

## **Central Bering Sea Pollock Workshop on Allowable Harvest Level and Stock Identification June 6-9, 2005 Seattle, Washington USA**

**Background:** At the Ninth Annual Conference of the Parties to the Convention on the Conservation and Management of Pollock Resources in the Central Bering Sea held last September in Kushiro, Japan, the Parties agreed on a Scientific and Technical (S&T) Committee Work Plan for 2005. This Plan requires that two working groups be formed: 1) a genetics working group to address research on the composition of pollock stocks in the Bering Sea, and 2) a working group to identify scientific factors that should be considered in deriving an AHL (Acceptable Harvest Level) after the Allowable Biological Catch (ABC) is determined by the S&T Committee. The United States offered to host an AHL workshop in May-June 2005 at the NOAA Alaska Fisheries Science Center in Seattle, Washington, and suggested that the Parties consider holding a Genetics Workshop at the same time.

### **1. Introductions and Election**

- 1.1. The meeting nominated L. Low as meeting chair and J. Ianelli as head rapporteur with assistance from each delegation.
- 1.2. Individual opening statements and introductions were made. There was considerable discussion over the interpretation of the language under Agenda 5. The workshop noted that rather than spend too much time on the wording of this agenda and given that the agenda was already agreed upon by the Parties to the Convention, issues related to concern were better highlighted in this report.
- 1.3. The workshop reviewed the text of the convention specifically as relates to how the AHL is prescribed. It was agreed that the focus should be on the scientific aspects within the context of the convention. *The workshop adopted the agenda as it was drafted.*

### **2. Health, status, and trends of Aleutian Basin pollock stock**

- 2.1. The workshop convened with a summary discussion on the status and trend of what is known about Aleutian Basin pollock. No new information was tabled specifically on survey or experimental fishing within the convention area. The subsequent agenda items present more detailed discussion on these aspects based on survey and other data from adjacent regions.

### **3. Present biomass level of stock**

- 3.1. D. McKelvey (AFSC) presented survey results from the Bogoslof survey and this is included in WP-3.
- 3.2. The delegate from Korea asked about the presence of myctophids in the region and apparently they were not found close to pollock aggregations.
- 3.3. The Russian delegation requested information on the magnitude of observation errors in the survey estimate. The response was that the coefficient of variation was about 17%. They also suggested that a type of adaptive sampling strategy to focus on concentrations may be useful to improve estimation precision. Ms. McKelvey noted that these are areas of research that could lead to improvements. It was also noted that over time, the transect length into the basin and transect-spacing has changed.



- 3.4. The question arose about the age composition of the biomass. Based on preliminary examination of the age-data that was released early this week, the stock appears to consist mainly of the 2000 year-class, followed by the 1999 year-class (numerically).
- 3.5. An extensive discussion revolved around different characteristics between Samalga Pass fish compared to that of Umnak Island (which were much smaller). There was a suggestion that the 2000 year-class might be from Bogoslof spawning concentrations. It was pointed out that it would be important to have a survey in 2006 to see if this year-class continues to recruit.
- 3.6. In Russian waters (specifically, in the Sea of Okhotsk) survey data suggest that biomass estimates were highest just after the peak of spawning. Perhaps the timing issue may affect biomass estimates since the goal for the Bogoslof survey is to arrive prior to the peak of spawning. Also, it was also noted that younger pollock seem to reach peak spawning later in March with older pollock spawning first.
- 3.7. *Agenda items 3-8 were suspended temporarily so that presentations for Agenda item 9 could be heard for background purposes.*
- 3.8. The Chair resumed discussion with a review of the methods for arriving at biomass levels for the CBS region. Under the convention, the default formula for the Basin stock is to assume that the Bogoslof region (the convention's "Specific Area") stock represents 60% of the basin stock.
- 3.9. Since Bogoslof pollock spawn in deep-water, this is a characteristic that differentiates them from shelf area spawners and hence, these may truly have Aleutian Basin characteristics. It was also noted that this pattern of distribution (aggregations concentrated around Samalga pass and NE of Umnak Island) was very common in many surveys over the past several years.
- 3.10. Other issues that affected biomass level of the stock included the timing of the survey (i.e., there may be evidence that the survey occurs too early and higher concentrations are found during or slightly after spawning. Also, adaptive sampling of transect lines may provide better estimates (current CV of the 2005 biomass estimate is on the order of 17%).
- 3.11. The Russian delegation suggested that the proportion attributed to the basin as coming from the Bogoslof region has changed substantially. Russia suggested that there is evidence that the proportion of Basin pollock occurring in the Bogoslof Region is more than 60% now. They proposed that estimation of this proportion be estimated and that this be on the agenda for discussion at the next convention meeting.
- 3.12. The Russian delegation proposed that it is necessary to develop a comprehensive program for the Bering-Aleutian Pollock International Survey (BAPIS) which has as a main goal to study pollock biomass distributions between the Donut Hole and Bogoslof regions and include surveys from surrounding US and Russian zones. This should be carried out throughout the period of Bogoslof stock recovery. A plan with a budget should be formulated for presentation at the annual conference.
- 3.13. Japan noted that the current BASIS (Bering-Aleutian Salmon International Survey) program is for salmon which is a relatively large industry compared to the pollock fishery, especially in the Convention area. For that reason, presently it would be difficult to gain support for undertaking this type of research.
- 3.14. The Russian delegation commented that the cumulative total catch was 7 million tons in the Aleutian Basin. This is a large amount and survey work should be done according to this magnitude. The delegation proposed that such a survey program be carried out for one or two years by each member country and include ichthyoplankton surveys.

#### 4. Safe exploitation rates on the stock

- 4.1. The US delegation presented WP-4 and WP-7. The use of SPR rates as done for domestic fisheries were presented along with the control rules for setting ABC. A specific application to the Bogoslof region was presented and three alternatives were given as examples. These were discussed in more detail under the next agenda item.

#### 5. Anticipated exploitation rate of different AHLs on the stock

- 5.1. Exploitation rates under the three alternative approaches presented in WP-4 give:

Option	ABC approach	2006 ABC (Bogoslof fraction)	Exploitation rate (relative to Bogoslof survey estimate, 253,000 t)
1)	Tier 3 (with target 2 mt)	5,501 t	2.15%
2)	Simple rate of 75% of $M$ ( $M=0.2$ )	37,950 t	15%
3)	Age-structured model (Tier 3 $F_{40\%}$ using NPFMC control rule)	Approximately 42,000 t	Approximately 16%

- 5.2. The meeting discussed factors that should be considered in choosing approaches for ABC and the above table is provided as background.
- 5.3. The workshop noted that the “target level” for rebuilding Bogoslof stock (and by extension, the Aleutian Basin pollock) may be affected by environmental change. The first option was considered appropriate given the current status (relatively low abundance levels). The target level of 2 million t was recognized to be very high. The target level and approach to estimating ABCs should be evaluated each year as new data become available.
- 5.4. The delegation from Japan proposed that for practical purposes of calculating Aleutian Basin ABC, the Bogoslof ABC value should be divided by 0.6 (as implied by the description in the Annex). They consider that the data are lacking to provide an alternative value other than that specified in the convention. The Russian delegation stated that they believe the pollock stock distribution between the Aleutian Basin and Bogoslof (i.e., the specific area detailed in the Convention) has changed. Therefore, the biomass of pollock in the Aleutian basin should be calculated accordingly. There was discussion about what evidence exists to estimate the current proportions. Dr. Stepanenko provided insight on direct observations from surveys in this region. Some participants noted that this highlights the need for a directed research program to evaluate pollock distribution patterns.
- 5.5. The delegate from Korea noted concerns on the assumption that fish migrate throughout the Basin. According to results from three years of hydroacoustic surveys (1996, 1997, and 1999) the echosign of pollock was present in 1996 and 1997, but not in 1999. Based on this, they thought that pollock appeared to be moving toward the east and west of Bogoslof region, not northward into the Basin. This may be due to environmental conditions. However, recent information is lacking (from their research) on the distribution and movement patterns of pollock in these regions.
- 5.6. The delegation from Japan proposed to set the AHL = ABC for the Aleutian Basin pollock.
- 5.7. The US delegation proposed that the level of AHL should be  $\leq$  ABC, but that the degree of departure should be part of the Annual conference. They felt that the workshop should focus on the biological issues related to estimating pollock ABC.

## 6. Biological reference biomass levels for the stock; such as minimum biomass, $B_{40\%}$ , $B_{msy}$ and optimum biomass

- 6.1. These concepts were reviewed and presented under Agenda item 4, specific from working papers WP-4 and WP-7. The approach of computing the minimum-stock size threshold (MSST) was discussed and it was noted that the value most appropriate would be on the order of 120,000 t (compared to the current estimate of 253,000 t for the Bogoslof region). This takes the assumption that the proxy for  $B_{msy}$  is equal to  $B_{35\%}$  as derived from the preliminary age-structured model presented in WP-4. It was noted in the presentation that this value ( $0.5B_{msy}$ ) of MSST was imposed for Steller sea lion considerations under the domestic US pollock fisheries management.

## 7. Desirable rebuilding schedule of the stock

- 7.1. This topic was discussed under agenda item 5. Since there are concerns about the changed conditions and the impact of highly variable recruitment for Aleutian Basin pollock, the workshop recommended that the rebuilding level should be reevaluated as needed (see paragraph 5.3). An exact schedule for attaining high stock sizes is difficult to detail due to the unpredictability of year-class strength.

## 8. Effects of different levels of AHL on the rebuilding schedule of the stock

- 8.1. The US party proposes that for the purposes of having a reasonable expectation of recovering pollock within the convention area, having a rebuilding target set high (as in option 1, with a 2 million t biomass target) would provide the most likely scenario for achieving the levels of catches observed in the convention area during the 1980s. However, they note that there is a large degree of uncertainty in this rebuilding effort since anomalous year-classes such as the 1978 event are unpredictable and likely a consequence of complex ecosystem and environment interactions.

## 9. Biological relationships between the Aleutian Basin pollock stock and those in the adjacent waters

- 9.1. Steve Barbeaux presented WP-5 which provided background on recent developments on stock assessment modeling for the Aleutian Islands region. In this assessment, the authors recognized that many catches were outside of the coastal areas that were covered by the main summer-time bottom trawl surveys. Dr. Choi (ROK) noted that the research done by the RV Tamgu 1 covered areas in the Convention area in the late 1990s and found no echosign of pollock. This report was presented at the 2000 CBS workshop and is available online.
- 9.2. It was noted that in the early 1990s Japan conducted EIT surveys and found little pollock in the region south of Bowers Ridge. This suggests that the pollock found around the Bowers Ridge area is unlikely to be part of the Aleutian Islands group and may belong to the Aleutian Basin pollock stock.
- 9.3. Dr. Ianelli presented an overview of EBS pollock on the shelf with particular reference to current patterns in fishing concentrations by region and within seasons (WP-6).
- 9.4. Dr. Stepanenko presented survey results of pollock from the Eastern and Western Bering Sea shelf (WP-11). The abundance of young-of-year in Anadyr Bay are comparable to Bristol Bay in 2003 and that recruitment could be derived from these regions to respective areas. However, recognition of these potential components is not possible in 2004.

- 9.5. Dr. Vasilyev presented a stock assessment model for the Navarin area (separable cohort model, WP-12). This approach includes many sources of information (two young-fish surveys, age structure, two CPUE indices (partitioned by vessel size classes), catch-at-age, and an age-zero survey. The model was introduced at ICES and should be useful for any stock in the Bering Sea and an appendix detailing the model configuration was also provided to the workshop (appendix to WP-12). They are also doing joint-research with Norway in order to create a joint model for herring stock assessment, partially based on robust properties of the above model. Confidence bounds were computed based on bootstrap methodology.
- 9.6. In summary, the biological relationships between Aleutian Basin pollock and surrounding areas are not well understood. Pollock are known to be one of the main biological components of the ecosystem for these regions and that further study on potential impacts is warranted.

## **10. Effects of fishing outside the central Bering Sea Convention Area on the status, biomass, and trend of the Aleutian Basin stock**

- 10.1. The Russian party noted that the “shelf” and “basin” (Bogoslof) pollock is thought to inhabit the shelf area as juveniles (prior to first maturation). The fisheries in these regions attempt to avoid these small immature fish since they are not marketable. Therefore the total catch of “Basin” pollock on the shelf is relatively low.
- 10.2. They further noted that if Bogoslof pollock abundance is high, the bycatch in shelf fisheries is unlikely to have a large influence. If Bogoslof abundance is low, the bycatch is likely to be low on the shelf and hence have minimal impact on the “Basin” stock. Some participants conclude that fishing effort outside of the Convention area have little impact on Aleutian Basin pollock.
- 10.3. The Japanese party expressed the opinion that the bycatch levels from adjacent fisheries may impact Aleutian Basin pollock and also that predation on pollock by other animals and competition for food should also be considered.

## **11. Other scientific factors that are considered relevant**

- 11.1. No papers were presented under this topic. There was some discussion that addressing ecosystem effects (in particular, trophic interactions) in the Aleutian Basin region and surrounding areas would be useful. Environmental changes were also discussed as playing an important role.

## **12. Recommendations to the Scientific and Technical Committee on Determination of AHL**

- 12.1. All parties reviewed methodologies for calculating AHL on the basis of ABC and agreed that the present procedure for calculating ABC used in the USA is appropriate and also should be applied to the Aleutian Basin pollock stock given its current condition.
- 12.2. Some parties proposed that in order to determine the transformation from ABC to AHL new information about the distribution of pollock in the Aleutian Basin is needed. The workshop recommends that the committee consider their proposals about possible approaches for collecting such information including the proposal of the Russian party for an international survey effort (BAPIS).