



DEEPER UNDERSTANDING

HUMAN DIMENSIONS RESEARCH IN PROGRESS

OCTOBER 2016

In Oregon, marine reserves are areas in our coastal waters dedicated to conservation and scientific research. The Oregon Department of Fish and Wildlife (ODFW) is tasked with overseeing the scientific monitoring and research of Oregon's five marine reserve sites. The ODFW Marine Reserves Program is working with numerous research partners to study both the ecology and the human dimensions of the reserves.

Our human dimensions research is looking to describe and understand the effects that occur over time to **regions, communities, social groups, and individuals** when we implement marine reserves - that is, when we set areas aside for conservation and cease fishing in those areas. Our research is looking at:

- **How communities are affected.** We look at communities of place — like Depoe Bay; of occupation — such as the fishing industry; and of interest — like wildlife viewers.
- **Ways ocean users are affected.** We consider both extractive and non-extractive uses and users.
- **How regional economies are affected.** This includes looking at economic contributions, losses, and changes.
- **Interactions between the economy, marine environment, and communities.** How do people value and depend on the ocean? What desires and expectations do the public hold for the ocean and conservation areas managed by the state?

Human dimensions research draws from multiple social science fields including economics, sociology, anthropology, geography, and psychology. In some instances the information produced is quantitative; in others it is qualitative or descriptive. Each of these sciences has established protocols or research tools for collecting information and drawing conclusions from that information.

Over time, we will begin to understand the variety and differences of effects that marine reserves can have here in Oregon. Each of Oregon's marine reserves is unique and it is likely we will see different effects at each site. For the state's evaluation of the Marine Reserves Program in 2023, we will have five case studies to learn from – one from each of the uniquely different marine reserve sites. What we're learning from this work is being used to support the management of marine reserves and sustainable nearshore ocean resources and coastal communities here in Oregon, now and into the future.

We are working in collaboration with a variety of research partners to study the human dimensions of Oregon's marine reserves. Our research partners provide advice, lend different expertise, and help us round out our monitoring program. Partners include social scientists at universities and in the private sector.

Marine reserves are a relatively new management tool here in Oregon. Based on what we are learning, our scientific research will evolve and be adapted over time to produce the best possible data. We will continue to ask questions about the ability of our research tools to generate robust, valid, and unbiased data about the human dimensions of marine reserves implementation and new research studies will be added over time. Our goal is to constantly seek to improve our scientific research based on the best-available science.

RESEARCH PROJECTS

The following is a brief description of our four general categories of research and the Human Dimensions projects that are currently in process, or planned, as of October 2016. Reports from completed research projects are available on the state's Oregon Marine Reserves website at oregonmarinereserves.com/library/#hd.

I. GENERAL SOCIAL AND ECONOMIC CHARACTERIZATION OF THE AREA

For each marine reserve site, we first develop a characterization of the communities that could be most directly affected by the reserve. This includes information such as historical records, demographics including employment data, social structure, tribal or spiritual connections, cultural and social events, and economic drivers of the local economy. This characterization is our attempt to set the "back story" and monitoring parameters for these communities. We then conduct research within the communities to determine how the community may respond to the challenges and opportunities created by marine conservation and other events.

1. Coastal Community Profiles

Several earlier OSU and ODFW reports were community profiles focused on ethnographic investigations of the fishing (occupational) community. This research was subsequently expanded to include a broad cross section of community interests and stakeholders. The goal is to produce comprehensive profiles of the reserve communities of place, including communities that do not have a significant fishing economic base.

Part 1: Background Information - Descriptive existing data (history, demographics, economic and census data) are compiled to characterize the local community. These data allow comparisons between communities to understand the context of each community's socioeconomic characteristics. As baseline data, this information will also serve to monitor changes over time.

Status: Ongoing, draft comparative demographic report completed.
Researchers: Dr. Tommy Swearingen, Haley Epperly, ODFW
Shannon Davis, The Research Group (TRG)

Part 2: Community Resilience, Adaptation, and Communication - How resilient/adaptive are Oregon coastal communities in response to both opportunities and stress created by external events (e.g. change in marine conservation policy, environmental or economic changes)? Through interviews with community members during 2014 and 2015, data were collected on characteristics of community resilience, adaptation and communication. A related webinar was conducted in 2016. Final reports are in preparation.

Status: Ongoing, draft report nearing completion.
Researchers: Dr. Tommy Swearingen, ODFW
Drs. Paige Fischer and Julia Wondolleck, University of Michigan, SNRE
SNRE masters students: Ricky Ackerman, Mike Burbidge, Xi Chen (Stanley), Theo Eggermont, Joanna Lehrman, Rachel Neuenfeldt, Nathan Wells
Karma Norman, NOAA Northwest Fisheries Science Center, advisory role (this work is complementary to the NOAA community resilience research)

2. Coastal Business Community Interviews

A brief questionnaire for assessment of the coastal business community's awareness and knowledge of marine reserves, and their expectations concerning visitation and business performance. This information provides a baseline for future comparisons after reserve implementation. Reports are in preparation.

Status: Ongoing. Interviews were revised for surveys conducted since 2014.
Researchers: Dr. Tommy Swearingen, Haley Epperly, ODFW

II. DIRECT USE OF THE AREA

To understand "who" has or currently uses the marine reserve sites, we first analyze quantitative, qualitative, and spatial data from commercial and recreational fisheries. This includes existing and new data obtained through logbooks, port sampling, observations, and interviews or surveys. This analysis allows us to identify physical areas of use, which fisheries are conducted in these areas, and which communities of place and interest may be affected from displacement or disruption of these activities. We also gather new and existing data on non-consumptive use of the ocean and shore area connected to these sites. This allows us to understand what uses presently exist, and to monitor changes which may occur with implementation of the marine reserve site. Sociological and economic information is also collected from the direct users of these areas.

3. Modeling the Economic Impacts of Marine Reserve Fishing Restrictions

Development of a model that can be used to conduct regional economic impact analyses of potential economic displacement of fishing effort due to area based fishing closures, such as marine reserves or wave energy projects. The model uses inputs of fisheries economic data, ORBS data, commercial fishery logbooks, and seafloor habitat mapping. We run the model to conduct an analysis of potential economic dislocation of fishing effort for each marine reserve site and across the entire marine reserve system. The model was updated during 2015 to include the most recent fisheries economic data (three year averages) and seafloor habitat mapping data.

Status: Ongoing. Model refinement includes development of a dashboard for managerial applications.
Researchers: Shannon Davis, The Research Group
Jim Golden, Golden Marine Consulting;
The Active Tectonics and Seafloor Mapping Lab, OSU (assisting with habitat data)

The updated model was used to provide baseline information for Project 10, *Perceived Value of Ecosystem Services Among Oregon Coastal Residents*. ODFW paid for these model revisions, and Dr. Michael Harte received Oregon Sea Grant support for his work integrating this model and additional ODFW data with the BOEM BASS model.

4. Visitor Counts

Randomized observations of reserve and beach users (pressure counts) to obtain basic data on visitor characteristics and behaviors. This data will allow analysis of potential change in non-consumptive marine reserve visitation and uses over time. Data were collected at Cape Falcon during the summer of 2015.

Status: Ongoing; draft project report completed.
Researchers: Dr. Tommy Swearingen, Haley Epperly, ODFW

5. Visitor Surveys

A random intercept survey of visitors to obtain more detailed information on demographics, trip purpose, party characteristics, expenditures, and knowledge of reserves. These data are collected concurrently with, and are complementary to, the observational data collected in Project #4. Data were collected at Cape Falcon during the summer of 2015.

Status: Ongoing; draft report nearly completed.
Researchers: Dr. Tommy Swearingen, Haley Epperly, ODFW

6. Ocean Awareness Visitor Survey

A coast-wide random survey of Oregon coastal visitors to assess their awareness of ocean environmental and management issues, factual knowledge of these issues, and potentially relevant visitation data and visitor demographic characteristics.

Status: Ongoing, draft report completed.
Researchers: Dr. Tommy Swearingen, Haley Epperly, ODFW
Justin Dalaba, OSG Summer Scholar

7. Fishing Effort Shift

An analysis of how fishermen adapt to marine reserve implementation. How do restrictions impact effort, costs, catch, and other variables? Are changes occurring in fishermen's behaviors and their related business plans?

Status: Pilot observations of existing fishing effort occurred at Cape Falcon from December, 2014 to January, 2016. Qualitative interviews were conducted during summer, 2015 in Garibaldi, and a report on this research is complete. Reports on observations and earlier interviews of fishers' anticipated effort shift are in preparation. A quantitative survey of fishing effort shift is pending. Further project development in process.

Researchers: Dr. Tommy Swearingen, Haley Epperly ODFW (earlier fishers' interviews and observation data reports in process)
Drs. Kreg Lindberg and Elizabeth Marino, OSU Cascades (2015 Garibaldi fisher interviews and completed report)
Dr. Elise Granek, Bryn Hudson*, PSU (effort shift survey, pending)

8. Native American Traditional Knowledge and Attitudes about the Oregon Coast

Both a qualitative and spatial study of traditional use and cultural values among Oregon Coast Tribes, particularly as related to the sites of the marine reserves.

Status: Data collection in process

Researchers: Dr. Tommy Swearingen, ODFW
Dr. Elise Granek, Sabra Comet*, PSU
(Sabra Comet was a 2015 OSG Malouf Scholar)

*Environmental Management Graduate students at PSU; Dr. Swearingen serves on their committees.

III. ATTITUDES AND PERCEPTION OF IMPLEMENTATION AND MANAGEMENT

To assist in management of the marine reserves, we seek to understand the knowledge and attitudes of stakeholders and other Oregon residents pertaining to perceptions of marine reserves purposes, regulations, monitoring and research, management, and enforcement. Collecting this information will allow us to tailor our marine reserves outreach to better serve Oregonians and engage community members and stakeholders in the implementation of these areas.

9. Oregon Residents' Attitudes and Perceptions Survey

A representative mixed methods (mail and internet) survey to understand Oregon residents' knowledge, values, attitudes and perceptions concerning marine reserves. Replication of this research will assess change over time.

Status: Ongoing; coastal survey completed, report on more in-depth analysis recently completed. Data collection for survey of I-5 corridor residents completed, fall, 2016. Report pending.

Researchers: Drs. Mark Needham and Lori Cramer, OSU
Elizabeth Perry (coast survey) and Jennifer Johnston (I5 survey), OSU Forestry FES graduate students

10. Coastal Community Resilience & Subjective Well-being

Mail and online survey research to assess a range of social and psychological variables that relate to individual attitudes, values and perceived well-being in response to the marine reserves and other socioeconomic or environmental changes (stressors) within their coastal community. Where Project #1 is focused on community level response to change such as reserve implementation, this project will focus on the individual.

Status: Pilot study is completed, funded by Oregon Sea Grant with supplemental funding provided by ODFW. Replication with a larger representative sample will be conducted during 2016-2018.

Researchers: Dr. Tommy Swearingen, ODFW
Drs. Kreg Lindberg, Christopher Wolsko and Elizabeth Marino, OSU Cascades

11. Community Resilience related to Marine Reserve Implementation

A qualitative study to augment OSU-Cascades survey research regarding the resilience and subjective well-being of individuals in coastal communities (Project #10). This work will also complement the community case studies by ODFW and U of MI SNRE (Project #1, Part 2). A primary research objective is to identify anticipatory decision-making strategies in response to marine reserves implementation including effort shift among fishermen and how tourism and business sectors of the community may choose to capitalize on marine reserves.

Status: Ongoing
Researchers: Dr. Tommy Swearingen, ODFW
Drs. Elizabeth Marino and Chris Wolsko, OSU Cascades

IV. ASSESSMENT OF THE NON-MARKET VALUES OF THE RESERVES

To gain a more complete understanding of the potential economic and social effects of marine reserves, we are working to identify the non-market values connected to these sites. These data will be complementary to extractive (i.e., market) data, and will allow us to paint a broader picture of how Oregon residents value the ocean and marine reserves. This research will investigate different cultural values associated with the natural resources and ecological characteristics of these areas across stakeholders, communities, and among the general public.

12. Perceived Value of Ecosystem Services Among Oregon Coastal Residents

An initial Oregon Sea Grant and ODFW funded pilot study used focus groups to determine what stakeholders perceive as the services provided by the marine environment, and the order of importance of those services. This approach is used to quantify an ecosystem service value by ranking the perceived importance of the ecosystem services. Bio-indicators were identified for different ecosystem services, which could be monitored by marine scientists in the marine reserve sites. Current additional research was funded by ODFW and Oregon Sea Grant. The objective is to develop a Bayesian model with spatial attribution of ecosystem services and the dynamic ability to perform tradeoff analyses and to provide graphic visualization of tradeoffs (heat maps).

Status: Ongoing

Researchers: Dr. Tommy Swearingen, ODFW; Drs. Michael Harte and Randall Rosenberger, OSU, Bran Black, OSU, Shannon Davis, The Research Group

Pilot study: Peter Freeman, OSU Graduate Student, Drs. Randall Rosenberger, Gil Sylvia and Selina Heppell, OSU

13. Survey of Oregonians' Perspectives on Marine Conservation: Statewide Survey of Social Values, Attitudes, and Opinions

This state-wide study is an exploration of perceptions, awareness, and values that Oregonians hold about the coast and marine reserves. The study includes a phone and web survey, as well as a participatory GIS component to elicit the respondent's spatial attribution of perceived ocean and coastal values. This project will illustrate the desires and expectations that the public holds for the ocean and conservation areas that are managed by the state. Project funded by OSG with supplemental support from ODFW.

Status: Ongoing; data collection phase.

Researchers: Drs. Elise Granek, Max Nielsen-Pincus, and Amy Lubitow, PSU, Paul Manson, doctoral student, PSU