



Photo: finfish trap gear; DFW



NORTH COAST FISHERY SPOTLIGHT: COMMERCIAL NEARSHORE FINFISH

This report includes an analysis of nearshore finfish species and gear types (Table 1) from 2005 to 2015 within the North Coast MPA region, which encompasses California's jurisdictional ocean waters (0-3 nautical miles [nm] from shore, including offshore rocks) from the California-Oregon border to Alder Creek near Point Arena in Mendocino County. Researchers

from the California Department of Fish and Wildlife (DFW) used reported landings data from DFW's Commercial Fisheries Information System (CFIS) for this report. These data were used to estimate various fishery metrics for commercial nearshore fishery species (collectively referred to as "finfish" throughout this document), as defined by California's [Nearshore Fishery Management Plan](#) (NFMP; Table 1). This analysis is meant to provide a brief look at commercial nearshore finfish fishery metrics in the North Coast MPA region near the time of North Coast MPA implementation.



Photo: female kelp greenling; DFW/Marine Applied Research and Exploration (MARE)

TABLE 1. Commercial finfish species and gear type/condition. Report analysis includes every finfish species as analyzed by each of the gear types/condition.

FISHERY ¹	INCLUDED SPECIES	NEARSHORE PERMIT CATEGORY	GEAR TYPE/CONDITION ²
CABEZON	Cabazon	Shallow	Hook and line/Live
GREENLING	Kelp greenling, rock greenling	Shallow	Hook and line/Dead
ROCKFISH	Black-and-yellow rockfish, china rockfish, gopher rockfish, grass rockfish, kelp rockfish	Shallow	Trap/Live
	Black rockfish, blue rockfish, brown rockfish, calico rockfish, copper rockfish, olive rockfish, quillback rockfish, treefish	Deep	Trap/Dead

¹California scorpionfish and California sheephead are not found in the North Coast, and monkeyface prickleback landings are not significant enough to include; therefore these three species from the NFMP are not included in the analysis.

²Gear type and condition apply to all finfish species identified above.



Photo: quillback rockfish; DFW/ MARE

Commercial fisheries performance factors (such as total landings, ex-vessel revenue, and the number of active fishermen) can fluctuate annually and seasonally as competing issues come into play, for instance:

- Economic fluctuations, such as consumer willingness to pay or dockside infrastructure.
- Changes in ocean conditions, such as upwelling and sea surface temperatures, can affect the quantity and quality of species available for harvest.
- Regulatory changes like fishery closures, a cap on maximum pounds landed, or gear restrictions can affect the number of fish that can be caught.

FINFISH MANAGEMENT OVERVIEW

The finfish species in this analysis represent some of the most commonly landed fish in the nearshore live fishery, and are primarily found in shallow habitats such as kelp beds or rocky reefs. **Many finfish are slow growing, long-lived, and territorial, making them vulnerable to overfishing even at low exploitation rates.** For these reasons, the Marine Life Management Act (effective 1999) mandated the development of the NFMP (adopted in 2002) to ensure the conservation, sustainable use, and restoration of California's marine living resources, including these important species.

Components of the NFMP:

A restricted access program for the nearshore commercial fishery includes two types of limited entry permits¹, which aim to bring fleet fishing capacity into balance with available resources:

- Shallow, Nearshore Permit: regional permit; only allows for the harvest of species identified as shallow nearshore species; most permits are transferable, but during the reporting period two existing shallow nearshore permits must be retired for one new permit to be issued.
- Deep, Nearshore Permit: statewide permit; only allows for the harvest of species identified as deep nearshore species; permit is non-transferable.

¹ permit transferability regulations changed in October 2017.

In addition to the NFMP, all finfish species in this report (except rock greenling) are subject to federal management regulations under a [federal fishery management plan](#) including but not limited to, gear restrictions, time and area closures, harvest quotas, and trip limits. For instance, rockfish conservation areas (RCAs) limit the time and how deep nearshore fishermen can fish. RCAs are a depth-based corridor extending along the coast, with the shoreward and seaward boundaries changing in different geographic areas.

While the RCAs are a federal regulation, they do extend into state waters, especially on the central and north coast of California. In both locations, the shoreward depth limit can be as shallow as 20 fathoms (i.e. fishermen cannot fish deeper than 20 fathoms unless they go beyond seaward management boundary, which is usually between 100 and 150 fathoms in depth).

The RCAs were implemented in 2003 to help protect overfished species, such as yelloweye rockfish, canary rockfish, cowcod, bocaccio, darkblotched rockfish, and lingcod. **As populations for some of these species recover, restrictions on fishing depths, season lengths and trip limits are slowly being relaxed to allow fishermen more harvest opportunities.**

LANDINGS AND EX-VESSEL REVENUE

Reported landings for finfish from 2005 to 2015 have fluctuated minimally (regulations have not changed significantly during this time), with an initial decrease from approximately 105,000 pounds in 2005 to approximately 65,000 pounds in 2008 (Figure 1). Following a slight increase in 2009 to 70,000 pounds, landings then decreased with fishermen landing an average of approximately 50,000 pounds per year from 2010 to 2014. This five-year stretch was followed by a 32 percent increase in landings to a high of 66,000 pounds in 2015.

Reported ex-vessel revenue also shows steady declines throughout the reporting period. However, this decline in ex-vessel revenue is proportional to the decline in the number of fishermen, with **fishermen taking home an average of \$7,000 per year for these finfish species**, throughout the reporting period.

During the reporting period, the number of fishermen participating in the fishery gradually decreased from a regional high of 50 in 2005 to a low of 23 in 2015. Decreases in fishery participation in this reporting period can be attributed, in part, to:

- The 2-for-1 nature of the shallow permits (two existing shallow nearshore permits must be retired for one new permit to be issued);
- Non-transferability of the deeper permits (if the permit is not renewed, that permit goes away);
- An aging population of fishermen who can no longer safely fish;
- Changes in market demand for nearshore fish caught in California;
- Reductions in the availability of infrastructure at nearshore ports (ice, etc.); and

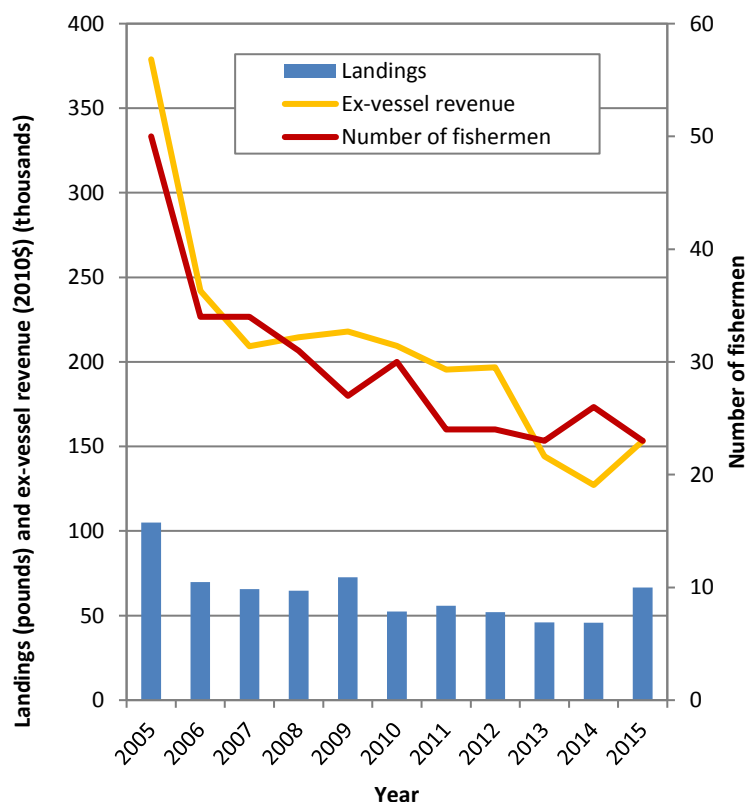


Figure 1. Reported North Coast MPA region annual commercial finfish landings, ex-vessel revenue, and number of active fishermen for all fisheries identified in Table 1, 2005-2015. Data Source: DFW; CFIS extract 6/2017.

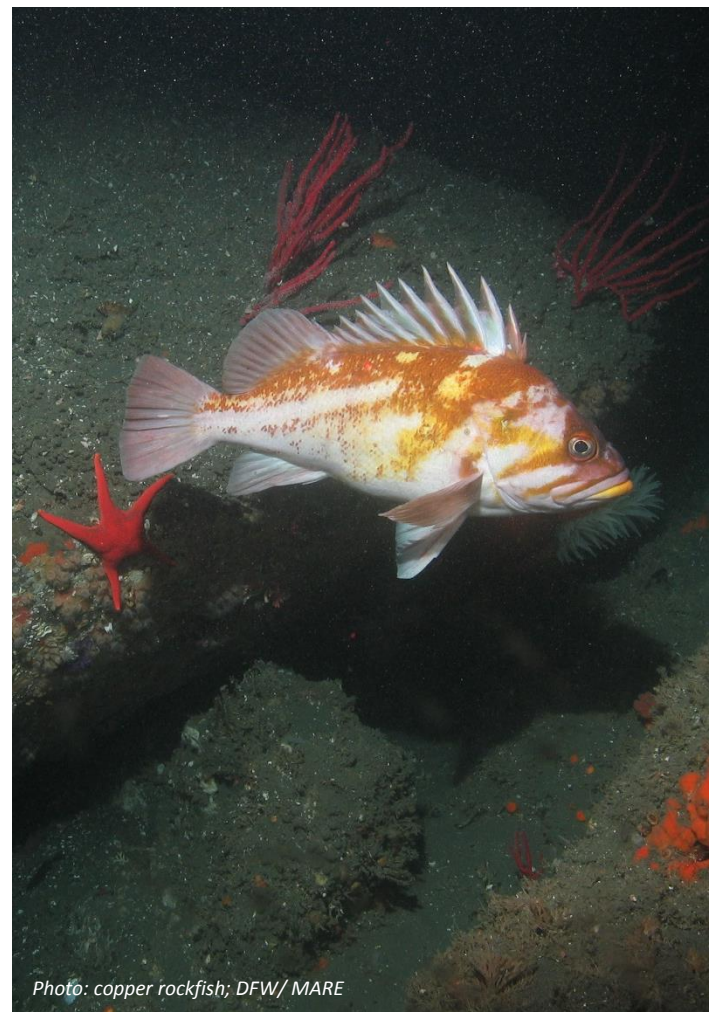


Photo: finfish trap gear; DFW



LANDING CONDITION AND GEAR TYPE

The statewide nearshore finfish fishery evolved into a multi-million dollar industry in the early 1990s, driven primarily by the demand for specialty foods in Asian restaurants and markets in San Francisco and southern California. Consumers are much more willing to pay a higher price for live fish than dead fish of certain species, particularly plate-sized fish. On average, **treefish receive the highest price per pound of live fish (\$7.98), whereas the highest average price paid per pound of dead fish is \$2.02 for olive rockfish** (Figure 2). The premium for live finfish has passed on to fishermen in the form of higher ex-vessel prices (price per pound paid to fishermen upon landing of catch) over dead fish (Figure 3). Between 2006 and 2013, ex-vessel revenue from live finfish was 3 to 6 times more lucrative than landings of dead finfish. Beginning in 2014, the gap between the market for live finfish and dead finfish narrowed, and in 2015 ex-vessel revenue for live finfish was only 1.5 times more lucrative than ex-vessel revenue for dead finfish (Figure 3).

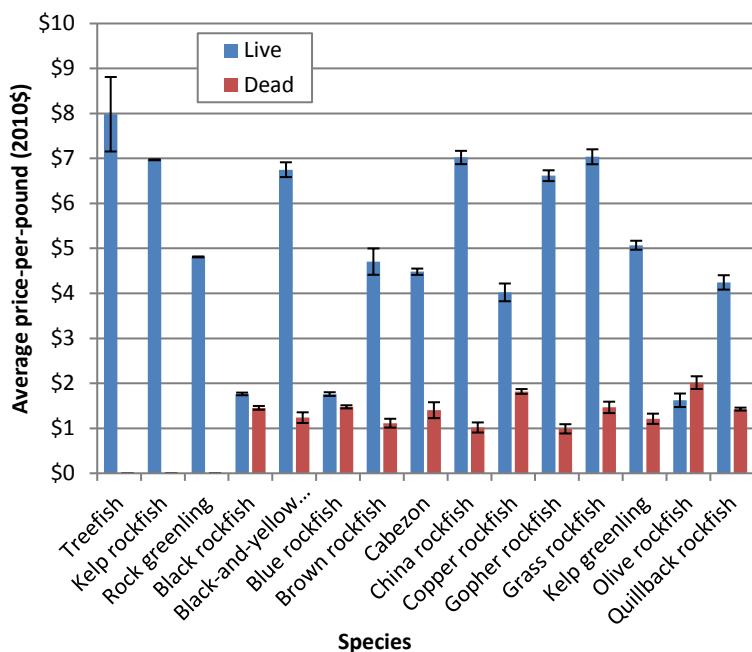


Figure 2. Average price-per-pound, ± 1 standard error, for finfish landed in the North Coast MPA region, 2005-2015. During the reporting period, no calico rockfish were reported landed commercially; treefish, kelp rockfish, and rock greenling were only landed live. Data Source: DFW; CFIS extract 6/2017.

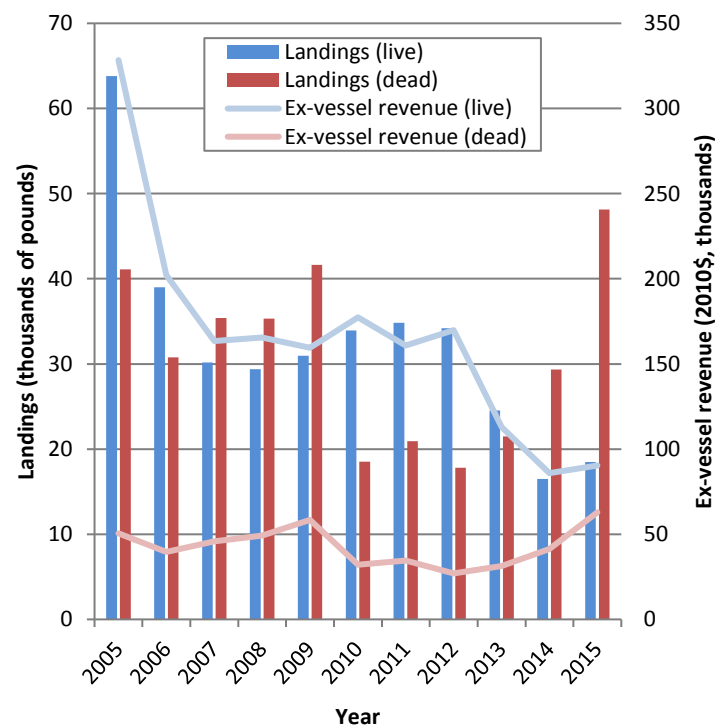


Figure 3. Reported landings and ex-vessel revenue for finfish in a live or dead condition in the North Coast MPA region, 2005-2015. Data Source: DFW; CFIS extract 6/2017.

Following a steady decline during 2011-2014, **average landings per fisherman increased to approximately 2,900 pounds in 2015** (Figure 4). This increase coincides with an increase in trip limits for black rockfish, which are often landed dead. Average ex-vessel revenue per fisherman in 2015 was lower despite increased landings (Figure 5) because most of the finfish were dead, fetching a lower price-per-pound.

The two primary gear types used to land nearshore finfish are hook and line and trap gear. **Hook and line gear far exceeded trap gear for both landings and ex-vessel revenue throughout the reporting period**, and collectively accounted for over 95 percent of reported landings and ex-vessel revenue for nearshore finfish (Figures 4 and 5).

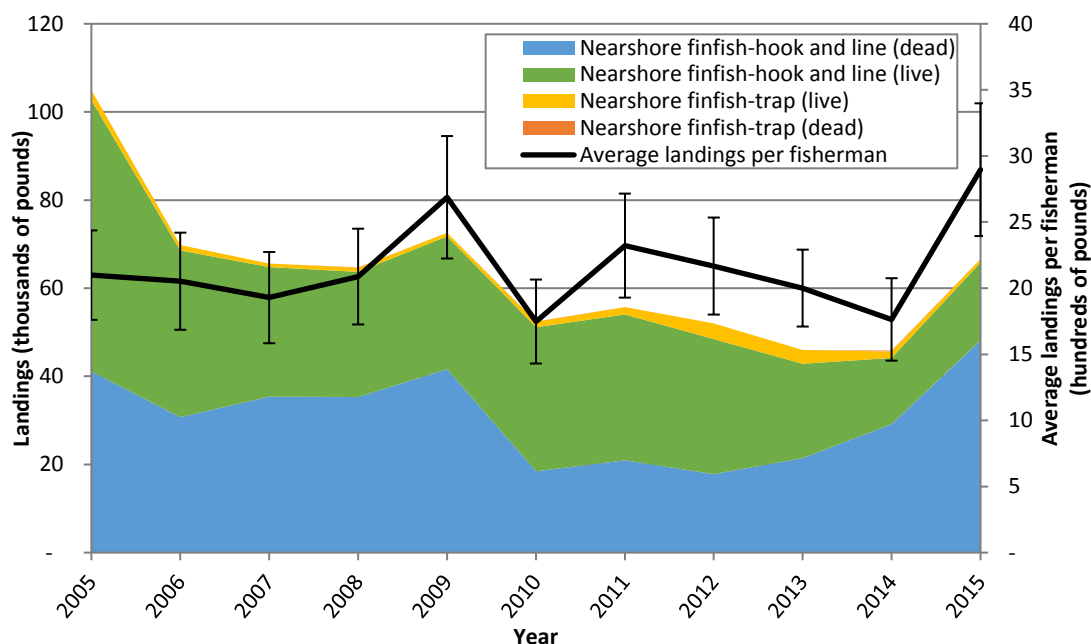


Figure 4. Reported commercial landings and average landings per fisherman, ± 1 standard error, for finfish in the North Coast MPA region, 2005-2015. Data Source: DFW; CFIS extract 6/2017.



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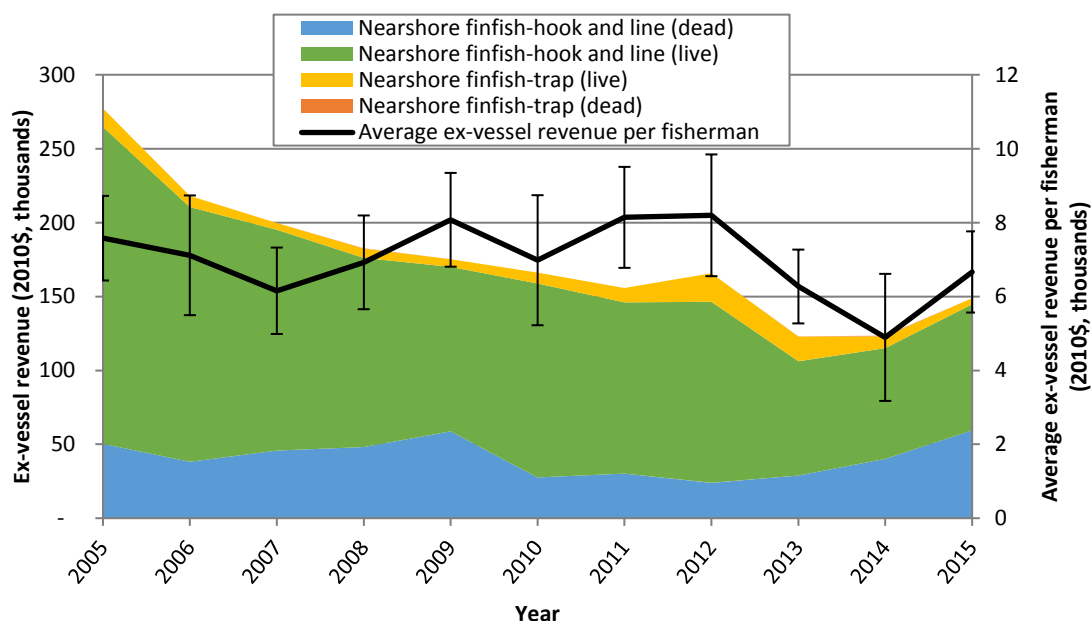


Figure 5. Reported ex-vessel revenue and average ex-vessel revenue per fisherman, ± 1 standard error, for North Coast MPA region finfish, 2005-2015. Data Source: DFW; CFIS extract 6/2017.

LANDINGS BY PORT

The North Coast MPA region has three distinct port groupings for this analysis (Table 2). Throughout the reporting period, **Crescent City ports averaged the highest reported number of landings in the region with about 47 percent of the total landings**; followed by the Fort Bragg ports and Eureka ports respectively (Figure 6). However, Fort Bragg ports outpaced Crescent City ports in revenue and averaged the highest reported ex-vessel revenue with approximately 50 percent of the total ex-vessel revenue (Figure 7).

The distinction between landings and ex-vessel revenue between ports can be attributed to the species landed in each location. On average over 70 percent of the landings within Crescent City ports were black rockfish, with over half of these landed dead (thereby receiving a lower price-per-pound and decreased ex-vessel revenue). However, in Fort Bragg Cabezon was landed the most frequently, followed by black, gopher, and china rockfish, respectively. With the exception of black rockfish, these species are more commonly landed live and received a higher price-per-pound increasing the ex-vessel revenue.

Eureka area ports averaged drastically lower landings and ex-vessel revenue than the other two port groupings. During the reporting period Eureka area ports averaged approximately 12 percent of the reported landings and 5 percent of the reported ex-vessel revenue, with a significant decrease in both landings and ex-vessel revenue beginning in 2010 (Figures 7 and 8). This decrease in landings and ex-vessel revenue around 2010/2011 was likely driven by a decline in commercial fishermen participation out of Eureka around the same time.

While Eureka area ports did try to start a live finfish market in the mid-90s, it never became established when compared to Crescent City and Fort Bragg area ports. Eureka's smaller market may be explained by:

- 1) The difficulty of getting out to good commercial fishing grounds (i.e., reefs) from Eureka area ports, especially in and out of Humboldt Bay.
- 2) The cost prohibitive nature of this fishery in Eureka area ports due to the lack of infrastructure such as buyers/receivers in the area.

TABLE 2. PORT GROUPINGS

PORT GROUP	PORT (North to South)
Crescent City	Crescent City Klamath
Eureka	Orick Trinidad Arcata Eureka King Salmon Fields Landing Humboldt Bay
Fort Bragg	Shelter Cove Westport Fort Bragg Little River Albion Elk



Photo: Eureka Marina; DFW Environmental Scientist, A. Frimodig

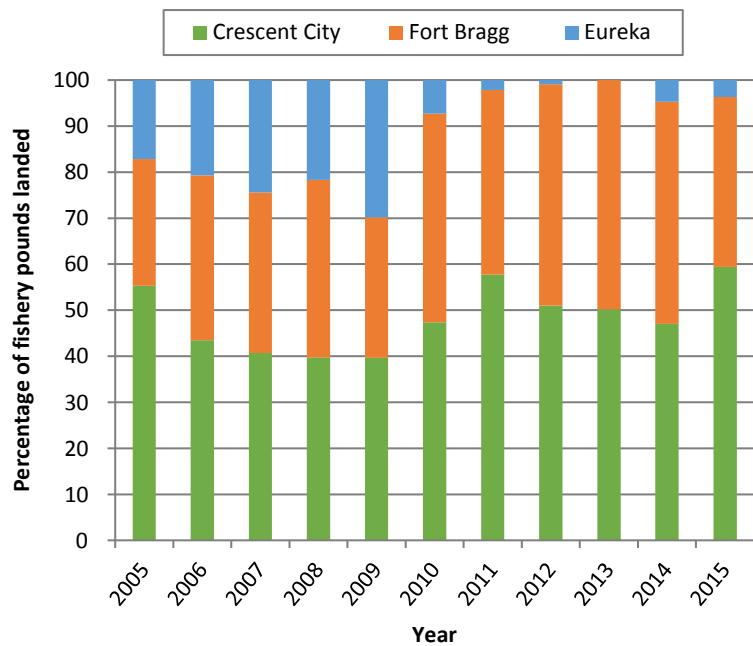


Figure 6. Average annual contribution of North Coast MPA region port groups to finfish landings, 2005-2015. Data Source: DFW; CFIS extract 6/2017.

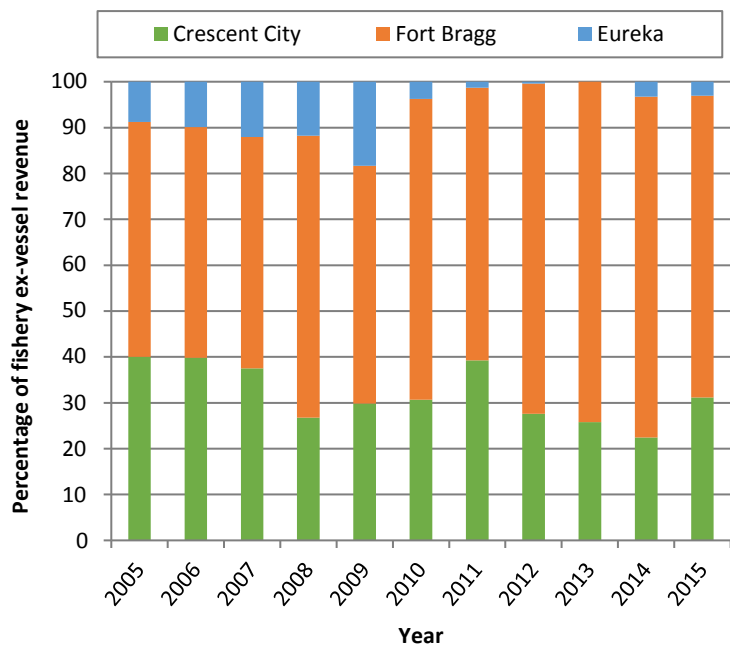


Figure 7. Average contribution of North Coast MPA region port groups to finfish ex-vessel revenue, 2005-2015. Data Source: DFW; CFIS extract 6/2017.



Photo: canary rockfish; DFW/ MARE

LANDINGS BY SPECIES

Of the 16 finfish species included in this analysis (Table 1), five contributed to approximately 90 percent of the reported total landings and 83 percent of the reported ex-vessel revenue (Figures 8 and 9). Black rockfish accounted for the most frequent landings with 55 percent of the total landings, followed by blue rockfish, cabezon, gopher rockfish, and china rockfish respectively (Figure 8). The same five species were also the most lucrative, with black rockfish again claiming the top spot, likely by the sheer volume of black rockfish landed (Figure 9). Blue rockfish, despite being the second most landed species, was out valued

by cabezon and gopher rockfish, respectively for ex-vessel revenue, with china rockfish as the fifth most lucrative species landed (Figure 10). Cabezon and gopher rockfish fetch a higher average market value price for live fish than blue rockfish (Figure 2) explaining the difference between pounds landed and ex-vessel revenue between the species (Figures 8 and 9). **The decrease in reported landings and ex-vessel revenue from 2005 to 2006 is likely attributed to the state and federal management actions to protect federally declared overfished groundfish species such as yelloweye rockfish and canary rockfish.**

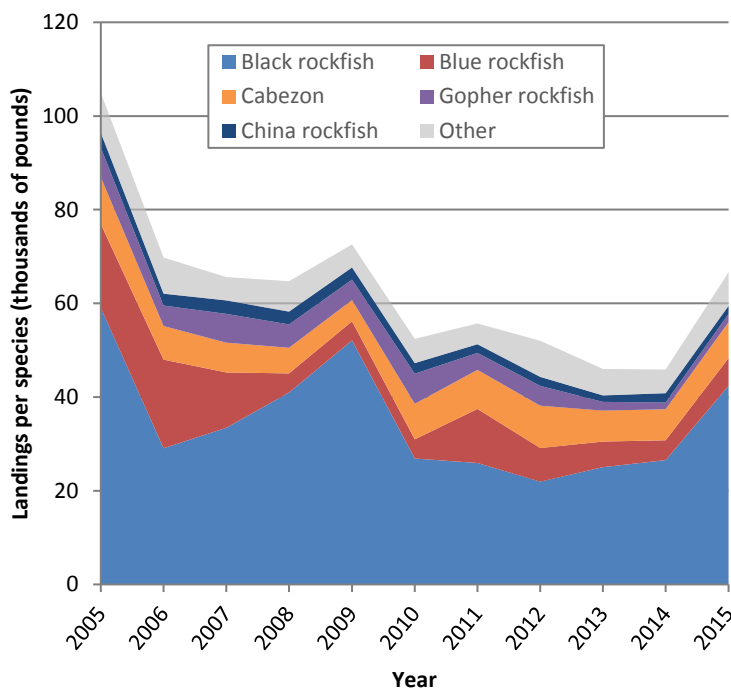


Figure 8. Reported landings for the five most commonly landed finfish species, and the 11 other finfish species identified on Table 1, in the North Coast MPA region, 2005-2015. Data Source: DFW; CFIS extract 6/2017.

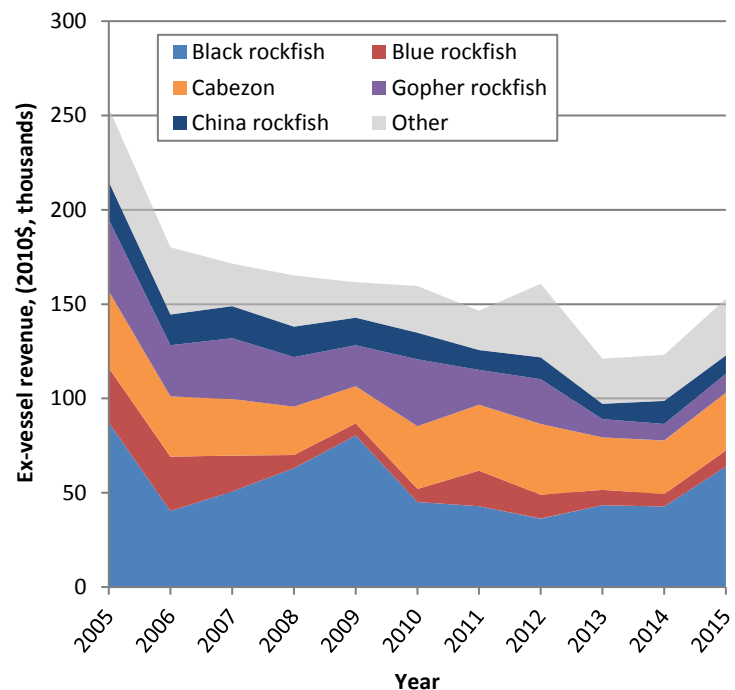


Figure 9. Reported ex-vessel revenue for the five most commonly landed finfish species, and 11 other finfish species identified on Table 1, in the North Coast MPA region, 2005-2015. Data Source: DFW; CFIS extract 6/2017.



Photo: China rockfish; DFW/ MARE



Photo: unidentified rockfish (left) and olive rockfish (right); DFW/ MARE

CATCH BY BLOCK

Commercial finfish catch (average annual landings) by DFW fishing block were compared from 2005 to 2012¹ (prior to marine protected area [MPA] implementation, Figure 10A) to 2013-2015 (after MPA implementation, Figure 10B). DFW fishing blocks are 10 nm by 10 nm, thus lacking spatial specificity; however, general trends and changes in commercial catch can be observed. **While Figures 10A and 10B may appear to indicate a decrease in catch reported in the North Coast MPA region following MPA implementation, the figures actually provide greater insight into fishing location rather than total catch by block.**

In the years prior to MPA implementation, 56 fishing blocks within the North Coast MPA region had reported catch (Figure 10A), with 30 of those blocks only having reported catch in one to two years of the eight-year reporting period (2005-2012). **Since 2012 commercial finfish fishermen have reported catch from fewer blocks than reported prior to MPA implementation (Figure 10A), but maintained or increased catches per block (Figure 10B).** This concentration of fishing location may be an artifact of fewer active fishermen in the fishery itself (Figure 1), as well as a fishing depth restriction prohibiting fishing deeper than 20 fathoms to protect deeper overfished species.

An example of the trend of fewer fishermen is shown by the disappearance in catch off the coast of Trinidad (Humboldt County). As mentioned in the *Landings by Port* section of this report, there was a decrease in participation of commercial fishermen landing finfish out of Eureka around 2010/2011. Prior to 2011, commercial fishermen landing finfish at Eureka area ports commonly fished blocks off the coast of Trinidad; however, reported catch by blocks in that area have not occurred since 2011.

During the report period, fishermen reported catch every year for only eight blocks. The boundaries of seven of the eight fishing blocks are located predominantly in state waters, with one fishing block with a greater area outside of state waters. These eight fishing blocks are also within 30 nm of ports that can handle landing live finfish, allowing for reduced travel time and fuel costs, which likely explains their popularity as prime fishing areas.

Many of the fishing blocks that had an MPA implemented within their boundaries showed the level of catch either remained neutral or increased. **Catch trends observed in blocks before and after MPA implementation may be driven by regulatory, economic, or oceanographic conditions in addition to the presence or absence of MPAs in the region.**

¹ The year 2012 is included in pre-implementation because North Coast MPAs were implemented December 19, 2012.

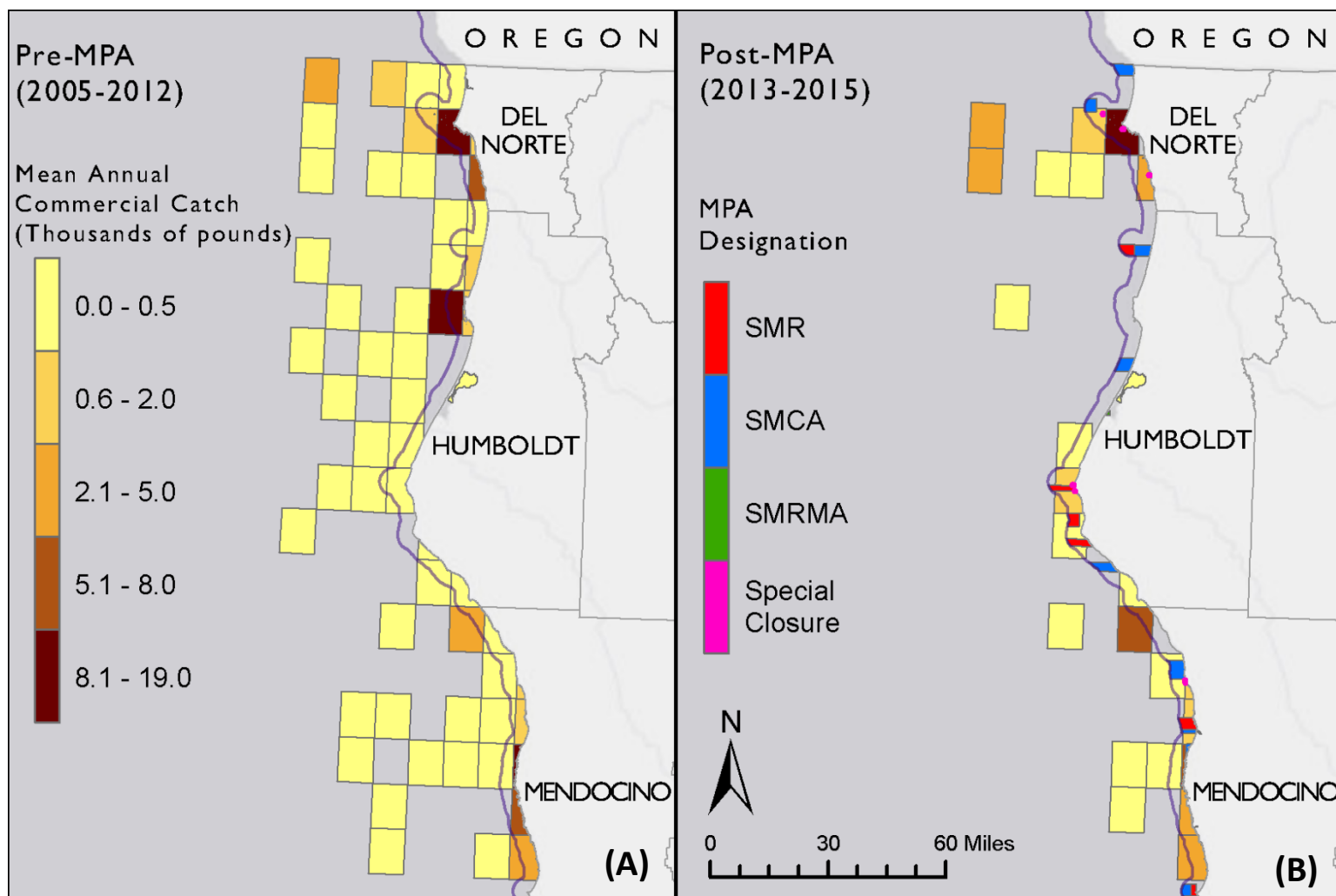


Figure 10. Average reported commercial catch of finfish for **A)** pre-MPA implementation, 2005-2012, and **B)** post-MPA implementation, 2013-2015. Data Source: DFW; CFIS extract 6/2017.

Acknowledgements

Author

Amanda Van Diggelen, DFW, Marine Region
Amanda.VanDiggelen@wildlife.ca.gov

Figure 11, Map Design

Jose Ayala, DFW, Marine Region

Document Design

Amanda Van Diggelen, DFW, Marine Region

About this Document

This document provides supplemental information to the [North Coast State of the Region](#) report. The State of the Region report provides a synopsis of the ecological, biological, oceanographic, and socioeconomic conditions in the North Coast MPA region near the time of MPA implementation in December 2012.

Explore California's MPAs at CDFW's MPA webpage
<https://www.wildlife.ca.gov/Conservation/Marine/MPAs>