Aleutian Islands Ecosystem Team

Workshop Report

January 10-12, 2007
Director's conference room, Building 4, Alaska Fisheries Science Center, Seattle, WA

Team

Kerim Aydin	Diana Evans	John Olson
Steve Barbeaux	Sarah Gaichas	Jennifer Sepez
Forrest Bowers	Carol Ladd	Paul Spencer
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Others present included: Dave Fraser

The Team's agenda for the three-day workshop was to review the first two chapters of the FEP, and move forward with drafting the remaining sections. Discussions about schedule and community consultation are highlighted in the logistics section of this report, immediately below. Changes were also proposed to the ordering of the FEP, and a revised table of contents is included on pages 2-3. The remainder of the report captures the Team's discussions on FEP content.

LOGISTICS

Schedule – major deadlines

Major deadlines for the completion of the FEP by June 2007 are listed below. The Team decided that the 'glossy' summary should be crafted after the FEP has been approved by the Council in June, rather than prepared conjointly with the main FEP document.

early Feb	Ecosystem Committee, SSC feedback
March 9	initial review draft completed and distributed
March 9-25	community consultation
end March	Ecosystem Committee, SSC, AP, Council feedback
April 5-6	Team workshop
May 18	final action draft completed and distributed
early June	Council final action on FEP document
July-Oct	create 'glossy' summary of FEP

Community consultation

- Adak, Atka, Dutch Harbor, Nikolski – why not Akutan? Ask Ecosystem Committee if oversight.
- Schedule meetings for March 9-25, use initial review draft as basis for discussion, also use consistent powerpoint presentation
- Intent: 1) let people know that FEP is being developed; 2) ask specifically for feedback on this document
- Notes from consultation to be considered by Team at April workshop

Agenda for April workshop

- Consider and address feedback from Council process and community consultation
- Review and augment 'implications for management' chapter
- Write 'priorities' chapter
- Create mock-up of 'glossy'

REVISED TABLE OF CONTENTS

The Team addressed feedback from the October SSC minutes with regard to the ordering of the Table of Contents for the FEP, as well as proposing a number of other changes. These include adding a new chapter 2, and reversing the management objective and ecosystem assessment chapters.

ORIENTATION

- map of AI (show where AI is on globe, focus on AI islands)
- Aleut creation myth

1 Introduction

1.1 Purpose and Need – vision of dynamic ecosystem planning: this is part of a process that started with ecosystem considerations chapter, now evolving; why AI

- Council's purpose statement

1.2 What is a Fishery Ecosystem Plan? – EPAP purpose, scope of FEP broader than FMPs

- graphic of old concept/new concept: circles around FMPs, FEP looks at context of many things that we are already doing

1.3 Role and Implementation of the FEP – Where does FEP information affect the process? SSC, Council, Plan Teams. Role of advisory team? FEP is living process – feedback loops to revise ecosystem goals, indicators based on new information, research priorities/data gaps; timeline for FEP supplements

2 Geography of Aleutian Islands

- physical description of the geographic Aleutian Islands (detailed map of AI, with all place names referenced)
- describe management boundary for the AI FEP

3 Understanding the Aleutian Islands ecosystem processes – what do we know about oceanographic and climate processes in the AI ecosystem area, about species present in the ecosystem and their interactions, and about human interactions with the ecosystem. This section should integrate existing models, and be a summary or inventory of other sources, rather than an encyclopedic listing. Focus on interactions between species, rather than status of individual modules (reference other sources, identify data gaps). Include in each section a discussion of what makes the AI ecosystem different from adjacent systems (EBS, GOA).

3.1 Historical Perspectives

- Weaves together the physical, biological, socioeconomic, and management history
- Primarily figures and graphs; supplemental narrative may be included in Appendix A

3.2 Physical relationships (oceanography, climate, bathymetry, habitat relationships)

- include discussion of oceanographic boundaries

3.3 Biological relationships

- include discussion of biological/species boundaries, stock structures, 'leaky' boundaries

3.4 Socioeconomic relationships (fisheries, other human activities)

3.5 Management Processes

3.5.1 Regulatory boundaries

- map showing the FEP boundary compared to other regulatory boundaries for AI
- table of who is responsible for what in AI (resources/people)

3.5.2 Description of fisheries (commercial, state, recreational, subsistence)

- discussion of scale at which species are managed (e.g., BSAI gfish)

3.6 Interactions

- What are they? Climate/physical changes, predator-prey, endangered species, fishing effects, other socioeconomic activities
- Identify interactions that are: (a) treated separately under current management programs, but are actually connected (e.g., seabirds and juvenile pollock); (b) or managed under same agencies, but connections not always made (e.g. marine mammals and fishery plans, economics with social); (c) or things that are not currently being managed but are important to the system (e.g. myctophids); (d) or things that are treated on a bigger scale than the AI but are critical to AI ecosystem

4 Ecosystem assessment – using interactions identified in 3.6, conduct risk assessment to identify which ones have potential to be of concern to managers, and identify ways to monitor interactions

4.1 Risk assessment – qualitative assessment of probability of risk versus scale of impact (average of individual Team rankings)

4.2 Identify indicators to monitor each interaction

- important to talk about <u>why</u> this parameter is important to the Council, what it can indicate, and what the probability is of likely outcomes

5 Management objectives – compare existing management goals for the various fisheries, make specific for Aleutians

- define objectives in context of uncertainty
- use as filter for evaluating risk assessment – where does Council want to focus

6 Implications for human use of ecosystem – identify areas of uncertainty, identify areas where management strategy evaluations to assess management measures calculated over a realistic range of uncertainty would be helpful. Look at implications to humans, implications to fishery management, implications to managers of other resources.

6.1 Consider tradeoffs and reconcile conflicting goals

- specific tradeoffs between things that we're doing separately, but when you put them together, you can't do both (use cogent examples)

6.2 Assess areas of uncertainty

- where are the data gaps in our understanding of AI ecosystem processes

7 Priorities – based on the above, what are priorities for future management analysis (MSEs), research; FMP-specific or more general

7.1 within the next year (e.g., what might we add to the FEP with another year to work on it)

7.2 longer-term (e.g., 2, 5, 20, 50 years – whatever appropriate scales are)

8 Recommendations for Council

- table summarizing conclusions/recommendations from chapters 5 and 6

9 What is the "value added" of this FEP process?

- what (if anything) are we learning from this pilot FEP that we weren't getting from previous ecosystem analyses (e.g., consideration of risk assessment/uncertainty; tie it back to sustainability and alerting Council to changes); what have we been missing with the single species focus

Appendix A History of Aleutians narrative

Appendix B Indicator data

FEP CONTENT

Review of chapters 1 and 2

The Team drafted various sections of chapters 1 and 2 prior to the workshop. Upon review of the sections, many suggestions were made for improving content. Some of the comments include:

- History section needs to be graphic rather than narrative; move narrative to appendix
    - Also much detail on pre-WWII history, but also need history of modern fisheries
    - Focus on co-evolution, connections
- Focus needs to be on AI ecosystem as one entity separate from EBS/GOA; too much focus on divisions within AI ecosystem (although spatial divisions are important)
    - Emphasize throughout why AI ecosystem is different from EBS/GOA
- Need to reinsert information on current fisheries
- Revise processes chapter: physical – biological – socioeconomic – management, bookend with history and summary of interactions
- Add necessary background to processes chapter to support identified interactions
- Emphasize that the system is constantly in state of change (for management, means need to plan flexibly)
- Illustrate that boundaries are fluid, animals and people impacting ecosystem from elsewhere (important which species are migrating through, but also which ones are permanently resident)
- Need to consider populations at Shemya and Attu (military)

Key species in FEP area

In order to focus in on the key interactions in the FEP ecosystem area, the Team began by identifying the important species in the food web. The FEP will look at the interactions among these species in particular.

- Key species in FEP area by abundance: myctophids, Atka mackerel, squid, grenadier, pollock
- Key species in FEP area by commercial value: Pacific cod, Atka mackerel, king crab, halibut, sablefish, Pacific ocean perch
- Other: SSL (regulatory measures)

Why is the FEP ecosystem different from neighboring EBS and GOA ecosystems

The Team believes that one of the purposes of this FEP is to highlight that the FEP ecosystem area acts differently from its neighboring ecosystems, and that this difference may be important to the Council in managing fisheries in the area. Consequently, the document should highlight these differences. Some examples that were discussed include:

- Global warming, but AI temperatures are cooling
- Everything is much closer together in AI (narrow shelf). Therefore nearshore and offshore have much more ability to impact shelf slope areas. Continental shelf is a minor part of AI ecosystem.

Identification of interactions

The Team identified interactions within the AI ecosystem that could have implications for fishery management. The following list of interactions will be the focus of the FEP.

Climate/physical changes:

- Changes in water temperature resulting from global warming
- Ocean acidification
- Change in nutrient transport though passes and predominant current patterns that drive primary production
- Changing weather patterns (storm intensity, direction, Aleutian Low, etc.)
- Impacts of seismic activity (earthquakes) and volcanism on populations
- Potential for interactions between ecosystems that we would consider separate in other areas, but in AI potential for overlaps and linked is much higher

Predator-prey:

- Direct predation: adults on adults, adults on juveniles
- Competition for same prey base
- Unexploited apex predators

Endangered species:

- Short-tailed albatross, Kittlitz murrelet
- Marine mammals (whales, SSL, etc.)

Fishing effects:

- Total removals from ecosystem
- Impact of one fishery on another through habitat impacts
- Impact of one fishery on another through bycatch impacts
- Need to find out more about pelagic habitat. Huge data gap, complicated in AI because of influence of currents and passes. May have long term impacts on recruitment etc. in future.
- Subsistence vs. commercial
- Limits vs flexibility

Other socioeconomic activities:

- Increase of military personnel
- Stability of communities
- Oil and gas development (e.g., North Aleutian Basin)
- Shipping on great circle route
- Onshore processor at Adak
- Other subsistence activities
- Aleut efforts to develop the community of Adak
- Research activities

Risk Assessment

The Team discussed ways to conduct a risk assessment of the interactions identified in the FEP ecosystem area. The Team decided that useful information for the Council would be to understand the probability of given impact occurring, and the magnitude of the impact should it occur. Given time constraints, it is not possible to conduct any quantitative analysis for this first version of the FEP. Consequently, this assessment will be qualitative in nature. The approach selected is for each Team member to individually rate the interactions identified above on a risk vs impact graph. Results will then be averaged, and presented in the FEP. The magnitude of impact should consider geographic and temporal scale, financial impact, and sociological and ecosystem value.

Each interaction will be subjected to the risk assessment. The Council's management objectives will then be used as a filter to focus specifically on priority interactions.

Discussion of indicators

The Team reviewed indicators specific to the Aleutian Islands in the Ecosystem Considerations chapter in the annual SAFE report. The indicators were cross-referenced with the interactions identified above, and where appropriate, new indicators were suggested. The Team also considered what information would be required for the 'perfect' indicator of a particular interaction. The information below will populate section 4.2 of the FEP. An appendix to the FEP will describe the data trends for each of the indicators listed below (similar to the SAFE report). The Team still needs to write up how the Council might interpret the indicators listed.

The Team believes that some of the listed indicators could be combined into multi-variate indicators, but that this may not be possible by June 2007.

Indicators of success of single species management

INDICATOR from chapter	Useful for us?	Perfect indicator
BSAI groundfish stock status	yes, to extent can for AI stocks	
Crab stock status - BSAI	plot on same index as groundfish	

Indicators of potential shifts in system – anomalies

INDICATOR from chapter	Useful for us?	Perfect indicator
NMFS bottom trawl survey – AI (anomalies)	rephrase as need to examine survey for anomalous catches; presence/absence, frequency of occurrence in tows (then perhaps cross-reference with fishery observer data) - perhaps index would look at some specific species, and then also try to look at anomalies too e.g. jellyfish, myctophids, grenadiers	potential good indicator – satellite data on chlorophyll/sea whip indicator of food base, should be able to get on monthly average perhaps? (also in NPRB RFP)
Non-specified species bycatch	combine with trawl survey data to look at key 3 spp for AI	
Seabird breeding chronology	yes	
Seabird productivity	yes	
Population trends	yes – perhaps choose a few representative species (include examples of resident versus migratory)	
NEW hot spots		distribution of feeding aggregations 'hot spots' of mammals and birds - physical models show where fronts are likely to occur, where hotspots likely to be?
NEW seabird survival rates	time series of survival rates for auklets - also index of die-offs	
NEW new fisheries	if new commercial fish is sold from AI subarea, need to take note	

INDICATOR from chapter	Useful for us?	Perfect indicator
NEW fish disease	measure weight per unit health -- levels of mercury and other toxins -- harmful algal blooms -- deformities	

Climate/physical change interactions:

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
Changes in water temperature resulting from global warming	AI summer bottom temperature	Temperature generally is useful.	Would prefer year-round indicator. Looking for change outside natural variation (?static, trend?)
	Seabird breeding chronology	yes	
Ocean acidification	**NEW** acidification		stick a buoy out there and measure pH
Change in nutrient transport though passes and predominant current patterns that drive primary production	**NEW** nutrient transport	use Amukta moorings for index on transport through the pass -- use Buck Stockhausen model for index of transport	data from moorings in Amukta Pass – would be nice if they have nutrient sensors too -- also nice to have more moorings in AI -- Stockhausen model needs improvement because based on Hermann model; possible area for focus of improvement -- also need better bathymetry – critical for models
Changing weather patterns (storm intensity, direction, Aleutian Low, etc.)	**NEW** change in weather patterns	need annual map showing frequency of storms (perhaps number of days per pixel that have weather considered stormy)	
Impacts of seismic activity (earthquakes) and volcanism on populations	**[NEED]**	**[NEED]**	**[NEED]**
Potential for interactions between ecosystems that we would consider separate in other areas, but in AI potential for overlaps and linkages is much higher	**NEW** otters	use otter surveys in the west to show nearshore predator abundance	
	NEW closer habitat interactions between nearshore and shelf	compare otter, SSL telemetry, seabird indices for foraging connections	

Predator-prey interactions:

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
Direct predation: adults on adults, adults on juveniles	Trophic level catch EBS and AI	yes capture trophic level of what we're fishing and intensity over time (in SAFE chapter now – continue) Tim Essington - survey and fishery trophic level graphs	
	Combined standardized indices of groundfish recruitment	yes – pull out specifically for AI species	
	Combined standardized indices of groundfish survival	yes – pull out specifically for AI species	
Competition for same prey base	Forage biomass indices from AI bottom trawl survey	no. use forage estimates from diets - need to clarify what we mean by forage – one category is Council's forage fish category; also zooplankton category; also juveniles of commercial fish category (AM, cod, pollock) - seabirds and/or mammals as an indicator of forage biomass	- surveys of forage fish species - need diet data over time (only have snapshot right now) - need to coordinate between seabird, fish, mammal food habits databases - need biomass estimates (or index) for each prey species of commercial species
Unexploited apex predators	Alaskan sea lion western stock non-pup counts	yes – but specifically for AI subarea - add index for pup counts in AI - SSL mortality by category (fishing, etc.)	combine into indicator of apex predators (show annual anomalies)
	Seabird breeding chronology **[DUPLICATE]**	yes	
	Seabird productivity **[DUPLICATE]**	yes	
	Population trends **[DUPLICATE]**	yes – perhaps choose a few representative species (include examples of resident versus migratory)	

Endangered species interactions:

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
Short-tailed albatross, Kittlitz murrelet	Seabird bycatch	no – except for measuring ESA species bycatch and sightings	
Marine mammals (whales, SSL, etc.)	Alaskan sea lion western stock non-pup counts **[DUPLICATE]**	yes – but specifically for AI subarea - add index for pup counts in AI - SSL mortality by category (fishing, etc.)	combine into indicator of apex predators (show annual anomalies)

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
	NEW otters: indicator of nearshore predator abundance – use also to determine whether connections between nearshore and shelf **[DUPLICATE]**	use otter surveys in the west to show nearshore predator abundance	

Fishing effect interactions:

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
Total removals from ecosystem	Total groundfish catch AI	sort of. catch relative to biomass, or catch relative to consumption? Use single species catch/biomass by trophic level? Also crab, halibut fisheries	looking for exploitation rate for the ecosystem, maybe catch relative to an ecosystem process more relevant; where is fishery relative to consumption in the ecosystem
	Total biomass EBS/AI	see above	
	Trophic level catch EBS and AI **[DUPLICATE]**	yes capture trophic level of what we're fishing and intensity over time (in SAFE chapter now – continue) Tim Essington - survey and fishery trophic level graphs	
	NEW food web diversity indices		potentially important, but need to think about what do you want diversity index to measure, what is meaningful -- habitat diversity might give us the same answer – if we knew about benthic habitats -- acknowledge spatial gradient of diversity generally in AI (FO volume, Loggerwell article p 93)
Impact of one fishery on another through habitat impacts	Groundfish bottom trawling effort in AI	yes	area swept by gear type over particular habitat type
	Longline effort in AI	yes, also add pot	same as trawl
	HAPC biota bycatch in EBS/AI groundfish fisheries	sort of. Would be better to look at frequency of tows with occurrence of HAPC biota	
	HAPC biota biomass indices in the AI bottom trawl survey	sort of. Would be better to look at frequency of tows with occurrence of HAPC biota	

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
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Impact of one fishery on another through bycatch impacts	NMFS bottom trawl survey – AI (anomalies) **[DUPLICATE]**	rephrase as need to examine survey for anomalous catches; presence/absence, frequency of occurrence in tows (then perhaps cross-reference with fishery observer data) - perhaps index would look at some specific species, and then also try to look at anomalies too e.g. jellyfish, myctophids, grenadiers	potential good indicator – satellite data on chlorophyll/sea whip indicator of food base, should be able to get on monthly average perhaps? (also in NPRB RFP)
	Non-specified species bycatch **[DUPLICATE]**	combine with trawl survey data to look at key 3 spp for AI	
Need to find out more about pelagic habitat. Huge data gap, complicated in AI because of influence of currents and passes. May have long term impacts on recruitment etc. in future.	**[NEED]**	**[NEED]**	**[NEED]**
Subsistence vs. commercial vs recreational	**NEW** commercial fishery: monitor for major changes	volume and value	regional economic model
	NEW recreational: monitor for major changes		work with AMNWR permits to figure out
	NEW subsistence	subsistence halibut permit	regular subsistence survey
Limits vs flexibility	**NEW** limits vs flexibility	description of entry level opportunities	

Interactions from other socioeconomic activities:

Interaction	INDICATOR from chapter	Useful for us?	Perfect indicator
Increase of military personnel	**NEW** military activity		facility placement, use of low and medium sonar, other testing
Stability of communities	population in AI communities	yes (shows population growth/declines)	also include people on Shemya and Attu - also need to talk about seasonal shifts in populations in these areas
Oil and gas development (e.g., North Aleutian Basin)	**NEW** oil and gas	DEC: history of development related spills	
Shipping on great circle route	**NEW** shipping route	port and waterways assessment; possibly information in contingency planning -- find out from DEC history of shipping related spills	count of vessels by type ?and cargo passing through route
Onshore processor at Adak	**NEW** processing jobs: indicator of onshore processing activities and habitat impacts	number of processing jobs	
Aleut efforts to develop the community of Adak	population in AI communities **[DUPLICATE]**	yes (shows population growth/declines)	also include people on Shemya and Attu - also need to talk about seasonal shifts in populations in these areas
Research activities	**NEW** research activities	fish resource permit from ADFG for research in State waters; EFH permits through NMFS	

Follow-on issues for second phase of FEP

The Team identified a number of areas of further work for a future version of the FEP:

- Examine spatial variation within the FEP area
- Consider eastern AI (Fox Islands), straddling BS and GOA – is ecosystem adequately addressed?
- Quantitative risk assessment
- Revise indicators
    - look at multivariate indicators
    - go through rigorous process of vetting indicators and mapping to management objectives