

2017 Sturgeon Fishing Report Card: Preliminary Data Report

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Summary

About 44,374 anglers were issued 2017 Sturgeon Fishing Report Cards (Cards). This report was written 05-Apr-2018 using information from the 14,578 Cards that had been received from anglers (11,223 via the Internet and 3,355 via mail) by that date.

Most catch of White Sturgeon was in Suisun and San Pablo bays. Most catch of Green Sturgeon was in Suisun Bay and in the Sacramento River from Rio Vista to Chipps Island. Anglers reported the release of 230 Green Sturgeon, retention of 2,755 White Sturgeon, and release of 4,817 White Sturgeon. As has been the case since 2007, roughly 50% of the anglers who fished for sturgeon were not successful and successful anglers retained on average just less than half the annual bag limit of three White Sturgeon.

Anglers reported fork length measurements for 117 Green Sturgeon (range 14-78 inches, averaged 33 inches). Of the White Sturgeon retained, anglers reported fork length measurements for 2,744 fish (range 40-60 inches, average 48 inches). Of the White Sturgeon released, anglers reported a length measurement for 2,522 fish (range 10-150 inches, averaged 44 inches).

Introduction

This report summarizes data from the 2017 California Sturgeon Fishing Report Card (Card). The Card is part of a suite of sport fishing regulations that are intended to protect California's year-round White Sturgeon fishery while increasing protections for the federally-threatened Green Sturgeon population and adding resiliency to the conservation-dependent White Sturgeon population.

The 2017 Card was distributed to any angler for a fee of \$8.13 exclusively through the Automated License Data System (ALDS) and was required of every angler — including minors, anglers fishing only from piers, and anglers fishing on 'free fishing' days — to fish for or retain a sturgeon in California.

Cards included fields for contact information, retained White Sturgeon, and released sturgeon (Appendix 1). To aid the Department's efforts to reduce illegal commercialization of sturgeon and to enforce the daily and annual bag limits on White Sturgeon, the Cards also included detachable single-use serially-numbered Card-specific tags to be placed on White Sturgeon retained by anglers.

Information on catch of sturgeon from 2017 Cards is complementary to on-going research and monitoring conducted by the Department (including application of disk-tags to wild fish) and others and will be used in planned articles and technical reports.

Card Distribution and Return

About 44,374 anglers were issued 2017 Sturgeon Fishing Report Cards (Cards). Anglers began returning Cards (on-line or via mail) almost immediately after distribution. Cards returned after preparation of this report began are not described here (cutoff date 05-Apr-2018, mid AM).

Fourteen thousand five hundred seventy-eight (14,578) Cards were returned. Of the Cards returned, 7,084 had no data (effort but no catch; 5,574 via the Internet and 1,510 via mail), 4,618 indicated no fishing effort (did not fish; 3,624 via the Internet and 994 via mail), and 2,876 (2,025 via the Internet and 851 via mail) had data on sturgeon catch.

Angler Data

The Card included fields for general, personal, and contact information (Appendix 1), but those data are not summarized here.

Catch Data

The Card contained three sections for reporting sturgeon catch: (1) Sturgeon Retained, (2) Sturgeon Released (no reward disk present), and (3) Sturgeon Released (reward disk present). See Appendix 1.

Recapture of disk-tagged fish — Twenty-four (24) anglers each caught one disk-tagged White Sturgeon or disk-tagged unidentified sturgeon (Table 1). No disk-tagged Green Sturgeon were reported. One angler reported catching and keeping (fish with) disk tag HH1001 (not shown in Table 1). Although this tag is a valid CDFW release from 2006, it also appears as the example on the report card. Anglers have previously recorded this tag, and to date the physical tag (HH1001) has not been returned to us.

Table 1. Angler-reported tag recaptures from 2017 Cards with corresponding CDFW tagging data; table sorted by date tagged (oldest to newest)

Angler-reported Tag Recaptures						CDFW Tagging Data			
Date (2017)	Location	Species	Fate	Fork Length (inches)	Tag Number	Date Tagged	Species	Fork Length (inches)	Days at large
1-Sep	Montezuma Slough	Unk	released	60	HH1909	23-Sep-10	White	42	2,535
22-Feb	San Pablo Bay	White	kept	41	HH1991	13-Aug-14	White	39	924
18-Oct	Suisun Bay	White	kept	44	HH2265	8-Oct-14	White	39	1,106
11-Nov	Sacramento River: Rio Vista to Chipps Island	White	kept	42	HH2132	13-Aug-15	White	35	821
7-Mar	Suisun Bay	White	kept	44	FF2139	25-Aug-15	White	39	560
14-Nov	Sacramento River: Rio Vista to Chipps Island	Unk	released	n/a	HH2145	1-Sep-15	White	35	805
1-Mar	Carquinez Strait	White	kept	57	HF2163	9-Sep-15	White	54	539
31-Dec	Suisun Bay	White	kept	41	HF2155	21-Sep-15	White	37	832
11-Dec	San Joaquin River: Stockton to Sherman Lake	White	kept	48	HF2180	29-Sep-15	White	41	804
29-Apr	Suisun Bay	Unk	released	n/a	HH2184	5-Oct-15	White	39	572
15-Feb	Montezuma Slough	White	kept	55	HH2172	8-Oct-15	White	51	496
18-Dec	Suisun Bay	Unk	released	63	FF2175	12-Oct-15	White	58	798
30-Apr	San Pablo Bay	Unk	released	n/a	HH2305	4-Oct-16	White	33	208
14-Apr	Montezuma Slough	White	kept	45	HF2332	5-Oct-16	White	43	191
18-Mar	Suisun Bay	Unk	released	n/a	HH2339	27-Oct-16	White	35	142
15-Nov	Suisun Bay	White	kept	47	HF2373	15-Aug-17	White	45	92
15-Nov	Suisun Bay	White	kept	44	HH2378	22-Aug-17	White	43	85
4-Nov	Grizzly Bay	White	kept	41	HF2378	22-Aug-17	White	41	74
12-Dec	San Pablo Bay	Unk	released	n/a	HH2386	5-Sep-17	White	38	98
21-Oct	Suisun Bay	White	kept	44	HF2389	6-Sep-17	White	44	45
28-Dec	Sacramento River: Knights Landing to Rio Vista	White	kept	44	HF2406	4-Oct-17	White	44	85
12-Dec	Napa River	White	kept	43	00126	-	-	-	-
3-Dec	Napa River	White	kept	46	1284150	-	-	-	-
25-Feb	Suisun Bay	Unk	released	63	1964	-	-	-	-

- = Cannot determine with information supplied

Catch — Anglers reported the release of 230 Green Sturgeon, retention of 2,755 White Sturgeon, and release of 4,817 White Sturgeon (Table 2). Twenty-seven (27) released sturgeon were not identified to species.

Table 2. White Sturgeon and Green Sturgeon catch reported on 2017 Cards

		White Sturgeon	Green Sturgeon	Unidentified Sturgeon	Overall Total
	Measured	2,744	NA	0	2,744
Retained	Not Measured	11	NA	0	11
	Total	2,755	NA	0	2,755
	Measured	2,522	117	12	2,651
Released	Not Measured	2,295	113	15	2,423
	Total	4,817	230	27	5,074
Overall Total		7,572	230	27	7,829

Two thousand twenty-eight (2,028) anglers reported retaining White Sturgeon (Table 3; average of 1.4 sturgeon). One hundred forty-six (146) anglers retained the limit of three White Sturgeon.

One thousand four hundred nine (1,409) anglers reported releasing White Sturgeon (Table 3). Of those anglers, 106 each released 10-30 fish and three each released > 30 fish.

One hundred fifty-two (152) anglers reported releasing Green Sturgeon (Table 3; average of 1.5 sturgeon). Of those anglers, 36 each released 2-8.

Table 3. Summary statistics for per-angler catch from 2017 Cards with catch data

	Number of Anglers	Number of Sturgeon	Maximum Number of Sturgeon per Angler	Average Number of Sturgeon per Angler
Retained White Sturgeon	2,028	2,755	3	1.4
Released White Sturgeon	1,409	4,817	40	3.4
Green Sturgeon	152	230	8	1.5
Unidentified Sturgeon	21	27	3	1.3

Far and away most of the successful White Sturgeon anglers caught 1-2 fish (Figure 1). Three hundred fifty-two (352¹) anglers retained and released White Sturgeon on the same day. The number of White Sturgeon voluntarily conserved could not be calculated, because the length of sturgeon released was not a required field on the Card.

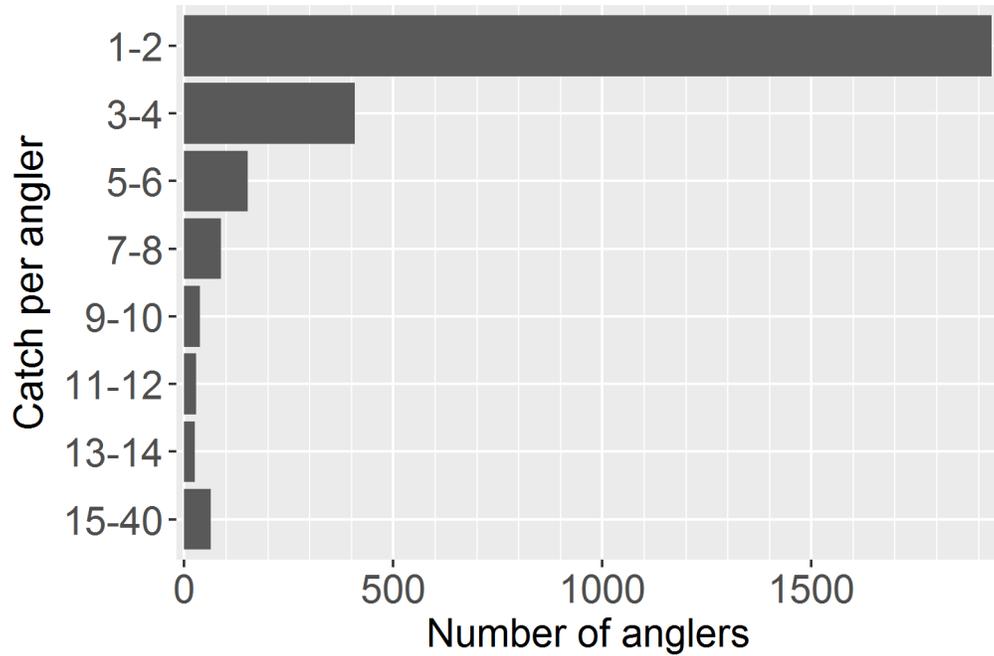


Figure 1. Frequency distribution of White Sturgeon catch per angler as reported on 2017 Cards

¹ Of the 352 anglers, 13 retained and released White Sturgeon on three separate days, 51 retained and released White Sturgeon on two separate days, and 288 retained and released White Sturgeon on one day.

Lengths — Green Sturgeon length ranged 14-78 inches and averaged 33 inches (Figure 2). Retained White Sturgeon length ranged 40-60 inches² and averaged 48 inches (Figure 3). For the released White Sturgeon for which a length measurement was reported³ (Figure 4), length ranged 10-150 inches and averaged 44 inches, 736 were within the slot limit, 1,363 were below the slot limit, and 423 were above the slot limit.

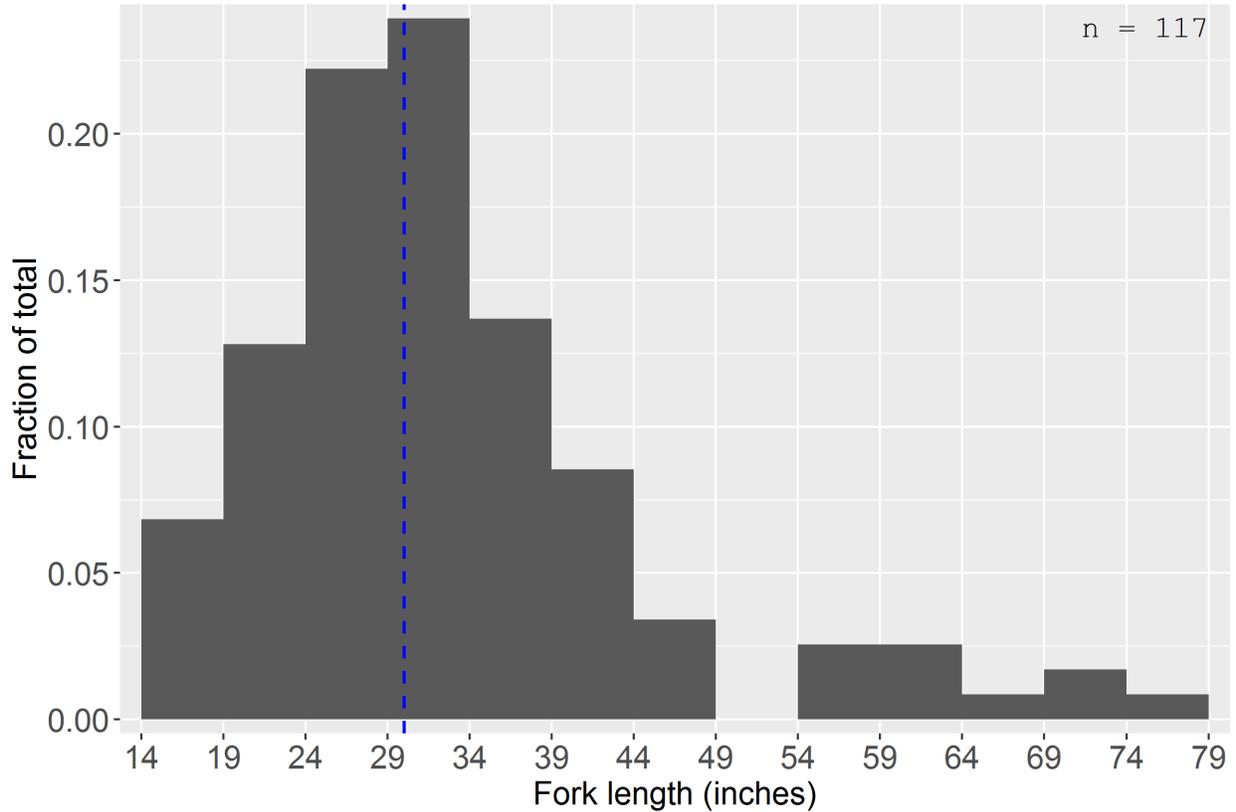


Figure 2. Length frequency distribution of Green Sturgeon released as reported on 2017 Cards; number measured included upper-right; dashed blue line indicates median; bins by 5 inches

² For 11 retained White Sturgeon, length was not recorded, illegible, or reported above or below the legal limit (40-60 inches FL).

³ Length of released fish is not a required field, but many anglers volunteered the information.

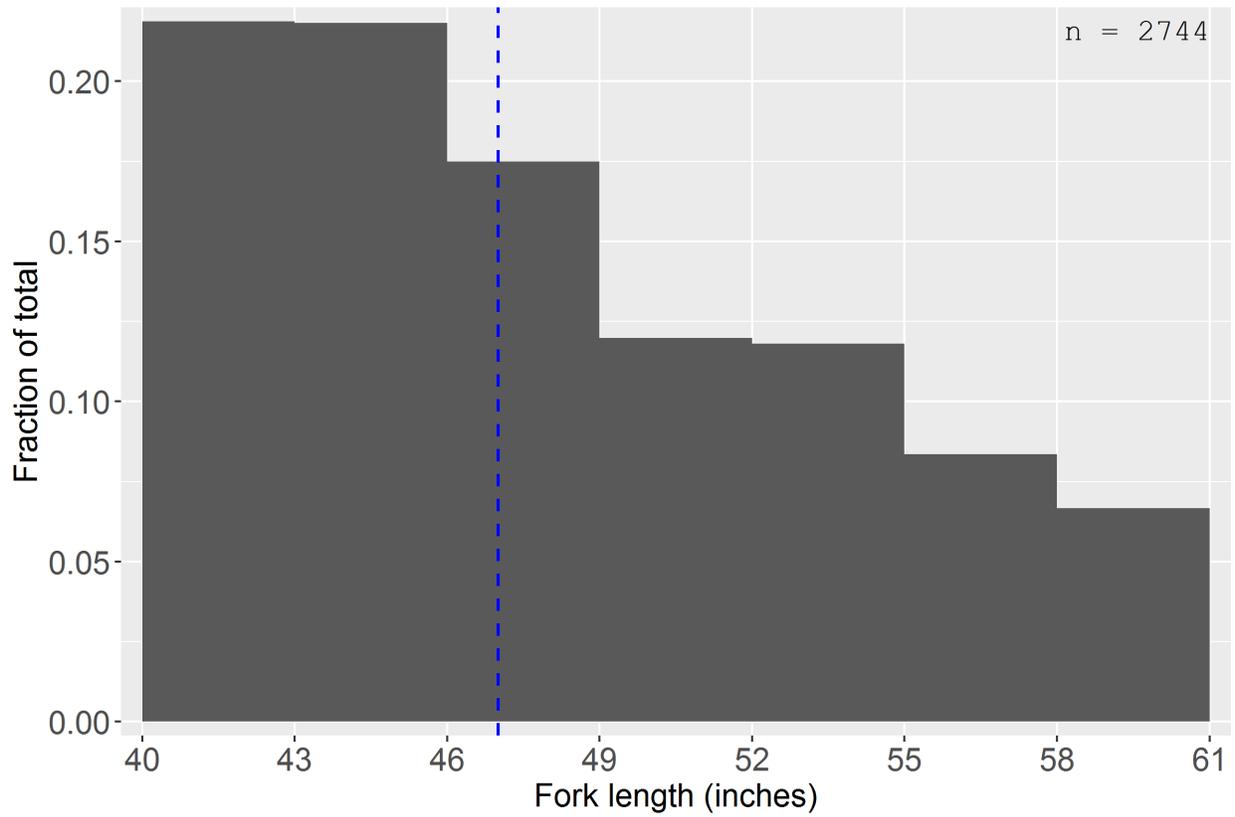


Figure 3. Length frequency distribution of White Sturgeon retained as reported on 2017 Cards; number measured included upper-right; dashed blue line indicates median; bins by 3 inches

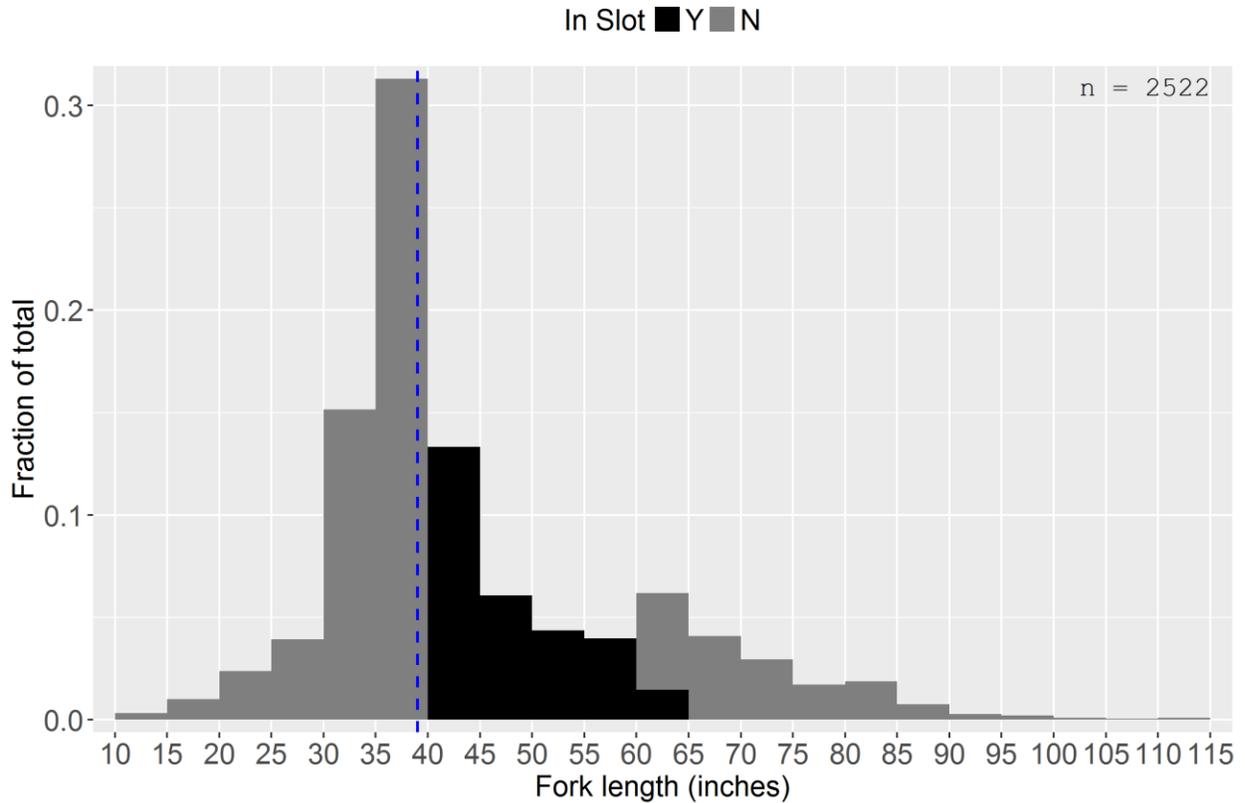


Figure 4. Length frequency distribution of White Sturgeon released as reported on 2017 Cards (dark bars denote slot limit of 40–60 inches FL); number measured included upper-right; dashed blue line indicates median; bins by 5 inches. Because these data are not collected randomly or systematically (e.g., many slot-sized fish are not released) and it is illegal to remove certain oversized White Sturgeon from the water (e.g., for measurement), this is not the population's actual distribution and is likely biased towards relatively small fish. Note: one fish at 150 inches not shown for ease of display

Seasonality — Catch per month ranged from approximately 1-18%, with the smallest proportions during summer months and early fall (Table 4).

Table 4. White Sturgeon and Green Sturgeon catch per month for 2017

Month	White Sturgeon	Green Sturgeon	Unknown Sturgeon	Catch Total	Percent of Total
Jan	729	13	1	743	9.49
Feb	893	25	2	920	11.75
Mar	1,024	17	2	1,043	13.32
Apr	680	15	3	698	8.92
May	354	5	0	359	4.59
Jun	163	10	1	174	2.22
Jul	106	5	0	111	1.42
Aug	95	2	0	97	1.24
Sep	172	13	1	186	2.38
Oct	796	48	2	846	10.81
Nov	1,231	33	9	1,273	16.26
Dec	1,329	44	6	1,379	17.61
Totals	7,572	230	27	7,829	

Locations — Anglers reported catching sturgeon in 27 of the 28 locations listed on the Card (Figure 5). For the present purposes, locations where 1-50 sturgeon were collected are grouped as 'All Other Locations' (AOL, N = 16). Locations were either not specified or were illegible (grouped as 'Unknown', here included in AOL) for three retained White Sturgeon, eight released White Sturgeon, and one unidentified sturgeon.

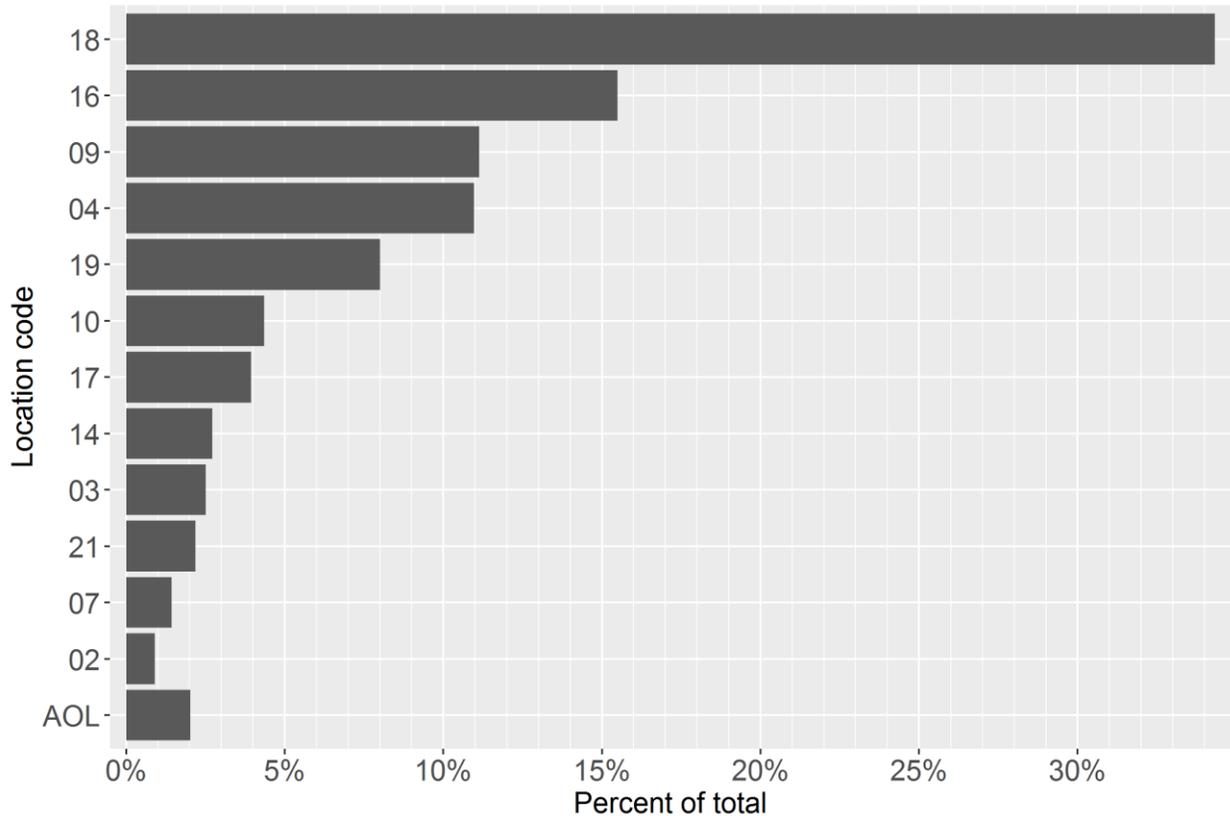


Figure 5. Percent of total catch of all sturgeon by location as reported on 2017 Cards; to conserve space location codes — rather than names — are given, see any of tables 5-7 for location names

Catch of Green Sturgeon was greatest in Suisun Bay and in the Sacramento River from Rio Vista to Chipps Island and (Table 5). Catch of White Sturgeon was greatest in Suisun and San Pablo bays (Tables 6 and 7).

Table 5. Green Sturgeon catch and length statistics by location and season as provided on 2017 Cards. The five locations where total catch was highest were ranked. Seasons were defined as follows: Winter=December-February, Spring=March-May, Summer=June-August, Fall=September-November.

Location Code	Location Name	Rank of Catch	Number of Anglers	No Month of Capture	Winter Catch	Spring Catch	Summer Catch	Fall Catch	Total Catch	Number Measured	Minimum Length (inches)	Maximum Length (inches)	Average Length (inches)
01A	Sacramento River: Upstream of Red Bluff		1	-	-	-	-	1	1	-			
01B	Sacramento River: Red Bluff to Hwy 32 bridge		-	-	-	-	-	-	-	-	-	-	-
01C	Sacramento River: Hwy 32 bridge to Colusa		-	-	-	-	-	-	-	-	-	-	-
2	Sacramento River: Colusa to Knights Landing		1	-	-	1	-	-	1	-			
3	Sacramento River: Knights Landing to Rio Vista		1	-	1	-	-	-	1	-			
4	Sacramento River: Rio Vista to Chipps Island	2	29	-	19	3	-	16	38	12	16	62	29.6
5	Feather River		2	-	-	-	7	-	7	1	60	60	60.0
6	American River		-	-	-	-	-	-	-	-	-	-	-
7	Sacramento Deepwater Ship Channel		-	-	-	-	-	-	-	-	-	-	-
8	Yolo Bypass		-	-	-	-	-	-	-	-	-	-	-
9	Montezuma Slough		12	-	4	3	-	5	12	7	25	72	39.6
10	Napa River		7	-	2	4	1	-	7	4	28	38	34.2
11	Petaluma River		1	-	1	-	-	-	1	1	45	45	45.0
12	San Joaquin River: Upstream of HWY 140 bridge		-	-	-	-	-	-	-	-	-	-	-
13	San Joaquin River: HWY 140 bridge to Stockton		1	-	-	1	-	1	2	-			
14	San Joaquin River: Stockton to Sherman Lake	4	10	-	6	1	2	15	24	11	14	39	26.5
15	Old River		-	-	-	-	-	-	-	-	-	-	-
16	San Pablo Bay	3	24	-	14	10	1	-	25	10	25	70	40.6
17	Carquinez Strait	5	9	-	1	2	1	12	16	7	18	42	29.3
18	Suisun Bay	1	54	-	23	8	5	42	78	50	18	78	30.6
19	Grizzly Bay		8	-	10	3	-	1	14	11	14	39	32.1
20	San Francisco Bay: North of HWY 80		1	-	-	-	-	1	1	1	42	42	42.0
21	San Francisco Bay: South of HWY 80		2	-	1	1	-	-	2	2	44	66	55.0
22	Pacific Ocean: North of Golden Gate Bridge		-	-	-	-	-	-	-	-	-	-	-
23	Pacific Ocean: Golden Gate Bridge to Point Sur		-	-	-	-	-	-	-	-	-	-	-
24	Pacific Ocean: Point Sur to San Diego		-	-	-	-	-	-	-	-	-	-	-
25	Any reservoir or lake		-	-	-	-	-	-	-	-	-	-	-
26	Klamath River		-	-	-	-	-	-	-	-	-	-	-
unk			-	-	-	-	-	-	-	-	-	-	-
Totals			163	-	82	37	17	94	230	117			

- = no reported angler catch

Notes: (1) some anglers fished more than one location; (2) any lengths reported as single-digits not included in descriptive stats (n, min, max, avg)

Table 6. Retained White Sturgeon catch and length statistics by location and season as provided on 2017 Cards. The five locations where total catch was highest were ranked. Seasons were defined as follows: Winter=December-February, Spring=March-May, Summer=June-August, Fall=September-November.

Location Code	Location Name	Rank of Catch	Number of Anglers	No Month of Capture	Winter Catch	Spring Catch	Summer Catch	Fall Catch	Total Catch	Number Measured	Minimum Length (inches)	Maximum Length (inches)	Average Length (inches)
01A	Sacramento River: Upstream of Red Bluff		2	-	-	1	-	1	2	2	42	43	42.5
01B	Sacramento River: Red Bluff to Hwy 32 bridge		1	-	1	-	-	-	1	1	56	56	56.0
01C	Sacramento River: Hwy 32 bridge to Colusa		5	-	-	5	-	-	5	5	49	60	53.8
2	Sacramento River: Colusa to Knights Landing		18	-	2	18	-	2	22	22	41	60	52.3
3	Sacramento River: Knights Landing to Rio Vista		88	-	29	33	1	40	103	103	40	59	50.0
4	Sacramento River: Rio Vista to Chipps Island	3	295	-	79	73	9	193	354	352	40	60	47.9
5	Feather River		12	-	1	10	1	-	12	12	44	59	53.6
6	American River		-	-	-	-	-	-	-	-	-	-	-
7	Sacramento Deepwater Ship Channel		37	-	6	11	2	24	43	43	41	58	47.7
8	Yolo Bypass		1	-	-	-	1	-	1	1	51	51	51.0
9	Montezuma Slough	4	213	-	58	88	21	89	256	256	40	60	47.2
10	Napa River		97	-	42	44	11	17	114	114	40	60	46.8
11	Petaluma River		6	-	3	2	-	1	6	6	44	60	51.7
12	San Joaquin River: Upstream of HWY 140 bridge		12	-	3	1	-	14	18	18	41	59	48.8
13	San Joaquin River: HWY 140 bridge to Stockton		12	-	3	2	1	12	18	18	40	58	47.3
14	San Joaquin River: Stockton to Sherman Lake		80	-	27	24	6	43	100	99	40	60	48.1
15	Old River		4	-	5	1	-	-	6	6	41	56	48.2
16	San Pablo Bay	2	324	-	227	142	18	12	399	396	40	60	47.9
17	Carquinez Strait		84	-	37	23	11	30	101	101	40	60	47.4
18	Suisun Bay	1	683	-	348	163	56	315	882	879	40	60	46.9
19	Grizzly Bay	5	164	-	111	22	1	62	196	195	40	60	47.3
20	San Francisco Bay: North of HWY 80		11	-	3	6	1	2	12	12	40	56	45.8
21	San Francisco Bay: South of HWY 80		75	-	40	49	-	10	99	98	40	59	49.2
22	Pacific Ocean: North of Golden Gate Bridge		1	-	-	-	1	-	1	1	56	56	56.0
23	Pacific Ocean: Golden Gate Bridge to Point Sur		1	-	1	-	-	-	1	1	59	59	59.0
24	Pacific Ocean: Point Sur to San Diego		-	-	-	-	-	-	-	-	-	-	-
25	Any reservoir or lake		-	-	-	-	-	-	-	-	-	-	-
26	Klamath River		-	-	-	-	-	-	-	-	-	-	-
unk			3	-	1	2	-	-	3	3	44	52	47.0
Totals			2,229	-	1,027	720	141	867	2,755	2,744			

- = no reported angler catch

Notes: (1) some anglers fished more than one location; (2) any lengths reported as single-digits not included in descriptive stats (n, min, max, avg)

Table 7. Released White Sturgeon catch and length statistics by location and season as provided on 2017 Cards. The five locations where total catch was highest were ranked. Seasons were defined as follows: Winter=December-February, Spring=March-May, Summer=June-August, Fall=September-November

Location Code	Location Name	Rank of Catch	Number of Anglers	No Month of Capture	Winter Catch	Spring Catch	Summer Catch	Fall Catch	Total Catch	Number Measured	Minimum Length (inches)	Maximum Length (inches)	Average Length (inches)
01A	Sacramento River: Upstream of Red Bluff		2	-	1	-	-	2	3	3	36	63	47.7
01B	Sacramento River: Red Bluff to Hwy 32 bridge		-	-	-	-	-	-	-	-	-	-	-
01C	Sacramento River: Hwy 32 bridge to Colusa		2	-	1	2	-	-	3	2	39	70	54.5
2	Sacramento River: Colusa to Knights Landing		18	-	12	19	2	15	48	8	36	84	59.2
3	Sacramento River: Knights Landing to Rio Vista		44	-	37	31	1	24	93	36	30	80	43.5
4	Sacramento River: Rio Vista to Chipps Island	4	185	-	140	90	9	225	464	197	16	108	39.7
5	Feather River		5	-	-	3	4	-	7	6	36	70	59.8
6	American River		1	-	3	-	-	-	3	-	-	-	-
7	Sacramento Deepwater Ship Channel		29	-	6	14	5	42	67	27	32	70	43.0
8	Yolo Bypass		1	-	-	-	-	1	1	-	-	-	-
9	Montezuma Slough	3	231	-	163	247	42	150	602	336	12	110	47.7
10	Napa River		104	-	99	78	15	28	220	119	24	96	47.5
11	Petaluma River		7	-	6	3	1	2	12	11	32	67	42.5
12	San Joaquin River: Upstream of HWY 140 bridge		4	-	3	-	-	4	7	-	-	-	-
13	San Joaquin River: HWY 140 bridge to Stockton		2	-	1	1	-	-	2	1	26	26	26.0
14	San Joaquin River: Stockton to Sherman Lake		42	-	21	16	12	40	89	54	16	85	39.8
15	Old River		2	-	1	1	-	-	2	1	10	10	10.0
16	San Pablo Bay	2	289	-	440	291	21	33	785	406	14	150	44.8
17	Carquinez Strait		77	-	76	48	18	47	189	109	16	80	40.6
18	Suisun Bay	1	519	-	654	396	87	580	1,717	939	10	110	43.0
19	Grizzly Bay	5	154	-	212	73	3	126	414	217	19	88	44.6
20	San Francisco Bay: North of HWY 80		4	-	4	-	1	-	5	4	28	76	54.0
21	San Francisco Bay: South of HWY 80		38	-	42	21	-	7	70	44	35	87	51.2
22	Pacific Ocean: North of Golden Gate Bridge		-	-	-	-	-	-	-	-	-	-	-
23	Pacific Ocean: Golden Gate Bridge to Point Sur		-	-	-	-	-	-	-	-	-	-	-
24	Pacific Ocean: Point Sur to San Diego		-	-	-	-	-	-	-	-	-	-	-
25	Any reservoir or lake		1	-	-	1	-	-	1	1	61	61	61.0
26	Klamath River		1	-	-	1	1	3	5	-	-	-	-
unk			6	-	2	2	1	3	8	1	45	45	45.0
- = no reported angler catch			Totals	1,768	-	1,924	1,338	223	1,332	4,817	2,522		

Notes: (1) some anglers fished more than one location; (2) any lengths reported as single-digits not included in descriptive stats (n, min, max, avg)

Discussion

Information from and about 2017 Cards includes the following highlights:

- (1) Approximately 33% of sturgeon anglers submitted their Cards or data, which is about equal to 2016, slightly greater than for 2015 Cards, moderately greater than 2013-2014, but substantially greater than for 2007-2012 Cards.
- (2) Just over 75% of reported Cards were done so via the Internet and about 70% of Cards with catch were reported on-line. Both are increases when compared to past years and suggests that anglers are becoming more familiar (or comfortable) with on-line reporting.
- (3) Some anglers (n = 11) reported single-digit sturgeon lengths and some anglers (n = 4) reported harvesting White Sturgeon in a closed reach of the Sacramento River (Location 01A). For those data submitted to us by way of mail, we verified that we entered the data accurately. We may attempt to clarify those reports by contacting the anglers.
- (4) As has been the case since 2007, roughly 50% of the anglers who fished for sturgeon were not successful and successful anglers retained on average just less than half the annual bag limit of three White Sturgeon.
- (5) Information on the reported capture of 21 (complete) disk-tagged White Sturgeon will augment the Department's sturgeon population study, and thus is important for the precision and/or accuracy of estimated abundance, harvest rate, and survival rate.
- (6) The mode in Green Sturgeon lengths is no doubt a sign that the 2011 brood year was exceptionally good, which — though we have essentially no data on the relationship between Green Sturgeon brood year strength and Sacramento River outflow — is what we expect from the strong relationship between White Sturgeon brood year strength and Sacramento River outflow.

Literature Cited and Relevant References

DFW-Region 3-Sport Fish Unit. 2018. Table: Sturgeon Fishing Report Card Summary Statistics, California Department of Fish and Wildlife
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=94336>

DFW-Region 3-Sport Fish Unit. 2018. Figure: Length Frequencies of White Sturgeon from Card Data, California Department of Fish and Wildlife
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=84549>

DFW-Region 3-Sport Fish Unit. 2018. Figure: Annual Abundance of San Francisco Estuary White Sturgeon by Size Category (sublegal, legal, oversized), California Department of Fish and Wildlife
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=84812>

Gingras, M. and J. DuBois. 2015. Estimating Annual Abundance of White Sturgeon 85-116 and >= 169 Centimeters Total Length, IEP Newsletter Volume 28, Number 2. Interagency Ecological Program for the San Francisco Estuary
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=114809>

Harris, M. D. 2016. Memorandum: Results of Nov 19–Dec 21 (2015) Pilot Sturgeon Angler Phone Survey. California Department of Fish and Wildlife.
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=115526>

Harris, M. D. 2016. Memorandum: Results of Jun 21-Aug 5 (2016) Pilot Sturgeon Angler Phone Survey, California Department of Fish and Wildlife
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=129286>

Harris, M.D. and J. DuBois. 2017. Memorandum: Results of 21-Dec-2016 to 30-Jan-2017 Pilot Sturgeon Angler Phone Survey, California Department of Fish and Wildlife
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentId=138277>

For more, click on [additional bibliography](#).

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