2015 Research Advisory Board (RAB) Meeting

IPHC Offices, Seattle WA
16 November, 2015

RAB members: Tony Blore, Steve Daniels, Art Davidson, Jim Hubbard, Charles McEldowney, Brad Mirau, Al Pazar, Richie Shaw. Absent: Lu Dochtermann, Jay Hebert.

IPHC staff: Bruce Leaman, Claude Dykstra, Lara Erikson, Tracee Geernaert, Heather Gilroy, Anna Henry, Ed Henry, Steve Keith, Tim Loher, Kirsten MacTavish, Steve Martell, Cole Monnahan (graduate student), Dana Rudy, Eric Soderlund, Lauri Sadorus, Ian Stewart, Robert Tobin, Ray Webster.

Agenda: The agenda for the meeting is appended to this report.

Note: This summary notes highlights and salient points of the RAB meeting. Elements of the discussion are grouped together for narrative clarity, rather than being presented in strict chronological order.

Opening comments

Bruce welcomed the RAB members and opened the meeting. All the participants introduced themselves.

Issues raised by RAB members and IPHC staff

The meeting began with a discussion of three issues: discard mortality rate (DMR) validation on fixed-gear vessels, impacts of shifting sablefish fishing to pot gear in the Gulf of Alaska (GOA), and halibut head size proportions by area and conversion factors.

Discard Mortality Rate validation on fixed-gear vessels

Bruce noted that the longline fleet handles over 1.5 million fish each year, so the DMR assigned to those fish has a big effect on the stock assessment. DMR assignment is based on the condition factor of the released fish, which in turn is based on injuries incurred during release.

IPHC is working with the longline fleet for different ways to assess condition factor relative to release methods to provide more accurate data. This requires an ability to observe releases without influencing the handling of the fish. Claude reported discussions with Alaska Longline Fishermen's Association (ALFA) on how to structure experimental observations to avoid observer bias, and Bruce noted that in the future, cameras could be used to record release method if a database of injuries associated with each release method could be established. It was noted that better release practices and less abuse of fish might become the norm with cameras.

Bruce invited the RAB members' ideas for possible experimental designs for a discussion later in the meeting.

On a related note, Tim described the ongoing work on accelerometer tags and their potential for detecting mortality of released fish. He reported that they may be used in test deployments as early as summer of 2016 on board some of the Amendment 80 vessels.

Impacts of shifting sablefish fishing to pot gear in Gulf of Alaska

Bruce opened this topic by describing the current proposal to allow pot fishing for sablefish in the GOA, including retention of incidentally caught halibut. He described the proposal currently before the North Pacific Fishery Management Council (NPFMC), which will likely come before the IPHC for consideration at the Annual Meeting. The question posed to the group concerned their expectations regarding the impacts on the halibut fishery if sablefish fishing moved to pot gear. This produced a wide-ranging discussion of the two fisheries and their interaction with each other and with whales, including:

1. Expectations for the sablefish fishery:
    a. Pots tend to catch smaller fish, so the economics point to using hooks. On the west coast, some are using pots with larger escape rings to target larger fish.
    b. Better coverage of the grounds is possible with hooks.
    c. Sablefish fishing observations suggest that sablefish may not go into the pot if halibut are already there, and pots do not get many halibut.
    d. Some Bering Sea and Aleutian Islands (BSAI) boats are going back to longlines after trying pots.
    e. Not all vessels are of suitable size and layout for handling pots. In the GOA, we expect to see some fishers shift to using pots, followed by a period of evaluation.
2. Expectations for the halibut fishery if the sablefish fishery shifts to pot gear:
    a. It could increase the frequency of whale attacks on halibut longlines if the whales no longer have sablefish longlines to target.
    b. Do we see spatial or temporal segregation of sablefish and halibut? Early in season they tend to be mixed on the deeper grounds, but less so in summer months.
3. Expectations for the halibut fishery if targeting in pots were allowed:
    a. Not many longliners are targeting halibut if they have sablefish quota – it is primarily an incidental catch during sablefish fishing in the GOA. So, it seems unlikely that vessels would develop targeting behavior on halibut with pots, although severe whale depredation may push in this direction.
    b. Catch rates are better on hooks.
4. Gear conflict between pots and lines:
    a. There will be gear conflict with no division of season or grounds between gears.
    b. There are problems with leaving pots on the grounds – limits for time in the water are not enforceable.
5. The observed behavior of whales:
    a. Whales go after pots, too. They hang around pot boats and wait for discards, and have been reported to tear the mesh on pots in the Aleutians.

b. Whales affect multiple target fish species.
c. Are whales a bigger problem for sablefish than for halibut? Sperm whales seem to prefer sablefish to halibut, but orcas are not so picky.
d. Temporal differences – more whales are seen early in the season. Later they are presumed to be going after salmon.
e. Different species of whales and other marine mammals occupy different areas of the ocean, sometimes with overlapping ranges.
f. Whales may be primarily following the distribution and abundance of other species (such as squid) and using plundered fish (halibut) as a supplement. Increased abundance of these natural prey species in areas of fishing activity can cause increased interactions.

6. Characterizing and quantifying the effects of whale depredation:
    a. We know if whales are present, but can't quantify their effect on the fishery. It is difficult to characterize their very cryptic behavior because it is hard to know which hooks are empty because of whales.
    b. How many whales are we seeing? This year, about 50 survey stations of over 1400 were affected. We have only dropped four sets from the data series in the last six years because of depredation.
    c. Steve Martell noted that our assessment models currently assume that whales are part of natural mortality for halibut. If we are losing many fish to whales, we must fish harder to get quota and should account for that. Whale depredation thus amounts to mortality that is not correctly designated and for which we need accurate estimation.
    d. In 2016, IPHC will add two questions to the port samplers' interviews with captains regarding depredation.
7. Experience from other fisheries:
    a. Commercial fisheries have a disincentive to report lost fish because they may count against their quotas or bycatch limits, in some fisheries.
    b. In the Pacific cod fishery, there is no incentive to report or avoid whales – the whales do them a favor when eating halibut because it decreases their discards.
    c. Lighter gangions and faster hauls (60,000 hooks per day, for example) tend to capture smaller Pacific cod and fewer halibut.
8. Future discussions: perhaps we should engage whale specialists to understand whale behavior.

Head proportions by area and conversion factors

Ray presented data on the proportions of the head to overall length which were collected this year from the ongoing length-weight project. About 70% of the commercial catch coastwide is reported head-off, and the IPHC uses fixed ratios of head-to-body length to adjust fish ticket data for use in the assessment. One goal of this project is to provide direct estimates of head weights through sampling of landings to compare with the currently assumed values, and to assess the variability in these factors. Data were gathered in Areas 2B, 2C, 3A, and 3B, and are reported in

this year's RARA[1]. The data appear to show clear differences among areas, which are attributed to differences in the way halibut are processed by fish plants in different parts of the coast. Additional ports will be sampled in 2016.

Questions to the group about heading procedures and potential methods to standardize reporting prompted the following discussion:

1. There are no regulations for how the head is cut, and each plant has a different method. There can be up to a 5% difference between a "square" and an "angle" cut.
2. IPHC may need head-on weights in order to accurately and consistently estimate all removals.
3. When asked if it would be an issue to require processors either to report head-on weights or to make a standard head cut, there was no consensus. Some preferred to report head-on, and others preferred not to.
4. Members asked the staff to show the effect on the stock assessment of the differences.

Other issues raised by RAB members

Several additional issues were raised for discussion by RAB members:

1. Length-weight ratio. Following a comment that big fish always seem to weigh less than the length-weight table predicts, Ray discussed more of the results from the length-weight project. We have found strong evidence that fish tend to be smaller than the table predicts, with variation by area and time. In most areas the fish appear to be lighter earlier in the season, and in some areas these temporal differences are pronounced. [This year's project results are reported in the same RARA article cited earlier.]
2. The effect of El Niño on halibut, if any, and whether it could be discerned.
3. The adequacy and accuracy of sport catch data, particularly for the unguided sector in Alaska and all sport sectors in British Columbia. Ray described the iRec initiative currently under way in British Columbia.

Issues from previous meetings and issues from RAB members in correspondence

Assessment update

Ian presented an update of the stock assessment, noting in particular:

1. The input of the Scientific Review Board (SRB).
2. Data improvements, including this year's Bering Sea calibration, improved bycatch estimates for Alaska, the generation of weight-at-age data by area, and the addition of length and weight data from the Alaska sport catch.
3. The development of spatial modeling using movement information.
4. New ways to present information.

[1] Webster, R.A. et al. 2016. Analysis of length-weight data from commercial sampling in 2015. Report of Assessment and Research Activities 2015, *in print.*

Follow-up discussion of the assessment touched on several topics, including:

1. Total mortality. Ian pointed out how some factors (such as unaccounted removals) can have relatively small effects on the assessment, but potentially large effects on harvest policy.
2. The difficulty of accounting for the effects of whale depredation.
    a. There is no index of abundance for whales, so we cannot tell if their population is changing.
    b. We do not know if or how much the level of depredation is changing, and if it is, whether it can be linked to changes in whale population or whale behavior.
    c. With such poor information, we may not be able to discern any effects on the halibut stock for many years.
    d. From the information we do have, we estimate that the amount of halibut lost to whales is still small relative to other removals, such as bycatch.

Sport fishery discard mortality estimates

Ian reported that in 2014 sport fishery discard mortality data were added to the assessment, including new estimates from Alaska and some additional data from state agencies in Area 2A. There are no new numbers from British Columbia and we are using data from Area 2C to create a proxy ratio of discard mortality in Area 2B sport fisheries. We are asking all agencies for length, weight, and age data, if available.

Brief review of selected ongoing IPHC research projects

Staff members reported on a number of ongoing research efforts:

1. Management Strategy Evaluation (MSE). Steve Martell updated the RAB on the MSE process, including the May and October Management Strategy Advisory Board (MSAB) meetings, revised governance and facilitation for the MSAB, and current modeling and analysis.

2. Size at age (SAA).
    a. Steve Martell reported on Jane Sullivan's work at the University of Alaska on the spatial and temporal history of SAA, and the cumulative effects of size-selective fishing on SAA. One question that can be explored in this approach is how hard we would have to fish to explain the SAA variation we have seen. The answer appears to be within the range of fishing mortality we estimate to have occurred, but there is no apparent correlation between fishing effort and the effects we see. What points to a non-fisheries-induced cause for the current smaller halibut is that we've seen these small sizes before.
    b. Steve also reported on Kirsten Holsman's work at the Alaska Fisheries Science Center on bioenergetics, including changes in temperature and changes in diet.
    c. A question about whether any of the new research had changed our thinking regarding a change in the minimum size limit (MSL) prompted these observations from the staff:
        1) Changing the MSL is a policy decision.

2) In accordance with the current harvest policy, we would need to lower the harvest rate to accommodate the changes in the catch resulting from a lower MSL.
3) If there were no change in fishing behavior a lower MSL could be a net positive, but with a change in behavior it could be a negative.
4) Without data on discards, we cannot directly evaluate the effect of a change in MSL. It would take at least 10 years to tell from assessment results whether it had achieved its objective.

3. Eastern Bering Sea flats calibration survey and survey expansion for 2016. Ray reported on this year's survey and the calibration results it produced for the Eastern Bering Sea. He also noted that we have added a calibration for Area 2A south of 40° N using the National Marine Fisheries Service (NMFS) west coast trawl survey. In 2016 we plan to expand the IPHC setline survey in the Area 4D Edge.

4. Sex composition of the commercial catch from marking fish at sea. Ian reported on this project, which we plan to expand to a larger number of volunteer vessels this year. Several RAB members expressed interest in participating in the project. Staff members also discussed the genetic assay being developed for determining the sex of the fish, as well as other potential techniques for testing maturity, such as hormone and/or vitellogenin testing.

5. Tagging studies. Tim reported on the status of IPHC tagging experiments, including the current project to wire-tag juveniles from the NMFS trawl surveys and potential accelerometer tagging experiments using Amendment 80 vessels. Bruce noted that we will not be able to derive quantitative movement rates from these tagging projects, but they can tell us something about movement pathways.

Selected IPHC staff research proposed for 2016

Bruce described ongoing and proposed staff research projects listed in Table 1 below. In response to questions, the group discussed several of the projects in more detail, including:

1. Length-weight relationship. Ray discussed the history of our size and weight data, including the original work in 1926 and the re-examination of the topic in the 1980s. Members noted that if fish were measured at sea, we should expect some shrinkage before delivery. Eric described the companion project to measure fish at sea during the survey to obtain comparative data from catch to delivery.
2. Assessment of mercury and contaminants. Claude described the risk and effects of mercury contamination in fish, noting particularly the importance of selenium loading with respect to risk from the mercury. Emerging science points to selenium offsetting the methyl mercury in many species, and could become a part of the considerations involved in setting safe human consumption.
3. Oceanographic monitoring. Lauri described the oceanographic data we gather on the survey, how it is processed, where it is posted, and its availability to the scientific community and the public.

Further discussion by RAB

Feedback for IPHC staff

Bruce asked the Board members for their feedback on topics we should be looking at and priorities for research. He also asked them to identify information they would like to have, particularly to help explain scientific topics to other members of the community. Board members contributed the following ideas and opinions:

1. On current projects:
    a. The fleet end of the sex-marking project should go well.
    b. On the shore end of the length-weight project, the processors could help us more if we ask. If the plants were on board with the port samplers, they might take pride in getting more out of the science. They could get head-on weights, too, even if that is not their preference.
2. On communication with others in the community:
    a. Information from the IPHC is getting to those who are paying attention, but how interested is the average fisher? Many aren't aware of IPHC research.
    b. People tend to turn away if what they hear doesn't fit their own experience, and they often want instant results, but what IPHC is doing is on the money. IPHC seems to be responding to the general population, although is generally a few years behind.
    c. IPHC has a lot of credibility with fishers, especially compared to some other agencies.
    d. The port visit trips by Bruce and Ian are well appreciated.
3. Ideas we should work on:
    a. Whale avoidance.
    b. Full catch accounting, which Bruce and Ian explained means understanding all sizes and sources of removals.
    c. Local movement of fish during the season.
    d. The potential for biological sampling on charter boats. It is not uncommon to pull up 50-100 fish in an afternoon.
4. On fishery management:
    a. Small boats are at a disadvantage in the current Area 2A derby fishery. Bruce noted that the Pacific Fishery Management Council would need to act to change the current system.
    b. In the effort to observe the Alaska sport fishery, what would the proposed "lodge verifier" look like? Bruce noted that it would be like creel sampling, and that because the charter sector is so large relative to the commercial fishery in southeast Alaska, it is very important to get data that we do not currently collect.

Discard Mortality Rate validation on fixed-gear vessels, continued

Returning to the earlier conversation about gathering data on releases, Bruce asked for ideas on experimental design to sample fish discarded in the commercial fishery without changing the way the fish are handled. This discussion included the following:

1. The likely need to use a special charter to gather this data.
2. Possible deck and gear arrangements:
    a. One possibility could be to station the rollerman at a second roller station inboard, so that the fish the rollerman released would be retained for assessment of their condition before being returned to the sea.
    b. Another possibility could be to use a chute for fish that would normally be released to allow assessment before returning them to the sea.
    c. Whether it would be feasible or perhaps even easier to use snap gear for this experiment.
3. The importance of technique in releasing fish, noting that the rate of observed prior hooking injuries had dropped but now seems to be going up. This led to the question of how to assess releases in the non-target fisheries.
4. The future possibilities for cameras as an alternative to observers:
    a. This experiment would develop some of the information necessary to allow cameras to record the release method.
    b. The possibility for high-speed cameras to capture the injury itself.

Staff comments

Staff members contributed several additional ideas for research, including:

1. Regarding whales:
    a. The possibility of something like tori lines for whales.
    b. The possibility of using hydrophones on each set to record whales, noting that Scripps had done something like this off Sitka.
    c. The possibility of engaging whale behavior specialists.
2. Regarding DMRs, looking at the difference between DMRs assigned to different fleets, noting that the longline catcher-processors are assigned a 9% DMR while the commercial halibut fleet is assigned 16%.

Closing comments

Bruce thanked the members for their attendance and the spirited discussion. He noted the value of the RAB's input to the staff's work, and that many staff members count RAB meetings among their favorite IPHC activities.

IPHC Research Advisory Board Meeting
November 16, 2015
IPHC Offices
2320 West Commodore Way, Suite 300

9 a.m. - Introductions and maybe an Intriguing Question

1. **New issues – RAB members and IPHC staff**
   1.1. Discard Mortality Rate validation on fixed-gear vessels - Bruce
   1.2. Impacts of shifting sablefish fishing to pot gear in Gulf of Alaska - Bruce
   1.3. Head proportions by area and conversion factors - Ray

2. **Issues from previous meetings and issues from RAB members in correspondence**
   2.1. Assessment update – Ian
   2.2. Sport fishery discard mortality estimates – Ian

3. **Brief review of some ongoing project results, highlighting those below**
   3.1. Management Strategy Evaluation/MSAB – Steve M/Bruce
   3.2. Size at age project – Steve M/Bruce
   3.3. Length-weight project – Ray
   3.4. Eastern Bering Sea flats calibration survey and survey expansion for 2016– Ray/Ian
   3.5. Sex composition of the commercial catch from marking fish at sea– Ian
   3.6. Tagging updates – Tim/Ray

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4. **Selected IPHC Research proposed for 2016**
   4.1. Proposed research for 2016 (report distributed)

5. **New research suggested from issues raised**
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Table 1. Summary of research proposed for 2016.

Project #	Project Name	Priority	Five Year Plan Objectives				Budget (US$)	Lead/PI	Begin/End Dates
			Stock ID, Monitoring & Assessment	Harvest Policy & Management	Biology, Physiology & Migration	Ecosystem Interactions			
Ongoing									
610.13	Oceanographic monitoring of the north Pacific and Bering Sea continental shelf with water column profilers	Medium				●	91,700	Sadorus/Walker	2009/Ongoing
621.15	Commercial sex marking project	High	●	●			3,379	Loher/Stewart/Marx	2015/Ongoing
621.16	Genetic sexing via SNPs	High	●	●			176,525	Loher/Hauser	2015/2017
636.00	Evaluation of Pacific halibut macroscopic maturity stage assignments	High		●	●		9,500	MacTavish	2008/2016
642.00	Assessment of mercury and contaminants in Pacific halibut	Medium				●	4,900	Dykstra/Gerlach	2002/Ongoing
650.18	Archival tags: tag attachment protocols	High			●		3,500	Loher	2015/2017
661.11	*Ichthyophonus* prevalence in halibut	Low				●	500	Dykstra/Hershberger	2012/Ongoing
665.11	Length-weight relationship	High		●	●		6,950	Webster	2013/Ongoing
669.11	Length-weight relationship at sea	High		●	●		1,500	Soderlund	2015/2016
670.11	Wire tagging of juveniles on NMFS survey	High	●				6,500	Sadorus/Forsberg	2015/Ongoing
Proposed									
2016-01	Condition factor of halibut	High			●	●	7,700	Dykstra/Planas	2016
2016-02	Early life history studies	Medium			●		0	Sadorus/Stewart /Duffy-Anderson	2016
2016-03	RNA sequencing of gonads	High			●	●	10,000	Planas	2016
2016-04	RNA sequencing of skeletal/liver tissue	High			●	●	4,600	Planas	2016
2016-05	4D Edge PAT tags	Medium		●	●		4,405	Loher	2016
	Total – Ongoing Projects						**$304,954**		
	Total – Proposed Projects						**$26,705**		
	Overall Total (all projects)						**$331,659**		