

U.S./Canada Pacific Hake/Whiting Treaty Joint Management Committee (JMC) Meeting – Record of Discussion

March 4-5, 2019, SFU Harbour Centre, 515 West Hastings Street, Vancouver, BC

PARTICIPANTS

Name	Body Advisory	Organization
Paul Ryall	JMC Canada Chair	DFO
Frank Lockhart	JMC U.S. Chair	NOAA
Barron Carswell	JMC Canada	Province of British Columbia
Phil Anderson	JMC U.S.	Pacific Fishery Management Council
Bruce Turris	JMC Canada	Groundfish Conservation Research Society
Dan Waldeck	JMC U.S.	Pacific Whiting Conservation Cooperative
Theresa Williams	JMC Canada	Fisher Bay Seafoods Ltd.
Steve Joner	JMC U.S.	Pacific Coast Treaty Indian Tribes
Aaron Berger	U.S. JTC Co-Chair	NOAA
Sandy Parker-Stetter		NOAA
Joe Bersch	U.S. AP Co-chair	Phoenix Processor Limited Partnership
Mike Okonelwiski	U.S. AP	Pacific Coast Seafood
Laurie Steele	U.S. AP	West Coast Seafood Processors Association
Mike Hyde	U.S. AP	American Seafoods
Brett Paine	U.S. AP	United Catcher Boats
Mike Turner		Ministry Agriculture Province of British Columbia
Rob Tadey	DFO – GMU	DFO
Adam Keizer	DFO - GMU	DFO
Chris Grandin	Canada JTC	DFO
John Holmes	Canada SRG	DFO
Stephane Gauthier	Canada	DFO
Dave Dawson	Canada AP co-chair	Pacific Seafood
Shannon Mann	Canada AP	Groundfish Trawl Advisory Co, Mariner Seafoods Ltd.
Joe Greene	Canada AP	Hake Consortium of B.C.
Brian Mose	Canada AP	Deep Sea Trawlers Association
Albert Radil	Canada AP	Assoc. of Pacific Hake Fishermen

Monday March 4, 2019

WELCOME AND INTRODUCTIONS – Paul Ryall, JMC Canada Co-Chair

Paul Ryall welcomed participants, led introductions and reviewed the agenda.

FISHERY UPDATE – Joe Bersch, U.S. AP Co-chair and Dave Dawson, Canada AP Co-chair gave updates on the current fishery for the countries respective fisheries. Steve Joner (U.S. JMC, Makah Tribe) provided remarks about the 2018 Tribal fishery in U.S. waters.

There is a written presentation of the US fisheries summary in the briefing book. We're all familiar with how the US fishery went last year. There was 70.8% utilization not including the tribal catch.

- The catch breakdown was as follows:
 - Mothership sector at 69.5% of TAC

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- Catcher-processors at 84.8% of TAC
- Shore-side vessels at 77.9% of TAC
- There was an abundance of fish. Fishing during the spring period was encouraging.
 - The catcher-processor and mothership sectors fished May 15 to mid-June, paused their respective hake fisheries to participate in the Alaska pollock fishery, and resumed hake fishing in September..
 - The shoreside fishery continued without interruption. There were bigger fish in the north than the south.
 - Bycatch avoidance was a dominate feature of the fishery, including many encounters with juvenile black cod from the north all the way down to the California border.
 - The fishery continued to take management efforts through voluntary measures to avoid species of concern
 - Fish aggregations were less strong during the fall fishery in the U.S., most notably in the at-sea processing sectors
 - The U.S. at-sea processing sectors fishery came to an early close after 15-metric ton “lighting strike” of Pacific ocean perch in the mothership sector. This effectively closed down the catcher-processor fishery as well in early November.
- In sum, there was a strong fishery in the spring, somewhat less productive fishing for some sectors in the fall, and continued avoidance of bycatch of species of concern, including rebuilt rockfish species and an apparently large sablefish recruitment event.

Discussion

- Q/A – Cause of Spike in Year one catch: We’re seeing very high concentrations of 1-yr-old fish. We could move away from those in the spring, but there are higher instances of bycatch of 1-yr-olds in the offshore fishery in the fall and we’re also finding bigger fish. The economics of continuing to fish along with other concerns caused the fishery to stop. Basically, the fish were farther offshore than previously encountered and in higher concentrations.
- Q/A – Complex protocols and intensive communication: Difficult question, no one-size-fits-all response. The fishers’ behaviour includes a lot of info sharing Recent population growth of several species of concern (e.g., rockfish and sablefish) are such that any one disaster can have a high impact on all sectors.
 - I’m not familiar with catcher-processor coop rules, but shore-side and offshore fisheries have very complex protocols. When they exceed the catch for any one tow they must immediately stop.
 - There’s no such thing as individuals trying to out catch each other. They’re trying to work together. It’s not a fun fishery for those on the boats. They’re doing everything they can to avoid bycatch.
 - Seeking and finding high-value hake is an additional primary concern. It’s well known that those fish are not available in a lot of areas because of bycatch so fishers avoid those areas and seek other areas to ensure clean fishing.
 - There are other issues, too, such as with net design, and rockfish excluders. I’m not sure if they’re yielding strong beneficial results. The shoreside fishery also uses different nets.

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- Q/A – Restrictions on rockfish and salmon bycatch: Although there are some federally mandated rules regarding avoidance, the rules I'm discussing here are internal to each coop and based on forecast TAC. They do make it more difficult for the fleet to catch its quota.
- Q/A – Communication protocols: I'm a former president of the mothership coop so I suspect we'd be happy to share information about our communication protocols, and I think shoreside would too. I don't know if the catcher-processors have a protocol document. But we're all in this together so we'd be happy to work with the Canadian industry.
- Q/A – Increased TAC for perch: TAC has increased for some species. For example, there's been a significant upswing in Pacific Ocean perch that will give us a lot more freedom to work around. Salmon bycatch is a major issue as well. We make all possible efforts to avoid it, but we're encountering rockfish bycatch as a result. And they can't be taken independent of black cod restrictions. Hard to imagine what it's like for skippers to try to prosecute these fisheries.

Steve Joner reported on the tribal fishery.

- The tribal whiting fishery was limited by processing. There were three boats operating, two for most of the year and one toward the end of the season. One vessel could make shore-side deliveries and the other vessels could only make at-sea deliveries. One tender vessel was available to take the at-sea deliveries and the turnaround time for the tender as well as the vessel making shore-side deliveries was two to three days, so each catcher vessel could fish every two or three days.
- The fishery started in early July and continued through the end of October. It was good fishing throughout, with big fish. The whiting catch was 5800 tons.
- There are ongoing concerns about the salmon bycatch and Makah vessels have been using salmon excluders for about ten years. The bycatch included 170 chinook salmon.
- There was a higher-than-normal bycatch of canary rockfish and about 2 tons of juvenile sable fish.
- NMFS did a reapportionment of tribal fish to the non-tribal sectors.
- Unfortunately, no mothership was available to take the at-sea deliveries and the shore-side deliveries were limited, so the catch was relatively small compared to years in the past when the tribe was regularly taking 30-35,000 tons.

Discussion

- Q/A – lost/late data: We use a fish ticket system but it's an arcane system. Fish tickets are mailed out, sometimes a couple of tickets get lost in the mail, there may be long delays in getting the numbers out.
 - At one time our fishery was a well-oiled machine and I've tried to update it but there are a lot of obstacles.
 - Efforts have been made to track lost tickets down but by the time they were found the federal government had shut down the fishery. This is not reflected in the Pacfin database.
 - Another problem is that this year a lot of the fish came out of the shoreside fishery.
 - All in all, utilization for at least the last 10 years has only been about 5%. To some extent, that reflects difficulties with processors.
- Q/A – US tribal sablefish bycatch: It's not part of the TAC and it's not recorded, but we are doing our best to participate in sustainable fishery so when we see them, we move on and try to help others avoid them through fleet communication.

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Canada

Fishers were generally happy with the fishery. We're starting to move back into traditional fishery areas, where we haven't been for several years. There was a 670-gram average for the year. A catch of 156,000 metric tons equated to a 55% utilization rate. The bycatch this year was largely black cod. We'd go to fish in any area and find a lot of juvenile black cod.

Discussion

- Q/A – Limits on utilization: One of our freezer boats was not out last year, but it should be repaired and out in 2019. But even in the past, we wouldn't always catch the TAC. I might add we had some juveniles this year. We should be able to avoid them with more in-season communication.
- Q/A – Bocaccio bycatch: Bocaccio is one roadblock in our hake fishery. We have a good record of sharing, and we don't like to see others in trouble, so we trade quotas. For example, the perch quota is accessible to the fleet. The bocaccio bycatch hasn't shut us down yet, but it has the potential to. If we start moving into traditional spots, we're going to see more bocaccio.
 - Survey data shows highest bycatch on record for bocaccio. We have individual bycatch allocation. Each vessel has a certain number of allowed fish. So the incentive is there to avoid it, but it's difficult to do so when recruitment is so huge.
- Q/A – SRKW and chinook: There's no firm cap, but chinook is a prohibited species in Canada. There will be further discussion when the SRKW return in May. Chinook by-catch is counted in pieces, not tons.

JTC CHAIRS REPORT ON STOCK ASSESSMENT – Chris Grandin, DFO and Aaron Berger NOAA

JTC met in December this year. We had a shuffle of members. Ian Taylor left, so now it's just Aaron, Kelli, Sandy and me. Joe Bersch took us on a tour of three vessels in the US fleet, which was eye-opening. With the US government shutdown, we weren't sure we'd be able to get the stock assessment done in time, but we did. Briefly:

- Same structure as recent years with regards to pre-2018 data, catch, composition and weight data, and varying fecundity. (See presentation online for more details.)
- New 2018 age data fits well with the model.
- The coastwide catch in 2018 was 410,443 t. out of a TAC of 597,500 t.
- Attainment in US was 71.4% of quota, down 9% from 2017; in Canada it was 61.1%, up 6% from 2017.
- Using over 200,000 samples, we found the following factors influencing weight-at-age:
 - Sampling variability
 - Aging imprecision
 - Environmental factors
 - Density
 - Fishing impacts
- It's hard to know, if fishing ceased entirely, whether we'd see a return to values from earlier years, or a fluctuation within the range of observed values.
- Maturity and fecundity estimates include evidence of skip spawning and senescence. Fecundity is used to calculate spawning biomass based on maturity at age X and varying weight-at-age.

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- Acoustic survey of biomass shows that our predictions using the survey are very accurate, within an expected margin of error.
 - Fit to acoustic survey age composition.
 - 1999 cohort was over predicted when it was younger.
 - 2011 composition show less good fits.
 - Recent years (2012-17) show good fits.
- We won't know until we've had a survey what we're looking at in terms of recruitment estimates, but our predictions of spawning biomass and relative spawning biomass have generally been quite accurate.
- There is significant uncertainty going into future with regards to fishing intensity.
 - The goal is to leave 40% of each cohort in the water. So far, we're doing better than this.
 - Our joint history shows we're leaving more than 40% of each cohort's biomass in the water, which means we're not overfished and we're not overfishing.
- In March 2018, the treaty default TAC was 725,984 t. but the JMC set an adjusted TAC at 597,500 t. The total catch in 2018 was 410,443 t.
 - The treaty default suggests a 2019 TAC of 725,593 t.
 - We use a combination of average fishery selectivity for the past four years and mean weight at age from 1975-2018 to calculate a default catch limit.
 - Equilibrium calculations come from base selectivity, the means of weight at age from 1975-2018 and recruitment from the stock-recruitment relationship.
 - Two-year forecasts show that catch streams of less than 350,000 t. result in increasing spawning biomass relative to 2019, while catch streams of 350,000 t. and above result in decreasing spawning biomass relative to 2019.
- Uncertainty is large and increases the further out the forecast goes.
 - Risk based on fixed 2019 and 2020 catch shows the point at which stocks go from increasing to decreasing.
 - If we catch 100% of TAC, we'll eventually be starting the season at a point of decreasing stocks.
 - The relative spawning biomass will be high in 2019 due to large 2010 and 2014 cohorts.
 - Median decrease in 2020-21 for catches will be above 350,000 t.
 - The median will be above B40% for all examined catch levels.
- Retrospective pattern of recruitment deviate estimates.
 - Gives info on recruitment and our knowledge of it. Up to age four, we don't know how big these cohorts are going to be. There's some promise of adding age one index to reduce this to age two.
 - Although the age-one index from the acoustic survey seems promising, from an initial survey design standpoint it wasn't designed to be used this way. We're doing ongoing work to increase our comfort level with using the information that way.
- Forecast age composition for 2019 catch:

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- Age 9 fish (2010 cohort) expected to be 14% by numbers 22% by weight.
- Age 5 fish (2014 cohort) expected to be 33%ish by numbers and 35% by weight.
- Age 3 fish (2016 cohort) expected to be 22% by numbers and 17% by weight.
- Estimated cumulative catch for large cohorts:
 - In 1999 with fish of ages 1-8, it was 1,164 901 t.
 - We predict in 2010, it will be 1,004,662 t.
- Summary:
 - Uncertainty is large.
 - Based on the default harvest rule, the treaty default 2019 catch limit is 725,593 t.
 - Our forecast is strongly influenced by the sizes of the large but uncertain 2014 cohort and the uncertain 2016 cohort.
 - There is a 50% chance that spawning biomass will decline.
 - Maintaining a constant catch of 597,500 t. is likely to result in a higher risk of falling below desired levels in about two years' time.

Discussion

- Q/A – This type of calculation is relatively new: It was added last year.
- Q/A – Based on new data the risk has gone up: If we fish 2019 and 2020 at 597,500 t., we're running a risk of starting 2021 with decreasing stocks.
- Q/A – Presentation came from AP request: An AP member asked for this type of analysis. We haven't gone back and looked at previous catches, but we could.
- Q/A – Relative degree of uncertainty: Whenever we're looking at a cohort size median, we know it could go up or down, but it's not going to stay in one place. We don't know until age four what size the fish are going to be, so we don't use an incoming cohort to estimate catch. That said, the degree of uncertainty is no different than last year. There's always uncertainty.
- Q/A – SPR difficult to grasp: It's a ratio of ratios, an aggregate across all spawning individuals. It's a cumulative potential of all reproductive behaviour across all ages.
- Q/A – Overall SRG pleased with assessment: We know what goes into it, it's a mature model, therefore we have a lot of confidence in it.

ACOUSTIC/TRAWL SURVEY – Sandy Parker-Stetter and Stéphane Gauthier

The survey went from Point Conception to Haida Gwaii. The transects were spaced every 10 nautical miles apart, with every eighth transect skipped in US waters. For the at-sea research we used sail drones and moored echo sounders.

- Five saildrones used in 2018 trial run.
 - They're prone to waves so the data degrades, even air bubbles underneath can have an impact.
 - They have no capacity to sample species, age, water quality, so if we intend to use these, there's lots of work to be done.
 - We also need to develop protocols to ensure comparability with our ongoing acoustic/trawl survey.

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- Moored echo sounders deployed 2017, retrieved summer 2018, redeployed.
 - Data analysis is underway.
 - Echograms show daily vertical migrations of fish and plankton.
 - They produce estimates of mean scatterer size and abundance.
 - The identity of the scatterers is then deduced from net trawls.

FATE Project

- This is helping us answer questions such as whether:
 - variability in the ocean environment can explain changes in Pacific hake biomass distribution across years.
 - the effect of temperature at 100 m is the same across age groups.
- Progress on the MSE is giving us some preliminary results.
 - Four seasons, two areas (Canada and US).
 - Movement between areas depends on age and season. Younger fish stay in US waters, older move north.
 - Still unable to use data from assessment model to duplicate forecast models.
 - The MSE cannot to be used to set the annual TAC.
 - The 2019 stock assessment survey represents the best available scientific information on the status and trends for offshore hake.

Discussion

- Q/A – Context for “considerable uncertainty”: We can only characterize uncertainty if it’s included in the model. For example, key uncertainties can have a strong effect on stock status.
- Q/A – Skipping every 8th transect in US waters: We’re skipping transects to accommodate reduced vessel time. We’ve been seeing an increase in northward movement, so we’re going to survey more in the north than previously.
 - If we look at the plan for Canada, we’re planning to go where the hake are typically densest.
 - There are indications of potential for el niño. The survey will indicate whether there have been shifts in the concentration of hake as a result.
 - If the need presents itself, transects can be added.
 - In the past, transects may have gone as far south as LA, but at this point they’re going no farther south than Point Conception.
- Q/A – Timing of survey: The timing is mostly connected with when we can get the ship time to do it. So if you’re thinking it could be done better in May, that’s a question to put to the MSE process.
- Q/A – Unfished spawning biomass: Previously we discussed a relationship between pre-1975 weights and the accuracy of spawning biomass. So have the questions about the unfished spawning biomass been addressed?
 - We have empirical weights-at-age data. The model starts at 1966. We used average mean weight across all years according to all data. Some calculations used time-invariant data, others used time-variant

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data. So we could see weights were large longer ago. We noticed an impact on the unfished biomass but we lack corroborating evidence that weights prior to 1975 were that much bigger. We've asked for more work on that but unless we can come up with consistent evidence showing a much larger size before 1975 there's nothing to be done. In the meantime, we're doing what we can with what we have.

- We haven't looked at other species. We had considered looking at hake in the Puget Sound area because it's older data. But they're for different stocks so we don't know whether to use them, how comparable they'd be. What we do know is there are no biologically significant trends across the whole time period so that gives us some comfort with using averages. I don't know how aging was done, or whether there are other things we can look into that could be causing this difference or even if the difference is real. But the question is what is the difference in terms of final management decisions.
- The other point about the early years is that sample sizes were lower, so it could be an artifact of that. If the difference turns out to be just noise, do we want to spend our time and resources chasing it?
- Q/A – Why not use sail drones in 2019: The drones use five frequencies. The 200 khz is not ideal as it doesn't go very deep and picks up a lot of stuff in the water. A higher khz better, but it requires a lower-frequency transducer, which is also a bigger transducer—too big for a sail drone.
- Q/A – Re biomass in 2020: Any amount less than 40% is good. But the forecast figure is just a median possibility. As each year's catch increases, the forecast catch for future years decreases. This also takes into account probabilities and uncertainties.
- Q/A – 10-mile transects located where there were historic aggregations of hake: The number 8, as in every eighth transect, was a method of balancing the number of miles we have to cover with number of days at sea we have available. We're also restricted by the presence of sea mammals. If we can add transects back in, we will.
 - The survey was designed methodically, but we can look at areas of historical density and make sure we're not missing anything.
 - We can't just spread the transects out more because hake don't aggregate in the same pattern every year. Trying to do too many calculations messes things up in the field and causes a lot of problems.
- Q/A – Survey bias: If they tend to aggregate in some areas, you could be missing out on areas that you should incorporate because you know there's likely to be an abundance there. Over time you could be developing your own bias about where to survey.
 - It would be worth doing an analysis to see if there are hot spots we're missing. But because of the nature of hake, the way they aggregate in different areas and according to age class, it's hard to determine the best way, which is why it's important to have a random start point every year.

2019 SURVEY DESIGN – Sandy Parker-Stetter

- Overall considerations:
 - Main distribution
 - Migratory stock
 - Overall distribution
 - Age distributions
- Last three can vary by year and aggregation of different age groups. It's very complicated to understand and assess this stock.

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- Because of this we need to keep the survey consistent. It may have bias, but if the bias is constant, we can take it into account.
- Radical changes essentially mean we're starting a new time series.
- The base design remains unchanged but with modifications as needed, such as to make up time, in case there's a medevac or if a vessel breaks down.
- For the 2019 survey, the US has 65 days at sea, Canada has 33. The plan is for the US to survey just inside the border and Canada to take over from there.
- The US will be on the water June 13-August 19 and Canada August 20-September 19.
- We're fairly confident about adding transects back in, especially if we identify particular areas of interest.
- One of the benefits of the design is that if we have weather days, we can bank the found time to extend survey north or add in transects.
- On the other hand, marine mammals are becoming a bigger issue on these surveys. US rules governing our ability to fish are becoming stricter. That is, if we see a killer whale, we cannot fish.

Discussion

- Q/A – Found time and missed transects: How do you decide what to do with skipped transects? You're not going to retrace your tracks to pick up transects you've missed, are you?
 - My sense is that if we start out survey at point Conception and we hear everything is north, that's where we'll go. But if we realize we're behind, we'll add a skip in to catch up. There will be decision rules, but we haven't determined them yet.
 - For example, if we have to follow a report to chase over to SE Alaska, how do we compromise so we're making the best use of time? We need to be fairly fluid, adjust our strategy based on the information we get as the survey progresses. If there's no indication of a big northern aggregation, we can adjust as we go along. But if we have news of a northern aggregation, we can try to work through more quickly, maybe skip some transects, to get to the north earlier than scheduled.
- Q/A – “Why not survey this aggregation?”: From the perspective of fishers out there, they see aggregations, they see a survey vessel that's not doing the sample, and they wonder why this aggregation is not being surveyed. How do we explain that to them?
 - To some extent, it comes down to statistics and it's baked into the design of the survey. The objective of the survey is not to capture all aggregations out there but to capture a picture of their distribution. We know we're not taking every aggregation into account. If we did, we'd be introducing a positive bias and overestimating stock. In general, a random sample could be right next to an aggregation but just outside it, or it could run right through the middle.
- Q/A – Questions about the randomness of surveys: Why skip transects in the US but not Canada? Isn't that a bias? And what about adding transects? Wouldn't that introduce a positive bias?
 - No because we wouldn't add a transect into an aggregation. We'd only add a transect where the survey design dictates to ensure we avoid positive bias.
- Q/A – What is and isn't positive bias: If you take a bunch of transects out in the south and add them into the north in a year when we know there will be a higher density in the north, isn't that adding positive bias?

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- No, because the effort is to increase the survey area but not the survey density. If anything, we'd add transects at a 20-mi distribution, so we'd be increasing what's called the survey domain, but not necessarily the number of transects.
- Recognizing that it's an el niño year, we may need to extend the survey north just to capture the full distributions, as we know the fish go north during el niño years.
- Q/A – More days at sea: We've pushed back on this and I can talk to people about it. I don't know where the 65 days at sea came from, but my feeling is that there weren't enough eyes on this.
 - Our sense is that this is a done deal. The Coast Guard is anticipating that a new vessel will be delivered this year. That's not a certainty. But even if it is, it would be on the water for our purposes this year.
- Q/A – Using the sail drones for northern surveys: If you get comfortable with the data from the sail drone, would there be utility in starting drone surveys in the north while vessels start in southern area?
 - I think the purpose of the drones is to augment data. We have many ideas about how they could be used to increase and augment data.
- Q/A – Data storage: Now that the sail drone can come in close to shore, we can do a data dump to satellite so we can start processing the data right away. Saildrone Inc is extremely responsive to recommendations, so as far as our requests for uploading data, increasing the transducer, they're all being taken very seriously.
- Q/A – Expanding the number of transects: Even if we had 6 or 7 more days, it's unlikely we'd return to the old pattern? We're under a lot of pressure to make things more efficient, so I doubt it would work that way.
- Q/A – Importance of survey: It seems like it's important to get as much information as possible out of this year's survey because it will affect what we're doing a couple years down the road.

SAIL DRONE PRESENTATION – Sandy Parker-Stetter

The sail drone is wind-powered and follows a predefined track line. During the day, it's operated by Saildrone Inc., and at night it mills about.

- Potential strengths:
 - It can go out in weather we don't want to go out in.
 - It can survey under-sampled areas.
 - It could be very cost-efficient.
 - It would have a low impact on marine mammals.
- Limitations:
 - It can't take biological samples.
 - It has limited acoustics.
- In 2018, we used them to tag team with traditional sampling. They're surprisingly robust and stable, and the 38/200 khz transducer will be replaced by 38/120 khz because 200 khz is not useful with hake.
- We need to determine whether the sail drone data will be used to identify hake and krill without trawl samples and only two frequencies.
- They may be available for the summer of 2019, and funding for them may be available, but we don't know yet. We also seeking funding for one or more post-docs to provide support.

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- It's important to know that the work we did with them in 2018 was entirely funded by Saildrone Inc.
- In future we'll be looking at questions such as:
 - Does using the sail drone have an effect on assessment?
 - When paired with NOAA or DFO data, are we introducing a bias?
 - What happens if we alternate transects, a vessel on one and a sail drone on the next? What other means do we have of compensating for bias?
 - What are the effects of changing survey frequency?
 - How do adverse weather conditions affect the quality of sail drone data?
 - What are the cost benefits of using them?
 - What's the total economic analysis of their potential impacts on the industry?

Discussion

- Q/A – Storm rating: We had one sailing where the drone encountered the highest wave ever recorded and survived, but obviously the data degrades in rough weather.
- Q/A – Consideration of data from other kinds of boats: We do this in the Bering Sea for pollock assessment. It's a good idea because it can complement the survey. But there are still questions, like how do we incorporate it in our work? How do we find time for it?

MSE EVALUATION UPDATE – Aaron Berger

Our focus at this point is on the elements of the workplan and the next steps.

- There's been a lot of communication over the past year.
 - We've planned the MSE and designed an MSE simulation.
 - It's an iterative process; we go back and revisit things as we go along.

There's a list of 13 tasks outlining the timeline for MSE development, many of which are revisited throughout the process:

1. Establish project team and work group, roles and responsibilities, communications strategies.
2. Establish goals:
 - a. Evaluate performance of current management procedures.
 - b. Better understand the effects of distribution.
 - c. Better understand how fishing influences the availability of fish to each country.
3. Review goals and objective.
4. Review performance metrics.
5. Develop environmental scenarios.
6. Identify other types of scenarios.

Some specifics related to 5 and 6:

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- a. Current plan: incorporate aged-based movement between two areas using data available to the stock assessment.
 - b. Planned step: incorporate findings from research project linking distribution/movement to temperature.
 - i. Use findings under Fisheries and the Environment (FATE) project to look at the distribution of hake across the coast at variable temperatures. To the north, we're seeing more hake in warmer years. This fits our hypothesis. In some years, abundance is negatively correlated with temperature. There's a statistically significant effect in the north, and smaller concentration in the northern US. There have been some suggestions about reasons but they're still unclear. In general, it seems that as fish get older and larger, they move farther north.
 - ii. Part of this work has a forecasting component beyond information around temperature. It could be useful for designing surveys.
 - c. Planned step: model trends or regime-like patterns of variables in movement.
7. Develop operating and estimation models.
- a. We have a single model developed for conditions relative to stock assessment model outputs. It's more complex and flexible than the previous MSE. The estimation model is built to mimic the stock assessment model (they're not the same). They don't exactly match but they're pretty close. Efforts are being made to improve that as we move forward. The simulation framework is more flexible than it was in the past so it can be quickly adapted to look at many questions as they arise, such as the ability to achieve management objectives, the utility of age-1 index, survey frequency, spacing and design, and so on.
8. Implement MSE simulation – develop computer code. All the main components will need to be coded.
9. Implement MSE simulation – parameterize the operating models. They're age-based, include four seasons per year, and have spatial and temporal components. We'll follow movements, recruitment, and selectivity. Currently, the rates are tuned to make mean age and abundance in each country roughly match observed patterns. The pattern follows the hypothesis of a northward shift in summer, then back south to spawn. We're generating simulation data, and we'll need to compare it against real data to test its effectiveness.
10. Implement MSE simulation – simulate each management strategy with each operating model, and then summarize and interpret the performance metrics. For example, we have the treaty harvest control. So we use a one-to-one rule: if this is the THC, this is the catch. The JMC provides a catch buffer. If we only look at the THC, our predictions won't be as accurate. So we use a realized catch buffer. But we have questions here, and we'd like your input. For example, do buffers seem reasonable? Should buffers be linearly proportional to HCR? Should buffers be capped at maximum value? We have so far used six different scenarios and varying combinations of catch buffers. For example, right now we're starting movement measures at age two, but what difference would it make if we measured at age one? I stress that this is the first iteration. It confirms that we're at the right place in developing the model, but we're not at the point of using this data for making management decisions.
11. Implement MSE simulation – develop communication tools for simulation results.
12. Provide results of MSE simulation. The first iteration was a single non-conditioned model in 2018. The second iteration, to be finished in March 2019, will include at least one conditioned model. The third iteration, in August 2019, will include multiple conditioned models. The goal is to have this operational by the end of 2019.
13. Technical documentation of results expected by the end of 2019.

Next Steps

U.S./Canada Pacific Hake/Whiting Treaty Joint Management Committee (JMC) Meeting – Record of Discussion

- We'll incorporate alternative movement dynamics, and how movement influences selectivity. We'll test catch limits to achieve full TAC utilization for both countries, and investigate the influence of temporally and spatially varying biological parameters.
- Our MSE objective—"minimize risk of severe overfishing and closing the fishery"—should be reworded to talk about depletion levels.

Tuesday March 5, 2019

REPORT AP INDUSTRY CHAIRS – Joe Bersch & Dave Dawson

Joe Bersch presented the report and recommendations which can be found at:

(https://www.westcoast.fisheries.noaa.gov/publications/fishery_management/groundfish/whiting/apreport-03-05-19.pdf). The AP believes there are sufficient precautionary measures in place to warrant a 2019 adjusted TAC of 597,500 t. Although the JTC stock assessment suggests there is a risk of going into the next two years with declining stocks, the AP notes that the full TAC will not be caught and that there are indications of strong years in upcoming cohorts. It would be difficult to sustain the sector this year with a much lower TAC. If it turns out the AP is wrong and there are declining stocks going into 2020 and 2021, the sector will accept the consequences. (For more detail, please see the report online.)

US and Canada co-chairs Ryall and Lockhart concurred with this assessment, as did the remaining panel members. The 2019 adjusted TAC is set at 597,500 t.

The JMC had extensive discussion about how to advance development of the Management Strategy Evaluation (MSE). The JMC recognizes that significant progress was made in the development of an analytical tool to assess the performance of the hake fishery. The MSE process offers the opportunity for the Parties to define what they want from the performance of the fishery through the development of objectives (e.g. conservation of the stock above specified levels, stability of fishing opportunities from one year to the next). This will allow for clear analysis of trade-offs between management options and help to inform JMC decisions. It was agreed that a workshop would be held in May 2019 to review the MSE work plan and provide additional guidance to the MSE Technical Team on MSE objectives and performance metrics.

The JMC notes that the biennial acoustic survey has been crucial to successful management of the highly variable Pacific hake resource. The JMC urges the parties to continue their support for this crucial source of information at current or even higher levels. In addition, the JMC believes it is important for the Parties to continue their collaboration with industry in developing the design of the biennial surveys. The Parties will be undertaking a workshop in 2019 to review current survey methodologies and potentially develop new tools for utilization in future survey protocols.

U.S./Canada Pacific Hake/Whiting Treaty Joint Management Committee (JMC) Meeting – Record of Discussion

March 5, 2019

Ms. Rebecca Reid
Regional Director General- Pacific Region
Fisheries and Oceans Canada Suite
200- 401 Burrard Street
Vancouver, B.C. Canada V6C 2S4

Barry A. Thom
Regional Administrator
National Marine Fisheries Service
7600 Sand Point Way, NE, Bldg. 1
Seattle, WA 98115

Dear Ms. Reid and Mr. Thom:

The Joint Management Committee (JMC) established under *the Agreement between the Government of the United States of America and the Government of Canada on Pacific Hake/Whiting* (the Agreement) held its eighth annual meeting in Vancouver, British Columbia from March 4 - 5, 2019.

The primary purpose of the meeting was to develop recommendations to the Parties on:

- 1) The coastwide hake/whiting total allowable catch (TAC) for 2019;
- 2) Each Party's national hake/whiting TAC, including any adjustments (uncaught TAC from the 2018 year to be carried forward to the 2019 year) allowed by the Agreement; and
- 3) Potential operational and research measures for the proper care and management of the hake/whiting resource.

In reference to the Coastwide Hake/Whiting TAC and each Party's National TAC, being consistent with Article II 3 (e) of the Agreement, and following a review of 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 519,834 metric tons (mt.) for the 2019 season.

Based on Article III 2 of the Agreement, the Canadian share of the coastwide TAC is 26.12 percent, or 135,781 mt., and the U.S. share is 73.88 percent, or 384,053 mt. and consistent with Article II 5. (b) of the agreement, an adjustment (carryover from 2018) of 20,286 mt. is added to the Canadian share, for an adjusted Canadian TAC of 156,067 mt. In the same manner, an adjustment of 57,380 mt. is added to the United States share, for an adjusted United States TAC of 441,433 mt. This results in a coastwide adjusted TAC of 597,500 mt. for 2019.

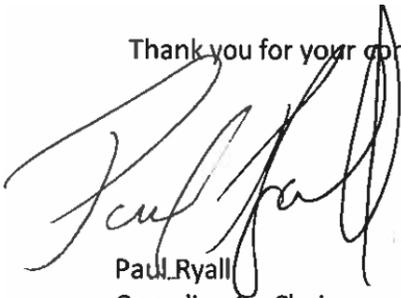
U.S./Canada Pacific Hake/Whiting Treaty Joint Management Committee (JMC) Meeting – Record of Discussion

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The JMC had extensive discussion about how to advance development of the Management Strategy Evaluation (MSE). The JMC recognizes that significant progress was made in the development of an analytical tool to assess the performance of the hake fishery. The MSE process offers the opportunity for the Parties to define what they want from the performance of the fishery through the development of objectives (e.g. conservation of the stock above specified levels, stability of fishing opportunities from one year to the next). This will allow for clear analysis of trade-offs between management options and help to inform JMC decisions.

The JMC notes that the biennial acoustic survey has been crucial to successful management of the highly variable Pacific hake resource. The JMC urges the parties to continue their support for this crucial source of information at current or even higher levels. In addition, the JMC believes it is important for the Parties to continue their collaboration with industry in developing the design of the biennial surveys. The Parties will be undertaking a workshop in 2019 to review current survey methodologies and potentially develop new tools for utilization in future survey protocols.

Thank you for your consideration of these recommendations.



Paul Ryall
Canadian Co-Chair
Joint Management Committee



Frank Lockhart
United States of America Co-Chair
Joint Management Committee

U.S./Canada Pacific Hake/Whiting Treaty Joint Management Committee (JMC) Meeting – Record of Discussion

**Joint Management Committee Meeting for Pacific Hake/Whiting
Main meeting room; 7000 Earl and Jennie Lohn Policy Room
Break out room: 2050 Alan and Margaret Eyre Boardroom
SFU Harbour Centre
515 West Hastings St
Vancouver, B.C.
March 4-5, 2019**

Agenda

Note: Past experience has revealed that the agenda for this meeting tends to be very fluid with respect to timing and sometimes the order of events. If changes are necessary, the Chairs will attempt to update attendees as soon as possible each day.

Monday March 4, 2019

8:30 Call to order

- Welcome
- personnel and other administrative updates
- Approve Agenda
- AP Chairs Report on 2018 fishery (J. Bersch & D. Dawson)

9:00 JTC Chairs Report on Stock Assessment

10:30 Break

10:45 SRG Chairs Report

11:30 Management Strategy Evaluation Update (A. Berger)

- Review work plan
- Questions & Discussion

12:30 Lunch/Delegation meetings

- Break for separate US/Canada delegation meetings

2:30 JMC-led Discussion

- Discuss Initial thoughts on the AP/JTC/SRG reports & Stock Assessment
- Initial guidance/direction to AP

4:00 Public Comment

4:30 Joint AP/JTC meets for discussion based on JMC direction

U.S./Canada Pacific Hake/Whiting Treaty Joint Management Committee (JMC) Meeting – Record of Discussion

5:00 Adjourn

Tuesday March 5, 2019

8:00 (continuation of Joint AP/JTC meeting)

10:00 Call to order, update Agenda if needed, hear report from AP chairs on industry Discussions

11:00 JMC discussion & additional direction to teams

11:45 Public comment

12:00 Lunch/Delegation meetings

1:00 JMC Discussion on TAC

- Final Decision on 2019 TAC

2:00 JMC-led Discussion

- review MSE work plan
- schedule next meeting
- Adjourn/Other business