An Assessment of the Use of Light-touch California Halibut Trawl Gear within Historic Monterey Bay Trawl Grounds: Seafloor Interactions, Catch Composition, and Economic Feasibility

Photo Credit: NOAA Fisheries

Final Report
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INTRODUCTION

In 2004, California state legislation (SB 1459) was introduced to close Monterey Bay to bottom trawling but the closure was not enforced until 2006. Prior to that, trawling had occurred for at least 75 years in this area. In May 2009, the California Fish and Game Commission established criteria for "light-touch" trawl gear (as defined in California Code of Regulations Title 14, Section 124, see Figure 1) and required that only this type of trawl gear could be used within the California Halibut (*Paralichthys californicus*) (halibut) Trawl Grounds off Santa Barbara County and Ventura County in southern California. Light-touch trawl gear has a lighter net and cod end, longer wing length, no rollers or bobbins, and lighter doors than traditional trawl gear. Because of interest expressed by the fishing industry about using light-touch halibut trawl gear within the historic Monterey Bay trawl grounds, a research study was developed among California Department of Fish and Wildlife (CDFW), the National Marine Fisheries Service-West Coast Region-Sustainable Fisheries Division (NOAA Fisheries), and industry. This study was undertaken to determine the environmental and economic implications of using light-touch trawl gear to target halibut in Monterey Bay.

OBJECTIVES

The objectives of the study were to conduct a fishery-independent survey to document seafloor interactions and species catch composition by use of light-touch trawl gear and to investigate the economic feasibility of using this gear in the former trawl grounds of Monterey Bay:

1. Attach remote cameras to the trawl doors and headrope to document seafloor interactions and degree of contact.

2. Measure, weigh (when possible) and assess condition of all species caught.

3. Measure, tag, and release all live, legal-sized (22 inches or greater) halibut, the target species of this survey.

4. Retain sublegal-sized halibut for life history studies.

5. Obtain economic information from the captain of the F/V *Cecelia* on fishing operations during the survey.

6. Monitor and record any protected species interactions.

METHODS

Permits

The nature and location of this study required obtaining a permit and meeting the requirements of federal regulations and laws. The survey was conducted in Monterey Bay, within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS required issuance of a research permit for CDFW and NOAA Fisheries to conduct the survey within its boundaries. The lead action agency for the survey was NOAA Fisheries, and the CDFW was considered a non-Federal representative which conducted some of the at-sea research and carried out many aspects of the survey. Further, since the NOAA Fisheries contributed equipment and had an at-sea biologist performing duties on-board the survey vessel, the action was considered a major Federal action requiring National Environmental Policy Act (NEPA), Endangered Species Act (ESA) and Essential Fish Habitat (EFH) consultations.

NOAA Fisheries initiated the EFH consultation (Appendix A) on January 9, 2013, the section 7 ESA consultation with a Biological Assessment (Appendix B) on February 4, 2013, and the NEPA consultation (Appendix C) on May 30, 2013. The EFH consultation was finalized on February 5, 2013 (Appendix A), the Categorical Exclusion Memo and checklist to satisfy NEPA requirements were approved on April 22, 2013 (Appendix C), the section 7 ESA consultation concurrence letter (Appendix D) and accompanying Monitoring and Mitigation Protocol (Appendix E) were finalized on May 28, 2013. NOAA Fisheries and CDFW originally applied for a permit (Appendix F; MBNMS Permit #MBNMS-2013-015) with the MBNMS on September 7, 2012, which was approved on June 4, 2013, allowing the survey to take place.

Vessel and Gear

The F/V *Cecelia* was contracted to conduct the survey tows with operations originating from Moss Landing Harbor, Monterey County. The F/V *Cecelia* is a 49-foot wooden vessel with a 19-foot beam, and weighs 13 gross tons. The light-touch trawl net used a different setup compared to the traditional trawl nets used in CDFW's 2007 and 2010 fishery-independent halibut trawl surveys in the same area. In those studies, conventional groundfish bottom trawl gear (including a 4.5-inch cod-end mesh) was used. The light-touch trawl net used a 60–foot long footrope, had a body mesh of 5 inches, and a cod end mesh of 7.5 inches (Figure 1). Additionally the light-touch trawl did not have floats attached to the headrope and therefore had a "low-rise" configuration making the net height from the headrope to footrope opening smaller (4¯foot opening) compared to that of a traditional trawl net (10-to-15 foot opening; M. McCorkle, personal communication, July 20, 2012). The capacity of the light-touch trawl net is hard to quantify but it is unlikely that the net would catch over 1,000 pounds of fish on any one haul (M. McCorkle, personal communication, July 20, 2012). The light-touch trawl net is not designed to be a high capacity trawl net.

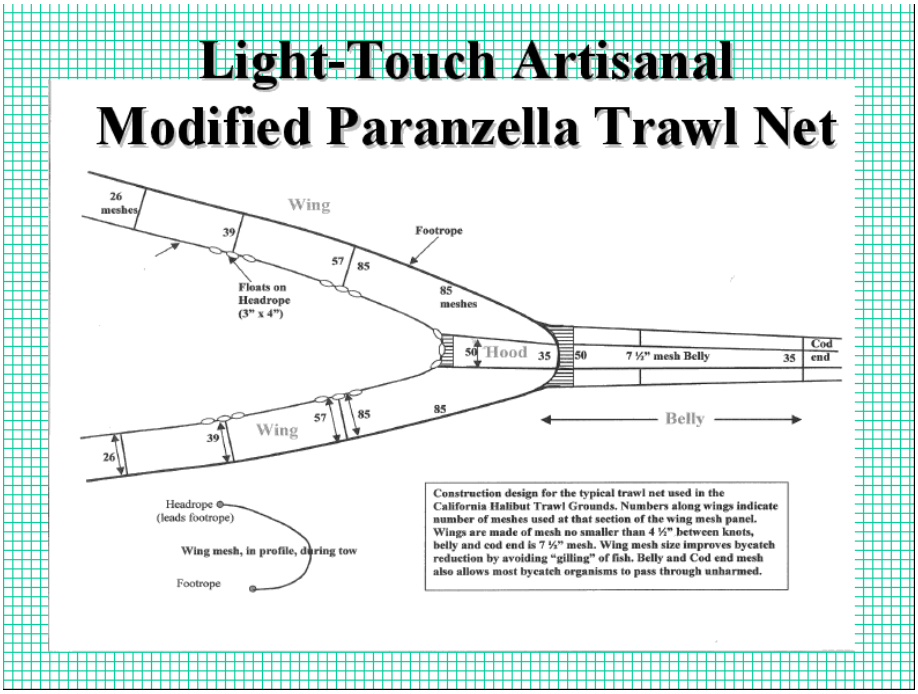


Figure 1. Diagram of light-touch trawl net gear with design specifics. Gear specifics as required by the California Code of Regulations Title 14. Specific description per CCR Title 14 § 124. Halibut Trawling Gears. Special gear requirements apply while trawling for California halibut in the California Halibut Trawl grounds. Each trawl net, including trawl doors and footrope chain, shall meet the following requirements: (1) Each trawl net shall have a headrope not exceeding 90 feet in length. The headrope is defined as a chain, rope, or wire attached to the trawl webbing forming the leading edge of the top panel of the trawl net. Headrope shall be measured from where it intersects the bridle on the left side of the net to where it intersects the bridle on the right side of the net. (2) The thickness of the webbing of any portion of the trawl net shall not exceed 7 millimeters in diameter. (3) Each trawl door shall not exceed 500 pounds in weight. (4) Any chain attached to the footrope shall not exceed one quarter inch in diameter of the link material. The footrope is defined as a rope or wire attached to the trawl webbing forming the leading edge of the bottom panel of the trawl net. (5) The trawl shall have no rollers or bobbins on any part of the net or footrope. Rollers or bobbins are devices made of wood, steel, rubber, plastic, or other hard material that encircle the trawl footrope. These devices are commonly used to either bounce or pivot over seabed obstructions, in order to prevent the trawl footrope and net from snagging on the seabed. (Figure courtesy of Mike McCorkle, 2012.)

Study Area

The study took place within the historic Monterey Bay trawl grounds along the similar trawl lines used by CDFW in the 2007 and 2010 fishery-independent halibut trawl surveys (Figure 2). Tow depths in the previous two surveys ranged from 12 to 41 fathoms. The 2013 survey design intended to tow within the same depth range and at the same speed, performing twenty tows at 30 minutes per tow, over a 4-day period. Typically commercial halibut trawlers tow for one to three hours, depending upon whether they are fishing for the live or fresh fish markets. The purpose of the shorter tow time for this survey was to document gear interactions with the seafloor by video camera, to increase the survivability of released organisms, and to reduce the chance of interactions with threatened, endangered, or other protected species.

Using the contracted fisherman's knowledge and data from previous CDFW trawl surveys, the F/V *Cecelia* conducted 30-minute tows using light-touch trawl gear (Figure 1). All tows followed a pre-determined bottom contour or followed the best possible course given tide and current direction. Prior to each tow, NOAA Fisheries staff would scan the immediate area for signs of threatened, endangered and other protected species in the planned fishing area.

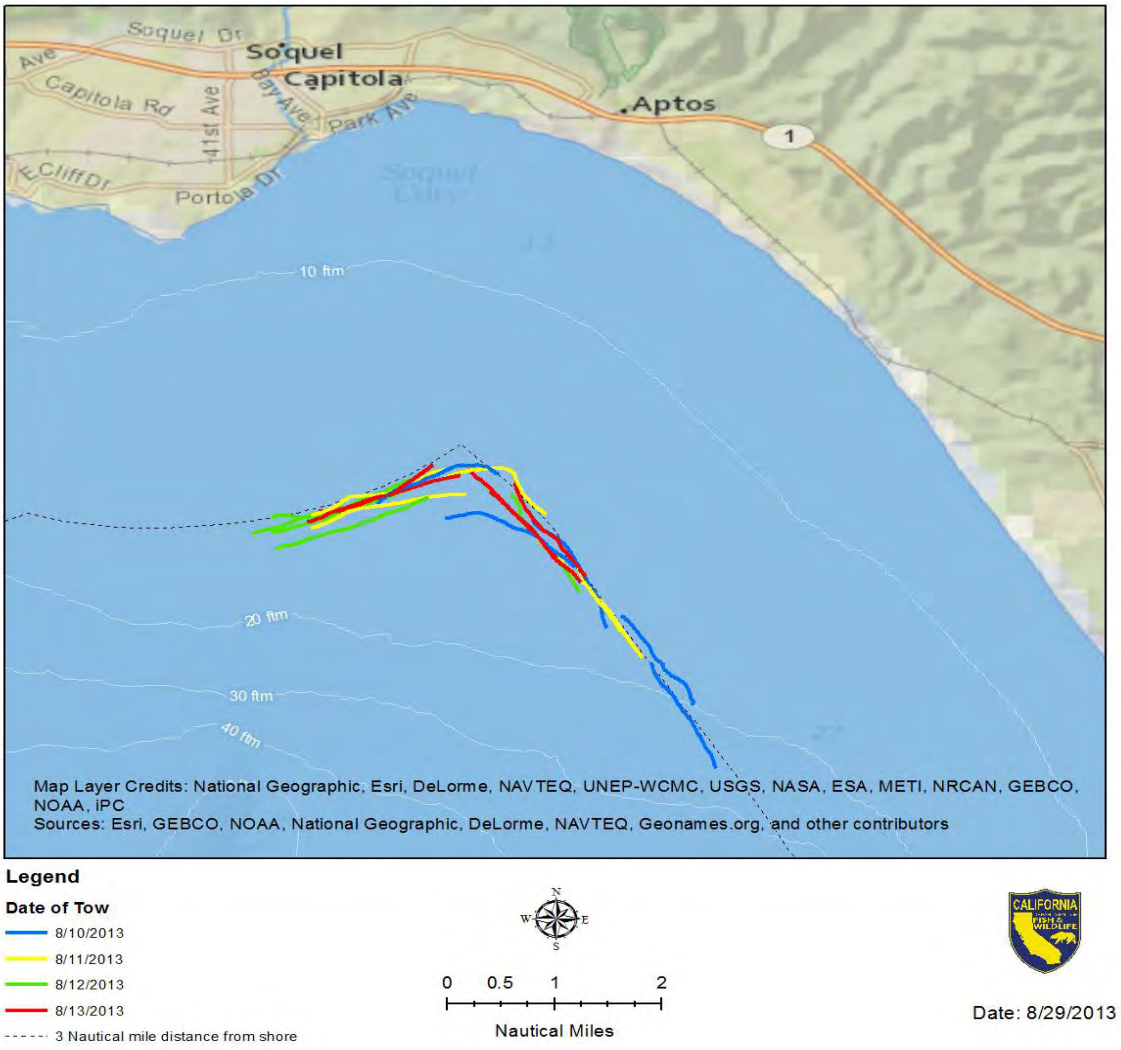


Figure 2. Trawl area for the 2013 Light-touch trawl survey, including tow track-lines and depth contours in fathoms.

Data Collected

Catch Data

Legal-sized (legal) halibut collected in the trawl were measured and, sexed by gently squeezing the abdomen and looking for milt or hydrated eggs. The halibut were then tagged and released alive. Sublegal-sized (sublegal) halibut were to be retained for life history studies. All halibut and any other finfish species not weighed on site had weights estimated from historic CDFW data and/or established length-weight estimates for that species. All finfish and invertebrates were placed into separate bins with fresh seawater to increase survivorship. All non-halibut organisms were identified to species, measured individually (except for some invertebrates), and weighed as species aggregates. In past surveys, Pacific sea nettles (*Chrysaora fuscescens*) were only observed and not weighted or counted. For the 2013 survey, every

attempt was made to identify, weigh and count Pacific sea nettles as they are considered primary prey for the Pacific leatherback sea turtle (*Dermochelys coriacea*). The condition of all species, including halibut, were noted before release. Condition status was based on a 1 through 4 rating (1: lively with no wounds, 2: minor wounds or bleeding, 3: severe wounds or bleeding, and 4: dead).

Video Data Collected

A NOAA Fisheries biologist was present to supervise the use of an underwater video camera which was attached to the trawl doors and headrope to document seafloor interactions and the degree of contact. NOAA Fisheries used GoPro Hero 2 cameras with 960p-30fps resolution, 170 degree field-of-view and a 1-second time lapse interval. Video data were processed using standard techniques developed by NOAA Fisheries personnel. The CDFW prepared a summary report and tables relative to halibut captured as well as associated species (Appendix G), enabling the NOAA Fisheries biologist to ground-truth the video data.

Economic Data and Analysis

Economic data were collected for the purposes of analyzing the economic feasibility of using the modified gear in Monterey Bay. Data included the cost earnings survey information completed by the contracted fisherman (Appendix H), and information from another fisherman with a long history of involvement in the California halibut fishery. Additional information obtained by the cost earnings survey included an estimation of anticipated monthly distribution of trips, potential expected number of trips in Monterey Bay if it were to re-open, potential expected revenue, and potential fleet size. To assess the economic feasibility of using the modified trawl gear in the Monterey Bay area, the economic profits were estimated using a standard economic approach (used in economic profit estimation where both explicit and implicit costs of resources used in the production process are accounted for) after deducting all variable and fixed costs from the gross revenue (Appendix I). The initial economic estimates from the experimental results were adjusted to enable comparison with existing commercial fisheries. Trip level estimates were extrapolated to the fleet level for one season. Monthly catch rates and distribution of fishing effort both in the Monterey Bay area and outside the area were also taken into account. The analysis only considered the catches of the primary target and any other marketable species caught in the trawls and not any income from other fisheries.

Protected Species Data Collected

To fulfill the requirements of the ESA consultation, the survey was designed to reduce potential interactions with marine mammals and other protected species. Marine mammal, sea turtle, green sturgeon (*Acipenser medirostris*), and Pacific sea nettle jellyfish monitoring and mitigation protocols were put in place to minimize potential interactions with these organisms (Appendix E). The surveys included one dedicated NOAA Fisheries biologist to perform the at-sea protocols, in combination with additional assistance from other crew members.

Prior to each tow, the NOAA Fisheries biologist would scan the immediate area for signs of protected resources in the fishing area. During transit to each station, and for a period of at least 30 minutes before the tow, the captain, deckhands, and all available scientists visually scanned the sea surface for marine mammals, turtles, and jellyfish. If marine mammals, other protected species, or jellyfish were sighted during this period, or upon arrival at the station, scientific staff would determine if trawling operations could commence without the likelihood of the gear interacting with the sighted animals.

During each tow, the captain and scientific crew kept continuous watch for protected resources and jellyfish. The observations focused within a radius of about 650 feet to approximate the distance between the trawl and the vessel on any given tow (see Appendix J: Protected Species Observing Distances). If animals were sighted while the net was in the water, the scientific crew would document the observation using a protected species sighting record (Appendix K) and determine the best strategy to avoid potential takes based on the species and number of animals sighted, their behavior, their positions, vectors relative to the path of the vessel, and other factors.

RESULTS

Haul Data

The 2013 survey took place over a 4-day period from August 10, 2013, to August 13, 2013, at depths from approximately 10 to 35 fathoms on soft-bottom substrate between approximately 36° 56' North latitude to 36° 48' North latitude (Figure 2). The average tow speed was approximately 2.3 to 2.7 knots. Twenty daylight tows at 30 minutes per tow were completed (Table 1). Most tows were performed in the northern part of the bay due to better water clarity for filming and to avoid the larger quantities of Pacific sea nettle jellyfish that were present elsewhere in the bay. Weather for the cruise was excellent with little wind or swell.

Table 1. Haul specifics including haul date, haul start and end time, and haul position data.

Haul Number	Haul Date	Start Haul Time	End Haul Time	Start Haul Latitude	End Haul Latitude	Start Haul Longitude	End Haul Longitude
1	08/10/2013	0700	0730	36.51.730	36.52.835	121.53.343	121.53.944
2	08/10/2013	0754	0826	36.53.203	36.54.332	121.54.360	121.55.058
3	08/10/2013	0857	0927	36.54.80	36.54.463	121.55.378	121.56.522
4	08/10/2013	0950	1020	36.54.341	36.53.836	121.55.867	121.54.653
5	08/10/2013	1043	1112	36.53.326	36.52.378	121.54.224	121.53.559
6	08/11/2013	0720	0750	36.52.895	36.53.917	121.54.035	121.54.680
7	08/11/2013	0811	0841	36.54.399	36.54.754	121.54.933	121.55.892
8	08/11/2013	0906	0936	36.54.876	36.54.375	121.55.795	121.57.115
9	08/11/2013	0955	1025	36.54.242	36.54.593	121.57.121	121.55.673
10	08/11/2013	1044	1114	36.54.140	36.53.164	121.55.003	121.54.229
11	08/12/2013	0741	0811	36.54.638	36.54.187	121.56.229	121.57.670

12	08/12/2013	0836	0906	36.54.196	36.54.748	121.57.494	121.56.177
13	08/12/2013	0924	0954	36.54.559	36.54.028	121.56.027	121.57.450
14	08/12/2013	1017	1047	36.54.348	36.54.712	121.57.486	121.56.067
15	08/12/2013	1105	1135	36.54.597	36.53.568	12155.264	121.54.620
16	08/13/2013	0726	0756	36.53.93	36.54.84	121.54.83	121.55.64
17	08/13/2013	0821	0851	36.54.89	36.54.30	121.55.98	121.57.15
18	08/13/2013	0918	0948	36.54.41	36.54.79	121.57.04	121.55.72
19	08/13/2013	1015	1045	36.54.63	36.53.67	121.55.45	121.54.60
20	08/13/2013	1106	1135	36.53.73	36.54.70	121.54.55	121.55.22

Life History & Bycatch Data

A total of 55 legal halibut were caught during the tows, all of which were tagged and released in good condition. All halibut had some degree of split caudal fins and minor bruising to their ventral side. Most of the halibut, despite minor bruising and split fins, were very lively and swam away immediately upon release. The total estimated weight for the halibut was 761.3 pounds (345.3 kilograms) with total length measurements ranging from 578 to 975 millimeters (22.8 to 38.4 inches). The estimated average halibut weight derived from length-weight relationships was 13.84 pounds (6.28 kilograms). No sublegal halibut were caught.

In addition to halibut, there were 33 incidentally-caught fish and invertebrate species (Table 2). The top three vertebrate species by number were California skate (*Raja inornata*, 302), shortbelly rockfish (*Sebastes jordani*, 287), and Pacific sanddab (*Citharichthys sordidus*, 241). The most abundant invertebrate species was Dungeness crab (*Metacarcinus magister*, 656). Pacific sea nettle jellyfish were present in small amounts in 16 of the 20 tows. All rockfish captured were juvenile and averaged 89 millimeters fork length in size. No groundfish designated as “overfished” by the federal government were captured. By number, 85.9 percent of all finfish were considered to be in good or excellent condition prior to release. Additionally, 14.1 percent (88.9 pounds) of finfish were considered dead or near death. When compared to halibut, the rate of loss for incidentals was approximately 11.7 percent. For the invertebrates, all jellyfish were assessed to be in poor or dead condition after capture. All the remaining individual invertebrates (n=739), except for two market squid (*Doryteuthis opalescens)* and one octopus (*Octopus* sp.), were released in good or excellent condition.

While the data is not directly comparable due to the difference of tow time and fishing season, two previous trawl surveys conducted by the CDFW using conventional trawl gear saw a 27.7 percent (2007) and 9.8 percent (2010) of catch that were dead or near death. The 2007 survey was conducted after the peak of the halibut season, while the 2010 and 2013 surveys were conducted during the peak. The 2010 survey caught 1,120 pounds (508 kilograms) of halibut.

Table 2. Total catch, by scientific name and common name, from the California halibut light-touch trawl survey in Monterey Bay, August 2013, including individual numbers and weight (pounds or lbs.).

Scientific Name	Common Name	Number	Weight (lbs.)
Metacarcinus magister	Dungeness crab	656	659.0
Raja inornata	California skate	302	557.25
Sebastes jordani	shortbelly rockfish	287	4.75**
Citharichthys sordidus	Pacific sanddab	241	56.3
Sebastes goodie	chilipepper rockfish (juvenile)	179	3.25**
Genyonemus lineatus	white croaker	163	24.25
Parophrys vetulus	English sole	152	34.8
Zaniolepis latipinnis	longspine combfish	141	11.0**
Raja binoculata	big skate	112	966.25
Chrysaora fuscescens	brown sea nettle	91	499.5**
Peprilus simillimus	Pacific butterfish	84	7.0**
Eopsetta jordani	petrale sole	79	88.75
Platichthys stellatus	starry flounder	72	240.5
Paralichthys californicus (legal-size)	California halibut	55	761.3*
Doryteuthis opalescens	California market squid	45	5.0
Pleuronichthys decurrens	curlfin turbot	35	11.45
Psettichthys melanostictus	sand sole	34	31.5
Ophiodon elongates	lingcod (juv)	33	0
Octopus spp.	Octopus	23	0
Leptocottus armatus	staghorn sculpin	15	6.75
Squalus acanthias	spiny dogfish	9	60.5**
Chitonotus pugetensis	roughback sculpin	8	0
Lunatia lewisii	moon snail	6	0
Pisaster brevispinus	giant pink seastar	4	0
	sea star spp.	4	
Pycnopodia helianthoides	sunflower star	4	4
Metacarcinus gracilis	slender crab	3	
Hyperprosopon anale	spotfin surfperch	3	
Synodus lucioceps	California lizardfish	2	0
Zalembius rosaceus	pink sea perch	2	0
Myliobatis californica	bat ray	1	11.5
Pleuronichthys verticalis	hornyhead turbot	1	0.5
Clupea pallasi	Pacific herring	1	0
Cancer productus	red rock crab	1	0

*= calculated weights based on Department sample data
**=Total weight calculated from on-board weights and established length/weight relationship data
0=No weight due to small size, lack of length/weight relationship data, or unable to calculate average weight due to low catch

Video Data

NOAA Fisheries staff analyzed all video footage to assess performance of the light-touch halibut trawl net and to help researchers understand the extent to which light-touch trawl gear minimizes contact with the seafloor. NOAA Fisheries personnel collected video footage on 15 of the 20 tows performed during the survey (Table 3). The quality of the video was dependent

on light and depth of the tow. Of the 18 videos collected (the last three tows had two cameras), seven were considered good quality video and were analyzed for seafloor contact and net performance by a NOAA Fisheries biologist.

Table 3. Video data collected by haul, camera (GoPro Hero 2) placement, video quality and whether it was used in the analysis.

Haul Number	Haul Date	Camera mounted on Headrope	Quality of Video from Headrope Camera	Headrope Video Used for Analysis	Camera mounted on Trawl Door	Quality of Video from Trawl Door Camera	Trawl Door Video Used for Analysis
1	08/10/2013	NONE	NA	NA	NONE	NA	NA
2	08/10/2013	NONE	NA	NA	NONE	NA	NA
3	08/10/2013	NONE	NA	NA	NONE	NA	NA
4	08/10/2013	NONE	NA	NA	YES	POOR	NO
5	08/10/2013	NONE	NA	NA	YES	POOR	NO
6	08/11/2013	YES	POOR	NO	NONE	NA	NA
7	08/11/2013	YES	GOOD	YES	NONE	NA	NA
8	08/11/2013	YES	GOOD	YES	NONE	NA	NA
9	08/11/2013	YES	GOOD	YES	NONE	NA	NA
10	08/11/2013	YES	GOOD	YES	NONE	NA	NA
11	08/12/2013	NONE	NA	NA	NONE	NA	NA
12	08/12/2013	NONE	NA	NA	YES	POOR	NO
13	08/12/2013	NONE	NA	NA	YES	POOR	NO
14	08/12/2013	NONE	NA	NA	YES	POOR	NO
15	08/12/2013	YES	FAIR	YES	NONE	NA	NA
16	08/13/2013	NONE	NA	NA	NONE	NA	NA
17	08/13/2013	YES	POOR	NO	NONE	NA	NA
18	08/13/2013	YES	POOR	NO	YES	POOR	NO
19	08/13/2013	YES	POOR	NO	YES	GOOD	YES
20	08/13/2013	YES	POOR	NO	YES	GOOD	YES

Review of the trawl footrope video showed that the footrope made minimal contact with the seafloor (Figure 3). The footrope skimmed above the seafloor while the chain loops hanging below the footrope did make bottom contact. These chain loops are intended to drive fish up and over the footrope and into the net. Many flatfish and crabs were observed passing under the footrope and chains thus avoid being captured in the trawl net.

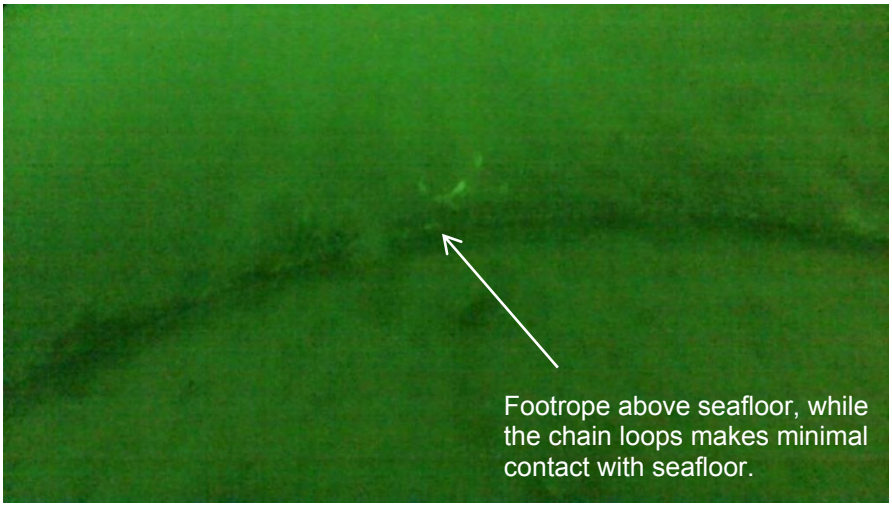


Figure 3. A still-frame picture taken from the video showing the footrope making minimal contact with seafloor. **Photo Credit: NOAA Fisheries**

Review of the trawl door video indicated that the door was not in constant contact with the seafloor during each trawl. The door traveled at an angle and skimmed above the bottom, while the leading edge made contact only when the seafloor had a corrugated surface (Figure 4). The door did pass through raised ripples in the seafloor, leaving a furrow approximately one inch deep into the soft sediment. This observation was supported by the condition of the trawl doors when examined onboard after trawling. The bottom surface of the doors was mostly covered with rust prior to the first trawl of the study. After a period of trawling on a sandy seafloor, a portion of the door had been scoured and appeared shiny (Figure 5). This rust-free area corresponded to the area seen making seafloor contact in the video.

Figure 4. Trawl door skimming the seafloor. **Photo Credit: NOAA Fisheries**

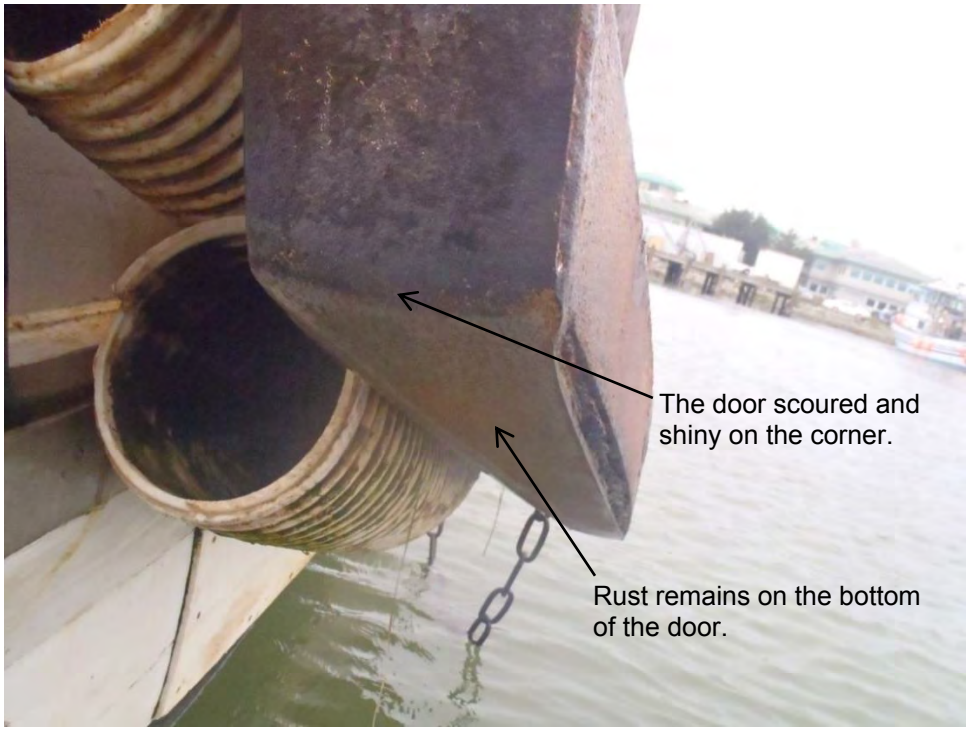


Figure 5. Picture of trawl door with rust on the bottom of the door, and scoured and shiny on the corner which corresponds to the area seen making seafloor contact in the video. **Photo Credit: NOAA Fisheries**

Economic Analysis

Returns at Trip Level

The results of the economic analysis show that targeting California halibut in the Monterey Bay area generates an economic profit of about $972 per trip during the halibut season (Appendix I). This profit level is substantially higher than the economic profit of $241 in the other fishing zones (i.e., Ventura and Santa Barbara) for the same target species and season. The economic return or profit after paying for the opportunity costs of all resources including the owner-operator's estimated value of labor constitutes about 47 percent of the fishing revenues in the Monterey Bay area, but only about 18 percent of revenue in the Ventura and Santa Barbara fishing grounds.

The owner operator's wage represents about 25 percent of the fishing revenue in the Monterey Bay area, but about 38 percent of the fishing revenue goes as wage to the owner operator when fishing outside the area, indicating that the Monterey Bay area offers higher potential entrepreneurial incentives and income to fishermen if this area were open. The lower profit margin in other fishing zones primarily reflect that bottom trawlers in other fishing zones catch less halibut and other marketable species there; catching only about 70 percent of halibut relative to the catch rate in the Monterey Bay area. In other words, the average catch rate per trip is about 180 pounds of California halibut during June-August as compared to the catch rate of 258 pounds in the Monterey Bay area. Further, the revenues from marketable, non-targeted species are also lower outside the Monterey Bay area. A good-valued, marketable incidental catch such as Starry flounders are largely caught in the in Monterey Bay area, but they are

uncommon or not available in other fishing grounds. The revenue from marketable incidental species is about $382 per trip (or 19 percent of the total revenue) in Monterey Bay area, but it is about $157 (or 12 percent of the total revenue) in other fishing zones (Table 4).

Table 4. Summary of Costs and Earnings (trip and fleet level) of a "Light-Touch" Trawl Gear for California Halibut in and Outside of the Monterey Bay Area, August 2013. (Appendix I).

Fishing Zones and Efforts	No. of Fishes		Catch (lbs.)		Revenue $			*Fixed Costs*	Variable Costs $		*Total Costs $*		Gross Profits $	
	CA Halibut	Bycatch	CA Halibut	Bycatch	CA Halibut (75:25 Live:Dead)	Bycatch	Total		w/o Owner's wage	w/ Owner's wage	w/o Owner's wage	w/ Owner's wage	Accounting Profit	Economic Profit
	A	B	C	D	E	F	G	H	I	J	K=H+I	L=H+J	M=G-K	N=G-L
In the Monterey Bay Area:														
***Catch Experiment (Unadjusted)*:**														
4-days trip	55	454	644	409	$4,188	$954	$5,142	$200	$1,841	$3,841	$2,041	$4,041	$3,101	$1,101
Per trip	14	114	161	102	$1,047	$239	$1,286	$50	$460	$960	$510	$1,010	$775	$275
***Normal Fishing (Adjusted)*:**														
4-days trip	88	726	1031	655	$6,701	$1,527	$8,228	$200	$2,141	$4,141	$2,341	$4,341	$5,887	$3,887
Per trip	22	182	258	164	$1,675	$382	$2,057	$50	$535	$1,035	$585	$1,085	$1,472	$972
Off the Monterey Bay Area:														
***Normal Fishing*:**														
Per trip	< 22 or ~ 14	154*	180	67*	$1,170	$157	$1,327	$50	$535	$1,035	$585	$1,085	$741	$241

* Bycatch is adjusted for Starry flounder, as the species is not caught off the Monterey Bay area.

Returns at Fleet Level

Trip level economic data was aggregated to a potential fleet level for the fishing season (June-August) in the Monterey Bay area and other fishing zones. It is assumed that possibly seven fishermen could be expected to trawl the Monterey Bay area should it be opened for California halibut trawl fishing. These fishermen would most likely be originating from Ventura, Santa Barbara, Moss Landing, and Monterey Bay area ports. It is expected that each vessel would, on average, take about five trips per week or 20 trips per month targeting California halibut in the area. There would be no incentive for these vessels to fish lesser trips after making the effort to travel to Monterey Bay. However, weekly number of fishing trips during the halibut season at the other fishing grounds is variable ranging from two to five trips per week or 10 to 20 trips per month depending upon sea conditions favorable for targeting halibut (M. McCorkle, personal communication, January 22, 2014).

Fleetwide revenue and gross profits for a potential halibut season (June-August) were estimated for both Monterey Bay area and other fishing grounds by using the information derived from the trip level analysis. The fleetwide revenue in the Monterey Bay area is expected to be about $863,906 with an economic profit of about $408,101 during the halibut season. The fleetwide economic profit in the Monterey Bay area is expected to be about $332,103 higher compared to fishing for halibut in other fishing grounds.

The incremental revenues for halibut fishing in the Monterey Bay relative to other fishing grounds are estimated to be about $585,338 for a low effort level; $446,054 for median level of effort; and $306,770 for the high level of effort in other fishing grounds. The resulting incremental return per vessel for halibut fishing in the Monterey Bay area is expected to be about $47,443 in economic profit in one halibut season for a median level of fishing effort in other fishing grounds.

Economic Impact

The additional economic contribution to the California economy through backward linked economic activities due to halibut fishing in the Monterey Bay area was estimated using the secondary data from an economic study by CDFW in 2009 (Hackette et al., 2009). The economic output multipliers for the trawlers operating in northern and southern California were used to assess the economic impact of halibut fishing in the Monterey Bay area. It is expected that the value-added from the incremental catches associated with fishing activities in the area would add to California's economy by the multiple of 1.67 on the incremental revenues. The halibut fishery in the Monterey Bay area is estimated to contribute an additional economic output to the California economy in the range of half million dollars to one million dollars depending upon the level of effort for halibut in other fishing grounds during the halibut season. The economic contribution from the forward linked economic activities at the restaurant or consumer's end will be an additional contribution to the economic impacts of backward linked activities. The economic analysis suggests that the economic return from the halibut fishery in the Monterey Bay area using the modified trawl gear is quite attractive to fishermen relative to same fishery in other fishing zones.

Protected Species Monitoring

In order to satisfy the requirements of the ESA consultation, NOAA Fisheries provided one dedicated scientific crew member to perform all the ESA monitoring and mitigating protocol at-sea duties. No ESA threatened or endangered species, or other protected species were encountered while transiting to the fishing grounds, during trawl fishing, or any other part of the survey. However, the survey team did observe large quantities of Pacific sea nettle jellyfish in the southern portion of Monterey Bay, therefore most of the tows were performed in the northern part of the bay as they are the primary prey of leatherback sea turtles which effectively categorizes them as critical habitat under the ESA.

DISCUSSION AND CONCLUSIONS

This research partnership, among CDFW, NOAA Fisheries, and industry, was successful in collecting an additional set of relative abundance, life history, and bycatch data to assist in the analysis of halibut stock health. The survey also analyzed the feasibility of using light-touch halibut trawl gear within the historic Monterey Bay trawl grounds. Video footage taken from cameras mounted on the headrope of the trawl showed that the light-touch trawl successfully caught fish with minimal disturbance to the seafloor while minimizing bycatch. The gear is economically feasible to provide a lucrative alternative source of income to fishermen in this fishery. In addition, the profit margin is attractive for halibut fishing in the Monterey Bay area relative to other fishing zones. The associated economic analyses indicated the use of light-

touch trawl in the Monterey Bay area could be profitable and may generate almost a million dollars in ex-vessel revenues and other positive impacts in Monterey Bay and throughout the California economy.

ACKNOWLEDGEMENTS

The authors wish to thank Morgan Castagnola (Captain of the F/V *Cecelia*), Daniel Castagnola (Deckhand of the F/V *Cecelia*), Cheryl Barnes (Moss Landing Marine Lab, participated in the survey from August 10-11, 2013), Kristine Lesyna (CDFW, participated in the survey from August 12-13, 2013) and Michael McCorkle (Southern California Trawlers Association). We also thank the Alliance of Communities for Sustainable Fisheries, the City of Monterey, the Southern California Trawlers Association, the Port San Luis Commercial Fishermen's Association, the South Bay Cable Committee and the Central Coast Cable Committee for their generous contribution to help fund this study. Thanks also to Mark Helvey, Paul Reilly, Tom Barnes, Charles Villafana and Stephen Freese for their insight and editing, and to the Monterey Bay National Marine Sanctuary for their assistance in approving the permit.

REFERENCES

Hackette, S. C., D. King, M. D. Hansen, and E. Price. 2009. The Economic Structure of California's Commercial Fisheries. California Department of Fish and Game, Sacramento. 87pp.

McCorkle, M., 2012. Personal Communication via phone to Tonya Wick, July 20, 2012. California Halibut Commercial Fisherman, (805) 886-4239.

McCorkle, M., 2014. Personal Communication via phone to Naresh Pradhan, January 22, 2014. California Halibut Commercial Fisherman, (805) 886-4239.

APPENDICIES

APPENDIX A: Essential Fishing Habitat Consultation and Concurrence

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

JAN - 9 2013 150413SWR2012SF01943:TLW

MEMORANDUM FOR: Steve Edmondson
Assistant Regional Administrator
For Habitat Conservation

FROM: Mark Helvey
Assistant Regional Administrator
For Sustainable Fisheries

SUBJECT: Essential Fish Habitat Assessment; Effects of a Proposed Study on the Use of Light-Touch California Halibut Trawl Gear within Historic Monterey Bay Trawl Grounds

This memo initiates an Essential Fish Habitat (EFH) consultation with respect to a proposed study on the use of light-touch California halibut (*Paralichthys californicus)* trawl gear within historic Monterey Bay trawl grounds now closed to trawling. This survey is in many ways comparable to the fishery-independent surveys for California halibut (halibut) performed in 2007 and 2010 by California Department of Fish and Game, Marine Region (CDFG). The research study will examine the effects of light-touch trawl gear using a video camera mounted on the head rope of the trawl. The footage from the camera will help to determine the extent of impacts, if any, there are to the seafloor. It will also compare catch composition, obtain an additional set of relative abundance and length frequency data used in stock assessment, track migration and movements of halibut using Floy dart tags, and provide data on benefits of an ad-hoc Marine Protected Area due to closure of trawl in 2006. The newly acquired data will add an additional index of biomass for future stock assessments of halibut. This research is a partnership between the CDFG and the National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (SFD). The proposed action will take place within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS requires issuance of a permit in order for the CDFG and SFD to conduct the survey within its waters. This is not anticipated to be controversial.

The area affected by the proposed light-touch trawl survey would occur within Monterey Bay along the same trawl lines used by CDFG in August 2010 for a fishery-independent halibut trawl survey (Attachment 1). A total of 20 daylight tows, each of 30-minute duration, would be completed in during a four or five day period. Specifically, the proposed survey will take place at depths from approximately 10 fathoms to 35 fathoms on sandy, soft-bottom between approximately 36° 56' North latitude to 36° 48' North latitude. This short-term study will take place in July or August 2013 (specific dates to be determined), aboard the F/V *Cecelia*.

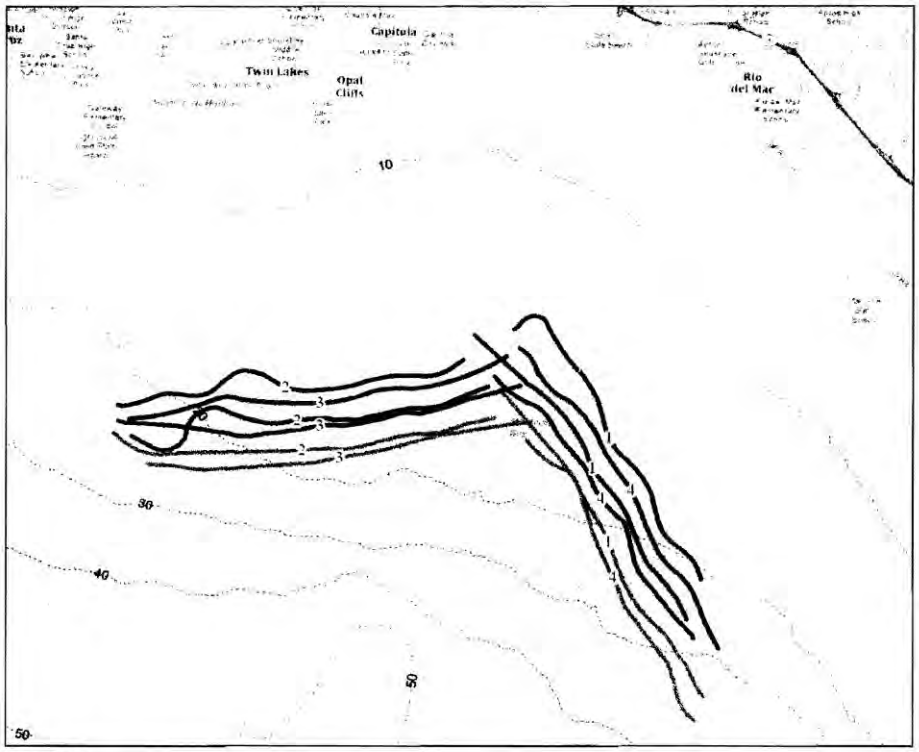
There may be minor adverse effects to EFH from trawling on the seafloor but the proposed survey will use light-touch trawl gear as opposed to traditional trawl gear. Traditional trawl gear has heavier doors, larger nets and smaller mesh size in the cod end compared to light-touch trawl gear (Attachment 2). Light-touch trawl gear webbing is thought to float and not drag on the

seafloor minimizing the footprint on the bottom. Further, the proposed study will be trawling on sand bottom therefore the impacts may be considered negligible in terms of impact.

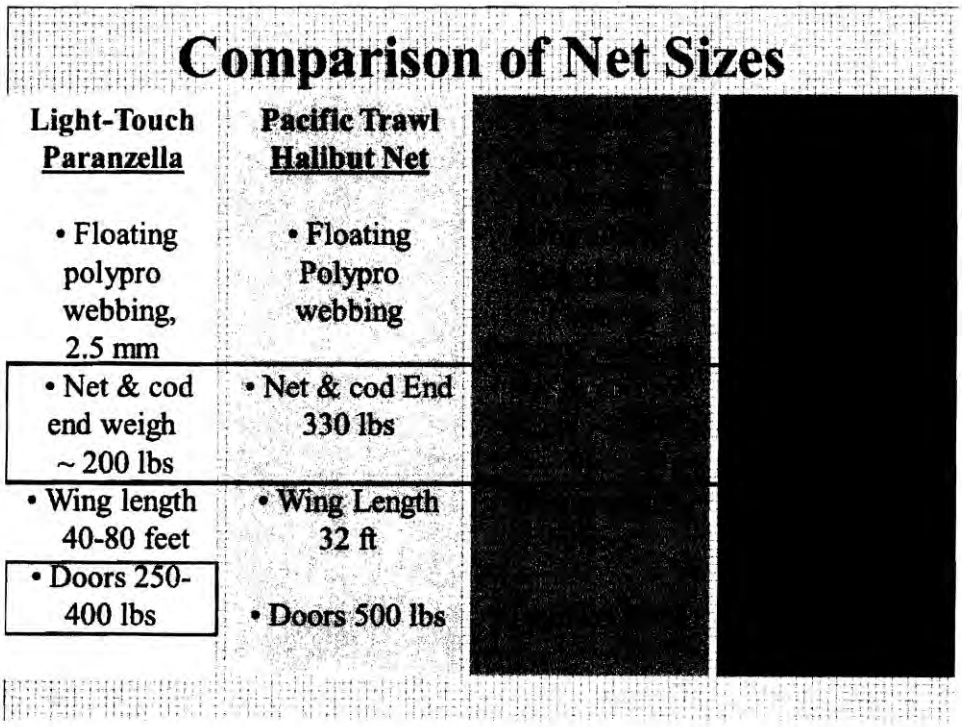
Due to the limited scope and duration of the project SFD considers the effect of the proposed light-touch trawl survey to be negligible in terms of the impact on the quality and quantity of EFH. Therefore, I recommended that performing this proposed survey should have no adverse impact on any areas identified as EFH for Federally managed species, and should not have an adverse impact on EFH within Monterey Bay. Proposed mitigation measures are not applicable to this study.

Attachments

Attachment 1. California halibut trawl survey tow tracks for 2010 California Department of Fish and Game fishery-independent trawl survey in north Monterey Bay.



Attachment 2. Comparison of Net Sizes for 4 different types of nets used on the U.S. Pacific coast by material, weight of net, wing length and door size. (Taken from a presentation by McCorkle, M. 2012. Light-Touch Trawl--Easy On the Seafloor. Presented to Southern California Academy of Science Innovations in Sustainable Fisheries Session, Occidental University, May 4, 2012. Los Angeles, CA.)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

February 5, 2013

In response, refer to:
SWR/F/SWR1:EC

MEMORANDUM FOR: Mark Helvey
Assistant Regional Administrator
for Sustainable Fisheries

FROM: Steve Edmondson
Assistant Regional Administrator
for Habitat Conservation

SUBJECT: Essential Fish Habitat Consultation, Effects of a Proposed Study on the Use of Light-Touch California Halibut Trawl Gear within Historic Monterey Bay Trawl Grounds

This memorandum is in response to your January 9, 2013, request for an essential fish habitat (EFH) consultation regarding the proposed study on the use of light-touch California halibut (*Paralichthys californicus*) trawl gear within historic trawl grounds in Monterey Bay now closed to trawling. NOAA's National Marine Fisheries Service (NMFS), Southwest Region, Sustainable Fisheries Division is partnering with the California Department of Fish and Wildlife (CDFW), formerly California Department of Fish and Game, Marine Region, to evaluate the effects of light-touch trawl gear using video equipment mounted on the trawl head rope. The footage collected from the camera will be used to: 1) determine the extent of impacts to the seafloor, if any; 2) compare catch composition; 3) obtain an additional set of relative abundance and length frequency data used in the stock assessment; 4) track migration and movements of halibut using Floy dart tags; and 5) provide data on benefits of an ad-hoc Marine Protected Area due to closure to trawl gear in 2006.

The proposed action would occur within the boundaries of the Monterey Bay National Marine Sanctuary, along the same trawl lines used by CDFW in August 2010 for a fishery-independent halibut trawl survey. There would be a total of 20 tows, each of 30-minute duration, completed over a four or five day period in July or August 2013. The study will be conducted at depths ranging from approximately 10 fathoms to 35 fathoms on sandy, soft-bottom habitat.

The proposed action is within EFH for various federally managed fish species within the Pacific Coast Groundfish, Pacific Coast Salmon, and Coastal Pelagic Species Fishery Management Plans (FMPs). NMFS' Habitat Conservation Division (HCD) believes the proposed action would adversely affect EFH for managed species within those FMPs due to impacts associated with trawling on the seafloor. However, light-touch trawl gear will be used instead of traditional

trawl gear, which has heavier doors, larger nets, and a smaller mesh size in the cod end. The light touch trawl gear is also expected to float, not drag, along the seafloor thereby minimizing impacts. In addition, the study will be conducted over sandy substrate away from sensitive habitats and will be of limited scope and duration. Therefore, NMFS' HCD believes that any adverse impacts associated with the proposed study will be no more than minimal and temporary in nature and has no additional EFH Conservation Recommendations to provide at this time.

APPENDIX B: Endangered Species Act Memo and Biological Assessment

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

FEB -4 2013 150413SWR2012SF01943:TLW

MEMORANDUM FOR: Chris Yates
Assistant Regional Administrator
For Protected Species

FROM: Mark Helvey
Assistant Regional Administrator
For Sustainable Fisheries

SUBJECT: Initiation of Section 7 Consultation on Effects of a Proposed Study on the Use of Light-Touch California Halibut Trawl Gear within Historic Monterey Bay Trawl Grounds on Endangered Species Act Listed Species

This memo initiates a consultation under section 7 of the Endangered Species Act (ESA) with respect to a proposed study on the use of light-touch California halibut (*Paralichthys californicus)* trawl gear within historic Monterey Bay trawl grounds now closed to trawling. This survey is in many ways comparable to the fishery-independent surveys for California halibut (halibut) performed in 2007 and 2010 by California Department of Fish and Game, Marine Region (CDFG). The research study will examine the effects of light-touch trawl gear using a video camera mounted on the head rope of the trawl. It will also compare catch composition, obtain an additional set of relative abundance and length frequency data used in stock assessment, track migration and movements of California halibut using Floy dart tags, and provide data on benefits of an ad-hoc marine protected area due to closure of trawl in 2006. The newly acquired data will add an additional index of biomass for future stock assessments of halibut. This research is a partnership between the CDFG and the National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (NMFS-SWR-SFD). The proposed action will take place within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS requires issuance of a permit in order for the CDFG and NMFS-SWR-SFD to conduct the survey within its waters. Further, since the NMFS-SWR-SFD will be contributing equipment and have an at-sea biologist performing duties on-board the survey vessel, this is the Federal nexus requiring NMFS-SWR-SFD to initiate consultation with the National Marine Fisheries Service, Southwest Region, Protected Resources Division (NMFS-SWR-PRD). Therefore the lead action agency for this proposed action is the NMFS-SWR-SFD, and the CDFG is a non-Federal representative who will be conducting the at-sea research and be carrying out many aspects of the survey. This action is not anticipated to be controversial.

Light-touch trawling would occur within Monterey Bay along the same trawl lines used by CDFG in August 2010 for a fishery-independent halibut trawl survey. A total of 20 daylight

tows, each of 30-minute duration, would be completed in during a four or five day period. This short-term study will take place in July or August 2013 (specific dates to be determined), aboard the F/V *Cecelia*. No ESA-listed species have been encountered on similar CDFG surveys in 2007 and 2010 in Monterey Bay.

There have been no previous consultations to date with the NMFS-SWR-PRD on this proposed survey or previous halibut surveys. The consultation process for this proposed action started with an initial meeting between NMFS-SWR-SFD and NMFS-SWR-PRD on October 22, 2012 asking for assistance on the biological assessment. This memorandum and attached biological assessment are the first official steps in the consultation process for this proposed action.

Based upon past observations of similar surveys and the lack of expected take of ESA-listed species or their critical habitat, we have determined that it is unlikely that ESA species will be taken or adversely affected by this proposed action and similarly, that there will be no adverse impacts to critical habitat. Specifically, we believe that the light-touch trawl survey to be conducted in Monterey Bay is not likely to adversely affect ESA-listed species of marine mammals, sea turtles, salmon, steelhead, or green sturgeon or their critical habitat. Based upon this conclusion, we are requesting informal consultation under section 7 consultation of the ESA. This determination was made utilizing the best available scientific data.

Biological Assessment

The effects of the proposed study on use of light-touch California halibut (*Paralichthys californicus)* trawl gear within historic Monterey Bay trawl grounds on Endangered Species Act listed species

January 10, 2013
National Marine Fisheries Service
Southwest Region
Sustainable Fisheries Division

I. Introduction

The purpose of this biological assessment is to review the potential ecosystem impacts of a proposed study to evaluate the use of light-touch California halibut (*Paralichthys californicus)* trawl gear within Monterey Bay in sufficient detail to determine to what extent the proposed action may affect any of the threatened, endangered, proposed, or sensitive species and designated or proposed critical habitats listed below. In addition, the following information is provided to comply with statutory requirements to use the best scientific and commercial information available when assessing the risks posed to listed and/or proposed species and designated and/or proposed critical habitat by proposed federal actions. This biological assessment has been prepared in accordance with legal requirements set forth under regulations implementing Section 7 of the Endangered Species Act (50 CFR 402; 16 U.S.C. 1536 (c)).

In order to comply with the statutory requirements of the Endangered Species Act (ESA), background information related to the short-term study being proposed is provided. The study will document immediate ecosystem impacts from the use of this trawl gear by placing a video camera on the head rope of the trawl net. The study will also document the catch rate and condition of California halibut (halibut) and associated species caught with light-touch trawl fishing gear, and compare the results with those of previous fishery-independent trawl surveys conducted by the California Department of Fish and Wildlife, Marine Region (CDFW) in both 2010 and 2007 using traditional commercial trawl gear. Additionally, the survey will provide another data set of relative abundance and length frequency to be used in the next central halibut stock assessment.

Threatened, Endangered, Proposed Threatened or Proposed Endangered Species

The following listed species may be affected by the proposed action (Wang, 2012, Pearson-Meyer, 2012, Fahy, 2012 and DeAngelis, 2012.):

Table 1. ESA-listed species that may present off the U.S. west coast in the action area.

Marine Mammals	**Status**
Blue whale (*Balaenoptera musculus*)	Endangered
Fin whale (*Balaenoptera physalus*)	Endangered
Humpback whale (*Megaptera novaeangliae*)	Endangered
Steller sea lion - eastern distinct population segment (DPS) (*Eumetopias jubatus*)	Threatened
Guadalupe fur seal (*Arctocephalus townsendi*)	Threatened
Sea turtles	
Leatherback turtle (*Dermochelys coriacea*)	Endangered
Loggerhead turtle (*Caretta caretta*)	Endangered
Olive ridley (*Lepidochelys olivacea*)	Endangered/Threatened
Green turtle (*Chelonia mydas*)	Endangered/Threatened
Marine fish	
North American green sturgeon, southern DPS (*Acipenser medirostris*)	Threatened

Salmonids		
Chinook (*Oncorhynchus tshawytscha*)	Sacramento River winter, evolutionarily significant unit (ESU)	Endangered
	Central Valley Spring ESU	Threatened
	California Coastal ESU	Threatened
Coho (*Oncorhynchus kistuch*)	Central California Coastal ESU	Endangered
Steelhead (*Oncorhynchus mykiss*)	South-Central California Coast DPS	Threatened
	Central California Coast DPS	Threatened
	Central Valley DPS	Threatened

Critical Habitat

The action addressed within this document may affect designated Critical Habitat for species listed below (Wang, 2012, Fahy, 2012 and DeAngelis, 2012):

Table 2. Designated Critical Habitat (by species) within the action area.

Critical Habitat		
Stellar sea lion (*Eumetopias jubatus*)	Rogue Reef: Pyramid Rock Oxnard Reef: Long Brown Rock and Seal Rock Ano Nuevo Island Southeast Farrallon Island Sugarloaf Island	Associated aquatic zones 3,000 feet seaward in State and Federally managed waters from the baseline of each designated rookery
Green Sturgeon, southern DPS (*Acipenser medirostris*)	US coastal marine waters within 60 fathoms from Monterey Bay, CA, to Cape Flattery, WA, the Sacramento River and other select waters within the Sacramento-San Joaquin River-Delta system, and other select coastal bays and estuaries waters within California, Oregon, and Washington.	
Leatherback turtle (*Dermochelys coriacea*)	This designation includes approximately 16,910 square miles stretching along the California coast from Point Arena to Point Arguello east to the 3,000 meter depth contour, and 25,004 square miles stretching from Cape Flattery, Washington to Cape Blanco, Oregon east of the 2,000 meter depth contour. The designated areas comprise approximately 41,914 square miles of marine habitat and include waters from the ocean surface down to a maximum depth of 262 feet (or 80 m).	

Non-ESA Listed Marine Mammals

In addition to the ESA-listed marine mammals described above, a number of non-ESA listed marine mammals, protected under the Marine Mammal Protection Act (MMPA), may also be found in the action area. In particular, California sea lions (*Zalophus californianus*), Pacific harbor seals (*Phoca vitulina*), northern fur seals (*Callorhinus ursinus*), northern elephant seals (*Mirounga angustirostris*), Pacific white-sided dolphins (*Lagenrhynchus obliquendens*), short-beaked Common dolphins (*Delphinus delphis*), northern right-whale dolphins (*Lissodelphis borealis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus*), Risso's dolphins (*Grampus griseus*) harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), Minke whales (*Balaenoptera acutorostrata*) and killer whales (*Orcinus orca*). None of these non-listed ESA species (or stocks) are listed as depleted under the MMPA except killer whales from the Southern Resident population. (The Southern Resident killer population contains three pods, considered one stock under the MMPA and is also listed as a "distinct population segment" (DPS) under the ESA, but it is unlikely that they will be in the area during the summer months.) Based upon the lack of interactions with these non-ESA listed marine mammals in similar surveys performed in 2007 and 2010, the short duration of the proposed survey (4-5 days, with approximately 20 daylight tows), and the monitoring and mitigation procedures outlined in Attachment 1, these non-ESA listed marine mammals above are not considered further in this analysis.

II. Consultations to Date

There have been no previous consultations to date for this proposed action or similar surveys performed by CDFW in 2007 and 2010. The original initiation process for this proposed action started with an initial email from National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (NMFS-SWR-SFD) to National Marine Fisheries Service, Southwest Region, Protected Resources Division (NMFS-SWR-PRD) on May 24, 2012. The initiation process was started with the intent to complete the survey in July/August of 2012 but the survey was postponed due to the late time of the year for halibut distribution. The proposed survey is now set to start in July/August 2013. The initiation process for the 2013 survey started with a meeting between NMFS-SWR-SFD and NMFS-SWR-PRD on October 22, 2012. The memorandum and this biological assessment are the first official steps into the consultation process for this 2013 proposed action.

III. Description of the Proposed Action

The proposed action will take place within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS requires issuance of a permit in order for the CDFW and NMFS-SWR-SFD to conduct the survey within its waters. Since the NMFS-SWR-SFD will be contributing equipment and have an at-sea biologist performing duties on-board the survey vessel, this is the Federal nexus requiring NMFS-SWR-SFD to initiate an ESA Section 7 consultation with NMFS-SWR-PRD, and therefore the lead action agency for this proposed action is the NMFS-SWR-SFD. Additionally, the CDFW is a non-Federal representative who will be conducting the at-sea research and be carrying out many aspects of the survey.

NMFS-SWR-SFD and the CDFW have highly experienced and educated biologist for performing the survey operations and obtaining the best available data. The CDFW will cover costs for their own staff to serve as observers, who will identify and enumerate all captured finfish and invertebrate species, measure and tag halibut with dart tags, and preparation and disseminate the catch summary report. NMFS-SWR-SFD will cover costs for their biologist, the video camera equipment, the video data analysis, and the report writing. All other costs will be paid by The Alliance of Communities for Sustainable Fisheries and

the City of Monterey, but may include partial funding by the Southern California Trawlers Association and the Port San Luis Commercial Fishermen's Association, as funded by South Bay Cable Committee and the Central Coast Cable Committee. This would include funding for four days of travel time for the F/V *Cecelia* from Santa Barbara Harbor to Monterey Harbor and return, and 4-to-5-days to perform the proposed survey. They will also provide funding for miscellaneous costs. The costs for these items are not expected to exceed $20,000.

Background Information, Methods and Objectives

In the summer of 2006, California state legislation (SB 1459) closed Monterey Bay to bottom trawling. Prior to that time trawling had occurred for at least 75 years in this area. In August 2008 the California Fish and Game Commission established criteria for "light-touch" trawl gear (as defined in California Code of Regulations Title 14, see Figure 1) and required that only this gear could be used within the California Halibut Trawl Grounds (CHTG) in southern California. In order to study the feasibility of using light-touch halibut trawl gear within the historic Monterey Bay trawl grounds, a research partnership was developed between CDFW and NMFS-SWR-SFD. The research study will examine the effects of light-touch trawl gear using a video camera mounted on the head rope of the trawl. This survey is many ways comparable to the fishery-independent survey for halibut performed in 2007 and 2010 by the CDFW. Therefore the study will also compare catch composition, obtain an additional set of relative abundance and length frequency data used in halibut stock assessment, track migration and movements of halibut using Floy dart tags, look at the potential economic sustainability of a revived halibut trawl fishery and provide data on benefits of an ad-hoc marine protected area due to closure of the area to trawling in 2006.

Light-touch trawling would occur within the historic Monterey Bay trawl grounds along the same trawl lines used by CDFW in August 2010 in the fishery-independent halibut trawl survey (Figure 2). Tow depths in the previous two surveys ranged from 12 to 41 fathoms. For all general purposes, the 2013 survey will take place at depths from approximately 10 fathoms to 35 fathoms on soft-bottom between approximately 36° 56' North latitude to 36° 48' North latitude. A total of 20 daylight tows, each of 30-minute duration will be undertaken. The vessel speed of the previous two surveys averaged between 2.4 knots to 2.7 knots. It is anticipated that the 2013 survey tow speed similarly will be between 2.4 knots and 2.7 knots depending on current and swell direction (Tanaka, 2012a). The study would occur during a 4-to-5 day period in July or August 2013 (specific dates to be determined), aboard the F/V *Cecelia*. The F/V *Cecelia* (vessel 10292, US Docs 262180) is a 49-foot wooden vessel with a 19 foot beam, and weighs 13 gross tons.

The light-touch trawl net to be used in the proposed trawl survey has different mesh sizes to that of traditional trawl nets used in the 2007 and 2010 California halibut trawl surveys. In 2007 and 2010, the traditional trawl used had a footrope 63 feet long, body mesh of 5 inches, and cod end mesh of 4 inches, as compared to the light-touch trawl net to be used in the 2013 survey which has a footrope 60 feet long, body mesh of 5 inches, and cod end mesh of 7.5 inches (Figure 1). Additionally the light-touch trawl also has no floats on the headrope and therefore has "low-rise" making the net height from the headrope to footrope opening smaller (4 foot opening vs. a 10-to 15 foot opening) than that of a traditional trawl net (McCorkle, 2012). The capacity of the light-touch trawl net is hard to quantify but it is unlikely that the net would catch over 1,000 pounds of fish (McCorkle, 2012). The light-touch trawl net is not made to be a high capacity trawl net. The light-touch trawl net targets halibut for the live fish market, therefore trawls are short and the net is made to catch fish and keep them in the best condition possible (McCorkle, 2012).

A NMFS-SWR-SFD Biologist will be present during all tows using an underwater video camera attached to the net and will operate the camera to record net and door performance. A CDFW Department

biologist will be on-board during all tows to monitor and process the catch. A graduate student from California State University, Moss Landing Marine Laboratories will be on-board for one or two days to collect information on halibut length and maturity. All halibut will be measured and condition noted as soon as possible after the catch is placed on the deck. The CDFW will retain any halibut which do not survive towing and will retain any other sub-legal sized halibut for life history studies. All legal-sized halibut in good condition will be tagged and released. The CDFW will provide standard dart tags. All non-halibut will be identified to species, measured individually (except some invertebrates), and weighed as species aggregates. In past surveys, Pacific sea nettles (*Chrysaora fuscescens*) were only observed and not weighted or counted due to broken individuals or the numbers were too numerous to be weighed. For the 2013 survey, every attempt will be made to identify, weigh and count Pacific sea nettles as they are considered primary prey for the leatherback sea turtle. The condition of all non-halibut species will be noted, and all will be released. Fish may be placed into a separate bin with fresh seawater to keep them alive before assessment and release.

Video data will be processed using standard techniques developed by NMFS-SWR-SFD personnel. The CDFW will prepare a summary report and tables relative to halibut captured as well as associated species. NMFS-SWR-SFD will analyze all video footage to assess performance of the light-touch halibut trawl net, and will prepare a summary report of their findings. All data and reports will be made available to the public and shared among the parties participating in the proposed study.

This proposed action will not only help to understand and quantify the use of light-touch trawl gear for a potential halibut fishery, but it will also provide another index of relative abundance for the halibut stock assessment. Additionally, this proposed study will help researchers understand the extent light-touch trawl gear minimizes contact with the seafloor. To our knowledge, there are no interrelated or interdependent actions that exist.

Action Area

The proposed action will take place in the Pacific Ocean off the coast of California in Monterey Bay and within MBNMS waters. Trawling using light-touch trawl gear would occur within the historic Monterey Bay trawl grounds along the same trawl lines used by CDFW in the August 2010 fishery-independent halibut trawl survey (Figure 2). Specifically, the proposed survey will take place at depths from approximately 10 fathoms to 35 fathoms on soft-bottom between approximately 36° 56'North to 36° 48' North latitude (Tanaka, 2012a). The survey expects to complete 20 daylight tows, each of 30-minute duration.

IV. Status of the Species and Critical Habitat in the Action Area

This section describes how ESA-listed species may be directly or indirectly affected by the proposed action. Direct effects would include incidental capture and injury or mortality in fishing nets, and indirect effects would be the loss of forage and possible loss of habitat due to performing the proposed study.

Status of Species

There are five individual species or DPSs (and therefore, "species" under the ESA) of marine mammals listed as under the ESA that occur in Monterey Bay, California (Table 1). These ESA-listed marine mammals occur in the action area but the probability of the 2013 survey having any incident with any of these species is unlikely based on the seasonality and short duration of the proposed project (DeAngelis, 2012). Again, the proposed survey will only perform 20 tows within a 4-5 day period. Tows will only

last 30 minutes and be carried-out in daylight hours. A monitoring and mitigation protocol will be followed including a visual scan of the sea surface before net deployment, and deploying and retrieving the trawl net as quickly as possible to minimize chances of having an interaction with ESA listed species (Attachment 1). If a marine mammal is caught it will trigger an immediate call to the appropriate personnel and the survey will cease. Further, there were no records of incidental take of ESA-listed marine mammals recorded during similar surveys performed by CDFW within Monterey Bay in 2007 and 2010 (Attachment 2 and Attachment 3). Due to the seasonality and short duration of the survey, having a protocol in place to minimize potential interactions, and the fact that the two previous surveys did not have encounters with ESA-listed marine mammals, NMFS-SWR-SFD believes it is highly unlikely that there will be any interactions with ESA-listed marine mammals during the proposed study.

With respect to ESA-listed sea turtles, four sea turtle species (green, loggerhead, leatherback, olive ridley) are found off the California coast at times and have stranded in central California, although it is extremely rare with respect to the hard-shelled turtles, that is, the green, loggerhead and olive ridley turtles (Fahy, 2012). Leatherbacks are found in the Monterey Bay area at the end of summer through fall so they have a higher likelihood of being in the action area than the hard-shelled turtles. Due to the small vessel size, the short duration of the proposed survey and the relatively short distance from the harbor to the trawl area, NMFS-SWR-SFD believes the chance of ship strikes to leatherbacks and other protected species to be minimal. Additionally, the light-touch trawl net also has no floats on the headrope and therefore operates with a low profile making the net height from the headrope to footrope opening smaller (4 foot opening vs. a 10-to15 foot opening) than that of a traditional trawl net (McCorkle, 2012).

Although all four sea turtle species may be in the action area at the time of the proposed study, there have been no interactions with sea turtles in similar surveys performed in Monterey Bay by CDFW. Also, a monitoring and mitigation protocol will be followed to minimize any chance of having an interaction with ESA listed sea turtles. The protocol includes a visual scan of the sea surface before deployment, and deploying and retrieving the trawl net as quickly as possible (Attachment 1). Additionally, with specific regard to leatherback sea turtles, each morning of a trawl survey day, the scientific crew will call the appropriate NMFS leatherback sea turtle expert (Attachment 1) to get the most recent information on location of leatherbacks within the specific survey area in order to avoid potential interactions. An interaction with a sea turtle will trigger an immediate call to the appropriate personnel and the survey will cease. However, NMFS-SWR-SFD believes the study is not likely to have any interactions with ESA-listed sea turtles.

There are seven individual evolutionarily significant units (ESUs; and therefore "species" under ESA) of salmonids listed as under the ESA that occur in Monterey Bay (Table 1). The ESA-listed salmonids may be present during the proposed survey, and could be found in water depths between 17-170 fathoms offshore (Pearson-Meyer, 2012). Data from the beginning of the 2011 Chinook fishing season (season runs from April – September) indicate Chinook were caught in waters between 20-30 fathoms in Monterey Bay. In the 2010 CDFW halibut survey, the tows closest to land were 3 miles from shore, and at a depth ranging from 12 to 34 fathoms (Tanaka, 2012b). There was no incidental take of salmonids, including ESA-listed salmonids, during similar surveys performed by CDFW within Monterey Bay in both 2007 and 2010.

Although salmonids may be present in the action area, the proposed trawl survey would likely avoid capture of salmonids because the gear is not designed to target pelagic species but rather bottom-dwelling halibut. The light-touch trawl net is not expected to catch salmonids during deployment or retrieval because the net will collapse on itself during these times, thereby making the net unfishable. NMFS-SWR-SFD believes the proposed study will not likely affect salmonids species within the action area.

On April 7, 2006, NMFS determined that the Southern DPS of North American green sturgeon (*Acipenser medirostris*) were at risk of being threatened (71 FR 17757). Green sturgeon are an anadromous species that range from the Bering Sea, Alaska, to Ensenada, Mexico (Figure 3). The only known spawning population for the Southern DPS is in the Sacramento River (NMFS, 2009). Tagging data have confirmed the presence of Southern DPS green sturgeon in Monterey Bay (Lindley et al., 2008). Additionally, the commercial California set-net fishery using one-panel trammel nets and fished at depths between 30 and 31 fathoms, caught seven green sturgeon in 1999 and one green sturgeon in 2000 (of unknown DPS) as bycatch (Rasmussen, 2006). The bycatch occurred within the area of the proposed project between 37° N to 36° 30' N latitude.

Data from the West Coast Groundfish Observer Program (WCGOP) show there were 457 green sturgeon caught as incidental catch on observed tows between 36° N to 38° N latitude during the 2002 to 2010 time period. WCGOP records indicate that out of 4,849 total observed tows during 2002 to 2010, only 237 observed tows were positive for green sturgeon. These observed positive tows were from the Limited Entry California Halibut Fishery, the California Halibut Fishery, or the Limited Entry Trawl fishery and were conducted north of 37.1875° N latitude (i.e., north of Monterey Bay). As a result, incidental take of green sturgeon during the survey is not expected as green sturgeon have not been caught as bycatch in the trawl fishery south of 37.1875° N latitude. Furthermore, green sturgeon were not listed as bycatch in similar surveys performed by CDFW in Monterey Bay in both 2007 and 2010 (Attachment 2 and Attachment 3). As a result, NMFS-SWR-SFD has determined that undertaking the California halibut light-touch trawl research survey is not likely to adversely affect green sturgeon. However, should any green sturgeon interactions occur, it will trigger an immediate call to the appropriate NMFS personnel and the survey will cease.

Critical Habitat

Critical habitat has only been identified for Stellar sea lions, leatherback turtles, and the green sturgeon southern DPS that occur in the proposed study area. Critical habitat for Steller sea lions in California includes the rookeries at Ano Nuevo Island, Sugarloaf Island, and the southeast Farrallon Islands (50 CFR 226.202 on Aug. 27, 1993). The proposed halibut survey does not fish near these islands, therefore the proposed action is not expected to affect critical habitat for Steller sea lions.

Critical habitat for the leatherback turtle has been identified as being off the California coast from Point Arena to Point Arguello east to the 3,000 meter depth contour and includes waters from the ocean surface down to a maximum depth of 80 meters (Benson et al., 2007; Graham, 2009). Leatherback sea turtles feed primarily on jellyfish species (75 FR 319). The primary constituent element essential for conservation of leatherback turtles is the occurrence of prey species, primarily scyphomedusae of the order Semaeostomeae of sufficient condition, distribution, diversity, abundance and density necessary to support individual as well as population growth, reproduction, and development of leatherbacks. Previous halibut surveys have been known to catch Pacific sea nettle jellyfish of the order Semaeostomeae. Although previous similar surveys have not shown any direct interaction with leatherback sea turtles, Pacific sea nettle jellyfish were present in all 12 tows of the 2010 survey. Jellyfish caught in these past surveys were only noted and not weighed or counted due to broken individuals or the numbers were too numerous to be weighed. For the 2013 survey the scientific crew will attempt to identify, weigh and count Pacific sea nettles to the best of their ability. The presence of the primary prey species during past tows within the study area suggest there could be impacts to sea turtle prey, in particular jellyfish removals by the survey. However, the proposed 2013 survey will only be performing 20 tows within Monterey Bay and will use light-touch trawl gear with 7.5-inch mesh which has been shown to reduce the amount of bycatch compared to traditional trawl gear with 4.5-inch mesh (CDFW, 2008). Also, as mentioned previously, the light-touch trawl operates with a low profile making the net height from the headrope to footrope opening smaller than that of a traditional trawl net (McCorkle,

2012). With the increase in mesh size of the cod end from 4 inches to 7.5 inches and the low-rise of the net, a reduction in the catch of Pacific sea nettles relative to previous CDFW survey tows is expected. Further, the net is not expected to catch large quantities of Pacific sea nettles when being deployed or retrieved because the doors will not be in proper fishing configuration resulting in a collapsed and unfishable net. Therefore NMFS-SWR-SFD believes the proposed survey is not likely to have any affect on leatherback sea turtles critical habitat as there have been no incidental take of sea turtles in previous surveys and the bycatch of leatherback prey will most likely be lower than previous similar surveys. Further due to the short duration of the proposed survey, obstruction of sea turtle migratory pathways is not expected. Finally, the survey will implement a mitigation and monitoring protocol to address concerns regarding the catch of jellies.

Figure 4 shows the critical habitat for green sturgeon which encompasses U.S. coastal marine waters within 60 fathoms from Monterey Bay, California, to Cape Flattery, Washington, the Sacramento River and other select waters within the Sacramento-San Joaquin River-Delta system, and other select coastal bays and estuaries waters within California, Oregon, and Washington. Within the study area, the Southern DPS green sturgeon critical habitat specifically includes coastal marine waters in Monterey Bay from the mean low, low water line onshore to the 60 fathom depth contour offshore. Monterey Bay is the most southerly area designated as critical habitat defined in the final report for green sturgeon critical habitat (NMFS, 2009). The southerly point of Monterey Bay is the dividing line between being designated as having "low" conservation value and "medium/high" conservation value. Additionally, the coastal marine waters of Monterey Bay, are outside of the connectivity corridor identified by the Critical Habitat Review Team (CHRT) when they designated critical habitat. Further, most Southern DPS subadults and adults exiting San Francisco Bay are believed to migrate north, but some small portion also migrates south as far as Monterey Bay, primarily in winter months. Thus, since the proposed survey will take place in the summer months when sturgeon would not be normally utilizing Monterey Bay, the impact to critical habitat will be minimal, if any.

Essential features of the nearshore coastal marine habitat for green sturgeon are a migratory corridor for safe and timely passage of fish within marine and between estuarine and marine habitats, suitable water quality, and abundant food resources (NMFS, 2009). The final green sturgeon critical habitat report lists three activities that may affect the primary constituent elements within the area from Monterey Bay to San Francisco Bay. Those activities include bottom trawl fisheries that may affect benthic habitats and food resources; the release of effluents from power plants (thermal effluent); and desalination plants (hypersaline effluent; plants are located as far north as Santa Cruz) that may affect water quality. The CHRT further stated that fishing vessels using bottom trawl gear may affect green sturgeon critical habitat by affecting sediment quality and available food resources for green sturgeon. Bottom trawling and the use of other bottom tending gear may result in positive effects on food resources (by digging up and making prey resources more available for green sturgeon), but may also result in adverse effects by potentially removing or disturbing benthic prey resources (NMFS, 2009).

The prey resources important to green sturgeon within the marine portion of their life-cycle (as well as in the freshwater environment) are believed to include mainly benthic invertebrate and similarly related fishes. The trawl operations are designed to specifically target soft-bottom benthic finfish and are generally considered effective at avoiding species that would be considered bycatch. However, bottom trawl fisheries can disturb the bottom. Information prepared by NMFS indicates that habitat impacts by bottom trawl gear in areas where California halibut trawling occurs (soft-benthic bottom) have the lowest sensitivity classification for impacts to seafloor habitat by bottom trawl gears (CDFW, 2008). Mean recovery time for trawl gear impacts in the CHTG is estimated by NMFS to be less than one year in the absence of continued fishing (CDFW, 2008). The proposed survey should potentially minimize the disturbance of the seafloor compared to previous similar surveys as the proposed survey will be using light-touch trawl gear, which is thought to have a lesser degree of a physical impact on the seafloor.

Further, the proposed study will be performed over such a short time period (only 4-to-5 days with approximately 20 tows) that any seafloor disturbance will be very temporary. Therefore, NMFS-SWR-SFD believes the proposed study will not disturb a migratory corridor, effect water quality or an abundant food source defined within critical habitat. Consequently, the proposed survey will not likely effect green sturgeon critical habitat within the action area.

V. Environmental Baseline and Cumulative Effects

In the summer of 2006, California state legislation (SB 1459) closed Monterey Bay to trawling. Prior to this time trawling had occurred for at least 75 years in this area. Present fisheries in Monterey Bay include: hook-and-line for white seabass, California halibut, salmonids, and rockfish (*Sebastes* species); purse seine for California market squid, Pacific sardine, Northern anchovy, and Pacific mackerel; and, trap for hagfish.

VI. Effects of the Action

NMFS-SWR-SFD believes the above analysis of the potential impacts from the proposed survey may affect, but is not likely to adversely affect the listed species identified and the designated critical habitat reviewed. Further NMFS-SWR-SFD believes the expected effects to be discountable and it would be extremely unlikely for take of any of the ESA-listed species to occur.

Analysis of Alternate Actions

The only alternate action for the purposes of this proposed survey would be to not perform the California halibut light-touch trawl survey within Monterey Bay. If this survey is not performed the CDFW will not be able to add an additional index of biomass in future stock assessments for California halibut and the effects and economic viability of light-touch California halibut trawl gear in Monterey Bay would remain unknown.

VII. CONCLUSION

The proposed research survey is a short-term study conducted over a 4-to-5 day period performing approximately 20 daytime tows. The study will test light-touch trawl gear with 7.5-inch mesh in the cod end which has been shown to reduce the amount of bycatch compared to traditional trawl gear (CDFW, 2008). No ESA-listed species from the included list (Table 1) have been encountered in similar CDFW surveys performed in Monterey Bay. Based upon past observations of comparable surveys and the lack of take of these ESA-listed species, NMFS-SWR-SFD has determined that it is unlikely that these species will be taken or adversely affected by this proposed action. Specifically, it is believed that the light-touch trawl survey proposed to be conducted in Monterey Bay is not likely to adversely affect ESA-listed species of marine mammals, sea turtles, salmon, steelhead, or green sturgeon, or designated critical habitat. It is the determination of NMFS-SWR-SFD that the proposed action may affect, but is not likely to adversely affect ESA-listed species that may be within the proposed action area or their critical habitat. This determination was made utilizing the best available scientific data. Based upon this conclusion, NMFS-SWR-SFD is requesting informal consultation under section 7 of the ESA.

IX. LIST OF DOCUMENTS

Attachment 1. 2013 Light-touch California Halibut Trawl Survey in Monterey Bay: Marine Mammal, Sea Turtle, Green Sturgeon and Pacific Sea Nettle Jellyfish Monitoring and Mitigation Protocol.

Attachment 2. 2007 Cruise Report State Finfish Management Project, Fishery Independent Trawl Survey in Monterey Bay.

Attachment 3. 2010 Cruise Report State Finfish Management Project, California Halibut (*Paralichthys californicus*) Trawl Survey of North Monterey Bay.

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XI. LIST OF CONTACTS/CONTRIBUTORS/PREPARERS

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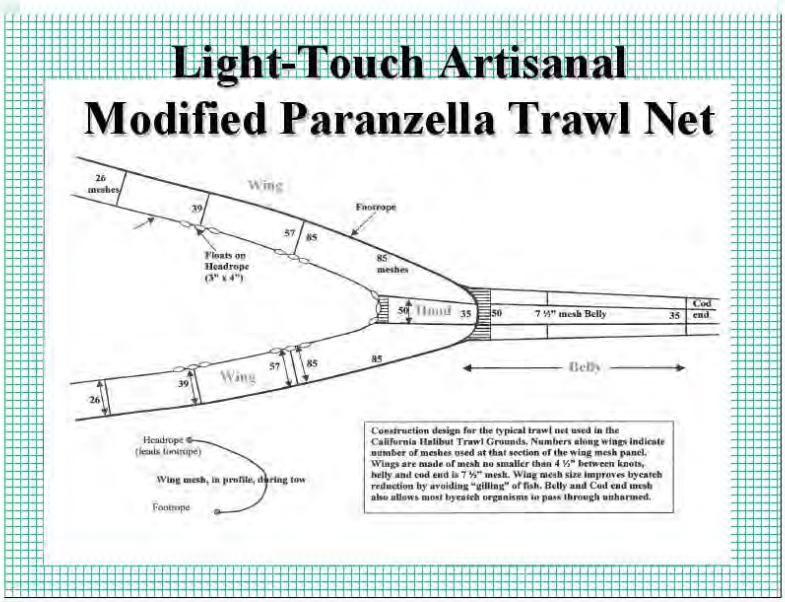

Figure 1. Diagram of light-touch trawl net gear with design specifics. (Gear specifics as required by the California Code of Regulations Title 14. Specific description per CCR Title 14 § 124. Halibut Trawling. (b) Gears. Special gear requirements apply while trawling for California halibut in the California Halibut Trawl grounds. Each trawl net, including trawl doors and footrope chain, shall meet the following requirements: (1) Each trawl net shall have a headrope not exceeding 90 feet in length. The headrope is defined as a chain, rope, or wire attached to the trawl webbing forming the leading edge of the top panel of the trawl net. Headrope shall be measured from where it intersects the bridle on the left side of the net to where it intersects the bridle on the right side of the net. (2) The thickness of the webbing of any portion of the trawl net shall not exceed 7 millimeters in diameter. (3) Each trawl door shall not exceed 500 pounds in weight. (4) Any chain attached to the footrope shall not exceed one quarter inch in diameter of the link material. The footrope is defined as a rope or wire attached to the trawl webbing forming the leading edge of the bottom panel of the trawl net. (5) The trawl shall have no rollers or bobbins on any part of the net or footrope. Rollers or bobbins are devices made of wood, steel, rubber, plastic, or other hard material that encircle the trawl footrope. These devices are commonly used to either bounce or pivot over seabed obstructions, in order to prevent the trawl footrope and net from snagging on the seabed.)

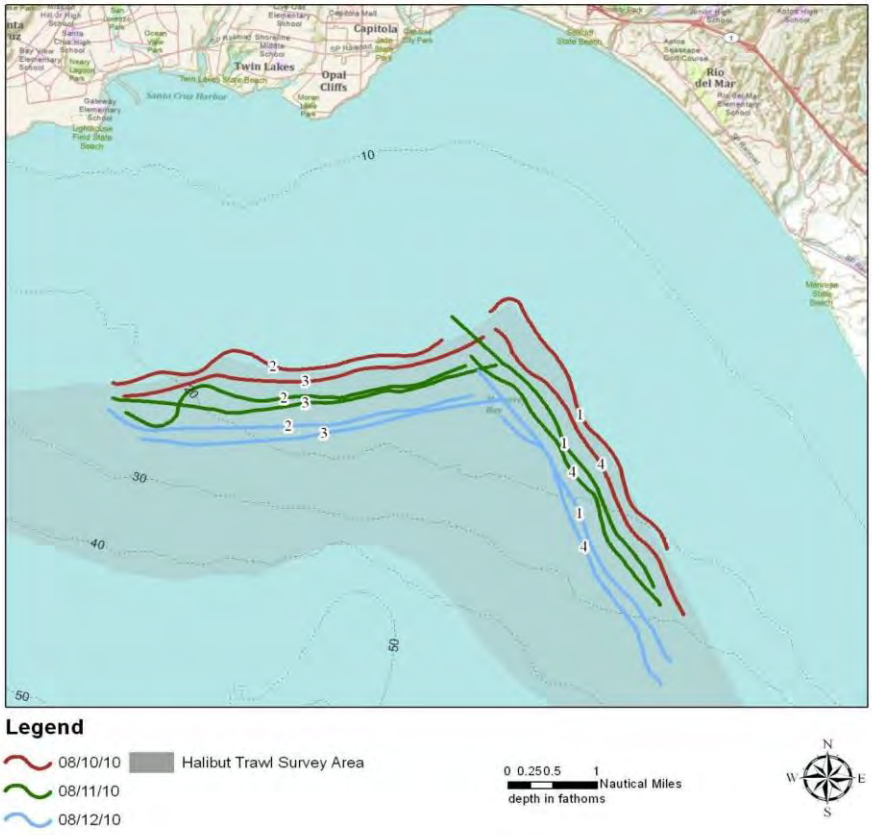

Figure 2. California halibut trawl survey tow tracks for 2010 California Department of Fish and Game fishery-independent trawl survey in north Monterey Bay.

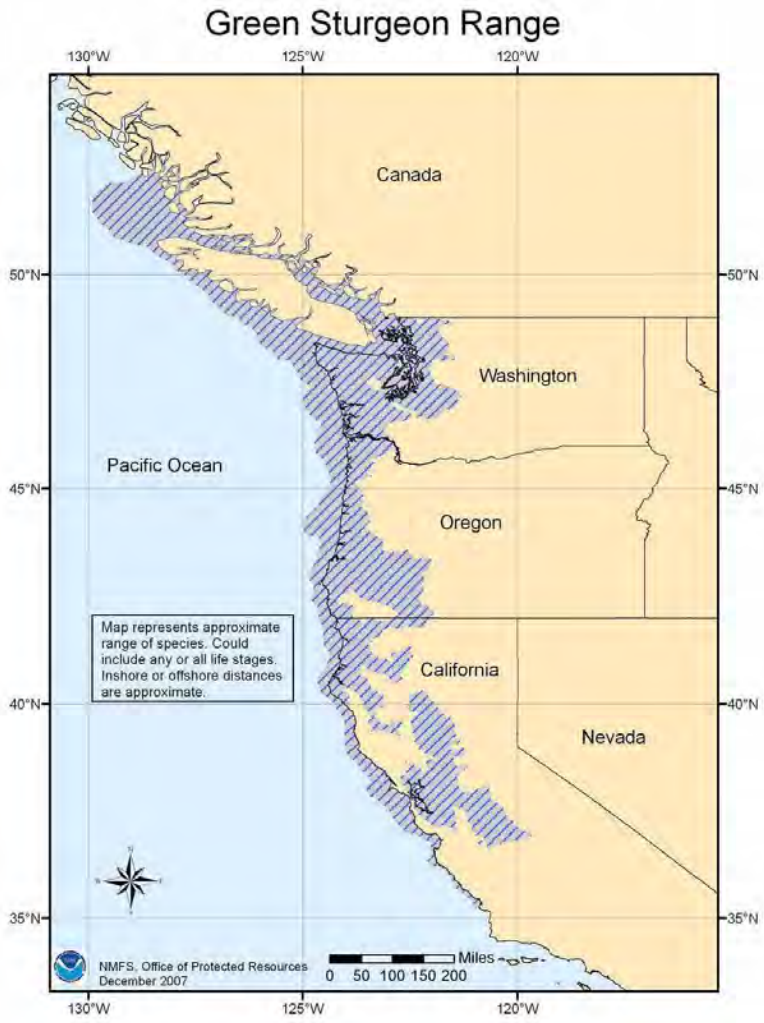

Figure 3. North American green sturgeon range (NMFS, 2009).

Figure 4. North American green sturgeon critical habitat (NMFS, 2009).

Appendix C: National Environmental Policy Act Categorical Exclusion and Concurrence Email

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

150413SWR2012SF01943:TW

MAY 30 2013

SWR Categorical Exclusion Memorandum

MEMORANDUM FOR: The Record

FROM: Mark Helvey
Assistant Regional Administrator
For Sustainable Fisheries

SUBJECT: Categorical Exclusion for Effects of a Proposed Study on the Use of Light-Touch California Halibut Trawl Gear within Historic Monterey Bay Trawl Grounds

NAO 216-6, Environmental Review Procedures, requires all proposed actions to be reviewed with respect to environmental consequences on the human environment. This memorandum summarizes the determination that the proposed study on the use of light-touch California halibut trawl gear within historic Monterey Bay trawl grounds qualifies to be categorically excluded from further NEPA review.

DESCRIPTION OF THE ACTION

Purpose

This proposed action is to conduct a study on the use of light-touch California halibut (*Paralichthys californicus)* trawl gear within historic Monterey Bay trawl grounds now closed to trawling. In the summer of 2006 California state legislation (SB 1459) closed Monterey Bay to trawling. Prior to that time trawling had occurred for at least 75 years in this area. In August 2008 the California Fish and Wildlife Commission established criteria for "light-touch" trawl gear (as defined in California Code of Regulations Title 14) and required that only this gear could be used within the California Halibut Trawl Grounds (CHTG) in southern California. In order to study the feasibility of using light-touch halibut trawl gear within historic Monterey Bay trawl grounds, a research partnership was developed between California Department of Fish and Wildlife (CDFW) and National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (NMFS SFD). The research study will examine the effects of light-touch trawl gear using a video camera mounted on the head rope of the trawl. This survey is in many

ways comparable to the fishery-independent survey for halibut performed in 2007 and 2010 by the CDFW. Therefore the study will also compare catch composition, obtain an additional set of relative abundance and length frequency data used in California halibut (halibut) stock assessment, track migration and movements of halibut using Floy dart tags, and provide data on benefits of an ad-hoc marine protected area due to closure of the area to trawling in 2006. The newly acquired data will add an additional index of biomass for future stock assessments of halibut.

The proposed action will take place within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS requires issuance of a permit in order for the CDFW and NMFS SFD to conduct the survey within its waters. Therefore the lead action agency for this proposed action is the NMFS SFD, and the CDFW is considered a non-Federal representative who will be conducting the at-sea research and be carrying out many aspects of the survey. Further, since the NMFS SFD will be contributing equipment and have an at-sea biologist performing duties on-board the survey vessel, this is the major Federal action requiring both National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) consultations. NMFS SFD initiated an ESA Section 7 consultation with National Marine Fisheries Service, Southwest Region, Protected Resources Division (NMFS PRD) on February 4, 2013. The MBNMS will prepare a separate NEPA document for their federal action of issuing CDFW and NMFS SFD a permit.

Description

A total of approximately 20 tows, each of 30-minute duration, would be completed during a four or five day period. Future surveys could result in small increased number of tows and days at-sea, and should not increase the overall impact. A NMFS SFD biologist will be present during all tows to monitor the use of an underwater video camera attached to the net and will operate the camera to record net and door performance. A CDFW biologist will be on-board during all tows to monitor and process the catch. A graduate student from California State University, Moss Landing Marine Laboratories will be on-board for one or two days to collect information on halibut length and maturity. All halibut will be measured and condition noted as soon as possible after the catch is placed on the deck. The CDFW will retain all sub-legal sized halibut and any halibut that do not survive towing for life history studies. All legal-sized halibut in good condition will be tagged and released. No fish will be landed as part of the annual catch specifications. The CDFW will provide standard dart tags. All non-halibut will be identified to species, measured individually, and weighed as species aggregates. The condition of all non-halibut species will be noted, and all will be released. Fish may be placed into a separate bin with fresh seawater to keep them alive before assessment and release.

Video data will be processed using standard techniques developed by NMFS SFD personnel. NMFS SFD will analyze all video footage to assess performance of the light-touch halibut trawl net, and will prepare a summary report of their findings. The CDFW will prepare a summary report relative to halibut captured as well as associated species.

All data and reports will be made available to the public and shared among the parties participating in the proposed study.

This proposed action will not only help to understand and quantify the potential use of light-touch trawl gear for the halibut fishery, but it will also provide another index of relative abundance for the halibut stock assessment. Additionally, this proposed study will help researchers understand the extent light-touch trawl gear minimizes contact with the seafloor and allow the collection of preliminary data for determining the economic viability of a halibut fishery. Future similar surveys could result in small increased number of tows and days at-sea as needed. This CE and checklist may be used for future surveys unless the survey includes activities or impacts that have not been considered in this CE and checklist.

Project Area

The area affected by the proposed light-touch trawl survey would occur within Monterey Bay along the same trawl lines used by CDFW in August 2010 for a fishery-independent halibut trawl survey. A total of approximately 20 daytime tows, each of 30-minute duration, would be completed during a four or five day period. Future surveys could result in small increased number of tows and days at-sea, as long as it is determined that the overall impact has not increased. Specifically, the proposed survey will take place at depths from approximately 10 fathoms to 35 fathoms on sandy, soft-bottom between approximately 36° 56' North latitude to 36° 48' North latitude. All tows will be performed in California state waters and within the MBNMS. This short-term study will take place in the summer months aboard the F/V *Cecelia*.

EFFECTS OF THE ACTION

This proposed action would not likely result in any adverse impacts to the environment. The proposed study will span a four or five day period within Monterey Bay in both California state waters and within the MBNMS. The light-touch trawl gear used in the study is legal within the CHTG in Southern California, but trawling is closed to fishing within Monterey Bay.

NEPA Determination

After reviewing the proposed action to conduct a study on the use of light-touch California halibut trawl gear within historic Monterey Bay trawl grounds now closed to trawling, including the criteria on the attached checklist which has been reviewed by the Southwest Regional NEPA Coordinator, I have concluded that the proposed action would not have a significant effect, individually or cumulatively, on the human environment. Further, I believe that the proposed action may appropriately be categorically excluded from the requirement to prepare either an environmental assessment or environmental impact statement, in accordance with Section 6.03.c.3 of NAO 216-6. Specifically, this

project fits under the categorical exclusion described in 6.03.c.3(a): Research Programs. Based on the criteria outlined in NMFS Policy Directive 30-131, Delegation of Authorities for Completing NEPA Documents, dated March 5, 2007, General Counsel review is not required for this action.

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL MARINE FISHERIES SERVICE
NEPA REVIEW CHECKLIST
FOR FINANCIAL ASSISTANCE ACTIVITIES

The purpose of this checklist is to assist National Marine Fisheries Service (NMFS) responsible program managers (RPMs) in determining if proposed financial assistance activities, such as grants and cooperative agreements, qualify for categorical exclusion (CE) status under NOAA's National Environmental Policy Act (NEPA) guidelines.

Many of NMFS' grants and cooperative agreements may qualify for exclusion from further NEPA review because the potential environmental effects of the activities they support are minor or negligible. Funded activities that are eligible for CE status are listed in NOAA's guidelines for implementing NEPA (Section 5.05.a of NAO 216-6), as well as the exclusions attachment to this checklist. The NAO 216-6 guidelines are also available electronically at: http://www.nepa.noaa.gov/NAO216_6_TOC.pdf.

A normally excluded action can lose its CE status if one or more of several project specific conditions exist. If so, then it becomes necessary to prepare either an environmental assessment (EA) or an environmental impact statement (EIS) for the proposed financial assistance activity.

This checklist should be filled out for those proposed financial assistance activities that initially appear to qualify for CE status. By answering the questions in this checklist, NMFS can determine whether the effects of the proposed financial assistance activity qualify for CE status, or require further NEPA documentation in the form of an EA or an EIS.

A. Description of proposed action

This proposed action is to conduct a study on the use of light-touch California halibut trawl gear within historic Monterey Bay trawl grounds now closed to trawling. This survey is in many ways comparable to the fishery-independent surveys for California halibut (halibut) performed in 2007 and 2010 by California Department of Fish and Wildlife, Marine Region (CDFW). The research study will examine the effects of light-touch trawl gear on the physical environment and on potential interactions with protected species using a video camera mounted on the head rope of the trawl. It will also compare catch composition, obtain an additional set of relative abundance and length frequency data used in stock assessment, track migration and movements of California halibut using Floy dart tags, and provide data on benefits of an ad-hoc Marine Protected Area due to closure of trawl in 2006. The newly acquired data will add an additional index of biomass for future stock assessments of halibut. This research is a partnership between the CDFW and the NMFS SFD.

The proposed light-touch trawl survey would occur within Monterey Bay along the same trawl lines used by CDFW in August 2010 for a fishery-independent halibut trawl survey (Attachment 1). A total of 20 daylight tows, each of 30-minute duration, would be completed during a four or five day period. Future surveys could result in small

increased number of tows and days at-sea, as long as it is determined that the overall impact has not increased. Specifically, the proposed survey will take place at depths from approximately 10 fathoms to 35 fathoms on sandy, soft-bottom between approximately 36° 56' North latitude to 36° 48' North latitude. This short-term study will take place in the summer months aboard the F/V *Cecelia*.

Determining the appropriateness for use of categorical exclusions, as defined in NAO 216-6 5.05 and 6.03c.3.

	Yes	No	Uncertain	N/A
1. The proposed action involves issuance of a permit for scientific purposes or to enhance the propagation or survival pursuant to section 10(a)(1)(A) of the ESA for *hatchery activities*? Explanation/Remarks:	☐	☐	☐	☒
2. The proposed action is a *modification* to an existing section 10(a)(1)(A) permit for a *hatchery activity* for which an EA or EIS has *not* already been completed? Explanation/Remarks:	☐	☐	☐	☒
3. The proposed action involves issuance of incidental take permit(s) pursuant to section 10(a)(1)(B) of the ESA? If "yes," is the proposed action considered to be something other than a "low effect" habitat conservation plan? Explanation/Remarks:	☐	☐	☐	☒
4. Would the proposed action require any federal permits, or other federal agency direct involvement, activity, oversight, or funding permits? Explanation/Remarks: The proposed action will take place within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS) and in California state waters. The MBNMS requires issuance of a permit in order for the CDFW and NMFS SFD to conduct the survey within its waters. Since the NMFS SFD will be contributing equipment and have an at-sea biologist performing duties on-board the survey vessel, this is the Federal nexus requiring NMFS SFD to initiate an ESA Section 7 consultation with NMFS PRD, and therefore the lead action agency for this proposed action is the NMFS SFD. Additionally, the CDFW is a non-Federal representative who will be conducting the at-sea research and be carrying out many aspects of the survey. The MBNMS will prepare a separate NEPA document for their federal action of issuing CDFW and NMFS SFD a permit.	☒	☐	☐	☐

	Yes	No	Uncertain	N/A
5. There have been *no* prior NEPA analyses, or equivalent analyses in the form of state environmental assessments, or Section 7 Endangered Species Act biological assessments and opinions, or scientific reports that describe the environmental effects of the same action and which demonstrate that the action is not likely to have significant impacts on the quality of the human environment? Explanation/Remarks: To date there have been no ESA, NEPA or state environmental assessments that describe the environmental effects of the two previous similar surveys performed in 2007 and 2010 by CDFW.	☐	☒	☐	☐
6. Are there any potentially adverse impacts even though, on balance, the effect of the proposed action may be beneficial? Explanation/Remarks: NMFS has not identified any significant effects and therefore believes that this action does not pose a significant adverse impact on the human environment. This proposed study is to document the effects of using light-touch California halibut trawl gear within a specific portion MBNMS and within state waters. Additionally, the survey will provide another data set of relative abundance and length frequency to be used in the next central California halibut stock assessment.	☐	☒	☐	☐
7. This action may have adverse effects on public health or safety, particularly considering minority and low-income populations? Explanation/Remarks: This action would not have any adverse effects on public health or safety. The project consists of evaluating the use of light-touch California halibut trawl gear within Monterey Bay over the course of four to five fishing days. The only public members interacting with the project are those conducting the study. These individuals all have considerable sea experience and are well trained in safety precautions.	☐	☒	☐	☐

	Yes	No	Uncertain	N/A
8. The activity will occur within, and may adversely affect, a unique geographic area of notable recreational, ecological, scenic, or aesthetic importance, such as coral reefs, marine protected areas, marine sanctuaries, essential fish habitat, park or refuge lands, wild or scenic rivers, wetlands, prime or unique farmland, or ecologically significant or critical areas, including areas that normally are inundated by water or areas within the 100-year flood plain? Explanation/Remarks: This proposed study is to document the effects of using light-touch California halibut trawl gear within a specific portion MBNMS and within state waters but should not adversely affect the area. The study is a short-term survey lasting four to five days and performing approximately 20 tows. Additionally the survey will use light-touch trawl gear that is thought to minimize physical disturbances and other impacts to the seafloor. No significant impacts to these areas are expected to occur. Further, we have conducted an Essential Fish Habitat (EFH) analysis with our Habitat Conservation Division which concluded that this proposed survey should have no adverse impact on any areas identified as EFH for Federally managed species, and should not have an adverse impact on EFH within Monterey Bay. NMFS SFD and CDFW will obtain a permit from the MBNMS to conduct this survey within the MBNMS.	☐	☒	☐	☐
9. The proposed action may result in adverse social or economic impacts that are interrelated with natural or physical environmental effects? Explanation/Remarks: This action would have no adverse social or economic impacts that are interrelated to the natural or physical environment because such relationships do not exist. The project consists of evaluating the effects of using light-touch California halibut trawl gear within Monterey Bay. The study is a short-term survey lasting four to five days and performing approximately 20 tows. Future surveys could result in small increased number of tows and days at-sea, as long as it is determined that the overall impact has not increased.	☐	☒	☐	☐

	Yes	No	Uncertain	N/A
10. The potential environmental effects of the action, including socio-economic impacts, may be the subject of public controversy? Explanation/Remarks: The action would not be the subject of controversy. Although trawl fishing gear is not authorized for use in the study area, the light-touch trawl gear to be used in this study is authorized to be used for fishing for California halibut in the California Halibut Trawl Grounds in southern California. The proposed study is to compare the use of light-touch trawl gear to traditional trawl gear used in the California halibut trawl surveys. Additionally, the survey will provide another data set of relative abundance and length frequency to be used in the next central California halibut stock assessment. The survey will perform approximately 20 tows over a four to five day period. Further, all aspects of the study will be monitored and documented and resulting reports will be made available to the public. There is a minority opinion held by some that all the trawling is harmful but since this gear is designed to minimize environmental impacts and is already in use in southern California, it is expected that the results of this action may help inform that minority.	☐	☒	☐	☐
11. The potential effects of the proposed action on the human environment are highly uncertain or involve unique or unknown risks? Explanation/Remarks: There are no uncertainties or unique risks associated with the action. The project consists of evaluating the use of light-touch California halibut trawl gear within Monterey Bay over the course of four to five fishing days over flat, sand bottom in 10 to 35 fathoms of water.	☐	☒	☐	☐
12. The action may establish a precedent or decision in principle about future agency actions? Explanation/Remarks: This action does not set a precedent for future decision making. The results of the study may be used to inform future state actions on trawling for California halibut within Monterey Bay.	☐	☒	☐	☐

	Yes	No	Uncertain	N/A
13. This action is related to other actions (both NMFS and non-NMFS) that together may cumulatively adversely affect the quality of the human environment? Explanation/Remarks: The proposed action is not related to other actions and consequently would not result in cumulative effects. The proposed study is to compare the use of light-touch trawl gear to traditional trawl gear used in the California halibut trawl surveys. Additionally, the survey will provide another data set of relative abundance and length frequency to be used in the next central California halibut stock assessment. The survey will perform approximately 20 tows over a four to five day period.	☐	☒	☐	☐
14. The proposed action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources? Explanation/Remarks: There are no impacts to the above objects. No such objects exist in the study area.	☐	☒	☐	☐
15. The proposed action may adversely affect an endangered or threatened species or their critical habitat, or marine mammals or their critical habitat? Explanation/Remarks: The action should not impact protected species or their designated critical habitat. We have prepared a Section 7 Endangered Species Act Consultation Biological Assessment for this proposed study. NMFS SFD determined that the proposed survey is not likely to adversely affect ESA species. NMFS PRD agreed with our conclusions and the informal consultation was finalized in May of 2013. The proposed study will compare the use of light-touch trawl gear to traditional trawl gear used in the California halibut trawl surveys. We hope the study may find that the light-touch trawl gear may lead to minimize impact on the seafloor and reduce protected species interactions for future surveys and the fishery (which is currently closed but the CA halibut fishery is open in the California Halibut Trawl Grounds in Southern California). The proposed study does have a marine mammal, sea turtle and green sturgeon protocol to be followed as a precaution and to minimize potential interactions with protected species. In previous California halibut surveys performed in 2007 and 2010 there were no interactions with any ESA-listed species or any protected species.	☐	☒	☐	☐

	Yes	No	Uncertain	N/A
16. The proposed action may violate Federal, State, or local law or requirements imposed for the protection of the environment? Related to this determination, is any laboratory, research center, or other facility to be used as part of this action currently operating in non-compliance with any federal, state, or local environmental law or regulation? Explanation/Remarks: The proposed action will not violate any federal, state, or local law or requirement. Light-touch trawl fishing gear is already authorized for use in the California Halibut Trawl Grounds in Southern California. The proposed action is a research study not a fishery. The proposed study is to compare the use of light-touch trawl gear to traditional trawl gear used in the California halibut trawl surveys. Additionally, the survey will provide another data set of relative abundance and length frequency to be used in the next central California halibut stock assessment.	☐	☒	☐	☐
17. The proposed action may result in the introduction or spread of a non-indigenous species? Explanation/Remarks: No non-indigenous species will be introduced or spread during this project.	☐	☒	☐	☐
18. The proposed action may jeopardize the sustainability of any Magnuson-Stevens Act (MSA) target species? Explanation/Remarks: California halibut is not a MSA target species. The project will consist of 4-5 fishing days, and any MSA target species caught as bycatch would be caught in such low numbers as to not jeopardize their sustainability. Every effort will be made to release any fish bycatch species alive.	☐	☒	☐	☐
19. The proposed action may jeopardize the sustainability of any non-target species? Explanation/Remarks: The proposed study is to compare the use of light-touch trawl gear to traditional trawl gear used in the California halibut trawl surveys. Additionally, the survey will provide another data set of relative abundance and length frequency to be used in the next central California halibut stock assessment. The project will consist of 4-5 fishing days, and any species caught as bycatch would be caught in such low numbers as to not jeopardize their sustainability. Also, light-touch trawl gear is thought to have a lower rate of bycatch compared to that of traditional trawl gear. Every effort will be made to release any fish bycatch species alive.	☐	☒	☐	☐

	Yes	No	Uncertain	N/A
20. The proposed action may cause damage to the ocean and coastal habitats and/or essential fish habitat as defined under the MSA and identified in fishery management plans? Explanation/Remarks: The proposed study is to compare the use of light-touch trawl gear to traditional trawl gear used in the California halibut trawl surveys. The project will consist of 4-5 fishing days, over flat, sand bottom to help understand the extent of contact and impact the trawl net will have with the seafloor. The light-touch trawl gear is intentionally designed to minimize physical effects of the fishing gear on ocean and coastal habitats and/or essential fish habitat. Further, we have conducted an Essential Fish Habitat analysis with our Habitat Conservation Division which concluded that this proposed survey should have no adverse impact on any areas identified as EFH for Federally managed species, and should not have an adverse impact on EFH within Monterey Bay.	☐	☒	☐	☐
21. The proposed action may result in cumulative adverse effects on the target species or non-target species as defined under the MSA? Explanation/Remarks: The project consists of evaluating the use of light-touch California halibut trawl gear within Monterey Bay over the course of four to five fishing days. This is a short term study (not a fishery) and will not contribute to a significant increase in fishing effort. The CDFW will retain all sub-legal sized halibut and any halibut that do not survive towing for life history studies. All legal-sized halibut in good condition will be tagged and released. No fish will be landed as part of the annual catch specifications.	☐	☒	☐	☐
22. The proposed action may adversely impact biodiversity and ecosystem function within the affected area (e.g., benthic productivity, predator-prey relationships, etc)? Explanation/Remarks: The project consists of evaluating the use of light-touch California halibut trawl gear within Monterey Bay over the course of four to five fishing days. Future surveys could result in small increased number of tows and days at-sea, as long as it is determined that the overall impact has not increased. The proposed short-term study should not adversely impact biodiversity and ecosystem function.	☐	☒	☐	☐
If the proposed action is a Trustee Restoration Action administered by the Damage Assessment and Restoration Program pursuant to the Comprehensive Environmental Response, Compensation and Liability Act of 1980, the Oil Pollution Act of 1990, or the National Marine Sanctuary Act, then the following questions must also be addressed.				
23. The action is intended to do something other than restore an ecosystem, habitat, biotic community, or population of living resources to a determinable pre-impact condition?	☐	☒	☐	☐

	Yes	No	Uncertain	N/A
24. The action may transplant organisms *not* currently or formerly present at the site or in its immediate vicinity?	☐	☒	☐	☐
25. The action may require dredging, excavation, or placement of fill?	☐	☒	☐	☐
26. The action may involve the risk of human or environmental exposure to toxic or hazardous substances?	☐	☒	☐	☐

IF YES OR UNCERTAIN WAS CHECKED FOR ANY OF THE ITEMS IN THE CHECKLIST, IT MAY BE NECESSARY TO DO ADDITIONAL NEPA REVIEW IN THE FORM OF AN ENVIRONMENTAL ASSESSMENT OR ENVIRONMENTAL IMPACT STATEMENT. CONTACT THE REGIONAL OR HQ NEPA COORDINATOR FOR FURTHER DISCUSSION AND GUIDANCE.

NEPA REVIEW DETERMINATION:

☒ Upon review, this action meets the criteria to be categorically excluded from further compliance with the National Environmental Policy Act. *Exclusion category: 6.03c.3(a) Research Programs*. This is a project of limited size and magnitude with little to no short-term effects on the environment and for which any cumulative effects are negligible. Also, attach this list to the decision memorandum for the action.

☐ Upon review, this action does not qualify to be categorically excluded from further NEPA review. Therefore, at a minimum, an environmental assessment is required.

PREPARED BY:

Tonya L. Wick
Printed Name/Signature

Fishery Policy Analyst
Title

April 16, 2013
Date

Shelby Mendez - NOAA Federal Apr 22

to me, Mark

Hi Tonya,
I have no comments to make on the subject categorical exclusion memo and checklist. Once all of the consultations are complete please proceed with finalizing the documents and have Mark sign the CE memo.

This email serves as my official review and clearance of the CE memo and checklist. Please retain this email for your records.

I do not need a copy of the signed memo.

Thank you,
Shelby

APPENDIX D: Endangered Species Act Concurrence

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

In response refer to:
2013/9538: SSW

MAY 2 8 2013

MEMORANDUM FOR: Mark Helvey
Assistant Regional Administrator,
Sustainable Fisheries Division

FROM: for Penny Ruvelas
Southern California Area Office Supervisor
Protected Resources Division

SUBJECT: Section 7 Consultation on Effects of a Proposed Study on the Use of Light-Touch California Halibut Trawl Gear within Historic Monterey Bay Trawl Grounds on Endangered Species Act Listed Species

On 4 February 2013, the NMFS Southwest Region (SWR) Protected Resources Division (PRD) received a memorandum from the NMFS Southwest Region Sustainable Fisheries Division (SFD) requesting consultation under section 7 of the Endangered Species Act (ESA) for a proposed study on the use of light-touch California halibut trawl gear within historical Monterey Bay trawl grounds that are presently closed to trawling (California Senate Bill 1459 in 2006). The memorandum provided a description of the proposed study and included a biological assessment of the potential effects of the proposed action on ESA-listed species and designated critical habitat. Based on the assessment, SFD concluded that the proposed action is not likely to adversely affect ESA-listed species or designated critical habitat and requested PRD's concurrence with this determination. Since receipt of this memorandum, staff from both PRD and SFD have met several times to discuss the proposed survey, particularly the monitoring and mitigation protocols and observation distances, which were finalized by SFD and transmitted to PRD at the end of April, 2013. Of note, SFD submitted a memo to PRD in July of 2012 proposing a similar survey and concluded that the proposed action was not likely to adversely affect ESA-listed species or designated critical habitat. PRD concurred with the determination, although for various reasons, the survey never took place.

PROPOSED ACTION

The proposed study is a trawl survey, to be conducted by the California Department of Fish and Wildlife (CDFW; formerly, California Department of Fish and Game (CDFG)) in partnership

with SFD, to examine the feasibility of using light-touch trawl gear to capture California halibut (*Paralichthys californicus*) and to examine the effects of the gear on benthic habitats and bycatch levels. The light-touch trawl gear is designed to comply with the California Fish and Game Commission's criteria (California Code of Regulations Title 14 §124). The proposed survey will be conducted by a 49-foot wooden vessel with a 19 foot beam over a period of four to five days in July or August 2013 and consist of a total of 20 tows (30 minutes per tow) using light-touch trawl gear. The trawl planned to be used in the 2013 survey has a 60-foot footrope, with no floats on the headrope, creating a 4-foot opening (versus a 10 to 15-foot opening on a traditional trawl). With a body mesh of 5-inches and a cod-end mesh of 7.5 inches, the trawl net is unlikely to catch over 1,000 pounds of fish. All tows will be conducted during daylight hours in Monterey Bay along the same trawl lines used by CDFW in a similar halibut trawl survey conducted in August 2010 (CDFG 2010), at depths from approximately 10 to 35 fathoms on soft bottom, between approximately 36°56' N to 36°48' N latitude. Effects of the trawl gear on bottom habitat will be documented by a video camera mounted on the headrope of the trawl. All legal-sized halibut and non-halibut catch will be identified, measured, weighed, and released. Dead or sub-legal sized halibut may be retained for life history studies.

To minimize and avoid effects on marine mammals and sea turtles, a dedicated SFD scientist will be responsible for implementing the monitoring and mitigation protocols, with other personnel on the survey vessel assisting the scientist, as practicable. A PRD protected resources specialist will train all scientific personnel prior to the commencement of the survey. The SFD scientist and others will visually scan for marine mammals, sea turtles, and jellyfish (specifically brown sea nettles, an important sea turtle prey item) in an area of planned operations during transit to each station and keep a continuous watch throughout the survey operations. During the tow, observations will concentrate from the vessel out to a maximum distance of 647 feet, as that is approximately how far the trawl net will be from the vessel on any given tow. PRD-trained scientific staff will assess whether trawling operations can be conducted to minimize the potential for interaction between the gear and the animals sighted. If there is a risk of interaction with the gear (*e.g.* a pod of dolphin transiting the area), staff will determine if the vessel should remain in place, or, if operations cannot continue, safely move away from the animal(s) by at least 0.5 nautical miles. This determination will be based on the species and number of animals sighted, their behavior and direction of travel, if applicable, and their vector relative to the path of the vessels. Visual scans will be conducted during each subsequent move until the scientific crew determines that trawling operations can be conducted without risk of interaction between the gear and visible animals, or until the station is abandoned. During each tow, the Captain and scientific crew will keep continuous watch for marine mammals, sea turtles, and jellyfish in the area. If sighted, the scientific crew will determine the best strategy to avoid potential takes (e.g., immediate retrieval of the net to move away from the area; continue towing until the animal is clear of the area to prevent contact with the gear during haul-back).

ESA-LISTED SPECIES AND CRITICAL HABITAT

The following ESA-listed species under NMFS' jurisdiction may be present in the action area during the proposed survey and may be affected by the proposed action:

Marine mammals:

- Blue whale (*Balaenoptera musculus*) - Endangered
- Fin whale (*B. physalus*) - Endangered
- Humpback whale (*Megaptera novaeangliae*) - Endangered
- Gray whale, western north Pacific stock (*Eschrichtius robustus*) - Endangered
- Steller sea lion, eastern distinct population segment (DPS) (*Eumetopias jubatus*) – Threatened
- Guadalupe fur seal (*Arctocephalus townsendi*) – Threatened

Sea turtles:

- Leatherback turtle (*Dermochelys coriacea*) – Endangered
- Loggerhead turtle, north Pacific DPS (*Caretta caretta*) – Endangered
- Olive ridley turtle (*Lepidochelys olivacea*) – Endangered/Threatened
- Green turtle (*Chelonia mydas*) – Endangered/Threatened

Marine/Anadromous fish:

- Green sturgeon, southern DPS (*Acipenser medirostris*) – Threatened
- Chinook salmon, Sacramento River winter evolutionarily significant unit (ESU) (*Onchorhynchus tshawytscha*) – Endangered
- Chinook salmon, Central Valley Spring-run ESU (*O. tshawytscha*) – Threatened
- Chinook salmon, California Coastal ESU (*O. tshawytscha*) – Threatened
- Coho salmon, Central California Coast DPS (*O. kisutch*) – Endangered
- Steelhead, South-Central California Coast DPS (*O. mykiss*) – Threatened
- Steelhead, Central California Coast DPS (*O. mykiss*) – Threatened
- Steelhead, Central Valley DPS (*O. mykiss*) – Threatened

In addition, designated critical habitat for green sturgeon and leatherback sea turtles occurs within the action area and may be affected by the proposed action. The biological assessment also identified but then determined that critical habitat for Steller sea lions does not occur within the action area. Non-ESA listed marine mammals also may be present within the action area and may be affected by the proposed action. All marine mammals are protected under the Marine Mammal Protection Act.

EFFECTS OF THE PROPOSED ACTION

In this section, we summarize NMFS SWR SFD's reasoning to support their determination that the proposed action is not likely to adversely affect ESA-listed species and designated critical habitat. We also provide the reasons for our concurrence with this determination, briefly describing the analysis of the effects of the proposed action on ESA-listed species and designated critical habitat and why we consider these effects insignificant and discountable.

Marine mammals

SFD determined that the proposed action is not likely to adversely affect ESA-listed marine mammals that may occur in Monterey Bay because the probability of encountering any of these species (i.e., visually observing or having any contact with the vessel and fishing gear) is unlikely based on the time of year and short duration of the proposed survey. In addition, the precautionary measures to be implemented under the marine mammal and sea turtle monitoring and mitigation protocol (enclosed with the biological assessment dated 10 January 2013 and subsequently amended, with PRD input) will also reduce the likelihood of an interaction. CDFW did not encounter any marine mammals during similar trawl surveys conducted in Monterey Bay in 2007 and 2010, using traditional trawl gear (CDFG 2007, 2010).

PRD concurs that the proposed action is not likely to adversely affect ESA-listed marine mammals, because the probability of incidental take (i.e., entangling, striking, or harassing a marine mammal) is extremely unlikely. Steller sea lions are not expected to be in the action area during the time of the proposed survey, making the probability of encounter very low. The probability of encountering Guadalupe fur seals is also extremely unlikely. Although within the species' range, the likelihood of Guadalupe fur seals being in the action area during the time of the proposed survey is low. If present at all, Guadalupe fur seals would likely be at very low numbers. Little is known about the timing and location of the western Pacific stock of gray whales and whether or not they may be in the action area during the proposed survey period. Blue whales, fin whales, and humpback whales occur in Monterey Bay during the time of year when the proposed survey is to be conducted and may be vulnerable to encounters with the fishing gear or the vessel. However, we agree that implementation of the measures (including, *inter alia*, the proposed tow speed and continuous visual scans for protected species prior to and during tows), as described in the monitoring and mitigation protocol, would minimize the probability of entangling, striking, or harassing a whale to an insignificant and discountable level. Specifically, continuous monitoring for whales prior to and during each tow and active measures to avoid interactions (e.g., moving at least 0.5 nm from animals that are observed in the area and at risk of interaction with the gear) would make the risk of entangling, striking, or harassing a whale extremely unlikely. In addition, the average expected tow speed of the vessel during the survey (2.4 to 2.7 knots) is relatively slow which could provide the observer with multiple opportunities to see a whale surface (dependent on sighting conditions) and take measures to avoid a collision.

Sea turtles and leatherback sea turtle critical habitat

SFD determined that the proposed action is not likely to adversely affect green, leatherback, loggerhead, and olive ridley sea turtles because the probability of encountering these species is low. SFD also determined that the proposed action is not likely to adversely affect designated critical habitat for leatherback sea turtles because the proposed action will have a low impact on leatherback sea turtle prey resources.

PRD concurs that the proposed action is not likely to adversely affect ESA-listed sea turtles, because of the extreme unlikelihood of incidental take. Green, loggerhead, and olive ridley sea turtles are considered rare north of Point Conception and are not likely to be in the action area

during the time of the proposed survey. In contrast, leatherback sea turtles are likely to be present in the area, based on satellite telemetry analyses, which showed leatherbacks returning back to the southern California Bight during the spring-time, and traveling to the central California coast in the summer/fall months (Benson et al. 2011). In addition, there were observations of leatherbacks in Monterey Bay in 2012 (likely to feed on the abundant brown sea nettles currently in the area; pers. comm. with C. Fahy, NMFS, 19 July 2012) and there was a stranding of a dead female adult leatherback on 25 July 2012 near the U.S. Coast Guard jetty in Monterey (likely dead due to natural causes; pers. comm. with H. Harris, NMFS Southwest Fisheries Science Center (SWFSC), 28 July 2012). Leatherback sea turtles are also vulnerable to capture by trawl gear, as shown by the capture of an individual in a mid-water trawl scientific research survey in July 2011 just north of Monterey Bay, off Pigeon Point (pers. comm. with C. Fahy, NMFS, 03 August 2012). Given confirmation that leatherbacks are currently and are likely to be present in the survey area and are vulnerable to capture in trawl gear, there is a risk of an animal being caught in the trawl net or struck by the vessel. However, that risk will be low, based on the short duration of the survey, the short tow times, the slow speed of the vessel, and the fact that no interactions with sea turtles occurred during similar trawl surveys conducted by CDFW in 2007 and 2010 (CDFG 2007, 2010). SFD has also proposed to contact NMFS scientist Scott Benson prior to each day of the survey to get information on the known location of any leatherbacks within the specific survey area in order to avoid potential interactions. We agree that implementation of the monitoring and mitigation measures, as described in the protocol, will further reduce the likelihood of entangling, capturing, striking, or harassing a sea turtle to a discountable level.

PRD also concurs that the proposed action is not likely to adversely modify or destroy designated critical habitat for leatherback sea turtles. The concern with respect to potential impacts within leatherback sea turtle critical habitat is the potential reduction of prey resources (e.g., jellyfish and salps), identified as the primary constituent element (PCE) for leatherback sea turtle critical habitat. Brown sea nettles, *Chrysaora fuscescens*, are likely the primary prey species targeted by leatherback sea turtles in this area (Benson et al. 2011). The CDFW trawl survey in 2010 incidentally caught brown sea nettles in all 12 tows conducted (CDFG 2010). The incidental capture of brown sea nettles in the proposed survey would likely be less than in the 2010 survey, because the light-touch trawl gear has a larger mesh size (7.5-inch mesh) than the traditional trawl gear used in the 2010 survey (4.5-inch mesh). In addition, the trawl gear is designed to collapse on itself so that it is unfishable when going down to the seafloor or on the way up to the vessel, minimizing the likelihood of capturing brown sea nettles in the water column when deploying or retrieving the gear. To further avoid incidental capture of brown sea nettles, the vessel will move to a different area before setting the gear if they are observed in the area. The increased mesh size of the trawl gear and precautions to avoid setting gear on brown sea nettles in the area will minimize incidental capture of jellyfish during the proposed survey. If jellyfish are captured and killed, the effect on the availability of these prey resources will be minimal, given the magnitude of prey in the area. In addition, the short duration of the tows and study will minimize impacts. Therefore, we conclude that the effects of the proposed action on the prey resources would be insignificant; we do not expect the proposed action to reduce the quality or quantity of jellyfish such that it reduces the conservation value of the prey resources for leatherback sea turtle critical habitat within the action area. Lastly, the scientific crew will attempt to identify, weigh, and count brown sea nettles incidentally caught, to the best of their

ability, in order to quantify the impact to leatherback sea turtle prey resources. This information will help to assess the actual impacts of the proposed survey on leatherback sea turtle prey resources in the area.

Green sturgeon and green sturgeon critical habitat

SFD determined that the proposed action is not likely to adversely affect ESA-listed green sturgeon (Southern DPS) because the probability of incidentally capturing a green sturgeon in the trawl gear is unlikely based on the short duration of the proposed survey, the short tow duration, and data indicating that green sturgeon have not been incidentally captured by trawl gear in Monterey Bay in the past. SFD also determined that the proposed action is not likely to adversely modify or destroy designated critical habitat for Southern DPS green sturgeon because the proposed survey will not disturb the species' migratory corridor or affect water quality or green sturgeon prey resources in the area.

PRD concurs that the proposed action is not likely to adversely affect Southern DPS green sturgeon because the probability of incidental take is extremely low. Green sturgeon may be present in the action area during the time of the proposed survey (Lindley et al. 2008) and have been incidentally caught in set-net gear in Monterey Bay in 1999 and 2000 (pers. comm. with R. Rasmussen, SWFSC, 18 July 2006). However, existing evidence indicates that the probability of incidental capture of green sturgeon in the proposed survey is extremely low. First, NMFS West Coast Groundfish Observer Program (WCGOP) data from 2002 through 2010 show that although numerous green sturgeon have been incidentally caught in groundfish bottom trawl fisheries along the California coast just north of Monterey Bay (Al-Humaidhi et al. 2012), there have been no observed encounters with green sturgeon in the groundfish bottom trawl fisheries in Monterey Bay. Fishing effort (measured by landings) and observer coverage rates for the groundfish bottom trawl fisheries in Monterey Bay varied over this period (from 6% to 28%; pers. comm. with J. Majewski, WCGOP, 26 July 2012), but were comparable to the fishing effort and observer coverage rates for the fisheries along the California coast just north of Monterey Bay (3% to 25%; groundfish landings data and WCGOP observer coverage rates, available online at: http://www.nwfsc.noaa.gov/research/divisions/fram/observer/sector_products.cfm). The lack of observed green sturgeon encounters in Monterey Bay, in contrast with numerous observed encounters in California north of Monterey Bay, indicates that incidental capture of green sturgeon in the bottom trawl fishery in Monterey Bay has either not occurred or has been rare, possibly because of differences in the abundance of green sturgeon between the two areas. Second, green sturgeon were not encountered in similar trawl surveys conducted in Monterey Bay by CDFW in 2007 and 2010 (CDFG 2007, 2010). Third, the trawl gear to be used is designed to collapse on itself when the doors are not in proper fishing configuration, making the net unfishable when it is being let down to the seafloor or brought back up to the vessel. This design will further minimize the risk of incidentally capturing green sturgeon in the water column when deploying or retrieving the trawl gear. Finally, the short duration of the proposed survey and proposed tows further minimize the risk of incidentally capturing a green sturgeon. Therefore, we agree that the potential for incidental capture of green sturgeon is discountable.

PRD also concurs that the proposed action is not likely to adversely modify or destroy designated critical habitat for green sturgeon. The concern with respect to potential impacts within green sturgeon critical habitat are the potential effects on water quality and benthic prey resources, two of the primary constituent elements identified for green sturgeon critical habitat. Disturbance of the seafloor by bottom trawl gear can affect water quality by stirring up sediments and increasing water turbidity. Effects on prey resources can result from the incidental capture of benthic species and disturbance of benthic habitats and communities. However, we expect the impacts on water quality and prey resources to be low, because the light-touch trawl gear is designed to have minimal contact with the seafloor and reduce bycatch compared to traditional trawl gear. In addition, we expect that any impacts to water turbidity and benthic communities would be temporary and short-lived, due to the short duration of the proposed survey and proposed tows.

Therefore, we agree that the potential effects on water quality and the availability of prey resources will be insignificant.

Salmon and Steelhead

SFD determined that the proposed action is not likely to adversely affect ESA-listed salmonids because the probability of incidentally capturing salmonids in the trawl gear is unlikely based on the fishing methods to be used and the fact that no salmonids were incidentally captured during similar trawl surveys conducted in Monterey Bay by CDFW in 2007 and 2010 (CDFG 2007, 2010).

PRD concurs that the proposed action is not likely to adversely affect ESA-listed salmonids because the probability of incidentally capturing salmonids during the proposed survey is extremely unlikely. Although ESA-listed salmonids may be in the action area during the time of the proposed survey, we agree that the capture of salmonids is unlikely based on the fishing methods to be used in the survey. The trawl gear will be deployed near the sea floor to fish for benthic halibut, rather than higher up in the water column. This will reduce the likelihood of capturing pelagic species, like salmonids. In addition, the trawl gear to be used is designed to collapse on itself when the doors are not in proper fishing configuration, making the net unfishable when it is being let down to the seafloor or brought back up to the vessel. This design will minimize the risk of incidentally capturing salmonids when deploying or retrieving the trawl gear. The lack of encounters with salmonids during the 2007 and 2010 trawl surveys further supports the low likelihood of encountering salmonids in the proposed survey.

ESA CONCLUSION

Based on the information and analyses discussed above, PRD concurs with SFD's determination that the proposed action may affect, but is not likely to adversely affect, ESA-listed marine mammals, sea turtles, salmonids, and green sturgeon and/or destroy or adversely modify designated critical habitat for leatherback sea turtles and green sturgeon.

This concurrence does not provide coverage for the take of ESA-listed species or non-listed marine mammals. Although NMFS does not anticipate incidental take of ESA-listed species due

to this proposed study, in the extremely unlikely event that incidental take of an ESA-listed species occurs as a result of this project (e.g., incidental capture or entanglement, vessel strikes, or harassment of ESA-listed species), SFD should immediately stop all operations and contact NMFS SWR PRD staff for further direction prior to releasing or discarding the animal. If an animal is captured or entangled and may suffer additional harm if not released immediately, we recommend that you release the animal if you can do so without danger to the animal or to personnel and contact NMFS SWR PRD immediately or simultaneously for further direction. Please note that NMFS regulations (*e.g.*, handling and resuscitation requirements for threatened sea turtles under 50 C.F.R. § 223.205(b)(5)) may apply and accordingly may supplement or supersede any of the recommendations concerning release or discarding discussed above.

The PRD points of contact are:

- Marine mammals: Monica DeAngelis (562-980-3232, Monica.DeAngelis@noaa.gov)
- Sea turtles: Christina Fahy (562-980-4023; Christina.Fahy@noaa.gov)
- Green sturgeon: Susan Wang (562-980-4199; Susan.Wang@noaa.gov)
- Salmon and steelhead: Jacqueline Pearson-Meyer (707-575-6057; Jacqueline.Pearson-Meyer@noaa.gov)

PRD would also appreciate a copy of any survey reports generated after the study has been terminated to assess impacts.

This concludes informal consultation for the proposed action. Reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered, (2) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered, or (3) a new species is listed or critical habitat designated that may be affected by the action. As noted above, injury or death of the listed species described herein are not expected from this project; evidence of such an outcome would require re-initiation under (1) of this paragraph.

If you have any questions regarding this memorandum or other ESA-related issues, please contact Susan Wang at 562-980-4199 or Susan.Wang@noaa.gov

Additional Comments Regarding Species Protected under the Marine Mammal Protection Act

Although not subject to this consultation, we note that several non ESA-listed marine mammal species also occur within the action area. These species are protected under the Marine Mammal Protection Act (MMPA) and include: California sea lions (*Zalophus californianus*), Pacific harbor seals (*Phoca vitulina*), northern fur seals (*Callorhinus ursinus*), northern elephant seals (*Mirounga angustirostris*), Pacific white-sided dolphins (*Lagenrhynchus obliquendens*), short-beaked common dolphins (*Delphinus delphis*), northern right-whale dolphins (*Lissodelphis borealis*), striped dolphins (*Stenella coeruleoalba*), common bottlenose dolphins (*Tursiops truncatus*), Risso's dolphins (*Grampus griseus*), harbor porpoise (*Phocoena phocoena*), Dall's porpoise (*Phocoenoides dalli*), Minke whales (*Balaenoptera acutorostrata*), and killer whales

(*Orcinus orca*). The monitoring and mitigation protocol would apply to these species as well as to the ESA-listed species discussed above, and provide precautionary measures which might help to minimize the risk of interactions with the research vessel and trawl gear. Please note that the discussion of MMPA issues contained herein is for informational purposes only and does not affect any obligations SFD may have under the MMPA with regard to the underlying action; specifically, this letter does not provide Incidental Harassment or Take Authorization for any marine mammals.

In addition, if incidental take of a marine mammal occurs as a result of this project, SFD should immediately stop all operations and contact Monica DeAngelis or Christina Fahy for further direction, as described above. This event would trigger the need for SFD to obtain coverage under the MMPA for take of marine mammals.

REFERENCES CITED

Al-Humaidhi, A.W., M.A. Bellman, J. Jannot, and J. Majewski. 2012. Observed and estimated total bycatch of green sturgeon and Pacific eulachon in 2002-2010 U.S. west coast fisheries. West Coast Groundfish Observer Program. NMFS NWFSC, 2725 Montlake Blvd E., Seattle, WA 98112. 27 pp.

Benson, S.B., T. Eguchi, D.G. Foley, K.A. Forney, H. Bailey, C. Hitipeuw, B.P. Samber, R.F. Tapilatu, V. Rei, P. Ramohia, J. Pita, and P.H. Dutton. 2011. Large-scale movements and high-use areas of western Pacific leatherback turtles, *Dermochelys coriacea*. Ecosphere. 2(7): 1-27.

CDFG. 2007. 2007 Cruise Report, State Finfish Management Project, Fishery Independent Trawl Survey in Monterey Bay. Prepared by T. Tanaka and A. Vincent, CDFG, Monterey, CA. 8 pp.

CDFG. 2010. 2010 Cruise Report, State Finfish Management Project, California Halibut (*Paralichthys californicus*) Trawl Survey in North Monterey Bay. Prepared by T. Tanaka, CDFG, Monterey, CA. 5 pp.

Fahy, Christina. Supervisory Fishery Biologist, NMFS, 19 July 2012. Personal communication, email to Mark Helvey (NMFS SFD) and other NOAA recipients, regarding comments on the potential effects of the proposed light-touch trawl survey on leatherback sea turtles, citing a phone call with Scott Benson, SWFSC, regarding leatherbacks in Monterey Bay.

Fahy, Christina, Supervisory Fishery Biologist, NMFS, 3 August 2012. Personal communication, email to Susan Wang (NMFS), regarding SWFSC 2011 incidental take report to PRD with data on the incidental capture of a leatherback sea turtle in a salmon mid-water trawl survey on 15 July 2011.

Harris, Heather. Wildlife Veterinarian, SWFSC, 28 July 2012. Personal communication, email to Sarah Wilkin (NMFS) and other recipients, regarding the stranding report for a dead leatherback sea turtle stranded 25 July 2012.

Lindley, S., M.L. Moser, D.L. Erickson, M. Belchik, D.W. Welch, E.L. Rechisky, J.T. Kelly, J. Heublein, and A.P. Klimley. 2008. Marine migration of North American green sturgeon. Transactions of the American Fisheries Society 137:182-194.

Majewski, Janell. Research Fish Biologist, WCGOP, NMFS Northwest Fisheries Science Center, 26 July 2012. Personal communication, e-mail to Susan Wang (NMFS), regarding unpublished data on the WCGOP coverage rates for Monterey Bay and groundfish landings in the Monterey port group from 2002 through 2010.

Rasmussen, Rand. Research Fish Biologist, NMFS SWFSC, CA. 18 July 2006. Personal communication, e-mail to David Woodbury (NMFS), regarding green sturgeon bycatch data from the California halibut set-net fishery from 1991-2000.

APPENDIX E: Protected Species Monitoring and Mitigation Protocol

2013 Light-touch California Halibut Trawl Survey in Monterey Bay: Marine Mammal, Sea Turtle, Green Sturgeon and Pacific Sea Nettle Jellyfish Monitoring and Mitigation Protocol

The below marine mammal, sea turtle, green sturgeon and Pacific sea nettle jellyfish monitoring and mitigation protocol are conditions put in place to minimize potential interactions with protected species and/or their critical habitat. Before the survey commences all scientific personnel must be trained by the National Marine Fisheries Service, Southwest Region, Protected Resources Division's (NMFS-SWR-PRD) protected species specialist. The survey shall have one dedicated scientific crew member to perform all at-sea duties below in combination with having additional watches from any available biologists and crew members. The dedicated scientific crew member will be a National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (NMFS-SWR-SFD) biologist.

Marine mammal, sea turtle, green sturgeon and Pacific sea nettle jellyfish (*Chrysaora fuscescens*) protocol, as described below, will be followed prior to, during, and following any trawl deployment. During transit to each station, for a period of at least 30 minutes before the tow, the Captain, deckhands, and all available scientists will visually scan the sea surface for marine mammals, turtles, and jellyfish. If marine mammals, other protected species, or jellyfish are sighted during this period, or upon arrival at the station, the scientific staff will determine if trawling operations can commence without likelihood of interaction between the gear and the animals sighted. This determination will be based on the species and number of animals sighted, their behavior, their position, and their vector relative to the path of the vessel, the professional judgment of scientific crew, and other factors. If marine mammals, turtles, green sturgeon or concentrated patches of jellyfish are directly observed, or if jellyfish are observed on the fathometer during this period and are determined to be at appreciable risk of interaction with gear, then the vessel will move away from the animals, at least 0.5 nm, to a new location within the same general area. For example, Pacific sea nettle jellyfish are considered critical habitat for the leatherback sea turtle under the Endangered Species Act and are an indicator that leatherback sea turtles may be in the area, but having jellyfish in the area does not have as high of scrutiny as other protected species that may be seen. If it has been determined to move to a new location and the protected species follow the vessel then the performing the tow will have to wait until the protected species leave. The final decision to stay or move to a new location should be made by the NMFS-SWR-SFD biologist. The visual scan for marine mammals, turtles, green sturgeon, and jellyfish will continue during each subsequent move until it is determined by the scientific crew that trawling operations can safely commence, or until the station is abandoned.

To reduce the potential of attracting marine mammals and other protected species to the vessel, trawl operations will be the first activity undertaken upon arrival at a new station. During each tow, the Captain and scientific crew will keep a continuous watch for marine mammals, other protected species and jellyfish. The observations should concentrate from the vessel out to a maximum distance of 647feet as that approximately how far the trawl will be from the vessel on any given tow, see Attachment 4 for observation distances depending on tow depth. If animals are sighted while the net is in the water, the scientific crew will document the interaction using a sighting record (Attachment 5) and determine the best strategy to avoid potential takes based on the species and number of animals sighted, their behavior, their positions, and vectors relative to the path of the vessel, and other factors. In some situations the decision may be to immediately retrieve the net and move away from the area. In other situations, the decision may be to continue towing until the animal(s) are clear of the area and away from potential contact with the gear during haul-back, when the risk of entanglement is believed to be highest. For example, if jellyfish, California sea lions or harbor seals are observed then maintain the tow, but if harbor porpoises are observed then the tow should stop. Every effort will be made to deploy and retrieve the

trawl net as quickly as possible to avoid potential interactions with marine mammals, other protected species or jellyfish.

With specific regard to leatherback sea turtles, on each trawl-survey morning or the night before the each survey day, the NMFS-SWR biologist will call Scott Benson (831-771-4154; Scott.Benson@noaa.gov) to get information on the location of any leatherbacks within the specific survey area in order to avoid potential interactions. Further, in past surveys Pacific sea nettle jellyfish were only observed and not weighted or counted due to broken individuals or the numbers were too numerous to be weighed. For the 2013 survey, every attempt will be made to identify, weigh and count jellyfish to the best of the scientific crew's ability as Pacific sea nettle jellyfish are considered primary prey for the leatherback sea turtle.

If one or more marine mammals, sea turtles, or green sturgeon are inadvertently caught in the trawl net and brought aboard, it will be the Captain and the crew's highest priority to release the animal back into the water as soon as it is safely possible. After release of the animal, the scientific crew will be responsible for recording the event on a sighting record form (Attachment 5), noting the status of the animal (e.g., injured, dead or alive), the species, and if possible other details such as sex, size, position of the vessel, time of day, etc. At that time the survey would not be allowed to continue and the survey would cease. Catching a protected species will also trigger immediate telephone contact to the NMFS-SWR-PRD leadership, regardless of the time of day, who will provide direction and take immediate action. Specifically, the scientific crew will immediately notify the appropriate personnel via telephone and convey all the pertinent information regarding the event via email. Monica DeAngelis (562-980-3232; Monica.DeAngelis@noaa.gov) will be notified for marine mammals, Christina Fahy (562-980-4023; Christina.Fahy@noaa.gov) will be notified for sea turtles, and Susan Wang (562-980-4199; Susan.Wang@noaa.gov) will be notified for green sturgeon.

APPENDIX F: Monterey Bay National Marine Sanctuary Permit

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Monterey Bay National Marine Sanctuary
99 Pacific Street, Bldg 455A
Monterey, CA 93940

June 4, 2013

Mr. Travis Tanaka
California Department of Fish and Wildlife
20 Lower Ragsdale Drive, Suite 100
Monterey, CA 93940

Dr. Mark Helvey
National Marine Fisheries Service
Southwest Region
Sustainable Fisheries Division
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802

Dear Mr. Tanaka and Dr. Helvey:

The National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries (ONMS) has approved the issuance of permit number MBNMS-2013-015 to conduct activities within Monterey Bay National Marine Sanctuary (sanctuary) for research purposes. Activities are to be conducted in accordance with the permit application and all supporting materials submitted to the sanctuary, and the terms and conditions of permit number MBNMS-2013-015 (enclosed).

This permit is not valid until signed and returned to the ONMS. Retain one signed copy and carry it with you while conducting the permitted activities. Additional copies must be signed and returned, by either mail or email, to the following individuals within 30 days of issuance and before commencing any activity authorized by this permit:

Erica Burton
Research Permit Coordinator
Monterey Bay National Marine Sanctuary
99 Pacific Street, Bldg 455A
Monterey, CA 93940
Erica.Burton@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

Your permit contains specific terms, conditions and reporting requirements. Review them closely and fully comply with them while undertaking permitted activities.

If you have any questions, please contact Erica Burton at 831-647-4246. Thank you for your continued cooperation with the ONMS.

Sincerely,

Paul Michel
Superintendent

Enclosure

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE

Monterey Bay National Marine Sanctuary
99 Pacific Street, Bldg 455A
Monterey, CA 93940

MONTEREY BAY NATIONAL MARINE SANCTUARY RESEARCH PERMIT

Permittees:
Mr. Travis Tanaka
California Department of Fish and Game
20 Lower Ragsdale Dr. Suite 100
Monterey, CA 93940

Dr. Mark Helvey
National Marine Fisheries Service
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, CA 90802

Permit Number: MBNMS-2013-015
Effective Date: July 1, 2013
Expiration Date: August 30, 2013

Project Title: California halibut light-touch trawl feasibility study

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This permit is issued for activities in accordance with the National Marine Sanctuaries Act (NMSA), 16 USC §1431 *et seq.*, and regulations thereunder (15 CFR Part 922). All activities must be conducted in accordance with those regulations and law. No activity prohibited in 15 CFR Part 922 is allowed except as specified in the activity description below.

Subject to the terms and conditions of this permit, the National Oceanic and Atmospheric Administration (NOAA), Office of National Marine Sanctuaries (ONMS) hereby authorizes the permittee listed above to conduct research activities within Monterey Bay National Marine Sanctuary (MBNMS or sanctuary). All activities are to be conducted in accordance with this permit and the permit application received May 31, 2013. The permit application is incorporated into this permit by reference; provided, however, that if there are any conflicts between the permit application and the terms and conditions of this permit, the terms and conditions of this permit shall be controlling.

Permitted Activity Description:
The following activities are authorized by this permit:

Alteration of the seafloor for conducting California halibut light-touch trawl feasibility survey.

No further violation of sanctuary regulations is allowed.

Permitted Activity Location:
The permitted activity is allowed only in the following location(s):

The proposed survey will take place at depths from approximately 10 to 35 fathoms (60 to 210 feet) on sandy, soft-bottom between approximately 36° 56' North latitude to 36° 48'

North latitude; approximately 3-4 miles from shore from Capitola (Santa Cruz County) to Moss Landing (Monterey County).

Special Terms and Conditions:

1. All authorized activities may be conducted from July 1, 2013 through August 30, 2013. All equipment shall be removed no later than the expiration date of this permit. The permittee may request an amendment from the MBNMS Superintendent in advance of this expiration date, to extend the effective date of this permit.

2. Permitted activities shall include the use of light-touch trawl gear designed to comply with the California Fish and Game Commission's criteria (California Code of Regulations Title 14 §124).

3. Permittee shall adhere to the Monitoring and Mitigation Protocols and observation distances, which were finalized by National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (SFD) and transmitted to National Marine Fisheries Service, Southwest Region, Protected Resources Division (PRD) in April 2013 as part of Section 7 consultation of the Endangered Species Act.

4. All equipment authorized for installation under this permit (including, but not limited to, anchors weighing less 500 pounds, mooring lines, tackle, buoys, individual instruments, and platforms) shall be removed when such equipment is no longer in use.

5. The equipment and support structures authorized by this permit shall be used in accordance with the methods and objectives identified in the permit application and Special Conditions included here. Disturbance of any other sanctuary resources is prohibited.

6. No activity authorized by this permit shall disturb or impact any historical or marine archaeological resources of the sanctuary. If historical or marine archaeological resources are encountered at any time, the permittee shall cease all further activities under this permit and immediately contact the MBNMS Superintendent.

7. All equipment authorized for installation under this permit shall be removed when such equipment is no longer in use, or sooner if directed by the MBNMS Superintendent if such equipment is causing or may cause unacceptable harm to sanctuary resources or qualities. Intentional abandonment of equipment or any item is prohibited. In the event that any mooring or equipment are damaged or dislocated due to weather or any other cause, the permittee shall use all available means to locate and recover the affected item(s). The location and description of any equipment abandoned or lost in the sanctuary for any reason shall be noted in the summary report with an explanation why the equipment was not recovered.

8. All items (e.g. batteries, data recorders, etc.) removed from instrument packages attached to mooring arrays or platforms must be carried to the surface and stored or disposed of

properly ashore. At no time may batteries be exposed to the sea or discarded within the sanctuary.

9. If contacted by MBNMS Sanctuary Integrated Monitoring Network (SIMoN) staff, the permittee agrees to provide project metadata from these permitted activities to the MBNMS Sanctuary Integrated Monitoring Network via a web-based interface. The permittee shall provide the information to the MBNMS within three (3) months of the request date. See http://www.sanctuarysimon.org for more information.

10. The permittee shall submit an annual report of all activities conducted under this permit to the MBNMS Permit Coordinator **no later than September 30, 2013**. The report should include information regarding daily activities such as location (latitude and longitude) of samples, monitoring efforts and sightings, discovery or disturbance of historical artifacts, problems encountered, equipment lost, etc. The annual report shall also include a synopsis of research results to date.

11. This activity may also require permission from other agencies. The enclosed permit is not valid until all other necessary permits and/or authorizations are obtained. Any direct or incidental harassment of marine mammals requires a permit from the National Marine Fisheries Service (contact Monica DeAngelis at 562-980-3232) and/or U.S. Fish and Wildlife Service (contact Douglass Cooper at 805-644-1766). Direct or incidental harassment of seabirds requires a permit from the U.S. Fish and Wildlife Service. Deployment of mooring or surface buoys may require authorization from the US Coast Guard (contact Brian Aldrich at 510-437-2983). Research conducted within California state waters or California state marine protected areas (MPA) may require permission from the California Department of Fish and Wildlife (contact Brian Owens at bowens@wildlife.ca.gov). Drilling into rock or installing devices may require permission from the California State Lands Commission (contact Grace Kato at 916-574-1227 or grace.kato@slc.ca.gov).

12. The permittee may be required to pay any or all expenses associated with the locating of and/or removal by NOAA or its designee of any equipment that is not recovered by the permittee.

General Terms and Conditions:

1. Within 30 (thirty) days of the date of issuance, the permittee must sign and date this permit for it to be considered valid. Once signed, the permittee must send copies, via mail or email, to the following individuals:

Erica Burton
Research Permit Coordinator
Monterey Bay National Marine Sanctuary
99 Pacific Street, Bldg 455A
Monterey, CA 93940
Erica.Burton@noaa.gov

National Permit Coordinator
NOAA Office of National Marine Sanctuaries
1305 East-West Highway (N/ORM6)
SSMC4, 11th Floor
Silver Spring, MD 20910
nmspermits@noaa.gov

2. It is a violation of this permit to conduct any activity authorized by this permit prior to the ONMS having received a copy signed by the permittee.

3. This permit may only be amended by the ONMS. The permittee may not change or amend any part of this permit at any time. The terms of the permit must be accepted in full, without revision; otherwise, the permittee must return the permit to the sanctuary office unsigned with a written explanation for its rejection. Amendments to this permit must be requested in the same manner the original request was made.

4. All persons participating in the permitted activity must be under the supervision of the permittee, and the permittee is responsible for any violation of this permit, the NMSA, and sanctuary regulations for activities conducted under, or in junction with, this permit. The permittee must assure that all persons performing activities under this permit are fully aware of the conditions herein.

5. This permit is non-transferable and must be carried by the permittee at all times while engaging in any activity authorized by this permit.

6. This permit may be suspended, revoked, or modified for violation of the terms and conditions of this permit, the regulations at 15 CFR Part 922, the NMSA, or for other good cause. Such action will be communicated in writing to the applicant or permittee, and will set forth the reason(s) for the action taken.

7. This permit may be suspended, revoked or modified if requirements from previous ONMS permits or authorizations issued to the permittee are not fulfilled by their due date.

8. Permit applications for any future activities in the sanctuary or any other sanctuary in the system by the permittee might not be considered until all requirements from this permit are fulfilled.

9. This permit does not authorize the conduct of any activity prohibited by 15 CFR § 922, other than those specifically described in the "Permitted Activity Description" section of this permit. If the permittee or any person acting under the permittee's supervision conducts, or causes to be conducted, any activity in the sanctuary not in accordance with the terms and conditions set forth in this permit, or who otherwise violates such terms and conditions, the permittee may be subject to civil penalties, forfeiture, costs, and all other remedies under the NMSA and its implementing regulations at 15 CFR Part 922.

10. Any publications and/or reports resulting from activities conducted under the authority of this permit must include the notation that the activity was conducted under National Marine Sanctuary Permit MBNMS-2013-015 and be sent to the ONMS officials listed in general condition number 1.

11. This permit does not relieve the permittee of responsibility to comply with all other federal, state and local laws and regulations, and this permit is not valid until all other

necessary permits, authorizations, and approvals are obtained. Particularly, this permit does not allow disturbance of marine mammals or seabirds protected under provisions of the Endangered Species Act, Marine Mammal Protection Act, or Migratory Bird Treaty Act. Authorization for incidental or direct harassment of species protected by these acts must be secured from the U.S. Fish and Wildlife Service and/or NOAA Fisheries, depending upon the species affected.

12. The permittee shall indemnify and hold harmless the Office of National Marine Sanctuaries, NOAA, the Department of Commerce and the United States for and against any claims arising from the conduct of any permitted activities.

13. Any question of interpretation of any term or condition of this permit will be resolved by NOAA.

Your signature below, as permittee, indicates that you accept and agree to comply with all terms and conditions of this permit. This permit becomes valid when you, the permittee, countersign and date below. Please note that the expiration date on this permit is already set and will not be extended by a delay in your signing.

Travis Tanaka

10 June 2013

Mr. Travis Tanaka — Date
Environmental Scientist
California Department of Fish and Game

6-11-13

Dr. Mark Helvey — Date
Assistant Regional Administrator
National Marine Fisheries Service

6-7-13

Paul Michel — Date
Superintendent
Monterey Bay National Marine Sanctuary

APPENDIX G: CRUISE REPORT: Investigation into the Feasibility of Use and Seafloor Interaction of Light-Touch Trawl Gear in the Former Trawl Grounds of Monterey Bay

State of California – Natural Resources Agency
DEPARTMENT OF FISH AND WILDLIFE
20 Lower Ragsdale Dr. suite 100
Monterey, CA 93940
www.wildlife.ca.gov

EDMUND G. BROWN JR., Governor
CHARLTON H. BONHAM, Director

CRUISE REPORT

Investigation into the Feasibility of Use and Seafloor Interaction of Light-Touch Trawl Gear in the Former Trawl Grounds of Monterey Bay

Prepared by

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September 26, 2013

Vessel: F/V Cecelia

Dates: August 10-13, 2013

Purpose: Conduct a fishery-independent survey to document seafloor interactions and species catch composition by use of "light-touch" trawl gear and to investigate the economic feasibility of using this gear in the former California halibut (halibut) trawl grounds of Monterey Bay:

1. Attach remote cameras to the trawl doors and headrope to document seafloor interactions and degree of contact.

2. Measure, weigh when possible, and assess condition of catch.

3. Measure, tag and release all live legal-sized fish of the target species California halibut (*Paralichtys californicus*).

4. Retain sublegal-sized halibut for life history studies.

5. Obtain economic information from the captain of the F/V Cecelia on fishing operations during the survey.

6. Monitor and record any protected species interactions.

Procedure:

This survey was a research partnership among the California Department of Fish and Wildlife (CDFW), the National Marine Fisheries Service, Southwest Region, Sustainable Fisheries Division (NOAA Fisheries), and commercial halibut trawl fishermen. The survey was conducted

in Monterey Bay, within the boundaries of the National Oceanic and Atmospheric Administration's, Monterey Bay National Marine Sanctuary (MBNMS). The MBNMS required issuance of a permit in order for the CDFW and NOAA Fisheries to conduct the survey within its boundaries. The lead action agency for the survey was NOAA Fisheries, and the CDFW was considered a non-Federal representative which conducted the at-sea research and carried out many aspects of the survey. Further, since the NOAA Fisheries contributed equipment and had an at-sea biologist performing duties on-board the survey vessel, this was considered a major Federal action requiring both National Environmental Policy Act (NEPA) and Endangered Species Act (ESA) consultations.

The section 7 ESA consultation was finalized on May 28, 2013, the Categorical Exclusion Memo and Checklist to satisfy NEPA requirements were approved on May 30, 2013, and the MBNMS Permit (#MBNMS-2013-015) was approved on June 4, 2013, allowing the survey to take place. The F/V Cecelia was contracted to run the survey and operated out of Moss Landing Harbor, adjacent to Monterey Bay. Using the contracted fisherman's knowledge and data from previous CDFW trawl surveys, the F/V Cecelia conducted 30-minute tows using "light-touch" trawl gear as defined in CCR Title 14 §124. All tows followed a pre-determined bottom contour or followed the best possible course given tide and current direction. Prior to each tow, NOAA Fisheries staff would scan the immediate area for signs of threatened, endangered and other protected species in the fishing area.

Legal-sized (legal) halibut collected in the trawl were measured, sexed by gently squeezing the abdomen and looking for milt or hydrated eggs, tagged, and released. Sublegal-sized (sublegal) halibut were to be retained for life history studies. All associated species were measured and weighed in aggregate when possible. All halibut and any other finfish species not weighed at sea had weights estimated from CDFW data and/or established length/weight estimates for that species. All finfish and invertebrates were placed into separate bins with fresh seawater to keep them alive before assessment and release. All live specimens were released upon completion of data collection.

Results:

Twenty tows at 30 minutes per tow were completed over 4 days (Figure 1). Typically commercial halibut trawlers will tow for 1-3 hours, depending upon whether they are fishing for the live or fresh market. The purpose of the shorter tow time for this survey was to document via video gear interaction with the seafloor, to ensure that captured species would have an increased chance of survival upon release, and to reduce the chance of interactions with threatened, endangered, or other protected species. Average tow speed was approximately 2.3 to 2.7 knots. Most of the tows were performed in the northern part of the bay due to better water clarity for filming and to avoid the larger quantities of sea nettles (phylum Cnidaria) that were present elsewhere in the bay. Weather for the cruise was excellent with little wind or swell.

The survey used GoPro Hero 2 cameras mounted on the trawl doors and/or headrope to document fishing gear contact with the seafloor. NOAA Fisheries personnel collected video clips on 15 of the 20 tows performed during the survey. The quality of the video was dependant on light and depth of the tow. Of the 18 videos collected, six are considered good quality video and will be analyzed for seafloor contact and net performance by a NOAA fisheries biologist.

There were 55 legal halibut caught, all of which were tagged and released in good condition. No sublegal halibut were caught. All released halibut had some degree of split caudal fins and minor bruising on the blind side. Many of the released halibut, despite minor bruising and split

fins, were very lively and swam away immediately upon release. The total estimated weight was 761.3 pounds (345.3 kilograms) with a length range of 578-975 mm.

In addition to halibut, there were 33 incidentally caught species (Table 1). The top three vertebrate species by count were California skate (*Raja inornata*, 302), shortbelly rockfish (*Sebastes jordani*, 287), and Pacific sanddab (*Citharichthys sordidus*, 241). The most abundant invertebrate species was Dungeness crab (*Metacarcinus magister*, 656). Sea nettle jellyfish (*Chrysaora fuscescens)* were present in small amounts in 16 of the tows. All rockfish captured were juvenile and averaged 89 mm fork length. No groundfish that are designated as overfished by the federal government were captured.

For all finfish, regardless of species, 85.9 percent by count were considered to be in good or excellent condition prior to release. For the invertebrates, all jellyfish were assessed to be in poor or dead condition after capture. For the remaining individual invertebrates (739), except for two market squid and one octopus, all were released in good or excellent condition.

In order to satisfy the requirements of the ESA consultation, NOAA Fisheries provided one dedicated scientific crew member to perform all the ESA monitoring and mitigating protocol at-sea duties. No ESA threatened or endangered species, or other protected species were encountered while transiting to the fishing grounds, fishing, or during any other part of the survey.

Economic data were gathered by NOAA Fisheries personnel using an economic survey form given to the captain of the F/V Cecelia. Data were collected on vessel characteristics, trip and catch information, fixed and variable expenses, quantities of catches, expected prices and revenues if the fish would have been landed by the vessel. Data were also collected on monthly distribution of trips, potential expected number of trips in Monterey Bay if the fishery were to re-open, potential expected revenue, and potential fleet size. The data collected are only intended to be used for the purpose of determining the practicality of using light-touch trawl gear to catch halibut in the former trawl grounds of Monterey Bay. A final/full report of the survey results (including both economic and video analysis) is in preparation and will be available by December 2013.

Personnel: Travis Tanaka, Co-principle investigator, CDFW
Lyle Enriquez, Co-principle investigator, NOAA Fisheries
Morgan Castagnola, Vessel captain
Daniel Castagnola, Deckhand
Cheryl Barnes, Moss Landing Marine Labs, August 10-11, 2013
Kristine Lesyna, CDFW, August 12-13, 2013
Michael McCorkle, Southern California Trawlers Association
Tonya Wick, NOAA Fisheries-ESA Biological Assessment

Figure1. Trawl area, including tow track lines.

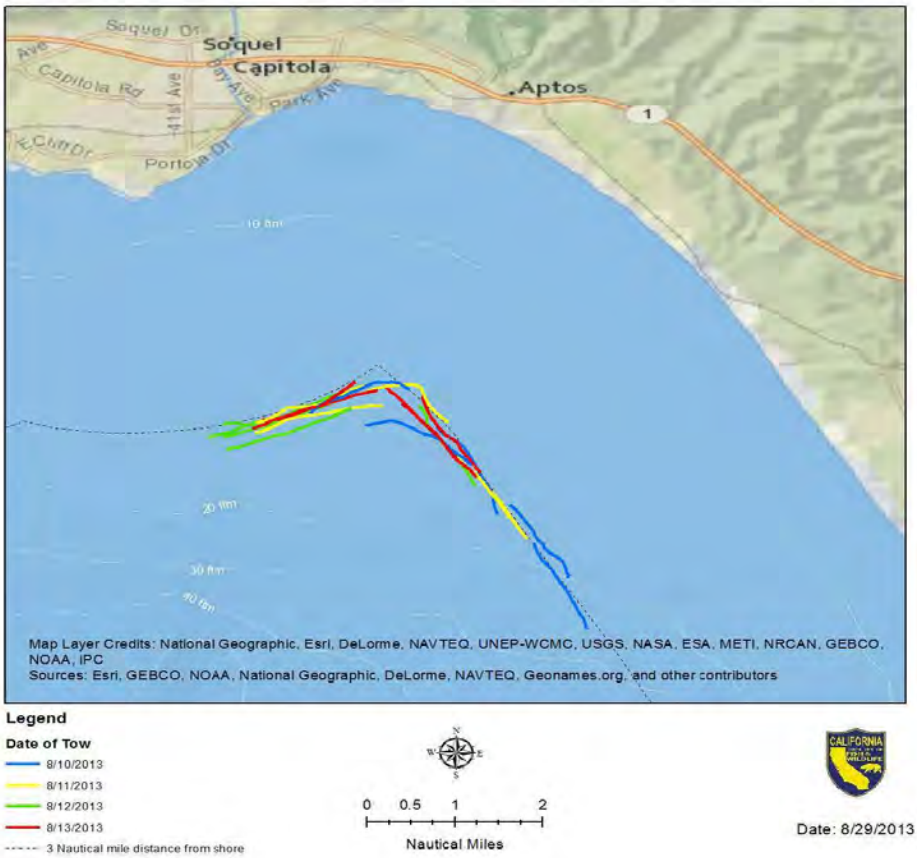

Table 1. Total catch from light touch trawl survey in Monterey Bay, August 2013, including individual numbers and total weight.

Scientific Name	Common Name	Number	Weight (lb)
Metacarcinus magister	Dungeness crab	656	659.0
Raja inornata	California skate	302	557.25
Sebastes jordani	shortbelly rockfish	287	4.75**
Citharichthys sordidus	Pacific sanddab	241	56.3
Sebastes goodei	chilipepper rockfish (juvenile)	179	3.25**
Genyonemus lineatus	white croaker	163	24.25
Parophrys vetulus	English sole	152	34.8
Zaniolepis latipinnis	longspine combfish	141	11.0**
Raja binoculata	big skate	112	966.25
Chrysaora fuscescens	brown sea nettle	91	499.5**
Peprilus simillimus	Pacific butterfish	84	7.0**
Eopsetta jordani	petrale sole	79	88.75
Platichthys stellatus	starry flounder	72	240.5
Paralichtys californicus (legal-size))	California halibut	55	761.3*
Doryteuthis opalescens	California market squid	45	5.0
Pleuronichthys decurrens	curlfin turbot	35	11.45
Psettichthys melanostictus	sand sole	34	31.5
Ophiodon elongates	lingcod (juv)	33	0
Octopus spp.	Octopus	23	0
Leptocottus armatus	staghorn sculpin	15	6.75
Squalus acanthias	spiny dogfish	9	60.5**
Chitonotus pugetensis	roughback sculpin	8	0
Lunatia lewisii	moon snail	6	0
Pisaster brevispinus	giant pink seastar	4	0
	sea star spp	4	
Pycnopodia helianthoides	sunflower star	4	4
Metacarcinus gracilis	slender crab	3	
Hyperprosopon anale	spotfin surfperch	3	
Synodus lucioceps	California lizardfish	2	0
Zalembius rosaceus	pink sea perch	2	0
Myliobatis californica	bat ray	1	11.5
Pleuronichthys verticalis	hornyhead turbot	1	0.5
Clupea pallasi	Pacific herring	1	0
Cancer productus	red rock crab	1	0

*= calculated weights based on Department sample data
**=Total weight calculated from on-board weights and established length/weight relationship data

0=No weight due to small size, lack of length/weight relationship data, or unable to calculate average weight due to low catch

APPENDIX H: Economic Survey

An Economic Survey for the "Light-Touch Trawl" Research Vessel for California Halibut in Monterey Bay

Conducted by:
NOAA Fisheries – Southwest Region

NOTE: This survey form is intended to be used only for the vessel that participated in the "Light-Touch Trawl" gear experiment in Monterey Bay targeting California Halibut during July ___to ___, 2013.

Part A: INTERVIEWEE INFORMATION

1. Name: _____
2. Interviewee's Role/Relationship: ___Owner-Operator ___Non-owner/Captain ___Non-operator owner
3. Address: _____
4. Telephone: ( ) _____ Fax: ( ) _____ E-mail: _____

Part B: VESSEL OWNERSHIP AND CHARACTERISTICS

5. Please verify the following information on record about your vessel's characteristics.

Item	Information on Record
USCG Vessel ID	
State Vessel ID	
Vessel Name	
Owner's Name	
Owner's Address	
Home Port	
Vessel Length (feet)	
Fuel Capacity (gallons)	
Vessel Capacity (gross tons)	
Vessel Capacity (net tons)	
Engine Horsepower (HP)	

Part C: TRIP and CATCH INFORMATION

6. Number of trip(s) during the research experiment: _____
7. Total number of tows during the research experiment: _____

8. Please provide the quantities of catches, expected prices and ex-vessel revenue for California halibut and other marketable species during this research experiment (for all trips and tows).

Fish Species	No. of Fishes	Catch Weights (Pounds)	*Expected Price (US $/lb)	*Expected Ex-Vessel Revenues (US$)
California halibut				
Species 2				
Species 3				
Species 4				
Species 5				
Species 6				
Species 7				

*Note: Expected figures if were sold.

Part D: VARIABLE EXPENSES

9. Please provide variable expenses incurred while targeting California halibut during this research experiment. Please provide data on a per trip basis OR for all trips OR both.

Variable Costs Items	Variable Cost	
	Per Trip (US$/Trip)	All Trips (US$)
Captain*		
Crew*		
Fuels		
Food and crew provisions		
Ice		
Lubes		
Other supplies		
Freight charges to vessel owner on supplies		
Trucking expenses paid to haul fish to buyer		
Offload expenses (Cross deck fees, port tariffs, hoist fees, etc.)		
Other variable expenses _____		
TOTAL EXPENSES		

*Note: include share payments, bonuses, other forms of compensation while estimating equivalent dollar cost on captain & crews

10. Total fuel usage (for the research): _____ Gallons Total fuel cost: _____ US$
11. Number of Crew (excluding Captain): _____
12. Does the vessel owner also serve as Captain? _____Yes _____No

Part E. ANNUAL FIXED COSTS (For the research vessel in 2012)

13. Please provide estimated annual fixed expenses incurred to this vessel in 2012.

Annual Fixed Costs Items	**Annual Fixed Costs (US$)**
Repair & Maintenance of vessel, gear, and equipment	
Insurance charges	
Interest charges (for purchase of vessel, equipment, etc.)	
Moorage fees	
Fishing association dues	
Purchase of permit	
Leasing of permit	
Other fixed expenses Pls. specify	
Other fixed expenses Pls. specify	
TOTAL EXPENSES	

14. If you adapt your vessel to "light trawl" gear from "Bottom trawl", what will that cost to you?
    a. One time cost: _____US$
    b. Annual recurring cost: _____US$/Year
    c. Per trip recurring cost: _____US$/trip

15. Current market value of this vessel: US $_____
16. Remaining expected life of this vessel: _____ Years
17. Expected Salvage value of this vessel: US$_____

Part F: TRIP and CATCH INFORMATION (On Regular Fishing Trips)

Please provide information <u>for a recent or typical year in the West coast for this vessel.</u>

18. How many days per year did you go fishing *targeting all species* using this vessel in a typical year?
    _____Number of days per year

19. How many trips (or days) per year did you go *targeting California halibut* using the bottom trawl gear?
    _____Number of trips per year

20. Please provide monthly distribution of trips <u>targeting California halibut</u> and their catches off the West Coast (*exclude Monterey Bay area*) by this vessel using bottom-trawl gear in a typical recent year.

Average Trips and catches using **Bottom-trawl gear**	Jan	Feb	Mar	Apr	Mar	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of Trips or Days (Trips/Month)												
Halibut Catches (Pounds/Trip)												

Expected Halibut Trips by "Light-Touch Trawl" in the Monterey Bay Area:

21. IF "light-touch trawl" gear is allowed in the Monterey Bay area, how many trips per year do you expect to take in this area targeting California halibut?
_____ *Number of trips per year*

22. Please provide how many halibut trips you anticipate taking each month in the Monterey Bay area IF "light-touch trawl" gear is allowed. Please, provide your best estimate of how much halibut you expect to catch with this vessel.

Expected Number of Trips and Catches	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**
Number of Trips (or Days)												
Halibut Catches (Pounds/ trip)												

Part G. EXPECTED REVENUE FROM CALIFORNIA HALIBUT RELATIVE TO ALL FISHES

23. If fishing for halibut with "light-touch trawl" gear is permitted in Monterey Bay area, do you expect an increase in annual revenue to this vessel? _____ *Yes* _____ *No.*

If "YES":*a)* Revenue from halibut alone is likely to increase by _____%
b) Total Revenue from all species likely to increase by _____%

24. If this vessel had fish revenue from California halibut, what would that constitute relative to total annual sales of all species?
Halibut constitute _____% of total annual sales from all species.

25. If "light-touch trawl" gear is opened in Monterey Bay area, will you reduce the number of trips targeting halibut in other West coast areas? _____ Yes _____ No

If "YES",
a) No. of trips targeting halibut in other Westcoast areas may be reduced by about ____trips / year
b) No. of trips targeting halibut in other West coast areas may be reduced by about _____% per year

Part H: POTENTIAL FLEET SIZE

26. Please provide estimate of the fleet size or number of trips (by all vessels) in the Monterey Bay area if fishing is permitted in the future for California halibut using "light-touch trawl":
_____ Potential number of "Light-touch" Trawlers per year
_____ Potential number of trips per year by individual "Light-touch" trawler

27. Please provide any other useful economic information that you would like to share in targeting the California halibut using "light-trawl gear" in the Monterey Bay Area in July 2013.

Survey Conclusion and Paper Reduction Act Statement

Thank you for participating in this survey. Your response to the survey is very much appreciated. The information you provided will used in the economic analysis of experimental data on California halibut catches and other catches using "light-touch trawl" gear in the Monterey Bay area.

Public reporting burden for this information collection, including time for gathering data needed, and completing the survey with an interviewer is estimated to be one hour. Any questions about this survey may be directed to either Naresh Pradhan (562-980-3248) or Lyle Enriquez (562-980-4025) at NOAA Fisheries Southwest Region, 501 W Ocean Blvd Suite 4200, Long Beach, CA 90802 and FAX (562) 980-4047. You may also inquire at the e-mail Naresh.Pradhan@noaa.gov. This survey expires after August, 2013.

APPENDIX I: An Economic Analysis of the Catch Composition in a "Light-Touch" Trawl Gear Survey Targeting California Halibut in the Monterey Bay, California

May 7, 2014

An Economic Analysis of the Catch Composition in a "Light Touch" Trawl Gear Survey Targeting California Halibut in Monterey Bay, California

Naresh C. Pradhan[1]

Executive Summary:

An economic analysis was carried out on the catch composition resulting from experimental trawls targeting California halibut in the Monterey Bay with a vessel using "light touch trawl" gear (i.e., a modified "bottom trawl" gear). The analysis examined the economic feasibility of using the modified gear to target California halibut in the Monterey Bay during the normal commercial fishing season (June to August). It evaluated the differential economic returns for fishing halibut in the Monterey Bay versus other fishing zones in California where halibut trawl fishing occurs. The data used for the analysis included catch data from the experimental trawl surveys, cost earnings survey information from a bottom trawl fisherman who participated in the study, and information from another fisherman with a long history of involvement in the California halibut fishery. To assess the economic feasibility of using the modified trawl gear in the Monterey Bay, the economic profits were estimated using a standard economic approach after deducting all variable and fixed costs from the gross revenue. The initial economic estimates from the experimental results were normalized to enable comparison with existing commercial halibut trawl fisheries by linear standardization for the amount of fishing effort. The performance measure was initially estimated on a per trip basis and then aggregated to the fleet level for the season by taking into account the monthly catch rates and distribution of fishing effort inside Monterey Bay (both historic and from the 2013 trawl experiment) and current fishing effort in more southern areas of the state. The analysis considered the catches of primary target and marketable incidentally-caught species from the study.

[1] Regional Economist (Contractor). NOAA Fisheries, West Coast Region. 501 W Ocean Blvd Suite 4200, Long Beach, CA 90802. E-mail: naresh.pradhan@noaa.gov and Tel: (562) 508-5452.

The results of this analysis show that targeting California halibut in the Monterey Bay generates an economic profit of about $972 per trip during the halibut season. This profit level is substantially higher than the economic profit of about $241 in other fishing zones for the same target species and during the same season. The economic return or profit after paying for the opportunity costs of all resources including the owner-operator's estimated value of labor constitutes about 47 percent of revenue while fishing in the Monterey Bay, but only about 18 percent of revenue in other fishing grounds. The owner operator's wage represents about 25 percent of the fishing revenue in the Monterey Bay area, but about 38 percent of the fishing revenue goes as wage to the owner operator when fishing outside the area, indicating that the Monterey Bay offers higher potential entrepreneurial incentives and income to fishermen if this area were open to fishing. The lower profit margin in fishing zones south of Monterey Bay primarily reflects that bottom trawlers in that area catch less halibut per tow and other marketable non-target species.

About seven fishermen from either south of Monterey Bay or local to the Bay could be expected to travel to or remain in the Monterey Bay area should it be re-opened to trawl fishing for about three months during the June to August period. The fleetwide revenue in the Monterey Bay area would be expected to be about $863,906 with an economic profit of about $408,101 during the halibut season at high effort level, i.e., 20 trips per month per vessel. The fleetwide economic profit for the fishing season in the Monterey Bay area would be expected to be about $306,771 higher compared to fishing for halibut in more southern grounds for the same but high effort level as in the Monterey Bay. The resulting incremental return by halibut fishing in the Monterey Bay relative to more southern fishing grounds would be expected to be about $43,824 per vessel at high effort level. In the other hand, for the very conservative scenario or low fishing effort inside and outside of the Monterey Bay, the fleetwide economic profit in the Monterey Bay area is expected to be about $153,510 higher than in more southern fishing grounds. The resulting incremental return per vessel in the Monterey Bay area is expected to be about $21,930 in economic profit in one halibut season at low effort level. Thus, the economic return differential largely depends on the number of trips for halibut in these fishing grounds.

The additional economic contribution to the California economy through backward linked economic activities due to halibut fishing in the Monterey Bay was estimated. The halibut fishery in the Monterey Bay could contribute an additional economic output to the California

economy in the range of one-half to one million dollars depending upon the level of effort for halibut and/or other targets in other fishing grounds during the halibut fishing season. The economic contribution from the forward linked economic activities at the restaurant or consumer's end will be an additional contribution to the economic impacts of backward linked activities. The economic analysis suggests that the economic return from the halibut fishery in the Monterey Bay area using the modified trawl gear is quite attractive to fishermen relative to same fishery in more southern fishing zones. The gear is economically feasible to provide a lucrative alternative source of income to fishermen in this fishery.

An Economic Analysis of the Catch Composition in a "Light Touch" Trawl Survey Targeting California Halibut in the Monterey Bay, California

Introduction

An economic analysis was carried out on the marketable composition of catch resulting from an experimental trawl study targeting California halibut in the Monterey Bay[2] with a vessel using "light touch trawl" gear (i.e., a modified "bottom trawl" gear). The analysis examined the economic feasibility of using the modified gear to target California halibut in the Monterey Bay during the halibut season (June to August). The analysis evaluated the differential economic returns of trawl fishing for halibut in the Monterey Bay versus more southern fishing zones in California where halibut fishing occurs. The following sections discuss the economic methods and the analysis of the catch experimental and survey results.

Data and Methods

The data used for the analysis included catch data from the experimental trawls, cost earnings survey information from a fisherman who participated in the project, and information from another fisherman with a long history of involvement in the California halibut fishery. Cost-earnings data along with the information on the halibut fishery in general were collected from the participant fisherman. This economic study did not survey all the bottom trawlers engaged in halibut fishing in California since only a limited number of boats from the vicinity of the Monterey Bay area were expected to resume fishing in the area if the current prohibition were lifted. Moreover, the key informants were very well knowledgeable about the fishery as well as other fishermen for their typical fishing behavior and performances, etc.

To assess the economic feasibility of using the modified trawl gear in the Monterey Bay, gross profits[3] in terms of the economic profits were estimated using a standard economic approach after deducting all variable and fixed costs from the gross revenue. Accounting profits were also estimated in the present analysis. Economic profit is more relevant for a rational decision, as it provides a better measure for the fishermen whether to stay in the business in the

[2] Monterey Bay has been closed to bottom trawling since 2006 summer.
[3] Gross profit is the return before interest and taxes. Net profit was not estimated, as this require information on tax and interest expenses.

long term. While economic profit takes into account explicit and implicit costs of all resources used in producing a good, accounting profit may leave out some of the major resource cost items such as owner's own labor or physical space for a business, etc. Accounting profit in this analysis is before the opportunity cost of owner operator's labor.

The data on variable costs were collected for the duration of experimental trawls, but estimates of other fixed cost items were collected for the recent past year. The variable cost items incurred during the fishing trips were labor (crew and captain), fuels and lubrications, foods, repair and maintenance of vessel/gear/equipment, and vessel monitoring system (VMS) operation costs. The fixed costs incurred for the vessel were the moorage fees, fishing association fees, permit fees, vessel safety equipment cost and depreciation charges. The annual fixed costs and the variable expenses for the duration of catch experiment were distributed so as to derive a trip level data.

The experimental trawls occurred over four consecutive days with five tows each day (30 minutes each tow). Therefore, the net time for fishing in this experiment was 2.5 hours per trip day. However, the normal fishing for halibut under normal circumstances is usually four tows per trip day (one hour each tow) or a net time of four hours per trip (or day). The initial economic estimates from the experimental results were, hence, normalized to enable comparison with existing commercial fisheries by linear standardization for the amount of fishing effort (i.e., for the tow hours) by a multiple factor of 1.6. Standardizing effort for "light trawl" and "bottom trawl" gears itself were not considered, as these gears, as used in trawl fisheries to the south, are similar on their operational characteristics and possibly on catch performances in many ways. Moreover, the state has required the use of modified trawl gear to target California halibut in the California Halibut Trawl Grounds (CHTG) since 2008. The performance measure was initially estimated on a per trip basis and then aggregated to the fleet level for the season by taking into account of the monthly catch rates and distribution of fishing effort both in the Monterey Bay and other California halibut trawl grounds south of the area.

Results and Discussion

Descriptive Statistics from the Catch Experiment and Survey:

In the study, California halibut composed 16 percent of catches by weight. The variability on the share of the halibut weight relative to all catches ranged from no catches to as much as 41 percent in a tow (Table 1). Table 2 provides the aggregates of the marketable catch composition during the study where halibut catches consisted of 61 percent of all marketable catches by weight (Table 3). Southern California trawl fishermen usually sell their halibut catches live when possible for reasons of a good market and the premium price paid for live halibut. About 75 percent of the halibut catches are sold live except very large halibut which are sold as dead. [4] The expected prices per pound at the time of study were $7 for live and $5 for dead halibut, thus, a weighted average price of $6.50 per pound was used in the event a live halibut fishery developed in Monterey Bay. The marketable incidental catches are all sold dead. Marketable incidental catch composed about 12 percent of the total incidental catches and 10 percent of all species catches by their weight (Table 3). Table 4 presents the detailed distribution of expected sales revenues from halibut and marketable incidental catches for each tow during the catch experiment. The outcome from the study is linearly extrapolated to the real fishing like scenario by normalizing the experimental outcome by a factor or multiple of 1.6. Therefore, the adjusted revenue from fishing in the Monterey Bay was estimated to about $2,057 per trip (Table 4). The trip level revenue derived from the experimental outcome was used for further economic analyses.

[4] Personal communication with a Santa Barbara based halibut fisherman Mr. Mike McCorkle on January 22, 2014.

Table 1. Catches of California Halibut during the "Light Touch" Trawl Gear Catch Experiment in Monterey Bay, August 10-13, 2013

Trip Day	Tow # (each tow of 30 minutes)	Total Catches from all species		Total Incidental Catches		Halibut Catch		Halibut Catch (%)	Average Percent of Halibut Catch per Trip
		No.	Pounds	No.	Pounds	No.	Pounds		
1	1	456	376	456	376	0	0	0%	11%
	2	254	238	250	202	4	36.4	15%	
	3	273	157	270	127	3	30.1	19%	
	4	160	175	158	151	2	24.2	14%	
	5	238	446	236	426	2	19.7	4%	
2	1	130	206	129	189	1	17.5	8%	14%
	2	58	193	56	175	2	18	9%	
	3	57	59	55	35	2	23.8	40%	
	4	116	203	112	179	4	24.4	12%	
	5	119	133	119	133	0	0	0%	
3	1	85	176	81	113	4	62.8	36%	23%
	2	131	152	130	146	1	6.7	4%	
	3	93	189	92	164	1	25	13%	
	4	105	130	103	94	2	36.5	28%	
	5	77	199	71	129	6	70.4	35%	
4	1	266	252	263	204	3	48.4	19%	27%
	2	101	223	97	174	4	48.8	22%	
	3	79	182	73	108	6	74.2	41%	
	4	148	156	144	119	4	36.7	24%	
	5	376	130	372	89	4	40.7	31%	
Total	**20**	**3,322**	**3,976**	**3,267**	**3,332**	**55**	**644.3**	-	-
Avg.		**166.1**	**198.8**	**163.4**	**166.7**	**2.8**	**32.2**	**16%**	-

Table 2. Primary Target (California halibut) and Marketable Incidental Catch from the Catch Experiment and their Expected Prices

Catches	No. of Fishes	Catches (Pounds)	Estimated Price ($/Pound)		
			If sold live*	If sold dead	Weighted Average Price**
California Halibut	**55**	**644**	$7.00	$5.00	$6.50
Incidental Catches (Marketable***):					
Starry Flounder	69	241	n/a	$3.00	$3.00
Sand sole	37	34	n/a	$1.00	$1.00
Petrale Sole	71	66	n/a	$2.00	$2.00
Pacific sanddab	235	55	n/a	$1.00	$1.00
Turbots (Curlfin, Hornyhead)	42	14	n/a	$1.00	$1.00
Subtotal Incidental Catches	**454**	**409**			

*Price estimates are by the fisherman involved in the catch experiment.
**Weightage average price is based on a general practice of 75% of California halibut sold as live.
*** Incidental catches considered here are marketable fish other than halibut as identified by the fisher in the research experiment.

Table 3. Study Outcome on the Proportion of Halibut Catches Relative to Other Marketable Catches

Species	Catch Number		Catch Weight			
	No. of Fishes	Percent	Catch Pounds	Percent Out of Total Marketable Catches	Percent Out of All Species Catches	Percent Out of All Incidental Catches
CA Halibut	55	11%	644	61%	16%	-
Marketable Incidental Catches	454	89%	409	39%	10%	12%
Total Marketable Catches	509	100%	1,053	100%	26%	-
All Incidental Catches	3,267	-	3,332	-	84%	100%
All Species Catches	3,322	-	3,976	-	100%	-

Table 4. Expected Revenues from the Experimental Trawls in the Monterey Bay (August 10-13, 2013)

Tows	Catch Number		Catch Pounds		Weightage Average Revenue $ (if halibut were sold at 25:75 dead:live)		
	CA Halibut	Marketable Incidental Catches	CA Halibut	Marketable Incidental Catches	*CA Halibut $*	Marketable Incidental Catches $	*Total $*
1	0	81	0.0	68.25	$ 0.00	$ 173.00	$ 173.00
2	4	47	36.4	10.5	236.60	11.00	247.60
3	3	29	30.1	16.1	195.65	35.10	230.75
4	2	15	24.2	14.1	157.30	33.60	190.90
5	2	58	19.7	70	128.05	177.00	305.05
6	1	37	17.5	37	113.75	84.00	197.75
7	2	9	18.0	7.8	117.00	11.30	128.30
8	2	10	23.8	12.25	154.70	31.00	185.70
9	4	15	24.4	14.75	158.60	32.00	190.60
10	0	14	0.0	27.95	0.00	77.35	77.35
11	4	15	62.8	15.4	408.20	33.80	442.00
12	1	9	6.7	11.5	43.55	26.00	69.55
13	1	20	25.0	20.6	162.50	43.70	206.20
14	2	13	36.5	10.5	237.25	26.50	263.75
15	6	14	70.4	8.5	457.60	11.50	469.10
16	3	7	48.4	9.5	314.60	26.50	341.10
17	4	11	48.8	17.5	317.20	45.00	362.20
18	6	9	74.2	10.25	482.30	24.25	506.55
19	4	25	36.7	11.5	238.55	17.50	256.05
20	4	16	40.7	15.25	264.55	34.25	298.80
Study Outcome (Unadjusted):							
Total	55	454	644	409	$ 4,187.95	$ 954.35	$ 5,142.30
Per Trip	14	114	161	102	$1,046.99	$238.59	$1,285.58
Expected Outcome (Adjusted for Study Outcome by 1.6x):							
Total	88	726	1,031	655	$ 6,700.72	$1,526.96	$8,227.68
Per Trip	22	182	258	164	$1,675.18	$ 381.74	$2,056.92

Note: Weighted average revenues are based on ratios of dead and live halibut expected to be sold.

Returns at Trip Level

Tables 5 and 6 summarize the economics of California halibut for the "light touch" trawl gear both in Monterey Bay and other halibut fishing grounds south of the area. The results of this analysis show that targeting California halibut in Monterey Bay generates an economic profit of about $972 per trip during the halibut season. This profit level is substantially higher than the economic profit of $241 in more southern fishing zones for the same target species and season. The economic return or profit after paying for the opportunity costs of all resources including the owner-operator's estimated value of labor constitutes about 47 percent of the fishing revenues in the Monterey Bay area, but only about 18 percent of revenue in more southern fishing grounds. The owner operator's wage represents about 25 percent of the fishing revenue in the Monterey Bay area, but about 38 percent of the fishing revenue goes as wage to the owner operator when fishing south of the area, indicating that the Monterey Bay offers higher potential entrepreneurial incentives and income to fishermen if this area were open. The vessel owner operator's wage or the opportunity cost of his labor which was set at $500 per trip day, i.e., twice the amount of wage paid to a crew (Table 5).

The lower profit margin in the more southern halibut fishing zones primarily reflects the fact that less halibut and other marketable incidentally-caught species are caught in these zones. Bottom trawlers in the more southern fishing grounds catch only about 70 percent of the halibut caught per trip in the Monterey Bay (i.e., the average catch rate per trip is about 180 pounds of California halibut during June-August as compared to the catch rate of 258 pounds in the Monterey Bay). Further, the revenues from marketable incidental catches are also lower south of the Monterey Bay area. Higher valued marketable incidental catches such as starry flounders are largely caught in the Monterey Bay, but they are not common in the other fishing grounds. The revenue from marketable incidental catch is about $382 per trip (i.e., 19 percent of the total revenue) in the Monterey Bay area, but it is about $157 (i.e., 12 percent of the total revenue) in other fishing grounds (Table 6).

Table 5. Costs and Earnings (trip level) of a "Light Touch" Trawl Gear for California Halibut in the Monterey Bay (August 10-13, 2013)

Description of Cost and Earnings	Total $ Value (4-days trip)		$ Value (Per trip day)	
	Experiment (Unadjusted)	Normal Fishing (Adjusted)	Experiment (Unadjusted)	Normal Fishing (Adjusted)
Expected Earnings from:				
Sales-- California halibut (75:25 live : dead)	$ 4,186.00	$ 6,697.60	$1,046.50	$1,671.40
Sales-- Incidental catches	956.00	1,529.60	239.00	382.40
Sub-total-- Expected Sales	***5,142.00***	***8,227.20***	***1,285.50***	***2,056.80***
Variable Costs:				
Wages-- Owner or Captain	2,000.00	2,000.00	500.00	500.00
Wages—Crew	1,000.00	1,000.00	250.00	250.00
Fuels	500.00	800.00	125.00	200.00
Food and crew provisions	200.00	200.00	50.00	50.00
Lubrications	25.00	25.00	6.25	6.25
Repair & maintenance of vessel, gear & equipment	109.59	109.59	27.40	27.40
VMS Operation Cost	6.58	6.58	1.64	1.64
Sub-total-- Variable Costs (with Owner's wage)	***3,841.16***	***4,141.16***	***960.29***	***1,035.29***
Sub-total-- Variable Costs (without Owner's wage)	***1,841.16***	***2,141.16***	***460.29***	***535.29***
Fixed Costs:				
Moorage fees	142.47	142.47	35.62	35.62
Fishing association dues	1.64	1.64	0.41	0.41
Purchase of permit	16.44	16.44	4.11	4.11
Other fixed costs-- Safety Equipment	2.74	2.74	0.68	0.68
Depreciation	36.53	36.53	9.13	9.13
Sub-total--Fixed Costs	***199.82***	***199.82***	***49.95***	***49.95***
Gross Profits:				
Accounting Profit (without Owner's wage)	3,101.02	5,886.22	775.25	**1,471.55**
Economic Profit (with Owner's wage)	1,101.02	3,886.22	275.25	**971.55**
Gross Profit Margin:				
Accounting Profit Margin				**72%**
Economic Profit Margin				**47%**

Table 6. Summary of Costs and Earnings (trip and fleet level) of a "Light Touch" Trawl Gear for California Halibut Inside and Outside of the Monterey Bay Area, August 2013

Fishing Zones and Efforts	No. of Fishes		Catch (Pounds)		Revenue $			Fixed Costs	Variable Costs $		*Total Costs $*		Gross Profits $	
	CA Halibut	Incidental Catches	CA Halibut	Incidental Catches	CA Halibut (75:25 Live:Dead)	Incidental Catches	Total		Without Owner's wage	With Owner's wage	Without Owner's wage	With Owner's wage	Accounting Profit	Economic Profit
Inside the Monterey Bay:														
Catch Experiment (Unadjusted):														
4-days trip	55	454	644	409	$4,188	$954	$5,142	$200	$1,841	$3,841	$2,041	$4,041	$3,101	$1,101
Per trip	14	114	161	102	$1,047	$239	$1,286	$50	$460	$960	$510	$1,010	$775	$275
Normal Fishing (Adjusted):														
4-days trip	88	726	1031	655	$6,701	$1,527	$8,228	$200	$2,141	$4,141	$2,341	$4,341	$5,887	$3,887
Per trip	22	182	258	164	$1,675	$382	$2,057	$50	$535	$1,035	$585	$1,085	$1,472	$972
Outside the Monterey Bay:														
Normal Fishing:														
Per trip	≤22 or ≈14	154*	180	67*	$1,170	$157	$1,327	$50	$535	$1,035	$585	$1,085	$741	$241

* Incidental catch is adjusted for starry flounder, as the species is not generally caught outside the Monterey Bay.

Returns at Fleet Level

Trip level economic data was aggregated to the fleet level for the fishing season (June-August) in the Monterey Bay and the more southern fishing zones. It is assumed that around seven fishermen from other fishing grounds could be expected to trawl the Monterey Bay should the area be opened for California halibut fishing during the June to August period. These fishermen would most likely be originating from Ventura, Santa Barbara, Morro Bay, and Monterey Bay area ports. It is expected that each vessel usually would take on average, about five trips per week or 20 trips per month targeting California halibut in the area. There would be no incentive for these vessels to fish lesser trips after making the effort to travel to Monterey Bay area. However, weekly number of fishing trips during halibut season at the more southern fishing grounds is variable ranging from two to five trips per week or about 10 to 20 trips per month depending upon sea conditions favorable for targeting halibut[5]. Fleetwide revenue and gross profits for the halibut season (Jun-Aug) were estimated for both Monterey Bay area and the more southern fishing grounds (Table 7) by using the information derived from catch experiment and costs-earnings survey. The fleet effort level south of the Monterey Bay area is set at par with the

[5] Personal communication with California halibut fisherman Mr. Mike McCorkle, and based on the information from the survey data.

effort level in the Monterey Bay (i.e., 20 trips per month targeting California halibut) for the comparison of fishing income between these two fishing grounds even if fishermen in other fishing grounds are more likely to take less than 20 trips per month targeting halibut during the halibut season.[6] The fleetwide revenue in the Monterey Bay area is expected to be about $863,906 with an economic profit of about $408,101 during a regular halibut season (Figure 7). In contrast, fleetwide revenue from the halibut target alone could be expected to range from $278,568 to $557,136 during the same time period in halibut fishing grounds south of Monterey Bay. The corresponding economic profits are expected to range from $50,665 to $101,331 in these other fishing grounds. Thus, the fleet level economic return from the Monterey Bay may be four to eight times higher relative to fishing in the more southern fishing grounds.

The gross profits were further decomposed to examine what share of the revenue from halibut fishing accounted for the opportunity costs of owner operator's labor. The owner operator's wage represents about 25 percent of the fishing revenue in the Monterey Bay area, but it is about 38 percent south of the area indicating that the Monterey Bay area offers higher entrepreneurial incentives and income to fishermen if this area is opened (Table 7).

Table 7. Fleetwide Simulation of Profit by Targeting California Halibut (June – August, 2013)

Fishing Zones	No. of trips per month per vessel	Total trips (Jun-Aug)	Fleet size	Revenue ($ per trip)	Gross Profit ($ per trip)		Fleet wide Revenue (Jun-Aug)	Gross Profit (Fleetwide $)		Gross Profit Margin (%)		Owner Operator's wage as % of revenue
					Accounting Profit	Economic Profit		Accounting Profit	Economic Profit	Accounting	Economic	
Inside Monterey Bay	20	60	7	$2,057	$1,472	$972	$863,906	$618,101	$408,101	72 %	47 %	25 %
Outside Monterey Bay	10	30	7	$1,327	$741	$241	$278,568	$155,665	$50,665	56 %	18 %	38 %
	15	45	7	1,327	741	241	417,852	233,498	75,998			
	20	60	7	1,327	741	241	557,136	311,331	101,331			

[6] The survey data reveals that the trawl vessel that participated in the in the halibut catch experiment typically takes about 275 fishing trips in a year of which 175 trips (or 64%) are directed for California halibut. Fishing trips in other fishing grounds during June to February range between 15-20 trips per month, but 10-15 trips during March to May.

Table 8. Simulated Comparison of Annual Returns to Owner by Fishing California Halibut Inside and Outside the Monterey Bay Area (June-August)

Scenario	Effort Level	Fishing Area and Differences in Returns	Fleet Size	Trips per month by a fisher (Jun-Aug)	Total trips by a fisher during (Jun-Aug)	Annual Return to Vessel Owner Operator (Jun-Aug)			
						Accounting Profit ($ per trip)	*Economic Profit ($ per trip)*	*Accounting Profit ($ fleetwide)*	*Economic Profit ($ fleetwide)*
1	High or Equal Effort	Inside Monterey Bay	7	20	60	$1,472	$972	$618,101	**$408,101**
		Outside Monterey Bay	7	20	60	741	241	311,331	**101,331**
		Differences in Annual Fleet Returns						*306,771*	***306,771***
		Annual Incremental Return per Vessel by fishing in Monterey Bay						*43,824*	***43,824***
2	Medium Effort)	Inside Monterey Bay	7	20	60	1,472	972	618,101	408,101
		Outside Monterey Bay	7	15	45	741	241	233,498	75,998
		Differences in Annual Fleet Returns						***384,603***	***332,103***
		Annual Incremental Return per Vessel by fishing in Monterey Bay						***54,943***	***47,443***
3	Low Effort	Inside Monterey Bay	7	20	60	1,472	972	618,101	408,101
		Outside Monterey Bay	7	10	30	741	241	155,665	50,665
		Differences in Annual Fleet Returns						*462,436*	***357,436***
		Annual Incremental Return per Vessel by fishing in Monterey Bay						*66,062*	***51,062***
4	Medium Effort in Both Zones	Inside Monterey Bay	7	15	45	1,472	972	463,680	306,180
		Outside Monterey Bay	7	15	45	741	241	233,415	75,915
		Differences in Annual Fleet Returns						230,265	**230,265**
		Annual Incremental Return per Vessel by fishing in Monterey Bay						32,895	**32,895**
5	Low Effort in Both Zones	Inside Monterey Bay	7	10	30	1,472	972	309,120	204,120
		Outside Monterey Bay	7	10	30	741	241	155,610	50,610
		Differences in Annual Fleet Returns						153,510	**153,510**
		Annual Incremental Return per Vessel by fishing in Monterey Bay						21,930	**21,930**

Table 8 summarizes pairwise comparison of fleetwide return when fishing halibut inside and south of the Monterey Bay area for various effort levels. As indicated earlier, per vessel effort level in the Monterey Bay area is fixed at 20 trips per month (i.e., 60 trips during the fishing season), but it ranges from about 10 to 20 trips per month (i.e., 30 to 60 trips during the fishing season) in the other fishing grounds depending upon availability of halibut or sea conditions for fishing. Scenario 1 (best case scenario) is for a high level of fishing effort for California halibut in fishing grounds south of the Monterey Bay. The effort level for halibut is also set at par with the effort level of that in the Monterey Bay. In the other hand, Scenario 3 is for a low level of effort (i.e., 10 trips per month) by a vessel south of the Monterey Bay. A typical or medium fishing effort for halibut south of the Monterey Bay (i.e., Scenario 2) would be about 15 trips per month (i.e., 45 trips in a fishing season) by a vessel.[7] Scenario 4 and 5 are lower effort levels in the Monterey Bay, i.e., lower than 20 trips per month per vessel. Lower effort levels in more southern fishing grounds could be either due to less availability of halibut or unfavorable sea conditions for fishing.

[7] The data for the effort levels in the Monterey Bay area and outside the area is from the survey of California halibut fishermen and personal communication with Mike McCorkle.

The incremental revenues for halibut fishing in Monterey Bay relative to more southern fishing grounds are estimated to be about $585,338 for a low level of effort; $446,054 for medium level of effort; and $306,770 for a high level of effort in these other fishing grounds (Table 7). For the best case scenario[8] or high fishing effort (Scenario 1) south of the Monterey Bay, the fleetwide economic profit in the Monterey Bay area is expected to be about $306,771 higher than in the more southern fishing grounds. The resulting incremental return per vessel in the Monterey Bay area is expected to be about $43,824 in economic profit in one halibut season (Table 8). In the other hand, for the very conservative scenario or low fishing effort (Scenario 5) inside and south of the Monterey Bay, the fleetwide economic profit in the Monterey Bay area is expected to be about $153,510 higher than in the more southern fishing grounds. The resulting incremental return per vessel in the Monterey Bay area is expected to be about $21,930 in economic profit in one halibut season at low effort level. Thus, the economic return differential largely depends on the number of trips for halibut in these fishing grounds.

Economic Impact

The potential additional economic contribution to the California economy through backward linked economic activities due to halibut fishing in the Monterey Bay was estimated using the secondary data from an economic study by the California Department of Fish and Wildlife in 2009.[9] The economic output multipliers for the trawlers operating in southern California were used to assess the economic impact of halibut fishing in the Monterey Bay area. It is expected that the value addition from the incremental catches associated to fishing activities in the area would add to California's economy by the multiple of 1.766 on the incremental revenues.[10] A potential halibut trawl fishery in the Monterey Bay is estimated to contribute an additional economic output to the California economy in the range of one half million to one million dollars depending upon the level of fishing effort by the bottom trawlers in more

[8] Although effort level in other fishing grounds is more likely to be lower than in Monterey Bay, but setting the effort level in other fishing grounds at par with Monterey Bay (i.e., 20 trips per month) will make the comparative economic return more conservative one.

[9] S. Hackette, D King, M Hansen, and E Price. "The Economic Structure of California's Commercial Fisheries". California Department of Fish and Wildlife (June 3, 2009). A Report in Fulfillment of Contract P0670015, California Department of Fish and Wildlife (https://www.dfg.ca.gov/marine/economicstructure.asp), (Reference date: March 24, 2014)

[10] The regional economic output multiplier is for the Trawl gear for the county of Monterey Bay. Please refer to the California Ocean Fish Harvester Economic (COFHE) Model, Excel Lookup Tables in the link https://www.dfg.ca.gov/marine/economicstructure.asp (Reference date: March 24, 2014)

southern fishing grounds during the halibut season. The economic contribution from the forward linked economic activities at the restaurant or consumer's end will be an additional contribution to the economic impacts of backward linked activities.

Conclusion

The economic analysis suggests that the economic return from re-opening the halibut fishery in the Monterey Bay using the modified trawl gear could be quite profitable to fishermen relative to the same fishery occurring in other fishing grounds in the Central or Southern California waters. The gear is economically feasible to provide a lucrative alternative source of income to fishermen in this fishery.

Acknowledgement

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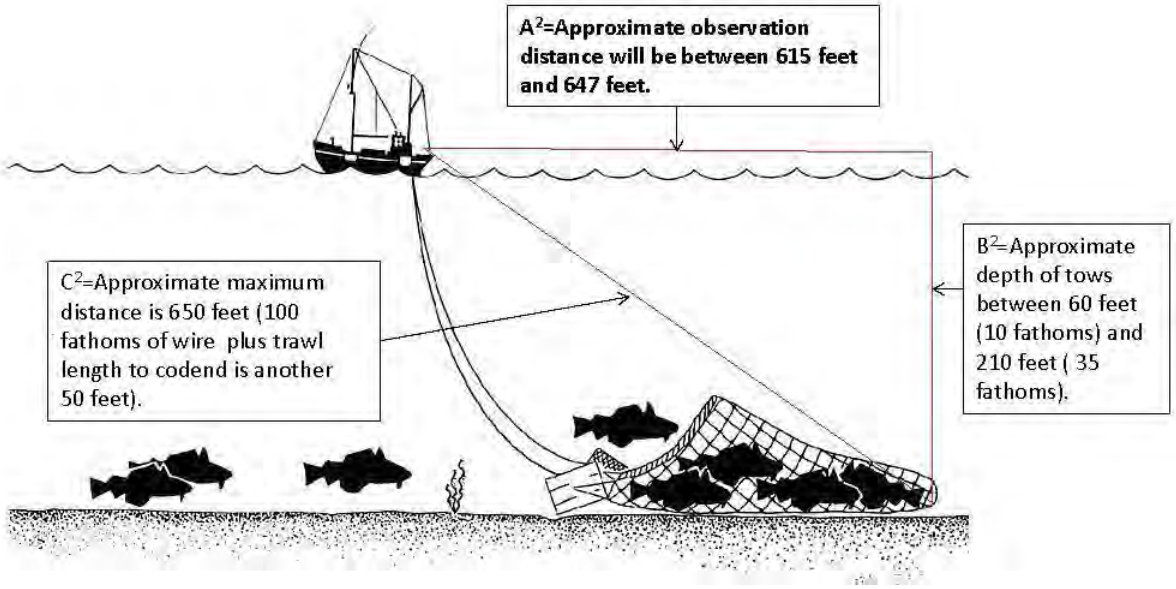
APPENDIX J: Protected Species Observing Distances

Approximate Distances for Protected Species Observing

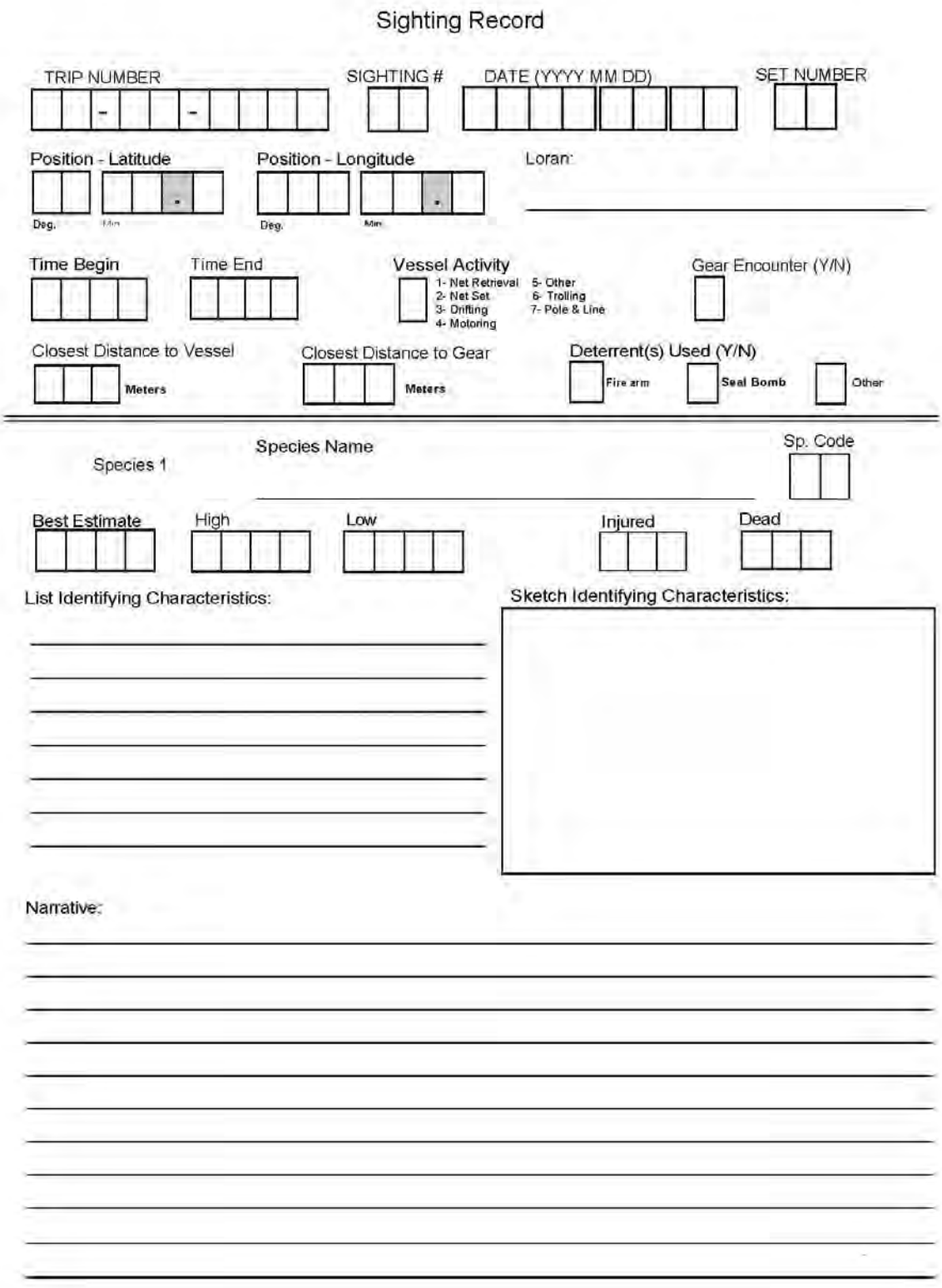
Using Pythagorean theorem to obtain an estimate of observing distances we use: $A^2=C^2-B^2$

Shallow set at 10 fathoms (60 feet): $A^2=(650*650)-(60*60)$
$A^2=647$ feet (215 yards)

Deep set at 35 fathoms (210 feet): $A^2=(650*650)-(210*210)$
$A^2=615$ feet (205 yards)



APPENDIX K: Protected Species Sighting Record



Sighting Record

TRIP NUMBER

SIGHTING #

DATE (YYYY MM DD)

SET NUMBER

Position - Latitude

Deg. Min.

Position - Longitude

Deg. Min.

Loran:

Time Begin

Time End

Vessel Activity

1- Net Retrieval
2- Net Set
3- Drifting
4- Motoring
5- Other
6- Trolling
7- Pole & Line

Gear Encounter (Y/N)

Closest Distance to Vessel

Meters

Closest Distance to Gear

Meters

Deterrent(s) Used (Y/N)

Fire arm

Seal Bomb

Other

Species 1

Species Name

Sp. Code

Best Estimate

High

Low

Injured

Dead

List Identifying Characteristics:

Sketch Identifying Characteristics:

Narrative:

Species 2

Species Name _____

Sp. Code ☐☐

Best Estimate ☐☐☐☐ High ☐☐☐☐ Low ☐☐☐☐ Injured ☐☐☐ Dead ☐☐☐

List Identifying Characteristics:

_____

_____

_____

_____

_____

_____

_____

Sketch Identifying Characteristics:

Species 3

Species Name _____

Sp. Code ☐☐

Best Estimate ☐☐☐☐ High ☐☐☐☐ Low ☐☐☐☐ Injured ☐☐☐ Dead ☐☐☐

List Identifying Characteristics:

_____

_____

_____

_____

_____

_____

_____

Sketch Identifying Characteristics:

Addtional Notes / Sketches: