Agenda Item D.1
Situation Summary
September 2010

2011 PACIFIC HALIBUT FISHERY REGULATIONS

Each September meeting, the Council considers proposed changes to the halibut regulations. The purpose of this consideration is for adjustments in the annual regulations (primarily in the recreational fishery) or the Catch Sharing Plan (CSP) for Area 2A (Agenda Item D.1.a, Attachment 1), and can include changes in catch allocation among areas or gear groups.

The Washington Department of Fish and Wildlife (WDFW) held a public meeting on August 16, and the Oregon Department of Fish and Wildlife (ODFW) held a public meeting on August 17 to solicit proposed changes to the CSP and to present staff proposals for public comment. Recommendations resulting from the ODFW meeting will be presented for review at the September Council meeting (Agenda Item D.1.b, ODFW Report). There were no recommendations following the WDFW meeting.

The Council will take final action on proposed changes for 2011 Area 2A halibut fisheries at the November 2010 Council meeting.

Council Action:

1. **Adopt, for public review, any proposed changes to season structure and the Catch Sharing Plan for 2011.**

Reference Materials:

1. Agenda Item D.1.a, Attachment 1: 2010 Pacific Halibut Catch Sharing Plan for Area 2A.
2. Agenda Item D.1.b, ODFW Report: Oregon Department of Fish and Wildlife Report on Proposed Changes to the Pacific Halibut Catch Sharing Plan for the 2011 Fishery.

Agenda Order:

a. Agenda Item Overview **Chuck Tracy**
b. Reports and Comments of Management Entities and Advisory Bodies
c. Public Comment
d. **Council Action**: Adopt For Public Review Proposed Changes to the 2011 Pacific Halibut Catch Sharing Plan and Annual Fishery Regulations

PFMC
08/26/10

2010 PACIFIC HALIBUT CATCH SHARING PLAN FOR AREA 2A

(a) FRAMEWORK

This Plan constitutes a framework that shall be applied to the annual Area 2A total allowable catch (TAC) approved by the International Pacific Halibut Commission (IPHC) each January. The framework shall be implemented in both IPHC regulations and domestic regulations (implemented by NMFS) as published in the *Federal Register*.

(b) ALLOCATIONS

This Plan allocates 35 percent of the Area 2A TAC to U.S. treaty Indian tribes in the State of Washington in subarea 2A-1, and 65 percent to non-Indian fisheries in Area 2A. The allocation to non-Indian fisheries is divided into three shares, with the Washington sport fishery (north of the Columbia River) receiving 36.6 percent, the Oregon/California sport fishery receiving 31.7 percent, and the commercial fishery receiving 31.7 percent. Allocations within the non-Indian commercial and sport fisheries are described in sections (e) and (f) of this Plan. These allocations may be changed if new information becomes available that indicates a change is necessary and/or the Pacific Fishery Management Council takes action to reconsider its allocation recommendations. Such changes will be made after appropriate rulemaking is completed and published in the *Federal Register*.

(c) SUBQUOTAS

The allocations in this Plan are distributed as subquotas to ensure that any overage or underage by any one group will not affect achievement of an allocation set aside for another group. The specific allocative measures in the treaty Indian, non-Indian commercial, and non-Indian sport fisheries in Area 2A are described in paragraphs (d) through (f) of this Plan.

(d) TREATY INDIAN FISHERIES

Thirty-five percent of the Area 2A TAC is allocated to 13 treaty Indian tribes in subarea 2A-1, which includes that portion of Area 2A north of Point Chehalis, WA (46°53.30' N. lat.) and east of 125°44.00' W. long. The treaty Indian allocation is to provide for a tribal commercial fishery and a ceremonial and subsistence fishery. These two fisheries are managed separately; any overages in the commercial fishery do not affect the ceremonial and subsistence fishery. The commercial fishery is managed to achieve an established subquota, while the ceremonial and subsistence fishery is managed for a year-round season. The tribes will estimate the ceremonial and subsistence harvest expectations in January of each year, and the remainder of the allocation will be for the tribal commercial fishery.

(1) The tribal ceremonial and subsistence fishery begins on January 1 and continues through December 31. No size or bag limits will apply to the ceremonial and

subsistence fishery, except that when the tribal commercial fishery is closed, treaty Indians may take and retain not more than two halibut per day per person for subsistence purposes. Ceremonial fisheries shall be managed by tribal regulations promulgated inseason to meet the needs of specific ceremonial events. Halibut taken for ceremonial and subsistence purposes may not be offered for sale or sold.

(2) The tribal commercial fishery season dates will be set within the season dates determined by the IPHC and implemented in IPHC regulations. The tribal commercial fishery will close when the subquota is taken. Any halibut sold by treaty Indians during the commercial fishing season must comply with IPHC regulations on size limits for the non-Indian fishery.

(e) NON-INDIAN COMMERCIAL FISHERIES

The non-Indian commercial fishery is allocated 31.7 percent of the non-Indian share of the Area 2A TAC for a directed halibut fishery and an incidental catch fishery during the salmon troll fishery. The non-Indian commercial allocation is approximately 20.6 percent of the Area 2A TAC. Incidental catch of halibut in the primary directed sablefish fishery north of Point Chehalis, WA will be authorized if the Washington sport allocation exceeds 224,110 lb (101.7 mt) as described in section (e)(3) of this Plan. The structuring and management of these three fisheries is as follows.

(1) Incidental halibut catch in the salmon troll fishery.

Fifteen percent of the non-Indian commercial fishery allocation is allocated to the salmon troll fishery in Area 2A as an incidental catch during salmon fisheries. The quota for this incidental catch fishery is approximately 3.1 percent of the Area 2A TAC. The primary management objective for this fishery is to harvest the troll quota as an incidental catch during the May/June salmon troll fishery. The secondary management objective is to harvest the remaining troll quota as an incidental catch during the remainder of the salmon troll fishery.

(i) The Council will recommend landing restrictions at its spring public meeting each year to control the amount of halibut caught incidentally in the troll fishery. The landing restrictions will be based on the number of incidental harvest license applications submitted to the IPHC, halibut catch rates, the amount of allocation, and other pertinent factors, and may include catch or landing ratios, landing limits, or other means to control the rate of halibut harvest. NMFS will publish the landing restrictions annually in the *Federal Register*, along with the salmon management measures.

(ii) Inseason adjustments to the incidental halibut catch fishery.

(A) NMFS may make inseason adjustments to the landing restrictions, if requested by the Council Chairman, as necessary to assure that the incidental harvest rate is appropriate for salmon and halibut availability, does not encourage target fishing on halibut, and does not increase the likelihood of exceeding the quota for this fishery. In determining whether to make such inseason adjustments, NMFS will consult with the applicable state representative(s), a representative of the Council's Salmon Advisory Sub-Panel, and Council staff.

(B) Notice and effectiveness of inseason adjustments will be made by NMFS in accordance with paragraph (f)(5) of this Plan.

(iii) If the overall quota for the non-Indian, incidental commercial troll fishery has not been harvested by salmon trollers during the May/June fishery, additional landings of halibut caught incidentally during salmon troll fisheries will be allowed in July and will continue until the amount of halibut that was initially available as quota for the troll fishery is taken or until the end of the season date for commercial halibut fishing determined by the IPHC and implemented in IPHC regulation. Landing restrictions implemented for the May/June salmon troll fishery will apply for as long as this fishery is open. Notice of the July opening of this fishery will be announced on the NMFS hotline (206) 526-6667 or (800) 662-9825. Halibut retention in the salmon troll fishery will be allowed after June only if the opening has been announced on the NMFS hotline.

(iv) A salmon troller may participate in this fishery or in the directed commercial fishery targeting halibut, but not in both.

(v) Under the Pacific Coast groundfish regulations at 50 CFR 660.383, fishing with salmon troll gear is prohibited within the Salmon Troll Yelloweye Rockfish Conservation Area (YRCA). The Salmon Troll YRCA is an area off the northern Washington coast and is defined by straight lines connecting latitude and longitude coordinates. Coordinates for the Salmon Troll YRCA are specified in groundfish regulations at 50 CFR 660.390 and in salmon regulations at 50 CFR 660.405.

(2) Directed fishery targeting halibut.

Eighty-five percent of the non-Indian commercial fishery allocation is allocated to the directed fishery targeting halibut (e.g., longline fishery) in southern Washington, Oregon, and California. The allocation for this directed catch fishery is approximately 17.5 percent of the Area 2A TAC. This fishery is confined to the area south of Subarea 2A-1 (south of Point Chehalis, WA; 46°53.30' N. lat.). This fishery may also be managed with closed areas designed to protect overfished groundfish species. Any such closed areas will be described annually in federal halibut regulations published in the *Federal Register* and

specifically defined at 50 CFR 300.63(e). The commercial fishery opening date(s), duration, and vessel trip limits, as necessary to ensure that the quota for the non-Indian commercial fisheries is not exceeded, will be determined by the IPHC and implemented in IPHC regulations. If the IPHC determines that poundage remaining in the quota for the non-Indian commercial fisheries is insufficient to allow an additional day of directed halibut fishing, the remaining halibut will be made available for incidental catch of halibut in the fall salmon troll fisheries (independent of the incidental harvest allocation).

(3) Incidental catch in the sablefish fishery north of Point Chehalis.

If the Area 2A TAC is greater than 900,000 lb (408.2 mt), the primary directed sablefish fishery north of Point Chehalis will be allocated the Washington sport allocation that is in excess of 214,110 lb (97.1 mt), provided a minimum of 10,000 lb (4.5 mt) is available (i.e., the Washington sport allocation is 224,110 lb (101.7 mt) or greater). If the amount above 214,110 lb (97.1 mt) is less than 10,000 lb (4.5 mt), then the excess will be allocated to the Washington sport subareas according to section (f) of this Plan. The amount of halibut allocated to the sablefish fishery will be shared as follows: up to 70,000 lb of halibut to the primary sablefish fishery north of Pt. Chehalis. Any remaining allocation will be distributed to the Washington sport fishery among the four subareas according to the sharing described in the Plan, Section (f)(1).

The Council will recommend landing restrictions at its spring public meeting each year to control the amount of halibut caught incidentally in this fishery. The landing restrictions will be based on the amount of the allocation and other pertinent factors, and may include catch or landing ratios, landing limits, or other means to control the rate of halibut landings. NMFS will publish the landing restrictions annually in the Federal Register.

Under Pacific Coast groundfish regulations at 50 CFR 660.382, fishing with limited entry fixed gear is prohibited within the North Coast Commercial Yelloweye Rockfish Conservation Area (YRCA) and the Non-Trawl Rockfish Conservation Area (RCA). The North Coast Commercial Yelloweye Rockfish Conservation Area YRCA is an area off the northern Washington coast, overlapping the northern part of North Coast Recreational YRCA. The Non-Trawl RCA is an area off the Washington coast. These closed areas are defined by straight lines connecting latitude and longitude coordinates. Coordinates for the North Coast Commercial YRCA are specified in groundfish regulations at 50 CFR 660.390. Coordinates for the Non-Trawl RCA are specified in groundfish regulations at 50 CFR 660.393.

(4) Commercial license restrictions/declarations.

Commercial fishers must choose either (1) to operate in the directed commercial fishery in Area 2A and/or retain halibut caught incidentally in the primary directed sablefish fishery north of Point Chehalis, WA or (2) to retain halibut caught incidentally during the salmon troll fishery. Commercial fishers operating in the directed halibut fishery and/or retaining halibut incidentally caught in the primary directed sablefish fishery must send their license application to the IPHC postmarked no later than April 30, or the first weekday in May, if April 30 falls on a weekend, in order to obtain a license to fish for halibut in Area 2A. Commercial fishers operating in the salmon troll fishery who seek to retain incidentally caught halibut must send their application for a license to the IPHC for the incidental catch of halibut in Area 2A postmarked no later than March 31, or the first weekday in April, if March 31 falls on a weekend. Fishing vessels licensed by IPHC to fish commercially in Area 2A are prohibited from operating in the sport fisheries in Area 2A.

(f) SPORT FISHERIES

The non-Indian sport fisheries are allocated 68.3 percent of the non-Indian share, which is approximately 44.4 percent of the Area 2A TAC. The allocation is further divided as subquotas among six geographic subareas.

(1) Subarea management. The sport fishery is divided into six sport fishery subareas, each having separate allocations and management measures as follows.

(i) Washington inside waters (Puget Sound) subarea.

This sport fishery subarea is allocated 23.5 percent of the first 130,845 lb (59.4 mt) allocated to the Washington sport fishery, and 32 percent of the Washington sport allocation between 130,845 lb (59.4 mt) and 224,110 lb (101.7 mt) (except as provided in section (e)(3) of this Plan). This subarea is defined as all U.S. waters east of the mouth of the Sekiu River, as defined by a line extending from 48°17.30' N. lat., 124°23.70' W. long. north to 48°24.10' N. lat., 124°23.70' W. long., including Puget Sound. The structuring objective for this subarea is to provide a stable sport fishing opportunity and maximize the season length. To that end, the Puget Sound subarea may be divided into two regions with separate seasons to achieve a fair harvest opportunity within the subarea. Due to inability to monitor the catch in this area inseason, fixed seasons, which may vary and apply to different regions within the subarea, will be established preseason based on projected catch per day and number of days to achievement of the quota. Inseason adjustments may be made, and estimates of actual catch will be made postseason. The fishery will open in April or May and continue until a dates established preseason (and published in the sport fishery regulations) when the quota is predicted to be taken, or until September 30, whichever is earlier. The Washington Department of Fish and Wildlife will develop recommendations to NMFS on the opening date and weekly structure of the fishery each year. The daily bag limit is one fish per person, with no size limit.

(ii) Washington north coast subarea.

This sport fishery subarea is allocated 62.2 percent of the first 130,845 lb (59.4 mt) allocated to the Washington sport fishery, and 32 percent of the Washington sport allocation between 130,845 lb (59.4 mt) and 224,110 lb (101.7 mt) (except as provided in section (e)(3) of this Plan). This subarea is defined as all U.S. waters west of the mouth of the Sekiu River, as defined above in paragraph (f)(1)(i), and north of the Queets River (47°31.70' N. lat.). The management objective for this subarea is to provide a quality recreational fishing opportunity during May and June. The fishery will open on the first Thursday between May 9 and 15, and continue 2 days per week (Thursday and Saturday) in May as scheduled pre-season, unless there is a quota management closure. If there is no quota management closure in May, the fishery will reopen on the first Thursday in June as an all depth fishery on Thursdays and Saturdays as long as sufficient quota remains. This schedule allows adequate public notice of any inseason action before each Thursday opening. If there is not sufficient quota for an all-depth day, the fishery would reopen in the nearshore areas described below:

A. WDFW Marine Catch Area 4B, which is all waters west of the Sekiu River mouth, as defined by a line extending from 48°17.30' N. lat., 124°23.70' W. long. north to 48°24.10' N. lat., 124°23.70' W. long., to the Bonilla-Tatoosh line, as defined by a line connecting the light on Tatoosh Island, WA, with the light on Bonilla Point on Vancouver Island, British Columbia (at 48°35.73' N. lat., 124°43.00' W. long.) south of the International Boundary between the U.S. and Canada (at 48°29.62' N. lat., 124°43.55' W. long.), and north of the point where that line intersects with the boundary of the U.S. territorial sea.

B. Shoreward of the recreational halibut 30-fm boundary line, a modified line approximating the 30 fm depth contour from the Bonilla-Tatoosh line south to the Queets River. Coordinates for the closed area will be specifically defined annually in federal halibut regulations published in the *Federal Register.*

No sport fishing for halibut is allowed after September 30. If the fishery is closed prior to September 30, and there is insufficient quota remaining to reopen the nearshore areas for another fishing day, then any remaining quota may be transferred inseason to another Washington coastal subarea by NMFS via an update to the recreational halibut hotline. The daily bag limit in all fisheries is one halibut per person with no size limit.

Recreational fishing for groundfish and halibut is prohibited within the North Coast Recreational Yelloweye Rockfish Conservation Area (YRCA). The North Coast Recreational YRCA is a C-shaped area off the northern Washington coast

and is defined by straight lines connecting latitude and longitude coordinates. Coordinates for the North Coast Recreational YRCA are specified in groundfish regulations at 50 CFR 660.390 and will be specifically defined annually in federal halibut regulations published in the *Federal Register*.

(iii) Washington south coast subarea.

This sport fishery is allocated 12.3 percent of the first 130,845 lb (59.4 mt) allocated to the Washington sport fishery, and 32 percent of the Washington sport allocation between 130,845 lb (59.4 mt) and 224,110 lb (101.7 mt) (except as provided in section (e)(3) of this Plan. This subarea is defined as waters south of the Queets River (47°31.70' N. lat.) and north of Leadbetter Point (46°38.17' N. lat.). The structuring objective for this subarea is to maximize the season length, while maintaining a quality fishing experience. The south coast subarea quota will be allocated as follows: 10% or 2,000 pounds, whichever is less, will be set aside for the nearshore fishery with the remaining amount allocated to the primary fishery. During days open to the primary fishery and seaward of the 30-fm line lingcod may be taken, retained and possessed, when allowed by groundfish regulations. The fishery will open on the first Sunday in May. The primary fishery will be open two days per week, Sunday and Tuesday, in all areas, except where prohibited. During the fourth week in May, the primary fishery will be open on Sundays only. Beginning the following week, the fishery would continue two days per week, Sunday and Tuesday, until the quota for the primary fishery season is reached or September 30, whichever is earlier. If there is insufficient quota remaining to reopen the primary fishery for another fishing day, the remaining primary fishery quota will be added to the nearshore quota. The nearshore fishery takes place, in the area from 47°31.70' N. lat. south to 46°58.00' N. lat. and east of a boundary line approximating the 30 fathom depth contour as defined by the following coordinates:

47°31.70′ N.lat, 124°37.03′ W. long;
47°25.67′ N. lat, 124°34.79′ W. long;
47°12.82′ N. lat, 124°29.12′ W. long;
46°58.00′ N. lat, 124°24.24′ W. long.

During the primary season the nearshore fishery will be open seven days per week. Subsequent to the closure of the primary fishery, the nearshore fishery will continue seven days per week until the remaining quota is projected to be taken. If the fishery is closed prior to September 30, and there is insufficient quota remaining to reopen the nearshore areas for another fishing day, then any remaining quota may be transferred inseason to another Washington coastal subarea by NMFS via an update to the recreational halibut hotline. The daily bag limit is one halibut per person, with no size limit.
Recreational fishing for groundfish and halibut is prohibited within two YRCA's off Washington's southern coast. The South Coast Recreational YRCA and the Westport Offshore YRCA are defined by straight lines connecting latitude and

longitude coordinates. Coordinates for these Recreational YRCAs are specified in groundfish regulations at 50 CFR 660.390 and will be specifically defined annually in federal halibut regulations published in the *Federal Register*.

(iv) Columbia River subarea.

This sport fishery subarea is allocated 2.0 percent of the first 130,845 lb (59.4 mt) allocated to the Washington sport fishery, and 4.0 percent of the Washington sport allocation between 130,845 lb (59.4 mt) and 224,110 lb (101.7 mt) (except as provided in section (e)(3) of this Plan). This subarea is also allocated 5.0 percent of the Oregon/California sport allocation or an amount equal to the contribution from the Washington sport allocation, whichever is greater. This subarea is defined as waters south of Leadbetter Point, WA (46°38.17' N. lat.) and north of Cape Falcon, OR (45°46.00' N. lat.). The fishery will open on the first Thursday in May or May 1 if it is a Friday or Saturday, 3 days per week, Thursday through Saturday until 70 percent of the subarea allocation is taken or until the third Sunday in July, whichever is earlier. The fishery will reopen on the first Friday in August and continue 3 days per week, Friday-Sunday until the remainder of the subarea quota has been taken, or until September 30, whichever is earlier. Subsequent to this closure, if there is insufficient quota remaining in the Columbia River subarea for another fishing day, then any remaining quota may be transferred inseason to another Washington and/or Oregon subarea by NMFS via an update to the recreational halibut hotline. Any remaining quota would be transferred to each state in proportion to its contribution. The daily bag limit is one halibut per person, with no size limit. No groundfish may be taken and retained, possessed or landed, except sablefish and Pacific cod when allowed by groundfish regulations, if halibut are on board the vessel.

(v) Oregon central coast subarea.

This subarea extends from Cape Falcon (45°46.00' N. lat.) to Humbug Mountain, Oregon (42°40.50' N. lat.) and is allocated 92.0 percent of the Oregon/California sport allocation minus any amount of pounds needed to contribute to the Oregon portion of the Columbia River subarea quota. The structuring objectives for this subarea are to provide two periods of fishing opportunity in Spring and in Summer in productive deeper water areas along the coast, principally for charterboat and larger private boat anglers, and provide a period of fishing opportunity in the summer for nearshore waters for small boat anglers. Any poundage remaining unharvested in the Spring all-depth subquota will be added to the Summer all-depth sub-quota. Any poundage that is not needed to extend the inside 40-fathom (73 m) fishery through October 31 will be added to the Summer all-depth season if it can be used, and any poundage remaining unharvested from the Summer all-depth fishery will be added to the inside 40-fathom (73 m) fishery subquota, if it can be used. If inseason it is determined via joint consultation between IPHC, NMFS and ODFW, that the combined all-depth

and inside 40-fathom (73 m) fisheries will not harvest the entire quota to the subarea, quota may be transferred inseason to another subarea south of Leadbetter Point, WA by NMFS via an update to the recreational halibut hotline. The daily bag limit is one halibut per person, unless otherwise specified, with no size limit. During days open to all-depth halibut fishing, no groundfish may be taken and retained, possessed or landed, except sablefish and Pacific cod when allowed by groundfish regulations, if halibut are on board the vessel.

Recreational fishing for groundfish and halibut is prohibited within the Stonewall Bank YRCA. The Stonewall Bank YRCA is an area off central Oregon, near Stonewall Bank, and is defined by straight lines connecting latitude and longitude coordinates. Coordinates for the Stonewall Bank YRCA are specified in groundfish regulations at 50 CFR 660.390 and will be specifically defined annually in federal halibut regulations published in the *Federal Register*.

ODFW will sponsor a public workshop shortly after the IPHC annual meeting to develop recommendations to NMFS on the open dates for each season each year. The three seasons for this subarea are as follows.

A. The first season opens on May 1, only in waters inside the 40-fathom (73 m) curve, and continues daily until the subquota (8 percent of the subarea quota) is taken, or until October 31, whichever is earlier. Any overage in the all-depth fisheries would not affect achievement of allocation set aside for the inside 40-fathom (73 m) curve fishery.

B. The second season is an all-depth fishery with two potential openings and is allocated 69 percent of the subarea quota. Fixed season dates will be established preseason for the first Spring opening and will not be modified inseason except if the combined Oregon all-depth Spring and Summer season total quotas are estimated to be achieved. Recent year catch rates will be used as a guideline for estimating the catch rate for the Spring fishery each year. The number of fixed season days established will be based on the projected catch per day with the intent of not exceeding the subarea subquota for this season. The first opening will be structured for 2 days per week (Friday and Saturday) if the season is for 4 or fewer fishing days. The fishery will be structured for 3 days per week (Thursday through Saturday) if the season is for 5 or more fishing days. The fixed season dates will occur in consecutive weeks starting the second Thursday in May (if the season is 5 or more fishing days) or second Friday in May (if the season is 4 or fewer fishing days), with possible exceptions to avoid adverse tidal conditions. If, following the "fixed" dates, quota for this season remains unharvested, a second opening will be held. If it is determined appropriate through joint consultation between IPHC, NMFS and ODFW, fishing may be allowed on one or more additional days. Notice of the opening(s) will be announced by NMFS via an update to the recreational halibut hotline. The fishery will be open every other week on

Thursday through Saturday except that week(s) may be skipped to avoid adverse tidal conditions. The potential open Thursdays through Saturdays will be identified preseason. The fishery will continue until there is insufficient quota for an additional day of fishing or July 31, whichever is earlier.

C. The last season is an all-depth fishery that begins on the first Friday in August and is allocated 23 percent of the subarea quota. The fishery will be structured to be open every other week on Friday and Saturday except that week(s) may be skipped to avoid adverse tidal conditions. The fishery will continue until there is insufficient quota remaining to reopen for another fishing day or October 31, whichever is earlier. The potential open Fridays and Saturdays will be identified preseason. If after the first scheduled open period, the remaining Cape Falcon to Humbug Mountain entire season quota (combined all-depth and inside 40-fathom (73 m) quotas) is 60,000 lb (27.2 mt) or more, the fishery will re-open on every Friday and Saturday (versus every other Friday and Saturday), if determined to be appropriate through joint consultation between IPHC, NMFS, and ODFW. The inseason action will be announced by NMFS via an update to the recreational halibut hotline. If after the Labor Day weekend, the remaining Cape Falcon to Humbug Mountain entire season quota (combined all-depth and inside 40-fathom (73 m) quotas) is 30,000 lb (13.6 mt) or more and the fishery is not already open every Friday and Saturday, the fishery will re-open on every Friday and Saturday (versus every other Friday and Saturday), if determined to be appropriate through joint consultation between IPHC, NMFS, and ODFW. After the Labor Day weekend, the IPHC, NMFS, and ODFW will consult to determine whether increasing the Oregon Central Coast bag limit to two fish is warranted with the intent that the quota for the subarea is taken by September 30. If the quota is not taken by September 30, the season will remain open, maintaining the bag limit in effect at that time, through October 31 or quota attainment, whichever is earlier. The inseason action will be announced by NMFS via an update to the recreational halibut hotline.

(vi) South of Humbug Mountain subarea.

This sport fishery subarea is allocated 3.0 percent of the Oregon/California subquota, which is approximately 0.62 percent of the Area 2A TAC. This area is defined as the area south of Humbug Mountain, OR (42°40.50' N. lat.), including California waters. The structuring objective for this subarea is to provide anglers the opportunity to fish in a continuous, fixed season that is open from May 1 through October 31. The daily bag limit is one halibut per person, with no size limit. Due to inability to monitor the catch in this area inseason, a fixed season will be established preseason by NMFS based on projected catch per day and

number of days to achievement of the subquota; no inseason adjustments will be made, and estimates of actual catch will be made post season.

(2) Port of landing management. All sport fishing in Area 2A will be managed on a "port of landing" basis, whereby any halibut landed into a port will count toward the quota for the subarea in which that port is located, and the regulations governing the subarea of landing apply, regardless of the specific area of catch.

(3) Possession limits. The sport possession limit on land in Washington is two daily bag limits, regardless of condition, but only one daily bag limit may be possessed on the vessel. The sport possession limit on land in Oregon is three daily bag limits, regardless of condition, but only one daily bag limit may be possessed on the vessel. The sport possession limit on land in California and on the vessel is one daily bag limit, regardless of condition.

(4) Ban on sport vessels in the commercial fishery. Vessels operating in the sport fishery for halibut in Area 2A are prohibited from operating in the commercial halibut fishery in Area 2A. Sport fishers and charterboat operators must determine, prior to May 1 of each year, whether they will operate in the commercial halibut fisheries in Area 2A which requires a commercial fishing license from the IPHC. Sport fishing for halibut in Area 2A is prohibited from a vessel licensed to fish commercially for halibut in Area 2A.

(5) Flexible inseason management provisions.

(i) The Regional Administrator, NMFS Northwest Region, after consultation with the Chairman of the Pacific Fishery Management Council, the IPHC Executive Director, and the Fisheries Director(s) of the affected state(s), or their designees, is authorized to modify regulations during the season after making the following determinations.

(A) The action is necessary to allow allocation objectives to be met.

(B) The action will not result in exceeding the catch limit for the area.

(C) If any of the sport fishery subareas north of Cape Falcon, OR are not projected to utilize their respective quotas by September 30, NMFS may take inseason action to transfer any projected unused quota to another Washington sport subarea.

(D) If any of the sport fishery subareas south of Leadbetter Point, WA are not projected to utilize their respective quotas by their season ending dates, NMFS may take inseason action to transfer any projected unused quota to another Oregon sport subarea.

(ii) Flexible inseason management provisions include, but are not limited to, the following:

(A) Modification of sport fishing periods;

(B) Modification of sport fishing bag limits;

(C) Modification of sport fishing size limits;

(D) Modification of sport fishing days per calendar week; and

(E) Modification of subarea quotas.

(iii) Notice procedures.

(A) Inseason actions taken by NMFS will be published in the *Federal Register*.

(B) Actual notice of inseason management actions will be provided by a telephone hotline administered by the Northwest Region, NMFS, at 206-526-6667 or 800-662-9825 (May through October) and by U.S. Coast Guard broadcasts. These broadcasts are announced on Channel 16 VHF-FM and 2182 kHz at frequent intervals. The announcements designate the channel or frequency over which the notice to mariners will be immediately broadcast. Since provisions of these regulations may be altered by inseason actions, sport fishermen should monitor either the telephone hotline or U.S. Coast Guard broadcasts for current information for the area in which they are fishing.

(iv) Effective dates.

(A) Inseason actions will be effective on the date specified in the Federal Register notice or at the time that the action is filed for public inspection with the Office of the Federal Register, whichever is later.

(B) If time allows, NMFS will invite public comment prior to the effective date of any inseason action filed with the *Federal Register*. If the Regional Administrator determines, for good cause, that an inseason action must be filed without affording a prior opportunity for public comment, public comments will be received for a period of 15 days after of the action in the *Federal Register*.

(C) Inseason actions will remain in effect until the stated expiration date or until rescinded, modified, or superseded. However, no

inseason action has any effect beyond the end of the calendar year in which it is issued.

(v) Availability of data. The Regional Administrator will compile, in aggregate form, all data and other information relevant to the action being taken and will make them available for public review during normal office hours at the Northwest Regional Office, NMFS, Sustainable Fisheries Division, 7600 Sand Point Way NE, Seattle, WA.

(6) Sport fishery closure provisions.

The IPHC shall determine and announce closing dates to the public for any subarea in which a subquota is estimated to have been taken. When the IPHC has determined that a subquota has been taken, and has announced a date on which the season will close, no person shall sport fish for halibut in that area after that date for the rest of the year, unless a reopening of that area for sport halibut fishing is scheduled by NMFS as an inseason action, or announced by the IPHC.

(g) PROCEDURES FOR IMPLEMENTATION

Each year, NMFS will publish a proposed rule with any regulatory modifications necessary to implement the Plan for the following year, with a request for public comments. The comment period will extend until after the IPHC annual meeting, so that the public will have the opportunity to consider the final Area 2A TAC before submitting comments. After the Area 2A TAC is known, and after NMFS reviews public comments, NMFS will implement final rules governing the sport fisheries. The final ratio of halibut to Chinook to be allowed as incidental catch in the salmon troll fishery will be published with the annual salmon management measures.

Sources:

73 FR 12280 (March 7, 2008)
72 FR 11792 (March 14, 2007)
71 FR 10850 (March 3, 2006)
70 FR 20304 (April 19, 2005)
69 FR 24524 (May 4, 2004)
68 FR 10989 (March 7, 2003)
67 FR 12885 (March 20, 2002)
66 FR 15801 (March 21, 2001)
65 FR 14909 (March 20, 2000)
64 FR 13519 (March 19, 1999)
63 FR 13000 (March 17, 1998)
62 FR 12759 (March 18, 1997)
61 FR 11337 (March 20, 1996)
60 FR 14651 (March 20, 1995)
59 FR 22522 (May 2, 1994)
58 FR 17791 (April 6, 1993)

OREGON DEPARTMENT OF FISH AND WILDLIFE REPORT ON PROPOSED CHANGES TO THE PACIFIC HALIBUT CATCH SHARING PLAN FOR THE 2011 FISHERY

The Oregon Department of Fish and Wildlife (ODFW) solicited public input via e-mail, phone, and a public meeting to discuss proposed changes to the Pacific Halibut Catch Sharing Plan (CSP) for fisheries off Oregon in 2011. The public meeting occurred on August 17, 2010 in Newport. Based on the meeting comments, and other public input, ODFW recommends the Pacific Fishery Management Council (Council) approve the following proposals for additional public review.

Central Coast Subarea

1. Adjust the number of open days per week in the spring all-depth fishery from three to two days, if the number of fixed days will be nine days or less, otherwise remain at three days per week.

Rationale: Reducing the spring all-depth fishery from three to two day openers, if there will be nine or fewer fixed days (three, 3-day openings) is intended to extend the duration of the all-depth fishery and provide more opportunities later into the season.

2. Adjust the number of open days per week in the nearshore (inside 40 fm) fishery from seven days per week to less than seven days per week. If, after some point mid-season, effort and harvest are tracking slowly, the nearshore fishery could then be expanded to seven days per week to more fully utilize the allocation.

Rationale: In 2010 the nearshore (inside 40 fm) fishery attained its entire allocation for the first time, causing the fishery to close on July 17. Angler effort, catch rates and average weights were all greater than in previous years. Reducing the number of days open per week in the nearshore fishery is intended to extend the duration of the nearshore fishery and help prevent the same situation from occurring in 2011.

3. Adjust the allocation to the three central coast subarea seasons (spring all-depth, summer all-depth, and nearshore.
    a. Alternatives that have been suggested:
        - Maintain status quo with 69% to the spring all-depth, 23% to the summer all-depth, and 8% to the nearshore.
        - Maintain 8% to the nearshore, then divide the remainder equally between the spring and summer all-depth seasons.
        - Maintain 8% to the nearshore, the divide the remainder 60% to the spring and 40% to the summer all-depth seasons.
        - Change the allocations to 45% to the spring all-depth, 45% to the summer all-depth, and 10% to the nearshore.

Rationale: Due to the decrease in the overall 2A total allowable catch over the last several years, the allocation to all recreational Pacific halibut fisheries has been decreasing, including those in the Central Oregon subarea. In 2009, the summer all-depth fishery was open for one period of three days; harvest exceeded the allocation enough that both the all-depth and the nearshore fishery were closed. In 2010, the summer all-depth fishery was open for one period of two days, with the quota again being exceeded; however in 2010 it was a much smaller overage. If the summer all-depth quota is at a level much lower than what was available in 2010, the summer season may be restricted to a one day opening, increasing the "derby" mentality of anglers and causing further congestion, safety and/or over harvest issues.

South of Humbug Mountain Subarea

1. Open the fishery on April 1 through October 31, seven days per week rather than opening on May 1.

Rationale: Opening on April 1 rather than May 1 would allow an extra month in which to have potentially favorable weather days allowing anglers to reach the fishing grounds, and attain more of the allocation. In recent years there has been minimal harvest in Oregon from this subarea. However, the entire quota is assumed to be taken due to the absence of a sampling and tracking program in Northern California, where there may be some effort and harvest.

Other Suggestions Received

There were several other suggestions received by ODFW that are not proposed for further public comment at this time. Below is a summary of these recommendations:

1. Reinstate the Florence north jetty boundary so as to split the central coast into north-central and south-central sub-areas as occurred prior to 2004
    a) for the all-depth seasons
    b) for nearshore fisheries.
2. Adopt a lottery based tag system.
3. Institute a 1-fish nearshore halibut annual sub-tag limit.
4. Re-institute a 32-inch minimum size limit.
5. Institute a maximum size limit.

Agenda Item D.1.b
Supplemental GAP Report
September 2010

GROUNDFISH ADVISORY SUBPANEL REPORT ON
2011 PACIFIC HALIBUT REGULATIONS

The Groundfish Advisory Subpanel (GAP) considered proposed changes submitted by Oregon Department of Fish and Wildlife (ODFW) to the Pacific halibut catch sharing plan and the present regulations of the halibut fishery in IPHC area 2A. A presentation was given to GAP members by a representative from ODFW.

GAP Recommendations:

The GAP supports the requested changes in the ODFW Report contained within Agenda Item D.1.b. with one exception. The GAP believes that the proposal to change the opening date south of Humbug from May 1 to April 1 should be removed. Removal of this would maintain consistency with other areas and prevent an earlier opening which would not be available to northern California anglers.

PFMC
9/12/10

Agenda Item D.1.b
Supplemental NMFS Report
September 2010

NATIONAL MARINE FISHERIES SERVICE REPORT ON 2011 PACIFIC HALIBUT REGULATIONS

NMFS is proposing changes to the 2011 Pacific halibut Catching Sharing Plan (CSP) and the codified regulations at §300.63. Currently closed areas and depth contours approximating boundary lines are defined within both the halibut regulations and the groundfish regulations. These proposed changes would remove coordinates from the halibut regulations and instead provide reference to the same information in groundfish regulations, therefore providing a single location for coordinate and closed areas information.

The proposed changes to the catch sharing plan are as follows:

1) In section (e)(2), specify that closed areas that will apply to the non-Indian directed commercial fishery will be defined within groundfish regulations at 50 CFR 660.70.

The proposed changes to the codified regulations at 50 CFR 300.63 are as follows:

1) In paragraph (e) replace the description of the groundfish RCA with specific reference to the closed areas and depth contours in 50 CFR 660.70 through 50 CFR 660.74.
2) Remove paragraphs (f) and (g), these paragraphs simply list the coordinates for the 30-fm and 100-fm lines, this information will now all be found in the groundfish regulations.
3) Update all references to current groundfish regulations with updated references as a result of the groundfish regulation restructure occurring through the TIQ program.

Finally, NMFS received suggested changes to the Treaty Indian sections of the IPHC and Federal regulations from the Lummi tribe. NMFS will coordinate with the halibut tribes, the states, and IPHC regarding the proposed changes. NMFS believes these changes do not implicate the CSP, but if they do, NMFS will notify the Council prior to the November meeting.

PFMC
09/11/10

PROPOSED PROCEDURES FOR ESTIMATING PACIFIC HALIBUT BYCATCH IN THE GROUNDFISH FISHERIES

National Marine Fisheries Service (NMFS) will brief the Council on the status of bycatch estimates for Pacific halibut in the Council-area groundfish trawl and fixed gear fisheries.

The halibut bycatch estimates for the 2009 groundfish trawl and fixed gear fisheries in International Pacific Halibut Commission (IPHC) Area 2A waters include information from the groundfish observer program and effects of the groundfish area closures in 2009. A report documenting the methods used to derive bycatch estimates was provided to the Scientific and Statistical Committee (SSC) for review and comment (Agenda Item D.2.b, NMFS Report). NMFS will provide bycatch estimates to the IPHC prior to the November 30 interim meeting of the IPHC for use in establishing the 2011 halibut total allowable catch (TAC).

The IPHC also convened a Halibut Bycatch Work Group, which met August 11, 2010. Ms. Michele Culver, as the Council's representative to IPHC, attended on behalf of Area 2A interests and will provide a summary of the meeting (Agenda Item D.2.c, WDFW Report).

Council Action:

Utilizing input from the SSC, provide any needed Council guidance to the completion of the bycatch assessment and its transmittal by NMFS to the IPHC.

Reference Materials:

1. Agenda Item D.2.b, NMFS Report: Pacific Halibut Bycatch in the U.S. West Coast Groundfish Fishery from 2002 through 2009.
2. Agenda Item D.2.c, WDFW Report: Washington Department of Fish and Wildlife Report on the International Pacific Halibut Commission's Bycatch Work Group.

Agenda Order:

a. Agenda Item Overview **Chuck Tracy**
b. Northwest Fisheries Science Center Report **Eliza Heery, Janell Majewski**
c. Reports and Comments of Advisory Bodies and Management Entities
d. Public Comment
e. **Council Action**: Review and Provide Guidance on Appropriate Bycatch Estimation Procedures

PFMC
08/26/10

Pacific Halibut Bycatch in the U.S. West Coast Groundfish Fishery from 2002 through 2009

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INTRODUCTION

Pacific halibut (*Hippoglossus stenolepis*) is found in coastal waters throughout the North Pacific Region. Off the west coast of the United States, it inhabits continental shelf areas (< 150 fm) from Washington to central California (Clark and Hare 1998). This species has long supported a directed commercial fishery in the US and Canada, but it is also caught as bycatch in other fisheries that target demersal species inhabiting similar depths and seafloor habitat types. The primary objective of this report is to provide estimates of Pacific halibut bycatch in the U.S. west coast groundfish fishery from 2002-2009.

The west coast groundfish fishery is a multi-species fishery that utilizes a variety of gear types. The fishery harvests species designated in the Pacific Coast Groundfish Fishery Management Plan (FMP; PFMC 2008) and is managed by the Pacific Fishery Management Council (PFMC). There are 89 species listed in the groundfish FMP, including a variety of rockfish, flatfish, roundfish, skates, and sharks (see Appendix A). These species are found in both federal (> 3 Nm) and state waters (0-3 Nm). Groundfish are both targeted and caught incidentally by trawl nets, hook-and-line gears, and fish pots.

Under the FMP, the groundfish fishery is defined as consisting of four management components:

- Limited Entry (LE) – The LE component includes all commercial fishers who hold a federal limited entry permit. The total number of limited entry permits available is capped and permitted vessels are allotted a larger portion of the total allowable catch for commercially desirable species than non-permitted vessels.

- Open Access (OA) – The OA component includes commercial fishers who are not federally permitted. However, state agencies (California Department of Fish and Game and Oregon Department of Fish and Wildlife) have instituted permit programs for certain OA sectors.

- Recreational – This component includes recreational anglers who target or incidentally catch groundfish species.

- Tribal – This component includes native tribal commercial fishers in Washington state that have treaty rights to fish groundfish.

These four components can then be further subdivided into sectors based on gear type, target species, permits and various regulatory factors. Commercial LE and OA sectors have traditionally caught the largest quantities of groundfish and are observed by the West Coast Groundfish Observer Program (WCGOP).

The WCGOP was established in May 2001 by NOAA Fisheries (NMFS) in accordance with the Pacific Fishery Management Plan (50 CFR Part 660) (50 FR 20609). This regulation requires that all vessels that catch groundfish in the US EEZ from 3-200 miles offshore to carry an observer when notified to do so by NMFS or its designated agent. Subsequent state rule-making has extended NMFS's ability to require that California and Oregon vessels, which only fish in

the 0-3 mile state territorial zone, also carry observers. WCGOP observers are stationed along the US west coast from Bellingham, Washington to San Diego, California.

The WCGOP's goal is to improve estimates of total catch and discard by observing shoreside groundfish sectors along the US west coast. Originally, the WCGOP focused observer effort in the LE bottom trawl and LE fixed gear sectors. In 2002, the WCGOP began deploying observers in open access sectors while increasing its coverage of the LE bottom trawl sector. In 2005, the WCGOP increased its coverage of the LE fixed gear sector, and in 2006, the WCGOP improved coverage of the nearshore sector. Currently, the WCGOP coverage goal is to maintain, at a minimum, 20% coverage in the LE bottom trawl and LE fixed gear fisheries by landings, while continuing to improve coverage in the open access sectors of the groundfish fishery. An observer coverage plan from the WCGOP is available at: www.nwfsc.noaa.gov/ research/divisions/fram/observer/observersamplingplan.pdf.

Pacific halibut is consistently caught as bycatch in two of the fishery sectors observed by the WCGOP: the LE bottom trawl sector and the sablefish (non-nearshore) fixed gear sector. The LE bottom trawl sector operates from the Canadian border to Morro Bay, California. Vessels in this sector must have a federal groundfish permit with a trawl endorsement. LE bottom trawl vessels range in size from 35 to 95 feet and fish throughout the year in a wide range of depths. Bottom trawlers often target species assemblages, which can result in diverse catch. A single groundfish bottom trawl tow often includes fifteen to twenty species. Fish size and weight of the total catch also vary widely. LE bottom trawl vessels deliver the portion of their catch that is marketable and permitted to be landed to shoreside processors. The portion of the catch that is prohibited by regulations or not marketable is discarded at-sea. Pacific halibut is considered a "prohibited species" in the LE bottom trawl sector, and all specimens caught as bycatch must be discarded.

The non-nearshore fixed gear fishery sector consists of 3 major components: the LE sablefish-primary, the LE sablefish non-primary, and the OA components. A federal groundfish permit is required to participate in either LE component. In addition, a tier endorsement is required to participate in the LE sablefish-primary component of the fixed gear sector. Although federal or state permits are not required to participate in the OA fixed gear sector, this portion of the fishery is subject to daily trip limit regulations set forth by PFMC. The same is true for LE non-primary vessels and for tier-endorsed LE vessels that have either reached their quota or are fishing outside of the sablefish primary season, which takes place from April to the end of October. Fixed gear vessels deploy pots and a variety of hook-and-line gears. However, the majority of directed sablefish effort is carried out using longlines. Pacific halibut is a "prohibited species" in the non-nearshore fixed gear sector with one exception. Prior to 2010, tier-endorsed (sablefish primary) vessels that fished with longline gear North of Point Chehalis, Washington (46° 53.30' N. lat.) were alloted some Pacific halibut landings. This regulation was modified in 2010 such that Pacific halibut can no longer be landed by any fixed gear vessels targeting FMP groundfish, due to a low total allowable catch for International Pacific Halibut Commission (IPHC) area 2A off the US west coast.

The WCGOP also observes the commercial nearshore sectors in Oregon and California, which target FMP groundfish typically in waters shallower than 50 fathoms. In addition, it provides

observer coverage for the pink shrimp and California halibut trawl fisheries. Pacific halibut bycatch is rare in these fishery sectors, occuring on a maximum of 8% of observed tows/sets annually. Although we provide our best estimates of Pacific halibut fishing mortality in nearshore, pink shrimp and California halibut sectors, we point to previous WCGOP data reports to supply more comprehensive information about each of these sectors and their annual observed catch of Pacific halibut (www.nwfsc.noaa.gov/research/divisions/fram/observer/). For a list of groundfish sectors that are not covered by the program, see the description of observer coverage provided by Bellman et al. (2009) in the annual report on estimated total mortality of groundfish species.

Pacific halibut is managed by the IPHC, a body founded through treaty agreement between the US and Canada. The IPHC oversees the implementation of a directed Pacific halibut fishery on the US west coast using a derby fishery system with 10-hour openings. Many of the vessels that are observed by the WCGOP as part of the LE and OA fixed gear sectors participate in the directed fishery, but are not covered by the WCGOP while doing so.

This report combines discard estimates from both the LE bottom trawl sector and the non-nearshore fixed gear sector, which have historically been computed by different authors and presented in separate reports. The most recently published versions of each report are Wallace and Hastie (2009) for LE bottom trawl discard estimates, and Heery and Bellman (2009) for groundfish non-nearshore fixed gear discard estimates. The methodology employed in each of these reports was reviewed in 2010 and updates based on that review have been employed in the current analysis. In addition, we provide data summaries from the nearshore fixed gear sector, which catches and discards a small amount of Pacific halibut annually.

METHODS

Data sources

Data sources for this analysis include onboard observer data (from the WCGOP), trawl logbook data, and landing receipt data (referred to as fish tickets). The WCGOP coverage plan details program goals, vessel selection, observer coverage, and basic data collection (NWFSC 2006a). A list of fisheries in order of coverage priority and detailed information on data collection methods employed in each observed fishery can be found in the WCGOP manual (NWFSC 2006b).

The sampling protocol employed by the WCGOP is primarily focused on the discarded portion of catch. In order to ensure that the recorded weights for the retained portion of the observed catch are accurate, haul-level retained catch weights recorded by WCGOP observers are adjusted based on trip-level fish ticket records. This process is described in further detail in annual reports produced by the WCGOP (www.nwfsc.noaa.gov/research/divisions/fram/observer/datareport/index.cfm) and was conducted prior to the analyses presented in this report.

Fish ticket landing receipts are completed by fish-buyers in each port for each delivery of fish by a vessel. Fish tickets are trip-aggregated sales receipts for market categories that may represent

single or multiple species. They are issued to fish-buyers by a state agency and must be returned to the agency for processing. Fish ticket and species-composition data are submitted by state agencies to the Pacific Fisheries Information Network (PacFIN) regional database. Annual fish ticket landings data were retrieved from the PacFIN database and subsequently divided into various sectors of the groundfish fishery as indicated in Figure 1.

Logbook record-keeping is a state-mandated requirement for the LE groundfish trawl sector in Washington, Oregon, and California. A common-format logbook is used by all three states and completed logbook information is entered into state agency databases. The electronic data are then submitted by state agencies to the PacFIN regional database. Trawl logbook data for 2002 through 2009 were retrieved from the PacFIN database and processed further as indicated in Figure 1.

When Pacific halibut are encountered on an observed vessel, WCGOP observers select a random sample of specimens and record length and viability. Lengths are determined through visual estimation or direct measurement. Although we summarize length frequency data in this report, it is not incorporated in our analysis. Viabilities are collected according to a protocol from the IPHC, which is utilized by the North Pacific Groundfish Observer Program as well. Viability information was used to compute discard mortality rates (DMR) whenever possible.

Limited entry bottom trawl sector

Evaluation of strata

In previous reports on Pacific halibut bycatch in the LE bottom trawl sector, observer data were stratified by season, depth, area, and retained catch of arrowtooth flounder per tow hour. These strata were designated based on an analysis by Wallace (2000) that evaluated the significance of various categorical variables in determining the catch per tow hour of Pacific halibut. The data employed to conduct that analysis originated from the EDCP observer program and were collected between 1996 and 1998 (Wallace 2000). The efficacy of this stratification system was then verified annually (J. Wallace, personal communication, May 2010).

A substantial amount of observer data is now available for analysis, as the WCGOP has been collecting data on Pacific halibut bycatch in the LE bottom trawl sector since 2002. We applied the same methods as Wallace (2000) and used tree-based models (Clark and Pregion 1992) both to confirm previous findings and establish new stratification that could be used consistently across all years of observer data. Furthermore, we employed an additional constraint that all strata include data from three vessels or more. This constraint is required under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) for confidentiality purposes, but also ensures a sufficient sample size in observer data for subsequent analyses. We recognize that strata in which no fishing occurred would presumably enhance the reliability of overall bycatch estimates expanded to the fleet-wide level, since a zero valued estimate has a variance of zero. However, the LE bottom trawl fleet has a wide spatial and temporal distribution (Figure 2) and isolating strata without any logbook or observer data records was not feasible.

Wallace (2000) evaluated the effectiveness of several variables at predicting observed catch-per-unit-effort (CPUE) of Pacific halibut, defined as the observed catch weight (kg) per tow hour. This response variable was defined in the same way as the bycatch ratio later applied to estimate fleet-wide bycatch amounts. Ratio estimators (Cochran 1977) have been widely used in bycatch estimation (Stratoudakis et al. 1999, Walmsley et al. 2007, Borges et al. 2005a). The method relies heavily on the assumption that bycatch is proportional to some metric or proxy of fishing effort, in this case tow duration (Rochet and Trenkel 2005). Rochet and Trenkel (2005) note that this assumption is often not supported by the data, and that in some cases, bycatch may vary nonlinearly or even be unrelated to the ratio estimator denominator. Variability in this relationship is quite high at the tow level (Borges et al. 2005b), and tows are not considered independent within the sampling framework used by the WCGOP. However, the explanatory variables that are generally thought to relate to Pacific halibut bycatch (latitude, depth, catch of other species) coincide with individual tows. Figure 3a demonstrates that on a coastwide basis and across all years observed, it is difficult to identify a clear relationship between Pacific halibut bycatch at the tow level and tow duration. To some extent the lack of an obvious relationship may be attributed to the fact that biomass and catchability are not constant over space and time (as $C/E = Bq$ and the plot includes observer data from all locations along this coast from 2002 through 2009). While we would expect to see a linear pattern within components of the data in which Pacific halibut biomass and catchability are constant, it is difficult to identify these components without a much more comprehensive understanding of the stock's dynamics. We do see a more linear pattern when the data are split out by latitude, depth, year, and month, and re-plotted. For instance, Figure 3b shows the relationship between catch and tow hours in May 2009, in the area north of Point Chehalis, Washington, on the continental shelf, between 50 and 250 fathoms. Most of the area within this range in which observed vessels are fishing is characterized by gradually sloping sandy bottom habitat. Within a single month over a consistent bottom type such as this, we might expect biomass and catchability to be relatively constant, and thus for the relationship between catch and effort to be linear. In relation to Pacific halibut bycatch, tow duration appears to vary in a similar way to other proxies of effort, such as retained catch of target species. Because of this, there was no apparent advantage to using an alternative denominator, and we therefore maintained the status quo of tow hours.

In accordance with methods by Wallace (2000), we plotted Pacific halibut CPUE in relation to latitude, depth, and season in order to identify natural breaks in the data. In this initial examination, Pacific halibut CPUE increased with increasing latitude, particularly in the area north of 47° N latitude. CPUE decreased with increasing depth, with a noticeable break between 100 and 150 fathoms, presumably caused by the lack of effort in this area as a result of spatial closures. These findings were in agreement with those from Wallace (2000), however, we were unable to distinguish seasonal patterns in the data.

We then examined the relationship between Pacific halibut CPUE and the retained catch of other species per tow hour, applying a log transformation to both variables. All FMP groundfish species were considered (Appendix A). The strongest relationships that were apparent graphically were with arrowtooth flounder, petrale sole, and lingcod. In addition, we found potential relationships with Pacific cod, skates, yellowtail rockfish and Pacific ocean perch. The retained catch per tow hour was thus considered as a potential level of additional stratification in subsequent steps.

A tree-based model (Clark and Pregion 1992) was applied to all potential stratification variables in order to identify breaks in the data that were most significant. A generalized linear model (GLM) was then used to evaluate the significance of each combination of variables, with Pacific halibut discard per tow hour as the response variable. A constraint was applied to ensure that strata contained at least 3 vessels and Akaike's Information Criterion (AIC) values from each run of the model were then compared. The variables and stratification lines supported by this process were as follows:

Variable	**Stratification**
Latitude	north / south of 47.1518° N. latitude
Depth	shallower / deeper than 60.5 fm
Retained catch of other species	greater than / less than 125 kg per tow hour of all species tested (arrowtooth flounder, petrale sole, lingcod, Pacific cod, skates, yellowtail rockfish, and Pacific ocean perch)

Season was excluded as a potential stratification variable, as it did not improve model fit. In order to make estimates relevant within a management framework, Point Chehalis, Washington (46° 53.30' N. lat.), the closest geographic coordinate used in groundfish management to the latitudinal break supported by the model, was employed to define latitudinal strata. Tows were stratified by depth as greater than or less than 60 fathoms. The AIC values associated with this adjusted model still demonstrated a considerable improvement over all other latitudinal and depth-based stratification schemes evaluated (except for that selected through tree regression, for which AIC was slightly lower) while maintaining the constraint that strata contain data from at least 3 vessels in all years. Table 1 summarizes observer coverage within each area and depth strata.

Bycatch estimation

Once the stratification scheme had been determined, we applied a deterministic approach to estimate bycatch of Pacific halibut in the LE bottom trawl sector. Through this approach, observed bycatch rates for Pacific halibut were directly expanded based on the total fleet effort (hours towed) (Table 1). Fleet effort was derived from trawl vessel logbooks.

Since logbooks are not available from 100% of the fleet, it was necessary to adjust logbook effort based on fish tickets, which are considered a more complete census of fleet-wide data and are legally binding documents. Washington Department of Fisheries and Wildlife (WDFW) calculates an expanded trawl effort amount to account for logbooks that were not submitted to the agency (Sampson and Crone 1997). Although this value has been used in previous reports on Pacific halibut bycatch in the LE bottom trawl sector (Wallace and Hastie 2009), we found that this data field was blank (did not contain a value) in some of the data when working at the tow level. Logbook effort for Washington, Oregon and California was instead adjusted based on the ratio of the total FMP groundfish catch reported on fish tickets to that reported in logbooks. This ratio was computed separately for each state and month and was then multiplied by the total tow hours from each haul associated with landings in that month and state:

$$r_{ap} = \frac{L_{ap}}{W_{ap}}$$

$$H_{adj_{tap}} = H_{tap} \times r_{ap}$$

where:

r_{ap} = adjustment ratio
L_{ap} = lbs of FMP groundfish recorded on fish tickets in state *a* and month *p*
W_{ap} = lbs of FMP groundfish recorded in vessel logbooks from state *a*, in month *p*
H_{tap} = logbook tow hours from tow *t*, which landed its catch in state *a* during month *p*
H_{adjtap} = adjusted logbook tow hours from tow *t*, which landed its catch in state *a* during month *p*

The adjustment ratio was then applied to logbook tow hours at the tow level in order to enable subsequent stratification of the data by area, depth, and CPUE of other species. Wallace and Hastie (2009) adjusted logbook tow hours based on an adjustment ratio that was computed for each port and month. In our evaluation, we found this approach to yield ratios with relatively small and highly variable numerators and denominators. Rather than averaging across port/month strata, we decided to aggregated logbook and fish ticket data at a higher level. The objective of adjusting logbook data was to account for submission rates of less than 100%. Since the logbook program is implemented at the state level and the data are entered into state databases, we decided to aggregate by state. Logbooks are submitted on a monthly basis (Sampson and Crone 1997) and change over time. We therefore maintained month as a variable used to aggregate data prior to computing adjustment ratios.

Previous reports on Pacific halibut bycatch in the LE bottom trawl fishery have focused on observed bycatch associated with vessels landing in Oregon and Washington only (Wallace and Hastie 2009). Some vessels from Oregon do fish and encounter Pacific halibut south of the California/Oregon border. A small amount of Pacific halibut is also caught in this area by vessels that are based in California and land their catch in California ports. The current analysis attempts to provide a comprehensive view of bycatch in the LE bottom trawl sector across all years in which observer data are available. Observer and logbook data from California were therefore included in our analysis.

LE bottom trawl vessels may hold a California halibut bottom trawl permit and participate in the state-permitted California halibut fishery. California halibut tows can occur on the same trip as tows targeting groundfish and were identified in logbook and observer data based on the following criteria: 1) the tow target was California halibut or 2) the tow target was nearshore mix, sand sole, or other flatfish, and the tow took place in less than 30 fathoms and south of 40°10’ N. latitude. All tows in the observer and logbook data that met at least one of the above criteria were removed from the LE bottom trawl dataset and included in bycatch estimation for the California halibut trawl fishery (see below). Whether in observer or logbook data, the tow target was typically determined by the vessel captain.

Next, both observer and logbook data were stratified based on the stratification scheme described in the previous section, with 2 area strata, 2 depth strata, and 2 CPUE strata. A discard ratio (R_{ij}) was then computed from all observed tows within stratum i and year j as:

$$R_{ij} = \frac{\sum_t y_{ijt}}{\sum_t x_{ijt}}$$

where:

y_{ijt} = observed discard of Pacific halibut (kg) in stratum i and year j during tow t
x_{ijt} = observed tow hours in stratum i and year j from tow t

The variance of R_{ij} was approximated by using the following equation (Cochran 1977):

$$Var(R_{ij}) = \left(\frac{\bar{y}_{ij}}{\bar{x}_{ij}}\right)^2 \left[\frac{s^2(y_{ijt})}{\bar{y}_{ij}^{\,2}} + \frac{s^2(x_{ijt})}{\bar{x}_{ij}^{\,2}} - \left(\frac{s^2(y_{ijt})}{\bar{y}_{ij}^{\,2}} \cdot \frac{s^2(x_{ijt})}{\bar{x}_{ij}^{\,2}}\right)\right]$$

where:

$\bar{y}_{ij}$ and $\bar{x}_{ij}$ = the means of y_{ijt} and x_{ijt}
$s^2(y_{ij})$ and $s^2(x_{ij})$ = the variances of y_{ijt} and x_{ijt}

This variance estimator is that which was employed by Pikitch et al. (1998) and is based on methods presented by Cochran (1977). Note that Var (R_{ij}) cannot be calculated when $x_{ijt} = 0$ or $y_{ijt} = 0$ for all tows. The lower and upper bounds of a 95% confidence interval were computed as follows:

$$l_{lower} = \frac{\bar{y}_{ij}}{\bar{x}_{ij}} - 1.96\left(\sqrt{Var(R_{ij})}\right)$$

$$l_{upper} = \frac{\bar{y}_{ij}}{\bar{x}_{ij}} + 1.96\left(\sqrt{Var(R_{ij})}\right)$$

In order to best support fishery management, variance and confidence intervals were calculated separately for data in each geographic area, depth, and CPUE stratum (Table 2). Variance estimates, therefore, do not relate back directly to the random stratified sampling framework employed by the WCGOP, where vessels within each port group were the sampling unit. This may introduce bias into variance estimates. Although variance computed from the observer data is still provided in the same way it has been in previous reports (Wallace and Hastie 2009), it should be considered with caution.

Discard ratios were then multiplied by the total adjusted tow hours (H_{adj}) within each stratum to produce as series of initial bycatch estimates (B_{ij}):

$$B_{ij} = R_{ij} \times \sum_t H_{adj_t}$$

The product B_{ij} represents the total, or gross estimated bycatch weight within stratum i and year j. This includes all discarded fish, regardless of whether the fish survived after being returned at sea.

Viability Analysis

In order to compute the total mortality of discarded Pacific halibut, discard mortality rates were computed through an additional viability analysis (Tables 3 and 4). WCGOP observers collect viability data on discarded Pacific halibut in the LE bottom trawl fishery using the condition key provided in Appendix L of the WCGOP manual (NWFSC 2006b). Observations of several condition characteristics are used to assign each fish that is evaluated to one of three categories: Excellent, Poor, or Dead (Williams and Chen 2004).

In order to account for the impact of size on survivorship, we computed a weighted average mortality rate for each condition category. Viabilities were grouped based on coinciding length measurements in to 2 cm bins. The weight associated with the midpoint of each length bin was then multiplied by the total number of observations from each condition category. Weights were determined based on the IPHC length weight relationship:

$$W_m = 6.921 \times 10^{-6} \cdot L_m^{3.24}$$

where:

L_m = fork length (cm) at the midpoint of length bin m
W_m = weight (lb, head off, eviscerated) in length bin m

The product of the number of fish and the weight associated with each length bin was then summed for each condition category. A weighted average discard mortality rate for each condition category was computed based on the following equations:

$$P_{csj} = \sum_m n_{csjm} \times W_{csjm}$$

$$DMR_{csj} = m_c \times P_{csj}$$

where:

n_{csjl} = number of Pacific halibut recorded in condition c, stratum s, year j, and length bin m
m_c = mortality rate for condition c
P_{csj} = proportion of Pacific halibut in condition c, in stratum s in year j
DMR_{csj} = discard mortality rate in condition c (Excellent, Poor, or Dead), in stratum s in year j

Mortality rates used for each of the condition categories (m_c) are as follows (Clark et al. 1992):

m_c	Rate
m_{exc}	0.20
m_{poor}	0.55
m_{dead}	0.90

These rates are originally based on mortality data collected by Hoag (1975), who found some survivorship among fish in the dead condition category. Discard mortality rates for each

condition category *c* and stratum *s* were then multiplied by gross discard estimates to compute total estimated discard mortality:

$$F_{ij} = \sum_{c} B_{ij} \times DMR_{cjs}$$

where:

F_{ij} = total estimated discard mortality in stratum *i* in year *j*

The variables used to define strata for discard mortality rates (*s*) and gross discard estimates (*i*) differed because of differences in the way viabilities and gross estimates are stratified. Viability data are collected from only a subsample of the Pacific halibut that observers encounter. Stratification of viability data by latitude, depth, CPUE strata, and year results in very small sample sizes. Based on previous evaluations by Wallace and Hastie (2009), we expect that survivorship of Pacific halibut in the trawl fishery is most directly affected by the length of the tow and the amount of catch that fills the net. These variables are not part of the bycatch ratio stratification process described in previous sections, and their use in stratifying viability data would make it difficult to then apply discard mortality rates to initial gross estimates of bycatch. We found that tow duration was directly related to depth (Figure 4), one of the variables that was used to stratify discard ratios and initial gross discard estimates. This relationship is attributed to the time it takes to fish trawl gear in deeper versus shallow waters and the smaller amount of consistent seafloor type that is available for trawling in shallow areas. Smaller areas of seafloor are available both because of the bottom habitat type and because of smaller trip limits associated with areas shoreward of the trawl Rockfish Conservation Area (RCA). In shallower areas, vessels are more likely to fish with a larger number of short tows, compared with vessels fishing a smaller number of longer-duration tows in deeper areas. Since depth and tow duration appeared to co-vary, we used only depth to stratify viability data from each year (Tables 3 and 4). This essentially assumed that the physical condition of discarded Pacific halibut was not related to tow location.

Viability data are available from 2004 onward. For 2002 and 2003, we applied a discard mortality rate computed by summing the averages weights in each condition category across all years. Final estimates of Pacific halibut bycatch and discard mortality are presented in Table 5. Results from our review of stratification alternatives analyzed for the LE bottom trawl sector are summarized in Table 6 for reference.

Length frequencies

The length frequency distribution for Pacific halibut in the 2009 trawl fishery is provided as supplementary information in Table 7. Pacific halibut pose unique challenges for observer sampling. When catch from a trawl net is dumped on deck, most vessels' crew will scan the catch for Pacific halibut and immediately return them to sea, which is termed "presorting". Vessels presort Pacific halibut to increase the likelihood of survival of the discarded fish. In addition to the need for quickly returning Pacific halibut to the sea in order to enhance survival, halibut are often too heavy and/or awkward to weigh in observer baskets. Therefore, in most circumstances observers visually estimate the length of the halibut in ten-centimeter units (40cm,

50cm , 60cm, etc.), which are later converted to weight using the IPHC length/weight conversion table. Observers also have the option of directly measuring a Pacific halibut and then converting the measurement to weight using the IPHC length/weight conversion table or actually weighing the individual fish, but these rarely occur.

Non-nearshore fixed gear sector

Evaluation of appropriate strata

Testing of alternative stratification schemes indicated that latitude and gear type were the most important variables with respect to Pacific halibut bycatch in the fixed gear fishery. The WCGOP samples each fixed gear sector through a separate random selection process, with LE primary permits receiving the highest level of coverage and OA fixed gear the lowest. Given this sampling structure and anticipated differences in variance from one sector to the next, we chose to maintain sector as a stratification variable in our analysis. Bycatch estimates were therefore produced separately for each sector and gear combination. Latitudinal strata were also applied whenever there were sufficient data and the added stratification was shown to significantly improve the fit of predicted bycatch amounts to the amounts observed.

The largest number of Pacific halibut bycatch events observed in the fixed gear fishery was on LE primary vessels fishing off of Washington with longline gear. For this sector/gear combination there were sufficient data to evaluate the efficacy of additional variables for predicting bycatch. We considered a variety of additional parameters, including latitude, state of landing, season, month, and bimonthly period. Each of these was used as an explanatory variable in a generalized linear model, with Pacific halibut bycatch (kg) per set (log-transformed) as the response variable. We then compared the AIC value from each model run. For continuous variables such as latitude, tree-based models (Clark and Pregion 1992) were also applied to identify stratification lines that would result in the best model fit.

For the LE primary longline sector, latitude produced the lowest AIC values among the variables tested. Results from the tree regression model supported the application of two latitudinal breaks: at 44˚ 36.54’ N. latitude and 47˚ 48.33’ N. latitude. While these breaks produced the lowest AIC value from our model, this AIC value was only slightly smaller than that resulting from a single latitudinal break at Point Chehalis, Washington (46° 53.30’ N. lat.). Point Chehalis was used in previous estimates of Pacific halibut bycatch in the LE primary longline sector because of its relevance to groundfish management and its apparent ability to split out higher bycatch rates off the northern coast of Washington (Heery and Bellman 2009). In this analysis, we found that coefficient of variation (CV) estimates for Pacific halibut discard ratios were lower when a latitudinal break was used at Point Chehalis. CV values associated with latitudinal strata at 44˚ 36.54’ and 47˚ 48.33’ N. latitude were generally about 2 times larger than CV values computed using the Point Chehalis break. This is due to the smaller sample size in each stratum that results from using more than one latitudinal break.

Given these findings, we decided to maintain the same stratification in this analysis as was used previously by Heery and Bellman (2009) for the LE primary longline sector. Similar evaluations were attempted for the other fixed gear sectors to identify whether variables other than sector and gear might be appropriate as additional strata. While there was a sufficient sample size to apply additional spatial or temporal breaks in some cases, the application of these variables as strata did not improve the fit of our model to an extent that justified their use. Thus, we maintained the same stratification for the other fixed gear sectors that was used previously by Heery and Bellman (2009).

Bycatch estimation

A deterministic approach was used to estimate Pacific halibut bycatch for all sectors of the non-nearshore fixed gear fishery. Bycatch ratios were computed from observer data as the discarded weight of Pacific halibut divided by the retained weight of either sablefish or all FMP groundfish (except Pacific hake), depending on the sector (Table 10). A complete listing of groundfish species included in the Groundfish Fishery Management Plan that were used to compute and expand ratios is provided in Appendices A and B. Bycatch ratio denominators were identified for each sector of the non-nearshore fixed gear fishery based on the targeting behavior of that sector. Bycatch ratios were then multiplied by the total sector landed weight of either sablefish or FMP groundfish (except Pacific hake), corresponding with the denominator used to compute the observed discard ratio for each sector. This provided an expanded gross estimate of Pacific halibut bycatch for each sector (Table 11). A discard mortality rate (discussed below) was then applied to compute estimated total mortality.

Fish tickets with landings of sablefish using fixed gear were partitioned into the three commercial fixed-gear sectors (LE sablefish primary, LE sablefish non-primary, and OA fixed gear) through the following process. Commercial fixed-gear fish tickets were first divided out by whether the vessel had a federal groundfish permit (limited entry) or no federal groundfish permit (open access). OA fish tickets were placed in the OA fixed gear sablefish sector. Next, LE fish tickets were separated based on whether the vessel's federal groundfish permit(s) had a sablefish endorsement with tier quota for the primary season or if it was not endorsed (also referred to as 'zero' tier). Fish tickets for all LE sablefish vessels with tier endorsements that were operating within this period and within their allotted tier quota were placed in the LE sablefish-endorsed primary sector. If LE sablefish-endorsed vessels fished outside of the primary season (November through March) or made trips within the season after they had reached their tier quota, the fish tickets were placed in the LE sablefish non-primary sector. In addition, fish tickets from non-endorsed LE vessels were also placed in the LE sablefish non-primary sector.

Further processing of fish tickets was then conducted to identify landings from the directed Pacific halibut fishery and remove them from the non-nearshore fixed gear analysis. The directed Pacific halibut fishery occurs for only a few days each year, during 10-hour openings that are designated by the IPHC. In 2009, there were two such openings on June 24th and July 8th. LE and OA fixed gear vessels that typically target groundfish can participate in the directed fishery. For most fixed gear vessels, (other than LE primary longline vessels north of Point Chehalis) this is the only time during which they are allowed to land Pacific halibut. Fish tickets

that included Pacific halibut landings within 4 days of a directed fishery opening were considered to be part of the directed fishery and not part of the non-nearshore fixed gear fishery targeting federal FMP groundfish. These fish tickets were removed prior to our analysis. This approach may have resulted in the removal of some non-directed fishery landings north of Point Chehalis, but any bias introduced by this step is considered to be extremely small given the short time period across which fish tickets were removed. In the previous report on Pacific halibut discard in the non-nearshore fixed gear fishery, derby fish tickets were identified as those on which that largest landings came from Pacific halibut. This filtering step was applied to the area north of Point Chehalis only. Estimates from the previous report for 2002-2008 are maintained in the tables (Tables 8-12) presented here for comparison purposes.

The WCGOP observes the non-nearshore groundfish fixed gear sectors in the following order of priority: LE sablefish-endorsed primary season, the LE non-sablefish-endorsed ('0' tier) sector, and the OA fixed-gear sector. LE sablefish-endorsed vessels that fish outside of the primary season or that have reached their tier quota in the primary season are not observed. For more information see the most recent WCGOP non-nearshore fixed gear report (NWFSC 2009).

WCGOP observer data were stratified according to sector and gear type (longline and pot/trap). As discussed earlier, one additional latitudinal stratification at Point Chehalis, Washington (46° 53.30' N lat.) was used for the LE sablefish-endorsed longline sector. As was discussed earlier, some retention of Pacific halibut was allowed in the LE sablefish-endorsed primary season in the area north of Point Chehalis up until 2010, from May through the end of October of each year. The regulation allowing for Pacific halibut landings north of Point Chehalis was in place throughout the time period of data included in this report, with some slight annual differences in the weight of Pacific halibut which could be retained. This was the only latitudinal stratification incorporated into our analysis and was only applied to the LE sablefish-endorsed primary sector. Discard amounts provided for the other two fixed gear sectors represent coastwide estimates.

The number of observed trips, sets, and vessels are summarized for each sector, gear type and area (where applicable) in Table 8. Table 9 provides the landed weight of sablefish and FMP groundfish (excluding Pacific hake) used as a measure for expanding discard from observed trips to the entire fleet. Observed discard ratios (also in Table 9) were calculated by sector, gear group and area based on the following equation:

$$\hat{D}_s = \frac{\sum_t d_{st}}{\sum_t r_t} \times F_s$$

where:

s: strata (sector / gear group / area)
t: observed sets
d: observed discard (kg) of Pacific halibut
r: observed retained weight (mt) of sablefish or all FMP groundfish except Pacific hake
F: weight (mt) of retained sablefish or all FMP groundfish excluding Pacific hake recorded on fish tickets in strata *s*

D_s: Discard estimate for strata *s*

For all sector/gear/area strata, except the LE non-primary longline sector, discard ratios were calculated by dividing the stratum discard weight of Pacific halibut by the retained catch weight of sablefish. Retained groundfish was used as the ratio denominator for the LE non-primary longline sector, rather than sablefish weight alone, because this sector targets a wider range of deepwater species. A broader denominator was therefore necessary in order to effectively capture the level of fishing effort in this sector. Values provided in the tables (Tables 8-12) for this report are identical to those provided in earlier years, but with updated information for 2009. Please refer to earlier reports for further details of data pooling and discard ratios in prior years of observer coverage.

Where FMP groundfish (excluding Pacific hake) was used to compute discard ratios, any retained weights that were recorded by the observer but that did not appear on fish tickets were excluded from the denominator. This was necessary to prevent double-counting associated with differences in the species codes used by observers and processors. For instance, while observers may record rockfish catch at the species level, various species of rockfish are often grouped, weighed, and recorded together on the fish ticket by the processor under a grouped species code such as NUSP - northern unspecified slope rockfish. In some cases, this difference in species coding prevents observer and fish ticket weights from being matched and adjusted properly. Species coding on fish tickets varies considerably between processors and over time, and it is not possible to make assumptions regarding which individual observer-recorded species likely coincide with species grouping codes on fish tickets. Instead, by using only the retained groundfish weight from fish tickets in discard ratio denominators, we prevent double-counting of retained weights. This is not a factor when using a single species in the denominator, such as sablefish, as any retained weights in observer and fish ticket data that share the same species code will match and adjust properly.

In each stratum, the observed discard ratio (Table 9) was multiplied by the fish ticket retained weight of sablefish or all FMP groundfish species (excluding Pacific hake). Figure 5 demonstrates how each fishery sector/gear, expansion factor, and observed discard rate were used. This provided an expanded gross discard estimate for each stratum. If landings were made by a fixed gear sector for which there were no or very few WCGOP observations, the most appropriate observed discard ratio was selected and applied to those landings based on similarities in the fishery management structure, fishing and discard behavior, and the gear fished. The LE sablefish non-primary sector landed 18 mt of FMP groundfish with pot gear in 2009, but this portion of the fleet was not observed by the WCGOP program. Given similarities in gear type and catch composition, OA fixed gear pot observations were selected as the most appropriate source of information for an observed discard rate to apply to those landings by vessels fishing with pots in the LE sablefish non-primary sector (Figure 5).

Discard mortality rates

Once an initial gross estimate of discard had been produced, this value was multiplied by a discard mortality rate to generate a final discard mortality estimate (Table 12 and Figure 6). Ideally, discard mortality would have been approximated based on viabilities in a manner similar

to the approach used for the LE bottom trawl sector. WCGOP observers do record viability as Pacific halibut are discarded from longline vessels. However, much of the time, Pacific halibut are removed from the line before being brought onboard. This is to ensure safety, as longline vessels are often small, and to have the least possible impact on Pacific halibut survivorship. Because these fish are not typically brought onboard, the observer is not able to effectively assess viability or gain a random sample from Pacific halibut catch. Although viabilities from pot gear would be appropriate to use in estimating discard mortality, bycatch of Pacific halibut in pot gear is infrequent and the sample size of viability data from this gear type was too small to utilize in this analysis.

Pacific halibut viabilities from the non-nearshore fixed gear fishery were not used in our analysis. Discard mortality rates therefore had to be identified through other means. Review of the literature on Pacific halibut bycatch revealed little that could be applied to the entire discard estimate. Several studies have examined the survivorship of Pacific halibut in various conditions (Kaimmer and Trumble 1998, Trumble et al. 2000). However, without any information on the state of Pacific halibut that were being discarded, the findings from these examinations could not be put to use.

Instead, we relied on discard mortality rates computed for groundfish fisheries off Alaska (Williams 2008). An 18% discard mortality rate was applied to estimates for pot gear, coinciding with the DMR used for the sablefish pot CDQ fishery in Alaska. For longline gear, we used a discard mortality rate of 16%, an average of DMRs over all years for the Bering Sea/Aleutian region longline fishery (Williams 2008).

For additional context, Table 13 provides the length frequency distribution of Pacific halibut from visual estimates and actual lengths measured in the LE sablefish primary sector. Table 14 presents the proportion of sampled Pacific halibut discard in the non-nearshore fixed gear sector that was of legal ($\geq$ 81 cm) and sublegal ($<$ 81 cm) size. The majority of Pacific halibut lengths recorded in this fishery have been collected through visual length estimation, during which observers round to the nearest 10 cm. In other words, specimens that are 76 cm and 82 cm are both visually estimated to be 80 cm. With this level of resolution, it was not possible to compute the exact proportion of sublegal versus legal Pacific halibut from visually estimated lengths. Visual estimates were instead summarized in the manner in which they are recorded; with sublegal and legal sized halibut falling within the 75-84 cm length bin. Actual length measurements are available for 138 Pacific halibut from September 2003 through December 2009. Although sublegal versus legal percentages were computed from this data, actual length measurements do appear to contain a higher frequency of smaller individuals than visual estimates (Figure 7).

Other fishery sectors

Pacific halibut was also observed in the nearshore fixed gear sector and the pink shrimp and California halibut trawl fisheries. Bycatch estimates for these three fishery sectors were computed based on the following equation:

$$\hat{B} = \frac{\sum_t b_t}{\sum_t r_t} \times F$$

where:

b: observed discard (kg) of Pacific halibut on set/tow *t*
r: observed retained weight (mt) of target species on set/tow *t*
F: weight (mt) of retained target species
B: Bycatch estimate

The nearshore fishery targets a variety of groundfish species that inhabit areas shallower than 50 fathoms. All species included in the nearshore target group as listed in Appendix C were included in the denominator when calculating bycatch ratios for the nearshore fixed gear sector. Pink shrimp and California halibut were considered the target species in their respective fisheries.

Tables 15, 16 and 17 present the resulting bycatch estimates for the nearshore fixed gear sector, pink shrimp trawl fishery, and California halibut trawl fishery. Discard mortality rates were not applied to bycatch estimates for these fishery sectors due to a lack of information regarding survivorship. Note that the California halibut trawl fishery consists of 2 components: a limited entry sector and an open access sector. For more information regarding the differences between these 2 components, see annual data reports published by the WCGOP (www.nwfsc.noaa.gov/research/divisions/fram/observer/).

RESULTS

Limited entry bottom trawl sector

Gross bycatch estimates and total discard mortality estimates for the 2002-2009 LE bottom trawl sector are provided in Table 5. Estimated Pacific halibut discard mortality was highest in 2002 and then peaked again in 2005. Discard mortality decreased after 2005, but increased in 2009 to 251 mt. Fluctuations have occurred while trawl effort in recent years has gradually increased, from 56,016 tow hours in 2004 to 85,047 tow hours in 2009. The combination of these two factors has led to a gradual decline in mortality (kg) per tow hour since 2005, from 4.7 in 2005 to 2.8 in 2008. Mortality per tow hour increased slightly in 2009 to 3.0 kg per tow hour (Table 5). Estimates prior to 2004 for the LE bottom trawl sector were computed using viability data from 2004 through 2009, as viabilities from earlier years were not available.

In previous reports on Pacific halibut bycatch in the LE bottom trawl sector, discard was estimated based on observer, logbook, and fish ticket data from Washington and Oregon only (Wallace and Hastie, 2009). Although observer and logbook data were compiled from vessels that fished as far south as 40.667° N. latitude, only those that returned to Oregon or Washington to land their catch were included. Pacific halibut is caught in small amounts off of Northern

California by both Oregon- and California-based vessels. We therefore chose to include observer, logbook, and fish ticket data from vessels landings in California in our analysis.

Despite differences in the stratification scheme and the base dataset used in this and previous reports, discard mortality estimates were similar. Estimates from our analysis differed from those reported previously by 11 to 25%, with the greatest difference occurring in 2007. Mortality estimates presented in this report for 2005 through 2008 are higher than previously reported values (Wallace and Hastie 2009), which would be expected given the inclusion of data from California. Interestingly, in 2004, our mortality estimate for Washington, Oregon, and California combined was actually lower than previously reported estimates for Washington and Oregon only. This difference is attributed to differences in stratification. Earlier reports employed a finer level of stratification and averaged discard ratios for strata with little to no observer data records. We have not made comparisons with previous estimates for 2002 and 2003, as Wallace and Hastie (2009) used a 50% mortality rates to estimate total discard mortality in these years.

Our confidence intervals are derived from uncertainty in observer data only. The stratified random sampling design employed by the WCGOP selects vessels for coverage within each port group and bimonthly period. This approach provides the best logistical scenario for the implementation of the program and appears to achieve good spatial and temporal coverage of the fleet (Figure 2). However, this framework differs from the post-stratification scheme used in this analysis. Uncertainty estimated from post-stratified data can be biased, and should be used with caution. For this reason, and because of uncertainty that has not been accounted for in fish ticket or logbook data, the confidence intervals we provide should be considered as minimum values.

Regardless of the method used to stratify observer and logbook data or the discard mortality rate applied to gross estimates, the trend in Pacific halibut bycatch mortality in the LE bottom trawl sector is consistent. Table 6 provides the estimates resulting from 5 alternative stratification schemes. The use of state of landing instead of latitude appears to result in more extreme peaks in discard estimates. However, the differences are minimal, particularly given the size of the 95% confidence intervals for each set of estimates.

Non-nearshore fixed gear sector

Estimated discard mortality of Pacific halibut in the LE sablefish primary longline sector increased from 2008 to 2009. To some extent, this increase was associated with greater fishing effort for sablefish, both north and south of the Point Chehalis line. In total, landings from the LE sablefish primary longline sector increased to 1402 mt, compared with 1048 mt in 2008. In addition, however, the discard ratio for Pacific halibut computed from observer data for the area north of Point Chehalis was noticeably larger than in 2008 (Table 9). In other words, more Pacific halibut was discarded in relation to the amount of sablefish landed. This does not appear to be associated with any increase in the rate at which Pacific halibut was encountered. In fact, a smaller percentage of observed trips, sets, and vessels had records of Pacific halibut catch in 2009 than was typically documented in previous years (Table 10). Instead, the large discard rate seems to be best explained by the increased frequency with which vessels chose to discard this species. As mentioned previously, some retention of Pacific halibut was allowed in the LE

primary longline sector operating north of Point Chehalis. However, all Pacific halibut observed in this area in 2009 were discarded. Conversely, only 87% of the observed halibut weight was discarded in 2008 (Table 10).

While the increase in estimated discard of Pacific halibut in the LE sablefish primary longline sector thus appears to be associated changes in discard behavior among fishermen, it is also important to note that observer coverage in this sector was considerably lower in 2009. The 2009 sablefish primary season coincided with the end of a selection cycle, a period defined as the length of time required for the WCGOP to observe all vessels in the fleet. In 2009, there were a small number of vessels remaining for selection. This combined with other logistical constraints resulted in the coverage of only 9 vessels, compared with 18 in the previous year. Overall, WCGOP observed only 8.7% of the sablefish that was landed by the LE sablefish primary sector. This low level of observer coverage introduces a considerable degree of uncertainty into our final discard estimates.

Discard of Pacific halibut in other non-nearshore fixed gear sectors was mostly consistent with estimated discard amounts in previous years. Gross estimated discard in the LE primary pot sector decreased from 2008 to 2009, but remained within a range comparable to that estimated for earlier years. Among the non-primary fixed gear sectors (LE and OA), OA fixed gear vessels fishing with hook-and-line gears had the largest amount of Pacific halibut mortality. Discard mortality in this sector was 6.4 mt, compared with 6.6 mt in 2008. Effort in the OA fixed gear sector increased noticeably in 2009, with sablefish landings nearly doubling from annual landings amounts in 2007 and 2008. This did not affect discard estimates however, as the observed discard rate for Pacific halibut in 2009 was lower than in previous years (Table 9).

A large source of uncertainty in our estimates of Pacific halibut discard mortality on non-nearshore fixed gear vessels is the actual discard mortality rate applied to initial gross estimates that are computed from observer data. A small sample size of observed viability data are available from sablefish vessels fishing with pots, but not enough to be used in discard mortality estimation. Instead, we relied on findings from observed pot vessels in Alaska that assign specimens to the same condition codes used for trawl gear and then apply the discard mortality rates assumed by Williams (2008). This informed our decision to increase the discard mortality rate applied to pot estimates to 18% from 16%. As more viability information is collected by WCGOP observers from pot vessels, we intend to apply this directly to compute discard mortality in a manner consistent with methods of Williams (2008).

Just as for trawl gear, discard mortality rates have been determined experimentally for Pacific halibut caught with longline gear (Kaimmer and Trumble 1998, Trumble et al. 2000). In order to apply these rates, Pacific halibut caught on longlines are assigned to one of four condition categories (minor, moderate, severe, and dead.) based on the extent of their injuries at the time of release. Kaimmer and Trumble (1998) first derived discard mortality rates for each of these categories using mark-recapture data. Their rates were later updated by Trumble et al. (2000) to account for hook sizes that are more consistent with gear used on the West Coast for commercial purposes.

For reasons described earlier, Pacific halibut were infrequently brought onboard observed fixed gear vessels from 2002 to 2009, resulting in a small and potentially biased sample of viability data. Mortality rates specified by Trumble et al. (2000) cannot therefore be used in conjunction with these data to assess overall discard mortality. However, changes in WCGOP data collection protocol as of 2010 should allow observers to spend more of their time on fixed gear vessels collecting a random sample of Pacific halibut from which to gather viability data. These will be employed to evaluate discard mortality as soon as they become available. In the meantime, discard mortality rates of 16% for longline gear and 18% for pot gear (Williams 2008) are thought to be the best option available currently.

Other fishery sectors

Observed bycatch amounts of Pacific halibut in other fishery sectors were very small. Even without the application of discard mortality rates, bycatch estimates for the nearshore fixed gear sector, pink shrimp trawl fishery, and California halibut trawl fishery made up a minor portion of our total mortality estimate for Pacific halibut. Bycatch estimates provided in Tables 15, 16, and 17 are not intended to represent mortality values, as rates of discard mortality for these sectors are not available.

SUMMARY & CONCLUSIONS

- Estimated discard mortality in the LE bottom trawl sector fluctuated over the study period, with peaks in 2002, 2005, and 2009.

- Estimated mortality per tow hour of Pacific halibut in the LE bottom trawl sector has declined steadily since 2005.

- Discard mortality estimates were produced for the LE bottom trawl sector using data from Washington, Oregon, and California. Total annual estimates were 11 to 25% larger than previously reported estimates for 2004 through 2008 from Wallace and Hastie (2009), which were derived from Washington and Oregon data only.

- Estimated discard mortality in the LE and OA sablefish fixed gear sector fluctuated over the study period, with the largest peak of 107 mt in 2006, and smaller peak in 2009, at 56 mt.

- Within the sablefish fixed gear sector, LE sablefish primary vessels had the largest amount of Pacific halibut discard, particularly in the area north of Pt Chehalis, WA.

For a complete list of groundfish sectors, including those for which bycatch estimates are not provided in this report, see Bellman et al. (2009).

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FIGURES

Figure 1. Fish ticket and logbook data processing for division into groundfish fishery sectors after retrieval of a full calendar year data set from the Pacific Fisheries Information Network (PacFIN) database. Grey highlight indicates sectors for which federal observer data is available.

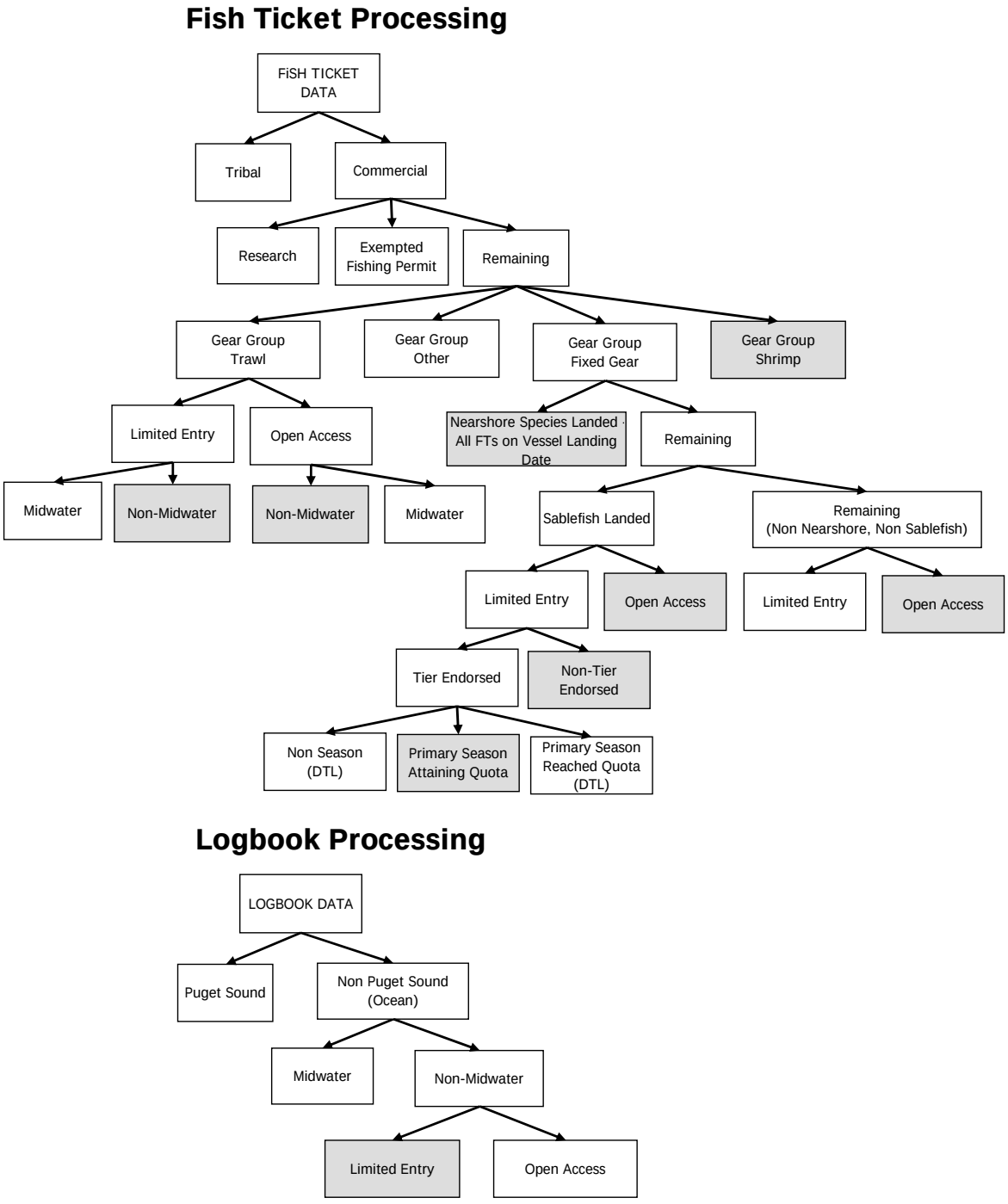


Figure 2a. Locations of observed and fleet logbook trawl tows north of Coos Bay, Oregon in 2009.

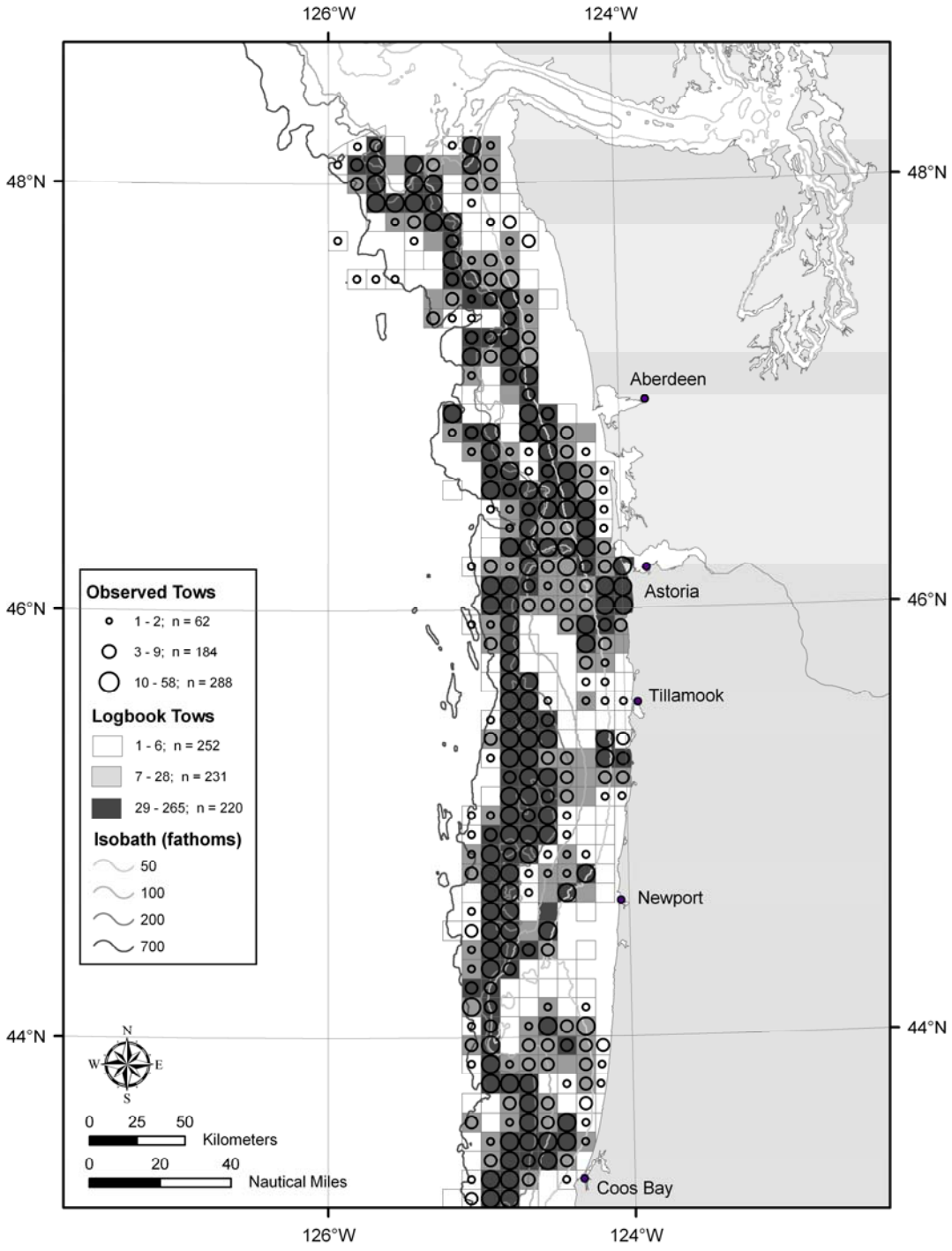


Figure 2b. Locations of observed and fleet logbook trawl tows south of Coos Bay, Oregon and north of San Francisco, California in 2009.

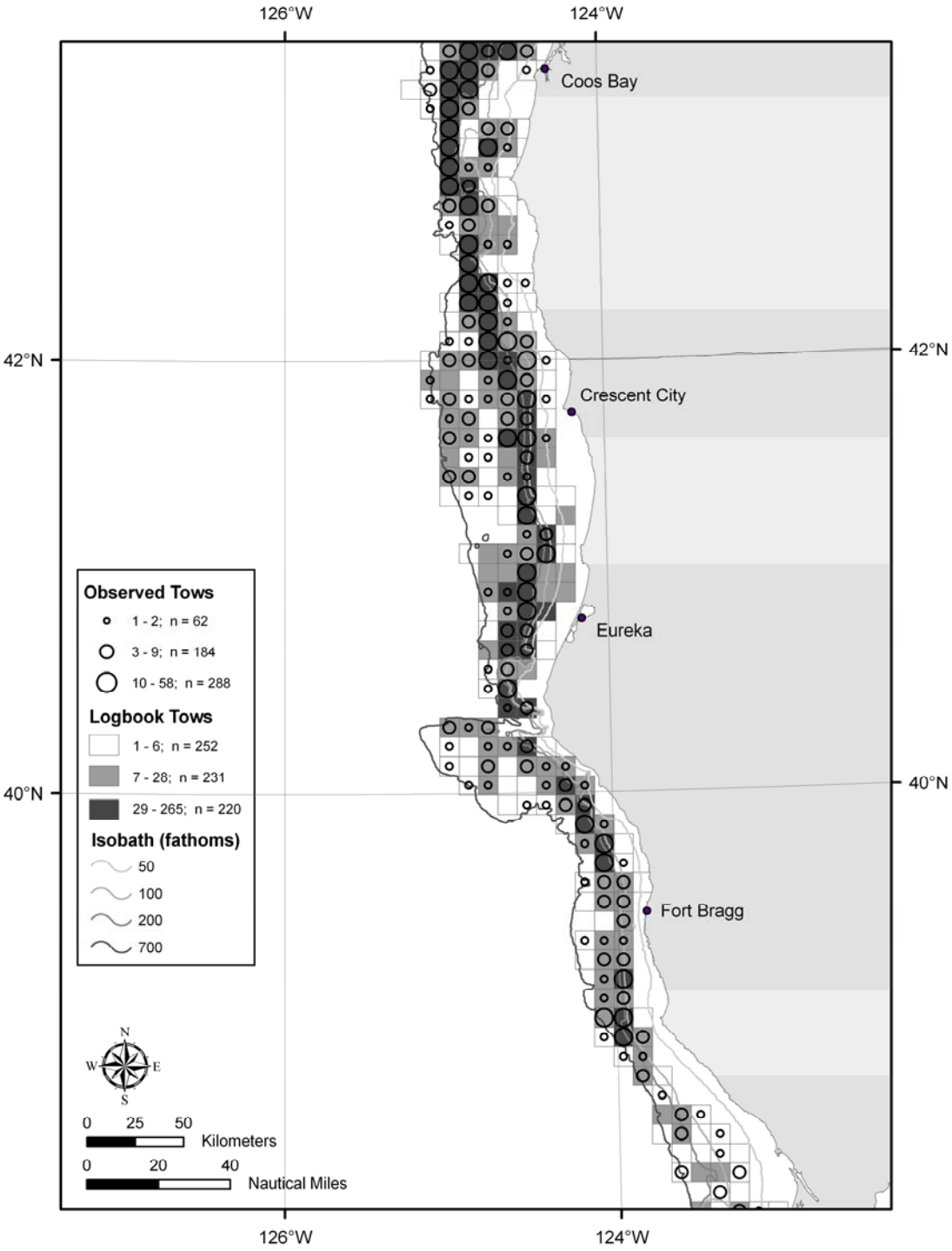


Figure 2c. Locations of observed and fleet logbook trawl tows south of San Francisco, California in 2009.

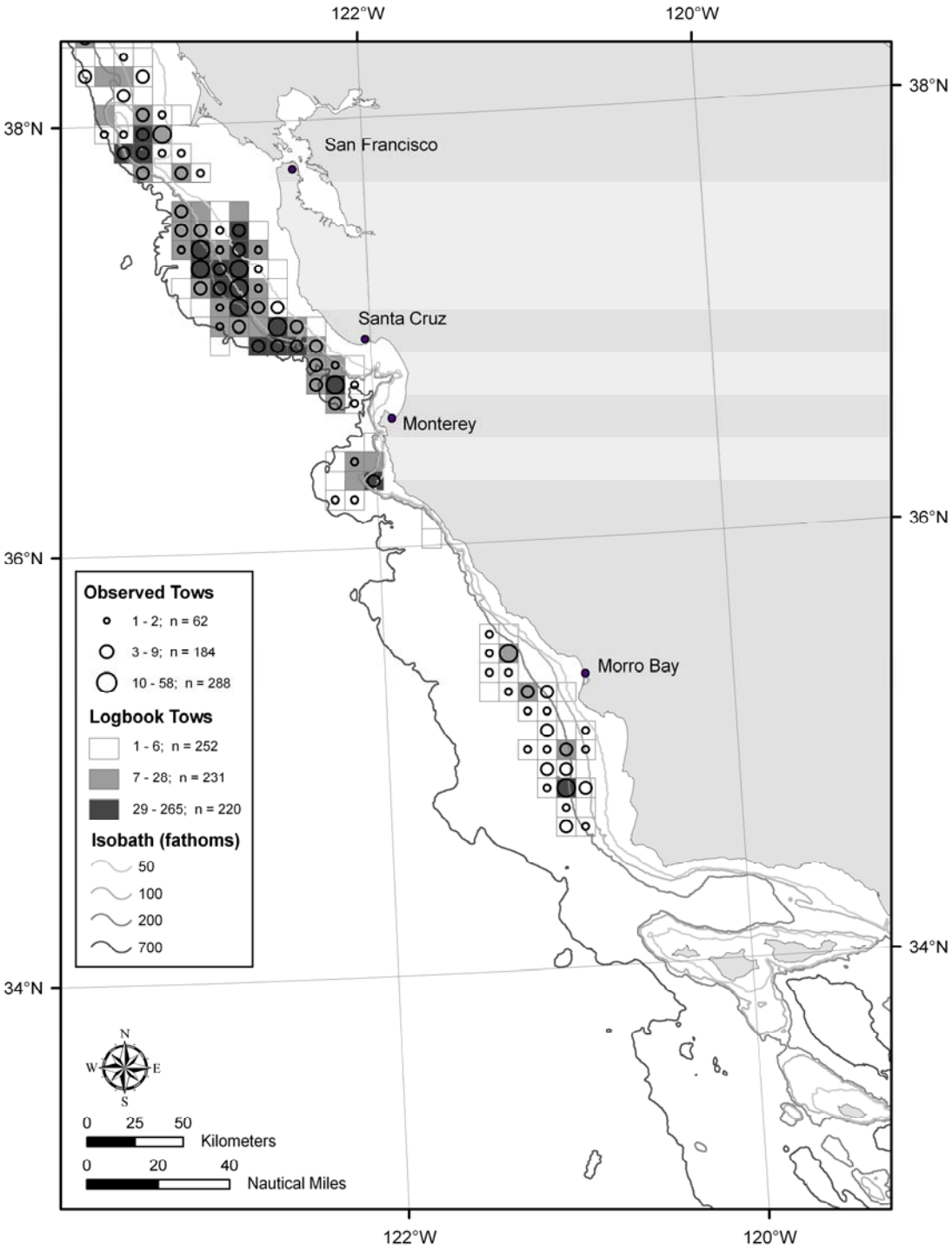
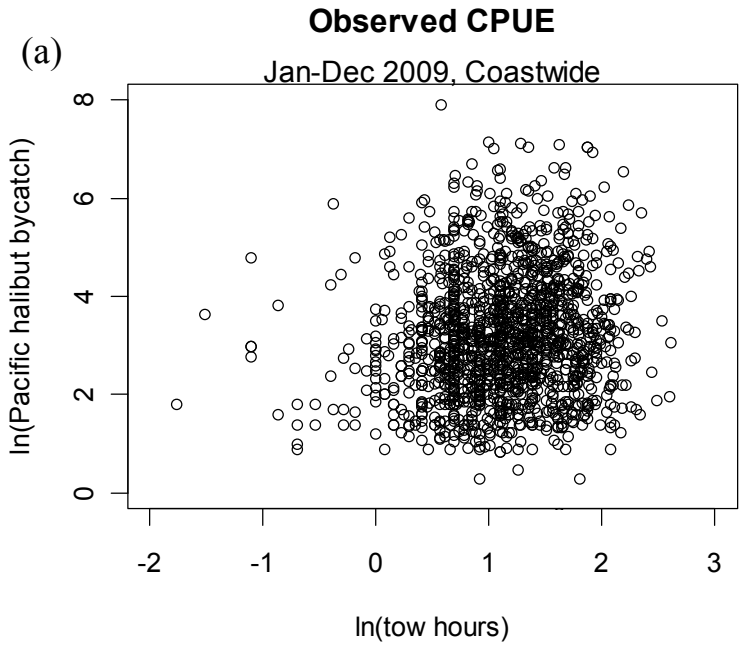


Figure 3. Log-transformed bycatch of Pacific halibut (kg) versus tow hours. A proportional relationship is not evident when including data from all areas and periods within the 2009 calendar year (a). When data from certain locations and months (b) are isolated, proportionality becomes more apparent.



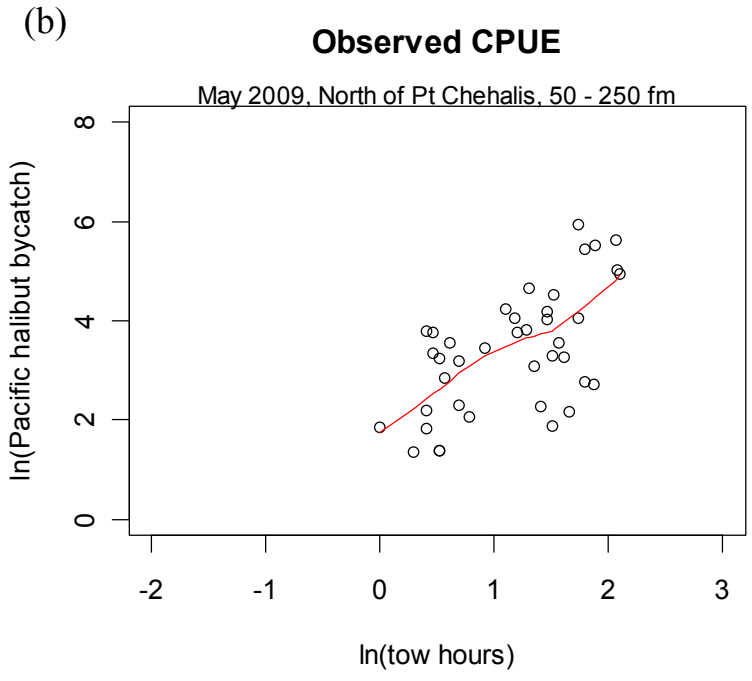


Figure 4. Tow duration (hours) versus average depth (fathoms), calculated from the depth recorded at the set and haul locations of a tow, from tows observed by the West Coast Groundfish Observer Program in the LE bottom trawl sector from 2002-2009.

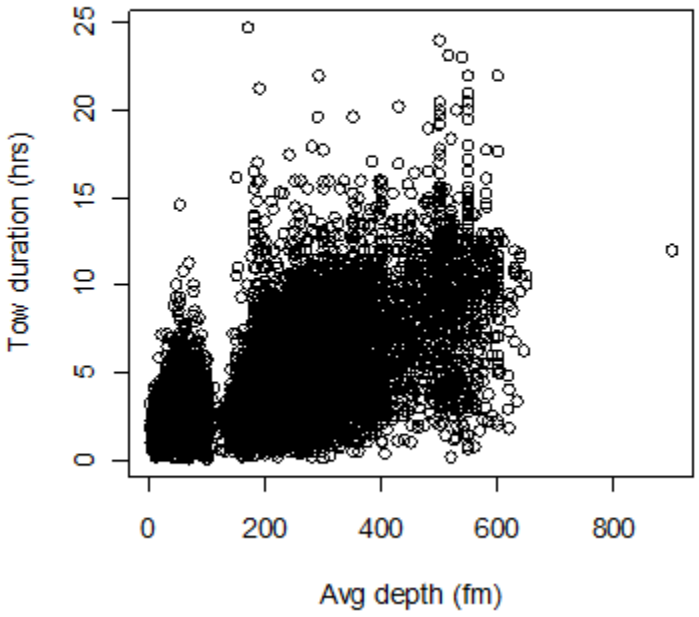


Figure 5. Expansion factors and WCGOP observed discard rate by gear type for the limited-entry (LE) and open-access (OA) non-nearshore fixed gear sectors used to expand discard estimates of Pacific halibut to the fleet-wide level.

Fishery		Expansion Factor	Observed Discard Rate Applied	
LE Sablefish Primary	Longline Pot	Retained Sablefish	LE Sablefish Primary	Longline Pot
LE Sablefish Non-Primary	Longline Pot	Retained Groundfish Retained Sablefish	LE Sablefish Non-Primary OA Fixed Gear *	Longline Pot
OA Fixed Gear	Hook-and-line Pot	Retained Sablefish	OA Fixed Gear *	Hook-and-line Pot

* No discard ratio or discard estimate was computed in the OA fixed gear sector for 2002-2006 because the WCGOP only covered OA vessels in California during this time.

Figure 6. Estimated discard mortality of Pacific halibut in the non-nearshore groundfish fixed gear fishery. Estimates are presented for fixed gear sectors with annual discard estimates exceeding 1 mt, which included all components of the limited entry (LE) sablefish primary sector (longline gear (LL) by area and pot gear (POT) coastwide) and the open access (OA) sector using hook-and-line gears. The OA fixed gear sector was only observed in California from 2003-2006 and was not covered in 2002. A fixed average discard rate from 2007 and 2008 data was applied to generate 2002-2006 discard estimates for the OA sector. Although OA 2002-2006 discard estimates are not included in final total mortality summaries, they are shown here for comparison purposes.

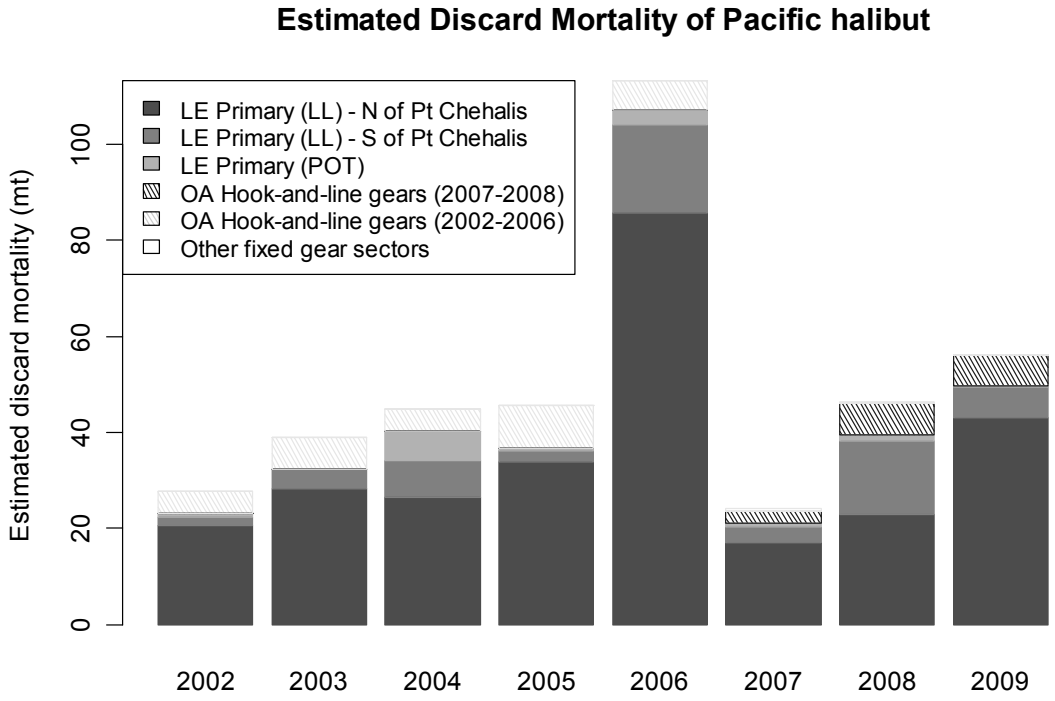
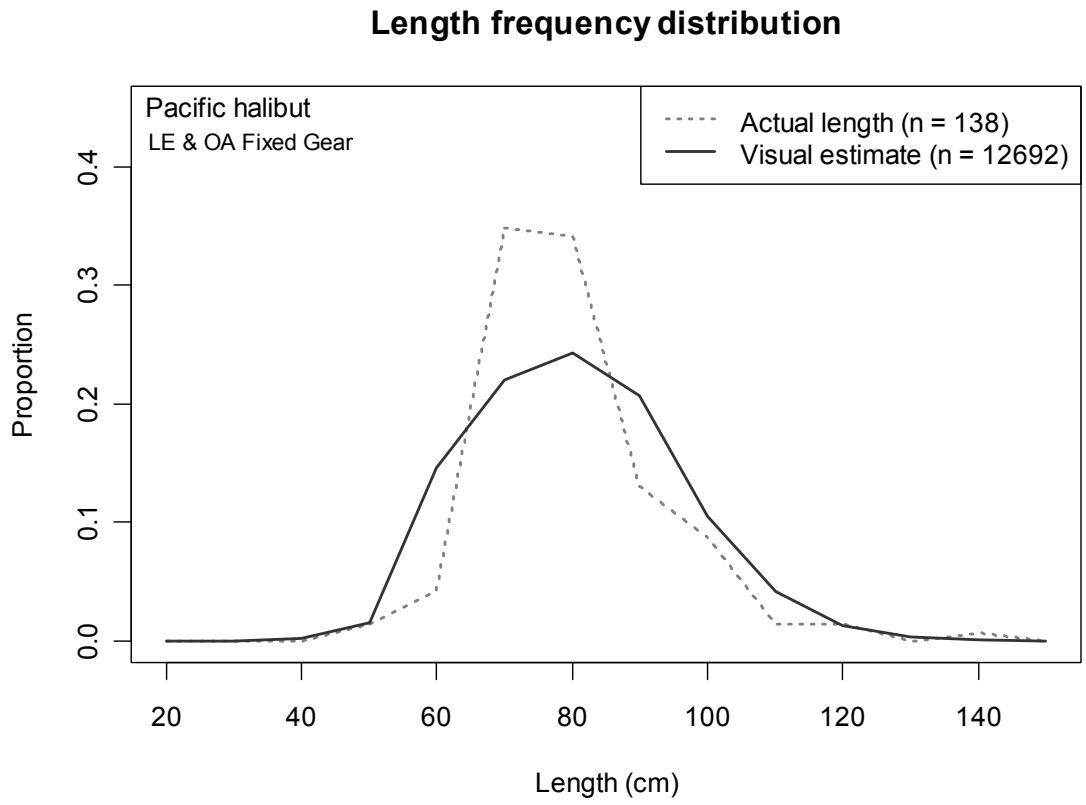


Figure 7. Length frequency distribution of discarded Pacific halibut on WCGOP observed limited entry (LE) and open access (OA) groundfish fixed gear vessels from September 2003 through December 2009. The majority of Pacific halibut lengths collected in this fishery were visual estimates (solid dark line). Actual length measurements (dashed gray line) were only available for 138 fish.



TABLES

Table 1. Observed trips, tows, vessels, Pacific halibut discard (kg), and tow hours in the LE bottom trawl sector. Data are provided for each year, area, and depth strata used in our analysis. Total fleet tow hours and the percentage of tow hours that were observed are presented on the far right, based on trawl logbook data from the PacFIN regional database. Note that Point Chehalis is located at 46° 53.30' N. lat.

	Num. of observed trips	Num. of observed tows	Num. of observed vessels	Observed Pacific halibut discard (kg)	Observed tow hours	Vessel logbook total tow hours*	% of tow hours observed
North of Pt Chehalis							
0 to 60 fm							
2002	102	341	15	5,818	592	2,934	20%
2003	20	80	7	412	199	1,527	13%
2004	98	307	13	6,969	604	3,539	17%
2005	62	234	16	5,380	451	2,559	18%
2006	73	197	14	4,400	411	3,044	14%
2007	26	114	6	3,261	254	1,965	13%
2008	12	124	3	2,320	373	1,345	28%
2009	19	138	10	4,931	271	967	28%
> 60 fm							
2002	110	443	25	41,165	1,623	13,766	12%
2003	59	299	23	11,188	1,318	10,521	13%
2004	94	397	21	22,851	1,256	5,862	21%
2005	134	778	31	64,433	2,157	9,465	23%
2006	96	417	21	36,897	1,330	7,177	19%
2007	42	281	15	14,872	1,223	7,446	16%
2008	54	459	24	35,271	2,328	10,962	21%
2009	68	526	25	42,739	2,475	11,055	22%
South of Pt Chehalis							
0 to 60 fm							
2002	110	609	34	4,226	1,208	8,394	14%
2003	91	279	25	575	566	6,615	9%
2004	125	812	28	3,286	1,536	7,417	21%
2005	132	622	35	8,141	1,603	8,590	19%
2006	118	678	28	12,902	1,640	9,568	17%
2007	72	406	21	8,934	1,131	7,678	15%
2008	61	321	15	1,798	726	4,278	17%
2009	88	616	21	11,412	1,511	5,152	29%
> 60 fm							
2002	378	1734	118	7,753	9,988	70,012	14%
2003	334	1625	104	8,293	9,388	58,480	16%
2004	390	1914	90	10,909	10,394	39,198	27%
2005	354	1808	89	24,016	8,297	39,770	21%
2006	330	1680	73	18,225	8,054	40,687	20%
2007	297	1707	81	18,017	8,758	46,857	19%
2008	376	2281	92	25,351	11,577	58,751	20%
2009	517	3098	95	32,303	15,285	67,873	23%

* Vessel logbook total tow hours have been adjusted based on the total fish ticket landings of

Table 2. Observed discard ratios (kg/hr) and estimated gross discard (kg) for Pacific halibut in each of the area, depth, and CPUE strata used in our analysis for the LE bottom trawl sector. "Correlating species" includes arrowtooth flounder, petrale sole, lingcod, Pacific cod, skates, yellowtail rockfish, and Pacific ocean perch. Confidence intervals were estimated based on uncertainty in observer data only.

	0 to 60 fathoms					> 60 fathoms				
	Observed		Estimated			Observed		Estimated		
	Discard ratio (kg/hr)	SE	Gross discard estimate (kg)	95% CI lower	95% CI upper	Discard ratio (kg/hr)	SE	Gross discard estimate (kg)	95% CI lower	95% CI upper
North of Pt Chehalis										
≤ 125 lbs/hr correlating species										
2002	6.85	0.99	6,261	4,483	8,040	5.62	0.89	32,795	22,586	43,004
2003	1.04	0.40	364	87	640	1.40	0.56	7,354	1,608	13,100
2004	6.49	1.61	5,235	2,682	7,788	1.34	0.29	3,457	1,979	4,935
2005	9.75	2.90	5,566	2,325	8,808	12.59	6.94	42,483	0	88,428
2006	7.84	1.64	9,254	5,453	13,054	5.16	1.06	17,259	10,327	24,190
2007	11.72	3.56	10,868	4,401	17,335	3.35	1.47	14,420	2,041	26,799
2008	2.35	0.66	953	428	1,478	1.18	0.20	8,139	5,432	10,846
2009	7.42	1.50	2,222	1,340	3,104	3.31	0.62	21,963	13,846	30,079
> 125 lbs/hr correlating species										
2002	10.88	1.05	21,973	17,808	26,138	46.28	5.97	367,146	274,388	459,904
2003	2.55	0.70	3,003	1,388	4,617	20.65	3.40	109,201	73,947	144,455
2004	12.54	1.55	34,254	25,944	42,564	32.46	4.75	106,598	76,023	137,173
2005	12.48	1.64	24,818	18,433	31,204	38.88	3.39	236,715	196,312	277,117
2006	12.34	1.49	23,006	17,566	28,447	45.08	6.66	172,672	122,674	222,669
2007	14.33	5.30	14,865	4,090	25,641	28.03	6.33	88,142	49,137	127,147
2008	7.92	1.52	7,428	4,628	10,229	35.53	5.33	145,011	102,366	187,656
2009	22.15	3.94	14,796	9,634	19,958	38.71	4.42	171,175	132,907	209,443
South of Pt Chehalis										
≤ 125 lbs/hr correlating species										
2002	3.91	0.77	22,477	13,751	31,203	0.44	0.08	26,125	17,061	35,190
2003	0.32	0.16	1,378	14	2,741	0.20	0.04	9,287	6,016	12,558
2004	1.10	0.20	4,205	2,743	5,668	0.28	0.04	8,411	5,942	10,881
2005	2.78	0.39	8,645	6,240	11,049	0.35	0.06	9,438	6,333	12,543
2006	1.34	0.22	5,333	3,641	7,024	0.27	0.04	7,483	5,384	9,583
2007	3.70	0.72	14,082	8,728	19,436	0.47	0.06	15,392	11,234	19,550
2008	1.21	0.27	2,318	1,303	3,334	0.92	0.20	39,272	22,436	56,108
2009	2.63	0.32	7,680	5,828	9,532	0.84	0.11	46,433	34,095	58,770
> 125 lbs/hr correlating species										
2002	2.95	0.39	7,799	5,770	9,828	4.00	0.52	39,837	29,604	50,070
2003	1.91	0.51	4,477	2,122	6,833	4.59	0.48	51,592	41,072	62,112
2004	3.28	0.54	11,841	8,005	15,678	4.16	0.51	38,425	29,266	47,584
2005	6.18	0.74	33,875	25,937	41,814	7.58	0.78	98,808	78,787	118,829
2006	13.50	1.97	75,235	53,665	96,804	6.13	0.70	80,668	62,579	98,756
2007	11.77	1.37	45,573	35,200	55,947	6.56	0.60	91,034	74,717	107,350
2008	3.83	0.63	9,030	6,120	11,941	5.80	0.78	93,055	68,584	117,526
2009	11.83	1.34	26,412	20,557	32,267	7.43	0.89	94,555	72,439	116,672

Table 3. Summary of Pacific halibut viability data collected by observers in each year and depth stratum in the LE bottom trawl sector. The condition of sampled Pacific halibut was identified as Excellent (Exc), Poor, or Dead based on the injury key presented in Appendix L of the WCGOP training manual (NWFSC 2006b), which is consistent with IPHC protocol. The number in each category was weighted based on the length weight relationship as described in the Methods.

	Number				Weighted average percentages in each category		
	Exc	Poor	Dead	Total	Exc	Poor	Dead
2004							
0 to 60 fm	397	208	229	834	52%	25%	23%
> 60 fm	168	181	641	990	20%	20%	60%
2005							
0 to 60 fm	267	208	405	880	35%	21%	44%
> 60 fm	777	808	1647	3232	27%	23%	50%
2006							
0 to 60 fm	424	189	333	946	54%	18%	28%
> 60 fm	237	157	609	1003	23%	15%	62%
2007							
0 to 60 fm	251	89	444	784	38%	12%	50%
> 60 fm	154	125	862	1141	15%	11%	74%
2008							
0 to 60 fm	32	61	179	272	12%	22%	65%
> 60 fm	490	343	1433	2266	24%	16%	60%
2009							
0 to 60 fm	446	221	367	1034	44%	20%	36%
> 60 fm	594	394	1635	2623	25%	15%	60%
All years *(us*							
0 to 60 fm	1817	976	1957	4750	43%	20%	37%
> 60 fm	2420	2008	6827	11255	24%	17%	59%

Table 4. Gross discard (kg), and discard mortality (kg) of Pacific halibut estimated for each depth stratum and year in the LE bottom trawl sector. Estimates were allocated to the three condition categories based on information presented in Table 3.

	Estimated Gross Discard (kg)				Estimated Discard Mortality (kg)				
	Exc	Poor	Dead	Total	*m(Exc)*	*m(Poor)*	*m(Dead)*	*m(Total)*	DMR
0 to 60 fm									
2002	25,270	11,727	21,513	58,510	5,054	6,450	19,362	30,866	53%
2003	3,982	1,848	3,390	9,221	796	1,017	3,051	4,864	53%
2004	29,022	13,904	12,609	55,535	5,804	7,647	11,348	24,800	45%
2005	25,230	15,585	32,090	72,905	5,046	8,572	28,881	42,499	58%
2006	60,767	20,850	31,210	112,827	12,153	11,467	28,089	51,710	46%
2007	32,090	10,211	43,087	85,388	6,418	5,616	38,778	50,812	60%
2008	2,383	4,434	12,913	19,730	477	2,439	11,621	14,537	74%
2009	22,334	10,463	18,313	51,110	4,467	5,755	16,482	26,704	52%
> 60 fm									
2002	109,897	81,222	274,785	465,903	21,979	44,672	247,306	313,958	67%
2003	41,853	30,932	104,648	177,434	8,371	17,013	94,184	119,567	67%
2004	31,665	30,616	94,610	156,891	6,333	16,839	85,149	108,321	69%
2005	104,172	90,731	192,541	387,443	20,834	49,902	173,286	244,023	63%
2006	64,401	41,243	172,437	278,081	12,880	22,684	155,194	190,757	69%
2007	31,333	23,298	154,355	208,987	6,267	12,814	138,920	158,000	76%
2008	67,929	46,002	171,546	285,476	13,586	25,301	154,391	193,278	68%
2009	84,101	49,849	200,175	334,126	16,820	27,417	180,158	224,395	67%

Table 5. Total fleet-wide trawl effort (hours), estimated Pacific halibut bycatch (mt), estimated Pacific halibut discard mortality (mt), and mortality (kg) per tow hour in the LE bottom trawl sector from 2002 to 2009.

	Trawl effort (hours)	Total bycatch (mt)			Total discard mortality (mt)			Mortality (kg) per tow hour
		Estimate	95% confidence interval		Estimate	95% confidence interval		
			lower	*upper*		*lower*	*upper*	
2002	95,106	524	(385,	663)	345	(254,	436)	3.6
2003	77,143	187	(126,	247)	124	(85,	164)	1.6
2004	56,016	212	(153,	272)	133	(96,	170)	2.4
2005	60,384	460	(334,	590)	287	(208,	367)	4.7
2006	60,476	391	(281,	501)	242	(175,	310)	4.0
2007	63,946	294	(190,	399)	209	(135	283)	3.3
2008	75,336	305	(211,	399)	208	(144,	272)	2.8
2009	85,047	385	(291,	480)	251	(190,	313)	3.0

Table 6. Pacific halibut bycatch (lb, net), mortality (lb, net), and mortality (lb) per trawl hour in the LE bottom trawl sector resulting from various stratification alternatives. We produced estimates using three different stratification schemes for observer and logbook data, which are detailed in the far left column. Two alternative stratification approaches were also considered when analyzing viability data, as noted in the second column. The first set of values provided, with 2 depths, 2 areas, 2 CPUE strata, and depth only as a means for stratifying viability data, coincide with our final estimates in Table 5. Values are provided in net lbs in order to provide easy comparison to estimates from Wallace and Hastie (2009). Note that 1 kg (round weight) = 1.65375 lbs (net weight).

Stratification of observer and logbook data	Stratification of viability data	Year	Trawl effort (hrs)	Bycatch (lb, net)			Mortality (lb, net)			Mortality (lb) per trawl hour
				est	Lower bound	Upper bound	est	Lower bound	Upper bound	
2 depths (60 fm) 2 areas (Pt Chehalis) 2 CPUE strata (125lbs/hr) *	depth only	2002	95,106	867,249	637,439	1,097,059	570,252	419,432	721,072	6.0
		2003	77,143	308,680	208,791	408,570	205,778	139,824	271,733	2.7
		2004	56,016	351,300	252,336	450,265	220,149	158,339	281,959	3.9
		2005	60,384	761,300	552,957	975,369	473,835	344,163	607,112	7.8
		2006	60,476	646,465	465,181	827,749	400,981	288,861	513,100	6.6
		2007	63,946	486,823	313,463	660,183	345,324	223,035	467,613	5.4
		2008	75,336	504,735	349,431	660,039	343,673	237,810	449,537	4.6
		2009	85,047	637,084	480,657	793,512	415,254	313,591	516,918	4.9
	depth & area	2002	95,106	867,249	637,439	1,097,059	571,112	420,151	722,074	6.0
		2003	77,143	308,680	208,791	408,570	205,908	139,906	271,909	2.7
		2004	56,016	351,300	252,336	450,265	207,435	149,351	265,518	3.7
		2005	60,384	761,300	552,957	975,369	463,083	337,007	592,586	7.7
		2006	60,476	646,465	465,181	827,749	408,952	294,308	523,596	6.8
		2007	63,946	486,823	313,463	660,183	339,387	221,892	456,882	5.3
		2008	75,336	504,735	349,431	660,039	347,423	240,515	454,332	4.6
		2009	85,047	637,084	480,657	793,512	427,362	322,256	532,467	5.0
2 depths (60 fm) 2 areas (Pt Chehalis)	depth only	2002	95,106	763,502	585,336	941,668	500,414	383,388	617,439	5.3
		2003	77,143	249,458	179,631	319,285	165,710	119,787	211,633	2.1
		2004	56,016	338,115	251,974	424,255	210,584	156,462	264,706	3.8
		2005	60,384	780,600	616,744	944,456	485,891	383,925	587,856	8.0
		2006	60,476	659,735	493,013	826,457	411,964	307,785	516,144	6.8
		2007	63,946	451,157	325,528	576,786	318,223	229,605	406,841	5.0
		2008	75,336	518,820	381,150	656,490	353,132	259,363	446,902	4.7
		2009	85,047	646,293	514,508	778,078	420,111	334,846	505,376	4.9
	depth & area	2002	95,106	763,502	585,336	941,668	501,246	384,093	618,399	5.3
		2003	77,143	249,458	179,631	319,285	165,792	119,840	211,743	2.1
		2004	56,016	338,115	251,974	424,255	198,048	147,533	248,562	3.5
		2005	60,384	780,600	616,744	944,456	475,219	375,699	574,739	7.9
		2006	60,476	659,735	493,013	826,457	420,065	313,218	526,911	6.9
		2007	63,946	451,157	325,528	576,786	312,506	227,098	397,914	4.9
		2008	75,336	518,820	381,150	656,490	357,648	262,342	452,953	4.7
		2009	85,047	646,293	514,508	778,078	431,344	342,980	519,709	5.1
2 depths (60 fm) by state (WA, OR, CA)	depth only	2002	95,106	800,798	582,613	1,018,983	526,039	382,525	669,554	5.5
		2003	77,143	229,817	149,752	309,881	152,157	99,825	204,489	2.0
		2004	56,016	257,856	188,863	326,850	160,222	117,631	202,812	2.9
		2005	60,384	819,617	628,552	1,010,682	510,200	391,366	629,034	8.4
		2006	60,476	627,591	457,072	798,109	391,228	285,046	497,410	6.5
		2007	63,946	443,613	306,848	580,378	313,756	216,075	411,438	4.9
		2008	75,336	578,736	406,997	751,516	393,419	276,574	511,032	5.2
		2009	85,047	605,068	463,631	746,506	389,973	299,734	480,212	4.6

Table 7. Pacific halibut length frequencies collected by WCGOP observers during 2009 in the LE bottom trawl sector. The upper limits on the length intervals are inclusive, while the lower limits are not.

Length interval (cm)	Length freq.	Percent length freq.
25-30	0	0.00
30-35	0	0.00
35-40	0	0.00
40-45	0	0.00
45-50	0	0.00
50-55	1	0.00
55-60	18	0.01
60-65	104	0.07
65-70	242	0.16
70-75	321	0.21
75-80	294	0.19
80-85	194	0.13
85-90	149	0.10
90-95	90	0.06
95-100	51	0.03
100-105	34	0.02
105-110	12	0.01
110-115	8	0.01
115-120	3	0.00
120-125	3	0.00
125-130	2	0.00
130-135	0	0.00
135-140	0	0.00
140-145	0	0.00
145-150	0	0.00
150-155	0	0.00
155-160	0	0.00
160-165	0	0.00
165-170	0	0.00
170-175	0	0.00
175-180	0	0.00
180-185	0	0.00

Table 8. Number of observed trips, sets, and vessels in the limited-entry (LE) sablefish primary, LE sablefish non-primary, and open-access (OA) fixed gear sectors annually by the West Coast Groundfish Observer Program.

	LE Sablefish Primary			LE Sablefish Non-Primary	OA Fixed Gear	
	Longline					
	North of Pt Chehalis	South of Pt Chehalis	Pot	Longline	Hook-and-line Gears	Pot
Number of observed trips						
2002	23	47	23	11	0	0
2003	25	25	35	130	41	16
2004	13	35	13	62	43	96
2005	31	73	39	35	34	43
2006	31	34	39	121	11	38
2007	36	40	30	158	50	45
2008	17	60	24	122	58	55
2009	13	34	27	138	68	30
Number of observed sets						
2002	207	181	247	22	0	0
2003	191	158	362	219	49	50
2004	115	205	139	130	53	182
2005	388	275	491	60	37	50
2006	291	159	288	196	12	39
2007	381	136	154	303	66	72
2008	194	345	329	220	68	74
2009	178	109	67	271	101	45
Number of observed vessels						
2002	9	18	6	4	0	0
2003	8	8	6	17	13	7
2004	6	13	3	14	15	17
2005	10	18	7	11	10	14
2006	9	10	7	21	8	15
2007	9	14	4	36	25	20
2008	6	13	6	32	33	20
2009	4	6	3	34	33	18

Table 9. Total sablefish and FMP groundfish landings (except Pacific hake) (mt) and observed Pacific halibut discard ratios for each sector and gear type in the non-nearshore fixed gear fishery. Sablefish landings were used as the discard ratio denominator and expansion factor in all cases except for the limited-entry (LE) sablefish non-primary sector, where target species include a variety of deepwater groundfish species.

	LE Sablefish Primary			LE Sablefish Non-Primary		OA Fixed Gear	
	Longline		Pot	Longline	Pot	Hook-and-Line Gears	Pot
	North of Pt Chehalis	South of Pt Chehalis					
Expansion factor	*Sablefish landings (mt)*			*Groundfish landings (mt)*	*Sablefish landings (mt)*	*Sablefish landings (mt)*	
Total fleet landings *(Based on fish tickets)*							
2002	390	407	354	452	6	266	109
2003	499	569	604	485	7	375	187
2004	698	654	626	377	6	272	182
2005	641	676	615	519	7	518	374
2006	684	708	611	441	4	347	435
2007	489	607	426	462	9	203	244
2008	385	663	421	652	18	326	235
2009	418	984	487	695	18	580	358
Observed Pacific halibut discard ratios							
2002	0.3297	0.0283	0.0114	0.0000	*	*	*
2003	0.3532	0.0467	0.0005	0.0003	*	*	*
2004	0.2369	0.0746	0.0526	0.0000	*	*	*
2005	0.3318	0.0204	0.0043	0.0000	*	*	*
2006	0.7827	0.1636	0.0271	0.0000	*	*	*
2007	0.2184	0.0334	0.0092	0.0032	(0.0035)	0.0839	0.0035
2008	0.3715	0.1453	0.0151	0.0041	(0.0010)	0.1259	0.0010
2009	0.6436	0.0413	0.0017	0.0003	(0.0007)	0.0684	0.0007

* No discard ratio is provided for the OA fixed gear sector for 2002-2006 because the WCGOP only covered OA vessels in California during this time. Since 2007-2008 OA pot discard rates were used to estimate LE non-endorsed discard, discard ratios for this sector were also excluded.

Table 10. Summary of the percent of observed trips that caught Pacific halibut by sector, gear, and area (where applicable). Observed average, minimum and maximum annual catch and annual discard weights of Pacific halibut are also provided, along with the percent of Pacific halibut catch weight that was discarded by year.

	LE Sablefish Primary			LE Sablefish Non-Primary		OA Fixed Gear	
	Longline		Pot	Longline	Pot	Hook-and-Line Gears	Pot
	North of Pt Chehalis	South of Pt Chehalis					
% of observed trips that caught Pacific halibut							
2002	95.7%	46.8%	17.4%	0.0%	--	--	--
2003	100.0%	52.0%	8.6%	0.8%	--	0.0%	0.0%
2004	100.0%	71.4%	38.5%	0.0%	--	0.0%	0.0%
2005	96.8%	58.9%	33.3%	0.0%	--	0.0%	0.0%
2006	100.0%	76.5%	56.4%	0.0%	--	9.1%	0.0%
2007	94.4%	47.5%	33.3%	1.9%	--	26.0%	6.7%
2008	100.0%	78.3%	83.3%	3.3%	--	34.5%	5.5%
2009	84.6%	35.3%	33.3%	0.7%	--	38.2%	10.0%
Observed annual catch (mt) of Pacific halibut							
Mean	51.5	11.6	2.1	0.1	--	0.9	0.0
Min	12.1	2.3	0.1	0.0	--	0.1	0.0
Max	117.2	36.6	5.4	0.1	--	1.6	0.0
Observed annual discard (mt) of Pacific halibut							
Mean	45.0	11.5	2.1	0.1	--	0.9	0.0
Min	9.5	2.3	0.1	0.0	--	0.1	0.0
Max	109.6	36.6	5.4	0.1	--	1.6	0.0
% of Pacific halibut catch that was discarded							
2002	80.1%	95.5%	100.0%	*	--	--	--
2003	82.5%	99.5%	100.0%	100.0%	--	*	*
2004	79.0%	97.7%	100.0%	*	--	*	*
2005	84.8%	100.0%	100.0%	*	--	*	*
2006	93.5%	97.9%	100.0%	*	--	100.0%	*
2007	80.6%	100.0%	100.0%	100.0%	--	100.0%	100.0%
2008	87.4%	100.0%	100.0%	100.0%	--	100.0%	100.0%
2009	100.0%	100.0%	100.0%	100.0%	--	100.0%	100.0%

* No catch of Pacific halibut was observed, and thus a % discarded calculation is not possible.
-- No WCGOP observations were made for the year/sector/gear type.

Table 11. Estimated gross discard (mt) and discard mortality (mt) of Pacific halibut in the limited entry (LE) sablefish primary, LE sablefish non-primary, and open access (OA) fixed gear sectors. Estimated discard mortality was computed by applying a 16% discard mortality rate to gross discard estimates for hook-and-line gears. An 18% discard mortality rate was applied to pot gear estimates. Discard estimates were not initially computed for the 2002-2006 OA fixed gear sector because the WCGOP only observed OA fixed gear vessels off of California during that time. In a previous report (Heery and Bellman 2009), potential values for these years were produced by applying a combined discard rate from 2007-2008 to 2002-2006 landings data. The results using this assumed 2007-2008 rate are shown in brackets.

	2002	2003	2004	2005	2006	2007	2008	2009
LE Sablefish Primary (mt)								
Longline								
North of Pt Chehalis								
Gross discard estimate	128.7	176.2	165.3	212.6	535.5	106.8	143.2	268.8
Estimated discard mortality (16%)	20.6	28.2	26.5	34.0	85.7	17.1	22.9	43.0
South of Pt Chehalis								
Gross discard estimate	11.5	26.6	48.7	13.8	115.9	20.3	96.3	40.7
Estimated discard mortality (16%)	1.8	4.3	7.8	2.2	18.5	3.2	15.4	6.5
Coastwide								
Gross discard estimate	140.2	202.7	214.1	226.4	651.4	127.1	239.5	309.4
Estimated discard mortality (16%)	22.4	32.4	34.3	36.2	104.2	20.3	38.3	49.5
Pot								
Coastwide								
Gross discard estimate	4.1	0.3	33.0	2.6	16.5	3.9	6.4	0.8
Estimated discard mortality (18%)	0.7	0.1	5.9	0.5	3.0	0.7	1.1	0.2
LE Sablefish Non-Primary (mt)								
Longline								
Coastwide								
Gross discard estimate	0.0	0.1	0.0	0.0	0.0	1.5	2.6	0.2
Estimated discard mortality (16%)	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.0
Pot								
Coastwide								
Gross discard estimate	*	*	*	*	*	0.03	0.02	0.01
Assuming OA fixed gear 07-08 pot discard rate for 2002 - 2006 *	[0.0]	[0.0	[0.0]	[0.0]	[0.0]			
Estimated discard mortality (18%)	*	*	*	*	*	0.0	0.0	0.0
OA Fixed Gear (mt)								
Hook-and-line Gears								
Coastwide								
Gross discard estimate						17.0	41.1	39.7
Assuming 07-08 discard rate for 2002 - 2006	[28.7]	[40.3]	[29.3]	[55.8]	[37.4]			
Estimated discard mortality (16%)						2.7	6.6	6.4
Pot								
Coastwide								
Gross discard estimate						0.8	0.2	0.3
Assuming 07-08 discard rate for 2002 - 2006	[0.2]	[0.4]	[0.4]	[0.8]	[0.9]			
Estimated discard mortality (18%)						0.2	0.0	0.0

* The LE sablefish non-primary pot sector has not been observed by the WCGOP and therefore estimates are based on discard rates from observed OA fixed gear pot vessels. Because the OA fixed gear pot sector was only observed on a coastwide basis in 2007 and 2008, estimates for LE sablefish non-primary pot are only available in these years as well.

Table 12. Estimated total discard mortality (mt) of Pacific halibut from each sector of the non-nearshore fixed gear groundfish fishery from 2002 through 2009.

	Estimated discard mortality (mt)			
	LE Sablefish Primary	LE Sablefish Non-Primary	OA Fixed Gear	All Sectors
2002	23.1	0.0	0.0	23.1
2003	32.5	0.0	0.0	32.5
2004	39.5	0.0	0.0	39.5
2005	36.6	0.0	0.0	36.6
2006	106.9	0.0	0.0	106.9
2007	21.0	0.2	2.9	24.1
2008	39.3	0.4	6.6	46.4
2009	49.7	0.0	6.4	56.1

Table 13. Pacific halibut length frequencies collected by WCGOP observers in the LE sablefish primary fixed gear sector from 2002-2009. Two tables are presented: (a) length frequency based on actual length measurements, and (b) length frequency based on visually estimated lengths. Visual estimates are approximated by essentially rounding to the nearest 10 cm.

(a) Actual length measurements

Length interval (cm)	Length freq.	Percent length freq.
25-30	0	0.00
30-35	0	0.00
35-40	0	0.00
40-45	0	0.00
45-50	0	0.00
50-55	2	0.01
55-60	3	0.02
60-65	8	0.06
65-70	16	0.12
70-75	34	0.25
75-80	29	0.21
80-85	14	0.10
85-90	9	0.07
90-95	9	0.07
95-100	6	0.04
100-105	3	0.02
105-110	0	0.00
110-115	2	0.01
115-120	0	0.00
120-125	2	0.01
125-130	0	0.00
130-135	0	0.00
135-140	1	0.01
140-145	0	0.00
145-150	0	0.00
150-155	0	0.00
155-160	0	0.00
160-165	0	0.00
165-170	0	0.00
170-175	0	0.00
175-180	0	0.00
180-185	0	0.00

(b) Visual length estimates

Approximate length	**Number**	**Proportion**
20 cm	0	0.00
30 cm	5	0.00
40 cm	29	0.00
50 cm	191	0.02
60 cm	1849	0.15
70 cm	2799	0.22
80 cm	3090	0.24
90 cm	2635	0.21
100 cm	1339	0.11
110 cm	528	0.04
120 cm	174	0.01
130 cm	43	0.00
140 cm	10	0.00
150 cm	0	0.00
160 cm	0	0.00
170 cm	0	0.00
180 cm	0	0.00

Table 14. Pacific halibut length data collected in the LE sablefish primary sector by the WCGOP approximating legal (≥ 80 cm) versus sublegal (< 80 cm) definitions by the IPHC. Both actual length measurements and visual length estimates are presented.

	Pacific halibut lengths	
	Number	Percentage
Actual length		
< 80 cm	88	63.8%
≥ 80 cm	50	36.2%
Visual estimate		
0 - 74 cm	4873	38.4%
75 - 84 cm	3090	24.3%
85 - 150 cm	4729	37.3%

Table 15. Coverage information, bycatch ratios, and bycatch estimates for Pacific halibut in the nearshore fixed gear groundfish sectors. The WCGOP began observing the California nearshore sector in 2003 and the Oregon nearshore sector in 2004. Bycatch estimates in this table are not intended to represent mortality values, as rates of discard mortality for this sector are not available.

	Observed							Total fleet catch of nearshore species (mt)	Estimated		
	Fleet observer coverage rate *	Number of observed sets	% of sets with Pacific halibut	Pacific halibut bycatch (kg)	Nearshore species retained (kg)	Pacific halibut bycatch rate	SE		Pacific halibut bycatch (mt)	Lower bound (mt)	Upper bound (mt)
Nearshore fixed gear groundfish fishery sector											
Oregon											
2002	*not observed*		-	-	-	-	-	279	-	-	-
2003	*not observed*		-	-	-	-	-	208	-	-	-
2004	4.9%	207	1.9%	48.9	10,210	0.0048	0.0027	210	1.005	0.002	2.123
2005	6.3%	167	0.6%	32.5	11,419	0.0028	0.0028	180	0.513	0.002	1.520
2006	11.6%	379	1.3%	62.8	19,396	0.0032	0.0016	168	0.543	0.005	1.081
2007	8.9%	242	0.4%	7.8	16,103	0.0005	0.0005	180	0.087	0.002	0.257
2008	7.6%	183	0.5%	27.2	14,285	0.0019	0.0019	189	0.360	0.002	1.066
2009	6.2%	219	2.3%	80.1	13,852	0.0058	0.0028	224	1.298	0.060	2.536
California											
2002	*not observed*		-	-	-	-	-	380	-	-	-
2003	3.2%	205	0.0%	0.0	8,085	0.0000	0.0000	255	0.000	0.000	0.000
2004	8.0%	422	0.0%	0.0	23,126	0.0000	0.0000	288	0.000	0.000	0.000
2005	4.7%	217	0.9%	79.5	13,108	0.0061	0.0054	280	1.695	0.003	4.665
2006	3.2%	158	0.0%	0.0	8,367	0.0000	0.0000	258	0.000	0.000	0.000
2007	4.5%	224	0.0%	0.0	12,138	0.0000	0.0000	271	0.000	0.000	0.000
2008	2.2%	87	0.0%	0.0	6,543	0.0000	0.0000	293	0.000	0.000	0.000
2009	2.6%	122	0.0%	0.0	6,723	0.0000	0.0000	260	0.000	0.000	0.000

* Coverage rate in the nearshore sector is defined as the proportion of nearshore target species landings that were observed. Nearshore target species are listed in Appendix C.

Table 16. Coverage information, bycatch ratios, and bycatch estimates for Pacific halibut in the pink shrimp trawl fishery. The WCGOP began observing the pink shrimp fishery in 2004, but was not able to observe the fishery 2006. Bycatch estimates in this table are not intended to represent mortality values, as rates of discard mortality for this fishery are not available.

	Observed								Estimated		
	Fleet observer coverage rate *	Number of observed tows	% of tows with Pacific halibut	Pacific halibut bycatch (kg)	Pink shrimp retained (kg)	Pacific halibut bycatch rate	SE	Total fleet catch of pink shrimp (mt)	Pacific halibut bycatch (mt)	Lower bound (mt)	Upper bound (mt)
Pink shrimp trawl fishery											
2002	*not observed*		-	-	-	-	-	25,375	-	-	-
2003	*not observed*		-	-	-	-	-	13,887	-	-	-
2004	6.5%	1026	0.0%	0.0	583,266	0.000000	0.000000	8,974	0.000	0.000	0.000
2005	3.9%	509	0.2%	2.3	424,683	0.000005	0.000005	10,862	0.058	0.109	0.172
2006	*not observed*		-	-	-	-	-	8,400	-	-	-
2007	6.2%	951	0.2%	15.3	672,663	0.000023	0.000019	10,935	0.248	0.109	0.649
2008	5.2%	840	0.0%	0.0	805,763	0.000000	0.000000	15,375	0.000	0.000	0.000
2009	6.0%	695	0.0%	0.0	866,905	0.000000	0.000000	14,412	0.000	0.000	0.000

* Coverage rate in the pink shrimp trawl fishery is defined as the proportion of pink shrimp landings that were observed.

Table 17. Coverage information, bycatch ratios, and bycatch estimates for Pacific halibut in the California halibut trawl fishery. This fishery is comprised of two components: a limited entry sector that operates primarily off of San Francisco, and an open access fishery that operates further south. Bycatch estimates in this table are not intended to represent mortality values, as rates of discard mortality for this fishery are not available.

	Observed								Estimated		
	Fleet observer coverage rate *	Number of observed tows	% of tows with Pacific halibut	Pacific halibut bycatch (kg)	California halibut retained (kg)	Pacific halibut bycatch rate	SE	Total fleet catch of California halibut (mt)	Pacific halibut bycatch (mt)	Lower bound (mt)	Upper bound (mt)
California halibut trawl fishery											
Limited Entry Sector											
2002	3.2%	52	0.0%	0.0	3,590	0.0000	0.0000	112	0.000	0.000	0.000
2003	17.0%	206	0.0%	0.0	19,104	0.0000	0.0000	112	0.000	0.000	0.000
2004	16.7%	141	0.7%	3.5	23,447	0.0001	0.0001	140	0.021	0.001	0.062
2005	14.1%	221	0.5%	4.7	27,342	0.0002	0.0002	194	0.033	0.002	0.099
2006	11.7%	224	0.9%	2.9	14,286	0.0002	0.0002	123	0.025	0.001	0.063
2007	12.8%	80	1.3%	8.1	5,419	0.0015	0.0015	42	0.063	0.000	0.188
2008	24.6%	118	8.5%	82.6	9,637	0.0086	0.0030	39	0.336	0.108	0.563
2009	6.0%	29	0.0%	0.0	2,898	0.0000	0.0000	48	0.000	0.000	0.000
Open Access Sector											
2002	*not observed*		-	-	-	-	-	90	-	-	-
2003	4.3%	110	0.0%	0.0	1,977	0.0000	0.0000	46	0.000	0.000	0.000
2004	6.4%	244	1.6%	49.4	5,100	0.0097	0.0058	80	0.776	0.001	1.691
2005	9.7%	360	0.0%	0.0	7,489	0.0000	0.0000	77	0.000	0.000	0.000
2006	*not observed*		-	-	-	-	-	61	-	-	-
2007	6.9%	226	0.0%	0.0	2,694	0.0000	0.0000	39	0.000	0.000	0.000
2008	5.2%	197	0.0%	0.0	2,631	0.0000	0.0000	50	0.000	0.000	0.000
2009	0.7%	30	0.0%	0.0	634	0.0000	0.0000	85	0.000	0.000	0.000

* Coverage rate in the California halibut trawl fishery is defined as the proportion of California halibut landings that were observed.

Table 18. Bycatch estimates for all fishery sectors observed by the West Coast Groundfish Observer Program (WCGOP) from 2002 through 2009. Total morality estimates are also provided in cases when discard mortality rates were available.

	LE bottom trawl	Non-nearshore fixed gear			Nearshore fixed gear	Pink shrimp	CA halibut	Total
		LE primary	LE non-primary	OA				
Gross discard estimates (mt)								
2002	524	144	0.0	-	-	-	0.0	669
2003	187	203	0.1	-	0.0	-	0.0	390
2004	212	247	0.0	-	1.0	0.0	0.8	461
2005	460	229	0.0	-	2.2	0.1	0.0	692
2006	391	668	0.0	-	0.5	-	0.0	1059
2007	294	131	1.5	17.9	0.1	0.2	0.1	445
2008	305	246	2.7	41.3	0.4	0.0	0.3	596
2009	385	310	0.2	40.0	1.3	0.0	0.0	737
Total discard mortality (mt)								
2002	345	23	0.0	0.0	*no discard mortality rate available*			
2003	124	32	0.0	0.0	""			157
2004	133	40	0.0	0.0	""			173
2005	287	37	0.0	0.0	""			323
2006	242	107	0.0	0.0	""			350
2007	209	21	0.2	2.9	""			233
2008	208	39	0.4	6.6	""			254
2009	251	50	0.0	6.4	""			307

" - " Indicates years of incomplete or no observer coverage for which estimates are not available

APPENDIX A

Common and scientific names of species included in the Pacific Coast Groundfish Fishery Management Plan, as amended through Amendment 19 (PFMC 2008).

SHARKS
Big skate, *Raja binoculata*
California skate, *R. inornata*
Leopard shark, *Triakis semifasciata*
Longnose skate, *R. rhina*
Soupfin shark, *Galeorhinus zyopterus*
Spiny dogfish, *Squalus acanthias*

RATFISH
Ratfish, *Hydrolagus colliei*

MORIDS
Finescale codling, *Antimora microlepis*

GRENADIERS
Pacific rattail, *Coryphaenoides acrolepis*

ROUNDFISH
Cabezon, *Scorpaenichthys marmoratus*
Kelp greenling, *Hexagrammos decagrammus*
Lingcod, *Ophiodon elongatus*
Pacific cod, *Gadus macrocephalus*
Pacific whiting, (hake) *Merluccius productus*
Sablefish, *Anoplopoma fimbria*

FLATFISH
Arrowtooth flounder, (turbot) *Atheresthes stomias*
Butter sole, *Isopsetta isolepis*
Curlfin sole, *Pleuronichthys decurrens*
Dover sole, *Microstomus pacificus*
English sole, *Parophrys vetulus*
Flathead sole, *Hippoglossoides elassodon*
Pacific sanddab, *Citharichthys sordidus*
Petrale sole, *Eopsetta jordani*
Rex sole, *Glyptocephalus zachirus*
Rock sole, *Lepidopsetta bilineata*
Sand sole, *Psettichthys melanostictus*
Starry flounder, *Platichthys stellatus*

ROCKFISH
Includes all genera and species of the family Scopaenidae, even if not listed, that occur in the Washington, Oregon, and California area. The Scopaenidae genera are *Sebastes*, *Scorpaena*, *Sebastolobus*, and *Scorpaenodes*.

Aurora, *Sebastes. aurora*
Bank, *S. rufus*
Black, *S. melanops*
Black-and-yellow, *S. chrysolmelas.*
Blackgill, *S. melanostomus*
Blue, *S. mystinus*
Bocaccio, *S. paucispinis*
Bronzespotted, *S. gilli*
Brown, *S. auriculatus*
Calico, *S. dalli*
California scorpionfish, *Scorpaena guttata*
Canary, *Sebastes pinniger*
Chameleon, *S. phillipsi*
Chilipepper, *S. goodei*
China, *S. nebulosus*
Copper, *S. caurinus*
Cowcod, *S. levis*
Darkblotched, *S. crameri*
Dusky, *S. ciliatus*
Dwarf-red, *S. rufianus*
Flag, *S. rubrivinctus*
Freckled, *S. lentiginosus*
Gopher, *S. carnatus*
Grass, *S. rastrelliger*
Greenblotched, *S. rosenblatti*
Greenspotted, *S. chlorostictus*
Greenstriped, *S. elongatus*
Halfbanded, *S. semicinctus*
Harlequin, *S. variegatus*
Honeycomb, *S. umbrosus*
Kelp, *S. atrovirens*
Longspine thornyhead, *Sebastolobus altivelis*
Mexican, *Sebastes. macdonaldi*
Olive, *S. serranoides*
Pink, *S. eos*
Pinkrose, *S. simulator*
Pygmy, *S. wilsoni*
Pacific ocean perch, *S. alutus*
Quillback, *S. maliger*
Redbanded, *S. babcocki*
Redstripe, *S. proriger*
Rosethorn, *S. helvomaculatus*
Rosy, *S. rosaceus*
Rougheye, *S. aleutianus*
Sharpchin, *S. zacentrus*
Shortbelly, *S. jordani*

Shortraker, *S. borealis*
Shortspine thornyhead, *Sebastolobus alascanus*
Silvergray, *Sebastes. brevispinus*
Speckled, *S. ovalis*
Splitnose rockfish, *S. diploproa*
Squarespot, *S. hopkinsi*
Starry, *S. constellatus*
Stripetail, *S. saxicola*
Swordspine, *S. ensifer*
Tiger, *S. nigorcinctus*
Treefish, *S. serriceps*
Vermilion, *S. miniatus*
Widow, *S. entomelas*
Yelloweye, *S. ruberrimus*
Yellowmouth, *S. reedi*
Yellowtail, *S. flavidus*

APPENDIX B

Species indentification codes used in the Pacific Fisheries Information Network (PacFIN) database and assigned to WCGOP observer data, with aggregated species groups used in this report for the non-nearshore sectors of the groundfish fishery.

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
ALBC	ALBACORE	Other nongroundfish	Other nongroundfish	
APLC	ALASKA PLAICE	Other non-FMP flatfish	Other non-FMP flatfish	
ARR1	NOM. AURORA ROCKFISH	Other slope rockfish	Other slope rockfish	yes
ARRA	AURORA ROCKFISH	Other slope rockfish	Other slope rockfish	yes
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder	yes
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder	yes
ASRK	PACIFIC ANGEL SHARK	Other nongroundfish	Other nongroundfish	
BABL	BLACK ABALONE	Other nongroundfish	Other nongroundfish	
BANK	BANK ROCKFISH	Other slope rockfish	Bank rockfish (Remaining rockfish)	yes
BCAC	BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio	yes
BCC1	NOM. BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio	yes
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish	
BGL1	NOM. BLACKGILL ROCKFISH	Other slope rockfish	Blackgill (Remaining rockfish)	yes
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish	
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLGL	BLACKGILL ROCKFISH	Other slope rockfish	Blackgill (Remaining rockfish)	yes
BLK1	NOM. BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLU1	NOM. BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BLUR	BLUE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BMCK	BULLET MACKEREL	Other nongroundfish	Other nongroundfish	
BMRL	BLUE MARLIN	Other nongroundfish	Other nongroundfish	
BMSL	BLUE OR BAY MUSSEL	Other nongroundfish	Other nongroundfish	
BNK1	NOM. BANK ROCKFISH	Other slope rockfish	Bank rockfish (Remaining rockfish)	yes
BRNZ	BRONZESPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
BRW1	NOM. BROWN ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BRWN	BROWN ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BRZ1	NOM. BRONZESPOTTED RK	Other shelf rockfish	Other shelf rockfish	yes
BSJK	BLACK SKIPJACK	Other nongroundfish	Other nongroundfish	
BSKT	BIG SKATE	Big skate	Big skate	yes
BSOL	BUTTER SOLE	Other flatfish	Other flatfish	yes
BSRK	BLUE SHARK	Other nongroundfish	Other nongroundfish	
BSRM	UNSP. BAIT SHRIMP	Other nongroundfish	Other nongroundfish	
BTCR	BAIRDI TANNER CRAB	Tanner crab	Tanner crab	
BTNA	BLUEFIN TUNA	Other nongroundfish	Other nongroundfish	
BTRY	BAT RAY	Other nongroundfish	Other nongroundfish	
BYEL	BLACK-AND-YELLOW ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
BYL1	NOM. BLACK-AND-YELLOW RK	Other nearshore rockfish	Other nearshore rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
CBZ1	NOM. CABEZON	Other groundfish	Cabezon	yes
CBZN	CABEZON	Other groundfish	Cabezon	yes
CEEL	SPOTTED CUSK-EEL	Other nongroundfish	Other nongroundfish	
CHL1	NOM. CALIFORNIA HALIBUT	California halibut	California halibut	
CHLB	CALIFORNIA HALIBUT	California halibut	California halibut	
CHN1	NOM. CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CHNA	CHINA ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CHNK	CHINOOK SALMON	Other nongroundfish	Other nongroundfish	
CHUM	CHUM SALMON	Other nongroundfish	Other nongroundfish	
CKLE	BASKET COCKLE	Other nongroundfish	Other nongroundfish	
CLC1	NOM. CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CLCO	CALICO ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CLP1	NOM. CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	yes
CLPR	CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	yes
CMCK	CHUB MACKEREL	Other nongroundfish	Other nongroundfish	
CMEL	CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
CML1	NOM. CHAMELEON ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
CMSL	CALIFORNIA MUSSEL	Other nongroundfish	Other nongroundfish	
CNR1	NOM. CANARY ROCKFISH	Canary rockfish	Canary rockfish	yes
CNRY	CANARY ROCKFISH	Canary rockfish	Canary rockfish	yes
COHO	COHO SALMON	Other nongroundfish	Other nongroundfish	
COP1	NOM. COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
COPP	COPPER ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
CPLN	CAPELIN	Other nongroundfish	Other nongroundfish	
CSKT	CALIFORNIA SKATE	Unspecified skate	Unspecified skate	yes
CSOL	CURLFIN SOLE	Other flatfish	Other flatfish	yes
CTRB	C-O SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
CUDA	PACIFIC BARRACUDA	Other nongroundfish	Other nongroundfish	
CWC1	NOM. COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
CWCD	COWCOD ROCKFISH	Other shelf rockfish	Cowcod	yes
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	yes
DCRB	DUNGENESS CRAB	Dungeness crab	Dungeness crab	
DFLT	UNSP. DEEP FLOUNDERS	Other flatfish	Other flatfish	yes
DOVR	DOVER SOLE	Dover sole	Dover sole	yes
DRDO	DORADO	Other nongroundfish	Other nongroundfish	
DSOL	DEEPSEA SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish	yes
DTRB	DIAMOND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
DUSK	DUSKY ROCKFISH	Other groundfish	Other groundfish	yes
DVR1	NOM. DOVER SOLE	Dover sole	Dover sole	yes
DWRF	DWARF-RED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish	
EGL1	NOM. ENGLISH SOLE	English sole	English sole	yes
EGLS	ENGLISH SOLE	English sole	English sole	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
ESTR	EASTERN OYSTER	Other nongroundfish	Other nongroundfish	
ETNA	BIGEYE TUNA	Other nongroundfish	Other nongroundfish	
EULC	EULACHON	Eulachon	Eulachon	
EURO	EUROPEAN OYSTER	Other nongroundfish	Other nongroundfish	
FLAG	FLAG ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
FLG1	NOM. FLAG ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
FNTS	FANTAIL SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
FRCK	FRECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
FSOL	FLATHEAD SOLE	Other flatfish	Other flatfish	yes
GABL	GREEN ABALONE	Other nongroundfish	Other nongroundfish	
GBAS	GIANT SEA BASS	Other nongroundfish	Other nongroundfish	
GBL1	NOM. GREENBLOTCHED RK	Other shelf rockfish	Other shelf rockfish	yes
GBLC	GREENBLOTCHED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GCLM	GAPER CLAM	Other nongroundfish	Other nongroundfish	
GDUK	GEODUCK	Other nongroundfish	Other nongroundfish	
GKCR	GOLDEN KING CRAB	Other nongroundfish	Other nongroundfish	
GPH1	NOM. GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPHR	GOPHER ROCKFISH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPRW	GOLDEN PRAWN	Other nongroundfish	Other nongroundfish	
GRAS	GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
GRDR	UNSP. GRENADIERS	Unspecified grenadiers	Unspecified grenadiers	yes
GRS1	NOM. GRASS ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
GSP1	NOM. GREENSPOTTED RK	Other shelf rockfish	Other shelf rockfish	yes
GSPT	GREENSPOTTED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSQD	GIANT SQUID	Other nongroundfish	Other nongroundfish	
GSR1	NOM. GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSRK	GREENSTRIPED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
GSRM	GHOST SHRIMP	Other nongroundfish	Other nongroundfish	
GSTG	GREEN STURGEON	Green sturgeon	Green sturgeon	
GTRB	GREENLAND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
HBRK	HALFBANDED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HCLM	HORSE CLAMS	Other nongroundfish	Other nongroundfish	
HLQN	HARLEQUIN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HNY1	NOM. HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HNYC	HONEYCOMB ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
HTRB	HORNYHEAD TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish	
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish	
JMCK	JACK MACKEREL	Other nongroundfish	Other nongroundfish	
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish	
KGL1	NOM. KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLP1	NOM. KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KLPG	KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLPR	KELP ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
KMKA	KAMCHATKA FLOUNDER	Other non-FMP flatfish	Other non-FMP flatfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish	
LCOD	LINGCOD	Lingcod	Lingcod	yes
LDAB	LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LDB1	NOM. LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LOBS	CALIF. SPINY LOBSTER	Other nongroundfish	Other nongroundfish	
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate	yes
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	yes
LSPN	LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	yes
LSRK	LEOPARD SHARK	Other groundfish	Other groundfish	yes
LSTR	OLYMPIA OYSTER	Other nongroundfish	Other nongroundfish	
LUVR	LOUVAR	Other nongroundfish	Other nongroundfish	
MACL	MUD CLAMS	Other nongroundfish	Other nongroundfish	
MAKO	SHORTFIN MAKO SHARK	Other nongroundfish	Other nongroundfish	
MCLM	MANILA CLAM	Other nongroundfish	Other nongroundfish	
MEEL	MONKEYFACE EEL	Other nongroundfish	Other nongroundfish	
MISC	MISC. FISH/ANIMALS	Other nongroundfish	Other nongroundfish	
MOLA	COMMON MOLA	Other nongroundfish	Other nongroundfish	
MRLN	STRIPED MARLIN	Other nongroundfish	Other nongroundfish	
MSC2	MISCELLANEOUS FISH	Other nongroundfish	Other nongroundfish	
MSHP	PLAINFIN MIDSHIPMAN	Other nongroundfish	Other nongroundfish	
MSQD	MARKET SQUID	Other nongroundfish	Other nongroundfish	
MSRM	MUD SHRIMP	Other nongroundfish	Other nongroundfish	
MXR1	NOM. MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
MXRF	MEXICAN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NANC	NORTHERN ANCHOVY	Other nongroundfish	Other nongroundfish	
NRCK	NORTHERN ROCKFISH	Other groundfish	Other groundfish	yes
NSHR	NORTHERN NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
NSLF	NORTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NSLP	NORTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
NUSF	NOR. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
NUSP	NOR. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
NUSR	NOR. UNSP. NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
OABL	OTHER ABALONE	Other nongroundfish	Other nongroundfish	
OANC	OTHER ANCHOVY	Other nongroundfish	Other nongroundfish	
OBAS	OTHER BASS	Other nongroundfish	Other nongroundfish	
OCLM	OTHER CLAM	Other nongroundfish	Other nongroundfish	
OCRB	OTHER CRAB	Other nongroundfish	Other nongroundfish	
OCRK	OTHER CROAKER	Other nongroundfish	Other nongroundfish	
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL RKFSH	Other groundfish	Other groundfish	yes
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish	
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish	yes
OGRN	OTHER GROUNDFISH	Other groundfish	Other groundfish	yes
OLV1	NOM. OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
OLVE	OLIVE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
OMSK	OTHER MOLLUSKS	Other nongroundfish	Other nongroundfish	
OPLG	OTHER PELAGIC RKFSH	Other groundfish	Other groundfish	yes
ORCK	OTHER ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)	yes
ORCK	OTHER ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)	yes
ORND	OTHER ROUNDFISH	Other groundfish	Other groundfish	yes
OSCL	OTHER SCALLOP	Other nongroundfish	Other nongroundfish	
OSKT	OTHER SKATES	Unspecified skate	Unspecified skate	yes
OSLR	OTHER SLOPE RKFSH	Other slope rockfish	Other slope rockfish	yes
OSRK	OTHER SHARK	Other nongroundfish	Other nongroundfish	
OSRM	OTHER SHRIMP	Other nongroundfish	Other nongroundfish	
OSTR	OTHER OYSTER	Other nongroundfish	Other nongroundfish	
OTCR	OPILIO TANNER CRAB	Tanner crab	Tanner crab	
OTNA	OTHER TUNA	Other nongroundfish	Other nongroundfish	
OURC	OTHER SEA URCHINS	Other nongroundfish	Other nongroundfish	
OWFS	OCEAN WHITEFISH	Other nongroundfish	Other nongroundfish	
PABL	PINK ABALONE	Other nongroundfish	Other nongroundfish	
PBNT	PACIFIC BONITO	Other nongroundfish	Other nongroundfish	
PBTR	PACIFIC BUTTERFISH	Other nongroundfish	Other nongroundfish	
PCLM	PISMO CLAM	Other nongroundfish	Other nongroundfish	
PCOD	PACIFIC COD	Pacific cod	Other groundfish	yes
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish	yes
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish	yes
PGMY	PYGMY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PHLB	PACIFIC HALIBUT	Pacific halibut	Pacific halibut	
PHRG	PACIFIC HERRING	Other nongroundfish	Other nongroundfish	
PINK	PINK SALMON	Other nongroundfish	Other nongroundfish	
PLCK	WALLEYE POLLOCK	Other groundfish	Other groundfish	yes
PNK1	NOM. PINK ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PNKR	PINK ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
POMF	PACIFIC POMFRET	Other nongroundfish	Other nongroundfish	
POP	PACIFIC OCEAN PERCH	Pacific ocean perch	Other slope rockfish	yes
POP1	GEN. SHELF/SLOPE RF	Other slope rockfish	Other slope rockfish	yes
POP2	NOMINAL POP	Pacific ocean perch	Other slope rockfish	yes
PRCL	PURPLE CLAM	Other nongroundfish	Other nongroundfish	
PROW	PROWFISH	Other nongroundfish	Other nongroundfish	
PRR1	NOM. PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PRRK	PINKROSE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PSDN	PACIFIC SARDINE	Other nongroundfish	Other nongroundfish	
PSHP	PINK SHRIMP	Other nongroundfish	Other nongroundfish	
PSRK	PELAGIC THRESHER SHARK	Other nongroundfish	Other nongroundfish	
PSTR	PACIFIC OYSTER	Other nongroundfish	Other nongroundfish	
PTR1	NOM. PETRALE SOLE	Petrale sole	Petrale sole	yes
PTRL	PETRALE SOLE	Petrale sole	Petrale sole	yes
PUGT	PUGET SOUND ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
PWHT	PACIFIC WHITING	Pacific hake	Pacific hake	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
QCLM	NORTHERN QUAHOG CLAM	Other nongroundfish	Other nongroundfish	
QFSH	QUEENFISH	Other nongroundfish	Other nongroundfish	
QLB1	NOM. QUILLBACK ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
QLBK	QUILLBACK ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
RABL	RED ABALONE	Other nongroundfish	Other nongroundfish	
RATF	SPOTTED RATFISH	Other groundfish	Other groundfish	yes
RCK1	BOCACCIO+CHILIPEPPER RK	Other shelf rockfish	Other shelf rockfish	yes
RCK2	UNSP. BOLINA RCKFSH	Other nearshore rockfish	Other nearshore rockfish	yes
RCK3	UNSP. DPWTR REDS RCKFSH	Other slope rockfish	Other slope rockfish	yes
RCK4	UNSP. REDS RCKFSH	Other groundfish	Other groundfish	yes
RCK5	UNSP. SMALL REDS RCKFSH	Other groundfish	Other groundfish	yes
RCK6	UNSP. ROSEFISH RCKFSH	Other groundfish	Other groundfish	yes
RCK7	UNSP. GOPHER RCKFSH	Other nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
RCK8	CANARY+VERMILION RCKFSH	Canary rockfish	Canary rockfish	yes
RCK9	BLACK+BLUE ROCKFISH	Black rockfish	Black rockfish	yes
RCKG	ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RCLM	RAZOR CLAM	Other nongroundfish	Other nongroundfish	
RCRB	ROCK CRAB	Other nongroundfish	Other nongroundfish	
RDB1	NOM. REDBANDED ROCKFISH	Other slope rockfish	Other slope rockfish	yes
RDBD	REDBANDED ROCKFISH	Other slope rockfish	Other slope rockfish	yes
REDS	REDSTRIPE ROCKFISH	Redstripe rockfish (Remaining rockfish)	Other shelf rockfish	yes
REX	REX SOLE	Other flatfish	Other flatfish	yes
REX1	NOM. REX SOLE	Other flatfish	Other flatfish	yes
REYE	ROUGHEYE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
RFLT	REMAINING FLATFISH	Other flatfish	Other flatfish	yes
RGL1	NOM. ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RGRN	REMAINING GROUNDFISH	Other groundfish	Other groundfish	yes
RHRG	ROUND HERRING	Other nongroundfish	Other nongroundfish	
RKCR	RED KING CRAB	Other nongroundfish	Other nongroundfish	
ROS1	NOM. ROSY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
ROSY	ROSY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
RPRW	RIDGEBACK PRAWN	Other nongroundfish	Other nongroundfish	
RRCK	REMAINING ROCKFISH	Other groundfish	Other groundfish	yes
RRND	REMAINING ROUNDFISH	Other groundfish	Other groundfish	yes
RSL1	NOM. ROCK SOLE	Other flatfish	Other flatfish	yes
RSOL	ROCK SOLE	Other flatfish	Other flatfish	yes
RST1	NOM. ROSETHORN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
RSTN	ROSETHORN ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
RURC	RED SEA URCHIN	Other nongroundfish	Other nongroundfish	
RZCL	ROSY RAZOR CLAM	Other nongroundfish	Other nongroundfish	
SABL	SABLEFISH	Sablefish	Sablefish	yes
SAIL	SAILFISH	Other nongroundfish	Other nongroundfish	
SARY	PACIFIC SAURY	Other nongroundfish	Other nongroundfish	
SBL1	NOM. SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	yes
SBLY	SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
SCLM	SOFT-SHELLED CLAM	Other nongroundfish	Other nongroundfish	
SCLP	UNSP. SCULPIN	Other nongroundfish	Other nongroundfish	
SCOR	CALIFORNIA SCORPIONFISH	Other groundfish	Other nearshore rockfish	yes
SCR1	NOM. CALIF. SCORPIONFISH	Other groundfish	Other nearshore rockfish	yes
SDB1	NOM. SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SFL1	NOM. STARRY FLOUNDER	Starry flounder	Starry flounder	yes
SFLT	UNSP. SHALLOW FLOUNDERS	Other flatfish	Other flatfish	yes
SHAD	UNSPECIFIED SHAD	Other nongroundfish	Other nongroundfish	
SHP1	NOM. CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish	
SHPD	CALIFORNIA SHEEPHEAD	Other nongroundfish	Other nongroundfish	
SHRP	SHARPCHIN ROCKFISH	Sharpchin rockfish (Remaining rockfish)	Sharpchin - south	yes
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish	
SLGR	SILVERGREY ROCKFISH	Silvergrey rockfish (Remaining rockfish)	Other shelf rockfish	yes
SLNS	SLENDER SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
SMLT	UNSP. SMELT	Other nongroundfish	Other nongroundfish	
SNOS	SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish	yes
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish	yes
SOCK	SOCKEYE SALMON	Other nongroundfish	Other nongroundfish	
SPK1	NOM. SPECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SPKL	SPECKLED ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SPRW	SPOTTED PRAWN	Other nongroundfish	Other nongroundfish	
SQID	UNSP. SQUID	Other nongroundfish	Other nongroundfish	
SQR1	NOM. SQUARESPOT	Other shelf rockfish	Other shelf rockfish	yes
SQRS	SQUARESPOT ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SRFP	SURFPERCH SPP.	Other nongroundfish	Other nongroundfish	
SRKR	SHORTRAKER ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SSCL	SHARPNOSE SCULPIN	Other nongroundfish	Other nongroundfish	
SSDB	SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SSHR	SOUTHERN NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
SSLF	SOUTHERN SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SSLP	SOUTHERN SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SSO1	NOM. SAND SOLE	Other flatfish	Other flatfish	yes
SSOL	SAND SOLE	Other flatfish	Other flatfish	yes
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	yes
SSPN	SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	yes
SSRD	Deep So. Nearshore RF	Other nearshore rockfish	Other nearshore rockfish	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	yes
SSRS	Shallow So. Nearshore RF	Other nearshore rockfish	Other nearshore rockfish	yes
STAR	STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STL1	NOM. STRIPETAIL ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STLH	STEELHEAD	Other nongroundfish	Other nongroundfish	
STNA	SKIPJACK TUNA	Other nongroundfish	Other nongroundfish	
STR1	NOM. STARRY ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
STRK	STRIPETAIL ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder	yes
SUSF	SOU. UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SUSP	SOU. UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
SUSR	SOU. UNSP. NEAR-SHORE RK	Other nearshore rockfish	Other nearshore rockfish	yes
SWRD	SWORDFISH	Other nongroundfish	Other nongroundfish	
SWS1	NOM. SWORDSPINE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
SWSP	SWORDSPINE ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
TCOD	PACIFIC TOMCOD	Other nongroundfish	Other nongroundfish	
TGR1	NOM. TIGER ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
THD1	NOM. THORNYHEADS	Mixed thornyheads	Mixed thornyheads	yes
THDS	THORNYHEADS (MIXED)	Mixed thornyheads	Mixed thornyheads	yes
TIGR	TIGER ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
TRE1	NOM. TREEFISH	Other nearshore rockfish	Other nearshore rockfish	yes
TREE	TREEFISH	Other nearshore rockfish	Other nearshore rockfish	yes
TSRK	COMMON THRESHER SHARK	Other nongroundfish	Other nongroundfish	
UABL	UNSPECIFIED ABALONE	Other nongroundfish	Other nongroundfish	
UCLM	UNSPECIFIED CLAM	Other nongroundfish	Other nongroundfish	
UCRB	UNSPECIFIED CRAB	Other nongroundfish	Other nongroundfish	
UDAB	UNSP. SANDDABS	Other flatfish	Other flatfish	yes
UDF1	UNSP. DEEP-91 FLOUNDERS	Other flatfish	Other flatfish	yes
UDF2	UNSP. DEEP-95 FLOUNDERS	Other flatfish	Other flatfish	yes
UDM1	UNSP. DEMERSAL-91	Other groundfish	Other groundfish	yes
UDNR	UNSP. DEEP NEAR-SHORE RF	Other nearshore rockfish	Other nearshore rockfish	yes
UDSR	UNSP. DEMERSAL RKFSH	Other groundfish	Other groundfish	yes
UDW1	SHORTRAKER+ROUGHEYE	Other slope rockfish	Other slope rockfish	yes
UECH	UNSPECIFIED ECHINODERM	Other nongroundfish	Other nongroundfish	
UFL1	FLOUNDERS (NO FSOL)	Other flatfish	Other flatfish	yes
UFLT	UNSP. FLATFISH	Other flatfish	Other flatfish	yes
UGRN	UNSP. GROUNDFISH	Other groundfish	Other groundfish	yes
UHAG	UNSPECIFIED HAGFISH	Other nongroundfish	Other nongroundfish	
UHLB	UNSPECIFIED HALIBUT	Other nongroundfish	Other nongroundfish	
UJEL	UNSP. JELLYFISH	Other nongroundfish	Other nongroundfish	
UKCR	UNSP. KING CRAB	Other nongroundfish	Other nongroundfish	
UMCK	UNSP. MACKEREL	Other nongroundfish	Other nongroundfish	
UMSK	UNSPECIFIED MOLLUSKS	Other nongroundfish	Other nongroundfish	
UPLG	UNSP. PELAGIC RKFSH	Other groundfish	Other groundfish	yes
UPOP	UNSP. POP GROUP	Pacific ocean perch	Other slope rockfish	yes
URCK	UNSP. ROCKFISH	Other slope rockfish (>150 fm)	Other slope rockfish (>150 fm)	yes
URCK	UNSP. ROCKFISH	Other shelf rockfish (<150 fm)	Other shelf rockfish (<150 fm)	yes
URK1	SRKR+REYE+NRCK+SHRP	Other slope rockfish	Other slope rockfish	yes
URND	UNSP. ROUNDFISH	Other groundfish	Other groundfish	yes
USCL	UNSPECIFIED SCALLOP	Other nongroundfish	Other nongroundfish	
USCU	UNSP. SEA CUCUMBERS	Other nongroundfish	Other nongroundfish	
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other flatfish	Other flatfish	yes
USHR	UNSP. NEAR-SHORE ROCKFISH	Other nearshore rockfish	Other nearshore rockfish	yes
USKT	UNSP. SKATE	Unspecified skate	Unspecified skate	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	FMP
USLF	UNSP. SHELF ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
USLP	UNSP. SLOPE ROCKFISH	Other slope rockfish	Other slope rockfish	yes
USLR	UNSP. SLOPE RKFSH	Other slope rockfish	Other slope rockfish	yes
USMN	UNSP. SALMON	Other nongroundfish	Other nongroundfish	
USR1	UNSP. SLOPE-91	Other groundfish	Other groundfish	yes
USR2	UNSP. SLOPE-93	Other groundfish	Other groundfish	yes
USRK	UNSP. SHARK	Other nongroundfish	Other nongroundfish	
USRM	UNSP. OCEAN SHRIMP	Other nongroundfish	Other nongroundfish	
USTG	UNSP. STURGEON	Other nongroundfish	Other nongroundfish	
USTR	UNSPECIFIED OYSTER	Other nongroundfish	Other nongroundfish	
UTCR	UNSP. TANNER CRAB	Tanner crab	Tanner crab	
UTNA	UNSPECIFIED TUNA	Other nongroundfish	Other nongroundfish	
UTRB	UNSP. TURBOTS	Other flatfish	Other flatfish	yes
UURC	UNSP. SEA URCHINS	Other nongroundfish	Other nongroundfish	
VRM1	NOM. VERMILLION ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
VRML	VERMILION ROCKFISH	Other shelf rockfish	Other shelf rockfish	yes
WABL	WHITE ABALONE	Other nongroundfish	Other nongroundfish	
WBAS	WHITE SEABASS	Other nongroundfish	Other nongroundfish	
WCLM	WASHINGTON CLAM	Other nongroundfish	Other nongroundfish	
WCRK	WHITE CROAKER	Other nongroundfish	Other nongroundfish	
WDOW	WIDOW ROCKFISH	Widow rockfish	Widow rockfish	yes
WDW1	NOM. WIDOW ROCKFISH	Widow rockfish	Widow rockfish	yes
WEEL	WOLF EEL	Other nongroundfish	Other nongroundfish	
WHOO	WAHOO	Other nongroundfish	Other nongroundfish	
WSTG	WHITE STURGEON	Other nongroundfish	Other nongroundfish	
YEY1	NOM. YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish	yes
YEYE	YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish	yes
YLTL	YELLOWTAIL	Other nongroundfish	Other nongroundfish	
YMTH	YELLOWMOUTH ROCKFISH	Yellowmouth rockfish (Remaining rockfish)	Other slope rockfish	yes
YSOL	YELLOWFIN SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
YTNA	YELLOWFIN TUNA	Other nongroundfish	Other nongroundfish	
YTR1	NOM. YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)	yes
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)	yes

APPENDIX C

Species identification codes used in the Pacific Coast Fisheries Information Network (PacFIN) database and assigned to WCGOP observer data, with aggregated species groups used in this report for the nearshore fixed gear sector of the groundfish fishery.

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
ALBC	ALBACORE	Other nongroundfish	Other nongroundfish	
APLC	ALASKA PLAICE	Other non-FMP flatfish	Other non-FMP flatfish	
ARR1	NOM. AURORA ROCKFISH	Minor slope rockfish	Minor slope rockfish	
ARRA	AURORA ROCKFISH	Minor slope rockfish	Minor slope rockfish	
ART1	NOM. ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder	
ARTH	ARROWTOOTH FLOUNDER	Arrowtooth flounder	Arrowtooth flounder	
ASRK	PACIFIC ANGEL SHARK	Other nongroundfish	Other nongroundfish	
BABL	BLACK ABALONE	Other nongroundfish	Other nongroundfish	
BANK	BANK ROCKFISH	Minor slope rockfish	Bank rockfish (Remaining rockfish)	
BCAC	BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio	
BCC1	NOM. BOCACCIO	Bocaccio (Remaining rockfish)	Bocaccio	
BCLM	BUTTER CLAM	Other nongroundfish	Other nongroundfish	
BGL1	NOM. BLACKGILL ROCKFISH	Minor slope rockfish	Blackgill (Remaining rockfish)	
BKCR	BLUE KING CRAB	Other nongroundfish	Other nongroundfish	
BLCK	BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLGL	BLACKGILL ROCKFISH	Minor slope rockfish	Blackgill (Remaining rockfish)	
BLK1	NOM. BLACK ROCKFISH	Black rockfish	Black rockfish	yes
BLU1	NOM. BLUE ROCKFISH	Blue rockfish	Blue rockfish	yes
BLUR	BLUE ROCKFISH	Blue rockfish	Blue rockfish	yes
BMCK	BULLET MACKEREL	Other nongroundfish	Other nongroundfish	
BMRL	BLUE MARLIN	Other nongroundfish	Other nongroundfish	
BMSL	BLUE OR BAY MUSSEL	Other nongroundfish	Other nongroundfish	
BNK1	NOM. BANK ROCKFISH	Minor slope rockfish	Bank rockfish (Remaining rockfish)	
BRNZ	BRONZESPOTTED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
BRW1	NOM. BROWN ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
BRWN	BROWN ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
BRZ1	NOM. BRONZESPOTTED RK	Minor shelf rockfish	Minor shelf rockfish	
BSJK	BLACK SKIPJACK	Other nongroundfish	Other nongroundfish	
BSKT	BIG SKATE	Big skate	Big skate	
BSOL	BUTTER SOLE	Other flatfish	Other flatfish	
BSRK	BLUE SHARK	Other nongroundfish	Other nongroundfish	
BSRM	UNSP. BAIT SHRIMP	Other nongroundfish	Other nongroundfish	
BTCR	BAIRDI TANNER CRAB	Tanner crab	Tanner crab	
BTNA	BLUEFIN TUNA	Other nongroundfish	Other nongroundfish	
BTRY	BAT RAY	Other nongroundfish	Other nongroundfish	
BYEL	BLACK-AND-YELLOW ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
BYL1	NOM. BLACK-AND-YELLOW RK	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
CBZ1	NOM. CABEZON	Cabezon	Cabezon	yes
CBZN	CABEZON	Cabezon	Cabezon	yes
CEEL	SPOTTED CUSK-EEL	Other nongroundfish	Other nongroundfish	
CHL1	NOM. CALIFORNIA HALIBUT	California halibut	California halibut	
CHLB	CALIFORNIA HALIBUT	California halibut	California halibut	
CHN1	NOM. CHINA ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
CHNA	CHINA ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
CHNK	CHINOOK SALMON	Other nongroundfish	Other nongroundfish	
CHUM	CHUM SALMON	Other nongroundfish	Other nongroundfish	
CKLE	BASKET COCKLE	Other nongroundfish	Other nongroundfish	
CLC1	NOM. CALICO ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
CLCO	CALICO ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
CLP1	NOM. CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	
CLPR	CHILIPEPPER	Chilipepper (Remaining rockfish)	Chilipepper	
CMCK	CHUB MACKEREL	Other nongroundfish	Other nongroundfish	
CMEL	CHAMELEON ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
CML1	NOM. CHAMELEON ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
CMSL	CALIFORNIA MUSSEL	Other nongroundfish	Other nongroundfish	
CNR1	NOM. CANARY ROCKFISH	Canary rockfish	Canary rockfish	
CNRY	CANARY ROCKFISH	Canary rockfish	Canary rockfish	
COHO	COHO SALMON	Other nongroundfish	Other nongroundfish	
COP1	NOM. COPPER ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
COPP	COPPER ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
CPLN	CAPELIN	Other nongroundfish	Other nongroundfish	
CSKT	CALIFORNIA SKATE	Unspecified skate	Unspecified skate	
CSOL	CURLFIN SOLE	Other flatfish	Other flatfish	
CTRB	C-O SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
CUDA	PACIFIC BARRACUDA	Other nongroundfish	Other nongroundfish	
CWC1	NOM. COWCOD ROCKFISH	Minor shelf rockfish	Cowcod	
CWCD	COWCOD ROCKFISH	Minor shelf rockfish	Cowcod	
DBR1	NOM. DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	
DBRK	DARKBLOTCHED ROCKFISH	Darkblotched rockfish	Darkblotched rockfish	
DCRB	DUNGENESS CRAB	Dungeness crab	Dungeness crab	
DFLT	UNSP. DEEP FLOUNDERS	Other flatfish	Other flatfish	
DOVR	DOVER SOLE	Dover sole	Dover sole	
DRDO	DORADO	Other nongroundfish	Other nongroundfish	
DSOL	DEEPSEA SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
DSRK	SPINY DOGFISH	Spiny dogfish	Spiny dogfish	
DTRB	DIAMOND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
DUSK	DUSKY ROCKFISH	Other groundfish	Other groundfish	
DVR1	NOM. DOVER SOLE	Dover sole	Dover sole	
DWRF	DWARF-RED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
EELS	UNSPECIFIED EELS	Other nongroundfish	Other nongroundfish	
EGL1	NOM. ENGLISH SOLE	English sole	English sole	
EGLS	ENGLISH SOLE	English sole	English sole	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
ESTR	EASTERN OYSTER	Other nongroundfish	Other nongroundfish	
ETNA	BIGEYE TUNA	Other nongroundfish	Other nongroundfish	
EULC	EULACHON	Eulachon	Eulachon	
EURO	EUROPEAN OYSTER	Other nongroundfish	Other nongroundfish	
FLAG	FLAG ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
FLG1	NOM. FLAG ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
FNTS	FANTAIL SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
FRCK	FRECKLED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
FSOL	FLATHEAD SOLE	Other flatfish	Other flatfish	
GABL	GREEN ABALONE	Other nongroundfish	Other nongroundfish	
GBAS	GIANT SEA BASS	Other nongroundfish	Other nongroundfish	
GBL1	NOM. GREENBLOTCHED RK	Minor shelf rockfish	Minor shelf rockfish	
GBLC	GREENBLOTCHED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GCLM	GAPER CLAM	Other nongroundfish	Other nongroundfish	
GDUK	GEODUCK	Other nongroundfish	Other nongroundfish	
GKCR	GOLDEN KING CRAB	Other nongroundfish	Other nongroundfish	
GPH1	NOM. GOPHER ROCKFISH	Other minor nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPHR	GOPHER ROCKFISH	Other minor nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
GPRW	GOLDEN PRAWN	Other nongroundfish	Other nongroundfish	
GRAS	GRASS ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
GRDR	UNSP. GRENADIERS	Unspecified grenadiers	Unspecified grenadiers	
GRS1	NOM. GRASS ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
GSP1	NOM. GREENSPOTTED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSPT	GREENSPOTTED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSQD	GIANT SQUID	Other nongroundfish	Other nongroundfish	
GSR1	NOM. GREENSTRIPED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSRK	GREENSTRIPED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
GSRM	GHOST SHRIMP	Other nongroundfish	Other nongroundfish	
GSTG	GREEN STURGEON	Green sturgeon	Green sturgeon	
GTRB	GREENLAND TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
HBRK	HALFBANDED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HCLM	HORSE CLAMS	Other nongroundfish	Other nongroundfish	
HLQN	HARLEQUIN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HNY1	NOM. HONEYCOMB ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HNYC	HONEYCOMB ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
HTRB	HORNYHEAD TURBOT	Other non-FMP flatfish	Other non-FMP flatfish	
ISRK	BIGEYE THRESHER SHARK	Other nongroundfish	Other nongroundfish	
JCLM	CALIFORNIA JACKKNIFE CLAM	Other nongroundfish	Other nongroundfish	
JMCK	JACK MACKEREL	Other nongroundfish	Other nongroundfish	
KFSH	GIANT KELPFISH	Other nongroundfish	Other nongroundfish	
KGL1	NOM. KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLP1	NOM. KELP ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
KLPG	KELP GREENLING	Kelp greenling	Kelp greenling	yes
KLPR	KELP ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
KMKA	KAMCHATKA FLOUNDER	Other non-FMP flatfish	Other non-FMP flatfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
KSTR	KUMAMOTO OYSTER	Other nongroundfish	Other nongroundfish	
LCD1	NOM. LINGCOD	Lingcod	Lingcod	yes
LCLM	NATIVE LITTLENECK	Other nongroundfish	Other nongroundfish	
LCOD	LINGCOD	Lingcod	Lingcod	yes
LDAB	LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LDB1	NOM. LONGFIN SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
LOBS	CALIF. SPINY LOBSTER	Other nongroundfish	Other nongroundfish	
LSKT	LONGNOSE SKATE	Longnose skate	Longnose skate	
LSP1	NOM. LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	
LSPN	LONGSPINE THORNYHEAD	Longspine thornyhead	Longspine thornyhead	
LSRK	LEOPARD SHARK	Other groundfish	Other groundfish	
LSTR	OLYMPIA OYSTER	Other nongroundfish	Other nongroundfish	
LUVR	LOUVAR	Other nongroundfish	Other nongroundfish	
MACL	MUD CLAMS	Other nongroundfish	Other nongroundfish	
MAKO	SHORTFIN MAKO SHARK	Other nongroundfish	Other nongroundfish	
MCLM	MANILA CLAM	Other nongroundfish	Other nongroundfish	
MEEL	MONKEYFACE EEL	Other nongroundfish	Other nongroundfish	
MISC	MISC. FISH/ANIMALS	Other nongroundfish	Other nongroundfish	
MOLA	COMMON MOLA	Other nongroundfish	Other nongroundfish	
MRLN	STRIPED MARLIN	Other nongroundfish	Other nongroundfish	
MSC2	MISCELLANEOUS FISH	Other nongroundfish	Other nongroundfish	
MSHP	PLAINFIN MIDSHIPMAN	Other nongroundfish	Other nongroundfish	
MSQD	MARKET SQUID	Other nongroundfish	Other nongroundfish	
MSRM	MUD SHRIMP	Other nongroundfish	Other nongroundfish	
MXR1	NOM. MEXICAN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
MXRF	MEXICAN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
NANC	NORTHERN ANCHOVY	Other nongroundfish	Other nongroundfish	
NRCK	NORTHERN ROCKFISH	Other groundfish	Other groundfish	
NSHR	NORTHERN NEAR-SHORE RK	Other minor nearshore rockfish	Northern nearshore rockfish	yes
NSLF	NORTHERN SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
NSLP	NORTHERN SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
NUSF	NOR. UNSP. SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
NUSP	NOR. UNSP. SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
NUSR	NOR. UNSP. NEAR-SHORE RK	Other minor nearshore rockfish	Northern nearshore rockfish	yes
OABL	OTHER ABALONE	Other nongroundfish	Other nongroundfish	
OANC	OTHER ANCHOVY	Other nongroundfish	Other nongroundfish	
OBAS	OTHER BASS	Other nongroundfish	Other nongroundfish	
OCLM	OTHER CLAM	Other nongroundfish	Other nongroundfish	
OCRB	OTHER CRAB	Other nongroundfish	Other nongroundfish	
OCRK	OTHER CROAKER	Other nongroundfish	Other nongroundfish	
OCTP	UNSP. OCTOPUS	Other nongroundfish	Other nongroundfish	
ODSR	OTHER DEMERSAL RKFSH	Other groundfish	Other groundfish	
OECH	OTHER ECHINODERM	Other nongroundfish	Other nongroundfish	
OFLT	OTHER FLATFISH	Other flatfish	Other flatfish	
OGRN	OTHER GROUNDFISH	Other groundfish	Other groundfish	
OLV1	NOM. OLIVE ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
OLVE	OLIVE ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
OMSK	OTHER MOLLUSKS	Other nongroundfish	Other nongroundfish	
OPLG	OTHER PELAGIC RKFSH	Other groundfish	Other groundfish	
ORCK	OTHER ROCKFISH	Minor slope rockfish	Minor slope rockfish	
ORCK	OTHER ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
ORND	OTHER ROUNDFISH	Other groundfish	Other groundfish	
OSCL	OTHER SCALLOP	Other nongroundfish	Other nongroundfish	
OSKT	OTHER SKATES	Unspecified skate	Unspecified skate	
OSLR	OTHER SLOPE RKFSH	Minor slope rockfish	Minor slope rockfish	
OSRK	OTHER SHARK	Other nongroundfish	Other nongroundfish	
OSRM	OTHER SHRIMP	Other nongroundfish	Other nongroundfish	
OSTR	OTHER OYSTER	Other nongroundfish	Other nongroundfish	
OTCR	OPILIO TANNER CRAB	Tanner crab	Tanner crab	
OTNA	OTHER TUNA	Other nongroundfish	Other nongroundfish	
OURC	OTHER SEA URCHINS	Other nongroundfish	Other nongroundfish	
OWFS	OCEAN WHITEFISH	Other nongroundfish	Other nongroundfish	
PABL	PINK ABALONE	Other nongroundfish	Other nongroundfish	
PBNT	PACIFIC BONITO	Other nongroundfish	Other nongroundfish	
PBTR	PACIFIC BUTTERFISH	Other nongroundfish	Other nongroundfish	
PCLM	PISMO CLAM	Other nongroundfish	Other nongroundfish	
PCOD	PACIFIC COD	Pacific cod	Pacific cod	
PDAB	PACIFIC SANDDAB	Other flatfish	Other flatfish	
PDB1	NOM. PACIFIC SANDDAB	Other flatfish	Other flatfish	
PGMY	PYGMY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PHLB	PACIFIC HALIBUT	Pacific halibut	Pacific halibut	
PHRG	PACIFIC HERRING	Other nongroundfish	Other nongroundfish	
PINK	PINK SALMON	Other nongroundfish	Other nongroundfish	
PLCK	WALLEYE POLLOCK	Other groundfish	Other groundfish	
PNK1	NOM. PINK ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PNKR	PINK ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
POMF	PACIFIC POMFRET	Other nongroundfish	Other nongroundfish	
POP	PACIFIC OCEAN PERCH	Pacific ocean perch	Minor slope rockfish	
POP1	GEN. SHELF/SLOPE RF	Minor slope rockfish	Minor slope rockfish	
POP2	NOMINAL POP	Pacific ocean perch	Minor slope rockfish	
PRCL	PURPLE CLAM	Other nongroundfish	Other nongroundfish	
PROW	PROWFISH	Other nongroundfish	Other nongroundfish	
PRR1	NOM. PINKROSE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PRRK	PINKROSE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PSDN	PACIFIC SARDINE	Other nongroundfish	Other nongroundfish	
PSHP	PINK SHRIMP	Other nongroundfish	Other nongroundfish	
PSRK	PELAGIC THRESHER SHARK	Other nongroundfish	Other nongroundfish	
PSTR	PACIFIC OYSTER	Other nongroundfish	Other nongroundfish	
PTR1	NOM. PETRALE SOLE	Petrale sole	Petrale sole	
PTRL	PETRALE SOLE	Petrale sole	Petrale sole	
PUGT	PUGET SOUND ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
PWHT	PACIFIC WHITING	Pacific hake	Pacific hake	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
QCLM	NORTHERN QUAHOG CLAM	Other nongroundfish	Other nongroundfish	
QFSH	QUEENFISH	Other nongroundfish	Other nongroundfish	
QLB1	NOM. QUILLBACK ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
QLBK	QUILLBACK ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
RABL	RED ABALONE	Other nongroundfish	Other nongroundfish	
RATF	SPOTTED RATFISH	Other groundfish	Other groundfish	
RCK1	BOCACCIO+CHILIPEPPER RCKFSH	Minor shelf rockfish	Minor shelf rockfish	
RCK2	UNSP. BOLINA RCKFSH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
RCK3	UNSP. DPWTR REDS RCKFSH	Minor slope rockfish	Minor slope rockfish	
RCK4	UNSP. REDS RCKFSH	Other groundfish	Other groundfish	
RCK5	UNSP. SMALL REDS RCKFSH	Other groundfish	Other groundfish	
RCK6	UNSP. ROSEFISH RCKFSH	Other groundfish	Other groundfish	
RCK7	UNSP. GOPHER RCKFSH	Other minor nearshore rockfish	Gopher rockfish (Remaining rockfish)	yes
RCK8	CANARY+VERMILION RCKFSH	Canary rockfish	Canary rockfish	
RCK9	BLACK+BLUE ROCKFISH	Black rockfish	Black rockfish	yes
RCKG	ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RCLM	RAZOR CLAM	Other nongroundfish	Other nongroundfish	
RCRB	ROCK CRAB	Other nongroundfish	Other nongroundfish	
RDB1	NOM. REDBANDED ROCKFISH	Minor slope rockfish	Minor slope rockfish	
RDBD	REDBANDED ROCKFISH	Minor slope rockfish	Minor slope rockfish	
REDS	REDSTRIPE ROCKFISH	Redstripe rockfish (Remaining rockfish)	Minor shelf rockfish	
REX	REX SOLE	Other flatfish	Other flatfish	
REX1	NOM. REX SOLE	Other flatfish	Other flatfish	
REYE	ROUGHEYE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
RFLT	REMAINING FLATFISH	Other flatfish	Other flatfish	
RGL1	NOM. ROCK GREENLING	Other nongroundfish	Other nongroundfish	
RGRN	REMAINING GROUNDFISH	Other groundfish	Other groundfish	
RHRG	ROUND HERRING	Other nongroundfish	Other nongroundfish	
RKCR	RED KING CRAB	Other nongroundfish	Other nongroundfish	
ROS1	NOM. ROSY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
ROSY	ROSY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
RPRW	RIDGEBACK PRAWN	Other nongroundfish	Other nongroundfish	
RRCK	REMAINING ROCKFISH	Other groundfish	Other groundfish	
RRND	REMAINING ROUNDFISH	Other groundfish	Other groundfish	
RSL1	NOM. ROCK SOLE	Other flatfish	Other flatfish	
RSOL	ROCK SOLE	Other flatfish	Other flatfish	
RST1	NOM. ROSETHORN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
RSTN	ROSETHORN ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
RURC	RED SEA URCHIN	Other nongroundfish	Other nongroundfish	
RZCL	ROSY RAZOR CLAM	Other nongroundfish	Other nongroundfish	
SABL	SABLEFISH	Sablefish	Sablefish	
SAIL	SAILFISH	Other nongroundfish	Other nongroundfish	
SARY	PACIFIC SAURY	Other nongroundfish	Other nongroundfish	
SBL1	NOM. SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	
SBLY	SHORTBELLY ROCKFISH	Shortbelly rockfish	Shortbelly rockfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
SCLM	SOFT-SHELLED CLAM	Other nongroundfish	Other nongroundfish	
SCLP	UNSP. SCULPIN	Other nongroundfish	Other nongroundfish	
SCOR	CALIFORNIA SCORPIONFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
SCR1	NOM. CALIF. SCORPIONFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
SDB1	NOM. SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SFL1	NOM. STARRY FLOUNDER	Starry flounder	Starry flounder	
SFLT	UNSP. SHALLOW FLOUNDERS	Other flatfish	Other flatfish	
SHAD	UNSPECIFIED SHAD	Other nongroundfish	Other nongroundfish	
SHP1	NOM. CALIFORNIA SHEEPHEAD	California sheephead	California sheephead	yes
SHPD	CALIFORNIA SHEEPHEAD	California sheephead	California sheephead	yes
SHRP	SHARPCHIN ROCKFISH	Sharpchin rockfish (Remaining rockfish)	Sharpchin rockfish (Remaining rockfish)	
SKCR	SCARLET KING CRAB	Other nongroundfish	Other nongroundfish	
SLGR	SILVERGREY ROCKFISH	Silvergray rockfish (Remaining rockfish)	Minor shelf rockfish	
SLNS	SLENDER SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
SMLT	UNSP. SMELT	Other nongroundfish	Other nongroundfish	
SNOS	SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish	
SNS1	NOM. SPLITNOSE ROCKFISH	Splitnose rockfish (Remaining rockfish)	Splitnose rockfish	
SOCK	SOCKEYE SALMON	Other nongroundfish	Other nongroundfish	
SPK1	NOM. SPECKLED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SPKL	SPECKLED ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SPRW	SPOTTED PRAWN	Other nongroundfish	Other nongroundfish	
SQID	UNSP. SQUID	Other nongroundfish	Other nongroundfish	
SQR1	NOM. SQUARESPOT	Minor shelf rockfish	Minor shelf rockfish	
SQRS	SQUARESPOT ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SRFP	SURFPERCH SPP.	Other nongroundfish	Other nongroundfish	
SRKR	SHORTRAKER ROCKFISH	Minor slope rockfish	Minor slope rockfish	
SSCL	SHARPNOSE SCULPIN	Other nongroundfish	Other nongroundfish	
SSDB	SPECKLED SANDDAB	Other non-FMP flatfish	Other non-FMP flatfish	
SSHR	SOUTHERN NEAR-SHORE RK	Southern nearshore rockfish	Deeper nearshore rockfish	yes
SSHR	SOUTHERN NEAR-SHORE RK	Southern nearshore rockfish	Shallow nearshore rockfish	yes
SSLF	SOUTHERN SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SSLP	SOUTHERN SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
SSO1	NOM. SAND SOLE	Other flatfish	Other flatfish	
SSOL	SAND SOLE	Other flatfish	Other flatfish	
SSP1	NOM. SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	
SSPN	SHORTSPINE THORNYHEAD	Shortspine thornyhead	Shortspine thornyhead	
SSRD	Deep So. Nearshore RF	Southern nearshore rockfish	Deeper nearshore rockfish	yes
SSRK	SOUPFIN SHARK	Other groundfish	Other groundfish	
SSRS	Shallow So. Nearshore RF	Southern nearshore rockfish	Shallow nearshore rockfish	yes
STAR	STARRY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STL1	NOM. STRIPETAIL ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STLH	STEELHEAD	Other nongroundfish	Other nongroundfish	
STNA	SKIPJACK TUNA	Other nongroundfish	Other nongroundfish	
STR1	NOM. STARRY ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
STRK	STRIPETAIL ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
STRY	STARRY FLOUNDER	Starry flounder	Starry flounder	
SUSF	SOU. UNSP. SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SUSP	SOU. UNSP. SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
SUSR	SOU. UNSP. NEAR-SHORE RK	Southern nearshore rockfish	Deeper nearshore rockfish	yes
SUSR	SOU. UNSP. NEAR-SHORE RK	Southern nearshore rockfish	Shallow nearshore rockfish	yes
SWRD	SWORDFISH	Other nongroundfish	Other nongroundfish	
SWS1	NOM. SWORDSPINE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
SWSP	SWORDSPINE ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
TCOD	PACIFIC TOMCOD	Other nongroundfish	Other nongroundfish	
TGR1	NOM. TIGER ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
THD1	NOM. THORNYHEADS	Mixed thornyheads	Mixed thornyheads	
THDS	THORNYHEADS (MIXED)	Mixed thornyheads	Mixed thornyheads	
TIGR	TIGER ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
TRE1	NOM. TREEFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
TREE	TREEFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
TSRK	COMMON THRESHER SHARK	Other nongroundfish	Other nongroundfish	
UABL	UNSPECIFIED ABALONE	Other nongroundfish	Other nongroundfish	
UCLM	UNSPECIFIED CLAM	Other nongroundfish	Other nongroundfish	
UCRB	UNSPECIFIED CRAB	Other nongroundfish	Other nongroundfish	
UDAB	UNSP. SANDDABS	Other flatfish	Other flatfish	
UDF1	UNSP. DEEP-91 FLOUNDERS	Other flatfish	Other flatfish	
UDF2	UNSP. DEEP-95 FLOUNDERS	Other flatfish	Other flatfish	
UDM1	UNSP. DEMERSAL-91	Other groundfish	Other groundfish	
UDNR	UNSP. DEEP NEAR-SHORE RF	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
UDSR	UNSP. DEMERSAL RKFSH	Other groundfish	Other groundfish	
UDW1	SHORTRAKER+ROUGHEYE	Minor slope rockfish	Minor slope rockfish	
UECH	UNSPECIFIED ECHINODERM	Other nongroundfish	Other nongroundfish	
UFL1	FLOUNDERS (NO FSOL)	Other flatfish	Other flatfish	
UFLT	UNSP. FLATFISH	Other flatfish	Other flatfish	
UGRN	UNSP. GROUNDFISH	Other groundfish	Other groundfish	
UHAG	UNSPECIFIED HAGFISH	Other nongroundfish	Other nongroundfish	
UHLB	UNSPECIFIED HALIBUT	Other nongroundfish	Other nongroundfish	
UJEL	UNSP. JELLYFISH	Other nongroundfish	Other nongroundfish	
UKCR	UNSP. KING CRAB	Other nongroundfish	Other nongroundfish	
UMCK	UNSP. MACKEREL	Other nongroundfish	Other nongroundfish	
UMSK	UNSPECIFIED MOLLUSKS	Other nongroundfish	Other nongroundfish	
UPLG	UNSP. PELAGIC RKFSH	Other groundfish	Other groundfish	
UPOP	UNSP. POP GROUP	Pacific ocean perch	Minor slope rockfish	
URCK	UNSP. ROCKFISH	Minor slope rockfish	Minor slope rockfish	
URCK	UNSP. ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
URK1	SRKR+REYE+NRCK+SHRP	Minor slope rockfish	Minor slope rockfish	
URND	UNSP. ROUNDFISH	Other groundfish	Other groundfish	
USCL	UNSPECIFIED SCALLOP	Other nongroundfish	Other nongroundfish	
USCU	UNSP. SEA CUCUMBERS	Other nongroundfish	Other nongroundfish	
USF1	UNSP. SHALLOW-91 FLOUNDERS	Other flatfish	Other flatfish	

PacFIN Species ID	PacFIN Common Name	Species Group - North of 40˚ 10' N latitude	Species Group - South of 40˚ 10' N latitude	NS Species
USHR	UNSP. NEAR-SHORE ROCKFISH	Other minor nearshore rockfish	Deeper nearshore rockfish	yes
USHR	UNSP. NEAR-SHORE ROCKFISH	Other minor nearshore rockfish	Shallow nearshore rockfish	yes
USKT	UNSP. SKATE	Unspecified skate	Unspecified skate	
USLF	UNSP. SHELF ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
USLP	UNSP. SLOPE ROCKFISH	Minor slope rockfish	Minor slope rockfish	
USLR	UNSP. SLOPE RKFSH	Minor slope rockfish	Minor slope rockfish	
USMN	UNSP. SALMON	Other nongroundfish	Other nongroundfish	
USR1	UNSP. SLOPE-91	Other groundfish	Other groundfish	
USR2	UNSP. SLOPE-93	Other groundfish	Other groundfish	
USRK	UNSP. SHARK	Other nongroundfish	Other nongroundfish	
USRM	UNSP. OCEAN SHRIMP	Other nongroundfish	Other nongroundfish	
USTG	UNSP. STURGEON	Other nongroundfish	Other nongroundfish	
USTR	UNSPECIFIED OYSTER	Other nongroundfish	Other nongroundfish	
UTCR	UNSP. TANNER CRAB	Tanner crab	Tanner crab	
UTNA	UNSPECIFIED TUNA	Other nongroundfish	Other nongroundfish	
UTRB	UNSP. TURBOTS	Other flatfish	Other flatfish	
UURC	UNSP. SEA URCHINS	Other nongroundfish	Other nongroundfish	
VRM1	NOM. VERMILLION ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
VRML	VERMILION ROCKFISH	Minor shelf rockfish	Minor shelf rockfish	
WABL	WHITE ABALONE	Other nongroundfish	Other nongroundfish	
WBAS	WHITE SEABASS	Other nongroundfish	Other nongroundfish	
WCLM	WASHINGTON CLAM	Other nongroundfish	Other nongroundfish	
WCRK	WHITE CROAKER	Other nongroundfish	Other nongroundfish	
WDOW	WIDOW ROCKFISH	Widow rockfish	Widow rockfish	
WDW1	NOM. WIDOW ROCKFISH	Widow rockfish	Widow rockfish	
WEEL	WOLF EEL	Other nongroundfish	Other nongroundfish	
WHOO	WAHOO	Other nongroundfish	Other nongroundfish	
WSTG	WHITE STURGEON	Other nongroundfish	Other nongroundfish	
YEY1	NOM. YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish	
YEYE	YELLOWEYE ROCKFISH	Yelloweye rockfish	Yelloweye rockfish	
YLTL	YELLOWTAIL	Other nongroundfish	Other nongroundfish	
YMTH	YELLOWMOUTH ROCKFISH	Yellowmouth rockfish (Remaining rockfish)	Minor slope rockfish	
YSOL	YELLOWFIN SOLE	Other non-FMP flatfish	Other non-FMP flatfish	
YTNA	YELLOWFIN TUNA	Other nongroundfish	Other nongroundfish	
YTR1	NOM. YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)	
YTRK	YELLOWTAIL ROCKFISH	Yellowtail rockfish	Yellowtail rockfish (Remaining rockfish)	

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Agenda Item D.2.b
Supplemental NWFSC PowerPoint
September 2010

Pacific halibut bycatch
in the groundfish fishery (2002-2009)

Eliza Heery, Marlene Bellman,
& Janell Majewski

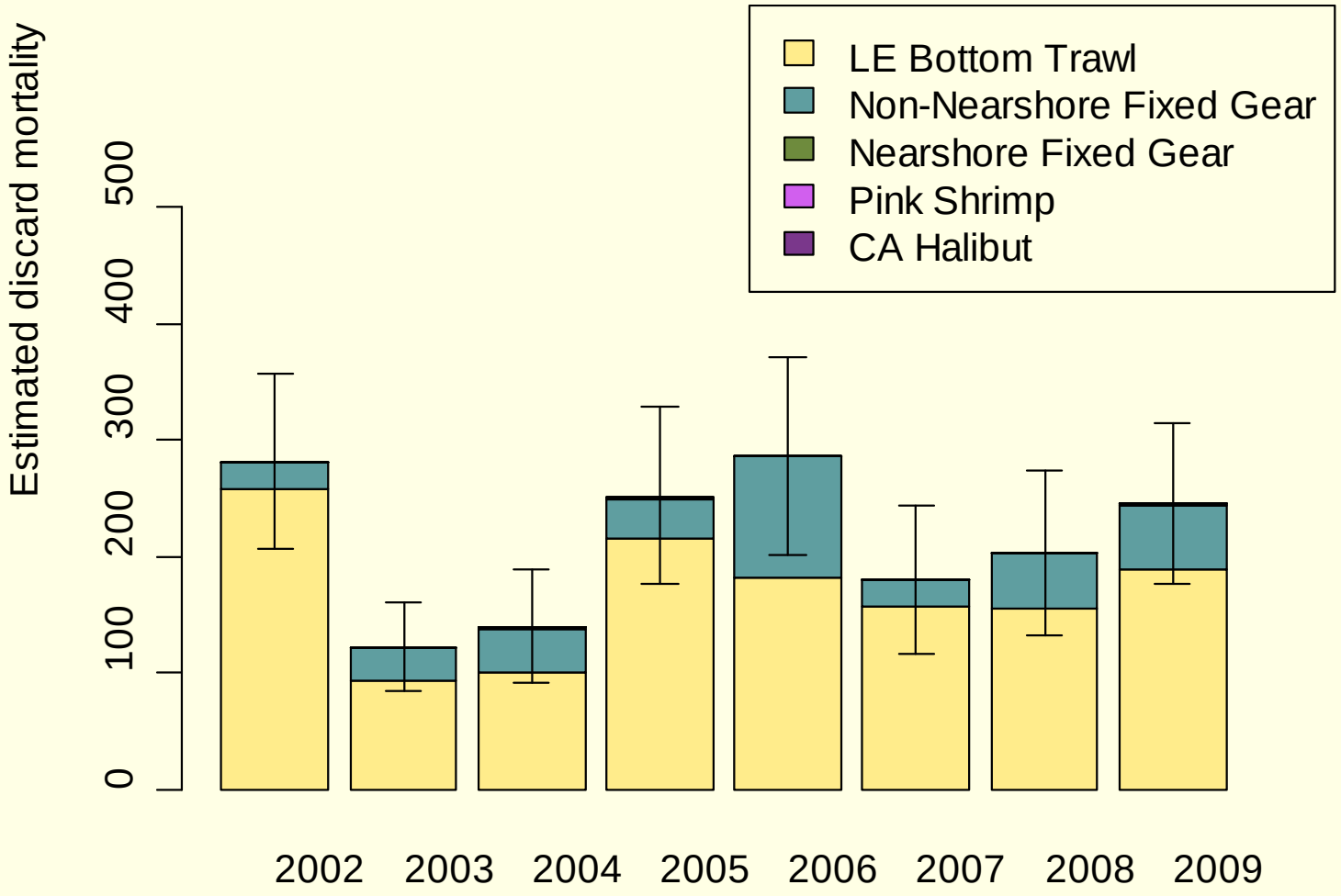
West Coast Groundfish Observer Program
Northwest Fisheries Science Center, Seattle

Pacific halibut bycatch

- Estimated for:
  - 2002-2009
  - **All sectors** observed by the West Coast Groundfish Observer Program (WCGOP)

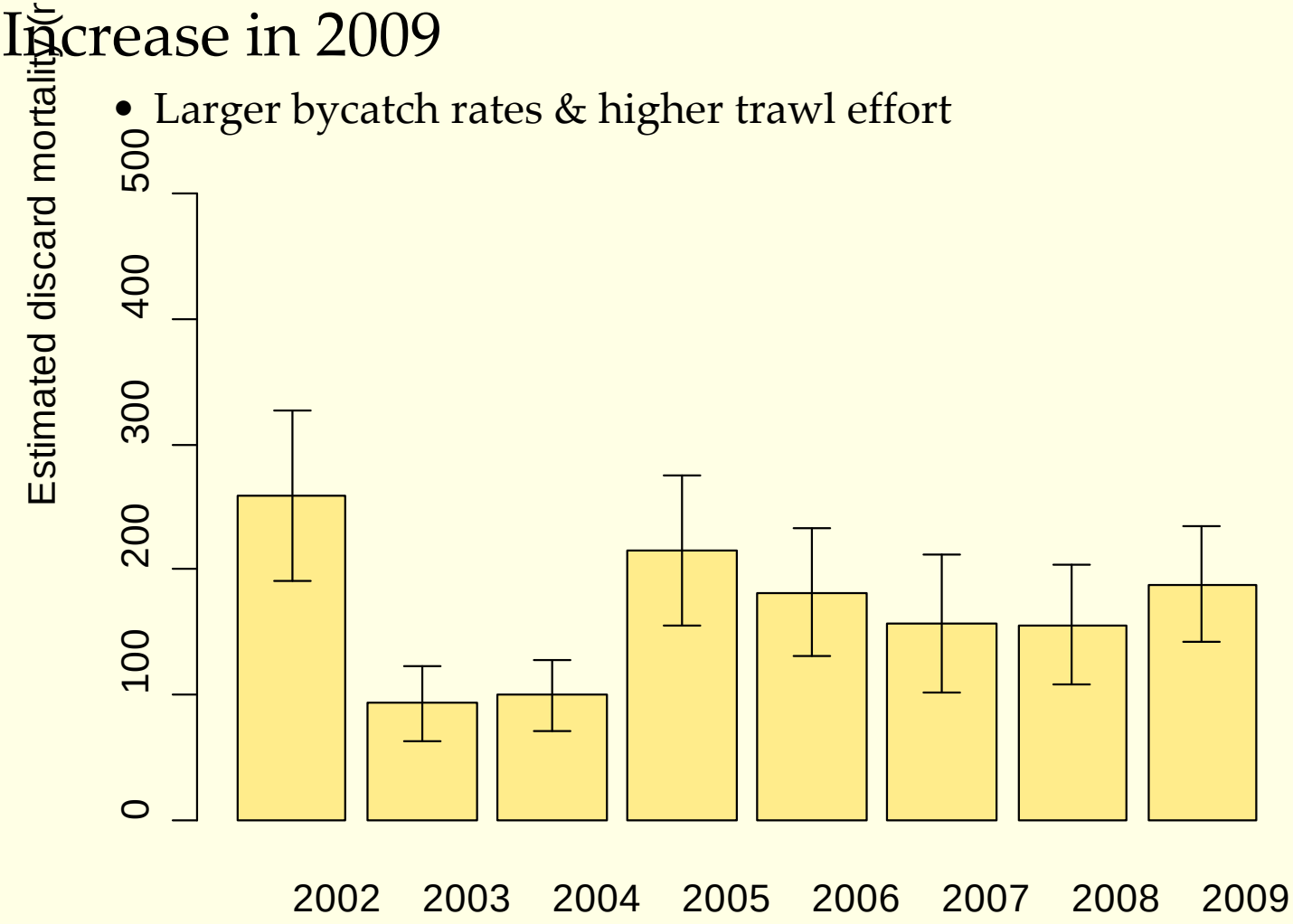
Sectors included
LE bottom trawl
Non-nearshore fixed gear
Nearshore fixed gear
Pink shrimp
CA halibut

Pacific halibut bycatch



LE Bottom Trawl

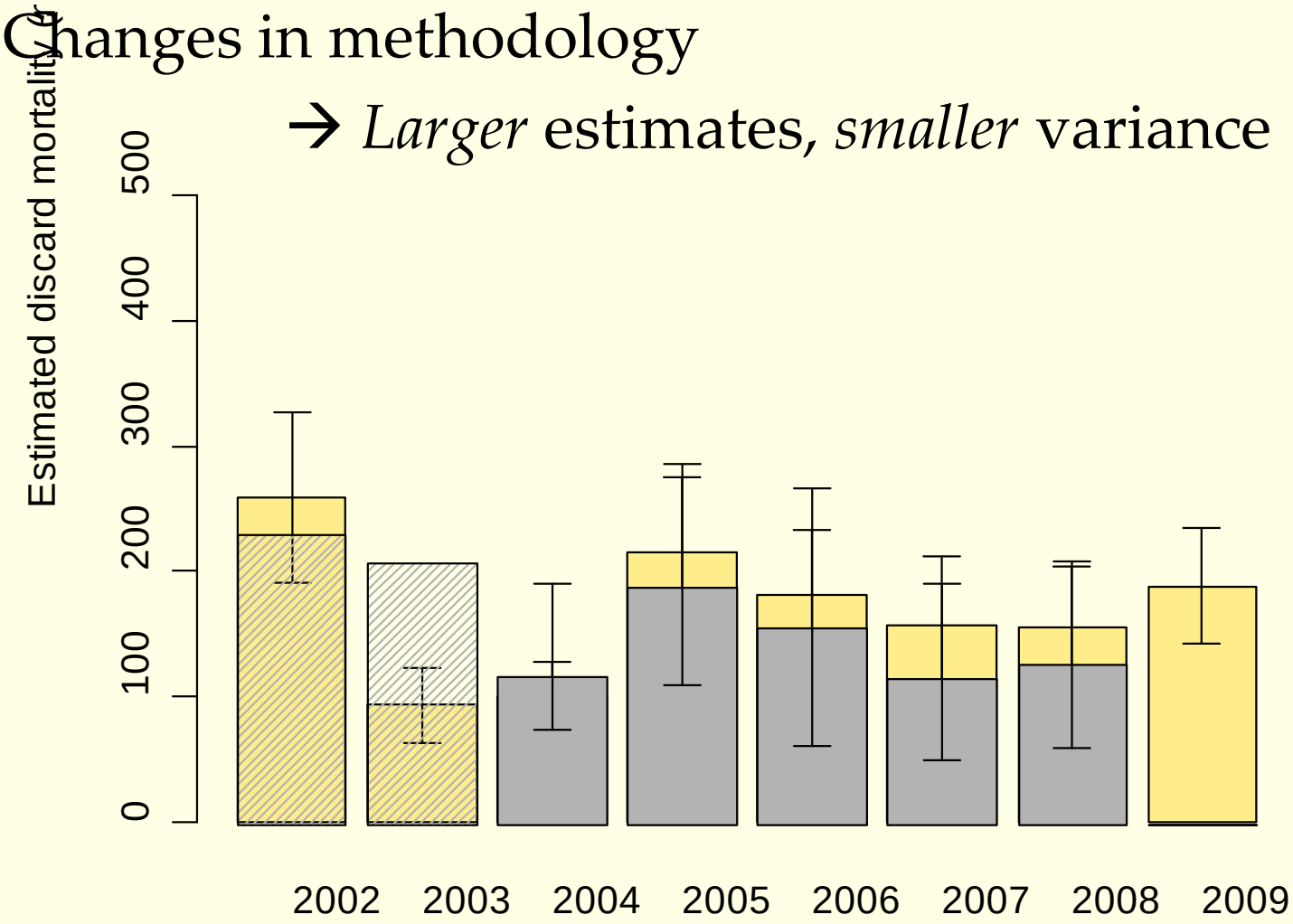
- Increase in 2009
  - Larger bycatch rates & higher trawl effort



LE Bottom Trawl

- Changes in methodology

→ *Larger* estimates, *smaller* variance



LE Bottom Trawl

- *Why are they different?*
  - Inclusion of CA data
  - Logbook tow time adjustment
    - Required b/c < 100% of logbooks are submitted
    - Changed to be consistent with other total mortality reports
  - Stratification
    - Broader
    - Identified through model selection process

LE Bottom Trawl

Stratification selected

Latitude: North / south of Point Chehalis, WA

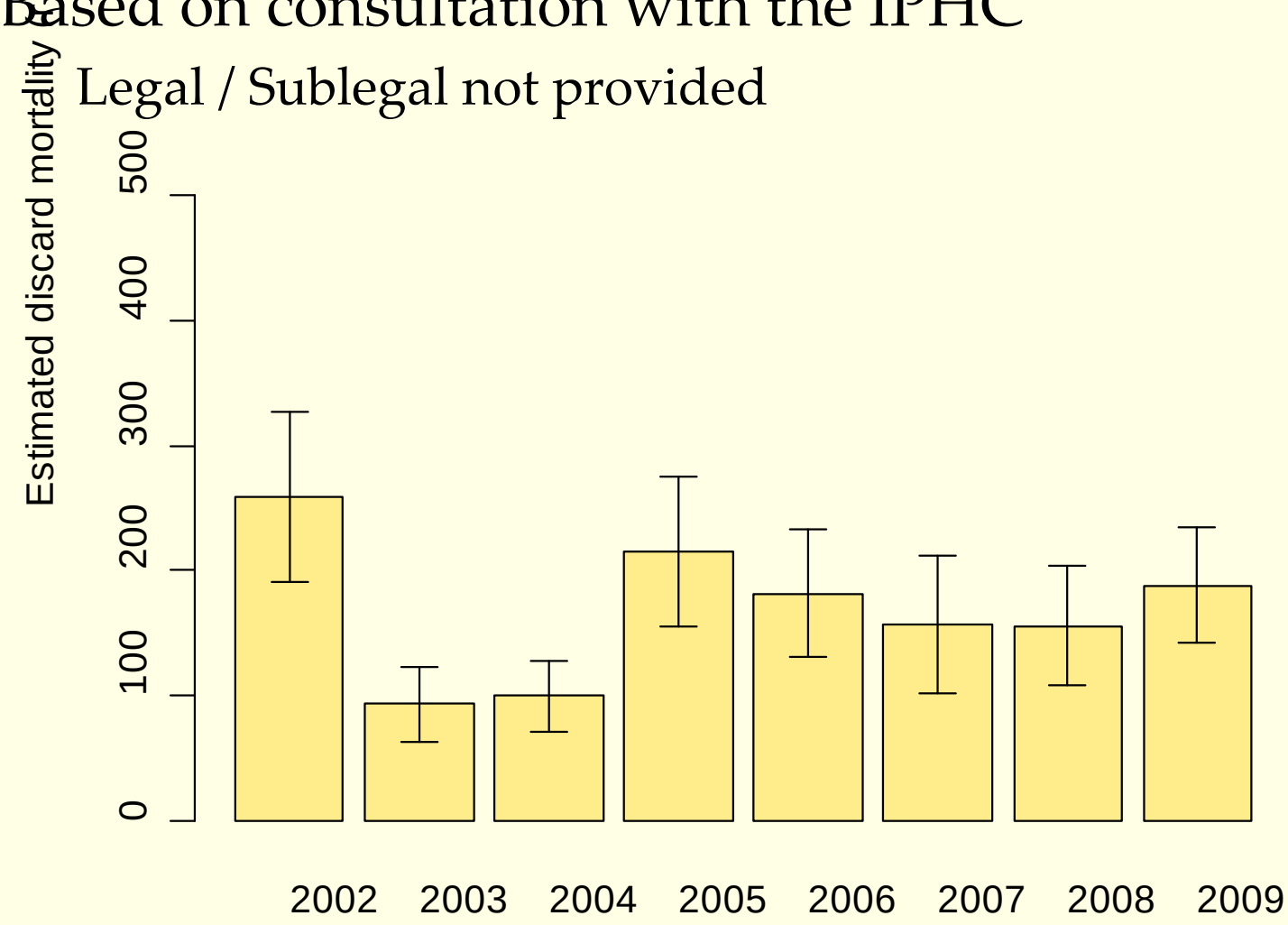
Depth: Shallower / deeper than 60 fm

CPUE of other species: Less than / greater than 125 lbs/hr of species with a positive relationship to Pacific halibut CPUE

- arrowtooth flounder
- petrale sole
- lingcod
- Pacific cod
- skates
- yellowtail rockfish
- Pacific ocean perch

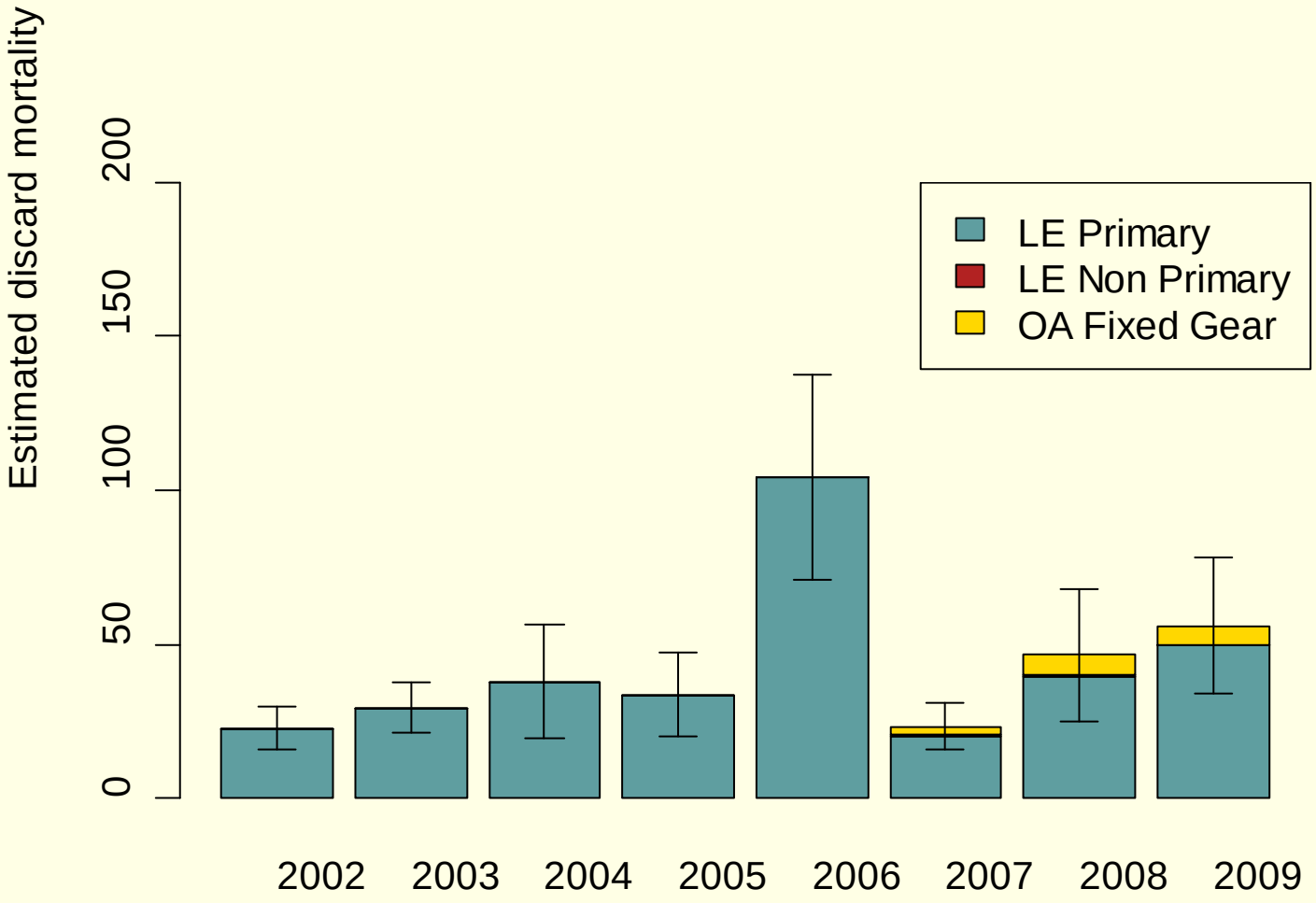
LE Bottom Trawl

- Based on consultation with the IPHC

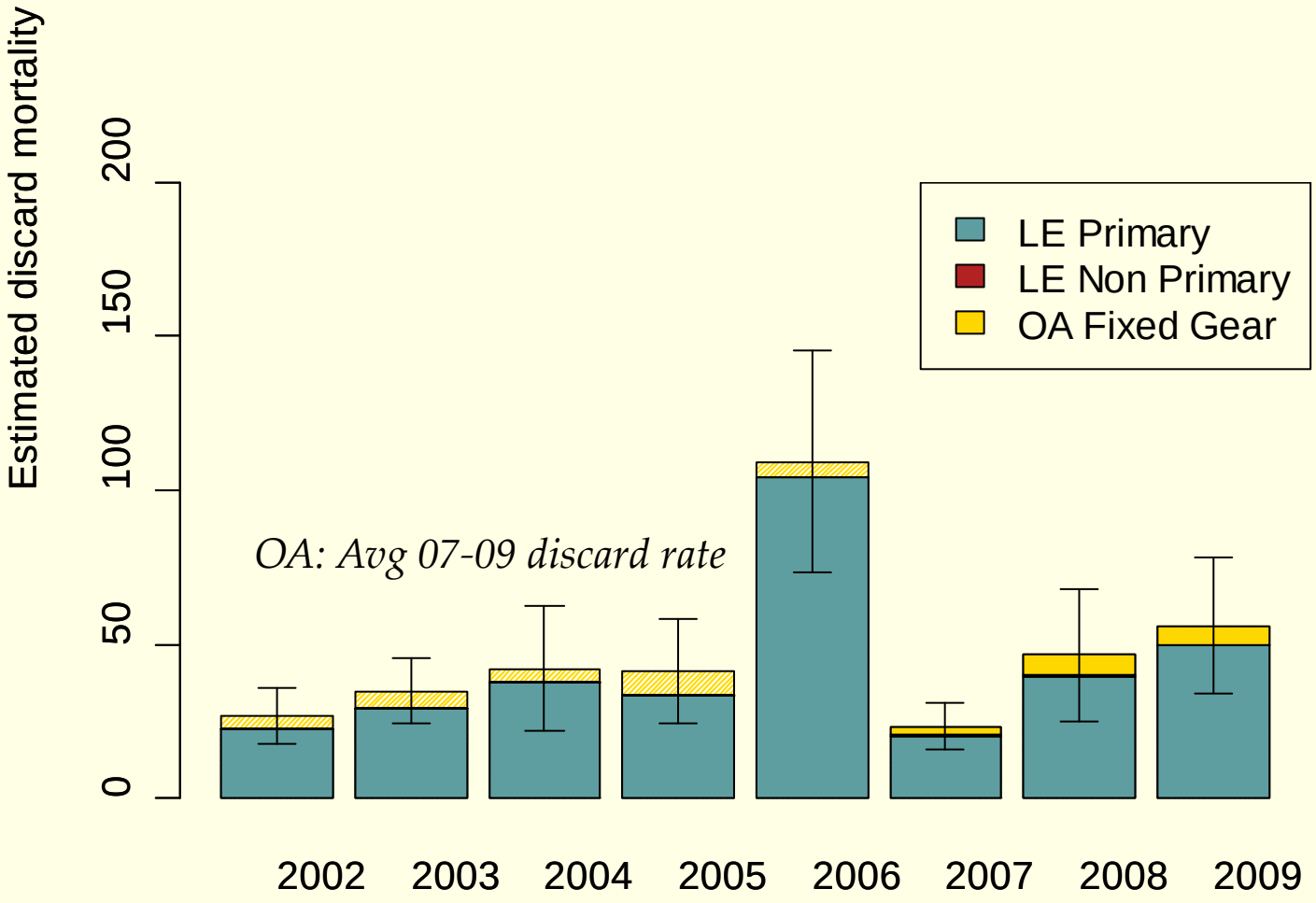


Non-Nearshore Fixed Gear

Non-Nearshore Fixed Gear

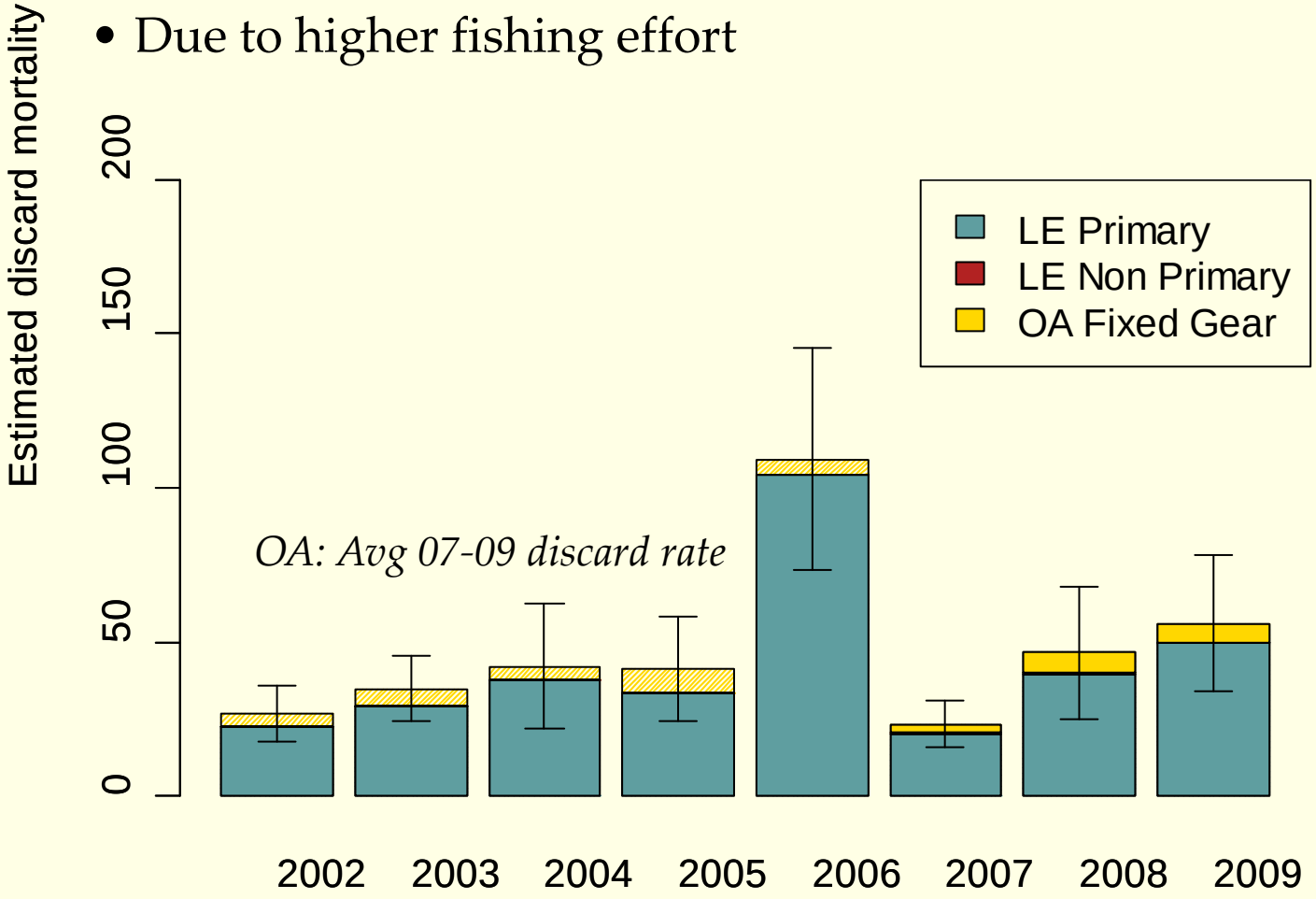


Non-Nearshore Fixed Gear



Non-Nearshore Fixed Gear

- Increase in 2009
  - Due to higher fishing effort



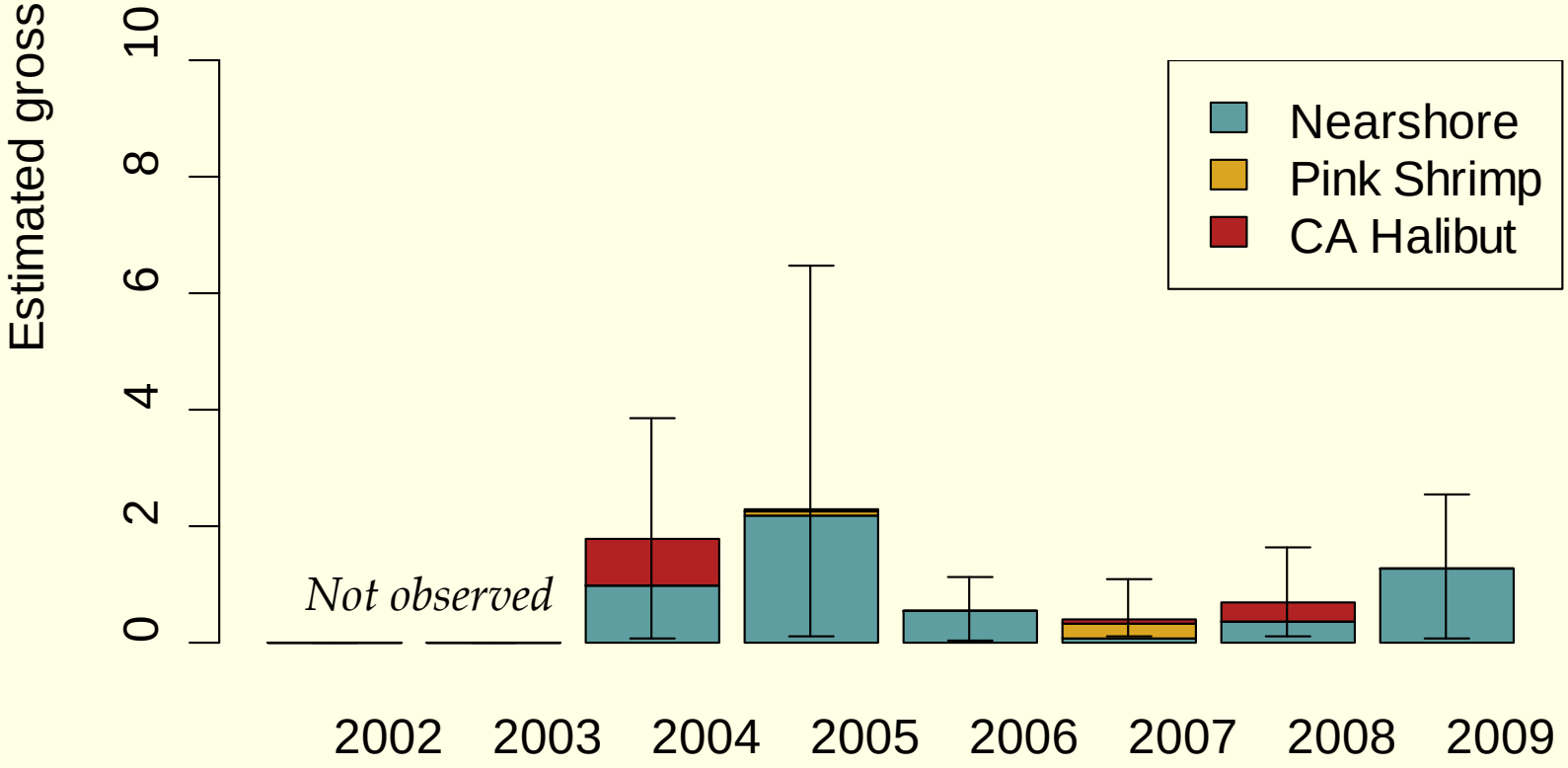
Non-Nearshore Fixed Gear

- Methodology also reviewed
  - Evaluation supported previous approach

Stratification
LE Sablefish Primary (longline) • *Latitude:* North / south of Point Chehalis, WA
All other sectors / gears • Insufficient data for additional strata

Other sectors

- Minor source of bycatch
  - Pink shrimp – well below 25,000 lbs
- No mortality applied



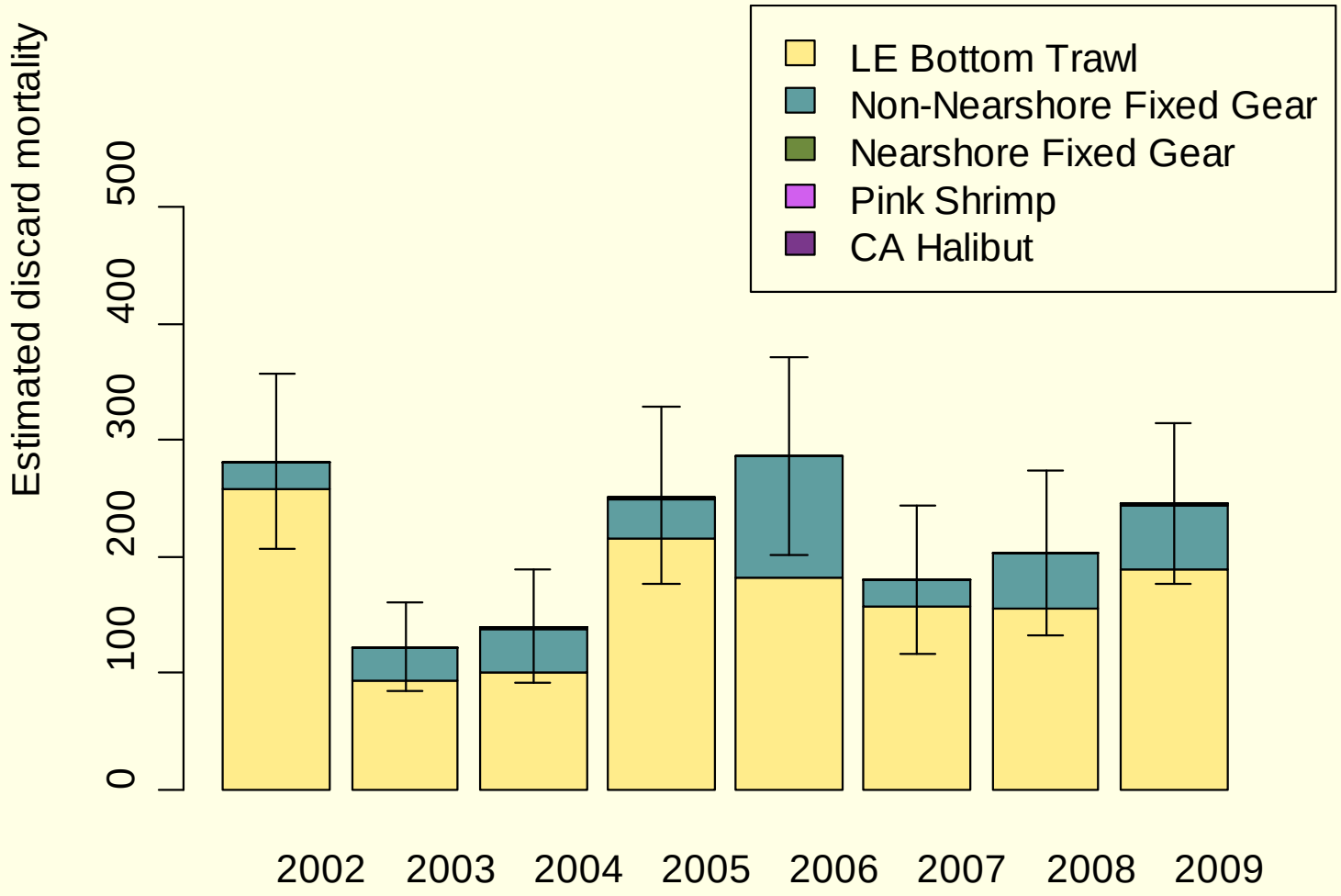
Summary

- Mortality increased in 2009
- Revised trawl methodology

  → ***Higher*** **estimates,** ***smaller*** **variance**

Sectors included	**Sectors not included**
LE bottom trawl	At-sea hake
Non-nearshore fixed gear	Shoreside hake
Nearshore fixed gear	WA tribal
Pink shrimp	Research
CA halibut	Incidental

Questions


Estimated discard mortality
0
100
200
300
400
500
2002
2003
2004
2005
2006
2007
2008
2009
LE Bottom Trawl
Non-Nearshore Fixed Gear
Nearshore Fixed Gear
Pink Shrimp
CA Halibut

Agenda Item D.2.c
Supplemental GAP Report
September 2010

GROUNDFISH ADVISORY SUBPANEL REPORT ON PROPOSED PROCEDURES FOR ESTIMATING PACIFIC HALIBUT BYCATCH IN THE GROUNDFISH FISHERIES

The Groundfish Advisory Subpanel (GAP) discussed proposed procedures for estimating Pacific halibut bycatch in groundfish fisheries and wishes to make the following recommendations.

The GAP notes that the estimated Pacific halibut bycatch in the pink shrimp trawl fishery used in the International Pacific Halibut Commission (IPHC) Pacific halibut assessment assumes a bycatch of 25,000 pounds. This level of bycatch was derived from observations prior to the mandatory use of fish excluders in the pink shrimp fishery. Current West Coast Groundfish Observer Program estimates based on methodologies reviewed and endorsed by the Scientific and Statistical Committee indicate a negligible bycatch of halibut in pink shrimp trawls since fish excluders have been mandated. The GAP recommends the Council charge Council staff to include a recommendation in their letter transmitting Council recommendations to the IPHC to use these newer bycatch estimates in the Pacific halibut assessment.

The GAP understands the assumed discard mortality of Pacific halibut in sablefish pot gear is based on observations of the sablefish fishery in the Gulf of Alaska and the Bering Sea. The gears used in these Alaska fisheries are largely modified king crab pots that are different than the sablefish pots used in Area 2A. The GAP recommends the Pacific halibut bycatch mortality rates used in Area 2A sablefish fisheries be used in the estimation of halibut bycatch mortality and management of west coast sablefish fisheries.

Finally, the GAP is concerned that the viability index for determining the mortality of discarded Pacific halibut in trawl fisheries is based on older studies that may not have adequately accounted for the shorter tow times and other changes to trawl fishing behavior anticipated under rationalization. The GAP notes that the highest survival of trawl-caught Pacific halibut is 80 percent, which accrues a minimum 20 percent mortality penalty of any halibut caught under IBQ management. The GAP recommends additional mark-recapture studies of Pacific halibut under a rationalized fishery be conducted to improve the viability index of discarded halibut to avoid the negative consequences to the trawl fishery under individual bycatch quota management.

PFMC
09/12/10

Agenda Item D.2.c
Supplemental GMT Report
September 2010

GROUNDFISH MANAGEMENT TEAM REPORT ON PROPOSED PROCEDURES FOR ESTIMATING PACIFIC HALIBUT BYCATCH IN THE GROUNDFISH FISHERIES

The Groundfish Management Team (GMT) reviewed Agenda Item D.2.b, NMFS Report and provides the following comments for Council consideration. The Pacific halibut bycatch estimates are reported combined legal (≥ 82 cm) and sublegal (< 82 cm**). The GMT recommends including information on Pacific halibut total mortality estimates by size class (legal and sublegal separately).** The GMT understands that International Pacific Halibut Commission does not require this information, yet we believe the Council should consider these data when developing management measures that reduce take and mortality to the Pacific halibut stock. Including this information in the annual reports will reduce workload, as the GMT would not have to make an additional request to the West Coast Groundfish Observer Program to inform management decisions made by the Council. For example, mortality of a sublegal-size halibut does not equate to the mortality of a legal-size halibut. Currently, the halibut allocation for the rationalized trawl fishery will be 15 percent of the Constant Exploitable Yield (CEY), and the CEY is comprised of only legal sized halibut, whereas trawl individual bycatch quota (IBQ) will include both legal and sublegal-sized halibut beginning 2011. Further, the additional information may be used to help guide management decisions, for example, whether to allow incidental retention of halibut by other fisheries (e.g., fixed gear sablefish fishery, Agenda Item D.3.b, ODFW Report, September 2010).

PFMC
09/12/10

SCIENTIFIC AND STATISTICAL COMMITTEE REPORT ON PROPOSED PROCEDURES FOR ESTIMATING PACIFIC HALIBUT BYCATCH IN THE GROUNDFISH FISHERIES

Ms. Eliza Heery briefed the Scientific and Statistical Committee (SSC) on the methods for estimating Pacific halibut bycatch in all fishery sectors observed by the West Coast Groundfish Observer Program (WCGOP). Methods presented in this report, in general, are similar to those used in previous reports. The three main changes made in this report for estimating bycatch in the limited entry (LE) bottom trawl sector are: 1) inclusion of California data, 2) modification of the method for adjusting trawl logbook tow time, and 3) simplified stratification. Bycatch estimates for other fishery sectors were also presented. Data sources used in this analysis include the WCGOP, trawl logbook, and fish ticket data.

The SSC reviewed the methods used for estimating halibut bycatch in the LE bottom trawl, non-nearshore fixed gear, and other fishery sectors. For the LE bottom trawl sector, the SSC recommends that the diagnostics from the generalized linear model and tree-based regression model be included in future reports. Design based estimates for the WCGOP data should also be included for evaluating possible biases caused by post stratification. The SSC notes that Pacific halibut bycatch estimates for California LE bottom trawl sector have increased in recent years.

For non-nearshore fixed gear, the SSC notes estimators based on total catch may not be appropriate and recommends the development of an effort-based estimator for future reports.

The SSC recommends updating mortality rates for discarded Pacific halibut by the LE bottom trawl sector, and including area specific consideration due to temperature effect on mortality. Viability information for fixed gear sector should also be collected so that mortality rates can be estimated in a similar manner.

The SSC commends the authors on the quality and timeliness of the report, endorses the methodology, and agrees that the estimates are the best available science. The SSC notes that estimates of halibut bycatch for non-nearshore fixed gear open access sector are not available before 2007. The assessment authors at the International Pacific Halibut Commission should collaborate with WCGOP staff to develop estimates for this sector for use in future halibut assessments.

PFMC
09/12/10

Agenda Item D.2.c
WDFW Report
September 2010

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE REPORT ON THE INTERNATIONAL PACIFIC HALIBUT COMMISSION'S BYCATCH WORK GROUP

At its 2010 annual meeting, the International Pacific Halibut Commission (IPHC) requested staff reconstitute the bilateral Halibut Bycatch Work Group (HBWG) to examine how impacts of bycatch from commercial non-tribal trawl fisheries can best be incorporated into halibut management, and to review progress on bycatch reduction and the target levels for reduction recommended by the original HBWG in 1991. The HBWG met on August 11, 2010, in Seattle.

The HBWG is comprised of three representatives from the Canada Department of Fisheries and Oceans, and five representatives from the U.S.-from the National Marine Fisheries Service Alaska Region, the Alaska Fisheries Science Center, the North Pacific Fishery Management Council, NOAA General Counsel, and Area 2A (West Coast).

In reviewing the targets for bycatch reduction that were set in 1991, there was considerable discussion about the data used for Alaska prior to then being erroneous; therefore, the group agreed to review data post-1991 in its assessment of management performance. IPHC staff provided a historical overview of bycatch in commercial halibut fisheries for all management areas. Bycatch in Areas 2A, 2B, and 2C exhibited significant declines since the mid-1990s, whereas Areas 3A and 3B have remained fairly level, and a slight decline was shown for Area 4 during this time period.

Each area representative provided an overview of its management structure and process, the different commercial fisheries encountering halibut, and recent regulatory actions. For Area 2A, I described the Council's catch sharing plan and management structure for the different fisheries, and the halibut individual bycatch quota provisions adopted through Amendments 20 and 21. Both Canada and Alaska commended 2A for the actions taken to reduce halibut bycatch in the trawl fishery and for the conservation aspects of the Council's Trawl Rationalization program.

IPHC staff gave a presentation on how bycatch in areas particularly in the west could affect yield in areas to the east given the recent study on migratory patterns. While bycatch may be a contributing factor, there are many other factors to consider, so it is difficult to determine the amount of yield affected. Staff also presented different alternatives relative to incorporation of bycatch into the management process; however, the HBWG did not have sufficient time at this meeting to discuss this topic and complete all of its tasks. As a follow-up, each area was asked to write a description of current management and planned, future management changes relative to bycatch reduction, which will be presented at the Interim Meeting. The HBWG will have a conference call in late September to review progress on those reports and will meet in early December to further discuss how to incorporate bycatch mortality into halibut management.

INITIAL CONSIDERATION OF PROPOSED CHANGES TO PACIFIC HALIBUT ALLOCATION FOR BYCATCH AND CATCH SHARING IN THE GROUNDFISH FISHERIES

At its September 2007 meeting, the Council received a proposal to allow retention of Pacific halibut caught in fixed gear sablefish fisheries in the Port Orford area. The Council took no action on the proposal, but did state its intent to consider halibut bycatch retention on a broader scale. This agenda item provides an opportunity to explore allocation and other issues associated with bycatch retention and to consider a process for developing formal proposals for retention of halibut bycatch in fixed gear groundfish fisheries. Given the potential nature of allocation issues, it is not anticipated that proposals would be solely handled through the annual Catch Sharing Plan (CSP) modification process. The decisions at this initial stage include whether to consider this issue further, and if so, to determine scoping issues for pursuing alternatives for halibut bycatch retention in groundfish fisheries.

The Oregon Department of Fish and Wildlife (ODFW) has developed a report (Agenda Item D.3.b, ODFW Report) outlining current fleet characteristics and halibut mortality issues, some possible alternatives for retention of halibut in fixed gear groundfish fisheries, and a decision process to consider alternatives. The Washington Department of Fish and Wildlife (WDFW) has developed another report (Agenda Item D.3.b, WDFW Report), which reviews the history of the directed non-Indian halibut fishery and halibut retention in the fixed gear sablefish fishery north of Point Chehalis.

Agenda Item G.6.a, Attachment 1, the Council's preliminary year-at-a-glance summary of potential agenda items for workload planning purposes, shows a possible Council meeting schedule that is timed to reach a final decision on this matter, should the Council decide to do so, consistent with the International Pacific Halibut Commission annual process for 2010 fisheries.

Council Action:

1. **Provide guidance on consideration of proposals for halibut bycatch retention.**
2. **Determine scope of issues to be considered, if appropriate.**
3. **Recommend schedule for completing a final decision process, if appropriate.**

Reference Materials:

1. Agenda Item D.3.b, ODFW Report: Initial Consideration of Proposed Changes to Pacific Halibut Allocation for Bycatch and Catch Sharing in the Groundfish Fisheries.
2. Agenda Item D.3.b, WDFW Report: Washington Department of Fish and Wildlife Report on Changes to Halibut Allocation for Bycatch and Catch Sharing.
3. Agenda Item D.3.c, Public Comment.

Agenda Order:

a. Agenda Item Overview **Chuck Tracy**
b. Reports and Comments of Advisory Bodies and Management Entities
c. Public Comment
d. **Council Action**: Consider the Proposed Changes and Plan Further Actions as Appropriate

PFMC
08/26/10

Initial Consideration of Proposed Changes to Pacific Halibut Allocation for Bycatch and Catch Sharing in the Groundfish Fisheries

In 2006, the Port Orford Ocean Resource Team (POORT) asked the Pacific Fisheries Management Council (PFMC) to consider changing the halibut catch sharing plan (CSP), to allow all or a portion of the 2A commercial Pacific halibut quota to be retained as bycatch in the sablefish longline fishery (Agenda Item G.1.d, Supplemental Public Comment, September 2006). The Oregon Department of Fish and Wildlife has since received additional requests to explore this proposed change to the halibut CSP for the fixed-gear sablefish fishery north of 36° N lat and south of Pt. Chehalis, WA. Currently, vessels authorized to participate in the primary sablefish fishery north of Pt. Chehalis are allowed to retain halibut bycatch within certain limitations (see below).

The purpose of this report is to provide the Council with information to determine whether this proposed change to the halibut CSP south of Pt. Chehalis should move forward for further analysis and consideration. Herein, we provide some background on the commercial directed halibut and fixed-gear sablefish fisheries. We seek guidance from the Council to determine whether this proposed measure can and should be pursued.

Directed Commercial Pacific Halibut Fishery

The directed commercial halibut fishery has been reduced to less than five-fishing days per year in Area 2A, since 2002. Figure 1 shows Area 2A directed commercial halibut fishery harvest in pounds and the number of days open to directed commercial halibut fishing from 1980-2010. In 1990, there were four 12-hour openings, rather than 24-hour openings. Beginning in 1991, the fishery was restricted to bi-weekly 10-hour openings. Since 2000, the number of 10-hour openings per year has ranged from one to six with an average of 3.5 openings per year. There were two 10-hour openings in 2009 and only one 10-hour opening in 2010. This directed commercial fishery is annually allocated 31.7% of the non-tribal Pacific halibut quota. The commercial fishery allocation is then split with 85% provided to the directed commercial fishery, and 15% to the salmon troll incidental fishery (Table 1).

Table 1. Area 2A Total Allowable Catch (TAC) and commercial allocations 2000-2010.

Year	2A TAC (lbs)	Allocations (lbs)				
		Non-Tribal (65% of TAC)	**Commercial** (31.7% of Non-Tribal)	**Directed** (85% of Commercial)	**Salmon Troll** (15% of Commercial)	**Incidental Sablefish N of Pt. Chehalis** [1]
2000	830,000	514,500	163,097	138,632	24,464	
2001	1,140,000	716,000	226,972	192,926	34,046	47,946
2002	1,310,000	826,500	262,001	222,700	39,300	88,389
2003	1,310,000	826,500	262,001	222,700	39,300	70,000
2004	1,480,000	937,000	297,029	252,475	44,554	70,000
2005	1,330,000	839,500	266,122	226,203	39,918	70,000
2006	1,380,000	872,000	276,424	234,960	41,464	70,000
2007	1,340,000	846,000	268,182	227,955	40,227	70,000
2008	1,220,000	793,000	251,381	213,674	37,707	70,000
2009	950,000	617,500	195,748	166,385	29,362	11,895
2010	810,000	526,500	166,901	141,865	25,035	0

[1] If the Area 2A TAC is greater than 900,000 lbs, the primary directed sablefish fishery north of Pt. Chahalis will be allocated the WA sport allocation that is in excess of 214,110 lbs, provided a minimum of 10,000 lbs is available; up to 70,000 lbs.

Incidental halibut North of Point Chehalis

The current halibut CSP contains a provision for retention of incidental halibut catch in the fixed-gear sablefish fishery north of Pt. Chehalis. If the Area 2A total allowable catch (TAC) is greater than 900,000 pounds, the primary directed sablefish fishery north of Point Chehalis will be allocated a portion of the Washington sport allocation (Table 1). The PFMC recommends landing restrictions at its spring public meeting each year to control the amount of halibut caught incidentally in this fishery (Table 2). *WDFW will be submitting an additional report with background and history of how this fishery came about.*

Table 2. The allocation, total harvest, landing restrictions, and season dates for the incidental halibut catch in the fixed-gear sablefish fishery north of Point Chehalis, 2001-2009 (Agenda Item F.2.a. Attachment 1, March 2009). Pacific halibut landings were restricted to 100 pounds per trip for this sablefish fishery during 2009.

Incidental Halibut Management in the Area 2A Sablefish Fishery North of Point Chehalis, Washington

Pounds of Halibut			Restrictions	
Year	Allocation	Total Harvest	Halibut per Sablefish (dressed weight)	Season Dates
2001	47,946	26,945	2+80 lb per 1,000 lb	Aug.15-Oct.31
2002	88,389	66,599	2+150 lb per 1,000 lb	May 1-Oct.31
2003	70,000	65,325	2+150 lb per 1,000 lb	May 1-Oct.31
2004	70,000	67,837	2+100 lb per 1,000 lb	May 1-Oct.31
2005	70,000	68,013	2+100 lb per 1,000 lb	May 1-Oct.23
2006	70,000	64,624	2+100 lb per 1,000 lb	May 1-Oct.31
2007	70,000	45,780	2+100 lb per 1,000 lb	May 1-Oct.31
2008	70,000	39,729	2+100 lb per 1,000 lb	May 1-Oct.31
2009	11,895	6,154	100 lb per trip	May 1-Oct.31
2010	N/A	-	-	-

Limited Entry and Open Access Fixed Gear Sablefish Fishery (North of 36° N latitude and South of Pt. Chehalis

The limited entry sablefish fishery north of 36° N latitude consists of the limited entry fixed gear vessels with or without fixed gear sablefish endorsements. Those vessels that hold a sablefish endorsement are allowed to fish in the primary sablefish fishery to attain their tier-limit beginning April 1 and ending October 31. When fishing outside of the primary season, or once a vessel catches its tier limit, then that vessel is subject to restrictions under the limited entry fixed gear "daily trip limit" (DTL) regulations. Limited entry fixed gear vessels without sablefish endorsements may only fish sablefish under the limited entry fixed gear "daily trip limit" landing restrictions. Finally, open access vessels are also permitted to land sablefish under open access fixed gear "daily trip limit" landing restrictions.

Even though the limited entry fixed gear fishery is managed as a unit north of 36° N latitude, only catches north of 40° 10' will likely contain appreciable quantities of halibut. Hence, we describe the fixed gear fishery north of 40° 10' N latitude (Tables 3, 4, and 5). Eighty fixed-gear vessels fished sablefish during 2009 with sablefish endorsements, whereas 156 open-access fixed gear vessels targeted sablefish (Table 3). Note that north of 40° 10', almost all limited entry vessels that targeted sablefish carried sablefish endorsements; only 17-sablefish landings were

identified for limited entry vessels that did not carry sablefish endorsements (Table 4), representing three vessels (Table 3).

Sablefish landings for fixed gear vessels are shown for the entire year of 2009 (Table 4) and for the period of the primary season (April 1 – October 31; Table 5). North of 40° 10', approximately 90% of the sablefish landings by LEFG-permitted vessels occurred during the primary season, whereas approximately 2/3 of the OAFG landings occurred during the primary season (Tables 4 and 5). Most LEFG-sablefish landings occurred in Port Orford (N = 289), Newport (N = 189), and Eureka (N = 134); appreciable sablefish landings were also observed in other ports such as Neah Bay, La Push, and Crescent City for LEFG-sablefish vessels. For the OAFG-sablefish DTL fishery, most landings occurred in Port Orford (N = 357), Coos Bay (N = 317), Eureka (N = 148) and Newport (N = 125).

Table 3. Number of commercial-permitted vessels that made landings during January 1 – December 31, 2009 for Pacific halibut, limited entry fixed gear (LEFG) with sablefish endorsement (LEFG-sable endorsed), LEFG – sable without endorsement (LEFG-not endorsed) and open access fixed gear sablefish (OAFG-sable) north of 40° 10' N lat. Halibut represents number of permits. The three sablefish categories represent permitted vessels that made sablefish landings.

	Halibut	LEFG-sable_endorsed[a]	LEFG-not sable endorsed	OAFG-sable	Total
Halibut	106	18		73	197
LEFG-sable endorsed		62			62
LEFG-not endorsed			3		3
OAFG-sable				83	83
Total	106	80	3	156	

[a]Vessels that were reported to hold both OAFG-sable and LEFG-sable permits were tallied under the LEFG-sable_endorsed column.

Table 4. Number of sablefish landings by port during January 1 – December 31 2009 for limited entry fixed gear (LEFG) vessels with sablefish endorsements (LEFG-sable endorsed), LEFG vessels without sablefish endorsements (LEFG-not endorsed) and open access fixed gear vessels (OAFG-sable). Only landings north of 40° 10' N latitude are shown. Only 17 landings were made for LEFG without sablefish endorsements, and are therefore not shown in the table.

Port	LEFG-sable_endorsed[a]	LEFG-not sable endorsed[b]	OAFG-sable
Bellingham Bay	47		--
Neah Bay / Port Angeles	86		13
La Push	65		37
Westport	53		26
Illwaco / Willapa Bay	49		120
Astoria / Tilamook	49		55
Newport / Winchester Bay / Florence	189		125
Coos Bay	49		317
Port Orford	289		357
Brookings	24		20
Crescent City/Trinidad	63		68
Eureka	134		148
Total	**1,097**	**17**	**1,519**

[a]Vessels that were reported to hold both OAFG-sable and LEFG-sable permits were tallied under the LEFG-sable_endorsed column.
[b]Landings by LEFG vessels that were not endorsed are not shown by port because of confidentiality reasons (i.e., fewer than 3 vessels per port).

Table 5. Number of sablefish landings by port during April 1 – October 31 2009 for limited entry fixed gear (LEFG) vessels with sablefish endorsements (LEFG-sable endorsed), LEFG vessels without sablefish endorsements (LEFG-not endorsed) and open access fixed gear vessels (OAFG-sable). Only landings north of 40° 10' N latitude are shown. No landings were made for LEFG without sablefish endorsements.

Port	LEFG-sable_endorsed[a]	LEFG-not sable endorsed	OAFG-sable
Bellingham Bay	46		--
Neah Bay / Port Angeles	61		13
La Push	51		23
Westport	48		23
Illwaco / Willapa Bay	47		120
Astoria / Tilamook	46		51
Newport / Winchester Bay / Florence	177		110
Coos Bay	49		252
Port Orford	196		255
Brookings	23		20
Crescent City/Trinidad	62		64
Eureka	97		123
Total	**903**		**1,054**

[a]Vessels that were reported to hold both OAFG-sable and LEFG-sable permits were tallied under the LEFG-sable_endorsed column.

Directed Commercial Pacific Halibut Fleet Characteristics

A total of 197 vessels were permitted for the Pacific halibut directed commercial fishery during 2009 (Table 3). Only 18 of those vessels also carried LEFG-sablefish endorsements. Seventy three of the 197 halibut-permitted vessels fished in the OAFG-DTL fishery. Most vessels that carried permits for the directed commercial Pacific halibut fishery did not participate in any sablefish fishery during 2009 (N = 106).

Halibut Discards in the Fixed Gear Fisheries

The West Coast Groundfish Observer Program (WCGOP) was established in 2001 and requires all commercial vessels that land groundfish caught in the United States exclusive economic zone (EEZ) to carry an observer when instructed by NMFS. When Pacific halibut are encountered by an observer, a random sample is selected and length and viability are recorded (NWFSC, 2008). A report by Heery and Bellman (2009) estimated the total discard mortality of Pacific halibut in the 2002-2008 non-nearshore fixed gear fisheries ranged from 51,000 to 236,000 pounds annually (Table 6). Most halibut bycatch was shown for the LE sablefish primary fishery. Discard in the LE non-primary sector was low relative to the primary fishery; the largest annual gross discard estimate of 2.6 mt occurred in 2008 with longline gear (Heery and Bellman 2009). Most discard estimates for the OA fixed gear fishery are shown as zero largely because the WCGOP observed trips in California that were beyond the range of Pacific halibut. The WCGOP therefore deemed these early halibut-discard estimates inappropriate (Heery and Bellman, 2009).

Table 6. Estimated discard mortality (mt and lbs) from each sector of the non-nearshore fixed gear fishery from 2002 through 2008 (modified from Heery and Bellman, 2009)

		Estimated discard mortality			
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	*mt*	*23.1*	*0.0*	*0.0*	*23.1*
	lbs	50,927	0	0	50926.7
2003	*mt*	*32.5*	*0.0*	*0.0*	*32.5*
	lbs	71,650	0	0	71,650
2004	*mt*	*39.5*	*0.0*	*0.0*	*39.5*
	lbs	87,082	0	0	87,082
2005	*mt*	*36.6*	*0.0*	*0.0*	*36.6*
	lbs	80,689	0	0	80,689
2006	*mt*	*106.9*	*0.0*	*0.0*	*106.9*
	lbs	235,674	0	0	235,674
2007	*mt*	*21.0*	*0.2*	*2.9*	*24.1*
	lbs	46,297	441	6,393	53,131
2008	*mt*	*39.3*	*0.4*	*6.6*	*46.3*
	lbs	86,642	882	14,550	102,074

The WCGOP provided estimates of the proportion of Pacific halibut larger than 80 cm and less than or equal to 80 cm total length (Table 7). Heery and Bellman (2009) provide a number of caveats on how this data was attained and calculated, and should be consulted prior to making any formal

allocations using data. Nonetheless, we applied these proportions to the annual discard weights (lbs) shown in Table 6 to estimate the mortality of legal versus sublegal halibut discarded in the non-nearshore fixed gear fisheries (Table 8). This estimation procedure is not precise because Table 7 splits length at 80 cm whereas the legal-retention length is 82 cm. Taking into account the assumptions and estimations made in the calculations for Table 8, with the exception of 2006, the LE fixed-gear sablefish primary fishery has resulted in 15,000 - 30,000 lbs (6.8 - 13.6 mt) of legal-sized halibut discard mortality.

Table 7. Number and percentage of sampled Pacific halibut lengths by size (from Heery and Bellman, 2009).

	Pacific halibut lengths	
	Number	Percentage
Actual Length		
< 80cm	56	66.7%
≥ 80 cm	28	33.3%
Visual Estimate		
0-74 cm	3,196	38.6%
75-84 cm	1,887	22.8%
85-150 cm	3,200	38.6%

Table 8. Estimated legal and sub-legal discard mortality (in pounds) for the LE sablefish primary, LE sablefish non-primary and OA fixed gear fisheries, 2002-2008.

		Estimated discard mortality (legal vs sub-legal) in lbs.			
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	sub	33,968	0	0	33,968
	legal	16,959	0	0	16,959
2003	sub	47,791	0	0	47,791
	legal	23,859	0	0	23,859
2004	sub	58,084	0	0	58,084
	legal	28,998	0	0	28,998
2005	sub	53,820	0	0	53,820
	legal	26,869	0	0	26,869
2006	sub	157,194	0	0	157,194
	legal	78,479	0	0	78,479
2007	sub	30,880	294	4,264	35,439
	legal	15,417	147	2,129	17,693
2008	sub	57,790	588	9,705	68,083
	legal	28,852	294	4,845	33,991

Items for Consideration

There are many issues the Council should consider if the choice is to move forward with developing alternatives for allowing incidental halibut retention in the sablefish fishery. Below is a bulleted list of some of the decisions points that would need to be included:

- Which fisheries will be allowed to retain incidental halibut (LE sablefish primary, LE sablefish non-primary, and/or OA fixed gear sablefish)?
- Season structure.
- Season dates (e.g., throughout the year or only during the primary season).
- Amount of Pacific halibut allocated for the retention of incidental catch (e.g., the entire directed commercial allocation or something smaller).
- Trip limit structure.
- Who will track landings?
- Who and how will biological data be collected from these landings?
- Can/will processors purchase and process small amounts of halibut over the course of the season rather than large quantities over short periods of time?

Council Action

As stated previously, the purpose of this report is to provide the Council with information to determine whether this proposed change to the halibut CSP south of Pt. Chehalis should move forward for further analysis and consideration.

References

Heery, E., and M.A. Bellman. 2009. Observed and Estimated Total Discard of Pacific Halibut in the 2002-2008 U.S. West Coast Groundfish Non-Nearshore Fixed Gear Fishery. NWFSC, 2725 Montlake Blvd. E., Seattle, WA 98112.

Northwest Fisheries Science Center (NWFSC). 2008. West Coast Groundfish Observer Program Training Manual. NOAA, West Coast Groundfish Observer Program. Northwest Fisheries Science Center, 2725 Montlake Blvd E, Seattle, WA.

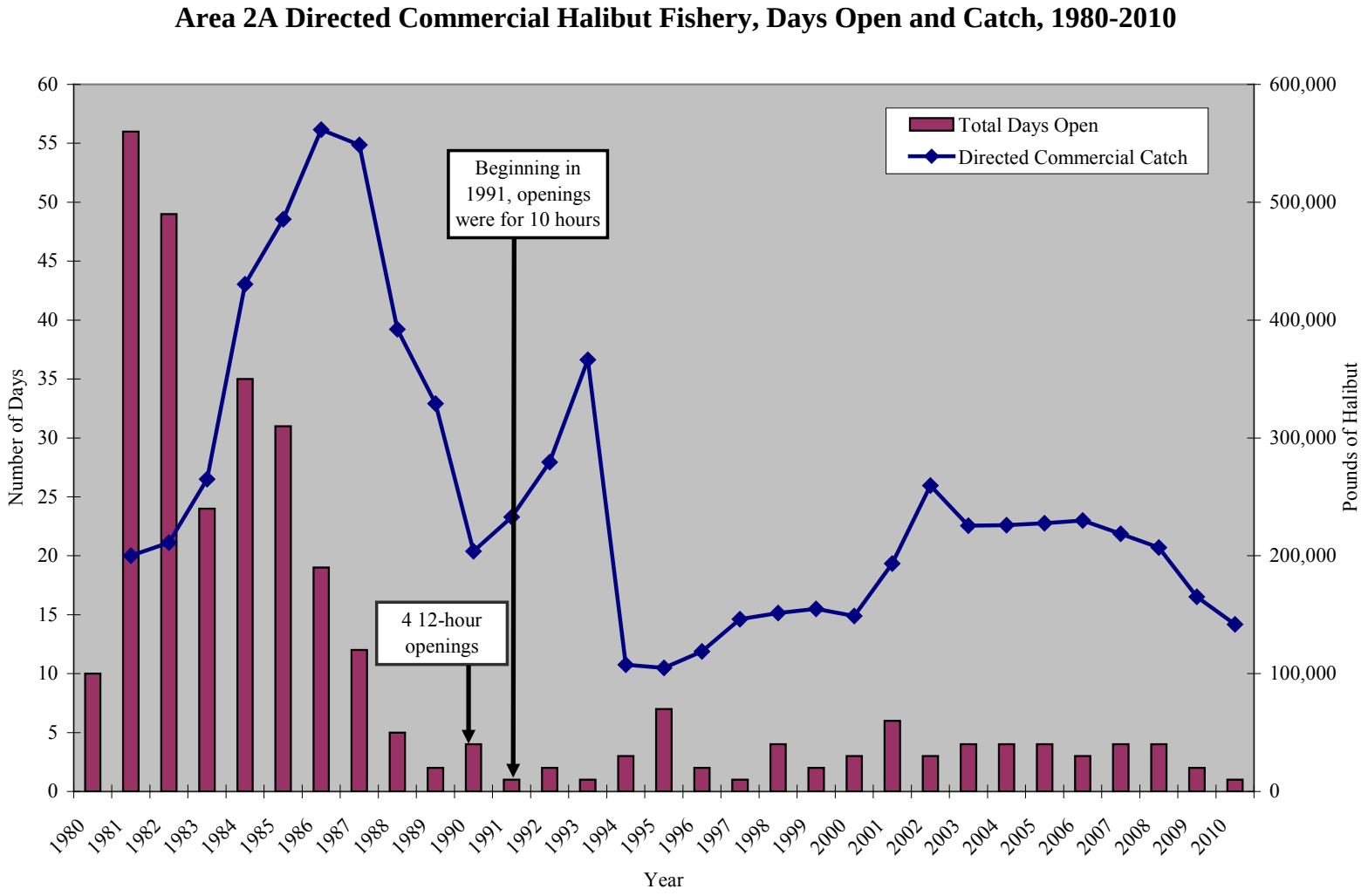


Figure 1. Area 2A directed commercial fishery catch and total number of days with an opening, 1980-2010.

GROUNDFISH ADVISORY SUBPANEL REPORT ON INITIAL CONSIDERATION OF PROPOSED CHANGES TO PACIFIC HALIBUT ALLOCATION FOR BYCATCH AND CATCH SHARING IN THE GROUNDFISH FISHERIES

The Groundfish Advisory Subpanel (GAP) discussed Initial Consideration of Proposed Changes to Pacific Halibut Allocation for Bycatch and Catch Sharing in the Groundfish Fisheries and wishes to make the following recommendations.

The GAP moved the following motion on a vote of 8 to 6:
The GAP supports consideration of proposals for halibut bycatch retention. Those supporting the motion discussed the need to have a broader discussion of the allocation and retention of halibut that may include a discussion of trawl concerns. Some discussion centered on reallocating the allocation of halibut currently used in the directed longline fishery to be used not only for the sablefish fixed gear fisheries to accommodate bycatch, but also to accommodate the need for halibut bycatch in the upcoming trawl ITQ fishery.

Those opposed to the motion expressed that the intent of the this agenda item was to give advice to the Council relative to the Port Orford proposal. It was pointed out that the motion that was made could direct the Council into a new allocation discussion for all user groups including recreational, fixed gear, and trawl, as well as treaty allocations. Those in opposition did not feel this was the discussion the Council intended.

The GAP further entertained a motion to support moving the Port Orford proposal for analysis. The motion failed on a vote of 8 to 6.
The majority felt that the proposal does not provide enough benefit to warrant Council analysis. The concerns that this proposal generates are as follows:

1. There would be an allocation from those who currently participate in the directed halibuit fishery. Those participants only choice to fish halibut would be to own or lease a sablefish LE tier permit or participate in the open access daily trip limit fishery.
2. It is not clear if this action would actually stimulate targeting by allowing halibut retention.
3. In table 3 of the Oregon situational paper there would be potentially 62 additional LE sablefish-endorsed permits and 83 existing open access participants that would share this new allocation. The bycatch implication to this would need to be addressed and is considered a potential problem by some members of the GAP.
4. Since open access participation is unlimited, the ability to access halibut in the daily trip limit fishery would likely increase effort in the fishery resulting in more catch impacts.

Those in favor of the motion had the following comments:

1. The current 10 hour directed fishery is becoming an unreasonable fishery to harvest a high valued species like halibut. A bycatch fishery would spread the delivery of halibut and help provide a higher potential price.

2. The future prospects for the derby are poor in that harvest limits are likely to be lower, resulting in even more safety and quality problems than there are currently.
3. It was believed that the Port Orford proposal would lower the overall bycatch and mortality of halibut in sablefish fisheries by moving the current directed allocation of halibut to be taken as a bycatch with sablefish.

PFMC
09/12/10

INTERNATIONAL PACIFIC HALIBUT COMMISSION

ESTABLISHED BY A CONVENTION BETWEEN CANADA

AND THE UNITED STATES OF AMERICA

DIRECTOR
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September 9, 2010

Mr. Mark Cedergreen, Chair
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, OR 97220-1384

Re: September 2010 Meeting, Agenda Item D.3: Halibut Catch Sharing Plan considerations

Dear Mark,

The staff of the International Pacific Halibut Commission has reviewed the Situation Summary and ODFW Report for the Initial Consideration of Proposed Changes to Pacific Halibut Allocation for Bycatch and Catch Sharing in the Groundfish Fisheries. Allocation among users is clearly the purview of the Council and not the Commission. However, we recommend that, should the Council consider allowing retention of legal-sized, incidentally caught halibut within the hook and line groundfish fisheries, such retention be handled solely within the Council's Halibut Catch Sharing Plan (CSP), where all other retained harvests are managed. To allow any retention of halibut outside the framework of the CSP would impede both the Commission's and the Council's management goals for Pacific halibut.

In addition, we note issues with the data provided in the ODFW Report. Table 3 provides the number of halibut permits issued for the commercial fishery and those that made sablefish landings. For 2009, our records indicate that IPHC issued 238 commercial vessel licenses which allowed a vessel to fish in the directed commercial halibut fishery and the incidental halibut fishery during the limited entry sablefish fishery, north of Point Chehalis. It is not clear how the numbers in Table 3 were derived and we have not been able to confirm them with our permit data. It is also difficult to evaluate the impacts of various landings when the weight of fish landed (halibut or sablefish) is not presented. The Commission typically uses the weight of halibut landed as the common metric for understanding the impacts of removals. Additionally, Table 6 provides estimated discard mortality in metric tons and pounds, which we assume are in units of round weight. However, halibut catch limits and all reporting by the Commission is typically in units of net weight (0.75 x round weight). If the Council chooses to consider this proposal in greater detail, Commission staff can work with Council or agency staff to provide halibut data or verify any of the data in future reports.

The last section of the ODFW report provides a list of items for Council discussion and consideration, and one item is season dates. The IPHC sets commercial fishery season dates,

with the Council and NMFS adopting more restrictive commercial fishing dates, where necessary. Proposals for season dates can and are regularly made to the Commission. However, harvesters should be aware that the season dates are ultimately determined by the Commission.

Gregg Williams from our staff will be attending the September meeting and would be pleased to address any questions the Council may have on this matter.

Sincerely,

Bruce

Bruce M. Leaman
Executive Director

cc: Commissioners

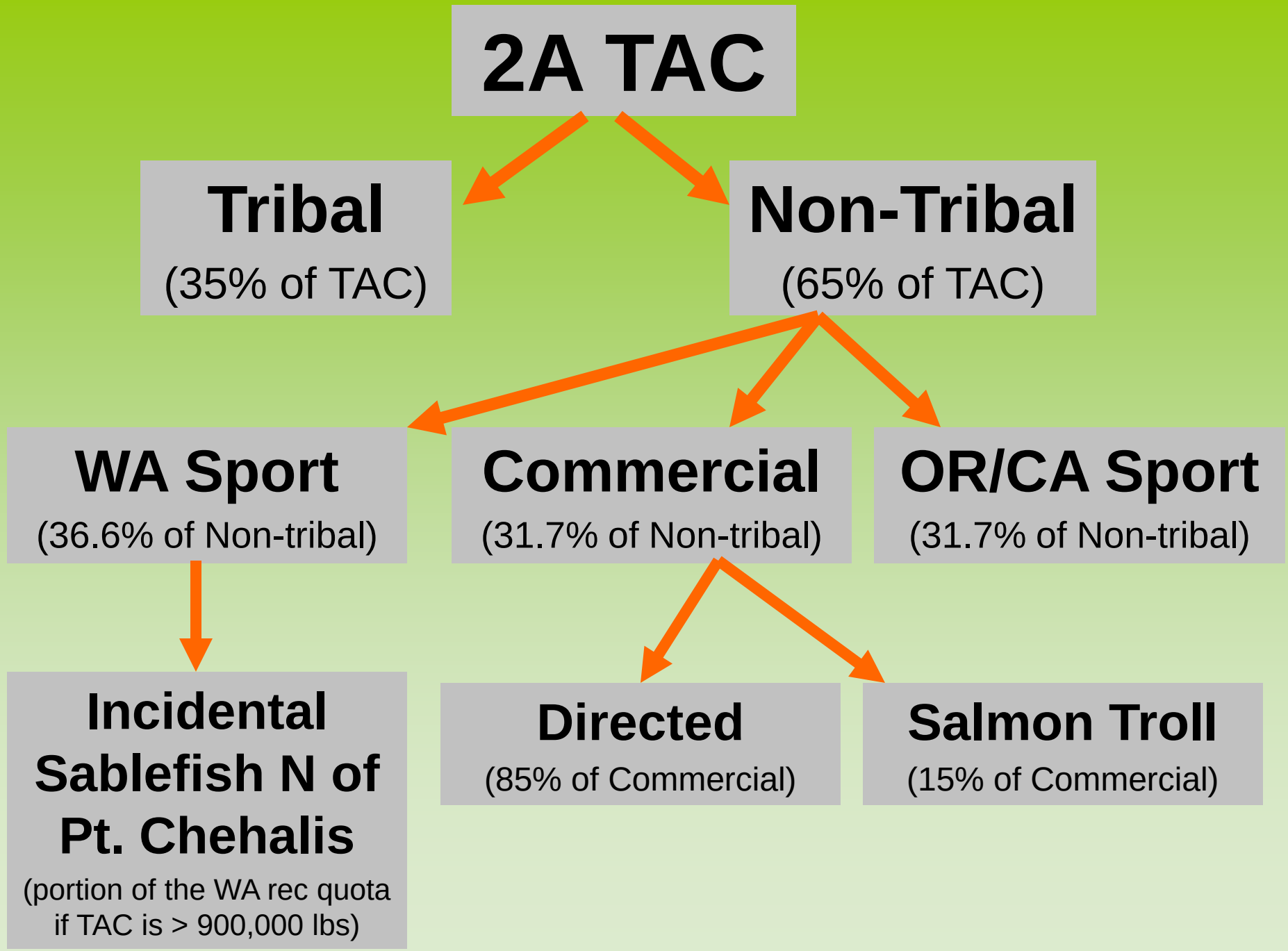
Agenda Item D.3.b
Supplemental ODFW PowerPoint
September 2010

Initial Consideration of Proposed Changes to Pacific Halibut Allocation for Bycatch and Catch Sharing in the Groundfish Fisheries

Purpose

- Not intended to be full scoping of issue
- Provide background to the Council to determine if this should go forward
  - Fishery regulations, quotas and open periods
  - Fleet characteristics
- Estimate of total bycatch from the fixed gear fisheries
- Things to consider if this moves forward

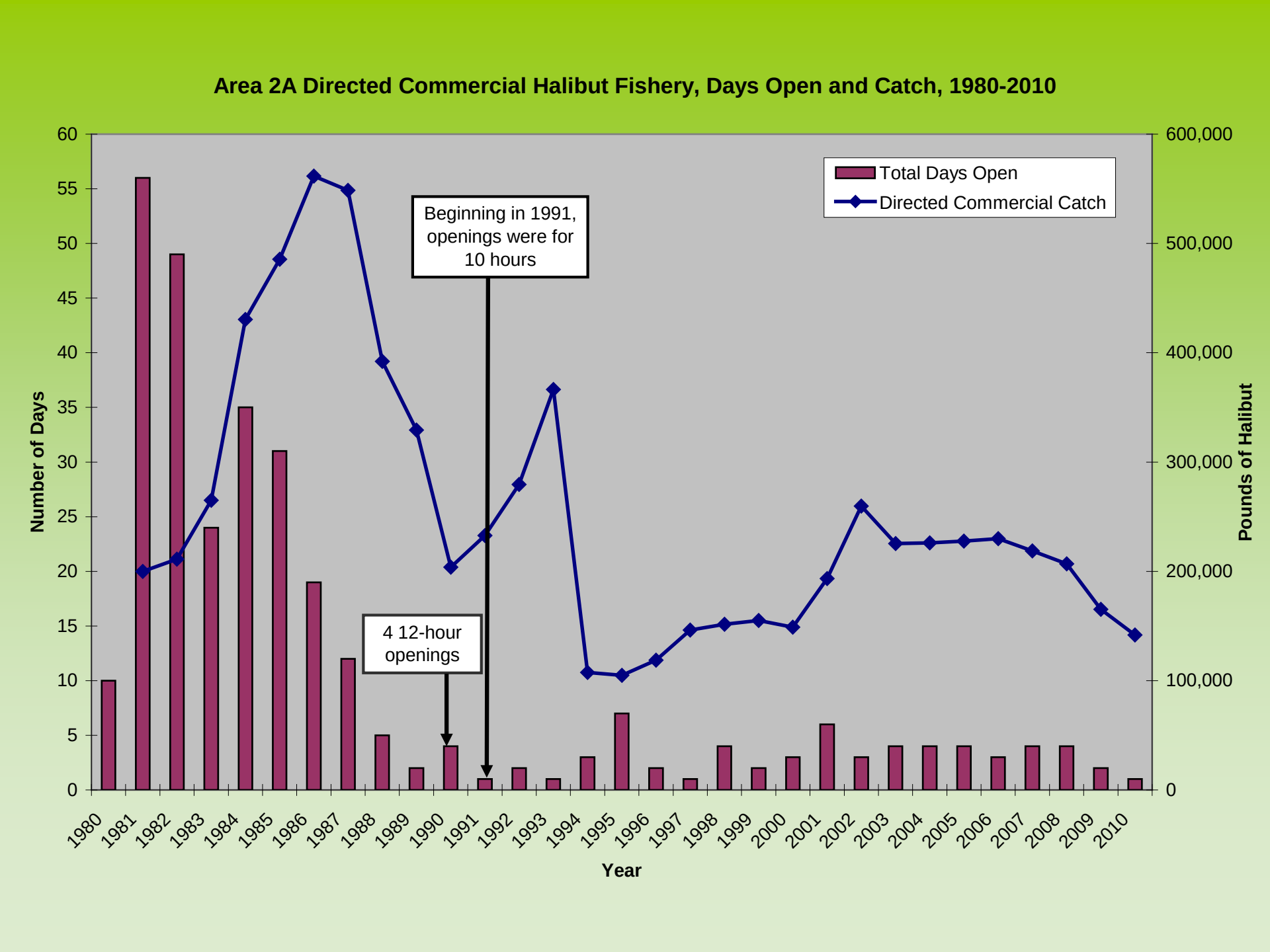
Background


2A TAC
Tribal
(35% of TAC)
Non-Tribal
(65% of TAC)
WA Sport
(36.6% of Non-tribal)
Commercial
(31.7% of Non-tribal)
OR/CA Sport
(31.7% of Non-tribal)
Incidental Sablefish N of Pt. Chehalis
(portion of the WA rec quota if TAC is > 900,000 lbs)
Directed
(85% of Commercial)
Salmon Troll
(15% of Commercial)

Area 2A Total Allowable Catch (TAC) and commercial allocations 2000-2010

Year	2A TAC (lbs)	Allocations (lbs)				
		Non-Tribal (65% of TAC)	**Commercial** (31.7% of Non-Tribal)	**Directed** (85% of Commercial)	**Salmon Troll** (15% of Commercial)	**Incidental Sablefish N of Pt. Chehalis** [1]
2000	830,000	514,500	163,097	138,632	24,464	
2001	1,140,000	716,000	226,972	192,926	34,046	47,946
2002	1,310,000	826,500	262,001	222,700	39,300	88,389
2003	1,310,000	826,500	262,001	222,700	39,300	70,000
2004	1,480,000	937,000	297,029	252,475	44,554	70,000
2005	1,330,000	839,500	266,122	226,203	39,918	70,000
2006	1,380,000	872,000	276,424	234,960	41,464	70,000
2007	1,340,000	846,000	268,182	227,955	40,227	70,000
2008	1,220,000	793,000	251,381	213,674	37,707	70,000
2009	950,000	617,500	195,748	166,385	29,362	11,895
2010	810,000	526,500	166,901	141,865	25,035	0

[1] If the Area 2A TAC is greater than 900,000 lbs, the primary directed sablefish fishery north of Pt. Chahalis will be allocated the WA sport allocation that is in excess of 214,110 lbs, provided a minimum of 10,000 lbs is available; up to 70,000 lbs.


Area 2A Directed Commercial Halibut Fishery, Days Open and Catch, 1980-2010
Total Days Open
Directed Commercial Catch
Beginning in 1991, openings were for 10 hours
4 12-hour openings
Number of Days
Pounds of Halibut
Year
0
5
10
15
20
25
30
35
40
45
50
55
60
0
100,000
200,000
300,000
400,000
500,000
600,000
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010

The allocation, total harvest, landing restrictions, and season dates for the incidental halibut catch in the fixed-gear sablefish fishery north of Point Chehalis, 2001-2010

Incidental Halibut Management in the Area 2A Sablefish Fishery North of Point Chehalis, WA

Pounds of Halibut			Restrictions	
Year	Allocation	Total Harvest	Halibut per Sablefish (dressed weight)	Season Dates
2001	47,946	26,945	2+80 lb per 1,000 lb	Aug.15-Oct.31
2002	88,389	66,599	2+150 lb per 1,000 lb	May 1-Oct.31
2003	70,000	65,325	2+150 lb per 1,000 lb	May 1-Oct.31
2004	70,000	67,837	2+100 lb per 1,000 lb	May 1-Oct.31
2005	70,000	68,013	2+100 lb per 1,000 lb	May 1-Oct.23
2006	70,000	64,624	2+100 lb per 1,000 lb	May 1-Oct.31
2007	70,000	45,780	2+100 lb per 1,000 lb	May 1-Oct.31
2008	70,000	39,729	2+100 lb per 1,000 lb	May 1-Oct.31
2009	11,895	6,154	100 lb per trip	May 1-Oct.31
2010	N/A	-	-	-

The number of vessels and landings, and the amount of quota and catch for the incidental sablefish fishery north of Point Chehalis is described in the table below. **(taken from WDFW report)**

Year	# Vessels	# Landings	Quota	Catch	% of Quota
2010	0	0	0	0	---
2009	17	79	11,895	6,154	51.7%
2008	36	58	70,000	39,729	56.8%
2007	24	84	70,000	45,780	65.4%
2006	27	130	70,000	64,624	92.3%
2005	27	124	70,000	68,013	97.2%
2004	30	148	70,000	67,837	96.9%
2003	---	---	70,000	60,356	86.2%
2002	---	---	88,389	88,389	---
2001	---	---	47,946	47,946	---

(Note: Catches in 2001 and 2002 were included as part of the total non-tribal commercial landings.)

Number of commercial-permitted vessels that made landings during January 1 – December 31, 2009 for Pacific halibut, limited entry fixed gear (LEFG) with sablefish endorsement (LEFG-sable endorsed), LEFG – sable without endorsement (LEFG-not endorsed) and open access fixed gear sablefish (OAFG-sable) north of 40° 10’ N lat.

	Halibut	LEFG-sable endorsed[a]	LEFG-not sable endorsed	OAFG-sable	Total
Halibut	106	18		73	197
LEFG-sable endorsed[a]		62			62
LEFG-not sable endorsed			3		3
OAFG-sable				83	83
Total	106	80	3	156	345

[a]Vessels that were reported to hold both OAFG-sable and LEFG-sable permits were tallied under the LEFG-sable_endorsed column.

Number of sablefish landings by port during Jan 1 – Dec 31, 2009

- Only landings north of 40° 10' N latitude are shown.
- Only 17 landings were made for LEFG without sablefish endorsements, and are therefore not shown in the table.
- [a]Vessels that were reported to hold both OAFG-sable and LEFG-sable permits were tallied under the LEFG-sable_endorsed column.
- [b]Landings by LEFG vessels that were not endorsed are not shown by port because of confidentiality reasons (i.e., fewer than 3 vessels per port).

Port	LEFG-sable_endorsed[a]	LEFG-not sable endorsed[b]	OAFG-sable
Bellingham Bay	47		--
Neah Bay / Port Angeles	86		13
La Push	65		37
Westport	53		26
Illwaco / Willapa Bay	49		120
Astoria / Tilamook	49		55
Newport / Winchester Bay / Florence	189		125
Coos Bay	49		317
Port Orford	289		357
Brookings	24		20
Crescent City/Trinidad	63		68
Eureka	134		148
Total	1,097	17	1,519

Number of sablefish landings by port during Apr 1 – Oct 31, 2009

- Only landings north of 40° 10’ N latitude are shown
- No landings were made for LEFG without sablefish endorsements
- [a]Vessels that were reported to hold both OAFG-sable and LEFG-sable permits were tallied under the LEFG-sable_endorsed column.

Port	LEFG-sable_endorsed[a]	LEFG-not sable endorsed	OAFG-sable
Bellingham Bay	46		--
Neah Bay / Port Angeles	61		13
La Push	51		23
Westport	48		23
Illwaco / Willapa Bay	47		120
Astoria / Tilamook	46		51
Newport / Winchester Bay / Florence	177		110
Coos Bay	49		252
Port Orford	196		255
Brookings	23		20
Crescent City/Trinidad	62		64
Eureka	97		123
Total	903		1,054

Estimate of Total Bycatch in the Fixed Gear Fisheries

Estimated discard mortality (gross weight mt and lbs) from each sector of the non-nearshore fixed gear fishery from 2002 through 2009

		Estimated discard mortality (gross weight)			
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	*mt*	*23.1*	*0.0*	*0.0*	*23.1*
	lbs	50,927	0	0	50,927
2003	*mt*	*32.5*	*0.0*	*0.0*	*32.5*
	lbs	71,650	0	0	71,650
2004	*mt*	*39.5*	*0.0*	*0.0*	*39.5*
	lbs	87,082	0	0	87,082
2005	*mt*	*36.6*	*0.0*	*0.0*	*36.6*
	lbs	80,689	0	0	80,689
2006	*mt*	*106.9*	*0.0*	*0.0*	*106.9*
	lbs	235,674	0	0	235,674
2007	*mt*	*21.0*	*0.2*	*2.9*	*24.1*
	lbs	46,297	441	6,393	53,131
2008	*mt*	*39.3*	*0.4*	*6.6*	*46.3*
	lbs	86,642	882	14,550	102,074
2009	*mt*	*49.7*	*0.0*	*6.4*	*56.1*
	lbs	109,570	0	14,110	123,679

modified from Heery and Bellman, 2009 and Heery, Bellman and Majewski, 2010

Number and percentage of sampled Pacific halibut lengths by size

	Pacific halibut lengths	
	Number	Percentage
Actual Length		
< 80cm	56	66.7%
≥ 80 cm	28	33.3%
Visual Estimate		
0-74 cm	3,196	38.6%
75-84 cm	1,887	22.8%
85-150 cm	3,200	38.6%

From 2009 report

	Pacific halibut lengths	
	Number	Percentage
Actual Length		
< 80cm	88	63.8%
≥ 80 cm	50	36.2%
Visual Estimate		
0-74 cm	4,873	38.4%
75-84 cm	3,090	24.3%
85-150 cm	4,729	37.3%

From 2010 report

Information on how these estimates were made are available in the WCGOP documents, along with a number of caveats on the data.

Estimated legal and sub-legal discard mortality (gross weight) for the LE sablefish primary, LE sablefish non-primary and OA fixed gear fisheries, 2002-2009

		Estimated discard mortality (legal vs sub-legal) in lbs.			
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	sub	33,968	0	0	33,968
	legal	16,959	0	0	16,959
2003	sub	47,791	0	0	47,791
	legal	23,859	0	0	23,859
2004	sub	58,084	0	0	58,084
	legal	28,998	0	0	28,998
2005	sub	53,820	0	0	53,820
	legal	26,869	0	0	26,869
2006	sub	157,194	0	0	157,194
	legal	78,479	0	0	78,479
2007	sub	30,880	294	4,264	35,439
	legal	15,417	147	2,129	17,693
2008	sub	57,790	588	9,705	68,083
	legal	28,852	294	4,845	33,991
2009	sub	73,083	0	9,411	82,494
	legal	36,487	0	4,698	41,185

Estimated legal and sub-legal discard mortality (net weight) for the LE sablefish primary, LE sablefish non-primary and OA fixed gear fisheries, 2002-2009

New table, from ODFW supplemental report

		Estimated discard mortality (net weight lbs) *net weight = gross weight x 0.75*			
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	sub	25,476	0	0	25,476
	legal	12,719	0	0	12,719
2003	sub	35,843	0	0	35,843
	legal	17,895	0	0	17,895
2004	sub	43,563	0	0	43,563
	legal	21,749	0	0	21,749
2005	sub	40,365	0	0	40,365
	legal	20,152	0	0	20,152
2006	sub	117,896	0	0	117,896
	legal	58,860	0	0	58,860
2007	sub	23,160	221	3,198	26,579
	legal	11,563	110	1,597	13,270
2008	sub	43,342	441	7,279	51,062
	legal	21,639	220	3,634	25,493
2009	sub	54,812	0	7,058	61,871
	legal	27,365	0	3,524	30,889

Estimated legal and sub-legal total discards (net weight) for the LE sablefish primary, LE sablefish non-primary and OA fixed gear fisheries, 2002-2009

New table, from ODFW supplemental report

Previous table values divided by mortality rate (0.16)

Estimated total weight of discards (legal vs. sub-legal) in lbs.
(total weight = discard mortality/ discard mortality rate)

		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	sub	159,226	0	0	159,226
	legal	79,493	0	0	79,493
2003	sub	224,019	0	0	224,019
	legal	111,841	0	0	111,841
2004	sub	272,269	0	0	272,269
	legal	135,930	0	0	135,930
2005	sub	252,279	0	0	252,279
	legal	125,951	0	0	125,951
2006	sub	736,849	0	0	736,849
	legal	367,872	0	0	367,872
2007	sub	144,751	1,379	19,989	166,118
	legal	72,267	688	9,980	82,935
2008	sub	270,890	2,757	45,493	319,140
	legal	135,242	1,377	22,712	159,331
2009	sub	342,576	0	44,114	386,691
	legal	171,031	0	22,024	193,055

Items for Consideration by the Council when determining if this should go forward:

- Which fisheries will be allowed to retain incidental halibut
  - LE sablefish primary
  - LE sablefish non-primary
  - OA fixed gear sablefish
- Season structure
- Season dates
  - throughout the year
  - only during the primary season
- Amount of Pacific halibut allocated for the retention of incidental catch
  - the entire directed commercial allocation
  - something smaller

Items for Consideration by the Council when determining if this should go forward:

- Trip limit structure
- Who will track landings
- Who and how will biological data be collected from these halibut landings
- Can/will processors purchase and process small amounts of halibut over the course of the season rather than large quantities over short periods of time

Initial Consideration of Proposed Changes to Pacific Halibut Allocation for Bycatch and Catch Sharing in the Groundfish Fisheries-Part II

After submitting the initial Oregon Department of Fish and Wildlife (ODFW) report on this agenda item, ODFW staff had a discussion with staff from the International Pacific Halibut Commission (IPHC). During that discussion, it was determined that two more calculations needed to be done to the weights in Table 8 of the ODFW report (Agenda Item D. 3. September 2010) to determine the total net weight of discarded halibut: (1) converting weights from gross pounds to net pounds (gross pounds x 0.75) which is the "currency" of halibut allocations (Table 1); and (2) convert the total discard mortality to total discarded weight (discard mortality/mortality rate; Table 2).

Table 1. Estimated legal and sub-legal discard mortality net weight for the LE sablefish primary, LE sablefish non-primary and OA fixed gear fisheries, 2002-2009.

		Estimated discard mortality (net weight lbs) *net weight = gross weight x 0.75*			
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	sub	25,476	0	0	25,476
	legal	12,719	0	0	12,719
2003	sub	35,843	0	0	35,843
	legal	17,895	0	0	17,895
2004	sub	43,563	0	0	43,563
	legal	21,749	0	0	21,749
2005	sub	40,365	0	0	40,365
	legal	20,152	0	0	20,152
2006	sub	117,896	0	0	117,896
	legal	58,860	0	0	58,860
2007	sub	23,160	221	3,198	26,579
	legal	11,563	110	1,597	13,270
2008	sub	43,342	441	7,279	51,062
	legal	21,639	220	3,634	25,493
2009	sub	54,812	0	7,058	61,871
	legal	27,365	0	3,524	30,889

Table 2. Estimated legal and sub-legal total net weight of discards for the LE sablefish primary, LE sablefish non-primary and OA fixed gear fisheries, 2002-2009; mortality rate = 0.16.

Estimated <u>total weight</u> of discards (legal vs. sub-legal) in lbs. *(total weight = discard mortality/ discard mortality rate)*					
		LE Sablefish Primary	LE Sablefish Non-primary	OA Fixed Gear	All Sectors
2002	sub	159,226	0	0	159,226
	legal	79,493	0	0	79,493
2003	sub	224,019	0	0	224,019
	legal	111,841	0	0	111,841
2004	sub	272,269	0	0	272,269
	legal	135,930	0	0	135,930
2005	sub	252,279	0	0	252,279
	legal	125,951	0	0	125,951
2006	sub	736,849	0	0	736,849
	legal	367,872	0	0	367,872
2007	sub	144,751	1,379	19,989	166,118
	legal	72,267	688	9,980	82,935
2008	sub	270,890	2,757	45,493	319,140
	legal	135,242	1,377	22,712	159,331
2009	sub	342,576	0	44,114	386,691
	legal	171,031	0	22,024	193,055

PFMC
09/11/10

WASHINGTON DEPARTMENT OF FISH AND WILDLIFE REPORT ON CHANGES TO HALIBUT ALLOCATION FOR BYCATCH AND CATCH SHARING

The Washington Department of Fish and Wildlife (WDFW) would like to recount the history of the incidental halibut retention allowance in the primary sablefish fishery north of Point Chehalis, Washington, as the Council considers whether to allow retention of incidentally caught halibut in other fisheries.

In 1988, the Pacific Fishery Management Council operated under its first annual Pacific Halibut Catch Sharing Plan. Allocations through this plan were to four fishery groups—tribal fishery, non-tribal commercial fishery, Washington sport fishery, and Oregon/California sport fishery. At this time, WDFW recommended and the Council chose to allocate the non-tribal halibut quota for Washington for the primary benefit of the recreational fishery. Therefore, the directed commercial fishery was restricted to the area south of Point Chehalis.

In 1995, the non-tribal commercial fishery allocation was divided into two components—the directed fishery south of Point Chehalis and the incidental landing allowance in the salmon troll fishery. During this same time period, the Council considered a limited entry program for the sablefish fishery, which was ultimately never adopted. In the late 1990s, the Council developed alternatives for establishing the primary sablefish fishery using a tiered limit system. The final plan for the tiered limit system and permit stacking provisions was adopted by the Council in November 2000.

There were some fishers who believed that the initial halibut allocation was "unfair" to those who had traditionally commercially fished for halibut off northern Washington, either as a targeted fishery or as retention of incidental catch when targeting sablefish, which tend to intermingle with halibut. However, at the time the Catch Sharing Plan was first adopted, the Area 2A TAC had been about 500,000 lbs and it was acknowledged that, with a growing recreational fishery, it would be difficult to accommodate both sport and commercial fisheries. The 2A TAC remained fairly steady (i.e., 450,000-650,000 lbs) for ten years until 1998, when it increased to 820,000 lbs. With this higher TAC, some fishers thought that a Washington sport and incidental commercial fishery could both be accommodated.

This was addressed at the same Council meeting in November 2000 when WDFW recommended that, in years of higher halibut abundance, the Washington recreational allocation would be reduced to accommodate landings of incidental catches in the directed sablefish fishery north of Point Chehalis. Specifically, in years when the Area 2A TAC is greater than 900,000 lbs, the primary directed sablefish fishery north of Point Chehalis was to be allocated the Washington sport allocation that is in excess of 214,110 lbs, provided a minimum of 10,000 lbs is available (i.e., at least 224,110 lbs is allocated to the Washington sport fishery). This change to the Catch Sharing Plan was adopted by the Council and became effective in 2001.

In 2002, the Area 2A TAC increased to 1.31 million lbs and there was almost 90,000 lbs available for the incidental sablefish fishery. WDFW met with representatives from the primary

sablefish fishery and the recreational fishery and developed a compromise whereby the allocation would still occur in years of higher halibut abundance, but the amount of the allocation would be capped at 70,000 lbs. The amount above 70,000 lbs would be transferred back to the Washington sport fishery. This was agreeable to all and the primary sablefish fishermen indicated that, given the trend in the sablefish stock and the landing ratio applied, 70,000 lbs would likely accommodate most of their incidental catch.

From 2001 through 2009, participants in the primary sablefish fishery were allowed to retain incidental catches of halibut because the TAC in Area 2A was above 900,000 lbs in those years. However, in 2010, the 2A TAC decreased to 810,000 lbs, so there was no allocation made to accommodate incidental catches in the sablefish fishery. The number of vessels and landings, and the amount of quota and catch for the incidental sablefish fishery north of Point Chehalis is described in the table below.

Year	# Vessels	# Landings	Quota	Catch	% of Quota
2010	0	0	0	0	---
2009	17	79	11,895	6,154	51.7%
2008	36	58	70,000	39,729	56.8%
2007	24	84	70,000	45,780	65.4%
2006	27	130	70,000	64,624	92.3%
2005	27	124	70,000	68,013	97.2%
2004	30	148	70,000	67,837	96.9%
2003	---	---	70,000	60,356	86.2%
2002	---	---	88,389	88,389	---
2001	---	---	47,946	47,946	---

(Note: Catches in 2001 and 2002 were included as part of the total non-tribal commercial landings.)

The sablefish fishery extends from April 1 through October 31 with associated halibut landings allowed beginning in May. Fishers are subject to a landing ratio of halibut (lbs) to sablefish (lbs) with up to two additional halibut per fishing trip to provide some flexibility in complying with the regulation. These annual ratios are adopted through the Council process in March.

Since 1995, three types of annual licenses from the International Pacific Halibut Commission (IPHC) have been issued for Area 2A fisheries: 1) a directed commercial/incidental license for the primary sablefish fishery north of Pt. Chehalis; 2) an incidental commercial salmon troll license; and 3) a charter license. Vessels participating in the directed commercial fishery cannot retain incidental halibut in the salmon troll fishery nor participate in the recreational halibut fishery; however, vessels may participate in both the incidental sablefish fishery and the directed commercial fishery, but not on the same trip.

Port Orford Ocean Resource Team

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August 20, 2010

Mr. Mark Cedergreen, Chairman
Pacific Fishery Management Council
7700 NE Ambassador Place, Suite 101
Portland, Oregon 97220-1384

Dear Chairman Cedergreen:

I am writing on behalf of the Port Orford Ocean Resource Team to ask the Council to consider modifications to the commercial 2A Pacific halibut fishery to allow retention of incidentally caught halibut that are currently discarded in hook and line sablefish fisheries south of Pt. Chehalis.

The purpose of this request is to reduce discard mortality of incidentally caught halibut in the sablefish hook and line fishery – consistent with the Council's mandate to reduce bycatch. The information provided by National Marine Fisheries Service estimating halibut discard mortality for the hook and line sablefish fishery provides valuable documentation that the hook and line sablefish fishery discards halibut throughout the year. Meanwhile we set thousands of hooks this year during the 10 hour directed halibut fishery and hoped to hit the right spot at the right time to find some fish. And we dumped all of the halibut we caught in 2010 on the market in one day—guaranteeing a low price to all fishermen.

We encourage the Council to consider management options that allow fishermen to retain halibut as bycatch in the hook and line sablefish fishery. Halibut is a valuable resource—it is ridiculous to discard it year round, and manage the fishery with a 10 hour derby.

Thank you for your consideration of this request.

Sincerely,

Leesa Cobb

Leesa Cobb, Executive Director