

2015 Adult Striped Bass Tagging Cruise Report

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

by Jason DuBois and Michael D. Harris

29 May 2015

Cruise Dates: 06 April 2015 – 07 May 2015

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 2015 Striped Bass-tagging field season.

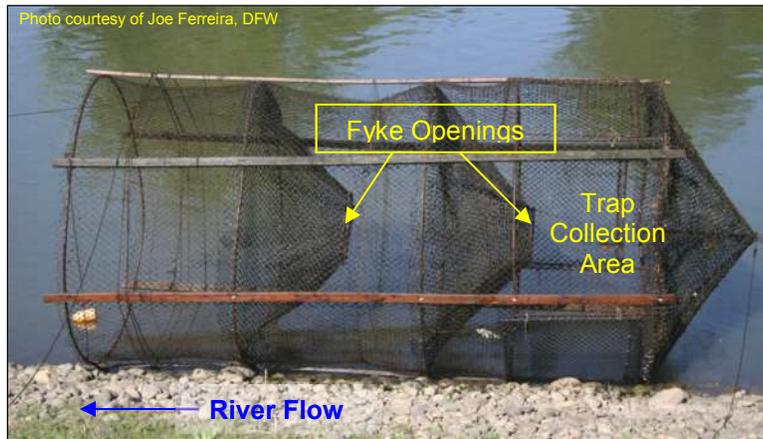
The tagging program is designed to understand and monitor the population dynamics of Striped Bass, with the ultimate goal being to provide the tools to inform science-based resource management decisions. These tools include relative and absolute abundance, harvest rate, mortality rate, individual growth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

Methods and Gear

The crew (Appendix 1) typically included one or two Environmental Scientists, one Technician, 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 five 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). One trap was placed on the east riverbank about one mile downstream of the Knights Landing Bridge. Traps were placed approximately 50 to 150 feet apart from each other and were secured to temporary (i.e., for the season) moorings on the levee terrace.



Traps were completely or near-completely submerged while fishing (collecting fish). Striped Bass swam through the two openings (marked in photo above) and collected 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 in such a way as to facilitate easy access for tending the trap from the ~20-foot pontoon boat, the *Kayot*, while ensuring the trap remained in enough water to minimize fish stress.

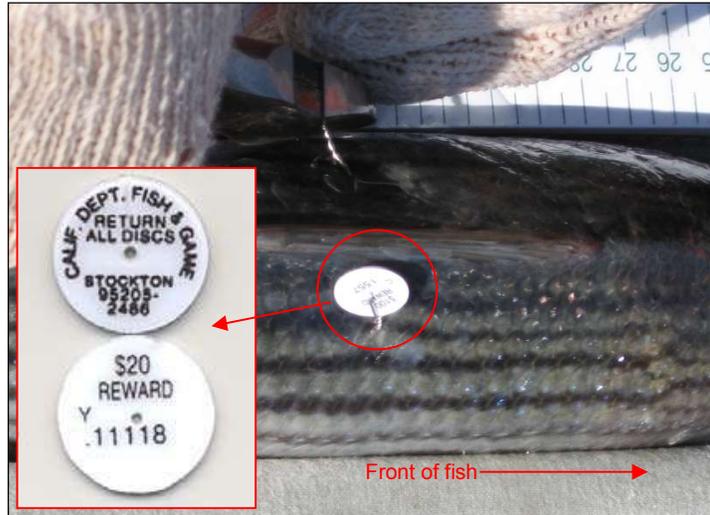
An electric winch was used to roll traps up and down the riverbank. When the trap and boat were in position, fish were netted from the trap and tagged on board the *Kayot*.

Striped Bass were measured to the



nearest centimeter fork length (cm FL). Most fish were sexed and 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 fish were processed at and returned to the location of capture, and condition (general health) of the fish upon return to the water was noted.

Not all captured Striped Bass were tagged. Dead fish 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.

Results

The season began on 06-April and ended on 07-May. Field days were Monday through Friday and tagging occurred Tuesday through Friday. To comply with requirements of the National Marine Fisheries Service, each trap was fished no more than one day before being inspected for listed fishes. Field days began at 0800 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 19 days, inspected each day for the presence of listed fishes, and tended 66 times (Table 1). On average, traps fished 24.0 hours per day (range: 18.5 – 25.25 hours).

Four hundred eighty four (484) Striped Bass were caught, of which 469¹ were then tagged (Table 1). Eight fish were recorded as “over”, three of which were smaller than the minimum tagging length of 35 cm FL.

¹ 94 of which were sub-legal, defined as < 42 cm FL

Table 1. Summary of fyke trap effort and Striped Bass catch during 2015

	Total Caught	Total Tagged	# Traps Fished	# Traps Tended	# Days Fished
Total	484	469	90	75	19
Daily Minimum	6	6	3	0	N/A
Daily Maximum	63	61	5	5	N/A
Daily Average	27	26	5	4	N/A
Minimum/Day/Trap	1	1	N/A	N/A	N/A
Maximum/Day/Trap	57	55	N/A	N/A	N/A
Average/Day/Trap	7	7	N/A	N/A	N/A

A tended trap = fish handled and removed from the trap

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

Six fish were recaptures (Table 2). All were from the 2013 tagging season.

Table 2. Striped Bass recaptured during 2015 Striped Bass-tagging field work

Date of Recapture	Tag Number	Date Tagged	Days at Large	Length at Tagging (cm FL)	Length at Recapture (cm FL)	Growth per Year (cm)
23-Apr	289655	1-May-13	722	63	74	5.6
24-Apr	289690	30-Apr-13	724	54	62	4.0
30-Apr	289978	8-May-13	722	54	65	5.6
1-May	291445	22-May-13	709	57	67	5.2
7-May	289622	1-May-13	736	64	75	5.5
7-May	290067	8-May-13	729	46	58	6.0

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 dropped from the beginning of the season to a season-low in week 3 (week of 19-April; Figure 1A). Thereafter river stage fluctuated between ~13.5 and ~14.5 ft. Water temperature was recorded by field crew at the beginning of each tagging day (Figure 1B). Average water temperature was 17 degrees Celsius (°C, or about 63 degrees Fahrenheit) for the tagging season. Water temperature was never lower than about 14 °C (57 °F).

Striped Bass catch per trap-hour² by day was calculated and plotted against river stage (Figure 1A) and water temperature (Figure 1B). Average catch per trap-hour for the tagging season was 0.228 fish (represented as the dashed grey line in Figures 1A and 1B). Seven days were above this average.

² 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.

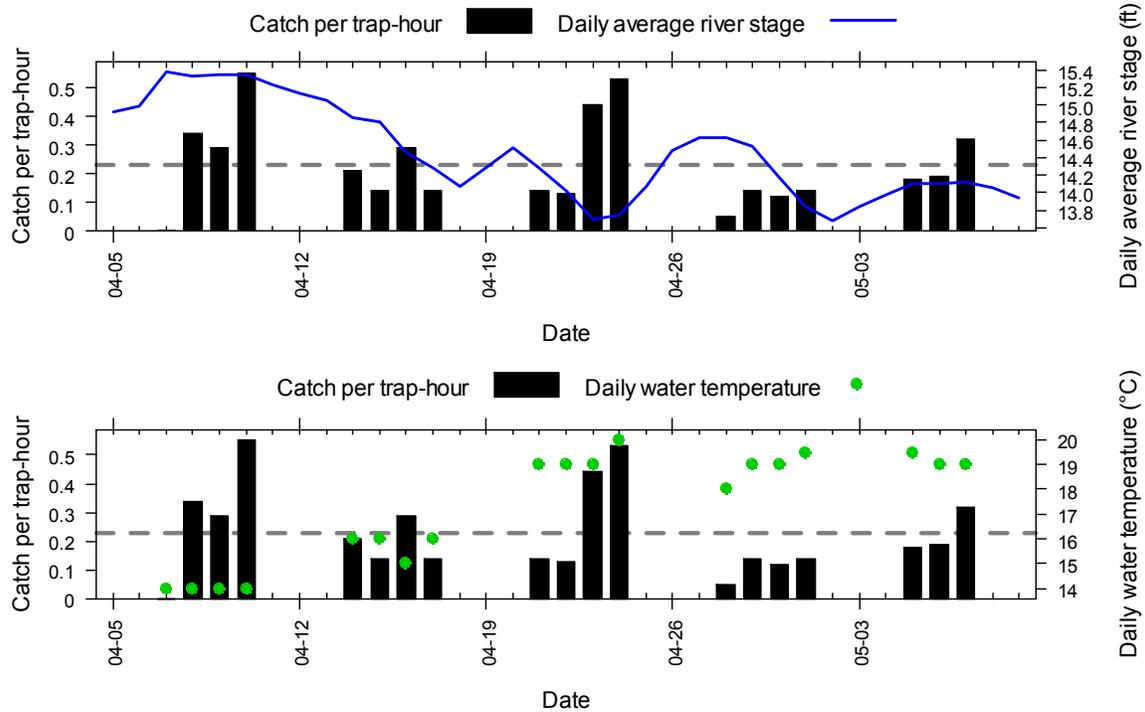


Figure 1. (A – top) Striped Bass catch per trap-hour by day with daily average river stage at Knights Landing; (B – bottom) Striped Bass catch per trap-hour by day with daily water temperature at Knights Landing; on 07-Apr traps inspected but not tended; date shown = Sunday

Table 3. Summary of fyke trap effort and Striped Bass catch in 2015

Week	1	2	3	4	5
Tagged	108	90	144	47	80
Creeled / Not Tagged ^a	0	0	0	0	0
Over and Short ^b	1	1	1	4	1
Dead	0	0	0	1	0
Recapture (previous and within season)	0	0	2	2	2
Weekly Total Catch	109	91	147	54	83
Number of Traps Tended	10	17	19	14	15
Number of Days Fished	4	4	4	4	3
Minimum FL (cm)	35	36	35	33	32
Maximum FL (cm)	110	75	112	102	111
Average FL (cm)	49	49	58	52	50

^a Healthy fish that could not be tagged safely (e.g., due to time constraints) were enumerated, measured, and sexed but not tagged

^b Fish < 35 cm FL (n = 3)

Most Striped Bass were caught from the beginning to middle of the season (Table 3). Of the fish for which a length measurement was recorded (N=479), length ranged from 32 to 112 cm FL and averaged 52 ± 13 cm FL (\pm SD). Of the fish for which sex was recorded (N=475), 438 were male and 37 were female (~11 males to 1 female). On average, females were larger than males ($\text{♀} = 67 \pm 23$ cm FL, $\text{♂} = 51 \pm 11$ cm FL).

About 20% of all Striped Bass caught (and measured) were sub-legal size (Figure 2; bottom panel). This was an increase of about 13% from 2013 (7%). Percent of total for fish between 42 and 51 cm FL was roughly about the same in 2013 (~40%) and 2015 (~36%). Percent of total catch of fish greater than 51 cm FL was greater in 2013 (~53%) than in 2015 (~43%). Larger fish (i.e., > 72 cm FL) appeared early on and were present throughout the season (Appendix 2).

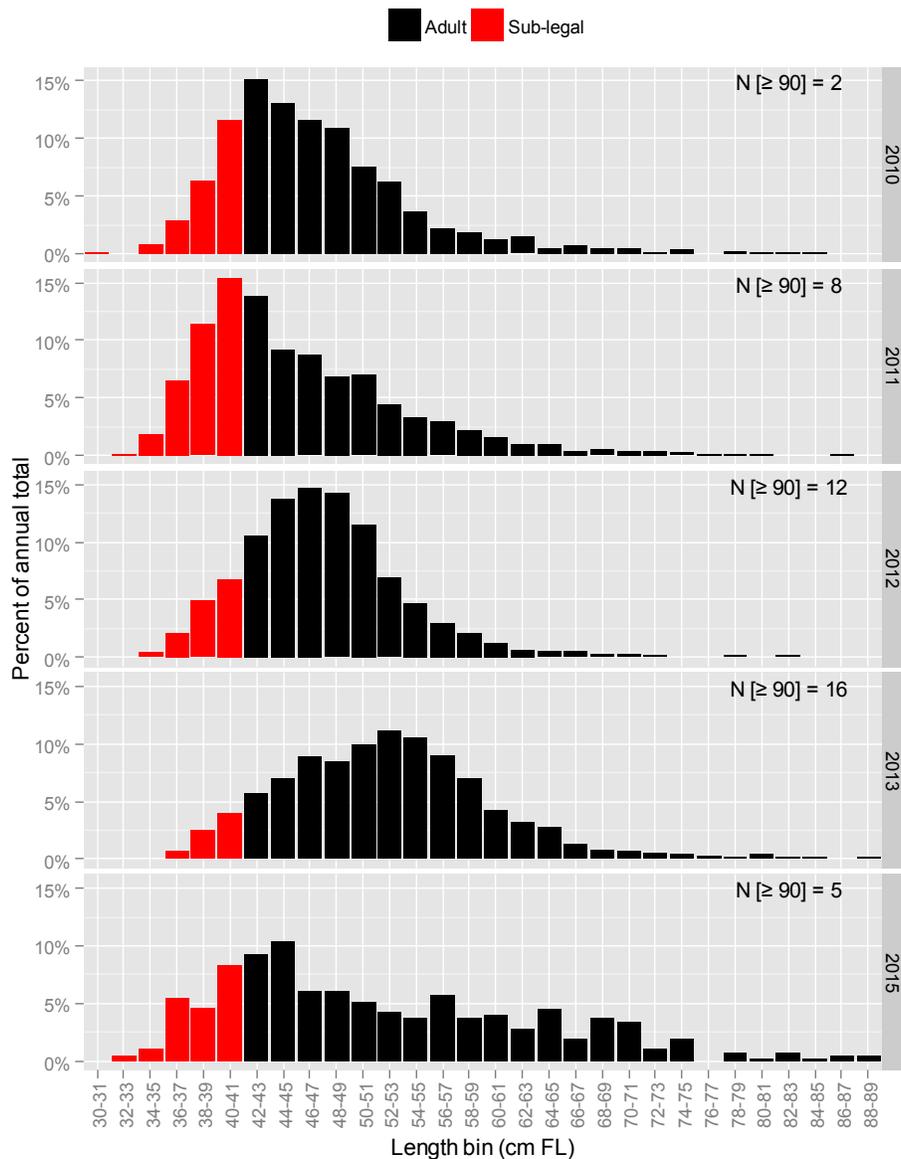


Figure 2. Length frequency of all Striped Bass collected in fyke traps from 2010-2013 and 2015; fish ≥ 90 cm FL not included in figure, see N ≥ 90

Listed Species and other By-catch

Seven (7) Chinook Salmon were caught this season (Table 4). Most salmon were brightly colored, all had an adipose fin (except for one), and all were released alive in good to excellent condition (estimated lengths between 62 and 88 cm). One Steelhead was also caught this season. It had an adipose fin and was also released alive in good to excellent condition (estimated length was 60 cm).

One Green Sturgeon was caught on April 30. It was released alive in excellent condition (estimated length was close to 2 meters). All other by-catch was noted (Table 4).

Table 4. By-catch of the 2015 Striped Bass tagging season

Other Species (common name)	Scientific Name	Total Count
American Shad	<i>Alosa sapidissima</i>	244
Bluegill	<i>Lepomis macrochirus</i>	1
Carp	<i>Cyprinus carpio</i>	1
Channel Catfish	<i>Ictalurus punctatus</i>	143
Chinook Salmon ^{a b}	<i>Oncorhynchus tshawytscha</i>	7
Green Sturgeon ^a	<i>Acipenser medirostris</i>	1
Sacramento Sucker	<i>Catostomus occidentalis</i>	2
Steelhead ^a	<i>Oncorhynchus mykiss</i>	1
White Catfish	<i>Ameiurus catus</i>	8

^a Fish were released alive in good to excellent condition

^b All but one had adipose fin; Steelhead had adipose fin

Discussion

Flows in the Sacramento River were consistently lower this season than any other time we have deployed fyke traps for this purpose. The steady low flows undoubtedly influenced the movements of spawning Striped Bass, such that we are relatively likely to have observed a subset of the adult population that is unusual for the spawning season in this area.

We deployed fewer fyke traps than typical, because initially we could not find enough locations that were deep enough. We later found additional suitable locations, but it quickly became clear that we would end the season early such that deploying more traps would not have been cost effective. We ended the season early because it became clear that we were unlikely to capture the large numbers of Striped Bass we sought and because water temperatures were increasingly close to stressful for the fish.

A relatively high proportion of fish we caught had been previously tagged, which suggests (but does not guarantee) that the Striped Bass population has declined substantially.

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 California Department of Fish and Wildlife (Bay Delta Region, 2109 Arch-Airport Road, Suite 100, Stockton, CA 95206)

Name	Position Title
Dave Hull	Mate
Jared Mauldin	Fish and Wildlife Technician
Jason DuBois	Environmental Scientist
Jeremiah Bautista	Environmental Scientist
Marco Cabral	Fish and Wildlife Technician
Matt Siepert	Fish and Wildlife Technician
Michelle Avila	Senior Lab Assistant
Mike Harris	Environmental Scientist
Ryan Kok	Scientific Aide
Spencer Lewis	Scientific Aide

Appendix 2. Weekly length frequency distribution of Striped Bass caught (and measured) in fyke traps at Knights Landing during 2015; bins by 5 (e.g., 37 = 37 to 41 cm FL); legal size: ≥ 42 cm FL

