

**Dataset Documentation –
NCCOS Oregon Groundfish Biodiversity Hotspots**

| Dataset Description | |
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| Dataset Title | NCCOS Assessment: Groundfish biodiversity hotspots off the Pacific Coast of Oregon from 1971-09-05 to 2010-09-20 |
| Principal Investigators | Charles Menza - US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) |
| Primary Points of Contact | Charles Menza - US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) |
| Collaborators | Simon Pittman, Randy Clark, Laurie Bauer - US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS); David Fox, Michael Donnellan, Arlene Merems - State of Oregon; Oregon Department of Fish and Wildlife Fishery Resource Analysis and Monitoring Division - US DOC; NOAA; NMFS; Northwest Fisheries Science Center |
| Author List | Menza, Charles; Pittman, Simon; Clark, Randy; Bauer, Laurie; Fox, David; Donnellan, Michael; Merems, Arlene |
| Abstract | <p>This data set comprises maps of predicted long-term groundfish biodiversity hotspot probabilities off the Pacific Coast of Oregon. Predicted hotspot probabilities are given for four biodiversity indices: 1) relative abundance, 2) relative biomass, and 3) species number for all groundfishes, and 4) relative abundance for only nearshore groundfishes. The nearshore species assemblage includes: Sand Sole, English Sole, Pacific Sanddab, Speckled Sanddab, Petrale Sole, Starry Flounder, and Butter Sole. Hotspots were defined as areas with predictions in the top 10% of values of at-sea observations.</p> <p>This data set was used to support the Oregon Territorial Sea Plan. It was used to define ecologically important areas in the Nearshore Ecological Data Atlas Marxan Analysis conducted by The Nature Conservancy of Oregon.</p> |
| Purpose | Biodiversity hotspot maps were created to inform the Oregon Territorial Sea Plan. |
| Methods | <p>Abundance, biomass and taxonomic data were obtained from three data sources:</p> <ul style="list-style-type: none"> • ODFW nearshore flatfish trawl data (1971-1974) • NOAA Triennial West Coast Bottom Trawl Groundfish Survey (1977-2004) • West Coast Groundfish Bottom Trawl Survey Data - Annual West Coast time series groundfish trawl data collection survey (1998-2010) <p>All metrics were standardized by area swept (distance X trawl width) to allow distinct trawl surveys to be combined into a single database. All data between 1971 and 2010 were used. Water hauls identified following Zimmerman et al. 2011 (collected before 1995 and with less than 1kg/10000m²) were removed from analysis. Water hauls are abnormal data. All data in the ODFW and NOAA triennial were analyzed. Only data with haul type =3 and performance >=0 from NOAA Annual were analyzed.</p> <p>Spatial analysis was undertaken using a contiguous grid developed by joint efforts between NCCOS, the Oregon Department of Fish and Wildlife and the Nature Conservancy. The grid was derived from Bureau of Ocean Energy Management lease blocks covering shelf and slope waters. Grid cells measured 1600m by 1600m, such that 9 grid cells fit within 1 lease block.</p> <p>Relative abundance, biomass and species number counts were calculated for each grid cell with data. Associative models were then used to predict to grid cells in the entire study area. Predictions used fish-environment relationships modeled using binary logistic regression trees for categorical data (High/Low classes). High values (hotspots) were defined as the top 10% of values (=>90th percentile) for each modeled biodiversity metric.</p> <p>Models used 42 predictors derived from 8 distinct environmental spatial layers. Layers were distance from shore, distance from shelf edge, benthic habitat richness, majority benthic habitat type, hotspots of chlorophyll a concentration, upwelling hotspots, depth, bathymetric complexity, slope, slope of slope, and aspect. Depth and predictors derived from depth were taken from the NOAA coastal relief model. Predictors for chlorophyll and upwelling hotspots</p> |

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| | <p>were provided by TNC. Chlorophyll-a concentrations were classified into two categories, high and low, using ≥ 2 SD above the mean for the high, 1 to 2 SD above the mean for low concentrations. Upwelling was split into two categories, high and low persistence, using ≥ 1.5 SD below the mean for the high persistence and 0.5 to 1.5 SD below the mean for low persistence.</p> <p>Benthic habitat predictors were calculated from a benthic habitat map developed by Oregon State University. The map used v3.5 in Oregon state waters and v3.1 in the rest of the study area. The map was later determined to have classification differences between Oregon/Washington and California classifications. After careful deliberation and analysis of predictor contributions we determined that the contribution of these derived layers would not have an appreciable impact on predicted spatial patterns. To be extra conservative one could exclude predictions from California.</p> <p>Min, mean and max metrics used to characterize bathymetry and derived bathymetric variables were calculated for 3 spatial scales. Spatial scales were equivalent to a 1600m X 1600 m area, 4800 m X 4800 m area and 8000m X 8000m areas. Model output was constrained to areas within 5 km of at-sea observations.</p> <p>An accuracy assessment using 20% of data removed prior to analysis was completed to assess the validity of model results. Overall accuracy ranged from 64% to 87% depending on the hotspot metric.</p> |
| Citations | |
| Data Start Date | 1971-09-05 |
| Data End Date | 2010-09-20 |
| Data Northern Boundary | 48.7 |
| Data Southern Boundary | 40.0 |
| Data Western Boundary | -126.0 |
| Data Eastern Boundary | -123.0 |
| Comment | n/a |
| Resource Provider | NCCOS Data Manager <NCCOS.data@noaa.gov> - US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) |
| Use Limitation | Please note: BOEM, NOAA and NCEI make no warranty, expressed or implied, regarding these data, nor does the fact of distribution constitute such a warranty. BOEM, NOAA and NCEI cannot assume liability for any damages caused by any errors or omissions in these data. |

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| Parameter details | | | | | |
|----------------------------------------|---------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-----------|------------------|
| Parameter | Filename | Units | Definition | Ranges | Overall Accuracy |
| Groundfish abundance hotspot | Abundance | Probability of groundfish abundance hotspot | The data describe spatially-explicit predictions of the long-term probability of a groundfish abundance hotspot. | 0 to 1.00 | 74% |
| Groundfish biomass Hotspot | Biomass | Probability of groundfish biomass hotspot | The data describe spatially-explicit predictions of the long-term probability of a groundfish biomass hotspot. | 0 to 1.00 | 87% |
| Groundfish species number hotspot | SpeciesNumber | Probability of groundfish species number hotspot | The data describe spatially-explicit predictions of the long-term probability of a groundfish species number hotspot. | 0 to 1.00 | 64% |
| Nearshore groundfish abundance hotspot | nearAbundance | Probability of nearshore groundfish abundance hotspot | The data describe spatially-explicit predictions of the long-term probability of a nearshore groundfish abundance hotspot. | 0 to 1.00 | 83% |

| General Parameter Description | |
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| Type | Calculated |
| Category | Model output |
| Instrument | Documentation only - no instrument type |
| Format, Projection, Resolution | GeoTiff; WGS_1984_UTM_zone_10N; 1600m X 1600m cell size; 90 cols X 601 rows |
| Data Source(s) | <ul style="list-style-type: none"> • ODFW nearshore flatfish trawl data (1971-1974). Retrieved April 2011. Provided by the Oregon Department of Fish and Wildlife. • NOAA Triennial West Coast Bottom Trawl Groundfish Survey (1977-2004). Retrieved December 2010. Provided by the Alaska Fisheries Science Center. • West Coast Groundfish Bottom Trawl Survey Data (1998-2010), NOAA Fisheries, NWFSC/FRAM, 2725 Montlake Blvd. East, Seattle, WA 98112. Acquired 2011. Provided by the Northwest Fisheries Science Center. • NOAA National Centers for Environmental Information (NCEI), U.S. Coastal Relief Model, Retrieved May 2011, http://www.ngdc.noaa.gov/mgg/coastal/crm.html • Oregon State University Habitat map version merged 3.1 and 3.5 (Retrieved May 2011). Provided by the Nature Conservancy of Oregon. |