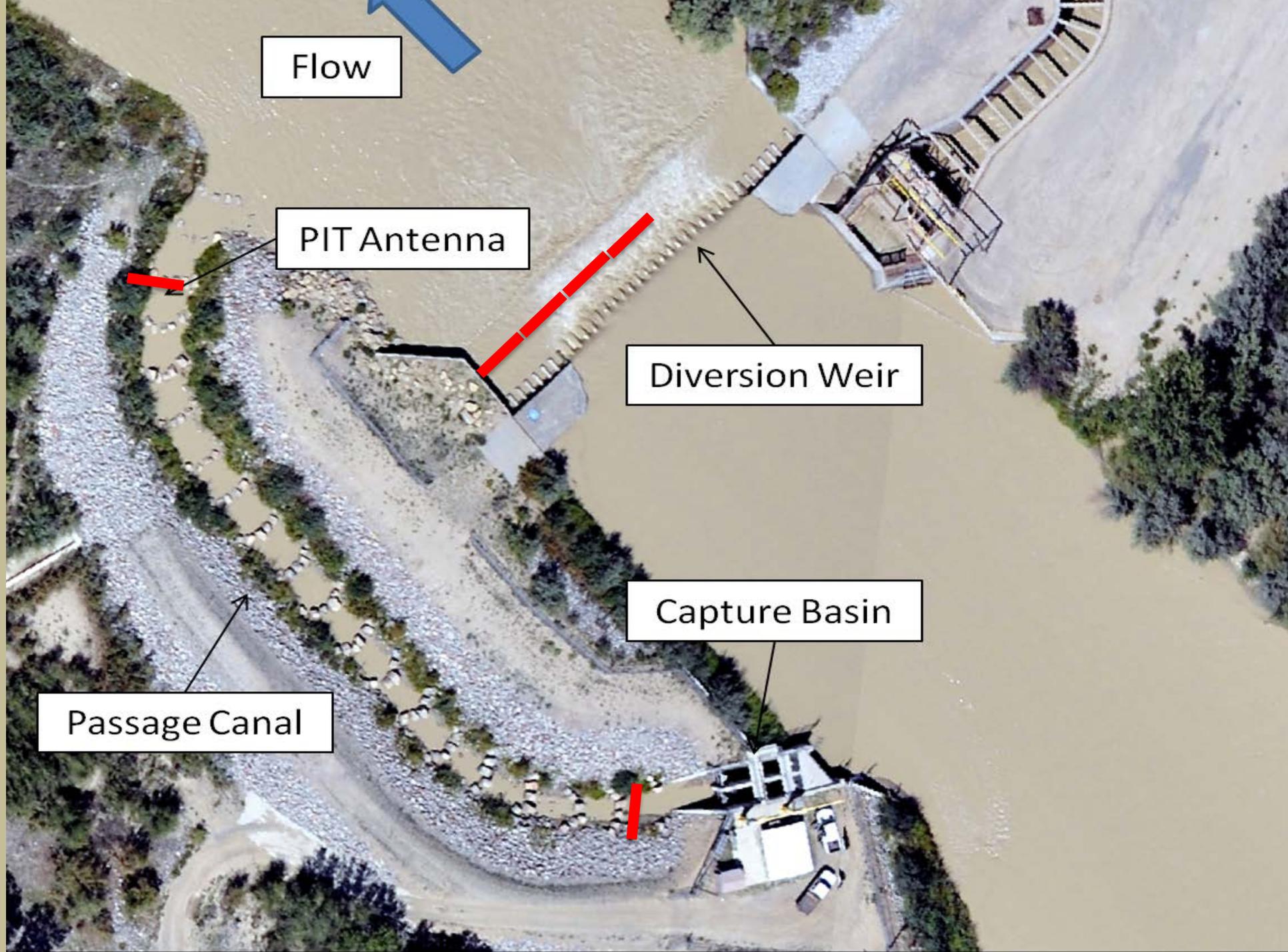


Public Service Company of New Mexico Fish (PNM) Passage Facility





Flow

PIT Antenna

Diversion Weir

Capture Basin

Passage Canal

Methods

- Selective fish passage
- April-October
- 7 days a week
- Native species enumerated and released
- Endangered species weighed and measured
- Non-natives are enumerated and removed



Methods

- Additional Objectives
 - Investigate fish passage efficiency
 - Determine movement timing to determine best operational period
 - Collect baseline data to determine the impact of self-cleaning trash rake

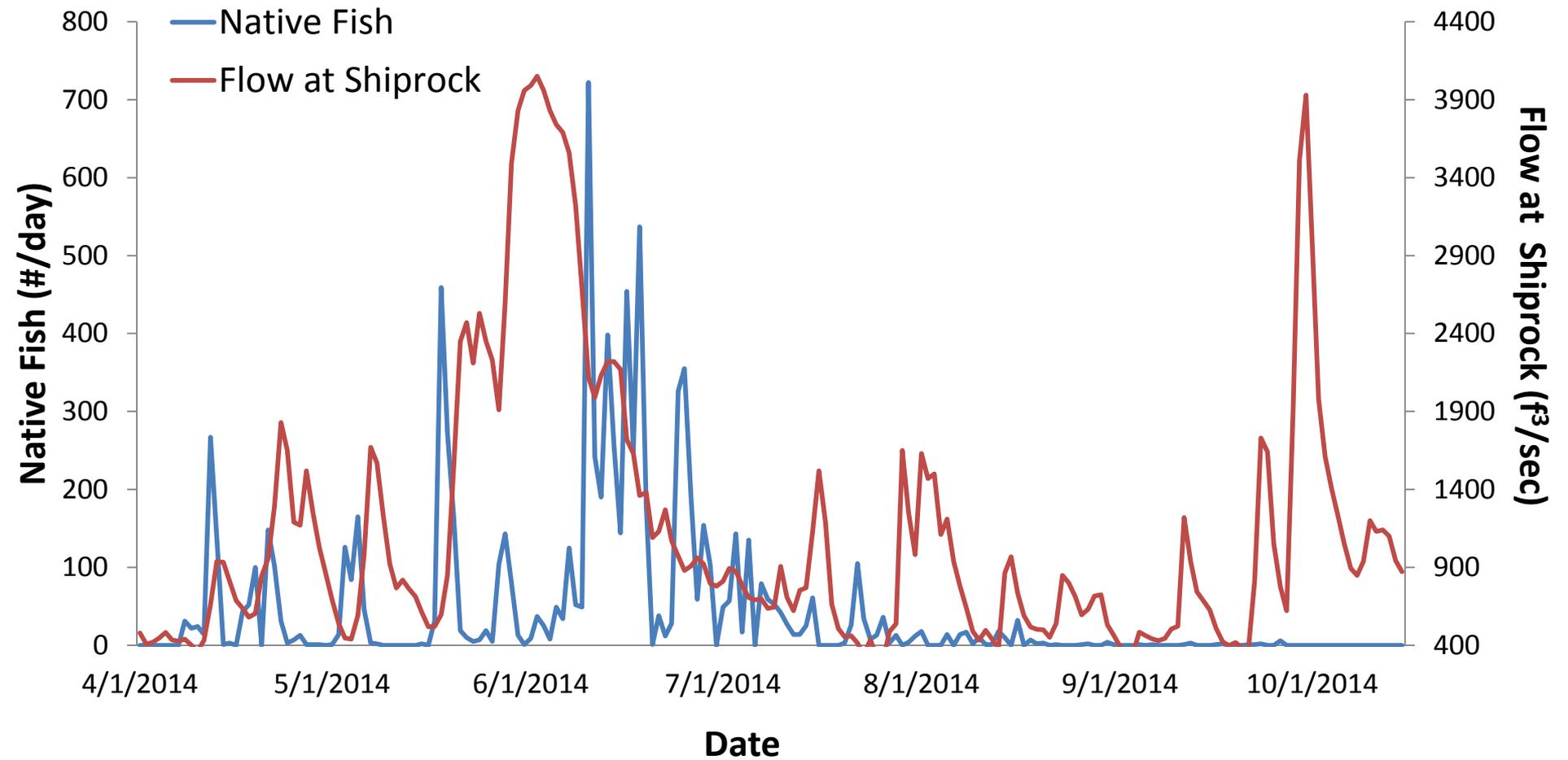


Results

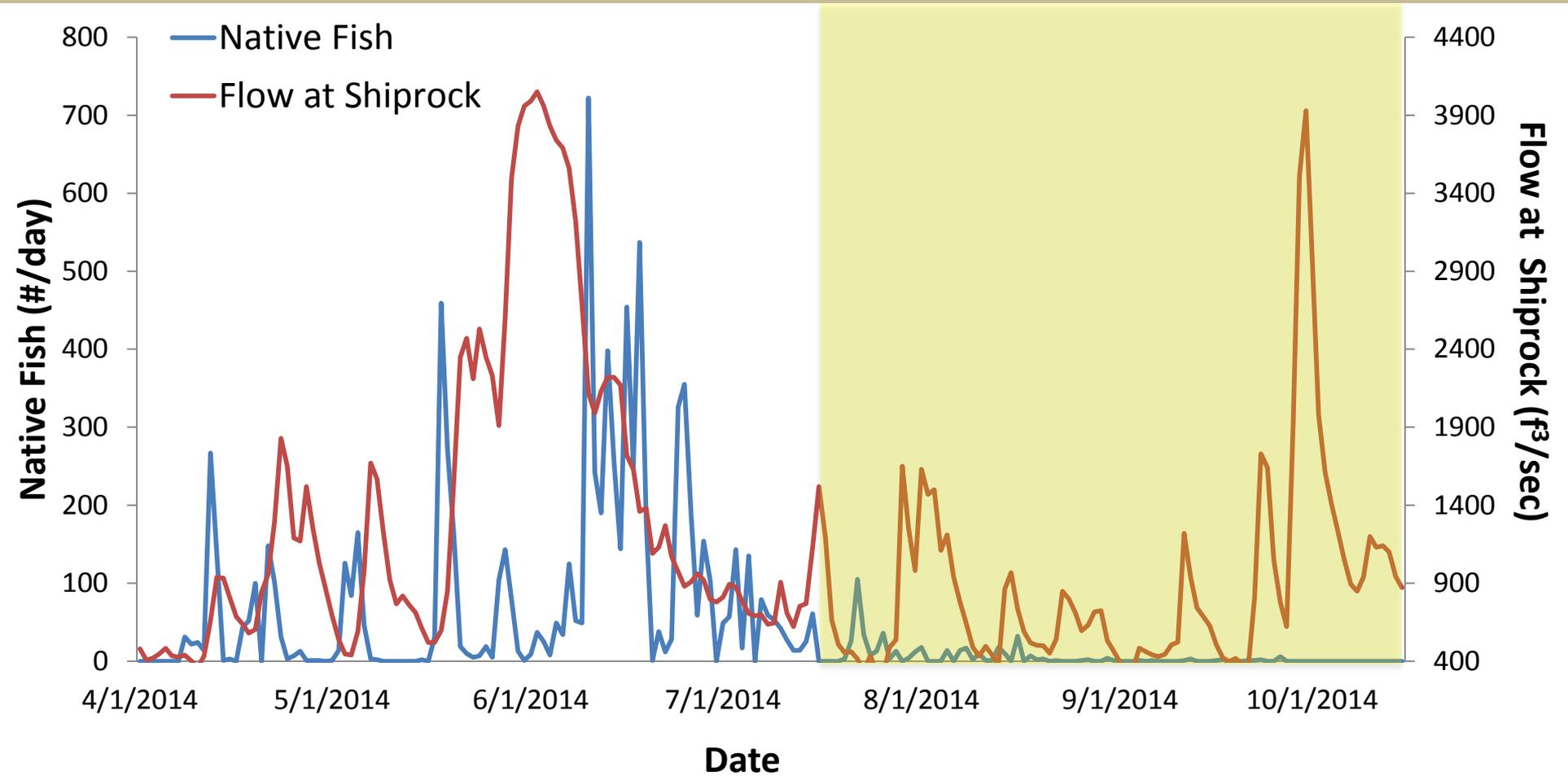
- Operated for 200 days
April 1 to October 15
- 9,145 fish were captured
 - 9,014 native fish
 - 10 Razorback Suckers
 - 40 Colorado Pikeminnow
 - 2 Roundtail Chub (1 in spawning condition)
 - 131 non-native fish
 - 28 Channel Catfish
 - 6 Common Carp
 - 22 Black Bullhead



Native Species



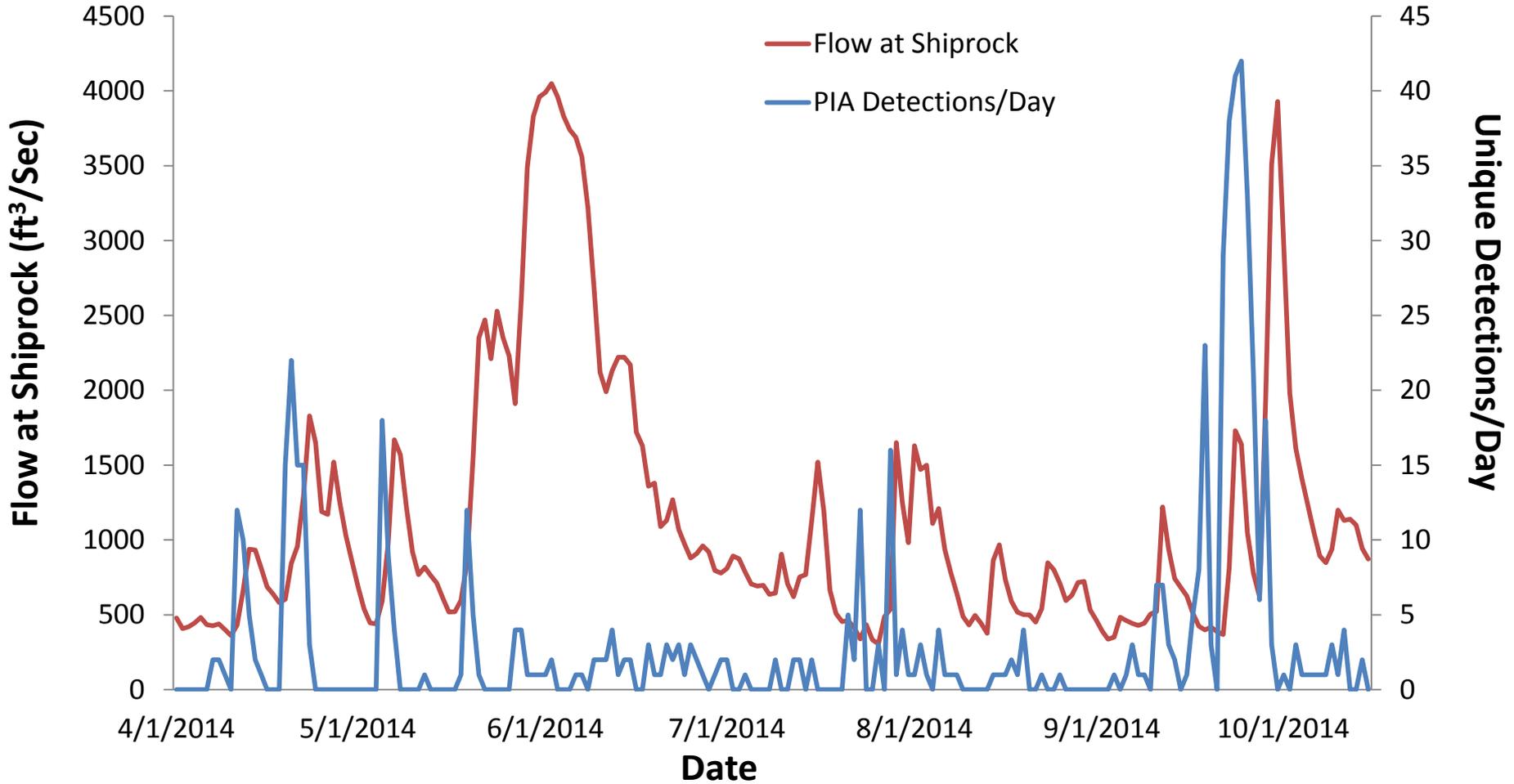
Native Species



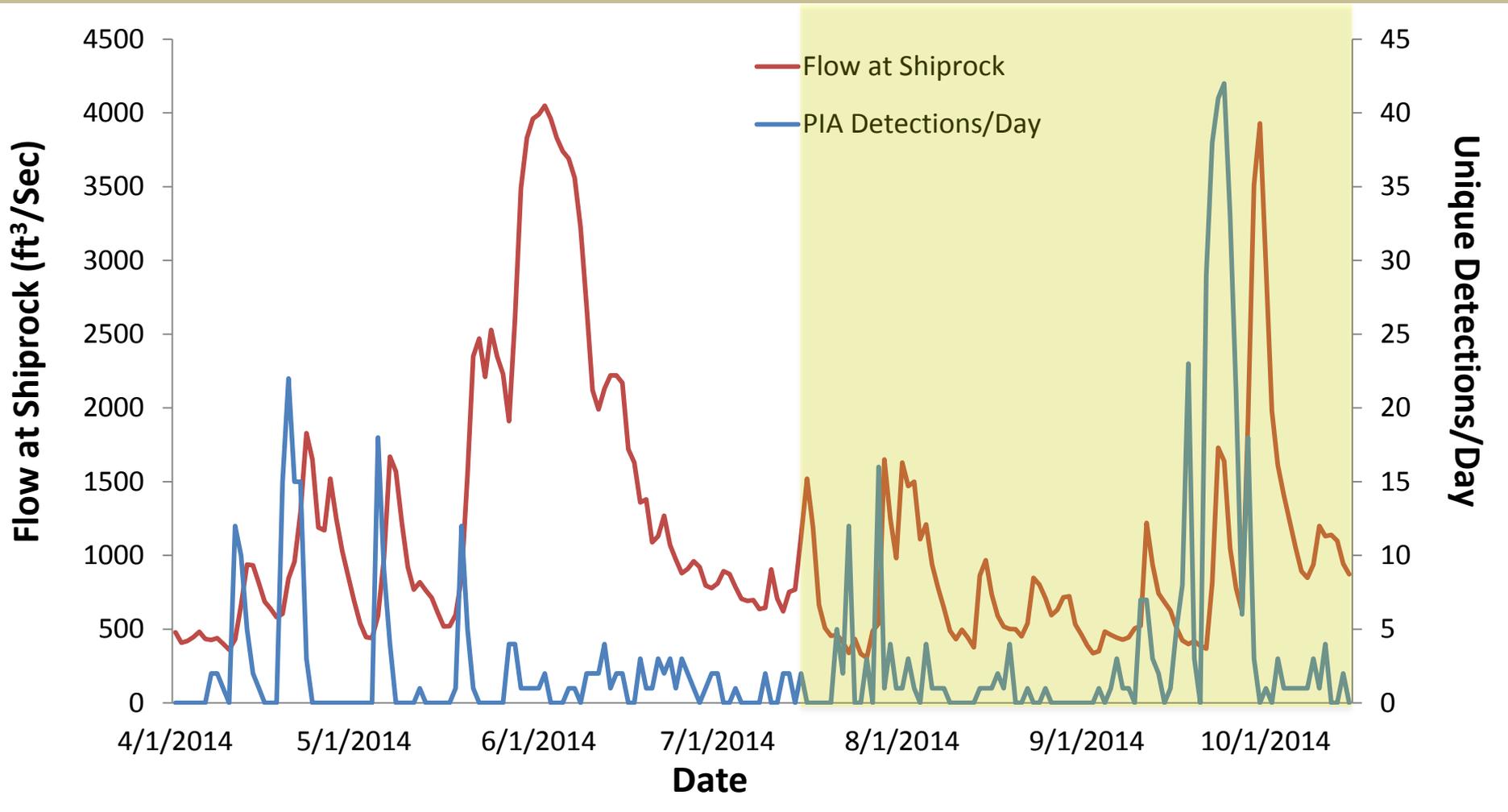
Antenna Detections

Species	Unique Fish Detections
Razorback Suckers (Prior 2014)	256
Razorback Suckers (2014)	303
Colorado Pikeminnow	26
Flannelmouth Sucker	43
Bluehead Sucker	4
Channel Catfish	4
Total	636

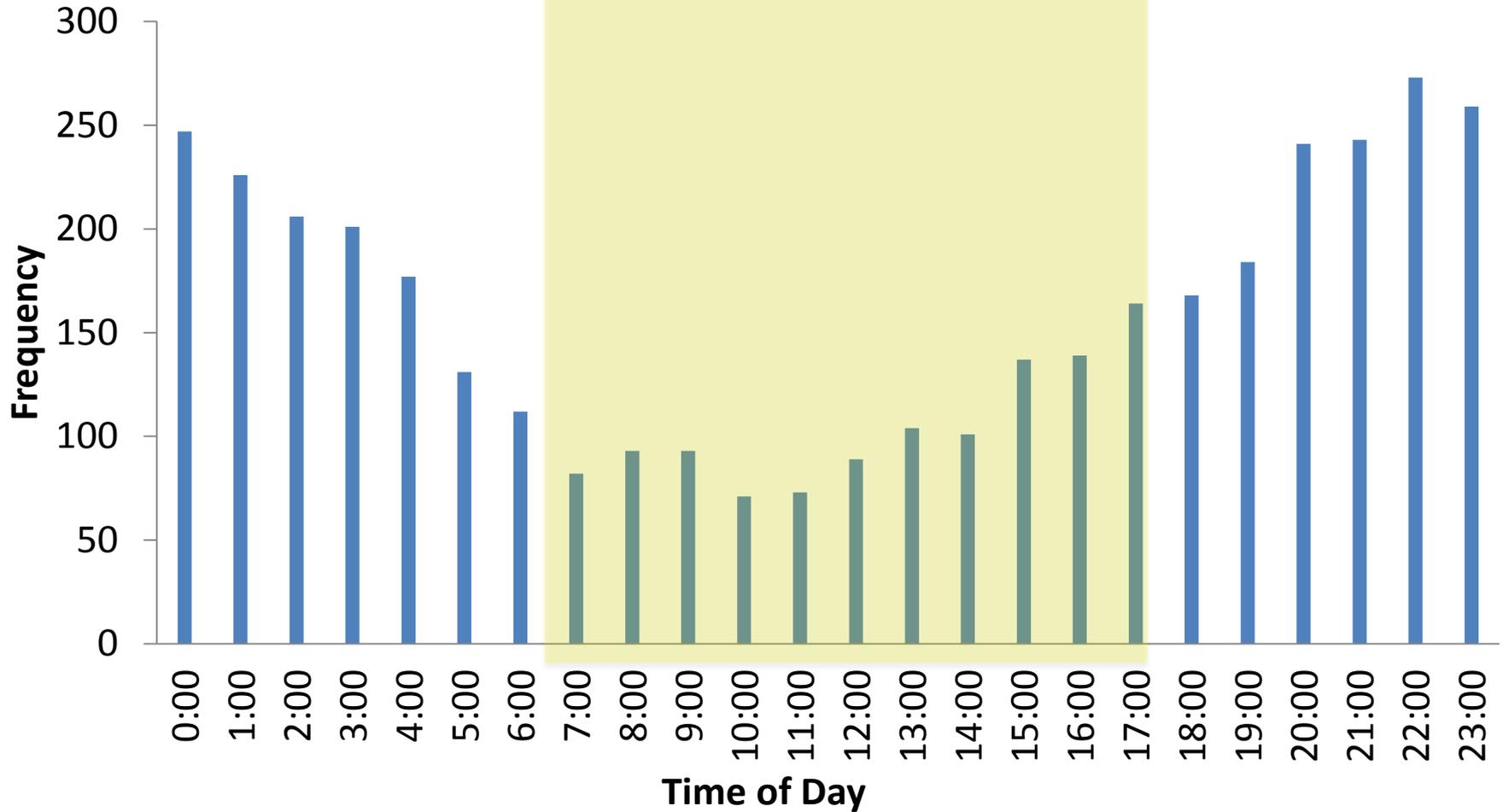
Unique Detections by Day



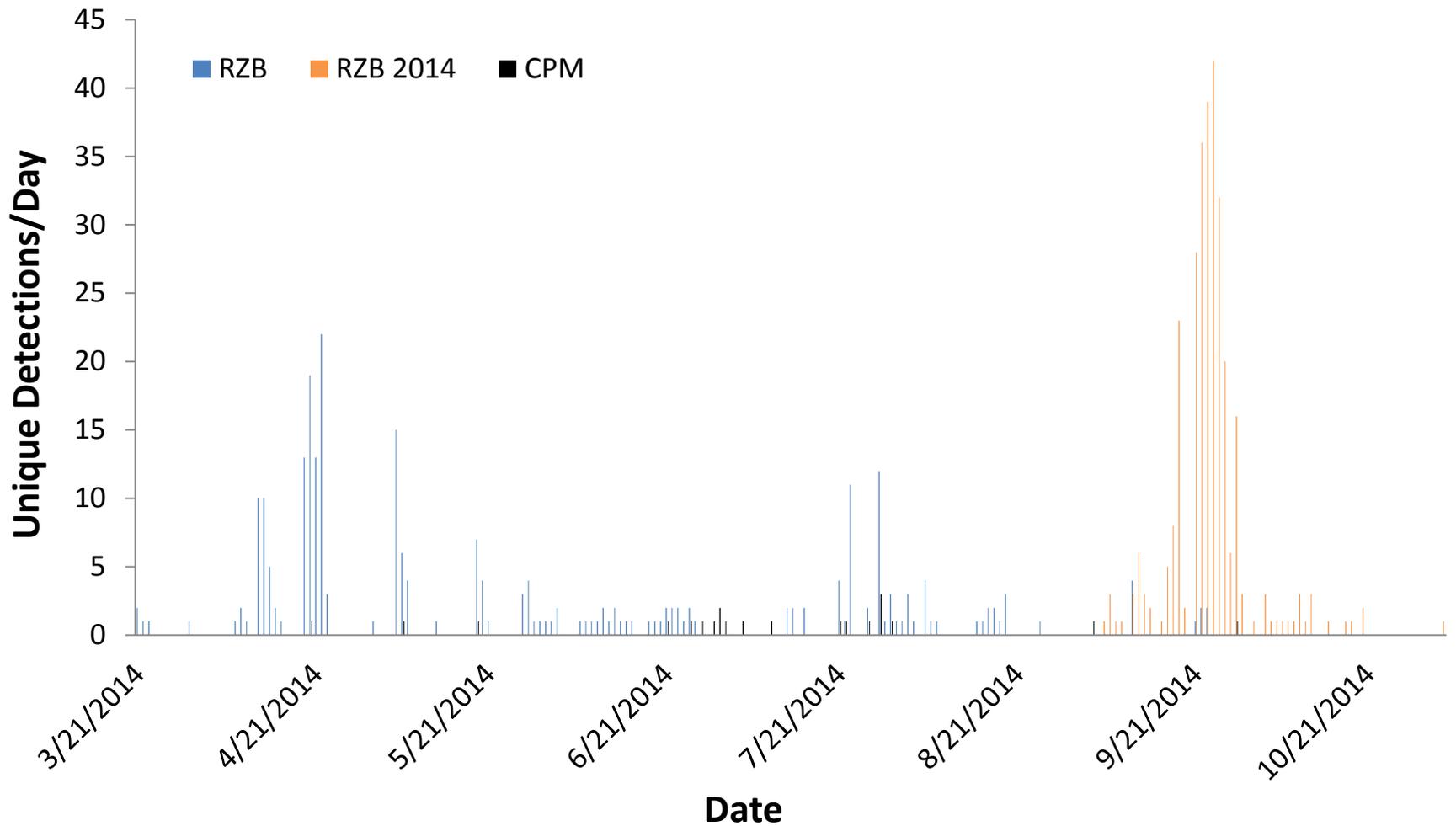
Unique Detections by Day



Total Detections by Time



Unique Detections by Time



Passage Efficiency

Species	Unique Detections*	Captures (Successful Passage)	Percentage Passed
Razorback Suckers	559 (256)	9 (9)	1.6% (3.5%)
Colorado Pikeminnow	26	7	26.9%

*Values in parentheses indicate results excluding razorback suckers stocked in 2014.

Why?



Conclusions

- Few non-native species were captured
- Low proportion of detected fishes were successfully passed through the facility
- Number of channel catfish and Colorado pikeminnow were possibly reduced by obstructions
- Patterns show relationship between fish movement and flow

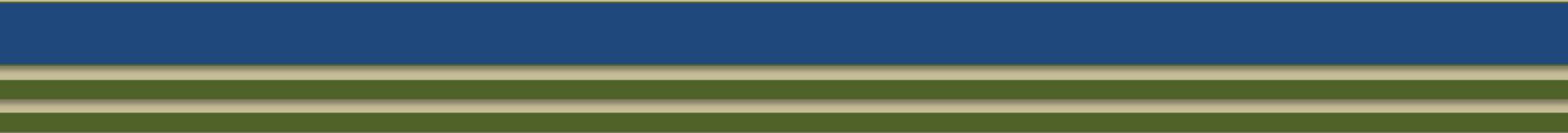
2015

- Facility Upgrades
 - Install self-cleaning trash rake
 - Hopefully soon!
- Continue to evaluate fish passage efficiency after rake installation



Acknowledgements

- Mark McKinstry, Ernie Teller, Bob Norman, Nate Franssen, Scott Durst, Nate Cathcart, Peter McKinnon, Ashley Curley, Drexel Pruitt
- Bureau of Reclamation
- US Fish and Wildlife Service
- Bureau of Indian Affairs
- Navajo Nation Department of Fish and Wildlife
- Navajo Agricultural Products Industry
- Public Service Company of New Mexico



Navajo Agricultural Products Industry (NAPI) Razorback Sucker Grow-Out Ponds

2014 Annual Report

Christopher Cheek
Navajo Nation
Department of Fish and Wildlife

Methods

- Ponds are dry October to April
- 9100 RZBs Stocked
 - April 14, 2014
 - TL: 180-220 mm
 - 100: >300mm
- 3 Ponds
 - East Avocet
 - West Avocet
 - Hidden Pond



Operation

Daily Operation

- Monitor Water Quality
 - Temperature
 - Body weight
- Feeding
- Mortalities

Monthly Operation

- Sample Counts
 - >30 individuals
 - TL, SL, Wt
 - Calculate feeding rates
- Vegetation Control



Passive vs. Active Harvest

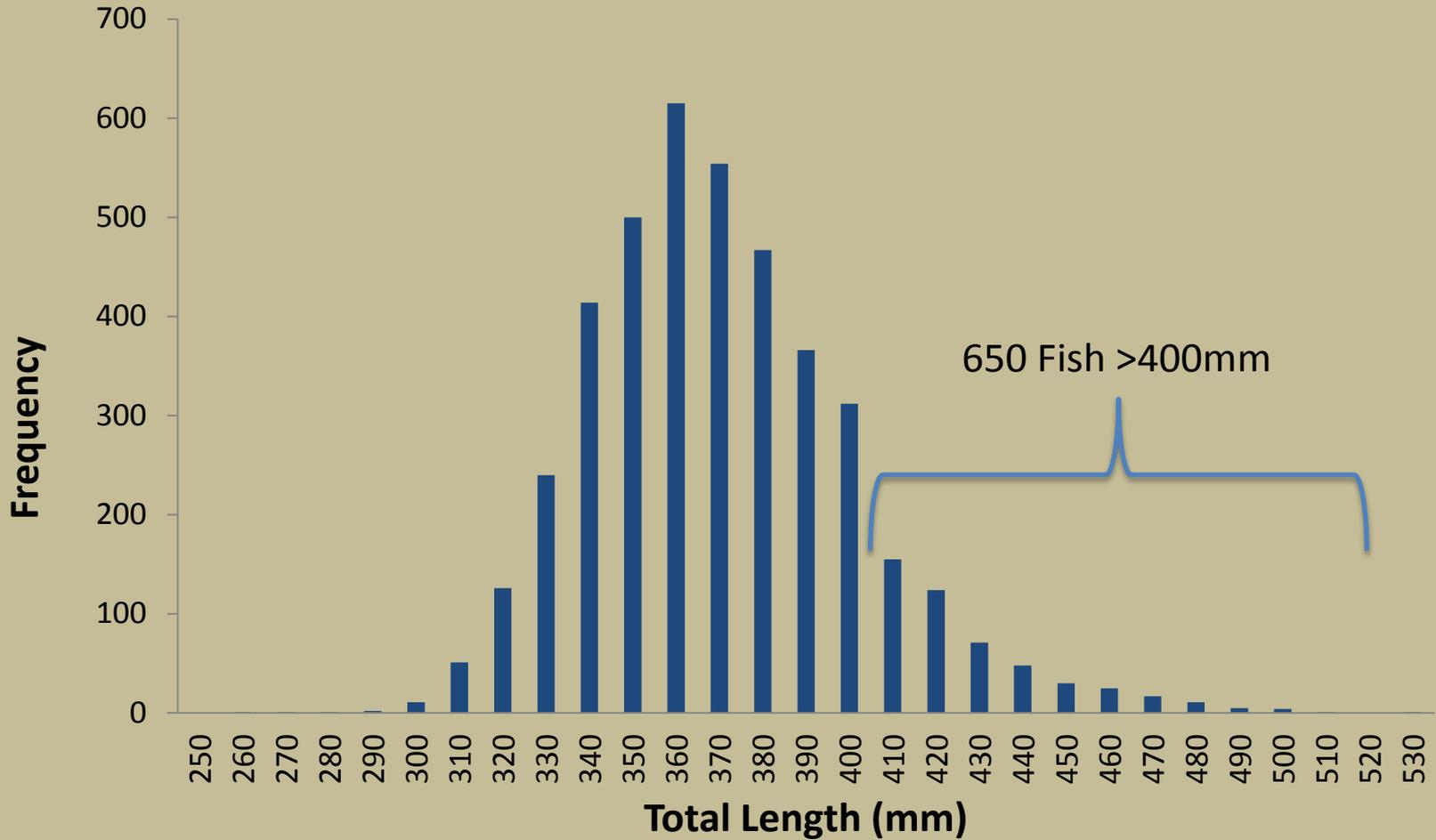
- Passive Harvest
 - Begins when 70% >300mm
 - Fyke nets
 - Sept 9-Oct 1, 2014
- Active Harvest
 - Harvest remaining fish
 - Oct 6-9, 2014



Results

Pond	Avg. Total Length (mm)	Number	Return Rate (%)
<i>Passive</i>			
West Avocet	364	917	30.5
East Avocet	352	779	25.9
Hidden	363	767	25.5
<i>Active</i>			
West Avocet	383	562	18.7
East Avocet	376	494	16.5
Hidden	380	636	21.2
<i>Total</i>			
West Avocet	373	1479	49.3
East Avocet	363	1479	49.3
Hidden	366	1273	42.4
	368	4155	46.2

Results

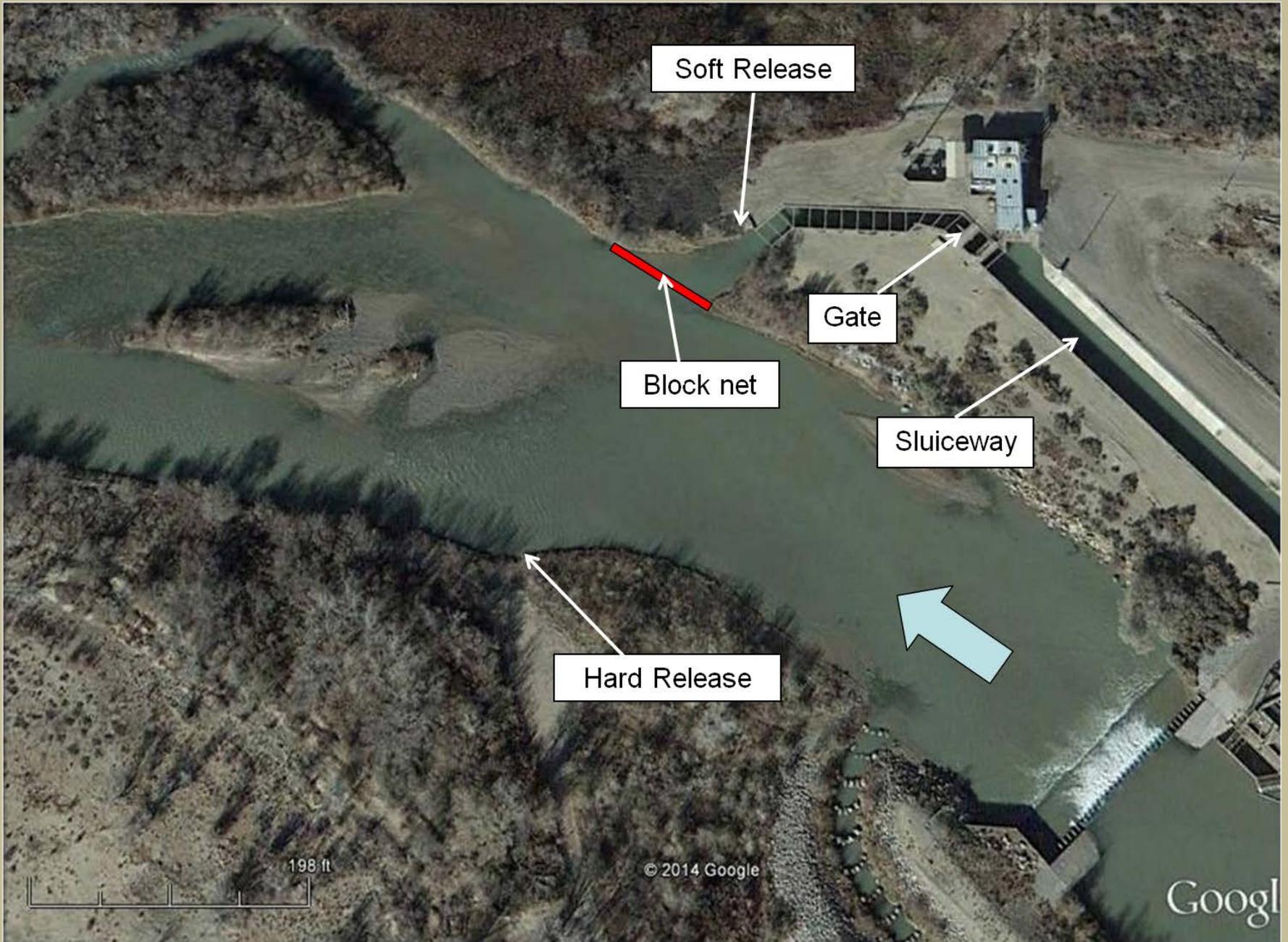


Reducing Confounding Factors

Site	River Mile	NAPI	Horse Thief
Bloomfield, NM	196.0	330	613
Berg Park (Animas)	1.0	563	622
PNM Weir	166.6	400	369
Montezuma Creek, UT	93.6	400	411

Hard vs. Soft Release

- Objective: Determine effect of hard and soft release on survival and dispersal of stocked RZBs
- Five stocking events in September
- Passively harvested fish from NAPI Ponds
- Paired (hard and soft) releases to reduce confounding factors



Soft Release

Gate

Block net

Sluiceway

Hard Release

198 ft

© 2014 Google

Google

Hard vs. Soft Release

Date	Pond	Soft	Hard	Total	Avg. TL
9/4	Hidden	139	139	278	352
9/9	Hidden	145	129	274	357
9/16	West Avocet	245	244	489	365
9/18	West Avocet	85	85	170	364
9/23	East/West	170	178	348	365
Total	All	784	775	1559	363

Evaluate PNM Barrier

- Objective: Evaluate PNM weir as a downstream barrier with paired hard releases
- Upstream stocking location at 1.7 RM from weir;
Downstream stocking location 0.1 RM from weir
- Reduce Downstream Dispersal?

Stocking Location	# of stockings	Total
Upstream	3	544
Downstream	2	360
Downstream (Hard vs. Soft)	5	775

Challenges

- Fish Health
 - Low level mortality occurred in June and July
 - SNARRC's Fish Health Lab was unable to diagnose the issue
- Draining Avocet Ponds
 - Consistent problem for a several years
 - Increased stress for fish and myself
 - Attempted to fix West Avocet in 2013
- Vegetation is always challenging



Conclusions

- Return rates were lower than expected
- Exceeded size goal with 99.99% >300 mm
- Large size (650 fish >400mm) increases survival and likely mitigates for stocking less fish
- 2015 Recommendations
 - Leave West Avocet fallow for 2015 to grade and scrape?
 - Reduce feeding rates
 - Continue to evaluate herbicide and alternative vegetation treatments

Acknowledgements

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