AI Ecosystem Team

September 9-10, 2008
AFSC, Seattle, WA

DRAFT MINUTES

Team members: Steve Barbeaux, Forrest Bowers, Vern Byrd, Diana Evans, Sarah Gaichas, Carol Ladd, Sandra Lowe, John Olson, Paul Spencer

Absent: Kerim Aydin, Jennifer Sepez, Francis Wiese

Others participating: Jennifer Boldt, Ivonne Ortiz, Jon Warrenchuk, Tori O'Connell

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The meeting began with a review of progress with the Aleutian Islands FEP since last the Team met. The glossy overview brochure has been widely distributed, and met with much interest on a national as well as a local level. The Ecosystem Committee has also met a couple of times this year, and begun to discuss ways to move the FEP forward. The Team also reviewed the workshop objectives, which are listed in the 'Discussion items' handout attached as Appendix 1.

The Team members then each took an opportunity to update the group on any new information, activities, or projects relative to the Aleutian Islands that may have relevance for the FEP. The items raised at the round table discussion are described in Appendix 2 to this report.

Review of FEP Interactions

A full day was then spent on reviewing the FEP interactions. As part of the review, the Team evaluated whether each interaction was still accurate and appropriate, and what indicators are now available in the Ecosystem SAFE to track the interaction. Jennifer Boldt has incorporated many of the FEP's suggestions for including new indicator data or breaking out existing data to focus specifically on the Aleutian Islands. The Team also reviewed indicators that are not yet available, and made further changes and suggestions for gathering monitoring data. For each interaction, the Team tried to frame the indicators to be used as a metric to rate the interaction, so that they would be useful to the Council. In the majority of cases, we are not yet at the stage where it is possible to define thresholds for the indicators in question, although the Team recognizes that as the goal. A number of edits were proposed for each interaction.

The Team decided to produce an **addendum to the FEP**, to make the proposed changes, and other edits that have been suggested. The addendum will be presented to the Council, but in fact the changes will be made directly to the document, and a revised draft will be posted on the website. The Team does not believe that the glossy brochure needs to be updated at this time. The timeframe for completing the addendum is the spring of 2009.

The Team's specific notes from the meeting on the individual interactions will be captured in Appendix 3 to these minutes. There were some overall comments on the FEP that are summarized below, however.

- **Aleutian Islands bottom trawl survey.** In reviewing the indicators for the FEP, it was noted that so much of the AI information comes from the AI bottom trawl survey, which was not conducted

on schedule this year. The Team reiterates that this survey is crucial to monitoring of the AI ecosystem, and recommends that NMFS and the Council continue their strong support of this survey.

- **Cooperative research opportunities.** Particularly with respect to the physical oceanography interactions, the Team noted that much of the missing data for monitoring the interactions will be very expensive to obtain, and may not be forthcoming. The Team suggested that a coordinated strategy of putting oceanographic sensor instrumentation on vessels, for example in the Pacific cod longline fleet and the golden king crab fleet, might be an interim step to filling in some of these data gaps. Although these would be ships of opportunity, they still fish in parts of the Aleutian Islands for which very little data is otherwise available. The Team noted that NPRB has included funding for ecosystem indicators in their request for proposals, which might cover some part of the cost of the equipment. The Team wondered whether the Council could play a role in encouraging fishermen to participate in such opportunities. Similar work has been done in the GOA by adding instrumentation to the Alaska ferry system vessels.
- **Development versus maintenance of indicators.** The Team noted that new indicators, to monitor particular ecosystem interactions, can be developed, for example through research project funding, but that such funding generally only lasts for a specified period. These indicators then need to be maintained, which generally requires a long-term funding source, for example through a government department. This is important to remember when looking for new ways to develop indicators.
- **Include a volcanic activity ecosystem interaction?** The Team originally included an interaction dealing with volcanic activity in the FEP, but subsequently removed it, because the effects of volcanic activity are generally localized, and do not impact the ecosystem as a whole. The Team discussed this issue again at this meeting, given the amount of volcanic activity that occurred in the Aleutians this summer, but again came to the same conclusion.
- **Harmful algal blooms and human health issues.** The FEP does not currently discuss much in the way of algal blooms or human health issues in general. The interaction that deals with coastal development does include these issues to some extent. The Team noted that this is an issue, but did not add an interaction to address this at this time.
- **Combine the habitat interactions.** There are currently two interactions in the FEP that address habitat: K, which looks at the impact of a fishery on another fishery's habitat, and L, which looks at the impact of a fishery on other (non-managed) biota. Available indicators for monitoring this change are the same, although ideal indicators would be different. The Team decided that while these are two distinct aspects of the habitat interaction, it is more in keeping with the approach of the rest of the interactions to combine the discussion of these two aspects within one interaction. K has been retitled "Indirect effects of fisheries on living things through habitat change." The Team also noted that, if appropriate, the section should include pelagic habitat as well as benthic habitat.
- **Cumulative effects section.** The Team identified a number of linkages between interactions that should be highlighted in the cumulative effects section (for example, the close linkage between bottom up change in ecosystem productivity and the physical oceanography interactions). These edits will be made as part of the addendum/ revisions to the FEP.
- **Effect of management on spatial dynamics of fisheries and bycatch patterns.** It was noted that it would be interesting for the FEP to amplify the discussion of how management actions affect spatial patterns (for example, the Atka mackerel spatial allocations, or Federal allocation programs resulting in increased use of State water fisheries), and also bycatch patterns (changes

in required gear types, or retention requirements). This might be something to include in the revisions to the FEP.

- **Formalize incorporation of predation mortality information into stock assessments.** It was noted that not all assessment authors request predation mortality information for their stock assessments. The information is available, but it is requested on an ad hoc basis. The Team noted that formalizing the process for including such information would be helpful. It was suggested that if the diet information could be made available on a website, this would be an easy way for stock assessment authors to access the information.

Team membership

The Team was not successful in getting a marine mammal expert to join the Team in time for this meeting, but will still pursue this addition. It would be timely to have someone available who could at least review the FEP from a marine mammal perspective, prior to the upcoming revisions.

The Team also discussed the need for an economist on the Team, and the Ecosystem Committee's reservations on this point. The Team definitely supports the need for an economist. The purpose of the Team is to bring a balanced perspective to the consideration of the ecosystem interactions, and while Jennifer Sepez is able to provide some social science perspective, she does not feel qualified to represent the economic viewpoint. Because the Team relies on discussion and consensus, the presence of someone who brings that expertise to the discussion is particularly important. The FEP is only a guidance tool and resource for the Council, and its recommendations still need to feed through the regular Council process to be implemented, so there is no allocative role that an economist on the Team would play that would supersede a Council role. The Team highlighted that the economic component of the risk assessment is an important counterpart perspective to the ecological component, but that the Team does not currently feel confident about retaining it in the FEP. The section was reviewed by an AFSC economist, and some of his comments illustrated issues that need to be further discussed by the Team. Lacking a qualified economist to lead that discussion, the Team suggests that this section be dropped from the FEP, supplemented with a disclaimer or caveats, or highlighted as a gap to be investigated further, but not described in detail.

Implementation of the FEP

The Team discussed the issue of further implementation, and how the Council can better use the information collected in the FEP. The group discussed how to formalize the process for incorporating ecosystem considerations, such as those in the FEP, into the harvest specifications process. The current process is ad hoc, and while it works well for some species, does not represent a consistent approach to addressing ecosystem considerations. For example, the process worked effectively for the evaluation of Bering Sea pollock during last year's assessment cycle, when ecosystem factors were explicitly considered in the setting of final specifications. There are other species, however, which may represent critical nodes in the ecosystem, but, for whatever reason, do not receive as much attention. This may also be exacerbated for Aleutian Islands species, which are grouped in with the BSAI as a whole.

The issue that is raised in the FEP is that ideally there ought to be a formal step in the process, occurring after the evaluation of single species assessments, but before final ABCs and OFLs are set, where species interactions and ecosystem interactions are evaluated. Understanding the ecosystem context would then feed into final harvest specifications. As part of this process, the responsible party would inform the decision-making body of the ecosystem considerations in the year in which they are making decisions, and provide an indication of the quality of the system – whether the signs indicate a declining or a productive system for certain species. In the FEP context, this would involve looking at the FEP

interaction indicators to assess these signs. Based on current information, this evaluation would be mostly qualitative. Additionally, the group would look for cumulative interactions between species. Under the groundfish management system, this step could be the responsibility of the Groundfish Plan Teams, the SSC, or a different group; there are pros and cons to each option. The Plan Teams are the most knowledgeable about the individual species, as they spend the most time reading through and evaluating the assessments. To the extent that predation mortality or other ecosystem factors are addressed in the individual assessments, they also have the opportunity to incorporate those evaluations or consider the linkages between managed species. The Plan Team's main task is stock assessment of managed species, however, and the evaluation of the overall quality of the ecosystem is a separate and added responsibility. Additionally, the ecosystem perspective would also inform how fishery management is affecting non-target species, particularly those that are important ecosystem nodes. The Plan Team is already severely constrained for time – they have difficulty as it is completing their assessment evaluations within the one week time frame of their meeting. The November Plan Team meeting is generally closely preceding the December Council meeting, and thus there is little or no leeway for extending this meeting.

Asking another group to take the Plan Team's work product, and evaluate it specifically through an Aleutian Islands (or other) ecosystem perspective, would be another approach. This would separate the ecosystem task and assign it as a specific responsibility to a particular group (which would then also report to the SSC and Council). This would work very well if there were ecosystem models available that could provide quantifiable data on the state of the ecosystem; this is not currently the case. A disadvantage would be getting a new group of people up to speed on the assessments. There is also the logistical question, of the fact that there is very little time for a group to meet between the Plan Team meeting and the Council meeting. However, it is possible that this AI group may not need to meet annually; for example, perhaps they might meet in years where there is an AI survey.

The third option is the current default, that the SSC has final scientific responsibility for integrating stock assessment information, tradeoffs among fisheries, and ecosystem information in setting biological harvest specifications. Time is also a factor here, as the SSC also has limited time to evaluate all of the stock assessment information within their three day meeting. Because of the severe time limitations, there is often limited discussion of impacts on non-target species. On an ad hoc basis, the current system can be effective for managed species, and improvements in the process are continually being implemented. However, the Aleutian Islands species are generally lower profile, and one of the main reasons the FEP was initiated was to provide a resource for a more proactive and holistic process in order to prevent situations where problems are not apparent until after the fact.

Based on this discussion, the Team recommends that the Council consider this issue further, and discuss how to institute a systematic process for evaluating ecosystem considerations. Some of the possible options are discussed above. The Council would naturally also want to get Plan Team input into how such changes could be instituted.

The Team also discussed the FEP's interaction with the Crab Plan Team, and how to improve the flow of ecosystem information into crab assessments. Forrest Bowers (the Crab Plan Team chair) noted that the team does not discuss ecosystem considerations and habitat at all in discussing harvest specifications. Now that the process for setting overfishing levels has recently changed, however, it might be a good opportunity, perhaps at the May meetings, to begin to improve this part of the process. Jennifer Boldt indicated that she would be willing to attend the May meetings and present the ecosystem SAFE, as she does at the Groundfish Plan Team meetings.

Ecosystem policy and evaluating tradeoffs

One of the tasks the Ecosystem Committee has been considering is how to better define the parts of the goal statement that address 'ecosystem health and vibrant communities'. The FEP suggested that the Council define desirable and undesirable states of the ecosystem as an approach to defining ecosystem health. The FEP also raises the issue that the Council could provide its scientific advisors (Plan Teams, SSC, etc.) with more information about how to evaluate risk and trade-offs, as the acceptability of risk is really a policy decision. Ivonne Ortiz described the Australian model for looking at ecosystem policy, which is visualized using star diagrams (for example, five axes radiating out from the center). Each axis of the star is a category (e.g., conservation, commercial fishery, etc.), the axis is divided into measurements, and the Council would pick a particular point on the scale for each axis. Then you would draw a figure connecting the dots. The resultant shape gives an indication of relative tradeoffs. The Team thought this approach might have application to the FEP, and for the Council to develop an ecosystem policy that represents tradeoffs. By comparing alternate scenarios, visualized through different shape figures, the Council could come up with the appropriate tradeoff scenario.

The team briefly discussed the possibility of using the FEP interactions as the axes for the star diagram, and decided that further exploration of this idea may be useful for the Council or the Ecosystem Committee. The approach is an easy way to visualize balancing multiple objectives.

Future meeting

The Team indicated that at the next meeting, it would be helpful to invite a couple of experts from different fields to help the Team, the Committee, and the Council move forward with some of the challenges of ecosystem-based management. For example, someone from the Forest Service could come and talk about their 'limits of acceptable change' approach, or someone who is using the J. Sanchirico model. It might be helpful to apply some of these ideas to the Aleutian Islands.

Appendix 1 – Workshop Agenda

AI Ecosystem Team workshop

Sep 9-10, 2008 8:30-4:30
NMML conference room 2049, AFSC, Seattle, WA

Agenda / Discussion items

Purpose of Team workshop

1. What new ecosystem information is available about the Aleutian Islands, and is it relevant for the FEP/Council?
2. Is there any evidence of changing conditions that would suggest we should reconsider our analysis of the interactions?
3. How might the Council/Ecosystem Committee best continue act to continue work/implementation of the FEP?
    - We suggested that the next step is to define an ecosystem policy, perhaps through identifying desirable or undesirable ecosystem states. There are other approaches to evaluating ecosystem trade-offs. We need to advise the Council/EC on an approach to moving forward.
4. What should our next steps be to improve the FEP?

Workshop output

- Meeting summary for Council
- FEP addendum with supplemental information or analysis?
- Guidance to the Council/Ecosystem Committee about ways to move forward
- Plan for further work on the FEP

DAY 1

Intros and discussion of purpose

Roundtable opportunity for each team member to present a brief overview of any new information relevant for the FEP/Ecosystem Team

- ongoing/new research projects, or available data (e.g., Sea Grant Marine Research Plan for the AI)
- other ongoing projects that might be relevant (e.g., AI Marine Transportation risk assessment)
- uses of the FEP (e.g., how indicators are being incorporated in the EcoSAFE)
- others

Review interactions and indicators associated with them

- Any new information that influences our conclusions/discussion?
- Do the indicators alert changing conditions? How to interpret them for the Council?
- Is it possible to develop natural variability thresholds for any of the indicators?
- Did we identify the right indicators? Anything we can do to identify data sources for the ones that we have not yet found?
- How do we evaluate tradeoffs among indicators?

(DAY 2)

Incorporating social science and human dimensions in the FEP

- This is a stumbling block for the Council/Ecosystem Committee, which we ran into when trying to advocate for an economist to join the Team, and also with some of our findings in the FEP
    - Human dimensions are also an important part of the ecosystem policy/tradeoffs discussion (below)
    - Useful to articulate how we consider human dimensions within the plan, and specifically for Ecosystem Committee, what the role of an economist on the Team would be

Approach to ecosystem policy/ evaluating tradeoffs

- In FEP we suggested that a next step for Council would be to better define parts of its goal statement ('ecosystem health and vibrant communities')
- Suggestion was for Council to define desirable/undesirable states of ecosystem
- Is this best approach? What guidance can we give Council/Ecosystem Committee to begin this task?
- How can the Council better use the FEP?
    - what does FEP monitoring mean for the Council? How should they interpret/ evaluate annual information, changes in data trends?
- Using our interactions/FEP, can we help the Council articulate a better policy or metric that can fine tune their decisions?
    - e.g., what type of policy guidance should the Council articulate in order to receive better scientific advice?
    - Can we provide examples based on our interactions?

Plan for further work on FEP

- do we need an addendum to address any of the new information issues that have come up at this meeting?
- Are there areas in the FEP that need bolstering, or are incorrect, that we should edit/ improve?
    - list of unaddressed comments from Dec 07 draft
- do we want to identify a plan for working on some of the larger scale improvements we have talked about in the past?
    - directions we had identified: quantified risk assessment; cumulative impacts/ comprehensive ecosystem assessment (multivariate definitions of AI ecosystem status); expand geographic area of FEP to look at transition areas to east and west; incorporate LTK
- Original plan was that FEP be updated on 3-5 year schedule (re-evaluate ecosystem against 2007 baseline, look at long-term trends and see how things are changing). Are we still on track for that?

Appendix 2 – Team updates on new information with respect to the Aleutian Islands

Sandra Lowe

There is a new Olav Ormseth et al paper summarizing **biological studies on Pacific cod between the Bering Sea and the Aleutian Islands**. It looks at length, age, genetics, and fatty acids, among other things. The paper will be appended to stock assessment document, and presented to the Council in October. It is a great source of information about Pacific cod; should also be useful for the FEP. The SSC has been asking for this information for a few years, and will use it to decide whether to modify the Pacific cod TACs to divide it between the BS and AI. The biological information seems persuasive – it seems very hard to ignore that these are different stocks (ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/Fall_2008_BSAI_cod_split_biology.pdf).

Forrest Bowers

Shareef Sideek has developed a **stock assessment model for golden king crab**. The Crab Plan Team will review it this fall, and hopefully endorse it for setting overfishing levels and TACs. The model covers all of the Aleutian Islands. This is a big step forward in managing golden king crab. The draft model will be available on the Crab Plan Team website (http://www.fakr.noaa.gov/npfmc/membership/plan_teams/CPT/908Chapters/AIGKCmodeling908.pdf).

The **volcano observatory website** has new information on the volcanoes that went off this summer, Okmok, Kasatochi, and Cleveland. The Team talked about adding back in the volcano interaction (see earlier in report; http://www.avo.alaska.edu/).

Diana Evans

There was an **integrated ecosystem assessment** workshop in June, for the California Current. The Council was not able to attend. They produced a white paper on IEAs for the workshop, but otherwise there does not appear to have been other direction from NOAA. The Ecosystem Goal Team is supposed to be providing guidance to develop IEAs for all regions, but so far there hasn't been much clear direction. Their discussions so far seem to have been more theoretical than practical. A NOAA background paper is available here: http://gcoos.tamu.edu/Office/documents/Nov2007/04b.pdf.

Sea Grant is working on an **Aleutian Islands marine research plan**. Several of the FEP team members participated in a panel to review and prioritize research needs that came out of a grassroots stakeholder process. It is not certain what the plan will be used for, but it could mesh with the FEP if it highlights some of the same data gaps as the FEP process. The website contains more information (http://seagrant.uaf.edu/research/projects/initiatives/marine_research_plan/general/).

EPA and DEC did **nearshore surveys in the Aleutians in 2006 and 2007**. They were continuous through Amchitka, and also went to Kiska. The study provides information on baseline data for coastal surveys. The focus is on contamination, but they also included an inventory of living marine resources, plants and invertebrates in the nearshore zone, and collected fish to examine for contaminants. http://www.dec.state.ak.us/water/wqamp/aleutians_emap.htm

DEC and the USCG are also ready to begin their **AI marine transportation risk assessment**. The National Academy of Sciences did a report on their methodology, and recommended four item for immediate implementation – 1. install a rescue tug in Dutch Harbor, 2. expand the AIS (USCG), 3. establish a framework structure for vessel identification, and 4. develop traffic lanes. These recommendations will be considered by the agencies involved. http://www.dec.state.ak.us/spar/perp/ai_risk/ai_risk.htm

NOAA had an **ecosystem workshop** (MSA 406) in January, which is intended to result in a follow-on report to the 1998 'Ecosystem-based Fishery Management' report to Congress, which laid out guidance for the development of Fishery Ecosystem Plans. The main outcome of the workshop for Team participants was to emphasize how different the regions are. The South Atlantic are morphing their habitat plan into a FEP; HI has place-based FEPs but they are really only renamed FMPs. The Chesapeake Bay FEP is most developed. The other regions have not begun to work on FEPs. Part of the issue with Councils is that no one is willing to give up their FMPs because they are familiar, and it is difficult to sign on for the unknown. The 1998 report called for FEPs to replace FMPs – that doesn't seem to have gained traction at the national level. The Team discussed that what is needed is a bridging step between the current, known process, and the unknowns of ecosystem-based management. Work on the FEP right now is very timely, and gives the Team and the Council a great opportunity to influence how these ideas are made practical. The final workshop report is being drafted.

Vern Byrd

Vern attended the recent **USFWS Ocean retreat**, which was addressing how to step down from the Ocean Action Plan. He talked about the FEP as an example of how DOI interest in ocean ecosystem-based management could be integrated. The final report from meeting is not out yet. The idea is to create momentum that will carry over beyond the administration change. Another DOI agency, the Park Service, tends to want to do own planning, and has developed their **NPS Ocean Parks Stewardship Action Plan** (http://www.nps.gov/pub_aff/oceans/Ocean_Park_ActionPlan.pdf).

NPRB has several Aleutian Islands topic areas available for their next proposal cycle. Last year there was an AI window also, but there were a low number of proposals submitted. The Team noted that members should encourage people to look at the FEP interactions that are not currently being monitored very well, especially those that need methods developing, as this is a good opportunity to fill gaps (http://www.nprb.org/proposals/current_rfp.html).

USFWS has complete second **nearshore assessment** of the marine system around Buldir, now have 2 years of studies around **Buldir and Kasatochi Islands**. The assessment characterizes bottom fauna and midwater oceanography around the islands. The surveys provide baseline information. The report is out now.

More work is being done on **Kittletz murrelets**, which are a candidate species for ESA listing. Work is being done at Agattu, where this summer they found 18 nest sites (more than before). There will be natural history information, and maybe diet samples, which will identify what link the birds have into the marine food web. Vern doesn't know if there will be fishery implications.

There may be opportunities to **study ecosystem process dynamics at Kasatochi**, where the eruption completely covered the island and filled out to the 20 m curve, so the island is some 5,000 m radius bigger. USFWS has some baseline data on plants and birds on island, and arthopods, so now it will be possible to do studies comparing pre- and post-eruption. Steve Barbeaux noted that he also did acoustic surveys around there this spring, and has three years of data available. Vern noted that the island has been targeted as a possibility for a USGS-organized integrated study, to look at the opportunity for understanding interactions from scratch.

Jim Estes was in the Aleutian Islands this summer, updating his work on nearshore habitat for **sea otters**. The **Steller sea lion** work resumed this summer. A **harbor seal** paper is in press (Bob Small is the senior author), which will document big changes between late 80s and early 90s. The paper may result in a

recommendation for depleted status for harbor seals, under MMPA, which could have effect on some things in fisheries.

Starting this fall, USFWS will start **eradicating rats off Rat Island**. It will be interesting to see what kind of recovery of seabirds will ensue. Marine transportation is the vector for rat introductions. There will be a lot of publicity for the operation, which will last 45 days, and will use rodenticide. There should be 0% chance of survival, the procedure has worked successfully on 200 islands, but this is third largest on which it has been tried. The rodenticide persists for about 2 weeks; if it is not eaten, it will break down in the weather, and it dissipates quickly in the marine system. There may be some non-target short term loss (ravens, maybe eagles), but rats mostly go underground to die (http://www.fws.gov/news/NewsReleases/showNews.cfm?newsId=5397291A-C34D-287E-1EEC972B68046692). There is a **new State law** makes it illegal to support or transport rats, knowingly or unknowingly, so liability now exists for introductions resulting from shipwreck (http://www.adfg.state.ak.us/special/invasive/invasive.php).

Paul Spencer

More data is now available on **stock structure for rougheye rockfish**. All the data they looked at, e.g. genetic, size at age, shows that there are dramatic differences between rougheye rockfish on the slope and in the Bering Sea. Rougheye definitely appears to be one of the stocks for which the AI area is distinct from the BS (ftp://ftp.afsc.noaa.gov/afsc/public/Plan_Team/BSAIrougheye.pdf).

Paul is on the **technical guidance team looking at non-target species management,** for the Magnuson Stevens Reauthorization Act (MSRA). The idea for the technical guidance is to use case studies from the various regions (Paul is working on Alaska skates). They are trying to take a multispecies approach, to look at ways to allow for stock complexes. They are looking at productivity, and at sensitivity - how likely is it that the fishery will impact the stock? He is also looking at bycatch and habitat issues. The final write-up for the case studies is due by the end of the month, and the deadline for the guidance is December. The Team discussed that the proposed rule talked about establishing ecosystem species versus fishery species. In practical terms, it's not different from what we are already doing in Alaska – what the proposed rule calls ecosystem species are the species that we refer to as non-target species. The difference is whether MSRA would require that ecosystem (non-target) species be monitored (which we don't currently do for all non-targets, particularly non-specified species in the FMP). Paul clarified that the rule is still dealing with stocks that are identified in the FMP, so non-specified species may still not fall into this category. The definition state that within the FMP, you would have target stocks (which have commercial value), and ecosystem component stocks (which could potentially be targeted, or comprise stocks other than target stocks). The proposed rule definition states that ecosystem components are non-target, not retained for sale or personal use, and are not subject to overfishing, overfished, or likely to become so. Sarah Gaichas noted that one of the alternatives in the Council's Arctic FMP is to have everything be an ecosystem species, which would parallel with the forage fish category in the groundfish FMPs (it is expected to have low catch, but at least the overall catch is monitored). The Team noted that once the final rule is published, it will be interesting to see how this affects the FEP. Interesting to see how it plays out. But should talk about how this would fit in if it stays.

Steve Barbeaux

Steve completed his third year of **acoustic surveys in the Aleutians this spring**, February and March, on the R/V Oscar Dyson and the F/V Muir Milach. The project is funded by NPRB. They did acoustic surveys between Atka flats and Kanaga Pass. The acoustic surveys were at night, and they also did oceanography studies during the day. There is a 2 ½ mile spacing on the acoustic track line. The researchers got a full spectrum of acoustic data from the Oscar Dyson; Steve has used one band to work up biomass estimates for pollock, the other frequencies are waiting to be used. They also did some bongo

tows (while it was blowing 90 miles/hour); they collected a number of species of myctophids, squid samples, stomach samples for Pacific cod and pollock, and did bottom tows by Kasatochi. In support of a special project, they collected eyeballs from Pacific ocean perch and Pacific cod, for isotope analysis (the lens of the eye is used for isotopes). They collected otaliths from cod, pollock, and POP. There were seabird and marine mammal observers on board, and they saw a white killer whale. There were also sperm whale sitings – the whale can be seen in the acoustics data. This is the first time observers have seen female, male, and juvenile sperm whales in the Aleutians since the 1950s (normally one just expects to see the males). The researchers weren't sure of the reason for that, whether it was expanding populations or global warming. There were also lots of orca and seabirds. They also did a winter survey of Steller sea lions, flyovers plus scat collections; Lowell Fritz is putting that report together. Steve is working on the report for the project, which must be ready by 2009 for NPRB. He and Libby Loggerwell are also working on the report for the Beaufort Sea survey, which may take precedence. http://project.nprb.org/view.jsp?id=27592f49-0654-40aa-97c3-85723ad9da1c

John Olson

John Heifetz and Bob Stone are continuing to look at the video data they collected from their AI submarine trips, and are still working to update **AI habitat maps**. There are some other Auke Bay folks trying to go out to the AI to work more on the **nearshore fish atlas** data, and to integrate more AI information. Vern offered to put them in touch with the FWS data for the AI. http://www.fakr.noaa.gov/habitat/fishatlas/; http://mapping.fakr.noaa.gov/Website/ShoreZone/viewer.htm?initTab=FA&RegionID=2.

There is also an **ecosystem-based management tools** network page on the web. Much of it is more coastal EBM, rather than pelagic or fishery based, but there are some interesting items, including a marine geospatial ecology tool (http://www.ebmtools.org/).

Ivonne Ortiz

Ivonne noted that the NW center is interested in implementing integrated ecosystem assessments along the lines of the **Australian ocean plan**. Australia benefits from having one homogenous governance structure, which is also true for Alaska, but not true for the California Current, with multiple state jurisdictions. Australia has been setting up a network of ecosystem models with Atlantis, and then has developed nested models for the different regions, at different scales. They are using these models to guide ocean policy, both within and outside of MPAs. They are trying to come up with programmatic objectives, which they consider for various categories (conservation, commercial/industry, economic, etc.). They utilize **star diagrams** for making the policy visual (e.g., 5 axes radiating out from center). Each axis is one category. Then alternative strategies are mapped on each axis, from a baseline to an 'optimal case', and then you can draw the shape for each alternative strategy, showing visual differences among strategies. They used a workshop to come up with ratings for the axis. The approach allows you to demonstrate tradeoffs, which are then embedded in a management evaluation strategy plan. California researchers are pursuing this approach, but so far, they have not made much progress (much of the research is not on a coastwide basis, and a lot of private money governs research, which means no secure funding pools).

Also, there is a new multispecies model on pollock, Pacific cod, and Atka mackerel available from the University of Washington. There is an updated model for Steller sea lions that looks at the AI, and considers different islands. Also, Susan McDermott is putting together a journal issue on Atka mackerel, which will come out through AFS proceedings or Fisheries Oceanography, and addresses all issues, from growth and reproductive issues, to abundance estimates, to the efficiency of trawl exclusion zones.

Appendix 3 – Changes to the FEP interactions

Will be made available at a later time.

AI Ecosystem Interaction		Changes
Climate and Physical Interactions	A. Interaction: Changes in water temperature may impact ecosystem processes	•
	B. Interaction: Increased acidification of the ocean may impact ecosystem processes	•
	C. Interaction: Changes in nutrient transport through the passes and changes in the predominant current patterns that drive primary production impact ecosystem processes	•
	D. Interaction: Changing weather patterns impact ecosystem processes	•
Predator-prey Interactions	E. Interaction: Fishing mortality and predation mortality both impact managed species	•
	F. Interaction: Bottom up change in ecosystem productivity impacts predators and fisheries	•
	G. Interaction: Top down changes in predation and fishing impact ecosystem structure and function	•
Fishing Effects Interactions	H. Interaction: Total removals from the ecosystem due to fishing impact ecosystem productivity	•
	I. Interaction: Differences between spatial stock structure and the spatial scale of fishery management may impact managed species	•
	J. Interaction: Impact of one fishery on another through fishing impacts on habitat	•
	K. Interaction: Impact of a fishery on other biota through fishing impacts on habitat	•
	L. Interaction: Impact of bycatch on fisheries	•
	M. Interaction: Commercial fishery may impact subsistence uses	•
Regulatory Interactions	N. Interaction: Changes in the population status of ESA-listed species impact fisheries through specific regulatory constraint	•
	O. Interaction: Sector allocations can impact the ecosystem and communities	•
	P. Interaction: Fishery participation permit systems (such as limited entry and harvest quotas) impact the flexibility of fishers to react to changing ecosystem conditions	•
Other Socio-economic Activity Interactions	Q. Interaction: Changes in fishery activities impact the sustainability of AI communities	•
	R. Interaction: Coastal infrastructure and development impact the ecosystem and communities	•
	S. Interaction: Vessel traffic, and risk of vessel grounding and spillage, may impact ecosystem productivity	•
	T. Interaction: Changes in the level of military activity in the area may impact communities	•
	U. Interaction: Oil and gas development may impact ecosystem productivity	•
	V. Interaction: Research activity may impact fisheries	•