

Bonytail post-stocking monitoring



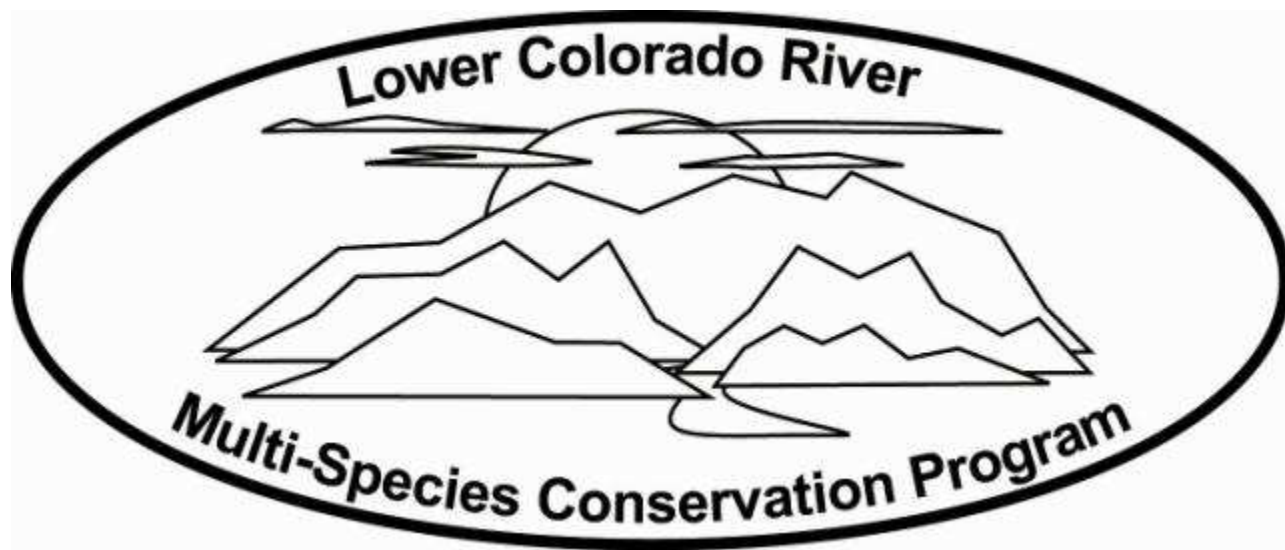
KRISTEN G. HUMPHREY, BRIAN R. KESNER, AND PAUL C. MARSH

MARSH & ASSOCIATES, LLC



Colorado River Aquatic Biologist Meeting
January 8 – 9, 2014
Laughlin, NV

Funding for this project has been provided by the Lower Colorado River Multi-Species Conservation Program.



Background – Bonytail (*Gila elegans*)



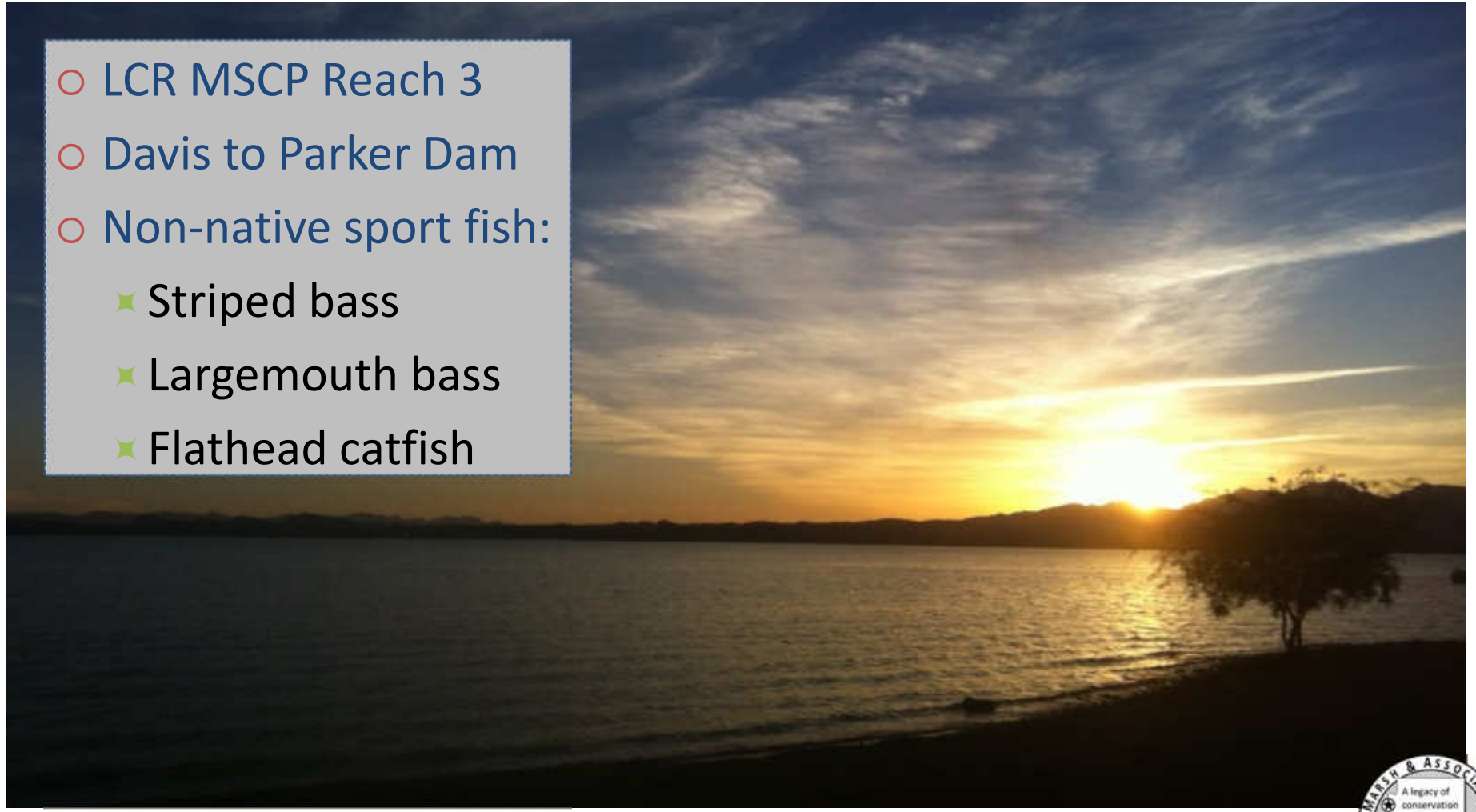
- Most critically endangered
- Last wild bonytail captured in Lake Havasu in the 1970's
- Rely entirely on stocking programs
- Over 209,000 stocked since 1981
- 305 have been recaptured

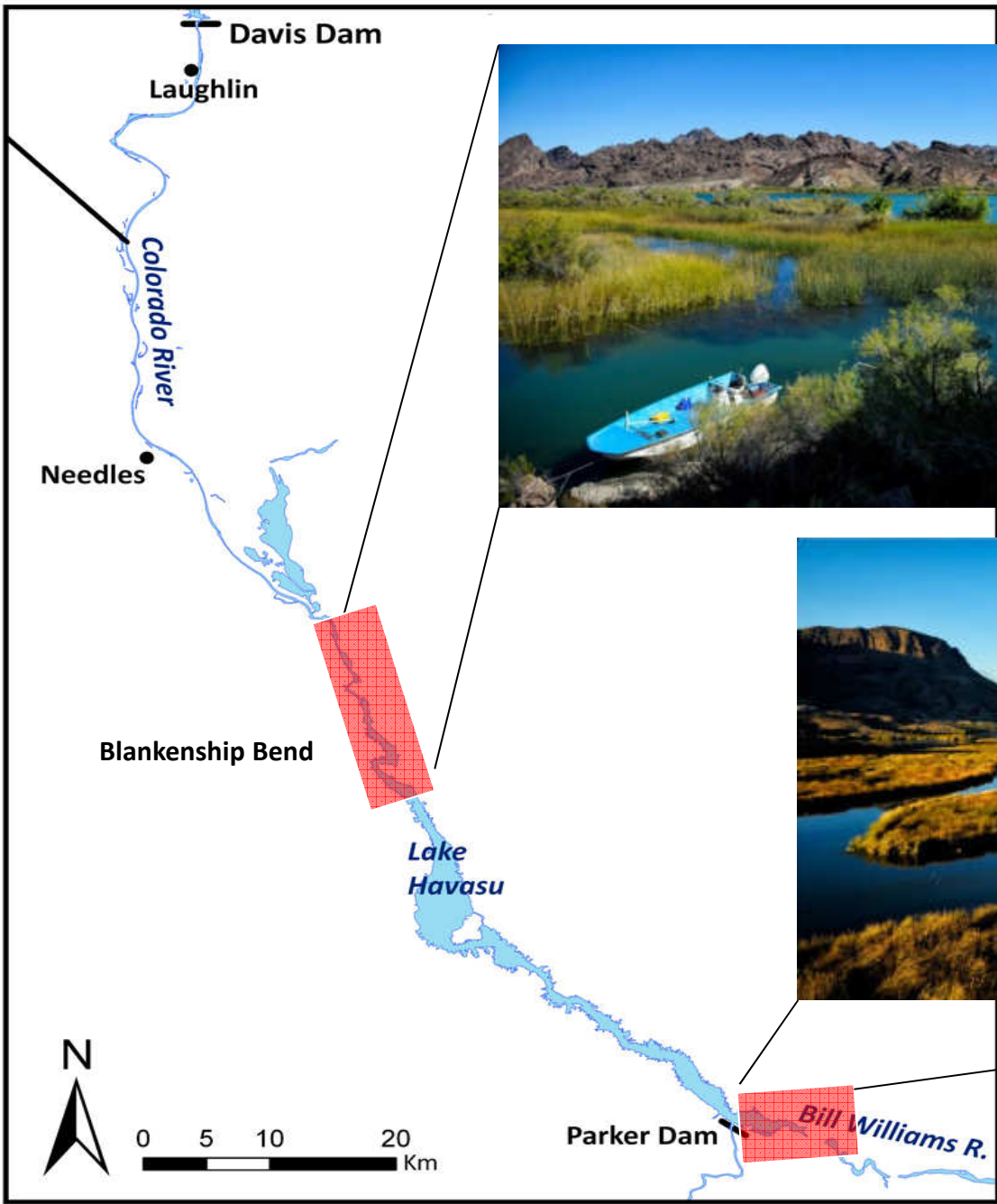


Study Area – Lake Havasu



- LCR MSCP Reach 3
- Davis to Parker Dam
- Non-native sport fish:
 - ✦ Striped bass
 - ✦ Largemouth bass
 - ✦ Flathead catfish





Objectives



- Identify specific habitat types used or preferred
- Short-term survival estimates (1-3 months)
- Monitor movements and/or movement patterns of individual bonytail



Surgical Technique

- Bonytail implanted with PT-4 acoustic transmitters (Sonotronics, Inc.)
- Anesthetized with tricaine methanesulphonate (MS-222)
- Acoustic tag inserted into abdominal cavity



- Autumn 2013: 10 study fish (TL=305.9 mm)
- Spring 2014: 12 study fish (TL=346.4 mm)



Acoustic Telemetry



A directional and towable omnidirectional hydrophone and receiver were used to actively track study fish

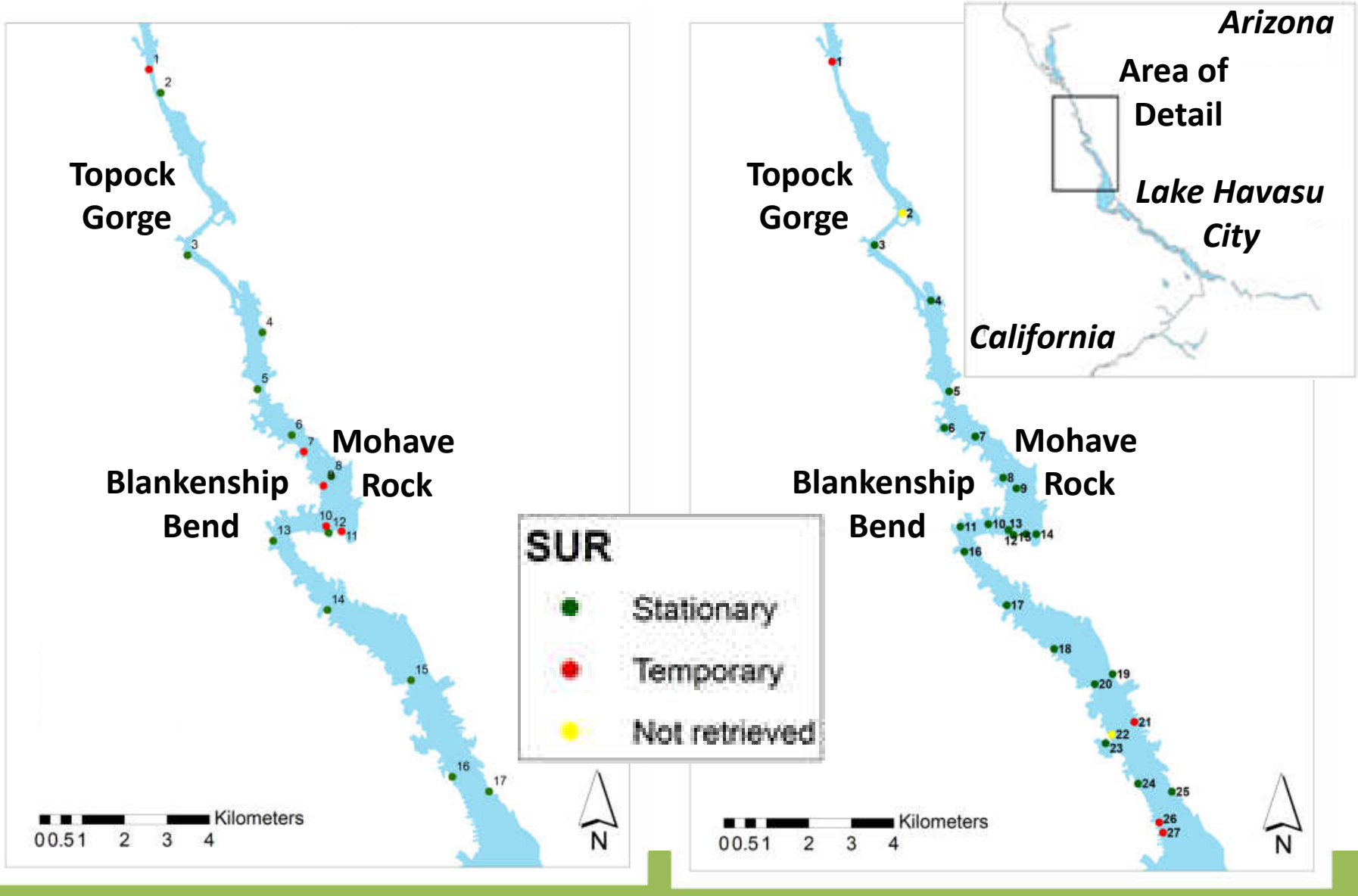
Submersible ultrasonic receivers (SURs) scan continuously and were positioned throughout the study area targeting passageways of fish movement, including backwater use



SUR Locations and Stocking Sites

Autumn 2013

Spring 2014





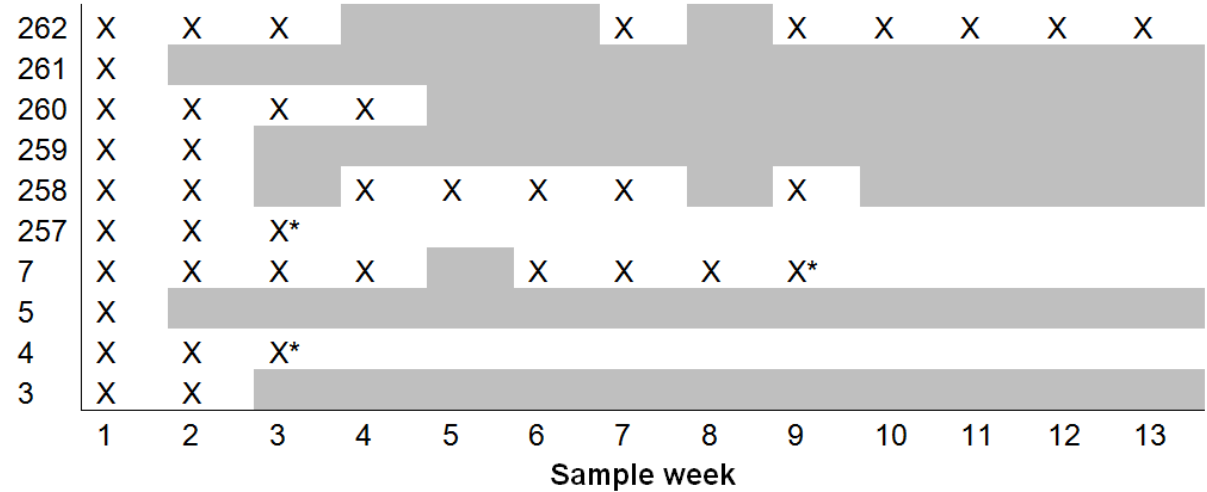
3/10 mortalities

6/10 lost

- 2 moved out of study area
- 4 last contacted in Blankenship Bend

1/10 active
(TL=310 mm)

- Backwater released



Weekly contacts (X), non-contacts (gray boxes), and mortalities (*) for all fish during bonytail telemetry study

Results – Autumn 2013



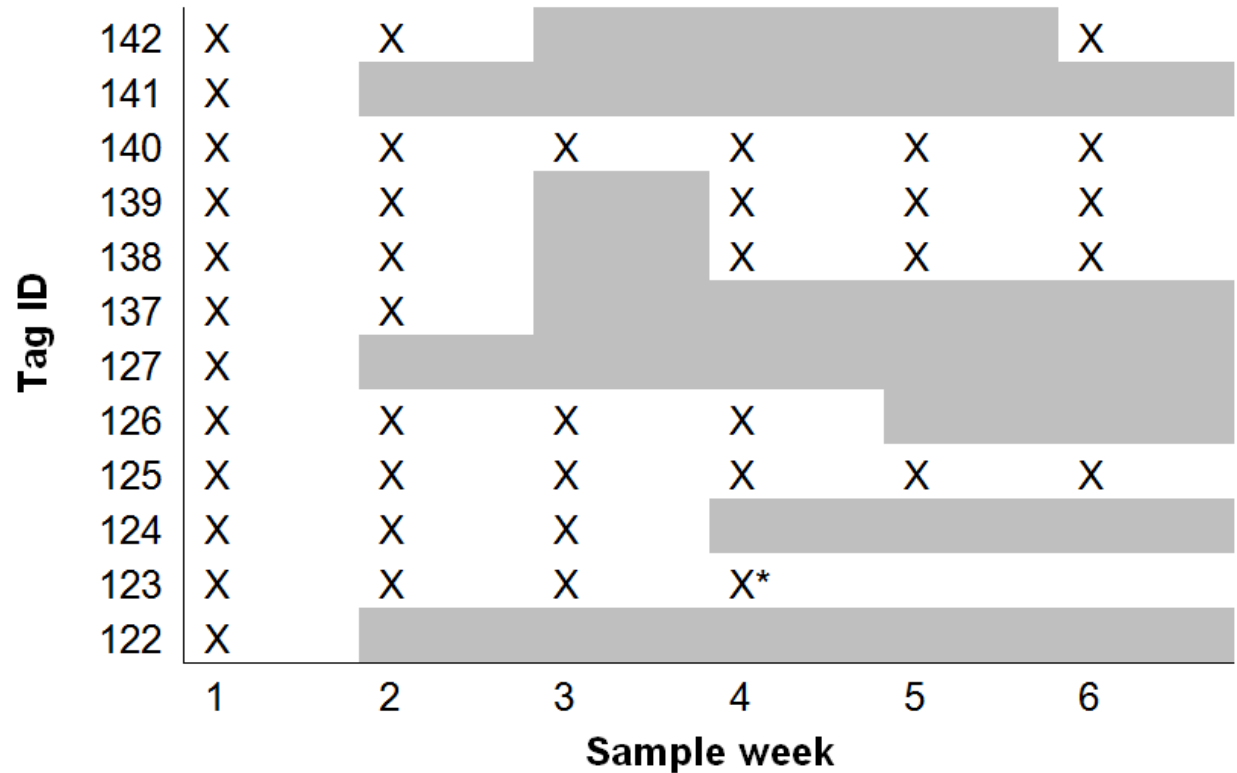
1/12 mortality

6/12 lost

- 2 moved out of study area
- 4 last contacted in/near Blankenship Bend

5/12 active
(TL=373 mm)

- 1 main channel release
- 4 backwater release



Weekly contacts (X), non-contacts (gray boxes), and mortalities (*) for all fish during bonytail telemetry study

Results – Spring 2014

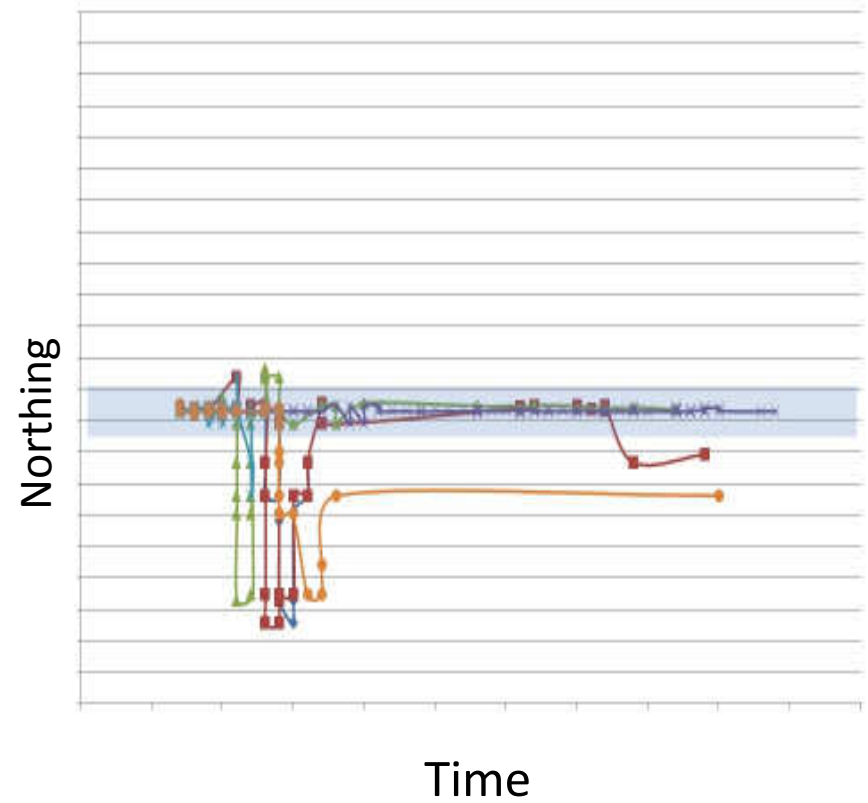
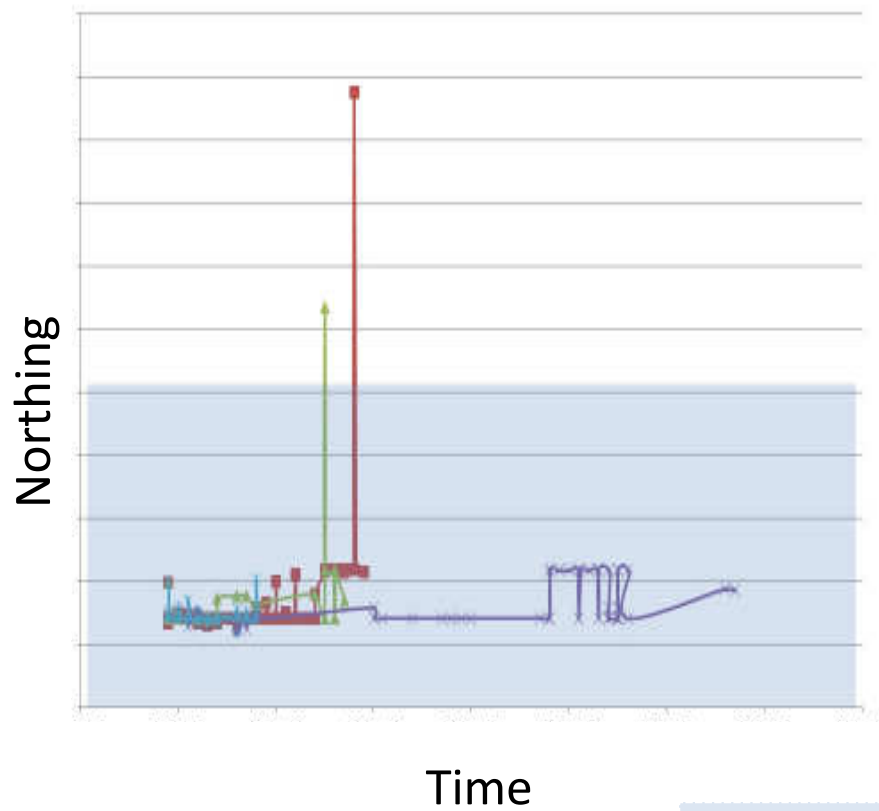


Backwater Released Fish



Autumn 2013

Spring 2014



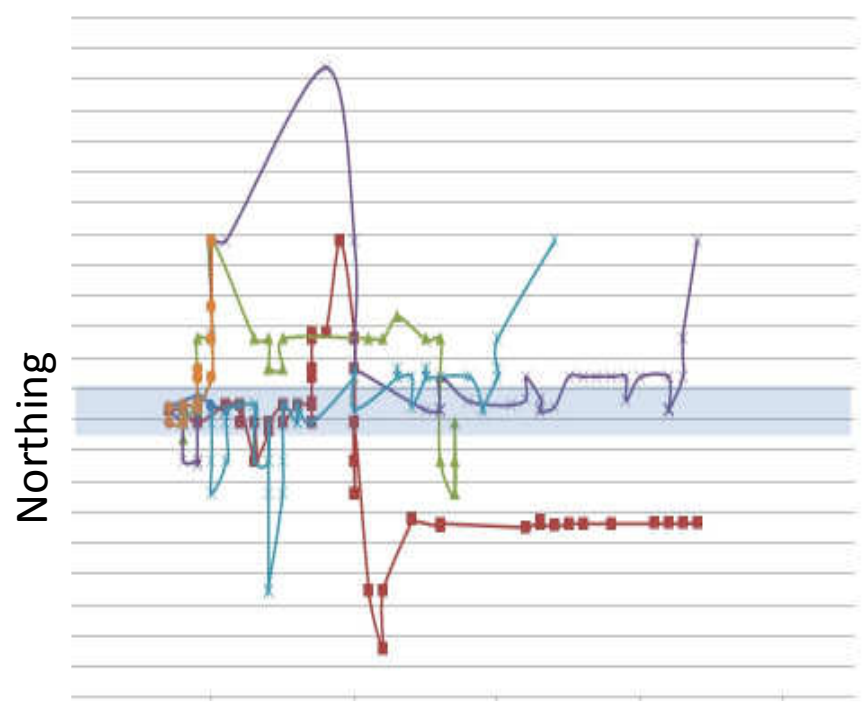
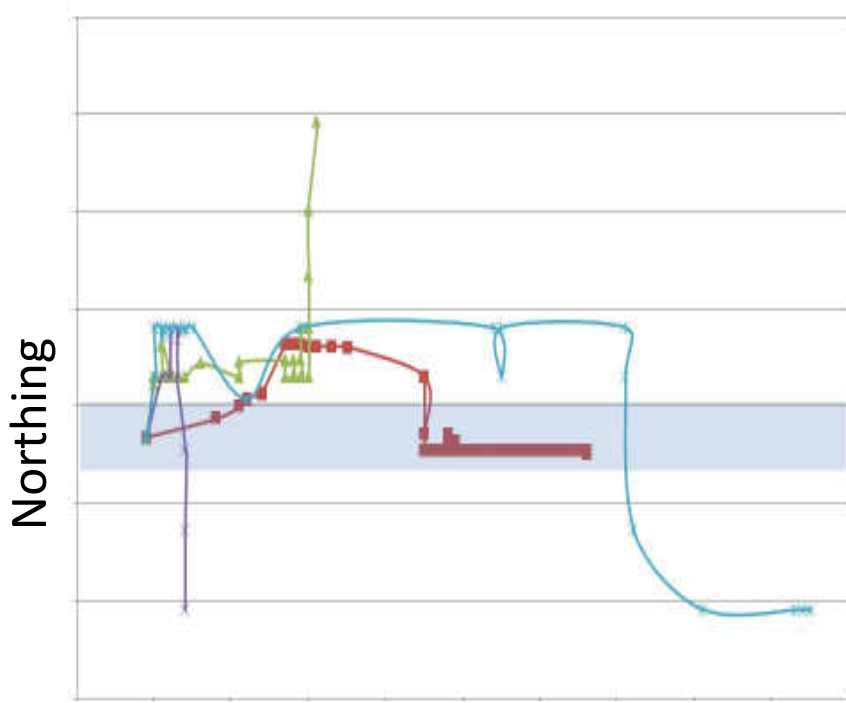
Blankenship Bend



Main Channel Released Fish

Autumn 2013

Spring 2014



Time

Time

Blankenship Bend



		Autumn 2013	Spring 2014
Mean dispersal (thalweg)	Main channel release	5.6 km	11.2 km
	Backwater release	1.1 km	8.5 km
Mean displacement (straight line)	Main channel release	13.8 km, 0.8 km/day	34.8 km, 2.0km/day
	Backwater release	4.7 km, 0.2 km/day	37.3 km, 2.1 km/day
Habitat	Secchi depth	1.30 m (0.50 – 2.25 m)	
	Turbidity		1.65 NTU
	Surface water temperature	15.7 °C (9.00 – 19.0 °C)	17.3 °C (12.0 – 22.8 °C)
	Depth	5.70 m (0.30 – 5.85 m)	3.42 m (0.52 – 10.6 m)
Mesohabitat		Riverine: 51% Backwater: 44% Peripheral channel: 5%	Riverine: 57.4% Backwater: 42.6% Mid-channel: 41.5% Periphery: 58.5%





Location of continued inhabitation

1. Fish 140 (backwater released) – Blankenship Bend Backwater
2. Fish 125 (main channel released) – outside of Blankenship Bend Backwater
3. Fish 138 (backwater released) and 139 (backwater released) – upstream of the Blankenship Bend California backwater



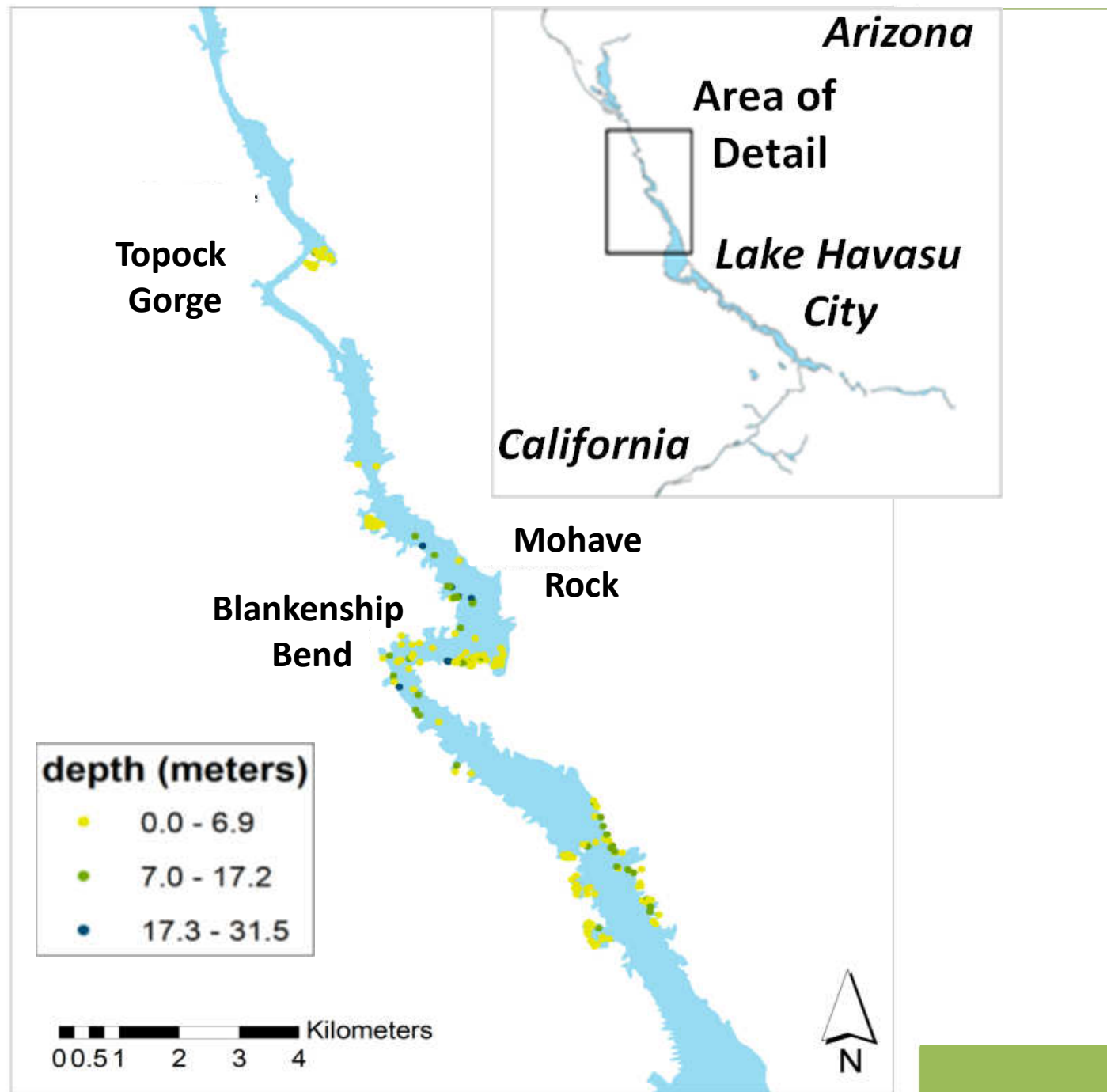
Passive integrated transponder (PIT) scanning



- Approximately 500 PIT tagged bonytail released January 14, 2014
- Submersible and shore-based PIT scanning units deployed in Reach 3 Jan 13 - Feb 28, 2014
- 4 isolated sampling events every other week



Locations of PIT scanning antennas deployed Jan – Feb 2014



○ 321 unique fish

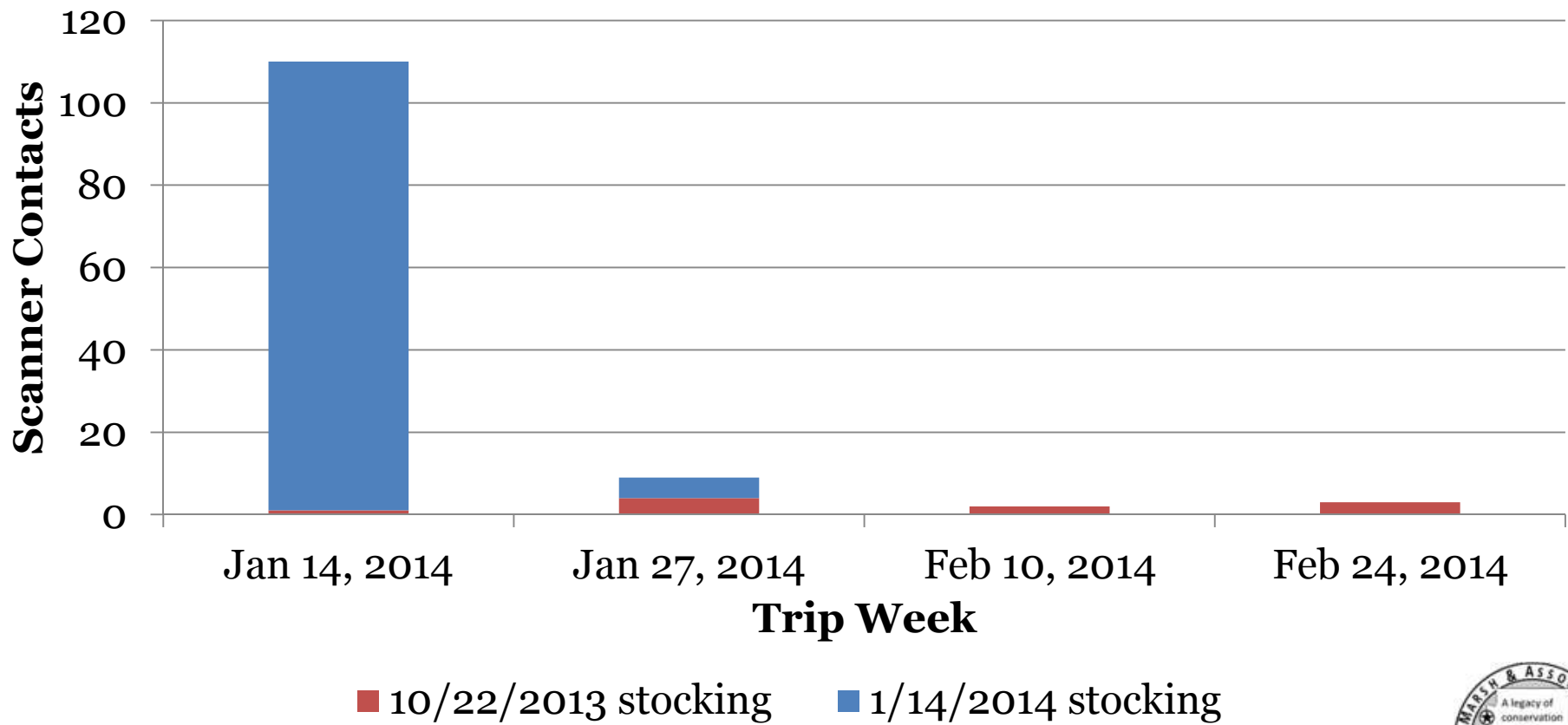
✦ 124 bonytail

✦ 194 razorback

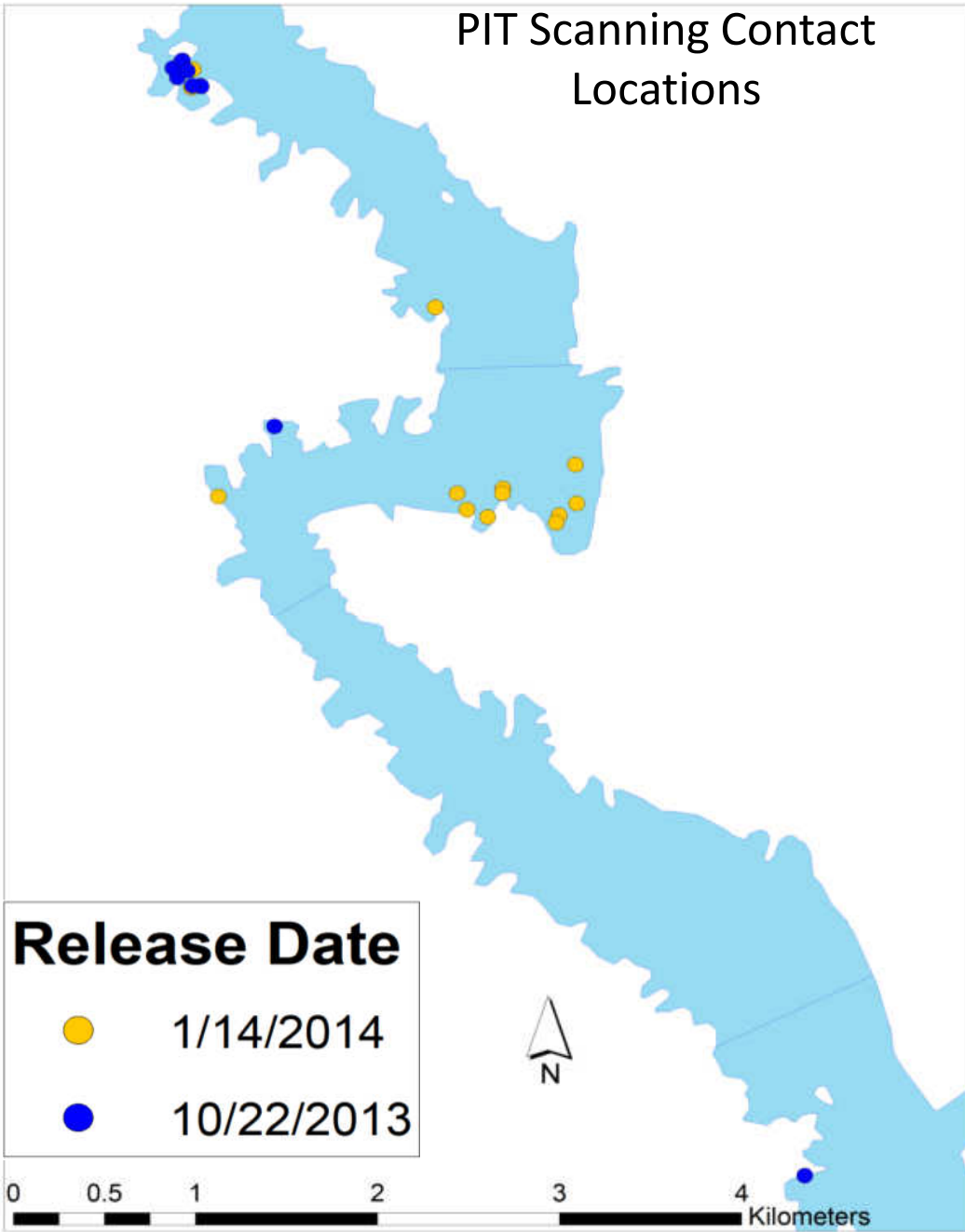
✦ 3 unknown

○ 26 additional through LCR MSCP Reach 3 study efforts (23 from Jan stocking)

○ 89% of contacts occurred within 3 weeks of the Jan stocking



PIT Scanning Contact Locations



- 124 bonytail
 - ✦ 10 released in Oct 2013
 - ✦ 114 released in Jan 2014
- ✦ 11 contacts in Trampas Cove
- ✦ 1 contact in Clear Bay
- ✦ 193 contacts in Blankenship Bend

2014 Lake Havasu Native Fish Netting “Roundup”



one bonytail mortality was found inside the throat of a netted largemouth bass (Photo Credit: Julia Mueller and Rick Wydoski)

- Feb 10 – 12, 2014
- 48 trammel nets
- 8 bonytail captured (TL = 303 mm, weight = 207.8 g)
 - 5 released Oct 2013
 - 3 released Jan 2014
 - 1 Trampas Cove
 - 1 Blankenship Bend
 - 6 Clear Bay



Summary



- 6 of 22 acoustic tagged fish were actively tracked into the final week of tracking
- Backwater released acoustic-tagged fish appeared more likely to inhabit Blankenship Bend
- Spring released study fish dispersed farther up- and downstream than autumn released study fish
- Contacts by PIT scanning decreased quickly after release
- PIT scanning and trammel netting contacted bonytail in Blankenship Bend, Trampas Cove, and Clear Bay

Preliminary Results



**ACOUSTIC TELEMETRY
AUTUMN 2014**

BILL WILLIAMS RIVER NATIONAL WILDLIFE REFUGE



Preliminary Results – Autumn 2014



1st release group

Sep 30, 2014

- 12 released
 - 6 at launch
 - 6 upstream in Bill Williams River
- 12 mortalities
 - 6 in week 2
 - 2 in week 3
 - 2 in week 5
 - 1 in week 6
 - 1 in week 7

2nd release group

Oct 21, 2014

- 7 released
 - All upstream in Bill Williams River
- 1 lost
 - Likely moved out of study area
- 5 mortalities
 - 2 in week 2
 - 2 in week 3
 - 1 in week 4
- 1 active at end of study
 - (week 5)



Avian predation



- 2 mortalities under power lines that act as cormorant roost site downstream of dam
- 1 mortality above barrier boom downstream of dam
- 1 mortality under power lines upstream of dam



Future Work



- Ongoing winter 2014/2015 PIT-scanning
- Spring 2015 telemetry study
- Further investigate avian predation
- Further investigate the role of turbidity on bonytail survival
- Telemetry tags with a dissolvable “trigger” to detect consumption by a predator are currently being tested by Hydroacoustic Technology, Inc. 2014



Thanks to our partners for their support



Southwest Native Aquatic
Resources & Recovery Center
(SNARRC)



Lake Mead Fish Hatchery



USFWS Achi Hanyo Native
Fish Rearing Facility

