

Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Cruise Dates: 04/01/08 – 05/30/08

Project: Adult Striped Bass Monitoring Project (Tagging from Fyke Trap and Gill Net)

Objective: To tag adult striped bass and document previously-tagged fish for an ongoing mark-recapture program to estimate abundance and mortality rate. The data collected this season will later be used to estimate the population of adult striped bass and we expect preliminary population estimates should be available in December 2008.

Methods and Gear

Overall

Fyke traps and gill nets were used to collect fish for the 2008 Striped Bass Tagging Season. Tagging began on April 1 and ended on May 29¹. (Refer to Appendix 1 for personnel.)

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.

Striped bass were measured to the nearest centimeter fork length (FL). Fish greater than or equal to 42 cm FL² were sexed and fitted with a disk-dangler tag (Figure 1). Each tag possessed a unique 6-digit numeric or alpha-numeric identifier. To evaluate response-rate, alpha-numeric tags posted rewards of \$20, \$50, or \$100 and 10% of all tags applied were reward tags. Sub-legal sized fish (< 42 cm FL) were enumerated but not sexed or tagged. For recaptures — fish possessing tags from previous years — length, sex, and tag number were recorded. All fish were processed and returned to the location of capture, and their condition was noted.

¹ Fyke traps terminated fishing on May 21 and the *New Alosa* — due to mechanical problems — terminated fishing on May 8.

² Equates to legal size of greater than or equal to 18 inches total length.

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Figure 1. Photo showing disk-dangler tag attached to striped bass.



Not all captured legal-sized striped bass were tagged. Some — either from sea lion attack or the gear itself — were found dead. These fish were recorded as “dead” and were added to the total catch. Fish in poor condition were not tagged. These fish were released, recorded as “over”, and added to the total catch. Sometimes it was necessary to return fish without a tag because too many fish were captured to safely complete processing. These fish were recorded as “over” and added to the total catch. Some legal-sized fish were collected for a pelagic organism decline (POD) analysis of bioenergetics. These fish were recorded as “over” and added to the total catch.

Incidental take of listed Chinook salmon, steelhead, and green sturgeon occurred. Lengths of these fish were estimated to expedite processing and minimize handling stress. Fish condition and coloration, as well as the presence or absence of an adipose fin (salmon and steelhead only), were noted.

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Fyke Traps

Ten fyke traps (length 20'; width 10') were fished in the Sacramento River near Knight's Landing (Figure 2). Five traps were placed on the left river bank about one mile upstream of the Knight's Landing Bridge. The remaining traps were placed on the left river bank about one mile downstream of the Knight's Landing Bridge. Traps were placed approximately 50'-150' apart from each other.

Figure 2. Rear view of a fyke trap on a bank of the Sacramento River near Knights Landing.



Traps were rolled up the bank until one of the doors was positioned to facilitate easy access for tending the trap from the ~20-ft pontoon boat *Kayot*, while ensuring enough water remained in the trap to minimize fish stress. Initially a winch was used to roll the traps up and down the river bank in order to tend them. After the winch failed and replacement parts were slow to arrive, we instead used a cable-and-block system. When the trap and boat were in position, fish were netted from the trap and tagged on board the *Kayot*.

Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Standard crew size included 2 Fish and Wildlife Technicians (boat driver and truck driver) and 3 Scientific Aides (fish taggers). An Associate Biologist and Range A biologist were sometimes part of the field crew.

The first 2 weeks of the field season, field days were Monday-Saturday. Thereafter, field days were Monday-Friday. Field days began at 0730 and ended at 1500, but varied depending on the number of fish caught and/or the number of available taggers. Typically, each trap fished about 24 hours.

Gill Nets

Department of Fish and Game (DFG) vessels — *New Alosa* and *Striper II* (Figure 3) — operated one gill net each. Both vessels were berthed at New Bridgehead Marina in Antioch, CA. Field sampling occurred at two locations within the Sacramento-San Joaquin Delta: 1) Schad Landing on the San Joaquin River, upriver from the Antioch Bridge on the southeast side of Sherman Island and 2) Broad Slough at the confluence of the Sacramento and San Joaquin rivers, east of Winter Island.

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Figure 3. *Striper II* underway just below Antioch Bridge.



Dimensions were the same for both gill nets: length = 100 fathoms, depth = 21 feet, mesh size = sections of 4, 4.5, 5, and 5.5 inches. The entire net was deployed from the vessel's stern. The net was retrieved onto a drum roller (spool), which was powered by hydraulics (Figure 4). Net design³ reduced the chance of fish mortality. A float line maintained buoyancy and allowed the net to drift with the tidal current.

³ Gill nets were constructed with stringers that created shallow pockets where fish might be encased rather than gilled (from Cruise Report June 29, 2005).

Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Figure 4. An Aide and a Mate retrieve the net onboard the *Striper II*. The spool is in the foreground.



Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Three crew members (boat operator and two taggers⁴) worked onboard the *Striper II*. Four crew members (boat operator, deckhand, and two taggers) worked onboard the *New Alosa*. When a dedicated deckhand was not available, one of the taggers would perform deckhand duties. Both crews met at New Bridgehead Marina at approximately 0700 hours. The vessels left the marina at approximately 0730 hours.

Gill netting was scheduled either 3 or 4 days a week (Tuesday–Thursday or Monday–Thursday). On a typical day the net was drifted 5-7 times between 0800 to 1400 hours. Net retrieval began about 20 minutes after complete deployment. Total fishing time (drift time) varied depending upon the number of fish in the net. Striped bass and non-salmonids were removed from the net onboard the vessel. When necessary, fish were kept in tubs of water prior to tagging. Salmonids and large sturgeon were shaken from the net rather than brought on board, so as to minimize stress. As a result, their lengths were estimated for these fish.

Results and Discussion

Overall

Fyke trap and gill net fishing efforts caught a combined legal sized 4,872 striped bass. Of these, 4,401 were then tagged. Additionally, collective efforts landed 497 sub-legal sized striped bass.

Fyke Traps

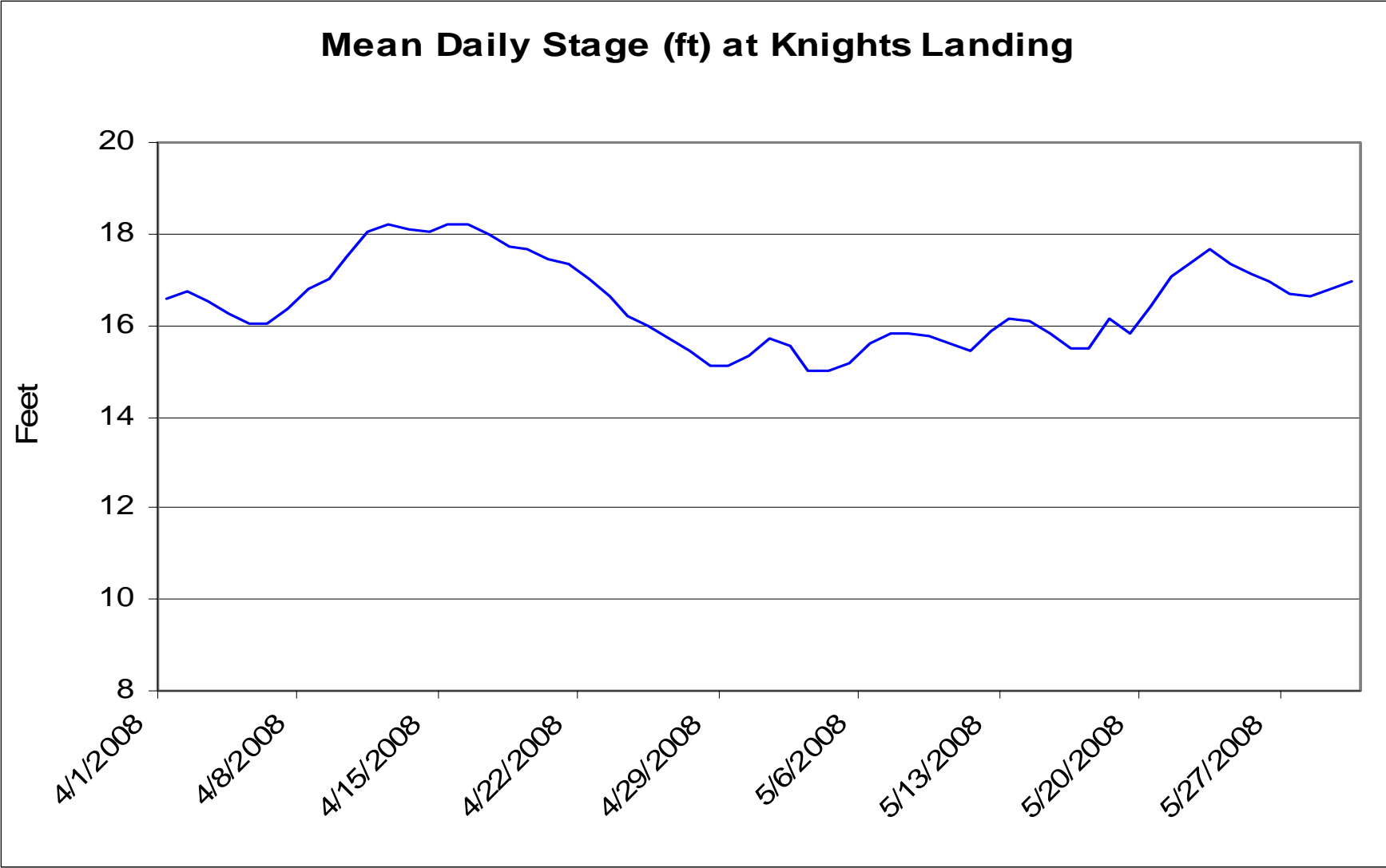
Fyke traps were deployed 26 days and tended 246 times. The total number of legal-sized striped bass caught was 2,630, of which 2,270 were tagged and 32 were recaptures from previous tagging seasons. We released 337 legal-sized striped bass alive (recorded as “overs”) and 3 dead. The total number of sub-legal (< 42 cm FL) fish was 277 (Table 2).

Striped bass catch numbers for this season were substantially lower (approx. 50%) than last season. Flows on the Sacramento River at Knight’s Landing were noticeably lower as well (Figure 5).

⁴ One who tags the fish — could be a Biologist, Aide, or Technician

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Figure 5. Mean daily stage at Knights Landing.



**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Table 1 shows a small increase in fish tagged, followed by a sharp drop. Following this drop is the peak, after which there is an overall drop for the remainder of the season. Mean fork length gradually increased during the sampling season. Males were more abundant than females. Of the total catch, 81% were males, 8% were females, and 11% were sub-legal.

Table 1. Weekly fyke trap totals.

Week #	1	2	3	4	5	6	7	8
# Tagged Fish	29	307	313	76	768	252	383	142
# Traps Tended	19	39	13	39	37	39	40	20
Mean FL (cm)	51	54	54	56	59	59	58	59

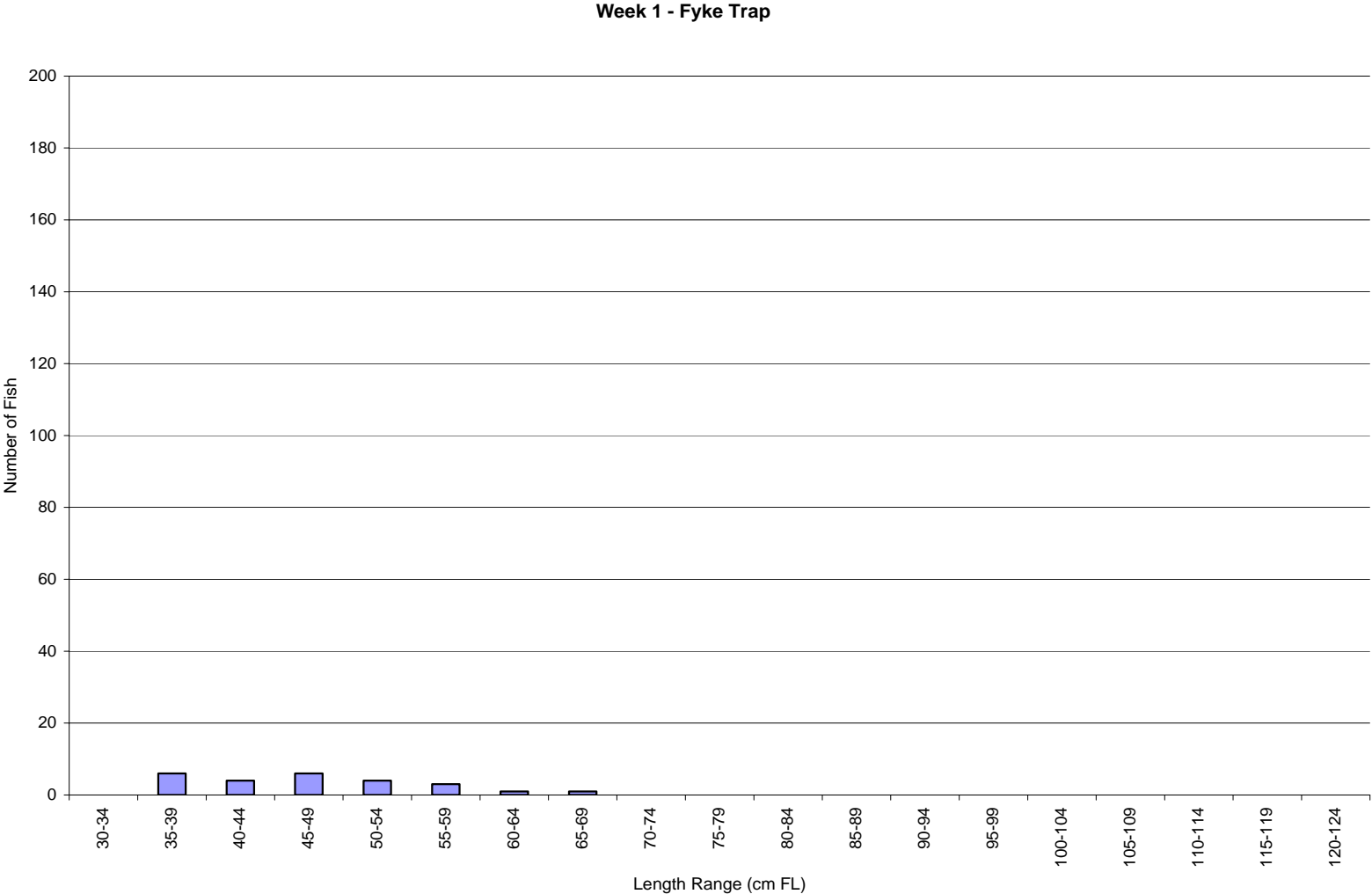
Most striped bass ranged from 35 to 74 cm FL (Figure 6). This range was slightly broader than observed for gill net (Figure 7). Length range broadened slightly around Week 4. Fish greater than or equal to 90 cm FL were caught Week 4 through Week 8. Only one fish was over 100 cm FL for the entire sampling.

Salmonid bycatch was 45 Chinook salmon and 2 steelhead. Salmon were caught throughout the sampling season; their condition varied from good to excellent and their color ranged from bright to off.

Non-salmonid bycatch included: 86 white sturgeon, 4 green sturgeon, 717 American shad, 95 channel catfish, 9 Sacramento pikeminnow, 1 black crappie, 10 carp, 15 white catfish, 9 Sacramento sucker, 3 Sacramento blackfish, 1 largemouth bass, and 1 brown bullhead.

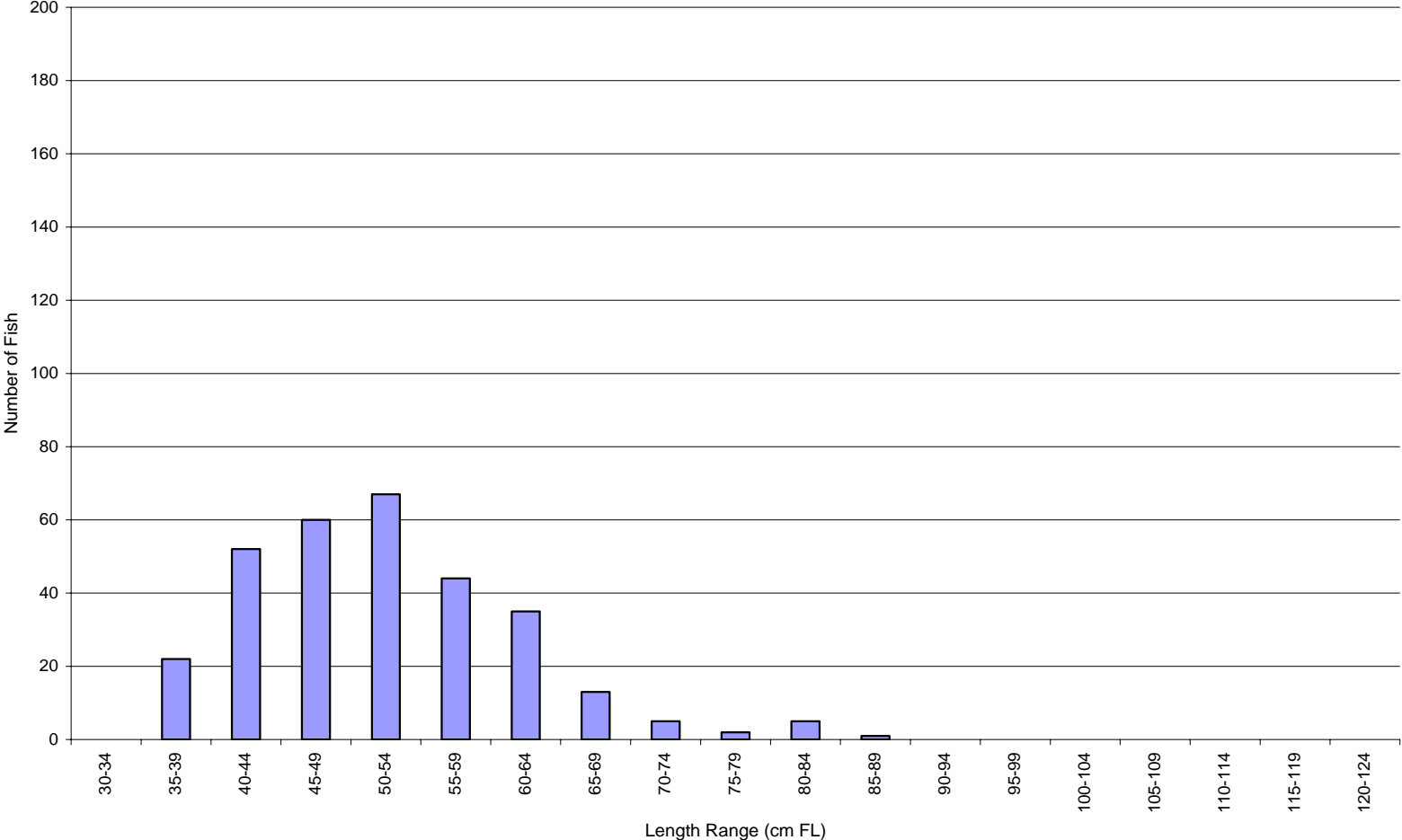
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Figure 6. Weeks 1 - 8 length-frequency distribution of fish caught in fyke traps.



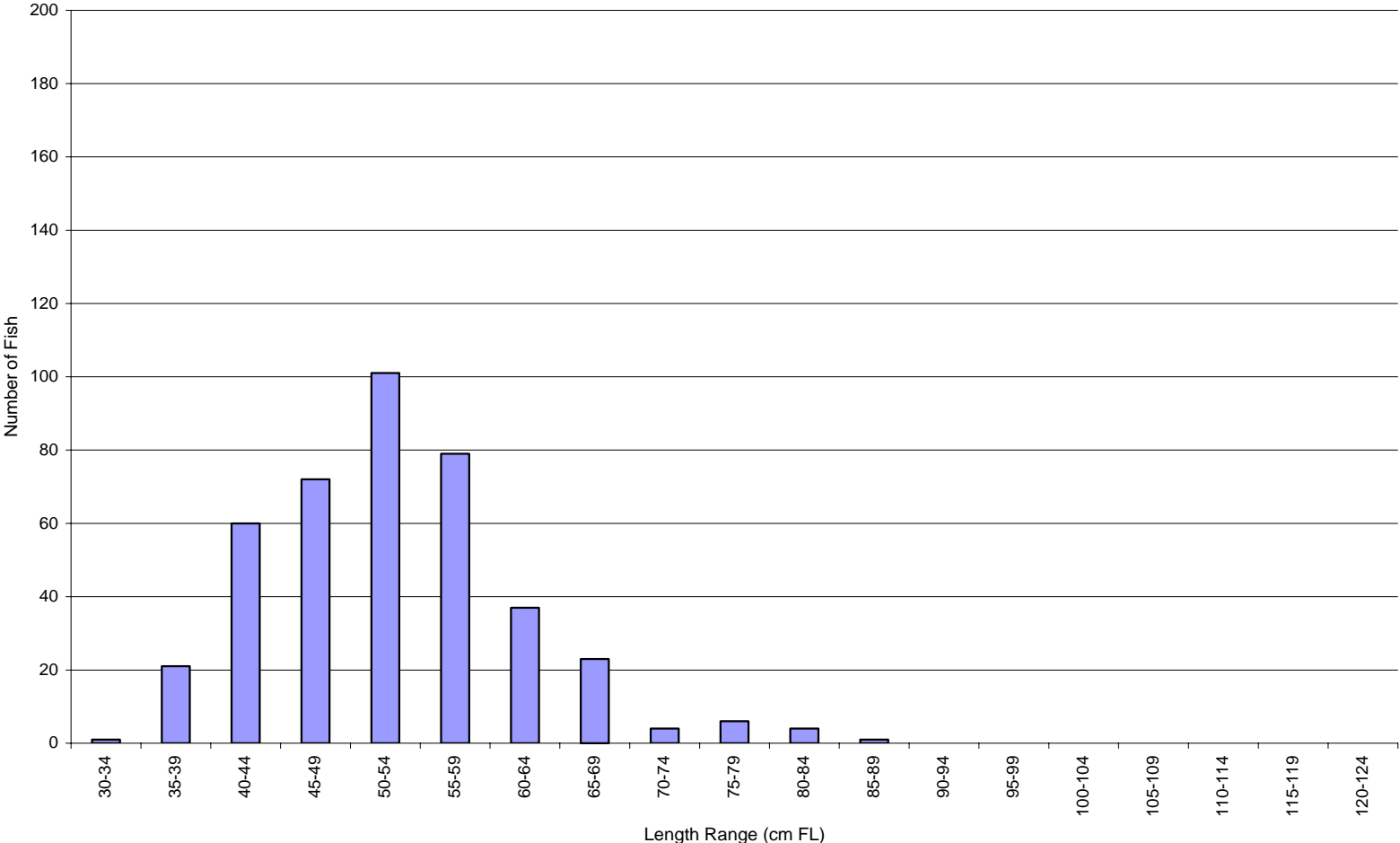
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 2 - Fyke Trap



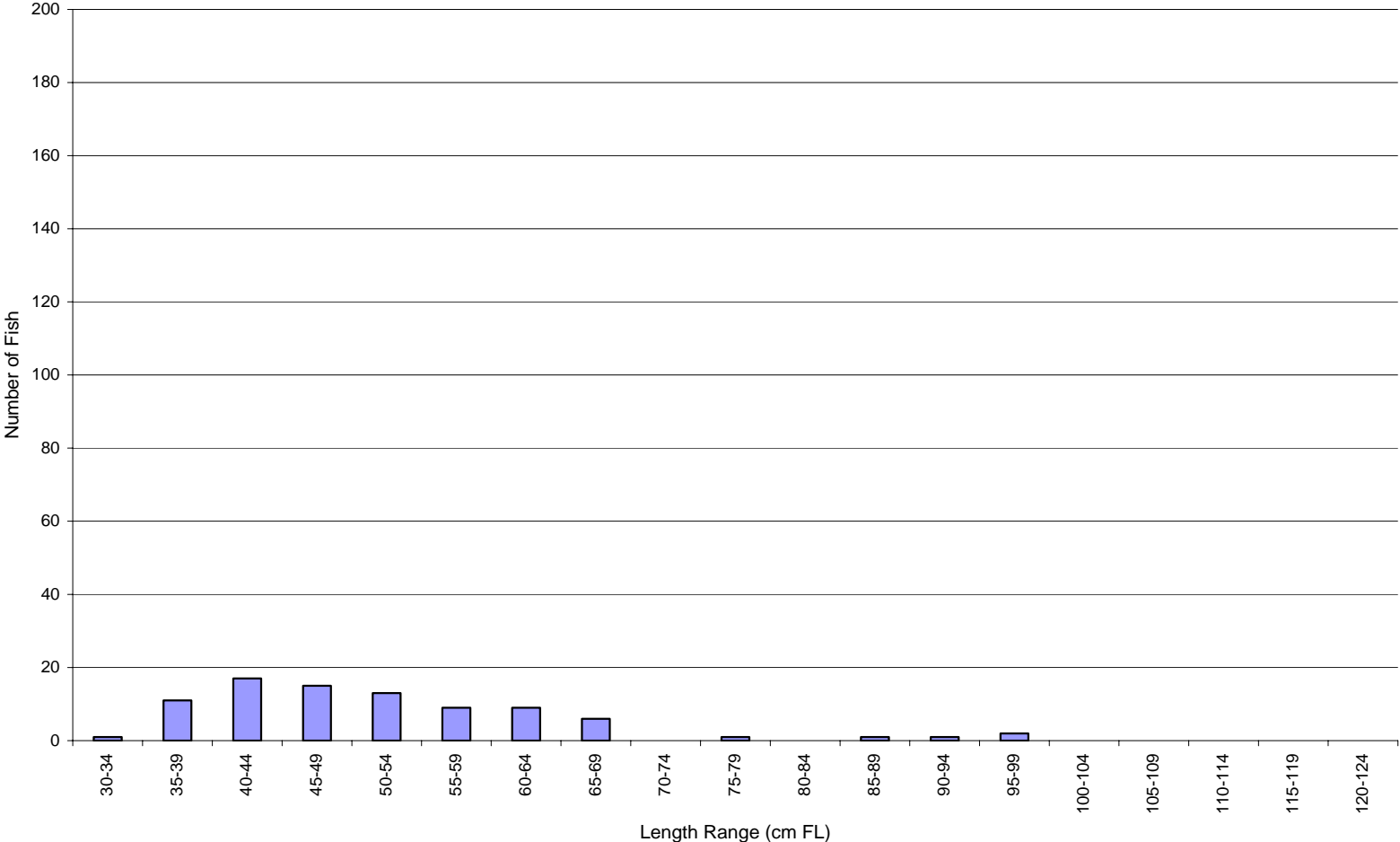
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 3 - Fyke Trap



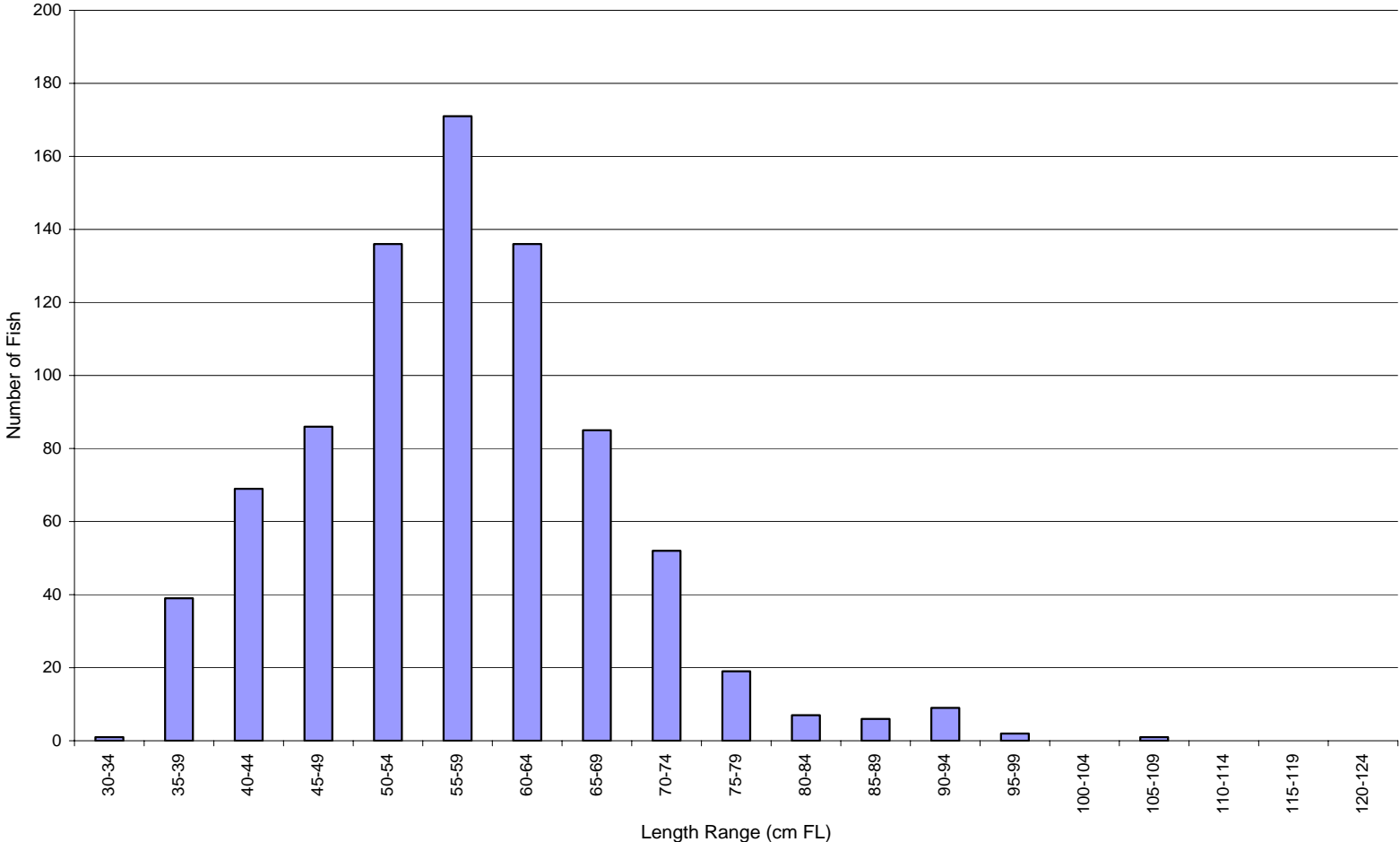
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 4 - Fyke Trap



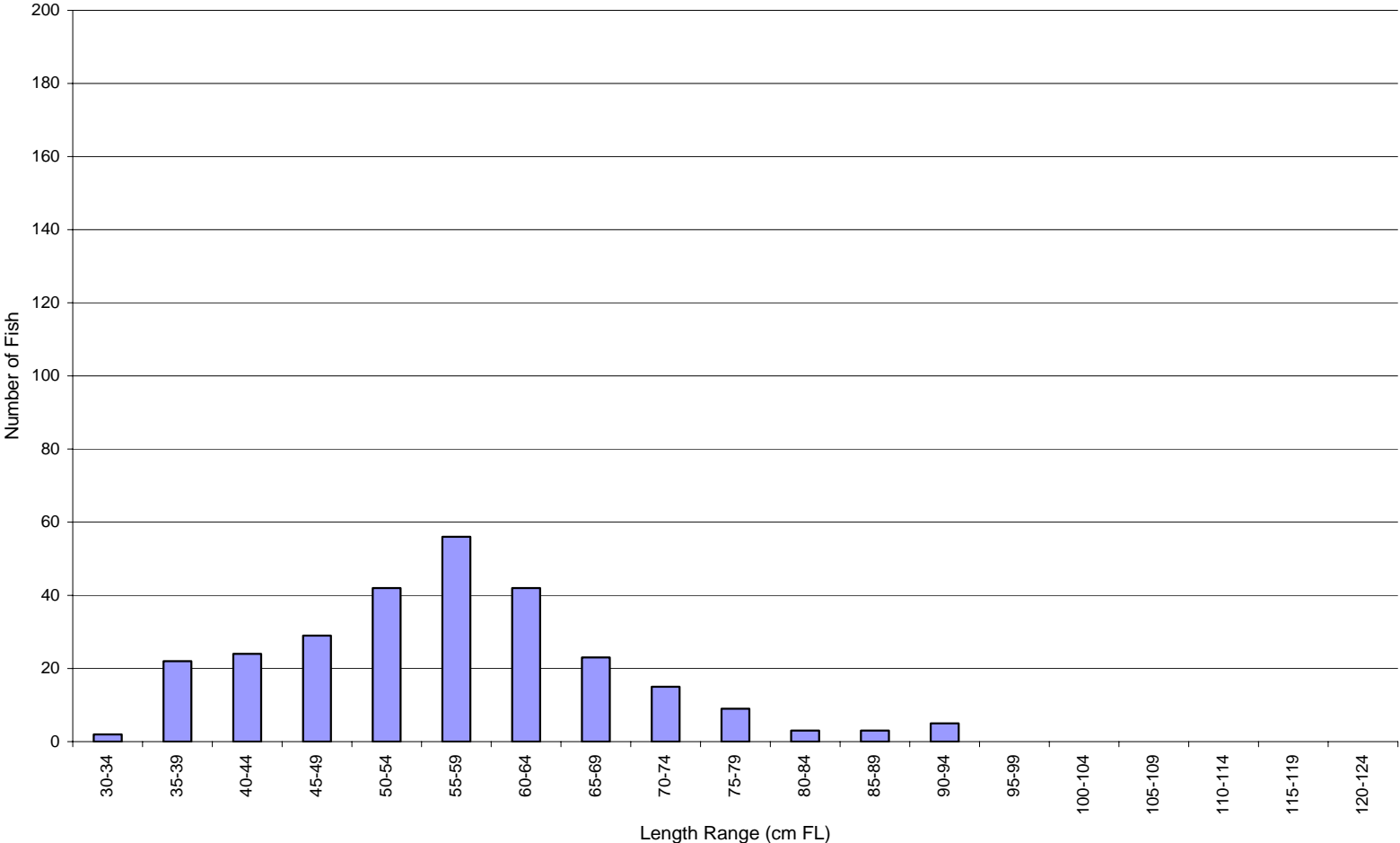
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 5 - Fyke Trap



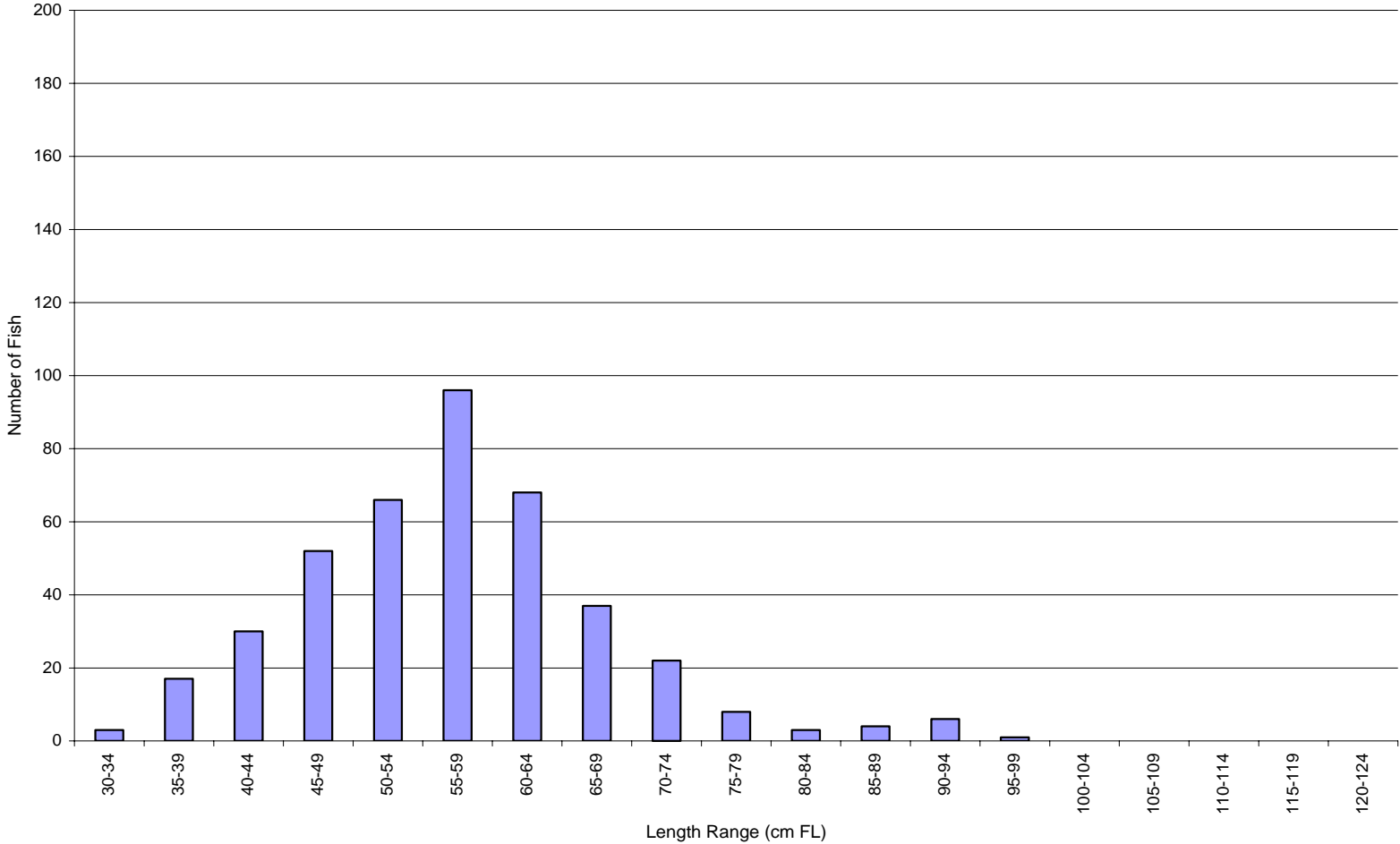
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 6 - Fyke Trap



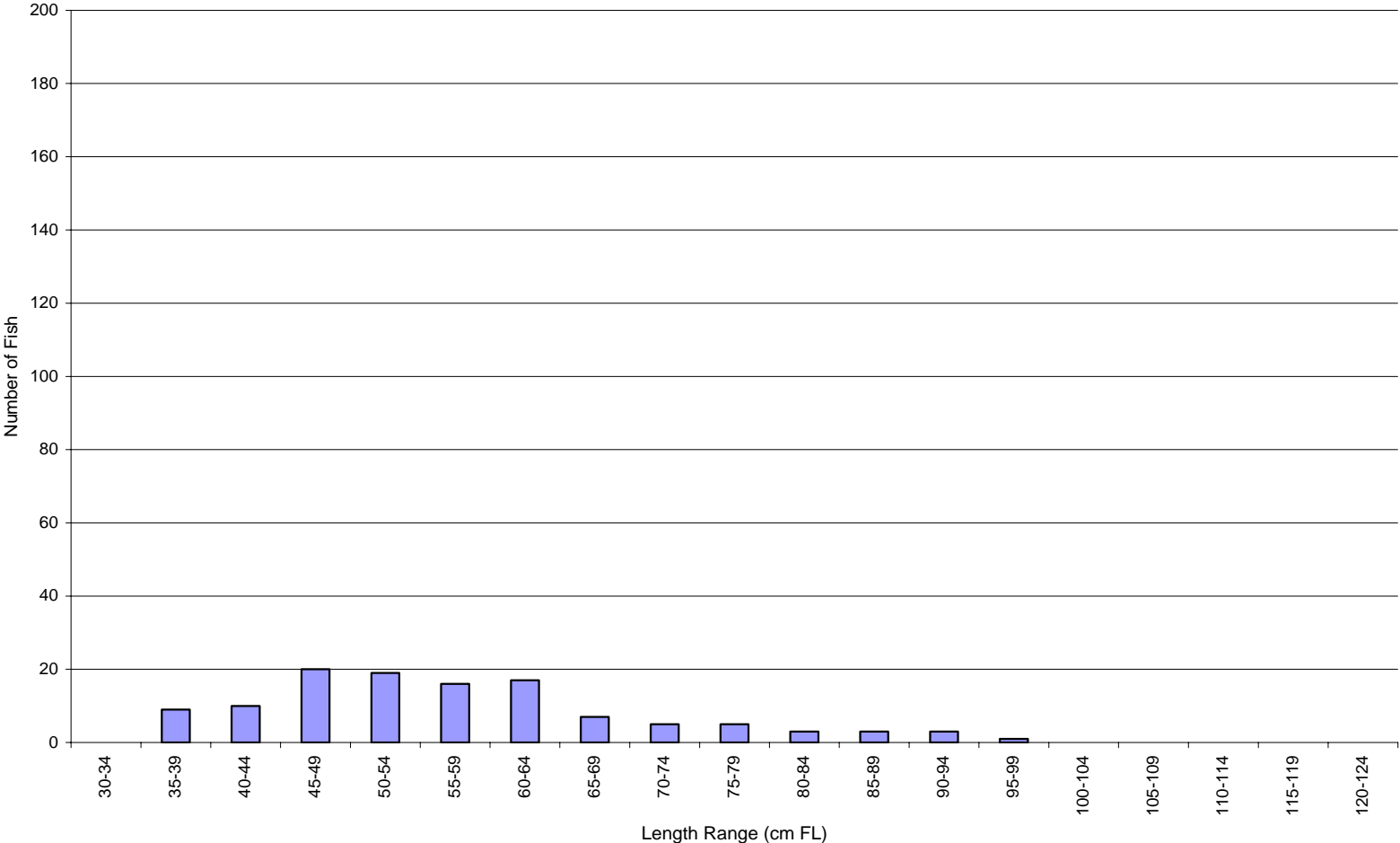
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 7 - Fyke Trap



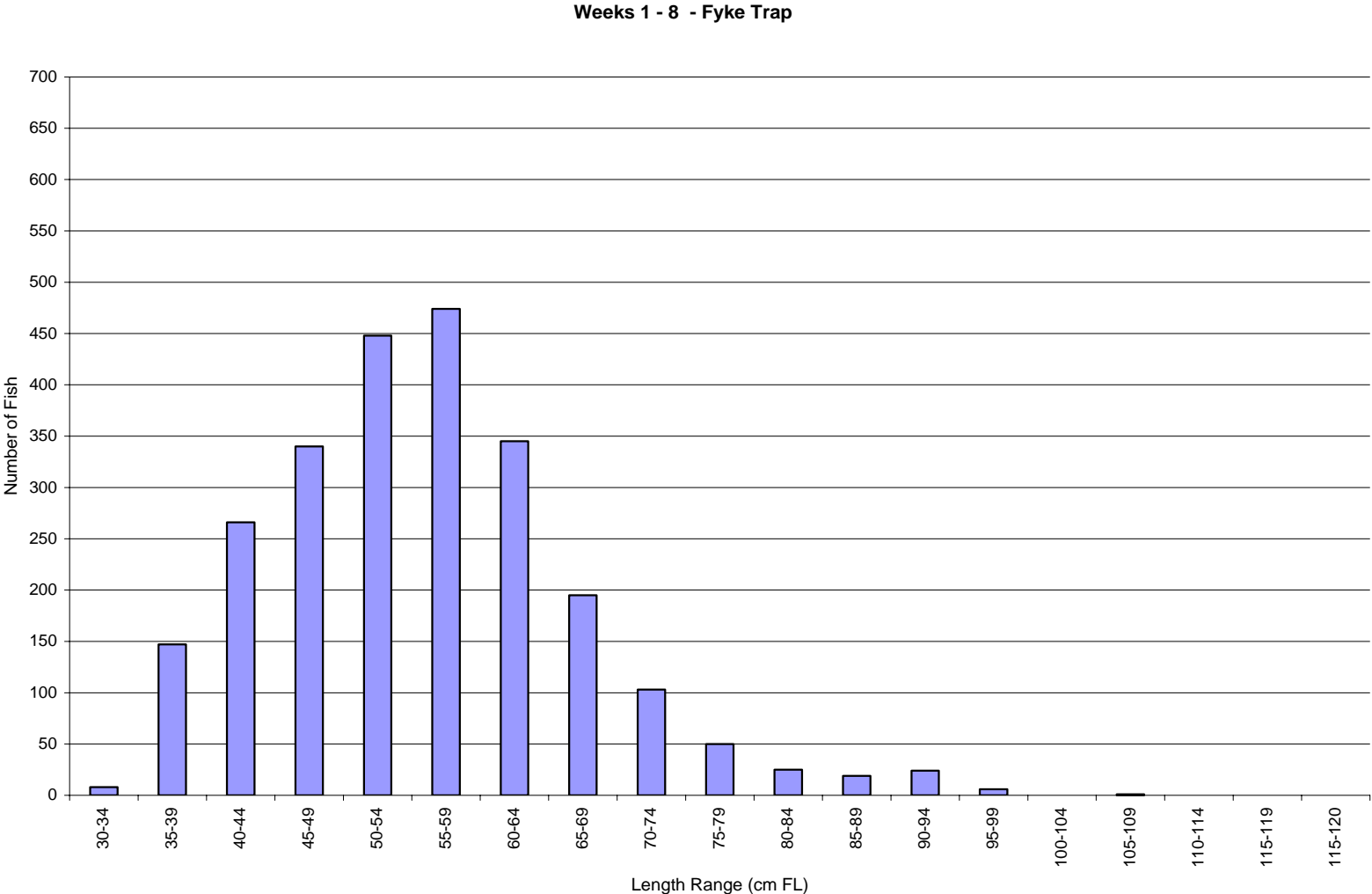
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 8 - Fyke Trap



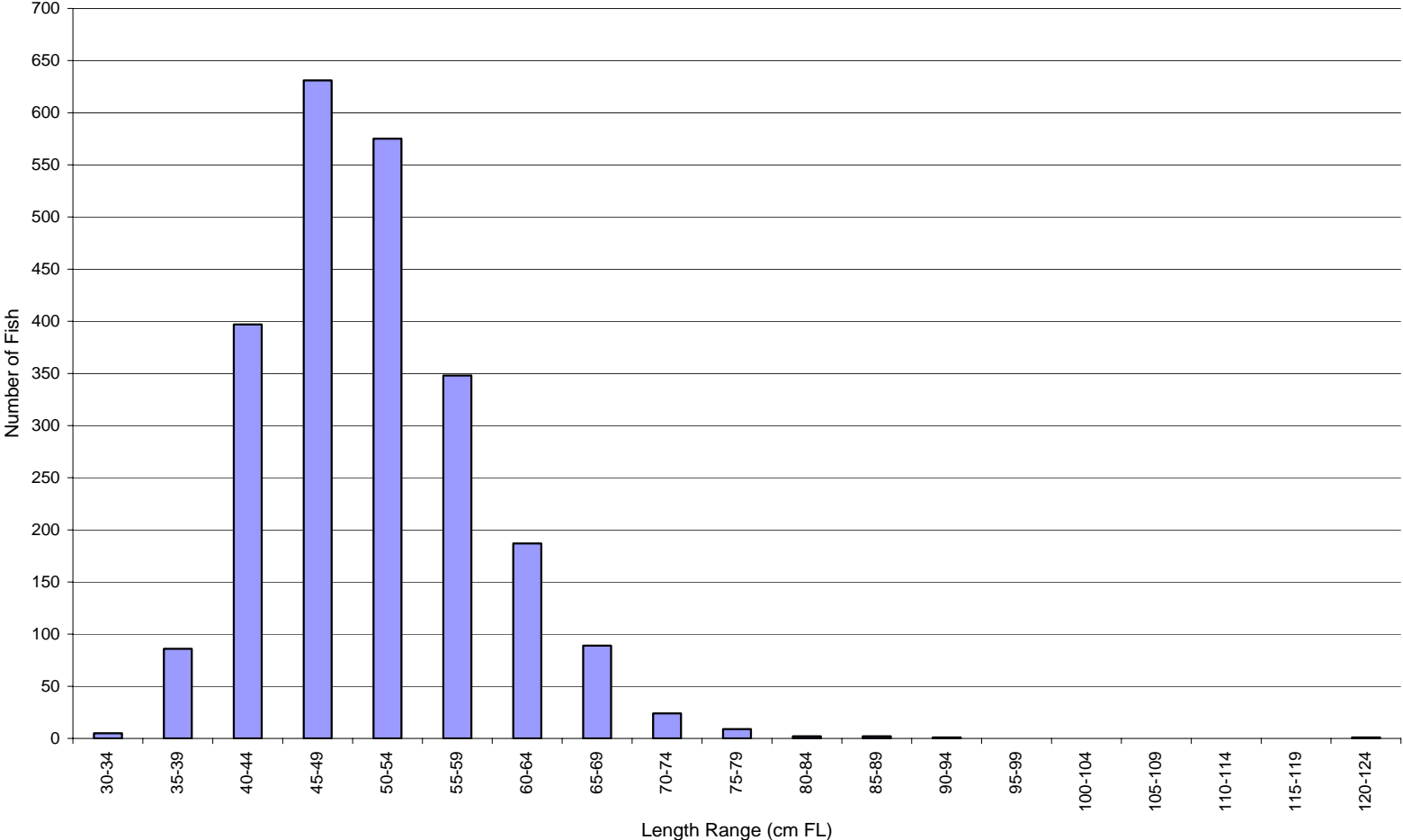
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Figure 7. Length-frequency distribution for fyke trap and gill net for 2008 season.



**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Weeks 1 - 9 - Gill Net



Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Gill Nets

The *New Alosa* fished on 18 days (3,812 minutes drift time) and the *Striper II* fished on 24 days (5,034 minutes drift time). Despite fewer fishing days (minutes drift time), the *New Alosa* posted a higher average daily catch than the *Striper II* (Table 2). Also, catch per hour was higher for the *New Alosa* than the *Striper II*, 17.9 versus 13.2.

Total legal-sized catch for both vessels combined was 2,242. Of these fish, 2,131 were tagged. This number was similar to the number of fish tagged fyke trapping (Table 2). Sixty-six fish were recorded as “over”, and 38 were recorded as dead⁵. Seven fish were recaptured⁶. Total sub-legal catch for both vessels combined was 220, which compared closely with the fyke trapping total (Table 2).

⁵ Combined for both vessels

⁶ Combined for both vessels

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Table 2. Summary of gill netting and fyke trapping efforts of the 2008 season.

	Total Legal Caught			Total Legal Tagged			Sub-legal			Minutes/# Traps Fished			Days Fished		
	<i>New Alosa</i>	<i>Striper II</i>	<i>Fyke Traps</i>	<i>New Alosa</i>	<i>Striper II</i>	<i>Fyke Traps</i>	<i>New Alosa</i>	<i>Striper II</i>	<i>Fyke Traps</i>	<i>New Alosa</i>	<i>Striper II</i>	<i>Fyke Traps</i>	<i>New Alosa</i>	<i>Striper II</i>	<i>Fyke Traps</i>
Total	1,138	1,104	2,630	1,102	1,029	2,270	135	85	277	3,812	5,034	246	18	24	26
Min	1	0	3	0	0	3	0	0	1	27	42	3	N/A	N/A	N/A
Max	153	119	547	148	118	382	22	10	43	351	296	10	N/A	N/A	N/A
Avg	63	46	101	61	43	87	8	4	11	212	210	9	N/A	N/A	N/A

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

The size of most striped bass ranged from 40 to 64 cm FL (Figure 8). Length range did not vary appreciably week to week. Like the fyke traps, only one fish was over 100 cm FL.

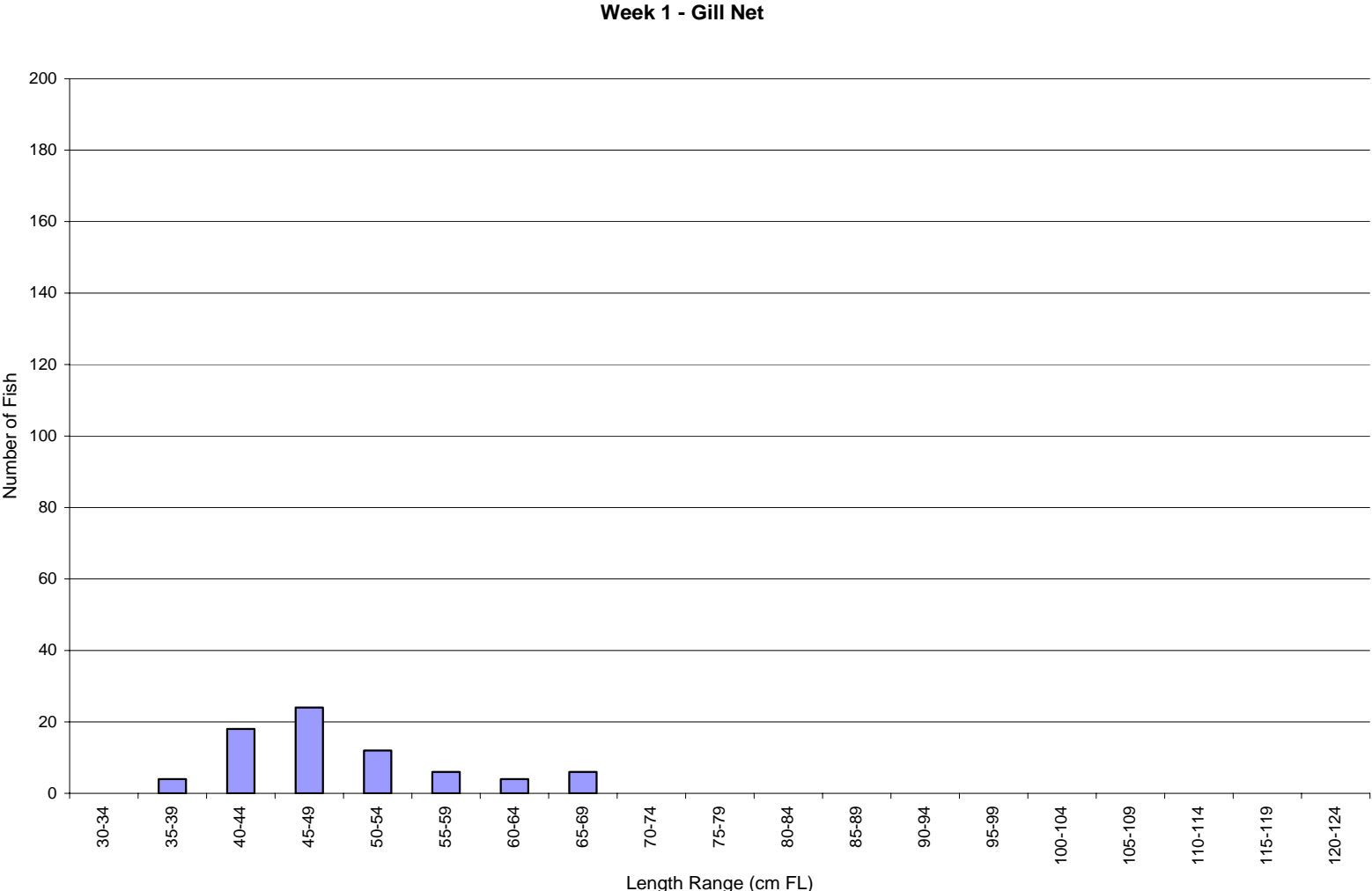
Weekly average length, combined for males and females, ranged from 50 – 55 cm FL. The greatest number of fish tagged during a single week was during Week 6 (Table 3). Males were more abundant than females. Of the total catch, 79% were males, 12% were females, and 9% were sub-legal.

Table 3. Weekly gill net totals.

Week #	1	2	3	4	5	6	7	8	9
# Tagged Fish	59	507	456	211	32	656	56	89	65
Minutes Fished	884	1,760	1,488	1,329	639	1,547	170	328	701
Mean FL (cm)	52	50	51	52	54	54	55	53	50

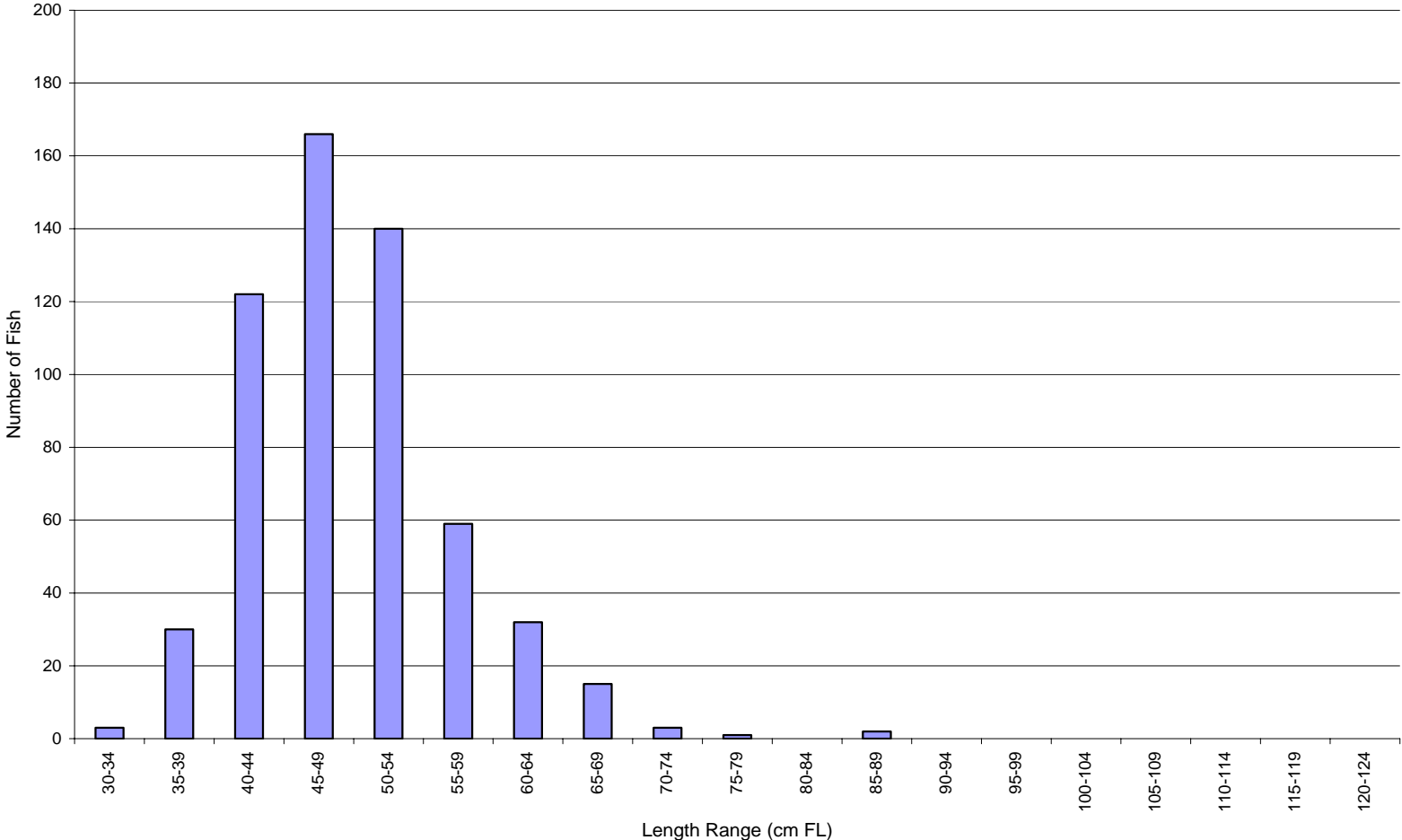
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Figure 8. Weeks 1 – 9 Length-Frequency distribution of fish caught in gill nets.



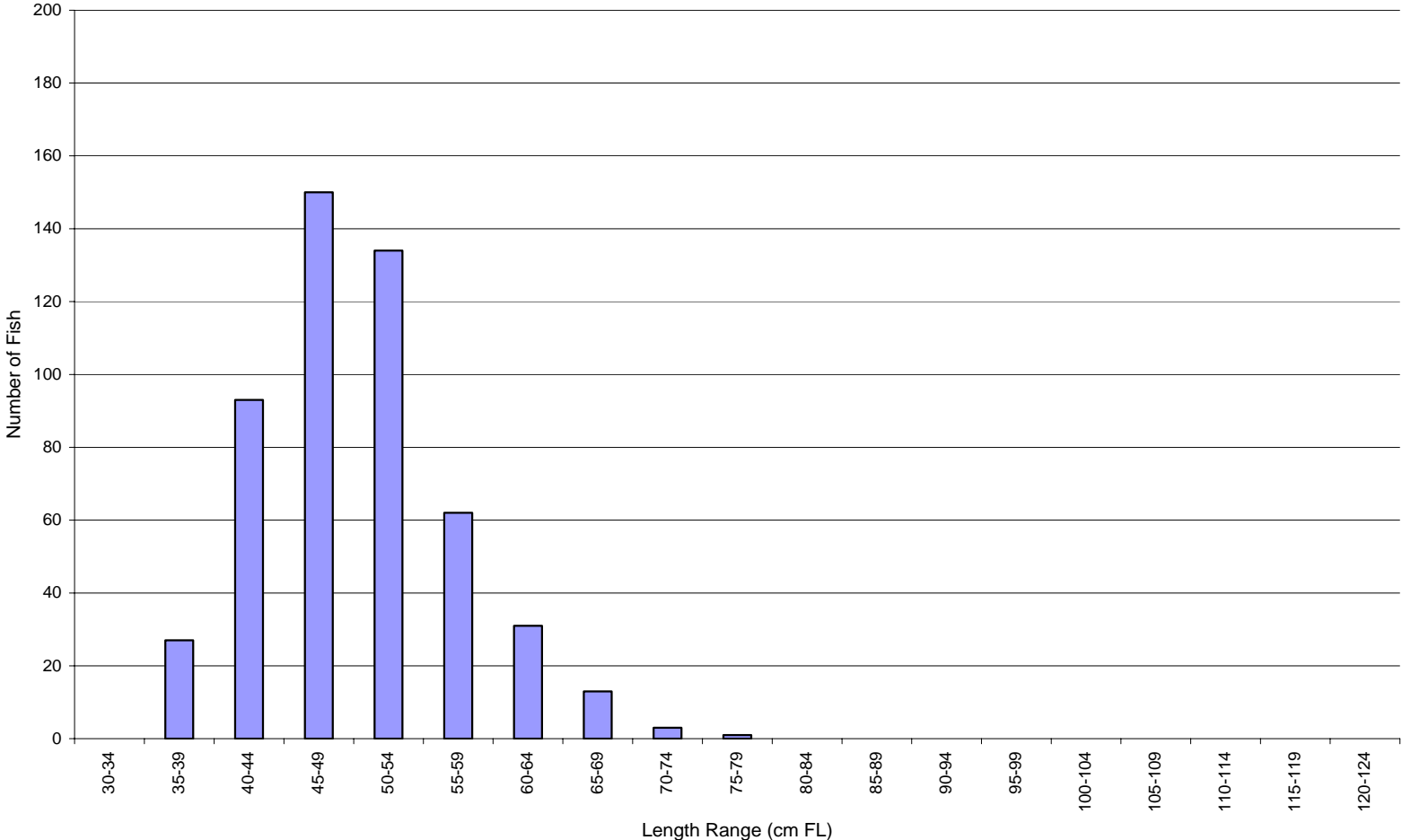
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 2 - Gill Net



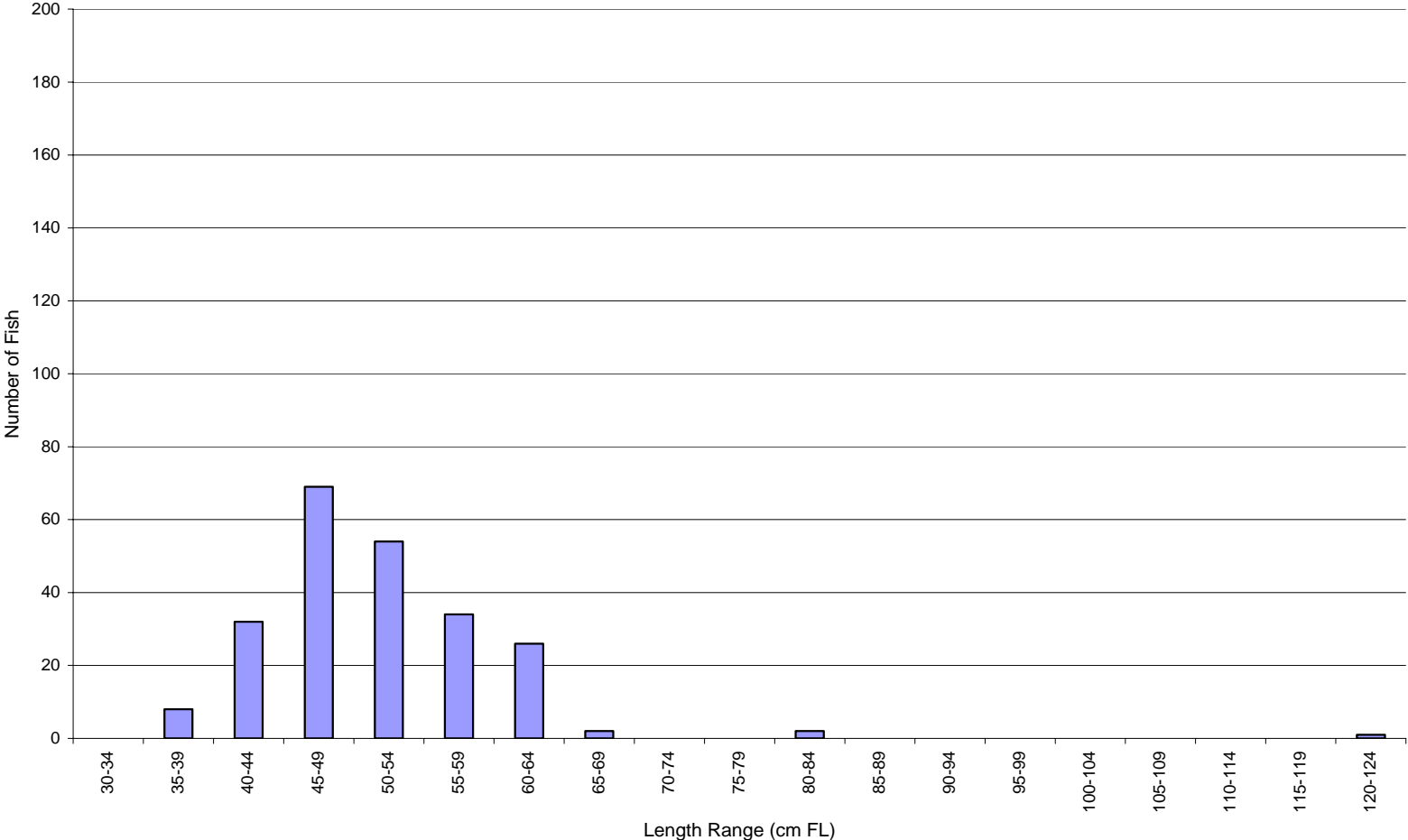
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 3 - Gill Net



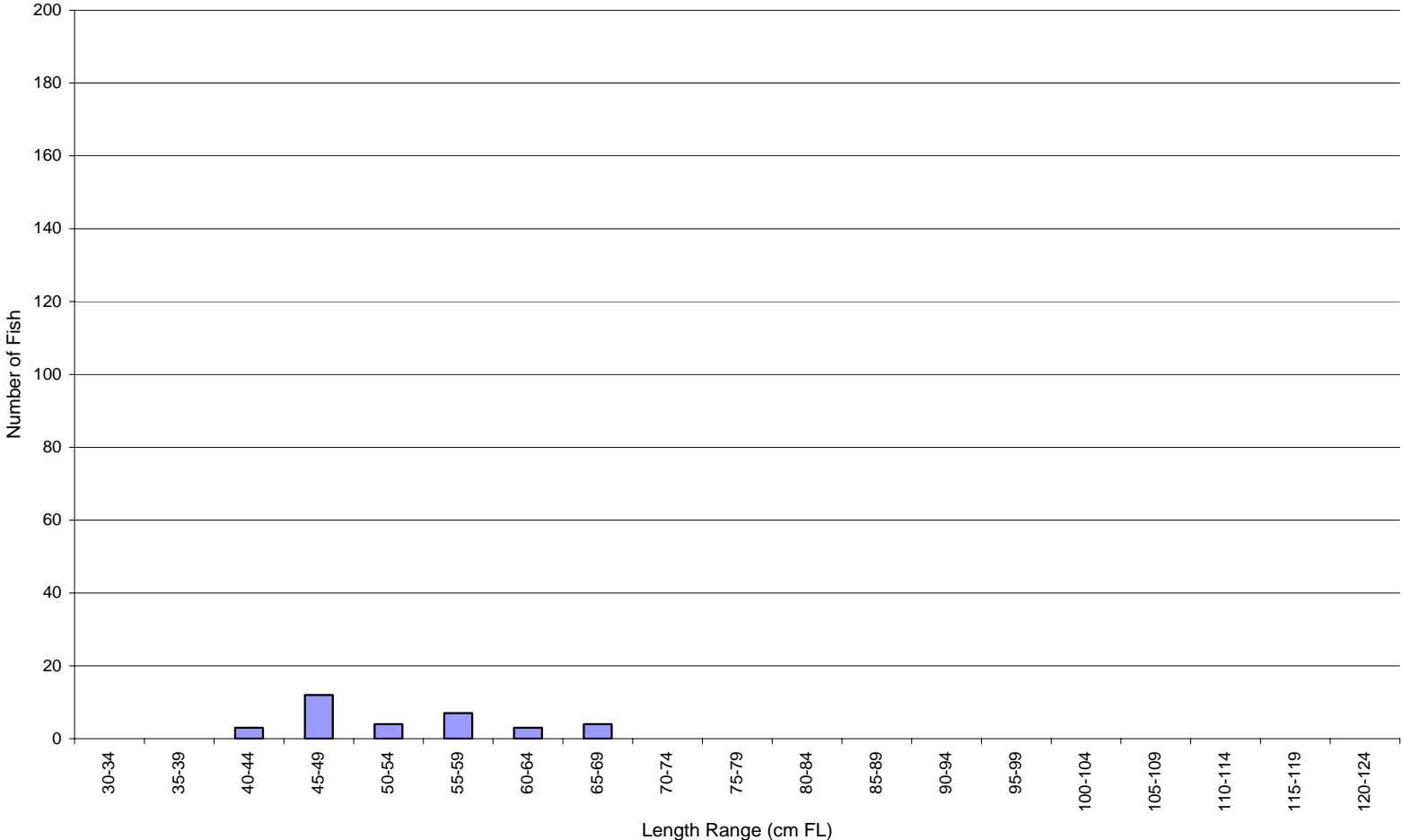
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 4 - Gill Net



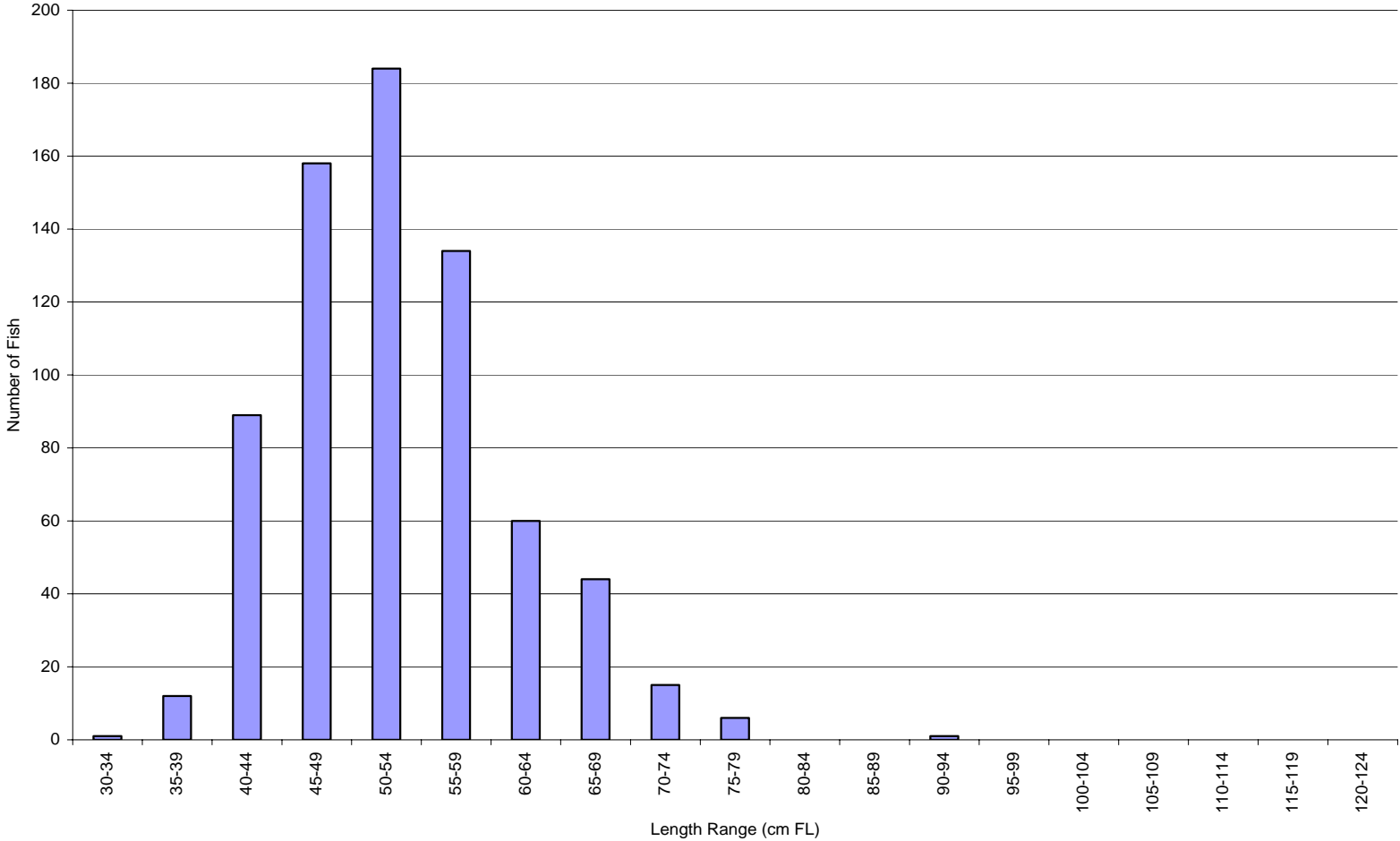
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 5 - Gill Net



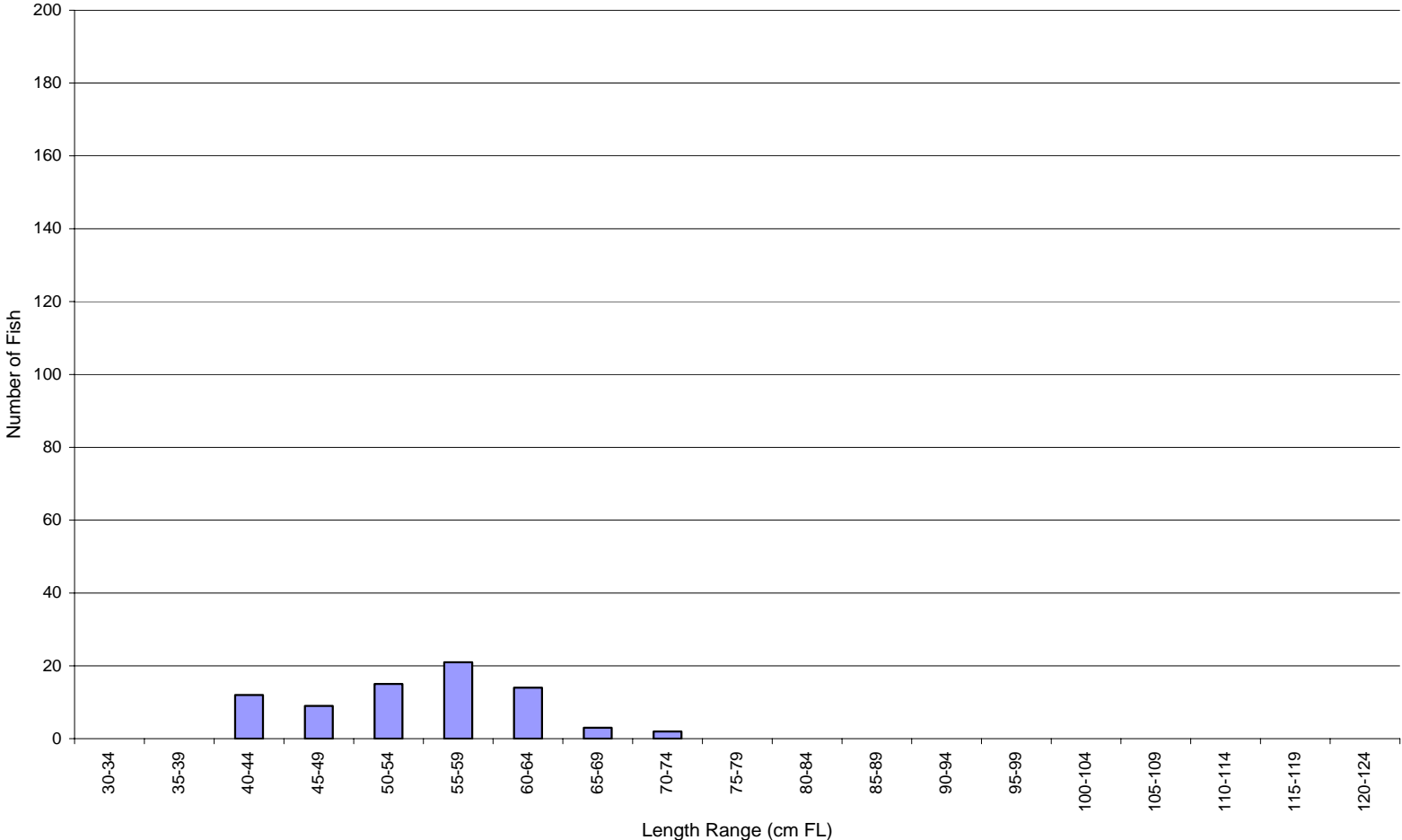
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 6 - Gill Net



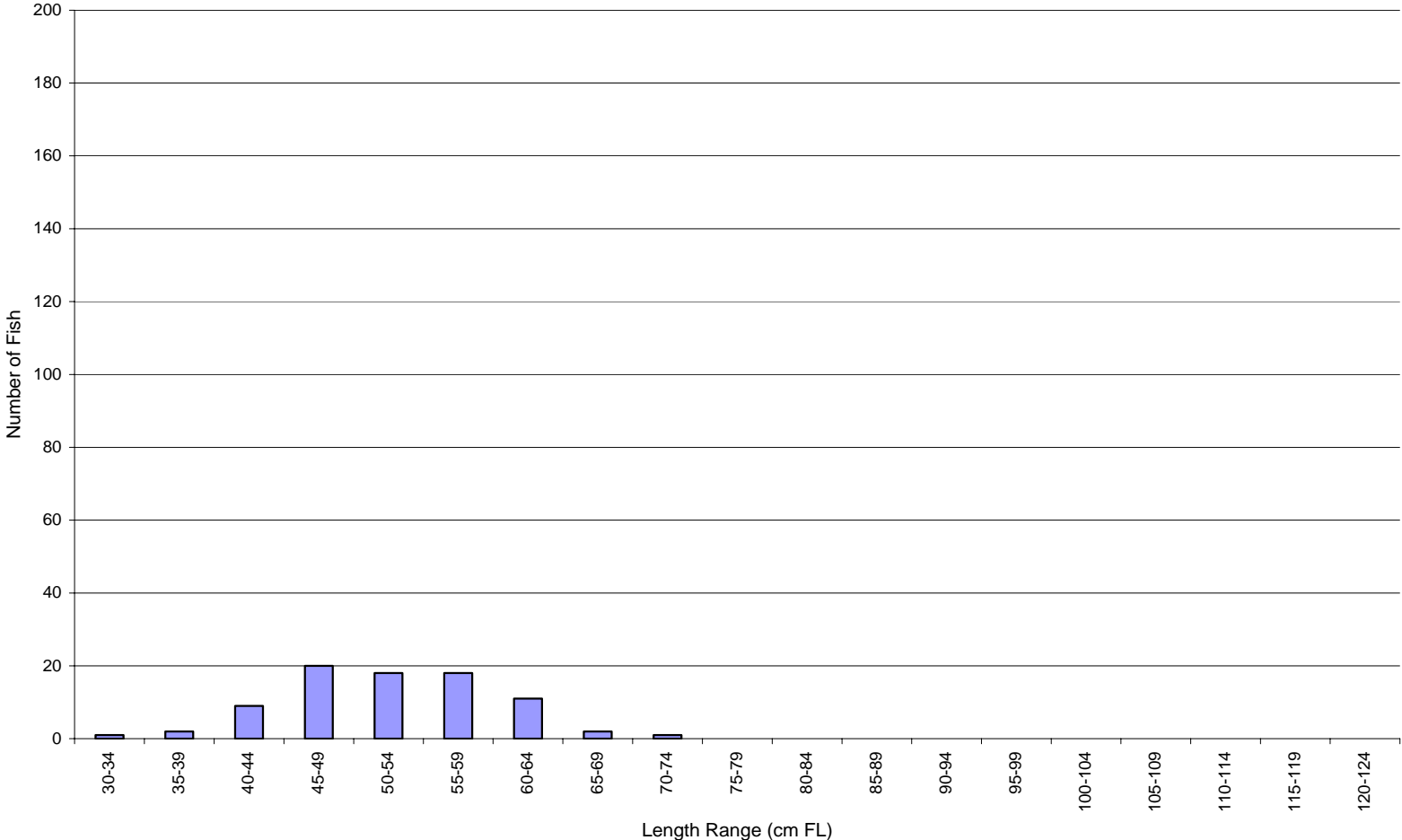
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 7 - Gill Net



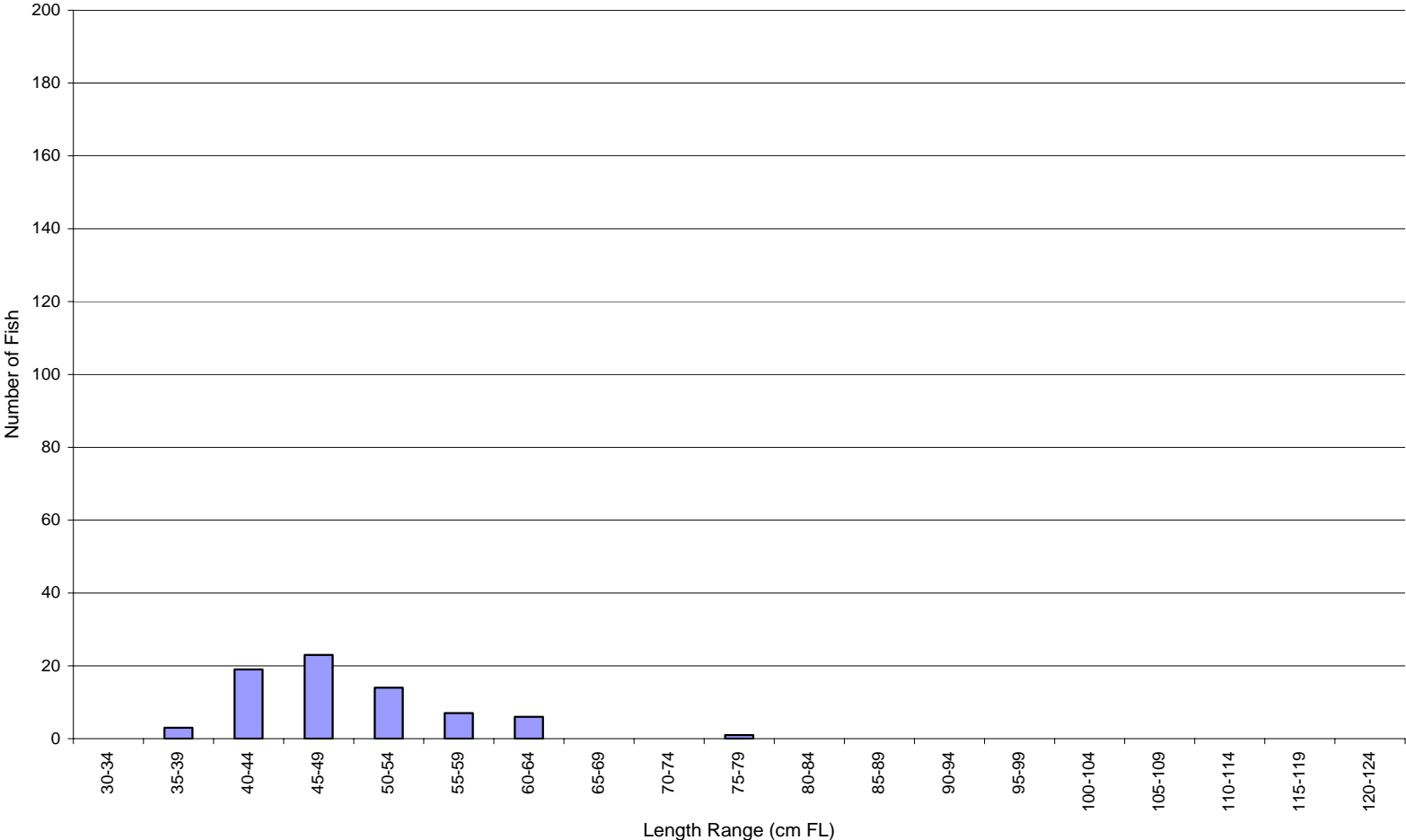
**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 8 - Gill Net



**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Week 9 - Gill Net



**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Gill nets caught 14 white sturgeon, one green sturgeon, one unidentified sturgeon, four Chinook salmon, and three steelhead. Small white sturgeon and green sturgeon were measured to the nearest centimeter total length. This data was recorded on the tagging datasheet. The *Striper II* caught one unidentified sturgeon approximated at 7 feet (200 pounds) (Figure 9). With the exception of sturgeon and salmonids, gill netting crews did not record incidental catch. Observed by-catch was American shad, white catfish, hitch, largemouth bass, bluegill/redear hybrid, and Sacramento pikeminnow.

Figure 9. Unidentified sturgeon caught gill netting. Fish could possibly be a green sturgeon. Fish was released unharmed.



Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Some problems that affected fishing (total catch) this season were as follows:

- Windy conditions prevented vessels from fishing for at least three days.
- Sometimes windy conditions — north winds, especially — made it difficult to fish the net well.
- Broad slough was a good area to catch fish, but there were too many snags. Both nets sustained considerable damage while fishing at this location⁹.
- On occasion, one or two private vessels were anchored in our drift area.
- Sea lions were a nuisance every day. These marine mammals would pick striped bass out of the nets. Some sea lions would bite the fish once, then toss it and leave it for dead (Figure 10).

Figure 10. Photot of tail-end of striped bass showing sea lion bite marks.



⁹ It is advisable to fish this area only during flood tides.

Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008

Summary of Recommended Changes

- Post written guidelines in clear view about how to optimize the tagging effort by shifting priorities. For example, when to shift into creel mode, plus-count fish, skip a trap, etc.
- Maintain resiliency between gill netting and fyke trapping personnel. Staff should be able to move seamlessly from the gill net operation to the fyke trap operation and vice versa.

**Bay Delta Region, IEP Program
Striped Bass Population Study
Cruise Report
June 20, 2008**

Appendix 1. Personnel list. All, except Phil Voong — US Fish and Wildlife Service, are employees of the California Department of Fish and Game (4001 N. Wilson Way, Stockton, CA 95205).

Name	Position Title	Fyke Trap (FT)
		Gill Net (GN) Both (B)
Denise Barnard	Scientific Aide	B
Ernest Chen	Scientific Aide	FT
Dorothy Crystal	Senior Lab Assistant	GN
Brian Delano	Mate	B
Jason DuBois	Biologist	GN
Kate Erly	Scientific Aide	GN
Ken Flowers	Mate - <i>Striper II</i>	GN
Marty Gingras	Supervising Biologist	-
Mike Harris	Associate Biologist	Lab
Brynn Hooton	Scientific Aide	B
Dave Hull	Fish and Wildlife Technician	FT
Don Jenkins	Fish and Wildlife Technician	FT
Jessica LaCoss	Scientific Aide	GN
Ryan Mayfield	Associate Biologist	FT
Andrew McClary	Scientific Aide	GN
Jen Messineo	Biologist	FT
Tim Morefield	Senior Lab Assistant	Lab
Dale Roberts	Scientific Aide	FT
Ashley Rogers	Scientific Aide	FT
Mike Silva	Mate - <i>New Alosa</i>	GN
Katie Smith	Scientific Aide	FT
Galen Tigan	Scientific Aide	GN
Phil Voong	Biological Technician - USFWS	B
Travis Walker	Scientific Aide	GN