Area

RECLAMATION

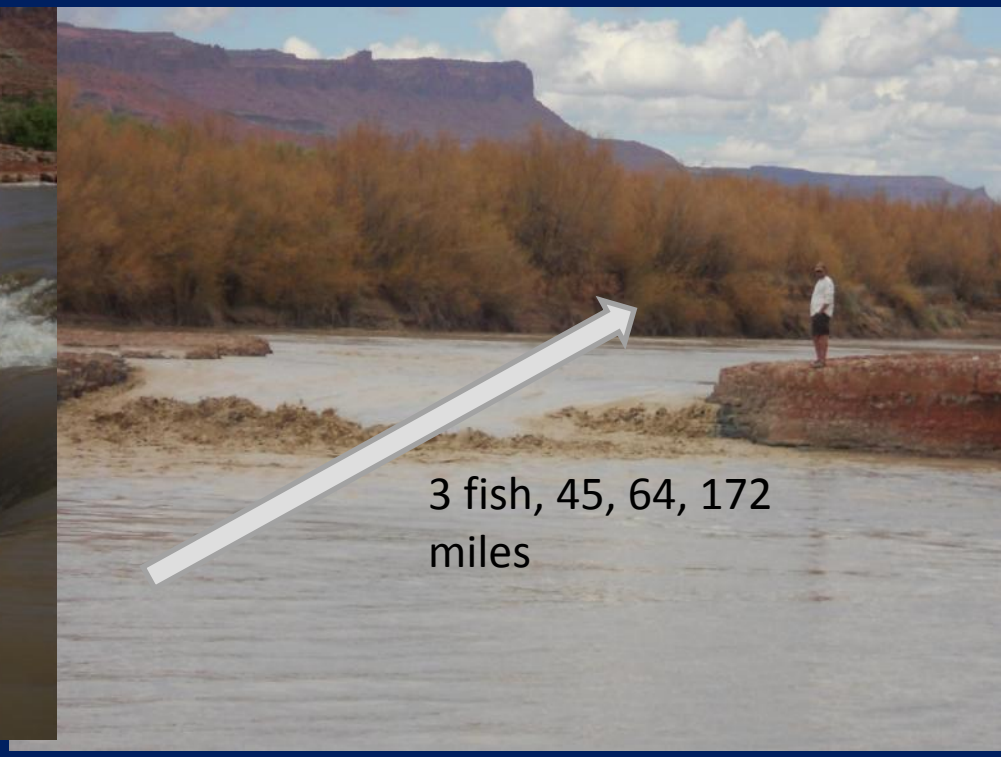

Spencer's Camp –
Inflow Area - Mile 38.5
Waterfall –
Mile 54
Neskahi Canyon – Mile 24.5
No Turbidity
End of Critical Habitat
Navajo Canyon
Castle Creek Canyon
Copper Canyon
Zahn Bay
Nokai Canyon
Piute Canyon
Lake Powell
NORTH
Scale
1:32,000
Created on: 01/25/2011
By: DE
2.5
1.25
0
2.5 Miles

Waterfall reach

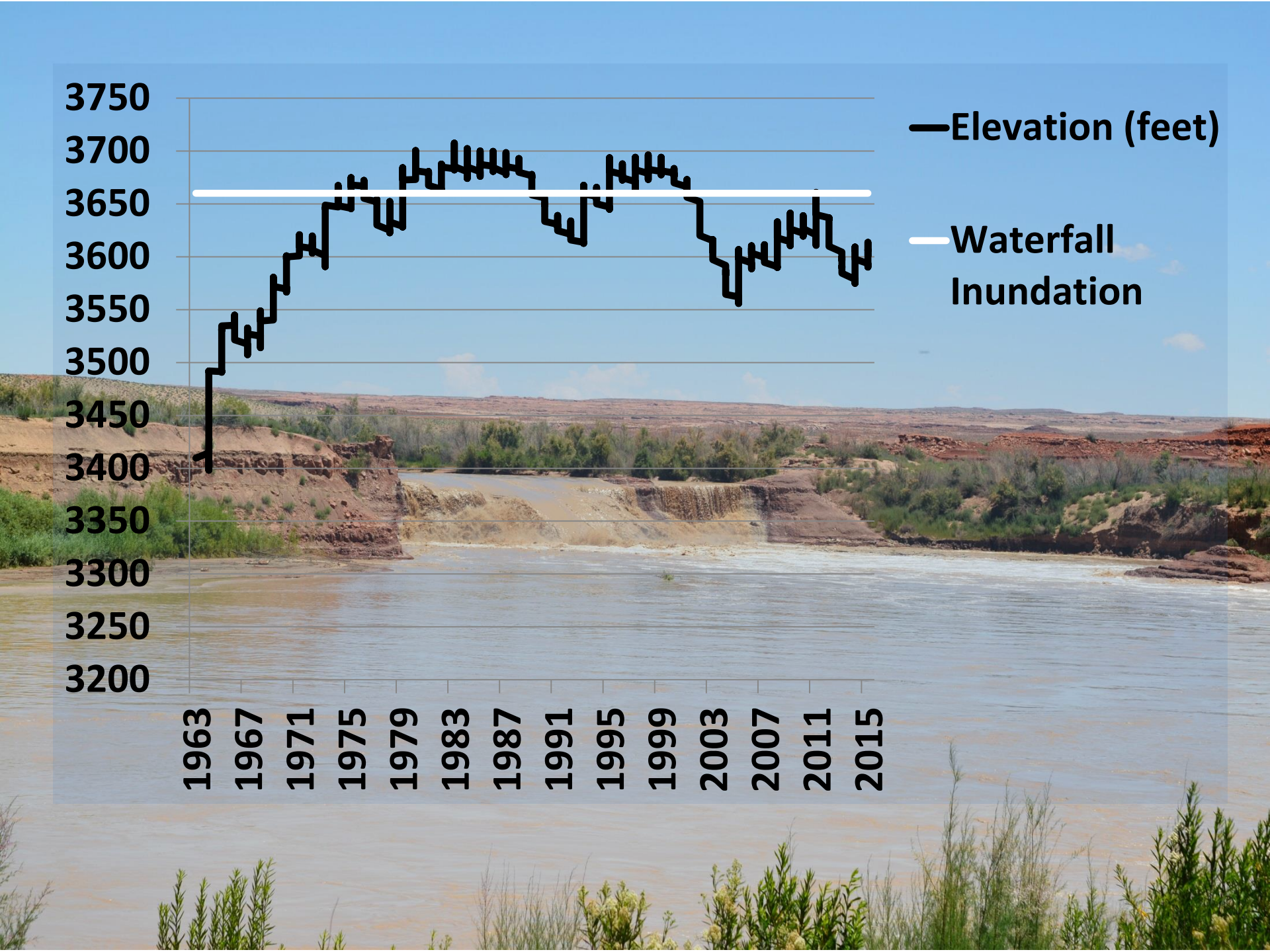
March 2015 ~ 700 cfs

June 2015 ~ 7,000 cfs

San Juan River Waterfall 2008 vs 2011



RECLAMATION


3750
3700
3650
3600
3550
3500
3450
3400
3350
3300
3250
3200
1963
1967
1971
1975
1979
1983
1987
1991
1995
1999
2003
2007
2011
2015
Elevation (feet)
Waterfall Inundation

Fish in San Juan River

- Razorback Suckers
  - ~14,000/yr stocked
  - 300++ mm length
  - All PIT tagged—some exceptions
  - 133,000 PIT tags since 2004
- Colorado Pikeminnow
  - ~400,000/yr stocked
  - 100 mm length
  - PIT tagged at first capture in river
  - 50,000 PIT tags since 2004

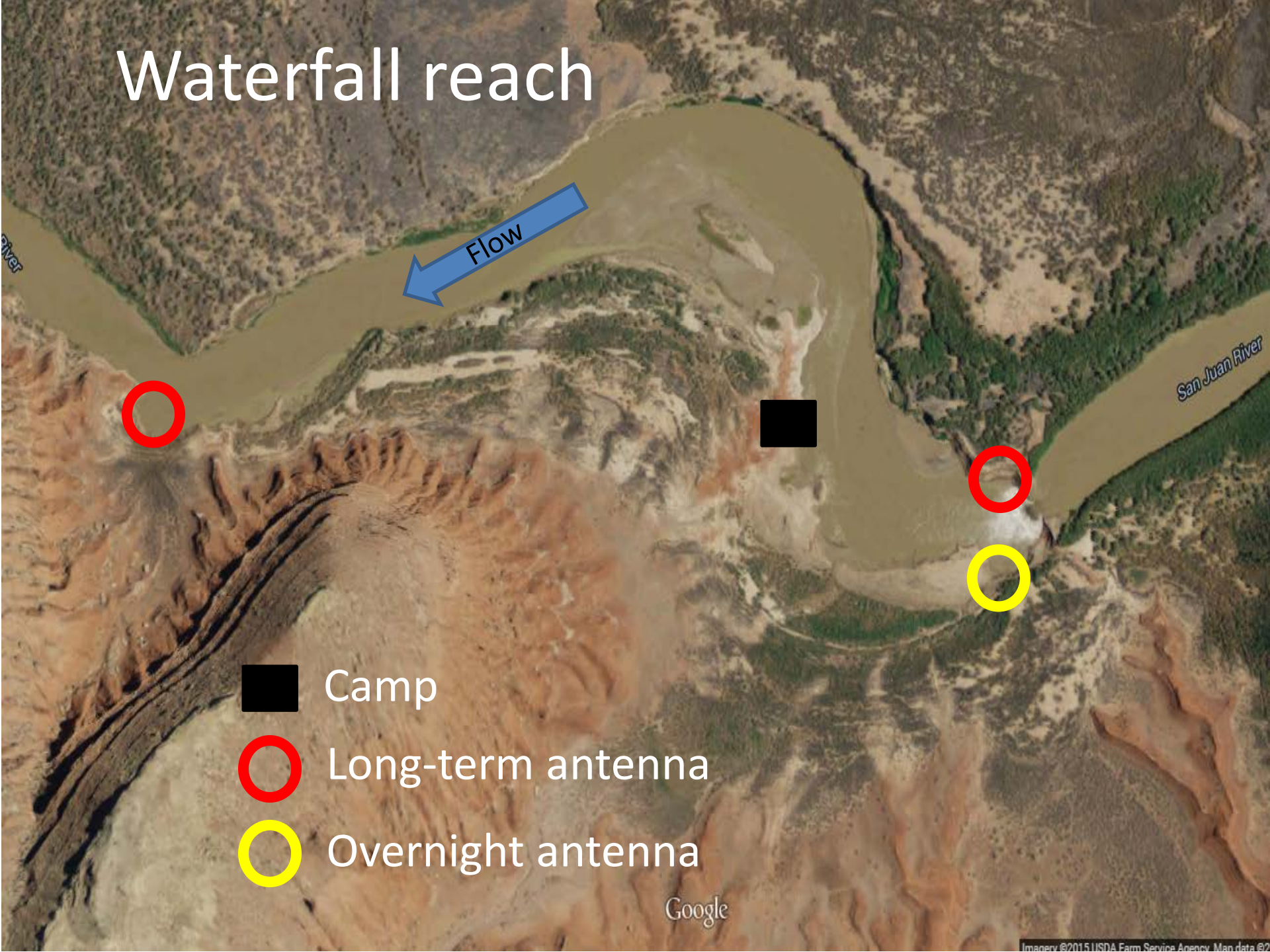
Background and question

- The waterfall has divided the San Juan River and Lake Powell continuously (except 1-2 months) since 2000
- 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 from March 21-July 6, 2015—107 days
- Floating Antenna 3 days
- Sampling with cast net, seines, and fyke net for 2 events
- Identify fishes, tagging records, and characteristics of the detected population

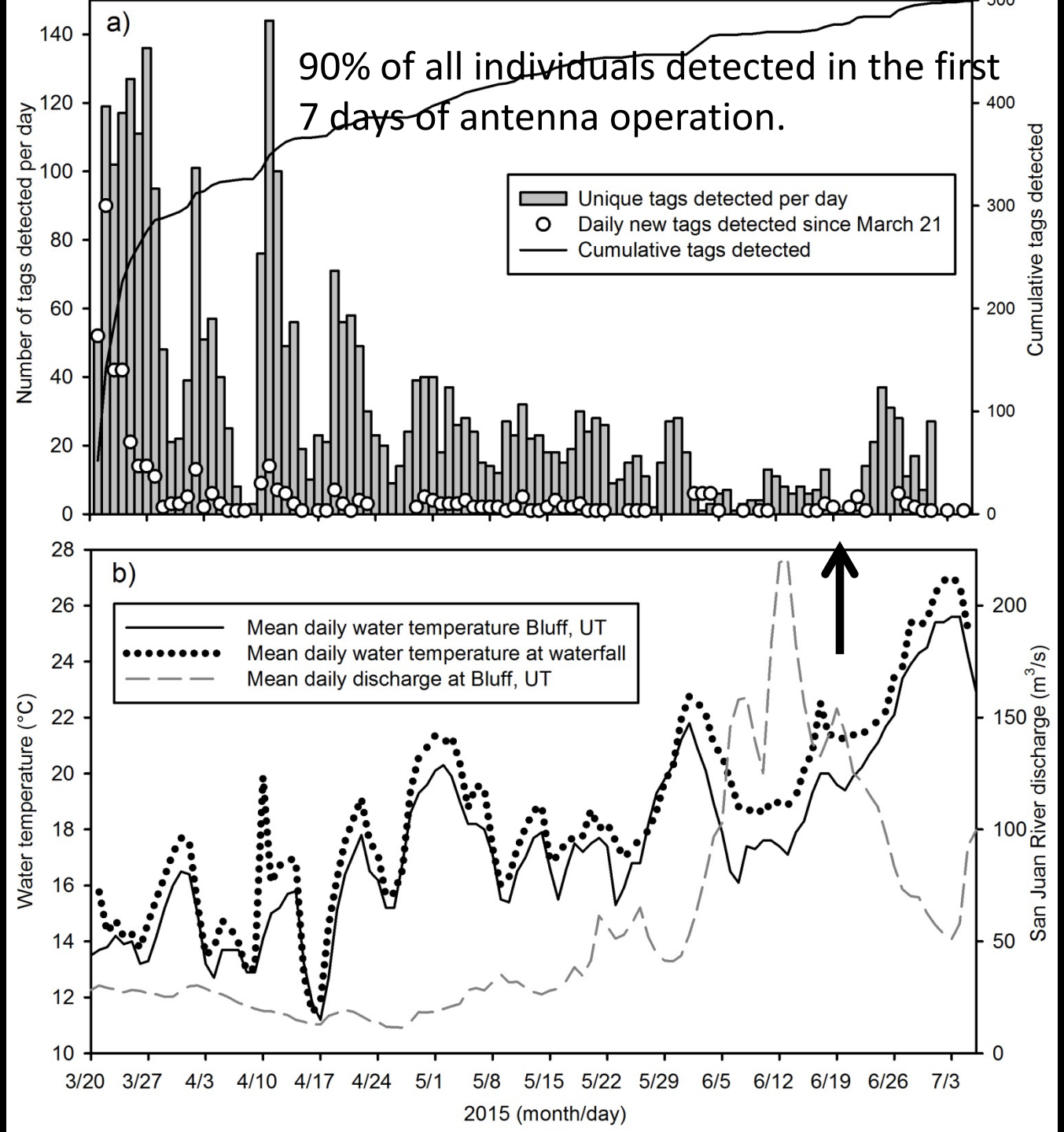
Waterfall reach



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

Submersible Antenna at waterfall
Deployed March 21-July 3
> 510 Unique Tags

Floating Antenna April 9 - 11
123 Razorbacks + 1 Pikeminnow


90% of all individuals detected in the first 7 days of antenna operation.
a)
Number of tags detected per day
Cumulative tags detected
Unique tags detected per day
Daily new tags detected since March 21
Cumulative tags detected
b)
Water temperature (°C)
San Juan River discharge (m³/s)
Mean daily water temperature Bluff, UT
Mean daily water temperature at waterfall
Mean daily discharge at Bluff, UT
3/20
3/27
4/3
4/10
4/17
4/24
5/1
5/8
5/15
5/22
5/29
6/5
6/12
6/19
6/26
7/3
2015 (month/day)

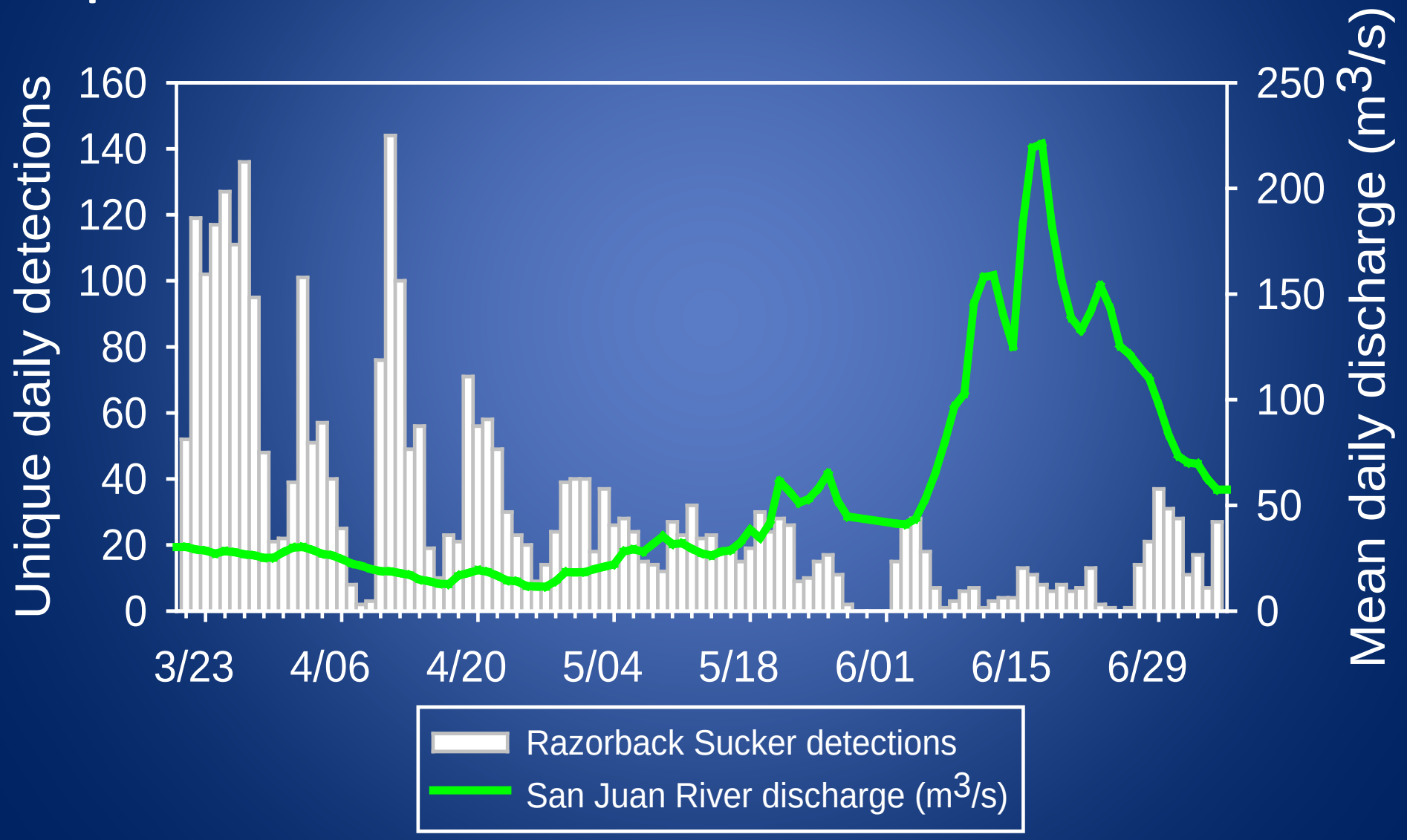
Continuous antenna data (107 days).

Species	Detections
Razorback Sucker	499
Colorado Pikeminnow	15
Flannelmouth Sucker[2]	3
Bonytail*	1
Channel Catfish[2]	6
Total	524

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

[2]Tagged in McElmo Creek

Razorback Sucker detections highest prior to runoff.



		Razorback Sucker	
Year class	Pikeminnow	SJR	UCRB
2000		1	
2001		10	
2002		9	
2003			
2004		6	1[d]
2005		8	
2006	4	41	
2007	1	2	
2008	3	7	2[e]
2009		23[a]	3[e]
2010	1	1	3[e]
2011	1	18	1[e]
2012	2	282[b]	
2013	3	61[c]	

Origins

[a]Three from the Animas River

[b]Twelve fish from the Animas River

[c]Thirteen fish from the Animas River

[d]Colorado River

[e]Green River

San Juan River recaptures prior to detection at waterfall are rare.

- Only 11/499 Razorback Sucker were recaptured in the SJR prior to swimming downstream below the waterfall.
- 3 Colorado Pikeminnow.

Untagged Razorback Suckers at Waterfall

5 Tagged Razorback Suckers captured at waterfall (out of 16 total fish).

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

Conclusions from Waterfall

- Razorback Sucker have highest abundances of tagged fish.
- Fish use area primarily in Spring (spawning?)
- Recruitment?
- Stocked fishes are moving between basins.
- Entire fish community affected by waterfall.
- Submersible antennas collect lots of data.
  - Even 12 hours
- Future work below waterfall?
  - 2016 new project
  - Natal origin of untagged fish—ASIR microchemistry
  - Sonic and radio telemetry project for fish moved upstream