



ecotrust


OCEAN: Modeling the linkages between marine ecology, fishing economy and coastal communities

Astrid Scholz

AAAS meeting, Seattle

13 February 2004

Introduction

- Ecotrust is a non-profit think tank and community development organization
 - Working to build Salmon Nation—where economy, ecology, and equity are in balance
 - Sector programs in Fisheries, Food & Farm, First Nations, Forestry
 - In-house GIS department and research
 - Collaborate with federal and state agencies, universities, industry, tribes & NGOs
- 
- A decorative graphic of a gear or cogwheel is located in the bottom right corner of the slide. It is rendered in a light blue color, matching the background, and consists of several concentric circles with rectangular teeth or segments.

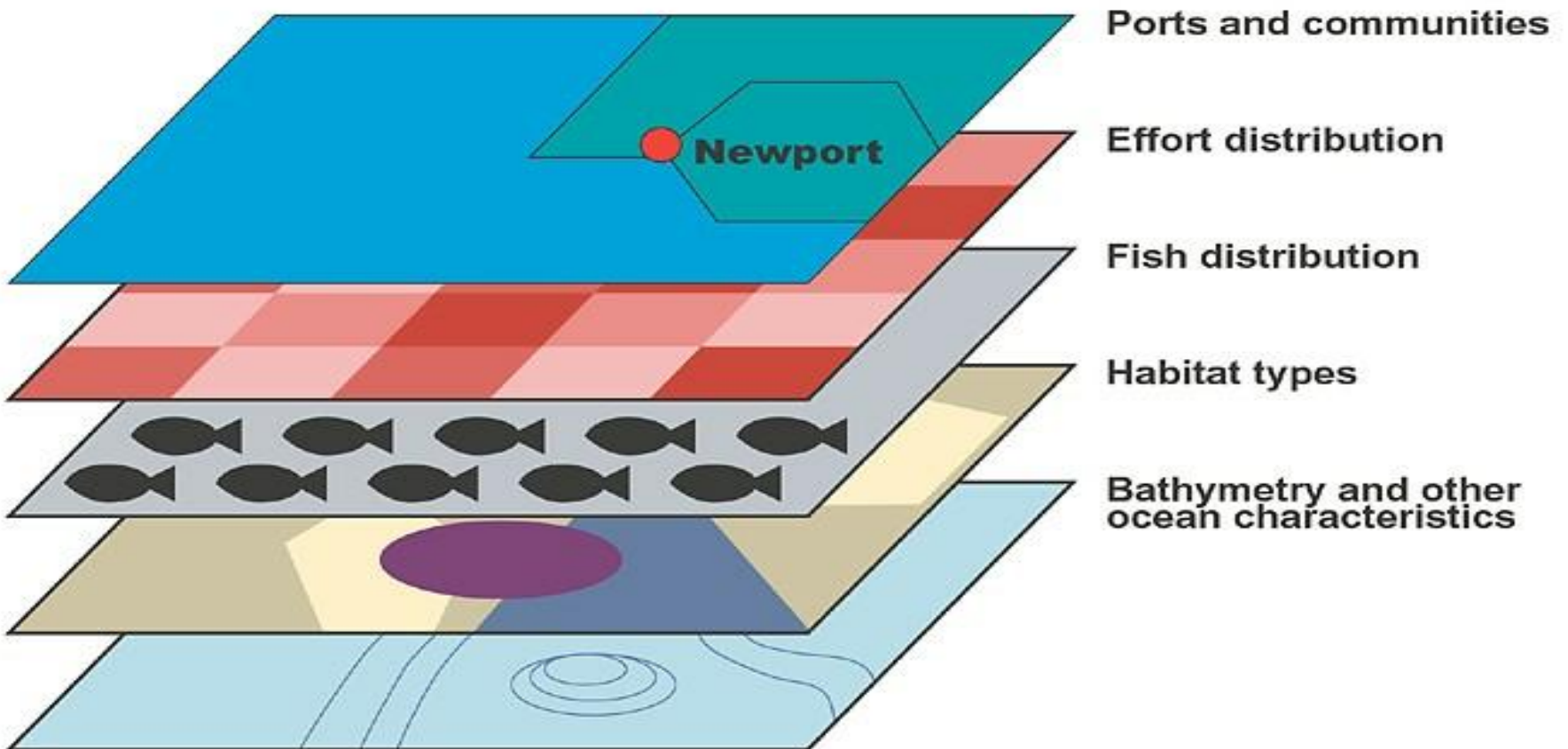
Outline

- Using GIS for socioeconomic analysis
- OCEAN model for mining existing data
 - Linking areas of the ocean to communities on land
- Applications to marine management issues:
 - Groundfish crisis
 - Area-based management (marine protected areas)
 - Habitat protection (deep sea corals)



OCEANI

Ocean Communities **Equity Ecology Analysis Economy**



Methods – Mining existing data

- Multiple data sources:
 - State and federal logbooks and landing records
 - NOAA trawl surveys (species distributions)
 - NOAA, USGS, universities: bathymetry, habitat classification and oceanographic data
 - 1990 and 2000 census (community profiles)
 - Regional economic model (income multipliers)
 - Literature, interviews, observation (business, port and community profiles)
- Combine in large, relational database

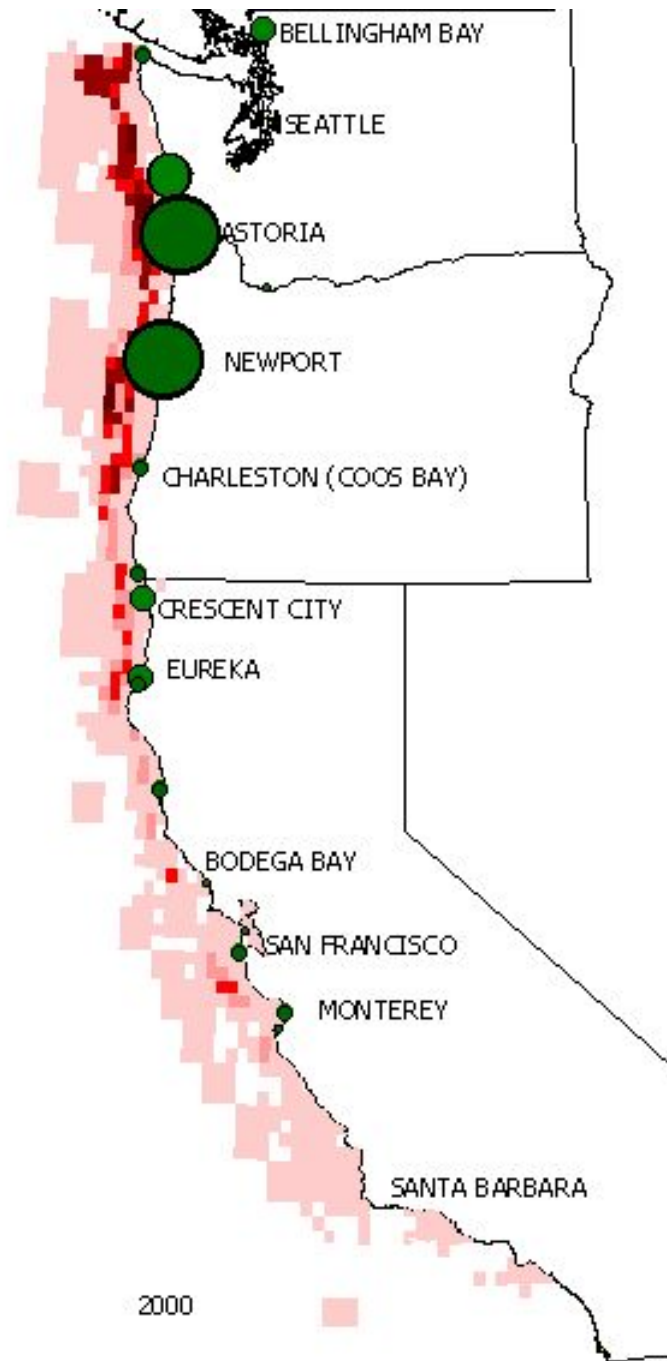


Methods – “Forensic” GIS


- Many data sets are not georeferenced
- Example: no comprehensive VMS or observer coverage on the West Coast — where vessels fish matters for habitat impacts
- ArcINFO model - Successive constraints imposed on landing records:
 - Fish distribution information derived from NMFS trawl surveys
 - Habitat constraints — e.g., untrawlable areas
 - Gear-depth associations
 - Expert testimonials on distance that vessels travel from landing ports



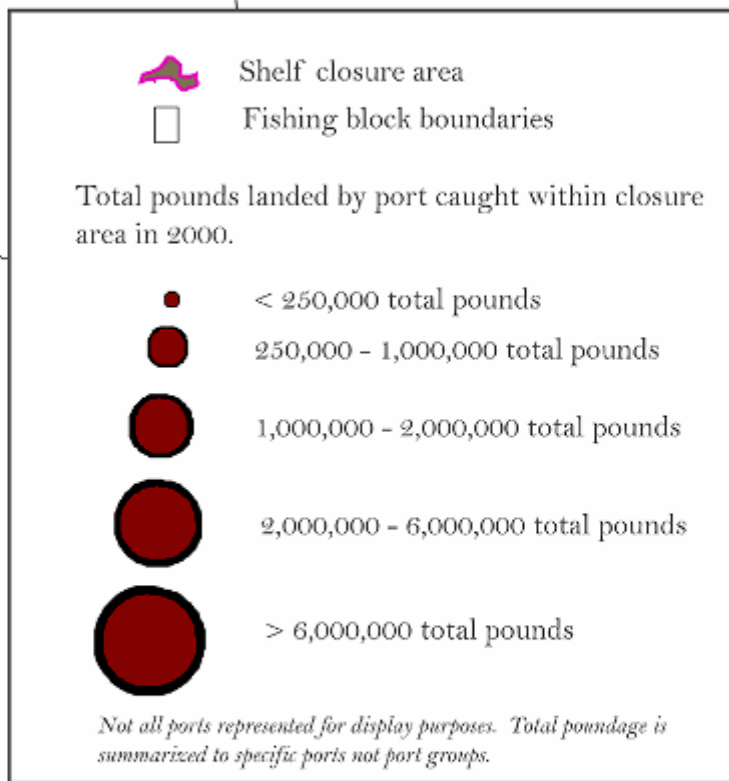
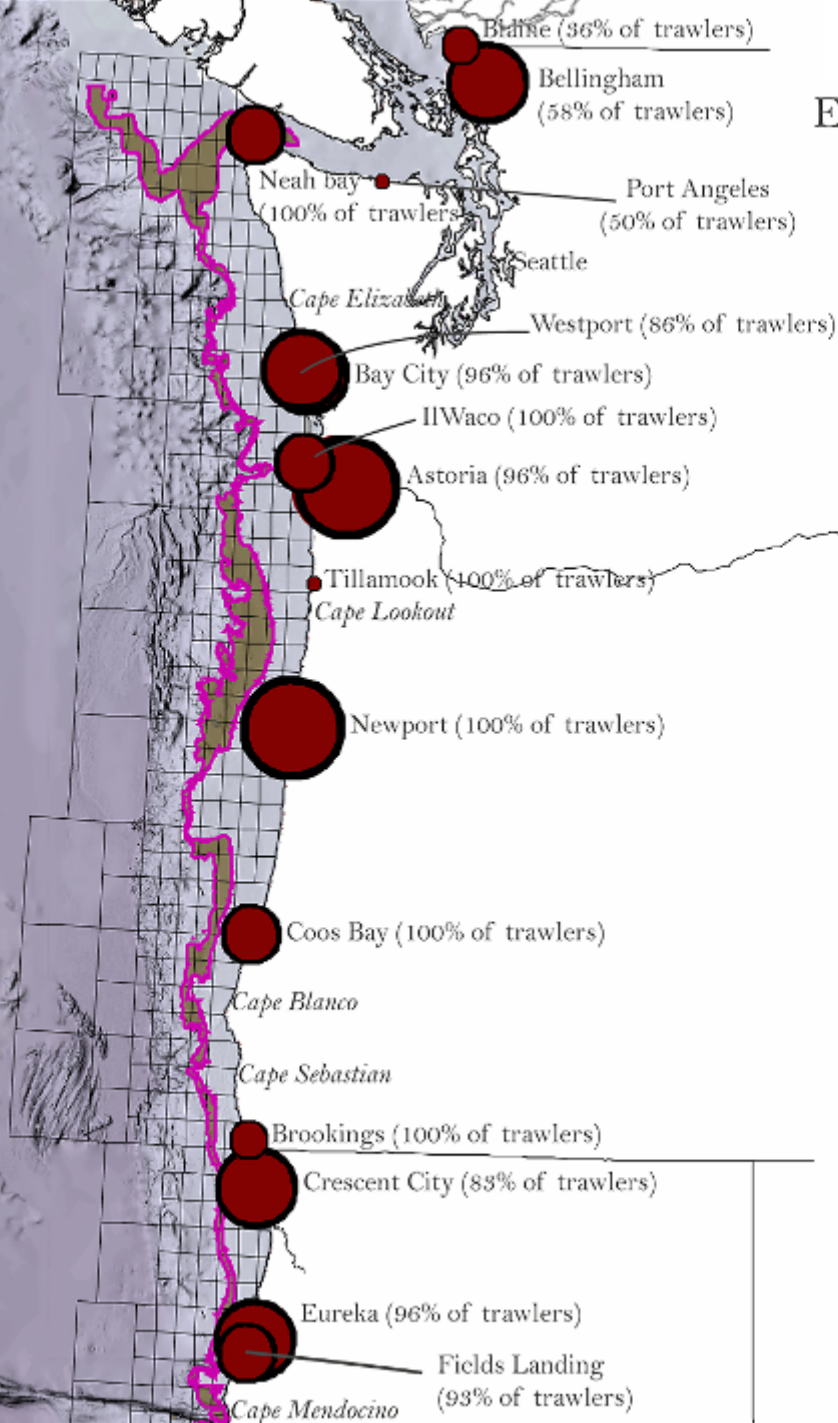
Distribution of trawl catch and landings, 1987 – 2000



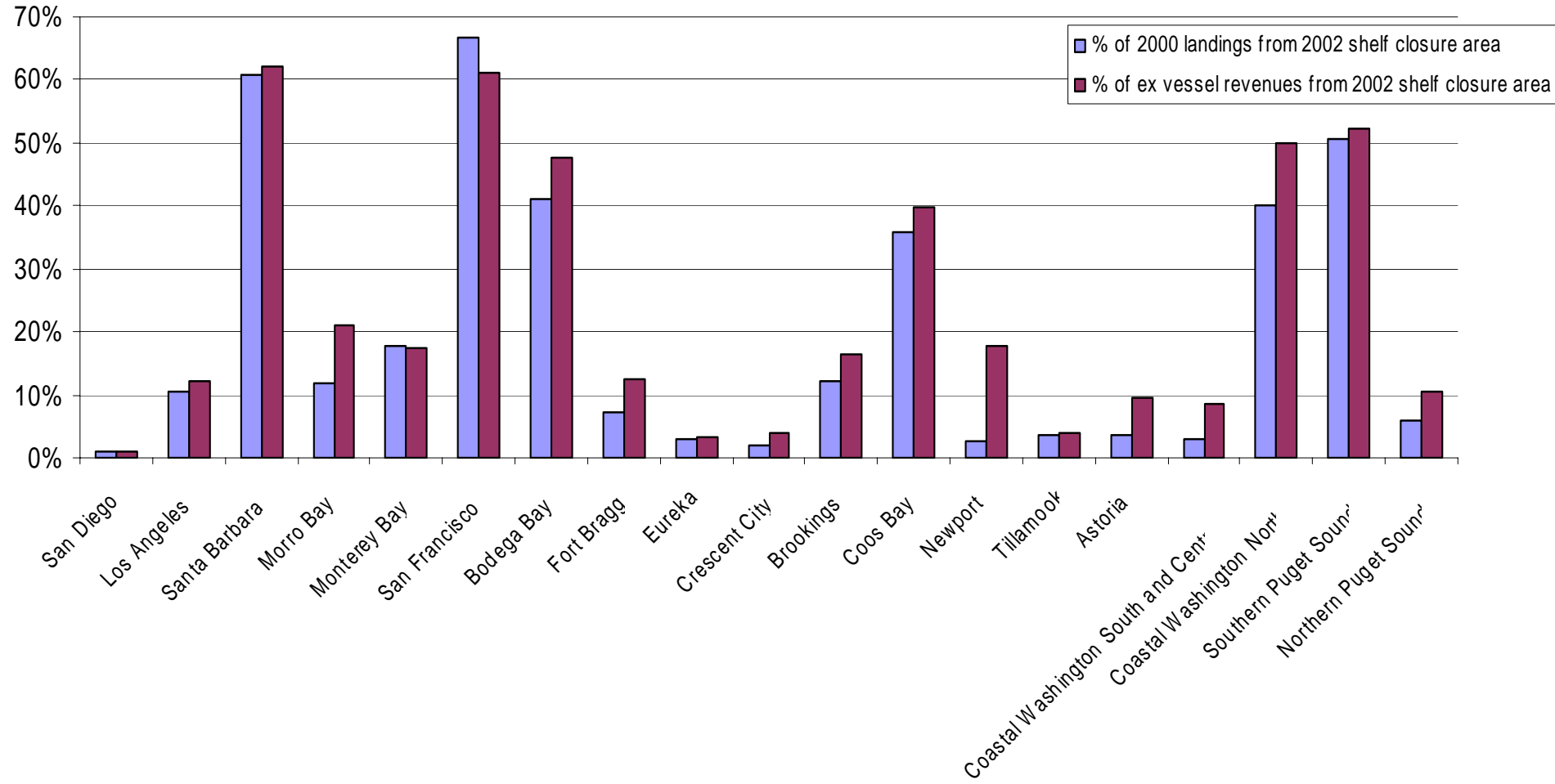
Application –Groundfish crisis

- Group of 80+ flat, round and rockfish
 - Fishery prosecuted with trawl and fixed gear
 - Several species of rockfish overfished — triggers rebuilding measures
 - Example: shelf closures that effectively establish no-trawl zones (since 2002)
 - Estimated effects of this closure:
 - Different effects on different parts of coast — some communities do better than others under this management regime
 - Use OCEAN to assess if the closures are working
- 

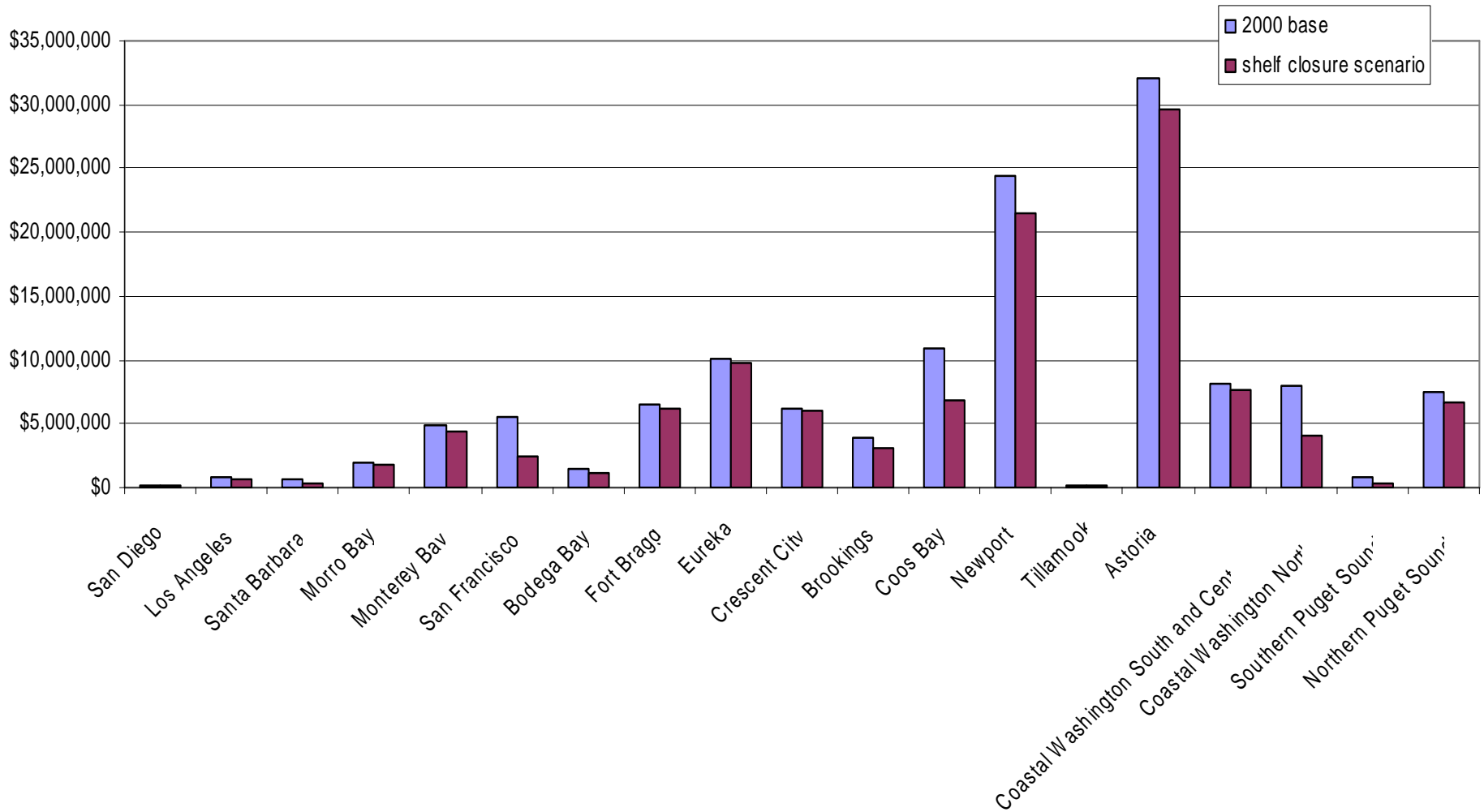
Effects of 2002 In-season Shelf Closure Area on the Pacific Coast Trawl Fishery



Reliance on shelf closure area



Coastwide impacts of closure scenario



Application – Habitat protection

- Fishing gear impacts sensitive marine habitats, including deep sea corals
- Majority of coral species live in cold, dark depths
- Widely distributed along the West Coast, especially along the shelf break
- Increasing concerns about interaction with fisheries, e.g. central CA marine sanctuaries



Acknowledgements

- Co-authors: Mike Mertens, Charles Steinback and rest of GFR team;
- Funding from: NOAA Fisheries NWR, David and Lucille Packard Foundation, Homeland Foundation, NOAA NOS.

