STATE OF CALIFORNIA-THE RESOURCES AGENCY



DEPARTMENT OF FISH AND GAME Marine Region CDFG Monterey Office 20 Lower Ragsdale Drive, Suite 100 Monterey, California 93940 (831) 649-2881

Cruise Report

State Finfish Management Project Southern California Fishery-Independent Halibut Trawl Survey

Prepared by Sabrina Bell and Travis Tanaka

- Vessel: F/V Cecelia
- Dates: February 19-21 and February 28-29, 2008
- Location: Halibut trawl grounds off Santa Barbara and Ventura Counties
- Purpose: Begin an annual monitoring program in southern California that will contribute to the assessment of California halibut and associated species within the halibut trawl grounds.
 - 1.Collect life history data for California halibut, *Paralichthys californicus*, including length, weight, sex, and otoliths.
 - 2. Tag and release sublegal-sized California halibut (less than 22 in., or 559 mm).
 - 3. Catalog associated incidental species.
 - 4. Record number of halibut damaged, destroyed, or taken because of marine mammal encounters.
- Procedures: Using Department trawl log data, the existing commercial trawling area was mapped using GIS. The F/V *Cecelia* was contracted for a 48-hr commitment met by 5 non-consecutive cruise days. Each day the F/V *Cecelia* embarked the harbor by 0600 and returned by 1700: February 19-21 from the Santa Barbara harbor, and February 28-29 from the Channel Islands Harbor. Most tows were conducted within the halibut trawl grounds using commercial halibut trawl gear with a cod-end mesh of 7.5 in. and were approximately 1 hr in length. Trawl tracks were recorded in real-time using GPS and GIS.

During the trawl survey, several considerations were made when choosing the fishing location and course of tows. Using the prepared chart of the proposed survey area as a guide, the captain and biologist-in-charge selected areas to survey. Based on the captain's experience and information obtained from other vessels, areas with hard or rocky bottom were avoided. Only soft bottom floor substrate was fished, as it is the California halibut desired habitat. In the original plans, hard substrate was marked as fishable due to California halibut bycatch from sea cucumber trawl logs. These areas were avoided.

Except for legal-sized California halibut, all finfish captured were assessed for condition based on a 1-4 scale, measured for total length to the nearest mm, weighed to the nearest 0.25 lb if possible, and released. In the 1-4 scale, one was the best condition with no wounds or bleeding and four was the worst condition with the finfish or invertebrate being near death or dead. All live sublegal-sized California halibut were assessed for condition, tagged and released. All dead sublegal-sized halibut were retained. All retained California halibut were measured for total length to the nearest mm, weighed to the nearest 0.25 lb if possible, sexed, and had otoliths removed.

Total length of California halibut was taken by measuring the fish, while in natural repose, from the tip of the snout or jaw (whichever extends furthest) with the mouth closed, to the tip of the longest lobe of the tail. The tail was not swung or fanned as allowed per California Fish and Game Code §8392, unless to clarify if the halibut was of legal length (22 in.). Measuring the fish in natural repose eliminated discrepancies due to tail swinging or fanning methods. Therefore, the results for this study yielded California halibut lengths less than 22 in. (559 mm), but of legal length according to regulations.

Results: The F/V Cecelia is a 49-ft multi-purpose commercial fishing vessel. The trawl footrope measured 80 ft and mesh body 5.5 in. The vessel staffing consisted of a captain, deck hand and two State Finfish Management Project Staff, except for Day 4 when only one staff member was present. The captain and deck hand have a great deal of experience with the commercial fishery and area surveyed. Three of the five days fished were conducted in the area of the proposed April 2008 closures as labeled in the figures. The halibut trawl survey yielded more California halibut (combination of legal- and sublegal-sized) than any other finfish species.

Twenty-six tows were completed in 5 days (Figures 1 and 2). Tow time ranged from 53 min to 87 min. Average tow speed was 2.5 k with tow depths ranging from 8.2 to 29.2 fm.

In total, 61 legal-sized California halibut, with an aggregate weight of 445.5 lb and a mean of 7.3 lb, were captured and retained. Two additional legal-sized California halibut were captured and retained but not weighed due to marine mammal damage. Length of the 63 California halibut ranged from 542 to 1014 mm with a mean of 624 mm, and all specimens retained were female. Fourteen of these fish measured less than 559 mm or 22 in. in natural repose. Ten of these fish had evidence of marine mammal encounters. In total, 51 sublegal-sized California halibut were captured; of these, 43 were tagged and released, and eight were retained due to their condition upon landing. Two California halibut, for which length could not be determined due to destruction by marine mammals,

were also retained. Sublegal-sized California halibut length ranged from 287 to 542 mm with a mean of 477 mm. Five of the 51 sublegal-sized California halibut had evidence of marine mammal encounters. Two additional California halibut were retained, but length could not be determined due to marine mammal destruction. The sublegal- to legal-sized California halibut ratio during the cruise was 51 to 63. There were 1,430 individuals representing 53 species or species groups captured (Tables 1 and 2).

Day 1. Six tows were completed in the halibut trawl grounds off El Capitan to Goleta (Figure 3). Twenty legal-sized California halibut were retained with an aggregate weight of 171.5 lb and mean weight of 8.58 lb. Length ranged from 547 to 1014 mm with a mean of 646 mm. Twelve sublegal-sized California halibut were tagged and released with length ranging from 440 to 542 mm and with a mean of 512 mm. There were no marine mammal encounters. The predominant associated finfish species by number were the pink seaperch (*Zalembuis rosaceus*), longspine combfish (*Zaniolepis latipinnis*), and Pacific sanddab (*Citharichthys sordidus*). The most common associated invertebrate species by number present were ridgeback prawns (*Eusicyonia ingentus*), sea cucumbers (Holothuroidea), and sea urchins (Echinoidea).

Day 2. Five tows were completed in the halibut trawl grounds off Montecito to approximately Mussel Shoals (Figure 4). Seventeen legalsized California halibut, with an aggregate weight of 101.5 lb and mean weight of 5.97 lb, were retained. Length ranged from 542 to 857 mm with a mean of 598 mm. Four of the 17 legal-sized California halibut had evidence of marine mammal encounters. Twelve sublegal-sized California halibut were tagged and released and five were retained due to marine mammal encounters. Length for sublegal-sized halibut ranged from 385 to 537 mm with a mean of 492 mm. Two additional halibut were retained, but no lengths were taken due to marine mammal destruction. The predominant associated finfish species by number were shovelnose guitarfish (*Rhinobatos productus*), longspine combfish (*Zaniolepis*) latipinnis), and pink seaperch (Zalembuis rosaceus). The most common associated invertebrate species by number present were the yellow rock crab (Cancer anthonyi), California spiny lobster (Panulirus interruptus), and sheep crab (Loxorhynchus grandis).

Day 3. Three tows were completed in the halibut trawl grounds off Montecito to Summerland (Figure 4). Two legal-sized California halibut were retained with an aggregate weight of 15.5 lb and mean weight of 7.75 lb. Lengths were 542 and 732 mm with a mean of 637 mm. Three sub-legal California halibut were tagged and released with lengths ranging from 511 to 527 mm and with a mean of 521 mm. There were no marine encounters during the duration of the day. The predominant associated finfish species by number were longspine combfish (*Zaniolepis latipinnis*) and shovelnose guitarfish (*Rhinobatos productus*). The most common associated invertebrate species by number were the sheep crab (*Loxorhynchus grandis*), California spiny lobster (*Panulirus interruptus*), and yellow rock crab (*Cancer anthonyi*). Work ended early due to weather conditions.

Day 4. Six tows were completed in the halibut trawl grounds between Port Hueneme and Point Mugu (Figure 5). Fourteen legal-sized California halibut were retained; 13 of these had an aggregate weight of 113.75 lb and mean weight of 8.75 lb. Lengths for the 14 legal-sized California halibut ranged from 542 to 965 mm with a mean of 646 mm. Three of the 14 legal-sized halibut had evidence of marine mammal encounters; for one fish, weight was not taken. Nine sublegal-sized California halibut were tagged and released and one was retained due to condition upon landing. Lengths ranged from 287 to 533 mm with a mean of 398 mm. There were no sublegal-sized California halibut marine mammal encounters. The predominant associated finfish species by number were shovelnose guitarfish (*Rhinobatos productus*), brown smoothhound (Mustelus henlei), and white croaker (Genyonemus lineatus). The most common associated invertebrate species by number were sea stars (Asteroidea), the slender crab (Cancer gracilis), and the mantis shrimp (Hemisquilla ensigera californiensis).

Day 5. Six tows were completed in the halibut trawl grounds south of Port Hueneme and in an area west of Channel Islands Harbor (Figures 4 and 5). The latter area west is on the edge of and outside the halibut trawl grounds. Ten legal-sized California halibut were retained; nine weighed with an aggregate weight of 43.25 lb and mean weight of 4.81 lb. Lengths of all retained California halibut ranged from 555 to 662 mm with a mean of 588 mm. Three of the 10 legal-sized halibut had evidence of marine mammal encounters; for one fish, weight was not taken. Seven sublegalsized California halibut were tagged and released and two were retained due to condition upon landing. Lengths ranged from 332 to 539 mm with a mean of 472 mm. There were no sublegal-sized California halibut marine mammal encounters. The predominant associated finfish species by number were shovelnose guitarfish (*Rhinobatos productus*), California skate (Raja inornata), and thornback ray (Platyrhynoides triseriata). The most common associated invertebrate species by number were sea stars (Asteriodea), yellow rock crab (Cancer anthonyi), sheep crab (Loxorhynchus grandis), and slender crab (Cancer gracilis).

Location and course of tows

Navigational hazards such as oil pipes, plane and ship wrecks (charted and uncharted), reefs, and crab/ lobster pot strings played a significant roll in survey location and tow course, as these areas were avoided. The vessel's chart plotter had a large number of the obstacles marked which provided guidelines to our location and path. Using the vessel captain's experience and the vessel's electronics, these obstacles were avoided, allowing for uninterrupted tows. This can be seen especially on Day 5 when the course of tows was directed outside of the halibut trawl grounds to avoid such obstacles as artificial reefs, oil barrack debris and pots of various sorts in the Ventura Flats. This was the only survey day conducted outside of the halibut trawl grounds. By avoiding areas with navigational hazards or the wrong substrate, the fishable area of the halibut trawl grounds is reduced.

Weather and oceanographic conditions played a role in altering survey plans and possibly halibut movement. Although the survey occurred in relatively shallow nearshore waters, ocean current, swell direction, and wind direction and strength did have some effect on vessel course. Following the fathom curve, trawl gear was set and fished either with or against the current and swell direction in order to reduce loss of catch due to net and door malfunctions. Large swells and storm conditions on Days 2 and 3 and before Days 4 and 5 may have had an influence on fish movement. It appeared that California halibut catch decreased after a large swell and the bycatch of sharks and rays increased. This same effect was also occurring to other halibut trawlers fishing in other parts of the halibut trawl grounds.

In the cruise plan, 4 consecutive cruise days were scheduled, but due to stormy weather conditions, high winds and swells the cruise days were broken up to allow for safer conditions at sea and a higher probability of completing tows. Day 3's poor weather and oceanographic conditions is reflected in the low catch, low number of tows (only 3), and the reduced workday.

Marine mammal (sea lion and harbor seal) encounters, depending upon location, varied. Fishing areas near haul out locations or harbor seal pupping areas had a sharp increase in the amount of marine mammal interactions. In these areas, marine mammals were hard to avoid since they would follow the vessel. The presence of marine mammals decreased the quality and quantity of catch. Quality was easier to determine and observe as fish would be landed with claw marks, teeth marks, and/or missing flesh. The two fish that were destroyed were missing the head, tail or both. Among all sopecies present, only California halibut were observed being taken and with actual sign of encounter with marine mammals. Though not seen, pinniped encounters may also have greatly influenced the survival rate of sublegal-sized halibut and other species upon release, as it is highly possible pinnipeds ate them as they were making their way back to the ocean floor. Sea lions were also observed eating fish on the surface behind the vessel, but far enough back to obscure positive identification of the fish. Some small finfish released back into the water had a high probability of being eaten by seabirds, if present, immediately upon entering the water.

The presence of other vessels and closures due to military activity limited the course of area fished. Day 4's concentration of effort in Hueneme Flat and not east, toward Point Mugu, reflected the effect of military activity. During military activity, the waters within 5 NM of Point Mugu, are closed. Activity on the survey day was not made public and was hampered by heavy coastal fog. The vessel had to vacate the area abruptly as captain and survey staff discovered they were fishing offshore of an active firearms range. During the last part of the second tow, bullets from machine gun fire prompted a rapid departure. The Coast Guard was notified and an investigation is pending. No injuries or vessel damage occurred.

Incidental Catch

By law, trawl gear used to take halibut within the halibut trawl grounds must have a minimum cod-end mesh size of 7.5 in. This mesh size normally would allow small finfish and some invertebrates to go through the cod end and not be captured. Larger finfish and most crustaceans are vulnerable to capture.

Debris type and quantity collected in the tows played a major role in the amount and size of bycatch. Two main types of debris were observed, kelp or kelp like and detritus, which included large tree roots and branches. Smaller sizes and larger quantities of incidentals were caught when kelp debris was observed in the cod end. Drift kelp was observed in the net on Days 1-3 and appeared to affect the incidental catch, with high numbers of small finfish such as longspine combfish (Zaniolepis latipinnis), pink surfperch (Zalembius rocaceus) and juvenile rockfishes, along with smaller invertebrates such as the ridgeback prawn (Eusicyonia ingentus). A reduced amount of small finfish and certain invertebrates were collected in tows when detritus debris was present compared to kelp (Days 4 and 5). Incidental catch was still greater than with an unobstructed mesh.

Incidental species survival rate and condition upon landing was affected by several factors. Debris in the net such as branches, broken holdfasts, and derelict pots increased injury to the finfish and invertebrates by battery, resulting in bruising and other bodily damages, and therefore decreased condition and survival rate. Debris could not be avoided and appeared to be localized. Short tows and the quick release of finfish and invertebrates once landed increased survival rates.

Market

California halibut supports a small quantity, high quality live-fish fishery in the Santa Barbara and Ventura area. Per contract stipulation, the vessel captain was allowed to sell all legal-sized California halibut captured. All legal-sized California halibut where killed in order to collect life history data. As a result, the ex-vessel price decreased by half or more compared to that of live halibut.

Personnel: Morgan Castignola Vessel Captain, Commercial Fisherman Tom Ellifson Deck Hand

Travis Tanaka	CDFG Associate Biologist-in-charge, Monterey
Sabrina Bell	CDFG Biologist, Santa Barbara
Deanna Harkink	CDFG Scientific Aide, Los Alamitos

Table 1. Species composition	n for all survey days on F/	/ Cecelia, February 2008.					
SPECIES-SCIENTIFIC NAME	SPECIES-COMMON NAME	Day 1	Day 2	Day 3	Day 4	Day 5	Totals
Asteroidea	sea star	0	6	0	280	200	486
Cancer anthonyi	yellow rock crab	2	24	10	14	28	78
Cancer gracilis	slender crab	0	0	0	24	8	32
Cancer productus	red rock crab	2	0	0	1	0	3
Cephaloscvllium ventriosum	swell shark	0	0	0	0	1	1
Chitonotus pugetensis	roughback sculpin	4	0	0	0	0	4
Citharichthys sordidus	Pacific sanddab	14	0	0	3	0	17
Cymatogaster aggregata	shiner surfperch	0	0	1	0	0 0	1
Echinoidea	sea urchin	23	0	0	0	0	23
Enophrys touring	bull sculpin	20	0	0	0	0	25
Eusiovonia ingontus	ridgeback prawp	2 55	0	1	0	0	56
		0	0	1	0	0	1
	spanish shawi	0	1	1	0	0	10
	white croaker	0	I	0	9	3	13
Hemisquilla ensigera californiensis	mantis shrimp	1	3	2	22	6	34
Heterodontus francisci	horn shark	0	1	0	0	0	1
Holothuroidea	sea cucumber	48	1	0	0	0	49
Hydrolagus colliei	spotted ratfish	0	0	0	1	1	2
lcelinus quadriseriatus	yellowchin sculpin	0	1	1	0	0	2
Leptocottus armatus	staghorn sculpin	2	0	0	0	0	2
Loligo opalescens	market squid eggs	0	0	1	0	0	1
Loxorhynchus grandis	sheep crab	6	12	16	12	8	54
Mursia qaudichaudii	armed box crab	2	2	1	7	4	16
Mustelus henlei	brown smoothhound	0	0	0	14	22	36
Myliobatis californica	bat rav	2	0	0	1	1	4
Notorhynchus cepedianus	broadnose sevengill shark	0	1	0	0	0	1
Octopus spp	octopus	1	1	0	4	2	8
Panulirus interruptus	California spiny lobster	15	18	13	4	2	52
Paralabray elathratus	koln bass	0	2	0	4	2	2
Paralabrax nabulifar	herred and here	0	2	0	0	0	2
Paraliabilax nebuliler		0	17	0	14	10	5
Paralichthys californicus		20	17	2	14	10	03
Paralichunys californicus	California halibut-sublegal	12	17	3	10	9	51
Paralichthys californicus	California halibut- undetermined size*	0	2	0	0	0	2
Parophrys vetulus	English sole	7	3	1	0	6	17
Phanerodon furcatus	white seaperch	0	1	2	0	0	3
Platyrhynoides triseriata	thornback ray	0	1	0	0	38	39
Pleuronichthys verticalis	hornyhead turbot	3	4	2	3	10	22
Raja binoculata	big skate	0	0	0	1	0	1
Raia inornata	California skate	1	7	1	6	54	69
Rhinobatos productus	shovelnose quitarfish	1	26	2	15	59	103
Scorpaena gutta	California scorpionfish	0	0	0	4	5	.00
Sebastes auriculatus	brown rockfish	0	0	1	0	0	1
Sebastes caurinus	copper rockfish	1	0	0	0	0 0	1
Sebastes bonkinsi	squarespot rockfish	1	0	0	0	0	1
Sebastes miniatus	vermilion rockfish	3	0	0	0	0	3
Sebastes miniatus	halfbanded realifish	2	0	0	0	0	5
	nalibanded focklish	3	0	0	0	0	ა ი
Seriprus politus	queeniish	0	0	0	0	0	0
Squalus acanthias	spiny dogfish	0	1	0	0	1	2
Squatina californica		3	3	0	3	5	14
Steriolepis gigas	black seabass	0	1	0	0	0	1
Symphurus atricauda	California tonguefish	0	0	0	0	1	1
Torpedo californica	Pacific electric ray	0	4	1	2	1	8
Triakis semifasciata	leopard shark	0	0	0	1	0	1
Xystreurys liolepis	fantail sole	2	0	1	3	5	11
Zalembius rosaceus	pink seaperch	19	21	0	1	1	42
Zaniolepis latipinnis	longspine combfish	14	22	19	8	3	66
	DAILY TOTALS	269	208	82	378	493	1430

Table 2. Species frequency and number of tows on F/V Cecelia survey February 2008.

SPECIES-SCIENTIFIC NAME	SPECIES-COMMON NAME	NUMBER PRESENT	# TOWS PRESENT	
Asteroidea	sea star	486	16	
Rhinobatos productus	shovelnose guitarfish	103	20	
Cancer anthonyi	yellow rock crab	78	18	
Raja inornata	California skate	69	14	
Zaniolepis latipinnis	longspine combfish	66	18	
Paralichthys californicus	California halibut-legal	63	19	
Eusicyonia ingentus	ridgeback prawn	56	4	
Loxorhynchus grandis	sheep crab	54	20	
Panulirus interruptus	California spiny lobster	52	16	
Paralichthys californicus	California halibut-sublegal	51	21	
Holothuroidea	sea cucumber	49	6	
Zalembius rosaceus	pink seaperch	42	8	
Platvrhvnoides triseriata	thornback ray	39	4	
Mustelus henlei	brown smoothhound	36	4 10	
Hemisquilla ensigera californiensis	mantis shrimp	34	10	
Cancer gracilis	slender crab	32	6	
Echinoidea	sea urchin	23	3	
Pleuronichthys verticalis	hornyhead turbot	22	16	
Citharichthvs sordidus	Pacific sanddab	17	7	
Parophrvs vetulus	English sole	17	8	
Mursia gaudichaudii	armed box crab	16	11	
Squatina californica	angel shark	14	9	
Genvonemus lineatus	white croaker	13	8	
Xystreurys liolenis	fantail sole	13	8	
Scornaena gutta	California scorpionfish	0	0	
Tornedo californica	Pacific electric ray	9	4	
Serinhus politus	queenfish	0	0	
Octopus spp	octopus	0	2	
Paralahray nebulifer	barred sand bass	0 5	5	
Muliobatis californica	balled salid bass	3	1	
	roughback sculpin	4	4	
Cancer productus	red rock crab	4	2	
Sobastas somicinatus	halfbanded reckfich	3	4	
Sebastes serificincius	vormilion rockfish	3	2	
Departed on furgeture	white accorde	3	2	
Paralichthus californicus	California halibut undetermined size	3	2	
Fnonhrys taurina		2	2	
Paralabray clathratus	keln bass	2	1	
	spotted ratish	2	1	
Squalua aconthica		2	2	
	spirty dogitish	2	2	
		2	1	
	yenowchin scupin	2	2	
Raja binoculata	big skate	1	1	
Steriolepis gigas	black seabass	1	1	
Sebastes auriculatus	brown rockfish	1	1	
Symphurus atricauda	California tonguefish	1	1	
Sebastes caurinus	copper rockfish	1	1	
Heterodontus francisci	horn shark	1	1	
Triakis semifasciata	leopard shark	1	1	
Loligo opalescens	market squid eggs	1	1	
Notorhynchus cepedianus	broadnose sevengill shark	1	1	
Cymatogaster aggregata	shiner surfperch	1	1	
Flabellina iodinea	spanish shawl	1	1	
Sebastes hopkinsi	squarespot rockfish	1	1	
Cephaloscyllium ventriosum	swell shark	1	1	









