



Rocky Reach Reservoir White Sturgeon Supplementation: Telemetry and Management

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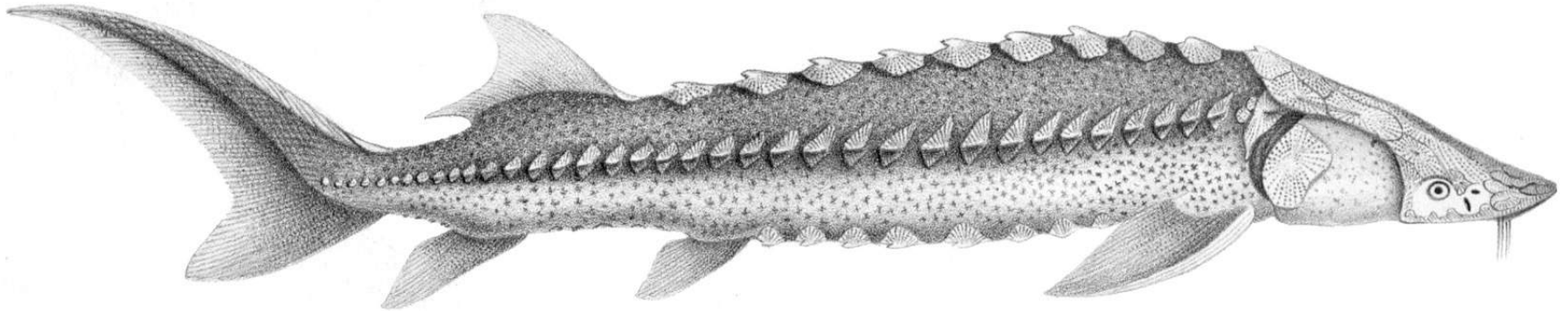
July 16, 2015



BLUE LEAF
ENVIRONMENTAL



White Sturgeon (*Acipenser transmontanus*)



Huët 1867

- Largest freshwater fish in North America
- Three main populations in the Sacramento, Columbia and Fraser Rivers.
- Historically was over exploited and populations fragmented by dams





Study Area



Pacific Northwest Reservoir System



0 80 Miles



Lower Columbia Basin

Middle Columbia Basin

Pacific Ocean

Rocky Reach Reservoir

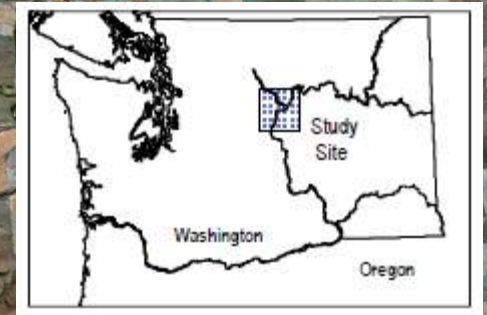
Wells Dam (850 MW)



- 67 km long from RKM 762 to 829
- Width ranges from 250 m to 1000 m
- Mean discharge 1,700 m³/s (60k cfs) to 5,100 m³/s (180 k cfs)



Rocky Reach Dam (1300 MW)





White Sturgeon Management Plan



- Remnant reservoir population estimated 75 individuals (CI 38-150)
- Need for supplementation identified and management plan adopted with overall goal of
 - ***“promoting white sturgeon population growth in the Rocky Reach Reservoir to a level that is commensurate with available habitat”***
- Supplementation program began in 2010
- Indexing and monitoring program began in 2012

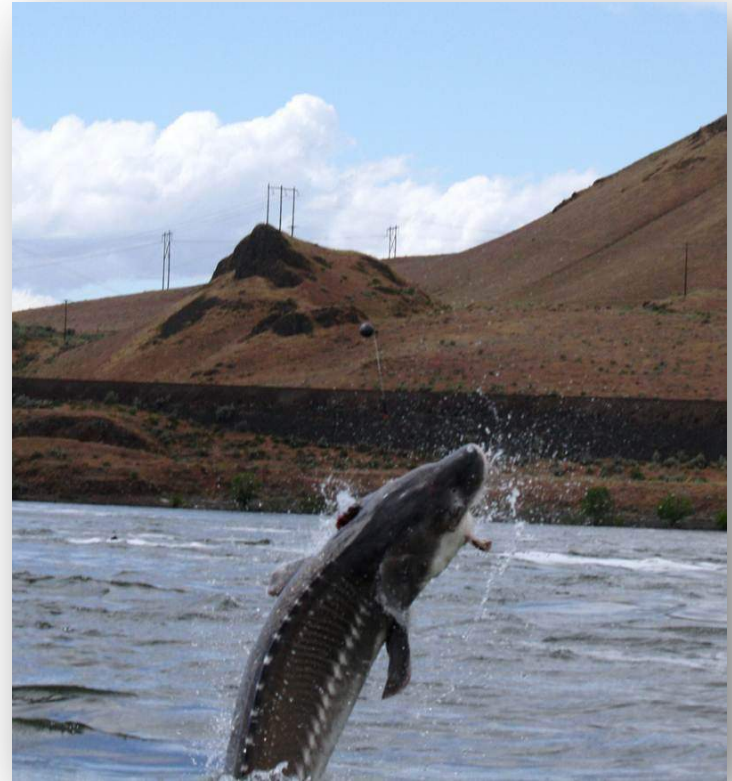
Telemetry Monitoring Program

Acoustic telemetry (2012 – 2015) of supplemented juvenile population to

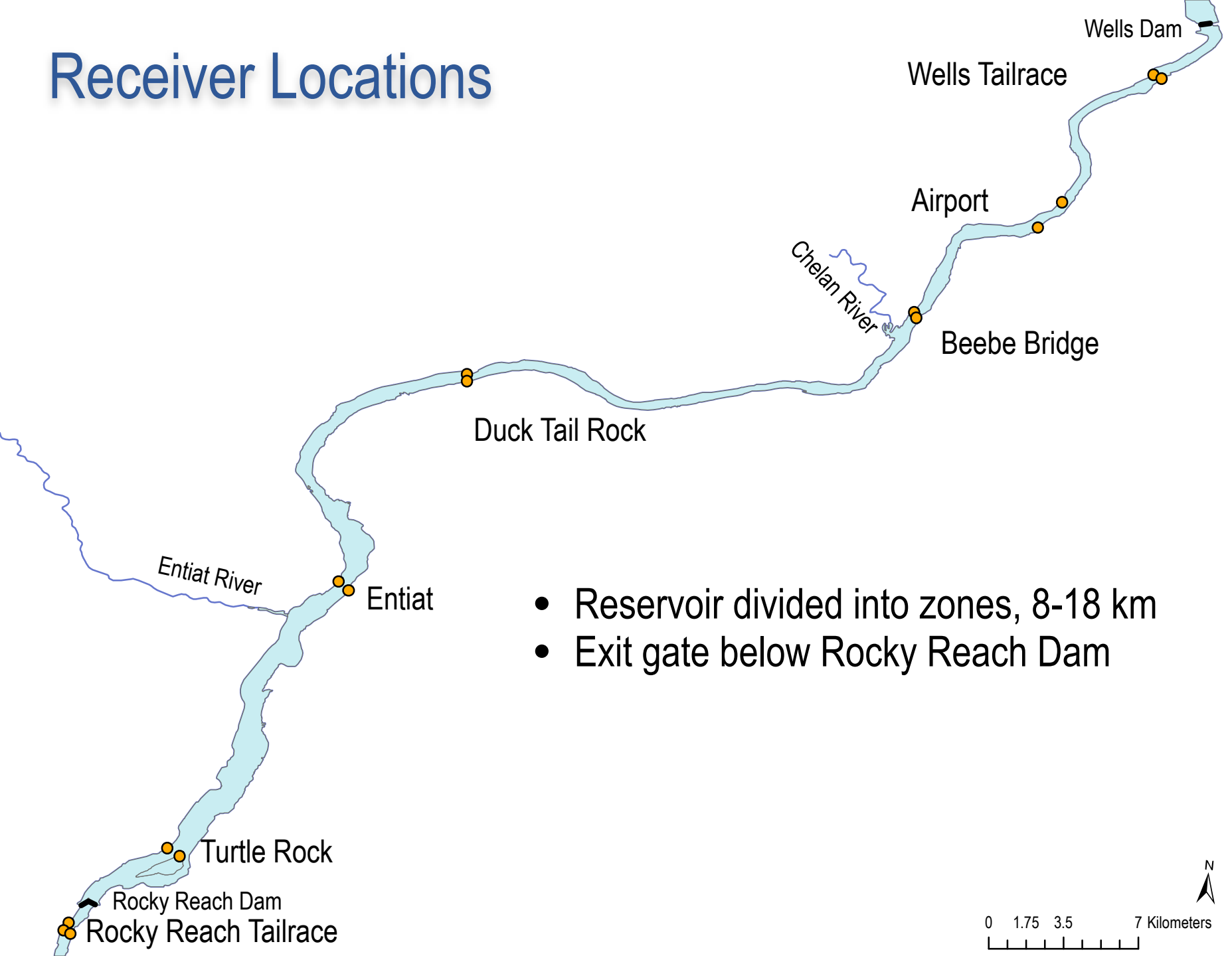
- Inform indexing effort (mark recapture: survival, growth)
- Determine emigration rates from the reservoir
- Investigate behavior and habitat use

Monitoring (2013-2015) of existing wild adult population to

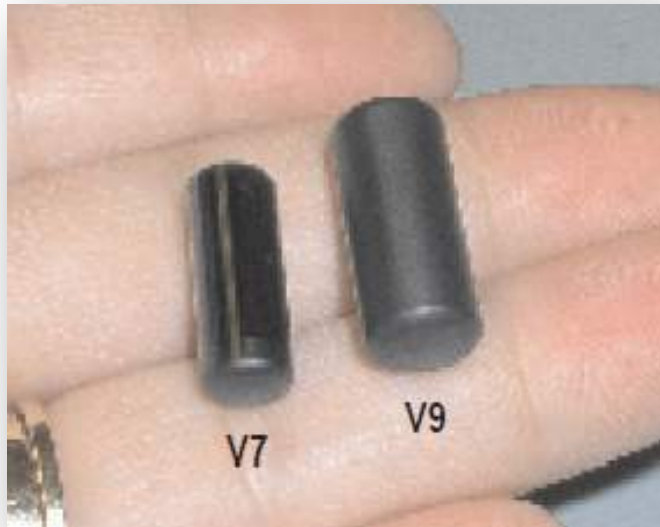
- Investigate spawning behavior
- Additional understanding of behavior and habitat use



Receiver Locations



Vemco Acoustic Tags



Tag Model	Number Released	Weight in Air (g)	Estimated Tag Life (d)
V7	30	1.6	185
V9	120	4.7	838
V9-P	15	6.4	581
V13	4	11	1,462

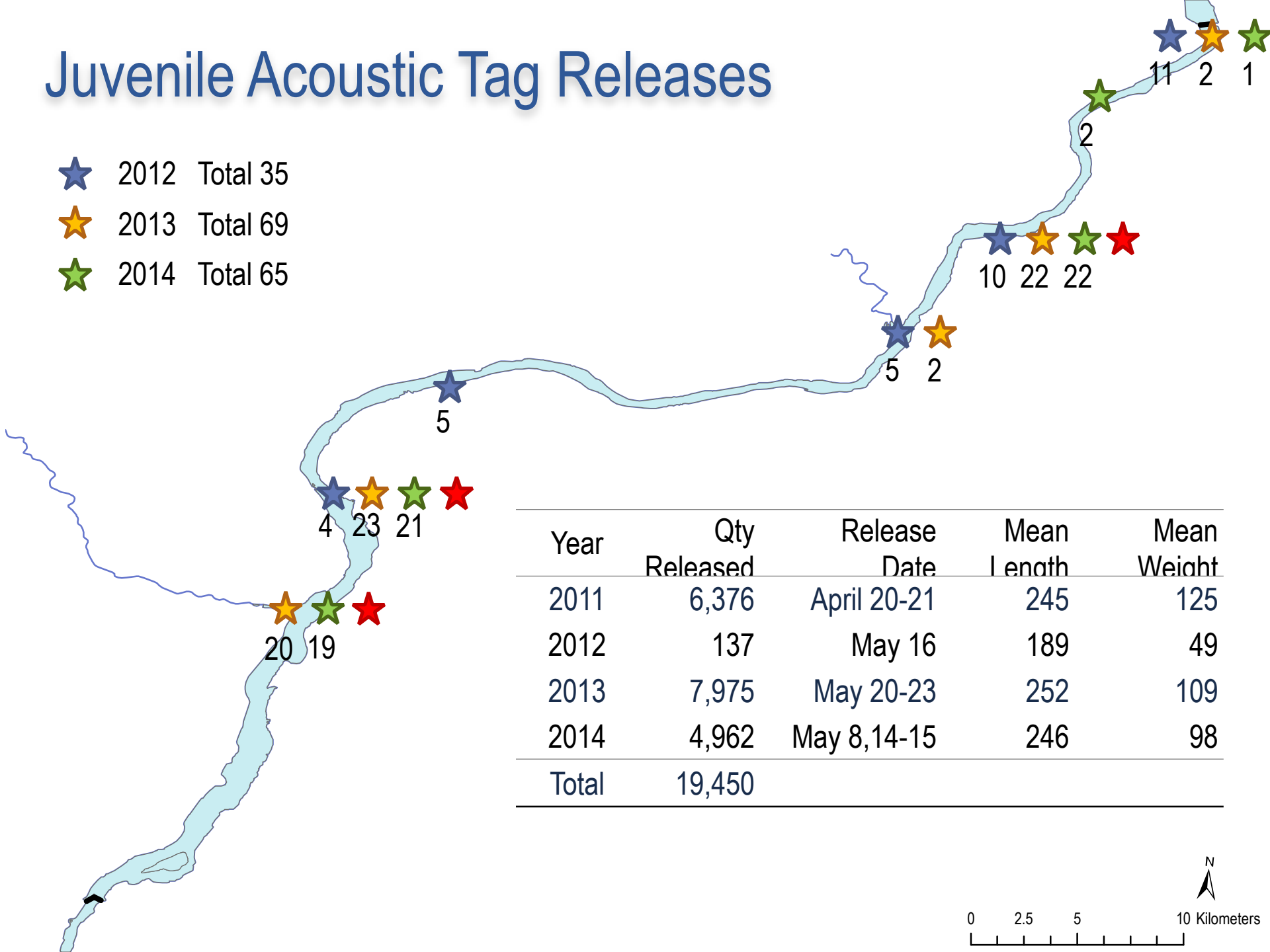


Tag \geq 1% of each year release group.

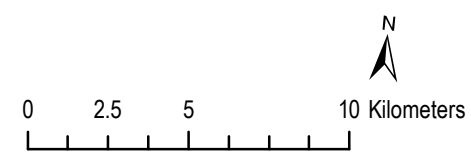
Year	Acoustic Tags Released
2012	35
2013	69
2014	65
Total	169

Juvenile Acoustic Tag Releases

- ★ 2012 Total 35
- ★ 2013 Total 69
- ★ 2014 Total 65

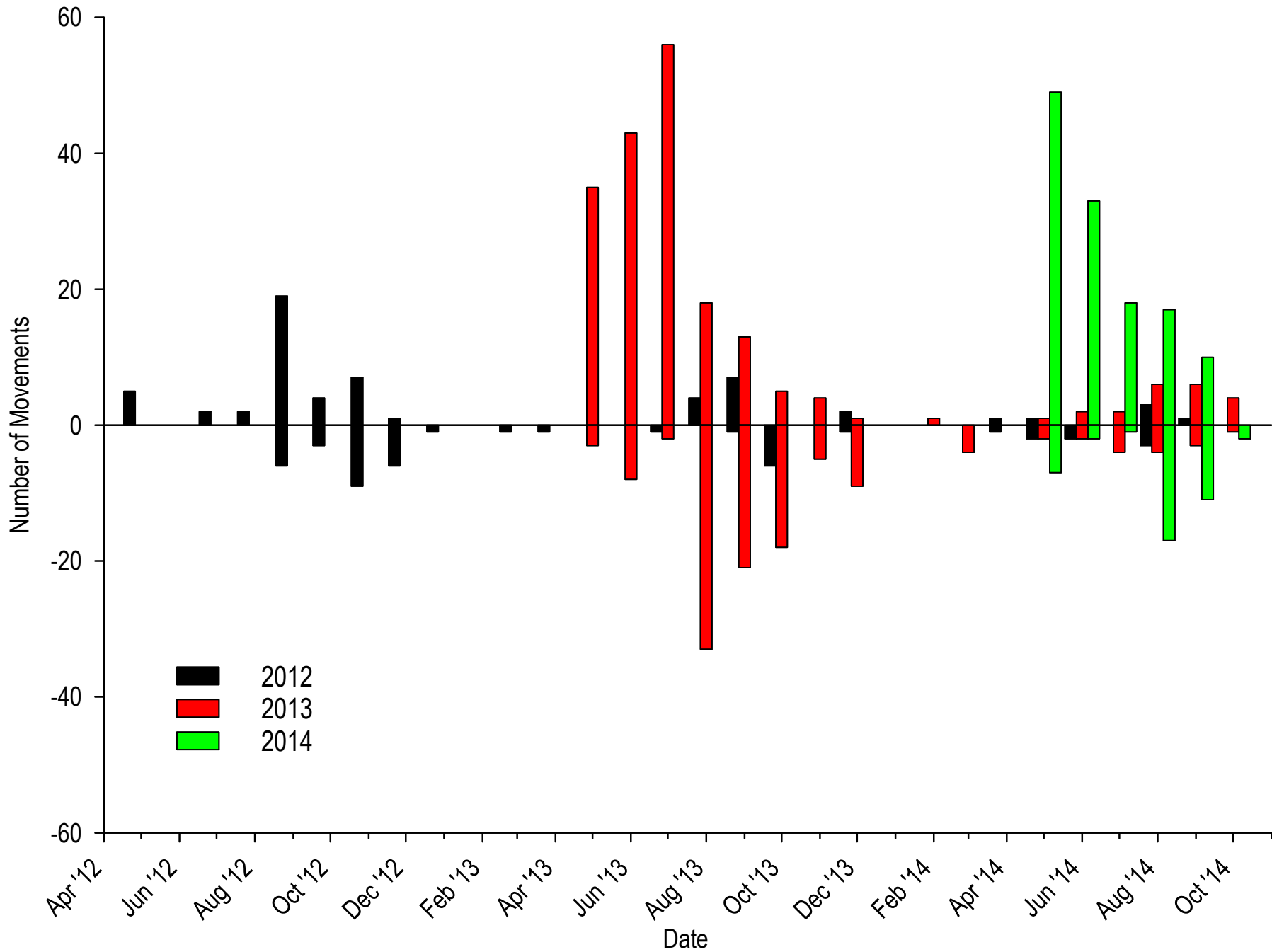


Year	Qty Released	Release Date	Mean Length	Mean Weight
2011	6,376	April 20-21	245	125
2012	137	May 16	189	49
2013	7,975	May 20-23	252	109
2014	4,962	May 8,14-15	246	98
Total	19,450			

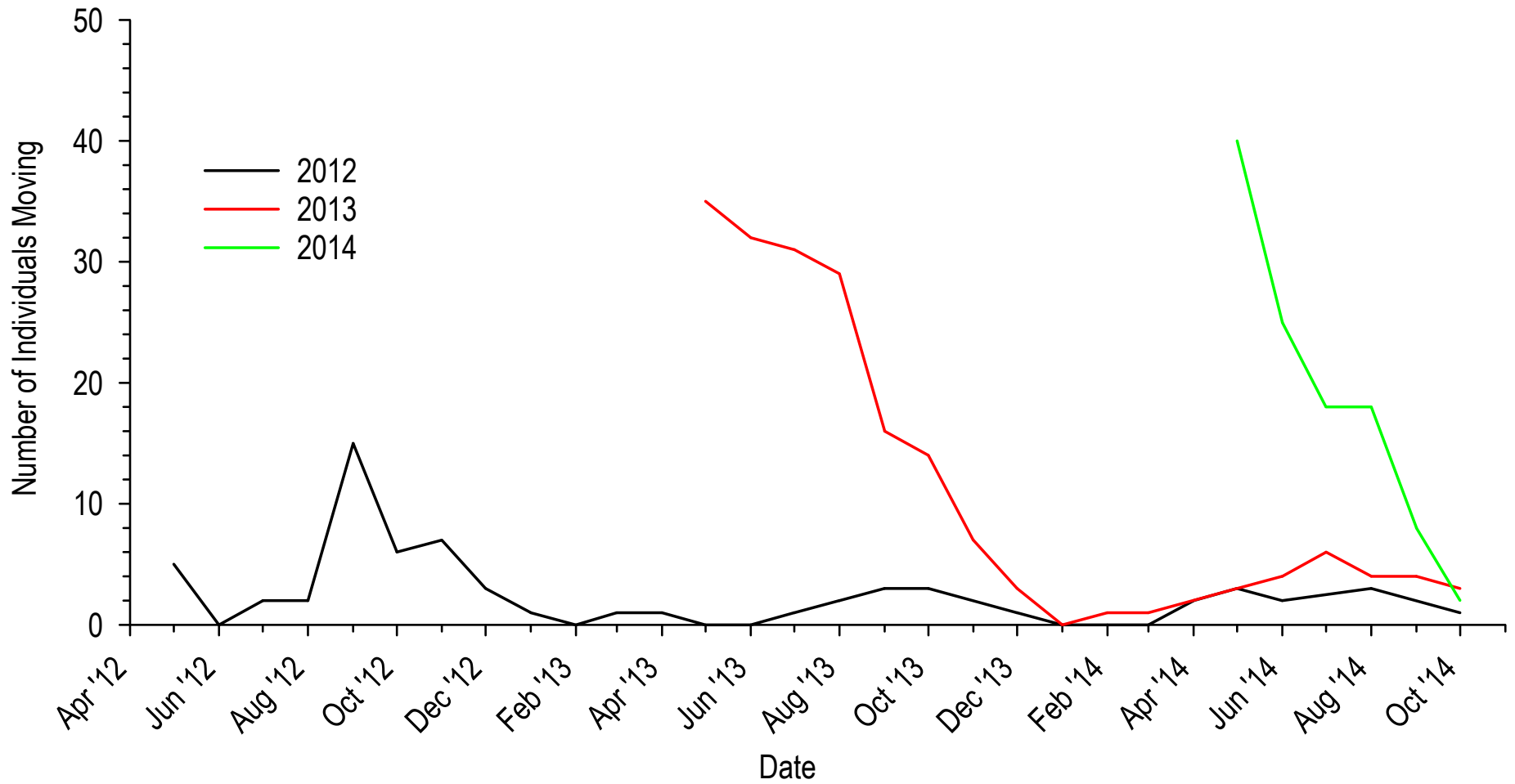


Acoustic Detections of Juveniles

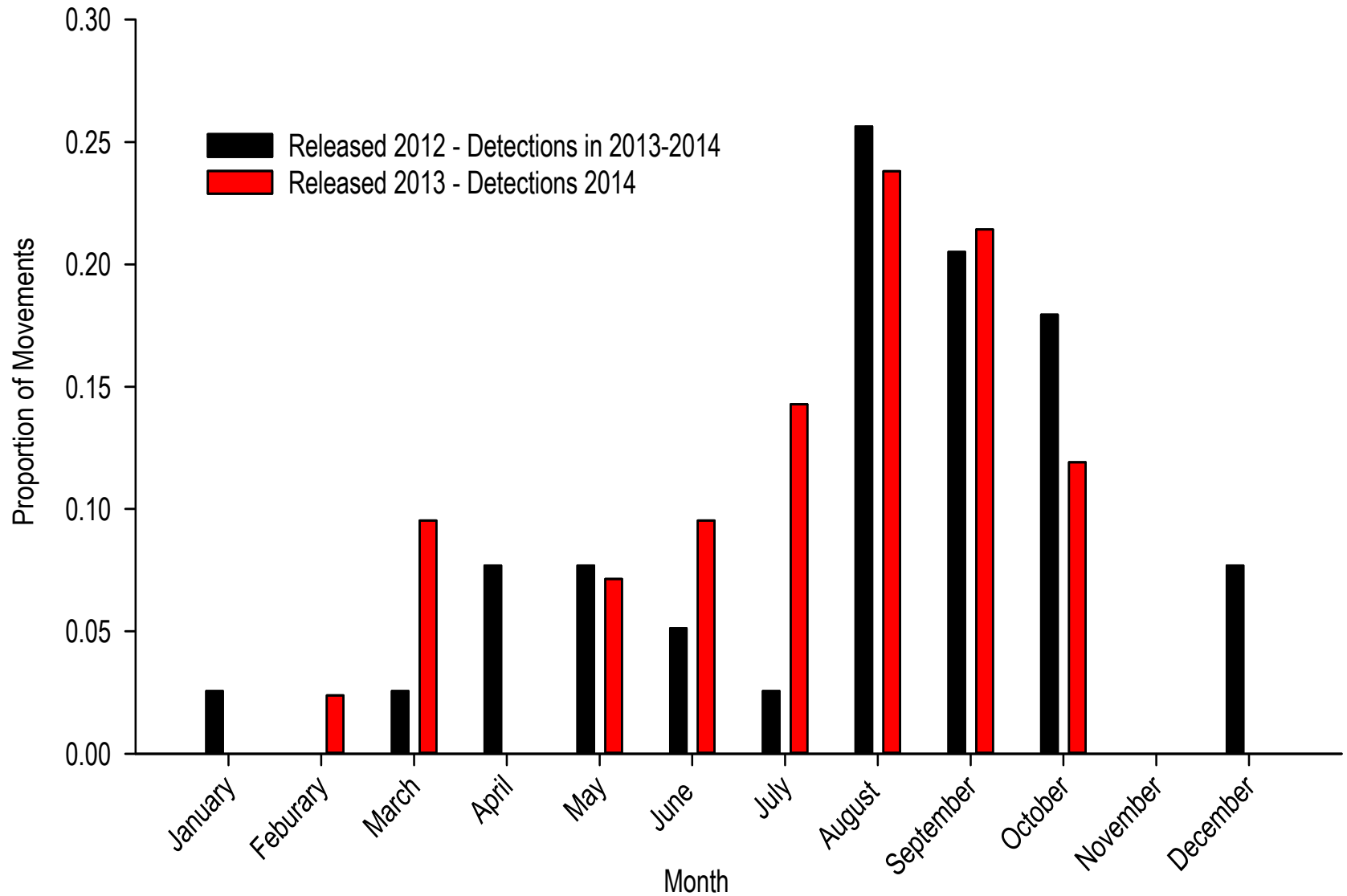
- 1,189,468 detections, 83% in top 18 km of the reservoir
- Largest number of individuals detected in upper reservoir
- Longest residence times near receivers in the upper reservoir
- Predominantly upstream movements with 63% released below Beebe bridge (bottom $\frac{3}{4}$ of reservoir) moved into upper 18 km of reservoir



Number of Sturgeon Moving Over Time

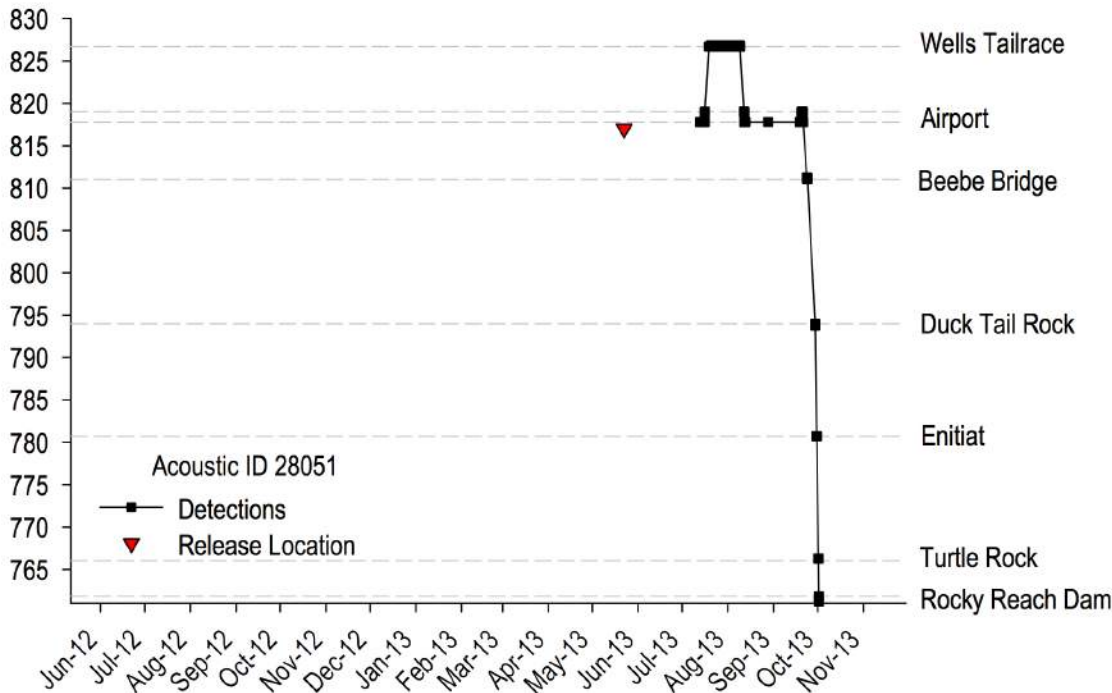


Seasonal Movements Post Year of Release

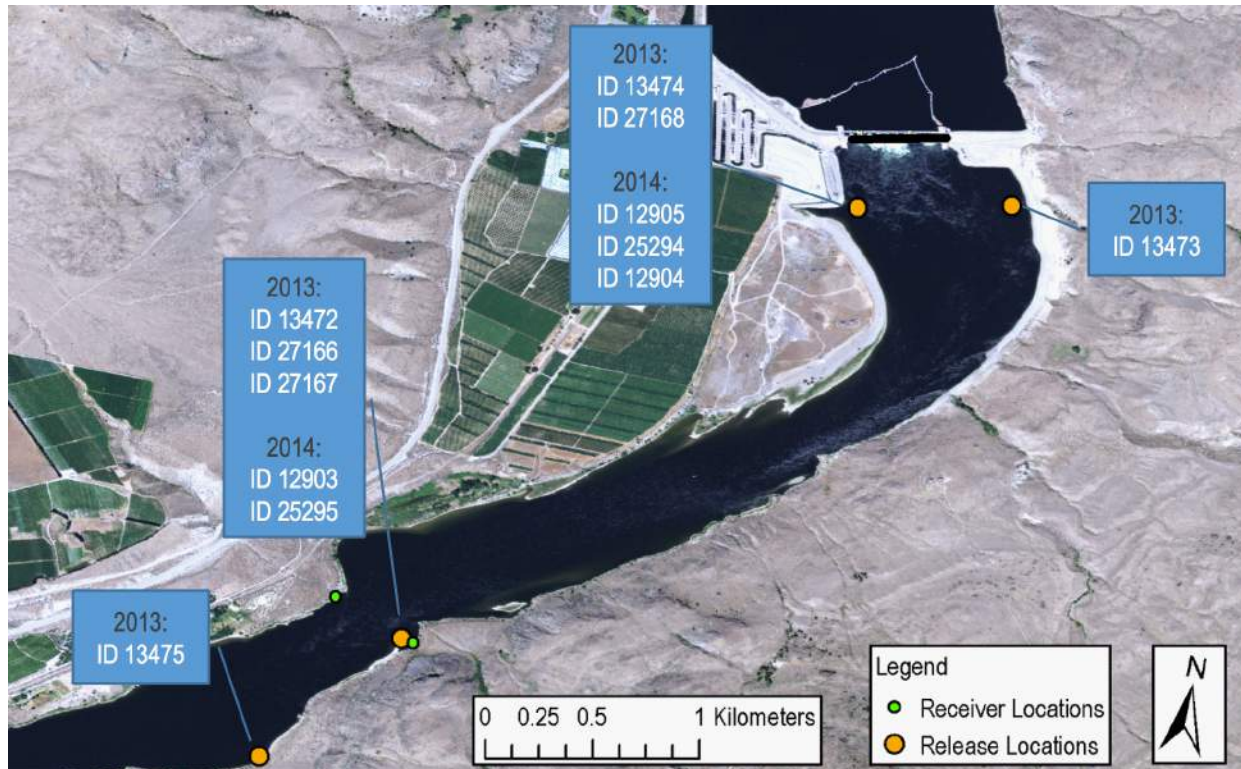


Emigration

Year	Tags Detected Below Rocky	Acoustic Tags	Percent Emigration
2012	2	35	5.7%
2013	4	69	5.8%
2014	2	65	3.1%
Total	8	169	4.7%



Adult Tagging

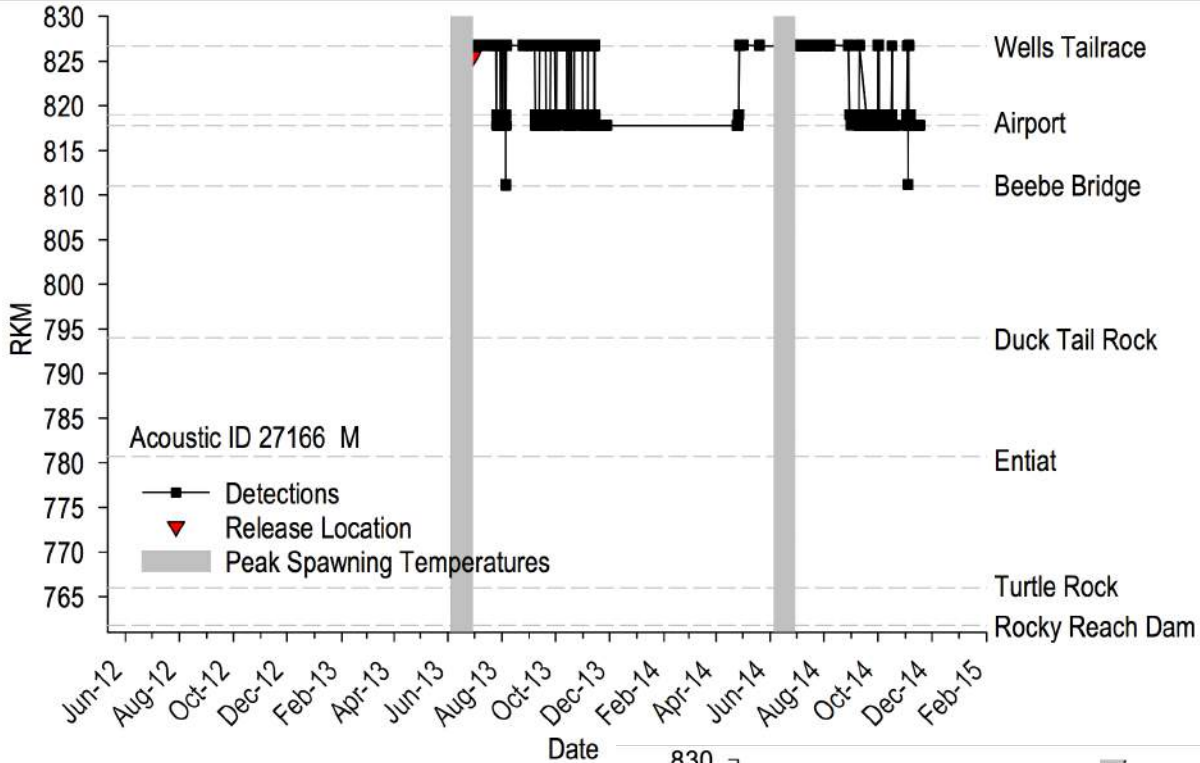


- 4 days of fishing in 2013 and 2014
- Captured and tagged 7 adult sturgeon in 2013, 5 in 2014
- V16 tags

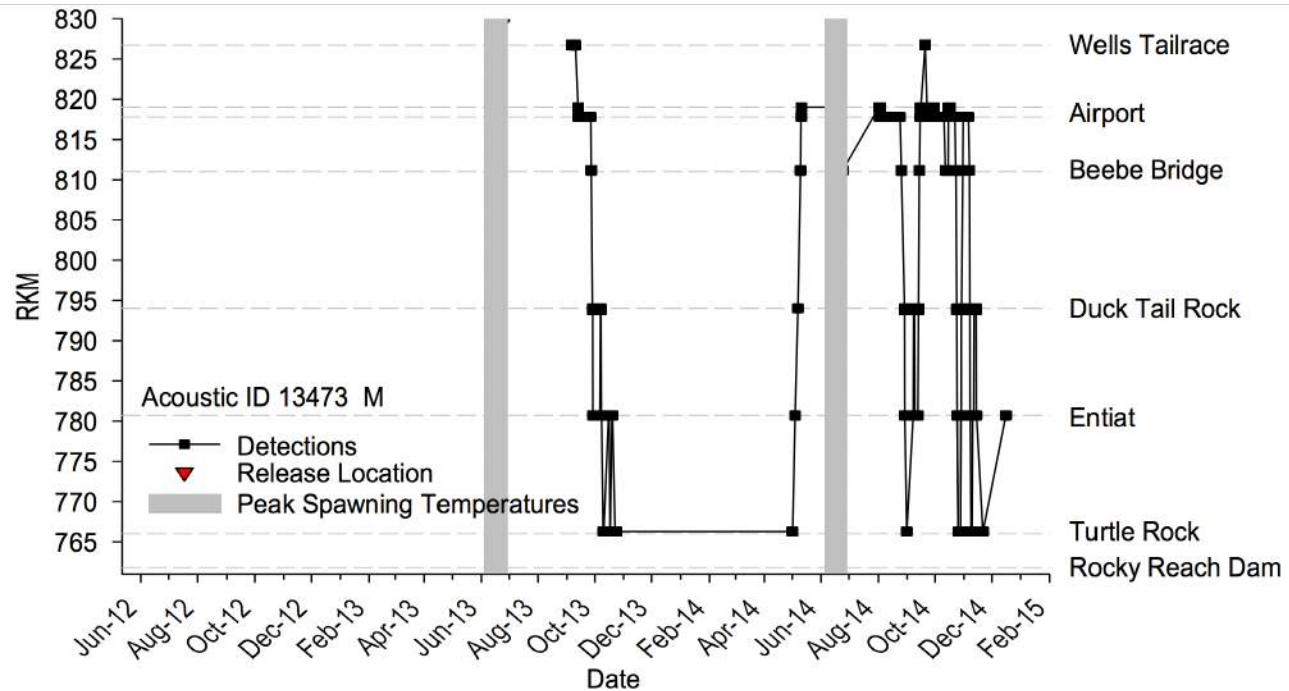
Adult Movements Between Detection Arrays

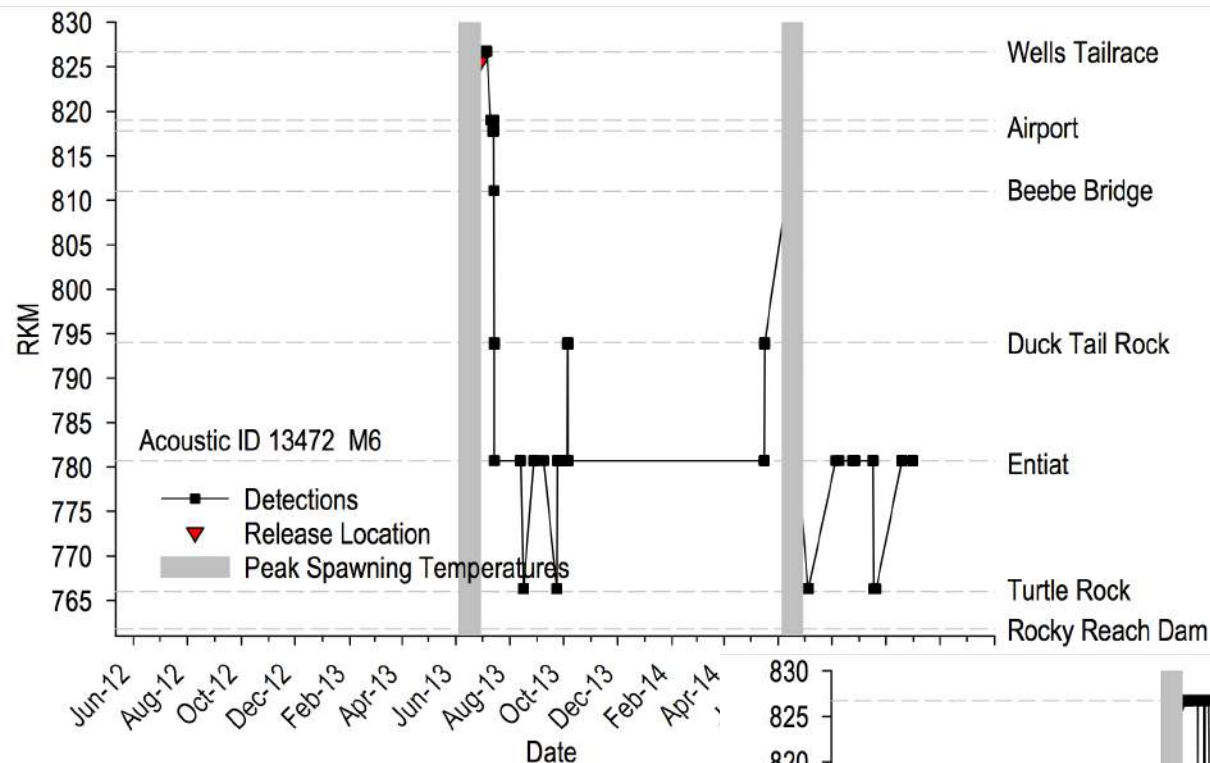
- Mean of 9 upstream and 12 downstream
- Mean km of movement 228 (range = 11 - 688 km)



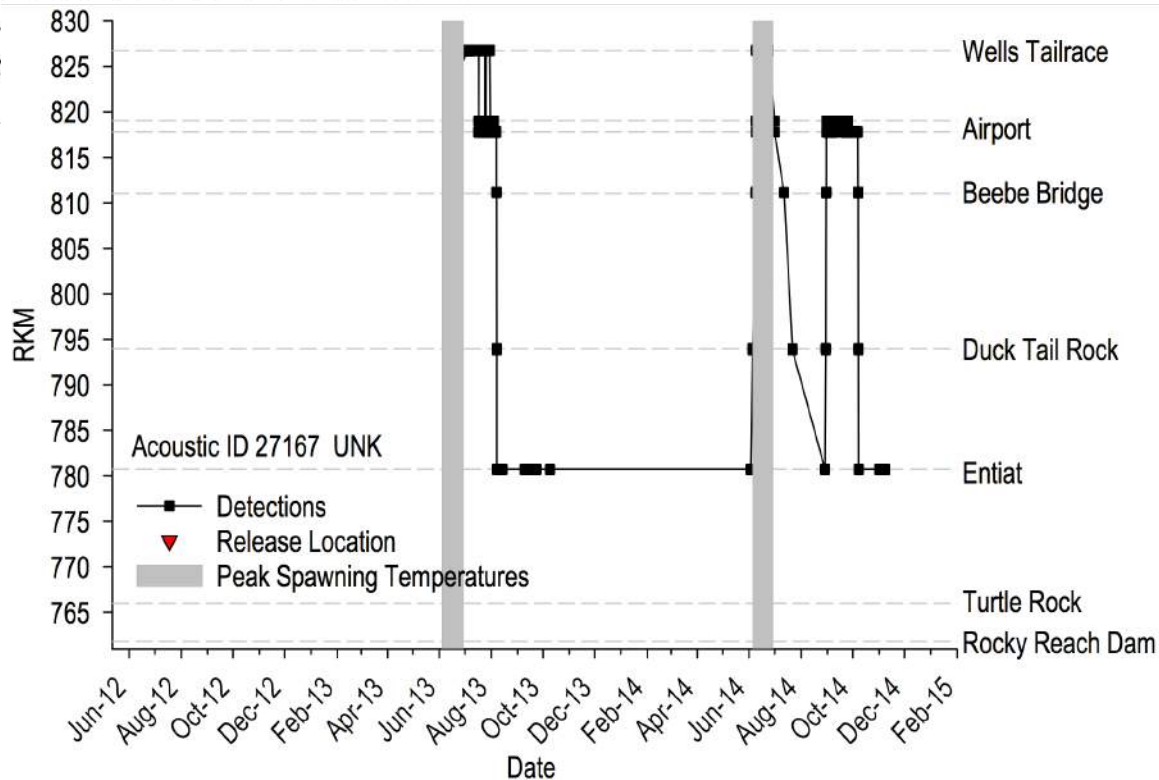


- 5 overwintered in upper reservoir and 7 in the lower reservoir near the Entiat River
- Seem to be two distinct populations



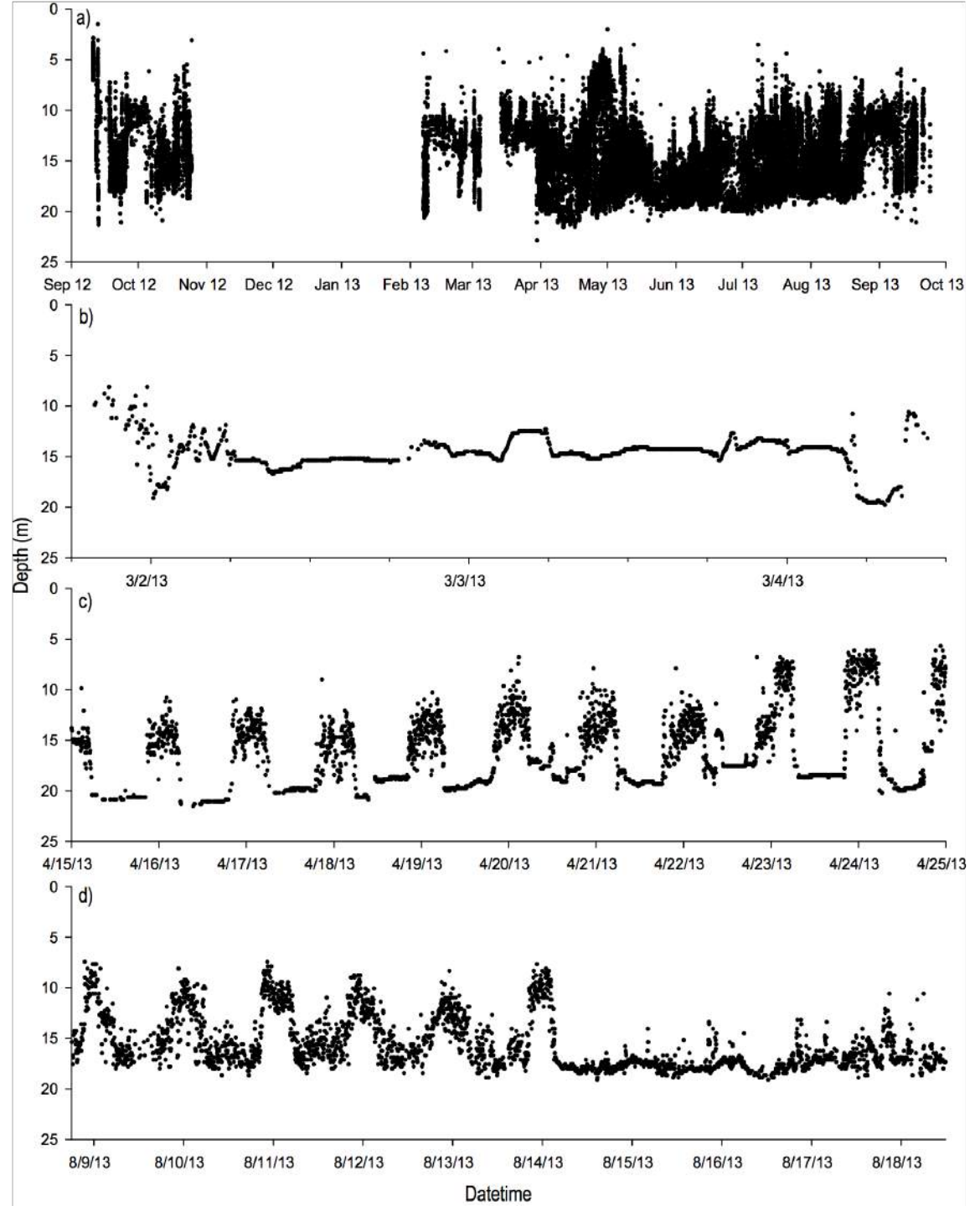


- 3 males returned to upper reservoir during peak temperatures

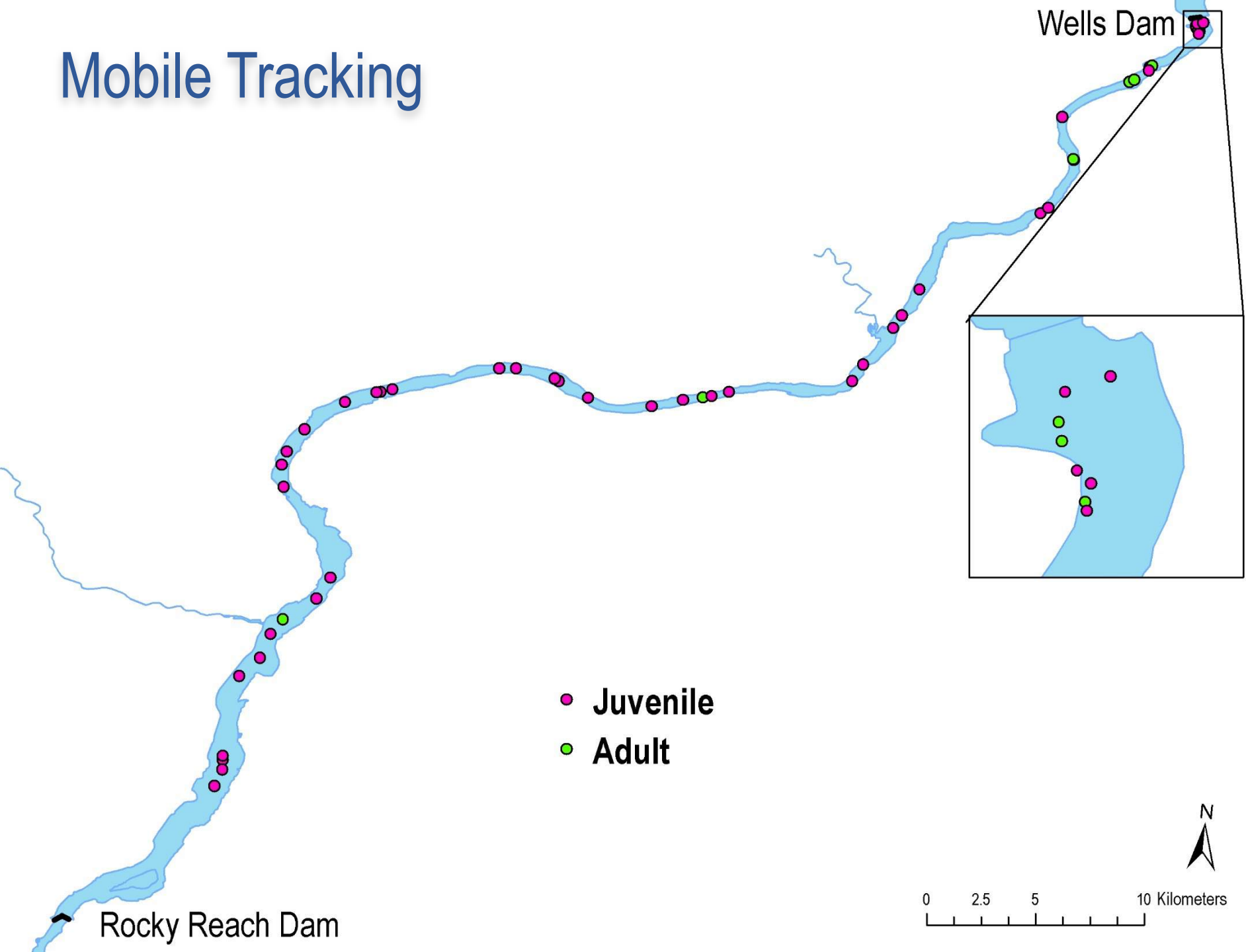


Depth Data

- Mean = 17.8 m
- Individual means ranged from 9.1 m to 29.5 m
- Diel and season patterns of movement



Mobile Tracking



Conclusions

- Low emigration from reservoir of acoustically tagged individuals to date
- The majority of juvenile movements are into to upper reservoir though juveniles move less over time (settle)
- Adults move substantial distances in some cases making multiple transects of the reservoir
- Two adult subpopulations: Entiat overwintering (large movements) and upper reservoir overwintering (small movements), attempted spawning likely to be in tailrace

What's next?

Acknowledgments:



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