

2013 Adult Striped Bass Tagging Cruise Report

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

by Jason DuBois and Michael D. Harris

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Cruise Dates: 09 April 2013 – 29 May 2013

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 2013 striped bass-tagging field season.

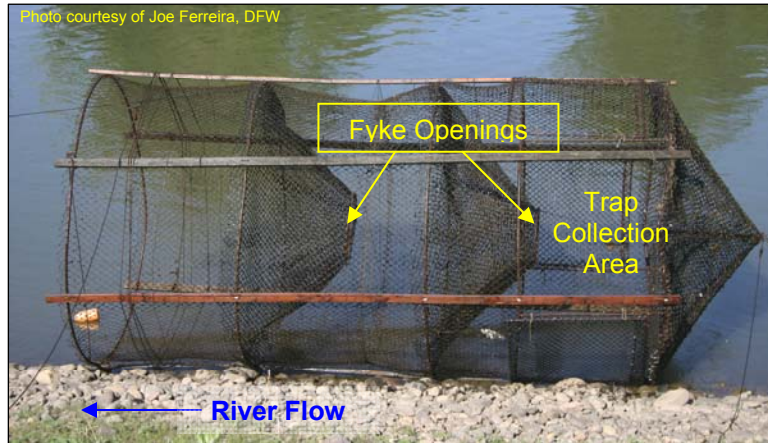
The tagging program is designed to understand and monitor the population dynamics of striped bass (*Morone saxatilis*), with the ultimate goal being to provide the tools to inform science-based resource management decisions. These tools include relative and absolute abundance, harvest rate, mortality 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 ten 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). Five traps were placed on the east riverbank about two miles upstream of the Knights Landing Bridge (Highway 113). Five traps were 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, or level area.



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.

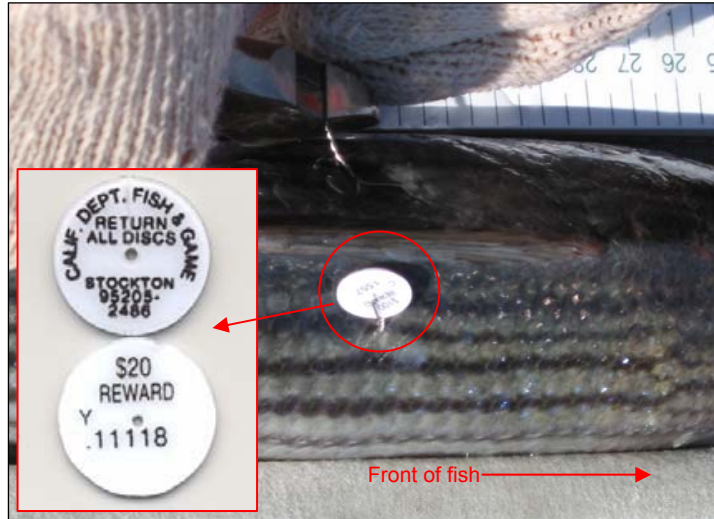
An electric winch was used to roll the traps up and down the riverbank. When the trap and boat were in position, fish were netted from the trap and tagged on board the *Kayot*.

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 09-April and ended on 29-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 27 days, inspected each day for the presence of listed fishes, and tended 155 times (Table 1). On average, traps fished 24.0 hours per day (range: 18.0 – 29.25 hours).

Two thousand seven hundred five (2,705) striped bass were caught, of which 2,627¹ were then tagged (Table 1). Fifty fish were recorded as “over”.

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

Table 1. Summary of fyke trap effort and striped bass catch during 2013

	Total Caught	Total Tagged	# Traps Fished	# Traps Tended	# Days Fished
Total	2,705	2,627	254	155	27
Daily Minimum	9	6	3	-	N/A
Daily Maximum	455	445	10	10	N/A
Daily Average	135	131	9	6	N/A
Minimum/Day/Trap	1	1	N/A	N/A	N/A
Maximum/Day/Trap	325	319	N/A	N/A	N/A
Average/Day/Trap	22	23	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.

Twenty-one fish were recaptures, of which five were within-season², 11 were from 2012, four were from 2011, and one was from 2008 (Table 2). Tag 284091 was inadvertently pulled from the fish during handling. This fish was re-tagged (new tag = 291101).

² Tagged and recaptured within the 2013 season

Table 2. Striped bass recaptured during 2013 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)
15-May	276675	5-May-08	1,836	49	73	4.8
3-May	281645	19-Apr-11	745	42	50	3.9
24-May	284091	13-May-11	742	71	84	6.4
3-May	C01776	11-May-11	723	42	54	6.1
12-Apr	284091	13-May-11	700	71	84	6.8
24-May	286065	18-Apr-12	401	51	57	5.5
24-May	286182	18-Apr-12	401	47	55	7.3
15-May	286319	18-Apr-12	392	55	58	2.8
30-Apr	285750	5-Apr-12	390	45	50	4.7
15-May	288197	9-May-12	371	52	63	10.8
15-May	C01946	9-May-12	371	48	53	4.9
11-Apr	285763	10-Apr-12	366	40	47	7.0
16-May	288391	17-May-12	364	53	56	3.0
10-May	288839	18-May-12	357	42	48	6.1
9-May	C01977	18-May-12	356	63	66	3.1
12-Apr	288205	9-May-12	338	56	61	5.4
10-May	C01989	12-Apr-13	28	40	40	NA
15-May	289605	30-Apr-13	15	57	56	NA
15-May	289830	3-May-13	12	71	72	NA
10-May	Y12099	30-Apr-13	10	47	47	NA
10-May	290060	8-May-13	2	54	55	NA

Note: Days at large < 31 = within-season recapture

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 from the beginning of the season to a season-low in week 3 (week of 22-April; Figure 1A). River stage fluctuated between ~14 and ~17 ft during mid-season, and then plateaued to about 18 ft for the remainder of the season. Water temperature was recorded by field crew at the beginning of each tagging day (Figure 1B). Average water temperature was 16 degrees Celsius (°C, or about 61 degrees Fahrenheit) for the tagging season. Water temperature was never lower than about 13 °C (56 °F).

Striped bass catch per trap-hour³ 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 0.575 fish (represented as the dashed grey line in Figures 1A and 1B). Six days were above this average.

³ 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.

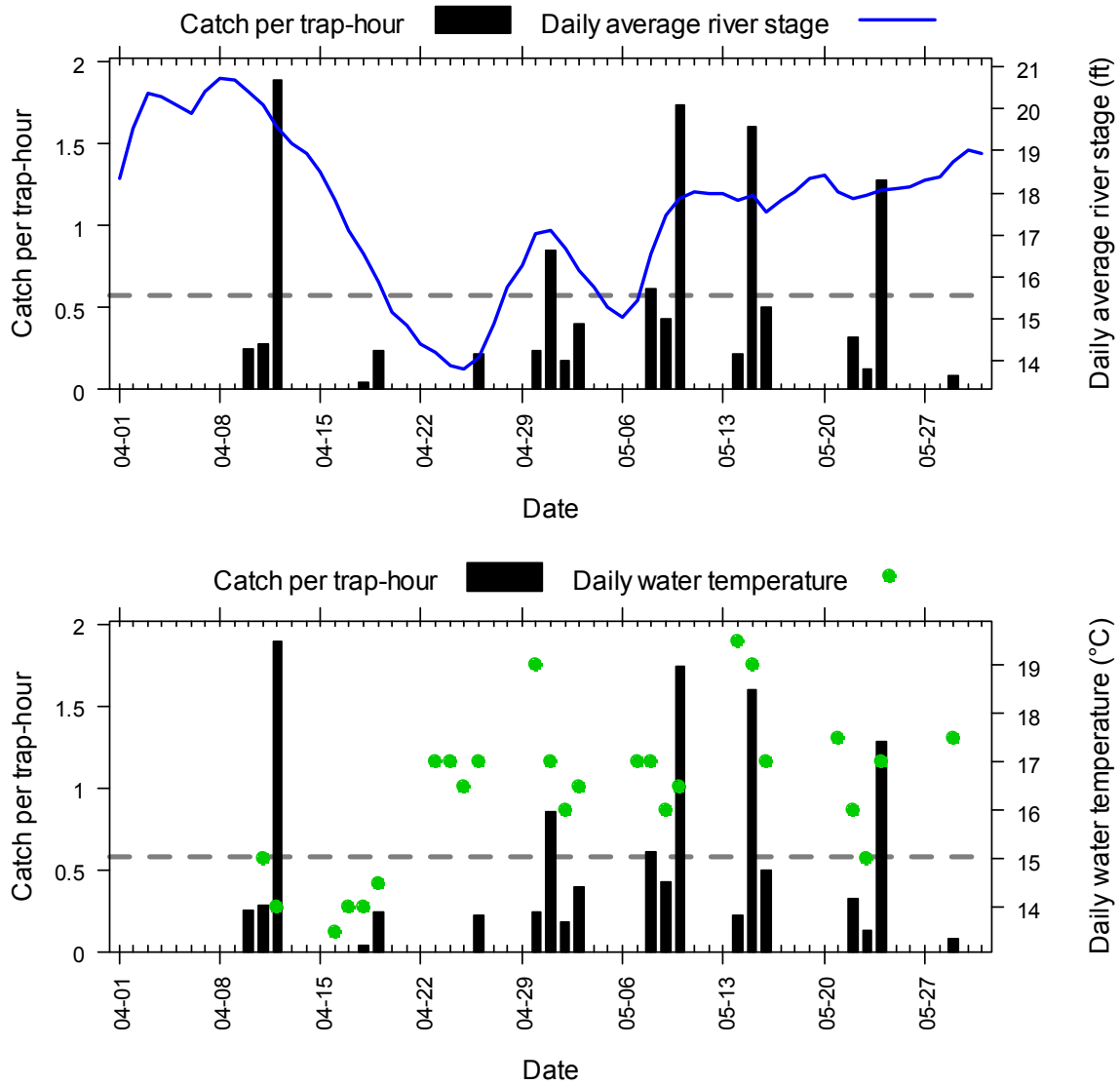


Figure 1. (A – top) Striped bass catch per trap-hour by day with daily average river stage at Knights Landing; (B – bottom) Striped bass catch per trap-hour by day with daily water temperature at Knights Landing; on 24-Apr, 25-Apr, and 07-May, traps inspected but not tended; 10-April temperature not recorded; date shown = Monday

Table 3. Summary of fyke trap effort and striped bass catch in 2013

Week	1	2	3	4	5	6	7	8
Tagged	420	66	53	393	695	575	419	6
Creeled/Not Tagged ^a	-	-	-	-	-	-	-	-
Over	6	1	-	2	11	9	7	14
Dead	-	-	1	3	-	2	1	-
Recapture (previous and within season)	3	-	-	3	5	7	3	-
Weekly Total Catch	429	67	54	401	711	593	430	20
Number of Traps Tended	15	18	11	26	23	25	27	10
Number of Days Fished	3	4	4	4	4	3	4	1
Minimum FL (cm)	34	36	41	37	37	35	36	39
Maximum FL (cm)	84	108	76	118	107	114	118	69
Average FL (cm)	50	52	55	55	53	53	53	50

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

Most striped bass were caught during the middle-end of the season (Table 3). Of the fish for which a length measurement was recorded (N=2,637), length ranged from 34 to 118 cm FL and averaged 53 ± 9 cm FL (\pm SD). Of the fish for which sex was recorded (N=2,633), 2,531 were male and 102 were female (~25 males to 1 female). On average, females were larger than males ($\text{♀} = 65 \pm 14$ cm FL, $\text{♂} = 52 \pm 8$ cm FL).

About 7% of all striped bass caught (and measured) were sub-legal size (Figure 2; bottom panel). This was a decrease of about 7% from 2012 (14%). Fish between 42 and 51 cm FL made up a greater percent of total in 2012 (~65%) than in 2013 (~40%). Percent of total catch of fish greater than 51 cm FL was greater this year (53%) than in 2012 (21%). Larger fish (i.e., > 72 cm FL) appeared early on and were present throughout the season (Appendix 2).

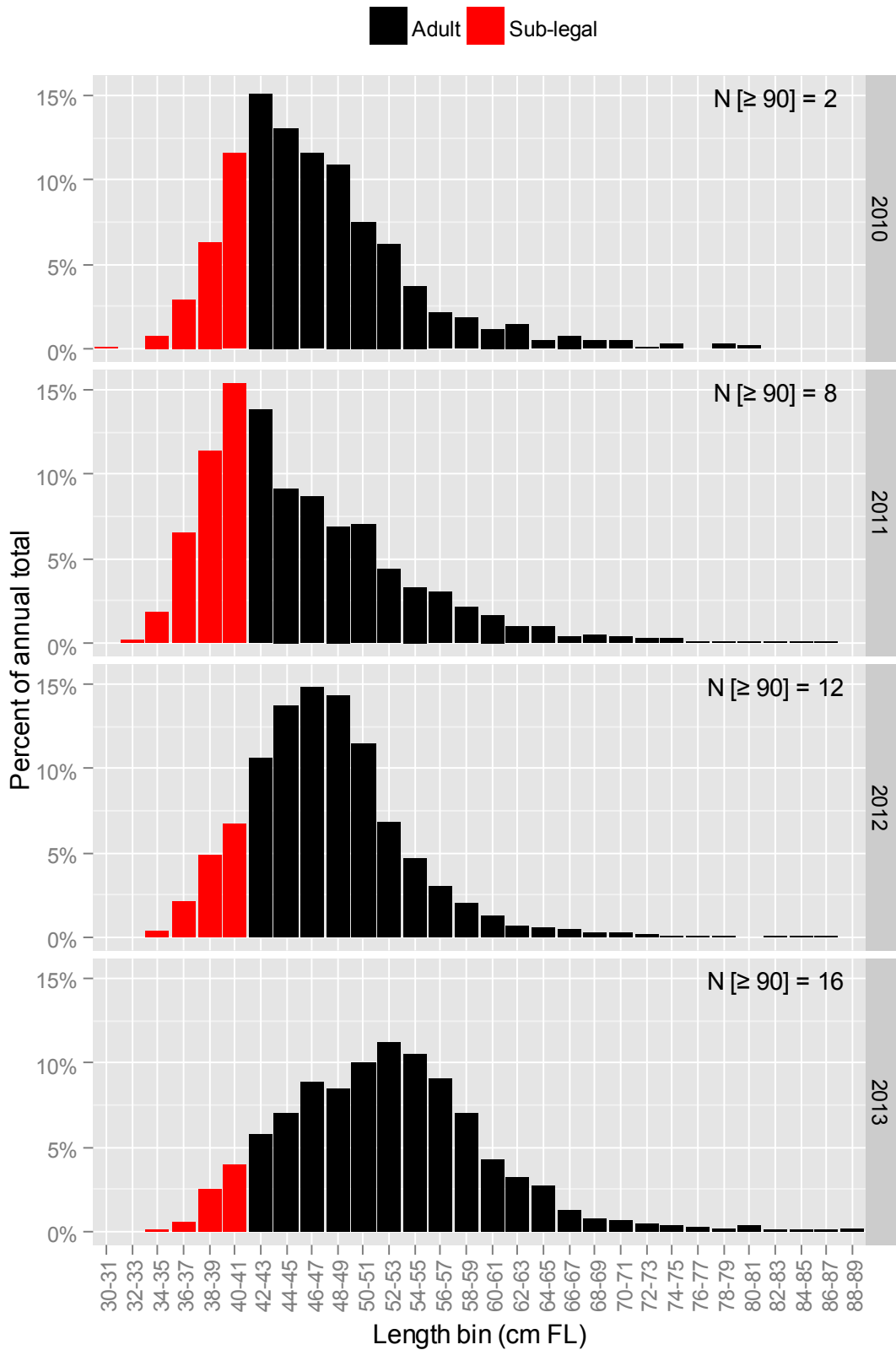


Figure 2. Length frequency of all striped bass collected in fyke traps from 2010-2013; fish \geq 90 cm FL not included in figure, see N [≥ 90]

Listed Species and other By-catch

Seventy-eight (78) 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 40 and 90 cm).

Two white sturgeon were caught within one week (10-May and 15-May) in two of the downstream traps. White sturgeon ranged in length from about 1 to 2 meters. All other by-catch was noted (Table 4).

Table 4. By-catch of the 2013 striped bass tagging season

Other Species (common name)	Scientific Name	Total Count
American Shad	<i>Alosa sapidissima</i>	449
Carp	<i>Cyprinus carpio</i>	3
Channel Catfish	<i>Ictalurus punctatus</i>	96
Chinook Salmon ^a	<i>Oncorhynchus tshawytscha</i>	78
Largemouth Bass	<i>Micropterus salmoides</i>	1
Sacramento Pikeminnow	<i>Ptychocheilus grandis</i>	8
Sacramento Sucker	<i>Catostomus occidentalis</i>	1
Smallmouth Bass	<i>Micropterus dolomieu</i>	3
Sacramento Splittail	<i>Pogonichthys macrolepidotus</i>	3
White Catfish	<i>Ameiurus catus</i>	5
White Sturgeon	<i>Acipenser transmontanus</i>	2

^a All were released alive in good/excellent condition (all except one had adipose fin)

Discussion

Although we caught about 4,000 fewer fish this year than in 2012, we tagged just 1,300 fewer fish because this year — unlike last year — CPUE was so low that we were never forced to “creel” fish due to overwhelming numbers.

Average catch per trap-hour was lower this year than in 2012 (~0.6 versus 1.4), which suggests that fewer striped bass migrated through the reach this year than last.

Although we must complete some laboratory work (reading striped bass scales) to confirm, four years of length frequency distributions shows recruitment (to the gear and the fishery) and progression of what appears to be a relatively strong 2008 year class (Figure 2).

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. A special thanks to Diana Jones who entered all the data and performed the ever-so-tedious line-by-line error checking of the entered 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
Diana Jones	Key Data Operator
Jared Mauldin	Fish and Wildlife Technician
Jason DuBois	Environmental Scientist
Mike Harris	Environmental Scientist

Appendix 2. Weekly length frequency distribution of striped bass caught (and measured) in fyke traps at Knights Landing during 2013; bins by 5 (e.g., 37 = 37 to 41 cm FL); legal size: ≥ 42 cm FL

