

2012 Adult Striped Bass Tagging Cruise Report

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

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Cruise Dates: 03 April 2012 – 22 May 2012

Introduction

An adult striped bass population study conducted by the California Department of Fish and Game (CDFG) has been ongoing since 1969. Part of the study is a “high-value” reward tagging program. Presented here is a summary of the 2012 striped bass-tagging field season.

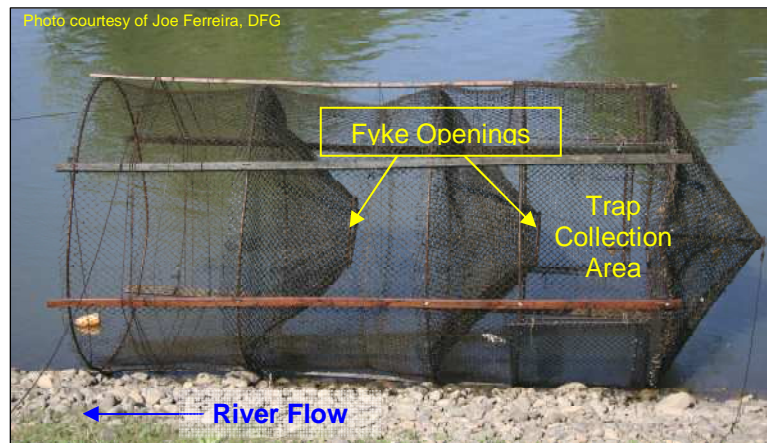
The tagging program is designed to understand and monitor the population dynamics of striped bass (*Morone saxatilis*), with the ultimate goal being to provide the tools to inform science-based resource management decisions. These tools include relative and absolute abundance, harvest rate, mortality 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 two Environmental Scientists, one Scientific Aide or 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 nine 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). Four 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.

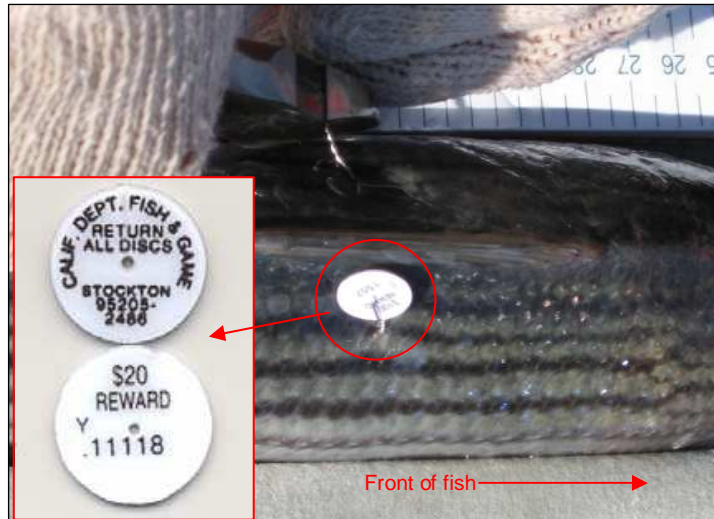
An electric winch was used to roll the traps up and down the riverbank (we did not need to use the cable-and-block system this season). When the trap and boat were in position, fish were netted from the trap and tagged on board the *Kayot*.



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 Game 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. Healthy fish that could not be tagged safely (e.g., due to time constraints) were enumerated, measured, and sexed but not tagged¹; scales were collected from about a tenth (N≈250) of these fish.

Results

The season began on 03-April and ended on 22-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 25 days, inspected each day for the presence of listed fishes, and tended 161 times (Table 1). On average, traps fished 24.0 hours per day (range: 15.5 – 31.0 hours).

On 10-May, the crew observed that five of the eight traps fishing had been vandalized and were not fishing properly (i.e., not completely submerged or not oriented correctly in relation to the channel).

Six thousand six hundred seventy-one (6,671) striped bass were caught, of which 3,912² were then tagged (Table 1). Thirty-eight fish were recorded as “over” and 2,676 were “creeled”.

¹ We described these fish as having been “creeled”.

² 563 of which were sub-legal, defined as < 42 cm FL

Table 1. Summary of fyke trap effort and striped bass catch during 2012

	Total Caught	Total Tagged	# Traps Fished	# Traps Tended	# Days Fished
Total	6,671	3,912	214	161	25
Daily Minimum	18	18	6	-	N/A
Daily Maximum	1,314	505	9	9	N/A
Daily Average	278	170	9	6	N/A
Minimum/Day/Trap	1	1	N/A	N/A	N/A
Maximum/Day/Trap	995	364	N/A	N/A	N/A
Average/Day/Trap	43	27	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-nine fish were recaptures, of which seven were within-season³, 19 were from 2011, and two were from 2007 (Table 2). For one of the 29 recaptured tags, the release year was unknown because the tag was broken and the complete tag number could not be recorded (number recorded = "xxx631"⁴).

³ Tagged and recaptured within the 2012 season

⁴ The first 3-digits are unknown (thus, "xxx631")

Table 2. Striped bass recaptured during 2012 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)
20-Apr	270047	8-Apr-07	1,839	50	63	2.6
17-May	F01411	8-May-07	1,836	58	60	0.4
15-May	281646	19-Apr-11	392	55	65	9.3
18-May	283289	4-May-11	380	40	50	9.6
20-Apr	281494	14-Apr-11	372	44	49	4.9
24-Apr	281949	19-Apr-11	371	42	47	4.9
25-Apr	282341	26-Apr-11	365	47	54	7.0
3-May	F01757	4-May-11	365	54	57	3.0
18-Apr	282088	20-Apr-11	364	49	58	9.0
24-Apr	282177	26-Apr-11	364	41	44	3.0
24-Apr	283134	28-Apr-11	362	46	51	5.0
2-May	283590	6-May-11	362	43	48	5.0
17-May	284878	24-May-11	359	40	43	3.1
18-May	Y11946	25-May-11	359	52	57	5.1
3-May	283671	11-May-11	358	50	52	2.0
19-Apr	283630	6-May-11	349	43	49	6.3
26-Apr	284019	13-May-11	349	43	50	7.3
25-Apr	284287	18-May-11	343	41	48	7.4
26-Apr	284838	20-May-11	342	55	59	4.3
25-Apr	Y11931	24-May-11	337	38	49	11.9
18-Apr	284886	24-May-11	330	43	51	8.8
17-May	286644	19-Apr-12	28	58	58	N/A
2-May	285863	5-Apr-12	27	53	52	N/A
26-Apr	285663	4-Apr-12	22	47	47	N/A
9-May	286129	18-Apr-12	21	48	47	N/A
25-Apr	285832	5-Apr-12	20	57	57	N/A
9-May	C01881	19-Apr-12	20	40	39	N/A
24-Apr	285981	13-Apr-12	11	41	40	N/A
16-May	xxx631 ^a	N/A	N/A	N/A	66	N/A

^a Tag broken, could not determine complete tag number; fish retagged with new tag

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

Of the fish for which a length measurement was recorded (N=6,621), length ranged from 30 to 114 cm FL and averaged 47 ± 7 cm FL (\pm SD). Males were more abundant than females. Of the fish for which sex was recorded (N=6,618), 6,490 were male and 128 were female (~50 males to 1 female). On average, females were larger than males ($\text{♀} = 63 \pm 14$ cm FL, $\text{♂} = 47 \pm 6$ cm FL).

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 fluctuated between 20 and 28 ft during the first five weeks of the season. Stage declined steadily during weeks five and six, then tapered to about 15 ft for the remainder of the season (Figure 1A). Water temperature was recorded by field crew at the beginning of each tagging day (Figure 1B). Average water temperature was 15 degrees Celsius ($^{\circ}\text{C}$, or about 59

degrees Fahrenheit) for the tagging season. Water temperature was never lower than about 10 °C (50 °F).

Striped bass catch per trap-hour⁵ 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 1.4 fish (represented as the dashed grey line in Figures 1A and 1B). Eight days were above this average.

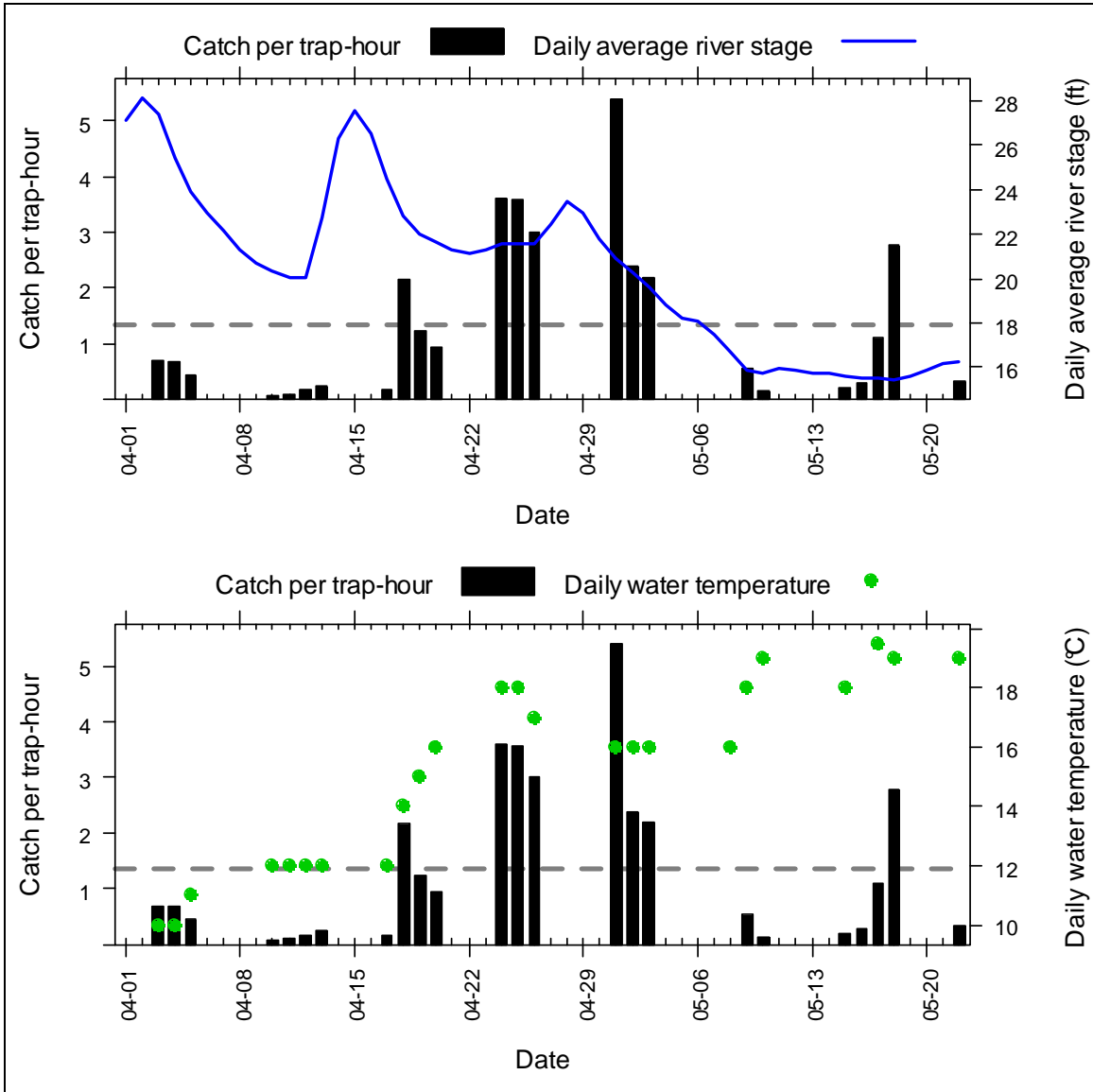


Figure 1. (A – top) Striped bass catch per trap-hour by day with daily average river stage at Knights Landing; (B – bottom) Striped bass catch per trap-hour by day with daily water temperature at Knights Landing; on 08-May, traps inspected but not tended; 16-May temperature not recorded; date shown = Sunday

⁵ 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.

Most striped bass were caught during the middle of the season (Table 3). Average fork length of tagged fish remained fairly consistent from week to week, until about week six and seven when the average increased by 3 to 5 cm.

Table 3. Summary of fyke trap effort and striped bass catch in 2012

Week	1	2	3	4	5	6	7	8
Tagged	303	135	932	790	716	154	805	77
Creeled/Not Tagged	-	-	1	1,193	1,374	-	108	-
Over	2	-	10	11	9	-	6	-
Dead	-	-	7	5	2	-	2	-
Recapture (previous and within season)	-	-	5	11	4	2	7	-
Weekly Total Catch	305	135	955	2,010	2,105	156	928	77
Number of Traps Tended	21	18	32	19	14	16	33	8
Number of Days Fished	3	4	4	3	3	3	4	1
Minimum FL (cm)	35	35	33	35	30	37	35	36
Maximum FL (cm)	72	76	91	79	103	101	101	114
Average FL (cm)	48	48	48	47	47	52	50	48

About 14% of all striped bass caught (and measured) were sub-legal size (Figure 2). This was a decrease of about 20% from 2011 (35%). Fish between 42 and 51 cm FL made up a greater percent of total in 2012 (~65%) than in 2011 (~46%). Percent of total catch of fish greater than 51 cm FL was about the same for both years (between 19% and 21%). Larger fish (i.e., > 72 cm FL) appeared early on but seemed to be more prevalent starting in week 6 (Appendix 2).

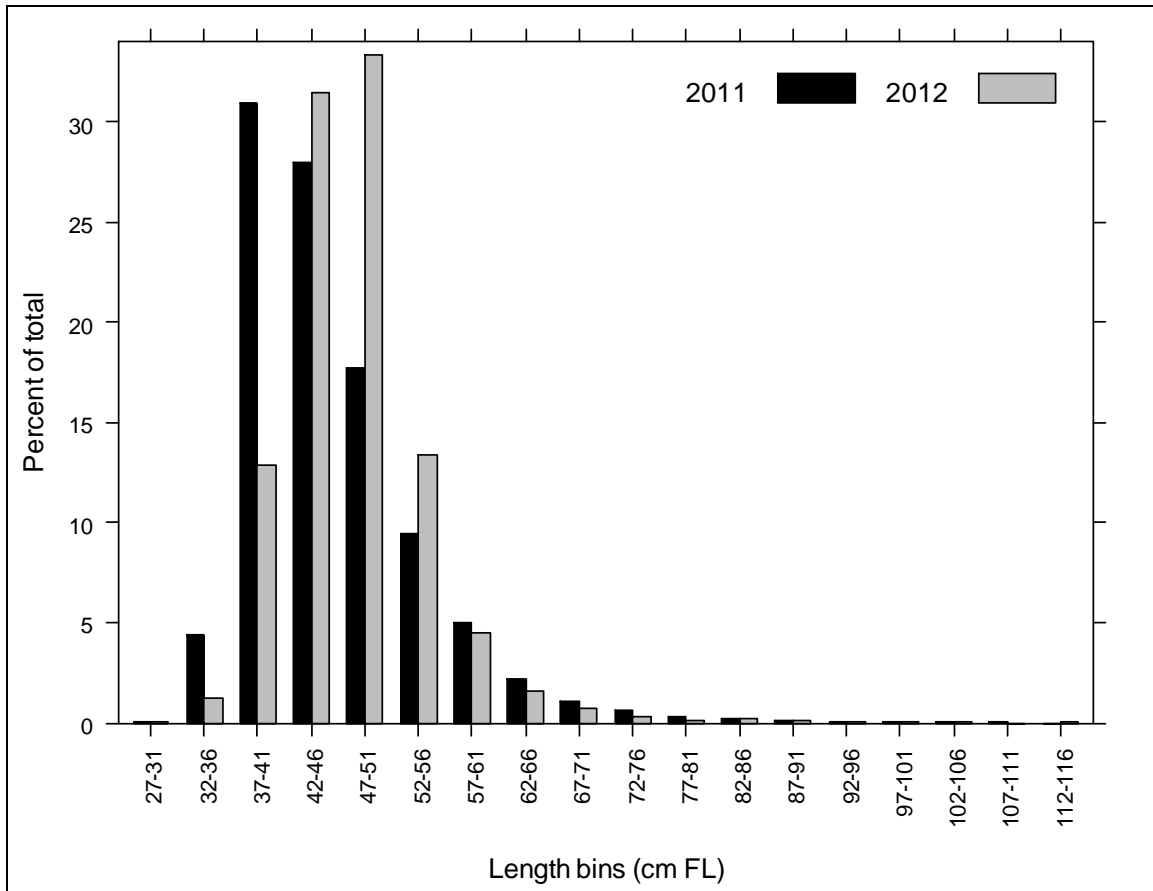


Figure 2. Length frequency of all striped bass collected in fyke traps during 2012; 2011 data included for comparison; (legal size: ≥ 42 cm FL)

Listed Species and other By-catch

Thirty-seven Chinook salmon, one steelhead, and one green sturgeon were caught this season (Table 4). All salmon were brightly colored, had an adipose fin, and were released alive in good to excellent condition (guesstimated lengths between 40 and 80 cm). The steelhead (~ 50 cm) had an adipose fin and was released alive in excellent condition. The green sturgeon (~ 1.5 m) was released alive and in good condition.

Fifty-five (55) white sturgeon were caught in one day, 46 of which were caught in one trap (19-Apr, Trap 7; Table 4). White sturgeon ranged in length from about 1 to 2 meters. All other by-catch was noted (Table 3).

Table 4. By-catch of the 2012 striped bass tagging season

Other Species (common name)	Scientific Name	Total Count
American Shad	<i>Alosa sapidissima</i>	510
Black Crappie	<i>Pomoxis nigromaculatus</i>	1
Carp	<i>Cyprinus carpio</i>	7
Channel Catfish	<i>Ictalurus punctatus</i>	80
Chinook Salmon ^a	<i>Oncorhynchus tshawytscha</i>	37
Green Sturgeon ^b	<i>Acipenser medirostris</i>	1
Largemouth Bass	<i>Micropterus salmoides</i>	1
Sacramento Blackfish	<i>Orthodon microlepidotus</i>	1
Sacramento Pikeminnow	<i>Ptychocheilus grandis</i>	6
Sacramento Sucker	<i>Catostomus occidentalis</i>	9
Smallmouth Bass	<i>Micropterus dolomieu</i>	6
Steelhead	<i>Oncorhynchus mykiss</i>	1
White Catfish	<i>Ameiurus catus</i>	2
White Sturgeon ^c	<i>Acipenser transmontanus</i>	62

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

^b Caught on 25-Apr

^c 55 caught during one day (19-Apr), 46 of which were in one trap

Discussion

We tagged about 600 fewer fish this year than in 2011, but we caught (overall) about 1,000 more fish — a fact attributable in part to three additional field days this season.

Average catch per trap-hour was about the same this year as in 2011 (1.4 versus 1.5), which suggests the abundance of striped bass in the reach was similar to last year.

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 Game (Bay Delta Region, 4001 N. Wilson Way, Stockton, CA 95205), except Metzger and MacColl — US Bureau of Reclamation (USBR)

Name	Position Title
Aaron Ngo	Senior Lab Assistant
Christina Harper	Scientific Aide
Dave Hull	Mate
Eric Haydt	Environmental Scientist
Gary Webb	Mate
Jennifer Messineo	Environmental Scientist
Katherine Osborn	Environmental Scientist
Lindsey Koos	Scientific Aide
Marty Gingras	Environmental Program Manager I
Maxfield Fish	Environmental Scientist
Michelle Avila	Scientific Aide
Mike Harris	Environmental Scientist
Ramiro Soto	Mate
Steve Metzger	Technician - USBR
Teresa MacColl	Technician - USBR

Appendix 2. Weekly length frequency distribution of striped bass caught (and measured) in fyke traps at Knights Landing during 2012; bins by 5 (e.g., 37 = 37 to 41 cm FL); legal size: ≥ 42 cm FL

