Introduction

• Yelloweye rockfish is a highly valued species yielding an average price per pound of $1.70 from the 2008 directed fishery for demersal shelf rockfishes (DSR).

• Yelloweye rockfish composed 96% of the species assemblage of demersal shelf rockfishes in all commercial fisheries since 2001 (Brylinsky et al. 2007).

• The full potential of the DSR fishery has not been realized in recent years due to area (2003–2005) and complete closures (2006 and 2007).

• The DSR fishery of the Southeast Outside Subdistrict is managed jointly by NMFS and ADF&G with a habitat based stock assessment.

• Habitat is delineated by a combination of multi-year DSR fishery logbook data and acoustic (multibeam and/or sidescan sonar) survey data interpreted into bottom type.

• We consider acoustic data a better proxy of suitable yelloweye habitat, as a consequence in locations where both data types are available we use solely acoustic data to delineate habitat.

• We hope to improve our estimate of suitable yelloweye rockfish habitat in locations where opportunistic bathymetry data is available in the absence of acoustic data.

Objectives

1. Predict yelloweye rockfish abundance using bathymetric data.

2. Delineate suitable rockfish habitat from yelloweye abundance prediction for incorporation into the stock assessment.

Methods

Dependent variables

Yelloweye abundance data was compiled from two different sources:

1. Catch per unit effort (CPUE) data- the number of yelloweye rockfish caught per hook was determined from fishermen’s logbooks.

2. Presence/Absence data- yelloweye rockfish observations from submersible surveys were used to designate presence of yelloweye rockfish.

Independent variables

• Habitat characterization was performed from location and depth (x,y,z) data to produce the following independent variables:

  1) depth, 2) slope, 3) rugosity, 4) bathymetric position index (BPI) broad, and 5) BPI fine.

• Rugosity = a measure of terrain complexity, surface area to planar area, or “bumpiness”. BPI = a measure of where a designated location is relative to surrounding locations. The broad (small) scale BPI uses a larger analysis neighborhood compared to fine (large) scale BPI.

• Four areas of high-resolution (5x5m cells) bathymetric data were used for habitat characterization.

References


Future Work

• Test the ability of the model to predict yelloweye rockfish abundance by randomly selecting 10% of the data to “hold out”, refit the model, and test the prediction in the “hold out” area. Perform repetitively.

• Compare predicted yelloweye abundance with interpretation of habitat as hard, mixed, and soft from acoustic data.

• Delineate suitable rockfish habitat from yelloweye abundance prediction for incorporation into the stock assessment.

• Produce a yelloweye prediction model with submersible survey data for comparison.

• Apply the model to “new” bathymetric datasets.