White Seabass (*Atractoscion nobilis*)

Certification Units Covered Under this Species

- Small Mesh Drift Gill Net

Summary

White seabass can range from Magdalena Bay in Baja California, Mexico to Juneau, Alaska, however they are rarely seen north of the San Francisco area. Stock structure is unclear, although there is evidence of genetic mixing between California and Mexico. White seabass are regulated by the Fish and Game Commission and managed by the Department of Fish and Wildlife. A White Seabass Fishery Management Plan was completed in 2002 and the fishery undergoes annual management reviews. There is also an experimental enhancement program that releases about 100,000 juveniles each year.

Strengths:

- Stock biomass has increased over the last 2 decades and is considered healthy
- Small mesh drift gill nets have minimal habitat impacts
- Fishery has a Fishery Management Plan and annual management reviews

Weaknesses:

- No stock assessment completed (yet)
- No harvest control rules and fishery independent monitoring data may be weak
- Need more information on retained, bycatch, and ETP species; some marine mammal and seabird bycatch

History of the Fishery in California

Biology of the Species

[From DFG 2006]: The white seabass is the largest member of the croaker family (Sciaenidae) in California. White seabass can range from Magdalena Bay, Baja California, Mexico to Juneau, Alaska, however they are rarely seen north of the San Francisco area. They are also found in the northern Gulf of California. The center of the white seabass population appears to be off central Baja California. Genetic research on white seabass populations shows that some mixing of fish from California and Mexico occurs. However, there may be local subpopulations of fish that do not mix regularly. While the question of population continuity remains unresolved, there is evidence that each summer the fish move northward with warming ocean temperatures (as demonstrated by catches), likely for spawning.

Spawning occurs over rocky reefs from April to August, with a peak in the late spring to early summer. Fecundity (egg productivity) for this species has not been determined, but a maturity study in the late 1920s reported females matured at 4 years old (61 cm) and some males matured at 3 years (51 cm). All white seabass have spawned at least once by age 6 (81 cm). The eggs, which are the largest of any croaker on the west coast (approximately 1.3 mm in diameter), are planktonic. The larvae, which are darkly colored, have been collected from Santa Rosa Island, California to Magdalena Bay, Baja California, Mexico. Most are found in the inshore areas of Sebastian Viscaino and San Juanico Bays, Baja California, Mexico, indicating major spawning occurs off central Baja California.

Young-of-the-year white seabass, ranging in length from 0.6 to 5.7 cm, inhabit the open coast in waters 4 m to 9 m deep. They associate with drifting macroalgae in areas of sandy ocean bottom. Between the ages of 1 and 3 years old, some juveniles may move into protected bays where they utilize eelgrass communities for cover and forage. Older juveniles are caught off piers and jetties and around beds of giant kelp. Maximum size for adult white seabass is 166 cm and 42.3 kg, although most commercially caught fish are near 102 cm and weigh about 9 kg. They can live at least 13 years (Love et al. 2011). Adults occupy a wide range of habitats including kelp beds, reefs, offshore banks, and the open ocean; they can be found in depths ranging from the surf zone to 122 m. Adult white seabass eat Pacific mackerel, Pacific sardines, market squid, pelagic red crabs, and Pacific herring.

Commercial Fishery

[CDFG 2006]: Prior to 1982, the majority of commercial white seabass catch was taken from Mexican waters; since that time, the Mexican government has denied access permits to U.S. fishermen, and the fishery has been concentrated in southern California, south of Point Conception. In the last decade, catch of white seabass has increased north of Point Conception, although this still comprises less than 20% of the total catch. Commercial landings of white seabass have fluctuated widely over the past 90 years of record keeping. Since 1959, when 1,588 mt were landed, the trend has been one of general decline (Figure 1). By the 1980–1981 fishing season, the fishery had collapsed to 10 percent of its historic catch (Allen et al. 2007), and annual landings remained at this level for the next 15 years. However, landings since 1999 have exceeded 91 mt annually, which is a modest increase over the period of 1983-1998. White seabass is a valuable fishery, exceeding $1 million in ex-vessel revenues over last two years (Figure 2).

During the early years of the fishery, commercial catches were made using gill nets, hook-and-line, and round haul nets. Round-haul net use was curtailed in the late 1920s because decreasing catches made it uneconomical. By the early 1940's, the take of white seabass by round haul gear was prohibited, and gill nets became the major commercial fishing gear, often accounting for over 90% of commercial landings. In 1994, restrictions on gill nets from Point Arguello to the US-Mexican border went into effect, and in 2002, gill net depth restrictions were expanded from Point Arguello north to Point Reyes (CDFG 2006). Despite these restrictions, most commercial landings are still taken with small mesh drift and set gill nets, although over the last three fishing seasons hook-and-line landings have increased steadily (Figure 3). The number of vessels using hook-and-line gear has also increased substantially in recent years (Figure 4), although the majority of hook and line vessels opportunistically catch white seabass when available along the coast (CDFG 2011).

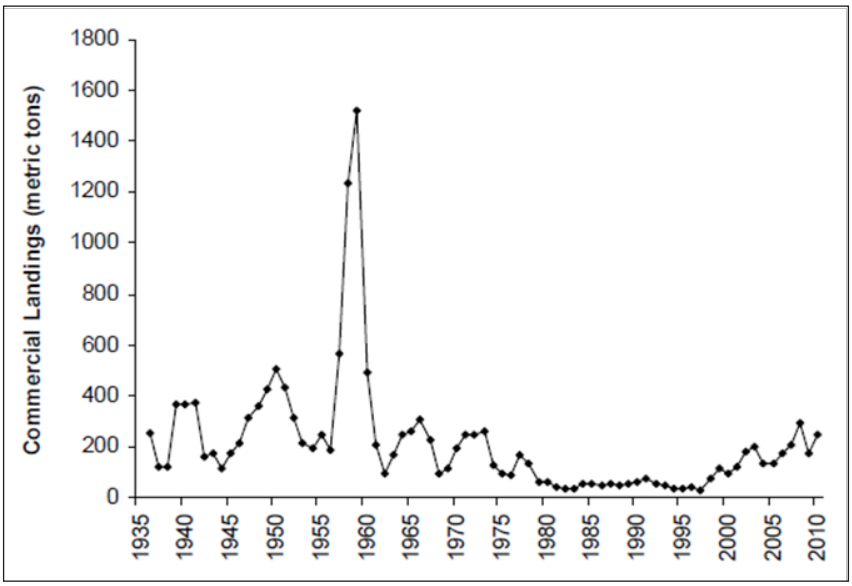

Figure 1. Commercial landings of white seabass that were both caught and landed in California (excludes data from when Mexico waters were open access) through 2010 (CDFG 2011).

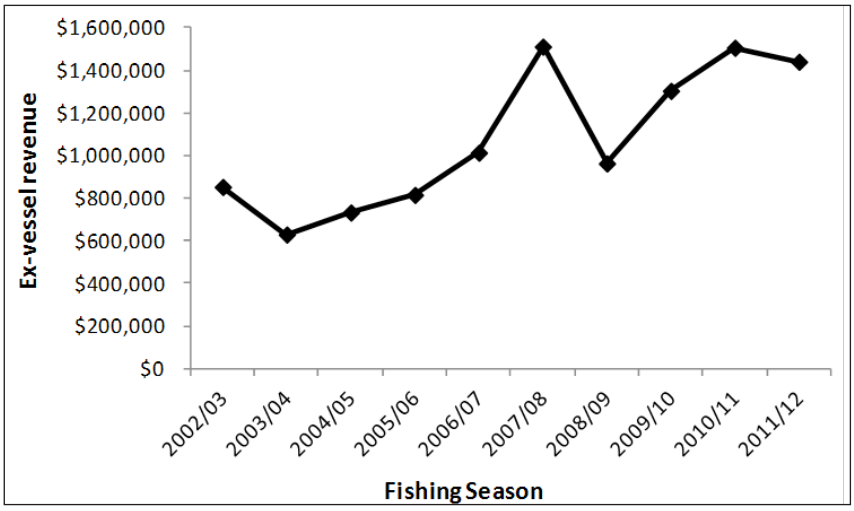

Figure 2. Total ex-vessel revenue from commercial white seabass from the 2002/03 to 2011/12 fishing seasons (data from CDFW 2013).

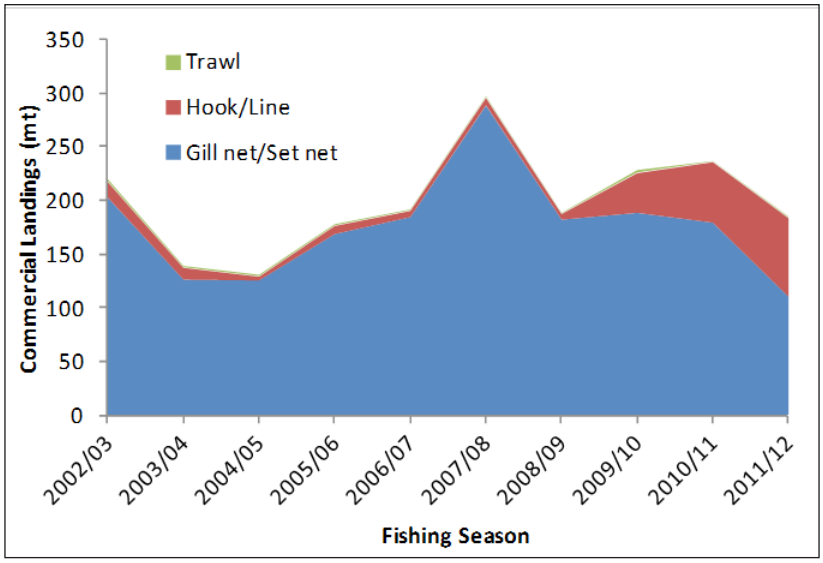

Figure 3. California commercial white seabass landings by gear type from the 2002-03 to 2011-12 fishing seasons (data from CDFW 2013).

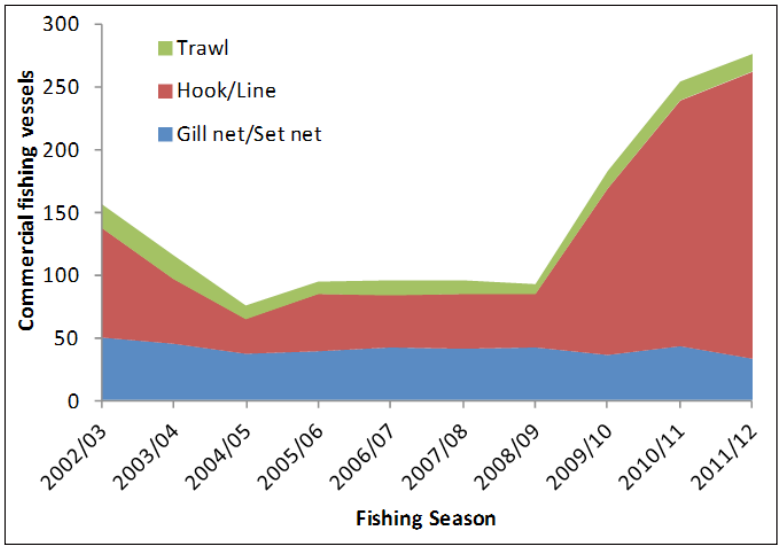

Figure 4. Number of commercial fishing vessels landing white seabass by principal gear type from the 2002-03 to 2011-12 fishing seasons (data from CDFW 2013).

Recreational Fishery

There is a very active recreational fishery in California; prior to 2004 recreational landings exceeded commercial landings (Figures 5 and 6). Most of the recreational fishery (90-95%) typically occurs south of Point Arguello; however, in recent years, increased landings have occurred further north in Monterey Bay (CDFG 2011). The recreational fishery is open year round but occurs primarily March through September. The daily bag limit is three fish, except from March 15 through June 15 when the daily bag limit is one fish south of Point Conception. There is also a minimum size limit of 71 cm (28 in). Most fish are caught by hook-and-line

anglers onboard CPFVs and private boats. From 1980 to 2004, the method for estimating recreational catch was the Marine Recreational Fisheries Statistical Survey (MRFSS) (Figure 5). After 2004, the California Recreational Fishing Survey (CRFS) was used to estimate recreational catch (Figure 6). Because these two data sets use different survey methods for collecting data, the data sets are not comparable.

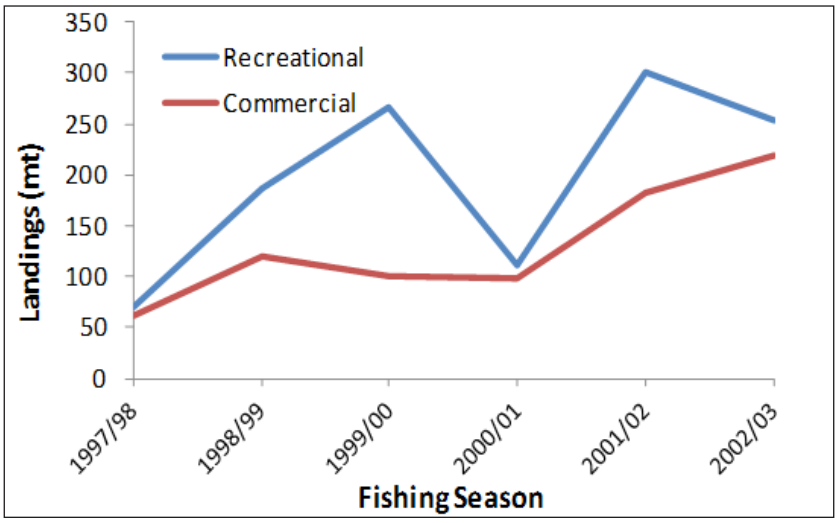

Figure 5. Recreational and commercial landings in California of white seabass from the 1997-98 season to the 2002-03 season (data compiled from CDFG 2011, CDFG 2006).

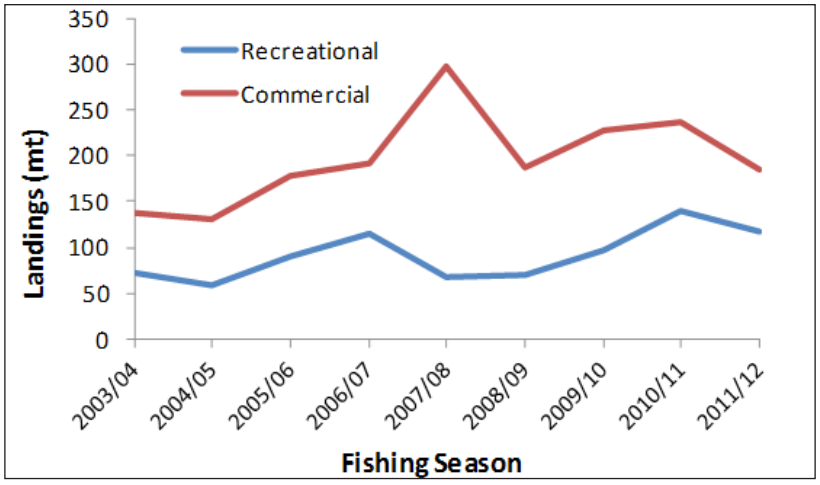

Figure 6. Recreational and commercial landings in California of white seabass from the 2003-04 season to the 2011-12 season (data from CDFW 2013).

MSC Principle 1: Resource Sustainability

*Sustainability of the Target Stock

Biomass at maximum sustainable yield (BMSY) was set in 2002 at 7,982 mt (16 million pounds). Although the fishery is data poor and current estimates of stock size do not exist, a scientific

*For California's Sustainable Seafood Program, this category must score an 80 or higher during an MSC assessment.

and constituent advisory panel determined that current biomass of white seabass is above the BMSY (CDFG 2002). A conservative optimum yield (OY) or total allowable catch (TAC) was set in 2002 of 599 mt (1.2 million pounds). The TAC has not been reached since it was set.

Historically, white seabass stocks experienced a long period of general decline (1960–1997), and in 1980 the stock was depleted to 10 percent of its historic catch (Allen et al. 2007). However, populations and landings have increased over the last two decades. Recent increases are largely attributed to increased regulation, particularly the closure of gill net fishing in California state waters south of Point Arguello (Allen et al. 2007).

Research is underway to conduct a stock assessment on white seabass (Valerie Taylor, personal comm., 2013). In lieu of a stock assessment, an annual review of both the commercial and recreational white seabass fishery has been conducted since 2002, as required by the White Seabass Fishery Management Plan (WSFMP). The review evaluates six points of concern (CDFG 2002); if any of them are met the California Fish and Game Commission (FGC), with guidance from the California Department of Fish and Wildlife (DFW), will determine if management measures need to be taken to prevent overfishing. A long-term goal of the 2002 WSFMP was to develop a formal stock assessment for the fishery rather than relying on fishery dependent data to evaluate the health of the stock. Once the stock assessment is complete, it will likely be incorporated into the WSFMP.

In addition to the wild population, the white seabass population is also supplemented by the Ocean Resources Enhancement and Hatchery Program (OREHP). In 1982, the California Legislature established the OREHP to enhance populations of depleted marine finfish. The OREHP is an experimental aquaculture program that raises juvenile white seabass to a length of 200–250 mm and releases them into the wild. Currently the OREHP can release up to 350,000 individuals per year, but have on average released around 100,000 individuals per year (Valerie Taylor, personal comm., 2013). In comparison, the red drum enhancement program in the Gulf of Mexico releases up to 1.4 million individuals per year. DFW is currently beginning the process of evaluating the OREHP to determine the program's contribution to the wild population (Valerie Taylor, personal comm., 2013).

Evaluation against MSC Component 1.1: Sustainability of Target Stock

Performance Indicators	Rating	Justification
1.1.1 Stock Status		Stock biomass is above B_{MSY}
1.1.2 Reference Points		Reference points have been calculated; the stock is maintained at a level exceeding B_{MSY}
1.1.3 Stock rebuilding		Not triggered

Harvest Strategy (Management)

White seabass are regulated by the FGC and managed by DFW. The WSFMP was adopted by the FGC in 2002. Under the WSFMP, the fishery undergoes an annual review where DFW works with the White Seabass Scientific and Constituent Advisory Panel (WSSCAP) to evaluate the fishery against criteria set forth in the WSFMP. DFW then presents the results and makes a recommendation to the FGC. It is at the discretion of the FGC to determine whether or not a

change to the management of the fishery needs to be made. The six criteria include:

1. Catch is expected to exceed the current harvest guideline or quota;

2. Any adverse or significant change in the biological characteristics of white seabass (age composition, size composition, age at maturity or recruitment) is discovered;

3. An overfishing condition exists or is imminent; consisting of evaluating:

   a. a 20% decline in the total annual commercial landings of white seabass for the past two consecutive seasons compared to the prior five season average;

   b. 20% decline in both the number of fish and the average size of fish caught in the recreational fishery; and

   c. 30% decline in OREHP recruitment indices for juvenile white seabass compared to the prior five season average.

4. Any adverse or significant change in the availability of white seabass forage or in the status of a dependent species is discovered;

5. New information on the status of white seabass;

6. An error in data or stock assessment is detected that significantly changes estimates of impacts due to current management.

Since the inception of the WSFMP, none of the points of concern have been met so no management changes have been adopted. Through 2008, status was evaluated using a combination of fishery dependent and fishery independent data (CDFG 2006); fishery independent data on juvenile white seabass was collected by the OREHP. However, from 2009-2011 funding for collection of juvenile recruitment data was cut and only fishery dependent data was used to inform reviews. Partial funding was restored in 2012 and a portion of the fishery independent data is being collected again (Valerie Taylor, personal comm., 2013).

Catch of white seabass is also regulated by limited entry permits, gear restrictions, minimum size limits, and seasonal and area closures:

- Limited entry gill/trammel net permit is required
- Minimum gill net mesh size of 15 cm (6 in)
- Minimum size limit of 71 cm (28 in) for both the commercial and recreational fishery
- Commercial fishery closure from March 15 to June 15 south of Point Conception to protect fish during spawning season
- State ban of gill net fishing in state waters from the US-Mexico border to Point Arguello, 70 fathoms or within one nautical mile (whichever is less) of the Channel Islands, inshore of 60 fathoms from Point Arguello north

We could find no information on fishery management practices in Mexico.

Evaluation against MSC Component 1.2: Harvest Strategy

Performance Indicators	Rating	Justification
1.2.1 Harvest Strategy		Management structure in place, but not rigorous right now; Might be lacking in monitoring; no harvest control rules; tools are available for limiting catch.
1.2.2 Harvest Control Rules and Tools		Mechanisms for response if stock declines, but no triggers; management strategy evaluations are a tool that could be used for this (limited entry, gear limits, area closures, etc); no info on removals from Mexico.
1.2.3 Information/Monitoring		Fishery dependent and independent data are collected.
1.2.4 Assessment of Stock Status		There are annual reviews, but no stock assessment (it is underway).

MSC Principle 2: Environment

Retained Catch

Small Mesh Drift Gill Net

This information is not available at this time, but could be accessed in the future by analyzing DFW landings receipts and logbooks. There is a sub-portion of this fishery that targets, not only seabass, but halibut, yellowtail, barracuda, or angel sharks. Since these are targeted species, they are not considered retained catch.

Evaluation against MSC Component 2.1: Retained Catch

Performance Indicators	Rating	Justification
2.1.1 Outcome		Unknown; no information publicly available, cannot assess
2.1.2 Management		Unknown; no information publicly available, cannot assess
2.1.3 Information		DFW landings receipts and logbooks should be available, although no information is publicly available

Bycatch

Small Mesh Drift Gill Net

Although detailed information from past observer programs was not readily available, there

should be data available on bycatch of non-protected species in these data sets. In addition, a federal observer program, for which data is not available at this time, may provide insight into bycatch for this fishery (see next section). Bycatch is not known for the hook-and-line portion of the fishery but is considered to be low.

Evaluation against MSC Component 2.2: Bycatch

Performance Indicators	Rating	Justification
2.2.1 Outcome		Unknown; no information publicly available, cannot assess
2.2.2 Management		Bycatch species unknown, need more information; although gear restrictions likely limit bycatch
2.2.3 Information		Some observer data, logbooks

Endangered, Threatened, & Protected Species

Small Mesh Drift Gill Net

The small mesh drift gill net fishery under the Marine Mammal Protection Act is currently rated a Category II (NMFS 2012). There is limited data available on ETP species bycatch in the small mesh drift gill net fishery; all data is from a federal observer program from 2002 to 2004 associated with the yellowtail, barracuda, and white seabass drift gill net fishery. A federal gill net observer program has been contracted out again, but there is no data available at this time (Valerie Taylor, personal comm., 2013). Observer data from 2002 to 2004 documented mortalities of three California sea lions and two long-beaked common dolphins among a total of 64 sets observed (Carretta et al. 2004, Carretta et al. 2005). Populations of these species are considered to be stable or increasing.

Evaluation against MSC Component 2.3: Endangered, Threatened & Protected Species

Performance Indicators	Rating	Justification
2.3.1 Outcome		Limited data publicly available; data that is available suggests the fishery does not cause irreversible harm to ETP species
2.3.2 Management		Gear restrictions in place likely limit harm to ETP species
2.3.3 Information		Some observer data, logbooks

Habitat

Drift gill nets have minimal impacts on physical habitats since they are not designed to come into contact with the seafloor (Cheunpagdee et al. 2003, Morgan et al. 2004). The state ban on

*For California's Sustainable Seafood Program, this category must score an 80 or higher during an MSC assessment.

gill net fishing in many state waters protects some of the habitat that might be fished if the ban were not in place.

Evaluation against MSC Component 2.4: Habitat

Performance Indicators	Rating	Justification
2.4.1 Outcome		Minimal habitat impacts from drift gill nets
2.4.2 Management		Limited entry permits, gear restrictions, area closures and seasonal closures help limit habitat impacts
2.4.3 Information		It is unclear if the information available on habitat impacts is adequate to assess the risk posed

Ecosystem

White seabass primarily prey on anchovies, herring, sardines, squid, and pelagic crabs (Thomas 1968; Vojokovivh et al 1983). Juveniles are preyed upon by many larger fish (Marguiles 1989), and adults have been seen being eaten by sea lions and sharks (CDFG 2002). It is unknown whether any changes to the ecosystem can be attributed to the white seabass gill net fisheries (CDFG 2002).

Evaluation against MSC Component 2.5: Ecosystem

Performance Indicators	Rating	Justification
2.5.1 Outcome		Not enough information to assess
2.5.2 Management		WS FMP criteria #4 addresses changes in the availability of white seabass forage fish species; existing mgmt may indirectly benefit ecosystem health; MPAs will protect some juvenile habitat
2.5.3 Information		There should be some info available on retained, bycatch and ETP species from landings receipts and observer data to help assess this PI

MSC Principle 3: Management System

Governance and Policy

The fishery is regulated by the Fish and Game Commission and managed by DFW. It is subject to and managed under all relevant US federal laws as well as California state regulations pertaining to fisheries management. The fishery is subject to an FMP and is reviewed on an annual basis by the Commission with recommendations from DFW and WSSCAP. The public can attend and comment at public Commission meetings, or send in comments by mail or e-mail.

Evaluation against MSC Component 3.1: Governance and Policy

Performance Indicators	Rating	Justification
3.1.1 Legal and/or Customary Framework		FGC and DFW manage the fishery within an effective framework for delivering sustainable fisheries
3.1.2 Consultation, Roles and responsibilities		Roles and responsibilities are clearly laid out; FGC meetings are open to the public and to public comments
3.1.3 Long-term Objectives		Magnuson-Stevens Act, Marine Life Management Act
3.1.4 Incentives for Sustainable Fishing		Magnuson-Stevens Act, Marine Life Management Act

Fishery Specific Management System

The white seabass fishery is actively managed and regulated by both the Commission and DFW. See the Harvest Strategy section for more information. It undergoes an annual review, and DFW is currently evaluating its experimental enhancement program. Enforcement of fishing regulations is conducted in state waters by CDFW's Law Enforcement Division and in federal waters by NOAA's Office of Law Enforcement. Additionally tools such as port sampling, logbooks, and observer coverage are used to monitor catch and ensure vessels have the correct permits for the catch they are landing. Violators are prosecuted under the law. There is no evidence of systemic non-compliance.

Evaluation against MSC Component 3.2: Fishery Specific Management System

Performance Indicators	Rating	Justification
3.2.1 Fishery Specific Objectives		Clear objectives are outlined in the WSFMP
3.2.2 Decision-making Processes		DFW provides recommendations that are vetted through the FGC
3.2.3 Compliance & Enforcement		An enforcement system exists and has demonstrated an ability to enforce relevant management measures, strategies and/or rules.
3.2.4 Research Plan		The WS FMP outlines short and long term research objectives however the research plan has not been formally reviewed in awhile
3.2.5 Management Performance Evaluation		There is an annual review to evaluate the fishery against six management criteria

California Specific Requirements

The California voluntary sustainable seafood program requires fisheries seeking certification to meet California specific standards in addition to the standards and requirements of the Marine Stewardship Council (MSC) sustainable fisheries certification program. These include:

1. Higher scores (80 instead of 60) for two performance indicators (PI) of the MSC program: "Stock Status" (PI 1.1.1) and "By-catch of Endangered, Threatened, or Protected (ETP) Species" (PI 2.3.1). These two PIs are highlighted in the report.

2. Additional independent scientific review: The OPC Science Advisory Team will be engaged in the certification process through early consultation in reviewing minimum eligibility criteria, and review of the MSC-required pre-assessments and full assessments. The reviews will be conducted in addition to MSC's peer review, thus bringing additional credibility, transparency, and independence to California's certification process.

3. Additional traceability components: The California program will develop a unique barcode for California certified sustainable fish. This barcode can be either scanned by a smart-phone or linked to a website that will reveal additional information about the fishery, and information about toxicity when available

Recommendations

In this fishery, there are three gear types. We investigated the small mesh drift gill net fishery, but we need to better understand the choices being made by fishermen when fishing either with set or small mesh drift gill nets. There are reasonably different impacts to habitat associated with each of these gear types that may affect the sustainability of the fishery. In addition, we did not consider the hook-and-line fishery that takes place in Monterey Bay. This is still a relatively small portion of the fishery but appears to be growing (Valerie Taylor personal comm., 2013). It is possible this portion of the fishery expands and shrinks based on environmental factors (warming waters, prey availability) (Valerie Taylor personal comm., 2013). California may want to take a closer look at the hook-and-line fishery since it appears to be a relatively sustainable gear type.

This fishery also has several components that are currently under investigation and will provide a clearer state of the fishery once complete. These include stock assessment research, review of the OREHP, resuming fishery independent data collection that has been suspended since 2008, and a federal observer program on both set and small mesh drift gill net vessels.

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Appendix A

MSC Assessment Tree			White Seabass
			Drift gill nets
Principle	**Component**	**Performance Indicator**	**Southern**
Principle 1: Health of Fish Stock	Outcome	1.1.1: Stock status	
		1.1.2: Reference points	
		1.1.3: Stock rebuilding	*Did not assess*
	Harvest Strategy (Management)	1.2.1: Harvest strategy	
		1.2.2: Harvest control rules	
		1.2.3: Info/ monitoring	
		1.2.4: Stock assessment	
Principle 2: Impact on Ecosystem	Retained species	2.1.1: Status	
		2.1.2: Mgmt strategy	
		2.1.3: Information	
	By-catch species	2.2.1: Status	
		2.2.2: Mgmt strategy	
		2.2.3: Info	
	ETP species	2.3.1: Status	
		2.3.2: Mgmt strategy	
		2.3.3: Info	
	Habitats	2.4.1: Status	
		2.4.2: Mgmt strategy	
		2.4.3: Info	
	Ecosystem	2.5.1: Status	
		2.5.2: Mgmt strategy	
		2.5.3: Info	
Principle 3: Management System	Governance & Policy	3.1.1: Legal framework	
		3.1.2: Consultation, roles, and responsibilities	
		3.1.3: Long term objectives	
		3.1.4: Incentives for sustainable fishing	
	Fishery Specific Mgmt System	3.2.1: Fishery specific objectives	
		3.2.2: Decision making process	
		3.2.3: Compliance & enforcement	
		3.2.4: Research plan	
		3.2.5: Management performance evaluation	