

eSeaGrant submitted Update Report

Period: 6/1/2012 - 2/28/2013

Project: E/I-20 - *NMFS Population Dynamics Sea Grant Graduate Fellowship: An evaluation of the stock assessment method for eastern Bering Sea snow crab incorporating spatial heterogeneity in fishing pressure, recruitment processes and distribution of spawning biomass. Andre Punt in support of Cody Szuwalski*

:: STUDENTS SUPPORTED

Szuwalski, Cody, szuwalsk@uw.edu, University of Washington, SAFS, status:new, field of study:Population dynamics, advisor:Andre Punt, degree type:PhD, degree date:2014-06-01, degree completed this period:No
Student Project Title:

An evaluation of the stock assessment method for eastern Bering Sea snow crab incorporating spatial heterogeneity in fishing pressure, recruitment processes and distribution of spawning biomass

Involvement with Sea Grant This Period:
Graduate fellow

Post-Graduation Plans:
stock assessment scientist (NOAA, hopefully)

:: CONFERENCES / PRESENTATIONS

Climate, recruitment and fisheries management: a management strategy evaluation for the eastern Bering Sea snow crab., public/profession presentation, 800 attendees, 2013-01-23

Alternative modeling and management strategies under uncertainty in climate, public/profession presentation, 40 attendees, 2012-09-01

Szuwalski, C. Spawning biomass, environment and recruitment: synchrony and implications for target biomasses, public/profession presentation, 25 attendees, 2013-03-15

:: ADDITIONAL METRICS

K-12 Students Reached:

Acres of degraded ecosystems restored as a result of Sea Grant activities:

Curricula Developed:

Resource Managers who use Ecosystem-Based Approaches to Management:

Volunteer Hours:

HACCP - Number of people with new certifications:

Cumulative Clean Marina Program - certifications:

:: PATENTS AND ECONOMIC BENEFITS

No Benefits Reported This Period

:: TOOLS, TECH, AND INFORMATION SERVICES

Description	Developed	Used	Names of Managers	Number of Managers
Spatially explicit assessment model for eastern Bering Sea snow crab	Actual 1 (6/1/2012 - 2/28/2013) :	0	0	0
	Anticipated 1 (6/1/2013 - 2/28/2014) :	1		
Spatially disaggregated data files for the assessment for the eastern Bering Sea snow crab	Actual 1 (6/1/2012 - 2/28/2013) :	0		0
	Anticipated 1 (6/1/2013 - 2/28/2014) :	1		

:: HAZARD RESILIENCE IN COASTAL COMMUNITIES*No Communities Reported This Period***:: ADDITIONAL MEASURES**Safe and sustainable seafood

Number of stakeholders modifying practices

Actual (6/1/2012 - 2/28/2013) :**Anticipated** (6/1/2013 - 2/28/2014) :

Number of fishers using new techniques

Actual (6/1/2012 - 2/28/2013) :**Anticipated** (6/1/2013 - 2/28/2014) :Sustainable Coastal Development**Actual** (6/1/2012 - 2/28/2013) :**Anticipated** (6/1/2013 - 2/28/2014) :Coastal Ecosystems**Actual** (6/1/2012 - 2/28/2013) :**Anticipated** (6/1/2013 - 2/28/2014) :**:: PARTNERS**

Partner Name: Alaska Department of Fish and Game (AK DFG)

Partner Name: National Marine Fisheries Service (US DOC)

Partner Name: NOAA Fisheries

:: IMPACTS AND ACCOMPLISHMENTS*No Impacts or Accomplishments Reported This Period***:: PUBLICATIONS***No Publications Reported This Period***:: OTHER DOCUMENTS***No Documents Reported This Period*

:: LEVERAGED FUNDS

No Leveraged Funds Reported This Period

:: UPDATE NARRATIVE

Uploaded File: [Szuealski 8427_update3.pdf](#), 79 kb

An evaluation of the stock assessment method for eastern Bering Sea snow crab incorporating spatial heterogeneity in fishing pressure, recruitment process and distribution of spawning biomass.

Cody Szuwalski and Andre Punt
Narrative for project E/I-20
Population Dynamics SeaGrant Graduate Fellowship

Activities:

Related to the project

Estimating movement rates between the areas designated in the proposal was the first task of the project. Spatially disaggregated abundance and length frequency data from the National Marine Fishery Service summer survey from 1978-2011, spatially disaggregated catch data from the Alaska Department of Fish and Game and spatially disaggregated length frequencies for the catch from NOAA observer data were obtained to achieve this goal and organized into a data file to be used in a spatial stock assessment. Preliminary analysis suggests the movement of male crab appears to mirror that of female crab reported in previous studies. Work has begun coding the spatially explicit assessment model, after which the management strategy evaluation framework will be coded using the resulting parameter estimates.

I presented my research on snow crab that identifies: 1) research priorities for management by detailing the estimation ability of the stock assessment, 2) a relationship between the environment and snow crab recruitment and 3) methods to possibly incorporate environmental influences in the management strategy twice during the reporting period. First, I was invited to an industry-sponsored meeting designed to introduce the fishermen and stake-holders to the science being used to manage the stocks they fish. I also presented at the Alaska Marine Science Symposium in Anchorage, AK.

A paper outlining the relationship between snow crab recruitment and regime shifts in the Pacific Decadal Oscillation was finalized and is in press at Fisheries Oceanography. This paper was the product of a North Pacific Research Board grant, but the results will influence this project. I attended a workshop on the stock assessments for Norton Sound red king crab and Aleutian Islands blue king crab and acted as rapporteur. Finally, I took a time series analysis class that will be central to the analysis of the movement patterns of snow crab in the Bering Sea.

Unrelated to the project

During this reporting period, I authored (or co-authored) three publications not directly related to this proposal. First, I wrote a response to an article in the Proceedings of the National Academy of Science entitled, "Production is a poor metric for identifying regimes in marine stocks." Second, I collaborated on a paper for ICES Journal of Marine Science entitled, "Management under climate and environmental uncertainty: Control rules and performance simulation." This paper surveyed the literature for the methods used to incorporate environmental forcing into management and identified promising techniques. Finally, I wrote, "Environment drives changes in recruitment for most marine fisheries," which analyzes recruitment and spawning biomass time series from the RAM legacy database to identify 1) the influence of spawning biomass on recruitment and 2) synchronous changes in recruitment dynamics within large marine ecosystems.

Participants:

I have had the opportunity to engage (and draw data from) individuals in relation to this project from industry, academia (UW), federal government (NOAA, NMFS) and state government (ADFG) during this reporting period.

Results:

Results will be coming soon and the next report will be consequently lengthier. The spatial assessment is in development.

Challenges:

none

Changes in project direction:

none