Pink (Ocean) Shrimp (*Pandalus jordani*)

Certification Units Covered Under this Species:

- Otter Trawl, Northern California
- Otter Trawl, Southern California

Summary

The West Coast pink shrimp stock extends from southeast Alaska to California. The Pacific Fishery Management Council (PFMC) prepared a draft management plan for California, Oregon, and Washington ocean shrimp in 1981, although it was never formally adopted; in 2004, management authority over the California fishery was granted to the Fish and Game Commission. It is suggested that pink shrimp populations are largely influenced by environmental conditions and less so by fishing pressure. Bycatch has been drastically reduced in the fishery since the mandatory implementation of bycatch reducing devices. As of 2007, the Oregon Pink (Ocean) Shrimp Trawl Fishery has been certified sustainable by the Marine Stewardship Council (MSC).

Strengths:

- Bycatch reducing devices (BRDs) have drastically reduce discards
- Observer coverage
- Part of the Individual Fishing Quota (IFQ) program along with West Coast Groundfish

Weaknesses:

- Population abundance is highly variable seasonally, difficult to estimate stock biomass
- No formal FMP or stock assessments

History of the Fishery in California

Biology of the Species

[From DFG "Status of the Fishery Report" 2006, unless cited otherwise]:

Pink shrimp are found in waters from Unalaska in the Aleutian Islands to San Diego, California, at depths from 150 to 1200 feet (45 to 366 meters). Off the coast of California, this species is generally found from depths of 240 to 750 feet (73 to 229 meters). Spawning may occur throughout the range, but commercial quantities are limited to the area between Queen Charlotte Sound, British Columbia and Point Arguello, California. High concentrations of ocean shrimp typically occur in well-defined areas from year to year, most commonly referred to as beds. Pink shrimp beds are generally characterized by green mud or muddy-sand bottoms. It is assumed that there are no genetically distinct subpopulations of ocean shrimp off the coast of western North America.

Pink shrimp are protandric hermaphrodites, functioning as males during the first year and a half of their life, then passing through a transitional phase to become females. Mating takes place during September and October. The peak hatching period occurs during late March and early April. Pink shrimp go through a larval period which lasts 2 to 3 months. The developing juvenile shrimp occupy successively deeper depths as they grow, and often begin to show up in commercial catches by late summer. Growth rates vary according to region, sex, age, and year class (Dahlstrom 1970). Annual recruitment success has been linked to the strength and timing of "spring transitions" (Hannah 1993; 1999). An early, strong transition is thought to be necessary to produce a large year class.

Pink shrimp undergo diel vertical migration by inhabiting deeper waters near the bottom during the day and ascending in the water column during the night to feed. Stomach contents of shrimp taken at night consist of primarily smaller planktonic animals, such as euphausiids and copepods. Pink shrimp have been reported as prey for many fish species, including Pacific hake, *Merluccius productus*; arrowtooth flounder, *Atheresthes stomias*; sablefish, *Anoplopoma fimbria*; petrale sole, *Eopsetta jordani*; spiny dogfish, *Squalus acanthias*; and several species of rockfish and skates.

Commercial Fishery

The California pink shrimp fishery was consistently more productive in the late 1980s and early 1990s compared to any other period in the 55 years of the fishery (Figure 1, Table 1; DFG 2007). Pink shrimp ex-vessel ladings values have ranged from an average of approximately $4.4 million in the 90's, a significant decrease to an average of $951,000 from 2000-06, and the most recent value is represented in Table 1 (DFG 2007; DFW Commercial Landings Data 2007-11).

A combination of factors may explain the decline in landings since the 90's, such as a weak market attributed to competition from other warm and cold water shrimp fisheries, competition from aquaculture production of warm water species worldwide, the federal groundfish vessel buyback program in 2003, and environmental conditions negatively affecting recruitment (Roberts 2005; MSC 2007; NMFS 2007; DFG 2007). Pink shrimp are very short-lived species, recruit to the fishery at age one and contribute to the fishery for just 3 years (Dahlstrom 1973; Hannah and Jones 1991). Recruitment from year to year can greatly affect the catch, and has

been negatively correlated with ENSO, strong upwelling events and sea level height causing excessive offshore transport of larvae (Hannah 2010). The most recent increase in landings may be due to particularly successful recruitment years due to favorable ocean conditions paired with opportunity to fish under the new federal IFQ program (Pete Kalvass, pers. comm.). Other invertebrate species such as Dungeness crab also saw increases in recruitment for the same time period.

The number of active vessels in the northern region has steadily decreased each year from 2002 through 2006 (Table 2; DFG 2007). Between 2007-12, the number of permits sold has leveled out at between 32-34 permits for the northern trawl, and 15-21 for the southern (declining trend for southern region (DFW, California Commercial Licensing reports 2007-12).

Historically, the majority of pink shrimp fishing off the west coast of the United States occurred in federal waters (DFW 2007). Since 2007, essentially all of the pink shrimp landings have been in the Eureka area off the coast of Northern California (DFW Commercial Landings Reports 2007-11). Although in recent years the southern beds have been productive, they do not appear to have been fished (Pete Kalvass pers. comm.; DFW, Commercial Landings Reports 2007-11). It is unclear as to why this may be, but it may be due to low value of the fishery itself and/or the inability to land pink shrimp at southern ports due to the lack of buyers (Pete Kalvass, pers. comm.). There are no enhancements on the west coast to the pink shrimp stock. ODFW estimates the number of vessels and amount of catch caught in federal waters off California and landed in Oregon ports, from logbooks. In recent years this catch and effort was considerably larger than California landings. In 2011, the estimated catch originating in federal waters off California was 10.3 million pounds from 20 vessels and in 2012 it was 9.5 million pounds from 31 vessels. This catch category was under 3.0 million pounds from 2008 through 2010 (Bob Hannah, pers.comm.). CDFW does not currently have an estimate of the amount of shrimp caught off Oregon and landed in California ports.

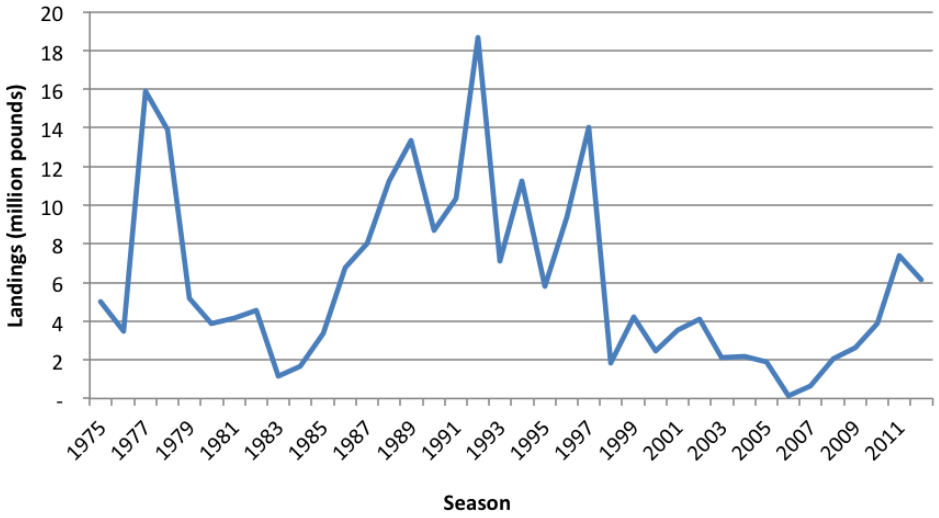

Figure 1. Pacific pink shrimp commercial landings from 1975 to 2012 based on commercial landing receipts.

Table 1. Pacific pink shrimp commercial landings and ex-vessel value for the years 2007-2012 (DFW Commercial Landings Reports 2007-11; *Unpublished, preliminary estimate, pers. comm. Pete Kalvass, DFW)

Year	Landings in pounds	Ex-vessel Value
2007	636,944	$301,695
2008	2,084,404	$1,094,707
2009	2,609,170	$782,876
2010	3,904,052	$1,274,496
2011	7,375,139	$3,684,168
2012	6,152,197*	$2,740,417*

Table 2. Pacific pink shrimp permits sold and active for the years 2001-2006 (From DFG "Information Concerning the Pink Shrimp Trawl Fishery off Northern California," 2007).

Year	Southern region[1]		Northern region[2]	
	Permits sold	Active vessels	Permits sold	Active vessels
2001	56	6	78	32
2002	57	7†	80	26†
2003	46	4	78	9
2004	38	0	47	7
2005	35	1†	43	12†
2006	21	1†	40	4†

[1] Refers to waters south of Point Conception.
[2] Refers to waters north of Point Conception.
† In 2002, 2005, and 2006, one vessel landed pink shrimp in both southern and northern waters.

Recreational Fishery

There is no recreational fishery for pink shrimp.

MSC Principle 1: Resource Sustainability

*Sustainability of Target Stock

The age class structure of the pink shrimp has not been assessed in California since the 1990s, though in Oregon catch is typically dominated by age-1 shrimp (ODFW, 2012) while in some years age-2 can dominate if there was a particularly strong recruitment. Growth rates vary according to region, sex , age, and year class (Dahlstrom 1970), however there is clear pattern

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

of seasonal growth despite the variations mentioned with very rapid growth during spring and summer and slower growth during winter (Frimdog et al. 2009).

Historically, population estimates of shrimp beds were done by DFW sea surveys (1959-1969) then mathematical population models (1969-1975), however its use was discontinued due to variable recruitment, growth and natural mortality rates associated with pink shrimp (DFG 2006). In California, no further attempts to estimate the population have been made. Status determinations of high turnover species are rarely possible due to the constraints of most traditional stock assessment models. Many of these species appear to be sustainably managed with regulatory actions (Field and Francis 2006). California implements regulations such as seasonal closures, maximum count per pound, etc. to manage the pink shrimp population (DFG 2006, 2007).

Environmental factors have been shown to explain most of the variation in the pink shrimp population (Hannah 1993; 1995; 1999; 2010; 2011). In Oregon, environmentally based models have been shown to be the most accurate for predicting and explaining the variation in pink shrimp recruitment. These models suggest that there is not a consistent impact of the pink shrimp fishery on stock abundance in Oregon. Although, overfishing may be possible if intensive fishing occurs on a failed year class (Frimodig et al. 2009).

No stock assessment has been completed for the entire west coast and fishing patterns and pressure may change as a result of the new groundfish IFQ program. Many fishing permits for pink shrimp in California have remained latent (DFW 2007; Pete Kalvass pers. comm.). In Oregon, there was a resurgence of the pink shrimp fishery under IFQ where latent effort was redirected to the fishery leading to higher pink shrimp fishing effort largely due to high shrimp abundance and higher price per pound (ODFW 2012). This could continue in the future and the behavior of the pink shrimp fishery under the IFQ program needs to be understood.

Evaluation against MSC Component 1.1: Sustainability of Target Stock

MSC Performance Indicators	Rating	Justification
1.1.1 Stock Status		No stock assessments have been conducted for CA, but have been in OR; stocks are influenced more by environmental conditions than by fishery; seasonal landings are highly variable
1.1.2 Reference Points		Implicit reference points; same measures as OR and WA – may need more data specific to CA; Changes may occur with new IFQ program
1.1.3 Stock rebuilding		Unable to assess

Harvest Strategy (Management)

The pink shrimp fishery off the west coast of the United States is principally state-managed, although some federal regulations apply. Historically there were federal regulations including daily and monthly trip limits for incidental catches of federally managed groundfish species. Now pink shrimp are part of a federal West Coast Groundfish Trawl Individual Fishing Quota (IFQ)

program. This changed the regulations from bimonthly trip limits to individual quota shares and still includes a vessel monitoring system and area restrictions protecting groundfish Essential Fish Habitat (EFH) (Code of Federal Regulations Title 50).

The Pacific Fishery Management Council (PFMC) created a draft Fisheries Management Plan (FMP) in 1981 (Abramson et al. 1981). The plan remains a draft, however the three west coast states – California, Oregon, and Washington – agreed on several management measures and work together with PFMC through a Memoranda of Understanding and/or reciprocal rulemaking to manage the west coast fishery (DFW 2007).

In 2004, the California State Legislature approved Senate Bill 1459, adding Fish and Game Code (FGC) §8841 to statute, granting the Fish and Game Commission (Commission) management authority over California's commercial bottom trawl fisheries and amending FGC §8842, which pertains to management of the pink shrimp trawl fishery. In 2001, the regulatory areas were eliminated and the fishery was divided into northern and southern management regions, requiring a separate permit Ito fish in each region (California Code of Regulations (CCR) Title 14 §120). The northern region extends from the California-Oregon border to Point Conception and is a limited entry fishery. The southern region extends from Point Conception to the California-Mexico border and it is an open access fishery. Trawling is not permitted in California State waters at this time and the pink shrimp fishery operates in federal waters only.

The stock in California is primarily managed through the following regulations:

- Closure of various state and federal waters to trawling
- Use of bycatch reduction devices (BRDs)
- Closed season from November 1 through March 31 to protect egg-bearing females
- Maximum count-per-pound of 160 to prevent overfishing juvenile shrimp
- Minimum mesh size of 1 3/8 inches to allow escapement of juvenile shrimp
- State and federal incidental catch limits to minimize mortality of non-target species

Oregon and Washington employ similar regulations for BRDs, size, and count similar to recommendations made in the PFMC draft FMP. In addition, the new federal west coast trawl IFQ program (implemented in 2012) monitors all catch of species though on board observers, including pink shrimp. Currently, California does not conduct a stock assessment of pink shrimp, but Oregon does. Modeling efforts have increased our ability to forecast stock abundance (Hannah 2010). Pink shrimp recruitment, and therefore populations, are thought to be more affected by environmental factors like ENSO, upwelling events and sea level height than fishing effort (Hannah 2010). However, this could change if fishing effort were high during a bad recruitment year. Oregon saw an increase in fishing effort in the pink shrimp fishery with the implementation of the new IFQ program. It is unknown whether this increase will continue or if it was seen in other Pacific states.

Evaluation against MSC Component 1.2: Harvest Strategy (Management)
Northern California fishery

MSC Performance Indicators	Rating	Justification
1.2.1 Harvest Strategy		Restricted access fishery, Included in West Coast Groundfish IFQ program - may be new changes in fishery; harvest rules not responsive to changes in the stock; need to better understand the Memorandum of Understanding between states
1.2.2 Harvest Control Rules and Tools		Managed via minimum mesh size, size limits, catch limits, seasonal closures; no evaluation of methods; Shared management with OR and WA; no CA-specific data
1.2.3 Information/Monitoring		Currently using OR-specific data, unclear whether information can be extrapolated to CA
1.2.4 Assessment of Stock Status		

Evaluation against MSC Component 1.2: Harvest Strategy (Management)
Southern California fishery

MSC Performance Indicators	Rating	Justification
1.2.1 Harvest Strategy		Open access; harvest rules not responsive to changes in the stock; need to better understand the Memorandum of Understanding between states
1.2.2 Harvest Control Rules and Tools		Managed via minimum mesh size, size limits, catch limits, seasonal closures; no evaluation of methods; Shared management with OR and WA; no evaluation of methods, no data collection in CA
1.2.3 Information/Monitoring		Currently using OR-specific data, unclear whether information can be extrapolated to CA
1.2.4 Assessment of Stock Status		

MSC Principle 2: Environment

Retained Species

According to observer data from 2008 - 2011, there is no retained catch in the California pink shrimp trawl fishery, although it is unclear how representative these values are for the entire California fishery, or if changes will occur with the IFQ program (NWFSC 2011). Since 2004, the West Coast Groundfish Observer Program (WCGOP) has observed California Northern Pink Shrimp Trawl Vessels, with relatively stable coverage of around 6% coastwide, and approximately 13% for California alone in 2011 (average from WA, OR, and CA) (NWFSC 2012). In 2007, the WCGOP combined California and Oregon pink shrimp fisheries into one sampling population for the period Mar-June 2007. Due to regulation differences between Oregon and California, the pink shrimp trawl fisheries were again split into two sampling populations by state for the period July-December 2007. Since 2008, Oregon pink shrimp and California pink shrimp licenses have been observed as two separate fisheries (NWFSC 2011; Bellman et al. 2010).

Evaluation against MSC Component 2.1: Retained Species

MSC Performance Indicators	Rating	Justification
2.1.1 Outcome		All non-target catch was discarded on observer covered vessels from 2008-2011
2.1.2 Management		Area and seasonal closures; mandatory bycatch reducing devices (BRDs)
2.1.3 Information		Observer data from the West Coast Groundfish Observer program, landings receipts

Bycatch Species

Percent of bycatch that is discarded relative to total landings in the California pink shrimp fishery has been less than 6% from 2008 - 2011, mostly consisting of other shrimp species, Pacific hake, squid and smelt, with minor amounts of rebuilding species (Table 3; NWFSC 2012). Bycatch is minimal for the US west coast pink shrimp fishery compared to other shrimp trawl industries worldwide since the implementation of mandatory bycatch reducing devices (BRDs), including the Nordmøre grate (rigid-grate excluder), a soft-panel excluder, and fisheye excluder (Frimodig et al. 2009).

Evaluation against MSC Component 2.2: Bycatch Species

MSC Performance Indicators	Rating	Justification
2.2.1 Outcome		Bycatch is <6% of total catch
2.2.2 Management		BRDs are mandatory and drastically reduce bycatch rates
2.2.3 Information		Observer data from the West Coast Groundfish Observer program, landings receipts

Table 3. West Coast Groundfish Observer data on bycatch from trawl vessels targeting California pink shrimp from 2008 to 2011 (NWFSC 2011).

	2011		2010		2009		2008	
Discarded Species	Amount of Discard (mt)	% discard relative to total landings	Amount of Discard (mt)	% discard relative to total landings	Amount of Discard (mt)	% discard relative to total landings	Amount of Discard (mt)	% discard relative to total landings
Non-rebuilding species								
Pacific Hake	3.52	0.81%	6.45	2.29%	0.70	0.53%	4.75	3.37%
Flatfish Unid	0.35	0.08%	0	0%	--		0	0%
Non-groundfish species								
Shrimp Unid	8.55	1.96%	7.24	2.57%	5.06	3.84%	2.11	1.50%
Squid Unid	1.48	0.34%	0.97	0.35%	0.01	0.01%	0.01	0.01%
Smelt Unid	1	0.23%	0	0%	--		0	0%
Slender Sole	0.60	0.14%	0.54	0.19%	0.42	0.32%	0.23	0.16%
Rebuilding species								
Arrowtooth Flounder	0.14	0.03%	0.04	0.01%	0.24	0.18%	0.04	0.03%
Darkblotched Rockfish	0.07	0.02%	--	--	0	0%	--	--

*Observer coverage: 2011 = 13%, 2010 = 15%, 2009 = confidential data, 2008 = confidential data.

*Endangered, Threatened, & Protected Species

There have been no significant interactions identified between the pink shrimp fishery and threatened or endangered marine species of birds, mammals, or fish in California (Roberts 2005; MSC 2007). The pink shrimp fishery is classified as a Marine Mammal Protection Act category III fishery with no observed or documented take of marine mammals (Federal Register: Vol. 72, No. 124). Other biologically sensitive species in near pink shrimp trawling grounds in California include canary rockfish, bocaccio, widow rockfish, and yelloweye rockfish (NMFS 2005; MSC 2007). The bycatch of these rockfish species has been minimized due to BRDs (Hannah et al. 1996; ODFW 2006; Hannah and Jones 2007; MSC 2007). Recently the listing of Pacific eulachon has resulted in the first and only interaction of the pink shrimp trawl fishery with ETP.

Evaluation against MSC Component 2.3: ETP Species

MSC Performance Indicators	Rating	Justification
2.3.1 Outcome		ETP species impacts are low
2.3.2 Management		BRDs; Magnuson-Stevens Act, CEQA, Migratory Bird Act, Marine Mammal Protection Act, etc.
2.3.3 Information		Observer data from the West Coast Groundfish Observer program, landings receipts, logbooks

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

Habitats

Pink shrimp beds are generally characterized by green mud or muddy-sand bottoms (Frimodig et al. 2009). Although soft bottom seafloor habitats on the continental shelf where pink shrimp fishing occurs are considered to have a low sensitivity to trawl gear, their recovery times from gear impacts may be longer compared to other substrate types. Several studies examining gear effects on soft bottom indicate that mud substrates are more stable and have longer recovery times than sand substrates (NRC 2002; Hannah et al. 2010). A mean recovery time for trawl gear impacts in pink shrimp fishing grounds is estimated to be less than one year in the absence of bottom trawl fishing (NMFS 2005).

Trawling is prohibited in all state waters in addition to Essential Fish Habitat Conservation Areas. The closure of the pink shrimp trawling fishery from November through March allows some recovery time to pink shrimp beds benthic habitats.

Evaluation against MSC Component 2.4: Habitats

MSC Performance Indicators	Rating	Justification
2.4.1 Outcome		Muddy bottoms have low sensitivity to trawl gear
2.4.2 Management		Area closures (no trawling in state waters, EFH areas)
2.4.3 Information		Observer data; logbooks; OR research available – may need more CA-specific research in the future

Ecosystem

An ecosystem approach to fisheries management in the California Current must take into consideration the constantly changing climate-driven physical and biological interactions in the ecosystem, the trophic relationships between fished and unfished elements of the food web, the adaptation potential of life history diversity, and the role of humans as predators and competitors (DFW 2007).

Intensive trawling has been shown to have effects on some types of seafloor habitats (NRC 2002). Some research of shrimp trawling effects on ocean floors has been done off the coast of Oregon by Hannah et al. in 2010 in four mud-habitat areas with different types of trawling history. Overall, they found measureable decreases in macroinvertebrate density and diversity in heavily trawled grounds. It is assumed that there would be similar effects of trawling off the coast of California.

In California pink shrimp trawl grounds there is the potential for coral habitats to be affected. Trawling may cause substantial damage to coral habitats (Auster and Langton 1999; Koslow et al. 2001; Fosså et al. 2002; Roberts et al. 2006) and coral habitats may occur in State trawling grounds. However, trawling in California state waters is currently prohibited. The structure and habitat type of federal pink shrimp trawling grounds has not been mapped.

Current state and federal pink shrimp management measures were not implemented to

specifically address ecosystem management (DFW 2007). The current management measures in place may collectively foster a sustainable fishery and indirectly promote a healthy ecosystem by reducing potential fishery impacts on the system. These measures include:

- Limited entry pink shrimp permitting system to control fishing capacity
- Reduction of fleet capacity due to vessel buyback programs
- Logbook program to monitor catch location, effort, and gear information
- Maximum count per pound of landed catch to avoid overfishing juvenile shrimp
- Closed fishing season to protect egg-bearing females
- Minimum mesh-size required to allow for escapement of juvenile shrimp
- Bycatch reduction device required on the net to minimize groundfish bycatch
- Area restrictions (Essential Fish Habitat, Marine Preserves, MPAs)
- Federal at-sea observer coverage mandated by law
- State and federal incidental trip limits to minimize mortality of non-target species

PFMC has written a draft Fishery Ecosystem Plan (FEP) for the US portion of the California Current Ecosystem. The goal of a FEP is to enhance the Council's species specific management programs with more ecosystem science, broader ecosystem considerations and management policies that coordinate Council management across FMPs and the California Current Ecosystem. This plan is set to be adopted as final during April 6-11, 2013. At this stage however, more information is needed to understand how or if the current management measures protect the ecosystem structure and function.

Evaluation against MSC Component 2.5: Ecosystem

MSC Performance Indicators	Rating	Justification
2.5.1 Outcome		Management measures may indirectly reduce ecosystem impacts, though no quantitative measures are in place to assess
2.5.2 Management		Gear and area restrictions; MPAs; The PFMC recently drafted the Fishery Ecosystem Plan
2.5.3 Information		More information is necessary

MSC Principle 3: Management System

Governance and Policy

The California pink shrimp fishery operates within federal and state waters off of California on

the west coast of the US. A permit is required to land pink shrimp in California, which can be obtained from DFW under specified conditions. In State waters the fishery is regulated by the Commission and regulations are implemented and the fishery is managed by DFW. California works to manage with the other west coast states, Washington, and Oregon as well as the PFMC through Memorandums of Understanding (MOU) and other agreements. In addition, the pink shrimp trawl fishery is now part of the West Coast Groundfish Trawl IFQ program.

Evaluation against MSC Component 3.1: Governance and Policy

MSC 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

Currently the fishery has a draft FMP from 1981 developed by the PFMC. However, the three west coast states, California, Oregon, and Washington utilize recommendations from the draft FMP and work together through MOUs to implement similar regulations across state borders. Trawling in California State waters is closed.

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

MSC Performance Indicators	Rating	Justification
3.2.1 Fishery Specific Objectives		Some objectives outlined in 1981 FMP
3.2.2 Decision-making Processes		MOUs between states, but no clear explicit process
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		Oregon has a research plan but not specifically for CA; CA may need to establish more biological monitoring
3.2.5 Management Performance Evaluation		Regulations are relatively static, though bycatch reduction devices have been evaluated; no formal review of management system in CA

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

OPC may want to consider working with Oregon (whose pink shrimp fishery is already certified) and Washington as well as MSC to certify the fishery for the entire west coast. This may result in reduced costs for certification and recertification in the future for all three states. If California pursues certification, Oregon will serve as an excellent example. There has been a very successful and trusting partnership between the pink shrimp fishing fleet and the State. This

has resulted in a recertification of the fishery earlier this year on more researching on the pink shrimp fishery.

The implementation of the IFQ program, of which pink shrimp is a part may change the way that the fishery is fished and the impacts. California should consider these changes. In the first year of the IFQ program in Oregon they saw a marked increase in pink shrimp landings over previous years. It is possible that the IFQ program may result in latent permits in California entering the fleet again when the conditions are right.

In addition, ODFW 2012 pink shrimp newsletter mentions that MSC certification may require a Target and Limit reference point system in the future. Basing a system like this on formal stock assessment and monitoring could be quite costly for CDFW to implement (Kalvass, pers. comm.).

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Appendix A

MSC Assessment Tree			Pink Shrimp	
			Otter trawl	
Principle	**Component**	**Performance Indicator**	**Northern**	**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*	*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		