

# Factoring People into Ecosystems – new tools for assessing socioeconomic impacts

The Case of the West Coast groundfish fishery

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# Introduction

- Empirical model, mining existing data sets;
- Prototype of regional, spatially integrated database and analytical framework;
- Results from static analysis, 2000 base year;
- Innovative, map-based decision support tools for communities and managers;
- Public-private partnership: funding from Packard Foundation, NFMS NWR, NOAA NOS MPA Center, Homeland Foundation, Oregon Sea Grant;
- Joint project between PMCC and Ecotrust;
- Particularly relevant for depth/space based measures.

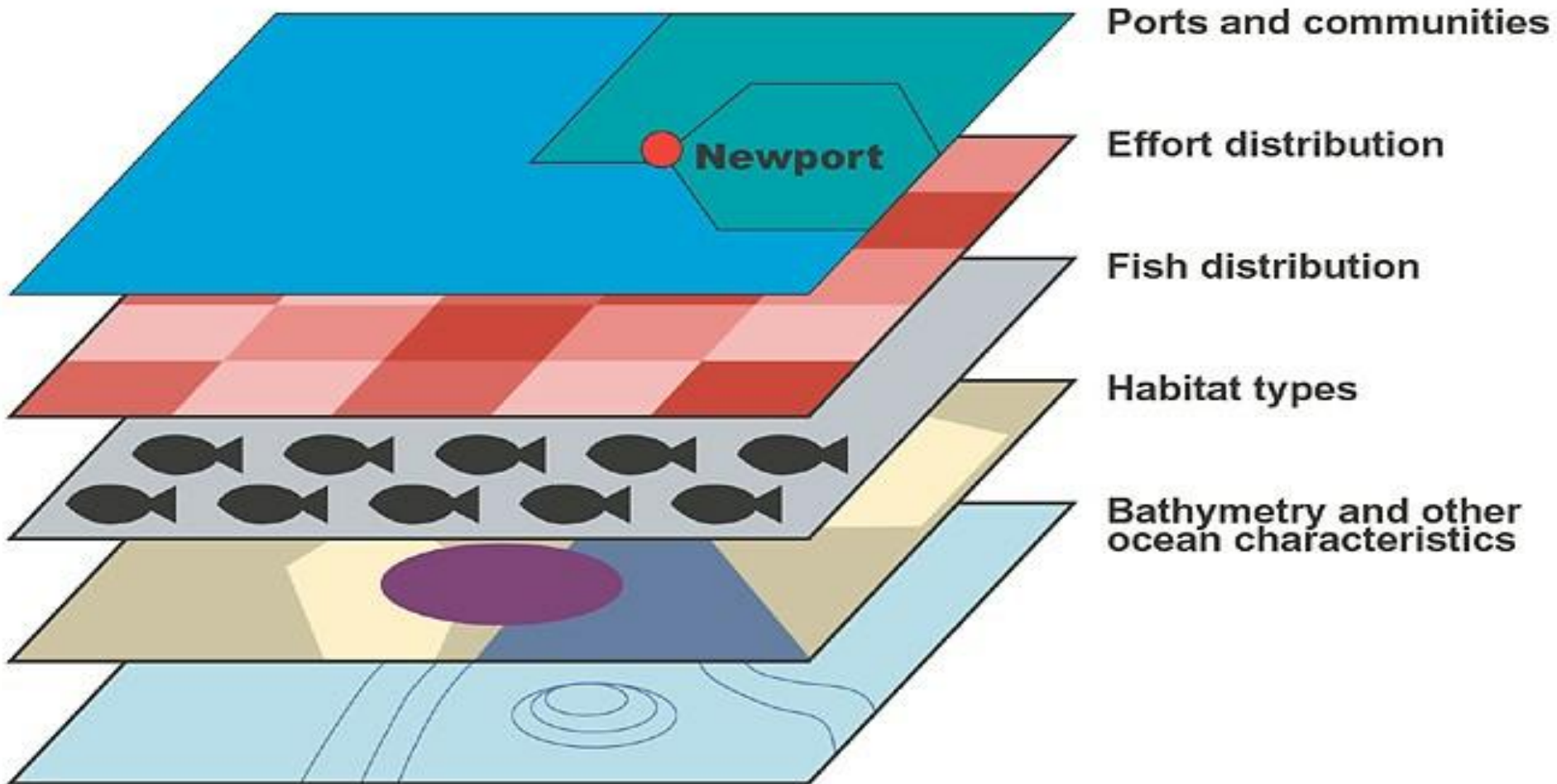
# Project background

- Motivation: worsening groundfish crisis, PFMC strategic plan (2000) mandate for 50% capacity reduction;
- “Groundfish Fleet Restructuring Information and Analysis Project” aims to develop coast-wide, spatially explicit framework, linking ecological, fishery-dependent and socioeconomic information;
- Goals:
  - analyze history of recent changes; develop scenarios for reducing fleet; and assess the associated impacts on fleet diversity, habitats, ecological and economical viability of remaining fishery and coastal communities;
  - Develop tools to support management and to help communities identify and plan for mitigation/transition options.

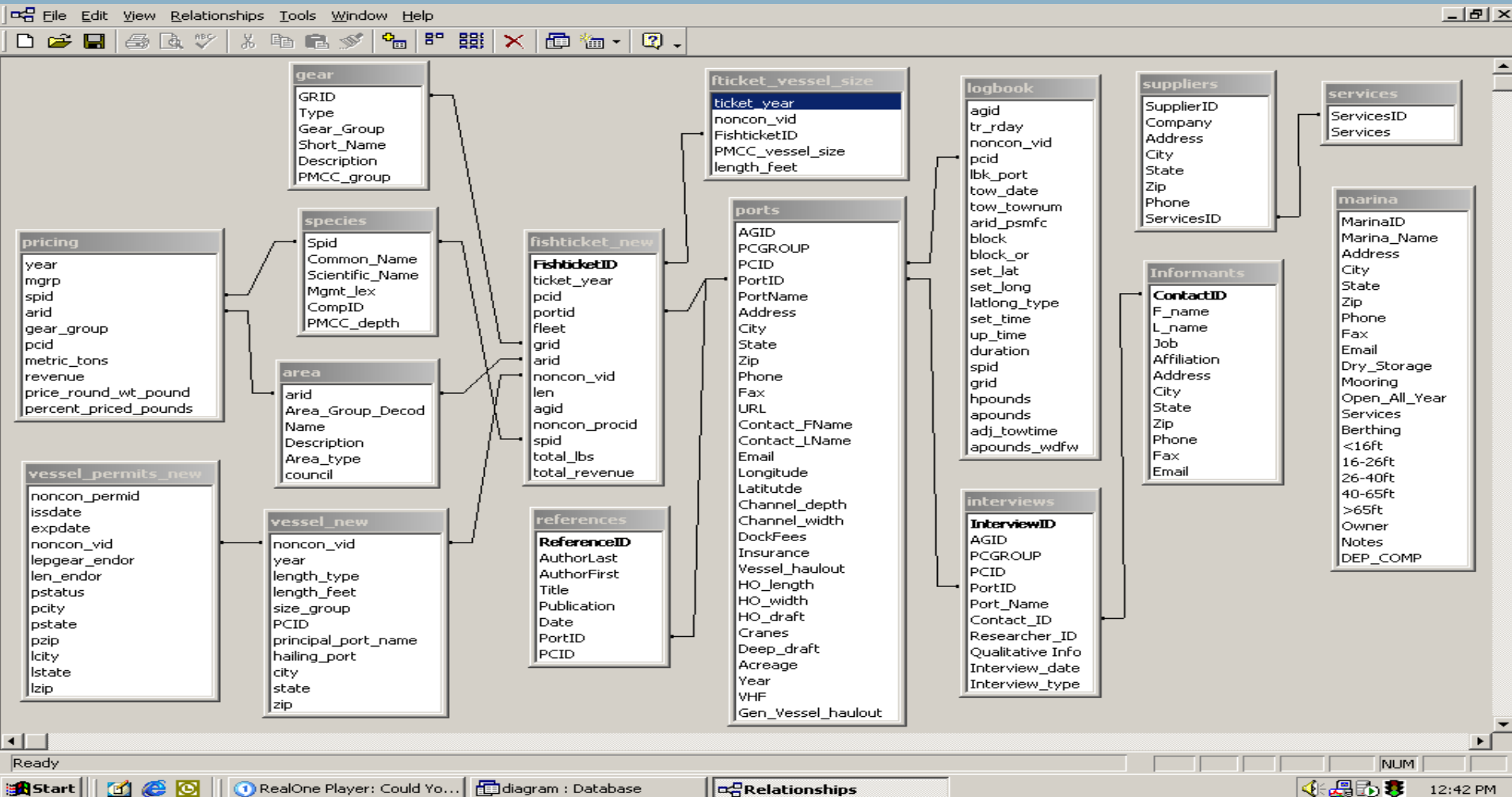
# Framework

- Systems view: ecosystems, fisheries and coastal communities are linked in multiple ways;
- Place matters: where the fish are, where businesses are, where communities are;
- Challenge for sustainability planning:
  - “NMFS and its partner agencies should integrate existing data (...) to provide geographic databases for major fishing grounds.” (NRC, 2002)
- GFR = GIS + relational database + analysis

# The GFR geographic information system

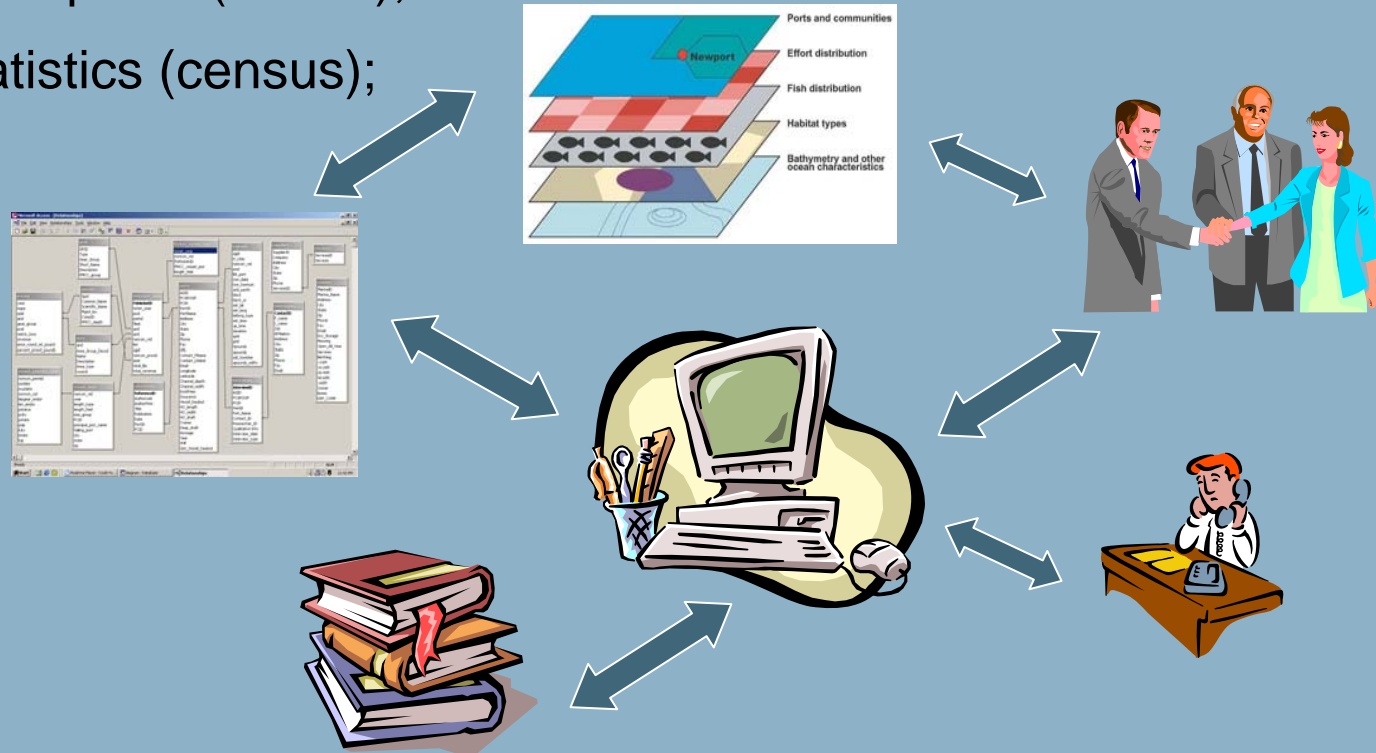


# Relational database



# Analysis

- Iterative query and map procedure;
- Spatial statistics;
- Derive income impacts (FEAM);
- Community statistics (census);
- Triangulation.



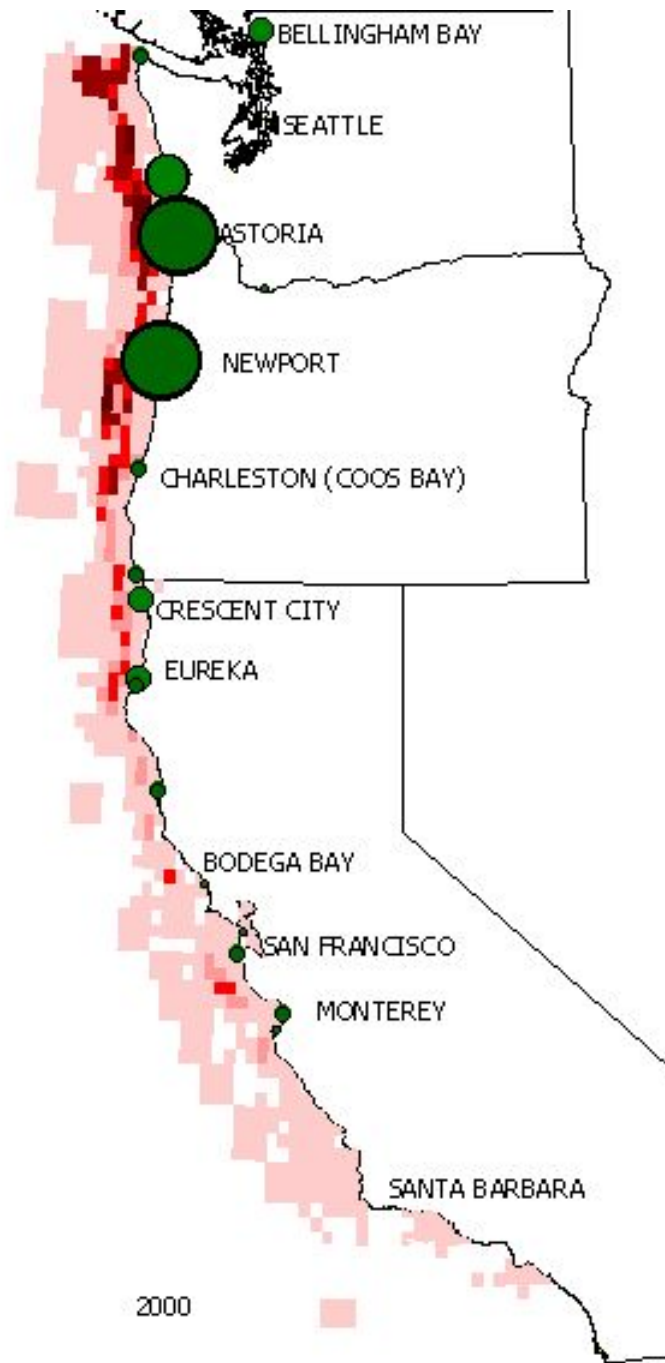
Total pounds landed / port

- 1 - 500,000
- 500,000 - 1,000,000
- 1,000,000 - 5,000,000
- 5,000,000 - 10,000,000
- 10,000,000 - 20,000,000
- 20,000,000 - 50,000,000
- > 50,000,000

Total pounds caught / block

- 1 - 250,000
- 250,000 - 500,000
- 500,000 - 1,000,000
- 1,000,000 - 5,000,000
- 5,000,000 - 10,000,000
- > 10,000,000

Distribution of  
trawl catch and  
landings, 1987 -  
2000

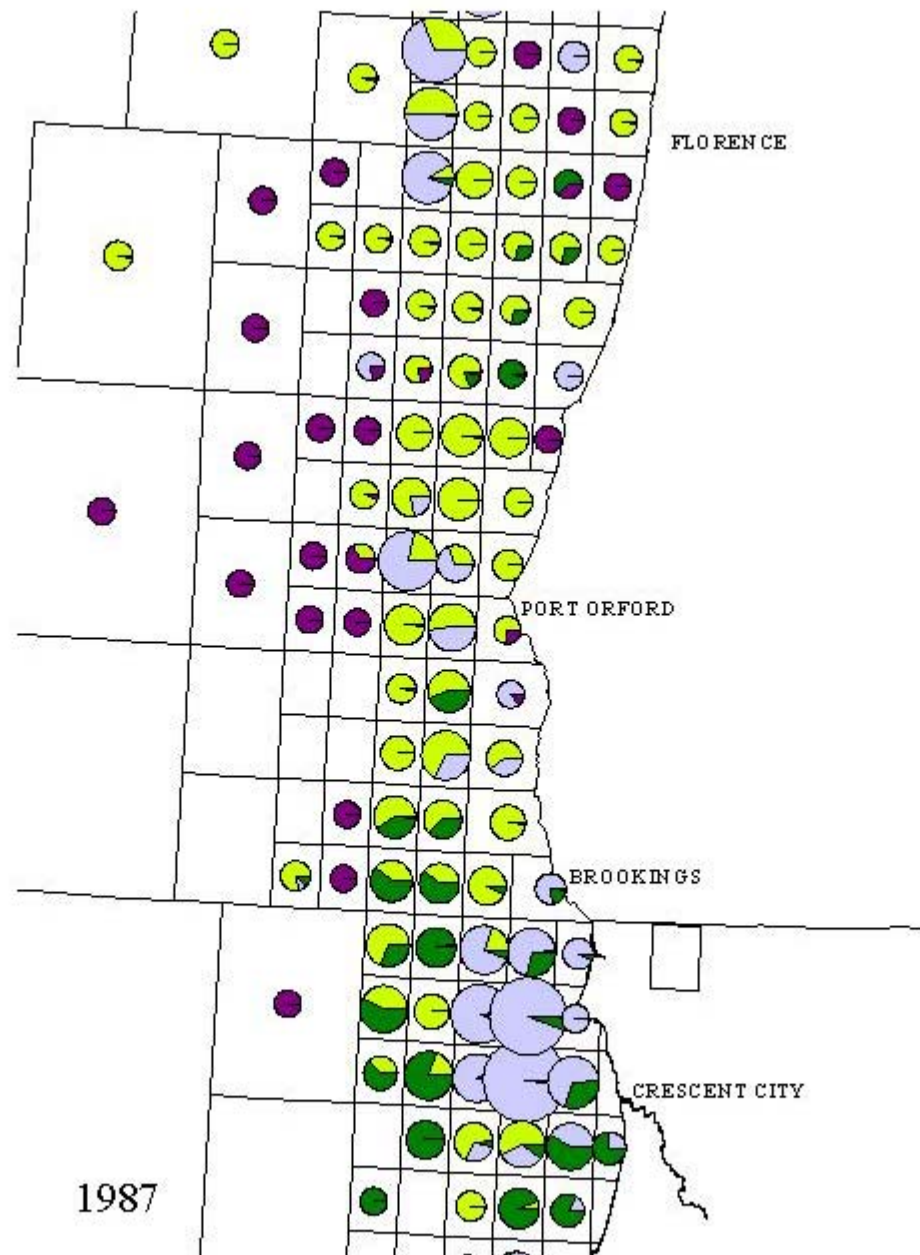


2000

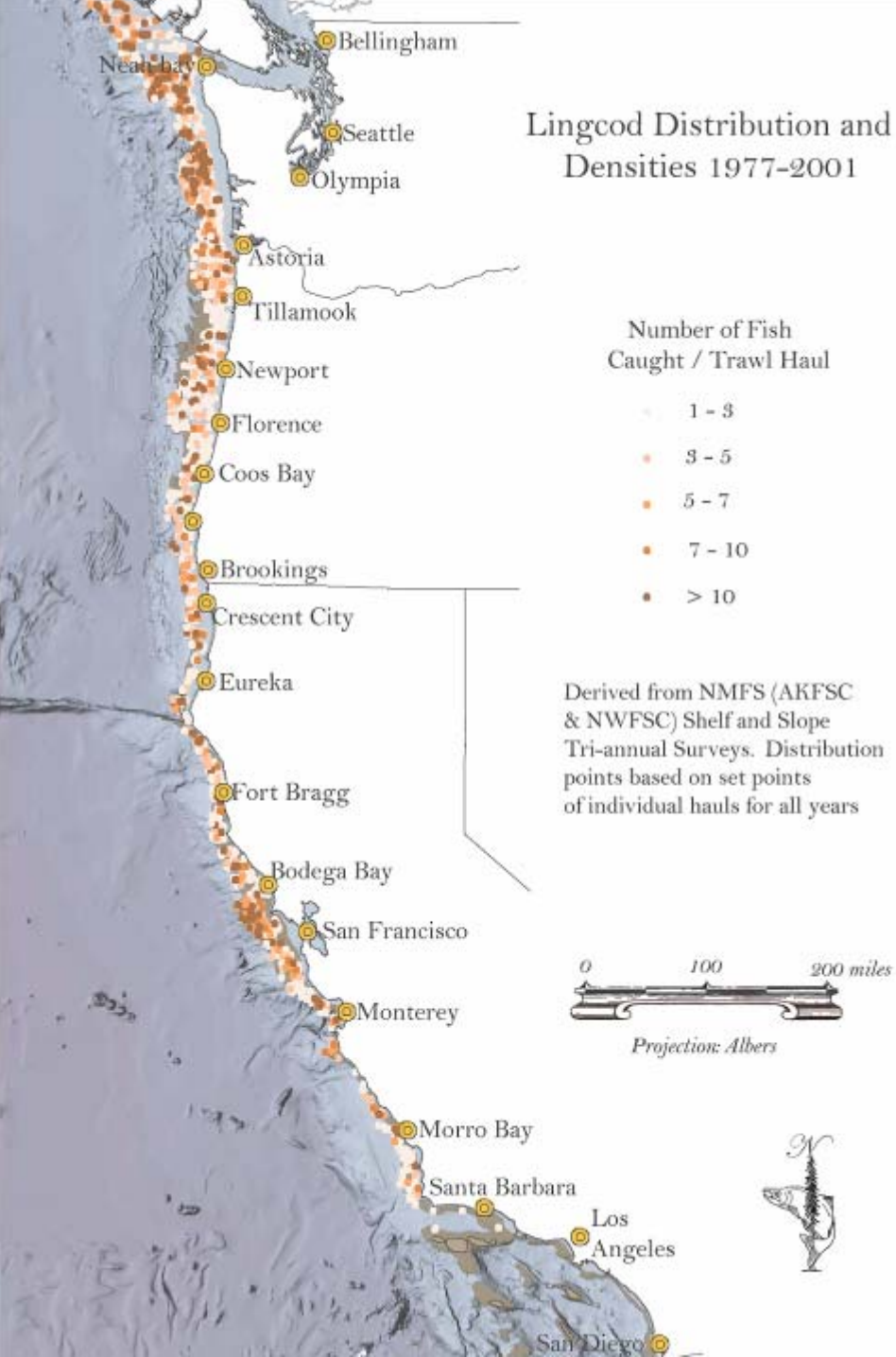
Fishing gear  
used in specific  
areas - zooming  
in on the South  
coast of Oregon

Dominant trawl type

- flat fish trawl
- groundfish trawl
- midwater trawl
- otter trawl
- roller trawl



## Lingcod Distribution and Densities 1977-2001

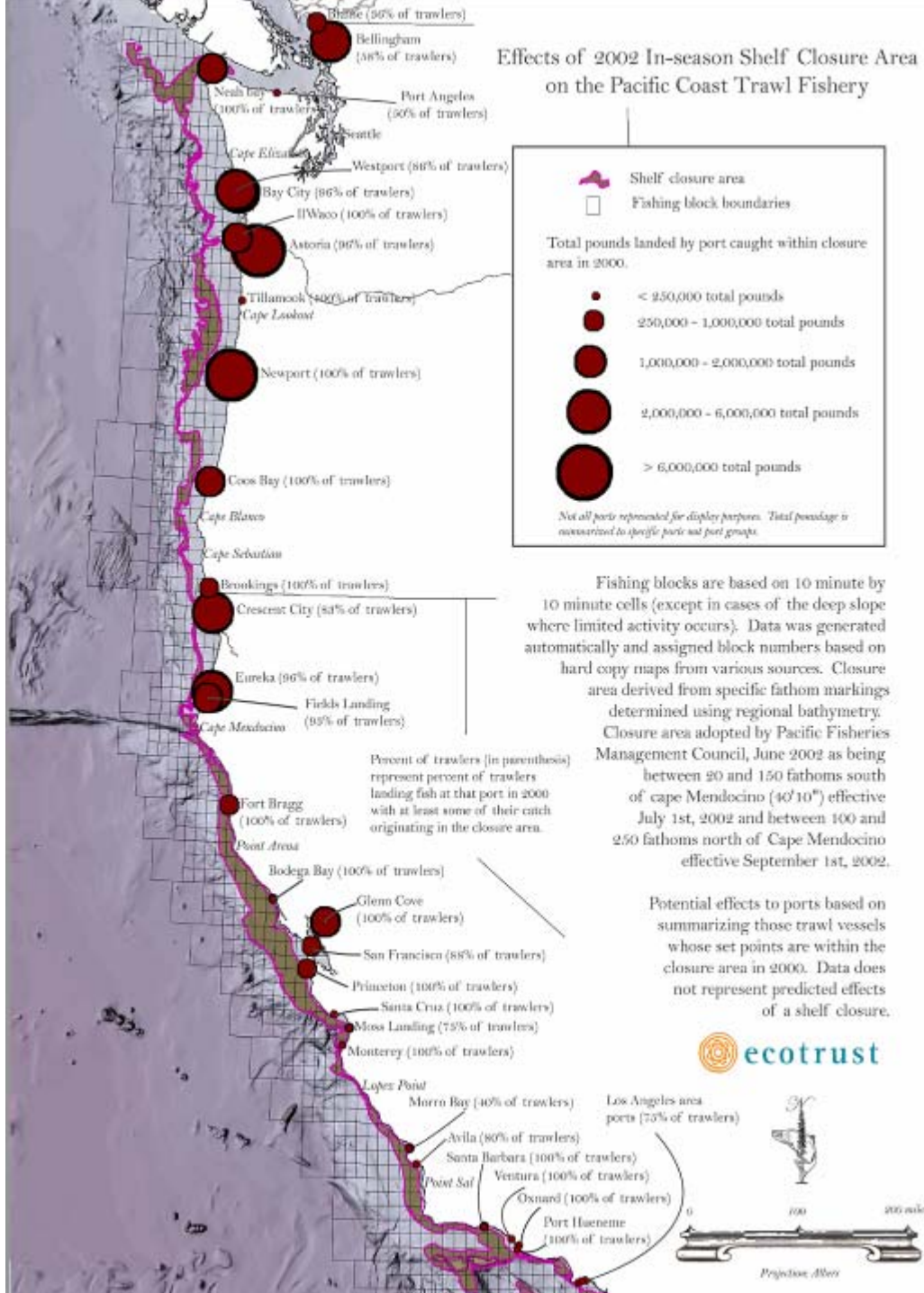


Note: Cumulative distribution mapping method follows NOAA's National Centers for Coastal Ocean Science and National Marine Sanctuaries Program (2002), *Interim Product: A Biogeographic Assessment off North/Central California to Support the Joint Management Plan Review for Cordell Bank, Gulf of the Farallones and Monterey Bay National Marine Sanctuaries*, Silver Spring, MD.

# Preliminary results – 2002 shelf closure

- In 2000, if vessels had not been able to fish in the 2002 in-season shelf closure areas, what would the effect have been on landings, revenues and income?
- Before relocation of effort, area closure have effect of reducing capacity of fleet;
- GFR platform identifies order of magnitude of effect, vessels and communities affected;
- Hinges on GFR fish ticket algorithm and its flaws.

## Effects of 2002 In-season Shelf Closure Area on the Pacific Coast Trawl Fishery

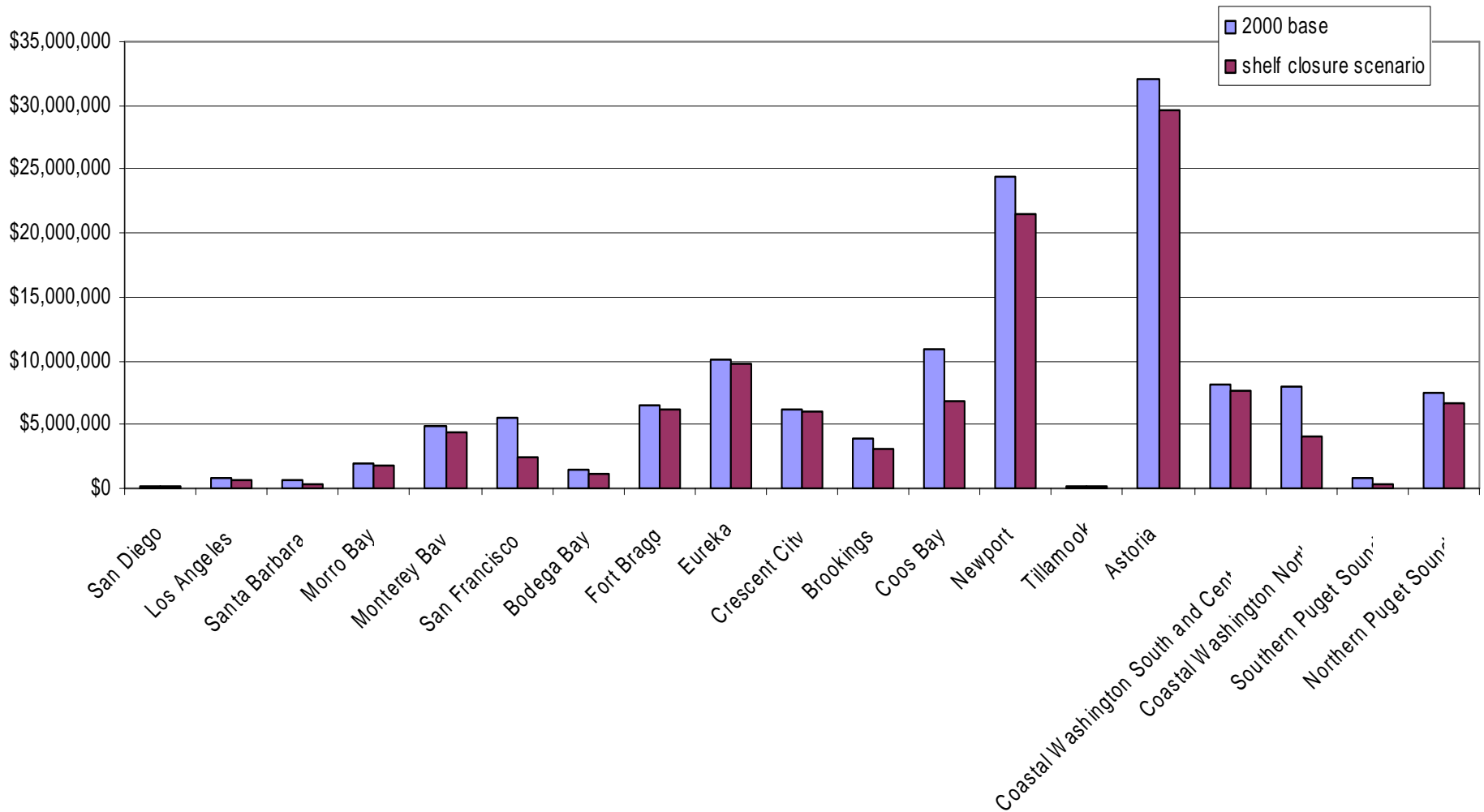


Fishing blocks are based on 10 minute by 10 minute cells (except in cases of the deep slope where limited activity occurs). Data was generated automatically and assigned block numbers based on hard copy maps from various sources. Closure area derived from specific fathom markings determined using regional bathymetry.

Closure area adopted by Pacific Fisheries Management Council, June 2002 as being between 20 and 150 fathoms south of cape Mendocino (40°10') effective July 1st, 2002 and between 100 and 250 fathoms north of Cape Mendocino effective September 1st, 2002.

Potential effects to ports based on summarizing those trawl vessels whose set points are within the closure area in 2000. Data does not represent predicted effects of a shelf closure.

# Preliminary results – closure scenario



# Next steps

- Producing and documenting tools
- Deliverables to NMFS NWR and PSMFC
- Community applications
- Dynamic systems modeling extensions
  - Joint ecological-economic modeling
  - Deepening community analysis: from descriptions to resilience indicators
- Peer review, presentations and publications
- More information at: [www.ecotrust.org/gfr](http://www.ecotrust.org/gfr)

# Acknowledgements

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- 60+ advisors and reviewers
- 100+ fishermen and others who provided information, reviews, and comments