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President: Andrew A. Rosenberg, Ph.D.

## **First Annual Re-assessment Surveillance Report**

### **US and Canada Pacific Hake/Whiting Mid-water Trawl Fishery**

**USA EEZ Waters**  
Certificate No.: **MRAG-F-011**

**Canadian EEZ Waters**  
Certificate No.: **MRAG-F-012**

**MRAG Americas, Inc.**

**Client Draft**

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## 1. General Information

**Scope against which the surveillance is undertaken:** MSC Principles and Criteria for Sustainable Fishing as applied to the Pacific Hake Mid-Water Trawl Fishery.

**Species:** *Merluccius productus*

**Area:** US Pacific EEZ waters of Washington, Oregon and California, and Canadian Pacific EEZ waters

**Method of capture:** Midwater Trawl

Date of Surveillance Visit: Nov 20-25, 2015

Date of US Re-Certification: Nov 25, 2014 Certificate Ref: MRAG-F-011

Date of Canada Re-Certification: Nov 25, 2014 Certificate Ref: MRAG-F-012

Surveillance stage	1st	2nd	3rd	4th
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Surveillance team:	Lead Assessor: Robert J. Trumble
Assessors:	Mark Pedersen, Max Stocker

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### Standards and Guidelines used:

1. MSC Standard v1.1
2. MSC Certification Requirements v1.3
3. Guidance to the MSC Certification Requirements, v.1.3

## 2. Results, Conclusions And Recommendations

This report contains the findings of the first surveillance audit in relation to the re-certified Pacific Hake mid-water trawl fishery in the US EEZ off Washington, Oregon, and California and the EEZ off the Pacific Coast of Canada. Pacific hake are also known as Pacific whiting and the terms will be used interchangeably in this document. The surveillance audit was carried out in accordance with the Marine Stewardship Council (MSC) Certification Requirements Version 1.3 and CR V2.0 process requirements.

The surveillance team of Dr. Robert J. Trumble (Lead Assessor), Dr. Max Stocker, and Mark Pedersen met by teleconference from 20-25 November 2015 with the staff of: the West Coast Regional Office and Northwest Fisheries Science Center of the US National Marine Fisheries Service (NMFS), NOAA Office of Law Enforcement, Fisheries and Oceans Canada (DFO), and the fishery clients. MRAG posted a notice of the site visit on the MSC website, and invited stakeholders to present information and to meet with the team. No stakeholders requested an opportunity to meet with the assessment team. The table below summarizes the participation, location, and topics of the meetings.

Date 2015	Location	Name/Affiliation	Topic
20 Nov	Teleconference	Bob Trumble, Max Stocker, Mark Pedersen – MRAG; Chris Grandin, John Holmes – DFO Science	Personnel changes; acoustic survey information; egg histology; base model structure; MSE progress; stock assessments for Yelloweye Rockfish, Rougheye Rockfish, and Pollock; possible Hake stock off Mexico
20 Nov	Teleconference	Bob Trumble, Max Stocker, Mark Pedersen – MRAG; Barry Ackerman, Ann Bussell – DFO Management	Personnel changes; market impacts on fishing strategy; interactions with Chinook, Bocaccio, Quillback, Eulachon; stock assessments for Yelloweye Rockfish, Rougheye Rockfish, and Pollock; enforcement; management changes; treaty implementation
24 Nov	Teleconference	Bob Trumble, Mark Pedersen – MRAG; Kevin Duffy – NMFS Regional Office	Personnel changes; management changes; treaty implementation; Chinook bycatch; constraining rockfish; tribal allocation; EFH review; electronic monitoring testing; chafing gear and flow scales consistent with Alaska
24 Nov	Teleconference	Bob Trumble, Max Stocker, Mark Pedersen – MRAG; Allan Hicks, Vanessa Tuttle – NMFS Science Center	Personnel changes; stock assessment changes; MSE progress; egg histology; EFH and bottom impacts; bycatch; acoustic-trawl survey schedule
24 Nov	Teleconference	Bob Trumble, Max Stocker, Mark Pedersen – MRAG; Dan Waldeck, Jan Jacobs – PWCC; Shannon Mann, Bruce Turris – APHF	Personnel changes; Chinook bycatch; Hake for reduction; treaty implementation; MSE progress; EFH; hake distribution in Canada; possible Mexico stock
25 Nov	Teleconference	Bob Trumble, Max Stocker, Mark Pedersen – MRAG; Dayna Mathews - OLE	Personnel changes; enforcement relationship with Coast Guard and states; violations reporting; electronic monitoring; bycatch compliance

The assessment process included discussions with NMFS, OLE, and DFO staff members on key issues of Principles 1, 2, and 3; changes in science and management; and likely future changes or changes underway. The clients had provided substantial documentation in advance of the surveillance review, and the NMFS and DFO staffs provided additional material to document the information presented at the visits. The assessment team received no stakeholder comments related to surveillance of the Pacific Hake Mid-water Trawl fishery. The team determined that both conditions

MRAG Americas 1<sup>st</sup> Re-assessment Surveillance Report, US/Canada Pacific Hake Mid-water Trawl Fishery 3

for the Canadian fishery are on schedule as set out in the milestones and client action plan. The team did not re-score either condition.

### **3. MSC Certification validation requirements**

#### **3.1 Complaints against the fishery**

The assessment team received no information that the fishery had received a complaint; enforcement officers from the US and Canada reported no complaints.

#### **3.2 Public claims made by the client**

The clients, as associations representing the vessels and companies participating in the fishery, do not use the logo or make claims concerning the fishery.

#### **3.3 Review of any personnel changes in science, management or industry**

The US and Canadian systems have a robust means of maintaining high levels of competence in science and management personnel. Both countries have a deep bench, so as key personnel retire, receive promotions, or otherwise leave, qualified replacements take over the roles. No changes occurred that would adversely affect the quality of science or management in either country. Personnel shifting has occurred in the US and Canadian stock assessment and management strategy evaluation (MSE) groups. The US Office of Law Enforcement (OLE) merged the two divisions that covered the northern and southern areas of the US west coast; OLE has lost staff to a hiring freeze, but this has not affected US enforcement of the Hake fishery. No personnel change has occurred for either client.

#### **3.4 Review of any changes to the scientific base of information, including stock assessments, or to the management regime**

The basic management and science procedures have continued without major changes that would adversely affect the Hake fisheries. Ongoing improvements to the base assessment model and to the MSE have occurred. The Hake Treaty continues to function well. Details of changes are described in Section 4.

### **4. Surveillance Review**

#### **4.1. Principle 1**

##### **2014 Pacific Hake/Whiting Fishery**

The 2014 TAC was set under the US/Canada Hake Treaty process. The JMC (2014) recommended (and NMFS and DFO implemented) a coastwide adjusted TAC of 428,000 mt, which provided an adjusted US TAC of 316,206 mt and an adjusted Canadian TAC of 111,794 mt. The adjusted TAC included carry over amounts from the respective US and Canadian 2013 fisheries. Coastwide, of the 428,000 mt TAC only 302,081 mt (70.8 percent) was caught in the 2014 fishery.

## 2014 Summary (Waldeck, 2015):

	alloc	catch	rmg	% util
NON-TRIBAL (post reapportionment, and less the 1,500 mt set aside for incidental/research)	304,371	264,026	40,345	86.7%
SS	127,836	98,714	29,122	77.2%
CP	103,486	103,203	283	99.7%
MS	73,049	62,109	10,940	85.0%
TRIBAL (post reapportionments)	10,336	618	9,718	6.0%
Total US (w/o 1,500 mt incidental/research set aside)	314,707	264,526	50,181	84.1%
BC Hake	111,794	37,437	74,357	33.5%
Total Coastwide	426,501	302,081	124,420	70.8%

## 2014 US Fishery

The 2014 US fishery reported a total catch of 264,526 mt. This amounted to an 84 percent utilization of the allocated total of 314,707 mt. The catch breakdown by sector was shoreside (SS) 98,714 mt, catcher-processor (CP) 103,203 mt and mothership (MS) 62,109 mt.

The US Treaty Tribal allocation was 55,336 mt (17.5 percent of the US TAC), which accounted for a request from the Makah Tribe. Two reapportionments occurred in 2014, the first on September 12, 2014 (25,000 mt) and a second on October 23, 2014 (20,000 mt), which resulted in a final 2014 tribal allocation of 10,336 mt, but only 6 percent (618 mt) were reported caught in 2014.

## 2014 Canadian Fishery

The BC hake fishery reported a total catch of 37,437 mt. This was only 33.5 percent of the Canadian allocation of 111,794 mt. Of Canada's allocation, 86,357 mt were allocated to the shoreside (SS) sector and 25,000 mt were allocated to the joint venture (JV) fleet and although there was opportunity, a JV partner agreement was not reached and so there was no JV operation in 2014. Approximately 60 percent of the catch in 2014 was delivered by the 4 Freezer Trawlers who were able to continue fishing through the difficult market conditions (Mann, 2015).

Much disruption occurred in the market place in 2014 with the embargo Russia placed on all North American seafood among other products, and the effects of the war in Ukraine (Mann, 2015).

## **P1 Stock Status**

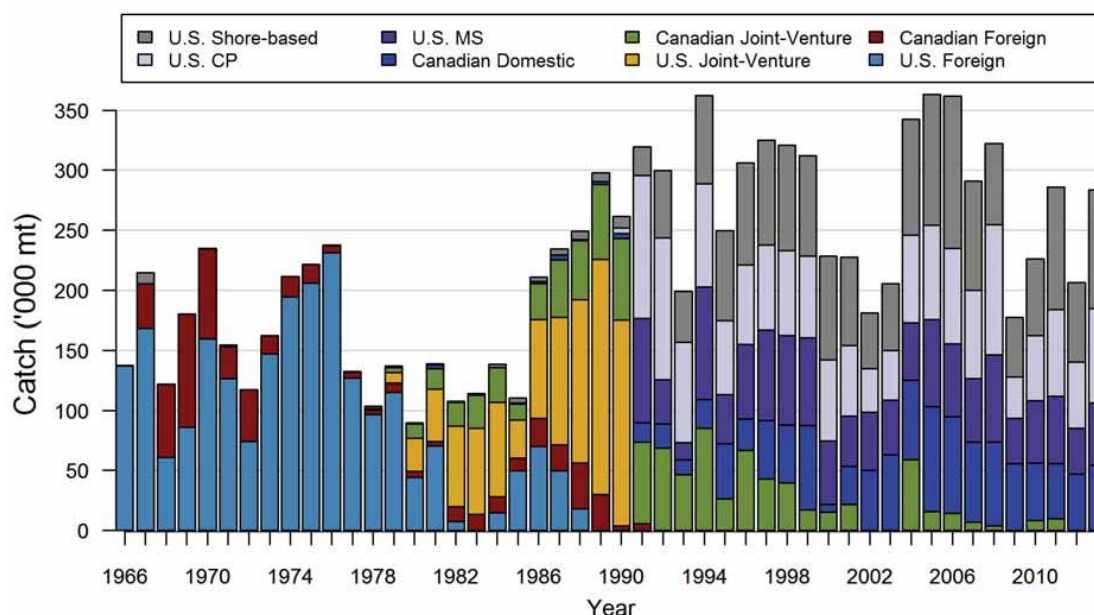
Under the *Agreement Between the Government of the United States of America and the Government of Canada on Pacific Hake/Whiting* (hereafter Hake Treaty) stock assessments are prepared by the Joint Technical Committee (JTC) consisting of both U.S. and Canadian scientists. The assessment is reviewed by the Scientific Review Group (SRG). Other committees under the Hake Treaty include the Joint Management Committee (JMC), and the Advisory Panel (AP). Through verbal testimony received from participants in these committees the surveillance team concluded that the stock assessment process worked effectively in 2014.

The following stock status summary was adopted from the 2014 Stock Assessment of Pacific Hake in U.S. and Canadian Waters prepared by the International Joint Committee for Pacific hake (JTC, 2014a).

### 2013 Fishery

The 2014 Pacific Hake stock assessment, prepared by the JTC, reported the following information in relation to the 2013 fisheries (JTC, 2014a).

Coast-wide Pacific Hake landings from 1966–2013 have averaged 223,238 mt (Figure 1). The lowest landings (89,930 mt) were reported in 1980, with the highest landings (363,157 mt) in the time series was reported in 2005 (JTC, 2014A). Total commercial fisheries catch for 2013 was reported to be 283,510 mt. This represents an increase in the catch of 37% over the 2012 catch of 206,350 mt.



**Figure 1 Total Pacific Hake landings used in the assessment by sector, 1966-2013 (JTC, 2014a).**

Coast-wide landings from 2010–2013 have been above the long term average of 223,238 mt. Landings between 2001 and 2008 were predominantly comprised of fish from the very large 1999 year class, with the cumulative removal from that cohort exceeding 1.2 million mt (JTC, 2014a). Catches in 2009 were dominated by the 2005 year class with some contribution from an emergent 2006 year class, and relatively small numbers of the 1999 cohort. The 2010 and 2011 fisheries caught very large numbers of the 2008 year-class, while continuing to see some of the 2005 and 2006 year-classes as well as a small proportion of the 1999 year class. Of the 2013 total coast-wide catch, 67% came from the 2010 year class.

The Canadian 2013 Pacific Hake domestic fishery removed 54,096 mt from Canadian waters, or 57% of the 95,367 mt Canadian TAC. The low catches by the domestic fishery dissuaded the Joint Venture vessels from participating in the fishery, even though there was a quota allocated to them. The most abundant year classes (by number) in the Canadian catch were 17.2% 2008 year-class, 18.2% 2006 year-class, 11.4% 2005 year-class and 16.3% 1999 year-class.

The distribution of the Canadian catch by month remained similar to other years, with the summer months showing the greatest catch. When compared to recent years, September 2013 was slightly

more productive for vessels but the catches dropped off quickly in October and were all but finished in November, approximately a month earlier than in recent years (2008-2012).

A significant change in the spatial distribution of the Canadian fishery was observed in 2008, with many vessels taking more of their catch than usual from Queen Charlotte Sound (Area 5B). A marked reversal of that trend has been observed since then, with a resumption of the traditional fishery off the West Coast of Vancouver Island (WCVI).

The 2013 U.S. adjusted allocation of 269,745 mt was divided to research, tribal, catcher-processor, mothership, and shore-based sectors. After the tribal allocation of 17.5% plus 16,000 mt, and a 2,500 mt allocation for research catch and bycatch in non-groundfish fisheries, the 2013 non-tribal U.S. catch limit of 204,040 mt was allocated to the catcher/processor (34%), mothership (24%), and shore-based (42%) commercial sectors. The catcher/processor fleet was allocated 69,373 mt, the mothership fleet was allocated 48,970 mt, and the shore-based fleet was allocated 85,697 mt. The at-sea fleet encountered larger fish in May and mainly smaller fish from the 2010 year class after May. The catches from the shore-based fleet were dominated by the 2010 year class. Tribal fisheries landed approximately 4,500 mt, but 30,000 mt were reapportioned from the tribal fisheries to the non-tribal fisheries on September 18, 2013. Both the at-sea and shore-based fleets nearly caught their respective total catch targets, leaving 40,332 mt, 15.0%, of the catch target uncaught (JTC, 2014a).

Since 2001, total catches have been below coast-wide fishery limits. The Hake Treaty establishes U.S. and Canadian shares of the coast-wide allowable biological catch at 73.88% and 26.12%, respectively, and this distribution has been adhered to since ratification of the Treaty. From 2009 to 2013 much of the U.S. tribal allocation remained uncaught and Canadian catches have also been well below the limit.

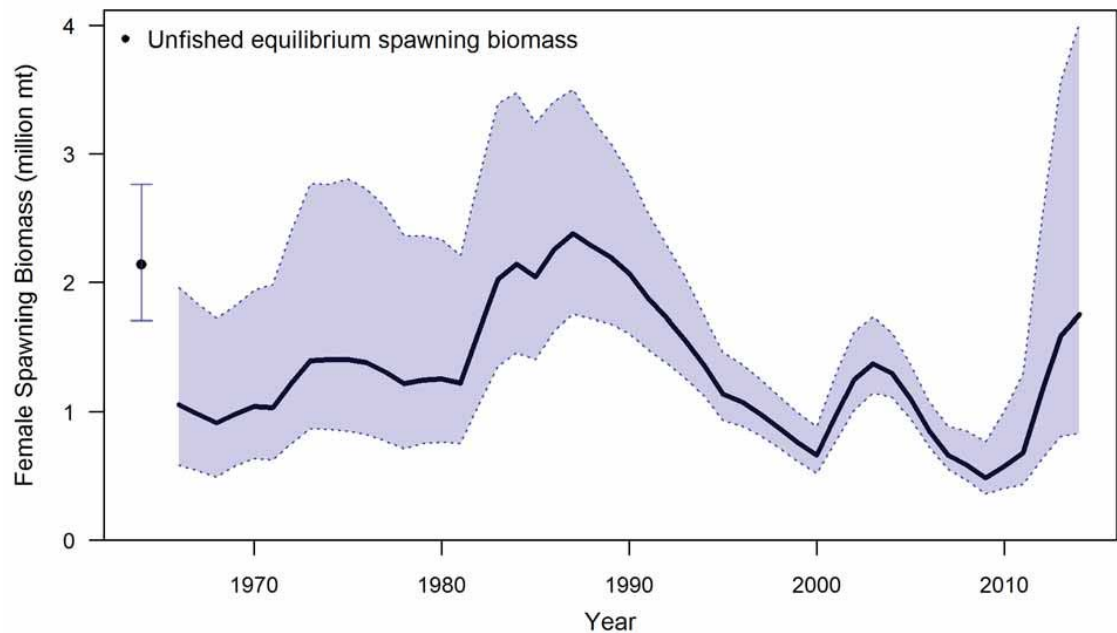
### 2014 Stock Assessment

The hake stock assessment uses Bayesian methods to incorporate prior information on natural mortality ( $M$ ), steepness of the stock-recruit relationship ( $h$ ), and several other parameters with likelihoods for acoustic survey biomass indices and age-composition, as well as fishery age composition data. The assessment provides results that can be probabilistically interpreted. The exploration of uncertainty is not limited to parameter uncertainty as structural uncertainty is investigated through sensitivity analyses. Sensitivity analyses are used to identify alternative structural models that may also be consistent with the data. The assessment also uses closed-loop simulations to explore how alternative combinations of survey frequency, assessment model selectivity assumptions, and harvest control rules affect expected management outcomes (JTC, 2014a).

The assessment input data primarily includes the fishery landings (1966-2013), acoustic survey biomass estimates and age-composition (1995-2013), and fishery age-composition. New data included in the 2014 assessment were the 2013 acoustic survey biomass estimate as well as the 2013 fishery and acoustic survey age compositions. Some histological analyses of hake ovaries were also undertaken, contributing to a preliminary re-examination of the Dorn and Saunders (1997) maturity estimates that were based on visual maturity determinations by observers during 1990–1992 (JTC, 2014a).

In 2014, the JTC changed the structural form of the base assessment model to include time-varying fishery selectivity. Overall, the model retained many of the previous elements as configured in Stock Synthesis (SS3) in 2013 (JTC, 2013). Time-varying fishery selectivity was implemented by estimating random annual deviations from the estimated base selectivity parameters. Both retrospective and closed-loop simulation analyses support time-varying fishery selectivity as the new base assessment model. Retrospective analyses of estimated cohort strength showed that the time-varying selectivity assessment model reduced the magnitude of extreme cohort strength estimates.

Results of the base-case stock assessment model indicate that Pacific hake female spawning biomass (Figure 2) was below the unfished equilibrium in the 1960s and 1970s (JTC, 2014a). The stock is estimated to have increased rapidly after two or more large recruitments in the early 1980s, and then declined steadily after a peak in the mid- to late-1980s to a low in 2000. This long period of decline was followed by a brief increase to a peak in 2003 (a median female spawning biomass estimate of 1.34 million mt in the SS model) as the large 1999 year-class matured. The stock is then estimated to have declined with the aging 1999 year-class to a female spawning biomass time-series low of 0.48 million mt in 2009. This recent decline is similar to that estimated in the 2013 assessment. Spawning biomass estimates have increased since 2009 on the strength of a large 2010 cohort and above average 2008 and 2009 cohorts. The 2014 female spawning biomass is estimated to be 81.8% of the unfished equilibrium level ( $B_0$ ) with 95% posterior credibility intervals ranging from 41.6% to 168%. The median of the forecast for 2014 female spawning biomass is 1.72 million mt (Table 1) (JTC, 2014a).



**Figure 2 Median of posterior distribution for female spawning biomass through 2013 (solid line) with 95% posterior credibility intervals (shaded area) (JTC, 2014a).**

**Table 1 Recent trends in estimated Pacific Hake female spawning biomass (million mt) and depletion level relative to estimated unfished equilibrium (JTC, 2014a).**



Year	Spawning biomass (mt)			Depletion ( $B_t/B_0$ )		
	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile
2005	0.951	1.090	1.343	0.418	0.517	0.647
2006	0.726	0.843	1.052	0.323	0.400	0.503
2007	0.553	0.656	0.867	0.247	0.311	0.401
2008	0.470	0.579	0.825	0.211	0.274	0.366
2009	0.365	0.479	0.746	0.169	0.228	0.327
2010	0.406	0.568	0.964	0.193	0.269	0.420
2011	0.443	0.669	1.271	0.215	0.317	0.543
2012	0.635	1.139	2.445	0.316	0.540	1.042
2013	0.813	1.566	3.499	0.410	0.745	1.526
2014	0.835	1.722	3.932	0.416	0.818	1.688

Pacific Hake are estimated to have low average recruitment with occasional very strong year-classes (Table 2). Very large year classes in 1980, 1984, and 1999 supported much of the commercial catch from the 1980s to the early 2000s. Some of the lowest recruitments in the time-series as well as some of the highest have been observed during the last decade. The current assessment estimates a strong 2010 year class comprising 67% of the 2013 commercial catch. However, due to the small number of years of observation, the size of the 2010 year-class remains uncertain. The model estimated a lower than average 2011 year class.

**Table 2 Estimates of recent Pacific Hake recruitment (billions of age-0) and recruitment diviations (deviation below 0 indicate less than average recruitment and deviations above 0 indicate above average recruitment) (JTC, 2014a).**

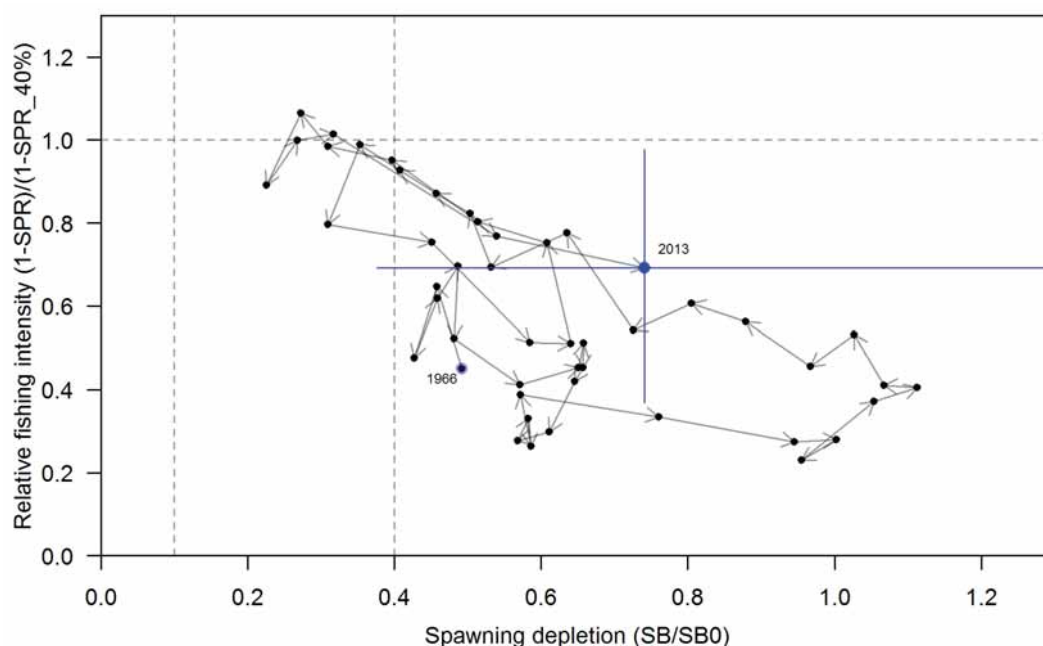
Year	Absolute recruitment			Recruitment deviation		
	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile
2003	0.99	1.41	2.16	0.02	0.36	0.67
2004	0.01	0.07	0.25	-4.35	-2.62	-1.49
2005	1.68	2.37	3.86	0.60	0.91	1.21
2006	1.21	1.84	3.23	0.32	0.69	1.07
2007	0.01	0.09	0.30	-4.11	-2.28	-1.12
2008	3.14	5.15	10.38	1.40	1.78	2.26
2009	1.06	2.01	4.37	0.34	0.87	1.42
2010	7.91	15.36	36.13	2.31	2.88	3.50
2011	0.04	0.37	1.64	-3.07	-0.90	0.49
2012	0.06	0.84	11.87	-2.79	-0.11	2.44

Pacific hake fishing intensity (Table 3) is estimated to have been below the F40% target until 2007 (JTC, 2013a). The base-case model estimates of prior fishing intensity indicate that the target was likely exceeded in 2008 and 2011. The exploitation fraction does not necessarily correspond to fishing intensity because fishing intensity accounts for the age-structure of the population. For example, the fishing intensity remained nearly constant and above target from 2010 to 2011. However, the exploitation fraction declined in these years because of many estimated 1 year-old fish.

**Table 3 Recent trends in fishing intensity (relative spawning potential;  $((1-SPR)/(1-SPR_{40\%}))$ ) and exploitation rate (catch divided by vulnerable biomass) (JTC, 2014a).**

Year	Fishing intensity			Exploitation fraction		
	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile
2004	57.71%	74.95%	90.97%	10.31%	12.62%	14.59%
2005	63.47%	80.48%	96.47%	14.87%	18.21%	20.95%
2006	76.35%	95.26%	110.68%	17.18%	21.73%	25.23%
2007	80.39%	98.61%	113.44%	19.68%	25.91%	30.77%
2008	87.22%	106.41%	120.58%	18.62%	26.19%	32.42%
2009	67.03%	89.31%	105.88%	10.49%	16.24%	21.49%
2010	73.82%	100.00%	118.09%	15.78%	26.06%	35.87%
2011	69.50%	101.39%	122.51%	10.91%	20.49%	31.24%
2012	45.60%	76.88%	103.69%	6.97%	14.63%	25.18%
2013	37.91%	69.37%	98.87%	3.21%	7.20%	13.96%

The exploitation history in terms of both the biomass and F-target reference points (Figure 3) shows that historically the fishing intensity has been low and the biomass has been high. Before 2007, estimated fishing intensity and biomass were below and above their respective targets, respectively. Between 2007 and 2011, fishing intensity ranged from 89 to 106% and spawning biomass depletion (relative spawning biomass) between 23% and 32% of unfished levels (Figure 3 and Figure 1, respectively). For 2013, there is an estimated 1% chance that fishing intensity estimates will be above the 100% target and spawning biomass depletion below the 40% target (JTC, 2014a).



**Figure 3 Estimated historical path followed by fishing intensity and spawning biomass depletion for Pacific Hake over years 1966-2013, inclusive. Blue bars span the 95% credibility intervals for 2013 fishing intensity (vertical) and spawning biomass depletion (horizontal). The dashed lines indicate the fishing intensity target (horizontal) and the 40:10 harvest control rule (vertical) 10% and 40% depletion points (JTC, 2014a).**

As in the 2013 assessment the 2014 assessment estimated reference points for Pacific hake using the base-case model (Table 4). The estimated unfished equilibrium spawning biomass estimate was 2,132,000 mt (95% posterior credibility interval ranges from 1,690,000 to 2,748,000 mt). The spawning biomass that is 40% of the unfished equilibrium spawning biomass ( $SB_{40\%}$ ) is estimated to be 853,000 mt. This is slightly larger than the equilibrium spawning biomass implied by the  $F_{40\%}$  default harvest rate target which is 769,000 mt or 36% of  $SB_0$  (JTC, 2014a).

**Table 4 Summary of median and 95% credibility reference points for the Pacific Hake base assessment model. Reference points were computed using 1966-2013 averages for mean size at age and selectivity at age (JTC, 2014a).**

Quantity	2.5 <sup>th</sup> percentile	Median	97.5 <sup>th</sup> percentile
Unfished female $B$ ( $B_0$ , thousand mt)	1,690	2,132	2,748
Unfished recruitment ( $R_0$ , billions)	1,788	2,720	4,496
<b>Reference points based on <math>F_{40\%}</math></b>			
Female spawning biomass ( $B_{F40\%}$ thousand mt)	592	769	968
$SPR_{MSY-proxy}$	—	40%	—
Exploitation fraction corresponding to SPR	18.3%	21.6%	25.6%
Yield at $B_{F40\%}$ (thousand mt)	252	342	489
<b>Reference points based on <math>B_{40\%}</math></b>			
Female spawning biomass ( $B_{40\%}$ thousand mt)	676	853	1,099
$SPR_{B40\%}$	40.6%	43.2%	49.6%
Exploitation fraction resulting in $B_{40\%}$	14.9%	19.1%	23.2%
Yield at $B_{40\%}$ (thousand mt)	248	334	479
<b>Reference points based on estimated MSY</b>			
Female spawning biomass ( $B_{MSY}$ thousand mt)	347	519	844
$SPR_{MSY}$	18.9%	28.4%	43.4%
Exploitation fraction corresponding to $SPR_{MSY}$	18.9%	34.2%	57.1%
$MSY$ (thousand mt)	263	363	524

A set of management metrics was identified as important to the Joint Management Committee (JMC), and Advisory Panel (AP). These metrics summarize the probability of various outcomes from the base case model given each potential management action (Table 5).

**Table 5 Probabilities of related to spawning biomass, fishing intensity, and 2015 catch limits for alternative 2014 catch options (JTC, 2014a).**

Catch in 2014	Probability $B_{2015} < B_{2014}$	Probability $B_{2015} < B_{40\%}$	Probability $B_{2015} < B_{25\%}$	Probability $B_{2015} < B_{10\%}$	Probability Fishing intensity in 2014 > 40% Target	Probability 2015 Catch Target < 2014 Catch
0	8%	1%	0%	0%	0%	0%
190,000	50%	2%	0%	0%	0%	0%
235,000	58%	3%	0%	0%	0%	0%
275,000	64%	3%	0%	0%	0%	1%
325,000	70%	3%	0%	0%	1%	3%
375,000	75%	4%	0%	0%	2%	5%
425,000	79%	4%	0%	0%	5%	9%
500,000	83%	5%	0%	0%	11%	18%
727,000	91%	9%	2%	0%	37%	50%
825,000	92%	12%	2%	0%	50%	62%
872,424	92%	13%	3%	0%	55%	68%

At all catch levels above 190,000 mt, the spawning biomass is predicted to decline with greater than 50% probability. The model predicts high biomass levels and the predicted probability of dropping below 10% is effectively zero and the maximum probability of dropping below B40% is 13% for all catches explored (JTC, 2014a).

#### Scientific Review Group

The SRG endorsed and commended the work of the JTC and the survey team (SRG, 2014). Ten summary conclusions were reported in the Scientific Review Group report of the February 18-21, 2014 meeting in Seattle, Washington (SRG, 2014).

1. The 2013 acoustic-trawl survey was successfully completed. For the second time, the US portion of the survey was conducted in conjunction with the acoustic-trawl survey for sardine, and we understand that a Center for Independent Experts review of the combined survey has been conducted from which a final report is due shortly. Members of the SRG would appreciate the opportunity to see that report. We also note that conducting surveys in consecutive years between 2011 and 2013 precluded the survey teams' ability to address research and technological development concerns raised in previous reviews.
2. The survey results included a relative biomass estimate of 2.42 Mmt (million metric tons), an increase from the 2012 survey estimate of 1.38 Mmt. The survey and fishery were mostly age 3 fish (76.2% survey; 66.9% fishery by numbers). In U.S. waters this 2010 cohort was strongly dominant, but in Canadian waters the 1999, 2005, 2006, and 2008 year classes also were present in significant numbers. The 2013 survey has verified that the 2010 year class is strong, but as always, some uncertainty remains about the precise size of the cohort.
3. Since 2011, the survey biomass estimate has been developed using a kriging (smoothing) methodology, applied to the entire time series. This year, the method resulted in considerable extrapolated biomass (approximately 28% of the total or 0.67 Mmt) outside the surveyed areas being included in the total biomass estimate. Given the pattern and amount of the extrapolated biomass in an area with no supporting observations, the SRG has concerns about this extrapolation, and provides recommendations later in this report to address this issue. A stock-assessment sensitivity run incorporating a lower 2013 survey biomass that excluded the extrapolated areas (1.75 Mmt) resulted in a default 2014 median harvest recommendation

from the F40% - 40:10 harvest policy that was approximately 14.6% (127 Kmt) lower than the corresponding estimate in the base assessment.

4. The 2014 base assessment model differs from the 2013 base model by the inclusion of time-varying selectivity in the fishery. We endorse the inclusion of this component, the utility of which was demonstrated through the Management Strategy Evaluation (MSE) tools developed by the JTC.
5. The median female spawning biomass estimated by the assessment is 1.72 Mmt at the beginning of 2014. This is the largest spawning biomass estimate in the assessment time series since 1992. In the absence of fishing, biomass would be expected to increase through 2016, because of the very large 2010 year class and the above average 2008 year class.
6. The model forecasts that, to have an equal probability of being above or below the target F40% fishing intensity, a catch of 825K mt in 2014 and 660K mt in 2015 could be achievable.
7. As noted, there is now greater certainty that the 2010 year class is strong, since it has been observed as 2 and 3 year olds in both the survey and fishery, but confidence intervals around its magnitude are still wide. The median estimate of 2010 year class strength is 15.4 billion recruits, compared to a median average recruit value of 2.7 billion recruits. Unless the assessment estimates are badly mistaken, this cohort will be a significant contributor to the fishery in 2014 and for several years beyond. A conservative estimate of year class strength based on the median of the lower 10% of the model (i.e., the 5<sup>th</sup> percentile) is 8.5 billion recruits. If 2010 recruitment truly is in this lower 10% range, the assessment model estimates a catch of 190K mt would allow the stock to maintain its current biomass level, which is well above historic levels and B<sub>40</sub> from 2014 to 2015; a 2014 catch up to 500K mt is estimated to maintain the stock above B<sub>40</sub> at the start of 2015.
8. The SRG recommends that the decision tables developed by the JTC at the SRG's request. The assessment uses Bayesian estimation. Summary results are reported here as medians of the estimated posterior distributions. be used in harvest decision-making. Those tables give the expected effects of various catch levels on stock size and other stock benchmarks.
9. The JTC made excellent progress in developing and using their Management Strategy Evaluation tools to investigate the use of time-varying fishery selectivity in the assessment model, and we commend them for this effort. We recommend continued development and use of this tool to address other questions, such as those highlighted in our research recommendations.
10. The MSE has provided some insight to evaluate and interpret the current harvest control rule and survey frequency.
  - *Survey frequency:* We note that the added information value of an annual survey, as estimated by the current MSE, was relatively low; however, this result is based on a limited set of operating model scenarios that preclude making a formal recommendation on survey frequency at this point. We believe that in some circumstances, an annual survey would be very informative. In our research recommendations (below), we suggest areas of future MSE evaluation of survey frequency and the development of an age-1 index that would be informative.
  - *Harvest control rule:* The MSE indicates that strict adherence to the treaty's F40% - 40:10 harvest control rule would result in a substantial long-term (but not short-term) probability that the stock would decline below the B<sub>40</sub> reference point (assessment, Appendix A). (To date, the JMC has recommended lower quotas than those prescribed by the treaty's harvest control rule.) This finding demonstrates the usefulness of the MSE in evaluating long-term consequences of harvest control rules.

The next stage of MSE development will continue to benefit from inputs from all parties.

### 2014 Harvest Recommendations

The Joint Management Committee met on March 18-20, 2014 in Vancouver, British Columbia to consider the stock assessment provided by the JTC and the findings and recommendations of the MRAG Americas 1<sup>st</sup> Re-assessment Surveillance Report, US/Canada Pacific Hake Mid-water Trawl Fishery 13

SRG. Following consideration of the presented information and recommendations from the Advisory Panel, the Joint Management Committee (JMC, 2014) approved the following recommendation for the coastwide Pacific hake total allowable catch.

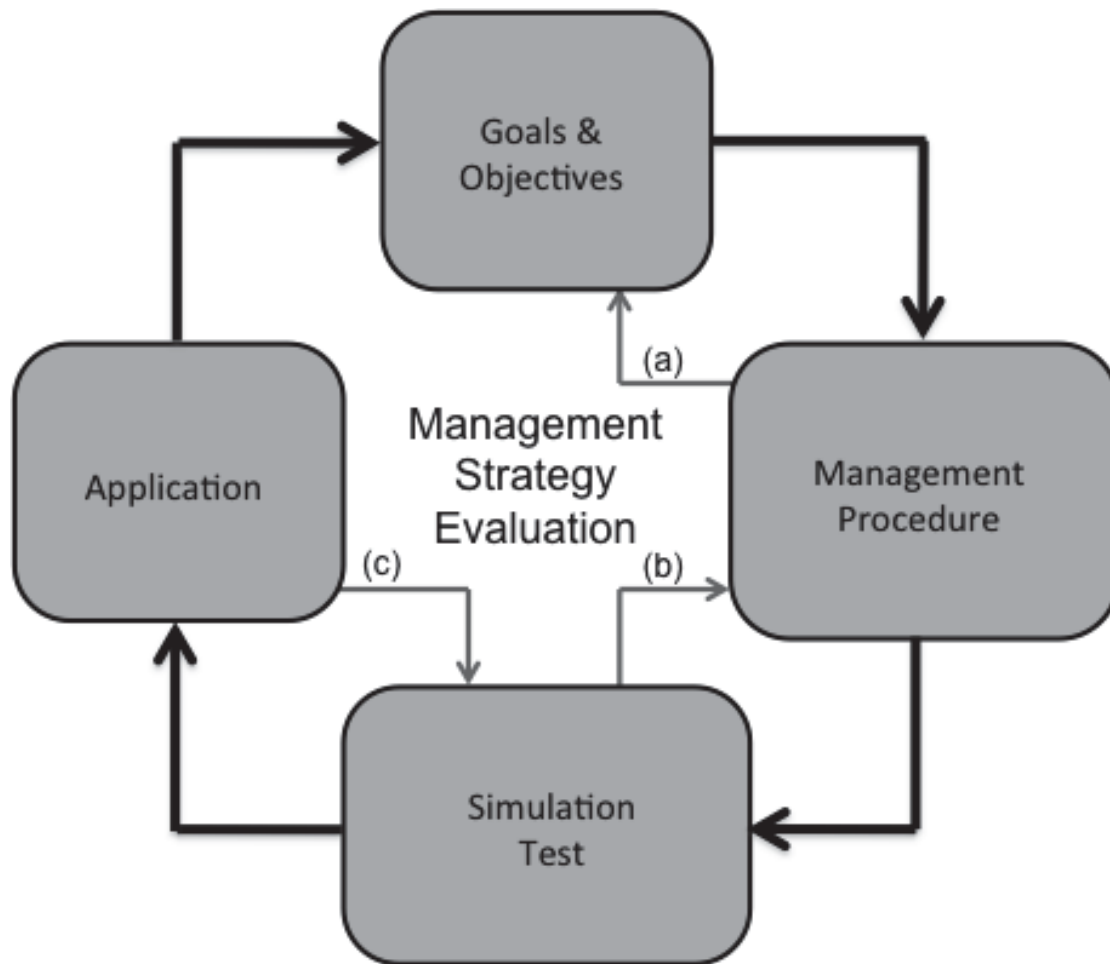
Consistent with Article II 3.(e) of the Agreement, and after reviewing the advice of the Joint Technical Committee (JTC), the Scientific Review Group (SRG), and the Advisory Panel (AP), the JMC recommends a coastwide TAC of 377,570 metric tons (mt). Based on Article III 2 of the Agreement, the Canadian share of the coastwide TAC is 26.12 percent, or 96,621 mt, and the U.S. share is 73.88 percent, or 278,949 mt. Consistent with Article II 5.(b) of the Agreement, an adjustment (carryover from 2013) of 13,172 mt is added to the Canadian share, for an adjusted Canadian TAC of 111,794 mt. In the same manner, an adjustment of 37,258 mt is added to the United States share, for an adjusted United States TAC of 316,206 mt. This results in a coastwide adjusted TAC of 428,000 mt for 2014.

The JMC (JMC, 2014) additionally recommended the continuation of the work of its MSE Steering Committee. The MSE Steering Committee, which includes hake scientists, fishery managers, and industry stakeholders, has been tasked with developing and MSE process that will inform and assist the JMC when formulating management advice for consideration of the parties on management of the Pacific Hake resource (JMC, 2014).

The JMC recommendation was transmitted via letter to the Parties on March 20, 2014. Subsequently NMFS and DFO formally implemented the JMC's recommended 2014 TAC (Federal Register, 2014).

#### Management Strategy Evaluation

Management strategy evaluation (MSE) is a structured decision-making process (Figure 4) in which fishing businesses, management agencies, and other stakeholders collaborate to develop and test a harvest strategy (JTC, 2014a).



**Figure 4 Four main elements of a fishery harvest strategy are developed through a Management Strategy Evaluation (MSE) process. The flows labelled (a-c) represent short-term response feedbacks that occur as part of each MSE sub-process. The Management Procedure and Simulation Test are linked via computer simulation of the fishery system (JTC, 2014a).**

The Management Strategy Evaluation (MSE) for Pacific Hake has provided guidance on the complexity of the stock assessment model and has provided insight into the performance of the management procedure (JTC, 2014b). The JMC defined some management principles as a start to defining objectives (JTC, 2014c)

Since 2012, both the SRG and the JMC have recommended simulation testing Management Procedures for the Pacific Hake fishery. During 2013, the simulation testing objectives were revised to determine (JTC, 2014a):

1. the expected long-term performance of a revised Harvest Rule consisting of two parts:
  - a.  $F_{40\%}$ -40:10 rule
  - b. Floor (0 or 180,000 mt) and Ceiling (None, 375,000, or 500,000 mt) options that limit output TACs to pre-determined ranges
2. the relative improvement in management performance of conducting Annual vs Biennial biomass surveys

3. whether implementing time-varying selectivity in the Management Procedure stock assessment model improves or degrades management performance compared to fixed selectivity

The  $F_{40\%-40:10}$  harvest rule leads to large year-to-year changes in catch, even in cases where perfect information about the population is available. The default Harvest Rule, as defined in the Agreement, was used with and without a catch range. The JTC suggested examining the effect of catch ceilings and catch floors (Hicks, 2015). In consultation with stakeholders, ceilings of 375,000 and 500,000 mt were chosen as values to be considered. Furthermore, a floor of 180,000 mt was also considered. These ranges were included as options to mimic the behavior of management often setting quotas lower than the harvest control rule suggests, and the fishery not catching the entire quota (JTC, 2014a).

In the limited cases investigated in the 2014 MSE, it was apparent that the introduction of time-varying selectivity to the assessment model has a greater benefit to stock status and catch in the long term than increased survey frequency. In the short term, an annual survey resulted in a higher average catch, but time-varying selectivity reduced the variability in the catch and lowered risk to the stock status. Combining both an annual survey and time-varying selectivity performed better than either option alone, but time-varying selectivity provided a large proportion of the improvement (JTC, 2014a).

The JTC closed-loop simulations carried out for the MSE showed that assessment models with time-varying fishery selectivity had higher median average catch, assessment models with time-varying fishery selectivity had higher median average catch, lower risk of falling below 10% of unfished biomass ( $B_0$ ), smaller probability of fishery closures, and lower inter-annual variability in catch compared to assessment models with time-invariant fishery selectivity (JTC, 2014a).

## 4.2 Principle 2

### **Retained species and bycatch**

#### U.S. Fishery

The coastal Hake fishery is a targeted mid-water trawl fishery that generally has very low bycatch rates. Dorn (1995) estimated that the historic non-directed catch in the at-sea fishery is less than 3% by weight. In 2012, less than 1% bycatch occurred in the total catch (Bellman et al. 2013) by all sectors of the U.S. mid-water trawl fisheries for Pacific Hake. Observed catch data from all four sectors (At-sea Mothership, At-sea Processor, Shoreside Processor, and Tribal) during 2014 (Appendix Table 1) indicates the bycatch rate is 0.7%. Appendix Table 1 lists 51 species (or species groups) of groundfish, plus 100 non-groundfish species taken during 2014.

An estimated 89% of the 1,029 mt of groundfish bycatch was retained. The main retained groundfish species continue to be Yellowtail Rockfish (*Sebastes flavidus*), Widow Rockfish (*Sebastes entomelas*), Spiny Dogfish (*Squalus acanthias*), and minor slope rockfish. Rougheye Rockfish (*S. aleutianus*) and Shortraker Rockfish (*S. borealis*), in the latter group, were classified a main retained species in the recertification due to their potential vulnerability.

Several 2014 PFMC meetings included discussion of how to manage the northern slope rockfish species complex, which includes Rougheye Rockfish. The PFMC was concerned with how best to manage targeted and incidental catches of Rougheye in Pacific coast groundfish fisheries, including the hake fishery. The primary issue was whether to maintain the current stock complex or to remove Rougheye from the complex. The latter could have included development of allocations of Rougheye Rockfish to various sectors of the industry. The groundfish industry responded by recommending that



the current stock complex be maintained and committing to take voluntary measures to reduce targeting and to minimize bycatch of rougheye rockfish.

The US Hake sectors took a number of steps to address the bycatch of those two species in addition to the information sharing that goes on between organizations and their members. The *Catcher Processor Cooperative* Board reviewed past Rougheye catch information and identified areas of high Rougheye catch occurrence. They agreed to several measures, including:

- Carry flexible grate rockfish excluders for use when fishing in known Rougheye bycatch areas to minimize Rougheye bycatch.
- Collect and record tow-specific Rougheye Rockfish amounts (numbers and total weight) that are reported to the PWCC Executive Director.
- Establish Rougheye Rockfish kg/mt of Hake rate that triggers action to prevent subsequent tows from exceeding the trigger.
- Establish policy whereby the PWCC Executive Director and Board track daily catches and will consider further actions as warranted.

The *Mothership Sector* also took action through its cooperative. The Mothership bycatch committee as well as the Board met and adopted the following protocols:

- Distribute maps of historic Rougheye bycatch to the members
- Distribute high bycatch tow alerts and VMS tracks for hauls exceeding a specified rate
- Establish a set of “relocation” triggers based on a 3-day rolling average exceeding a certain rate
- Additionally, Mothership operators will incorporate Rougheye information in the daily ship reports.

The *Shoreside Sector*’s risk pool also discussed the issue through its bycatch committee and then through the cooperative’s Board of Directors. The group encouraged vessel captains to use Sea State’s “Preliminary Fish Ticket Entry” form to report the plant tally of Rougheye after each landing, to help provide more real time information on Rougheye encounters. Sea State will then use the information to produce alerts and VMS trackline maps. Individual shoreside whiting vessel owners (both risk pool members and non-members) have invested hundreds of thousands of dollars into the development of rockfish excluders to reduce the take of non- target species – this development will continue.

During 2014, the fishery took trivial amounts of the latter two species (10 mt of Rougheye and 1 mt of Shortraker), which suggests the efforts to reduce bycatch of these species was successful.

The Shoreside Sector took nearly 75% of the groundfish bycatch and retained 99+% of it. The Catcher-Processors took 13% and retained 70%, while Motherships took 12%, retaining 45% of the groundfish bycatch. Those species not discussed above, but listed on Appendix Table 1, and which show less than 50% discard, can be considered minor retained species, and those that show more than 50% discard would be considered minor bycatch.

An estimated 77% of the 894 mt of non-groundfish bycatch is retained. The common retained non-groundfish species are Jack Mackerel (*Trachurus symmetricus*), Pacific Mackerel (*Scomber japonicas*) other mackerels, squids, and American Shad (*Alosa sapidissima*) (Appendix Table 1). All of these are considered minor retained species. The Shoreside Sector took nearly 55% of the non-groundfish bycatch and retained 97% of it. The Catcher-Processors took 34% and retained 55%, and Motherships took 11%, retaining 45% of the non-groundfish bycatch.

According to the Pacific Coast Groundfish Plan (2014), seven groundfish species were categorized as overfished in the U.S. west coast. These species include Bocaccio (*Sebastes paucispinis*), Canary

Rockfish (*Sebastes pinniger*), Cowcod (*Sebastes levis*), Darkblotched Rockfish (*Sebastes crameri*), Pacific Ocean Perch (POP) (*Sebastes alutus*), Petrale Sole (*Eopsetta jordani*) and Yelloweye Rockfish (*Sebastes ruberrimus*). In general, under U.S. management these species may not be taken or retained, but when captured in association with fisheries targeting other stocks they are subject to bycatch quota share. In addition to bycatch restrictions, the incidental catches of overfished species are managed through gear restrictions and closures of Rockfish Conservation Areas (RCAs) (MSA 2007). These management measures appear to be working because catches of these species are very small relative to the Acceptable Catch Limit (ACL). A summary is presented in Table 6.

**Table 6 Bycatch (mt) of overfished species, by Hake sector, compared to ACL.**

Species	MS catch	CP catch	SS catch	2013 ACL	2014 Total catch
Bocaccio Rockfish	0.07	0.01	0.46	320	0.55
Canary Rockfish	0.35	0.28	2.57	116	3.20
Cowcod	--	--	--	3	0
Darkblotched Rockfish	7.21	3.41	8.45	317	19.06
Pacific Ocean Perch	3.60	0.32	10.17	150	14.09
Petracle Sole	--	--	0.03	2,592	0.03
Yelloweye Rockfish	--	--	0.00	18	0

Data source: NMFS, URL:

[http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data\\_products/sector\\_products.cfm](http://www.nwfsc.noaa.gov/research/divisions/fram/observation/data_products/sector_products.cfm)

Prohibited fish species taken during the fishery in 2014 by sector, is presented in Table 7.

**Table 7 Prohibited fish species taken (in numbers) during the fishery in 2014 by fishery sector.**

Species	Mothership	Catcher Processor	Treaty	Shoreside	Total
Chinook Salmon	2,908	3,780	1	6,756	14,445
Chum Salmon	4	0	0	4	8
Coho Salmon	96	8	0	163	208
Sockeye Salmon	0	0	0	1	1
Steelhead	0	0	0	2	2
Salmon Unid.	0	2	0	0	2
Dungeness Crab	0	0	0	0	0
Eulachon	25	242	0	0	267
Pacific Halibut	31	2	0	124	157

Research to reduce bycatch is active. In 2014, NMFS's Fishery Resource Analysis and Monitoring Division at the Northwest Fisheries Science Center and the Pacific States Marine Fisheries Commission (PSMFC) published results of a collaborative study (Lomeli and Wakefield 2014) to develop a rockfish excluder (bycatch reduction device or BRD) for Pacific Hake fishery. The design uses two vertical sorting grids and an exit ramp that sort fish by size as they move back toward the codend. Fish that are smaller than the sorting grid openings (i.e., Pacific Hake) will pass through and be retained, whereas larger fish (i.e., rockfishes) will be excluded. Other bycatch reduction research involves the use of artificial light to enhance the escapement of Chinook Salmon when used in conjunction with a BRD in Pacific Hake midwater trawl nets. Results from this project suggest artificial illumination could be used to enhance Chinook Salmon escapement by attracting them towards escape openings on a BRD. Behavioral observations of widow rockfish (*Sebastes entomelas*) and Pacific hake in relation to the BRD are also reported. In addition, the hake industry has continued to improve on their operations to reduce bycatch as explained above.

## Canadian Fishery

The Canadian Coastal Hake fishery is also a targeted mid-water trawl fishery that generally has a very low bycatch rate, which was reduced to just over 3% in 2014. The catch of non-hake species taken by the Canadian fishery is presented in Appendix Table 2. Based on 2014 data alone, no species met the criteria for main retained species; however, the team retained the main species identified in the re-assessment report <https://www.msc.org/track-a-fishery/fisheries-in-the-program/certified/pacific/pacific-hake-mid-water-trawl/reassessment-downloads> based on historical data. Yellowtail Rockfish had the highest landings of the minor retained species, however, followed by Widow Rockfish and Walleye Pollock. Rougheye Rockfish and Bocaccio were the only two main bycatch species. Pacific Ocean Perch and Splitnose Rockfish, and Restripe Rockfish were recorded with the highest catches of the minor bycatch species

In addition to the Hake Agreement meetings, the Canadian Groundfish Trawl Advisory Committee (GTAC) met several times throughout 2014 as usual, also In-season Hake Advisory Committee (IHAC) and the GTAC Hake Subcommittee met. Among the usual agenda items discussed at GTAC, it was noted that this was the second year of the Bocaccio rebuilding plan. Also, industry was heavily involved in developing a skate rebuilding plan and sector allocation plan, both implemented in 2015 across all gear types.

Bocaccio. Based on updated science information, the Department introduced Bocaccio catch reduction targets from 2012 catch levels of approximately 137 tonnes (inclusive of trawl, groundfish hook and line, salmon troll, and recreational sectors) to a mortality cap of 75 tonnes over a three year period, in order to support stock rebuilding. The Department will continue to review the efficacy of these and other pilot measures at the end of each fishing season, and consider any additional measures necessary to support stock rebuilding.

To date Industry has been trying to both rebuild the stock, and provided rationale to support the industry belief that DFO is the best authority to manage this stock, and that a SARA listing is not warranted. A TAC of 120 tonnes or less would likely reduce total mortality to meet rebuilding plans; the Industry suggested a reduction of the TAC to 110 tonnes for the current season. Catches are tracking in line with a target of 61.9 tonnes of mortality. According to Ackerman (personal communication 2015) there was less pressure by stakeholders regarding more restrictions related to Bocaccio bycatch management.

Yellowtail Rockfish. In late 2014, DFO completed its peer review process of the assessment of Yellowtail rockfish. The Science Advisory Report (*DFO. 2015. Yellowtail Rockfish (Sebastes Flavidus) Stock Assessment for the Coast of British Columbia, Canada. DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2015/010*) is available online at the following link [http://www.dfo-mpo.gc.ca/csas-sccs/publications/sar-as/2015/2015\\_010-eng.html](http://www.dfo-mpo.gc.ca/csas-sccs/publications/sar-as/2015/2015_010-eng.html). This information contained in the Science Advisory report shows the stock is healthy and current levels of removals are not depleting stock. The MSY decision tables indicate that at current catch levels (~4,300 t), there is a high probability (>86%) that the stock will remain in the Healthy Zone over the next five years. The SAR was used by managers in establishing the total allowable catch levels for Yellowtail Rockfish. In addition, the Monterey Bay Aquarium Seafood Watch Program is in the process of adding yellowtail as a yellow listed species.

Collection of data on Yellowtail rockfish and other groundfish species continues through the established catch monitoring programs for the commercial groundfish fisheries. Additionally, data are collected through the various regular research surveys conducted by DFO and/or in conjunction with the industry (e.g. Annual Groundfish Trawl Synoptic Survey, IPHC setline survey, and other DFO research cruises), and DFO regularly undertakes data analysis to assess data accuracy, completeness and representativeness in support of aging and assessment requirements.

Now that an acceptable assessment has been completed and peer reviewed for Yellowtail, it is possible to assess risk levels. Information is now sufficient to estimate outcome status with respect to biologically based limits for Yellowtail rockfish. Furthermore sufficient data continue to be collected and could detect any increase in risk level to Yellowtail. Yellowtail catches are within biological limits, risk levels are monitored, it is a quota fishery with 100% at sea and dockside monitoring and as such, the team has determined that the condition for yellowtail rockfish has been met.

Walleye Pollock, Rougheye Rockfish and Redstripe Rockfish. For the remaining three main retained species (Walleye Pollock, Rougheye Rockfish and Redstripe Rockfish), as noted in the recertification conditions, it is required that “by the end of the first year, the client shall provide a plan that will achieve the condition by end of the fourth year”. The Canadian Groundfish Industry, through the established processes like the Groundfish Industry Advisory Board and the Groundfish Trawl Advisory Committee, has reviewed the groundfish assessment schedule. They have shown their support for and have recommended to DFO that it ensures Walleye Pollock, Rougheye Rockfish and Redstripe Rockfish are assessed by 2018 to ensure these conditions can be closed as per the agreed to Action Plan.

In addition, collection of data on groundfish species continues through the established catch monitoring programs for the commercial groundfish fisheries. Additionally, data are collected through the various regular research surveys conducted by DFO and/or in conjunction with the industry (e.g., Annual Groundfish Trawl Synoptic Survey, IPHC setline survey, and other DFO research cruises). DFO has a regular and ongoing commitment to the undertaking of data analysis to assess data accuracy, completeness and representativeness in support of aging and assessment requirements. Already a pre-assessment evaluation has been undertaken for both Pollock and Redstripe to advise what needs to be done (surveys, data collection, ageing) in preparation for a successful assessment.

DFO also continues to undertake a science review of appropriate assessment methodology for groundfish species including Rougheye Rockfish and Redstripe Rockfish and for such data deficient species, (like Walleye Pollock) work on a “Tiered Approach” is currently underway and scheduled for completion in the fall of 2016. The Tiered Approach will synthesise the most applicable approaches, methods, and tools into a framework for BC groundfish that will provide guidance on how stock assessments for different groundfish can be completed, given the varying amounts and types of data available for different stocks. It is intended to enable more efficient completion of assessments, support more successful completion of assessments for some of the species that are data limited, and assist in development of a better picture of the ecosystem state and health. The development of a tiered approach will draw on approaches that have been developed in Alaska and Australia for similar purposes.

As with Yellowtail, through established DFO processes, consultation with stakeholders on assessment requirements for groundfish including Walleye Pollock, Rougheye Rockfish and Redstripe Rockfish are also undertaken, as well as identifying work plan and human and financial resource requirements. As before, consultations and participation of stakeholders in the Canadian Science Advisory Secretariat (CSAS) and various advisory bodies is a key element of the processes. Included are discussions on the future science priorities, review work plans, resource needs and identification of possible industry assistance/involvement.

It is expected that by 2018 all three species will have peer reviewed assessments completed. From that work, outcome status with respect to biologically based limits for Redstripe Rockfish, Rougheye Rockfish, and Walleye Pollock should be known. Furthermore, as ongoing regular commitments are already in place to continue collecting and analysing data, risk will be well monitored.

All three species are scheduled for assessment through the DFO - CSAS process. The timelines for the each assessment are:

- Walleye Pollock: Assessment was originally scheduled for 2014 but was deferred due to a lack of data and analytical resources, no index, limited biological data, and CPUE is unreliable as it is a targeted midwater fishery. The current approach is to assess Walleye Pollock as part of the “Tiered Approach” which will define options for providing harvest advice for data deficient species. Work on the “Tiered Approach” is underway (2015) and is scheduled for review by CSAS in the fall of 2016.
- Rougheye Rockfish: Assessment is scheduled for delivery in 2017
- Redstripe Rockfish: Assessment is scheduled for delivery in 2018

Big and Longnose Skate. The first full stock assessment on Big and Longnose Skate was conducted in 2013 through a CSAS peer review process. In response to the stock assessment results, DFO undertook an initiative to strengthen the commercial management of Big and Longnose Skate to help ensure their conservation and sustainable use. The initiative also sought to support the long term stability and certainty of commercial groundfish allocation arrangements. Following consultation with groundfish fishing interests, including CIC and GTAC, the initiative has resulted in

- (1) the establishment of total allowable catches (TACs) for these species in outside waters<sup>1</sup>,
- (2) changes to commercial management measures, and
- (3) the establishment of a commercial allocation formula that will apportion the commercial TAC among commercial fisheries within the context of the existing integrated groundfish fishery.

Management changes will entail transitioning Big and Longnose Skate management to individual transferable quota in outside waters for 2015/16 in the Dogfish, trawl, Halibut, Sablefish, and outside rockfish fisheries. Individual license quota allocation formulas vary by sector; please see the respective fishery harvest plans appended to the 2015 IFMP for details. Longnose Skate TACs and the Big Skate Area 3 C/D TAC will be progressively reduced over 2 years..

Salmon. Salmon bycatch was not directly managed 2014, and was lower than the average of past years (Ackerman, personal communication 2015).

## **ETP Species**

### U.S. Fishery

In 2013, NMFS re-initiated ESA consultation about the impacts of the Pacific Coast Groundfish Fishery (including the Pacific Hake fishery) on ESA-listed salmonids. This process will include development of a new Biological Opinion. In 2014, the Pacific hake fishery exceeded the 11,000 Chinook salmon threshold contained in the current Biological Opinion. The total Chinook catch by all Hake sectors was estimated at 14,445. 2014 fishery data is included in the NMFS analyses of impacts to ESA-listed salmonids.

The goal of the consultation process is to ensure that the incidental take of salmonids in the groundfish fishery does not cause jeopardy to any population listed under the ESA. The current Biological Opinion (BiOp) indicates that an overall threshold of 20,000 Chinook (for the whiting and non-whiting groundfish fisheries combined) achieves this goal. Information provided by NMFS indicates that the groundfish fishery, as a whole, has stayed below 20,000 Chinook in most years. For the Pacific Hake fisheries, the current BiOp limits the bycatch rate in the whiting sectors to 0.05 Chinook per metric ton (mt) of Pacific whiting, with an associated total annual catch of 11,000 Chinook. The Pacific Hake fishery catch has exceeded 11,000 Chinook in four years (1995, 2000, 2005, and 2014) during the 1991 to 2014 period. Moreover, NMFS indicates that the authorized take amount accommodates the variable nature of the fishery and results in low bycatch of ESA stocks.

The NMFS reports state that “bycatch of ESA listed Chinook in the whiting fishery is low – 0.002 listed Chinook per metric ton of whiting and 0.07 listed Chinook per total Chinook caught.” Therefore, it is clear that the whiting fishery, in specific, and the groundfish fishery, in general, are performing well relative to impacts to listed salmonids.

Chinook bycatch rates and number caught vary by year, month, area and depth where the Pacific whiting fisheries occur. For the at-sea sectors the majority of the Chinook were caught in waters deeper than 150 fm. In general, salmon bycatch rates have been highest in the fall, September to December, and lowest from late-spring to summer, May to August. The majority of the Chinook taken in the at-sea sectors were taken between Cape Falcon (45°46' N. lat.) and Cape Blanco (42°50' N. lat.), with almost all of the Chinook being caught in the fall from September to December. For the Pacific whiting shorebased fishery the number of Chinook caught was highest from June to August in waters shallower than 100 fm. However, from September to December, bycatch rates more frequently exceeded 0.05 Chinook per mt of Pacific whiting with November having the high bycatch rates in all depths. Approximately 36 percent of the Chinook bycatch in the Pacific whiting shorebased fishery occurred north of Cape Falcon and 64 percent occurring between Cape Falcon and Cape Blanco with the highest Chinook bycatch occurring from July to November, with bycatch rates most frequently exceeding 0.05 Chinook per mt of Pacific whiting in the area between Cape Falcon and Cape Blanco. All Pacific Hake sectors have high bycatch rates in the area west of Heceta Bank. The tribal fishery, which is more spatially constrained than non-tribal whiting fisheries, most frequently exceeded the 0.05 Chinook per mt of Pacific Hake bycatch rate. However, the small amount of Pacific Hake harvest in tribal fishery in recent years, 2012 to 2014, has resulted in minor amounts of Chinook bycatch (NMFS 2015).

From 2009 to 2013, 933 readable Coded Wire Tags (CWTs) were recovered from Chinook and 16 from Coho Salmon. Of all Chinook with CWTs, 30 percent were from Endangered Species Act (ESA) listed stocks, with the remaining 70 percent from unlisted U.S. stocks, Canadian Stocks, or of unknown origin. For the at-sea sector, 42 percent of the listed fish were Puget Sound Chinook, 34 percent were lower Columbia River Chinook, 16 percent were Snake River fall run Chinook, 4 percent were Upper Willamette River Chinook, 3 percent were Snake River spring/summer run Chinook, and 2 percent were Central Valley spring run Chinook. This is in contrast to the Shorebased fishery during the same time period, where 77 percent of the listed Chinook were lower Columbia River Chinook, 15 percent were Snake River Fall run, 6 percent were Puget Sound Chinook, and 1 percent were Central Valley spring run Chinook. Although fewer overall salmon are caught in the Pacific whiting sectors in the May to July time period, a greater proportion of the fish recovered with CWTs during the May to July time period were from ESA-listed stocks. CWT data indicates that all sectors of the Pacific whiting fishery were dominated by two and three year old Chinook (NMFS 2015).

Green Sturgeon and Eulachon also occur in the US fishery, but rarely. Operation of the Pacific coast groundfish fishery (including the Pacific Hake fishery) is not likely to jeopardize the continued existence of Eulachon (PFMC and NMFS 2012)

No significant interactions with ETP marine mammals or birds, beyond the status quo, were reported. Because the interactions with this species are so small, this bycatch is unlikely to affect the status of this stock.

### Canadian Fishery

No ETP species occurred in the 2014 Canadian Hake fishery to a degree that the Hake fishery could cause adverse impacts.

Pacific Halibut. The 2014 catch of Pacific Halibut was 0.12 mt compared to the 454 mt ALC.

Salmon. Pacific salmon bycatch was slightly over 5 mt, with Chinook Salmon comprising 90% of the bycatch.

Eulachon. A socio-economic analysis is currently being completed as one element of the overall SARA process before submission to the Minister for a decision whether to list. Eulachon has since been added as a prohibited species. For the 2014/2015 season and DFO has prohibited the retention of Eulachon by all groundfish trawl licensed vessels. The catch is negligible in trawl, being less than 1 mt/yr and was not recorded in the 2014 Hake fishery (Ackerman personal communication 2015).

## Habitat

### U.S. Fishery

The PFMC is formally reviewing groundfish Essential Fish Habitat (EFH), which includes exploration of and (potential) development of changes to current groundfish EFH designations and regulations. The nature of habitat conservation demands consideration of the full range of impacts regardless of the authorizing statute. For example, if non- Magnuson-Stevens Act (MSA) fisheries were to occur in a Habitat Conservation Area closed to MSA fisheries, the closure would probably not be effective in conserving habitat. For this reason, the approach taken in Amendment 19 of applying conservation measures to both MSA and non-MSA fisheries should be carried forward to Phase 3 of this 5-year review. The PFMC review is being conducted by the Essential Fish Habitat Review Committee (EFHRC), a group of governments, academicians, and stakeholders.

The midwater trawl Whiting fishery is currently exempt from closures designed to prevent bottom contact in EFH conservation areas. Some stakeholders requested the PFMC consider if new measures might be necessary because information indicates that midwater trawls do occasionally make contact with the sea floor. The PFMC requested NMFS analyze Whiting fishery data to ascertain potential impacts to EFH from the fishery. NMFS provided reports to the PFMC in Sept 2014. A summary of estimated frequency of “probable” bottom contact by vessels using midwater trawl gear in the At-sea Hake fishery is presented in Table 8. “Probable” bottom contact is defined as the presence of either one or more benthic or demersal fish or invertebrate taxa in the catch. (The set of taxa defined as benthic or demersal were determined by a team of expert marine ecologists and fisheries biologists.) Bottom contact is reported as frequency of hauls both coastwide and within existing EFH conservation areas. As an aid to interpreting this table: out of 949 hauls that occurred within the EFH Conservation Areas, 115 or 12.1% were interpreted as contacting the seafloor; out of 19,090 hauls that occurred outside of the EFH Conservation Areas, 4,353 or 22.8% were interpreted as contacting the seafloor; and out of 20,039 hauls that occurred coastwide, 4,468 or 22.3% were interpreted as contacting the seafloor.

**Table 8 At-sea Hake fishers contact with bottom.**

	Inside		Outside		Total	
Hauls (total)	949	4.7%	19,090	95.3%	20,039	100%
Hauls with >=1 benthic taxa	115	12.1%	4,353	22.8%	4,468	22.3%
Hauls with >=2 benthic taxa	31	3.3%	1,808	9.5%	1,839	9.2%
Hauls with 1 benthic taxa	84	8.8%	2,545	13.3%	2,629	13.1%

Data sources: IFQ At-sea Hake Observer Program (12 Jun 2006 – 31 Dec 2013)

Table 9 presents a summary of estimated frequency of “probable” bottom contact by vessels using midwater trawl gear in the Shore-side Hake fishery. “Probable” bottom contact is defined as the presence of either one or more benthic or demersal fish or invertebrate taxa in the catch. Bottom contact is reported as frequency of trips coastwide.

**Table 9 Shoreside Hake fishers contact with sea bottom.**

	<b>Inside + Outside</b>	
Hauls (total)	2,574	
Hauls with $\geq 1$ benthic taxa	1,808	70.2%
Hauls with $\geq 2$ benthic taxa	955	37.1%
Hauls with 1 benthic taxa	853	33.1%

Data sources: IFQ shore-side hake fish ticket matched 2011 - 2013 observer data.

Note: the data set includes a total of 4,989 hauls from 2,574 unique fishing trips, averaging about 2 hauls per trip.

The NMFS is continuing to develop data on EFH and analyze results to characterize the Hake fishery effect on benthic habitat. Detailed results will be available during the next MSC audit, and will be used to evaluate proposals from stakeholders regarding any future adjustments to the conservation of EFH.

The At-sea Sectors of the Pacific Hake fishery worked with the U.S. Environmental Protection Agency (EPA) to develop a general NPDES permit to authorize at-sea discharge of fish processing wastes. This process was ongoing in 2014, formally noticed in 2015, and expected to be implemented in 2016.

### Canadian Fishery

Marine habitat work continues under several acts, policies, and strategies. DFO continues to operate under the Oceans Act, the Policy for Managing the Impacts of Fishing on Sensitive Benthic Areas, and DFO's Pacific Region Cold-Water Coral and Sponge Conservation Strategy, which encompasses short and long-term goals and aims to promote the conservation, health and integrity of Canada's Pacific Ocean cold-water coral and sponge species.

Management and monitoring frameworks are under various stages of development for all Oceans Act Marine Protected Areas (MPAs). A well-defined MPA management framework increases certainty and predictability for oceans users. It also tailors MPA management towards achievement of stated MPA goals and objectives, resulting in more effective and efficient protection. This may yield greater ecological benefits and associated ecosystem goods and services (DFO 2015).

When MPA management is supported by a monitoring framework, managers make informed decisions to adaptively manage the MPA. This results in more effective MPA management. A monitoring framework also ensures that monitoring is strategic, efficient, and makes use of collaborative arrangements where possible.

DFO requires Hake fishers to report fishing gear contact with bottom. No bottom contacts were reported in 2014 (B. Ackerman, personal communication, 2015).

### **Ecosystem**

#### U.S. Fishery

The PFMC Fishery Ecosystem Plan (FEP), which includes this fishery, is a living document, which is updated annually. The current FEP was adopted by the PFMC in April 2013. The following schedule is intended to allow the PFMC to respond to emerging issues by annually assessing the status of ecosystem-based initiatives and revising priorities every two years (odd years) as necessary. The FEP itself is scheduled for comprehensive review every five years.

Each year at the PFMC's March meeting, the PFMC and its advisory bodies will:

- review progress to date on any ecosystem initiatives the PFMC already has underway;



- review the list of potential ecosystem initiatives provided in Appendix A to the FEP and determine whether any of those initiatives merit PFMC attention in the coming year;
- if initiatives are chosen for PFMC efforts, request background materials from the appropriate entities;
- in March 2015 and in each subsequent odd-numbered year, assess whether there are new ecosystem initiative proposals that could be added to the appendix; and
- in March 2018, assess whether to initiate a review and update of the FEP.

In support of its ecosystem-based management processes, the Council has requested that NMFS, in coordination with its Integrated Ecosystem Assessment Program and interested agencies, provide an annual state-of-the-ecosystem report at each of its March meetings (beginning in 2014). Highlights of the 2014 report (PFMC 2014) include:

- From late 2010 to 2012, the tropical Pacific transitioned from weak La Niña to ENSO-neutral conditions.
- Strong upwelling occurred in 2012 for southern and central California and in 2013 for the whole coast, indicating higher primary productivity.
- Copepod biomass and diversity indicate generally average to favorable conditions for secondary production in the California Current Ecosystem (CCE).
- Survey catches indicate that Northern anchovy abundance is reduced along much of the coast recently; however, a number of other forage fish populations have responded positively to productive conditions.
- Most salmon populations examined are near their average escapement, but trends are mixed: 3 populations show increasing trends, 6 show downward trends, and 3 show no trends.
- The mean trophic level of groundfish exhibited a declining trend south of Cape Mendocino, but has been largely stable since 2009 throughout the CCE.
- In response to the poor condition of sea lion pups at rookeries and a high level of strandings, NMFS declared an Unusual Mortality Event (UME) of California sea lion pups in March 2013
- Non-fisheries human activities in the CCE that may negatively impact the ecosystem are generally low with stable or declining trends. Nutrient input is an exception: it is elevated, although it shows a declining trend at the coast-wide scale.

Other findings relative to Pacific Hake included:

Mean trophic level (MTL) is the biomass weighted average of the trophic levels of the species in a sample. It is widely used as an indicator of change in trophic structure. Previous work suggests that the changes in MTL are strongly driven by the abundance of Pacific Hake, Spiny Dogfish and Sablefish—relatively high TL, high biomass species that have all declined in abundance in the trawl survey since 2003. Low groundfish MTL probably indicates good conditions for competitors of groundfishes. Many predators in the CCE eat krill and forage fishes. Food web modeling suggests that a drop in groundfish MTL due to a loss of higher TL species lowers predation pressure on the forage species and makes these prey available to other taxa such as squid, salmon, tuna and seabirds leading to positive population forcing for these taxa. Therefore, setting targets for groundfish MTL entails making trade-offs with these other species.

Landings provide the best long-term indicator of fisheries removals. Landings of coastal pelagic species increased and were above historic levels over the last five years; shrimp landings increased over the short-term but were still within historic levels; and landings of salmon and groundfish species (excluding Hake) were at historically low levels for the last five years. Landings of Pacific Hake and crab varied within historic landing levels. Total removals from commercial and recreational fisheries varied within historical ranges and were highly dependent on the trends of Pacific Hake landings.

NMFS NWFSC conducted ecosystem research during 2014 with relevance to Pacific Hake:

- Modeling Pacific Hake (*Merluccius productus*) summer distribution
- Potential overlap between cetaceans and commercial groundfish fleets operating in the California Current large marine ecosystem
- Cumulative impacts of fisheries in the California Current
- Economic impacts of ocean acidification on California Current fisheries

Details can be found in Appendix I.

### Canadian Fishery

DFO is responsible for the management and protection of marine resources on the Pacific coast of Canada. Examples of DFO stewardship activities include work to prevent and mitigate the introduction of aquatic invasive species, fisheries closures to protect valuable ecosystems, supporting the recovery of species at risk, and strengthening Canada's response to ship-source marine pollution. Ecosystem work continues under several Acts, Policies, and strategies. These include the Oceans Act, Canada's Oceans Action Plan, the Strategic Program for Ecosystem-Based Research and Advice (SPERA), and the Pacific Region Cold-water Coral and Sponge Conservation Strategy (DFO 2010).

SPERA supports those objectives with research projects and scientific tool development which support national priorities for managing ecosystems in our domestic waters. Projects address key issues, such as scientific guidance on the avoidance of benthic impacts; science support for mitigating by-catch and tools to help manage biological diversity in Canadian waters.

An annual State of the Pacific Ocean meeting is held to review the physical, biological and selected fishery resources and present the results of the most recent year's monitoring in the context of previous observations and expected future conditions (Chandler, et al. 2015). The workshop to review conditions during 2014 took place at the Institute of Ocean Sciences, Sidney, B.C. on March 10 and 11, 2015, with over 100 participants both in person and via webinar.

In general, Pacific Canadian waters experience strong seasonality and considerable freshwater influence and include relatively protected regions such as the Strait of Georgia as well as areas fully exposed to the open ocean conditions of the Pacific. The region supports ecologically and economically important resident and migratory populations of invertebrates, groundfish, pelagic fishes, marine mammals and seabirds. Observations of the marine environment in early 2014 identified a large pool of very warm water in the Northeast Pacific Ocean and an area of cooler water along the west coast of North America. By the end of the year the very warm water had moved into the coastal regions with record high temperatures recorded at many locations in the fall. Monitoring of the biological conditions showed the influences of this warm water on marine species composition and distribution. Such observations include a change from cold water to warm water zooplankton taxa from spring to fall 2014 off the west coast of Vancouver island, the second year with no sardines observed in B.C. waters, a record proportion of Fraser River Sockeye Salmon returning via the 'northern diversion' through Johnstone Strait, and mass mortalities of juvenile Cassin's Auklets (a plankton-feeding seabird) in late fall 2014.

Warmer than normal weather was experienced in the fall and winter of 2014 along the west coast of British Columbia with less regional snowpack evident in the spring of 2015. A special session at the meeting was convened to examine the emerging issue of ocean acidification. The level of monitoring and research on this subject was considered below that required given the potential risk to the health of the environment and commercial interests. The proposals of groups to advance the work on this subject were discussed.

The Canadian Groundfish Research and Conservation Society, on behalf of the British Columbia groundfish trawl industry, and the Pacific Marine Conservation Caucus agreed in 2012 to innovative restrictive management measures to provide additional protection of Coral and Sponge Habitat off the west coast of Canada. The objectives of this agreement are:

- To reduce and manage the catch of corals and sponges by the British Columbia groundfish bottom trawl fishery with a management objective of an annual coral and sponge fleet-wide catch at the 2009 level or lower (coral 562 kg, sponge 322 kg); □
- To reduce the impact of the British Columbia groundfish bottom trawl fishery on low energy and low productivity environments in deep waters off of the west coast of British Columbia; □
- To ensure that the British Columbia groundfish bottom trawl fishery does not disproportionately affect any one particular benthic habitat type; □
- To ensure that the British Columbia groundfish bottom trawl fishery is restricted to areas previously trawled between 1996-2011; □
- To improve the performance of the British Columbia groundfish bottom trawl fishery against habitat criteria used to evaluate the sustainability of fisheries. □

To achieve these objectives the following management measures were agreed to:

- Freeze the footprint of where groundfish bottom trawl activities can occur (see section 18.10).
- Establishing a combined habitat bycatch conservation limit (HBCL) for coral and sponges.
- Allocating the HBCL among groundfish trawl licence holders and allow for transferability within specified vessel caps with the groundfish trawl fleet,
- The establishment of an encounter protocol for trawl tows where combined coral and sponge catch exceeds 20 kg.

During the first three years, there have been no footprint violations, and coral and sponge mortalities have been less than the target levels, demonstrating a success for stakeholders in the trawl industry (Mann 2016).

### 4.3 Principle 3

Management of the coastal stock of Pacific whiting continues to be accomplished through a bilateral agreement between the United States and Canada, known as the Pacific Hake Agreement. The agreement allocates a set percentage of the harvest quota to United States and Canadian fishermen. Currently, the United States harvests nearly 74 percent of the annual quota and Canada the remaining 26 percent.

2014 was another year well served under the treaty. The two Parties have met officially since 2012, reviewing and discussing in depth the survey, the stock assessments, the fishery reports and performance and developing the MSE. In 2014, the JMC set up and adopted these Draft Management Principles:

- Manage the Pacific Whiting resource in a precautionary manner
- Maintain a healthy stock status across a range of recruitment events
- Consider the long-term implications associated with using the treaty harvest policy (Article III paragraph 1).
- Manage the fishery to ensure that each country has the opportunity to receive the intended benefits contemplated in the treaty.
- Set total allowable catch levels that spread the harvest of strong recruitment events over multiple years.
- Use a harvest policy that sustains the Pacific Whiting resource.

2013 was an at sea survey year and so the 2014 Stock Assessment has fishery and acoustic data included. Although 2014 was not an acoustic survey year, the *R/V WE Ricker* and *R/V Shimada* did MRAG Americas 1<sup>st</sup> Re-assessment Surveillance Report, US/Canada Pacific Hake Mid-water Trawl Fishery 27

perform other hake related research, calibrations, environmental data collections, etc. The JTC held meetings in December of 2013 with the AP and again in January 2014. The SRG met for several days in February 2014. Presentations were made in both January and February's meetings from the survey team and the JTC, feedback and input were given in all three meetings from members of the AP. In March the JMC met along with the AP, JTC and SRG to review the stock and fishery performance and discuss the TAC. A 2014 Adjusted TAC of 428,000 mt was decided upon. The Canadian portion being 111,794 mt and the US portion being 316,206 mt.

## U.S. Fishery

Fishery Management during 2014. Management of the 2014 fishery was similar to 2013. The PFMC has no formal role in the TAC setting process, but reviews the results of the JMC process at each year's April PFMC and is free to give advice to NMFS if it pleases. The PFMC does maintain control over the fishery management process. Management of the 2014 fishery included: sector-specific bycatch limits, rollover provision of unused bycatch allocations between the MS and CP sectors, 100% observer coverage on MS catcher vessels (CVs), no discarding allowed for MS CVs, 100% observer coverage for SS CVs, two NMFS-certified observers on all catcher-processors and motherships, and regulations for depth-based closures if a sector is projected to attain one of its rockfish hard caps and/or if Chinook Salmon bycatch is running above levels prescribed in the BiOp.

The 2014 fishery harvest guideline (HG), or non-tribal allocation, for Pacific whiting was 259,370 mt. This amount was determined by deducting from the total U.S. TAC of 316,206 mt, the 55,336 mt tribal allocation, along with 1,500 mt for research catch and bycatch in non-groundfish fisheries. The remainder was allocated among the non-tribal Catcher/processor, Mothership, and Shorebased Sectors of the Pacific Hake fishery. The Catcher/ processor Sector is allocated 34 percent (88,186 mt for 2014), the Mothership Sector is allocated 24 percent (62,249 mt for 2014), and the Shorebased Sector is allocated 42 percent (108,935 mt for 2014). The fishery south of 42° N. lat. may not take more than 5,447 mt (5 percent of the shorebased allocation) prior to the start of the primary Pacific whiting season north of 42° N. lat. The 2014 allocations of Pacific Ocean Perch, Canary Rockfish, Darkblotched Rockfish, and Widow rockfish to the Hake fishery were published in a final rule on January 3, 2013 (78 FR 580) (Federal Register 2014a).

In-season management actions included:

- The first reapportionment of the Tribal share on September 12, 2104: 25,000 mt, leaving a tribal allocation of 30,336 mt, Tribal harvests to date were less than 500 mt. Reapportionments were disbursed to the other sectors in the same proportion as each sector's allotted portion of the fishery harvest guideline (Appendix 2).
- The second reapportionment of the Tribal share on October 23, 2104: an additional 20,000 mt, leaving a tribal allocation of 10,336 mt. The reapportionment was distributed to only the Catcher/ Processor and Mothership sectors, in proportion to their allotments (34% and 24%, respectively) of the fishery harvest guideline. The remaining portion of the reapportioned amount (8,400 mt or 42%) was held for the exclusive use of the shorebased sector, but not distributed at that time, pending evaluation of Chinook Salmon bycatch rates (Appendix 2).
- There was reapportionment of Darkblotched Rockfish between Catcher/Processor and Mothership Sectors on October 17, 2014. A surplus of 3.0 mt of Darkblotched Rockfish was reallocated from the Catcher/processor Sector to the Mothership Sector. The revised darkblotched rockfish allocations by sector for 2014 were: Catcher/Processor 6.0 mt; Mothership 9.3 mt, and Shorebased 11.1 mt (unchanged from original allocation) (Appendix 2).
- There was implementation of the Ocean Salmon Conservation Zone on October 20, 2014. When NMFS projected that the Pacific whiting fishery may take in excess of 11,000 Chinook salmon (known as incidental take) within a calendar year, an Ocean Salmon Conservation

Zone, closing waters shoreward of approximately 183 m depth, was implemented through automatic action (Appendix 2).

- A proposed rule to modify the existing chafing gear regulations for midwater trawl gear was published in the Federal Register on March 19, 2014 (79 FR 15296), followed by a correction which was published on April 4, 2014 (79 FR 18876) Appendix 2). The final rule was not effective until January 1, 2015, so will be discussed in the next annual audit.

Also during 2014, several management initiatives continued to develop:

Exempted Fishing Permit Proposal for Utilizing Electronic Monitoring (EM) Systems in Lieu of Human Observers in the At-sea and Shoreside West Coast Whiting Fishery.

Draft regulations for the use of flow scales were presented for the C/P and MS vessels. The changes would update the performance and technical requirements for scales to be consistent with the Alaska regulations. New generation scales are now required in the Alaska fisheries. Improved scale technology includes features that allow NMFS to determine how well the flow scales are performing, and improve the accuracy and reliability of flow scale measurements. Because the C/P and MS coop processing vessels already have upgraded scale systems for the Alaska Fisheries, aligning the requirements for Pacific Coast groundfish fishery is not expected to result in an added burden for the affected vessels.

Progress Toward Ecosystem Management. The PFMC formed the ad hoc Ecosystem Workgroup (EW) and charged the group with the development of alternative ways of achieving the desired protection by incorporating forage species into one or more of the PFMC's FMPs. At its September 2014 meeting, the PFMC reviewed the range of alternatives for protecting unfished and unmanaged forage fish species and reaffirmed the Ecosystem Trophic Role pathway as a preliminary preferred alternative. Under this pathway, protective measures for forage species would be added to each of the PFMC's four Fishery Management Plans (FMP). This multi-FMP amendment is known as Comprehensive Ecosystem-Based Amendment 1 (CEBA 1) and will include these FMP amendments: Amendment 15 to the Coastal Pelagic Species FMP, Amendment 25 to the Pacific Coast Groundfish FMP, Amendment 3 to the Highly Migratory Species FMP, and Amendment 19 to the Pacific Coast Salmon FMP.

In September 2014, the PFMC also adopted draft FMP amendment language and draft Council Operating Procedure (COP) 24 for public review. Draft COP 24 is based on the PFMC's preliminary preferred alternative, which would allow the development of new fisheries for unfished species and is structured similarly to existing COPs associated with FMP fisheries. Should a U.S. citizen want to develop targeted fisheries for Shared EC Species at some future time, COP 24 would provide the PFMC and the public a framework for evaluating the potential impacts of such a fishery to existing fisheries, fishing communities, and the greater marine ecosystem.

The EFH Final Rule (50 C.F.R. § 600.815(a) (7)) states that "FMPs should list the major prey species for the species in the fishery management unit" and indicates that "actions that reduce the availability of a major prey species, either through direct harm or capture, or through adverse impacts to the prey species' habitat that are known to cause a reduction in the population of the prey species, may be considered adverse effects on EFH if such actions reduce the quality of EFH." Subsequent NMFS guidance clarified that "prey should be included in EFH descriptions as a component of EFH." However, the term "major prey species" has yet to be defined by NMFS, and no criteria currently exist for determining which prey species should be considered "major."

Amendment 19 provided general lists of prey categories for various life stages of FMP groundfish, typically at broad levels of taxonomic specificity (general prey types or families, e.g., "Clupeids"). These lists are found in the HUD database and in Appendix B3 of the Pacific Coast Groundfish FMP. The full list is included in Table 14 of the EFHRC's Phase 1 Report. However, the EFHRC notes that

Amendment 19 did not include or synthesize significant information on groundfish diets that was available prior to Amendment 19. Furthermore, much of the available information on groundfish diets was collected several decades ago during periods where prey were present in different relative abundances in the ecosystem than they are presently. For example, Pacific sardines appear to be more prevalent in the diets of certain groundfish in the 2000s than they were in the 1980s (Brodeur et al. 2009). This indicates that diet compositions may vary depending on seasonal and multi-decadal temporal and spatial scales. There is also wide variation in the quality of groundfish prey data (i.e., sample size, geographic scope, seasonal scope, interannual scope) as well as the methods for how prey data are collected and reported in the literature (i.e., taxonomic specificity, weight vs. number).

The Essential Fish Habitat Review Committee (EFHRC) recommends:

- That higher levels of specificity (ideally at the species level) would be more useful than broad prey categories for EFH management purposes. For example, species-specific major prey identification would enable NMFS and the Council to clearly identify which groundfish prey species are currently under Council management.
- That the Council consider modifying the description of major prey species for groundfish. The Council should establish criteria for distinguishing major prey species (rather than a full exhaustive list of all prey items) for each groundfish species and life stage. The new Major Prey Index proposed by Oceana/Ocean Conservancy/NRDC has merit both in terms of methodology and substance. This index should be further explored as a potential tool for refining and updating the list of major prey species in the Groundfish FMP during Phase 3.
- That once the Council has updated its list of major prey species in its description of EFH, that the Council conduct an assessment of 1) the extent to which fishing and/or non-fishing human impacts may be occurring on major prey species for groundfish, either through direct take or impacts to prey habitat; and 2) whether these impacts have significantly reduced the availability of such prey so as to reduce the quality of EFH (i.e., are there adverse impacts?).

Regarding enforcement, administration of officers from the NW Center was merged with the SW Center so now it is the West Coast Division with one acting division chief. There is a five year freeze on hiring that has resulted in loss of 60% of NMFS agents. There is, however, good partnership with the coastal States and US Coast Guard. There has been no significant letdown in enforcement of Hake fishery. They have 100% observation of the 36 vessels. No violations of Hake fishery regulations were recorded for 2014.

### Canadian Fishery

The 2014 Pacific Hake Harvest Plan (DFO 2014a) is an addendum to the 2014/1015 Integrated Fisheries Management Plan for Groundfish (IFMP) (DFO 2014b) and sets out the main objectives and management measures in effect for the Groundfish trawl fishery for Pacific Hake in the Pacific Region. These two documents in concert communicate the basic information on the fishery and its management to Fisheries and Oceans Canada (DFO) staff, legislated co-management boards and other stakeholders. They provide the common understanding of the basic “rules” for the sustainable management of the fisheries resource.

The IFMP and this addendum are not legally binding instruments that can form the basis of a legal challenge. Both documents can and are modified in-season when warranted and at no time fetters the Minister's discretionary powers set out in the Fisheries Act. The Minister can, for reasons of conservation or for any other valid reasons, modify any provision of the IFMP in accordance with the powers granted pursuant to the Fisheries Act.

There were management changes and reminders for 2014:

- Preseason assessment by the Groundfish Trawl Advisory's (GTAC) Hake Subcommittee concluded that given the current hake abundance and the prognosis for the 2014 Pacific Hake fishery that there is a likelihood that the projected shoreside processing needs would not utilize the entire available total allowable quota (TAC plus 12,736 mt. of uncaught carryover fish from 2013) of Pacific Hake this year. In addition by consensus agreement the GTAC Hake Subcommittee has recommended that Fisheries and Oceans Canada allow a limited Joint Venture (JV) fishery for 2014 season.
- For the 2014 Pacific Hake fishery comprehensive catch monitoring requirements are in effect.
- All shoreside Hake deliveries are subject to 100% coverage by the Groundfish Trawl Dockside Monitoring Program (DMP).
- All vessels are subject to 100% percent at sea monitoring. For groundfish trawl vessels using midwater gear for Pacific hake and that deliver all catch in a fresh round form have the option to have at-sea monitoring carried out by either by an on-board at-sea observer or by an electronic monitoring (EM) system. Any groundfish trawl vessel landing frozen at sea hake products is subject to one hundred percent (100%) onboard at sea observer coverage.
- The frequency of Hard Drive retrieval from active vessels using EM system has been set for every fifteen (15) days. (Section 19).
- Retention of all catch is mandatory on all electronic monitored trips in the 2014 fishery (with the exception of prohibited species).
- Enhanced hailing rules are in effect when fishing hake. Hail-outs must be filed at least eight hours prior to the start of any hake fishing trip.
- The retention of groundfish, other than Sablefish, Mackerel, Walleye Pollock and Halibut, on non-observed (electronically monitored) dedicated Pacific Hake mid-water trips cannot exceed 20% of the weight of hake landed per trip. Catch allowances for Sablefish and Walleye Pollock are 3% and 30% respectively of the hake landed for electronically monitored trip. The catch allowance for Mackerel is 6% of the Offshore Pacific Hake on the vessel's groundfish trawl license. There is no catch allowance for prohibited species Pacific Halibut, Salmon species, Green and White Sturgeon, Pacific Herring, Basking Shark, Tope Shark, Sixgill Shark, Wolf-eels and new for the 2014 season Pacific Eulachon.
- All catch will be registered against the vessel and applied against the vessel's Individual Vessel quota (IVQ) holdings. Groundfish trawl license holders are accountable for all groundfish catch and responsible for ensuring sufficient IVQ holdings to cover assigned catch is on the vessel's groundfish trawl license.
- DFO will again use the IHAC and their Onshore Plant Committees (OPC) to solicit in-season advice to DFO on the in-season review of the hake fishery. IHAC will meet as required to address quantity, quality, delivery and harvesting issues related to both the shoreside and JV fisheries.
- The Canadian Hake industry has asked that Hake fishers document, preferably in their fishing logbooks, any instance of contact of their mid-water trawl nets with the ocean bottom. This request is to address a condition of the MSC Certification.

Following consultations with stakeholders, the Canadian TAC of 111,357 mt of Offshore Pacific Hake has been allocated as follows:

Shoreside Delivery TAC: 86,357 mt (includes 10,207 mt. carryover from 2013) Joint Venture TAC: 25,000 mt (includes 2,529 mt. carryover from 2013).

The Offshore Pacific Hake fishery season for Shoreside Delivery was open from February 21, 2014 until February 20, 2015. The Pacific Hake Joint Venture fishery was open from August 1st, 2014 until October 31st, 2014 or until the Joint Venture TAC is attained.

The following species were prohibited by the conditions of the groundfish trawl license: Pacific Halibut, all Salmon species, Green and White Sturgeon, Pacific Herring, Basking Shark, Tope Shark, Sixgill Shark, Wolf-eels and new for the 2014 season, Eulachon.

## Allocation by Sector

For the 2014/2015 fishing year, the 76,150 mt. TAC set for the Offshore Pacific Hake for shoreside delivery, as of June 25th, 2014 was allocated as follows:

- 80% (60,920 mt.) was allocated directly to groundfish trawl licensed vessels as IVQ based on the percentage of the permanent IVQ holdings of Pacific Hake Offshore - for shoreside delivery held respectively by each licence holder and
- 10% (7,615 mt.) was allocated to individual groundfish trawl licensed vessels by DFO, taking into consideration advice from the Groundfish Development Authority (GDA) as Code of Conduct Quota (CCQ) and
- The remaining 10% (7,615 mt.) will be allocated inseason to individual groundfish trawl licensed vessels by DFO, taking into consideration advice from the GDA as Groundfish Development Quota (GDQ). For the 2014/2015 fishing year, the 22,471 mt.

TAC set for Offshore Pacific hake for the Joint Venture program was allocated June 25, 2014 as follows;

- 89% (19,975 mt.) was allocated directly to groundfish trawl licensed vessels as IVQ based on the percentage of the permanent IVQ holdings of Pacific Hake - Offshore Joint Venture held respectively by each licence holder and
- 11% (2,497 mt.) was allocated to individual groundfish trawl licensed vessels as CCQ based on the percentage of the permanent IVQ holdings of Pacific Hake - Offshore Joint Venture held respectively by each licence holder and taking into consideration advice from the GDA.

Complete details are found in the 2014 Pacific Hake Harvest Plan (DFO 2014a).

During 2014 work was contracted by Industry to develop a new Data Management Platform to cover catches to landings, at sea to dockside. On October 8th, 2014, the groundfish trawl industry implemented their new data management platform that allows for electronic collection and submission of fishery information to DFO. This industry platform has been developed for use on tablets and personal computers. It includes elements to meet Hail, Fishing Logbook, At-Sea Observer and Dockside monitoring and data requirements consistent with groundfish trawl license conditions, the IFMP rules governing the fishery operations, and data confidentiality requirements. RFPs were sent out by December 2014 for new contracts for At-sea and Dockside monitoring observers, implemented August 1, 2015. Throughout these developments, there have been no changes to data entered into DFO FOS, however great improvements have been generated for fishery participants in terms of taking ownership of the process and realizing cost benefits to owning the data portion of the observer program, creating a level playing field for competitive bids for boots on the ground. In addition, all data recording is paperless now. There are apps for the skippers, for the at sea observers and for the dockside observers.

Regarding enforcement, during 2014 there were 2 warnings issued, and there was one ongoing case involving a prohibited species: 33,000 herring were landed in hake fishery. The onboard observer contractor, Archipelago, reports any ETP species occurrences. About half of the catch is monitored with electronic monitoring (EM) and the other half by onboard observers with 100% coverage.

## **5. Progress in implementing the client action plans and addressing conditions**

### The U.S. Fishery



There were no conditions of certification for the U.S. fisheries. The clients continued, however, to develop their cooperative approach with managers, regulators, and other stakeholders to minimize bycatch, assess habitat effects, and improve management efficiency.

### The Canadian Fishery

There were two conditions on the Canadian Hake fishery (Table 10, Table 11):

**Table 10 Condition 1 - Canada**

<b>Performance Indicator</b>	2.1.3 b Information is <b>sufficient</b> to estimate outcome status with respect to biologically based limits. 2.1.3 d Sufficient data continue to be collected to detect any <b>increase in risk level</b> to main retained species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy)
<b>Score</b>	75
<b>Rationale</b>	DFO has a wide amount of information on fishing catch, effort, and mortality for many species suitable for assessment, as demonstrated by Bocaccio; however, acceptable assessments for Yellowtail Rockfish, Redstripe Rockfish, and Walleye Pollock have not been completed to determine biological reference points and status relative to reference points. It is not clear that all main species have sufficient biological parameters available for an assessment.  Because acceptable assessments for Yellowtail Rockfish, Redstripe Rockfish, and Walleye Pollock have not been completed to determine biological reference points, it would be difficult to detect an increase in risk level other than anecdotally from fishery performance.
<b>Condition</b>	By the fourth year, the fishery client shall demonstrate that information is sufficient to estimate outcome status with respect to biologically based limits for Yellowtail Rockfish, Redstripe Rockfish, and Walleye Pollock and that sufficient data continue to be collected to detect any increase in risk level to Yellowtail Rockfish, Redstripe Rockfish, and Walleye Pollock
<b>Milestones</b>	At the end of the first year, the client shall provide a plan that will achieve the condition by end of the fourth year.  At the end of the second and third years, the client shall provide evidence that achieving the condition will occur by the end of the fourth year.  At the end of the fourth year, the client shall provide evidence that information is sufficient to estimate outcome status with respect to biologically based limits for Yellowtail Rockfish, Redstripe Rockfish, and Walleye Pollock and that sufficient data continue to be collected to detect any increase in risk level to these species
<b>Client action plan</b>	There are two very similar conditions covering 4 species caught in association with Pacific hake in Canadian waters. The following action plan is in response to both conditions.  The Canadian Client will work collaboratively with DFO to estimate outcome status with respect to biologically based limits for Yellowtail Rockfish, Redstripe Rockfish, Roughey Rockfish, and Walleye Pollock and to assure that sufficient data continue to be collected to detect any increase in risk level to these species. The Client will report on the progress of this work annually, and will provide evidence by the fourth surveillance audit that information exists to show if these species are within biological limits and that risk levels are monitored. This work will encompass the following action items: <ul style="list-style-type: none"> <li>• annually collect valuable data on yellowtail rockfish, walleye pollock, roughey rockfish and redstripe rockfish through established and ongoing</li> </ul>

	<p>research surveys, bio-sampling programs, and catch monitoring programs;</p> <ul style="list-style-type: none"> <li>• undertake data analysis to assess data accuracy, completeness and representativeness in support of aging and assessment requirements;</li> <li>• undertake a science review of appropriate assessment methodology for groundfish species, including yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish;</li> <li>• through established DFO processes, consult with stakeholders on assessment requirements for groundfish, including yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish, and identify workplan and human and financial resource requirements;</li> <li>• undertake peer reviewed stock assessments for yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish through DFO's established CSAP (Center for Scientific Advice Pacific).</li> </ul>
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Status of the Condition and milestones:

The client action plan is being fully implemented and this condition is being addressed. The first milestone has been met, as described below:

Collection of data on groundfish species continues through the established catch monitoring programs for the commercial groundfish fisheries. Additionally, data is collected thru the various regular research surveys conducted by DFO and/or in conjunction with the industry (e.g., Annual Groundfish Trawl Synoptic Survey, IPHC setline survey, and other DFO research cruises). DFO has a regular and ongoing commitment to the undertaking of data analysis to assess data accuracy, completeness and representativeness in support of aging and assessment requirements. Already a pre-assessment evaluation has been undertaken for both Pollock and Redstripe to advise what needs to be done (surveys, data collection, ageing) in preparation for a successful assessment.

An acceptable assessment has been completed and peer reviewed for Yellowtail, so it is now possible to assess risk levels. Information is now sufficient to estimate outcome status with respect to biologically based limits for Yellowtail Rockfish. Furthermore sufficient data continue to be collected and could detect any increase in risk level to Yellowtail. Yellowtail catches are within biological limits, risk levels are monitored, it is a quota fishery with 100% at sea and dockside monitoring and as such, the client suggests this condition for Yellowtail has been met.

DFO also continues to undertake a science review of appropriate assessment methodology for groundfish species including Walleye Pollock and Redstripe Rockfish and for such data deficient species, (like Walleye Pollock) work on a "Tiered Approach" is currently underway and scheduled for completion in the fall of 2016. The Tiered Approach will synthesise the most applicable approaches, methods, and tools into a framework for BC groundfish that will provide guidance on how stock assessments for different groundfish can be completed, given the varying amounts and types of data available for different stocks. It is intended to enable more efficient completion of assessments, support more successful completion of assessments for some of the species that are data limited, and assist in development of a better picture of the ecosystem state and health. The development of a tiered approach will draw on approaches that have been developed in Alaska and Australia for similar purposes.

The Canadian Groundfish Industry, through the established processes like the Groundfish Industry Advisory Board and the Groundfish Trawl Advisory Committee, has reviewed the groundfish assessment schedule. They have shown their support for and have recommended to DFO that it ensures Walleye Pollock, Rougheye Rockfish and Redstripe Rockfish are assessed by 2018 to ensure these conditions can be closed as per the Action Plan agreed to. All three species are

scheduled for assessment through the DFO - CSAS process. The timelines for the each assessment are:

- Walleye Pollock: Assessment was originally scheduled for 2014 but was deferred due to a lack of data and analytical resources, no index, limited biological data, and CPUE is unreliable as it is a targeted midwater fishery. The current approach is to assess Walleye Pollock as part of the “Tiered Approach” which will define options for providing harvest advice for data deficient species. Work on the “Tiered Approach” is underway (2015) and is scheduled for review by CSAS in the fall of 2016.
- Rougheye Rockfish: Assessment is scheduled for delivery in 2017
- Redstripe Rockfish: Assessment is scheduled for delivery in 2018

**Table 11 Condition 2 - Canada**

<b>Performance Indicator</b>	2.2.3 b Information is <b>sufficient</b> to estimate outcome status with respect to biologically based limits. 2.2.3 d Sufficient data continue to be collected to detect any <b>increase in risk level</b> to main retained species (e.g. due to changes in the outcome indicator scores or the operation of the fishery or the effectiveness of the strategy)
<b>Score</b>	75
<b>Rationale</b>	DFO has a wide amount of information on fishing catch, effort, and mortality for many species suitable for assessment, as demonstrated by Bocaccio; however, an acceptable assessment for Rougheye Rockfish not been completed to determine biological reference points and status relative to reference points. It is not clear that this species has sufficient biological parameters available for an assessment.  Because an acceptable assessment for Rougheye Rockfish has not been completed to determine biological reference points, it would be difficult to detect an increase in risk level other than anecdotally from fishery performance.
<b>Condition</b>	By the fourth year, the fishery client shall demonstrate that information is sufficient to estimate outcome status with respect to biologically based limits for Rougheye Rockfish and that sufficient data continue to be collected to detect any increase in risk level to this species.
<b>Milestones</b>	At the end of the first year, the client shall provide a plan that will achieve the condition by end of the fourth year.  At the end of the second and third years, the client shall provide evidence that achieving the condition will occur by the end of the fourth year.  At the end of the fourth year, the client shall provide evidence that information is sufficient to estimate outcome status with respect to biologically based limits for Rougheye Rockfish and that sufficient data continue to be collected to detect any increase in risk level to this species.
<b>Client action plan</b>	There are two very similar conditions covering 4 species caught in association with Pacific hake in Canadian waters. The following action plan is in response to both conditions.  The Canadian Client will work collaboratively with DFO to estimate outcome status with respect to biologically based limits for Yellowtail Rockfish, Redstripe Rockfish, Rougheye Rockfish, and Walleye Pollock and to assure that sufficient data continue to be collected to detect any increase in risk level to these species. The Client will report on the progress of this work annually, and will provide evidence by the fourth surveillance audit that information exists to show if these species are within biological limits and that risk levels are monitored. This work will encompass the following action items:

	<ul style="list-style-type: none"> <li>• annually collect valuable data on yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish through established and ongoing research surveys, bio-sampling programs, and catch monitoring programs;</li> <li>• undertake data analysis to assess data accuracy, completeness and representativeness in support of aging and assessment requirements;</li> <li>• undertake a science review of appropriate assessment methodology for groundfish species, including yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish;</li> <li>• through established DFO processes, consult with stakeholders on assessment requirements for groundfish, including yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish, and identify workplan and human and financial resource requirements;</li> <li>• undertake peer reviewed stock assessments for yellowtail rockfish, walleye pollock, rougheye rockfish and redstripe rockfish through DFO's established CSAP (Center for Scientific Advice Pacific).</li> </ul>
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#### Status of the Condition and milestones:

The client action plan is being fully implemented and this condition is being addressed. The first milestone has been met, as described below:

Collection of data on groundfish species continues through the established catch monitoring programs for the commercial groundfish fisheries, as described above relative to Condition 1.

DFO also continues to undertake a science review of appropriate assessment methodology for groundfish species including Rougheye Rockfish.

The Canadian Groundfish Industry, through the established processes like the Groundfish Industry Advisory Board and the Groundfish Trawl Advisory Committee, has reviewed the groundfish assessment schedule. The industries have shown their support for and have recommended to DFO that it ensures Rougheye Rockfish are assessed by 2018 to ensure this condition can be closed as per the Action Plan agreed to. Rougheye Rockfish are scheduled for assessment through the DFO - CSAS process. The Rougheye Rockfish assessment is scheduled for delivery in 2017.

#### 5.1 Closed-out conditions

##### The U.S. Fishery

Not applicable: There were no conditions of certification for the U.S. fisheries.

##### The Canadian Fishery

No conditions were closed out during this first audit, although yellowtail rockfish was removed from Condition 1 as the status is now determined as above PRI.

#### 5.2 Surveillance

The assessment team has determined that the fishery qualifies for Level 2 surveillance in accordance with CR V2.0 process requirements:

- 1 on-site surveillance audit
- 2 off-site surveillance audits
- 1 review of information

The assessment team based its decision for reduced surveillance level for the fishery on the basis that the clients have a high level of access to government documents and can provide them to the team; the government scientists and managers have a high level of cooperation in providing information needed by the team, and the information relates to changes in the science and management of the fisheries, and to monitoring progress towards meeting conditions. Therefore, the assessment team has a high level of confidence in its ability to remotely verify information. Should any change occur in the access to information or the ability to verify it, the assessment team will re-evaluate the surveillance level.

### 5.3 Certification Decision

The MRAG Americas Decision-Making Process concurs that the certification of the Pacific hake fisheries against the MSC Principles and Criteria for Sustainable Fishing be continued for a further year.

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