

# **2018 Adult Striped Bass Tagging Cruise Report**

California Department of Fish and Wildlife  
Bay Delta Region (Stockton)

by Jason DuBois and Andrew Danos

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Cruise Dates: 17 April 2018 – 17 May 2018

## Introduction

An adult Striped Bass population study conducted by the California Department of Fish and Wildlife has been ongoing since 1969. Part of the study is a “high-value” reward tagging program. Presented here is a summary of the 2018 Striped Bass-tagging field season.

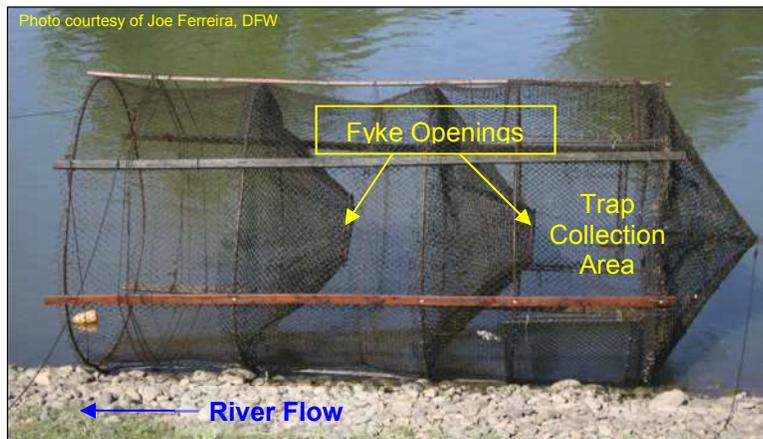
The tagging program is designed to understand and monitor the population dynamics of Striped Bass, with the ultimate goal being to provide the tools to inform science-based resource management decisions. These tools include relative and absolute abundance, harvest rate, mortality rate, individual growth rates, and large-scale movement/migration patterns.

Our objective during the field season was to capture, tag, measure, sex, and release in good condition as many Striped Bass as possible and to document previously-tagged Striped Bass. We also helped another group develop a large set of data that is complementary to ours.

## Methods and Gear

The crew (Appendix 1) typically included an Environmental Scientist, two Fish and Wildlife Technicians, and a Mate. Tagging was performed per procedure outlined in Appendix 2 of the Sacramento-San Joaquin Sport Fish Management Striped Bass Population Study Quality Control and Operating Manual.

Up to eight cylindrical fyke traps (length 20'; diameter 10'; 9 gauge 2¼-inch mesh) were fished in the Sacramento River near Knights Landing (see photo at right of a fyke trap). Four traps were placed on the east riverbank about two miles upstream of the Knights Landing Bridge (Highway 113). Four traps were placed on the east riverbank about one mile downstream of the Knights Landing Bridge. Traps were placed upwards of 250 feet apart from each other and were secured to temporary (i.e., for the season) moorings on the levee terrace.



Traps were completely submerged while fishing (collecting fish). Striped Bass and other fishes swam through the two openings (marked in photo above) and accumulated in the front (cone) of the trap. To remove fish from a trap, the trap was rolled up the riverbank until one of the doors was positioned to allow relatively easy access from the *Kayot* (~20-foot pontoon boat) while ensuring the trap remained in enough water to minimize fish stress.

An electric winch was used to roll traps up and down the riverbank. When the trap and boat were in position, fish were netted from the trap and processed on board the *Kayot*.

Striped Bass were measured to the



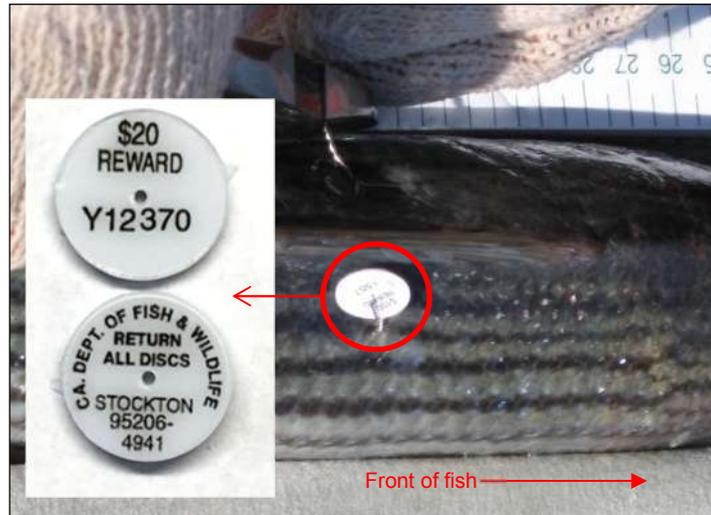
nearest centimeter fork length (cm FL). Most were sexed and over half were fitted with a Petersen disc-dangler tag (see photo below of disc tag as it was applied to the fish; inset is example of the two sides of the tag).

Each tag possessed a unique 6-digit numeric or alpha-numeric identifier and the location of the Fish and Wildlife office to where the tag should be returned. To evaluate return-rate, ~10% of all tags applied offered rewards of \$20 (example shown), \$50, or \$100.

For fish possessing tags from previous years (i.e., recaptures), length, sex, and tag number were recorded.

All live Striped Bass were processed at and returned to the location of capture, and condition (general health) of the fish upon return to the water was noted.

Dead Striped Bass were recorded accordingly and added to the total catch. Fish in poor condition were released without a tag, recorded as “over”, and added to the total catch. In a protocol we term “creeling”, healthy fish that could not be tagged safely (e.g., due to time constraints) were enumerated, measured, and sexed but not tagged. This season we did not collect scales of creeled fish.



## Results

Though we intended to begin the season on or about 1-April and end the season on or about 31-May, the season began on 17-April and ended on 17-May. The late start was due to crew availability and equipment readiness. The early conclusion was due to higher-priority activities that required redirection of the core tagging crew. Additionally, anecdotal information suggested catch per day had significantly declined and likely would continue to decline.

Field days were usually Monday through Thursday and tagging occurred Tuesday through Thursday. Week 3 had one extra day of tagging on Friday. Field days began at 0700 and ended at 1700 or earlier/later depending on the number of fish caught and/or the number of available personnel. Fyke traps were deployed 13 days, inspected each day for the presence of listed fishes, and tended 98 times. On average, traps fished 24.0 hours between inspections.

Three thousand seven hundred twenty-two (3,722) Striped Bass were caught, of which 2,360 were then tagged (Table 1). Seven hundred seventy-nine (779) fish were recorded as “over” and 571 fish were creeled. See Table 2 for other information about recaptures and Appendix 2 for the sequence of tags applied.

**Table 1. Summary of fyke trap effort and Striped Bass catch during 2018**

	<b>Total Caught</b>	<b>Total Tagged</b>	<b># Traps Fished</b>	<b># Traps Tended</b>	<b># Days Fished</b>
<b>Total</b>	<b>3,722</b>	<b>2,360</b>	<b>103</b>	<b>98</b>	<b>13</b>
Daily Minimum	53	51	7	6	n/a
Daily Maximum	1,376	434	8	8	n/a
Daily Average	286	182	8	8	n/a
Minimum/Day/Trap	1	0	n/a	n/a	n/a
Maximum/Day/Trap	800	289	n/a	n/a	n/a
Average/Day/Trap	40	24	n/a	n/a	n/a

A tended trap = fish handled and removed from the trap; this season all traps fished were tended

Not all traps fished were tended. If the trap had few Striped Bass and no ESA species, then the trap was rolled back into the water without handling fish.

Three Striped Bass were recaptures from previous season, two of which were from 2013 (Table 2). We recaptured one Striped Bass the same day it was tagged (not shown in Table 2; tag: 297855; date: 08-May). We had no other recaptures this season.

**Table 2. Striped Bass recaptured during 2018 Striped Bass-tagging field work**

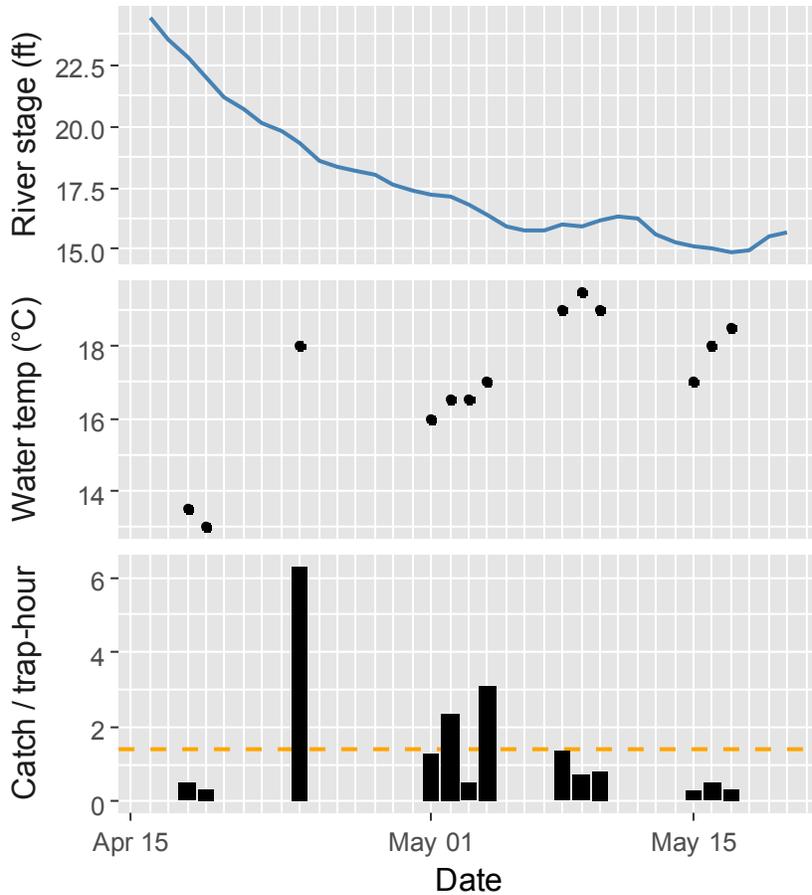
<b>Date of Recapture</b>	<b>Tag Number</b>	<b>Date Tagged</b>	<b>Days at Large</b>	<b>Length at Tagging (cm FL)</b>	<b>Length at Recapture (cm FL)</b>	<b>Growth per Year (cm)</b>
9-May	289690	30-Apr-13	1,835	54	73	3.8
2-May	289990	8-May-13	1,820	50	66	3.2
24-Apr	294985	2-May-17	357	40	46	6.1

Daily average river stage for the Knights Landing-portion of the Sacramento River was calculated from quarter-hourly readings (n=96/day) posted on-line at the California Data Exchange Center's website. River stage declined steadily until early May and then maintained between ~15 and 16 feet (Figure 1 – top panel).

Water temperature was recorded by the field crew at the beginning of each tagging day. Average water temperature was 17.0 degrees Celsius (°C, or ~ 62.6 degrees Fahrenheit) for the tagging season (Figure 1 – middle panel).

Striped Bass catch per trap-hour<sup>1</sup> by day was calculated and plotted with river stage and water temperature. Average catch per trap-hour for the tagging season was ~1.4 fish (Figure 1 – bottom panel).

<sup>1</sup> Rounded to nearest ¼-hour and cumulative for the number of traps fishing (for example, if 10 traps each fished 24 hours in one day, then trap-hours for that day equaled 240.) Catch includes any fish left in the trap from the preceding day.



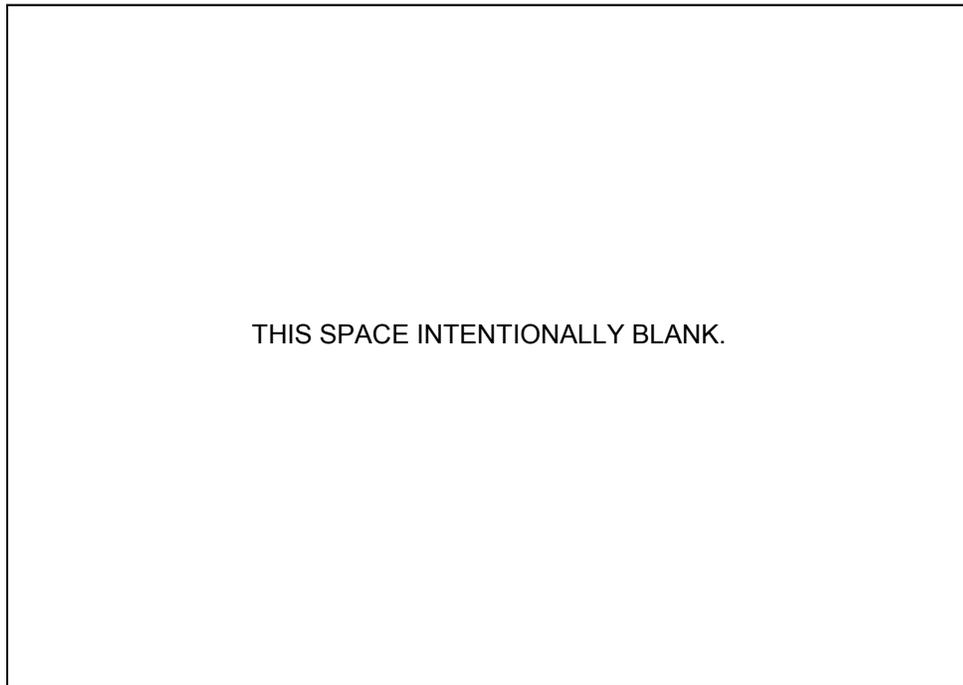
**Figure 1. Daily Striped Bass catch per trap-hour for 2018 (bottom) with daily average river stage at Knights Landing (top) and daily water temperature (middle); note: dashed-line (orange) in bottom plot indicates season-average catch per trap-hour (~1.4)**

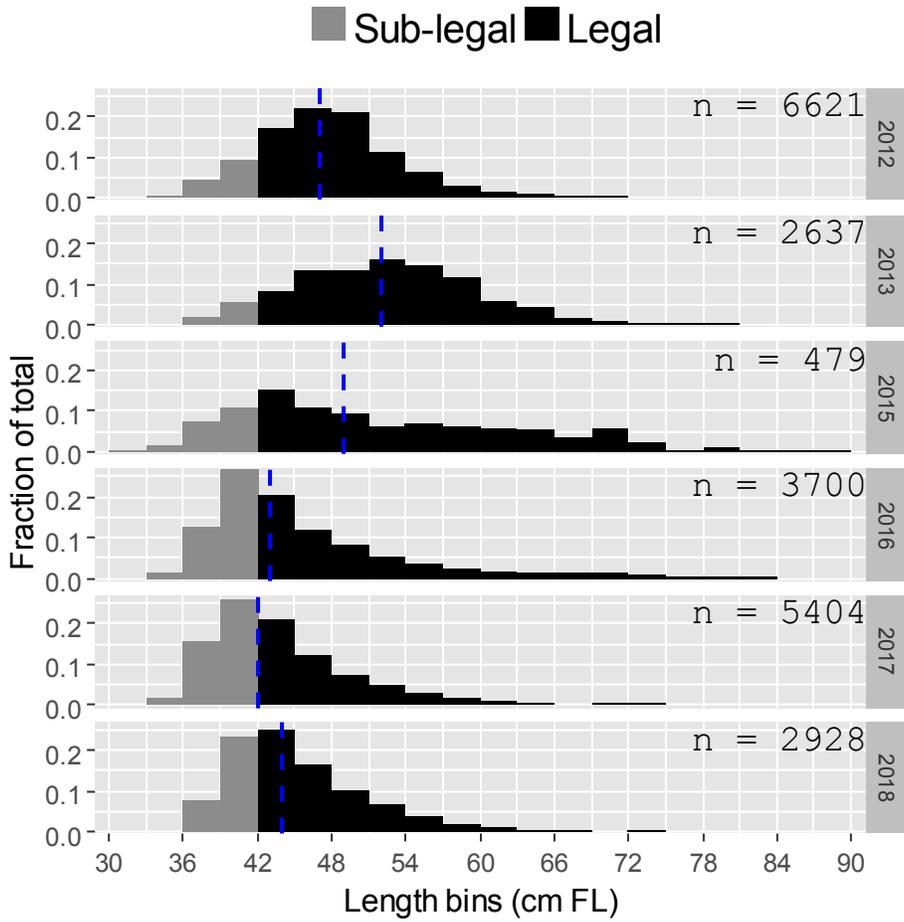
We creeled a large fraction of the fish we caught in Weeks 2 and 3 because we deployed a large number of traps relative to our ability to rapidly tag fish and relative to fish condition given water temperature and density of fish in traps. On 24-Apr, trap 4 had over 800 fish. Due to time constraints, we had to release many of these fish without tagging or creeling. Thus, the 600+ (approximated count) recorded as “over” for Week 2. See Table 3 for other information about weekly effort and catch and Appendix 3 for weekly variation in fork lengths.

**Table 3. Weekly summary of fyke trap effort and Striped Bass catch in 2018; number in parentheses is calendar week**

<b>Week</b>	<b>1 (15)</b>	<b>2 (16)</b>	<b>3 (17)</b>	<b>4 (18)</b>	<b>5 (19)</b>
Tagged	129	353	1,167	513	198
Creeled / Not Tagged	0	341	230	0	0
Over	3	680	64	22	10
Dead	0	1	3	5	0
Recapture (previous and within season)	0	1	1	1	0
<b>Weekly Total Catch</b>	<b>132</b>	<b>1,376</b>	<b>1,465</b>	<b>541</b>	<b>208</b>
Number of Traps Tended	14	8	31	23	22
Number of Days Fished	2	1	4	3	3
Minimum FL (cm)	36	33	34	36	36
Maximum FL (cm)	106	86	87	111	100
Average FL (cm)	45	45	45	46	48

Of the fish for which a length measurement was recorded (N=2,928), length ranged 33-111 cm FL and averaged  $45 \pm 7$  cm FL ( $\pm$  SD). Of the fish for which sex was recorded (N=2,930), 2,894 were male and 36 were female (80:1 male). On average, females were larger than males ( $\text{♀} = 57 \pm 18$  cm FL,  $\text{♂} = 45 \pm 7$  cm FL). About 31% of all Striped Bass caught (and measured) were sub-legal size (Figure 2 – bottom panel), which was a decrease of about 13% from 2017 (44%).





**Figure 2. Length frequency of all Striped Bass collected in fyke traps from 2012-2013 and 2015-2018; notes: (1) for simplicity fish  $\geq 90$  cm FL not included in figure ( $n \leq 22$  per year), (2) vertical dashed line (blue) indicates annual median length cm FL & median includes fish  $\geq 90$  cm FL, (3) length bins by 3 cm**

Four (4) Chinook Salmon were caught this season and their estimated lengths ranged 42-83 cm (Table 4). All salmon were brightly colored, and all were released alive in excellent condition. Three of the four had an adipose fin.

**Table 4. By-catch of the 2018 Striped Bass tagging season**

<b>Other Species (common name)</b>	<b>Scientific Name</b>	<b>Total Count</b>
American Shad	<i>Alosa sapidissima</i>	583
Black Crappie	<i>Pomoxis nigromaculatus</i>	1
Carp	<i>Cyprinus carpio</i>	2
Channel Catfish	<i>Ictalurus punctatus</i>	47
Chinook Salmon <sup>a</sup>	<i>Oncorhynchus tshawytscha</i>	4
Redear Sunfish	<i>Lepomis microlophus</i>	3
Sacramento Pikeminnow	<i>Ptychocheilus grandis</i>	1
Sacramento Sucker	<i>Catostomus occidentalis</i>	4
Smallmouth Bass	<i>Micropterus dolomieu</i>	30
Tule Perch	<i>Hysterothorax traskii</i>	1
White Catfish	<i>Ameiurus catus</i>	4

<sup>a</sup> Fish were released alive in excellent condition

### **Complementary Dataset**

Like last season, this season we helped a California Department of Fish and Wildlife crew from Fisheries Branch develop a large complementary dataset while that crew was doing a pilot study to monitor adult Steelhead near Sacramento. We provided data sheets and training to that crew, who then — using fyke traps and methods patterned after ours — creeled 2,803 Striped Bass from 18-Mar to 25-May 2018. See Appendix 4 for length frequency distributions.

We will compare and contrast the datasets soon, but for now note that the two sampling efforts yielded (a) male:female ratios of 80:1 (April-May by us) and 16:1 (March-May by Fisheries Branch) and (b) comparing the length frequency distributions from Weeks 15-19 via scatter plots showed that slopes ranged 0.06-2.72 and averaged 0.85, while R-squared ranged 0.92-0.98 and averaged 0.94. Please contact Senior Environmental Scientist (Specialist) Jonathan Nelson with questions about the pilot study.

### **Discussion**

Striped Bass catch this season was notable in that the male:female sex ratio (80:1) was far higher than last season (14:1) and similar to what was seen during the 2016 tagging season (85:1 male dominant). In general, catch was down this year on both targeted species (Striped Bass) and bycatch. This was likely due to decreased river flows and increased temperature beginning in May.

### **Acknowledgements**

We recognize and give a very special thanks to our friends at *StingRayz Beach Boardwalk and Marina* in Knights Landing. They generously allowed us to berth the *Kayot* at their marina.

We thank Mr. Jack Bailey (Reclamation District 1500) for his efforts in presenting to the trustees of Reclamation District 1500 and to local landowners our request for access to the Sacramento River through various properties. His efforts allowed us to begin our fieldwork in a timely manner.

Last but not least...we thank all personnel involved in this project. Their commitment and hard work ensured the collection of sound scientific data.

### **Appendix 1. Personnel list. All were employees of the CDFW**

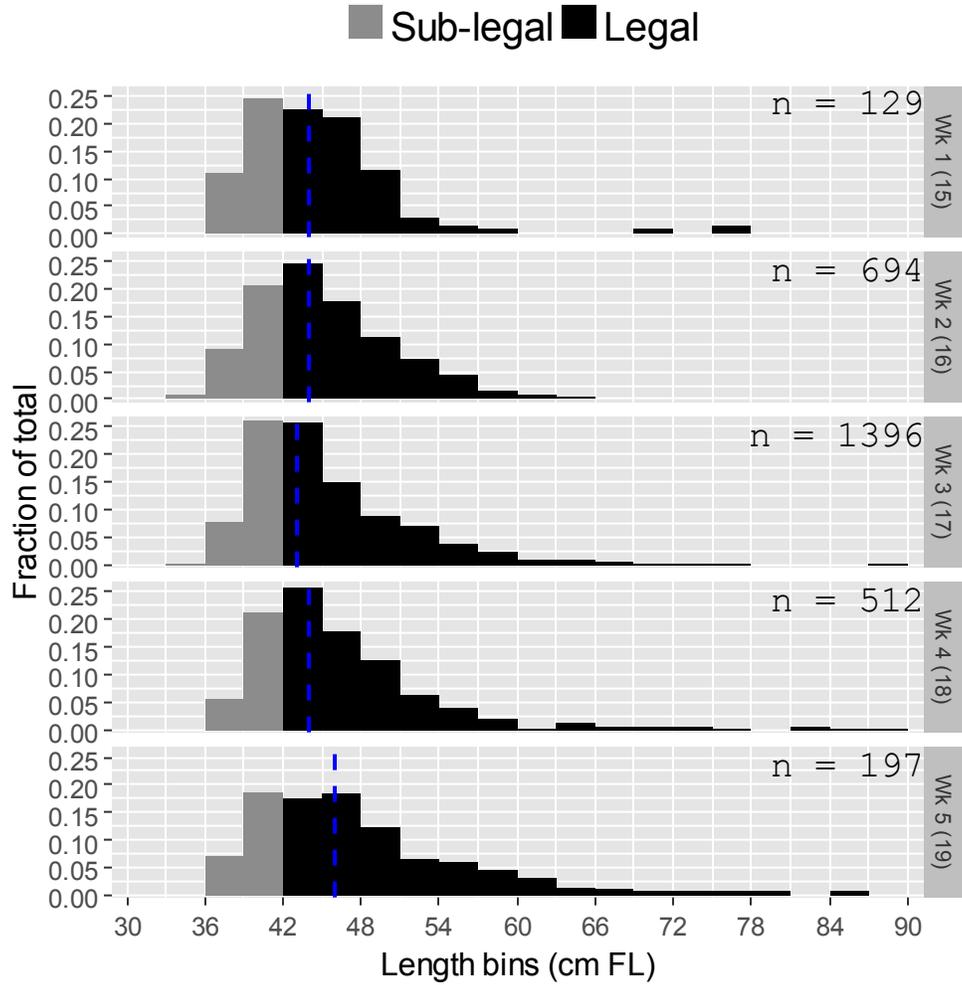
<b>Name</b>	<b>Position Title</b>
Jeremiah Bautista	Environmental Scientist
Tina Enderlein	Senior Laboratory Assistant
Michael Espriella	Scientific Aide
Thomas Gabel	Senior Laboratory Assistant
Michael Grady	Mate
Allison Holevoet	Scientific Aide
David Hull	Mate
Ugochi Ikeme	Senior Laboratory Assistant
Brian Jones	Scientific Aide
Tim Keopadubsy	Key Data Operator
Shoshana Lescht-Smith	Scientific Aide
Spencer Lewis	Fish & Wildlife Tech
Nicole Montoya	Scientific Aide
Annette Narzynski	Scientific Aide
Matthew Siepert	Fish & Wildlife Tech
Katie Smith	Scientific Aide

## Appendix 2. Sequence of tags released in 2018

Tag Value	From	To	N
NR	296315	296511	197
NR	296513	297041	529
NR	297043	297130	88
NR	297132	297545	414
NR	297547	297574	28
NR	297576	297617	42
NR	297619	298225	607
NR	298227	298387	161
NR	298390	298447	58
\$20	Y12381	Y12459	79
\$50	F02281	F02356	76
\$50	F02358	F02359	2
\$100	C02280	C02358	79

NR = non-reward

**Appendix 3. Weekly length frequency distribution of Striped Bass caught (and measured) in fyke traps at Knights Landing during 2018; Notes: (1) for simplicity fish  $\geq 90$  cm FL not included in figure (n = 2, week 1; n = 0, week 2; n = 0, week 3; n = 1, week 4, n = 1, week 5), (2) vertical dashed line (blue) indicates weekly median length cm FL & median includes fish  $\geq 90$  cm FL, (3) length bins by 3 cm, (4) number in parentheses is calendar week**



**Appendix 4. Weekly length frequency distribution of Striped Bass caught (and measured) in fyke traps near Sacramento during 2018; Notes: (1) for simplicity fish  $\geq 90$  cm FL not included in figure ( $n \leq 1$  in any given week), (2) vertical dashed line (blue) indicates weekly median length cm FL & median includes fish  $\geq 90$  cm FL, (3) length bins by 3 cm, (4) number in parentheses is calendar week**

