

Sturgeon Fishing Report Card: 2020 Summary Data Report

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Introduction

This technical document provides a summary of California Sturgeon Report Card (hereafter, Card) data. Since 2007, any angler fishing for sturgeon has been required to have a Card in their possession. It is part of a suite of sport fishing regulations intended to protect California's year-round White Sturgeon (*Acipenser transmontanus*) fishery while adding resiliency to the conservation-dependent population, as well as increase protections for the federally-threatened Green Sturgeon (*Acipenser medirostris*) 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 sturgeon fishery in California has experienced major regulatory changes since the onset of the commercial industry in the late 19th century. Substantial population declines caused by commercial fishing led to a moratorium on the commercial and recreational sturgeon fishery from 1901-1953. Only recreational sturgeon fishing has since been re-opened, albeit with increasing restrictions over time. From 1954-1963, anglers were permitted to take one sturgeon (either Green or White) per day each day of the year, only restricted by a 40 inch (102 cm) total length (TL) minimum size limit. Populations continued to decline as angling techniques for catching sturgeon improved in the 1980's, thus prompting the implementation of a maximum size limit of 72 inches (183 cm) TL in 1990. In 2006 the National Marine Fisheries Service (NMFS) determined that the southern Distinct Population Segment (DPS) of Green Sturgeon was at risk of extinction throughout their range, and subsequently listed the species as Threatened under the Endangered Species Act (ESA). Under growing concern for both Green and White Sturgeon, the California Fish and Game Commission voted to close the recreational fishery for Green Sturgeon in 2007. Around this time, new regulations were put in place to further protect White Sturgeon populations, including an annual bag limit of three fish and a reduction in the maximum size limit from 72 inches to 66 inches (168 cm) TL.

Current regulations state that all retained White Sturgeon must be within 40-60 inches (102-152 cm) fork length (FL), and anglers may keep only one fish daily and three annually. Only a single barbless hook is permitted for taking White Sturgeon and anglers must cease sturgeon fishing for the day after one is retained (California Code of Regulations (CCR), Title 14, Section 5.8 and 27.90). It is illegal to take or possess Green Sturgeon or remove them from the water if incidentally caught (CCR, Title 14, Section 5.81 and 27.91). 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 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, as well as length if kept. A 'Reward Disk' field is available should the angler catch a sturgeon with a CDFW-affixed disk tag (Figure 1). While interpreting the results of this report, please be aware of the following nuances:

- (1) Card data are typically summarized in the spring and reported to the public in summer; however, annual summaries may change as additional report cards are returned to the Department and new data become available. The current summary year (typically one year behind current calendar year) is most affected by this. The most recent data extraction was 06-Jul-2021 @ 08:43.
- (2) Reporting by anglers for the current valid Card (year 2021) is not due until 31-Jan-2022. Any summary of 2021 data is incomplete and should be used cautiously.
- (3) From 2007-2017, CDFW produced single-year Card summary reports, available at <https://wildlife.ca.gov/Conservation/Delta/Sturgeon-Study/Bibliography> entitled 'YYYY' Sturgeon Fishing Report Card: Preliminary Data Report. Updated annual summaries are found in this document, and CDFW will no longer produce single-year summaries.
- (4) The Card was first made available March 1, 2007, and some anglers reported data for January and February of 2007. However, catch data for reported catches are incomplete and low for this period compared to subsequent years. Keep this in mind when interpreting the summaries reported here.
- (5) For conciseness, location *codes* are displayed in figures and tables. For reference, please see Table 5 in section 'Card Location Codes and Descriptions.'



Figure 1. Reward tags used for on-going sturgeon mark-recapture study.

Distribution and Return

Cards were issued free of charge from 2007-2012, and a fee of ~\$8 was instituted in 2013. Until the establishment of the Automated License Data System (ALDS) in 2012, Cards were returned exclusively by mail. The ALDS offers anglers the option of reporting Card data online, a convenience that has been increasingly utilized over time (Table 1, see 'IS' or Internet Submission). Further, there has been an overall increase in reporting ('ReturnRate') since the onset of the program, though this seems to have stabilized in recent years (Table 1; ~33%).

Table 1 field names explained below for reference.

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

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

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	4,424	7,052	2,870	29.76	33,954	5,526	8,858
2016	47,617	6,129	6,683	2,997	32.92	31,942	4,495	11,181
2017	44,374	4,715	7,239	2,815	33.52	29,498	3,662	11,223
2018	44,146	4,861	6,972	2,398	32.56	29,771	2,877	11,498
2019	40,844	4,605	6,160	1,751	31.02	28,175	2,207	10,463
2020	44,079	5,008	6,701	1,995	31.49	30,198	1,951	11,931

Reported Catch

Anglers must report sturgeon catch, whether kept or released, while adhering to a bag limit of one White Sturgeon daily and three annually. Cards were initially categorized as 'catch' or 'no catch', but in 2010 a 'did not fish' check box was included. Anglers that return cards report keeping an average of 2,000 (± 421 SD) (mean \pm standard deviation) White Sturgeon each year, and release 4,500 (± 983 SD) White Sturgeon on average (Figure 2).

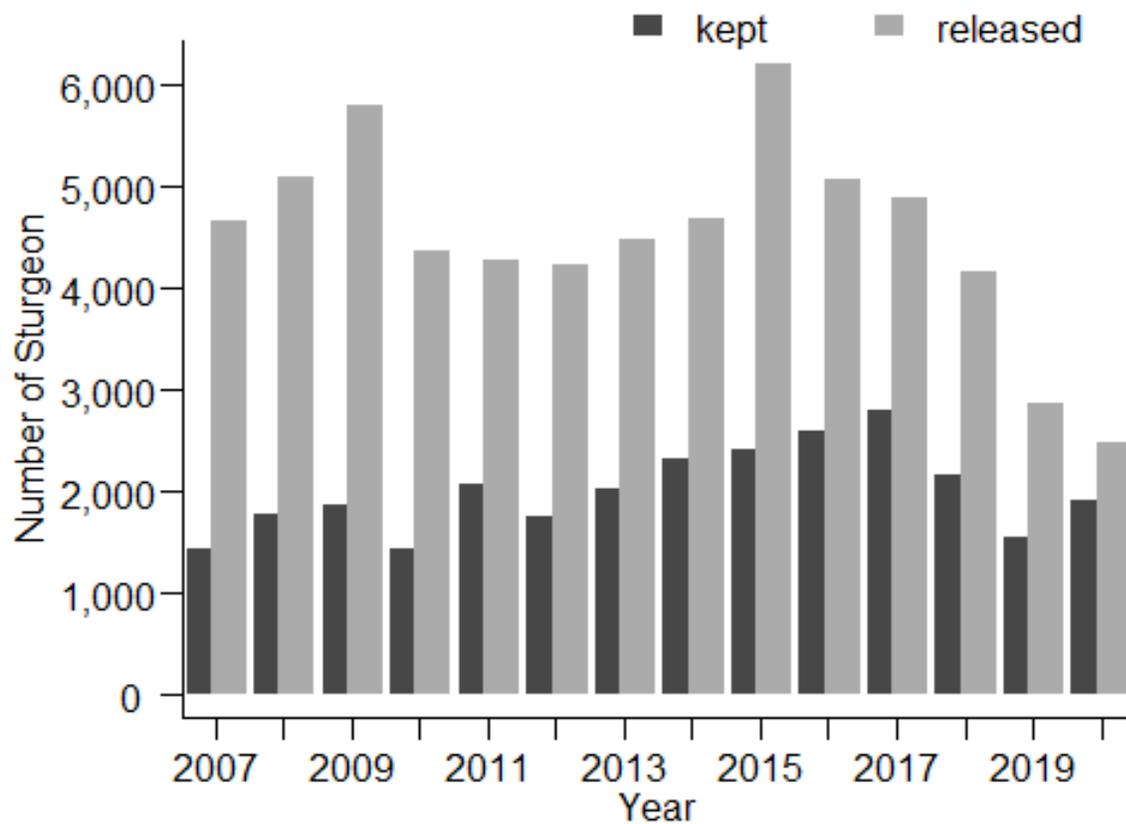


Figure 2. 2007-2020 Annual White Sturgeon catch (kept & released) from reported Cards.

Green Sturgeon are bycatch in the White Sturgeon fishery, and anglers are prohibited from keeping any that are caught. On average, anglers report releasing about 190 (± 60 SD) Green Sturgeon each year (Figure 3).

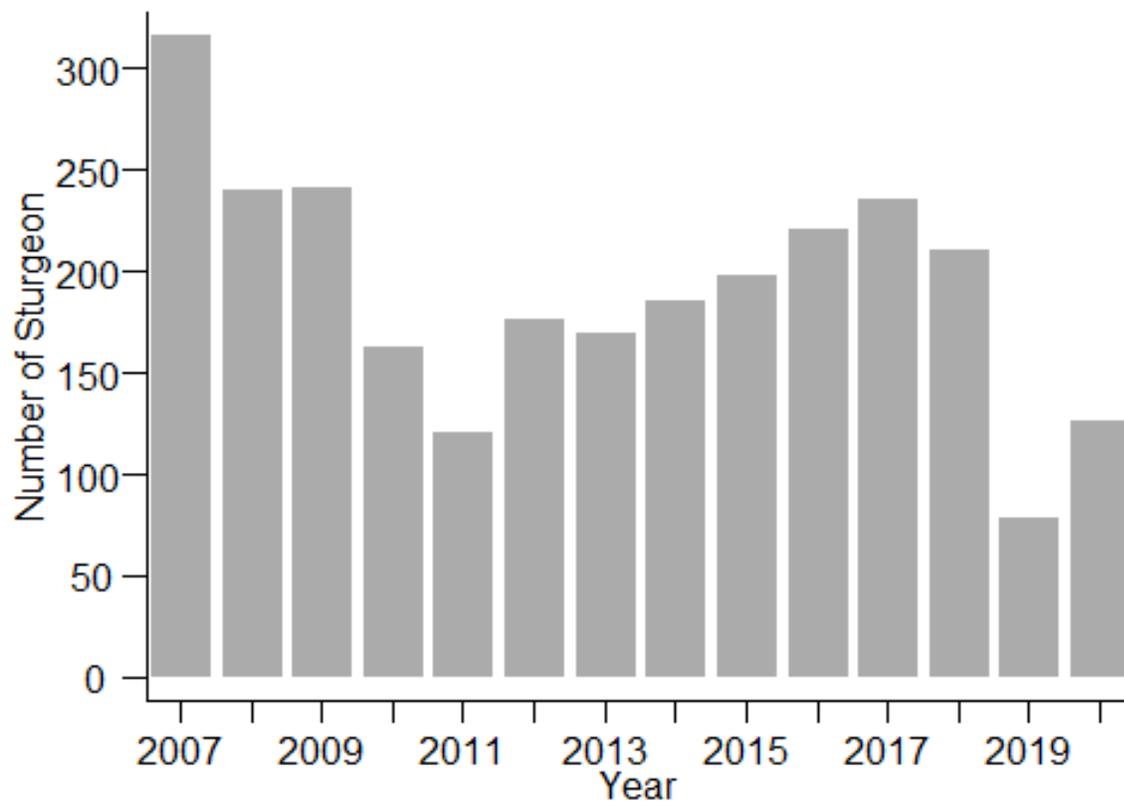


Figure 3. 2007-2020 Annual Green Sturgeon bycatch from reported Cards.

The Card provides species check boxes (White or Green) for fish that are released absent of a reward disk. No such check boxes exist for fish released with reward disk present, considering a correctly recorded disk tag number can be traced back to CDFW release data. An annual average of about 39 (± 25 SD) sturgeon cannot be identified to species given the available information.

Catch per Angler

Of the anglers who report fishing for sturgeon, the majority do not catch any fish ($73\% \pm 3.5$ SD; Figure 4). On average, about 19% (± 2.1 SD) catch one or two White Sturgeon per year (includes both kept and released) and few anglers ($<7\%$) catch three or more (Figure 4).

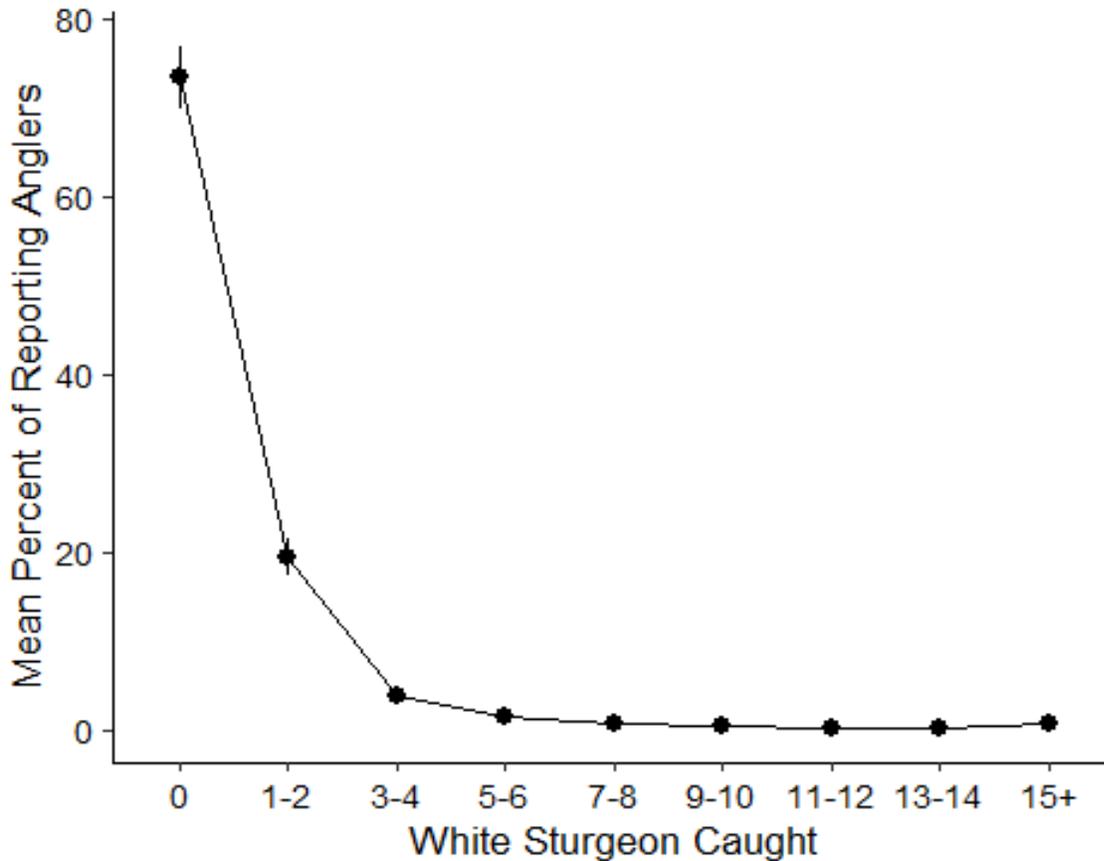


Figure 4. 2013-2020 Mean percent of all anglers that report catching White Sturgeon (kept or released). Points mark the fraction (represented as a percent) of total anglers who report fishing for sturgeon, averaged across 2013-present. Vertical lines represent the standard deviation. Zero (0) White Sturgeon caught represents the average percent of anglers that fish but do not catch any sturgeon; calculation does not include anglers who reported 'did not fish.'

2013-present

From 2013-present day, Card reporting has consistently offered anglers three categories for fishing: (1) did not fish, (2) fished but no catch, and (3) fished (& caught fish). Out of the anglers expending fishing effort (ie. all anglers except those that 'did not fish'), 1.4% (0.014 ± 0.003 SD) (n ≥ 1000 reporting) catch and release at least one Green Sturgeon (Table 2) on average each year. Some anglers catch and release more than one Green Sturgeon annually, though these numbers are relatively low (Table 2, see 'Max' field).

Table 2. 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	0.0074	3
2020	99	0.0112	7

Across all years (2013 – 2020), 27%-39% of all reporting anglers reported 'did not fish' (ie. "No Effort", Figure 5). Out of all reporting anglers (n ≥ 1000; including 'did not fish'), about 9% (± 1.2 SD) on average keep one White Sturgeon, and even fewer keep the limit of three (≤ 0.72% ± 0.19) (Figure 5).

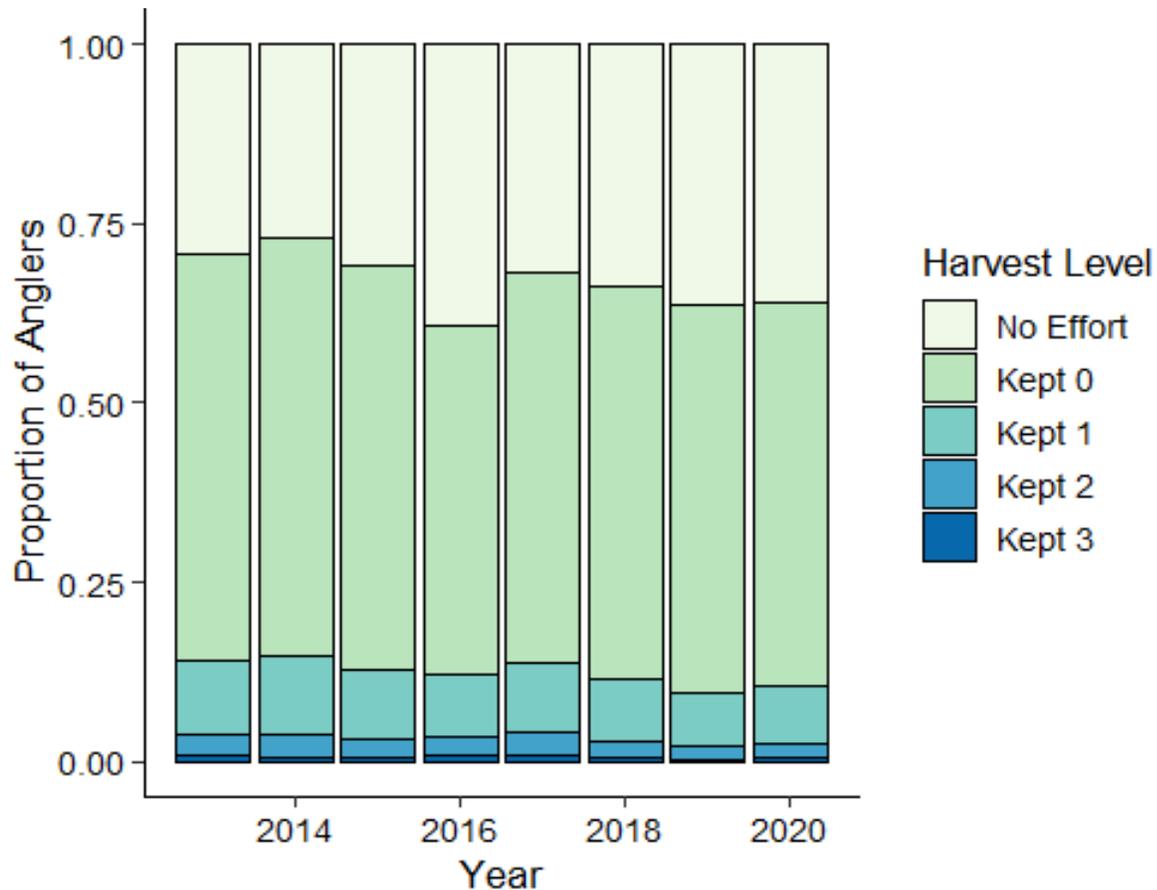


Figure 5. 2013-2020 Annual proportion of all reporting anglers that keep 0, 1, 2, or 3 White Sturgeon. 'NoEffort' denotes anglers reporting 'did not fish.'

Given the available data, it is not possible to identify the fraction of anglers that exclusively practice 'catch-and-release' fishing. However, 6.0%-10.1% (mean = 8% ± 1.6 SD) of

reporting anglers that expended fishing effort released sturgeon without retaining any that were caught (2013-2020, years with ≥ 1000 reporting).

Length

The current slot size for harvesting a White Sturgeon is 40-60 inches (102-152 cm) FL, and anglers are required to report length for fish that are retained. Anglers report inches, as required by regulations, but lengths were converted to centimeters FL for this report. Occasionally, an angler will report a suspiciously small length (i.e., ≤ 10). In doing so, the angler is most likely using shorthand to report catch (i.e. number caught). Therefore, any “length” ≤ 10 inches is flagged as invalid and set to NA for analytical purposes. Since the start of the Card program, the number of invalid lengths reported each year is typically low, with a range of 0-15.

Green Sturgeon

While anglers are not required to report the length of fish that are released (Green or White), some include this information in the species check box. Of the valid lengths reported, most Green Sturgeon caught are less than 100 cm (~40 inches; Figure 6).

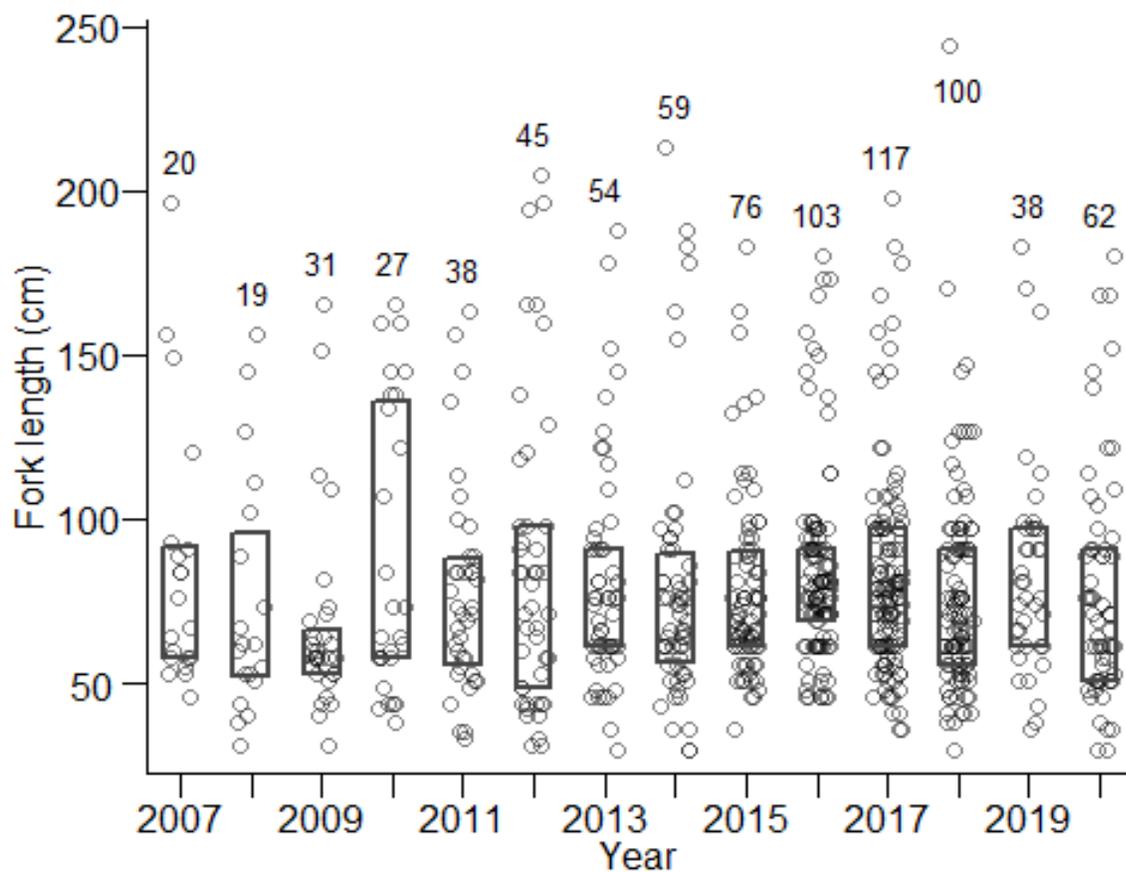


Figure 6. 2007-2020 Reported Green Sturgeon lengths (cm). Bottom and top of box denotes

25th and 75th percentile, and numbers indicate the count of Green Sturgeon measured. Note: noise added to x-axis to minimize over-plotting.

White Sturgeon

Released

Length distributions for released White Sturgeon show that annual median values are typically below 102 cm FL, which is associated with the lower boundary of the slot (Figure 7, see 'x' on figure). The annual trend of progressively darker points below the slot appears to indicate that anglers have been catching more sub-slot sized fish, reporting measurements of more sub-slot sized fish, or a combination of both (Figure 7). Additionally, each year anglers released White Sturgeon that legally could have been retained, thus providing evidence for 'catch-and-release' fishing activity (Figure 7).

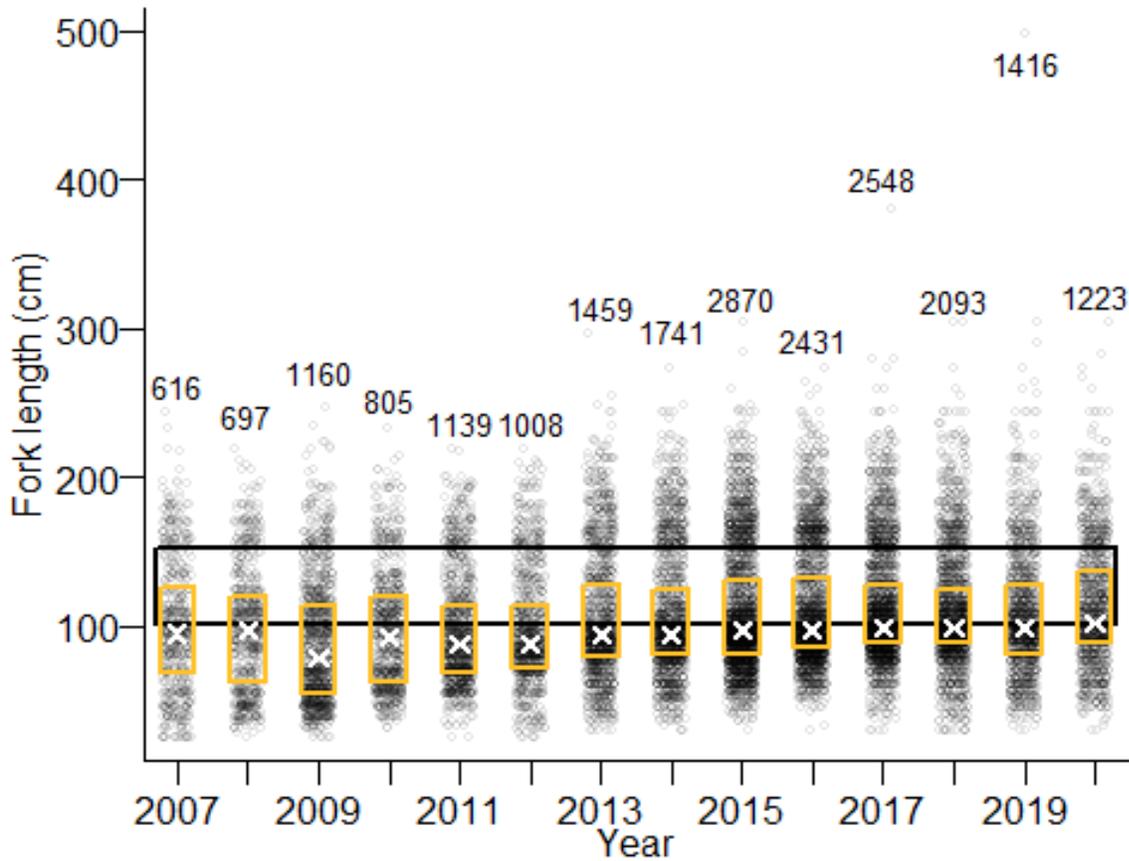


Figure 7. 2007-2020 Reported released White Sturgeon lengths (cm). Bottom and top of vertical boxes denote the 25th and 75th percentile, 'x' denotes median. Horizontal box represents the current slot limit 102-152 cm FL (40-60 inches FL), and numbers indicate the count of released White Sturgeon measured. Note: noise added to x-axis to minimize over-plotting.

Kept

The distribution of length quartiles (25-75%) indicates interannual variation in the size of harvested White Sturgeon (Figure 8). For example, it appears that reporting anglers harvested more fish with lengths closer to the upper slot limit in 2012-2014, versus sizes closer to the lower end of the slot in 2016-2018 (Figure 8). This might indicate a year class (or classes) growing into and out of the slot limit (102-152 cm or 40-60 in FL).

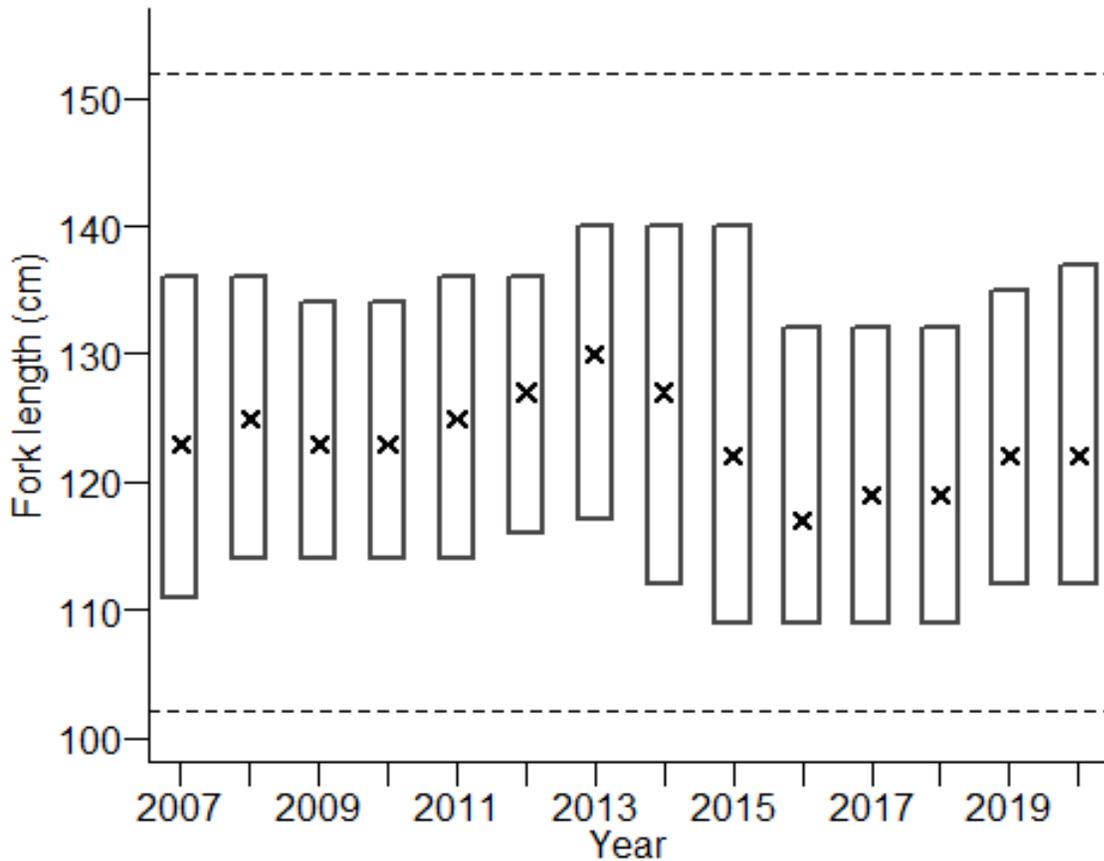


Figure 8. 2007-2020 Lengths (cm) of White Sturgeon that were harvested (ie. reported as 'kept'). Bottom and top of vertical boxes denote the 25th and 75th percentile, 'x' denotes median. Dashed lines mark the upper and lower bounds of the slot limit (102-152 cm FL or 40-60 inches FL). Note: Nearly all 'kept' fish (See Figure 2) were measured, as required by regulations.

Catch by Location & Month

Anglers are required to report the date and location of any sturgeon (Green or White; kept or released) that are caught, thus making coarse spatial and temporal analyses possible. This section explores these analytics for all White Sturgeon (kept & released). Numerical location codes are defined in Table 5.

Location: Ranking Top 5 for White Sturgeon

Suisun Bay (code 18) consistently yields the greatest fraction of White Sturgeon catch (22% - 40%) by a margin of 5% - 29% (with the exception of 2008; Table 3). The region spanning Rio Vista to Chipps Island in the Sacramento River (code 04) also results in relatively high catch of White Sturgeon (Table 3).

Table 3. 2007-2020 Annual top 5 ranking of locations with highest White Sturgeon catch. Number represents the location code, and percent of total is denoted in parentheses.

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)
2020	18 (39)	04 (13)	09 (10)	10 (7)	19 (7)

Month: White Sturgeon

Though the White Sturgeon fishery is open year-round, there appears to be a natural seasonality in catch that coincides with the timing of winter spawning migrations into the Sacramento-San Joaquin Delta and lower rivers (Figure 9). Catch as a fraction of total caught is lowest in the late spring through summer and tends to be highest in the late fall through the early spring (Figure 9). Note that calculations do not take fishing effort into account, as these data are not currently available.

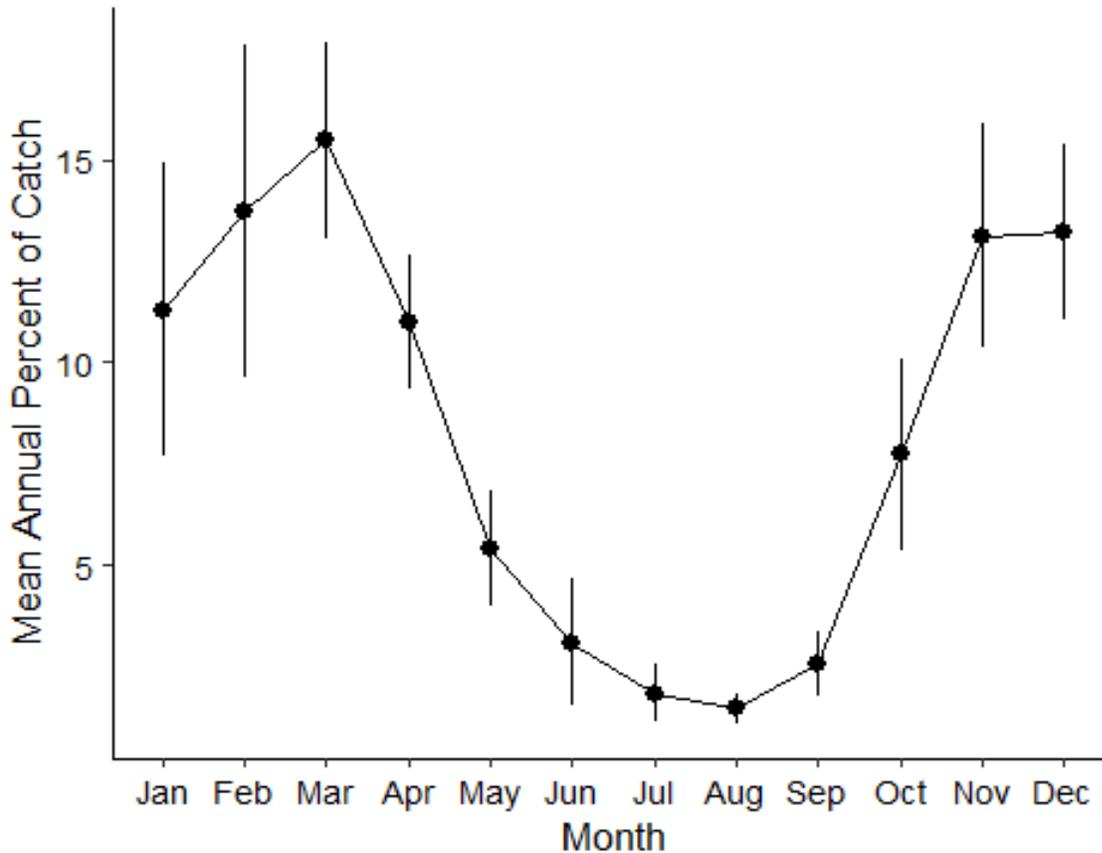


Figure 9. 2007-2020 Mean annual percent of White Sturgeon catch by month, vertical bars represent standard deviation. Calculations do not take effort into account. Additionally, the Card was not required until 01-Mar-2007, so data from January and February of that year is likely incomplete.

Angler Tag Returns

In 2010, CDFW added a field for reporting the disk tag number, if present. Angler-reported disk tags are used to augment mark-recapture data in an effort to improve the accuracy in estimating population metrics such as harvest rate and abundance. Some anglers recorded this information starting in 2009 despite the absence of an official field (Table 4). Disk tags consist of a two-letter prefix followed by series of numbers (e.g. HH1234); the prefix represents the reward value (e.g. 'HH' = \$100). Ideally, an angler should report the entire alpha-numeric ID, but some tag codes are not completely reported (Table 4). To date, anglers have reported 33 disk tags with too few or too many digits to make a positive match with CDFW release data. Table field names are explained below for reference.

- **Anglers:** Number of anglers reporting a disk tag or possible disk tag.
- **Good Tag:** Count of complete disk tags (angler correctly reported disk tag).

- **No Prefix:** Count of disk tags reported without the two-letter prefix; likely a valid disk tag but further investigation is required.
- **Prefix 'ST':** Count of disk tags reported as 5-digits, no prefix. In the past, CDFW released some \$20 disk tags with 'ST' followed by 5 digits. These are likely \$20 tags but additional investigation is required.
- **Reward Only:** Count of likely disk tags but no number available. Angler reported reward value only (e.g., \$50.00).
- **Zip Only:** Count of likely disk tags but no number available. Angler reported Stockton zip code (the CDFW Stockton address is printed on the opposite side of the disk tag number).

Table 4. 2007-2020 Annual count of anglers who reported catching a disk-tagged sturgeon and number of tags based on completeness of reported disk 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
2020	20	15	1	1	0	0

Additional Information and CDFW Contacts

Please visit following webpages for more information on:

- *Past years card reporting results and sturgeon study literature:*
<https://wildlife.ca.gov/Conservation/Delta/Sturgeon-Study/Bibliography>
- *Sturgeon biology, status, and threats:*
<https://wildlife.ca.gov/Conservation/Fishes/Sturgeon>
- *Sturgeon Report Card webpage coming soon*

CDFW contact: [John Kelly](#) and [Colby Hause](#)

Card Location Codes & Descriptions

The fishing locations referenced in this report are included below.

Table 5. 2007-2020 Sturgeon Report Card Location Codes as listed on the Card. Note: codes 2-9 appear on Card with a leading 0 (e.g., 03).

Card Code	Card Description
1	Sacramento River: Red Bluff to Colusa (2007-2009)
01A	Sacramento River: Upstream of Red Bluff
01B	Sacramento River: Red Bluff to Hwy 32 bridge
01C	Sacramento River: Hwy 32 bridge to Colusa
2	Sacramento River: Colusa to Knights Landing
3	Sacramento River: Knights Landing to Rio Vista
4	Sacramento River: Rio Vista to Chipps Island
5	Feather River
6	American River
7	Sacramento Deepwater Ship Channel
8	Yolo Bypass
9	Montezuma Slough
10	Napa River
11	Petaluma River
12	San Joaquin River: Upstream of HWY 140 bridge
13	San Joaquin River: HWY 140 bridge to Stockton
14	San Joaquin River: Stockton to Sherman Lake
15	Old River
16	San Pablo Bay
17	Carquinez Strait
18	Suisun Bay
19	Grizzly Bay
20	San Francisco Bay: North of HWY 80
21	San Francisco Bay: South of HWY 80
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

CDFW, Fisheries Branch and Bay-Delta Sportfish Unit

updated: 06-Jul-2021 @ 10:05