Gulf of Alaska Halibut Prohibited Species Catch Limit Discussion Paper

Addendum to June 2010 Draft
December 2010

PART 1. Near Term and Long Term Management Approaches

The Council identified a two-prong approach for determining whether and how to take potential action to revise Gulf of Alaska (GOA) halibut Prohibited Species Catch (PSC) limit(s) during its review of a June 2010 Draft Halibut PSC Limit discussion paper (Attachment 1):

1) **simple measures to reduce halibut bycatch in near term and**
2) **an action list of industry approaches to reduce halibut bycatch in the long term.**

Near term approaches

In terms of process, a February 2010 NMFS discussion paper described the different management processes the Council could pursue to revise halibut PSC limits (Attachment 2). The Council could choose the status quo approach to modify PSC limits as part of the annual harvest specifications process based on specified criteria in regulations and the FMP, or amend the GOA Groundfish FMP to place the PSC limits in regulation. Information identified under existing FMP criteria to determine whether a change the PSC limits is warranted was presented for Council consideration in the June 2010 discussion paper.

Step 1. Decide on the process

Step 1a. Status quo approach (continue halibut PSC limits under the groundfish specifications process)

As the status quo is described therein, the GOA Groundfish FMP and implementing regulations authorize the Council to recommend, and NMFS to approve, annual halibut mortality PSC limits as a component of the proposed and final groundfish harvest specifications. The final harvest specifications summarize the Council and NMFS's findings with respect to each of these FMP considerations. Section 679.21(d) already authorizes the apportionment of annual halibut PSC limits to GOA trawl and hook-and line gear fisheries and allows the establishment of apportionments for pot gear.

The current 2,000 mt halibut PSC limit for the GOA trawl groundfish fisheries has remained unchanged since 1986. The 300 mt halibut PSC limit for the non-trawl groundfish fisheries has remained unchanged since 1995, when the IFQ sablefish fishery was exempted from the PSC limit and the PSC limit was reduced by 450 mt. Halibut PSC limits for GOA trawl and non-trawl fisheries and associated catch mortality since 1995 are listed in Attachment 2, Table 1.

Separate but related criteria are set forth in the GOA Groundfish FMP for the seasonal distribution of the halibut PSC limits (Attachment 2, Appendix 1), as well as in regulations at §679.21(d)(5). The paper describes the schedule for an analysis that would need to coincide with the annual harvest specifications process so that harvest specifications are not delayed (see Figure 1 in Attachment 2). In summary, under the status quo (i.e., GOA Groundfish FMP) the timing of periodic changes in halibut PSC limits may not dovetail simultaneously with periodic environmental assessments prepared for the harvest specifications process. This year is a case in point, during which the information required by the FMP has been presented for Council review but not analyzed *per se* (either in the previous harvest specifications EA or any other type of formal analysis).

Step 1b. Amend the GOA Groundfish FMP (set halibut PSC limits in regulations)

While the harvest specifications EIS/FRFA does contain a summary of social and economic effects of the alternative harvest strategies for GOA groundfish considered by the Council. It does not contain an assessment of alternative PSC limits and the types of socio-economic analyses contained in the regulatory impact review or regulatory flexibility analysis that would be required to accomplish a change in PSC limits that typically are required to implement regulatory amendments. Changing the GOA halibut PSC limits as a component of the annual harvest specifications would require that this analysis be prepared.

Therefore, the Council would have the greatest (future) flexibility by first amending the GOA Groundfish FMP to remove the FMP authority to set halibut PSC limits annually as part of the annual harvest specifications process and amend the FMP to authorize the establishment of halibut PSC limits in federal regulations; this first step would require an EA/RIR/IRFA to remove halibut PSC limits from the FMP. The effect of such an action is to have the two groundfish FMPs operationally similar.

The Council could adopt a *problem statement* that addressed the need for increased flexibility (i.e., timing not dependent upon that for the harvest specifications EA/EIS) and additional analytical requirements (RIR/IRFA) for setting the halibut PSC limits in regulations, which better inform the public.

To mirror the BSAI Groundfish FMP, *plan amendment language* could be revised to reflect the BSAI FMP text in the box (right).

BSAI FMP Pacific Halibut PSC Limit Specifications

Annual BSAI-wide Pacific halibut bycatch mortality limits for trawl and non-trawl gear fisheries will be established in regulations and may be amended by regulatory amendment. When initiating a regulatory amendment to change a halibut bycatch mortality limit, the Secretary, after consultation with the Council, will consider information that includes:

1. estimated change in halibut biomass and stock condition;
2. potential impacts on halibut stocks and fisheries;
3. potential impacts on groundfish fisheries;
4. estimated bycatch mortality during prior years;
5. expected halibut bycatch mortality;
6. methods available to reduce halibut bycatch mortality;
7. the cost of reducing halibut bycatch mortality; and
8. other biological and socioeconomic factors that affect the appropriateness of a specific bycatch mortality limit in terms of FMP objectives.

Step 2. Decide on appropriate halibut PSC limits

Step 2a. Status quo (no change(s) to halibut PSC limits in the GOA)

A second, coincident step would be to decide whether to set the status quo (rollover) halibut PSC limits (or alternative limits) in regulation; this step would require an EA/RIR/IRFA. Under this proposed scenario, the total PSC limits and sector allocations (trawl and non-trawl sectors) would be set in regulation.

Step 2b. Revise the halibut PSC limits

At this point the Council has yet to decide if there is a problem in its management of groundfish or halibut fisheries regarding halibut PSC limits. Should the Council identify a problem, it must identify both potential management alternatives to address the problem AND the process for implementing the change(s) to the fisheries (i.e., under the GOA Groundfish FMP or regulations).

A contract report by Northern Economics, Inc. provides additional information on GOA halibut mortality in the groundfish fisheries for the years 2000 – 2009 (Attachment 3). This report can be used by the Council to identify alternative halibut PSC limits (in total or by fishery, target, and/or regulatory area), if so desired, for potential action.

Long term approaches

The Council identified an interest in halibut bycatch avoidance techniques that could reduce incidental harvests in groundfish fisheries. Long term approaches would be the subject of future, separate regulatory action(s) or voluntary industry efforts.

PART 2. Response to Issues Identified in June 2010 for Additional Clarification

The Council requested additional information on the following topics during its review of the June 2010 Halibut PSC Limit discussion paper. Staffs of the Council, NMFS AKRO, IPHC, and ADF&G responded to the requests for additional information.

1. The amount of halibut bycatch reduction projected from the June 2010 preferred alternative for the GOA Rockfish Program.

Halibut prohibited species catch allowances will be made to the program in an amount equal to 87.5 percent of the annual average usage of halibut in the target fishery during the qualifying period (2000-2006) by both sectors. The remaining 12.5 percent would remain unavailable for use in any fishery. This program allowance is then divided between and within the sectors based on qualifying primary rockfish species histories. The resulting calculation results in a 74.1 mt limit for catcher processors, 117.3 mt limit for the catcher vessels, and 27.4 mt remaining unavailable for use in any fishery. In addition, to create an incentive for further halibut mortality reductions, 55 percent of any cooperative's unused halibut allowance would be available for use in the 5th season trawl fisheries. The remaining halibut allowance would remain unused for that fishing year.

The Council may wish to revise total GOA halibut PSC limits to document the reduced allocation of PSC limits to component fisheries[1].

2. Basis for original PSC limits

Beginning in 1985, annual halibut bycatch limits were implemented for the GOA groundfish trawl fisheries, attainment of which triggered closure of the GOA to bottom trawl gear. In 1990, regulatory authority was also implemented to limit GOA halibut bycatch in fixed-gear fisheries. Seasonal allocations of halibut PSC limits also are authorized.

In order to provide opportunity for development of a fully domestic fishery and protection for the halibut resource, the FMP specified halibut bycatch limits for a domestic fishery. The limits applied to domestic trawling conducted between December 1 and May 31 and were specified at 29 mt (48,000 pounds) for the Western area and 52 mt (86,000 pounds) for the Central area. The limits were based on the assumption of a one percent bycatch rate, or roughly equal to one percent of the domestic harvest of Pacific cod expected in 1979 or soon thereafter. When the limits were reached, further domestic trawling during the December-May period in that area was prohibited. Fishing conducted outside this period was

[1] The Council also may wish to revise total BSAI halibut PSC limits to better document reduced PSC limit allocations to BSAI groundfish fishery sectors (e.g., Amendment 80 halibut PSC limit reductions), in a separate action.

unencumbered by limits. These limits were in addition to various halibut bycatch restrictions in place for foreign and joint venture fisheries.

The domestic groundfish fishery grew more quickly than anticipated and by the mid-1980s, the bycatch limits began to seriously restrict the fishery. For the 1984 and 1985 fisheries, the Council requested NMFS to enact Emergency Rules increasing the bycatch limits to 270 mt (0.45 million pounds) in the Western area and 768 mt (1.27 million pounds) in the Central area to prevent domestic on-bottom trawling from being excessively restricted. Also, additional Emergency Rules were implemented for the 1984 and 1985 fisheries to exempt midwater trawls from any fishery closure because of the inherently low halibut bycatches. This was done in recognition of the valuable pollock fishery in Shelikof Strait, which was conducted with midwater trawls.

3. Whether the Council can set PSC limits by area.

Yes. The Council has the authority to recommend that NMFS allocate PSC limits by area, but inseason management may have difficulty insuring area PSC limits are not exceeded if these limits are in areas where open access fisheries occur and the areas are of small size. The primary reason for difficulty is that PSC rates change as information collected by observers enters the catch accounting system and more landing information is obtained. Thus, inseason managers make closure decisions that require forecasting when a PSC limit will be reached based on PSC estimates that can change. This issue is exacerbated when the PSC limits are small given that each vessel's PSC is proportionally a larger part of the total PSC limit.

A PSC limit specific to an area smaller than a federal reporting area requires consideration as to whether the PSC information needs to be area specific. If so, then observer coverage must be available to provide an area-specific estimate. For smaller areas this usually requires 100 percent observer coverage on vessels. In addition, regardless of whether a PSC rate is area-specific, a trip-specific method is required to determine the total amount of groundfish caught in the special PSC area. For example, vessels could be prohibited from fishing both inside and outside a special area on a single trip, or required to carry 100 percent observer coverage on a trip that occurs in the special area.

In designing the new deployment model for the observer program, consideration of PSC limits will be required, such that observer coverage is able to complement management needs. Matching observer coverage to management needs likely becomes more difficult with small PSC limits.

4. In-depth historical discussion of halibut discard mortality rates and all ongoing studies.

A summary of historical rates and ongoing studies was provided in the June 2010 paper. Additional descriptions may be provided in future analyses, pending Council action. Additional information on halibut bycatch avoidance may be requested of the industry. An in-depth summary of halibut bycatch mortality in groundfish fisheries is presented under Attachment 3.

5. Description of general management and regulatory requirements that affect mortality rates and amounts

Access to unsorted catch is critical for observers to collect unbiased samples from which robust estimates of catch can be made and biological information used. Federal regulations support this need by stipulating that observers must have access to unsorted catch. For example, specific regulation referencing the ability for observers to obtain unsorted catch is found in general prohibitions (679.7[g][2]), equipment and operational requirements (679.28), IRIU (679.27), Groundfish and CDQ catch monitoring (679.32), Groundfish Observer Program (679.50), Rockfish Pilot Program (679.84), and Amendment 80 program (679.93).

Within a sampled haul or set, observers weigh and count all halibut within a species composition sample, take length measurements and record halibut viability. Length measurements and estimates of viability may come from inside or outside of the random species composition samples. Obtaining representative viability estimates requires observers to assess viability at the point of discard and account for the time on deck for non-sampled halibut. Halibut sampled for viability do not have a higher mortality than unsampled halibut discarded by crew. http://www.afsc.noaa.gov/FMA/Manual_pages/MANUAL_pdfs/manual2010.pdf.

6. **Description of use of hook strippers (i.e., crucifiers) by fishery over time; is there a direct correlation to mortality (e.g., P cod)**

Hook strippers, also called crucifiers, speed up the process of removing hooks by stopping the fish but allowing the longline gear to proceed thereby tearing the hook out of the fish's mouth. Crucifiers are mounted near the roller on longliners and consist of a pair of parallel bars spaced just far enough apart to allow gangions and hooks to pass, but not hooked fish. This technique increases mortality on fish which are to be discarded, compared with careful release techniques. Increasing the mortality of discards has the effect of decreasing the fishery catch limits.

A review of mortality associated with fishery sectors (www.fao.org/docrep/008/y6981e/y6981e07.htm) reported that all major fishing gear types involve some degree of injury to fish through internal and external wounding, crushing, scale loss and hydrostatic effects, with the severity of the injury depending on the gear type and its operation. Susceptibility to injury varies with species and type of stressor. There have been several investigations on the survival of fish released from the hook in various longline fisheries. Generally, it appears that hook penetration depth, hooking location and the technique used to remove fish from the hook have major impacts on subsequent survival. A swallowed hook may induce a substantially greater injury than a hooked mouth (e.g., through the jaw, lips or operculum). Fish removed from hooks automatically (e.g., by a crucifier or gaff) experience a significantly higher mortality than fish removed manually. Both manual and automatic release methods have the potential to inflict severe injuries to the mouth parts of the fish. Fish that were released by a gaff suffered also from punctures to the body wall and damage to the abdomen and intestines. It is worth noting that a gaff can be used to remove the hook without handling the fish, and this is likely to result in minimal injury.

Several IPHC papers and studies address the careful release of halibut in the IFQ and Pacific cod fisheries (Kaimmer 1994, Kaimmer and Trumble 1998, and Trumble, Kaimmer, and Williams 2000). Kaimmer (1994) reported that setline vessels in the North Pacific began using automated gear retrieval systems incorporating hook strippers to remove unused bait and caught fish from the hooks during gear retrieval. Pacific halibut removed by these automated systems suffer a handling mortality which is as much as nine times that experienced by fish removed carefully by the more traditional manual method of rolling the hook out of the mouth using a gaff. This increased mortality results from more severe injuries in the mouth area associated with the automated removal. Fish receiving sublethal injuries as a result of automated removal experience a significantly reduced growth rate in subsequent years.

Kaimmer and Trumble (1998) reported that Pacific halibut caught as bycatch or intended for discard by longline vessels in U.S. and Canadian waters of the north Pacific must be removed from the hook using careful release techniques required by regulation. In many fisheries, trained observers subsample the released halibut for fish condition. These condition codes are used to track cumulative bycatch mortality in these fisheries. Tag return rates of halibut released from longline gear near Kodiak Island, Alaska, were used to estimate relative and absolute mortalities of fish by release method, hook removal injury, and condition code. Generally, the proper application of the careful release techniques result in only minor hook removal injuries. Mortality rates of moderately and severely injured halibut are 1.5–2 times higher than previously assumed. One result of our study is the finding that not all fish judged at tagging as likely

to die, actually die. They recommended a reworking of the condition code methodology, which subsequently occurred in 2000

Trumble et al. (2000) noted that mandatory release of halibut incidental catches in groundfish fisheries has the potential to close fisheries managed with PSC limits, when those PSC limits are reached. His study demonstrated that halibut with similar types of injuries experienced lower mortality following release from small circle or autoline hooks than from larger circle hooks and led to revised criteria to determine viability (reducing discard mortality rates in longline fisheries by 20 percent).

Trumble et al. (2000) summarized the earlier IPHC studies that suggested that Pacific halibut are very hardy fish that have high survival rates, when handled appropriately, following capture and discard to sea from longline vessels. He reported that most longline fishermen use circle or semi-circle autoline hooks which hook the fish in the mouth and cause little damage. Almost all halibut are hooked with the bend of the hook circling the jaw and the point protruding through a hole in the cheek. Removal of the hook requires either backing the hook out around the jaw (generally with low mortality) or tearing the hook out through the jaw (generally with increased mortality. A later study found that survival by injury type with the smaller hooks was much greater than than with larger hooks.

Adlerstein and Trumble (1998) reported on mortality of discarded Pacific halibut bycatch from Pacific cod fisheries in the Bering Sea leads to significant losses in the halibut setline and in the Pacific cod fisheries. The commercial halibut fishery loses yield because of fishery catch limit reductions to compensate the resource for lost spawning potential and because halibut killed as bycatch will not be available for subsequent harvest, and the cod fisheries may lose harvest if they reach a bycatch mortality limit before reaching allowed catch. In this study, significant differences in Pacific halibut bycatch rates and associated yield losses were found among months and areas of the Bering Sea in the longline and trawl fisheries for Pacific cod in 1990–1992. Bycatch rates were usually highest in late spring and early summer and in areas close to the Unimak Pass. With the exception of 1992, yield loss in the longline fishery was around 1 kg per kg of bycatch mortality, irrespective of where or when bycatch occurred. In the trawl fishery, loss of halibut yield varied from 1 to 4 kg per kg of bycatch mortality. Highest halibut net yield losses per ton of groundfish harvest usually coincided with highest bycatch rates. When both fisheries operated in one area, trawl bycatch often imposed higher yield losses than longline bycatch, despite lower bycatch rates. Bycatch was affected by the strong 1987 halibut year class. Highest bycatch and yield loss rates occurred in the trawl fishery in 1990 and 1991 when the population was dominated by halibut age-3 and age-4, and in the longline fishery in 1992 as fish reached age-5.

Heery and Bellman (2009) reported that when Pacific halibut are caught by trawl vessels fishing off the US west coast, they are always brought on-board the vessel, ensuring the observer can randomly select a subsample for length and viability sampling. On hook-and-line vessels, crew members have the ability to "shake" or use other means (cutting of gangions, straightening of hooks) to discard the halibut without having to bring it onboard. This type of crew behavior normally occurs before or as the Pacific halibut reaches the "roller", which prevents the fish from hitting the "crucifier" (being torn from the hook) and lying on deck for any period of time. This is generally considered good handling practice that reduces potential mortality. However, at this time west coast groundfish fishery regulations do not have 'careful release' requirements.

Hooking mortality is variable and is affected by many factors, for example, the size and shape of the hook. Trumble et al., (2000) conducted a large-scale tagging experiment on Pacific halibut released from longline gear; halibut experienced lower mortality following release from small circle or autoline hooks than from large circle hooks.

Crucifiers were prohibited by IPHC regulation beginning in 1987 (Hoag et al. 1993), so their use was illegal aboard halibut longliners prior to the implementation of the IFQ program in 1995. Their use was reinstated by IPHC after the Council adopted the IFQ program for halibut. At that time the focus of the regulations shifted from prohibiting the gear to prohibiting the effects of the gear, i.e., damaging jaws. The use of hook strippers started on the bigger vessels fishing sablefish, as they were very handy for the close-spaced gear commonly used in that fishery. In the preparatory work for implementing the IFQ program, a multiagency group that worked on 'harmonizing' the regulations for halibut and sablefish resolved the inconsistency by recommending that IPHC drop the prohibition and instead prohibit the injuries caused by hook strippers. Currently, the North Pacific hook-and line and halibut fisheries have specific careful release handling techniques for Pacific halibut that are defined in regulation (CFR 679.7):

(1) All halibut that are caught and are not retained shall be immediately released outboard of the roller and returned to the sea with a minimum of injury by

(a) hook straightening;

(b) cutting the gangion near the hook; or

(c) carefully removing the hook by twisting it from the halibut with a gaff.

(2) Except that paragraph (1) shall not prohibit the possession of halibut on board a vessel that has been brought aboard to be measured to determine if the minimum size limit of the halibut is met and, if sublegal-sized, is promptly returned to the sea with a minimum of injury.

A 2009 proposal to the IPHC by the U.S. sport charter sector called for a renewed ban on the use of crucifiers on commercial halibut vessels, unless the vessel was equipped with an EM system. The proposal was ultimately withdrawn, as IPHC had no authority to require vessels to use EM. Consequently, the IPHC took no action..

The impact of hook strippers on released halibut may also be tracked through information on Prior Hook Injuries (PHI) collected by IPHC on its annual halibut setline assessment survey (Kaimmer and Leickly 2010). The survey consists of approximately 1,250 stations laid out on a systematic grid on the continental shelf, from 20-275 fathoms, and employs chartered commercial longline vessels. One of the duties of on-board samplers is to record the presence of PHI in the halibut brought on board for sampling. Data collection follows a set of prescribed criteria in which severity of prior injury is noted. While the precise cause of the PHI cannot be determined, IPHC has noted that the occurrence of PHI tends to be concentrated in areas which groundfish longline fisheries target Pacific cod.

7. Description of Canadian IBQ trawl fishery

A PowerPoint presentation by the DFO Pacific Region Groundfish Management staff provided to the IPHC and halibut industry at the January 2010 IPHC Annual Meeting is provided under Attachment 4. Canada DFO staff may be invited by the Council to provide additional information at a future meeting depending on Council interest, possibly February 2011. The (DFO) Pacific Region Integrated Fisheries Management Plan for 2010/2011 is available at:

http://www.scribd.com/doc/34285199/Integrated-Fisheries-Management-Plan-for-Southern-B-C.

8. Effects of restructured observer program

The current federal groundfish observer program in Alaska is structured by vessel size. As such, groundfish vessels less than 60' are not required to carry observers; vessels 60' – 125' length overall (LOA) are required to carry and pay for their own observers 30 percent of their fishing days, regardless of gear type or target fishery; vessels greater than 125' LOA are required to carry observers 100 percent of the time. Vessels in the 30 percent coverage category select when to carry observers and are constrained in this self-selection by regulatory requirements for quarterly coverage levels. The two size categories with less than 100 percent observer coverage comprise the majority of vessels fishing in the Gulf of Alaska (GOA) and out of ports other than Dutch Harbor and Akutan in the Bering Sea and Aleutian Islands (BSAI).

Observers estimate total catch for a portion of hauls or sets, and sample hauls or sets for species composition, including PSC. These data are extrapolated in the Alaska Region Catch Accounting System (CAS) to make estimates of total PSC halibut catch on both observed and unobserved vessels. Observer data are assumed to be representative of the activity of all vessels and are used to estimate total halibut PSC. The ratio estimator is derived from a set of covariates that match both observer and groundfish landing/production information. A detailed description of this process is presented in Cahalan et al. (2010).

Regulations governing observer deployment (i.e., observer coverage requirements) introduces the potential of bias in observer data by using a non-random deployment model which may facilitate non-representative fishing. Given the use of observer data in CAS, and the subsequent use of CAS estimation in stock assessments and quota management, this issue can undermine the data used to manage halibut PSC (among other species) in the North Pacific groundfish fisheries. In response to these issues, the Council took action at its October 2010 meeting to recommend that NMFS restructure the observer program to address multiple issues with the current program, including bias (NPFM 2010). The recommended restructuring preferred alternative provides NMFS with flexibility to place observers onboard vessel using accepted statistical practices so that coverage gaps and vessel-trip selection bias is addressed (http://www.alaskafisheries.noaa.gov/npfmc/current_issues/observer/ObserverMotion1010.pdf).

The preferred alternative is likely to influence estimation most in sectors currently with 30 percent or less coverage. Past analytical examinations of the North Pacific Groundfish Observer Program have dealt with such issues as sampling protocols, reducing bias, estimate expansion, and the statistical properties of estimates (e.g. Jensen et al. 2000, Volstad et al. 1997, Pennington 1996, and Pennington and Volstad 1994). These and other studies suggest bias is likely reduced by changing from the current system, in which 30 percent coverage vessels can choose when and where to take observers, to a new system in which NMFS is responsible for distributing observers among vessels using statistically robust methods.

The extent to which random deployment influences PSC halibut estimates is related to current efforts by the fleet to manipulate PSC rates as well as the magnitude of bias caused by quarterly deployment regulations and timing of observer coverage. Work presented in the restructuring analysis (NPFMC 2010) suggests evidence of a deployment effect, but the magnitude of this bias on PSC estimates is not known. Improvements in the statistical properties of observer samples and estimates will result in many data improvements, including improved spatial coverage as smaller vessels that fish in inshore areas receive coverage; a reduction in the ability for vessels to "game" coverage by not taking an observer to certain areas of known high bycatch or attempting to manipulate PSC rates; CAS estimates may better reflect sector-specific PSC halibut catch due to a consistent amount of observer data available throughout the year; and finally a more representative sample of halibut viability may be obtained.

The potential changes in PSC halibut estimation described in the preceding paragraph will most influence groundfish fisheries that currently have a large amount of effort from 30 percent or unobserved vessels. Fisheries currently with a 100 percent or more of coverage will continue to receive vessel specific rates, which is the most accurate and precise estimate available. Fisheries currently with a mixture of 100 percent and 30 percent vessels receive PSC estimates that are vessel-specific for observed vessels and PSC halibut rates derived from observer information collected onboard a mixture of 100 percent and 30 percent vessels. PSC estimates in a fishery may change depending on the direction of deployment bias and the amount of 30 percent coverage relative to 100 percent coverage under the current observer deployment model. Fisheries with both levels of coverage, but historically operated under high levels of 30 percent coverage, may experience a larger reduction in bias (and subsequent change in PSC) than those with a large amount of 100 percent coverage. Further, the amount of variation associated with PSC rates and estimates may also change due to a representative sample better reflecting true variation of halibut catch in the fishery, as well as additional vessels (those 40-60' LOA) being sampled by observers.

9. Information on (exempted) jig fisheries (P cod and rockfish), with ramp up levels

NMFS uses the Catch Accounting System to estimate the amount of halibut PSC in the parallel fisheries, which occur in State waters. Because the system is set up to make the estimates in State waters, PSC in the GHL fisheries is estimated as well. In the GOA, halibut PSC started accruing in 2009 when the State allowed longline gear to fish its Prince William Sound (PWS) fishery. Before 2009, no halibut mortality accrued to the federal PSC limits from the GOA State GHL fishery since the allowed gears, pot and jig, are exempt from halibut mortality limits. The method of estimating PSC is the same in State waters fisheries as in federal fisheries. PSC is estimated on unobserved trips by matching observer-based rates with the groundfish catch based on year, week ending date, trip target, gear, and FMP area. In 2009 and 2010, the halibut mortality rates were derived from observer data on hook-and-line catcher/processors in the Western and Central Pacific cod fisheries, since no observer coverage is required in the State's PWS fishery. In 2009 and 2010, the estimate of halibut PSC was 3 mt (per year) out of the 290 mt annual limit. In the Aleutian Islands, halibut PSC has accrued since 2006 from hook-and-line and trawl gear effort in the State waters GHL fishery. The halibut PSC from the State's Aleutian Islands Pacific cod fishery are: 20 mt in 2006, 46 mt in 2007, 10 mt in 2008, 2 mt in 2009, and 10 mt in 2010 (through September 25, 2010).

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Table 3. Halibut Mortality in the Deep Water Complex Fisheries by Target and Gear for the GOA, 2000-2009

	Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Arrowtooth Trawl										
Mortality (MT)	369.5	157.0	323.1	429.3	313.2	500.5	613.0	442.3	532.0	285.6
Target Catch (MT)	16,210.7	5,579.9	13,429.5	20,134.4	8,541.3	15,031.8	21,331.0	20,822.7	24,931.3	15,812.3
Mortality Rate (%)	2.28%	2.81%	2.41%	2.13%	3.67%	3.33%	2.87%	2.12%	2.13%	1.81%
Deep Water Flatfish Trawl										
Mortality (MT)	42.6	43.4	24.1	20.5	72.0	--	--	0.3	--	--
Target Catch (MT)	1,007.0	1,176.8	551.2	814.4	1,196.0	--	--	22.1	--	--
Mortality Rate (%)	4.23%	3.69%	4.37%	2.52%	6.02%	--	--	1.42%	--	--
Rex Sole Trawl										
Mortality (MT)	255.4	249.4	310.4	236.6	189.6	85.6	129.2	132.2	108.3	274.1
Target Catch (MT)	8,898.7	7,741.2	7,943.1	10,310.6	3,521.1	3,244.0	7,166.3	5,926.7	4,740.4	13,207.9
Mortality Rate (%)	2.87%	3.22%	3.91%	2.29%	5.38%	2.64%	1.80%	2.23%	2.28%	2.08%
Rockfish Trawl										
Mortality (MT)	200.9	329.4	242.9	256.4	300.1	247.3	170.5	96.0	111.7	74.9
Target Catch (MT)	23,026.7	21,858.6	23,989.7	25,537.1	26,421.1	22,942.3	25,354.7	24,331.4	24,870.1	25,878.7
Mortality Rate (%)	0.87%	1.51%	1.01%	1.00%	1.14%	1.08%	0.67%	0.39%	0.45%	0.29%
Deep Water H&L (Misc)										
Mortality (MT)	12.0	8.2	3.5	1.9	6.3	4.7	4.6	--	--	0.1
Target Catch (MT)	591.8	640.7	301.5	2.8	229.0	163.3	30.5	--	--	13.5
Mortality Rate (%)	2.03%	1.27%	1.17%	0.00%	2.73%	2.86%	0.00%	0.00%	0.00%	0.00%
Deep Water ComplexTotal										
Mortality (MT)	880.4	787.3	904.1	944.6	881.1	838.0	917.2	670.9	752.0	634.6
Target Catch (MT)	49,735.0	36,997.2	46,215.0	56,799.2	39,908.5	41,381.4	53,882.5	51,102.9	54,541.8	54,912.4
Mortality Rate (%)	1.77%	2.13%	1.96%	1.66%	2.21%	2.03%	1.70%	1.31%	1.38%	1.16%

Source: Developed by Northern Economics from NMFS CAS data provided by Fey (2010).
Note: Deep water H&L comprised target fisheries for rockfish (92 percent), arrowtooth flounder (7 percent), and deep water flatfish (>0.5 percent).

Table 4. Halibut Mortality in the Shallow Water Complex Fisheries by Target for the GOA, 2000-2009

	Year									
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Pollock - Bottom Trawl										
Mortality (MT)	39.2	69.8	3.0	9.5	12.8	1.9	67.9	79.3	70.2	36.0
Target Catch (MT)	9,851.2	30,373.1	10,325.7	3,576.1	11,057.2	18,544.4	35,096.6	14,791.7	16,890.3	10,692.0
Mortality Rate (%)	0.40%	0.23%	0.03%	0.27%	0.12%	0.01%	0.19%	0.54%	0.42%	0.34%
Pollock -- Midwater Trawl										
Mortality (MT)	11.7	10.7	0.5	0.4	1.0	0.5	0.4	0.6	1.9	1.1
Target Catch (MT)	57,404.3	39,549.6	27,565.4	45,894.2	49,918.6	63,113.9	37,134.7	36,944.9	33,102.1	26,526.3
Mortality Rate (%)	0.02%	0.03%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
Shallow Water Flatfish Trawl										
Mortality (MT)	576.3	483.6	841.8	530.0	526.4	564.5	634.6	707.5	495.9	796.1
Target Catch (MT)	9,783.7	8,280.5	13,992.3	8,448.1	4,115.7	8,260.2	11,213.5	14,393.5	15,074.5	19,774.3
Mortality Rate (%)	5.89%	5.84%	6.02%	6.27%	12.79%	6.83%	5.66%	4.92%	3.29%	4.03%
Flathead Sole Trawl										
Mortality (MT)	4.5	62.5	56.1	120.1	65.0	43.1	22.6	16.5	58.1	59.6
Target Catch (MT)	140.1	1,535.4	2,724.5	4,023.6	3,075.5	3,058.6	1,461.1	1,591.0	1,779.7	2,785.6
Mortality Rate (%)	3.18%	4.07%	2.06%	2.98%	2.11%	1.41%	1.55%	1.04%	3.26%	2.14%
Other Species/Atka Mackerel Trawl										
Mortality (MT)	1.8	0.7	0.1	20.8	25.2	0.1	--	--	0.0	1.2
Target Catch (MT)	121.7	71.1	6.7	2,365.8	572.9	190.6	--	88.3	3.1	39.4
Mortality Rate (%)	1.50%	0.94%	0.00%	0.88%	4.40%	0.03%	0.00%	0.00%	0.00%	0.00%
Pacific Cod Trawl										
Mortality (MT)	385.6	790.1	193.3	461.9	938.5	664.1	346.0	473.0	577.3	289.3
Target Catch (MT)	25,557.5	29,474.5	15,250.1	15,967.4	16,856.7	12,481.8	11,419.8	14,048.4	22,880.8	8,774.7
Mortality Rate (%)	1.51%	2.68%	1.27%	2.89%	5.57%	5.32%	3.03%	3.37%	2.52%	3.30%
Pacific Cod Pot										
Mortality (MT)	6.9	4.5	2.5	9.2	16.1	33.0	18.6	18.9	31.2	6.8
Target Catch (MT)	17,647.7	7,371.6	7,136.9	21,154.9	26,087.2	24,706.7	23,826.8	24,669.3	20,798.5	22,125.7
Mortality Rate (%)	0.04%	0.06%	0.03%	0.04%	0.06%	0.13%	0.08%	0.08%	0.15%	0.03%
Pacific Cod H&L										
Mortality (MT)	255.8	266.5	238.3	185.2	292.8	202.8	324.2	290.2	495.9	270.9
Target Catch (MT)	13,957.3	11,049.6	15,355.9	9,846.4	11,049.1	6,127.9	11,824.8	12,853.9	14,395.7	14,559.0
Mortality Rate (%)	1.83%	2.41%	1.55%	1.88%	2.65%	3.31%	2.74%	2.26%	3.44%	1.86%
Shallow Water H&L (Misc)										
Mortality (MT)	0.6	8.9	1.8	102.8	--	0.1	5.2	0.0	--	--
Target Catch (MT)	6.2	82.7	21.4	1,506.3	--	1.8	51.8	2.0	--	--
Mortality Rate (%)	0.00%	10.74%	0.00%	6.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Shallow Water Complex Total										
Mortality (MT)	1,282.4	1,697.3	1,337.2	1,439.8	1,877.7	1,510.1	1,419.4	1,586.1	1,730.4	1,461.0
Target Catch (MT)	134,469.7	127,788.0	92,378.8	112,782.9	122,732.8	136,486.0	132,029.1	119,383.1	124,924.8	105,277.0
Mortality Rate (%)	0.95%	1.33%	1.45%	1.28%	1.53%	1.11%	1.08%	1.33%	1.39%	1.39%

Source: Developed by Northern Economics from NMFS CAS data provided by Fey (2010).
Note: Shallow water H&L comprised target fisheries for "other species" (99 percent), flathead sole (1 percent), and bottom pollock (>0.5 percent).

Agenda Item D-1(b) GOA Halibut PSC Limits

Council Motion

In recent years, the directed halibut catch limits in the GOA regulatory areas 2C, 3A and 3B have declined steadily, and the recommended catch limits for 2011 are almost 30% lower than in 2010. Growth rates of halibut remain very low and size at age has been declining; much of the total biomass is made up of smaller fish that are more vulnerable than larger fish to trawl gear. In addition, evidence of west to east migration of halibut within a coast wide stock may have implications for the impacts of halibut bycatch on stock assessment, and directed fishing opportunities. These factors raise concerns about the current halibut PSC limits in the GOA, and the effect this bycatch has on the directed fishing opportunities, as well as the productivity of the stock.

At this time the Council has not selected a specific process for considering changes to the GOA halibut PSC limits. Although the Council believes that an evaluation of the current halibut PSC limits is warranted, additional information about the condition of halibut stocks, the effects of bycatch reduction, and other fishery factors is necessary. Therefore, the Council directs staff to provide information on the following topics:

1. The effect of reducing bycatch limits in the GOA on the exploitable biomass available to the directed fisheries, over an appropriate time period; this includes the effects of migration on downstream users. (i.e. what is the effect of a 100mt reduction in bycatch over a 5 year period?).

2. The recent changes in IPHC stock assessment methods, harvest policies, and catch limit setting on directed halibut fisheries.

3. Changes to Federal fishery management programs and halibut PSC apportionments that begin in 2012 that are relevant to the use of halibut PSC.

4. Possible causes of low growth rates and the effects on future exploitable biomass and spawning biomass.

The Council further requests the IPHC to provide the appropriate scientific expertise and information to assist the Council.

Talking Points

The Council has received a discussion paper that focuses on alternative procedures for changing current halibut PSC limits in the Gulf of Alaska, and provides background information on halibut bycatch policy, halibut stocks, and bycatch in the groundfish fisheries. The discussion paper notes that the halibut PSC limit of 2,000 mt for the trawl groundfish fisheries has remained unchanged since 1986, and the 300 mt limit for the non-trawl groundfish fisheries has not changed since 1995.

These limits were set as a way of promoting the development of U.S. groundfish fisheries while also removing the incentive that groundfish participants might have to otherwise target halibut.

Since 1986 there have been significant changes in groundfish and halibut management programs and fishing patterns, environmental conditions, fishing technology, and our knowledge of halibut and groundfish stocks. Halibut is fully utilized in the directed sport, subsistence and commercial fisheries and is of significant social,cultural and economic importance to communities throughout the geographical range of the resource. Halibut PSC allowances are also critical to the prosecution of many groundfish trawl and non-trawl fisheries operating in the GOA.

The intent of the motion is that this information would be available prior to the April meeting, which is the timeline staff has identified as necessary if the Council wishes to consider changes during the 2012 TAC setting process.