Developing a Comprehensive Pacific Coast Fisheries GIS Resource Database

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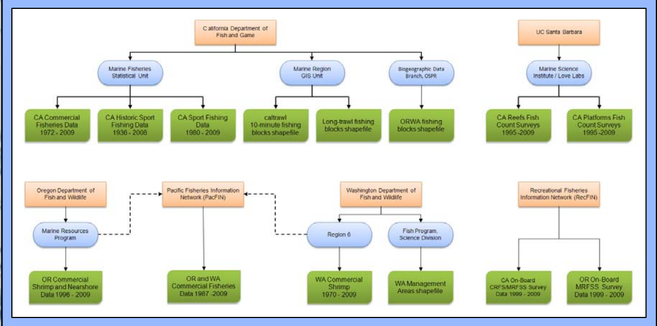
Introduction

Pacific Coast fisheries information is currently only available from wildlife agencies in disparate databases. To maximize the value of these data, the Bureau of Ocean Energy Management, Enforcement and Regulation and U.S. Geological Survey combined data from several of these sources into a single comprehensive geodatabase. This geodatabase, combined with a pre-made ArcMap™ document, custom query tools, and tutorials will be available to coastal wildlife and resource managers in Fall 2010.

Data Acquisition

From 2008 to 2010, fisheries and coastal spatial data were collected from wildlife agencies in California, Oregon, and Washington and compiled into an ESRI™ File Geodatabase. Each of the data providers collect and maintain fisheries data in different ways according to their management needs. Consequently, all of the catch data had to be summarized and formatted to work in our comprehensive database and to meet confidentiality requirements.



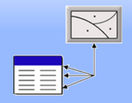
Fisheries datasets and providers

Locations for most fishing activity are represented on our map using the fishing block reporting system from the California Department of Fish and Game and the *WA–OR–CA Trawl Logbook*. These blocks are primarily 10 x 10 minutes in size, but vary depending on location and usage. Summarizing the data to the fishing blocks also generalized any precise catch locations recorded for fishing activity to a non-confidential level.

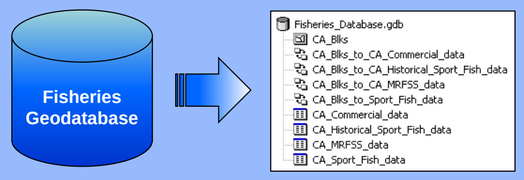
More specific points were used to designate the initial dive locations for the UCSB Marine Science Institute's fish count surveys (1995-2009) off Southern California. These are depicted on the map as reefs and platforms (see inset map).

Geodatabase Design

When working with fisheries data, the one-to-many relationship between the locations and the records can make analysis and visualization challenging. A single fishing block can have multiple fishing records associated with it when records are compiled by species or date. This prevents a perfect join between the spatial features (fishing blocks) and the fishing data, making symbolization difficult.



We chose to place individual fisheries data tables inside a geodatabase and tie them to the fishing blocks through relationship classes. This allows for spatial selections to be made on the map and associated data to be viewed and extracted for further analysis. Future updates to the data tables can be made by users through ArcCatalog™ and the relationship classes remain intact.



Offshore Fishing Blocks

Oregon and Washington Blocks

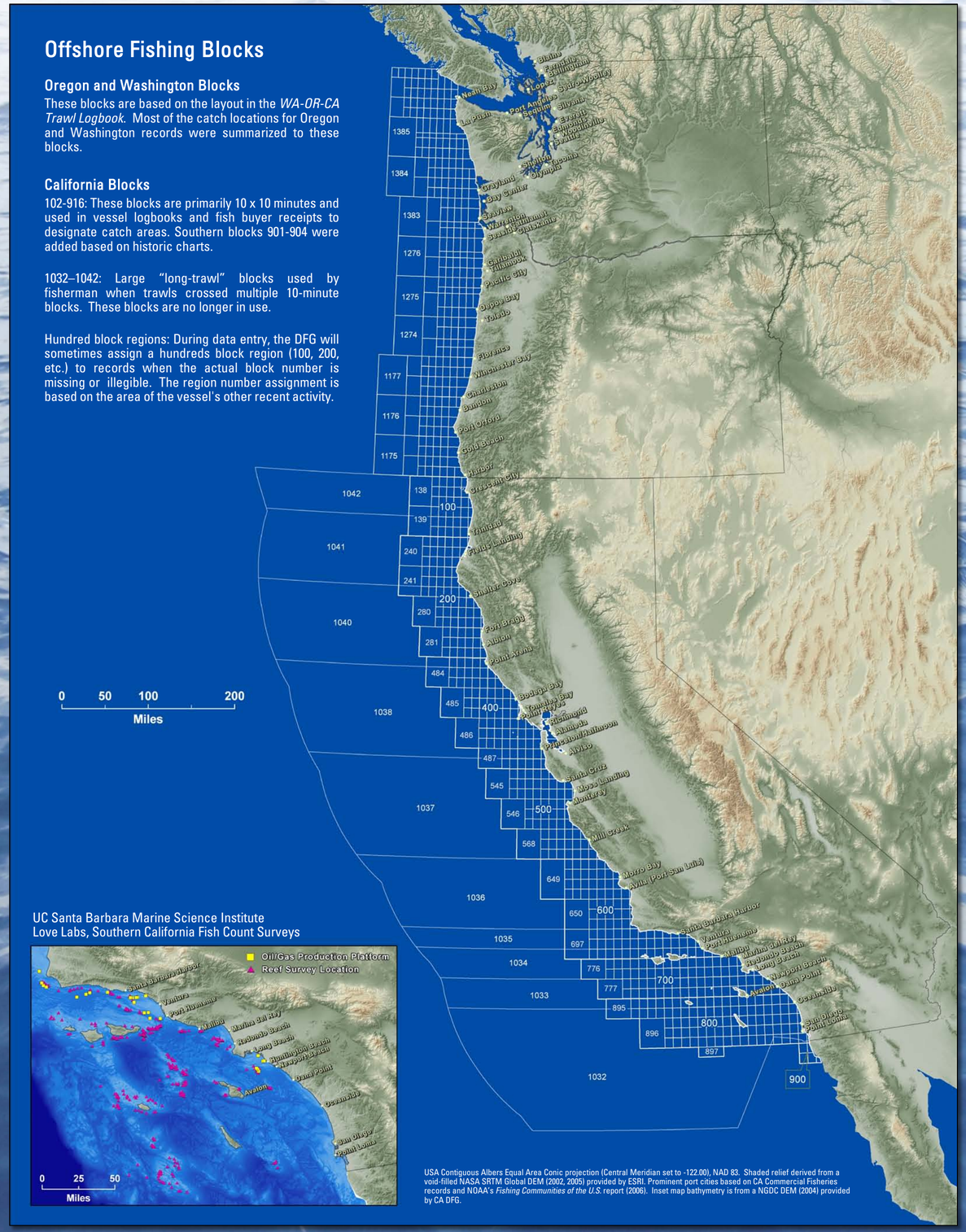
These blocks are based on the layout in the *WA-OR-CA Trawl Logbook*. Most of the catch locations for Oregon and Washington records were summarized to these blocks.

California Blocks

102-916: These blocks are primarily 10 x 10 minutes and used in vessel logbooks and fish buyer receipts to designate catch areas. Southern blocks 901-904 were added based on historic charts.

1032–1042: Large "long-trawl" blocks used by fisherman when trawls crossed multiple 10-minute blocks. These blocks are no longer in use.

Hundred block regions: During data entry, the DFG will sometimes assign a hundreds block region (100, 200, etc.) to records when the actual block number is missing or illegible. The region number assignment is based on the area of the vessel's other recent activity.

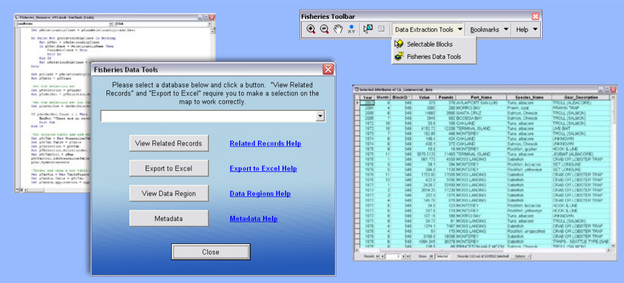


UC Santa Barbara Marine Science Institute
Love Labs, Southern California Fish Count Surveys

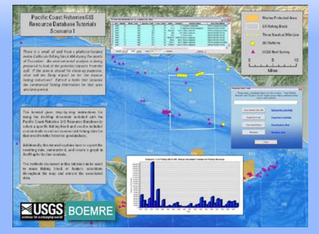
USA Contiguous Albers Equal Area Conic projection (Central Meridian set to -122.00), NAD 83. Shaded relief derived from a void-filled NASA SRTM Global DEM (2002, 2005) provided by ESRI. Prominent port cities based on CA Commercial Fisheries records and NOAA's *Fishing Communities of the U.S.* report (2006). Inset map bathymetry is from a NGDC DEM (2004) provided by CA DFG.

Custom Tools

Custom query tools were developed in VBA that allow users less familiar with ArcMap™ to easily view or extract associated data based on selections made on the map. Once a selection has been made, users choose one of the 15 included datasets and can view the data, export it to Microsoft Excel®, see all the regions with associated data, or view the metadata for that database.



Management Uses



To help demonstrate how the custom tools function and the possible ways in which the Pacific Coast Fisheries GIS Resource Database can be used, we've included a series of instructional tutorials. These step-by-step tutorials are based on realistic scenarios that coastal and marine resource managers might encounter. These tutorials include methods that can be applied to a wide variety of other scenarios.

Additional Data

As an additional resource, we've included data from the *At-Sea Distribution and Abundance of Seabirds and Marine Mammals off Southern California: 1999-2002* CD-ROM from the U.S. Geological Survey, Minerals Management Service (now BOEMRE), and Humboldt State University.

These data are reformatted to fit the structure of the geodatabase and accessible through the custom tools. The seabird and marine mammal survey's aerial transect blocks are selectable locations on the map from which associated data can be viewed or extracted.

The inclusion of the Seabird and Marine Mammal data, along with other coastal spatial datasets (bathymetry, maritime limits, prominent ports, marine protected areas, etc.), expands the GIS analysis capabilities available to managers.

More information on the seabird and marine mammal project can be found at: http://www.werc.usgs.gov/Project.aspx?ProjectID=106

Acknowledgments

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