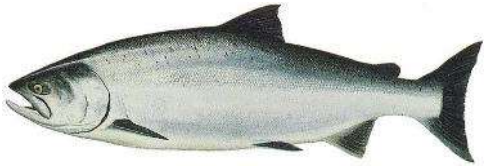
Telemetry studies of adult Chinook salmon and white sturgeon in the Yolo Bypass

Myfanwy E. Johnston, Ted Sommer, A. Peter Klimley, Jared Frantzich, Zoltan Matica

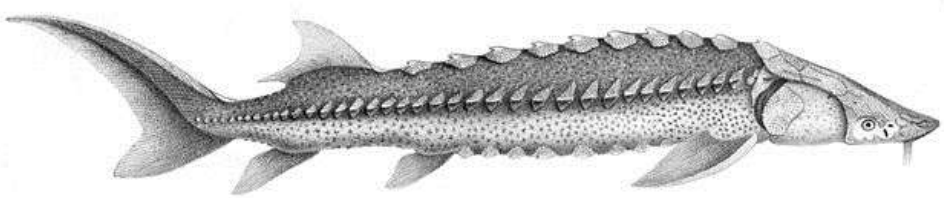


The Yolo Bypass

Migratory fishes of the Yolo Bypass

White sturgeon

Acispenser transmontanus



Chinook salmon

Oncorhynchus tshawytscha

Iteroparous

Sacramento splittail

Pogonichthys macrolepidotus

Return every 2-6 years

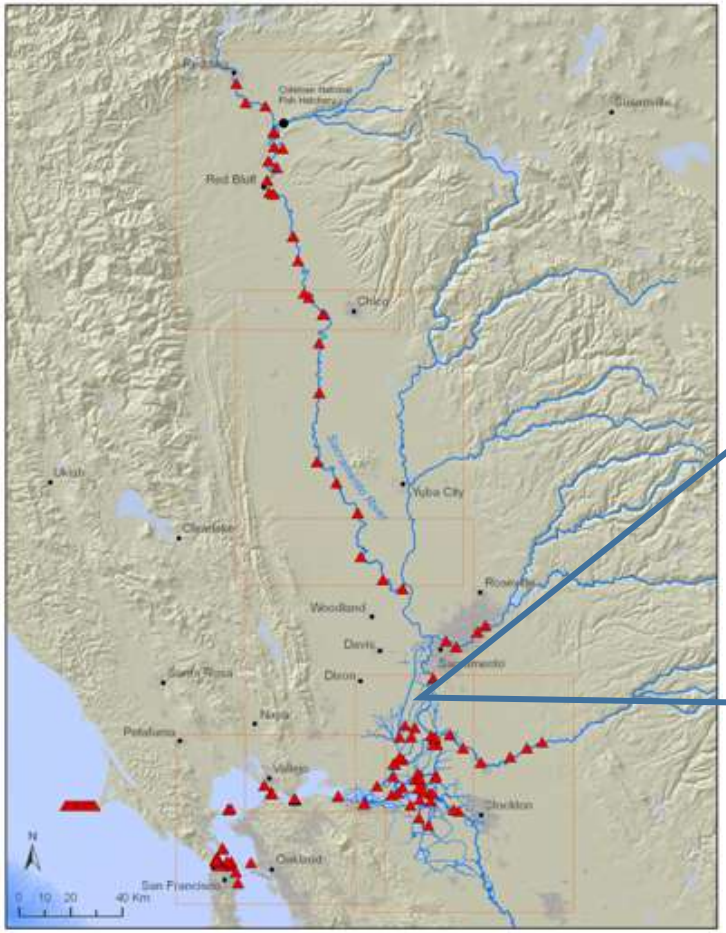
Semelparous

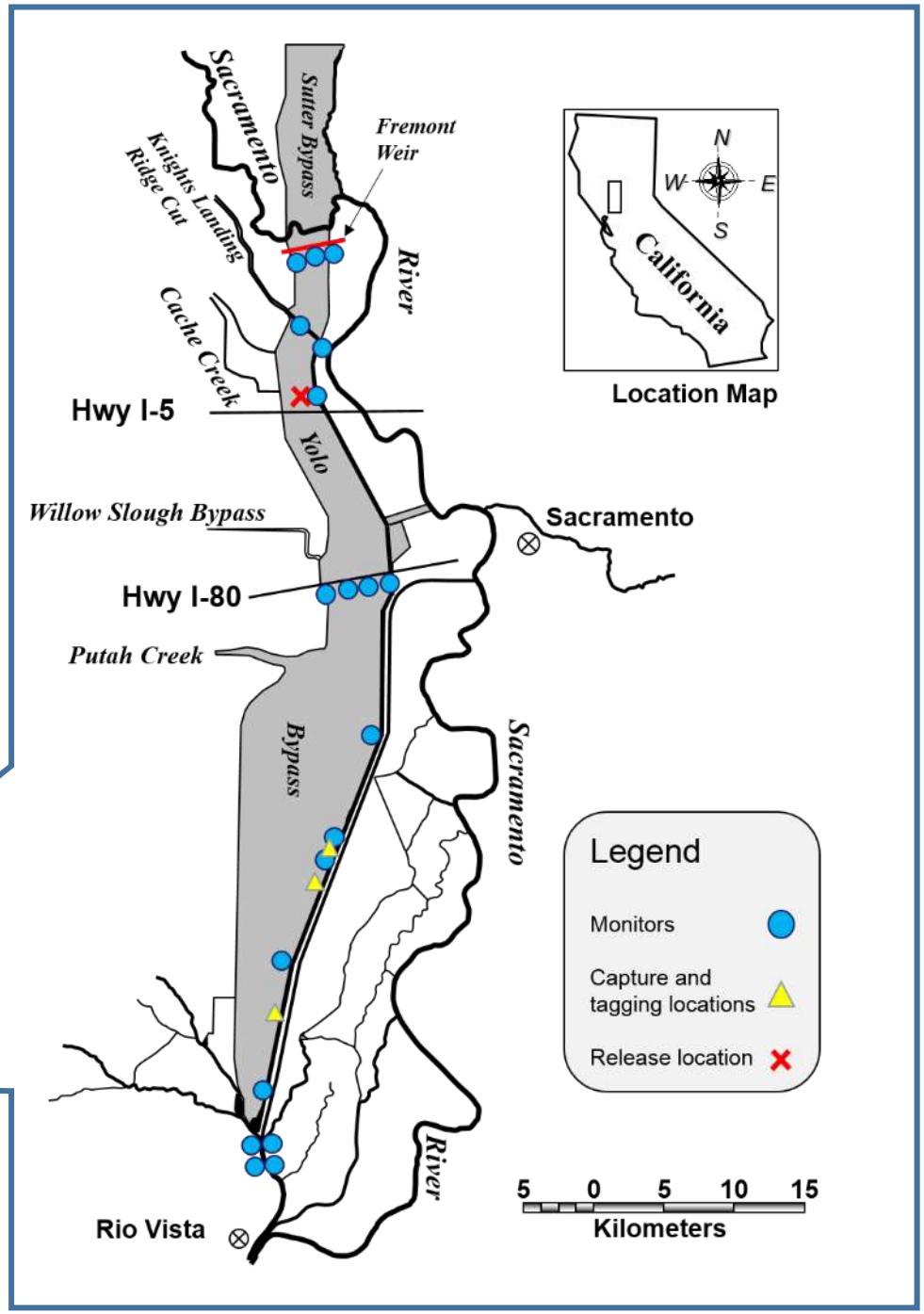
Sacramento pikeminnow

Ptychocheilus grandis

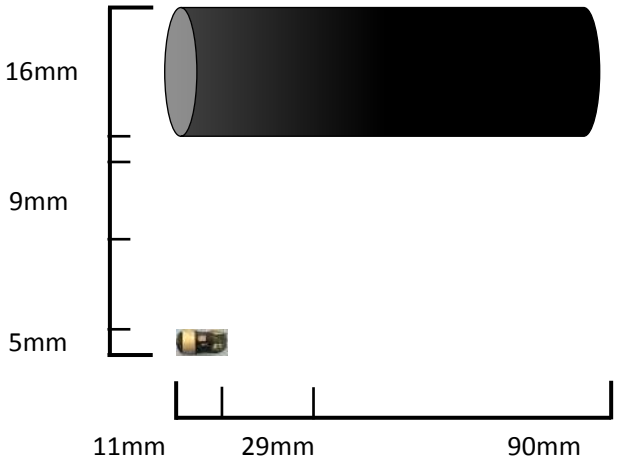
Return in 2-5 years

Acoustic telemetry methods: the receiver array(s)





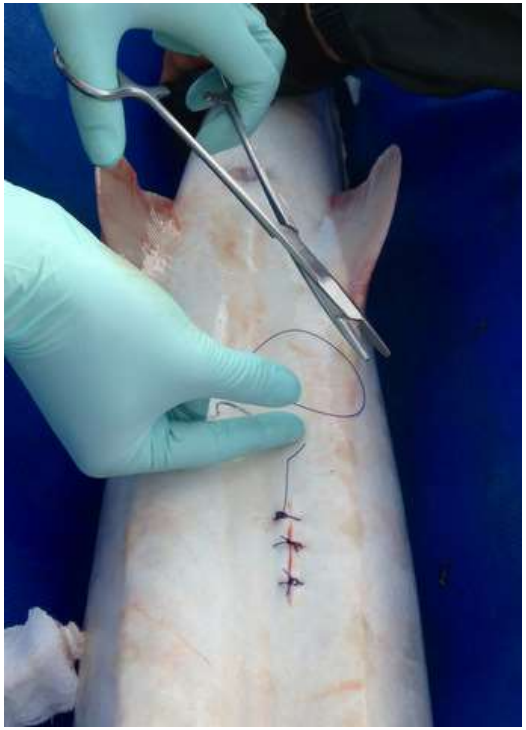
Tagging methods

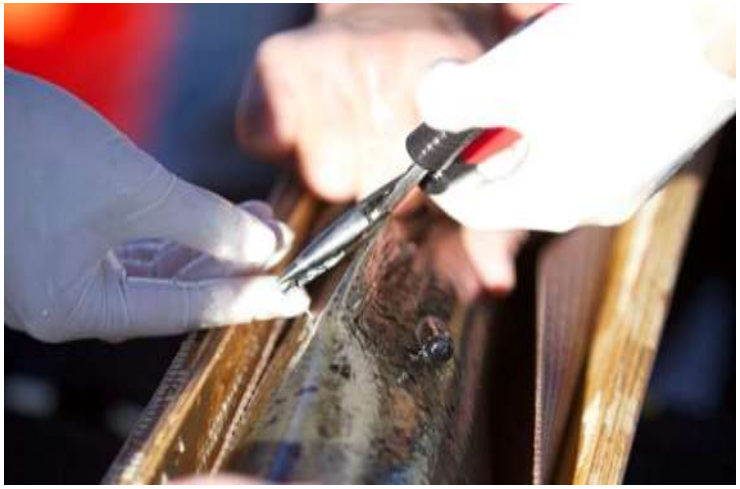


V16 (sturgeon)

V9 (adult salmon)

V5 (juvenile salmon)

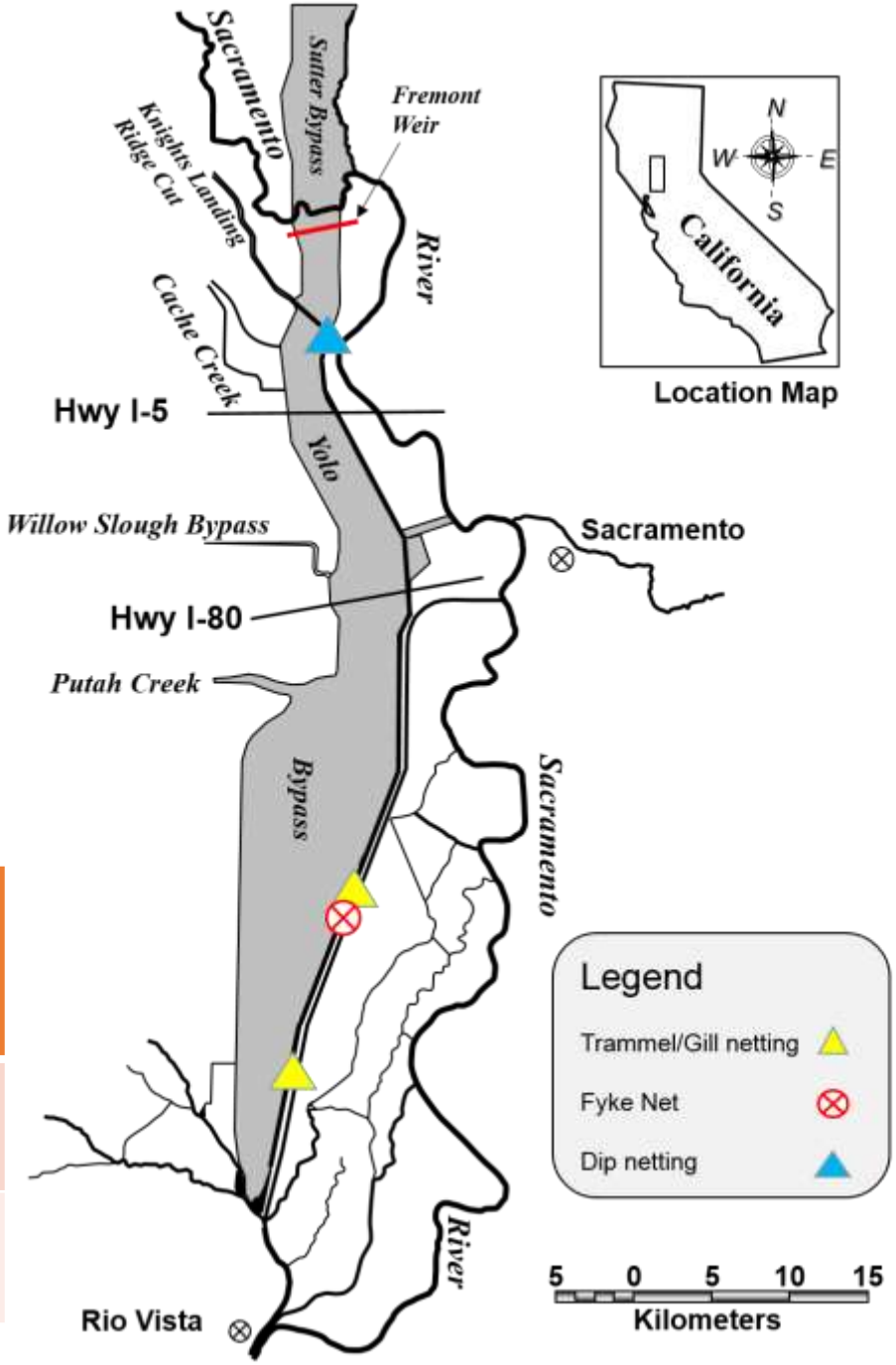




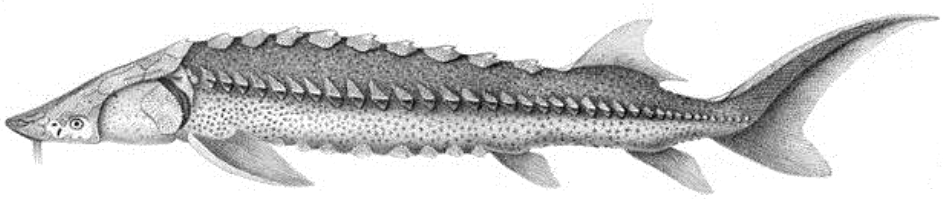
Tagging Locations

Year	Fyke Net ⊗
2012	67
2014	25

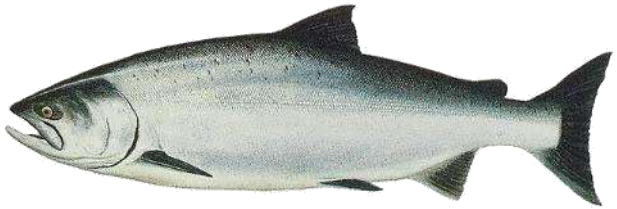
Year	Fyke Net ⊗	Lisbon Weir △	BRSTR △	Wallace Weir ▲
2012	5	2	0	5
2013	11	4	37	0



Tagging Summary

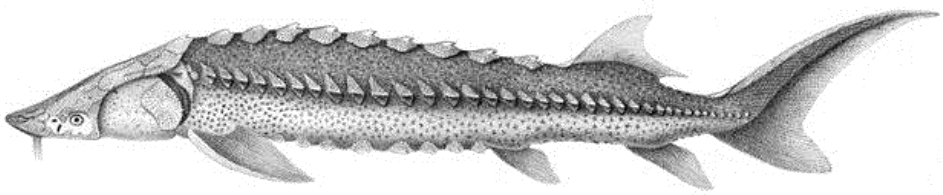


2012	2014	Total	Total Detected
67	25	92	92

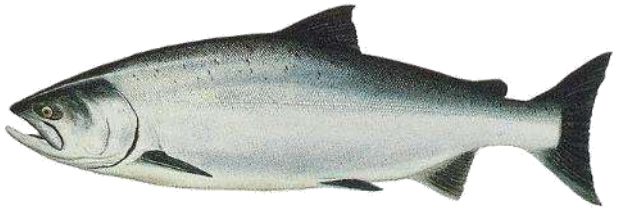


2012	2013	Total	Total Detected
12	52	64	63

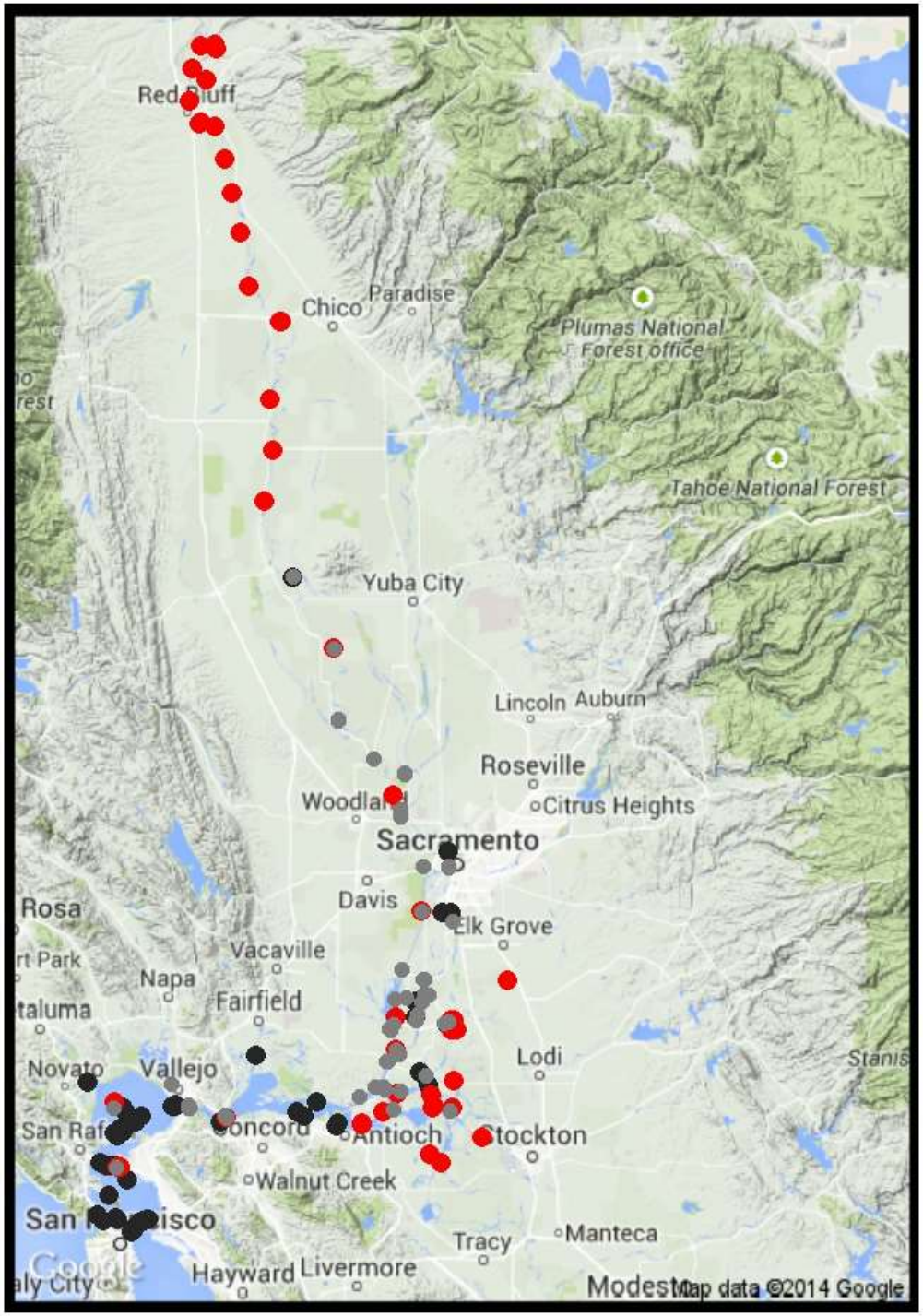
Tagging Summary



Females	Males	Unknown	Total
5	65	22	92



Females	Males	Unknown	Total
32	26	6	64

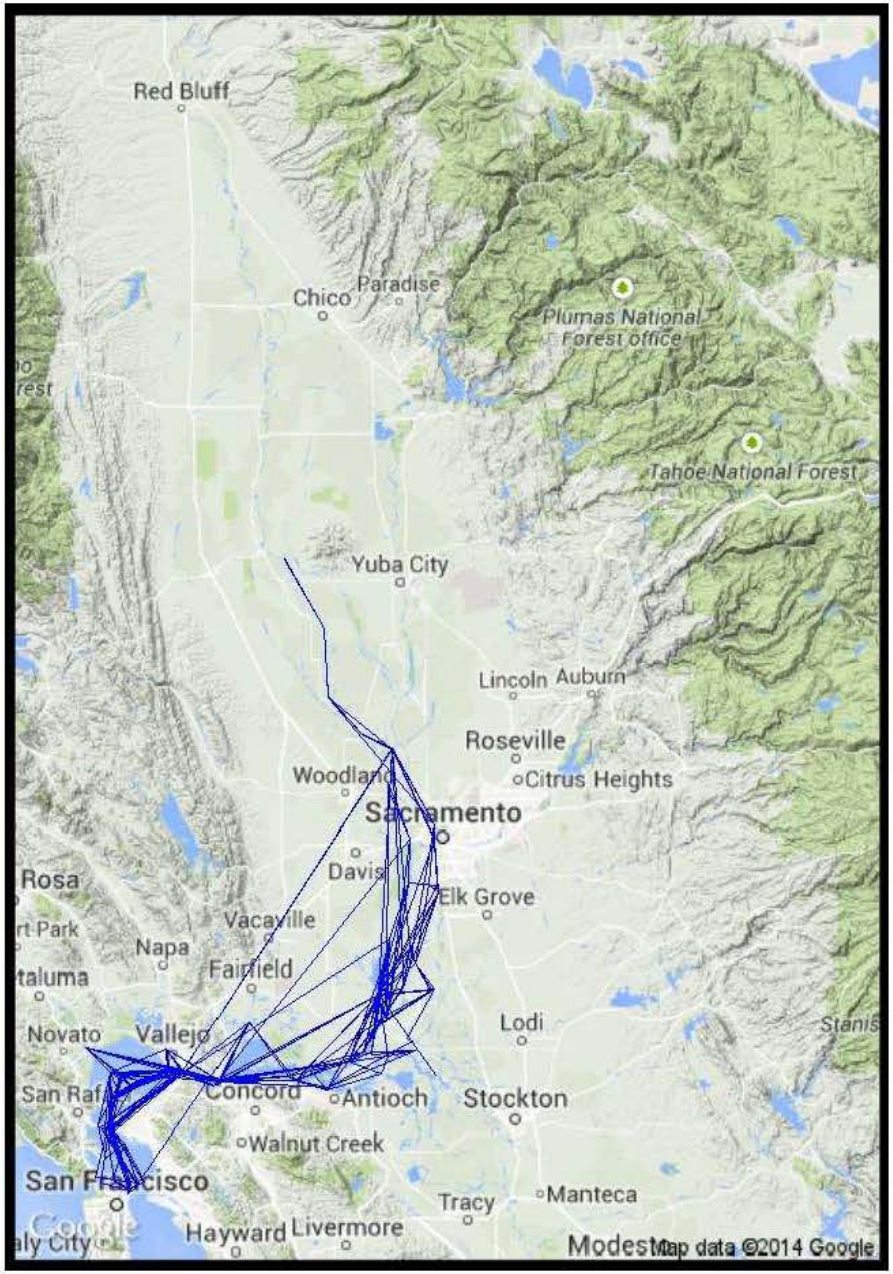


White sturgeon

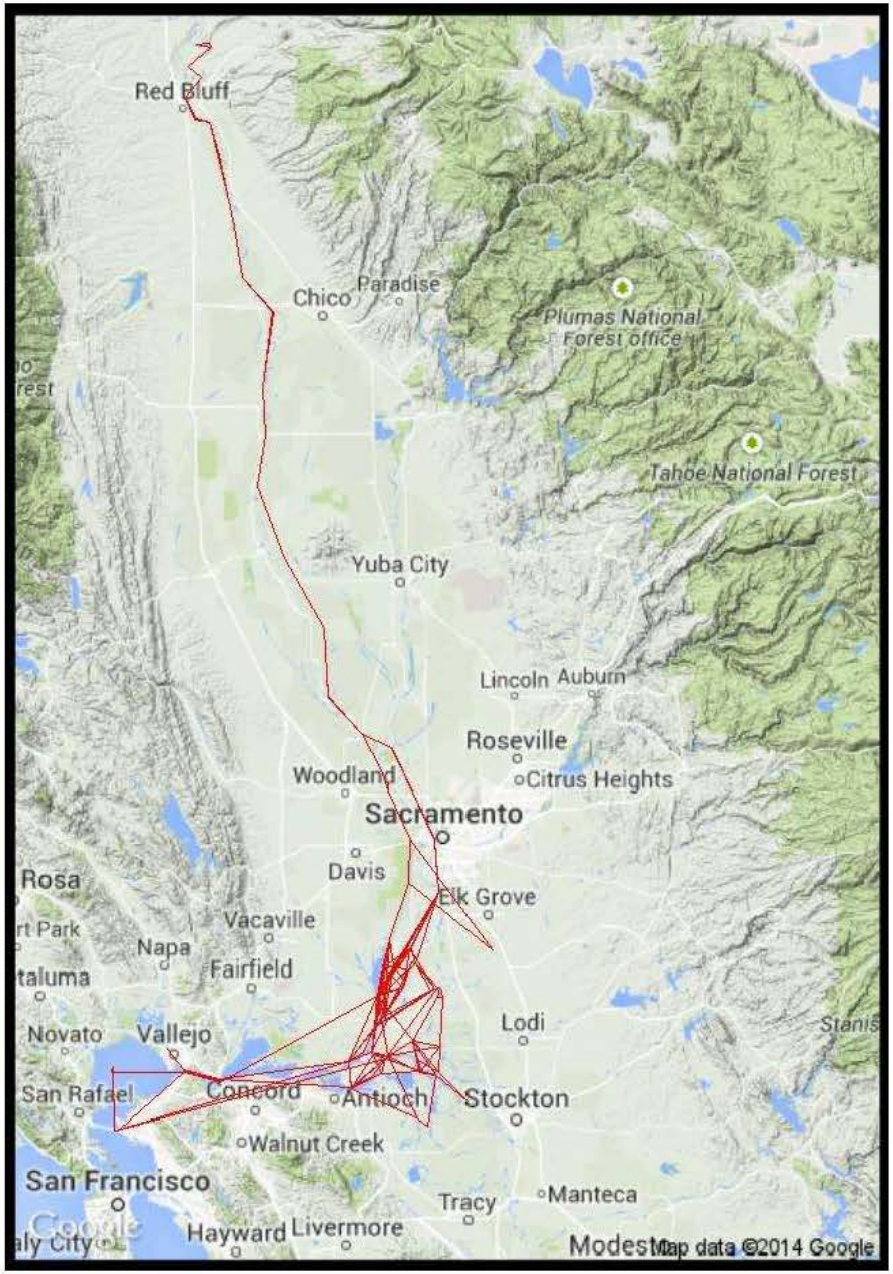
Chinook salmon

Both

White sturgeon (2012-2014)

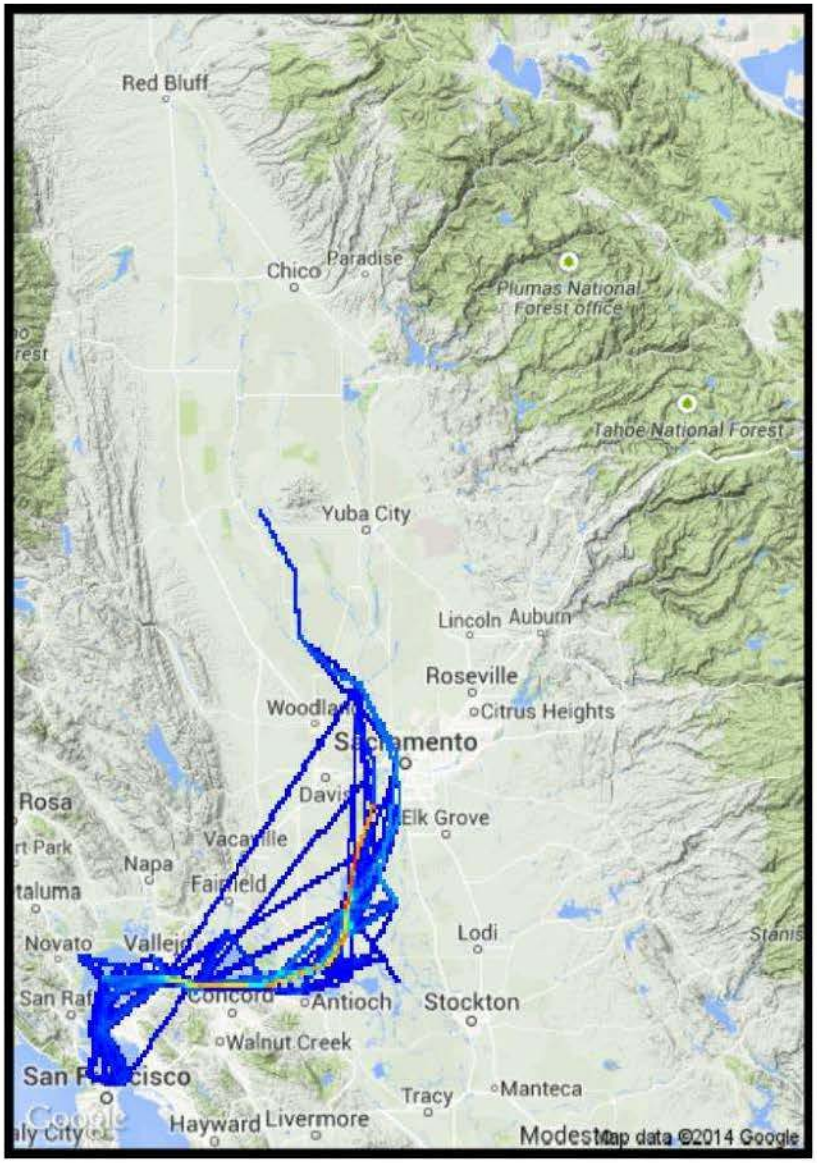


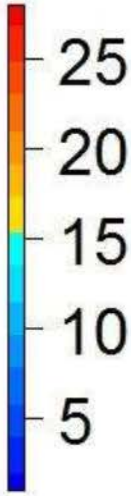
Chinook salmon (2012-2013)



White sturgeon (2012-2014)

Chinook salmon (2012-2013)





Chinook salmon

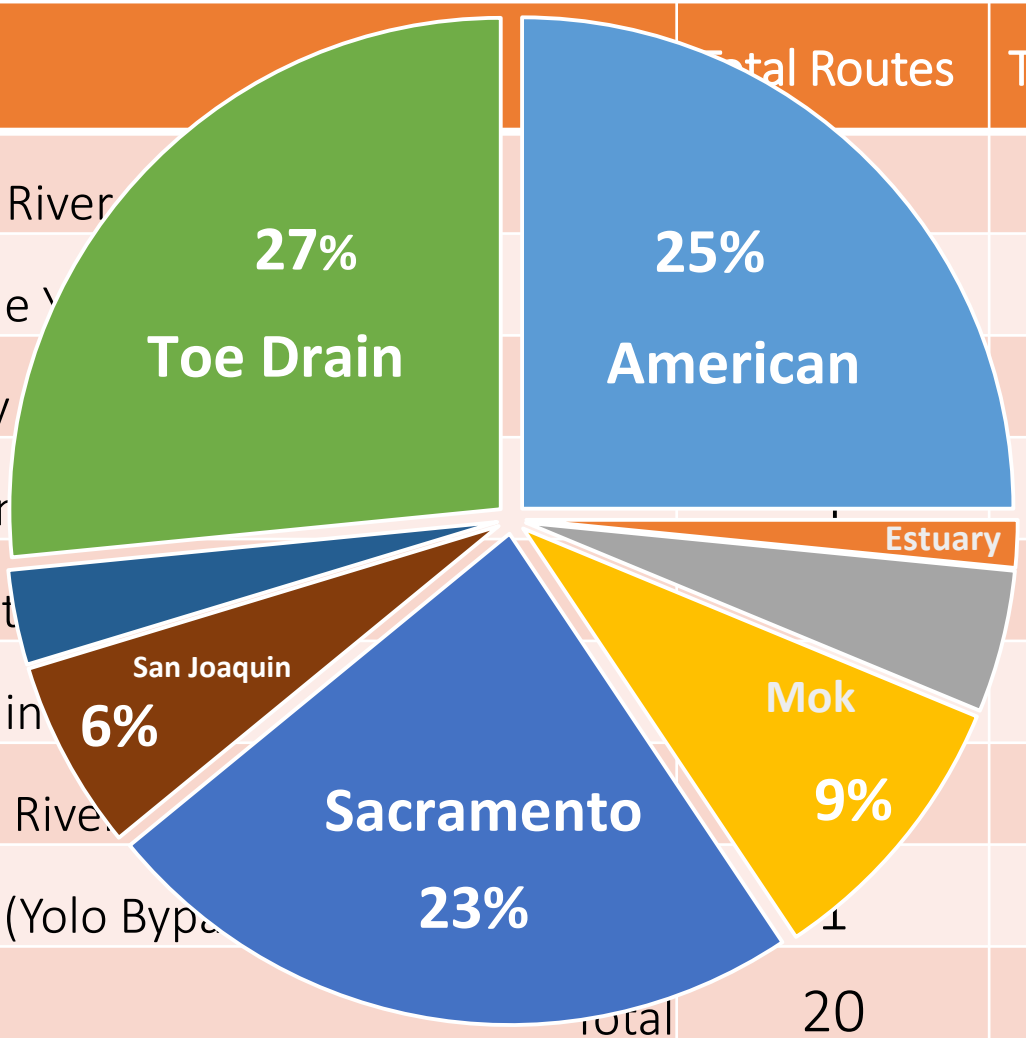
Oncorhynchus tshawytscha

Telemetry Summary

2012-2013

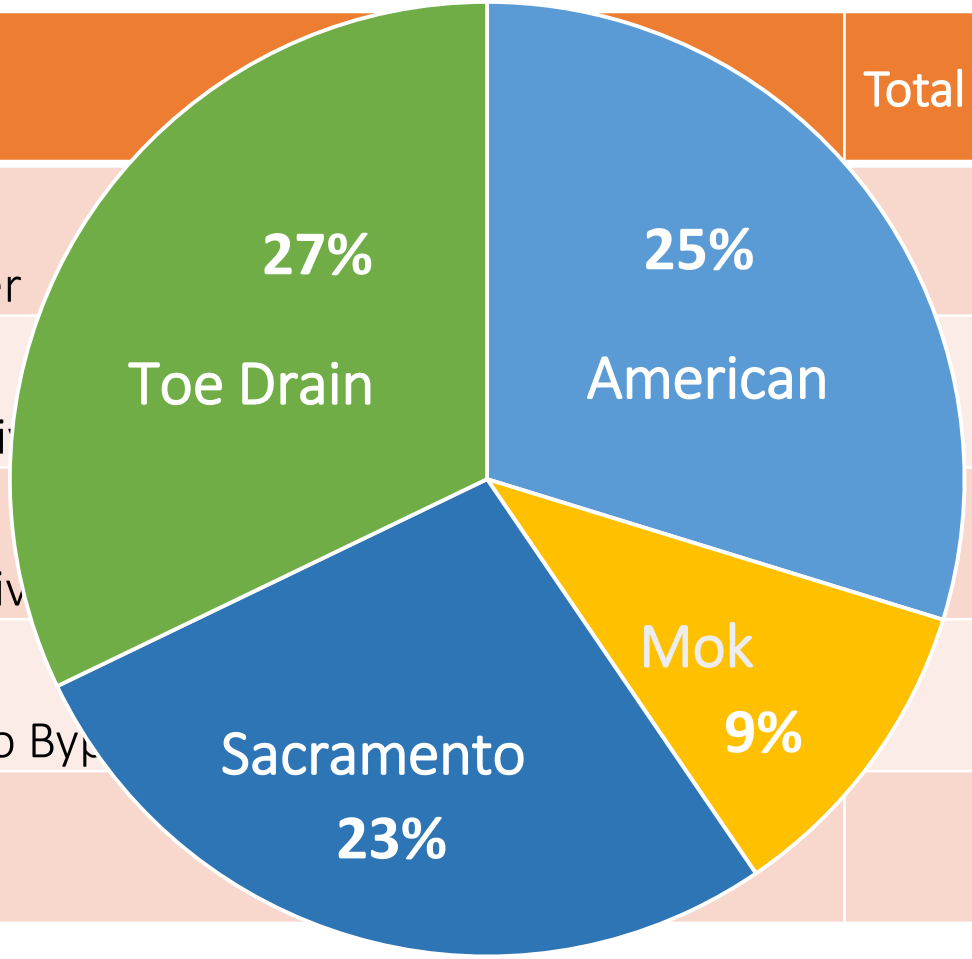
Final Detection Locations: Chinook Salmon

Location	Total Routes	Total Fish
American River		16
Base of the Y		1
SF Estuary		3
Mokelumn		6
Sacrament		15
San Joaquin		4
Stanislaus River		2
Toe Drain (Yolo Bypa	1	17
Total	20	64

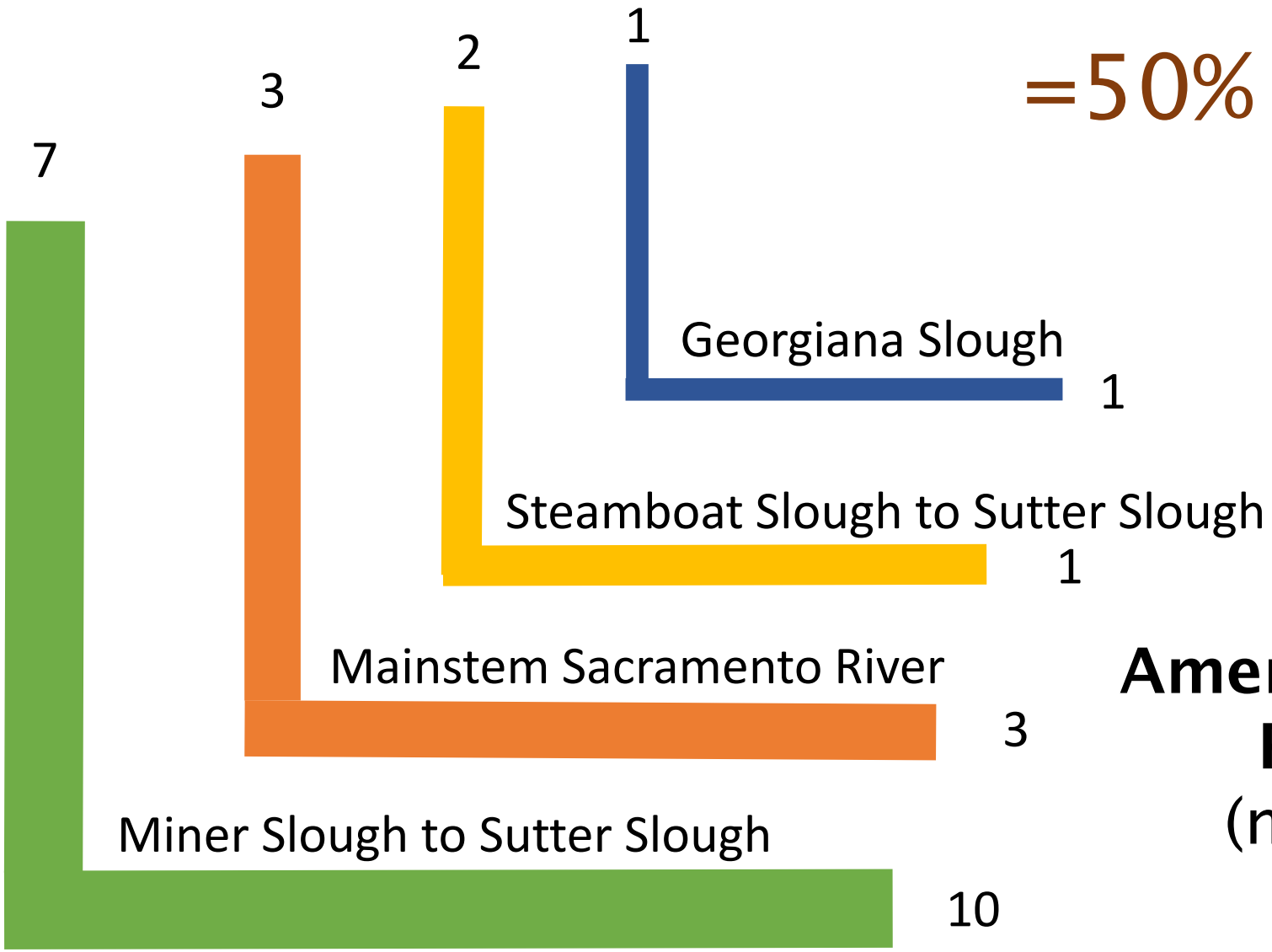


Final Detection Locations: Chinook salmon

Location	Total Fish
American River	16
Mokelumne Ri	6
Sacramento Riv	15
Toe Drain (Yolo Byp	17
Total	54



Sacramento River (n=16)



American River (n=15)

Sacramento River

(n=16)

Migration Track Categorization

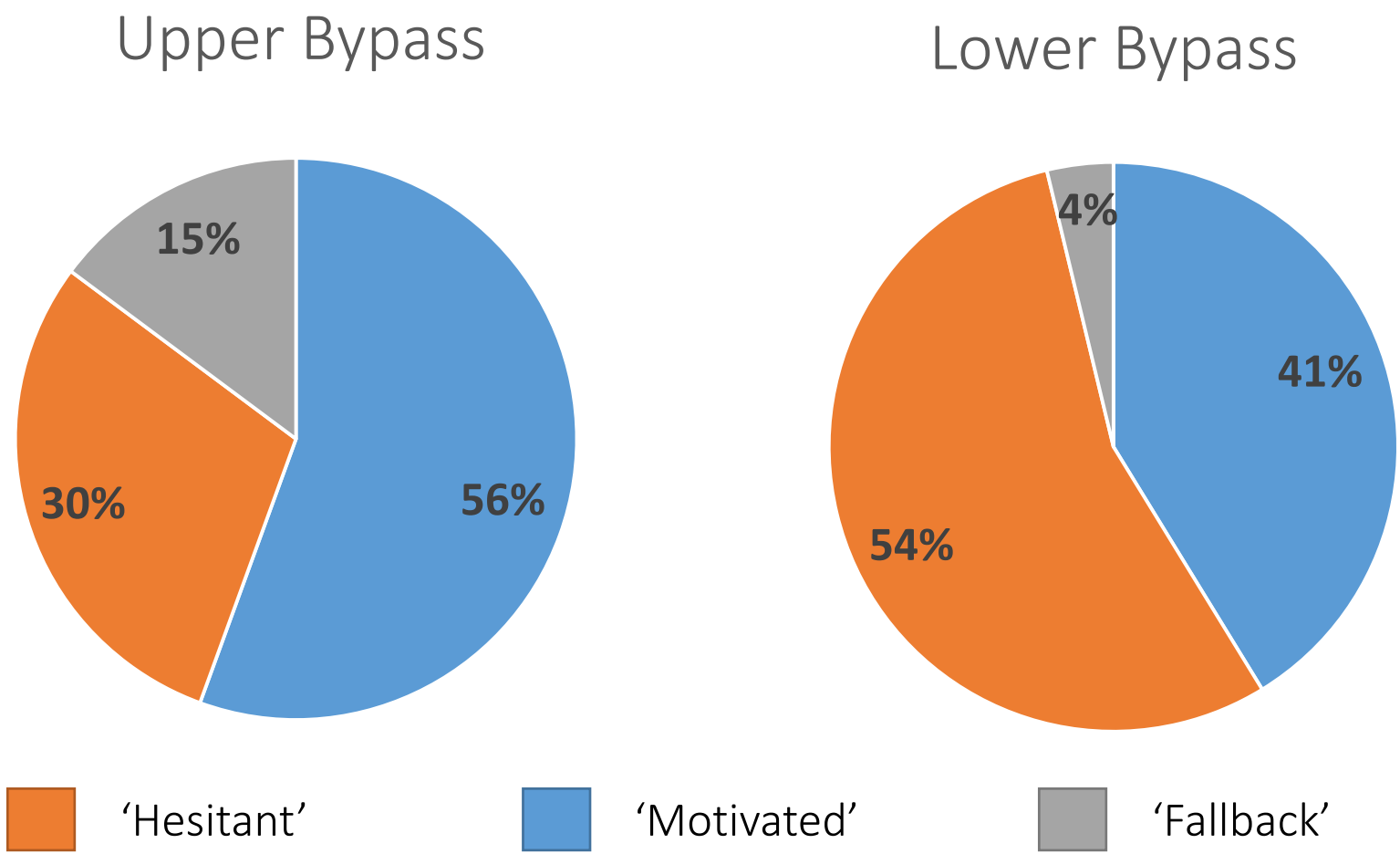
‘Motivated’	‘Hesitant’	‘Hesitant’*	‘Fallback
30	28	16	5

*minus south Delta (San Joaquin, Mokolemne, Stanislaus)

YB categorization by tagging location

Location	Total	'Motivated'	'Hesitant'	'Fallback'
Upper Bypass	27	12	8	4
Lower Bypass	37	20	15	1

Individuals tagged in Upper Bypass may show less ‘hesitation’ by proportion



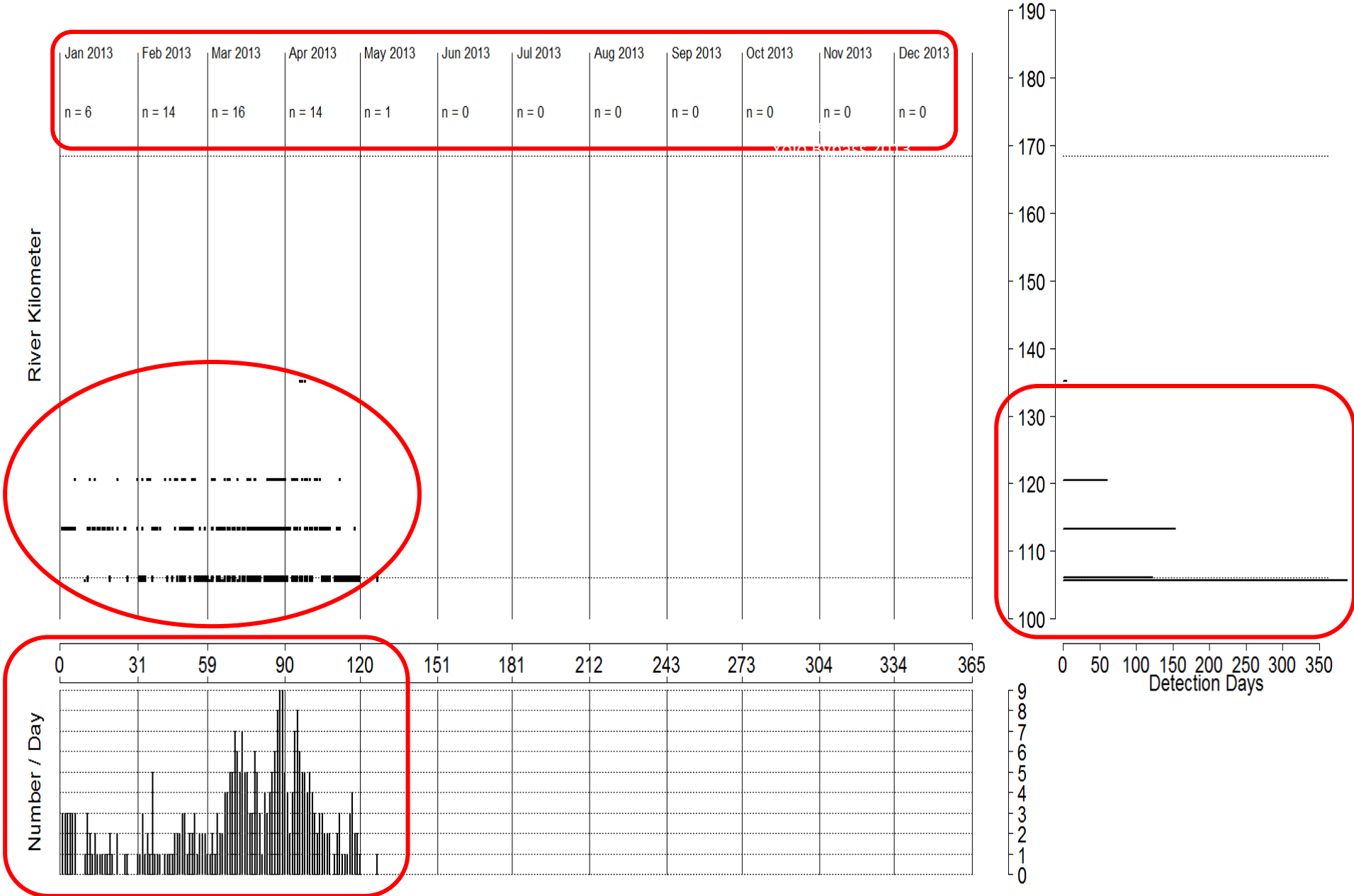
White sturgeon

Acispenser transmontanus

Telemetry Summary

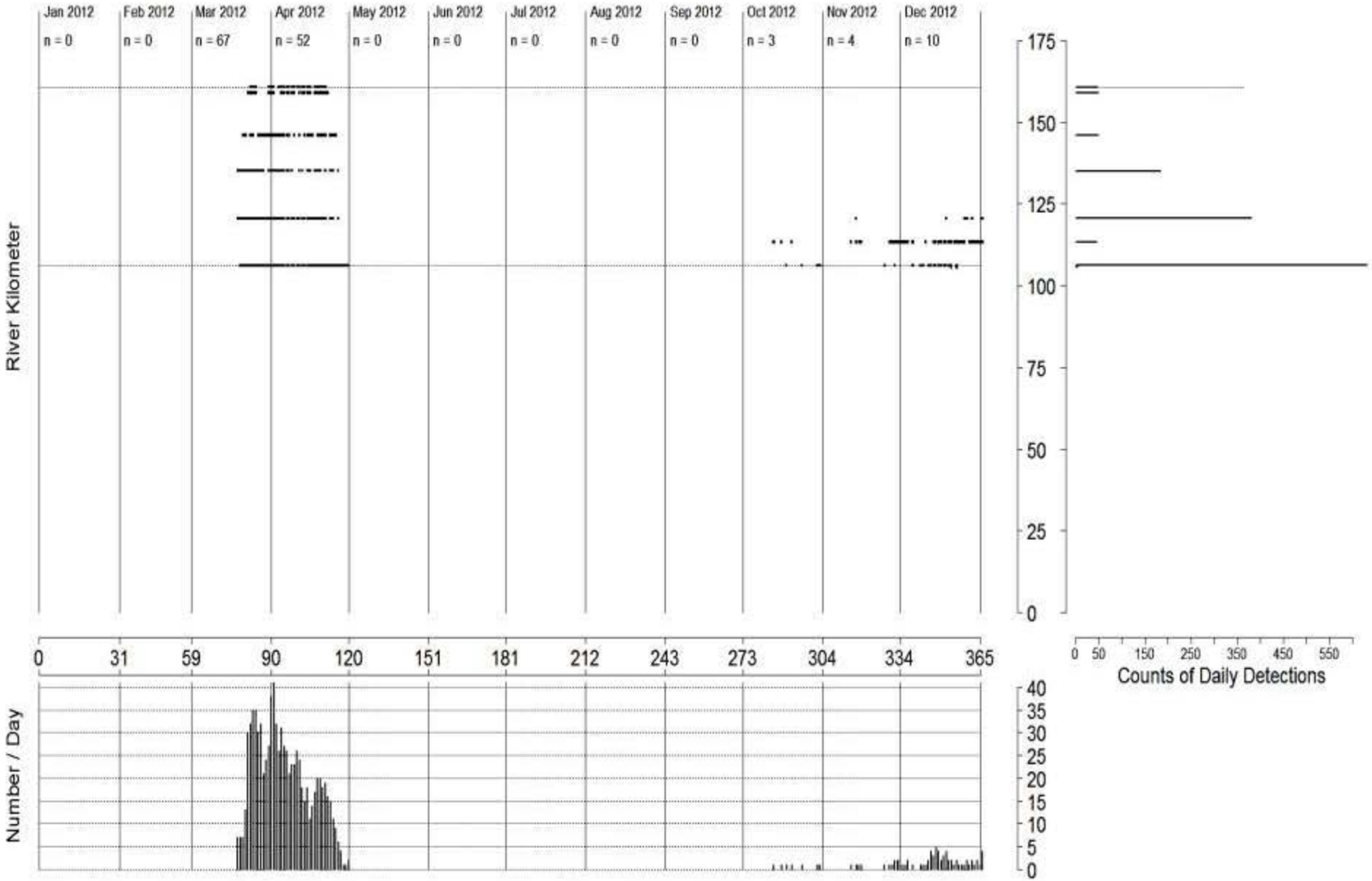
2012-2014

Spatiotemporal Plot



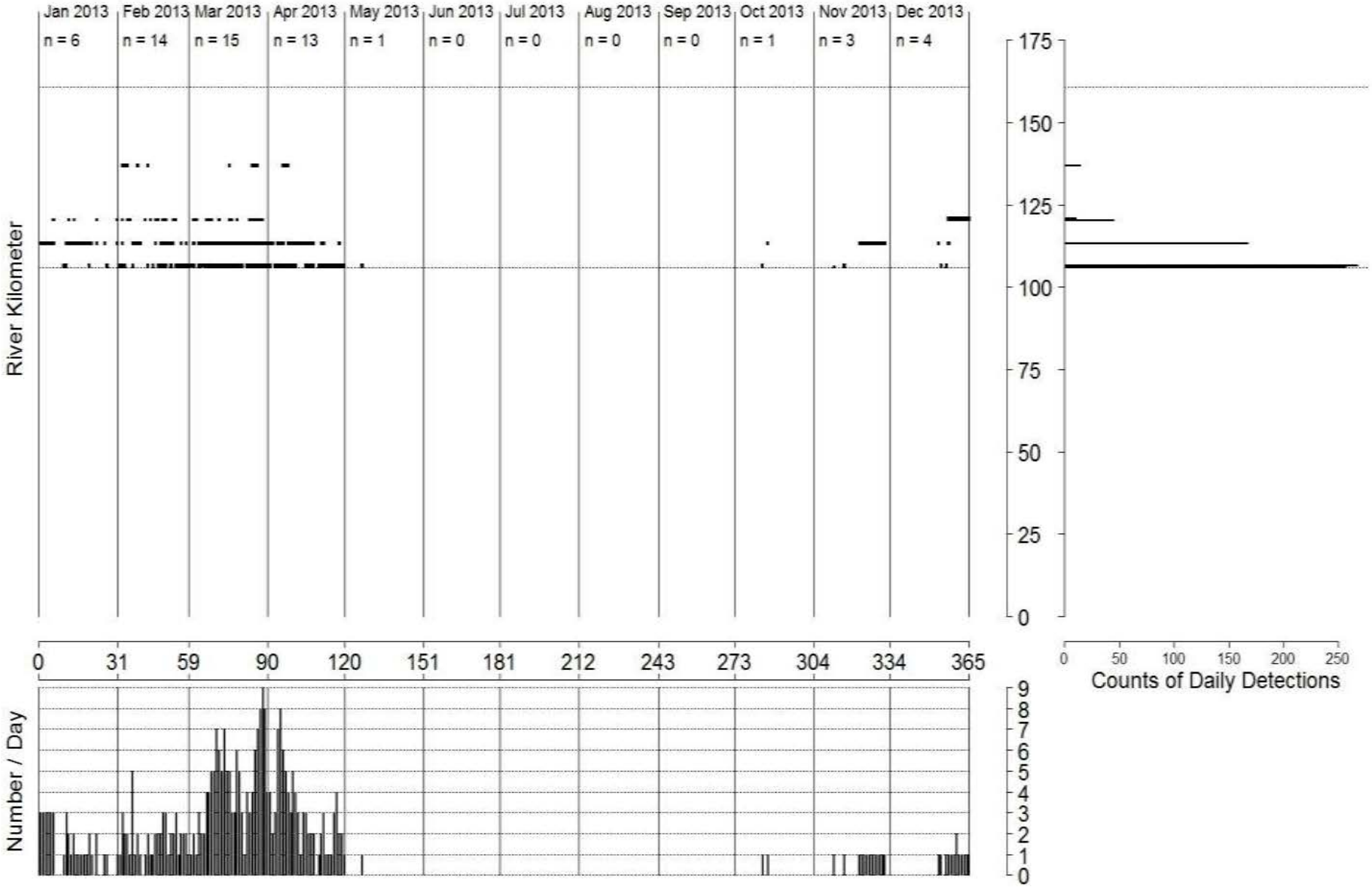
2012

n=67


Jan 2012
n = 0
Feb 2012
n = 0
Mar 2012
n = 67
Apr 2012
n = 52
May 2012
n = 0
Jun 2012
n = 0
Jul 2012
n = 0
Aug 2012
n = 0
Sep 2012
n = 0
Oct 2012
n = 3
Nov 2012
n = 4
Dec 2012
n = 10
River Kilometer
175
150
125
100
75
50
25
0
0 50 150 250 350 450 550
Counts of Daily Detections
0 31 59 90 120 151 181 212 243 273 304 334 365
Number / Day
40
35
30
25
20
15
10
5
0

2013

n=19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n = 6
Feb 2013
n = 14
Mar 2013
n = 15
Apr 2013
n = 13
May 2013
n = 1
Jun 2013
n = 0
Jul 2013
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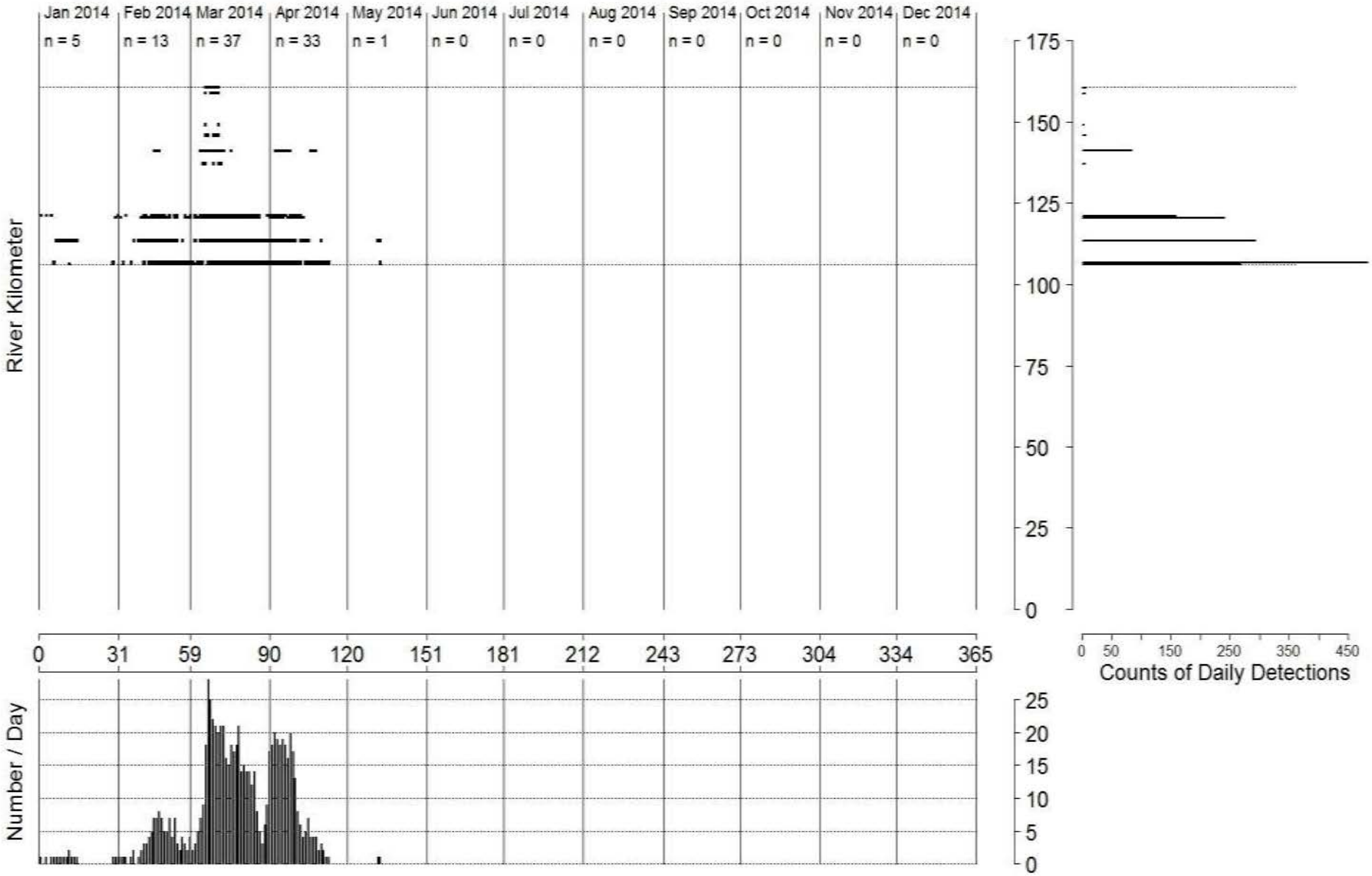
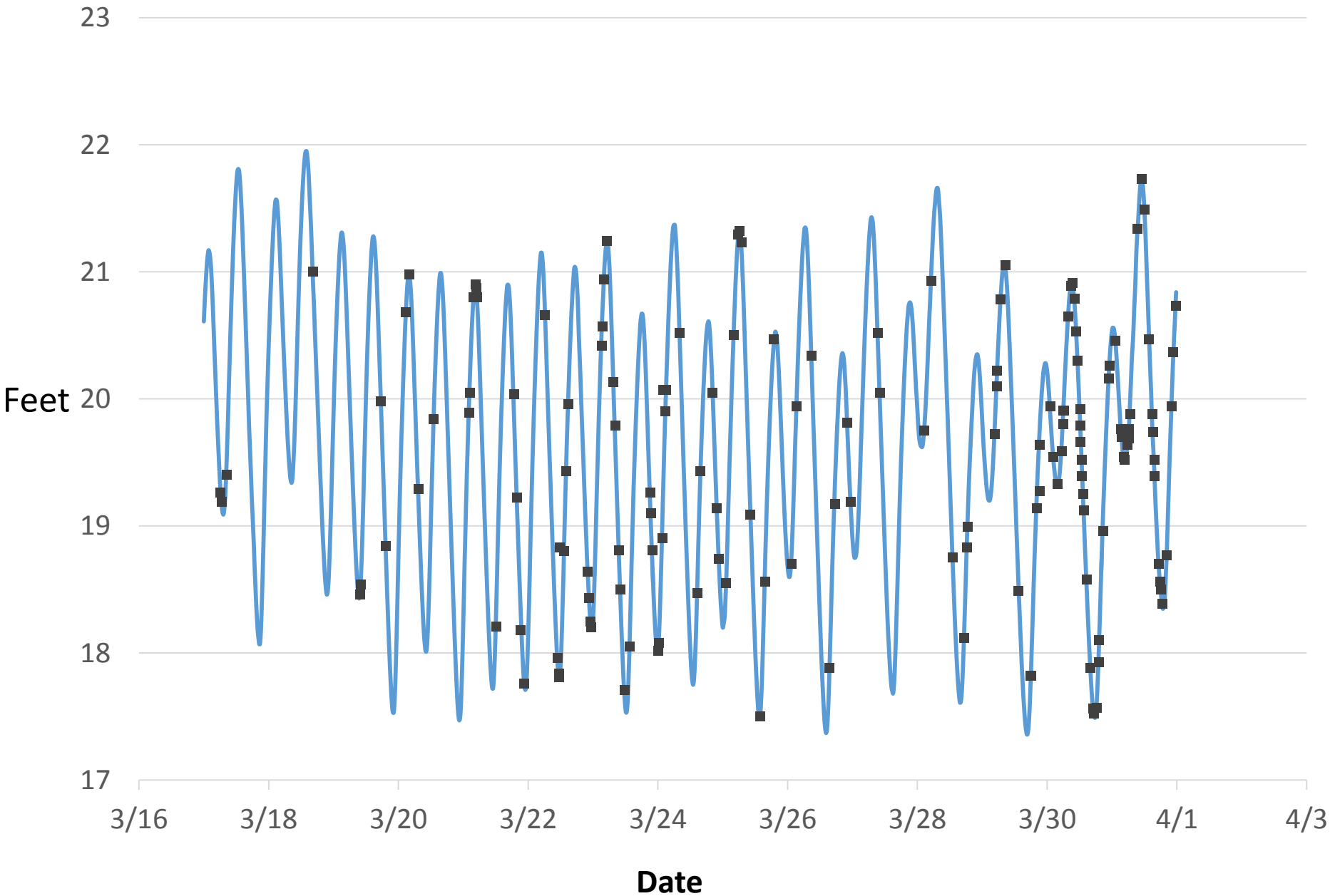
Aug 2013
n = 0
Sep 2013
n = 0
Oct 2013
n = 1
Nov 2013
n = 3
Dec 2013
n = 4
River Kilometer
175
150
125
100
75
50
25
0
0
31
59
90
120
151
181
212
243
273
304
334
365
0
50
100
150
200
250
Counts of Daily Detections
Number / Day
9
8
7
6
5
4
3
2
1
0

2014

n=39


Jan 2014
n = 5
Feb 2014
n = 13
Mar 2014
n = 37
Apr 2014
n = 33
May 2014
n = 1
Jun 2014
n = 0
Jul 2014
n = 0
Aug 2014
n = 0
Sep 2014
n = 0
Oct 2014
n = 0
Nov 2014
n = 0
Dec 2014
n = 0
River Kilometer
175
150
125
100
75
50
25
0
0
31
59
90
120
151
181
212
243
273
304
334
365
0
50
150
250
350
450
Counts of Daily Detections
Number / Day
25
20
15
10
5
0

Upstream Movement and River Stage



Take-aways

Chinook salmon tagged in the Yolo Bypass may be from or headed to locations throughout the Delta

The Yolo Bypass may represent a migration ‘sink’ for Chinook salmon

White sturgeon are typically present in the Toe Drain for ¾ of the year

Future Directions

Complete tagging activities

In-depth spatial analysis

Incorporation of environmental variables

Acknowledgements

ECOSYSTEM RESTORATION PROGRAM

California Department of Fish & Game
National Oceanic & Atmospheric Administration
US Fish & Wildlife Service

California Department of Fish & Wildlife

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California Department of Water Resources

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BIOTELEMETRY LABORATORY

DEPARTMENT OF WATER RESOURCES STATE OF CALIFORNIA