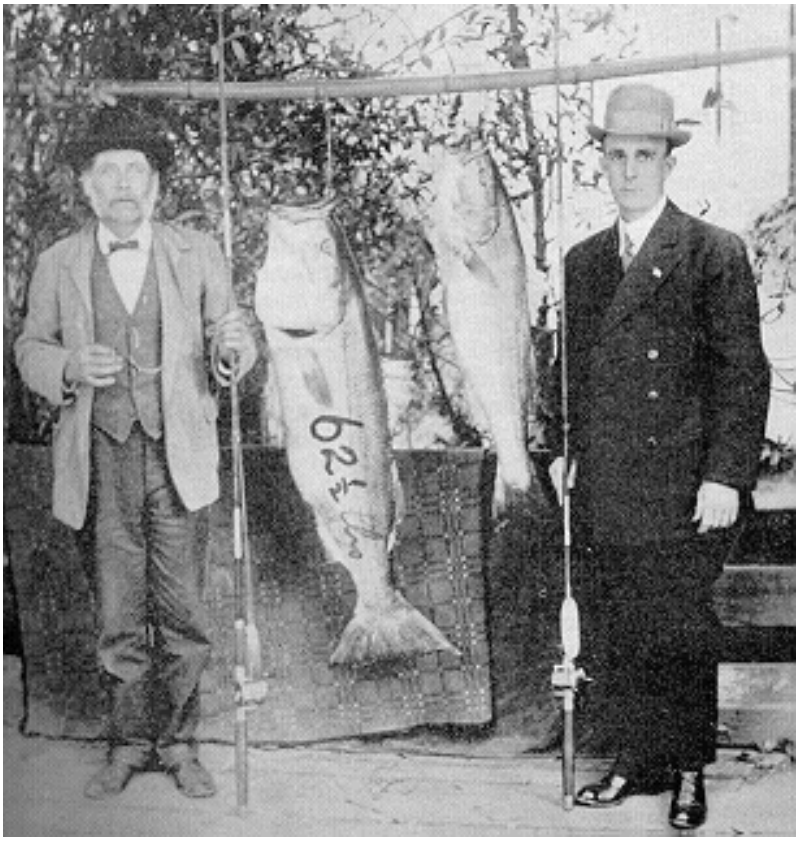
State of California
The Natural Resources Agency

DEPARTMENT OF FISH AND GAME

REPORT AND RECOMMENDATION TO THE FISH AND GAME COMMISSION IN SUPPORT OF A PROPOSAL TO REVISE SPORTFISHING REGULATIONS FOR STRIPED BASS



California Department of Fish and Game
December 2011

California Striped Bass in the Scientific Literature

N. B. Scofield and H. C. Bryant (1926) — "To the angler the striped bass is "a gallant fish and a bold biter." It is eagerly sought for by a host of anglers because of the excellent sport offered in its capture as well as the delectable white meat so desirable as food."

Eugene C. Scofield (1931) — "Some questions regarding young chinook salmon as one of the foods of the bass have been repeatedly called to attention. During this investigation no salmon have ever been observed in the stomach of a bass. The lack of small salmon as a result of the serious depletion of this race is the probable reason none has been found in the stomachs of the voracious striped bass."

Leo Shapovalov and Alan C. Taft (1954) — "Under certain conditions striped bass which have entered a stream may consume large quantities of seaward migrant trout and salmon, as shown by Shapovalov (1936). In that paper the writer described the stomach contents of 47 striped bass seined by A. C. Taft and himself in the upper end of Waddell Creek lagoon on April 26, 1935. The larger of these fish (37 to 49 cm. long) had been feeding largely on silver salmon and steelhead fingerlings and sculpins (Cottus), while the smaller bass (20 to 31 cm. long) had been feeding almost entirely on small crustaceans (Gammarus, Exosphaeroma, and Corophium), sticklebacks (Gasterosteus), and gobies (Eucyclogobius)."

Donald E. Stevens (1961) — "The most important finding of this study is that young king salmon are a major food item in the diet of striped bass in the study area during June, July and August…The [delta smelt] was the most important food during March and April, and was also important during June and August."

John L. Thomas (1967) — "At times striped bass feed heavily on their own young and on young king salmon. The effects of this predation on these populations can not be determined from the available data."

Peter B. Moyle (2002) — "The major impact striped bass had on native species, especially salmon, presumably took place after their initial establishment as voracious predators capable of eating their way through large populations of juvenile salmon and other species. They may have had major responsibility for the extinction of thicktail chub and Sacramento perch, but we have no way of knowing for sure. Although Chinook salmon declined in the Central Valley as bass increased, there was also a virtually unregulated fishery for salmon at the same time, and hydraulic mining was devastating to many salmon spawning and rearing habitats. It is likely that striped bass continue to be an important predator on small salmon and that the decline of striped bass may have assisted recent increases in some salmon populations. On the other hand, large populations of other native fishes, such as delta smelt, longfin smelt, and splittail, thrived when bass were abundant, suggesting that they are capable of coexistence."

Matthew L. Nobriga and Frederick Feyrer (2007) — "…striped bass likely remains the most significant predator of Chinook salmon, Oncorhyncus tschawytscha (Lindley and Mohr 2003), and threatened Delta smelt, Hypomesus transpacificus (Stevens 1966), due to its ubiquitous distribution in the Estuary and its tendency to aggregate around water diversion structures where these fishes are frequently entrained…"

Loboschefsky et al. (2011) — "As expected, long-term trends in population consumption (total and prey fish) by all striped bass cohorts (ages 1 though 6) closely followed their respective population abundance trends. Population total consumption and prey fish-specific consumption by sub-adult striped bass was found to be similar to the population consumption by adult striped bass, due largely to the high abundance of sub-adults. Unlike adult striped bass that may emigrate and forage in the Pacific Ocean, the majority of sub-adult striped bass reside permanently within the [San Francisco Estuary]; hence, consumption by the relatively abundant sub-adult population may have significant impacts upon their estuarine prey species."

I. INTRODUCTION

Striped bass are opportunistic predators, preying on a wide variety of fish, invertebrates, and other species. Among its prey are Sacramento River Winter-run Chinook salmon, Central Valley Spring-run Chinook salmon, coho salmon, Central Valley steelhead, delta smelt, longfin smelt, and tidewater goby (collectively the "listed species"). These species are all listed as "endangered" or "threatened" under either or both the federal Endangered Species Act[1] and the California Endangered Species Act.[2]

While predation by striped bass is only one of numerous stressors on the listed species, by previously stocking striped bass and by enacting the striped bass sport fishing regulations currently in effect, the Department of Fish and Game (Department) and the Fish and Game Commission (Commission) may have inadvertently contributed to this stressor by helping establish and maintain the current population of predatory striped bass. More importantly, this particular stressor not only has roots in the actions of the Department and the Commission, but standard fisheries management practices indicate it may be alleviated, at least in part, by further action on the part of the Department and Commission.

This staff report provides an overview of historic and current population trends for the listed species. This report further provides a brief overview of the striped bass fishery, historic and current population trends, the nature and extent of striped bass predation on the listed species, and key features of the recreational fishery for striped bass. While acknowledging uncertainty about the extent and impacts of striped bass predation, the Department concludes:

- The populations of each of the listed fish have declined, and some are at perilously low levels;

- Although striped bass abundance has declined in recent decades, the population remains substantial;

- Although studies of striped bass predation show each of the listed species to constitute a relatively small part of the striped bass diet, and although the actual level of striped bass predation on these species is unknown and likely unknowable, the enormous volume of fish (up to 110 million pounds annually) consumed by striped bass and the widespread distribution of striped bass within the geographic range of the listed species indicate the impact of striped bass predation on the listed species could be substantial; and

- The recreational fishery for striped bass is very popular, and many anglers will harvest substantially more striped bass if they are allowed to keep smaller fish.

[1] Title 16, U.S.C., § 1531, et seq.
[2] Fish & G. Code, § 2050, et seq.

For these reasons, the Department concludes that, notwithstanding uncertainty as to the extent and impact of striped bass predation on the listed species, the highly precarious state of the populations of the listed species warrant a change in sportfishing regulations to allow greater harvest of striped bass. Attached to this staff report as Exhibit A is a regulatory proposal to amend several sections of Title 14 with the goal of increasing the harvest of striped bass and thereby reducing predation by striped bass on the listed species. The Department recommends that the Commission:

- Direct the Department and Commission staff to prepare a regulatory packet for the attached regulatory proposal in accordance with the California Administrative Procedure Act[3]; and

- Direct the Department and Commission staff to commence appropriate environmental review under the California Environmental Quality Act[4] (CEQA) for the proposed regulation change.

II. LISTED FISH SPECIES

The populations of the listed species have long been in decline. Striped bass are known and/or expected to prey on each of the listed species, sometimes very extensively. While the precise impact of striped bass predation on the listed species is unknown, the best available science indicates that the impact on listed species populations is substantial.

Of the many listed fish in California, the proposed regulation is most likely to benefit the following listed species (listing year in parentheses):

- Chinook salmon (Winter-run); State Endangered (1989); Federal Endangered (1994)
- Chinook salmon (Spring-run); State Threatened in 1999); Federal Threatened (1999)
- Steelhead (Central Valley); Federal Threatened (1998)
- Steelhead (Central Coast); Federal Threatened (1997)
- Steelhead (South/Central Coast); Federal Threatened (1997)
- Coho salmon (Central Coast); State/Federal Endangered (2005); Federal Threatened (1996)
- Delta smelt; State/Federal Threatened[5] (1993); State Endangered (2010)
- Longfin smelt; State Threatened (2010)
- Tidewater goby; Federal Endangered (1994)

[3] Gov. Code, § 11340, et seq.
[4] Pub. Resources Code, § 21000, et seq.
[5] USFWS has concluded that Delta smelt warrant reclassification as endangered, but that action was precluded by other higher priority
actions (USFWS 2010).

1. Chinook Salmon Status and Trends

The population of Winter-run Chinook salmon had collapsed by the mid-1980s such that spawning escapement in 1994 was estimated at fewer than 200 fish, increased to 17,153 in 2006, then declined to just 1,596 fish in 2010 (Figure 1). Escapement of Spring-run Chinook (from several streams) was extremely low from the mid-1970s through the mid-1990s, increased to nearly 15,000 fish in 2005, then declined precipitously to 1,904 fish in 2010 (Figure 1). Ocean conditions are thought to have been the proximate cause for the recent collapse of Sacramento River fall Chinook (Lindley et al. 2009) and no doubt affect Winter-run and Spring-run Chinook salmon.

Threats to Winter-run and Spring-run Chinook salmon include (in no particular order) barriers and impediments to migration, water diversions, habitat loss and degradation, impaired water quality, commercial and recreational fishery effects, hatchery effects, and predation from non-native fish (NMFS 2009a).

By virtue of their abundance, habits, and size, predation by striped bass has been implicated as a substantial contributor to the poor survival of young salmon used in experiments to estimate reach- and site-specific survival rates through the Delta and in the Sacramento River (Bowen et al. 2009; Gingras 1997; MacFarlane et al. 2008; Michel 2010; Newman and Brandes 2010; Perry and Skalski 2008; Perry and Skalski 2009; Tucker et al. 1998; Vogel 2010; Vogel 2011). By plausible extension, listed salmon (and steelhead) also suffer poor survival rates due to predation, including predation by striped bass.

See CDFG 2011; NMFS 2011a; and NMFS 2011b for more detail about Chinook salmon.

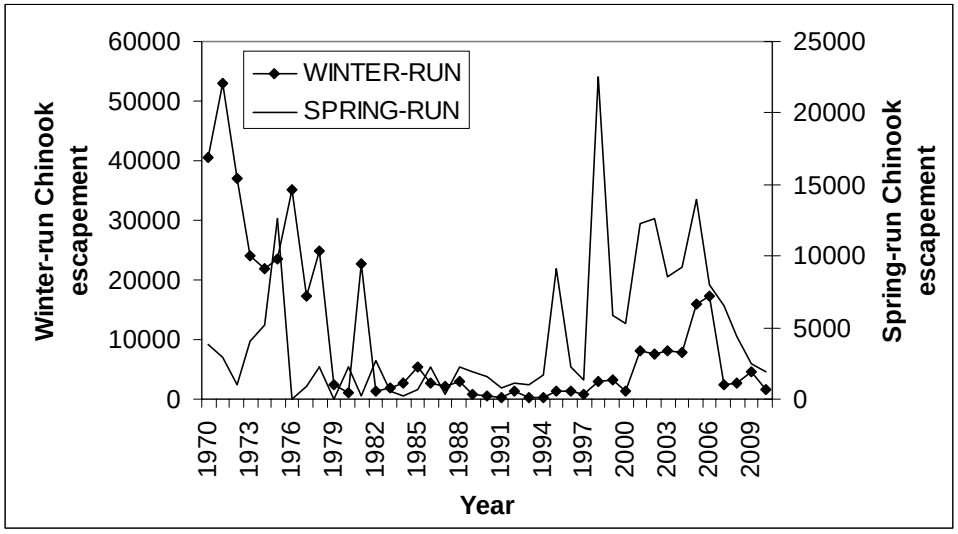


Figure 1. Escapement of Chinook salmon over time.

2. Delta Smelt Status and Trends

Delta smelt was historically one of the most common open-water fish in the upper Sacramento-San Joaquin Delta and its abundance has often fluctuated considerably from year to year. The three indices the Department uses to monitor delta smelt abundance trends have declined steeply since the late 1990s, indicating that the population has declined sharply since its listing in 1993 (Figure 2; For brevity, only one index is shown). Recent indices are persistently low despite sometimes-favorable environmental conditions and intensive management efforts attributable in part to endangered species act listings.

Some factors affecting delta smelt abundance are thought to include (in no particular order) low numbers of adults, a decline in fall habitat environmental quality, adverse water quality, loss to diverted water flows, changes in food web function, and predation by managed fishes, including striped bass.

Survival of delta smelt (Castillo et al. 2010) and steelhead (Clark et al. 2009) entrained into Clifton Court Forebay has been the subject of recent research. The findings strongly suggest that predation by striped bass causes mortality rates range from 78-99% and are harmonious with findings from decades of research by the Department (Gingras 1997).

See CDFG (2008) for more detail about delta smelt.

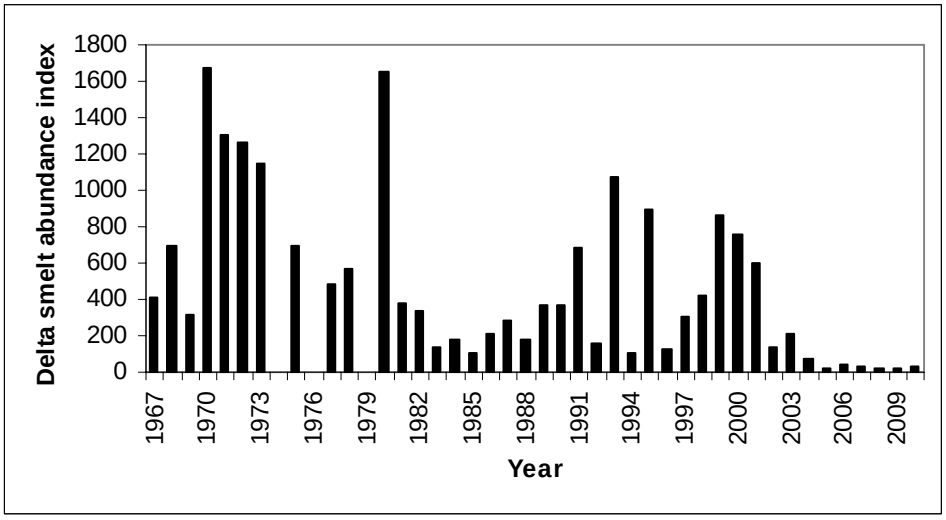


Figure 2. Trends in the annual abundance of delta smelt as indexed by the Department's Fall Midwater Trawl Survey.

3. Longfin Smelt Status and Trends[6]

The three indices the Department uses to monitor longfin smelt relative abundance trends have declined steeply since the late 1990s (Figure 3; For brevity, only one index is shown).

The USFWS has made preliminary estimates of adult (>30 mm) longfin smelt abundance during fall months within the upper San Francisco Estuary and Sacramento-San Joaquin Delta (i.e., a subset of their geographic range) based on the Department's Fall Midwater Trawl Survey data for the period 1975-2007. The estimates suggest that abundance peaked in the "tens of millions" in 1982 and declined to the "tens of thousands" by 2007 (Ken Newman, personal communication, December 2008). The accuracy of the absolute estimates is disputable due to potential selection biases in the trawl, incomplete sampling of longfin smelt habitat and considerable month-to-month variation in catches. However, evidence for a decline of at least two orders of magnitude in the relative abundance of the fall upper estuary population between 1982 and the present is quite strong (Ken Newman, personal communication, January 2009).

Some factors affecting longfin smelt abundance include (in no particular order) low numbers of adults, water pollution, adverse water quality, prevalence of exotic species (including food items), loss to diverted water flows, changes in food web function, a commercial bait fishery for bay shrimp in the San Francisco Estuary and Sacramento-San Joaquin Delta, and predation by managed fishes, including striped bass.

See CDFG (2009) for more detail about longfin smelt.

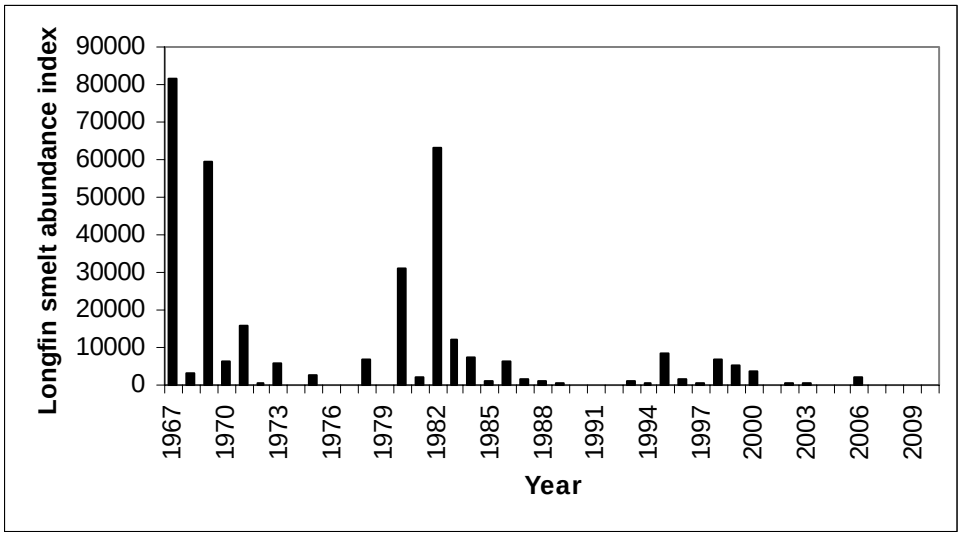


Figure 3. Trends in the annual abundance of longfin smelt as indexed by the Department's Fall Midwater Trawl Survey

[6] Due to a paucity of information about longfin smelt outside of the San Francisco Estuary and Sacramento-San Joaquin Delta, the following is relevant only to longfin smelt within the Estuary.

4. Steelhead, Coho Salmon, and Tidewater Goby Status and Trends

Due largely to their rarity and the resulting lack of information, it is beyond the scope of this report to describe the status and trends of these listed species.

Factors affecting the abundance of these species are varied and include, for example: dewatering, degraded water quality, habitat channelization, loss of spawning habitat due to operations of dams, loss and modification of habitat, and competitive and predatory introduced fish species. Protection and recovery of these species through instream, riparian, and upslope work — and work in central-coast lagoons — has been on-going and sometimes quite extensive.

It is common for striped bass to enter central-coast watersheds during the relatively brief period their rivers and streams flow to the ocean and to become trapped, often for many months, when lagoons develop due to receding flows and sand-bar formation (Shapovalov and Taft 1954). Because these same lagoons provide critical habitat for steelhead, Coho salmon, and tidewater goby, and because striped bass both prey on and compete with those species, striped bass in lagoons constitute a substantial threat to these listed species.

The most recent investigation into striped bass in coastal watersheds took place in the Carmel River lagoon. Due largely to extensive de-watering of the Carmel River's lower reaches and barriers to fish-passage, Carmel River steelhead have survived due to decades of active management and habitat restorations, including construction of fish ladders, trap-and-truck operations at a major dam, translocating young steelhead from de-watering reaches to a rearing facility and to the lagoon, and extensive restoration of the lagoon. The number of young steelhead in the Carmel River lagoon during fall/winter has been estimated three times and has ranged from 1,335 (in 2010) to 5,643 (in 1996) (Kevan Urquhart, personal communication, July 2011). As part of a research effort in 2010, approximately 100 adult striped bass ranging in size from 309-920 mm were removed from the lagoon by anglers fishing just 143 hours (CDFG 2010). Although it is impossible to estimate the number of young steelhead eaten by striped bass in the Carmel River lagoon during 2010, it is plausible they ate thousands.

See NMFS 2011c for detail about status and trends of Central Valley steelhead.

III. STRIPED BASS

1. Development of the Striped Bass Fishery

Striped bass in California are an abundant, broadly-distributed, resilient, piscivorous (fish-eating), non-native sport species. Striped bass are anadromous and occur in coastal rivers and lagoons, the ocean, the San Francisco Estuary and Sacramento-San Joaquin Delta, the Sacramento River watershed, and the San Joaquin River watershed. Striped bass spawn during spring in rivers (predominantly the Sacramento River), and rear and

forage year-round in bays, estuaries, and the ocean. The Sacramento-San Joaquin river system is likely the southern-most extent of striped bass spawning and is clearly where most spawning occurs. Striped bass in California mature at 2-4 years old, can reach a maximum size of greater than 3 feet, and can live more than 20 years. Striped bass life-history characteristics (e.g., frequent spawning after maturity and high fecundity) make striped bass very resilient in the face of environmental and other stressors.

Commercial and recreational fisheries on a booming striped bass population extended from southern California to Washington shortly after striped bass were introduced into California in 1879 from New Jersey. After development in the Central Valley caused a substantial decline in the number of adult striped bass, striped bass recovery — through restrictions on the fishery, augmentation with fish produced in hatcheries, and protective approaches to water management — became a focus in the 1970s. Although striped bass recovery has not been achieved, the fishery remains substantial, and in 2000 the population experienced a spike in adult abundance not seen since the mid-1970s.

Efforts to manage and recover striped bass became controversial with the listing of Chinook salmon and delta smelt under the state and federal Endangered Species Acts and have remained controversial since. To address concerns about Winter-run Chinook salmon, the Department temporarily stopped stocking striped bass in 1990. The Department worked for several years to receive federal permits from the United States Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NOAA Fisheries) to resume stocking striped bass but again stopped stocking striped bass in 2000 to address concerns about several listed species in the Central Valley.

Controversy over striped bass management peaked in 2008 when the Coalition for a Sustainable Delta, et al., sued the Department under the federal Endangered Species Act seeking to prohibit enforcement of Title 14, section 5.75 of the California Code of Regulations or to require the Department to apply for federal permits to enforce the regulation. In February 2011, the Department and the Coalition entered into a settlement agreement. As an integral part of that settlement, the Department agreed to develop, in cooperation with the USFWS and NOAA Fisheries, a proposal based upon the best available scientific information to modify the striped bass sport fishing regulation (i.e., Section 5.75) to reduce striped bass predation on Sacramento River Winter-run Chinook salmon, Central Valley Spring-run Chinook salmon, Central Valley steelhead, and delta smelt.

2. Striped Bass Status and Trends

Although the population of striped bass has declined in recent decades, it remains substantial, and there have likely been millions of striped bass in California every year for more than a century. The abundance (Figure 4) and relative abundance (Figure 5) of adult striped bass has varied substantially over the decades. The present abundance of adult striped bass may be as low as roughly 500,000 after a recent peak of approximately 1,500,000 in the year 2000.

Whereas the decline and year-to-year variation in striped bass abundance through the mid-1990s has been attributed primarily to environmental conditions (including operation of the State Water Project (SWP) and Central Valley Project (CVP)) affecting young striped bass (Stevens et al. 1985), the most-recent increasing trend (1994-2000), though still the subject of active investigation, is likely attributable in large part to augmentation with hatchery-reared fish (Kohlhorst 1999).

The abundance of young striped bass is also known to vary substantially, declining from very-high levels in the 1960s to moderate levels in the 1980s, then declining further during the last decade to record-low levels (Figure 6). Although the Department rarely estimates the abundance of young striped bass, they are generally vastly more abundant than adult striped bass. The continued high abundance of adult striped bass after decades of low juvenile abundance is a sign of striped bass resilience, as is the shift of young striped bass from mid-water habitat towards shallow-water habitat (Sommer et al. 2011).

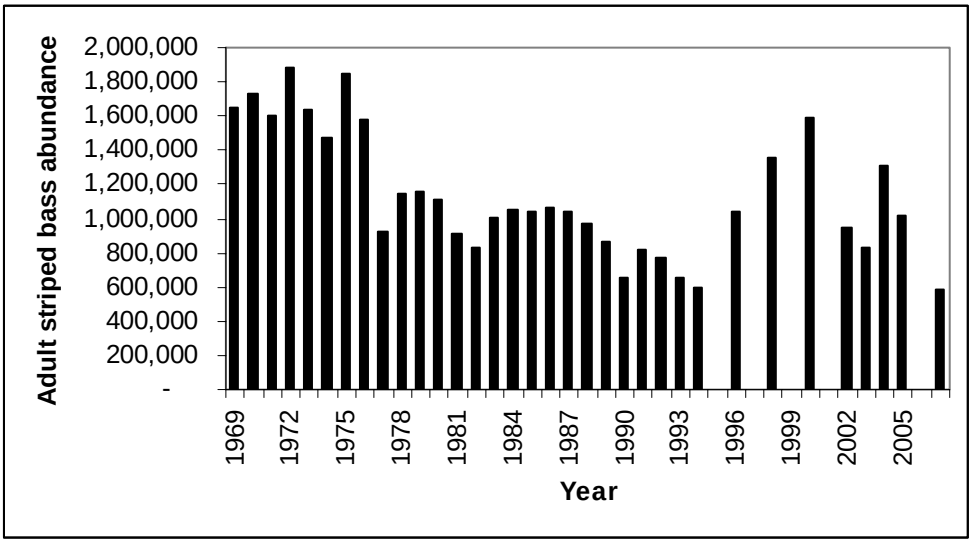


Figure 4. The annual abundance of adult striped bass in California's anadromous waters.

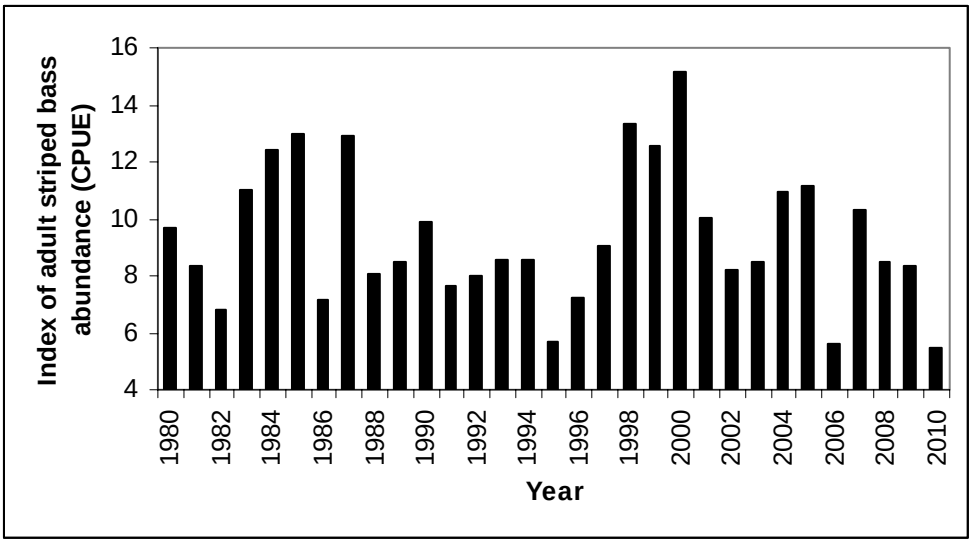


Figure 5. Trends in annual abundance of adult striped bass in California's anadromous waters, expressed in terms of catch-per-unit-effort (fish kept/100 hours) from Commercial Passenger Fishing Vessels inside the San Francisco Estuary.

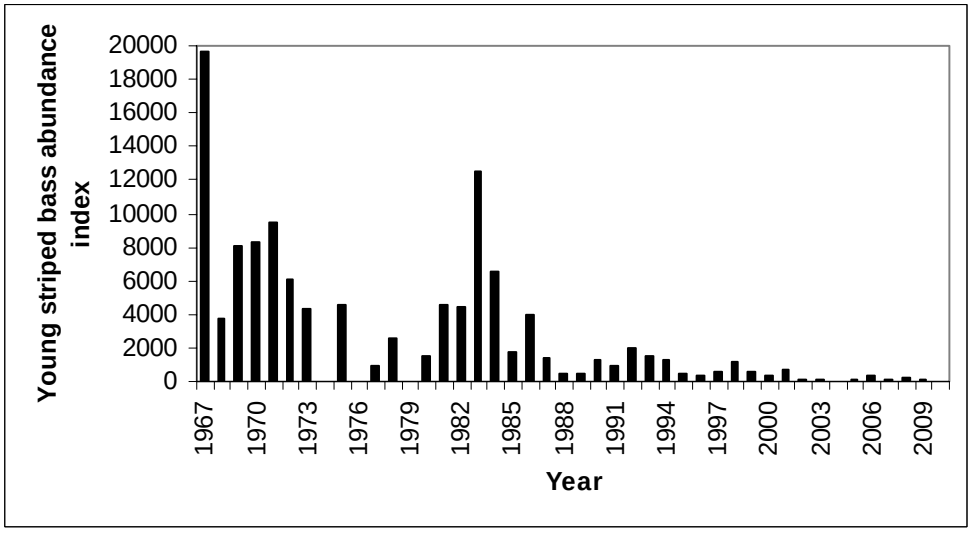


Figure 6. Trends in annual abundance of young striped bass in California's anadromous waters, as indexed by the Department's Fall Midwater Trawl Survey.

3. Striped Bass Predation on Listed Species

Due to striped bass abundance and listed species rarity, accurate and comprehensive assessments of predation are difficult, if not impossible, to obtain. Listed species are, in this respect, a needle in the haystack of striped bass. Notwithstanding the difficulty in assessing the precise level of striped bass predation, however, studies of striped bass feeding habits indicate they consume an enormous volume of fish, overlap in their geographic range with the listed species, and have historically consumed listed species, at times in very substantial quantities.

As fish in their first year of life, striped bass eat mostly zooplankton. Some first-year fish and most second-year fish eat other fish (i.e., they are piscivorous). As striped bass age, their diet includes increasing fractions of fish but they also eat invertebrates (e.g., crabs, crayfish, etc).

Consumption of Chinook salmon, coho salmon, steelhead, and tidewater goby (each presently a listed species) by striped bass in California was first documented in collections from Waddell Creek Lagoon (Santa Cruz County) in the year 1935 (Shapovalov 1936). When Chinook salmon and delta smelt were common they were often observed to be common in the diet of striped bass from the San Francisco Estuary (e.g., Figure 7; Stevens 1963; Stevens 1966; Thomas 1967). Because the listed species are rare and quickly digested and because striped bass were abundant, the listed species have rarely been found in the striped bass diet (Nobriga and Feyrer 2007; Boyd 2007; CDFG unpublished) since the listed species declined.

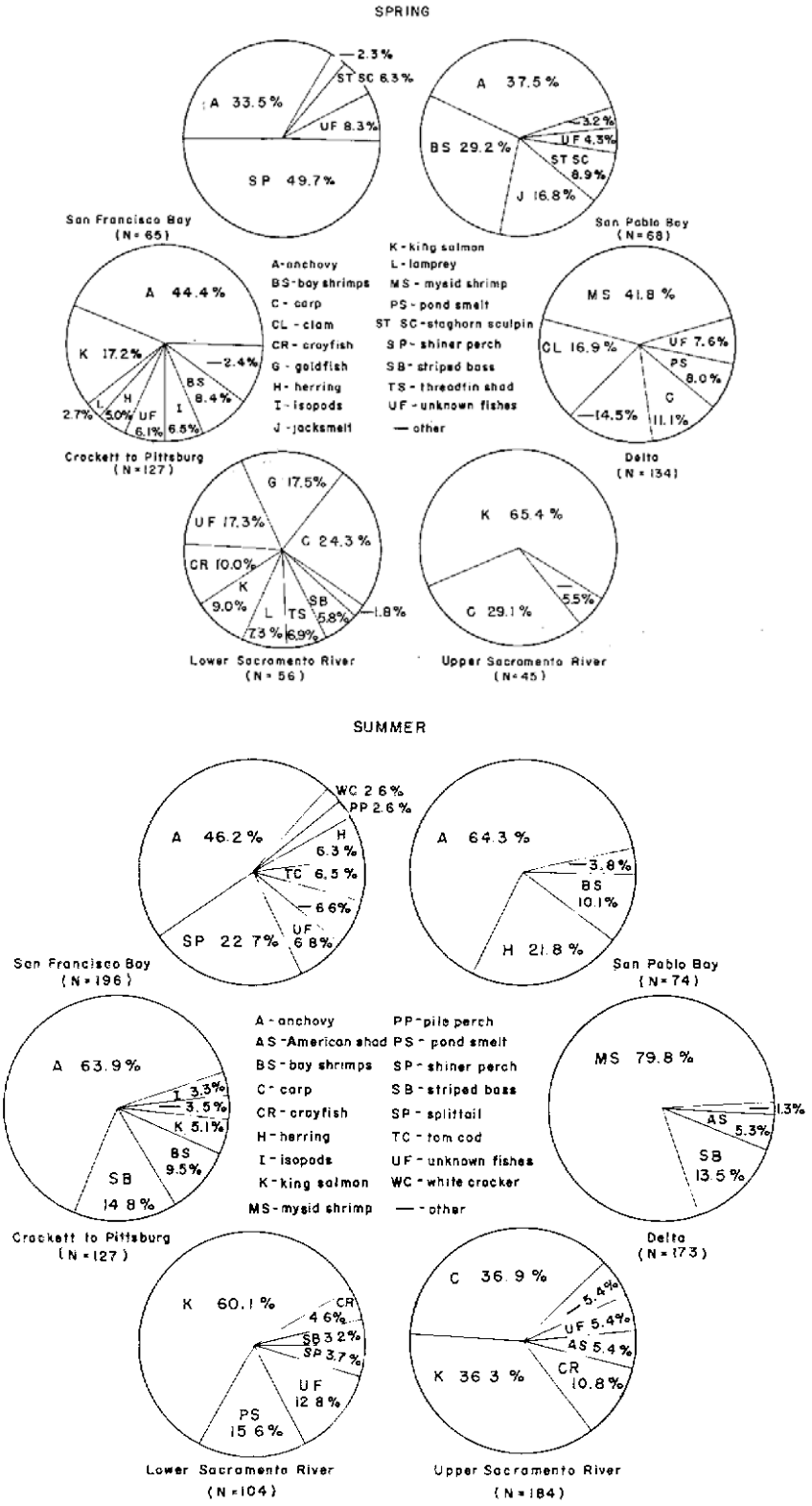


Figure 7. An example of the historical diet (expressed as the volumetric fraction of stomach contents) of striped bass by season and area. For example, Chinook salmon were 65.4% of the diet of striped bass in the upper Sacramento River during Spring. Reprinted from Thomas (1967).

Likely due to a paucity of pertinent information (e.g., mortality rates and population levels of the listed species; sufficiently-detailed diet and distribution information for striped bass), few studies have attempted to quantify consumption of the listed species by striped bass in California and few studies have attempted to describe the impact of predation by striped bass on the populations of listed species in California. The following are the key findings from several significant investigations of striped bass predation, each of which indicates the significant risks associated with the potential impact of striped bass predation on listed species, even though they do not definitively establish the extent of the impact of that predation:

- Loboschefsky et al. (Submitted for publication 2011): Population-level consumption of fish by striped bass has been a linear function of striped bass abundance (Figure 8; Loboschefsky et al. 2009). By virtue of their growth rate, striped bass *individuals* aged 2-6 have consumed (on average) approximately 5-25 kilograms of fish per year. Given their individual consumption of prey and striped bass abundance, (a) the *population* of striped bass aged 3-6 has consumed approximately 8-30 million kilograms (18-66 million pounds) of fish per year while (b) the *population* of striped bass aged 1-2 has consumed approximately 2-25 million kilograms (4-55 million pounds) of fish per year.

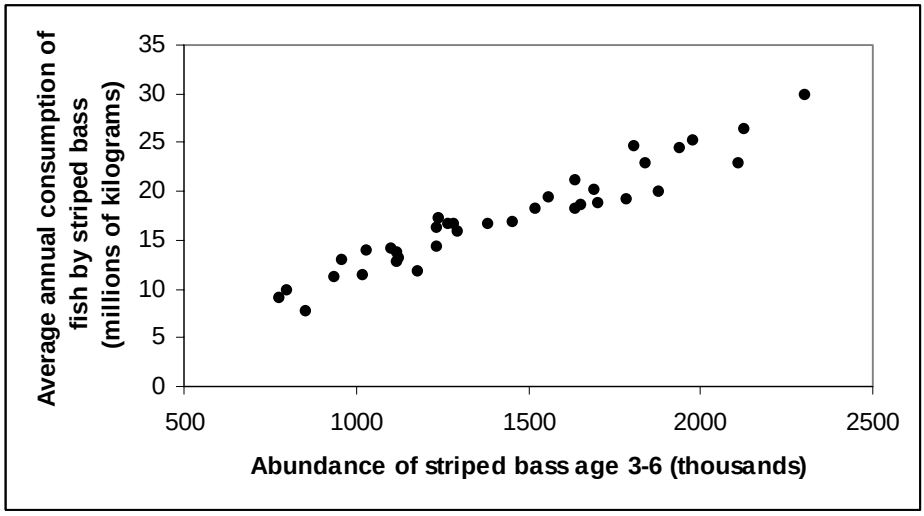


Figure 8. The relationship between the quantity of fish consumed annually by striped bass and striped bass abundance in California's anadromous waters.

- CDFG 1999: The great abundance of striped bass suggests that even a small predation rate results in the loss of many individuals of the listed species. For example, CDFG (1999) wrote that, "Based on the 1994 abundance of delta smelt (4,803,000), annual consumption of delta smelt by the present (mean 1992-94) striped bass population in the Estuary is estimated to be 5.3% of the population…." The "(mean 1992-1994) striped bass population" used by CDFG (1999) was 6,760,385 and included estimated abundance of piscivorous age-1 and older striped bass (CDFG, unpublished analysis). The striped bass population characterized by CDFG (1999) would have consumed 254,559 delta smelt

annually, even though delta smelt were very rarely observed in the stomachs of striped bass.

- Johnson et al. 1992: A decline of Chinook salmon in Coos Bay coincided with large populations of striped bass and loss of spawning habitat, and a period of Chinook recovery coincided with reduced striped bass populations and improved habitat. When considering a striped bass enhancement program, Oregon Department of Fish and Wildlife wrote that it is plausible for striped bass in the Coos Bay watershed to consume many thousands of young Chinook salmon annually and that large striped bass populations may limit enhancement options for salmonids. Note: In an independent review of the Central Valley Project Improvement Act fisheries program organized by the US Fish and Wildlife Service, Cummins et al.(2008) expressed a similar notion by writing that "The stated goal to increase the production of both native salmonids and exotic predators/competitors (e.g., striped bass and shad) is internally inconsistent."

- Lindley and Mohr (2003): In a modeling effort limited by available data (e.g., striped bass functional response to prey abundance), the authors predicted that if the striped bass population declines to 512,000 adults, Winter-run Chinook salmon will have about a 28% chance of quasi-extinction (i.e., three consecutive spawning runs of fewer than 200 adults) within 50 years whereas a population of 3 million adult striped bass would increase the predicted quasi-extinction probability to 55%.[7]

4. The Recreational Fishery for Striped Bass

The striped bass fishery is very popular, with hundreds of thousands of anglers fishing for striped bass annually.

Striped bass in California are targeted by individuals from boat, shore, and pier; during guided fishing trips; and from Commercial Passenger Fishing Vessels (CPFV), also known as party boats. An average of 15% (range: 9%-24%) of the adult striped bass population has been caught by anglers each year since 1969 (Figure 9).

[7] The Commission's Striped Bass Policy, adopted in April 1996, sets forth a restoration goal of 3 million adult striped bass.

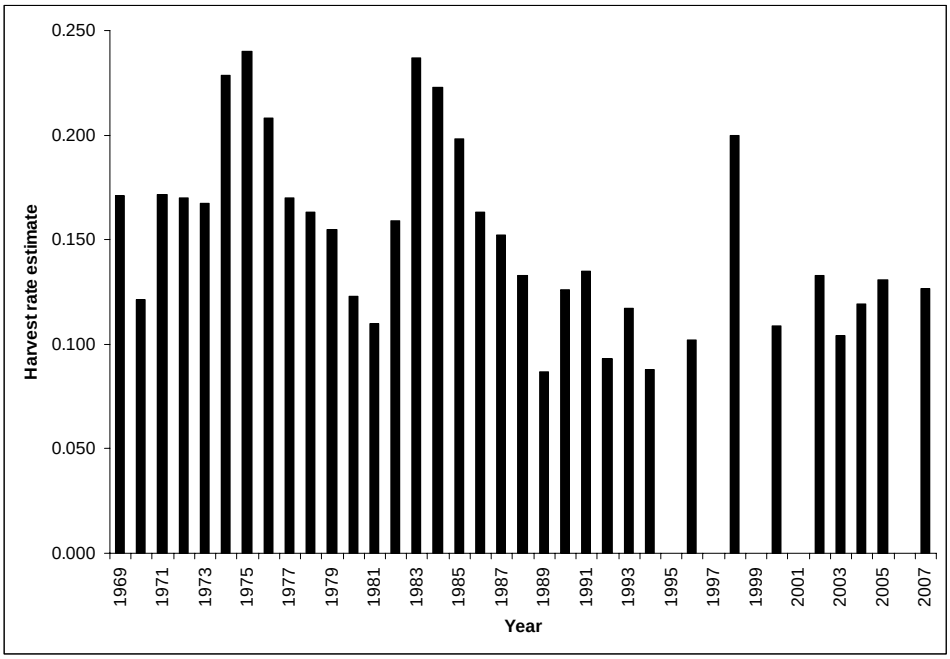


Figure 9. Annual harvest rate of adult striped bass in California's anadromous waters.

Although the exact number of anglers who fish for striped bass is not known, the number is clearly large; for example, anglers bought an average of 333,828 Striped Bass Stamps annually from 1992-2003.

A comprehensive listing of fishing effort for striped bass through time is beyond the scope of this report, but the following facts provide an accurate picture of recent trends: Anglers on CPFVs inside the San Francisco Estuary fished for striped bass an average of 51,355 hours (range: 13,175-117,488) each year from 1980-2010 (Figure 10), while anglers from Carquinez Strait to the base of dams in the Sacramento River watershed fished an estimated average of 1,073,790 hours annually during the periods 1998-2000 and 2008-2010. Because substantial fishing effort for striped bass happens throughout the San Francisco Estuary, along the coast, and during night-time hours, recent annual fishing effort no doubt substantially exceeds the above values.

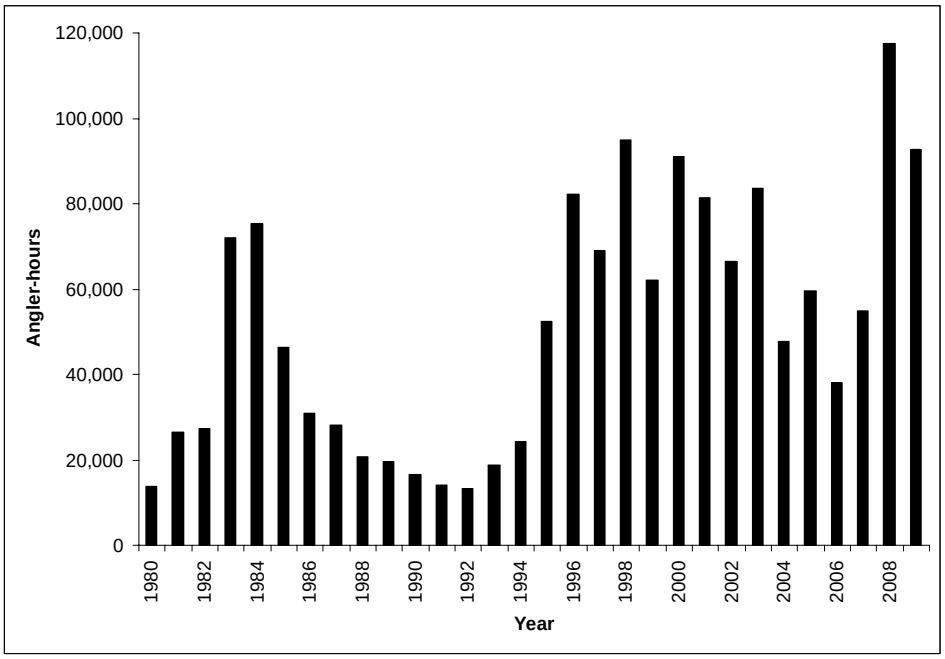


Figure 10. Annual fishing effort for adult striped bass from Commercial Passenger Fishing Vessels inside the San Francisco Estuary.

Throughout the range of striped bass in California, anglers caught an average of 179,381 adult striped bass (range: 52,780-443,808) annually since 1969 (Figure 11). Anglers on CPFVs inside the San Francisco Estuary have kept an average of 5,079 striped bass (range: 1,057-13,820) yearly from 1980-2010 (Figure 12), while anglers fishing from Carquinez Strait to the base of dams in the Sacramento River watershed kept an average of 57,217 fish annually during the periods 1998-2000 and 2008-2010.

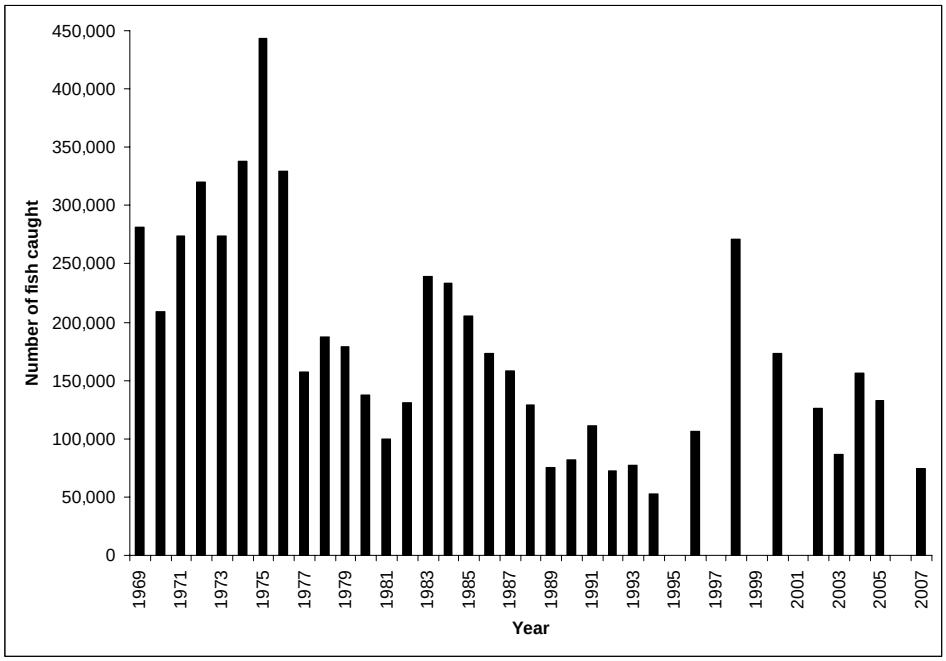


Figure 11. The estimated number of adult striped bass caught annually in California's anadromous waters, as calculated from annual abundance estimates and annual harvest rates.

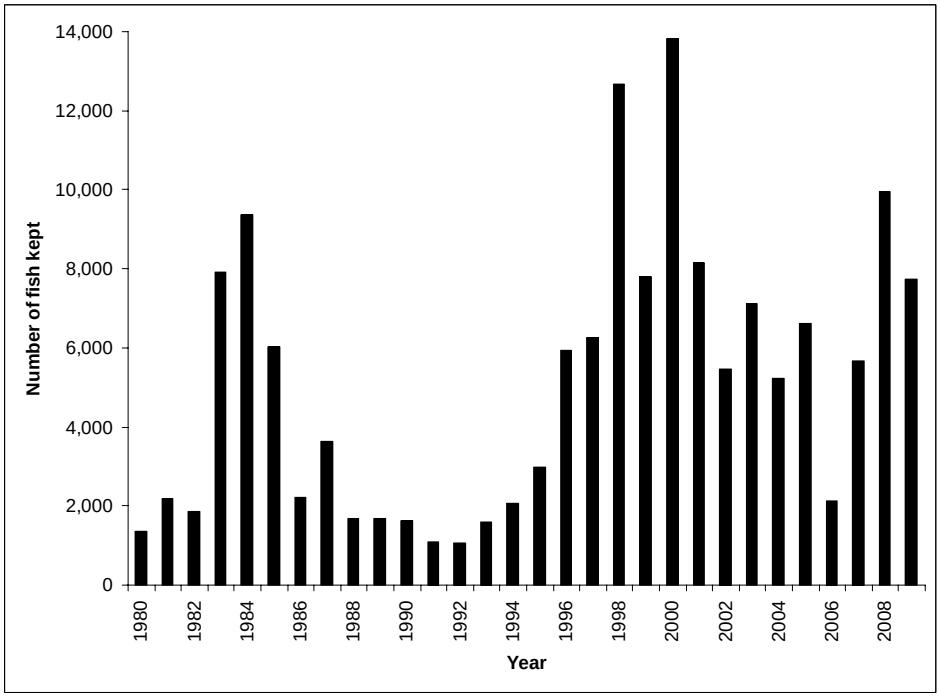


Figure 12. The number of striped bass kept annually by anglers fishing from Commercial Passenger Fishing Vessels inside the San Francisco Estuary.

Catch-and-release of striped bass has been promoted by the Department, but very little data — none of it comprehensive — speaks to the size and fate of fish released by anglers. Anglers on CPFVs inside the San Francisco Estuary have released an average of

2,580 striped bass (range: 822-5,212) annually from 1995-2010 (Figure 13), and anglers fishing from Carquinez Strait to the base of dams in the Sacramento River watershed released an average of 257,357 fish annually during the periods 1998-2000 and 2008-2010. By virtue of their greater abundance, most released fish were likely sub-adults.

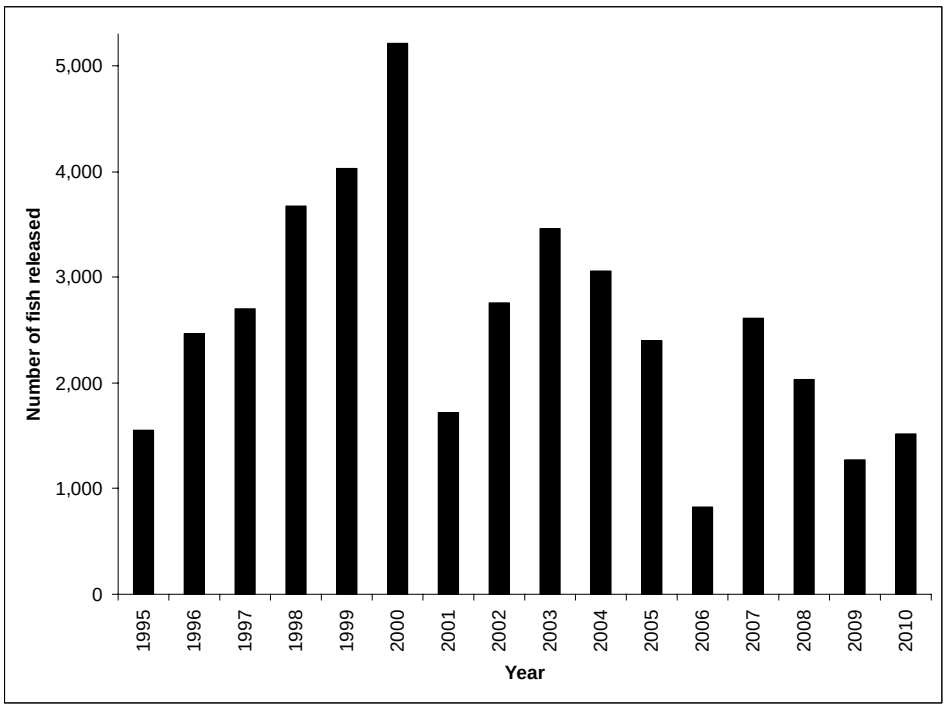


Figure 13. The number of striped bass released annually by anglers fishing from Commercial Passenger Fishing Vessels inside the San Francisco Estuary.

Because anglers have released many striped bass, the preponderance of which were likely not of legally harvestable size, lowering the minimum size of striped bass that may be taken would encourage and likely lead to increased harvest of striped bass.

IV. AN ANALOGOUS SITUATION IN NEIGHBORING STATES

The states of Oregon and Washington, attempting to manage multiple beneficial uses of a drastically altered ecosystem, have for decades been attempting to address predation on young salmon by a native predator. What they have learned is germane when considering approaches to addressing predation on listed species in California.

The Columbia River is managed through a series of large dams. The dams impair the downstream migration of salmon and, except when passage is provided through engineering solutions, prevent the upstream migration of salmon. Lake-like habitat in the reservoirs created by the dams has replaced many miles of normal river habitat.

The northern pikeminnow, a native piscivore that grows to less than half the size of a striped bass, benefited from habitat modifications attributable to operation of the Columbia River dams whereas the salmon have not. When investigating very high

mortality rates of young salmon migrating through the reservoirs (e.g., Reiman and Beamesderfer 1991), it became evident that predation on young salmon by pikeminnow was common and was likely a significant issue.

In an effort to improve survival of young salmon migrating through the Columbia River reservoirs, Oregon and Washington implemented a Northern Pikeminnow Management Program. Seeking to reduce the number of large pikeminnow, the program promotes a sport fishery for pikeminnow. The sportfishery is promoted by paying rewards for harvest of pikeminnow.

The program has been ongoing for roughly 20 years, has resulted in the removal of three million pikeminnow, and has reduced by nearly 40% the apparent predation on salmon by pikeminnow (Porter 2010). There is no sign that surviving northern pikeminnow compensated (e.g., by growing faster) for removals (Knutsen and Ward 1999) or that other species have expanded such that the salmon have not benefited by the program. Due to system complexity and a paucity of data, it is not possible to attribute changes in young-salmon survival rates to the program.

More information on the program is at this site: http://www.pikeminnow.org/

V. REGULATORY PROPOSAL

The present regulatory proposal, attached as Exhibit A, is intended to improve the survival of the listed species by reducing striped bass predation on individuals of these listed species. This approach is the latest in a series of efforts to address striped bass predation while conforming with the Commission policy to both increase the number of striped bass and to "ensure that actions to increase striped bass abundance are consistent with the Department's long-term mission and public trust responsibilities including those related to threatened and endangered species and other species of special concern." (FGC, Striped Bass Policy, 04/05/96.)

The attached regulatory proposal was developed by the Department, with technical support from the USFWS and NOAA Fisheries. Within the Department, input was received from Bay Delta Region, Fisheries Branch, Marine Region, the Law Enforcement Division, and the Office of General Counsel. Prior to developing the regulatory proposal, Department representatives met separately with and received input from representatives of the Coalition for a Sustainable Delta, the lead plaintiff in the litigation over the striped bass sport fishing regulations, and representatives of the California Sportfishing Protection Alliance, the California Striped Bass Association, the Northern California Council of the Federation of Fly fishers, the Central Delta Water Agency, and the South Delta Water Agency, all of which were intervenors in the litigation. While the regulatory proposal is rooted in part in the litigation, this proposal represents the shared and reasoned views of the Department and is based on the best available science. This proposal has been reviewed by the USFWS and NOAA Fisheries and found consistent

with the federal agencies' goals for endangered species protection and ecosystem restoration in the Delta.[8]

Most striped bass have been taken under Commission-adopted regulations (See Cal. Code Regs., tit. 14, §§ 5.75; 27.85) that limit daily harvest to two fish that are eighteen inches or longer. Because the regulations limit the number and size of striped bass that an angler may harvest each day and may possess, the striped bass population is likely larger than it would be with less-restrictive regulations.

Because striped bass are resilient and fishing effort for striped bass appears to be a simple function of striped bass abundance (DuBois 2009), the Department expects the striped bass population and the associated fishery would not collapse if managed according to the proposed regulations. Furthermore, the fundamental character of California's striped bass fishery would be preserved under the proposed regulations.

The regulatory proposal, which the Department recommends the Commission adopt, includes the following provisions:

- Raising the daily bag limit for striped bass from 2 to 6 fish;
- Raising the possession limit for striped bass from 2 to 12 fish;
- Lowering the minimum size for striped bass from 18 to 12 inches;
- Establishing a "hot spot" for striped bass fishing at Clifton Court Forebay and specified adjacent waterways at which the daily bag limit will be 20 fish, the possession limit will be 40 fish, there will be no size limit, and anglers fishing at the hot spot will be required to fill out a report card and deposit it in an iron ranger or similar receptacle;
- Changes to the sport fishing regulations for the Carmel, Pajaro, and Salinas Rivers to allow harvest of striped bass when the fishery would otherwise be closed.

The proposed bag, possession, and size limits are intended and expected to encourage more fishing effort for and greater harvest of striped bass. These expectations are due to the facts that to date: (1) fishing effort and the abundance of legally harvestable striped bass have been correlated; and (2) anglers have released many striped bass, the preponderance of which were likely not legally-harvestable size.

The proposed "hot spot" fishery in the southern Delta (centered around Clifton Court Forebay) and associated report card requirements are intended and expected to encourage more fishing effort for and greater harvest of striped bass, thereby substantially and immediately increasing survival rates of listed species entrained by SWP and CVP operations in the south Delta, providing new information for use in further investigations

[8] For example, the Central Valley salmonid (NMFS 2009a), longfin smelt (DFG 2009), and tidewater goby (USFWS 2005) status reviews and/or recovery plans call, explicitly or implicitly, for reduced predation by striped bass. The Biological Opinion issued on long-term operations of the CVP and SWP (NMFS 2009b) requires a reduction in predation on listed salmonids at Clifton Court Forebay and states: "DWR may petition the Fish and Game Commission to increase bag limits on striped bass caught in Clifton Court Forebay."

of the impact of SWP and CVP operations on fish, and discouraging the illegal commercialization of striped bass.

The proposed coastal river regulations are intended and expected to encourage fishing effort for and harvest of striped bass during periods when the fishery would otherwise be closed.

Although the Department expects these regulation changes to result in increased harvest of striped bass, the response of recreational anglers to revised regulations is unknown. For that reason, and as explained in more detail below and in the adaptive management provisions of the regulatory proposal, if the regulatory proposal is ultimately adopted by the Commission, the Department will engage in additional monitoring and increased creel surveys in an effort to determine the impact of the increased daily bag and possession limits and the decreased size limit.

VI. CONCEPTUAL ALTERNATIVES TO THE PROPOSED REGULATION

While the Department recommends consideration and adoption of the attached regulatory proposal, alternative approaches exist. The following brief exploration of alternatives comes from a review of pertinent literature and discussions with anglers, angling groups, and fishery resource managers.

1. Retain Current Regulations

Because adverse impacts to the listed species by striped bass predation are likely and protection for the listed species is of overriding importance, the Department and Commission must err on the side of caution. That said, the primary scientific arguments are these:

- Striped bass could precipitously decline with additional harvest and (if so) other predators (e.g., Sacramento pikeminnow, largemouth bass, and the egg-eating Mississippi silverside) could expand such that the listed species would not benefit. While this scenario is possible, available data — limited in some regards (e.g., striped bass stock-recruit curve; Botsford 2009) but very robust in many others — suggests neither is likely. The Department fully expects that ongoing monitoring of the impacted fisheries and fish populations would signal the need for adaptive management in a timely manner.

- Striped bass predation on the listed species may not adversely impact the listed species, because the listed species are so rare that striped bass may not pursue them to any notable extent. This is a question of the 'functional response' of striped bass to varying densities of prey. Although the functional responses of striped bass to varying densities of the listed species is not known, the responses can range from linear responses with devastating consequences to complicated responses that involve abandoning listed species as prey.

2. Habitat (Including Water) Restoration and Mitigation

The decline of listed species occurred only after striped bass had been established in California for many decades and the SWP and CVP were substantially implemented, which, given the timing and rate of development (e.g., water, timber, agriculture, roads, industry, etc.) in California, suggests the species could co-exist in a future where the impact of development was effectively mitigated. Although some have argued that habitat restoration and mitigation is being implemented to the fullest extent of the law, the status of the listed species has not improved. Recovering the listed species is an extremely urgent matter that must be attempted using all feasible means.

3. Catch-and-Kill Regulations

Requiring anglers to kill the striped bass they catch is feasible and would likely quickly provide greater benefit to the listed species than the proposed regulations, but would: (1) be a 'nuclear option' that could be effectively implemented only with extensive education and outreach; and (2) likely have significant longer-term impacts on the fishery and damage the sport fishing industry.

4. Site-Specific Eradication Programs

Agency staff could authorize and/or conduct eradications of striped bass at sites where predation is a particular problem or where striped bass can be efficiently captured. Translocating striped bass (e.g., to a reservoir) would be very expensive and killing striped bass would deprive anglers of fishing opportunity.

5. Bounty Program

Offering anglers money to kill striped bass would likely quickly provide greater benefit to the listed species than the proposed regulations, but, like catch-and-kill regulations, would be a 'nuclear option' that would necessitate extensive education, outreach, and funding to implement and would impact the fishery and the sport fishing industry.

VII. ADAPTIVE MANAGEMENT

1. Impact of the Proposed Regulation on the Striped Bass Population and Fishery

Due primarily to lack of information about angler preference and on the striped bass stock-recruitment relationship (Botsford 2009), the Department cannot forecast specifically how the proposed regulation would impact the striped bass population or fishery. Because striped bass are resilient and fishing effort for striped bass appears to be a function of striped bass abundance (DuBois 2009), however, the Department expects striped bass would become somewhat less abundant, the average size of striped bass would decline, and both fishing effort and fishing success would increase for a period of

at least several years. Given the lack of certainty as to the ultimate effectiveness of the proposed regulation change, the Department recommends an adaptive management plan designed, in part, to assess the efficacy of the new regulations as a means of increasing fishing effort and harvest of striped bass.

2. Monitoring

To allow for adaptive management based on actual conditions, the Department would monitor the striped bass population, the striped bass fishery, and the demographics of Winter- and Spring-run Chinook salmon, Central Valley steelhead, longfin smelt, and delta smelt.[9] Indications of any of the following scenarios would be of particular concern:

- The striped bass population show signs of imminent collapse and the listed species show signs of recovery.
- The illegal commercialization of sport-caught striped bass increases substantially or user-group conflicts became evident.
- The striped bass population shows no signs of decrease and the listed species show no signs of recovery.
- Bycatch of listed species increases to substantial levels.

If the regulatory proposal is adopted by the Commission, the Department would engage in monitoring and expanded creel-survey activity with the goal of assessing the effectiveness of the regulatory change. The Department would report back to the Commission on a regular basis the results of the monitoring and surveys and provide the Commission with the Department's conclusion as to whether the new regulations are having their intended and desired effect.

VIII. CONCLUSION

Having studied striped bass for nearly a century and listed species for many decades, the Department recognizes that the consequences of management actions — past, present and future — are rarely certain. Although the impact of striped bass predation on the listed species is not certain, the Department has evaluated the large body of information and has determined that striped bass predation is an adverse impact, albeit one of unknown magnitude, that can likely be mitigated in part by promulgating a set of regulations that would authorize additional harvest by recreational anglers. The regulations would allow for the harvest of smaller and more striped bass in anadromous waters only. The

[9] Due to the lack of existing information regarding coho salmon, tidewater goby and steelhead, and their interactions with striped bass, and the prohibitive cost of developing such information at this time, the Department cannot commit to adaptive management of coho salmon, tidewater goby, and other steelhead based on results from investigations into striped bass.

Department expects that striped bass would become somewhat less abundant, the average size of striped bass would decline, and both fishing effort and fishing success would increase for a period of at least several years — resulting in a measure of protection for the listed species that would not cause the collapse of the striped bass fishery. For the foregoing reasons, the Department recommends that the Commission adopt the attached regulatory proposal. As a first step in that process, the Department recommends that the Commission direct the Department and Commission staff to prepare a regulatory packet for the attached regulatory proposal in accordance with the California Administrative Procedure Act and commence appropriate environmental review under CEQA for the proposed regulation change.

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EXHIBIT A

Striped Bass Sport Fishing Regulatory Proposal

I. Proposed Changes to Striped Bass Sport Fishing Regulations

Section 1.74, Title 14, CCR. Sport Fishing Report Card and Tagging Requirements.
(a) Purpose. These regulations address potential concern for overfishing and a lack of recreational fishing effort and catch information in some or all areas where the fishery operates. Many of these species are of high commercial value, and therefore, additional enforcement mechanisms are needed to improve compliance with existing bag limits and other regulations, and to reduce the potential for poaching.
(b) Species and Location Requirements. Individuals fishing for or taking the following species are subject to report card requirements in the following locations described below:
(1) Salmon, in the Klamath-Trinity River System and Smith River only. The Klamath-Trinity River System and Smith River are defined as the anadromous waters of the Klamath, Trinity, and Smith river basins. Anadromous waters are defined in Section 1.04.
(2) Steelhead trout, in all anadromous waters where take is authorized.
(3) White sturgeon, in all areas where take is authorized. Tagging of retained individual sturgeon is also required.
(4) Red abalone, in all areas where take is authorized. Tagging of retained individual abalone is also required.
(5) California spiny lobster, in all areas where take is authorized.
(6) Striped bass at the South Delta Hot Spot.
(c) General Report Card Requirements.
(1) Any person fishing for or taking any of the species identified in this Section shall have in their possession a non-transferable report card issued by the department for the particular species. See special exemption regarding possession of report cards for lobster divers in Section 29.91.
(2) Notwithstanding other statutes and regulations that may exempt sport fishing license requirements, non-transferable report cards are required for any person fishing for or taking the species identified above. All cardholders shall adhere to all reporting and tagging requirements defined in this Section and Sections 5.76, 5.79, 5.87, 5.88, 27.92, 29.16, and 29.91 regardless of whether a sport fishing license requirement applies. This provision applies to all of the following persons:
(A) Any person who is under 16 years of age
(B) Any person who is fishing from a public pier
(C) Any person who is fishing on free fishing days
(D) Any person who holds a lifetime fishing license
(3) Persons described in subsections 1.74(c)(2) may purchase report cards without purchasing a license.
(4) All entries made on any report card or tag must be legible and in indelible ink.
(5) Entries Required at the Time of Report Card Issuance. At the time of issuance of the report card, the cardholder is responsible for entry of the following information, unless

both the report card and the sport fishing license are issued through the Automated License Data System:

(A) The date the report card is issued, the individual's name, street address, city, state, zip code, home phone, and date of birth shall be entered in the appropriate spaces on the report card. If the cardholder has a driver's license, or DMV identification number, this information shall also be entered in the appropriate spaces. If the cardholder has an e-mail address, it may be entered in the space provided.

(B) Acquisition of Sturgeon Fishing Report Cards, ~~and~~ Abalone Report Cards, and South Delta Hot Spot Report Cards - If the cardholder is required to have a sport fishing license, the report card number shall be entered in the designated space provided on the back of the individual's sport fishing license, and the sport fishing license number shall be entered on the report card in the appropriate space.

(C) Acquisition of North Coast Salmon Report Cards, Steelhead Report and Restoration Cards and Spiny Lobster Report Cards - If the cardholder is required to have a sport fishing license, both the name of the report card and the number shall be entered in the blank area on the back of the individual's sport fishing license, and the sport fishing license number shall be entered on the report card in the appropriate space.

(D) If the cardholder wishes to purchase another fishing license after their one, two, or ten-day sport fishing license has expired the cardholder need not purchase a second report card for any species, so long as the cardholder still possesses the report card valid for the calendar year. At the time of purchase of the subsequent license, the additional sport fishing license number shall be entered in the appropriate space on the report card. If there is a space provided for the particular card on the sport fishing license, the number shall be entered in the appropriate space at the time of purchase. If there is no space provided for the card, both the name of the report card and the number shall be entered on the back of the individual's sport fishing license.

(6) A report card shall be valid only during the open fishing season for the calendar year shown on the report card.

(7) Cardholders shall return their card by January 31 of the following year to the department at the address specified on the card. Unused South Delta Hot Spot Report Cards need not be returned.

(8) Any person who fails to return his or her report card to the Department by the deadline may be restricted from obtaining the same card in a subsequent license year or may be subject to an additional fee for the issuance of the same card in a subsequent license year.

(9) For abalone and sturgeon report cards, only one report card may be issued per person per license year.

(10) Report cards may not be transferred to another person and no person may possess any report card other than their own.

(d) Replacement Procedures for Lost Abalone or Sturgeon Report Cards. For species for which an individual may purchase only one report card per year (i.e., abalone and sturgeon), if the cardholder loses the card, a replacement card shall be acquired only by following the procedures below:

(1) The individual shall provide all of the following to a department license sales office:

(A) A photocopy of the original report card issued in the cardholder's name, unless the report card was issued through the Automated License Data System.

(B) An affidavit, signed under penalty of perjury, containing the following information:
1. A statement confirming that the originally issued report card cannot be recovered.
2. A statement of the cardholder's best recollection of the prior catch records that were entered on the report card that was lost, including the number of tags utilized.
3. A statement describing the factual circumstances surrounding the loss of the card.
(C) Proof of purchase of the original report card, in the form of an itemized receipt, credit card billing statement, invoice, or other written business record expressly documenting that a report card for the particular species was purchased and the corresponding fee was paid. The cardholder is exempt from this requirement if the report card was issued through the Automated License Data System.
(D) Payment of the Replacement Card Fee specified in Section 701(f), 701(g) or 701(h) Title 14, CCR, established pursuant to subdivision 1053(b) of the Fish and Game Code, and as adjusted pursuant to Sections 713 and 1055 of the Fish and Game Code.
(E) Payment of the Replacement Processing Fee specified in Section 701(i) or 701(j), Title 14, CCR, established pursuant to subdivision 1050(e) of the Fish and Game Code.
(2) Based on the information provided in the written affidavit, the department shall issue only the number of tags that were reported unused on the previously issued report card.
(3) At the time the replacement card is acquired, if the cardholder is required to have a sport fishing license, the number of the replacement card shall be entered in the appropriate space on the sport fishing license and the fishing license number shall be entered in the space provided on the report card.
(4) All regulations applicable to the initial card also apply to additional cards issued pursuant to this subsection.
(e) Replacement Procedures for Salmon, Steelhead, or Lobster Report Cards.
(1) Any cardholder who fills in all available lines on his or her steelhead, salmon or lobster report card shall return the card to the department at the address specified on the card prior to purchasing a second card.
(2) Any cardholder who loses his or her steelhead, salmon or lobster report card may purchase a second card, but at or before the time of purchase shall provide a written affidavit to the department at the address on the report card documenting the lost catch and effort data required by the card to the best of the cardholder's recollection.
(3) At the time the additional card is acquired, if the cardholder is required to have a sport fishing license, both the name of the report card and the number shall be entered on the back of the individual's sport fishing license, and the fishing license number shall be entered in the space provided on the report card.
(4) All regulations applicable to the initial card also apply to additional cards issued pursuant to this subsection.

Section 5.75, Title 14, CCR. Striped Bass.

(a) Open season: All year except for closures listed in special regulations.
(b) Limit: ~~Two~~6 per day, except in waters listed in ~~(d)~~(e) below.
(c) Possession limit: 12 in possession, except in waters listed in (e) below. Any person taking striped bass pursuant to both Section 5.75(b) and Section 5.75(e)(3) shall not exceed a cumulative possession limit of 52.
~~(c)~~(d) Minimum size: ~~18~~12 inches total length except in waters listed in ~~(d)~~(e) below.
~~(d)~~(e) Exceptions:

(1) In the Colorado River District, the Southern District (except Lake Elsinore), and New Hogan, San Antonio and Santa Margarita lakes.

(A) Limit: ~~Ten~~10.

(B) Minimum size: No size limit.

(2) Lake Elsinore~~ has the limit and minimum size shown in (b) and (c) above~~.

(A) Limit: 2 per day.

(B) Minimum size: 18 inches total length.

(3) South Delta Hot Spot (Clifton Court Forebay; West Canal between (a) the northern-most confluence with Old River at the southern-most point of Victoria Island and (b) the southern-most West Canal confluence with Old River at the southern-most point of Coney Island; and south on Old River between its southern-most confluence with West Canal and the Tracy Fish Collection Facility Debris Boom).

(A) Limit: 20 per day. No person shall take striped bass pursuant to this subsection while in immediate possession of striped bass taken pursuant to Section 5.75(b) or Section 27.85. No person shall take striped bass pursuant to Section 5.75(b) or Section 27.85 while in immediate possession of striped bass taken pursuant to this subsection.

(B) Minimum size: No size limit.

(C) Possession limit: 40 in possession. Any person taking striped bass pursuant to both Section 5.75(b) and Section 5.75(e)(3) shall not exceed a cumulative possession limit of 52.

(D) Report Card Requirement: Any person taking and/or possessing striped bass pursuant to the bag and size limits in this section shall have in his or her possession a nontransferable South Delta Hot Spot Report Card issued by the department and shall adhere to all requirements set forth in Sections 1.74 and 5.76.

~~(e)~~(f) For the purpose of these regulations, any striped bass hybrid with white bass is considered to be striped bass.

Section 5.76, Title 14, CCR. South Delta Hot Spot Report Card.

(a) All anglers must have a South Delta Hot Spot Report Card in their possession while taking and possessing striped bass pursuant to the bag and size limits in Section 5.75(e)(3).

(b) Anglers shall complete the report card, remove and retain the receipt, and deposit the report card (not the receipt) in one of the South Delta Hot Spot report card receptacles prior to transporting striped bass taken pursuant to Section 5.75(e)(3) on any public road or waterway outside the South Delta Hot Spot.

(c) Any person taking striped bass at the South Delta Hot Spot who fails to deposit a report card and retain the receipt as required by this section shall be subject to the bag, possession, and size limits of Section 5.75(b)-(d) rather than the more permissive limits of Section 5.75(e)(3).

(d) Recording Requirements. Upon retaining or releasing a striped bass taken at the South Delta Hot Spot, the cardholder shall immediately record in designated spaces on the report card the month, day, time, fishing location, length of the fish, and the number of any DFG disk tag on the fish.

Section 701, Title 14, CCR. Sport Fishing Forms and Fees.

(a) Declaration for Multi-Day Fishing Trip (FG 935 (rev. 09/08)), incorporated by reference herein $5.25

(b) 2010 North Coast Salmon Report Card (FG 684 (rev. 09/09)), incorporated by reference herein $5.50

(c) 2010 Sturgeon Fishing Report Card (FG 683 (rev. 09/09)), incorporated by reference herein $0.00

(d) 2009 Spiny Lobster Report Card (FG 685 (rev. 9/08)), incorporated by reference herein $8.00

(e) 2009 Abalone Report Card (FG 2915 (rev. 09/08)), incorporated by reference herein Duplicate Fee $8.75

(f) 2009 Sturgeon Fishing Report Card Duplicate Fee $0.00

(g) 2009 Replacement Processing Fee for a 2009 Abalone Report Card $7.50

(h) 2009 Replacement Processing Fee for a 2009 Sturgeon Fishing Report Card $7.50

(i) 2010 Steelhead Fishing Report and Restoration Card (FG 682 (rev. 09/09)), incorporated by reference herein (per Section 7380(b) Fish and Game Code)

(j) 2010 South Delta Hot Spot Report Card (FG INSERT NUMBER (rev. INSERT DATE), incorporated by reference herein Fee $0.00.

~~(j)~~(k) Pursuant to the provisions of Section 699, Title 14, the department shall annually adjust the fees of all licenses, stamps, permits, tags, or other entitlements required by regulations set forth in this section.

Section 7.50, Title 14, CCR. Alphabetical List of Waters with Special Fishing Regulations.

Alphabetical List of Waters with Special Fishing Regulations		
Area or Body of Water	*Open Season*	*Daily Bag and Possession Limit*
(37) Carmel River below Los Padres Dam. (Monterey Co.).		
(A) Carmel River tributaries below Los Padres Dam and main stem from Los Padres Dam to the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge).	Closed to all fishing all year.	
(B) Carmel River main stem from~~below~~ the bridge at Robles Del Rio/Esquiline roads (Rosie's Bridge) to the bridge at Highway 1. Also, see Section 8.00 (c).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only artificial lures with barbless hooks may be used.	0 trout, steelhead or salmon. 6 striped bass per day and 12 striped bass in possession. Striped bass minimum size of 12 inches total length.
(C) Carmel River main stem below the bridge at Highway 1. Also, see Section 8.00 (c).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only artificial lures with barbless hooks	0 trout, steelhead or salmon 6 striped bass per day and 12 striped bass in possession. Striped bass minimum size of 12 inches total length.

	may be used.	
(135) Pajaro River		
(A) From mouth to the Highway 1 bridge.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	0 trout, steelhead or salmon. 6 striped bass per day and 12 striped bass in possession. Striped bass minimum size of 12 inches total length.
(B) (Monterey, Santa Clara, Santa Cruz and San Benito Cos.) from ~~mouth~~the Highway 1 bridge to Uvas Creek. Also see Section 8.00(c).	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	0
(158) Salinas River and tributaries (Monterey and San Luis Obispo Cos.). Also see Section 8.00(c).		
(A) From mouth to the Highway 1 bridge.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	0 trout, steelhead or salmon. 6 striped bass per day and 12 striped bass in possession. Striped bass minimum size of 12 inches total length.
(B) The main stem Salinas River from the Highway 1 bridge.	Dec. 1 through Mar. 7, but only on Sat., Sun., Wed., legal holidays and opening and closing days. Only barbless hooks may be used.	0
~~(B)~~(C) All Salinas River tributaries upstream of Arroyo Seco River confluence (including the San Antonio River below San Antonio Reservoir and Dam, Paso Robles Creek and tributaries, Atascadero Creek, Santa Margarita Creek and tributaries but excluding the Nacimiento River) See 7.50(b)(128).	Last Saturday in Apr. through Nov. 15. Only barbless hooks may be used.	0 trout

Section 8.00, Title 14, CCR. Low-Flow Restrictions.
(c) South Central Coast Streams - Special Low Flow Closures:

* * *

(8) The Carmel River main stem~~, and the adjacent waters of San Jose~~ shall be closed to all fishing when the department determines that the flow at the U. S. G. S. gauging station near Carmel is less than 80 cfs. Notwithstanding the foregoing, fishing for striped bass is permitted West of Highway 1 (See Sections 5.75 and 7.50(37)(C)) on Sat., Sun., Wed., legal holidays and opening and closing days from Dec. 1 through Mar. 7. Only barbless hooks may be used.

(9) The waters of San Jose, Gibson, Malpaso, and Soberanes creeks that are West of Highway 1 (Monterey Co.), shall be closed to all fishing when the department determines that the flow at the U.S.G.S. gauging station near Carmel is less than 80 cfs.

~~(9)~~(10) The Big Sur River main stem west of the Highway 1 bridge, all of Limekiln Ck and its tributaries, and the anadromous portions of all other Big Sur Coast streams West of Highway 1 in Monterey Co., from Granite Ck. south to Salmon Ck., shall be closed to all fishing when the department determines that the flow at the U.S.G.S. gauging station on the Big Sur River is less than 40 cfs.

* * *

Section 27.85, Title 14, CCR. Striped Bass.
(a) Open season: All year.
(b) Limit: ~~Two~~6 per day.
(c) Possession limit: 12 in possession. Any person taking striped bass pursuant to both Section 27.85(b) and Section 5.75(e)(3) shall not exceed a cumulative possession limit of 52.
~~(c)~~(d) Minimum size:
(1) North of Pt. Conception, ~~18~~12 inches total length.
(2) South of Pt. Conception, no minimum size limit.
~~(d)~~(e) Methods of take: No striped bass may be taken while using a sinker weighing over four pounds, or while using any power driven gurdy or winch. Striped bass may only be taken by angling as defined in Section 1.05, Title 14, CCR; snagging is an illegal method of take.

II. Rationale, Monitoring, and Adaptive Management

Biological Rationale (Central Valley)

(1) Listed salmonid and delta smelt populations have collapsed and mortality rates of their juveniles are extremely high when migrating to the ocean.

(2) Striped bass >=12 inches total length likely number in the millions, are typically piscivorous, are estimated to have recently consumed upwards of 100 million pounds of fish/year, eat juvenile salmonids and delta smelt, and reside year-round in waters of the Bay-Delta through which juvenile salmonids and delta smelt migrate.

(3) Striped bass >=18 inches total length likely number up to one million, feed during their spawning migration, and co-occur with juvenile salmonids and delta smelt in the Sacramento River, San Joaquin River, and many major tributaries to those rivers.

(4) Although there is insufficient data regarding the extent and impacts of striped bass predation, the best available science offers support for the conclusion that predation by striped bass on juvenile salmonids and delta smelt likely impairs recovery of those species.

Biological Rationale (Coastal Streams and Lagoons)

(1) Listed salmonid and tidewater goby populations have collapsed.

(2) Striped bass co-occur with salmonid and tidewater goby populations and are known to prey on individuals of both species.

(3) Although there is insufficient data regarding the extent and impacts of striped bass predation, it appears predation by striped bass on salmonids and tidewater gobies likely impairs recovery of those species.

Management Rationale

(1) Recovery of salmonid, tidewater goby, and delta smelt populations is an urgent matter where the speed of recovery has important economic and cultural repercussions.

(2) Striped bass support a sport fishery with important economic and cultural value.

(3) More-intensive investigation is warranted on the impact of striped bass on salmonids, tidewater goby, and delta smelt and the impact of angling on striped bass.

(4) Data from the capture of striped bass by anglers is an important and cost-effective element of investigations into striped bass management options.

(5) Many important characteristics of the striped bass fishery would be preserved, the recovery of salmonids, tidewater goby, and delta smelt would likely be accelerated, and scientific investigation would be facilitated by making specific types of alterations to the striped bass bag, possession, and size limits.

Regulatory Rationale

(1) Because small striped bass are more numerous than large striped bass, anglers likely capture more small striped bass than large striped bass. Furthermore, for many years the typical successful party of anglers has kept an average of fewer than 1 striped bass per angler per day. Thus, the proportion of small striped bass in the harvest would likely increase if bag (and possession) limits are increased and size limits are decreased.

(2) Variations in catchability of striped bass by season, location, and method can be used to maximize opportunity to harvest striped bass, but limiting the complexity of fishing regulations and limiting bycatch has merit. Thus, seasonal and/or location-specific bag and size limits, and allowable method of take, should be used to address only exceptional situations.

(3) Predation by striped bass in Clifton Court Forebay is exceptional by virtue of its substantial perceived impact on listed species and the substantial amount of research conducted to date on-topic. The Clifton Court Forebay striped bass fishery is exceptional because it has both (a) substantial access that is easy to monitor (analogous to fishing from a large pier) and (b) striped bass catch rates and catch that are often very high. Thus, distinct bag and size limits are warranted for Clifton Court Forebay.

(4) Management of striped bass in lakes, reservoirs, the Colorado River District, and the Southern District is not thought to be pertinent to the recovery salmonid and tidewater goby populations.

Monitoring Rationale

(1) To address uncertainty regarding the impact of striped bass on salmonids, tidewater goby, and delta smelt and the impact of angling on striped bass, all can be investigated and the findings used to evaluate the merits of extant, complementary, and alternative management approaches.

(2) The impact of striped bass on listed species is an interaction of (a) age- and season-specific striped bass abundance, distribution, and feeding habits and (b) listed-fish abundance and mortality rate by source.

(3) The impact of angling on striped bass is an interaction of age- and season-specific fishing effort, catch rate, mortality rate, and mortality rate by source.

(4) Season-specific metrics for striped bass abundance, distribution, mortality rate by source (except by angling), and feeding habits are not monitored, so pertinent monitoring efforts must be implemented or helpful indices must be agreed on.

(5) Listed-fish mortality rate by source is not monitored, so pertinent monitoring efforts must be implemented or helpful indices must be agreed on.

Monitoring Effort

(1) Catch Data: Use California Recreational Fisheries Survey and Fisheries Branch Central Valley Angler Survey data. To the extent practicable, expand the Central Valley Angler Survey to include the south Delta and anadromous reaches of the San Joaquin River and its major tributaries.

(2) Population Statistics: Continue the Bay Delta Region Sport Fish Unit striped bass population study.

(3) Food habits: Establish and conduct a food habits study using Sport Fish Unit staff and other capable collaborators.

(4) Predation estimates and/or indices: Using a bioenergetics approach and food-habits data, model individual- and population-level consumption of fish by striped bass. To the extent practicable, develop monthly, seasonal, and/or river-specific metrics.

(5) Data on salmonids: Data produced by others will be compiled by the Sport Fish Unit.

(6) Predator release (black bass and silverside): Re-establish (requires 1 Biologist and 2 Scientific Aides), implement, and use data from the Bay Delta Region Sport Fish Unit delta-wide electrofishing survey.

(7) Synthesis and reporting: To be conducted by the Sport Fish Unit with feedback and/or assistance from capable collaborators and stakeholders (e.g., Fisheries Branch, NMFS, and FWS).

Adaptive Management

(1) To allow for and monitor a period of adjustment, the bag, possession, and size limits will not be decreased and the minimum size limits will not be increased sooner than 5 years from their implementation.

(2) Between 5 and 10 years from implementation of the new bag, possession, and size limits, the DFG will not recommend decreased bag or possession limits or increased minimum size limits unless any of the following occur:

(a) Central Valley salmonid populations and delta smelt populations have recovered,

(b) scientific investigations demonstrate with a high degree of certainty that striped bass predation has not and likely will not measurably reduce survival rates of any listed Central Valley salmonid population or of delta smelt,

(c) the bag, possession, or minimum size limits appear to promote intolerable law-enforcement issues.

(3) To encourage informed public discourse, each year the DFG will submit to the California Fish and Game Commission a report from the preceding calendar year that:

(a) summarizes findings of investigations into the impact of striped bass on salmonids, tidewater goby, and delta smelt and the impact of angling on striped bass,

(b) includes tables and graphics regarding the striped bass population and fishery,

(c) includes tables and graphics regarding the Central Valley salmonid populations, delta smelt, and — to the extent practicable — listed coastal salmonids and tidewater goby.

EXHIBIT B

Other Pertinent Literature

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