

Sturgeon Fishing Report Card: Summary Data Report

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Introduction

Herein provides a summary of California Sturgeon Report Card (Card) data. Since 2007, the Card has been required of any angler fishing for sturgeon. It is part of a suite of sport fishing regulations 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. Card data are complementary to on-going research and monitoring conducted by the California Department of Fish and Wildlife (CDFW) and other entities.

The Card includes fields for angler contact information (pre-printed), retained White Sturgeon, and released sturgeon. To aid CDFW's efforts to reduce illegal commercialization of sturgeon and to enforce the daily and annual bag limits on White Sturgeon, each Card also includes detachable single-use serially numbered Card-specific tags to be placed on retained White Sturgeon. Anglers must record the day, month, and location for any sturgeon they catch and keep or catch and release. Anglers also must record sturgeon length if kept. Though not required, many anglers record length for sturgeon released. A 'Reward Disk' field is available should the angler catch a sturgeon with a CDFW-affixed disc tag.

NOTES

- (1) Card data are not static, and summaries may change as new data become available. The current summary year (typically one year behind current calendar year) is most affected by this. This summary report is updated periodically as new data are collected. The most recent data extraction was 03-Jun-2020 @ 11:54.
- (2) Reporting for current valid Card (year 2020) is not due until 31-Jan-2021. Consider this when viewing any summary herein for 2020.
- (3) From 2007-2017, CDFW produced single-year Card summary reports. These reports are available at <https://wildlife.ca.gov/Conservation/Delta/Sturgeon-Study/Bibliography>, find title 'YYYY' *Sturgeon Fishing Report Card: Preliminary Data Report*, though updated annual summaries are found herein. The CDFW's Sportfish Unit will no longer produce single-year summaries.
- (4) The Card was first made available 01-Mar-2007. Some anglers reported data for Jan 2007 & Feb 2007; however, catch data are a bit 'thin' for this period compared to the norm. Keep this in mind when interpreting summaries herein.
- (5) Card location descriptions as written are long. For conciseness, locations *codes* are displayed in figures and tables herein. For reference, please see table in section 'Card Location Codes and Descriptions.'
- (6) 'disk' or 'disc' are used interchangeably when referring to the external tag CDFW affixes to White Sturgeon. The Card uses 'disk'.

CDFW contact: [Jason DuBois](#)

Distribution and Return

The Card has been distributed through the Automated License Data System (ALDS) since 2012. From 2007 through 2012, the Card was issued free of charge. A fee of ~\$8 was set in 2013. Initially, Cards were categorized as catch or no catch, but in 2010 a 'did not fish' check box was included (Table 1).

The ALDS affords anglers on-line reporting. There has been a steady increase of anglers making use of such accommodation (Table 1, see 'IS' or Internet submission). Further, there has been an increase overall in reporting ('ReportingRate'), though it seems to have reached a plateau (Table 1; ~33%).

Table 1 field names explained below for reference.

- **Year:** calendar year for which Card was issued (sold)
- **Issued:** number of Cards issued (or sold post 2012)
- **NoEffort:** number of anglers reporting 'did not fish' (available from 2010)
- **NoCatch:** number of anglers reporting 'fished, no catch'
- **Catch:** number of anglers reporting catching one or more sturgeon
- **ReturnRate:** sum of NoEffort, NoCatch, Catch divided by Issued
- **NotReturned:** number of Cards not returned
- **CC:** Control Center - Card entered by CDFW staff
- **IS:** Internet Submission - Card entered (reported) on-line by angler

Table 1. 2007-2020 Card distribution, return, and return rate. Did not fish ('NoEffort') not an option 2007-2009. Automated License Data System implemented 2012, making possible Internet submission (IS).

Year	Issued	NoEffort	NoCatch	Catch	Return Rate	Not Returned	CC	IS
2007	37,680	NA	5,064	1,855	18.36	30,761	NA	NA
2008	53,777	NA	5,281	2,048	13.63	46,448	NA	NA
2009	72,499	NA	6,350	2,208	11.80	63,941	NA	NA
2010	66,357	1,482	4,275	1,758	11.33	58,842	NA	NA
2011	112,000	4,374	5,765	2,274	11.08	99,587	NA	NA
2012	112,800	5,382	5,203	2,052	11.20	100,163	10,797	1,844
2013	50,915	3,130	5,213	2,290	20.90	40,273	6,850	3,792
2014	49,260	3,258	6,173	2,645	24.51	37,184	5,984	6,094
2015	48,337	4,423	7,052	2,870	29.75	33,955	5,525	8,858
2016	47,617	6,129	6,682	2,997	32.92	31,943	4,494	11,181
2017	44,374	4,715	7,236	2,814	33.52	29,502	3,658	11,223
2018	44,146	4,858	6,968	2,398	32.55	29,778	2,870	11,498

Year	Issued	NoEffort	NoCatch	Catch	Return Rate	Not Returned	CC	IS
2019	40,844	4,574	6,126	1,742	30.84	28,248	2,133	10,463
2020	35,986	0	1	NA	0.00	35,985	1	NA

Reported Catch

Anglers must report sturgeon catch, whether kept or released. Anglers may keep only White Sturgeon, with bag limits of one daily and three annually. On average, each year anglers keep about 2,000 White Sturgeon (Figure 1). Anglers catch and release an annual average of about 4,600 White Sturgeon (Figure 1).

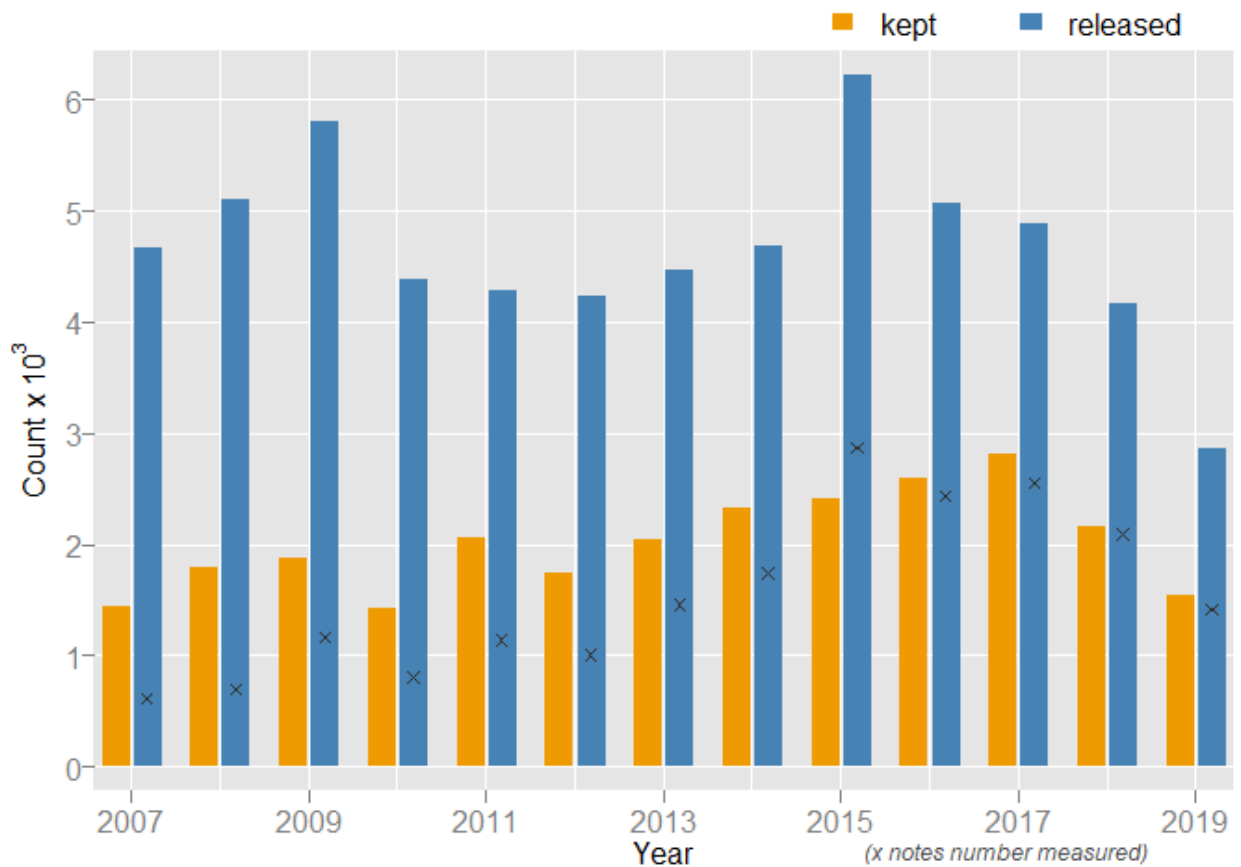


Figure 1. 2007-2019 Annual White Sturgeon catch (kept & released) from reported Cards. 'x' denotes number measured (released) and orange bars represent number kept (nearly all of which are measured as required by regulations).

Green Sturgeon are bycatch in the White Sturgeon fishery. Anglers may not keep a Green Sturgeon and annually release on average about 190 (Figure 2).

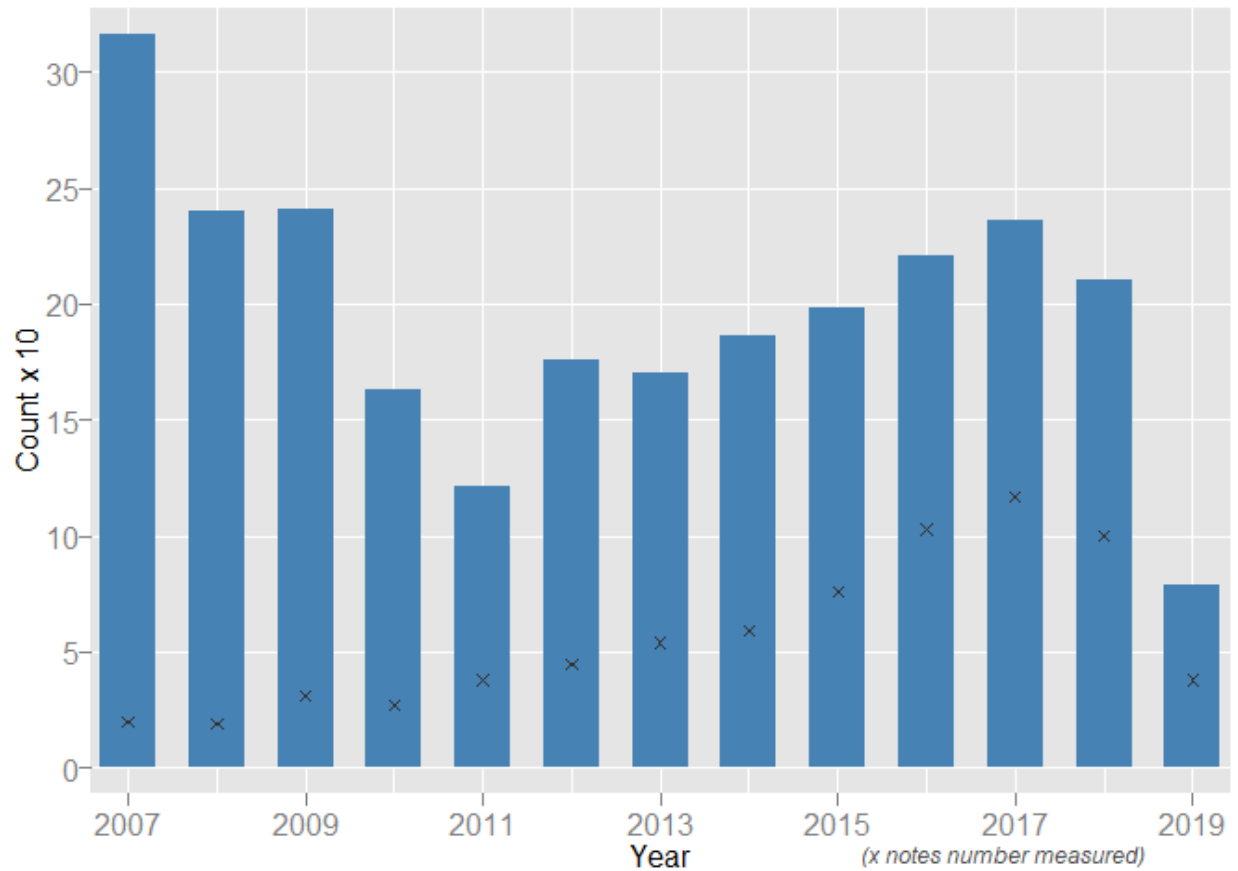


Figure 2. 2007-2019 Annual Green Sturgeon bycatch from reported Cards. 'x' denotes number measured.

The Card provides species check boxes (White or Green) for fish released with no reward disk present. No such check boxes exist for fish released with reward disk present, given a correctly recorded disk tag number provides trace back to CDFW release data. Annually, on average, about 40 sturgeon cannot be identified to species given the available information.

Catch per Angler

Roughly $\frac{2}{3}$ to $\frac{3}{4}$ of anglers who report catching sturgeon catch only 1 or 2 White Sturgeon per year (includes both kept and released; Table 2). Few anglers (<4%) catch 15 or more, and each year at least one angler reports catching many White Sturgeon (Table 2, field 'Max').

Table 2. 2007-2019 Annual White Sturgeon catch (kept or released) by angler. Displayed number is fraction of total anglers who report catching one or more sturgeon. Does not include anglers who reported 'fished no catch' or 'did not fish.' Column headings denote binned sturgeon catch, with 'Max' showing highest annual catch for one angler.

Year	1-2	3-4	5-6	7-8	9-10	11-12	13-14	15+	Max
2007	0.67	0.15	0.06	0.03	0.02	0.01	0.01	0.04	39
2008	0.66	0.17	0.06	0.03	0.02	0.01	0.01	0.04	39
2009	0.67	0.14	0.07	0.03	0.02	0.01	0.01	0.04	143
2010	0.66	0.16	0.07	0.03	0.03	0.01	0.01	0.04	53
2011	0.68	0.17	0.05	0.03	0.02	0.01	0.01	0.02	82
2012	0.69	0.15	0.06	0.03	0.02	0.01	0.00	0.03	32
2013	0.71	0.15	0.06	0.03	0.01	0.01	0.01	0.02	84
2014	0.72	0.15	0.05	0.02	0.02	0.01	0.01	0.02	49
2015	0.69	0.15	0.06	0.03	0.02	0.01	0.01	0.03	44
2016	0.73	0.14	0.05	0.03	0.01	0.01	0.01	0.02	39
2017	0.71	0.15	0.05	0.03	0.01	0.01	0.01	0.02	40
2018	0.73	0.15	0.04	0.02	0.02	0.01	0.01	0.02	41
2019	0.75	0.13	0.04	0.02	0.02	0.01	0.01	0.02	33

2013-present

In the ALDS-era and post-2012, Card reporting has consistently offered three categories: did not fish; fished no catch; and fished (& caught). This facilitates analyzing catch for the angling population expending effort (i.e., to not include 'did not fish' anglers).

Annually, on average about 1.4% (0.014) of anglers ($n \geq 1000$ reporting) who fish catch and release at least one Green Sturgeon (Table 3). Some anglers do catch and release more than one Green Sturgeon annually (Table 3, see 'Max' field).

Table 3. 2013-2020 Annual fraction of all reporting anglers who caught and then released one or more Green Sturgeon. 'Max' denotes maximum annual catch for one angler.

Year	Anglers	Fraction	Max
2013	120	0.0160	7
2014	137	0.0155	7
2015	151	0.0152	5
2016	157	0.0164	5
2017	154	0.0152	8
2018	141	0.0148	15
2019	60	0.0075	3

Of reporting anglers ($n \geq 1000$, including 'did not fish'), about 9% (0.09) on average keep one White Sturgeon. Fewer still keep the limit of three (Table 4). Roughly 27%-39% anglers reported 'did not fish.'

Table 4. 2013-2020 Annual fraction of all reporting anglers who kept 0 (none), 1, 2, or 3 White Sturgeon per Card (calendar) year. 'NoEffort' denotes anglers reporting 'did not fish.'

Year	Anglers	None	Kept-1	Kept-2	Kept-3	NoEffort
2013	10,642	0.5631	0.1031	0.0307	0.0089	0.2941
2014	12,074	0.5826	0.1091	0.0320	0.0065	0.2698
2015	14,382	0.5633	0.0968	0.0264	0.0060	0.3075
2016	15,674	0.4872	0.0868	0.0263	0.0086	0.3910
2017	14,872	0.5439	0.0992	0.0299	0.0100	0.3170
2018	14,368	0.5470	0.0864	0.0217	0.0067	0.3381
2019	12,596	0.5407	0.0744	0.0176	0.0041	0.3631

To derive the number of anglers who actively practice catch-n-release only is not possible given available data. However, of the reporting anglers who fished, between 6.6% and 10.1% released sturgeon yet retained none (2013-2019, years with ≥ 1000 reporting).

Length

Anglers must report length for White Sturgeon kept. Anglers are not required to report length of released fish, but some do, typically in the species check box. Anglers report inches, as required by regulations, and herein lengths were converted to centimeters fork length (FL).

Occasionally, an angler will report a suspiciously small length (i.e., ≤ 10). Likely, here the angler is using short hand for catch (i.e., number caught). So, any "length" ≤ 10 is flagged and set to NA for analytical purposes (Table 5).

Table 5. 2007-2019 Annual count of reported 'lengths' by species CDFW identified as suspect (i.e., too small). For White Sturgeon, this includes kept and released fish, but most are released.

Year	White	Green
2007	2	0
2008	0	0
2009	5	0
2010	1	0
2011	1	0
2012	1	0
2013	2	1

Year	White	Green
2014	6	1
2015	3	1
2016	15	1
2017	13	0
2018	5	0
2019	11	0

Green Sturgeon

Of the reported valid lengths, most Green Sturgeon are less than 100 cm (~40 inches; Figure 3). The orange box represents the interquartile range (25%-75%).

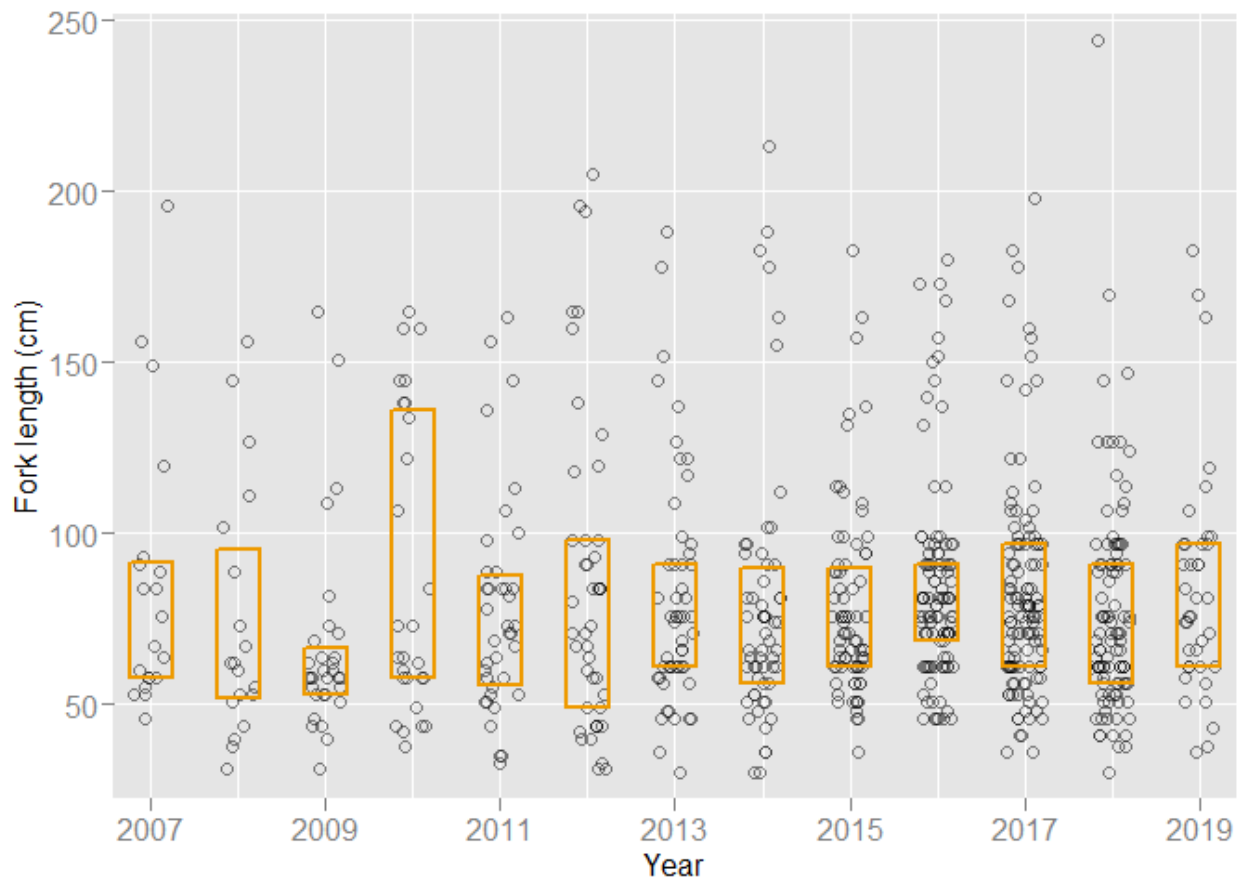


Figure 3. 2007-2019 Reported Green Sturgeon lengths (converted from inches to centimeters). Bottom and top of orange box denotes 25th and 75th percentile. Note: noise added to x-axis to lessen over-plotting.

White Sturgeon (released)

Length distributions indicate annual median values below 102 cm FL, the lower bound for the slot (Figure 4, see 'x' on figure). From 2013-2019, it appears anglers were catching

more sub-slot sized fish, measuring more sub-slot sized fish, or a combination of both (Figure 4, see progressively darker points below the slot). Anglers released White Sturgeon that could have been retained.

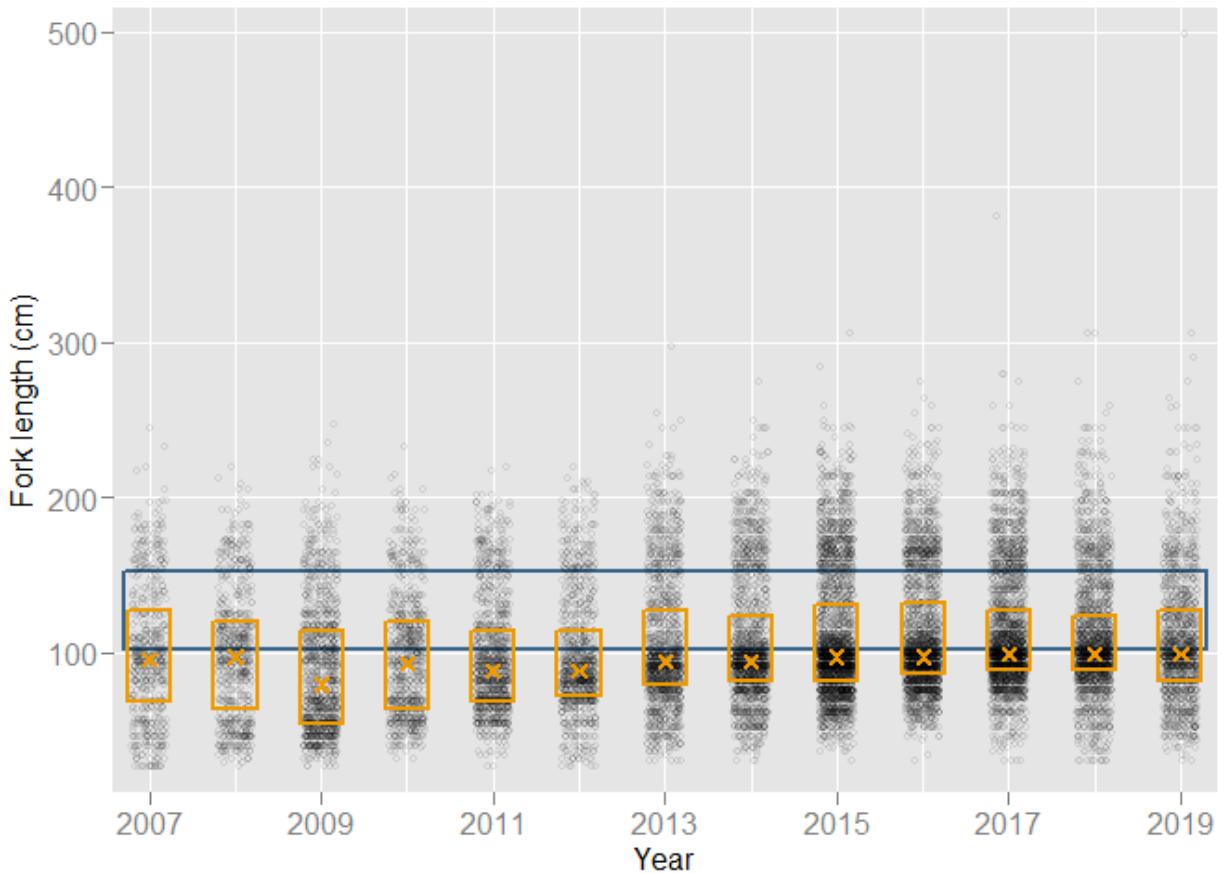


Figure 4. 2007-2019 Reported released White Sturgeon lengths (converted from inches to centimeters). Bottom and top of orange box denotes 25th and 75th percentile, 'x' denotes median. Blue box denotes current slot limit 102-152 cm FL (40-60 inches FL). Note: noise added to x-axis to lessen over-plotting.

White Sturgeon (kept)

Length quartiles 25%, 50%, and 75% show in certain years anglers harvested more fish closer in length to the upper slot limit and other years more fish closer in length to the low slot limit (Figure 5). This might indicate a year class (or classes) growing into and out of the slot limit (102-152 cm FL or 40-60 in FL).

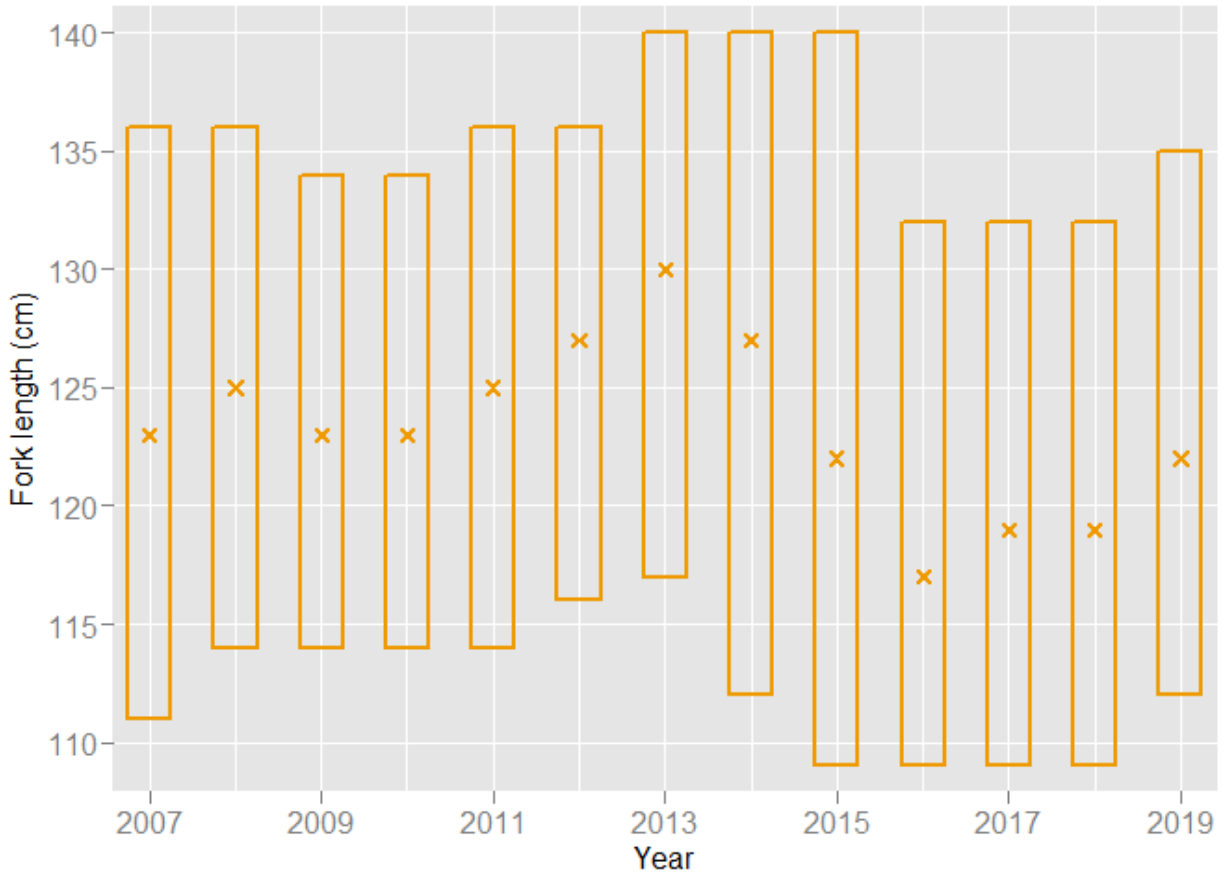


Figure 5. 2007-2019 Reported kept White Sturgeon lengths (converted from inches to centimeters). Bottom and top of orange box denotes 25th and 75th percentile. 'x' denotes median.

Catch by Location & Month

Card data make possible some spatial and temporal analyses. Though spatially the data are coarse, limited to larger geographic sections and not specific way-points. This section explores such analytics for all White Sturgeon (kept & released).

Location: Ranking Top 5 for White Sturgeon

Suisun Bay (code 18) consistently yields the greatest fraction of White Sturgeon catch, 2008 excepted (Table 6; 20%-40%). In fact, Suisun Bay is typically 5+ points higher than the second-ranked location. Sacramento River: Rio Vista to Chipps Island (code 04) is also a top spot for White Sturgeon catch (Table 6).

Table 6. 2007-2019 Annual top 5 ranking of locations with highest White Sturgeon catch. Number is location code (in parentheses denotes percent of total).

Year	First	Second	Third	Fourth	Fifth
2007	18 (23)	04 (17)	09 (12)	16 (7)	03 (7)
2008	04 (21)	18 (20)	09 (10)	03 (9)	16 (6)
2009	18 (28)	04 (18)	09 (9)	03 (7)	14 (6)
2010	18 (25)	04 (20)	10 (7)	16 (6)	17 (6)
2011	18 (22)	04 (15)	16 (14)	10 (10)	03 (9)
2012	18 (25)	04 (16)	03 (10)	10 (7)	09 (7)
2013	18 (26)	04 (17)	03 (11)	09 (10)	16 (7)
2014	18 (28)	04 (15)	03 (11)	09 (10)	10 (7)
2015	18 (30)	04 (16)	09 (12)	03 (8)	16 (6)
2016	18 (29)	04 (17)	09 (13)	10 (7)	03 (6)
2017	18 (34)	16 (16)	09 (11)	04 (11)	19 (8)
2018	18 (40)	09 (11)	04 (10)	16 (8)	19 (7)
2019	18 (37)	09 (12)	16 (11)	10 (8)	04 (7)

Month: White Sturgeon

Though the White Sturgeon fishery is open year-round, there appears to be a natural seasonality (Table 7). Catch as a fraction of total caught is lowest late spring through summer (Table 7). Unlike location, no single month stands out as exceptional; winter and spring months hover around 15%.

Table 7. 2007-2019 Annual White Sturgeon catch by month. Number represents percent of total annual catch. Note: Card not required until 01-Mar-2007, so 2007 Jan & Feb data not representative of full fishing effort.

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2007	1.4	2.2	18.4	11.8	7.1	3.2	2.3	2.1	4.5	12.1	17.6	17.4
2008	9.6	14.6	15.9	11.0	7.1	3.8	1.6	1.7	2.1	6.4	13.0	13.2
2009	13.1	15.4	16.5	11.3	5.9	3.1	2.3	2.0	2.8	6.8	10.3	10.6
2010	13.6	14.9	16.0	10.6	5.5	2.6	2.6	1.9	2.7	6.7	11.0	11.8
2011	12.1	13.1	11.9	12.6	8.3	7.5	3.6	1.8	2.9	5.6	10.3	10.2
2012	12.2	13.1	12.4	14.4	6.6	4.4	2.0	1.4	2.4	7.3	11.9	11.9
2013	10.1	15.0	17.8	11.3	4.7	3.3	1.6	1.3	1.8	7.4	12.6	13.2
2014	12.0	17.4	18.1	10.9	5.0	2.4	1.7	0.9	1.5	5.0	10.4	14.8
2015	17.8	18.8	19.1	7.4	3.9	2.1	0.8	1.4	1.4	5.1	9.5	12.6
2016	12.7	18.4	12.4	10.3	3.5	1.4	1.0	0.8	3.2	8.3	16.1	12.0

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2017	9.6	11.8	13.4	9.0	4.7	2.2	1.4	1.2	2.3	10.6	16.4	17.5
2018	13.0	14.6	15.2	9.9	4.8	2.4	1.9	1.4	3.3	7.7	13.5	12.2
2019	11.8	11.4	16.1	12.2	4.2	3.9	2.1	1.4	2.3	6.9	14.4	13.5

Anglers have reported catching one or more White Sturgeon each month every year for the following locations: 04(7); 09(12); 18(21) (Figure 6; y-axis is number in parentheses - see section *Card Location Code* for y-axis number & corresponding Card code). To date, the highest White Sturgeon catch was observed Nov 2017 at location 18(21), n=559.

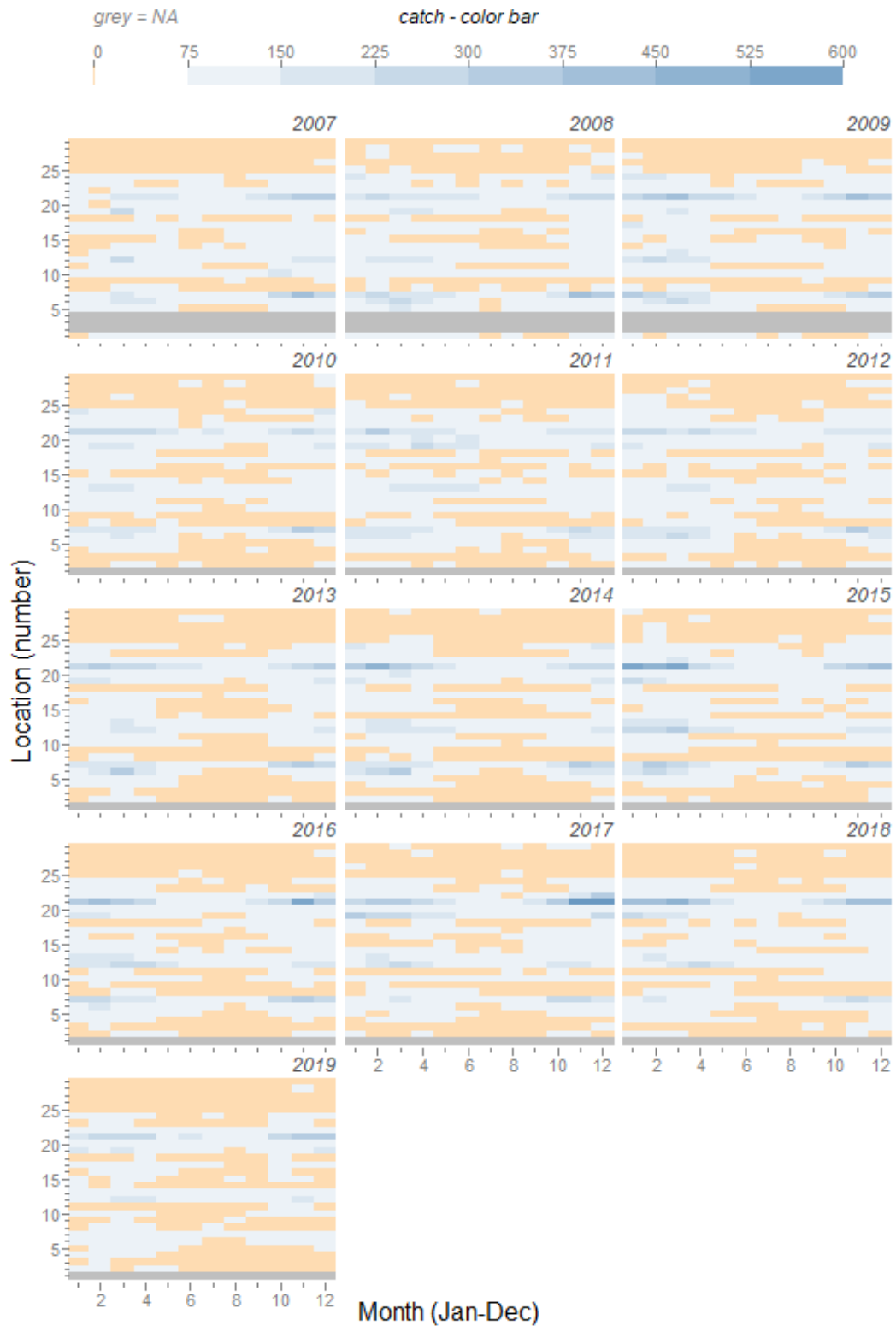


Figure 6. 2007-2019 Heatmap (or tile plot) showing reported White Sturgeon catch by location and by month. Grey shading denotes location not an option on Card, and orange shading denotes zero reported catch.

Angler Tag Returns

In 2010, CDFW added a field for reporting the disc tag number, if present. Some anglers recorded such information starting in 2009 despite such field's absence (Table 8). Ideally, an angler should report the entire alpha-numeric (e.g., HH1234). The prefix denotes the reward value (e.g., 'HH' = \$100). A complete tag number makes easier the task of precisely retrieving CDFW release data. Many anglers do their best, but not every reported disc tag is complete (Table 8). CDFW staff use angler-reported disc tags to augment mark-recapture data, perhaps improving population metrics accuracy. Table field names are explained below for reference.

- **Anglers:** number of anglers reporting a disc tag or possible disc tag
- **Good Tag:** count of complete disc tags (angler correctly reported disc tag)
- **No Prefix:** count of disc tags reported without alpha (i.e., missing prefix); likely a valid disc tag but more sleuthing is required
- **Prefix 'ST':** count of disc tags reported as 5-digits, no prefix. CDFW released \$20 disc tags with 'ST' followed by 5 digits. So these are likely \$20 tags but more sleuthing is required.
- **Reward Only:** count of likely disc tags but no number available. Angler reported reward value only (e.g., \$50.00).
- **Zip Only:** count of likely disc tags but no number available. Angler reported Stockton zip code (CDFW Stockton address printed opposite side of disc tag number).

To date, anglers have reported 29 disc tags as digits only. However, digits are too few or too many to make a positive match with CDFW release data.

Table 8. 2007-2019 Annual count of anglers who reported catching a disc-tagged sturgeon and number of tags based on completeness of reported disc number.

Year	Anglers	Good Tag	No Prefix	Prefix 'ST'	Reward Only	Zip Code
2009	5	3	0	1	0	0
2010	34	23	11	2	0	0
2011	37	27	9	3	0	0
2012	34	23	3	5	0	0
2013	30	24	4	3	0	1
2014	40	26	8	1	1	2
2015	36	21	7	0	2	1
2016	22	18	1	0	0	0
2017	28	23	1	1	1	0
2018	29	21	0	2	0	1
2019	10	9	0	0	0	0

Card Location Codes & Descriptions

Card locations are included below for reference. Field 'Number' is not on printed Card and is merely included here for simplifying y-axis in Figure 6. Card codes 2-9 may appear on Card with leading 0 (e.g., 03).

Number	Card Code	Card Description
1	1	Sacramento River: Red Bluff to Colusa (2007-2009)
2	01A	Sacramento River: Upstream of Red Bluff
3	01B	Sacramento River: Red Bluff to Hwy 32 bridge
4	01C	Sacramento River: Hwy 32 bridge to Colusa
5	2	Sacramento River: Colusa to Knights Landing
6	3	Sacramento River: Knights Landing to Rio Vista
7	4	Sacramento River: Rio Vista to Chipps Island
8	5	Feather River
9	6	American River
10	7	Sacramento Deepwater Ship Channel
11	8	Yolo Bypass
12	9	Montezuma Slough
13	10	Napa River
14	11	Petaluma River
15	12	San Joaquin River: Upstream of HWY 140 bridge
16	13	San Joaquin River: HWY 140 bridge to Stockton
17	14	San Joaquin River: Stockton to Sherman Lake
18	15	Old River
19	16	San Pablo Bay
20	17	Carquinez Strait
21	18	Suisun Bay
22	19	Grizzly Bay
23	20	San Francisco Bay: North of HWY 80
24	21	San Francisco Bay: South of HWY 80
25	22	Pacific Ocean: North of Golden Gate Bridge
26	23	Pacific Ocean: Golden Gate Bridge to Point Sur
27	24	Pacific Ocean: Point Sur to San Diego
28	25	Any reservoir or lake
29	26	Klamath River