MEASURING REGIONAL ECONOMIC IMPACTS FROM NON-EXTRACTIVE ACTIVITIES AT OREGON'S MARINE RESERVES

CASE STUDY AT REDFISH ROCKS MARINE RESERVE IN PORT ORFORD, OREGON

Oregon Department of Fish and Wildlife

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The research team, including ODFW marine reserve social scientists and Sea & Shore Solutions staff, want to thank the 23 scientists, managers, and community members who generously shared their time and data with us. The foundation of this study was based on a similar study completed by The Research Group, LLC (TRG) in 2013. We want to recognize Shannon Davis from TRG for providing guidance to our research team for this replication study. We also want to thank the Oregon Marine Reserves Partnership whose members include the Redfish Rock Community Team. Lastly, we thank Tom Calvanese with the Oregon State University Field Station in Port Orford whose contributions included assisting in the project selection process and providing context for existing project representatives.

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EXECUTIVE SUMMARY

The state of Oregon implemented five marine reserves to advance scientific research while conserving biodiversity and habitat. The Redfish Rocks Marine Reserve (RRMR) located near Port Orford, Oregon was one of the first established in 2012. The marine reserves system supports and enables scientific research, planning, management and ecotourism business activities. The spending activity during trips, equipment purchases, guided kayak tours and labor compensation that accompanies the activities can provide economic benefits to communities and the state.

Oregon Department of Fish & Wildlife (ODFW) Marine Reserves social scientists and researchers at Sea & Shore Solutions estimated the economic impacts of non-extractive activities associated with RRMR, including research, planning, management, and ecotourism. This case study replicates an economic analysis that reviewed similar economic activities during the five-year period 2008-2012. Using RIMS II multipliers, the research team calculated economic impacts using both one-time and annual expenditures spanning 2022 through 2024. As shown in Figure 1, the economic impacts over these three years that includes the multiplier effect generated a total of approximately $177k of income and 5 full time equivalent (FTE) jobs in the local area within Curry County. This income is also called household and individual earnings. The FTE estimates are the sum of full-time and part-time job equivalencies. These non-extractive activities at RRMR had an additional impact of $435k and 8 FTE jobs at the seven-county coast economy level. Spending at the state economy level was an additional $228k in income and 4 FTE jobs. The total economic impact at the state economy level was approximately $982k and 20 jobs.

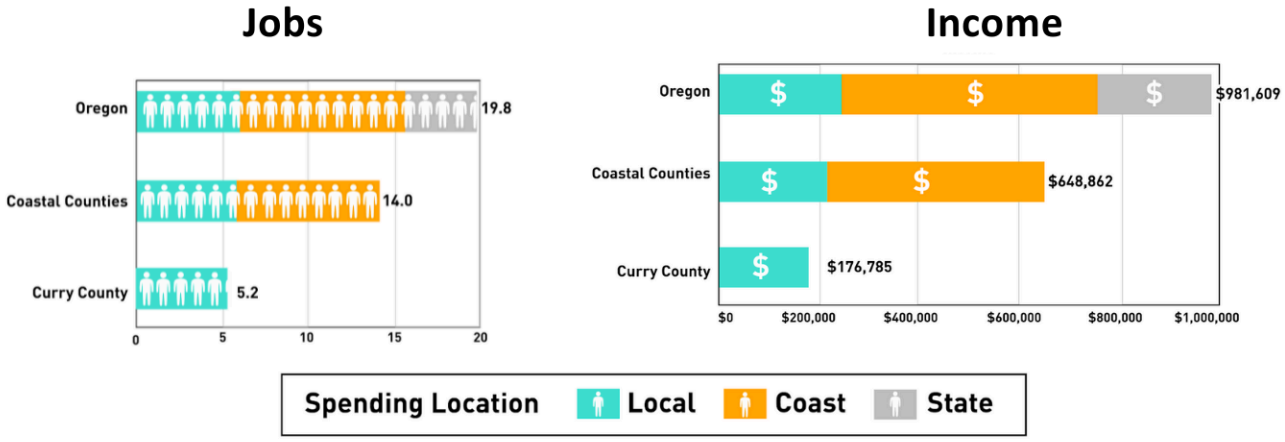

Figure 1. Redfish Rocks Marine Reserves economic contributions based on input-output analysis for 2022-2024

This case study involved a comprehensive census of non-extractive projects associated with RRMR, including research, planning, management, and ecotourism. The research team worked with local experts who led and/or managed these projects, including researchers, community group leaders, non-governmental organization (NGO) leaders, project managers, and business owners to create an exhaustive project survey list. The research team reviewed all permits for non-extractive activities within RRMR, solicited the relevant funding agencies and reviewed current research project compendiums. A total of 23 interviews were completed with the local experts identified above. The interviews revealed there were 21 projects underway during the 3-year study period. A total of 6 (26%) of the interviewees were based in Port Orford, while the remaining 17 (74%) resided elsewhere and traveled to Port Orford as needed. The projects varied in purpose and some projects had multiple purposes. The purposes of the projects included resource planning (18 projects, 86%), recreation (12 projects, 57%), market or business related (five projects, 24%), public health (five projects, 24%), public outreach and education (seven projects, 24%).

The survey included questions about factors that limited the extent of non-extractive activities. Five interviewees (22%) reported being limited by poor weather, three (13%) reported inability to launch vessels, two (9%) mentioned lack of opportunities to secure funding, one mentioned expensive lift fees for research vessels and eight (35%) mentioned lack of infrastructure and other problems associated with the small size of Port Orford's economy. Compiling these limitations can help inform local governments or organizations as they make choices, such as infrastructure investments, that could maintain or expand these non-extractive activities.

The Oregon Marine Reserves system demonstrates a commitment to biodiversity conservation, ecological research, socioeconomic research and coastal communities. This input output modeling quantifies the economic contribution of this marine reserve and associated marine science, planning and ecotourism to the local, coastal and statewide economies. These results can increase the visibility of the economic benefits of marine reserves among coastal residents, natural resource managers, policy-makers and others.

INTRODUCTION

Oregon's marine reserve system supports scientific research, protects habitat and conserves biodiversity. This system encompasses Marine Protected Areas (MPAs), which allow limited types of fishing, and marine reserves, which prohibit all extractive activities including commercial and recreational fishing, mineral extraction, and development. All marine waters within three nautical miles of the coastline are designated as Oregon's territorial sea (~1,000 sq. miles). MPAs cover 6% (77.2 sq. mi) and no-take marine reserves cover approximately 3% (40.3 sq. miles) of this territorial sea (see Figure 1).

Figure 2. Oregon Marine Reserves and Marine Protected Areas. Grayish blue denotes Oregon's territorial sea.

Oregon Department of Fish and Wildlife (ODFW) is responsible for managing the marine reserve system and conducting ongoing ecological and socioeconomic monitoring. No-take reserves and fishing limited marine protected areas (MPAs) often displace fishing effort while supporting non-extractive ocean uses. Various studies have investigated the potential and realized impacts of marine reserves and MPAs on commercial and recreational fishing (e.g., Roberts et al., 2001, White et al., 2013, Kayal et al, 2020, Rees et al., 2021). Considerably fewer studies have quantified the non-extractive economic impacts. This research is a case study of economic impacts from non-extractive activities associated with the Redfish Rocks Marine Reserve (RRMR).

RRMR, the southernmost of Oregon's marine reserves, is located near Port Orford, Oregon and encompasses 2.7 sq. miles (Figure 2). The greater Port Orford area (northern Curry County zip codes 97450, 97476 and 97465) had a population of 2,757 in 2021.[1] With the weakening of natural resource job opportunities and attractiveness of the area to retirees, demographic characteristics have shifted to older age groups. The median age of Curry County in 2021 was 59.2 as compared to the state median age of 39.6.

An estimated 10,590 people are employed in Curry County. In 2021, employment in the greater Port Orford area was about 9% of this total employment (BEA, accessed 2024). The major employment in recent history was timber and commercial fishing (including harvesting and processing sectors) which is now shifting to tourism and service business jobs (see more employment context on p. 20). Fishing fleets continue to be active in Port Orford. Most fisheries landings are trucked elsewhere for processing and distribution. The Port of Port Orford provides a seawater pump and distribution system for the handling of live fish deliveries.

A distinctive feature of Port Orford's port facilities is that all ocean-based transportation and industries rely on a crane-operated hoist to launch and retrieve vessels. This system limits ocean access and vessel size for commercial and recreational fishing, tourism, and environmental monitoring activities. As of 2025, the Port is underway on a facility improvement project to upgrade the cranes.

Regarding the commercial fishing industry, 71 different vessels (56 of which Port Orford is their home port) made 2,498 deliveries in 2021. Nearshore groundfish and Dungeness crab comprised the majority of deliveries. For the three-year period 2022 through 2024, annual average landings in Port Orford were 1.6 million pounds of all-species with ex-vessel value $4.7 million. The estimated economic contribution from the commercial fishing industry in 2021 was $5.6 million income and 119 jobs at the coast economy level. The contribution is 13.0% of all earnings in the greater Port Orford area.

Ocean recreational fishing in the area is limited due to the inconvenience and cost of requiring crane launching. One recreational ocean fishing charter business currently operates out of Port Orford. Fishing grounds near Port Orford are occasionally accessed by guide and private boats launched at Gold Beach, which is approximately 30 miles south.

[1] Population based on census data. See Appendix F for more social and economic details and map of zip code boundaries for the greater Port Orford area.

In 2012, RRMR was implemented as a no-take area adjacent to a limited harvest MPA (Figure 2 and Appendix G). TRG (June 2024a) discusses the estimated economic impacts from commercial and recreation harvesting restrictions at Oregon's marine reserve sites. From 2019 to 2021, the potential annual average regional economic impact from displacement at RRMR was $163k income. As noted in the cited report, the estimated impacts should be considered the maximum potential effects. Fishermen may use other locations for the same fisheries or participate in other fisheries as substitutes for the marine reserve management closures.

TRG (October 2013) investigated the economic contribution of research, planning, and management activities associated with the RRMR from 2008 through 2012. The economic activity associated with ecotourism was not included in the previous analysis. The previous analysis and this study considered Port Orford trip expenditures and labor compensation for researchers and contractors. We compare the economic impacts from the previous and current studies in the results section below.

Economic assessments are important for understanding the broader impact of industries and other activities that contribute to local economies, particularly in resource-dependent communities like Port Orford. Given this importance, ODFW supported this updated study to determine current trends in non-extractive activities. The current study expanded the scope of activities assessed by adding ecotourism businesses. The included ecotourism business activity does not include economic effects from visitors attracted to the area due to RRMR. Also, the previous study only addressed local economic impacts. The current study estimates economic impacts for the coast and state level economies.

Through a census of projects from 2022 through 2024, the research team collected primary data on trip expenditures and project-related spending, which was analyzed using an input-output model to estimate economic impacts. The findings highlight the value of RRMR to the local economy and barriers to expanding the non-extractive activities. While focused on RRMR, this study demonstrates the broader applicability of these methods for understanding the full economic value of Oregon's marine reserves.

RESEARCH GOALS AND METHODS

The overarching goal of this research was to **assess the economic impacts generated by marine reserve science, planning, and management activities as well as reserve-based tourism to communities adjacent to RRMR**. Specifically, this project sought to:

1. Quantify the spending associated with projects that contributed to the implementation, monitoring, and management of RRMR as well as reserve-based tourism.

2. Provide a detailed understanding of how marine reserve-related activities stimulate local economies and support community resilience.

3. Highlight the broader significance of marine reserves as drivers of scientific collaboration, ecosystem stewardship, and community engagement.

4. Solicit information about project barriers and hindrances to help inform local governments and responsible organizations about what can be done to promote non-extractive activities, such as infrastructure investments, permitting requirements, scheduling and fee amounts.

Quantifying the economic impacts of these activities supports ongoing efforts to recognize and promote the multifaceted benefits of marine reserves as natural and economic assets for Oregon. This research also aligns with ODFW's ongoing socioeconomic monitoring efforts and supports policymakers and community leaders in recognizing the benefits from providing services and facilities for non-extractive projects.

METHODOLOGY

Interview Design

The survey interview protocol (see Appendix B: Survey Instrument) was adapted from the previous study (TRG October 2013). The structured interviews, conducted between November 2024 through January 2025, provided the spending data for economic impact modeling. The research team chose this three-year time frame for projects to mitigate how the COVID-19 pandemic reduced a wide range of economic activities, including those associated with research.

Questions were adapted from the previous study to allow comparability while introducing additional questions to address new ways project spending was occurring. The questions captured spending details like labor, materials, travel, and access costs. There were seven additional questions to identify respondents' institutional affiliations and professional roles. The structured interviews aimed to balance brevity with detail so respondents could provide accurate information in less than 30 minutes.

Data Collection Protocol

The Dillman method (Dillman 2011) for identifying interviewees as part of a group was used, i.e., potential interviewees were people who conduct research, planning, management or ecotourism services at RRMR. Consultants at Sea & Shore Solutions administered the survey in collaboration with ODFW. Interviews were conducted via online video calls. Due to the small number of projects and ecotour operators, the team aimed to conduct a census of projects and tour services – interviewing all applicable parties within a group (Cantwell 2008). We screened for projects that incurred expenses in the years 2022 to 2024.

The research team identified and recruited interviewees through multiple sources. Putting together the survey frame began with participants listed in the TRG (October 2013) report. This was supplemented with additional contacts that included community members actively involved in relevant work and principal investigators who were granted ODFW marine reserve permits from 2022-2024. Snowball sampling was employed to further expand the pool of potential interviewees by asking 10 managers from various organizations to suggest additional interview participants. During interviews, participants were asked to recommend other individuals or organizations that may have conducted similar activities in the Port Orford area. Ultimately, 46 individuals were invited to participate in the study.

Each invitee received an invitation via email detailing the purpose of the study and requesting their participation in a video-call interview. The interviews, which lasted approximately 15-25 minutes each, consisted of 21 core questions alongside seven demographic questions to provide context about the respondents' backgrounds and organizational affiliations. All interviews were conducted via video call and recorded with the participants' consent for accuracy in data collection and analysis.

Out of the 46 individuals invited, six declined because they did not partake in relevant activities within the project time frame. From the remaining 40 invitees, 23 completed the interview. The project team does not have evidence that the 17 non-respondents conducted activities in Redfish Rocks. The snowball sampling did not identify additional people or projects known to be active in RRMR between 2022-2024. We assume these 17 people did not respond because they were not active in RRMR during the study time frame.

Regional Economic Impact Framework

Marine reserves can have both market (monetary) and non-market (non-monetary) value. Valuation can be approached either through an ecosystem services (ES) framework or a total economic value (TEV) framework. The TRG (October 2013) previous study report has methodological descriptions for both. Figure F.1 in the TRG (October 2013) report shows the spectrum of TEV components. The measurement of "value" in ES and TEV analysis means the price individuals are willing-to-pay less their actual costs or, in the case of business, their profits for obtaining the components' goods and services. Schoubroeck et al. (December 2024) offers a systematic review of evaluating monetary and non-monetary methods for valuing ecosystem services. Johnston et al. (2017) and Lew et al. (August 2022) discuss best practices for assigning unit values for ecosystem services. De Valck et al. (September 2023) suggests both ES and TEV frameworks should be used to capture a fuller range of marine reserve benefits.

The economic values in ES and TEV components have common measurements, therefore results can be used in benefit-cost and tradeoff analysis to evaluate alternative policies or management actions. Results are useful to inform policymakers of ecosystem relative importance and can help design programs involving payments for ecosystem services like user or access fees.

The previous study and this current study measure economic value from a different perspective: quantifying the transactional value of non-extractive activities. This is a partial and limited economic analysis compared to applying an ES or TEV framework. The choice of

activities omits direct use values such as might accrue from fisheries and a variety of non-use values that people might attach to marine reserves, such as existence, option and bequest values. Transactional values have the advantage of being broadly recognizable metrics while ES and TEV values tend to be more abstract and difficult to comprehend as well as potentially incommensurate with monetary and employment metrics (e.g., value derived from sense of place or identity does not translate easily to monetary valuation).

Economists use the transactional valuation method, called regional economic impact modeling, to show changes in household and individual income and the number of equivalent jobs that would be necessary to generate that same income. This regional economic impact modeling is based on the economic relationships between industries. The inter-relationships trace the monetary flow of industry inputs and outputs and final consumer purchases. Once the patterns are specified and balanced, factors called multipliers are garnered from the model that can be used to show economy-wide effects from an initial change in a region's economic activity. For this study, the change in economic activity is brought about from defined non-extractive project expenditures and labor compensation. It is assumed the expenditures and compensation are afforded by new money (e.g., external research grants, non-local tourists purchasing a guided kayak tour) rather than just re-spending money already in the economy.

There are several input-output modeling systems available to purchase so that a researcher does not have to build their own model. Examples are the Impact Analysis for Planning (called IMPLAN) currently offered by IMPLAN Group, LLC (www.IMPLAN.com) and the Regional Input-Output Modelling System (called RIMS ll) offered by the U.S. Bureau of Economic Analysis (www.bea.gov). RIMS II was used for this study.

The RIMS II model generates several economic measures in 372 distinct industries and 64 aggregate industry categories. The data year for the procured RIMS II model was 2022.

RIMS II models can be purchased for a single county, multi-county region, metropolitan statistical areas or state economies. Regions must be geographically contiguous (e.g., adjoining counties), as it is assumed that the economic impact of one region depends on its neighboring region. Economic activity within a region may "leak" outside its economy. In practice there can also be non-contiguous regions to account for leakages, but RIMS II does not have features for building models for areas that do not share county or state boundaries.

The non-extractive projects for this study are scientific research, planning, management, and ecotourism business that are associated with the presence of the RRMR. The projects' effect

measurements are household and individual income (also called earnings) and equivalent jobs whether full or part-time positions. The jobs are termed equivalent because they represent the average wages, salaries and proprietorship net income necessary to generate the calculated income. The jobs multiplier is an industry specific ratio for output and employment at the state level. This study's economic analysis assesses three regions to show the full scope of the economic impacts: 1) Curry County which we refer to as "local"; 2) seven counties adjacent to the Pacific Ocean here called "coast"; and 3) Oregon, referred to as "state".

The first region, Curry County, represents the local economy where the RRMR is located, with a specific focus on Port Orford as the closest population center. The research team asked project participants about their expenditures in the Port Orford area. The second region consists of the aggregated coastal counties of Oregon: Clatsop, Tillamook, Lincoln, Lane, Douglas, Coos, and Curry. The analysis only considers the coastal portions of Lane and Douglas counties (i.e., the cities of Florence and Reedsport, respectively) as part of the coast region when accounting for project spending. The multipliers for the coast spending were from the integrated multi-county model.

Large municipalities influence the regional economy of a county; Eugene impacts Lane County's economy and Roseburg influences Douglas County's economy. Separate accounting was used when there was project spending at the inland portions of these counties. Similarly, spending outside of the coast region, such as in Corvallis, to support the Port Orford RRMR projects was categorized as inland spending. The inland spending used multipliers from the statewide region. This approach better reflects the scale of economic impact calculations.

According to the Bureau of Economic Analysis, the multipliers used to show economic impacts for retail and wholesale trade are based on various expectations and assumptions (BEA, 2013). The RIMS II multipliers for these industry categories expect the change in sales to exclude cost-of-goods sold. Data from the U.S. Bureau of Census, Census of Retail trade provided the margins to calculate the portion of sales applicable to the retail and wholesale industry multipliers. The cost-of-goods producer portion of the sales would then typically be allocated to the distributor (including transportation services and wholesale margins) and manufacturer industries to account for their economic impacts. The allocation was not incorporated into this study because not enough was known about retail and wholesale products purchased, and if known, multipliers would be minor or zero. For example, the allocation of fuel sales cost-of-goods would partially be to the industry category petroleum refineries whose multipliers are zero in the RIMS II model for all three economic levels used in this study. If

purchases were locally produced goods such as seafood, the multipliers could be positive, in which case the margined economic impacts would be a conservative estimate.

The choice of an industry category to use for labor compensation greatly influences the economic impact results. Labor payments were the largest category of project expenditures. It was assumed the NAICS code 5416A0 “environmental and other technical consulting services” best represented the industry category mapping.

Many assumptions must be made when creating and applying input-output models. Therefore, there are limitations in their application. Appendix D: Regional Economic Impact Analysis Background has a more thorough discussion of the RIMS II model features, considerations in its application and why caution is needed in their parameterization and interpretation of results.

RESULTS AND DISCUSSION

Respondent and Project Characteristics

The project team interviewed 23 people representing 21 unique projects. Appendix A: Study Projects and Organizations lists the organizations involved in these projects, the purpose of the various projects and project timelines. Figure 3 shows the categories of organizations where interviewees worked. Non-governmental organizations (NGOs) and academic institutions had the highest representation in both the previous and current study. The research team found no information that Tribes were leading projects at RRMR from 2022 through 2024.

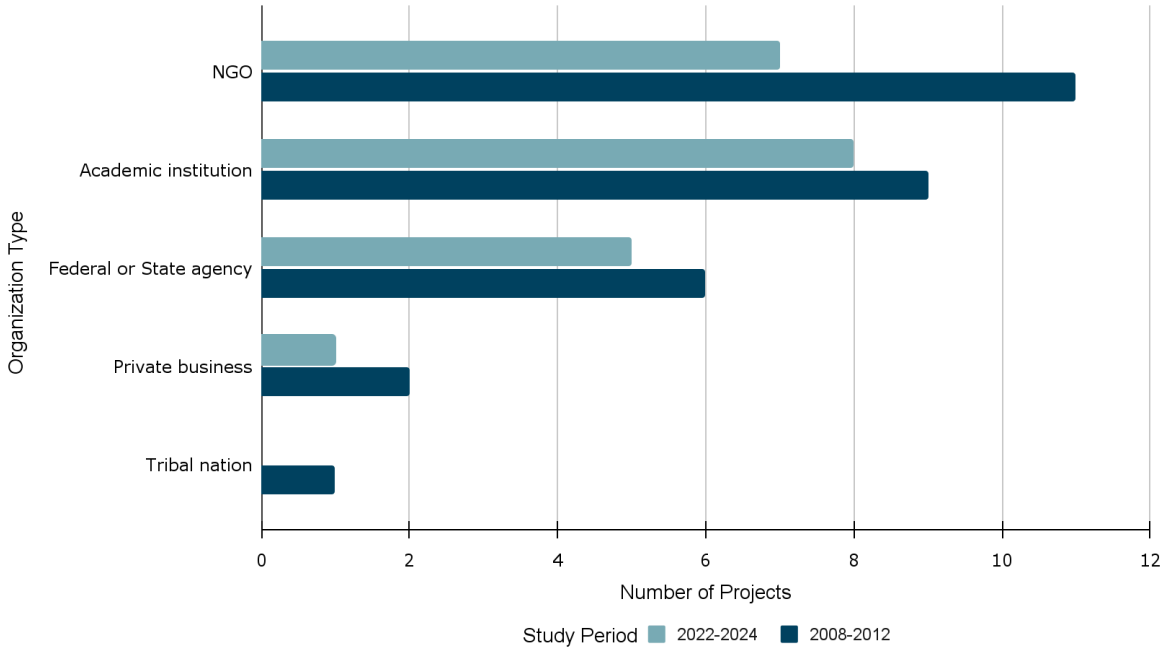

Figure 3. Non-extractive Project Sponsor Organization Type for Previous and Current Study

The 23 interviewees identified a total of 48 people who worked on their teams. Table 1 shows project numbers grouped by purpose. The most common purpose in both the previous and current study was research and natural resource planning.

Table 1. Non-extractive project purpose

Purpose	Number	Percentage
Scientific research	21	100%
Natural resource planning	18	86%
Recreational activities (not fishing related)	12	57%
Business-related	5	24%
Public outreach and education	7	33%

Note: Projects often had more than one purpose. For example, ecotour operators also assisted in university-led, agency-led, and/or community science data collection.

Projects associated with RRMR encompass a wide range of activities, from in-situ monitoring of kelp forest ecosystems to outreach events that promote marine conservation awareness in Oregon. Both the previous and current study finds a key driver of projects has been funding from federal and state agencies aimed at building research and management capacity. A notable example of large-scale state agency funding mentioned in the previous study is the use of fixed-wing aerial surveys to document surface kelp habitat and efforts to index biodiversity in benthic habitats around Port Orford. These efforts assisted in the designation of RRMR in 2012. Since the establishment of the RRMR, ODFW sponsored research with access to technical equipment, such as remotely-operated vehicles and sensors designed to detect changes in temperature, pH, and salinity, has expanded.

Federal grants also support research activities at RRMR. For example, the National Center for Coastal and Ocean Sciences (NCCOS) within the National Oceanic and Atmospheric Administration (NOAA) awarded the Oregon Kelp Alliance (ORKA) with $950k for research. This entails monitoring biogenic habitats along the Oregon coast from 2023 through 2025. Interviewees indicated that slightly less than two-thirds of this funding was spent in 2023 and 2024. During this time, approximately 383 kelp habitat surveys were conducted with the support of the NCCOS grant, 123 of which (38%) occurred near the RRMR.

Federal funding was more prevalent in current projects than projects described in the previous report. State agency funding played a significant role in both the previous and current study periods. Between 2022 and 2024, ODFW spent nearly $330k on labor compensation and contracts for ecological and human dimensions research at RRMR. ODFW projects included SCUBA and ROV surveys to assess the abundance and diversity of fish and invertebrate

species, state-led mapping of kelp forest habitats, and visitor intercept surveys to gauge public awareness and perceptions of marine reserves. Many of these projects involved contracting organizations that helped expand the capacity and expertise of state agencies, particularly in vessel operation, SCUBA diving, and fisheries-independent surveys using commercial fishing gear.

The survey instrument also enabled the research team to collect information about barriers to ocean research, planning, and management activities in Port Orford. An open-ended question prompted participants to discuss these challenges (see Appendix B. Survey Instrument, p. 34). Responses covered a variety of topics. Five interviewees (24%) reported being limited by poor weather, three (13%) reported inability to launch vessels, two (9%) mentioned lack of opportunities to secure funding, one (4%) mentioned expensive lift fees for research vessels and eight (35%) mentioned lack of infrastructure and other problems associated with the small size of Port Orford.

Regional Economic Impacts Model Results

The research team selected three nested spatial scales to show the economic effects: local, coast and state. The following explanations are for economic impact model results for the three regions. Table 2 shows a summary of project spending and economic impacts in the three regions. Appendix E, Table E.1 shows the detailed spending categories and displays the multipliers used to derive economic impacts. Other tables in Appendix E show the itemized spending and economic impacts for trip expenditures and ecotourism business sales.

Local

Economic impacts in the Port Orford area were calculated using multipliers from the Curry County RIMS II model. Expenditures for various goods and services were grouped based on the spending profiles supplied by the surveyed project participants. This includes the category of staff and partners' labor compensation.

This study expands on the methodology described in TRG (October 2013) by using multipliers for the coast and the state level economies and adding related economic activity for ecotourism businesses. The annual local spending described in the 2013 report for projects occurring during the period 2008 through 2012 was $507k (2012 dollars, $718k inflation adjusted 2025 dollars) resulting in the economic impact of $479k income (2012 dollars, $678k inflation adjusted 2025 dollars) and 15 jobs. This compares to this study's annual project spending during the period 2022 through 2024 for $369k, economic impact of $177k income and just

over 5 jobs (Table 2). The decrease in economic impacts is partly explained by the shorter assessment period for the current study.

Coast

Multipliers representing the seven county regional economy were used to calculate coast economic impacts. A majority of the interviewees for this project (74%) reside outside of the Port Orford area but within the coast geographic region. While the RIMS II model was for the contiguous county region, spending compilations were from the five whole counties and the coastal portion of Lane and Douglas counties. Spending at the inland portion of the two counties was included in the state model. Spending outside of the Port Orford area summed to $646k with just over $600k for labor compensation (Table 2). This is a significant addition to the project expenditures made in the Port Orford area. The addition includes the portion of ODFW marine reserve budget used to manage and monitor RRMR and the portion of other project's headquarter costs incurred to operate research taking place at RRMR. The combined Port Orford area and other coast spending resulted in a coast economic impact of $648k income and 8 jobs (Table 2).

State

Some project survey participants had expenditures outside of coastal counties. Expenditures in the Eugene area in Lane County, greater Roseburg area in Douglas County and other non-coastal counties were added to coastal spending to calculate state economic impacts. The RIMS II state multipliers are derived from economic activity in all 36 counties. There was RRMR project oriented spending that was largely labor compensation for participants residing outside of the Port Orford area but within coastal counties (13% of all participants). Additional spending at the state level was just over $315k with labor compensation $248k. Total state level economic impacts was $982k income and 20 jobs (Table 2).

Table 2. Aggregated Expenditures and Economic Impacts in Local, Coast and State Economies

		Economic Impacts					
		Local		Coast		State	
Areas and Spending Categories	Expenditures	Earnings	Jobs	Earnings	Jobs	Earnings	Jobs
Expenditures in Port Orford							
Labor payments	$133,300	$80,633	1.5				
Nonlabor payments	$68,100	$21,297	0.5				
Vessel charters and other contracts	$167,200	$74,855	3.2				
Total	$368,600	$176,785	5.2	$213,367	5.8	$240,586	6.1
Expenditures in other coastal counties							
Labor payments	$600,100			$427,991	8.0		
Trip related expenses	$46,200			$7,504	0.2		
Total	$646,300			$435,495	8.2	$513,002	9.5
Expenditures in other parts of the state							
Labor payments	$248,200					$205,832	3.8
Trip related expenses	$66,835					$22,190	0.4
Total	$315,035					$228,022	4.2
Total spending and economic contributions	$1,329,935	$176,785	5.2	$648,862	14.0	$981,609	19.8

Notes:

1. Expenditures and labor compensation were from projects occurring during 2022 through 2024. The spending is either one-time or annual average during the period.
2. Economic impacts measured by earnings are wages, salary and proprietorship net income accruing to households and individuals. Economic impacts measured by jobs are full and part-time positions.
3. The expenditure categories for retail, equipment/supplies and fuel are margined to account for cost-of-goods sold. Assigned margins are from the U.S. Bureau of Census, Annual Retail Trade Survey. Industry allocation of cost-of-goods to distributor, transportation services and producer RIMS II categories was not necessary given the insignificance or unknown industry representation in the economic levels.
4. Insurance and other fees are included as trip related expenses in the state economy level.

Results Context

We aim to contextualize the economic impacts from the RRMR non-extractive activities in comparison to other economic activities in the area. Economic modeling results are available for other ocean-related economic activities at the coast economy level. Figure 3 compares commercial fisheries in 2021 to the estimated displacement of commercial and recreational fisheries in the no-take RRMR. The displacement modeling used average annual fisheries harvest data 2019-2021. The non-extractive activities' economic impact is about four times greater than the displacement estimates and about 12% of all commercial fisheries. Total greater Port Orford area income from earnings is shown on Table F.3. The commercial fishing industry contribution represents 13.0% of all earnings in the greater Port Orford area. The

county-wide commercial fishing industry contribution to the Curry County economy in 2021 was 5.3% (OCVA January 2024). In comparison, the tourism industry was 12.3% in 2021.

The local economic impact from non-extractive use is a small share of the earnings income (about 1%), but the activity expenditures are a welcome infusion of sales for local benefiting businesses. These comparisons provide context for the absolute numbers but should not be interpreted as interdependent. The activities would not necessarily complement or substitute for another activity and may occur anyway without the RRMR existence.

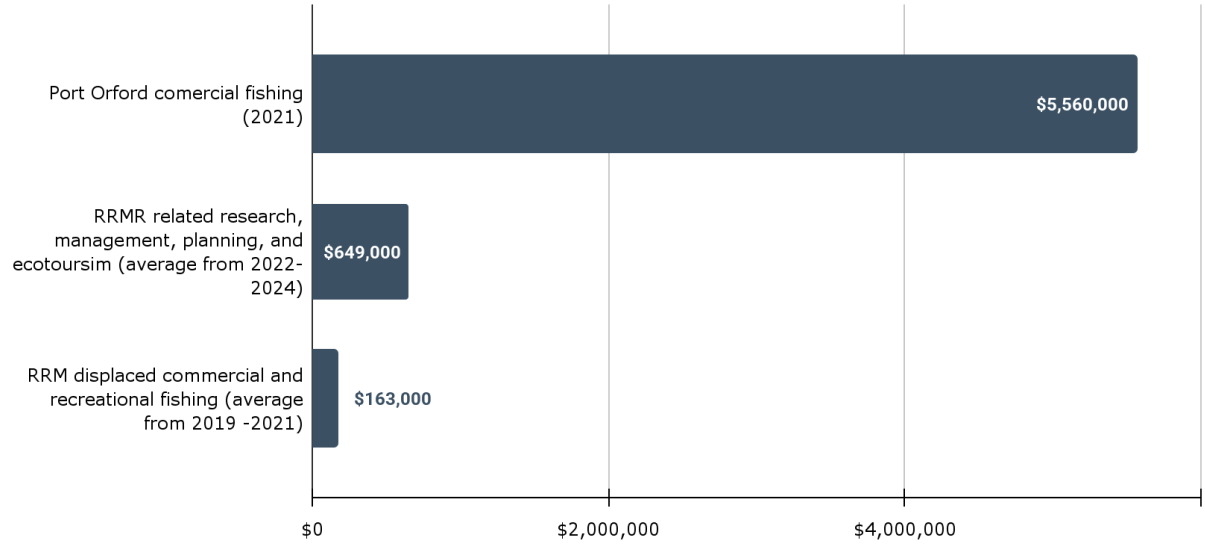

Figure 4. Ocean Activity Context adjacent to Port Orford

Note: 1. Economic impact at the coast economy level. Source: TRG (June 2024a)
2. Dollar year is nominal.

Limitations

While this study provides valuable insights from the non-extractive projects occurring at Port Orford, we identify survey limitations that should be considered. The main considerations are the assumption in the regional economic impact model, some of which were professional judgments when there were information gaps. Other limitations are:

- Sampling constraints: We aimed for a census of projects. We interviewed 23 individuals representing 21 different projects. We do not have evidence of RRMR research, planning, management, or ecotourism projects that were omitted. However, some people invited to be interviewed did not respond. We lack evidence that this resulted in self-selection bias but it is possible.

- Participation bias: Port Orford is a small community and the interview team has had previous contact over several years with many of the participants. It is possible that people who are more actively engaged in the marine reserve and those with a prior relationship with the survey administration consultant were more likely to respond.
- Estimations of dollar amounts: It is unreasonable to expect that all participants recalled exact figures for their spending, meaning that precise responses to survey questions are unlikely.

The regional economic impact model contains many assumptions because we had incomplete information. It is worth noting that:

- The multiplier induced effect for project labor compensation assumes participants reside in the project area. A more refined model would account for how only 6 out of the 23 interviewees live in the greater Port Orford area. The assumption would be representational at the coast and state level economies.
- Procedures to marginalize retail and wholesale sales before applying multipliers did not account for the economic impacts that might accrue from the cost-of-goods production and distribution. For example, if the product sold was locally produced seafood, then there would be additional impacts.
- It is assumed that all project expenditures are afforded by new money in the economy. This assumption is probably valid for all projects except sales from ecotourism businesses. Some of the sales could be to local residents.
- Economists and others often raise concerns about regional economic impact models (see discussion in Appendix D). Principal criticisms are that production is unconstrained and prices are fixed. And while the model specification is linear, the economy response could be non-linear. More flexible model specification could have been developed and warranted if the impacts were large. More involved project surveys would have been necessary.

Testing the mentioned limitations, data quality and other mathematical assumptions would show uncertainty envelopes the calculated point results. Model results could be expressed as a range depending on the exploration of adopted assumptions, data treatments, survey results veracity and model specification.

There can be confusion about regional economic impact analysis and ES/TEV valuation analysis. Impact analysis assumes that marginal and average impacts are the same, capital and labor do not have alternative uses and that the structure of the economy does not vary

significantly from year to year. Valuation analysis includes non-market costs and benefits and does account for alternative uses or opportunity costs of capital and labor in the economy. Readers are cautioned not to contrast results from the two procedures.

Future Research

Scaling this project from one to the full system of Oregon's five marine reserves could provide important information about how the protected area's non-extractive activities benefit local and statewide economies. Expanding these methods across the Oregon coast poses opportunities and challenges. The opportunities include building a greater understanding of the diverse ways in which marine reserves are used and more comprehensive accounting of the economic benefits from ocean non-extractive activities. The relative isolation of Port Orford and proximity to RRMR makes input-output modeling more straightforward than in other communities near reserves. For example, Cape Perpetua Marine Reserve straddles two counties, which would require additional analytic adjustments when calculating regional economic contributions.

CONCLUSIONS

The findings of this study underscore how non-extractive use of protected areas support economic activities with benefits to communities, regions and states. This analysis documents the economic impacts of scientific research, planning, management, and ecotourism businesses associated with the RRMR. Over the 2022-2024 study period, these activities generated an estimated $177k income and 5 jobs in the local economy. The activities generated $649k income and 14 jobs in the coast economy and $982k income and 20 jobs in the state economy. These numbers highlight the continued economic importance of marine reserve-related activities to coastal communities and the state.

Results demonstrate that, despite fluctuations in funding sources and external challenges such as the lingering impacts of the COVID-19 pandemic, investments in marine reserve science and management remain a vital component of Port Orford's and Oregon's economy. However, barriers such as high research costs, infrastructure limitations, and funding constraints persist, necessitating continued support and strategic investment in marine reserve-related activities.

As ODFW continues to adhere to their mandates to manage Oregon's marine reserve system, future research may focus on long-term economic trends, workforce diversity in reserve-related activities, and the broader socio-ecological benefits of conservation initiatives. This type of project could be replicated across the other four marine reserves in Oregon managed by ODFW to provide a more comprehensive understanding of the economic contributions of these reserves. By quantifying these contributions, this study provides a foundation for informed decision-making about Oregon's Marine Reserves as ecological and economic assets.

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APPENDIX A: STUDY PROJECTS AND ORGANIZATIONS

Organization	Type of Organization	Project Title and Description	Completion
Oregon State University	Academic	Ocean Seismic Survey Impacts on the Movement and Distribution of Nearshore Fish Species	2024
Oregon State University	Academic	TOPAZ: Theodolite Overlooking Predators in Zooplankton	Ongoing
Reef Check Oregon	NGO	Reef Check Benthic Kelp Surveys and Monitoring	Ongoing
Oregon State University	Academic	JASPER: Journey Aspiring Students Pursuing Ecological Research	Ongoing
South Coast Tours	Private Business	Kayak Tours in Redfish Rocks Marine Reserve	Ongoing
Oregon Kelp Alliance	NGO	ORKA Kelp Status Report and Restoration Work	Ongoing
Oregon State University	Academic	Nearshore Sound Propagation and Species Response to Active Source Seismic Surveys	Ongoing
The Nature Conservancy	NGO	Liaising with the Redfish Rocks Community Team	Ongoing
ODFW	State Agency	Human Dimensions Project: Visitor Intercept Surveys	Ongoing
ODFW	State Agency	Redfish Rocks Marine Reserve Ecological Monitoring	Ongoing
ODFW	State Agency	Marine Mammals, Fisheries and Ocean Energy Research	Ongoing
Oregon Shores Conservation Coalition	NGO	Coast Watch Program	Ongoing
Sea & Shore Solutions	Private Business	Redfish Rocks on the Docks Tabling	2024
Elahka Alliance	NGO	Spatial Siting Analysis for Reintroduction of Sea Otters	Ongoing
Oregon State University	Academic	ORKA NCCOS Grant Administration	Ongoing
Redfish Rocks Community Team	NGO	Redfish Rocks on the Docks Tabling	2022
ODFW	State Agency	Shifts in Ocean Conditions and Ecological Responses to Species of Conservation importance	Ongoing
ODFW	State Agency	ROV Biogenic Habitat Surveys	Ongoing
University of Oregon	Academic	ORKA Kelp Forest Ecological Monitoring	Ongoing
Oregon State University	Academic	Grey Whales Response to Ambient Noise	Ongoing
Oregon State University	Academic	Overlap Predictions of Large Whales	Ongoing
Cape Perpetua Collaborative	NGO	Redfish Rocks on the Docks Tabling	2023

Table A.1 Study Projects and Organizations

APPENDIX B: SURVEY INSTRUMENT

Hello my name is [NAME]. I work with Sea & Shore Solutions, an environmental consulting firm that is collaborating with the Marine Reserves Program (Program) in the Oregon Department of Fish and Wildlife (ODFW). The Program is conducting an economic impact assessment of research, planning, and marine reserve specific tourism activities that occur at or near Port Orford connected to Redfish Rocks. You have been identified as an individual who may have conducted or is responsible for these types of activities.

The survey will only take about 15-20 minutes to complete and you can refuse to answer any question or stop at any time. Is it okay with you if I record this interview for internal purposes? The recording will not be shared with anyone other than our team.

Name:

Phone Number:

Organization:

Name of project in Port Orford:

Who are the team members on this project:

Are these activities ongoing or finished?

Great, thank you. Other projects have focused on fishing related economic activity at Port Orford. Now we want to find out about other types of activities occurring at or near Port Orford. I will be asking questions about trips. When I say "trips," I mean an event that has occurred or is continuing to occur in the general vicinity of Port Orford. And "vicinity" is arbitrarily defined because we want to know if your organization is spending money in the community. For example, you might have a destination to a beach 10 miles distant from Port Orford city limits, but occasionally make purchases at businesses located nearby Port Orford. Our preliminary investigations found that several organizations based away from Port Orford have led many non-fishing related activities. In these cases, we want to know about trip spending in the vicinity of Port Orford. In a few other cases, the organization is located at Port Orford and workers/contractors are living and spending money in the vicinity in a manner not

connected to trips. This survey is to find out about both cases, so you need to give me some guidance for which case best applies to your organization.

1. Is your organization based in Port Orford or based outside of Port Orford?

2. Please describe your organization's purpose. Can I quickly read you some type and purpose categories to help in formulating a description?
    - Science related for professional or personal research
      Terrestrial/Wildlife/Riverine/Riparian Marine/Fisheries/Estuary
      Social/Cultural/Economic/Anthropologic
    - Market/business/investment related
    - Natural resource plan development
    - Public health
    - Enforcement
    - Recreation specific to Redfish Rocks Marine Reserve

3. Please tell me your organization's affiliation
    - Government agency
    - University
    - NGO
    - Community Group
    - Private Business

4. Please tell me your organization’s type
    - Private, for profit
    - Non-profit
    - Academic
    - State or federal agency

5. Did any member of your organization's team live more than six months in the Port Orford vicinity to carry out project activities? If yes, please provide the name(s) of team members that lived for more than six months in the Port Orford vicinity to carry out project activities

For Port Orford Based Organizations:

Given your organization is or was based in Port Orford, the information we need is about the annual spending that occurred for personnel that were living in the vicinity and expenditures being made for materials, supplies, boat launches, etc. If the project is finished, think about a year when expenditures were made. If the project is ongoing, use the most recent complete year for expenditures.

[ASK FOR EACH YEAR: 2022, 2023, 2024, OR TOTAL IF THEY DON'T KNOW, estimated annual average or specific amounts for past years are acceptable, note how interviewee develops this number.]

1. How much did this project spend on:
    1. Labor and manager payments (include labor overhead) for personnel that reside near Port Orford?
    2. Expenditures for contract services for personnel that reside near Port Orford?
    3. Expenditures for contract services for personnel that reside somewhere else and commute to Port Orford?
    4. Expenditures for professional services, such as accounting and legal fees?
    5. Expenditures for fuel?
    6. Local project expenditures for rent, utilities, and supplies?
    7. Local project expenditures for maintenance and upkeep on equipment?
    8. Local project expenditures for fees and dues?
    9. Local project expenditures for equipment and other capital items?
    10. All other project expenditures (such as for travel outside the local area) that when added above equals total annual organizational expenditures?

For Not Port Orford Based Organizations

Given your organization is not based in Port Orford, I will be asking about trips. The definition of a "trip" is an event that occurred because it was supporting some level of research, planning activity, or enforcement mission. A trip starts when you leave home (home can mean your home town or place of employment) and ends when you return home, regardless of whether you were gone one day or more than one day. It doesn't matter if you were able to complete the trip's purpose.

Given that a trip may be more than one day, how many trips to the Port Orford vicinity have you or your organization's team taken this year, last year, and the last five years?

1. How many trips did you take to Port Orford for this project in 2024, 2023, and 2022?

Think back about all of the trips taken to the Port Orford vicinity. I would like to ask about a typical trip. In what city did you and/or your team usually begin a typical trip from?

2. Including yourself, how many people travelled to the Port Orford vicinity on typical trips?
    1. [ONLY ASK IF MORE THAN 1 PERSON] Were all these people part of your organization's team? If not, please tell us the number who traveled and their relationship.
3. How many times did you use the Port Orford hoist to launch a vessel during your most recent trip? Only count the launch, not the haul ups.
4. How many nights did you and/or your team spend away from home on your most recent trip to the Port Orford vicinity?
5. How many nights did you and/or your team spend in the Port Orford vicinity on your last trip?
6. Where did your team stay in Port Orford on your last trip? (motel, rental house, RV/campground, friend/family, Port Orford Field Station, other)
7. Where did your team stay when not in Port Orford on your last trip?
8. Did you utilize any contractor services for your research at Port Orford?
    1. How much did you pay the contractor for your research at Port Orford?
    2. Can you give us the names and contact info of each of the contractors you worked with in Port Orford? (NOTE: record the name, phone and email of contractor)

For this question we need to find out how much was spent on different items related to these trips. I will ask how much annually was spent on specific categories of your trip(s). Please try to answer the best you can. [If interviewee struggles to respond, ask about the most recent trip, walk through extrapolating this information, take notes on how interviewee arrives at their estimates]

1. How much did you spend at restaurants/cafes in 2022, 2023, and 2024?
2. How much did you spend at grocery stores/markets in 2022, 2023, and 2024?
3. How much did you spend on lodging/camping in 2022, 2023, and 2024?
4. How much did you spend on fuel (auto and vessel) in 2022, 2023, and 2024?
5. How much did you spend on equipment/supplies in 2022, 2023, and 2024?
6. How much did you spend on repairs in 2022, 2023, and 2024?
7. How much did you spend on souvenirs in 2022, 2023, and 2024?
8. How much did you spend on permits in 2022, 2023, and 2024?

9. How much did you spend on insurance in 2022, 2023, and 2024?
10. How much did you spend on other things in 2022, 2023, and 2024?

For this next question we need to find out how much was spent on different items over the duration of your last trip. I will ask you about the approximate amount of money spent on specific categories in three different phases of your trips. Please try and answer the best you can.

1. How much did you spend at restaurants/cafes in your home county, en route, and Curry County?
2. How much did you spend at grocery stores/markets in your home county, en route, and Curry County?
3. How much did you spend on lodging/camping in your home county, en route, and Curry County?
4. How much did you spend on fuel (auto and vessel) in your home county, en route, and Curry County?
5. How much did you spend on equipment/supplies in your home county, en route, and Curry County?
6. How much did you spend on repairs in your home county, en route, and Curry County?
7. How much did you spend on souvenirs in your home county, en route, and Curry County?
8. How much did you spend on permits in your home county, en route, and Curry County?
9. How much did you spend on insurance in your home county, en route, and Curry County?
10. How much did you spend on other items in your home county, en route, and Curry County?

Is there anything that has or is hindering your project at Port Orford? For example, unable to launch a vessel due to sand inundation or poor weather. You may provide more than one example(s) of a hindrance?

3. Demographics

We would now like to ask some questions related to the demographics of your project team in order to explore the general characteristics within this sector. As with previous questions, you are welcome to skip any questions that you do not wish to answer.

1. What is the highest level of education in your project team?

2. What is the lowest level of education in your project team?
3. To the best of your knowledge, what percent of your project team identifies as a person of color?
4. What year were you born?

If the interviewing team should need to contact you for further clarification, would that be alright?

APPENDIX C: PARTICIPANT COMMENTS

Interview participants were asked an open ended question as to whether there have been any hindrances to facilitating projects in Redfish Rocks Marine Reserve and the adjacent Port Orford area: “Is there anything that has or is hindering your project at Port Orford? For example, unable to launch a vessel due to sand inundation or poor weather. You may provide more than one example(s) of a hindrance.”

Hindrances to Facilitating Projects in Redfish Rocks Marine Reserve

Interview participants identified several challenges that have hindered research, planning, management, and ecotourism activities in Redfish Rocks Marine Reserve and the adjacent Port Orford area. While some respondents reported no significant barriers and felt well accommodated in Port Orford, others highlighted logistical, financial, and environmental obstacles such as limited infrastructure for small boats, lack of housing accommodations, and weather conditions that impact their work.

A major concern raised by multiple participants was the lack of a small boat ramp and the reliance on the port’s hoist for vessel launches. Several researchers and project facilitators noted that launching vessels in Port Orford is costly compared to other locations, which has led some to launch from alternative sites such as Winchester Bay, Gold Beach, and Bandon. Additionally, sand inundation and the need for frequent dredging were cited as challenges, with some participants expressing concern that low tides may soon prevent larger vessels from launching altogether. The limited number of contract vessels available, particularly those with the necessary insurance, was also identified as a barrier to conducting fieldwork.

Housing shortages and high accommodation costs presented another set of challenges, particularly in terms of recruiting and hosting researchers. The limited availability of hotels, combined with the rising prevalence of short-term rentals, has made it increasingly difficult for visiting scientists and field staff to secure affordable lodging. Participants also noted that the local field station requires additional housing capacity and improved management to better support research teams.

Environmental factors, including poor weather conditions, wildfires, and road maintenance issues along Highway 101, further complicated field operations. Winter storms have disrupted meetings, and wildfires have created poor air quality conditions, making it difficult to conduct surveys and even fill scuba tanks.

Beyond these logistical hurdles, administrative burdens were cited as deterrents to collaboration. Some participants reported difficulty in recruiting local fishermen to assist with research, attributing the challenge to the complexity and insurance costs of contracts with ODFW. Others pointed to unreliable internet access and a general lack of services in Port Orford, making remote work more difficult.

Despite these challenges, some participants expressed interest in continuing community engagement efforts, such as tabling at events like Redfish Rocks on the Docks, if they are held again in the future. However, inconsistent funding from both private and state sources has made it difficult to sustain such initiatives on an annual basis.

APPENDIX D: REGIONAL IMPACT ANALYSIS BACKGROUND

Regional economic impact analysis starts with assessing the direct effects of local spending being made by the economic activities being studied. Direct effects capture the consequences of businesses selling goods and services directly to the study activity participants or persons being compensated for their participation. In addition to these direct effects, economic impact analysis also reports on the secondary effects from local spending through the use of multipliers. The concept of a multiplier is that an initial amount of spending will also have successive re-spending rounds using the new money brought into an economy.

These secondary effects assess the impacts on backward linked industries that sell goods or services to the initial businesses (indirect effects) and the impacts from household spending of income earned at the local businesses (induced effects). The total business selling changes are sometimes called changed business "output." A portion of the output from businesses will be what those businesses need for purchasing, manufacturing, and/or providing services for the sold product. Those costs will include wages and salaries and proprietorship profits or “income.” Figure D.1 shows the relationship between output and income that accrues from successive re-spending rounds of the new money brought into an economy. Figures D.2 and D.3 have a cumulative view of how local businesses first supply goods and services to the external economy's demand, and the leakage of the new money out of the local economy as it circulates between businesses (accounted for in Type I multipliers) and is re-spent by local households (accounted for in Type II multipliers). The households receive a portion of the new money via employment at the businesses where studied industry participants spending occurs.

For this study, multipliers were provided by the U.S. Bureau of Economic Analysis Regional Input-Output Modeling System (RIMS II) for certain geographic areas. It is necessary to choose the geographic area for the economy being assessed. The RIMS II system areas are single counties, contiguous multiple counties, metropolitan statistical areas and states. Larger geographic areas generally have more mature and supply chain integrated economies with less leakage. A consideration for the area choice in the current study is where project trip spending occurs (home base, en/route, and at the destination). The area choices for the current study were: 1) Curry County termed local; 2) seven counties located adjacent to the Pacific Ocean termed coast; and 3) all 36 counties in Oregon termed state.

The economic impact metrics selected for this study are income or “earnings” and jobs. It could just have well been other metrics that would describe the same economic direct and secondary

effects, but in different dimensions. The definitions for all the dimensions available when using RIMS II are:

- Value added includes income as well as profits and rents and indirect business taxes. Value added is a preferred measure as it most closely resembles gross state product therefore providing a comparison index.
- Output represents the business sales in the region. Total output is equal to the sum of intermediate inputs and value added. It is a duplicated total because it counts goods and services multiple times if they are used in the production of other goods and services.
- Income or earnings include wages and salaries, payroll benefits, and income of sole proprietors.
- Jobs include full and part time positions. The RIMS II model uses industry specific state level ratios of earnings-to-employment to calculate jobs factors. The ratio is transitioned to jobs per industry output for use as a multiplier. Since average earnings per job are just a simple average, it does not account for variations in the distribution of earnings among high-pay versus low-pay jobs. Average earnings per job within industries involving more part time work is lower than industries involving more full-time work, although there could be little difference in the underlying wage of full-time workers.

Economic impact analysis attempts to identify spending that would be lost to the region being studied in the absence of the studied industry activity. Such a "with versus without" analysis requires considerable knowledge of industry activity purposes and potential substitution behaviors to assess which spending would be lost if the project or policy did not occur. In the absence of incorporating that knowledge in the modeling, results will tend to overstate actual economic impacts because it assumes that all possible adjustments to an economy's disturbance are instantaneous and permanent, and that individual responses to disturbances are limited. People who lose a job, for example, are assumed to stay unemployed. In reality people and businesses adjust over time, as they consider and try alternative occupations, technologies, and locations. Economic changes created by the alternatives can be "short-run" or "long-run." Short-run describes the effects of construction or other temporary spending that typically lasts for less than a few years while industry adjusts to the changes.

Regional economic impact modeling is an appropriate methodological approach for understanding key relationships, such as effects across broad economic sectors from investment incentives to promote an industry activity. However, the quantitative results do not

provide a complete picture of an industry activity's effects on a region. For example, it does not show project feasibility. A project can be unprofitable and still show positive economic impacts through its spending. Government agencies public financing incentives for establishing a private sector business will be interested in the long-term success of an industry activity in order to derive the expected returns in jobs and other financing program objectives. Second, the economic modeling does not show fiscal impacts such as the effects on government services and revenues. Local governments may have to finance new roads, schools, buildings and other infrastructure to accommodate the new industry activity. Residents may have to endure crowding costs (such as increased traffic) if there is under capacity in infrastructure.

Third, economic modeling used in a prospective analysis may not address lag structures of the studied industry expenditures (time relationships between expenditures and economic impacts). Lagging may occur if there is a business start-up horizon that requires regional economic adjustment.

Finally, economic impact modeling does not show social impacts on residents.[2] Current housing stock value may increase, especially if the economy is already growing and the anticipated impact is comparatively large. The value may make shelter costs unaffordable to current residents. Use of economic impact modeling results in local government policy making should at least acknowledge its limitations and more appropriately be accompanied by additional fiscal and social analyses.

Note: This discussion is a slightly edited version of Appendix E in TRG (October 2013). The edits have to do with describing the purchased input-output modeling systems. The previous research study used multipliers from IMPLAN. The current study uses multipliers from RIMS II.

[2] There are accepted methodological practices for conducting social impact assessments just as there are for regional economic impact analysis. They are directed more at finding distributional impacts across households and demographics. For example, economic impact analysis may show net job growth, but there may be winner and loser individuals in the calculation for net. The experience and training of those employed in the negatively impacted sector may not qualify individuals for jobs in the positively impacted sector. A subset of a social impact analysis is a social equity analysis where historically disadvantaged and vulnerable groups are examined.

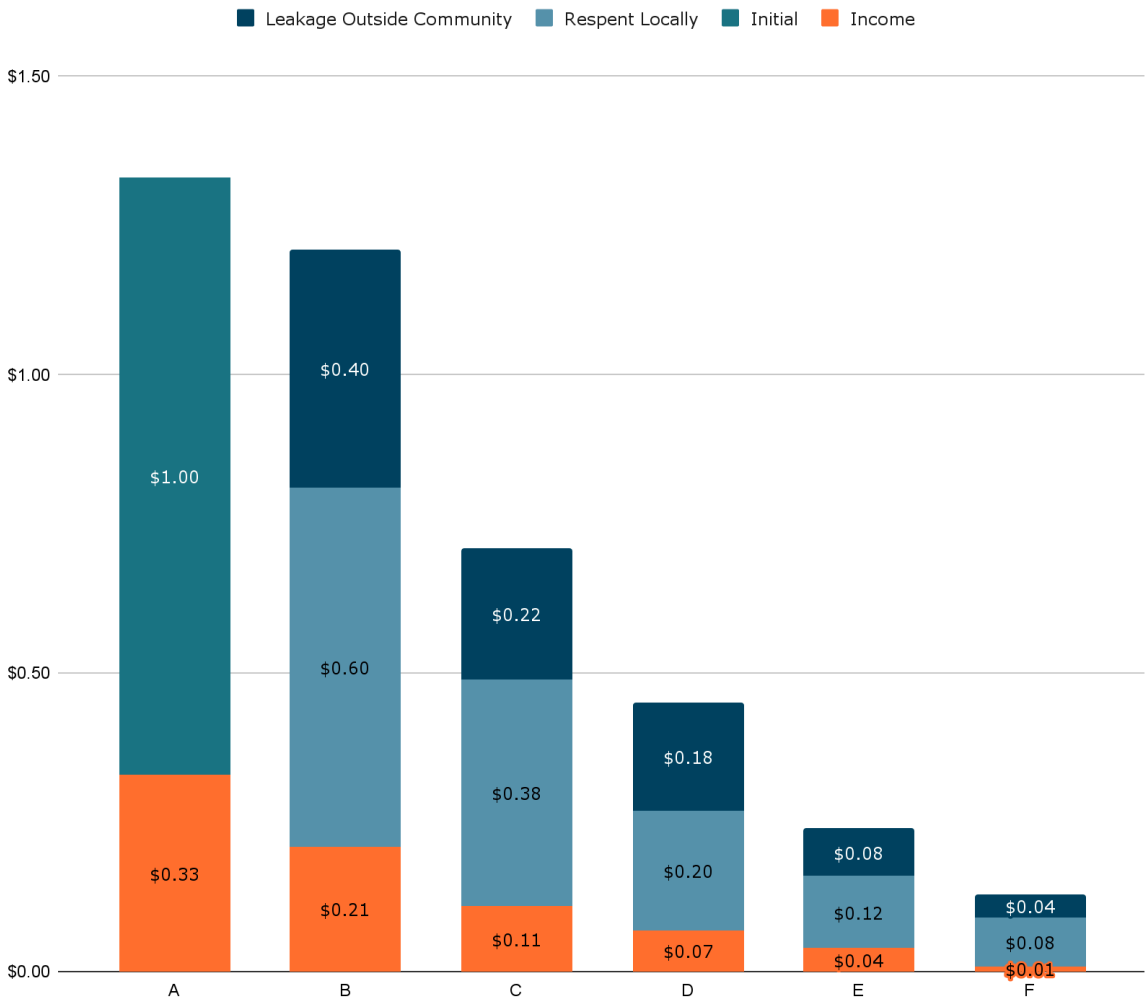

Figure D.1 Relationship Between Output and Income Over Successive Spending Rounds (A to F). The orange portion indicates the amount of spending that goes to households in terms of wages, salaries, and proprietor profits and is called income. Total local spending is $2.38, total leakage outside the community is $0.92. This chart utilizes a labor income multiplier of 0.77. Adapted from TRG (October 2013).

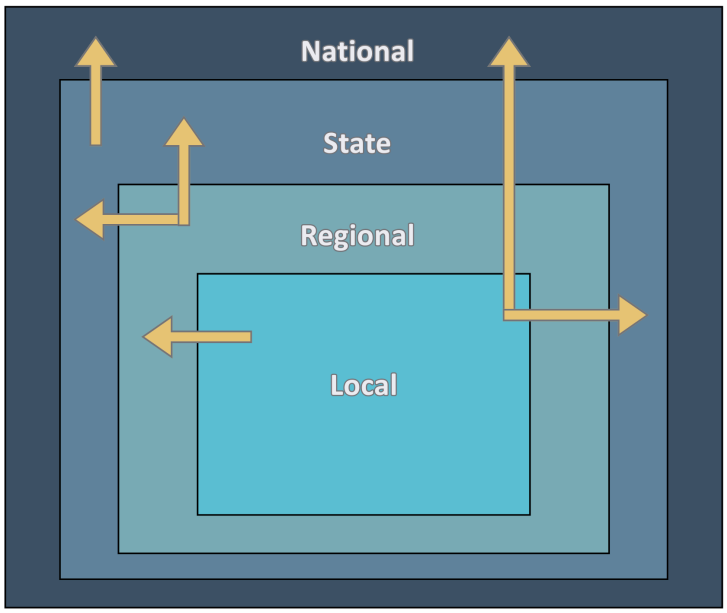

Figure D.2 Economy Level Leakages and Multipliers. The arrow directions show the outflows from the injection of funds to the local economy. The outflow is due to purchases made in the larger regional economies. The box sizes reflect the relative magnitude of multiplier income generated from the local injection. Adapted from Swearingen (October 2014).

APPENDIX E: DETAILED EXPENDITURES AND REGIONAL ECONOMIC IMPACTS IN LOCAL, COAST AND STATE ECONOMIES

Table E.1 Detailed Expenditures and Regional Economic Impacts from Local Spending in Local, Coast and State Economies

					Economic Impacts											
					Local				Coast				State			
	NAICS			Margin	Earnings		Jobs		Earnings		Jobs		Earnings		Jobs	
Expenditure Category	Code	NAICS Name	Expenditure	Factor	Multiplier	Amount	Multiplier	Amount	Multiplier	Amount	Multiplier	Amount	Multiplier	Amount	Multiplier	Amount
Restaurant	722110	Full-service restaurants	$10,100	100.0%	0.4348	$4,391	11.6928	0.1	0.5565	$5,621	14.0829	0.1	0.6373	$6,437	15.5479	0.2
Grocery Markets	445000	Food and beverage stores	$7,300	28.8%	0.4222	$888	12.3016	0.0	0.5078	$1,068	13.9777	0.0	0.5748	$1,208	15.1515	0.0
Lodging	721000	Accommodation	$26,700	100.0%	0.3334	$8,902	9.3196	0.2	0.4366	$11,657	11.3091	0.3	0.512	$13,670	12.6431	0.3
Fuel (Vessel/Auto)	447000	Gasoline stations	$7,800	18.6%	0.3743	$543	10.0876	0.0	0.4682	$679	11.9746	0.0	0.5461	$792	13.3882	0.0
Equipment/Supplies	452000	General merchandise stores	$4,600	26.8%	0.3941	$486	11.5552	0.0	0.4841	$597	13.2517	0.0	0.5521	$681	14.4085	0.0
Charters and Organizations	485A00	Transit and ground passenger transportation	$167,200	100.0%	0.4477	$74,855	18.8965	3.2	0.5456	$91,224	20.2607	3.4	0.5916	$98,916	19.6546	3.3
Rent	531000	Real estate	$1,100	100.0%	0.2242	$247	5.5794	0.0	0.2817	$310	6.6685	0.0	0.3241	$357	7.3919	0.0
Maintenance	811300	Commercial and industrial machinery and equipment repair and maintenance	$8,500	100.0%	0.5841	$4,965	8.0862	0.1	0.6891	$5,857	10.0698	0.1	0.7652	$6,504	11.4955	0.1
Fees and Dues	523900	Other financial investment activities	$1,700	100.0%	0.4254	$723	15.3007	0.0	0.6425	$1,092	21.4478	0.0	0.7382	$1,255	22.9778	0.0
Other	722A00	All other food and drinking places	$300	100.0%	0.5078	$152	15.4303	0.0	0.6396	$192	18.0433	0.0	0.734	$220	19.786	0.0
Insurance	5241XX	Insurance carriers, except direct life insurance	$0	100.0%	0	$0	0	0.0	0.3035	$0	4.5227	0.0	0.3892	$0	5.9677	0.0
Labor	5416A0	Environmental and other technical consulting services	$133,300	100.0%	0.6049	$80,633	11.3491	1.5	0.7132	$95,070	13.3725	1.8	0.8293	$110,546	15.4276	2.1
Total			$368,600			$176,785		5.2		$213,367		5.8		$240,586		6.1

Table E.1 Notes:

1. Expenditures and labor compensation were from projects occurring during 2022 through 2024. The spending is either one-time or annual average during the period.
2. Economic impacts measured by earning are wages, salary, and proprietorship net income accruing to households and individuals. Economic impacts measured by jobs are full and part-time positions.
3. The expenditure categories for retail, equipment/supplies and fuel are margined to account for cost-of-goods sold. Assigned margins are from the U.S. Bureau of Census, Annual Retail Trade Survey. Industry allocation of cost-of-goods to distributor, transportation services and producer RIMS II categories was not necessary.
4. Insurance and other fees are included as trip related expenses in the state economy level.

Table E.2 Project Trip Expenditures and Regional Economic Impacts in the Local Economy

					Local Economic Impacts			
	NAICS			Margin	Earnings		Jobs	
Expenditure Category	Code	NAICS Name	Expenditure	Factor	Multiplier	Amount	Multiplier	Amount
Restaurant	722110	Full-service restaurants	$10,100	100.0%	0.4348	$4,391	11.6928	0.1
Grocery Markets	445000	Food and beverage stores	$7,300	28.8%	0.4222	$888	12.3016	0.0
Lodging	721000	Accommodation	$26,700	100.0%	0.3334	$8,902	9.3196	0.2
Rent	531000	Real estate	$1,100	100.0%	0.2242	$247	5.5794	0.0
Fuel (Vessel/Auto)	447000	Gasoline stations	$7,800	18.6%	0.3743	$543	10.0876	0.0
Equipment/Supplies	452000	General merchandise stores	$4,600	26.8%	0.3941	$486	11.5552	0.0
Maintenance	811300	Commercial and industrial machinery and equipment repair and maintenance	$8,500	100.0%	0.5841	$4,965	8.0862	0.1
Insurance	5241XX	Insurance carriers, except direct life insurance	$0	100.0%	0	$0	0	0.0
Fees and Dues	523900	Other financial investment activities	$1,700	100.0%	0.4254	$723	15.3007	0.0
Other	722A00	All other food and drinking places	$300	100.0%	0.5078	$152	15.4303	0.0
Total			$68,100			$21,297		0.5

Table E.3 Project Trip Expenditures and Regional Economic Impacts in the Coast Economy

					Coast Economic Impacts			
	NAICS			Margin	Earnings		Jobs	
Expenditure Category	Code	NAICS Name	Expenditure	Factor	Multiplier	Amount	Multiplier	Amount
Restaurant	722110	Full-service restaurants	$3,200	100.0%	0.5565	$1,781	14.0829	0.0
Grocery Markets	445000	Food and beverage stores	$1,000	28.8%	0.5078	$146	13.9777	0.0
Lodging	721000	Accommodation	$600	100.0%	0.4366	$262	11.3091	0.0
Fuel (Vessel/Auto)	447000	Gasoline stations	$7,300	18.6%	0.4682	$636	11.9746	0.0
Equipment/Supplies	452000	General merchandise stores	$33,600	26.8%	0.4841	$4,359	13.2517	0.1
Insurance	5241XX	Insurance carriers, except direct life insurance	$0	100.0%	0.3035	$0	4.5227	0.0
Fees and Dues	523900	Other financial investment activities	$0	100.0%	0.6425	$0	21.4478	0.0
Other	722A00	All other food and drinking places	$500	100.0%	0.6396	$320	18.0433	0.0
Total			$46,200			$7,504		0.2

Table E.4 Project Trip Expenditures and Regional Economic Impacts in the State Economy

					State Economic Impacts			
	NAICS			Margin	Earnings		Jobs	
Expenditure Category	Code	NAICS Name	Expenditure	Factor	Multiplier	Amount	Multiplier	Amount
Restaurant	722110	Full-service restaurants	$0	100.0%	0.6373	$0	15.5479	0.0
Grocery Markets	445000	Food and beverage stores	$200	28.8%	0.5748	$33	15.1515	0.0
Lodging	721000	Accommodation	$0	100.0%	0.512	$0	12.6431	0.0
Fuel (Vessel/Auto)	447000	Gasoline stations	$4,600	18.6%	0.5461	$467	13.3882	0.0
Equipment/Supplies	452000	General merchandise stores	$12,100	26.8%	0.5521	$1,790	14.4085	0.0
Insurance	5241XX	Insurance carriers, except direct life insurance	$48,600	100.0%	0.3892	$18,915	5.9677	0.3
Fees and Dues	523900	Other financial investment activities	$960	100.0%	0.7382	$709	22.9778	0.0
Other	722A00	All other food and drinking places	$375	100.0%	0.734	$275	19.786	0.0
Total			$66,835			$22,190		0.4

Table E.5 Compensation and Regional Economic Impacts for Contractors in the Local Economy

					Local Economic Impacts			
	NAICS			Margin	Earnings		Jobs	
Expenditure Category	Code	NAICS Name	Expenditure	Factor	Multiplier	Amount	Multiplier	Amount
Charters and Organizations	485A00	Transit and ground passenger transportation	$167,200	100.0%	0.4477	$74,855	18.8965	3.2
Labor	5416A0	Environmental and other technical consulting services	$133,300	100.0%	0.6049	$80,633	11.3491	1.5
Total			$300,500			$155,489		4.7

APPENDIX F: PORT ORFORD SETTING AND COMMERCIAL FISHERIES ENGAGEMENT

Setting

Port Orford is the westernmost city in the contiguous United States (Countryaah 2022). Established in 1851, it is the oldest town on the Oregon coast. The city's history includes roles in the fur trade, gold mining, and as a strategic military site during World War II (Epperly et al. April 2020). Today, Port Orford is known for its artistic community and natural beauty. Some high-tech manufacturing occurs in the City. With the weakening of natural resource job opportunities and attractiveness of the area to retirees, demographic characteristics have shifted to older age groups.[3] The median age in the greater Port Orford area in 2021 was 59.2 as compared to the state 39.6 (Table F.3). Major employment is now trending to tourism and service businesses. There is still an active commercial fishing industry.

Port Orford City is located along the major north-south coast travel route U.S. Highway 101 (Figure F.3). The Redfish Rocks Marine Reserve (RRMR) is about three miles south of the City Limits (Figure F.4). The highway has parking lot turn offs for convenient access to RRMR. Shoreline access to the RRMR is from Hubbard Creek and Battle Rock Wayside Beach. Spectacular views of the RRMR are at Rocky State Scenic Viewpoint (ODFW 2017).

The greater Port Orford area had a population of 2,757 in 2021. Population within the City of Port Orford boundaries was 1,148 in 2021 (Figure F.1). There was a large City and County population increase in the 1950's spurred by timber industry growth (Epperly et al. April 2020). The population declined after 1960 until slowly increasing again in the early 2000's congruent with increased retiree age immigration (OCVA, January 2024). The City's population has remained steady since the Great Recession in Year 2008.

Categories for an area's total income are typically expressed as earnings, investment (such as retirement plan 401(k) disbursements) and transfers (such as social security). In general, higher earnings income proportion would mean lower effects from an area's retiree related income. The greater Port Orford area earnings proportion was 52.4% as compared to the County 32.0% and state 76.7% (Table F.3). This shows while retiree related income is important in the greater Port Orford area, it is less prominent than the County.

[3] The geographic area chosen to show demographic and employment statistics is the greater Port Orford area. It is represented by northern Curry County ZIP codes 97450, 97476 and 97465 (Figure F.3). It was assumed the region better represents the labor market area after reviewing workforce commuting data. Sometimes statistics are only available and reported for Port Orford City and Curry County.

Employment in the greater Port Orford area is about 9% of Curry County's 10,590 total employment in 2021 (Table F.3). Major employment industry categories for the greater Port Orford area are: lodging/restaurant/entertainment 25.0%, natural resources 16.1%, retail/wholesale 15.7%, and health and education 11.7% (Table F.3). The share of Curry County's ocean related economy is 19.2% in 2021 (ENOW 2022). This compares to Oregon's 2.1% share.

Small businesses such as artisans are usually one-employee. Commercial fishing vessel skippers and crew usually are individual contractors for their work. These examples contribute to the high proportion of proprietorship employment in the county. Curry County's proprietorship share is 33.3% and Oregon's share is 23.7% in 2021 (Table F.3).

A distinctive feature of Port Orford's port facilities is that all ocean-based transportation and industries rely on a crane-operated hoist to launch and retrieve vessels. This system limits ocean access and vessel size for commercial and recreational fishing, tourism, and environmental monitoring activities. Hoist counts in past years have averaged around 3,500 annually including commercial and recreational fishing vessels, research boats and ocean touring boats (MCI April 2009). The Port is underway on a dock improvement project that includes crane replacement and up-sizing (OCVA May 2024). The Port is also active in other facility initiatives, including upgrading a seawater pump and distribution system to support live fish buyers, sea urchin fishery participants and aquaculture.

Regarding the commercial fishing industry, there were 71 different vessels (56 of which Port Orford is their home port) making 2,498 deliveries in 2021 (Table F.2). There are large deliveries of groundfish and Dungeness crab (Table F.1). There was a large sea urchin fishery in the 1989 to 1991 period (Figure F.2a). There still is a small sea urchin fishery, albeit with declined abundances and more conservative resource regulations. Port Orford delivery trends

can be visually compared to state landing trends in Figure F.2b.[4] For the three year period 2022 through 2024, annual average landings in Port Orford were 1.6 million pounds of all-species with ex-vessel value $4.7 million (Table F.1). The estimated economic contribution from Port Orford's commercial fishing industry in 2021 was $5.6 million income and 119 jobs (TRG June 2024a). The contribution represents 13.0% of all earnings in the greater Port Orford area. The local economy's dependency on commercial fisheries is discussed in this appendix next section. Ocean recreational fishing in the area is limited due to the inconvenience and cost of only crane launching being available. There is one recreational ocean fishing charter business currently operating out of Port Orford. Fishing grounds near Port Orford are sometimes accessed by guides and private boats launched at Gold Beach (distance about 30 miles). There is high participation in freshwater recreational fishing in the area (ODFW February 2021). The Sixes River and Elk River attract significant effort during fall Chinook and steelhead fishing seasons. Many surrounding lakes provide excellent trout fishing opportunities.

Commercial Fisheries Engagement

A brief set of commercial fishery engagement indicators is described in TRG (June 2024a). The indicators discussion is supplemented with social/economic descriptors at the Oregon port group level that show coastal area vulnerability to changes in fisheries. Fisheries engagement indicators along with social/economic descriptors can be used in trend analysis to monitor and assess social vulnerability status and risk positions. They provide a basis for retrospective and prospective investigations to determine impacts arising from changing ocean conditions, new ocean uses, and natural resource management. When supplemental ocean use choices data

[4] The state deliveries ex-vessel value variability in the middle and late 1980s are explained by lower-then-higher deliveries of salmon (coho was a south and central Oregon directed ocean fishery in those years), pink shrimp, and Dungeness crab combined with higher prices in those fisheries. For example, pink shrimp was $1.56 per pound and coho was $3.69 in 1987 adjusted to 2023 real dollars. The ex-vessel value variability in 2020 through 2022 are lingering effects from COVID pandemic (AFSC August 2024). Broadly speaking with the acknowledgment there are regional nuances, seafood food service sales dropped in 2020 due to social distancing constraints. This led to high in-store demand for seafood starting in 2020. Demand driven prices rose in 2021; industry ramped up seafood production and inventories. There was seafood price resistance in 2022 that was fueled by inflation and higher general prices (and wages not keeping up especially after the federal wage subsidy ended). Consumers' purchase of seafood dropped, leading to trading down to cheaper proteins like chicken. Distributors were forced to sell-off inventories at low prices. The accompanying wholesale price drop was transmitted to the harvesting sector ex-vessel price. This drop in revenue for the sector was exacerbated by processors not needing deliveries in some fisheries in 2022. Harvesters were forced to not fish in those fisheries without a market to sell their catch. There is some price recovery starting in 2023, but shifting consumer seafood preferences and import/export buying restrictions due to the Ukraine War continues ex-vessel price volatility. Superimposed on these unsettled market conditions will be international trade responses and restrictions due to the current federal administration's ultimate import tariff and export nation's tariff rulings.

are available, primary factors for adaptive responses can be identified and predictive models developed. New management and mitigation program alternatives can be evaluated for implementation impacts and tradeoffs. Discussions can have benefits for providing conservation awareness and making natural resource planning more responsive to those most affected (Jacob et al. 2012; Samhouri et al. 2013; Poe et al. 2015).

Commercial fisheries engagement can be decomposed into regional economic reliance, fisheries dependency, and social vulnerability. Figure F.5 shows Oregon port group rankings for these dimensions in 2021. The Astoria port group had the highest reliance on commercial onshore fisheries and Port Orford was the most dependent on commercial nearshore fisheries. (If distant water fisheries were included in Figure F.5, then the Newport port group would have had the highest reliance on commercial fisheries.) Port Orford, Newport, and Astoria are of higher social vulnerability. Other demographic and well-being indicators can also be used to show the social fabric backdrop of communities where fishing families live and work. For example, the Port Orford port group has the highest share of individuals living under the poverty level (21.1%) in 2021 (Table F.3). The State individual's poverty level is 12.1% (OCVA January 2024).

Indicators help communicate and identify goals and objectives for natural resource management and enable decision makers to measure and monitor changes and outcomes towards meeting management goals (Poe et al. 2015). Social indicators can show disparity in impacts from marine conditions changes that are specific to communities and tribal interests (Tuler et al. 2008; Singleton 2009).

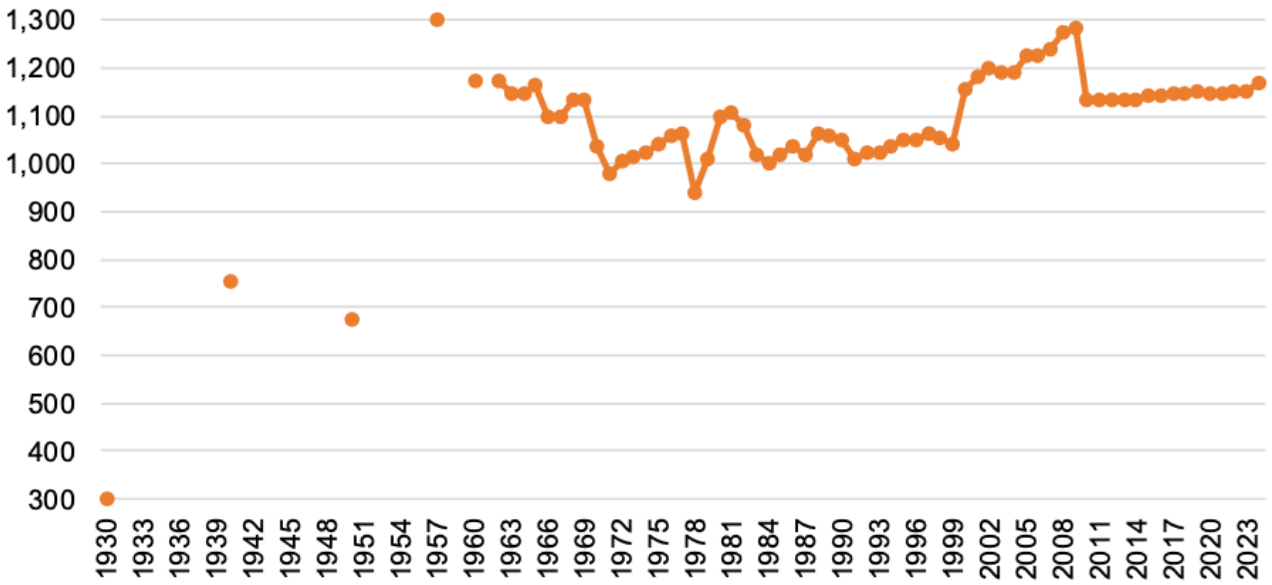

Figure F.1 City of Port Orford Population in 1930 to 2024. Sources: Wikipedia, accessed May 30, 2025. University of Oregon Bureau of Municipal Research and Service (1958) and Portland State University, Population Research Center, annual population reports.

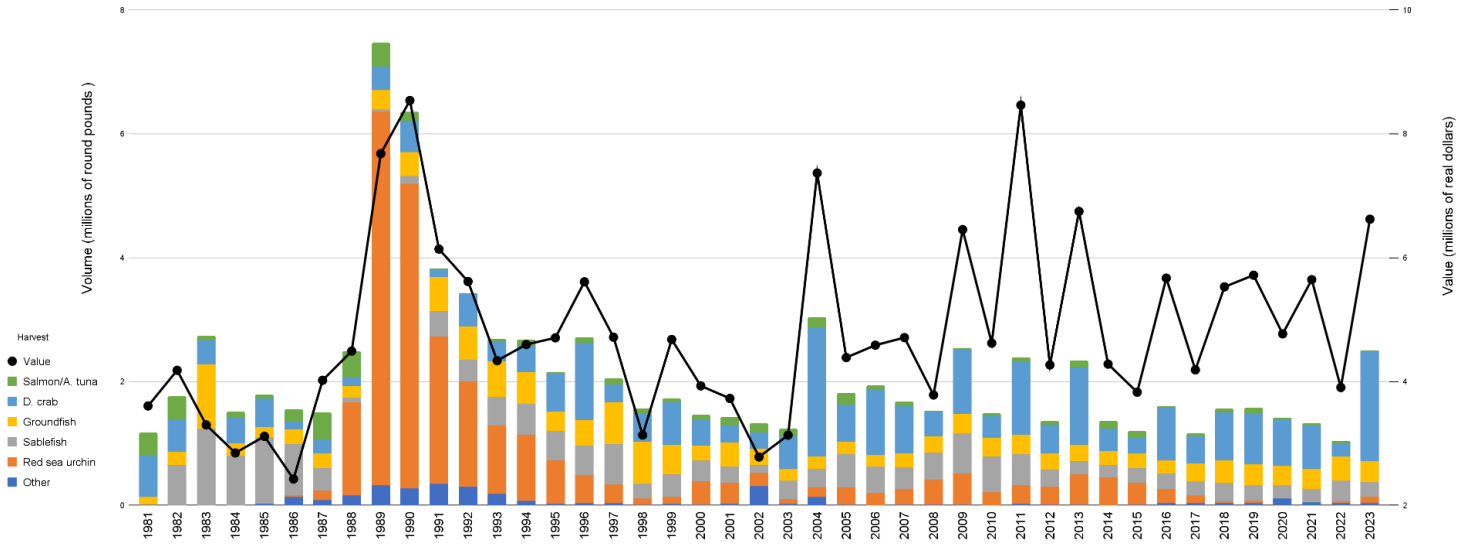

Figure F.2a Port Orford Port Group Fisheries Deliveries 1981 - 2023

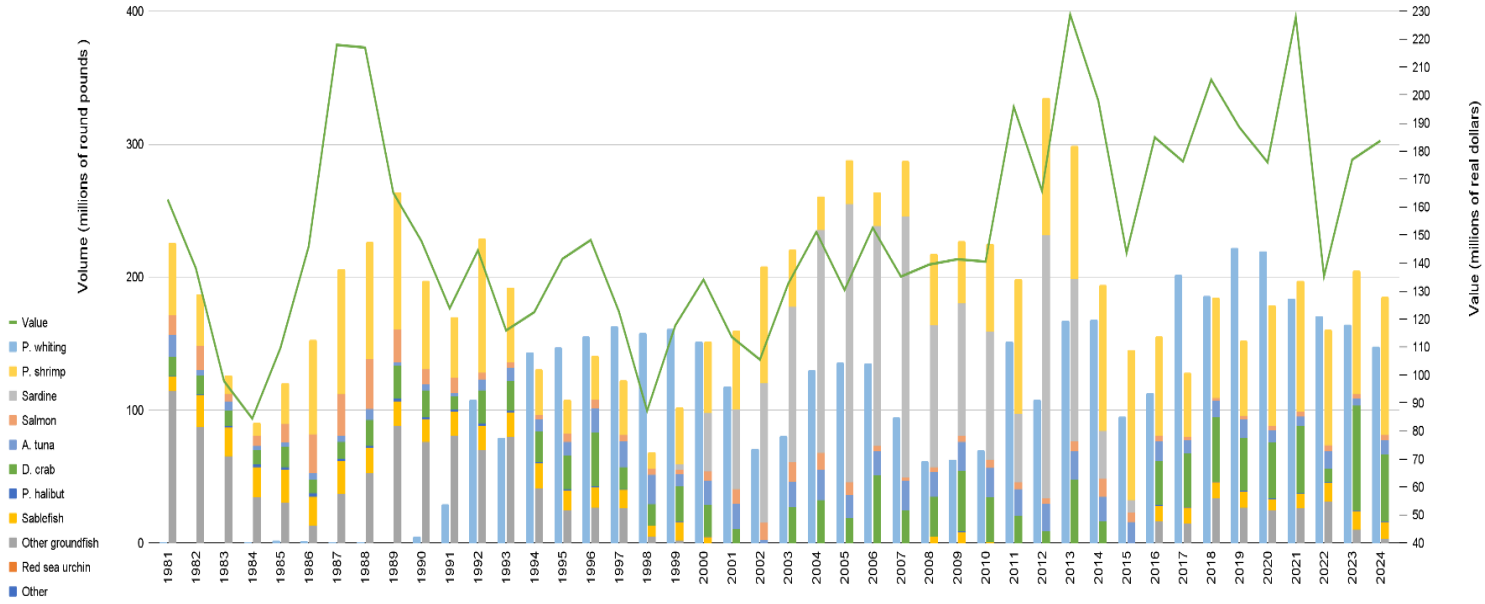

Figure F.2b Oregon Onshore Fisheries Deliveries 1981 - 2024

Notes:

1. Values are in 2023 dollars, adjusted using GDP implicit price deflator developed by U.S. Bureau of Economic Analysis, except 2024 is nominal.
2. Landings are for each calendar year, including Dungeness crab.
3. Pacific whiting (also known as hake) did not emerge as a major fishery species until after 1990.
4. State "Other" in 2024 includes landings (thousands of round pounds) of American shad (601.1), market squid (382.3), gaper clams (281.9), jack mackerel (276.7), Pacific herring (235.3), and other species. Shellfish volume excludes aquaculture production.

Sources: TRG (June 2024a) for 1981 to 2023; ODFW commercial fish landings statistics for Oregon as of 1/22/2025 for 2024.

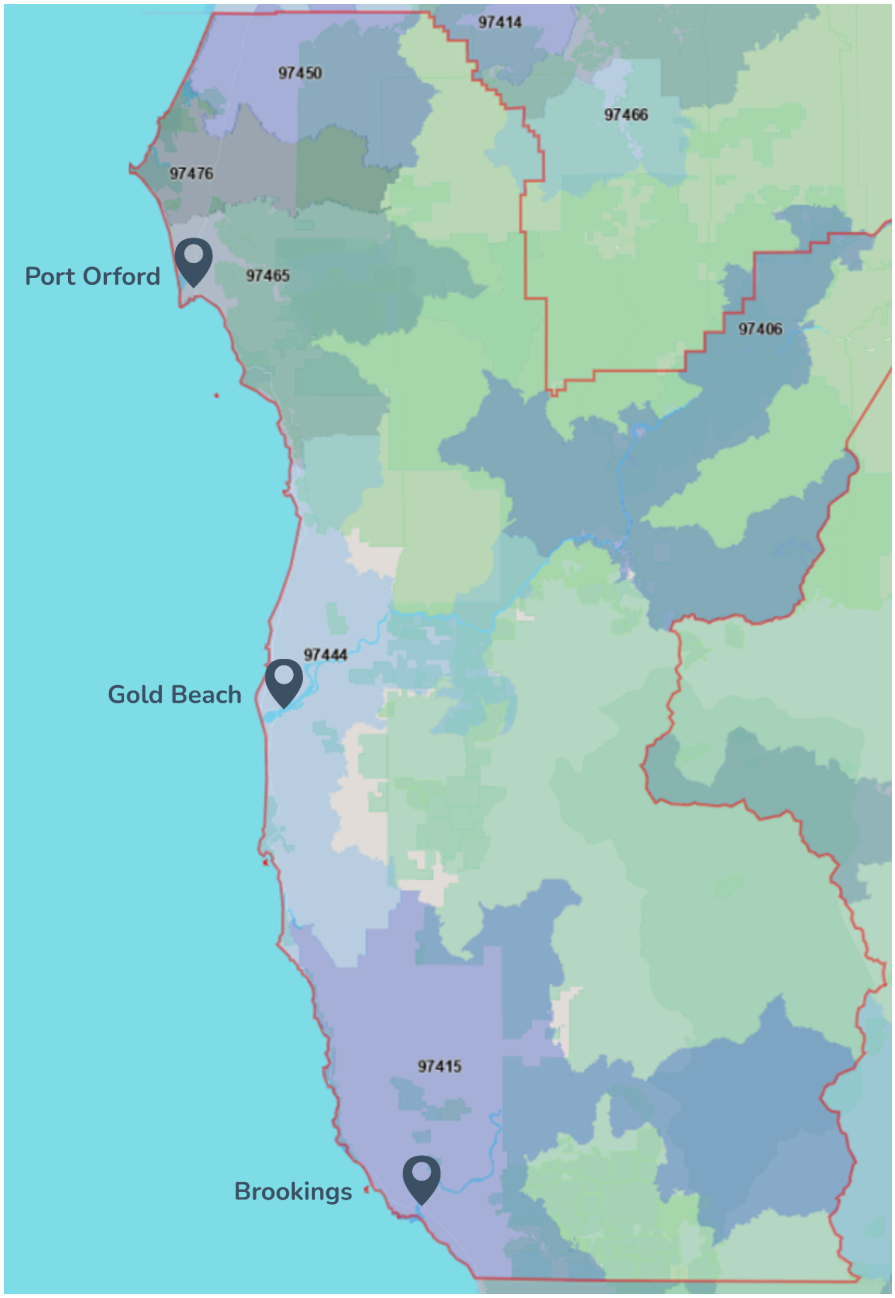

Figure F.3 Map of the Greater Port Orford Vicinity

Note: The greater Port Orford area is defined as the northern Curry County ZIP codes 97450, 97476, and 97465.

Sources: UnitedStatesZipCodes.org and Google Maps.

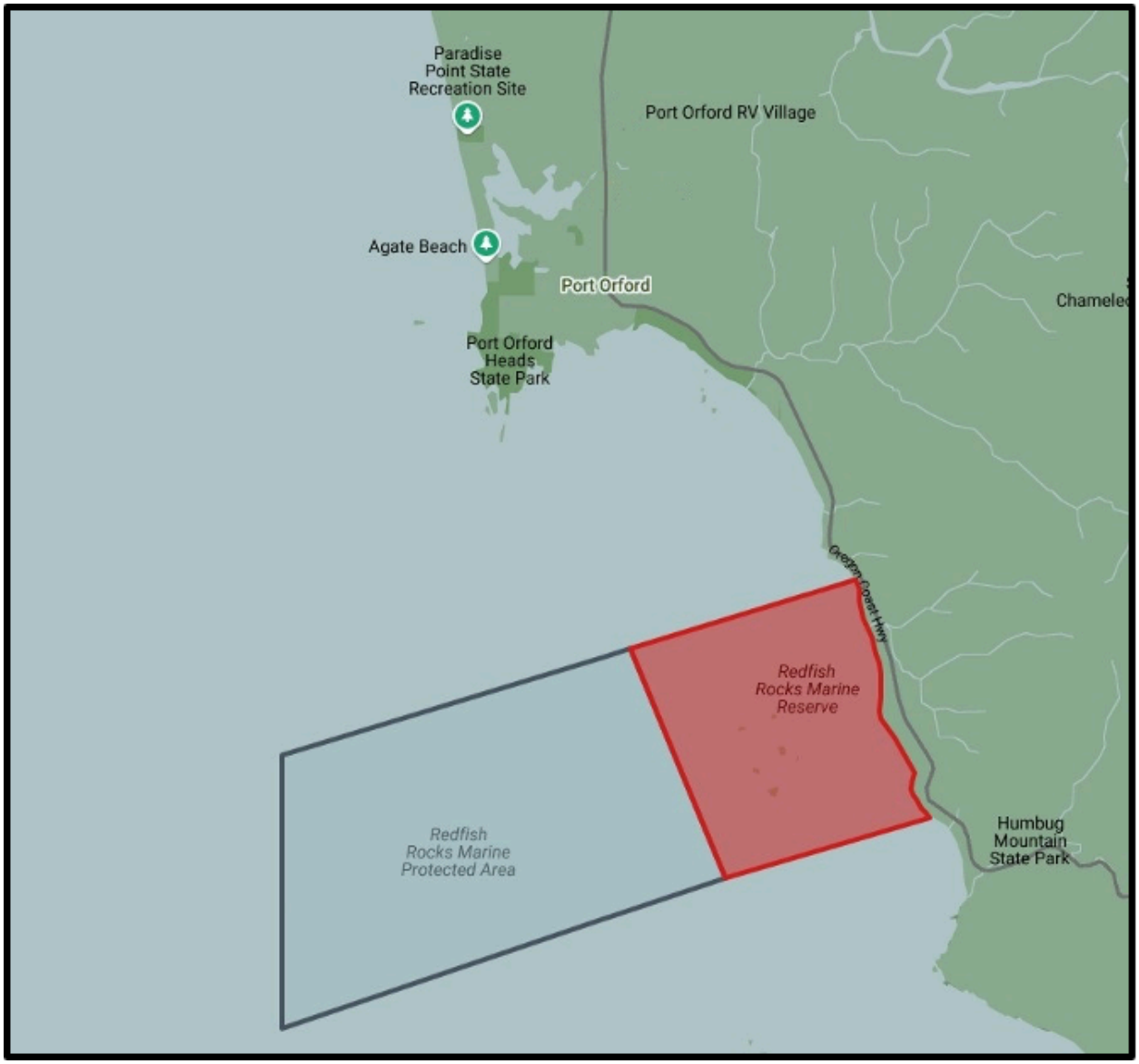

Figure F.4 Redfish Rocks Marine Reserve Location

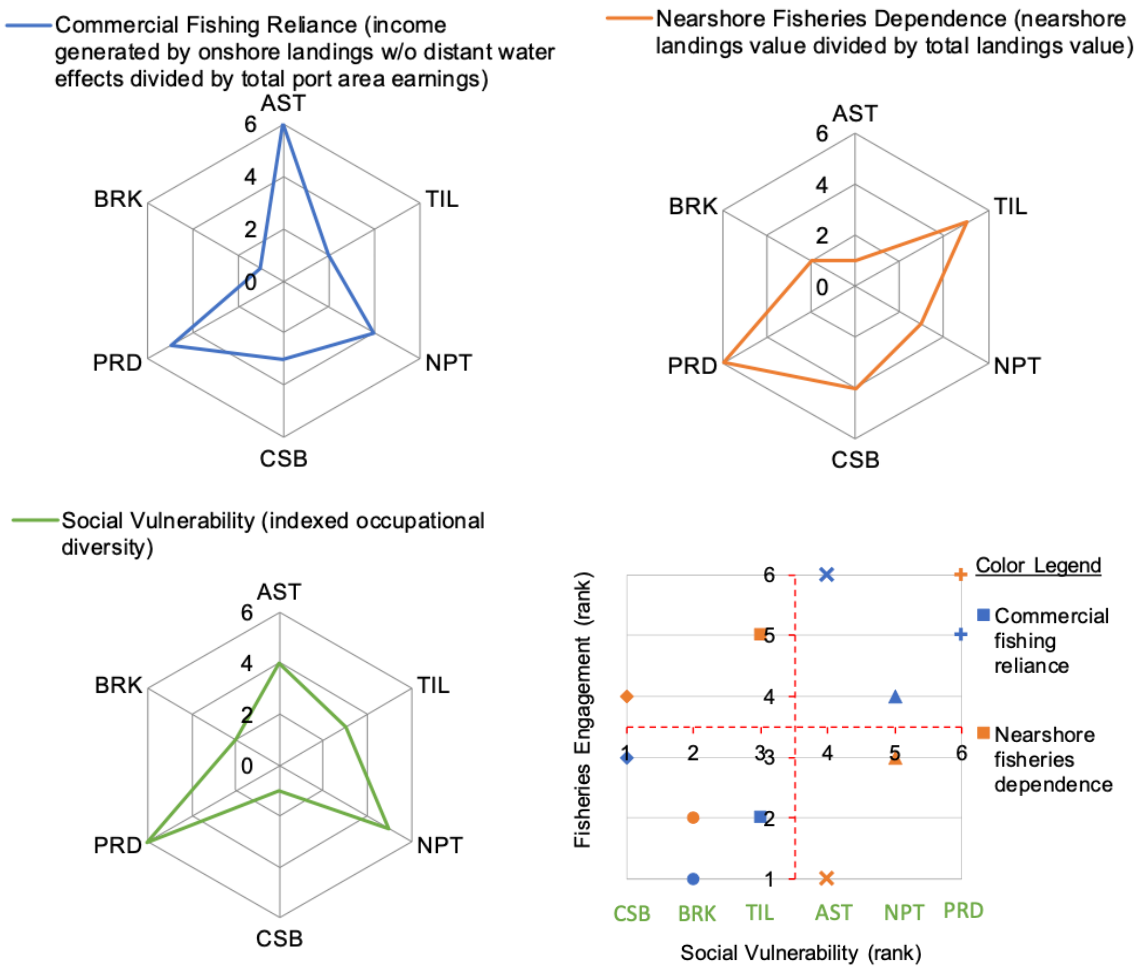

Figure F.5 Oregon Rankings of Port Group Area Commercial Fishing Industry Reliance, Commercial Nearshore Fisheries Dependency, and Social Vulnerability in 2021

Notes: Sources: TRG (June 2024a) using ACS 2017-2021 estimates.

1. Port group acronyms are Astoria (AST), Tillamook (TIL), Newport (NPT), Coos Bay (CSB), Port Orford (PRD), and Brookings (BRK).
2. Nearshore fisheries are defined for this figure to be Dungeness crab, salmon troll, nearshore groundfish, and market squid. The nearshore fisheries portion of the commercial salmon troll fishery is assumed 35% and the nearshore portion of the Dungeness crab fishery is assumed to be 54% of the total amounts shown.
3. Reliance rankings are based on economic contribution (measured by income that includes the multiplier effect) from commercial fisheries (without distant water fisheries effects) divided by port group area household earnings. Port Orford area earnings are from northern Curry County zip codes.
4. Dependency rankings are from the ratio of commercial nearshore fisheries landed value divided by total onshore fisheries landed value.
5. Social vulnerability rankings are based on Shannon Index of occupational diversity.
6. The ranking 6 represents the highest commercial fishing reliance, highest commercial nearshore fisheries dependency, and highest social vulnerability.
7. Port groups within upper right quadrant would be of higher social vulnerability with greater commercial fisheries reliance and dependence on nearshore fisheries.

Table F.1 Port Orford/Bandon Port Group Fisheries Deliveries in 2020 - 2024

	2020		2021		2022		2023		2024	
Fishery	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value
Salmon	15,192	138,448	19,726	210,041	14,490	134,022	19,143	147,540	17,891	160,059
D. crab	746,834	2,917,529	705,680	3,742,357	223,376	1,453,889	1,767,792	4,710,189	492,607	2,169,063
P. shrimp	0	0	0	0	0	0	0	0	0	0
A. tuna	17,117	39,689	19,214	32,550	36,368	87,563	8,216	19,034	36,743	69,910
P. whiting	0	0	39	2	41	17	4	0	53	3
P. halibut	61,616	309,967	41,783	294,242	31,127	200,854	29,323	150,071	37,082	171,882
Lingcod	97,061	316,385	101,442	320,885	161,415	489,382	117,907	336,340	80,559	224,900
Bl. rockfish	105,761	299,963	117,647	320,642	121,507	333,338	115,963	303,946	107,691	269,380
Sablefish	217,816	317,711	217,921	362,462	339,523	882,667	233,834	386,680	235,852	321,672
Other Invertebrates	2,081	3,889	1,333	4,437	23,956	45,269	107,064	235,762	50,961	122,162
Other	167,287	495,051	114,475	390,482	132,059	492,613	118,069	411,957	108,777	309,766
Total	1,430,765	4,838,630	1,339,260	5,678,100	1,083,862	4,119,612	2,517,315	6,701,519	1,168,216	3,818,797

Notes: Sources: ODFW commercial fish landings statistics for Port Orford/Bandon group as of 1/22/2025 for 2024. Except salmon

1. Bandon landings in the combined Bandon and Port Orford summary information is minor (typically one percent in five
2. Values are in 2023 dollars, except 2024 is nominal. Landings are for calendar year, including D. crab. Adjustment used GDP implicit price deflator developed by U.S. Bureau of Economic Analysis.
3. The top three highest value species in "Other" in 2024 are greenlings ($113 thousand), cabezon ($64 thousand) and China rockfish ($58 thousand). "Other invertebrates" in 2024 are red sea urchins ($83 thousand), purple sea urchins ($25 thousand), and California sea cucumbers ($14 thousand).

Table F.2 Port Orford Commercial Fishing Industry Characteristics in 2021

Volume	$1.3 million
Value	$5.1 million
Share	2%
Vessel Counts	
Unique landing	71
Homeport	56
Ratio homeport to unique landing	79%
Active landing	68
Active homeport	54
Deliveries	2,498
Economic impact	
Income	$5.6 million
Jobs	119

Notes: Source: TRG (June 2024a).

1. An active vessel is any identifiable vessel that landed over $500 in Oregon in a year.
2. A vessel's homeport is the port group where a plurality of Oregon harvest value is delivered.

Table F.3 Demographics and Employment for Port Orford Area and Oregon in 2021

	Port Orford Area	Curry County	Oregon
Population	2,757	23,683	4,207,177
Median age (years)	59.2	56.2	39.6
Individuals below poverty level	21.1%	13.2%	12.1%
Civilian employment	956	10,590	2,026,107
Natural resources	16.1%	6.4%	2.9%
Construction and manufacturing	6.8%	16.6%	17.7%
Retail and wholesale	15.7%	9.2%	14.2%
Transportation and communication	8.5%	5.8%	6.2%
Finance, insurance, real estate	6.4%	10.7%	17.0%
Health and education	11.7%	20.0%	23.4%
Lodging, restaurants and recreation	25.0%	15.9%	9.4%
Public administration	9.8%	15.5%	9.3%
Share in ocean economy (employment)		19.2%	2.1%
Share of proprietorship (employment)		33.3%	23.7%
Per capita income	$28,790	$53,044	$37,816
Total income	$82.4 million	$1,256.2 million	$155,916.9 million
Earnings income	$43.2 million	$401.9 million	$119,515.8 million
Share of total income	52.4%	32.0%	76.7%

Notes: Port Orford area is northern Curry county ZIP codes 97465, 97476, 97450.

Sources: Port Orford area from Census ACS, three ZIP codes. Total and earnings income estimated using average per household times number of households. Curry County from OCVA (January 2024), NOAA, Economics: National Ocean Watch (ENOW), BEA Table CAINC30.

APPENDIX G: MARINE RESERVE SITE TARGET FISHERIES RESTRICTIONS AND EXCEPTIONS

Marine Reserve Site		Target Fisheries Management	
		Recreational	Commercial
Cape Falcon MPA			
	Seaward	allowed: salmon (troll) and crab; prohibited: bottomfish	allowed: salmon (troll) and crab prohibited: sardine, sea urchin, rockfish, roundfish, flatfish
	Shoreside	prohibited: all from boat allowed: all angling from shore	all prohibited
MR		all prohibited	all prohibited
Cascade Head MPA			
	West	allowed: salmon (troll) and crab prohibited: bottomfish	allowed: salmon (troll) and crab prohibited: sardine, sea urchin, rockfish, roundfish, flatfish
	North	allowed: salmon (troll) and crab and bottomfish (private boat) prohibited: bottomfish (chartered boat)	allowed: salmon (troll) and crab prohibited: sardine, sea urchin, rockfish, roundfish, flatfish
	South	all allowed except net gear prohibited	all allowed except net gear prohibited
MR		all prohibited	all prohibited
Otter Rock MPA		n/a	n/a
MR		all prohibited	all prohibited
Cape Perpetua MPA			
	North	allowed: salmon (troll) and crab and all angling from shore prohibited: bottomfish from boat	allowed: salmon (troll) and crab prohibited: sardine, sea urchin, rockfish, roundfish, flatfish

Sea & Shore
SOLUTIONS