Informing Oregon’s Marine Protected Area (MPA) Baseline
Past and Present Tribal Uses of Marine Resources

by

Sabra Marie TallChief Comet

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Thesis Committee:
Dr. Max Nielsen-Pincus
Dr. Elise Granek
Dr. Thomas Swearingen

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Abstract:

Oregon implemented a series of marine reserves from 2012 through the beginning of 2016 that will be evaluated in 2023. As part of that evaluation, several studies are focusing on the impact of the reserves on coastal communities. This project focused on tribal members with ancestral territory on the Oregon coast. Tribal members from three tribes, the Confederated Tribes of Siletz Indians, the Coquille Indian Tribe, and the Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians were interviewed for this project. The interviews centered around two themes: 1) past and present use of marine and coastal species, and 2) experiences and opinions about the implementation and policies of Oregon’s marine reserves. A mapping exercise in which tribal members marked where they gathered species was performed concurrently with the interviews. Shared patterns in the interview narratives around changes in plant/animal populations, habitats, and land uses are the focus on Chapter 2. Spatial information from the mapping exercise is the focus of Chapter 3. Chapter 4 briefly introduces techniques for efficiently engaging with tribes on resource management projects, using this project as the example application for the techniques. Over 150 species were reported by 28 participants in 23 interviews, and the areas marked during the mapping exercise covered over 12,000 square kilometers. Several trends were corroborated across interviews, including the timing of two smelt populations, and the crash and slow recovery of the Starry Flounder. There was traditional/subsistence use reported in areas overlapping four of the five marine reserves in Oregon, although some of the activity had stopped well before the implementation of the reserves. The majority of participants were in favor of the existence of marine reserves, but had a variety of suggestions for changes to the implementation and policy.
Chapter 1: Project Introduction

Overview

In 2012, the state of Oregon designated five ocean areas as marine reserves (MRs) in which ocean development and “take” of marine resources is prohibited. Four of these reserve sites are paired with Marine Protected Areas (MPAs) that have limited “take” of specific species, instead of full prohibition. The purpose of my thesis project was to determine whether “take” restrictions in MRs and MPAs affect coastal tribal members’ resource gathering for subsistence, ceremonial, and traditional use and to identify the extent to which tribal members felt engaged in the marine reserves process. Determining whether tribal members were affected is important because similar restrictions have caused conflicts that threaten the long-term viability of marine protected areas in other parts of the North American west coast (Singleton, 2009). Additionally, part of the Oregon MR/MPA initiative is to gather information at the beginning of the program’s implementation, creating a baseline to gauge effectiveness and outcomes of marine reserves. Assessment of these outcomes after 10 years is legislated to measure whether the marine reserves have fulfilling the paired goals of protecting habitats and biodiversity and avoiding significant adverse social and economic impacts to coastal communities and other marine resource users (ODFW, 2013). This project will help inform Oregon’s baseline of both species use and social impact of marine reserves on coastal tribal members.

For my project I used methods modeled after northern California’s tribe-led marine protected area baseline project, titled “Traditional Knowledge of Keystone Marine Species and Ecosystems” (Sea Grant California, 2014). This is a joint project between several tribes: Smith River Rancheria (Tolowa Dee-ni’), Inter-Tribal Sinkyone Wilderness Council, Cher-Ae Heights
Indian Community of the Trinidad Rancheria, and the Wiyot Tribe. The project set out to describe the historical and present distribution and use by Native Americans of key marine and intertidal species. This was accomplished through archival research of grey literature (including journals, PhD theses, and interview transcripts), as well as interviews with tribal members. Some of the methods used in the interview section of the California project were adopted for this thesis.

**Study Area**

Oregon established five MPA/MR pairings through a lengthy public input process (see Table 1.1). The reserves were first recommended by the Ocean Policy Advisory Council (OPAC) in 2002. In August 2008 Oregon Governor Kulongoski issued Executive Order 08-07 to OPAC; the Order recommended no more than nine potential marine reserve sites. Local groups and individuals submitted proposals for twenty sites to Oregon Department of Fish and Wildlife (ODFW) in the summer of 2008 (State of Oregon, 2012). In 2009, OPAC accepted the proposals for six sites (ODFW, 2012) which were approved for the current Marine Reserves system on the Oregon coast. Four of the five implemented sites have paired MRs (no-take) and MPAs (limited take), and one site contains only a MR. Senate Bill (SB) 1510 gave ODFW the power to enforce “take” restrictions within the initial reserves (SB 1510, 2012). The data from this thesis project will go to the Oregon Marine Reserves Baseline Program, housed within ODFW.
Table 1.1: Key legislation behind creation and implementation of Oregon’s marine reserves and marine protected areas. OPAC: Ocean Policy Advisory Council; ODFW: Oregon Department of Fish & Wildlife; GPS: Global Positioning System; MR/MPAs: marine reserves/marine protected areas.

<table>
<thead>
<tr>
<th>Legislation &amp; Date</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Order 13158, 2000</td>
<td>President Clinton expanded the U.S. system of MPAs, and established the management of such under sound scientific principles, and underlined the cultural importance of such protected areas.</td>
</tr>
<tr>
<td>Executive Order 08-07, March 2008</td>
<td>Governor Kulongoski’s order to Oregon OPAC to begin the process of recommending marine reserve designations. Also designates ODFW as the lead agency in the OPAC marine reserve recommendations. Lays out the organization, roles for various agencies and staff, and timeline for the recommendation process. No more than 9 sites will be recommended for marine reserves by January 1, 2009.</td>
</tr>
<tr>
<td>OPAC Recommendations, August 2008</td>
<td>Defined marine reserves, associated terms, as well as the objectives, principles, and guidelines that provided the framework for future planning and implementation of the reserves.</td>
</tr>
<tr>
<td>House Bill (State) 3013, May 2009</td>
<td>Authorized OPAC’s November 2008 recommendations implemented. The recommendations included a pilot marine reserve at Otter Rock and pilot marine reserve and marine protected area at Redfish Rocks. Further evaluation for potential marine reserves was authorized at Cape Falcon, Cascade Head, Cape Arago, and Cape Perpetua. Biological and socioeconomic assessments were authorized, as well as formation of community teams for developing recommendations for potential marine reserves. The legislation provided more detail for development of baseline studies, planning documents, and roles of state agencies in the planning and implementation of the marine reserves. Also authorized a $1 million budget.</td>
</tr>
<tr>
<td>Senate Bill 1510, 2012</td>
<td>Establishes ODFW and OPAC reporting guidelines to state legislature on marine reserves. Authorizes Cape Falcon, Cascade Head, and Cape Perpetua as future marine reserves; removes Cape Arago/Seven Devils from the potential marine reserves list. Establishes framework and timeline for evaluation report on the marine reserves in 2022-2023.</td>
</tr>
<tr>
<td>Oregon Administrative Rules</td>
<td>Details boundaries (including GPS coordinates) and allowed and prohibited activities for each marine reserve, marine protected area, and wildlife reserve in the five sites. Also contains the</td>
</tr>
</tbody>
</table>
Marine reserves and marine protected areas have been used to designate protected areas around the world, with each area having a specialized set of restrictions. Marine reserves have more stringent “take” restrictions, allowing no “take” except for research and education purposes (as approved by ODFW). Marine protected area policies are more variable; each allows fishing of one to a few species with specific gear. The different management regimes allow for scientific comparison of ecosystem effects among no take (MR), controlled take (MPA), and the rest of Oregon state waters.

The current five MPA/MR pairs were put in place as a “limited” initial system of marine conservation areas (EO 08-07, 2008); in 2022 a report will be submitted first to the Science and Technical Advisory Committee (STAC) of OPAC, and then to the Oregon state legislature to review the reserves and ascertain if they are indeed fulfilling their goals. The review is planned for early 2023 and future management strategies for marine reserves in Oregon will be determined by Oregon the state legislature.

Two sets of data make up the final “product” for this project. Original data, from interviews that include transcribed audio data and a participatory mapping project that includes GIS polygons; participant-specific data (interview transcripts and GIS polygons) will be given to participant families and their member tribal government. Aggregated data is contained within this document, and will be given to participating tribal governments, the Oregon Marine Reserves Baseline (contained within ODFW), and Oregon Sea Grant (a major funder of the project).

The following questions are addressed in Chapters 2 and 3 of this report:
**Research Questions**

1. What marine and coastal species are important to tribal members for subsistence and cultural uses?
2. Do tribal members perceive a shift in coastal species distribution on the Oregon coast?
3. How have Oregon tribal government staff and tribal members experienced the creation of the Oregon MRs/MPAs?
4. Where do Oregon tribal communities use marine resources, and where does the MR/MPA system overlap with and/or affect these uses?

**Why is this important?**

The recognition of tribes and tribal members as stakeholders in marine policy is an evolving process, and understanding how to effectively incorporate tribal knowledge and concerns in projects that affect their resource use is of growing importance. To that effect, this project addresses several issues on varying scales. First, tribal-state conflicts have occurred in marine reserve programs elsewhere in North America (Singleton, 2009), and understanding tribal uses of marine resources can help develop strategies that reduce tribal-state conflict in the implementation and administration of MRs and MPAs. Second, the methods used in this project can further the use of traditional knowledge in higher-level scientific research, a process that continues to develop in natural resource management. Gathering oral knowledge from tribal elders can also help preserve history for elders’ families and tribal government. Incorporating data feedback to tribal staff when gathering oral histories in resource management projects can help build stronger relationships with tribal governments.

Baselines are important for determining “potential” population levels and (in this project) marine community structure. However, the last several years have experienced abnormal weather
and ocean conditions; using current populations and community structure as a baseline may misrepresent long-term trends in marine ecology. For the new Oregon MPA baseline, oral histories that span several generations of tribal members can extend baselines several decades back in time.

The methods employed in this project are unique in Oregon given the coast-wide scale and include standardized data collection across several tribes. The success of this project in engaging tribal governments and members will be beneficial in gauging whether this approach is efficient for gathering input from tribes on marine resource policy.

Finally, this project is intended to help develop the relationship between tribes and state resource managers. By encouraging tribal members to share their perceptions, they may feel like they have a voice in the marine reserve process.

**Chapter Summaries**

The subsequent sections of this report are comprised of two main chapters that report and analyze interviews (Chapter 2) and GIS data (Chapter 3). The final chapter (Chapter 4) concludes with reflections on engaging tribes and tribal members in natural resource management projects.

Chapter 2 focuses on the oral history data including species use, stories, re-occurring trends, and practices described by interview participants. Results include changes in species range/migration, population and community structure, and similar information that will help inform the MPA baseline data set. This chapter also discusses how the Oregon MPA process has affected tribal marine resource use, tribal members’ and tribal governments’ experience with the
Oregon MPA process, and concludes with ideas from tribal members about how MPAs should be used in the future.

Chapter 3 contains data from the participatory GIS mapping exercise. The results examine species use through time, which species are most heavily used by tribal members, and concentrations of use (“hot spots”). Maps showing tribal members’ species use overlapping with the current MR/MPAs were created to inform the MPA Baseline. Species of cultural or subsistence important to tribal members (determined from interview data) were mapped as well. Maps generated from this section will also be available to participant member tribal governments.

Chapter 4 describes techniques for engaging with tribes on a variety of resource management projects, using specific examples from this project as practical applications. Suggestions such as researching a tribe’s history, culture, and recent resource management projects are included. Also discussed is the need for flexibility in research proposals when engaging with tribes, as each is a sovereign nation with its own policies, and some suggestions on cultural sensitivity. Although the basis for this chapter is from experience with tribes in Oregon and northern California, the chapter was written for managers working with tribes throughout North America.
References:


Retrieved from:

Chapter 2: Tribal Member Interview Narratives of Coastal Species Use

Abstract

Oregon implemented a system of marine reserves from 2012 through 2016; baseline studies created data sets on a variety of biological factors, including the reserves’ effects on coastal residents. In this study tribal members were interviewed as to their historical and present use of marine and coastal species, experiences with the marine reserves and other restricted “take” areas, and opinions on how the marine reserve policies can be improved. A wide diversity of species was reported (152 species) for a variety of uses, including for subsistence and cultural purposes. Many changes in habitats, target species populations, and land uses were mentioned by participants. Although the overlap with the marine reserves and reported tribal use was relatively minor, numerous participants reported conflict of traditional uses in other areas of restricted “take”. Although most participants were in favor of the existence of marine reserves, there were many suggestions for the future management of the reserves.
Introduction

The concept of marine reserves (MRs) blends two parallel values: that of conservation in marine areas and mitigating the effects of human extractive practices on biodiversity (Botsford, et al., 2003). The first stems from the protection of pristine beauty that has been enacted on a much wider scale in terrestrial systems, and is prevalent across the United States (U.S.) in the form of state and national parks (Cronon, 1996). Similar to their terrestrial counterparts, the primary purpose of marine reserves is the integrity of functioning and sustainable ecosystems.

The World Conservation Union defines marine conserved areas as “Any area of intertidal or subtidal terrain, together with its overlying water and its association flora, fauna, historical and cultural features, which has been reserved by legislation to protect part or all of the enclosed environment.” (Sloan, 2002). This definition fits marine reserves in the U.S. as places excluded from extractive uses in favor of a more “pristine” ecosystem condition.

Although establishment of early terrestrial reserves focused on aesthetics, the concerns driving formation of marine reserves today is to preserve fauna and habitat from the effects of human uses, particularly overharvest (Claudet, 2006). Numerous studies have supported the theory that reserves specifically benefit species that have relatively sedentary adult life stages and those that have larval dispersal (Claudet’s 2006). Halpern et al. (2003) analyzed the results from 89 studies and 112 no-take marine reserves from around the world and concluded that marine reserves “work”, on average increasing organism size and diversity 20%-30%, nearly tripling biomass, and doubling density relative to unprotected areas. The study also found that benefits from marine reserves extend most strongly to carnivorous fish, but were still significant for planktivorous and herbivorous fish (Halpern, 2003). Although direct benefits may not encompass all fauna of a protected ecosystem, marine reserves have been shown to be an
effective conservation tool, albeit one that needs to be tailored for the specific area. Looking to reserves and protected areas implemented elsewhere can serve as lessons for newly implemented marine reserve networks.

Countries around the world have established MRs over the past several decades with the goal of protecting long-term marine uses. One such reserve is the Cote Bleue Marine Park established in the French Mediterranean in 1983; its primary goals were to protect biodiversity, promote education and research, and support social and economic activities (Claudet et. al., 2006). Two “no-take” marine reserves were established within the Cote Bleue Marine Park, one in 1983 and a second in 1995. Additionally, two artificial reefs were constructed to act as physical barriers to illegal trawling and increase biodiversity. Human uses were prohibited in the reserves with the dual goals of protecting the long-term viability of extractive uses such as fisheries and to increase the health of the broader ecosystem. An example of a successful reserve network, the Cote Bleue reserves implemented physical as well as legislative restrictions that have been maintained over the course of several decades. Although this reserve prohibited all “take”, other marine protected areas (MPAs) have experimented with a more moderate approach.

There have been debates amongst researchers over whether areas of “limited take” can still allow systems to recover, or whether “no take” areas are required to increase biodiversity (Lester & Halpern, 2008). Limited take areas, often referred to as marine protected areas (MPAs), can be appealing to policy developers, primarily because they can be an easier “sell” to the public and resource users (especially participants in various fisheries). However, MPAs can be harder to regulate; violations to exclusion of all uses (except research and education) are easier to spot from a patrol boat than whether a fishing boat is catching the correct species with allowable gear. Additionally, there is the question of whether limited take areas are effective at
protecting the species not under the “allowed take” rules. Lester et al. (2008) found that no-take areas had a significantly higher increase in biodiversity, as well as size and density of individuals than limited take reserves. The difference was great enough that Lester et al. (2008) stated no-take reserves are a preferred tool over limited take areas, although they did note that implementation is subject to political constraints (Lester & Halpern, 2008). There are many variations in the marine reserve model, including designs that incorporate local and indigenous knowledge.

In other parts of the world, MPAs have been established after analysis of traditional ecological knowledge (TEK). An example of using indigenous knowledge in the development of fishery legislation is in the Solomon Islands. The bumphead parrotfish is an important food source in the Indo-Pacific. Traditional methods of fishing have been replaced with modern gear in the last couple of decades, leading to higher catch and the collapse of the fishery in Guam and Fiji (Aswani, 2003). An intact fishery still exists in the Solomon Islands, but size and frequency of large fish (the target for harvest) had decreased significantly. A study by Aswani et al. (2003) verified local knowledge about fish density and size across habitats with quantitative studies. Using this information the scientists pinpointed areas best suited for several MPAs, which were established shortly thereafter. The Solomon Islands example is an important case study that exemplifies how local knowledge can expose patterns of community structure and decreasing marine community health that would not necessarily be apparent to researchers who do not have traditional knowledge or long-term data from the area.

The idea of areas being “preserved” or set aside with little or no human disturbance is nothing new in the management of United States (U.S.) terrestrial ecosystems. The preservation policy on land had a string of founders, from John Muir to President Theodore Roosevelt who
established several of America’s most-visited national parks to keep the “wild” intact for future generations (NPS, 2015), to Aldo Leopold, the father of modern conservation ethics. But the preservation of marine habitats in the U.S. had a later start. First, there were small scientific research reserves located within national parks in the 1920’s and marine components were added to several national parks in the 1930’s. Modern MPAs were not seen in the U.S. until 1960 with the establishment of Point Lobos Marine Reserve in California and John Penncamp Coral Reef State Park in Florida (NRC, 2001). A large jump in the number and acreage of marine reserves came from Executive Order 13158 in May 2000 (E.O. 13158, 2000). The mandate states that the Departments of Commerce and of the Interior must cooperate in expanding the national network of marine protected areas, but that expansion must come as a result of public consultation. This was the first time such a mandate for marine protected areas had been issued on a national scale in the U.S. and has advanced the marine reserve concept as a valid resource management tool.

This thesis project concerns the development of a system of MRs/MPAs on the Oregon coast, the implementation of which began in 2012 (see Table 1.1). Oregon’s marine policy incorporates both limited and no-take protected areas, consisting of five no-take MRs and a limited-take MPA adjacent to four of the five MRs (Figure 1). These five MR/ MPA pairings were established after a period of more than 15 years of recommendations and mandates from state agencies. In 2000, Governor John Kitzhaber requested that the state’s Ocean Policy Advisory Council (OPAC) investigate whether a limited network of marine reserves in Oregon would aid in accomplishing state planning goal 19: “To conserve marine resources and ecological functions for the purpose of providing long-term ecological, economic, and social value and benefits to future generations” (OAR 660-015-0010(4)). In August of 2002 OPAC recommended a set of limited marine reserves after additional analysis and public input (OPAC,
2002). In August 2008, Governor Ted Kulongoski issued Executive Order 08-07, which directed OPAC to recommend no more than 9 potential marine reserve sites (Oregon, 2012). In 2009, House Bill 3013 implemented the recommendations for marine reserves in Oregon, establishing pilot reserves at Otter Rock and Redfish Rocks, and ordered an evaluation for potential sites at Cape Falcon, Cascade Head, and Cape Perpetua. These five areas were approved for the current Marine Reserves system on the Oregon coast. Oregon Department of Fish and Wildlife (ODFW) was charged with the development of a work plan in partnership with advisory committees, scientists, state agencies, and coastal communities (HB 3013). In 2012 Senate Bill 1510 finalized the MR/MPAs at Cape Falcon, Cascade Head, and Cape Perpetua. The legislation also established the reporting guidelines for baselines and interim reports for the reserves (SB 1510).
Figure 2.1: Oregon’s five Marine Reserves (MR) and Marine Protected Areas (MPA) pairs (bold black labels) span the north and south coast. One MR, Otter Rock, is too small to be seen at this scale and is indicated with an arrow.
Although these areas have been excluded from the “commons” of the sea and restrict extractive uses, Oregon’s goal is to create a healthier environment for the entire territorial sea, including surrounding areas with eventual beneficial spill-over into the areas that are allowed to be fished. Another goal is to manage the reserves using sound scientific principles, including establishing a solid baseline of ecosystem conditions in the protected areas.

Part of the guiding principles behind Oregon’s MRs/MPAs has been establishing baselines for ecological conditions in key marine ecosystems. Baselines are extremely important as they allow evaluation of marine reserve designation effects. Shifting baselines have been a growing concern among marine scientists, especially in the wake of rapid climate change and human disturbance (Knowlton & Jackson, 2008). Oral histories based on trends people have observed over decades can add important context for interpreting baseline data. Aswani et al.’s study (2001) showed that baselines established through oral histories can help form working hypotheses for current studies, and provide information on whether reserve areas are restoring historical diversity and population levels, or whether emerging patterns are further deviations from the past.

From the first OPAC proposal in 2002, part of the state’s goal in considering marine reserves in Oregon has been to avoid “significant adverse social and economic impacts on ocean users and coastal communities” (OPAC, 2008). Tribal members of the coastal Oregon tribes are both ocean users and coastal community members. Meetings were conducted in coastal communities to gather input for placement and implementation of the reserves (OPAC, 2012). The extent of tribal member input into the design of Oregon’s marine conservation system was limited, and observations from tribal members who are marine and coastal resource users may
add an important dimension to understanding the emerging baseline data collected for Oregon’s marine conservation areas.

This chapter addresses the following questions based on interviews with members of Oregon coastal tribes. The purpose of the project was to address questions centering on Oregon MR/MPAs, and the first set of research questions reflect this. However, as interviews progressed, many of the results did not focus on the MRs/MPAs. Instead, the narratives centered on where tribal members use species. These are important results to report, as they can inform future management outside of the MRs/MPAs, especially if the state chooses to grow the network of MRs/MPAs after the 2023 legislative evaluation. I ask the following questions in this chapter:

1. How familiar are tribal members with previous outreach efforts conducted by the marine reserves program? (TRIBAL MEMBER FAMILIARITY WITH MR/MPA OUTREACH)

2. Do tribal members have recommendations for improving the marine reserves planning and/or implementation process? (TRIBAL MEMBER PLANNING RECOMMENDATIONS)

3. What is historic and present use of species by tribal members and what were the species used for? (COASTAL & MARINE SPECIES USE BY TRIBAL MEMBERS)

4. What changes have tribal members observed in habitat/species dynamics? (COASTAL & MARINE POPULATION/HABITAT CHANGE)

5. How has enforcement of “take” regulations affected tribal members? (TRIBAL MEMBER EXPERIENCES WITH ENFORCEMENT OF “TAKE” REGULATIONS)
Methods

Participants

Four federally-recognized tribes exist in western Oregon whose ancestral territory was directly connected to the coast. All four tribes were invited to take part in this study, and three tribes (listed below) participated.

- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI)
- Coquille Indian Tribe (Coquille)
- Confederated Tribes of the Siletz Indians (Siletz)

Initial contact with participants took place either by a phone call or through a tribal staff mediator, depending on negotiations with tribal administrators. If I was the initial contact point, the participants were sent a project packet with the list of interview questions, explanation of the project, and expected uses of the resulting data, as well as contact information and a copy of the confidentiality/consent form (Appendix A). If tribal staff was the initial point of contact for tribal member interviewees, the staff was given the pre-interview packet and encouraged (but not required) to give the interviewees the packet before the interview.

Interviews were open to all tribal members over the age of 18. Tribal staff who are also tribal members were invited to participate as well. Current tribal staff from the Siletz tribe and CTCLUSI participated, and there were participants from all three tribes that had been tribal staff in the past (most had served on their Tribal Council). Although this was not part of the selection criteria, I found it very useful to have current and former staff when discussing state-tribal policy interactions.
Tribal administration and staff were invited to participate in interviews because they may have a different perception of public natural resource management processes generally, and the Oregon MR process specifically. Either as scientists or having served on advisory committees for coastal resources and/or the Oregon MRs, these perspectives compliment the data provided by other tribal members.

Interviews were conducted in a semi-directed manner, in which there was a set of questions that I wanted to cover, but the flow of the conversation sometimes altered either the order or pace of the prompts. Many of the participants were elders, and a more structured interview may not have worked well within a culture that values disseminating knowledge and history through stories.

Interviews

Interviews were conducted in person at either a tribal government building or the participant’s house; interviews ranged from approximately 40 minutes to over 3.5 hours. Each started with a review of the pre-interview packet, including the consent form. The rights of the participant were made clear, including the right to refuse to answer questions or stop the interview at any time. No participants refused to do the interview, or cut the interview short due to the interview questions.

Several interviews were conducted in groups. In this chapter the frequency of “uses” (of a species or place) is counted by interview, instead of by participant. Using the interview as the unit of analysis avoids artificially inflating statistics by counting those participants that made statements in group interviews, which may have been influenced by the input of other participants in the room.
Several field guides were used for species identification during the interviews. Interviewees were not expected to know the official common names of the marine species they gathered/fished. Three picture field guides were available; one was fish-specific, another was intertidal species, and another was a general ocean, coast, and beach book (Coastal Fishes of the Pacific Northwest, Beachcombers Guide to Seashore Life in the Pacific Northwest, and Whelks to Whales: Coastal Marine Life of the Pacific Northwest). When a species was mentioned, interviewees were asked to try to identify species based off the pictures in the field guide. Although this did not ensure correct identification of gathered resources down to species level, it increased the chances of correct identification down to type (clam vs. mussel, seaweed vs. kelp) and in most cases down to species. The field guide increased recollection exponentially in most interviews, and served as an ice-breaking tool. If a similar approach is used for another project, having physical specimens of similar species in conjunction with field guides might be a beneficial approach. Participants seemed confident with most of their species identification (with pictures). Usually, the regional name correlated to the same species participants identified in the field guide.

Participants often used regional and alternative names. To assign regional and alternatives names to their “assumed species” I matched names and species based on research from the Oregon Department of Fish and Wildlife (ODF&W) website, field guides, and confirmation from participants during interviews (See Appendix B).

Included in the project guide presented at the beginning of the interviews was a map of one of the current MR/MPA pairs published by ODFW. I emphasized that these are the main areas of interest, but talk on other areas restricting “take” was encouraged. The participants were
told they could ask questions at any point during the interview, and included where the information was going, how it was being reported, and more information on marine reserves.

I attempted to direct the interview to places adjacent to the MR/MPAs first before other areas of restricted “take”. Information on areas outside the current MR/MPAs is still useful information for the Oregon MPA baseline because many other locations were considered for MPAs during the planning process. When the 2023 review of the MPAs is conducted, information on other areas may be useful.

**Confidentiality**

Original transcripts were offered to each interviewee, and interviewees were asked whether they were willing to have their transcript shared with their respective tribal government. Transcripts were not shared across tribes. If interviewees did not want the transcripts to be shared with their member government, they were given an opt-out option on their confidentiality form (no participants chose this option).

Data protections, such as confidentiality and data aggregation, were used to allow participants the freedom to express opinions that may not be shared if their name was attached to statements. This may include opinions about politics, cultural changes, and actions that follow traditional practices but may not be legal under current regulations. Regarding this last point about legality under current regulations, discussions around how regulations and laws disrupt or conflict with traditional practices were important to document. By remaining anonymous, participants were encouraged to share information and opinions that would otherwise be tempered or omitted from a discussion of public record.
Results/Discussion

I interviewed 5 participants from Coquille, 11 participants from CTCLUSI, and 12 participants in 7 interviews from Siletz (several were group interviews), for a total of 23 interviews and 28 participants. Group interviews were only done if participants’ schedules required it; several involved 2 participants and 2 interviews involved 4 participants. I use interviews, rather than individual participants, as my unit of analysis in this chapter. Interviews included both tribal staff (majority tribal members) and non-staff tribal members. The age of participants ranged from 28 to 84, with an average age of 57. Most interviewees were male (24/28). I encouraged both men and women to participate, but men overwhelmingly responded to either the tribal staff or my requests for participation.

The following narrative consists of findings from interviews, backed up by the number of interviews that reported the same or very similar statements. The numbers in parentheses represent the number of interviews supporting the statement.

TRIBAL MEMBER FAMILIARITY WITH MR/MPA OUTREACH

It is important to note that the majority of participants (12 interviews), unless they were tribal representatives at meetings, had little or no knowledge of Oregon’s marine reserves, and even fewer had knowledge that there had been community engagement meetings held on the coast prior to the marine reserve implementation. From the beginning of implementation, the Oregon Marine Reserves process has highlighted the importance of community engagement and input. The gap between agency engagement with coastal communities versus with tribal
members is important to note and target for resolution in future rounds of community outreach conducted by the Oregon Marine Reserves Program.

**TRIBAL MEMBER RECOMMENDATIONS FOR MARINE RESERVES**

Although opinions of the marine reserves ran the whole spectrum from the wish to dismantle the whole system (2) to placing a majority of the coast under protection (1), many participants were in favor of the idea of marine reserves (9). Four (4) were against the reserves, one (1) stated that the tribes needed to be consulted prior to implementation, one (1) wanted them closed and reopened after more evaluation, one (1) thought the restrictions needed to apply to commercial fleets, not the public, and five (5) did not express a clear opinion. Most stated, in response to their observations of decreased populations of different species, that restrictions were needed to preserve ecological communities for future generations. There were several common threads for improvement on the current model.

One of the more common recommendations from tribal members was a tribal exemption to varying scales of the “no-take” rule. The requested exemptions ranged from a complete exemption to a permit that would require reporting of what is taken. This second option was meant to inform studies on the effect traditional gathering has on the limited take area. Two (2) interviews suggested that a permitting committee, controlled by the members’ tribe, should oversee the granting of exemption permits.

Another suggestion mentioned by several interviews (3) was the need to balance the environmental protection mission of the reserves with the needs of the residents near them; to build policies and limited take areas in a way that allows residents to make a living in the short
term while developing reserves to keep the resources viable in the long term. The ability to balance these two needs was reported as a sign of a successful marine reserve system (1). Many small reserves covering different habitat types were not thought to be effective compared to a larger contiguous one (1).

A need for tribal permits to gather by proxy for elders was mentioned in one group interview (1). To be most effective, this would not only be restricted to immediate family (parents, grandparents) as there were numerous reports of gathering for more distant relatives or friends that were very closely knit in the tribal community. One interview explained that even if the elder(s) do not catch/gather the target, they commonly will do prep work such as cleaning, cooking, and canning.

One (1) interview reported that they did not think the marine reserves currently in place were based on sound science or baseline knowledge. This respondent suggested that baseline ecosystem conditions have changed so much from historical conditions, including the loss of the kelp highway (fish nurseries) and other changing ocean conditions due to pollution, that reserves could not scientifically represent a pristine ecosystem.

One (1) interview said they had submitted several letters from the tribe to the Marine Reserves committee against the implementation of Marine Reserves. The interviewee reported that the requests in the letters were not addressed to their satisfaction.

COSTAL & MARINE SPECIES USE BY TRIBAL MEMBERS

Tribal members were asked about species use on the entire Oregon coast. Since the mapping exercise (see Chapter 3) revealed little overlap with the MR/MPAs, the species use
described below mostly occurs outside of the MR/MPA system. However, with over 150 species reported by tribal members, the information might be very useful for informing baselines for future management of the Oregon coast in general.

Tribal members were asked a series of questions concerning coastal and marine species use for subsistence, cultural, and/or commercial purposes. To form a broader baseline of species dynamics and use, interview questions included the approximate decade (e.g., 1970’s, 1960’s) of use, teachers, seasonality, and events that caused a temporary or permanent end to the practice. More far-reaching questions were asked when appropriate, such as population or habitat changes, regulations or policies that affected practices, and improved technology.

This study involved 28 participants in 23 interviews from three tribes; the interviews were semi-directed and ranged from 40 minutes to over 3.5 hours.

Table 2.1 describes all taxonomic groups discussed in interviews; for a full list of species, see Appendix C. The italicized and underlined taxa in Table 2.1 are discussed in more detail in Appendix D.
Table 2.1: Frequency (number of interviews) in which use of a taxon was mentioned in total and by tribe, ordered from most reported in interviews to least. Numbers in parentheses next to taxa are number of species discussed within each group. Italicized and underlined groups are those that are discussed in the species-specific narrative. For full table with individual species counts see Appendix C.

<table>
<thead>
<tr>
<th>Species Groups</th>
<th>Total (n = 23)</th>
<th>Coquille (n = 5)</th>
<th>Siletz (n = 7)</th>
<th>CTCLUSI (n = 11)</th>
</tr>
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<tbody>
<tr>
<td><strong>Invertebrates</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CLAM (21)</td>
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<td>41</td>
<td>66</td>
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<td>1</td>
<td>10</td>
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<td>5</td>
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<td>2</td>
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</tr>
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</tr>
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</tr>
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<td>5</td>
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<td>1</td>
<td>4</td>
</tr>
<tr>
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<td>3</td>
</tr>
<tr>
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<td>1</td>
<td>1</td>
</tr>
<tr>
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<td>0</td>
<td>2</td>
</tr>
<tr>
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<td>1</td>
<td>1</td>
<td>0</td>
</tr>
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<td>6</td>
<td>20</td>
</tr>
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<td>SEAWEED/ALGAE (12)</td>
<td>21</td>
<td>1</td>
<td>6</td>
<td>14</td>
</tr>
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<td>4</td>
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<td>0</td>
<td>4</td>
</tr>
<tr>
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<td>2</td>
</tr>
<tr>
<td><strong>Mammals</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MARINE MAMMALS (4)</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Tribal members interviewed use shellfish (particularly clams) more heavily than any other group (Table 1). Rockfish, the second most used species group after clams, was the most heavily used fish taxon. Salmon, being both of cultural importance and an economically
important fish, followed rockfish in popularity. Seaweed, flatfish, and rockfish were more reported in the CTCLUSI interviews than in Coquille or Siletz. CTCLUSI also reported the highest number of species used. Marine mammals were reported sparsely, and only for collection of deceased specimens; hunting of live mammals was talked about as a historic practice, with no harvest taking part in the participants’ lifetimes.

A more detailed account created by the synthesis of interview transcripts can be found in Appendix D. The detailed narrative focuses on shared themes across interviews, in particular those species that were of significant cultural or subsistence importance. Trends include: for most species and across tribes the majority of teachers were male, although the majority of the interview participants were also male. Population declines were cross-reported for the same species across interviews, across tribes, and sites, confirming oral histories can be a useful tool for informing baseline studies. It was noted across several interviews that non-tribal members were harvesting tide pool and beach areas at much higher rates than the practices many tribal members follow. Tribal members also described changes and patterns of the habitat and resource uses affecting species and practices, detailed in the next section.

In order to evaluate whether this was a sufficiently large sample size, a saturation curve was created to measure when the number of species mentioned in interviews peaked (Figure 2.2).
Figure 2.2: Saturation curve for number of species reported in tribal member interviews. Solid line shows the number of new species (those not mentioned in previous interviews); dashed line shows the cumulative (total) number of species mentioned in interviews. Interview number pertains to chronological order of interviews.

As shown in Figure 2.2, the “saturation point” at which the number of new species, or those that had not been mentioned in previous interviews, is close to zero, is reached by interview 8. Interviews 17 and 18 are outliers to this trend. One of these interviews was with a biologist with acute species identification skills and training that few other participants had. It would follow logically that the number of species identified would be higher due to the participant’s specialty. Additionally the other outlier interview was a participant who showed a trend of utilizing a significantly wider diversity of species for subsistence use, and reported seeing and using species not mentioned in other interviews. Except for these two interviews, the incidence of new species remained fairly low after interview 8. Figure 2.2 shows that unless
other specialists were sought out (which was not part of the selection criteria for this study) saturation was reached for biodiversity of utilized species.

**COASTAL & MARINE POPULATION/HABITAT CHANGE**

*Changes in habitats/species*

*Logging*

Logging was reported across all three tribes to have detrimental effects upriver from the reservations. Interviewees primarily attributed the negative impacts to spraying of pesticides/herbicides (3) and siltation (6), as well as effluent from mills (3) and log booms in the estuaries (1). Many of these effects were noted to slow down or stop with the decrease in logging and mill activity, such as the turn-around of the Starry Flounder from local extirpation to slow signs of recovery.

One (1) interview reported that bark sloughing off harvested logs affected the river habitat and damaged wildlife populations. One (1) interview connected dredging of the bays with logging activity, explaining that tug boats were used to tow log rafts to the mills. In other interviews, individual channels were used to gather a specific set of species based on particular characteristics. When these channels were dredged it disrupted these fishing/gathering practices.

Siltation was talked about in many interviews (5); one (1) interview mentioned how siltation of the rivers was a lot worse in the interviewee’s childhood, and that the change in the river water when slides occurred upriver was drastic. But the period of muddy, silted water has been perceived to be shorter in recent years and a quicker return to normal river conditions. The interview also reported that the river has straightened out (does not meander) contains more
gravel. A couple interviews (2) connected logging activity, particularly chemical use, with the collapse of the Lamprey eels in rivers while another interview (1) reported pesticide use and siltation as a combination effect on the lamprey population.

**Sewage**

Spillover from treatment plants (mostly reported in Coos Bay) and the increase in septic tanks along estuary channels has been blamed for several species’ declines. Another complaint was that the treatment plant in the Coos Bay area was not updated to handle the current load (2) which is especially concerning for those who rely on shellfish for a regular part of their diet (2), as the spillovers decrease (1) or wipe out (1) shellfish beds. These spillover events were noted as being more prevalent during times of heavy rainfall (1).

Agricultural runoff was reported as a significant problem in Sunset Bay, which had historically heavy gathering significance (1). There are agricultural areas near the creek that eventually empty into the bay. One (1) interview reported that people had gotten sick from swimming in Sunset Bay and there had been signs posted that there was a dangerous level of *E.coli*. The interview reported that after the water quality incidents, they do not gather mussels there anymore.

**Trash**

Trash was noted at several locations (3). One (1) participant recalled that during the period when logging was still prevalent, there would be times when trash would pile up in spawning beds; fishing quality in the area drastically declined. But when logging decreased the trash also decreased and fishing activity recovered.
In an area that was mentioned as having a higher saltwater intrusion level, buoyant trash such as Styrofoam was being retained in eelgrass beds (1). One (1) interview reported that while gathering in marshy intertidal bay areas they had constant concerns of contaminated needles; although the participant had gathered barefoot in the same areas as a child, they now must wear shoes to avoid this hazard. Oil sheens on the water in intertidal areas were also noted (1).

**Sea level rise**

Sea level rise was noted in an estuary by a long-term resident (1) over a period of thirty years; the interview reported a ten-foot increase in the average tidal intrusion as well as debris (driftwood) level.

**Red Tide**

Red tide closures have impacted razor clams for multiple years in many tribal members’ most heavily used areas (6). Since razor clams were such a prevalent species, this has been a significant impact to gathering practices. Some participants reported ignoring the red tide closures (or knowing family members who did so), stating that they knew how to gather during a red tide and not get sick (2). But the majority followed the suggested closure. None reported getting sick from shellfish gathered during a red tide warning.

**Regulations/Impetus for Change**

**Closing of South Slough**

Two tribes, Coquille and CTCLUSI had families with properties adjacent to the South Slough estuary and used the slough extensively before it was made into a reserve. The South Slough area in Coos Bay was very different historically; one (1) interview described the entrance to the bay before jetties were put in. What is now called Bassendorf Beach was open ocean, and
the cliffs nearby were deep water, not sanded shelves. This means the ecology of the south slough area was different as well, and may account for some of the early population shifts reported, in addition to the changes mentioned by interview participants.

Shellfish and flounder were the primary species reportedly impacted by the South Slough closure. Although the closure was seen as a positive development by some (1) for long-term conservation of the rich resources within, it restricted many families’ subsistence activities (7), and business ventures, such as a bait business (1) and selling fish to the community. One (1) interview reported that a family member was among the group to push for the establishment of the reserve, citing the concern of housing development throughout the slough as the primary need for the reserve.

*Marine Mammal Protection Act (MMPA)*

The Marine Mammal Protection Act (MMPA), enacted in 1972, prohibits “take” (with some exception) of marine mammals within U.S. waters. This law was put into place by Congress in reaction to decreased numbers of marine mammals as well as a lack of knowledge of ecology and population dynamics of marine mammals that made it difficult to determine how much the populations could decrease before reaching an unsustainable level (NOAA). This act has affected tribal members in two main ways: 1) stopping traditional hunting of and use of products from marine mammals; 2) changing marine mammal prey species population dynamics.

Participants in all 3 tribes reported the explosive increase in seals and sea lions (usually lumped together) (10). Some participants drew the direct link between changes (declines) in several fish species and the mammal increases. One (1) interview reported that in South Slough there used to be a lot of salmon before the MMPA was enacted; since then the salmon have
crashed and some sand bars in the slough will have 30-40 seals resting on them. Salmon declines linked to marine mammal booms were reported in several interviews (3). Other impacted species were flounder (1), perch (1), and crab (1); seals and sea lions were also reported to destroy crab pots (1).

The sea lion boom is linked with some unusual behaviors; one (1) interview reported seeing seals as far as 12 miles upriver away from the ocean. This was reported to not have happened before 2009. Several participants described how these mammals had been managed historically so there was a balance between the predators and fish. This was through a combination of directly decreasing numbers by hunting and the wariness that hunting produced that kept marine mammals away from humans and their nets (3).

**Fisheries/collapse**

*Starry Flounder collapse/return*

One (1) interview told a story linking siltation from logging to Starry Flounder collapse. In the 1970’s, the drastic declines in logging allowed silt to build up in the estuary. By the 1980’s siltation had killed off the eelgrass, which the Starry Flounder and Rainbow Perch used to hide in. With the boom in the seal population, Starry Flounder disappeared. But in the last ten years the silt has been blown out of the old channels, and the eelgrass is growing back. Harbor seals are still around in large numbers, but not the larger sea lions that were seen back in the 1970’s and 1980’s. Starry Flounder has been reported as a rare sighting within the last decade (2). The boom in seal and sea lion populations has also been linked to the Starry Flounder collapse (1), especially in the Coos Bay and South Slough areas, and may explain in part why the recovery of the Starry Flounder has been very slow.
Overharvest

As with most places on the west coast, Oregon has seen its share of fishery population crashes. Commercial salmon fishing in Coos Bay in the 1940’s (1) and the smelt crash (1) are examples of crashes borne of taking more than the population can replenish. According to interview participants, overharvest is still an issue.

Overharvest, especially by tourists, was reportedly affecting shellfish (2) and seaweed species (1). Non-tribal persons were reported as gathering species in much larger numbers over a smaller area, leading to stripping or denuding of an area. The approach witnessed by interview participants deviated from their own harvest practices due to the non-tribal harvesters taking away target species in much higher numbers from smaller gathering spots. This type of practice can lead to depletion of an area more quickly than how tribal members describe their own practices of moderate harvest. Ecotourism, mentioned specifically in South Slough, was reported as being a concern for over-use of the area (1).

Overharvest has been an issue since the beginning of European colonization. One story concerned a place called “Oysterville”, which was a large and heavily used oyster bed area used by a tribal band before European contact. Until the 1850s it was within tribal lands, but in 1855 Yaquina Bay was opened to settlement by non-tribal peoples and the band was wiped out. Commercial oyster growers took over the oyster beds but within 3 years there were meetings to discuss how much the oysters had declined. This was attributed to overharvest, siltation from upriver dredging and logging, and a particularly bad fire season which deposited a thick layer of ash in the bay. Reportedly, this had both a physically suffocating effect on the oyster beds as well as changing the pH of the water.
TRIBAL MEMBER EXPERIENCES WITH ENFORCEMENT OF “TAKE” REGULATIONS

Although no incidents were reported in connection to the existing MPA/MR system, many tribal members reported enforcement issues related to state-wide take limits, which were described as confusing and inconsistent, or to other restricted areas such as marine gardens. Despite limited knowledge of the Oregon Marine Reserves and Protected Areas, members of all 3 tribes described incidents in which tribal members were ticketed for violating restrictions on take of marine species (however, it was noted that court cases were dropped). Interviews with members from 2 tribes talked about how they wished to take these cases to federal court to set a precedent for future case law. Details of these incidents can be found in Appendix E.

Oregon Fish and Wildlife Outreach and Legal Limitations

I had personal communication with Oregon Department of Fish and Wildlife (ODFW) employees who clarified some of the legal, administrative, and communication gaps that were brought up in interviews with tribal members. This section briefly summarizes communication between ODFW and tribes as a group or individually on the subject of marine reserves (personal communication, November 2017).

First, ODFW does not have the authority to make agreements with tribes; in order to do so, the process has to go through the Oregon Department of Justice (ODOJ). There are several completed and in-progress Memoranda of Understanding (MOUs) with specific tribes on specific issues (such as the traditional use in shellfish areas), and every agreement must go through ODOJ. A recommendation from a significant number of tribal member interviews (5)
was to develop tribal member “take” permits in prohibited take areas that overlap traditional gathering sites; MOU’s through the ODOJ may be a method to address these recommendations.

According to the ODFW contacts, there has been “limited direct interaction between tribes and the marine reserves program” outside of meetings they attended together. There have been informal individual meetings with 2 of the tribes in this study but not as a formal outreach for the marine reserves. These meetings occurred in 2008, 2009, and 2012; meetings occurred in two pathways. The first was through OPAC, which has a tribal representative; this is where the final recommendations on marine reserve sites were discussed. There was mention in one (1) interview of the history of the Ocean Policy Advisory Council (OPAC) using one tribal representative for the whole state. The interview differentiated the responsibilities of that tribal representative from the state’s responsibility to individually contact tribes when conducting planning efforts that affect individual tribes’ rights. Currently, OPAC is the group through which tribes work with ODFW on marine reserve policy.

The second was meetings between ODFW staff and individual tribes; one tribe held the meeting with their Tribal Council. Meetings with another tribe involved tribal staff and a tribal attorney. There have been other meetings with biology staff discussing possible future collaborations with the Grand Ronde tribe (not included in this study, but a tribe with ancestral coastal territory). As of November 2017, there is an existing MOU (memorandum of understanding) with the Siletz Tribe for collaboration on biological studies. There have been meetings similar to those with the Grand Ronde Tribe, but these have not discussed harvest regulations. No non-staff tribal members were part of these meetings.

The stance from the ODFW is the tribes chose not to participate formally as a stakeholder in the marine reserves community meetings held in several locations along the Oregon coast.
Each location had a community action team, and if any tribe had participated, would have been an interested stakeholder group participating in majority-wins votes on topics such as reserve nominations, boundaries, and rules.

During the time when these community groups were forming, there was some communication with tribes, but not one that qualified as formal outreach (defined as “formal effort engagement, usually as a mechanism for education, communications, and public involvement”) (ODFW, personal communication). From the conversation with the contact, this was a less formal setting more on the level of direct conversation between staff of ODFW and tribal staff. These meetings did brief the tribes on the legislative process and plans for the reserves, and were done with individual tribes. At the conclusion of these, the verdict was that the tribes wanted to instead interface through OPAC, where there is a tribal representative and communication with higher levels of government than ODFW. This follows the established line of communication between the Oregon state government and tribes and predates the implementation of the marine reserves.

There have been some steps taken to establish a more formal contact process with individual tribes on the marine reserves. This process was started in 2016, and will be carried forward at the conclusion of this project, potentially using this report to inform those dialogues. Although the process was different than that attempted with non-tribal coastal communities, ODFW is moving forward in establishing a line of communication with individual tribes on marine reserves and protected areas in Oregon.

**Conclusion**
Tribal members are interested in the marine reserves and protected areas, and how they can be improved for long-term viability. Although there were a minority that knew of the
community input meetings that had been held on the coast prior to implementation of Oregon’s marine reserves, most showed interest in sharing their opinion. If tribal members are included in the process at a level to which they feel they will be heard, most participants would support the continuation of the marine reserves program. I suggest a communication structure in which ODFW can address tribal members’ concerns from each tribe individually, to the extent legally possible. I also suggest a brochure addressed to tribal members explaining the legal restrictions ODFW has in making agreements with tribes (through ODOJ).

Tribal members utilize a wide diversity of species (over 150) for both subsistence and cultural use. Although some practices have either decreased or ceased due to age of participants, habitat and species changes, and increased harvest pressure, tribal members continue to rely on coastal and marine resources through the present decade. They utilize a diverse array of habitats far outside their reservation boundaries (discussed in detail in Chapter 3). Tribal members who have used specific locations for many years, and have heard stories of past conditions and changes in species and habitats can be very valuable to understanding the historical conditions of ecosystem dynamics for resource management projects. Tribal members are very dependent on the health of coastal ecosystems for food, culture, and recreation and are invested stakeholders in the future management of their harvest areas. Laws and regulations on marine resources affect tribal members in their traditional areas. Inconsistencies in enforcement of these regulations have caused confusion for tribal members, leading to either legal difficulties or stopping traditional and subsistence practices for fear of breaking the law. Moving forward, a clear line of communication is needed between law enforcement agencies and each tribal government.

Two tribes with ancestral territory in Oregon, the Grand Ronde Tribe in northern Oregon and the Smith River Rancheria (Tolowa Dee-ni) in northern California (whose ancestral territory
extends north into Oregon) did not participate in this study. Subsequent studies building off this project should attempt to include these two tribes and address the data gap.

The saturation curve (Figure 2.2) showed a trend towards biodiversity saturation; however if the other two tribes who have ancestral territory on the Oregon coast, Smith River Rancheria in southern Oregon and Grande Ronde Tribe in northern Oregon, were to be involved this would likely not be the case. Due to the relatively close geographic proximity of two of the three reservations that participated, as well as the overlapping use areas throughout the coast, it is logical that some degree of saturation was reached. However the two tribes that are relatively far from each other as well as the participating tribes may well introduce a number of species not mentioned in this study.

This project only interviewed 28 tribal members in three tribes, a small sample of tribal members living on the Oregon coast and who regularly utilize coastal and marine resources. The diversity of knowledge and opinions from a relatively small group is indicative of the individuality present in tribes. I hope that future engagement with tribes, both their governments and their members, can reach a much broader audience.
References


Chapter 3: Spatial Distribution of Tribal Marine and Coastal Species on the Oregon Coast

Abstract

Indigenous populations stand at a crossroads of historical knowledge of a particular place, practices of resource use that moderate “take” of species, and an emotional connection to the area. As a result, indigenous peoples can both inform current ecological studies to establish baselines and have a strong interest as stakeholders in marine conservation areas. Questions about resource dynamics as well as changes in habitat conditions can be proposed to indigenous persons who are spatially and temporally aware of the resource dynamics they depend on. Asking tribal resource users to share narratives of resource utilization is a useful exercise to inform baseline ecological studies, and incorporating a spatial mapping component with those narratives helps complete the representation of storyteller’s experience and history. This thesis project set out to inform Oregon’s Marine Protected Area Baseline about tribal use of marine and coastal species, whether there was overlap with the recently implemented marine reserves and marine protected areas, and of tribal member’s perceptions of marine reserves and the planning/implementation processes. Tribal members from three tribes located on the Oregon coast were interviewed and participated in an exercise mapping areas of marine and coastal species use; the polygons drawn by tribal members were imported to maps in ArcGIS. The study revealed about half of nearshore/offshore tribal use (several miles from the coastline) overlaps with the current Marine Reserves/Marine Protected Areas (MR/MPAs), and less than 5% of the MR/MPAs overlap shoreline/nearshore tribal uses (within a mile of the coastline and within
estuaries). Tribal members reported several restricted take areas outside the marine reserves that have interfered with traditional practices.

Introduction

Marine reserves are a product of conservation biology, which “addresses the biology of species, communities, and ecosystems that are perturbed, either directly or indirectly, by human activities or other agencies.” (Soule, 1985). Soule describes conservation biology as rooted in crisis, but one whose goals lie in “the long-term viability of whole systems” (Soule, 1985). Marine reserves are areas where extractive uses are prohibited, designed to either limit or eliminate the direct effects of human activity in order for species and habitats to be protected, preserved, or allowed to recover. Oregon’s marine reserves legislation (see Table 1.1) aims to implement a set of marine reserves that will go through regular reviews to best balance the needs of the recovering habitat and populations with the needs of the resource users so that the marine reserves serve the long-term protection of both ecosystems and resource uses (ODFW, 2008).

Incorporating Traditional Ecological Knowledge (TEK) is one way to address both sides of this balance.

TEK is knowledge passed down either through oral history or by practice among users of a common resource, and is “used to understand and predict environmental events upon which the livelihood or even survival of the individual depends.” (Huntington, 2000). The timing and duration of harvest, sustainable harvest levels, and whether a species is unfit for harvest due to disease are some of the aspects that can be passed down from TEK. TEK can be specific to one community, and is inherently not readily shared with a wider audience, a direct paradox to typical western scientific knowledge (Hunn, 1999). This trend can make it difficult to gather TEK for academic inquiry but it is important to take the time. Local knowledge can help
illuminate long-term patterns and details that can be difficult to obtain in western science (Hunn, 1999), especially in areas where western scientists have only been observing the system for the last 100-200 years (such as Oregon). Although many projects are measuring detailed quantitative data in and around Oregon’s marine reserves – such as aggregation of larval fish (Ottman, 2016) and measuring fish diversity via video landers (Watson, 2016) - TEK is best suited for finding patterns in qualitative data. In other words, TEK is not superior to western techniques, but complements them (Hunn, 1999). This chapter reports on participant-generated spatial uses of marine and coastal areas by tribal members of Oregon’s coastal tribes, and can be used to augment quantitative studies rooted in modern western scientific methods.

Marine conservation areas (MCAs) have experienced a boom in popularity; 430 MCAs had been created globally by 1985 but each covered a relatively small area. By 1995 the number had jumped to 1,306 and were on average 1,584 hectares (Agardy, 2003). But with such a rapid increase, there has been little opportunity to study the long-term effects, and resulted in many opportunities for errors in management, especially in relation to communities surrounding or near the reserves. Educating the public that the benefits of marine reserves outweigh the costs for local communities is essential for the long-term viability of each marine reserve (Agardy, 2003). Part of education is participation which can in part be achieved by allowing community members to take part in marine reserves management and planning. Sharing spatial knowledge of the region in and around the proposed protected area can be a useful knowledge set to guide the placement of marine reserves.

Participatory Geographic Information Systems, or PGIS, is a practice in which stakeholders use their knowledge of an area to contribute spatially defined knowledge using a map. Reported PGIS data can include uses (e.g., spear fishing sites), observations (e.g., sightings
of mountain lions on a hiking trail), or attitudes (e.g., areas of concern for overgrazing). PGIS has been used in many projects in which citizens are asked to create, assemble, and/or disseminate geographic information (Brown, 2017). Although the mapping of specific data onto a comprehensive map may require technical skills, many people can share location-based information on a map with little or no training. The interest in gathering information by such methods has increased over the last two decades, but there continues to be a lack of trust in the origin and accuracy of the results (Brown, 2017). However there is increasing evidence that geographic information mined from laypersons is indeed accurate. Another study by Brown in 2012 found a relatively low error rate (14.5%, compared to 35.6% error rate of random points) when participants were asked to map native vegetation in New Zealand and another group was asked to identify places providing watershed services. The accuracy of participant knowledge of their environment was further supported by Brown’s 2017 study in which participants were asked to map areas of high conservation importance, which resulted in 70% overlap with expert-modeled areas. Participant-derived data can be a powerful tool, but can be difficult to obtain, especially in areas where management policies are contentious.

Even though marine reserves are implemented for the long-term benefits of the ecosystem, both spatial and policy impacts on traditional practices can be significant. Roberts (2003) outlined four values that have to be addressed when siting and implementing a marine reserve: economic, social, scientific, and feasibility/practicality. Listed among the social values was “maintenance of traditional fishing methods”. We can expand this to maintenance of traditional gathering/harvest practices to include the vast diversity of techniques utilized by indigenous peoples in the habitats encompassed within marine reserves, including those on the Oregon coast. Tribal members are part of coastal communities that are impacted by marine
reserves; however, the level to which the current marine reserves impact traditional methods and uses is unknown. The maps generated in this report address this question, and can help inform future discussions about the placement and regulations of the marine reserves. Like any mechanism that limits profits and access to a public area, the implementation of marine reserves can be polarizing (Agardy, 2003). Although MR/MPAs do promote the long-term viability of marine resources, they do involve limiting or prohibiting uses of “public” resources. Limitations to public uses become a more complex issue when restrictions spatially overlay areas of traditional tribal uses due to tribal laws and their status as sovereign nations.

Broad implementation of large-scale marine reserve networks has had a rocky start on the United States (US) west coast. When California enacted its system of MRs and MPAs in 2005 (Kirlin et al., 2013), neighboring communities had mixed reactions. The northern California coast in particular had some very strong reactions, especially from the tribal communities. Redding Rock, a nearshore/offshore sea stack, is a prominent figure in many oral histories and is still used as a place to harvest marine resources (Yurok Tribe Marine Resource Plan, 2011). When the MPA established Reading Rock (which the tribes call Redding Rock) as a marine reserve, closed all “take” from the site, and prohibited approaching the rock, several tribes contested the designation (Resighini Rancheria, 2011 & Yurok Tribe, 2011). The Northern California Tribal Chairman’s Association, which included representatives from the Elk Valley Rancheria, Hoopa Valley Tribe, Karuk Tribe, Smith River Rancheria, Trinidad Rancheria, and the Yurok Tribe, contested the science behind California’s Marine Life Protection Act Initiative (MLPAI), the administrative group that identified specific marine species for protection in California’s marine reserves system, stating it was “incomplete and terminally flawed” (Bacher, 2009). The tribes’ protests of the MLPAI were centered on several species of traditional and
cultural significance which were the reason for the creation of the Redding Rock State Marine Conservation Areas (SMCA). The MLPAI, while acting as the guidance for the establishment of the Marine Reserve network in California, did not address the sovereign rights of tribes (Bacher, 2009). Therefore, the California Department of Fish and Game could not provide specific exemptions for tribes and had to treat them as any other stakeholder (Effron, 2011). The tribes argued that they had not been consulted about the decision during the planning process, and that the state had no right to exclude them from such an important cultural icon. The Yurok Tribe and the Resighini Rancheria sent letters officially protesting the State Marine Conservation Area (SMCA) (Resighini Rancheria, 2011 & Yurok Tribe, 2011). The state of California has since conducted an outreach process with the concerned tribes and has drafted amendments to the policy that will allow some tribes access to the rock for specific cultural uses. The only tribe listed on the Northern California Marine Protected Areas website as having official exemption is the Yurok tribe in the SMCA, but no exemption is given for the more stringently managed State Marine Reserve (SMR) (CDFW, 2016). This example shows the importance of engaging tribes during the planning process in projects that may affect tribes’ use of marine resources.

Oregon established their five MPA/MR pairings through a lengthy public input process (see Table 1.1). A feasibility study was ordered by Governor Kitzhaber in 2000; in 2002 the Ocean Policy Advisory Council (OPAC) submitted recommendations for a limited set of marine reserves. In August 2008 Oregon Governor Kulongoski issued Executive Order 08-07, which directed OPAC to recommend no more than 9 potential marine reserve sites (Oregon, 2012). Local groups and individuals submitted proposals for 20 sites to Oregon Department of Fish and Wildlife (ODFW) over the summer of 2008 (Oregon, 2012). In 2009 OPAC accepted the proposals for six sites (ODFW, 2012); community teams conducted various outreach efforts,
which resulted in the marine reserves being split into marine reserves (more stringent “take” regulations) and marine protected areas (some limited “take” allowed). Five of the six proposed sites were approved by vote of coastal communities. These five sites were officially enacted in 2012 by SB1510 and make up the current Marine Reserves system on the Oregon coast today. Four of the five sites have paired MRs (no-take) and MPAs (limited take), a set-up with advantages and disadvantages.

There is no “one way” to implement marine reserves; rather, each needs to be tailored to the specific habitat it is protecting and community that will feel restriction impacts. Part of the implementation process for marine conservation areas includes deciding the size, boundaries, and level(s) of restrictions (Agardy, 2003). Oregon’s marine conservation areas incorporate both limited and no-take protected areas, consisting of five no-take MRs and limited-take MPAs adjacent to four of the five MRs (Figure 1). These areas have been excluded from the “commons” of the sea and restrict extractive uses with the goal of creating a healthier environment including beneficial spill-over to the areas outside of the MCAs that are allowed to be fished. Another goal is to document ecosystem dynamics in the reserves using sound scientific principles, including establishing a solid set of baseline ecosystem conditions in the protected areas.
Figure 3.1: All Marine Reserves (MR) and Marine Protected Areas (MPA) currently implemented on the Oregon Coast. One reserve (Otter Rocks) is too small to be seen at this scale.
Part of the guiding principles behind Oregon developing MRs/MPAs was the establishment of a baseline ecological condition in key marine ecosystems. Marine conditions have been degraded (Knowlton, 2008) and establishing baselines from which to develop restoration goals can be difficult when starting with a damaged ecosystem. Furthermore, there is the danger of “shifting baseline syndrome”, which has occurred when identifying sustainable catch rates for fisheries (Pauly, 1995). If the population is based on an already low population in a degraded habitat, the goals for sustainable catch may not reflect ecosystem capacity or may set catch rates that diminish the capacity for species populations to recover to historic levels. When stocks are re-evaluated using new technologies, the baseline is established on a lower population. Following this trend, newer marine reserves’ baselines can be formed on degraded habitat conditions compared to older marine reserves. Traditional knowledge can remedy part of the problem; oral histories based on trends people have observed over decades can add important context for interpreting baseline data. Although far from complete, oral histories can prove to be an invaluable source of data of earlier conditions.

This PGIS project answers four key questions that can be addressed via spatial knowledge of long-term residents, in this case tribal members, to inform Oregon’s new set of marine reserves.

1. Where does sustenance/traditional use overlap with the current MR/MPAs (TRIBAL USE AND MR/MPA OVERLAP)

2. Where are the concentrated areas of marine and coastal species use? (HOTSPOTS OF TRIBAL USE OF MARINE AND COASTAL SPECIES)

3. Is there variability of spatial use areas among tribes? (TRIBE SPECIFIC COASTAL SPECIES USE)
4. Is there overlap with traditional use areas and areas of restricted uses, other than MR/MPAs? ([OVERLAP BETWEEN TRIBAL USE AND NON-MR/MPA])

Methods

Study Area

Four federally-recognized tribes exist in western Oregon with ancestral territory directly connected to the coast. All four tribes were contacted, and three tribes participated in the project:

- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw Indians (CTCLUSI)
- Coquille Indian Tribe (Coquille)
- Confederated Tribes of the Siletz Indians (Siletz)

Initial outreach was conducted with the staff at natural resource or cultural resource departments of each tribe. Each of the tribes had a research permit process that ranged from one meeting with staff and research permit approval within two weeks of submission to a presentation in front of a fully convened Tribal Council and twenty tribal members in order to approve the research permit.

PGIS Approach

I conducted a PGIS mapping exercise with tribal members from three tribes on the Oregon coast; participants were over 18 years old and self-reported that they had hunted, gathered, or fished coastal or marine species on the Oregon coast. The mapping exercise asked participants to identify the approximate areas where harvest took place, the species gathered, approximate decade(s) the practice took place (with recent indicating activities occurring in the current decade, 2010-2017), and what the species were used for (i.e., cultural use, subsistence for immediate or extended family, commercial, sport). The mapping exercise was done in order to
capture information at a spatial scale that would be helpful to natural resource managers. The mapping exercise allows the research to be more spatially explicit than just using place names, as tribal members’ place names may not correspond with the place names on modern maps.

A paper map was shared with participants to identify the location of the marine reserves. Polygons marked anywhere on the Oregon coast were deemed important to the study even though the MR/MPA areas were the focus of this study. Polygons outside of the MR/MPA areas can be used to identify hotspots of tribal uses or show areas where traditional use overlaps with other areas where “take” restrictions (such as marine gardens) impact tribal uses.

The protocol for the mapping exercise changed slightly during the course of the project. In the first group of interviews the Red Book Atlas of Oregon was used as the first locating tool before showing the digital Google Earth app in order for participants to look at the whole Oregon coast before looking at a finer scale. This procedure was dropped because most participants knew the coast well enough that this step was deemed unnecessary.

Several field guides were used for species identification. Regional and traditional names do not always align with common or widely accepted names, so the field guides were an effective tool for establishing what species participants referred to. Participants were asked to identify species from the field guide, and were asked to verify if the species name matched that in the book. Following interviews, I also confirmed regional names with an ODFW website (ODFW, Clam ID). A table of the regional and alternative names mentioned in interviews were assigned to an “assumed species”, when the species could not be verified by the participant. These assumed species are the species reported in this Chapter and can be found in the Appendix A. All identified species were put into species groups (all clam species went into “clams”,
abalone and chiton went into “large mollusk”, etc.) to simplify reporting. The numbers of reported species listed by their species groups can be found in Appendix B.

All mapping/location exercises were completed on a Microsoft Surface Tablet with a touch-screen using the Google Earth program. The interactive maps acted as a way to “jog” more memories; as participants scrolled on the map, they would commonly remark they had remembered another area or event. Locations were drawn using the “polygon” or “shape” button. This application allows interviewees to draw irregular shapes, name individual shapes, and record metadata about each shape (e.g., participant code, polygon number, and notes about the practice taking place within the polygon area). The polygons could be drawn with a mouse, but far more popular and intuitive was the touch screen method in which participants used their finger to draw on the screen.

All polygons were saved in the Google Earth program and imported to ArcGIS. To preserve confidentiality of specific locations, polygons were aggregated onto either a 5 km by 5km (25km²) or 0.5km by 0.5 km (0.25 km²) grid. The 0.25 km² grid was used to represent shoreline/nearshore polygons, which tended to be small in size and were usually drawn by participants at a fine spatial resolution. The 25km² grid was used to represent nearshore/offshore polygons, which tended to be large and were usually drawn by participants at a course spatial grain. To map polygons to their respective grids, the originally drawn polygons that were farthest from shore and significantly larger than the majority of the coastal polygons were joined in ArcGIS to the 25km² grid. The rest of the polygons were joined to the 0.25km² grid.
Confidentiality

Data protections and participant confidentiality were tools employed to protect the identity of participants for several reasons. Part of the interview might involve describing fishing and gathering spots that had been used for generations, including some small areas that may not be known to the wider fishing community. By aggregating data to the larger scale of the shoreline/nearshore (0.25 km²) and nearshore/offshore grids (25 km²), participants were given greater confidence to talk about specific areas without concern that those specific areas would be compromised by making the data publicly accessible. More finely detailed polygon data was, with each participant’s permission, given to each participant’s member tribe so that the original data was not lost and could potentially be used as a valuable resource within participants’ respective tribal governments.

This confidentiality allowed participants the freedom to express opinions that may not be shared if their spatial data was intended to be available beyond their tribe. As per the confidentiality agreement, this chapter reports GIS data that are summarized more coarsely at the level of the grids, which is not so detailed that specific marine and coastal use sites can be identified, yet retains sufficient detail to be useful for ODFW managers. This data represents the input of a small percentage of tribal members living on the Oregon coast, and should not be considered comprehensive.

Results

I conducted the mapping exercise with 5 participants from Coquille, 12 participants (in 7 interviews) from Siletz, and 11 participants from CTCLUSI, for a total of 23 interviews and 28
participants\textsuperscript{1}. The age of participants ranged from 28 to 84, with an average age of 57. Despite efforts to encourage both men and women to participate, 24 interviewees were male. The time to complete the mapping exercise and associated discussions ranged from 40 minutes to 3.5 hours. Mapping was conducted mostly one-on-one, although several mapping exercises involved 2 participants and 2 interviews involved 4 participants. Groups larger than 2 participants were not ideal because the mapping exercise was difficult to follow with several people calling out different locations simultaneously. Group interviews were only done if participants’ schedules required it.

Although the pictures in the field guides commonly elicited positive reactions, several interviews mentioned that when trying to identify similar species, pictures were not enough compared to holding the physical animal or seaweed/algae. Participants seemed confident with the majority of their species identification (with pictures). In most cases, participants in different interviews identified the same species in the field guide when using a particular regional name. The cross-reporting of species by regional name and the picture they identified in the book was very similar across all interviews.

Understanding the movement of ancestral groups is an important piece of history to understand when looking at the areas of use reported by tribal members during this project. One of the questions asked during interviews for this project was to what bands/tribes participants traced their ancestry; Table 3.1 lists the region of the ancestral territory of each reported band. Interview participants from the Coquille tribe reported their ancestry traced to the Coos, Coquille, Upper Coquille, and Miluk bands. Participants from the CTCLUSI tribe reported their

\textsuperscript{1} Polygons from one interview were lost and could not be retrieved; the audio recording was still used in the data analysis. One of the polygons drawn for nearshore/offshore commercial tuna fishing was corrupted and could not be used in the final analysis.
ancestry from the Coquille, Colville, Miluk, Miluk-Coos, Coos, Hanis, Hanis-Coos, Karuk, Lower Rogue, Tututni, Siuslaw, Quuich (aka Quuichenich, Lower Umpqua), Alsea, and Poanoke (Virginia) bands and tribes. Participants from the Siletz tribe reported ancestry traced to the Tututni, Chetco, Grand Ronde, Yurok, and Shasta-Applegate bands and tribes. Each of the three present-day federally recognized tribes is comprised of many bands and tribes, more than those mentioned by interview participants. These groups were moved numerous times since European contact in Oregon. Additionally, the Termination Act of 1953 revoked the federal trust status of tribal members (Fixico, 2016). This led to a period of instability for tribal governments. A portion of the terminated tribes were reinstated with the Restoration Act starting with the Siletz Tribe in 1977; restoration was done on a case-by-case basis, and the CTCLUSI was formed in 1984 and the Coquille Tribe in 1989. For more details of these movements and the context in which they occurred, please contact the specific tribal government.
Table 3.1: Tribes/bands interview participants traced their ancestry and regions where ancestral territory originated.

<table>
<thead>
<tr>
<th>Tribe/Band</th>
<th>Region</th>
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<tbody>
<tr>
<td></td>
<td><em>Within modern-day Oregon</em></td>
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<tr>
<td>Alsea</td>
<td>Central Oregon coast</td>
</tr>
<tr>
<td>Applegate</td>
<td>Southern Oregon</td>
</tr>
<tr>
<td>Chetco</td>
<td>Southern Oregon coast</td>
</tr>
<tr>
<td>Coos</td>
<td>Southern Oregon coast</td>
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<tr>
<td>Coquille (Coquelle)</td>
<td>Southern Oregon coast</td>
</tr>
<tr>
<td>Upper Coquille (Coquelle)</td>
<td>Southern Oregon coast</td>
</tr>
<tr>
<td>Grand Ronde</td>
<td>Northern Oregon coast</td>
</tr>
<tr>
<td>Hanis</td>
<td>Southern Oregon coast</td>
</tr>
<tr>
<td>Miluk</td>
<td>Southern Oregon coast</td>
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<tr>
<td>Quuich (Quuichenich, Lower Umpqua)</td>
<td>Southern Oregon coast</td>
</tr>
<tr>
<td>Lower Rogue</td>
<td>Southern Oregon coast</td>
</tr>
<tr>
<td>Shasta</td>
<td>Southern Oregon/northern California</td>
</tr>
<tr>
<td>Siuslaw</td>
<td>Central Oregon coast</td>
</tr>
<tr>
<td>Tututni</td>
<td>Southern Oregon coast</td>
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<tr>
<td></td>
<td><em>Outside Oregon</em></td>
</tr>
<tr>
<td>Colville</td>
<td>Northeastern Washington</td>
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<tr>
<td>Karuk</td>
<td>Northern California</td>
</tr>
<tr>
<td>Poanoke</td>
<td>Virginia</td>
</tr>
<tr>
<td>Yurok</td>
<td>Northern California coast</td>
</tr>
</tbody>
</table>

Oregon bands/tribes locations from (Wilkinson, 2010).

The results of this study are from the interviews of a small subset of the tribal community on Oregon’s coast, and are not comprehensive. The methods employed in this study are unique in Oregon, and have created a dataset that can initiate conversations between resource managers and tribes concerning Oregon’s marine reserves.
TRIBAL USE AND MR/MPA OVERLAP

Of the 284 polygons drawn on Google Earth by interview participants, 9 fell within the nearshore/offshore tribal uses (average size 2,357 km²) and 275 were within the shoreline/nearshore uses (average size 2.44 km²). The polygons translated to 2,855 (713.75 km²) shoreline/nearshore grid cells and 455 (11,375 km²) nearshore/offshore grids cells. Figure 2 shows the distribution of all the active cells (shoreline/nearshore and nearshore/offshore tribal uses) on the Oregon coast. The MR/MPAs cover an area of 244.7 km². Approximately 137.5 km² of the MR/MPA areas overlapped with nearshore/offshore tribal use grids (56.2% of the total MR/MPA acreage) and 10.75 km² of the MR/MPA areas overlapped with shoreline/nearshore grids (4.4% of the total MR/MPA acreage). The tribal use overlaps are discussed in each marine reserve/marine protected area in the following sections. Areas of nearshore/offshore overlap reflect data from 2 interviews; areas of shoreline/nearshore overlap represent data from 22 interviews.
Figure 3.2: Marine resource use by tribal members across the Oregon coast, north (A) and south (B). Numbers in the legend correspond to number of polygons drawn by interviewees that overlapped a given grid cell.

**Cape Falcon**

There was one (1) interview that reported using the area overlapping the Cape Falcon MR and MPA west section for fishing Black Rockfish, Vermillion Rockfish, Canary Rockfish,
salmon (general), Coho Salmon, Chinook Salmon, shrimp, halibut, and crab (general) (Figure 3, nearshore/offshore tribal use). No dates were reported, so it is uncertain whether these practices have continued since the implementation of the MR/MPAs.
Figure 3.3: Cape Falcon Marine Reserve (red rectangle), and Marine Protected Areas (blue rectangles) west and east sections. Blue grid with dots shows nearshore/offshore tribal use. Species shown are Black Rockfish (BR), Vermillion Rockfish (VR), Canary Rockfish (CR), Salmon (Sa), Chinook Salmon (ChS), Coho Salmon (CoS), Halibut (H), Shrimp (Sh), and Crab (C).
Cascade Head

Four (4) interviews reported using the area overlapping the MPA at Cascade Head for gathering California Mussels, Pacific Blue Mussels, and other unspecified mussels (Figure 4, purple hatched shoreline/nearshore tribal use). These were reported as recent activity (within the last decade). One (1) interview reported gathering mussels in the area overlapping the MR, and this was also reported to be recent activity (Figure 4, purple hatched shoreline/nearshore tribal use). There was one interview that reported using an area adjacent to the MR boundary for fishing Copper Rockfish (Figure 4, nearshore/offshore tribal use), in 2006 and 2007.
Figure 3.4: Cascade Head Marine Reserve (red rectangle), and Marine Protected Area (blue rectangle). Small colored grids show shoreline/nearshore tribal use (see legend). Blue grid with dots shows nearshore/offshore tribal use. Species shown are Black Rockfish (BR), Vermillion Rockfish (VR), Canary Rockfish (CR), Salmon (Sa), Chinook Salmon (ChS), Coho Salmon (CoS), Halibut (H), Shrimp (Sh), and Crab (C).
**Otter Rock**

Two (2) interviews reported collection of Razor Clam in the area overlapping the marine reserve (Figure 5, green hatched shoreline/nearshore tribal use) and nearshore/offshore tribal use for a variety of species: Black Rockfish, Vermillion Rockfish, salmon, shrimp, halibut, crab, Coho Salmon, Chinook Salmon, and Canary Rockfish were reported (Figure 5, nearshore/offshore tribal use). Razor Clam collection was reported to be a recent activity (within the last decade), but no dates were reported for the other species.
Figure 3.5: Otter Rock Marine Reserve (red rectangle). Small green grids show shoreline/nearshore tribal use (Razor Clam). Blue grid with dots shows nearshore/offshore tribal use. Species shown are Black Rockfish (BR), Vermillion Rockfish (VR), Canary Rockfish (CR), Salmon (Sa), Chinook Salmon (ChS), Coho Salmon (CoS), Halibut (H), Shrimp (Sh), and Crab (C).
Cape Perpetua

One (1) interview reported gathering smelt in the area now managed as the northern MPA (Figure 6, brown hatched shoreline/nearshore tribal use), although not since the 1960’s due to a population crash. Two (2) interviews reported using the area overlapping both the north MPA and the MR. One (1) interview reported gathering mussels in the area and one (1) interview reported gathering Black Katy Chiton, California Mussel, and Olympia Oyster (Figure 6, solid purple shoreline/nearshore tribal use). These uses were reported as occurring recently, within the current decade. One (1) interview reported gathering Olivella and Razor Clam in areas overlapping the southern MPA (Figure 6, solid green shoreline/nearshore tribal use); this was also reported as a recent activity (within the last decade).
Figure 3.6: Cape Perpetua Marine Reserve (red rectangle), and Marine Protected Area (blue rectangles). Small colored grids show shoreline/nearshore tribal use (see legend). Blue grid with dots shows nearshore/offshore tribal use. Species shown are Black Rockfish (BR), Vermillion Rockfish (VR), Canary Rockfish (CR), Salmon (Sa), Chinook Salmon (ChS), Coho Salmon (CoS), Halibut (H), Shrimp (Sh), and Crab (C).
Redfish Rocks

One (1) interview reported using the area now managed as a Marine Reserve to gather Giant Wrymouth Eel and Vermillion Rockfish, although not since the 1960’s and 1950s’ respectively (Figure 7, solid yellow shoreline/nearshore tribal use). One (1) interview reported using the Marine Protected area to fish for Dungeness crab and shrimp commercially (Figure 7, nearshore/offshore tribal use), although no date was given.

One (1) interview reported fishing for Kelp Greenling and halibut in an area very close to the current MR boundary (Figure 7, solid pink shoreline/nearshore tribal use); although no dates were given, the halibut population was described as locally extinct due to overfishing from trawlers.
Figure 3.7: Redfish Rocks Marine Reserve (red rectangle), and Marine Protected Area (blue rectangle). Small colored grids show shoreline/nearshore tribal use (see legend, GWE = Giant Wrymouth Eel). Blue grid with dots shows nearshore/offshore tribal use. Species shown are Black Rockfish (BR), Vermillion Rockfish (VR), Canary Rockfish (CR), Salmon (Sa), Chinook Salmon (ChS), Coho Salmon (CoS), Halibut (H), Shrimp (Sh), and Crab (C).
HOTSPOTS OF TRIBAL USE OF MARINE AND COASTAL SPECIES

“Hotspots” show areas of concentrated use in several areas on the Oregon coast. Figure 8 A-D shows these hotspot locations (grouping all species together) moving from north to south. The numbers correspond to the number of interviews that marked the same area for use of a marine species. Although outside of the current MR/MPA locations, this information may be useful for future marine resource planning, management, and potentially identifying current “areas of concern” for tribal members.
Species-specific hotspots

Figures 9-13 show the areas that were reported as used for the same species group (e.g., clams) in the same area. Areas designated as “hotspots” showed a clear pattern of higher use than surrounding areas with a spread (number of use, as shown in the legend) of at least 3 interviews. Each area depicted is where a high number of the same or closely related species were marked by tribal members. Although the legend for the hotspots maps do not necessarily separate
interviews (e.g., the same interview could report three rockfish species in the same area) hotspot maps may be useful for future management discussions.

**Culturally Important Species**

Although not reported in high numbers, salmon, lamprey, starry flounder, smelt, sturgeon, olivella, mussel, large mollusks (chiton and abalone), oysters, and barnacles are species groups that participants reported to be of cultural or traditional subsistence importance. Even if the reported numbers are relatively small (compared to other species) these areas are considered important for traditional uses. For details of the importance of each species type, see Appendix D. Maps can be found in Appendix F.
Figure 3.9: Areas of concentrated use (maps A-D) for all reported rockfish species. Numbers correspond to number of times a rockfish species was reported in an area.
Figure 3.10: Concentrated shoreline/nearshore tribal use areas (maps A-C) for all reported clam species (colored squares) for the Oregon coast. Numbers correspond to number of times an area was marked for a clam species.
Figure 3.11: Concentrated shoreline/nearshore tribal use areas (maps A & B) for seaweed and algal species (colored squares) for the Oregon coast. Numbers correspond to number of times an area was marked for a seaweed species.
Figure 3.12: Concentrated nearshore/offshore tribal use areas for perch species (colored squares) for the Oregon coast. Numbers correspond to number of times an area was marked for a perch species.
TRIBE SPECIFIC COASTAL SPECIES USE

Although the data were aggregated for all tribes to show overall tribal member usage of areas along the coast, it is also useful to break out the data by tribe. However, each tribe-specific section represents a small sample of tribal members and should not be treated as the only areas of use for any tribe. Rather, these sections are meant to serve as a starting point for future conversations with individual tribal governments.

Coquille Indian Tribe

Participants from Coquille marked areas that are centered on their current reservation in Coos Bay (Figure 14). Coquille had the fewest number of participants (4) of the three participating tribes. The species that were mentioned the most in interviews were Gaper Clam (5), Chinook salmon (4), Starry Flounder (4), Striped Bass (4), Nuttal’s Cockle (4), and Butter Clam (4) (Figure 13).
Figure 3.13: Most commonly mentioned species in Coquille tribal member interviews. Bars depict percentage of interviews mentioned each species, out of a total of 5 interviews.
Siletz Indian Tribe

Tribal members from Siletz marked a wider area than the tribal members from Coquille, possibly due to the larger sample size (7 interviews and 12 participants). The Siletz reservation is the only one in this study that is not on a bay and is instead several miles up a river. More participants reported hunting terrestrial species and riverine fish species too far from the ocean to be relevant to this study. The coastal and marine species most commonly reported by Siletz tribal
members include: Nuttal’s Cockle (6), Gaper Clam (5), Soft Shell Clam (5), Lamprey (4), Razor Clam (4), Butter Clam (4), Dungeness Crab (4), and unspecified mussels (4) (Figure 15).

Figure 3.15: Most commonly mentioned species in Siletz tribal member interviews. Bars depict percentage of interviews mentioned each species, out of a total of 7 interviews.
Figure 3.16: Areas of tribal use of Siletz tribe interview participants. Detail maps are in Figure 17.
Figure 3.17: Ocean uses as marked by Siletz tribal members; small pink grids shows shoreline/nearshore tribal use. A)-F) depict locations in bold in Figure 16, north to south. A) Tillamook, B) Lincoln City, C) Newport, D) Waldport, E) Reedsport, F) Coos Bay. Numbers in legend correspond to number of species/times a place was marked.
CTCLUSI

CTCLUSI, with the largest sample size (11 interviews), marked the largest area, although represented similar maximum concentrations to Siletz. CTCLUSI also showed the most overlap with the MR/MPAs. The species most commonly reported by CTCLUSI tribal members include: Gaper Clam (8), Razor Clam (8), Dungeness Crab (7), Coho Salmon (6), Nuttal’s Cockle (6), Black Rockfish (5), Butter Clam (5), Chinook Salmon (5), Starry Flounder (5), and unspecified rockfish (5).

Figure 3.18: Most commonly mentioned species in CTCLUSI tribal member interviews. Bars depict percentage of interviews mentioned each species, out of a total of 11 interviews.
Figure 3.19: Areas of tribal use of CTCLUSI tribe interview participants. Detail maps are in Figure 20.
Figure 3.20: Nearshore/offshore and shoreline/nearshore uses as marked by CTCLUSI tribal members; small pink grids show shoreline/nearshore tribal use. A)-G) depict locations in bold in Figure 19, north to south. A) Lincoln City, B) Newport, C) Yachats, D) Florence, E) Coos Bay, F) Port Orford, G) Gold Beach. Numbers in legend correspond to number of species/times a place was marked.
OVERLAP BETWEEN TRIBAL USE AND NON-MR/MPA

This section examines results about tribal members’ experience with “take” restrictions both in the current MR/MPAs and areas with similar restrictions that were established before the MR/MPA’s.

Interview participants were asked if there were areas other than the Oregon MR/MPAs that had affected their gathering practices, particularly other “take” restricted areas. Eight (8) of the interviews reported “yes” and named a variety of areas including: a NOAA research site (1), Yaquina Head (3), Seal Rock (1), Sunset Bay (1), the north spit of Coos Bay (1), the Snowy Plover closure area at Coos Bay (1), and Cape Arago (1). Each of these areas was described by participants as having some form of take restriction. For example, the Yaquina Head marine gardens, was cited in numerous interviews as a heavy use area both past and (attempted) present. Given the historical heavy use, there is a significant sense of loss due to the “take” restrictions of the area. This loss is conceptualized in relation to sustenance, tradition (repeating practices), and the ties to important social events that surrounds these practices of passing along the culture that surrounds these activities.

According to one (1) interview, the Siletz tribe has a consent decree with the state and federal government on the Yaquina Head marine gardens in federal court in 1980. It was a part of the “restoration period” and according to the interviewee if the tribe had not agreed to the consent decree the “state congressional delegation would not enter, introduce, or support legislation returning land to us after we were restored.” This is in reference to the Restoration Act, which was enacted for Siletz in 1977 (which followed the Termination Act of 1953) (Fixico, 2016). The Termination Act revoked the sovereign nation status of tribes for several decades,
and the Restoration Act legislatively reversed termination. But according to several participants, tribes had to re-form under a new set of conditions defined by the federal government. The tribe agreed to gathering limits in the consent decree. These limits essentially qualified as “cultural limits” with the tribal government’s hunting, fishing, and gathering Ordinance. The Ordinance allows tribal members to procure a ceremonial permit, gather over the state limit, and distribute to other tribal members. The marine gardens designation was not mentioned in this decree.

There were quite a few interviews (6 of 13) that cited a restricted take area of conflict but when asked what area in particular, none of the marine reserves or marine protected areas were mentioned. Instead, Yaquina Head (a marine garden) (2), South Slough (an estuary reserve) (2), and Cape Arago (a state park) (4) were mentioned.

**Discussion**

Although the marine reserves and marine protected areas overlap a small percentage of the total area that tribal members utilize on the Oregon coast, they still overlap important sites. The other important pattern that emerged during the map analysis was the diversity of species that overlap the MR/MPAs. Smelt, clam, rockfish, and halibut inhabit different habitats, have their own regulations, and are caught using different equipment. This supports overlap as an issue that needs to be addressed on a comprehensive level (with each tribe), not on a case-by-case basis. The overlap of restricted use areas (other than the MR/MPAs) with traditional harvest areas is a more acute issue, and one that seems to have affected the opinions of tribal members about marine reserves. Although the restrictions for these other “limited take” areas are similar to MR/MPAs, this points to a significant knowledge gap among tribal members in the locations of these reserves, and a need for visible signage at these locations clearly describing the reason for the closed area.
On the other hand, several areas that were drawn on maps did overlap with the current MR/MPA’s, but this overlap did not come up in conversation. This reinforces the point that these resource users do not know the boundaries of the marine reserves. It must be pointed out that most of the gathering activities were reported as starting long before the MR/MPA’s were put into place. But if they are still being used, it points towards a potential enforcement issue as well. Whether areas are being used since implementation is uncertain because participants were asked to report the period of use within the nearest decade (i.e., 1980’s, 1990’s). Since all of Oregon’s MR/MPA’s were implemented between 2012 and 2016, current use may or may not have violated Oregon’s Marine Reserve and Protected Area designations. Participants reported areas where they had interactions with law enforcement, and based on the place names described, the MR/MPA areas were not included in reported law enforcement interactions.

Each tribe utilizes a different range of areas for traditional and subsistence uses, which should be reflected in future communications; a tailored approach with individual tribes would allow the specific needs of each sovereign nation to be met. Although the lessons learned with each tribe will inform interactions with subsequent tribes, the policies and resources of each tribe will shape the specific approach needed to address these issues. Additionally, since this project only incorporated 28 tribal members from three of the four Oregon coast tribes, the data in this project are not comprehensive. Because each tribe utilizes a different range of coastline, the fact that neither the Grand Ronde Tribe in northern Oregon nor the Smith River Rancheria (Tolowa Dee-ni) (whose Rancheria is in northern California but ancestral territory extends into southern Oregon) were able to participate in this study created a gap. Incorporating both a higher number of participants and those from more tribes in subsequent studies, would likely increase both the range of areas used, as well as show more “hotspots”. Incorporating a larger sample size may
also provide a more robust dataset as to whether there is significant conflict of use between the MR/MPAs and current tribal uses.

One aspect in particular that should be addressed is education of tribal members about the regulations and placement of marine reserves specifically communication to tribal members about the regulations and placement of the marine reserves. This might be done by using tribal staff as the distributors of information within the tribe, via meetings with tribal members, newsletters, brochures, or other media. Cross-reporting of species from the field guides was fairly consistent across interviews, and the field guides increased recollection in most interviews; if a similar approach is used for another project, having physical specimens of similar species might be a beneficial approach in conjunction with field guides.

Oregon needs marine reserves in order to investigate the effects of human disturbance on and benefits of small closures for marine ecosystems. Learning how to balance the needs of the ecosystem with the needs of coastal communities is a complex process; working with stakeholders, especially tribes, can be difficult, but if done well can build a marine reserve system that is sustainable for the long-term.
References


Effron, et. al. (2011). Integrating tribal resource use into the north coast marine life protection act initiative. Master’s group project MESM report, Bren School of Environmental Science and Management at the University of California, Santa Barbara.


Resighini Rancheria. (2011). *Subject: Resighini Rancheria Factual Record of Historic or Current Uses in North Coast Marine Protected Areas*; letter to California Fish and Game Commission.


Chapter 4: Techniques for natural resource practitioners to productively engage with tribes

Abstract

Native American tribes in the United States have a special status few other natural resource stakeholders share – sovereign nations. Although some federal and state laws have jurisdiction within reservations, tribal laws typically take precedent on tribal, and in some cases, US federal lands. As natural resource management and conservation projects and practices often require or benefit from engaging tribes, understanding techniques for incorporating knowledge from different cultures can lead to more efficient partnerships with these sovereign nations. We describe our experience engaging tribes with historical ties to Oregon’s recently designated network of marine reserves and protected areas. While ideas presented in this article were developed primarily from our experience working with tribes in the northwestern U.S., we propose that these techniques are useful for academic, governmental, and non-profit professionals working on projects that would benefit from or require tribal input. Integrating sustainability lessons from tribal cultures with technological advancements of western science can enhance 21st century global natural resource management.
**Introduction**

Co-managed natural resource projects are becoming more common across the United States, and Native American tribes and nations are pursuing opportunities in which to participate not only as commentators, but as sovereign nation partners (Goodman, 2000). Although stakeholder “groups” each have their own niche and objectives, working with tribes can present its own set of rewards and challenges. Partnerships with tribes on natural resource projects require investment of resources similar to other stakeholders; but unlike other stakeholder groups, the sovereign status of tribal governments – with their own laws, resources, and cultures – requires a tailored approach. Partnerships with tribes exist in projects spanning diverse fields such as salmon restoration (NWTT, 2016) archaeological research (Duer & Butler, 2016), willow stand protection at Malheur Wildlife Refuge (Allen, 2016), and fishery management (Pinkerton, 1999). These partnerships can be incredibly beneficial as tribes have place-specific knowledge of areas spanning longer time periods than most western scientific or other stakeholder perspectives (Hunn, 1999). However, history is rife with examples of natural resource projects in which U.S.-tribal relations were ignored, or where the interests of tribes were actively opposed (Allan, 1988). Unfortunately these experiences have left natural resource managers with little guidance on how to initiate tribal partnerships, and, until recently, many federal agencies had no published guidelines on how to engage tribes.

A recent executive order has made engagement of tribes a more active priority for federal agencies. Penned by United States (U.S.) President Obama in 2013, Executive Order (EO) 13647 established the White House Council on Native American Affairs, which would coordinate establishing policies across federal agencies to efficiently engage with Tribes. EO 13647 was an extension of President Clinton’s executive order re-affirming the procedure for
government-to-government consultation between federal agencies and tribes (EO 13175; 2000). Results from these changes in administrative policy have included cultural training, education on how tribes reach decisions within their governments, and how early in the process tribes must be notified. This significant piece of administrative guidance led to a slew of new agency policies and many tribes receiving requests for consultation in issues they had little or no voice in before. As agencies draft consultation policies, tribes are experiencing a more standard line of communication for government-to-government inquiries.
Figure 4.1: Infographic summarizing steps for engaging tribes in natural resource management projects.

Drawing on examples from the literature and our experience working on a project with Oregon coastal tribes to understand the effects of Oregon’s recently implemented system of marine reserves and protected areas on tribal uses of coastal and marine species, we discuss (1) when tribes should be included in a project, (2) how to navigate those first steps in forming a
solid working relationship, and (3) how to express cultural sensitivity in ways that can prepare managers and researchers to successfully work with diverse tribal entities including Tribes, Rancherias, Bands, Confederations, and Indian Nations (hereafter referred to as “tribes”; Table 1a). Through the steps discussed in Figure 1, we provide suggestions for engaging with tribes in an effective manner. Although our recommendations are primarily based on work with tribes on the U.S. West Coast, many steps will be applicable to projects with tribes across the U.S. and internationally.

The process of and timing for engaging tribes

Step 1: Deciding whether to engage a tribe

1. Plan on outreach to tribal governments if the project may affect or benefit tribes and/or tribal members. Resources on or adjacent to tribal, reservation, ceded, or trust lands (Table 1b); projects upriver of tribal lands where tribal communities may experience downstream effects; archaeological sites, middens, or gathering/dance sites that are only used seasonally may all be within a tribe’s interests.

2. Outreach and engagement early in the planning process is critical for tribal leadership to develop their interests and engage in the project. Early engagement during the initial part of the planning process can strengthen the input of the tribe as a sovereign partner rather than a stakeholder group consulted at a later step during a “public comment” period, potentially leading to a stronger sense of ownership in the project from tribal representatives.

3. Tribal engagement can benefit natural resource projects outside of reservation or trust lands, if the area was within ancestral territory, or usual and accustomed land. Tribal
engagement can evoke traditional ecological knowledge that extends the ecological baseline for the project area.

4. Tribal governments and tribal communities differ in their perspectives, especially those staff that are not members of the tribe they work for. Outreach to tribal staff does not necessarily mean outreach to tribal community members. Separate outreach efforts may be needed if practitioners are seeking input from both groups.

Application:

Our project interviewed members of tribes who historically lived on the Oregon coast and utilized coastal and marine resources on a regular basis (see Chapter 2). The interviews also contained questions on whether restricted “take” areas such as marine reserves affected traditional and subsistence use of the coast and ocean. Although none of the tribes’ present-day reservations are directly on the coast or adjacent to a marine reserve, several places with “take” restrictions overlay areas of historical gathering significance, where regular and significant gathering still takes place.

The constraints of previous tribe-specific outreach was evident in the varying knowledge of Oregon’s marine reserves between interview participants that were (or had been) tribal government staff and those that were tribal resource users but not tribal staff. The majority of non-staff had no knowledge that there had been community outreach meetings hosted by state agencies prior to marine reserve implementation. A different approach to reach non-staff tribal members and gain their engagement in outreach efforts will be needed in the future.
Step 2: Timing of Outreach

1. Each tribe is a sovereign nation; decisions may require approval from the highest decision-making body (usually a Tribal Council or equivalent) and communication back to the staff. Depending on project complexity, magnitude, and cultural impacts, this approval process may take several months and should be accounted for when developing project plans.

2. Each tribe has developed its governance procedures and laws independently. Therefore outreach, approval for projects, and discussions will be different for each tribe. Some approaches may work better for some tribes than others. At the first meeting with tribal staff, have several approaches ready for discussion. When developing an outreach strategy, keep flexibility in mind.

Application:

For our project, one tribe required several phone meetings with staff, an in-person meeting with the head of a department, as well as an in-person presentation in front of Tribal Council and tribal members to gain approval for research. Another tribe required one in-person meeting with staff and a short application before approval. When attempting to set up interviews, two tribes had their staff lead the contact and scheduling process for tribal member participants. Another tribe gave us a list of names and contacts and let researchers handle the rest of the interaction. The timeline for approval varied, from three weeks to not being able to reach a finalized agreement in eight months. The key to success in this stage of the project was to have several ‘process’ options available for tribes to choose from, each of which would work within the project frame. For example, we presented tribes with the following options: the researchers present at a tribal community meeting to recruit interview participants, the tribal staff create a list
of tribal members and the researchers conduct outreach, or the tribal staff conduct all contact and recruitment of interview participants. These were brought to tribal staff as a starting point for negotiating approaches to recruitment, and were the options that were then customized by each tribe for their specific needs and staff availability.

Step 3: Before Contact

1. Research the history of the tribe including ancestral territory. Key questions include: 1) Which bands make up confederated tribes and 2) What is the history of the reservation? Other questions to consider would be: is the reservation on original territory? When was the tribal government formed? Are there treaties designating traditional take or harvest? Knowing the answers to these questions will help reassure tribal representatives that you are prepared for a partnership.

2. Historically, a majority of many landscapes were utilized periodically by Native peoples. Therefore activities that break the ground surface risk disturbing undiscovered gravesites or middens. In addition to checking with the local State Historic Preservation Office (SHPO), contact the local Tribal Historic Preservation Office (THPO). A THPO officer can inform project planners whether projects with ground disturbance activities may need further tribal oversight.

Application:

Before conducting outreach with Oregon coastal tribes, I researched which tribes had current reservations on the coast, and which were federally recognized. Ancestral territories of these tribes were also researched, to determine where the current reservation fit within the ancestral territory, or whether the tribe had been settled outside their ancestral lands. From
this research I had a rough idea which bands made up each tribe. Each tribe’s website was
searched for the appropriate department with which to conduct initial outreach.

Although our project did not include ground disturbance activities, interviewees
described and mapped areas that were past village sites. When past village sites (or other
culturally sensitive sites) were mentioned, participants were encouraged to protect the
specific location by mapping the more general area of the village domain.

**Cultural Sensitivity During Tribal Engagement**

1. If the project involves information of cultural sensitivity, approach tribal members as a guest.
   Issues of cultural sensitivity can include species of plants or animals used in dance, regalia,
or ceremony; songs, stories, or language; locations of gathering, hunting, or fishing; or oral
histories.

2. Natural resource management is of cultural, ecological, and human health importance as the
   health of the environment is tied to the health of the people across tribal cultures. Be aware
that interpretation of project proposals may be seen through a different lens by tribes than
project managers may be expecting.

3. Sharing confidential information across tribes may be inappropriate as there may have been
   historical conflicts between tribes or competition for resources. Managers should identify
what is considered confidential and what is not by each partner tribe during initial
conversations with tribal staff.

4. Gifts of gratitude, especially food or items special to your cultural identity, go a long way in
   showing sincerity and respect.

5. Elders can be the most outspoken personalities in the room. Pay full attention and show
   active listening, which can include repeating back part of the question in your answer,
nodding along when an elder is speaking, and using “and” as much as possible instead of “but”.

6. Personal behaviors, such as prolonged eye contact may be interpreted differently – as a sign of respect or disrespect to elders – depending on the tribe. Reach out to others who have worked with the tribe and inquire as to proper etiquette.

7. If you are invited to a cultural event such as a gathering event or dance, accept the invitation and attend if at all possible. Participating in cultural events is a very significant part of building a relationship with a tribe.

Application:

Our interview questions fell into two sub-categories: those that helped establish a baseline of hunting/gathering/fishing practices and those that asked for beliefs about and experiences with the marine reserves and other limited “take” areas. The baseline interview questions included items about the use, frequency, timing, and location of specific species. If applicable, patterns of rise/decline of species, changes in health of the habitat, and outside influences (e.g., pollution, overharvest, etc.) were asked as follow-up to interview responses. To remain culturally sensitive, information was repeated to show active listening, specifics of cultural use were not asked (a “yes” or “no” usually sufficed), and participants were not pushed to answer questions about recently deceased family members.

Two tribes in our study currently occupy reservations in close proximity to each other, and ancestrally share close borders. We were notified by one Tribal Council that resource claims across borders was a concern, and they did not want another tribe to make a claim in their territory. To address this concern, we suppressed tribal names in outreach materials where
locations near tribal borders where mentioned, and produced separate maps of tribal use for each tribe.

**Conclusion**

This project set out to incorporate historic tribal use of coastal and marine species use into baseline data for Oregon’s recently implemented set of marine reserves. Interactions with tribal members and tribal staff were conducted with the goal to build a long-term relationship with each tribe, incorporating flexibility according to the tribes’ availability and staff resources. Treating each tribe as a sovereign nation and the original data confidential, as well as transparency about how the data would be used in the end product was employed to build trust with tribal members. This was essential in a project that asked questions about sensitive cultural information.

Projects that can meld the lessons of sustainability from tribal cultures and the technological advancements of western science will have greater potential for success in the coming decades of natural resource management. Learning how to work effectively with tribes is an important part of modern management.

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2 The Confederated Tribes of Grand Ronde have produced a well-written document covering several cultural sensitivity tips geared towards archaeological projects. It is a great resource with more detailed information.
References


Table 4.1: Description of (a) tribes and sub-categories within tribal nations, and (b) types of tribal lands.

<table>
<thead>
<tr>
<th>a. Types of &quot;Tribe&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Band</td>
</tr>
<tr>
<td>Usually a smaller sub-set than a tribe, either a village, several geographically adjacent villages, or a small group that was closely related culturally and through similar dialects.</td>
</tr>
<tr>
<td>Confederate</td>
</tr>
<tr>
<td>Usually a gathering of bands, villages, or small groups to form a larger Tribe under a single government. Usually geographically adjacent over a wider area than a single band.</td>
</tr>
<tr>
<td>Rancheria</td>
</tr>
<tr>
<td>A term used in California. Usually designated at a later date than the original reservations, Indians that were not enrolled at existing reservations settled here. Because of this, usually has mixed ancestry across several tribes.</td>
</tr>
<tr>
<td>Nation</td>
</tr>
<tr>
<td>A larger group, mostly interchangeable with &quot;Tribe&quot;. Usually made up of many bands, villages or smaller nations. Not always geographically adjacent.</td>
</tr>
<tr>
<td>Tribe</td>
</tr>
<tr>
<td>Default name for a single tribal sovereign nation. May or may not be in the official name.</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>b. Types of Tribal Lands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reservation lands</td>
</tr>
<tr>
<td>Lands included in the original reservation boundaries as dictated by the US government allotment of land to the tribe.</td>
</tr>
<tr>
<td>Trust Lands</td>
</tr>
<tr>
<td>Lands not in the original reservation lands but purchased by the tribe.</td>
</tr>
<tr>
<td>Tribal Land</td>
</tr>
<tr>
<td>Default term for all lands under jurisdiction of the tribal sovereign government.</td>
</tr>
<tr>
<td>Ceded Lands</td>
</tr>
<tr>
<td>Lands within ancestral territory that were abdicated through a formal written document between a leader of the tribe and the federal U.S. government.</td>
</tr>
</tbody>
</table>
APPENDIX A

Introduction Packet Documents

Master’s Project Introduction

Synopsis:
My master’s thesis is intended to inform the Oregon Marine Reserve and Protected Area Baseline on tribal past (ancestral) and present (recent, within the current generation) uses of marine resources, as well as tribal member’s perceptions and involvement in the Marine Reserve (MR) planning process.

Background:
In 2012, the state of Oregon designated five marine sites as reserves in which ocean development and “take” of marine resources was prohibited. Marine Protected Areas (MPAs) are paired with these reserve sites and have “take” restrictions. “Take” restrictions may affect tribes’ resource gathering for subsistence, ceremonial, and traditional use. Similar restrictions in other states have caused conflict between state policy and tribal use. This project is intended to better understand marine resource use by tribal peoples on the Oregon coast.

Prior to beginning my master’s degree I worked for the Trinidad Rancheria with several other northern California tribes on a project that was designed to inform the California MPA Baseline. I am proposing an interview/survey project to document Oregon tribal marine resource use and the perceived effect of Oregon’s marine reserves and MPAs on those uses. The interview strategies, data collection, and confidentiality measures I use will be based on my experience with the California MPA Baseline.

Research Questions:

5. Where do Oregon tribal communities use marine resources, and where does the MR/MPA system overlap with and/or affect these uses?
6. Based on oral histories, is there a perception of shifting coastal species community structure on the Oregon coast?
7. Where would future marine spatial planning affect current harvest/gathering practices by tribes?
8. How have Oregon tribal government staff and tribal members experienced the creation of the Oregon MRs/MPAs?

Tribes that will be contacted to participate in the project:

- Confederated Tribes of Grand Ronde
- Confederated Tribes of Coos, Lower Umpqua, and Siuslaw
- Coquille Indian Tribe
- Confederated Tribes of the Siletz Indians
- Smith River Rancheria

Ideally, a minimum of 5-15 interviews from each tribe.
Why this is important:

1) Tribes are important stakeholders in public planning processes such as the Marine Reserves program; identifying priorities and current engagement in the public input period is crucial for shaping future outreach efforts.

2) Understanding tribal uses of marine resources can help develop strategies that reduce tribal-state conflict in the implementation and administration of marine reserves and MPAs.

3) The methods used in this project can help further the use of traditional knowledge in higher-level scientific research.

4) Capturing oral knowledge from tribal elders can help preserve history for their family and tribal government.

5) The MPA baseline can be extended back several decades, instead of a decade or less, by gathering knowledge from multiple generations.

Methods:

Some interview strategies used are similar to those in an MPA Baseline project in northern California.

- A mixture of open-ended and close-ended questions about marine resource use, knowledge of marine reserves and MPAs, and perceived effects of marine reserves and MPAs on tribal uses.
- Interviewees will be asked to describe important places on a digital tablet mapping program.
- Interviews will be audio recorded.
- A field guide of marine species will be used with common and (if available) traditional names.

Confidentiality:

- Since interviews will ask questions about specific harvest/fishing spots, confidentiality will be of high importance.
- Interviewees will sign a confidentiality notice and a copy will be available for their records.
- Data will be kept in a secure drive at Portland State University.
- The final report and Geographic Information System (GIS) data will be summarized at a level useful for management practices, but will not detail specific places (e.g., inlets) important for harvest/gathering.
- Original transcripts and detailed GIS layers will not be shared across tribes; original transcripts and detail GIS layers will only be shared with the interviewee’s member tribal government.
  - If interviewees do not want the transcripts to be shared with their member government, there will be an opt-out option available on the confidentiality form.
- As this project develops, additional protections may be adopted.

Products:

- Audio recordings, with permission from the interviewee, will be given to the interviewee to be shared with family members and/or their member tribal government.
- GIS polygon layer, with permission from the interviewee, will to be given to their member tribal government.
- Summary GIS layer will be given to the MPA baseline group, the participating tribal governments, and Oregon Sea Grant.
• Report of aggregated findings will be given to the MPA Baseline management group and Oregon Sea Grant.

Questions/Interested in the Project?

Contact Information:

Email: sabr@pdx.edu

Phone: (541) 499-1399

Portland State University

CONSENT TO ACT AS A HUMAN PARTICIPANT

Project Title: Past and Present Tribal Uses of Marine Resources on the Oregon Coast

Principal Investigator and Faculty Advisor (if applicable):

Advisor: Dr. Max Nielsen-Pincus

Student Researcher: Sabra Marie TallChief Comet

Participant’s Name: ________________________________

What are some general things you should know about research studies?

You are being asked to take part in a research study. Your participation in the study is voluntary. You may choose not to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. There may not be any direct benefit to you for being in the research study. There also may be risks to being in research studies. If you choose not to be in the study or leave the study before it is done, it will not affect your relationship with the researcher or Portland State University.

Details about this study are discussed in this consent form. It is important that you understand this information so that you can make an informed choice about being in this research study.

You will be given a copy of this consent form. If you have any questions about this study at any time, you should ask the researchers named in this consent form. Their contact information is below.

Sabra Comet: sabr@pdx.edu
(541-499-1399)

What is the study about?
This is a research project. Your participation is voluntary.

The purpose of this study is to inform the Oregon Marine Protected Areas Baseline on tribal member marine resource use. The information collected in the study will help inform present and future projects on the Oregon coast. Tribes are important stakeholders and this study is part of a larger effort to give tribal members a more active voice in the ocean and coast programs occurring on the coast.

Why are you asking me?
The student researcher contacted your member tribe staff about the project and asked for suggestions on tribal members to contact. You were referred by the tribal staff. We are looking for tribal members who are 18 years or older with knowledge of past and present hunting/gathering practices on the coast. We are also looking for tribal members who are willing to share their thoughts on the Oregon Marine Reserves, and if any tribal members participated in the marine reserve planning process. This can include going to meetings, writing letters, etc.

What will you ask me to do if I agree to be in the study?
If you agree to be in this study, we will ask questions within an interview setting. The first part of interview will include questions about your family history, your family’s past hunting/gathering practices on the coast, and if there is still any of these occurring today. There will be a couple times where we will pause questions to do a mapping exercise. Pictures of coast plants/animals will be available to match local names to the “common names” used across the U.S. The second set of questions will be about your thoughts on the Marine Reserves in Oregon and if you had any involvement in the planning process. The interview duration will depend on the information you wish to share, and more than one session can be scheduled. With your permission, we would also like to record the audio for this interview on a digital recording device. Only your voice will be recorded; there will be no video.

Is there any audio/video recording?
With your permission, we would like to record the audio for this interview on a digital recording device. Only your voice will be recorded; there will be no video. Because your voice will be potentially identifiable by anyone who hears the recording, the audio will only be shared if you give your consent to share with specific groups listed below.

What are the risks to me?
The Institutional Review Board at the Portland State University has determined that participation in this study poses minimal risk to participants.

If you have questions, want more information or have suggestions, please contact Sabra Comet at (541) 499-1399 or sabr@pdx.edu or Dr. Max Nielsen-Pincus at maxnp@pdx.edu.
If you have any concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study please contact the Office of Research Integrity at PSU at (503) 725-2227.

**Are there any benefits to society as a result of me taking part in this research?**

Part of the purpose of this study is to give tribes a greater voice in the Oregon coastal marine planning programs. Your contribution to this study will help inform resource planners as to tribes’ needs and values on the coast.

**Are there any benefits to me for taking part in this research study?**

Snacks and refreshments will be available before and during the interview. At the end of the interview you will be given a food-related gift as an added thank-you for your participation and time.

**Will I get paid for being in the study? Will it cost me anything?**

There will be no monetary payment for participating. Only if you have to drive to the interview location will it cost you any money.

**How will you keep my information confidential?**

Several layers of data protection will be used to protect your identity in the final report. Original transcripts (word-for-word) and mapping data (your marks on the maps) will only be shared with family and your tribal member government if you consent (see last section of document).

Original data will be kept on password-protected devices, on secure computers, and in locked cabinets.

**What if I want to leave the study?**

You have the right to refuse to participate or to quit the interview at any time, without penalty. If you do leave, it will not affect you in any way. If you choose to leave, you may request that any of your data which has been collected be destroyed unless it is not traceable to you. The researchers also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped.

**What about new information/changes in the study?**

If new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

**Voluntary Consent by Participant:**

By signing this consent form/completing this interview you are agreeing that you read, or it has
been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, in this study described to you by Sabra Comet.

Signature: ________________________ Date: ________________

You will be given a copy of this form to keep for your records.

**Records release:** As part of the wider impact of this study, we are giving you the chance to share the original transcripts and mapping data to selected individuals. If you want the original data, which will be traceable to you, to be released to the following people, please “X” next to the statement:

____ Your household  ____ Family member

If yes, provide mailing/contact information:

________________________________________________________________________

____ Member tribe government administration staff

Original records will not be shared with any group other than those you consent to.

**Statement of Consent:** I have read the above information, and have received answers to any questions I asked. I consent to take part in the study.

Your Signature ___________________________________ Date ________________________

Your Name (printed) ___________________________________________________________________

In addition to agreeing to participate, I also consent to having the interview voice-recorded.

Your Signature ___________________________________ Date _________________________

Signature of person obtaining consent ______________________________ Date ____________

May we contact you if there are follow-up questions about your responses? Yes No

Printed name of person obtaining consent ______________________________ Date ____________

*This consent form will be kept by the researcher for at least three years beyond the end of the study.*
Participant Interview Guide

This guide will help you understand what will be asked and how the interview will be set up.

- Participation is voluntary. You may choose to skip a question if you wish, or end the interview at any time.
- If the interview ends up taking more than 3 hours, it can be broken up into 2 sessions on different days.
- If you have any questions before, during, or after the interview please feel free to contact the student researcher.
  - Sabra Comet
  - Sabr@pdx.edu
  - (541) 499-1399

Set-up

- A digital voice recorder will be used to record voice only, no video.
- Questions will be asked in a semi-directed manner. This means I will have a list of subjects to cover, but not always in the same order. We want this to be a conversation, and you to tell your stories in the manner you want to.
  - I may occasionally “prompt” you or ask for more details in a section of your story/narrative, but interruptions will try to be kept to a minimum
- At several points a tablet with Google Earth will be used and you will be asked to show where harvest/gathering/hunting practices were done.
  - The points and shapes on the tablet will be saved to a file with your “code”, which is a number that will be used when storing your interview information. This is to protect your identity.
  - Your information will not be seen by other interviewees. They will be “hidden” (not visible) so each person sees a clear map.
  - If you have any questions about how the privacy protections work on the tablet, please ask.
Questions
Below are the topics I hope to cover during the interview:

1. Have you ever gathered, hunted, or fished coastal plants/animals on the Oregon coast?
   a. What, where, when, etc.
2. Have you noticed any changes to the area of the plant/animal amount, movement, etc.?
3. Did any family members tell stories of harvesting/fishing/gathering coastal or marine species?
   a. Who, what, where, when, etc.
   b. Did they notice any changes to the area of the plant animal amount, movement, etc.?
4. Have any human-caused changes to the area affected your use of these areas or species?
5. Are you familiar with Oregon’s new network of Marine Reserves (MRs) and Marine Protected Areas (MPAs)?
6. Did the Oregon Marine Reserve planning process affect your use of these areas or species?
7. Did you or anyone you know take part in the Oregon Marine Reserves planning process?
8. What is your overall opinion of the Oregon Marine Reserves system?
   a. Has it been a benefit or cost to your community?
9. Would you suggest any changes to the current Marine Reserves policies?

Student Researcher Interview Script
1) Introductions
   a) Brief summary of research project: the purpose of the interviews is to better understand marine resource use by tribal peoples on the Oregon coast as well as tribal members’ perceptions and participation in the Oregon Marine Reserves planning process.
   b) Answer any questions about project or paperwork.
   c) Obtain oral consent from key informant (follow oral consent procedure)
   d) Overview of the interview outline:
   e) 2 sections
      i) Marine resource uses past/present
      ii) Perceptions/planning participation
2) Main interview
   1) Please state your full name (including any maiden, clan, or family names)
   2) Which tribe are you a member of?
3) What tribe(s) do you belong to (other than your member tribe)?

4) Have you ever gathered, hunted, or fished coastal or marine species on the Oregon coast?
   a) What species
   b) Where
   c) Periodicity
   d) Seasonality
   e) Who taught you
   f) For what purpose (i.e., sustenance (you, family, tribal community), cultural items, supplies for dance/cultural event, or to sell outside tribe)
   g) Did you stop and/or resume at any time (break in regular periodicity)?
   h) Have you noticed any changes:
      i) Ease of access to site
      ii) Ease of locating harvestable individuals
      iii) Health of individuals or the habitat
      iv) Timing of runs
      v) Timing of “best” harvest
      vi) Size, sex ratio, or number

5) Did any family members tell stories of harvesting/fishing/gathering coastal or marine species?
   a) If yes, who?
      i) Name
      ii) Member tribe
      iii) Tribe(s) by ancestry:
   b) Can you recall any of the following details:
   c) What species
   d) Where
   e) Periodicity
   f) For what purpose
   g) Who taught them
   h) Did you stop and/or resume at any time (break in regular periodicity)?
      i) Have you noticed any changes:
         i) Ease of access to site
         ii) Ease of locating harvestable individuals
         iii) Health of individuals or the habitat
         iv) Timing of runs
         v) Timing of “best” harvest
         vi) Size, sex ratio, or number

6) Have any human-caused changes to the area affected your use of these areas or species?

7) Are you familiar with Oregon’s new network of Marine Reserves and MPAs?

8) Did the Oregon MPA planning process affect your use of these areas or species?

9) Did you or anyone you know take part in the Oregon MPA planning process?
   a) Who and in what way?

10) Have you or other tribal members been excluded from any areas due to the Oregon MPAs? If so, which one(s)?

11) What is your overall opinion of the Oregon MPA system?

12) Do you have any opinion on ways it went well/can benefit you or your community?
13) Has it been a benefit or cost to your community?
14) Do you think it will improve the overall health of the areas surrounding the no take and/or “limited take” areas? In what ways? Why?
15) When the MPAs are up for review in 2022, what would you like to see done differently?
   a) What would you want to be changed or become more emphasized?
16) Would you support more areas under protection?
   a) If so, what areas or what species/resources would you like to see protected?
17) If the MPAs were to remain, would you suggest any changes to the current policies?
18) Is there anything else you would like to talk about?

3) **Conclusion**
   a) Questions?
   b) Thank participant
   c) Follow-up contact (if needed)
   d) Give business card with contact information
   e) Compensation gift
### APPENDIX B

*name overlaps into other group.

<table>
<thead>
<tr>
<th>Assumed Species</th>
<th>Other Names</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CLAMS</strong></td>
<td></td>
</tr>
<tr>
<td>Soft Shell Clam</td>
<td>Mud Clam</td>
</tr>
<tr>
<td></td>
<td>Bay Clam*</td>
</tr>
<tr>
<td></td>
<td>Eastern Soft Shell Clam</td>
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<td>Gaper Clam</td>
<td>Pacific Gaper Clam</td>
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<tr>
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<td>Fat Gaper Clam</td>
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<td>Empire Clam</td>
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<td>Horse Neck Clam</td>
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<tr>
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<td>Blues</td>
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<tr>
<td></td>
<td>Bay Clam*</td>
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<tr>
<td>Butter Clam</td>
<td>Martha Washington Clam</td>
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<tr>
<td></td>
<td>Quahog Clam</td>
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<tr>
<td>Native Littleneck Clam</td>
<td>Littlenecks</td>
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<tr>
<td></td>
<td>Steamers</td>
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<td>Vanilla Clam</td>
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<tr>
<td></td>
<td>Manilla Clam</td>
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<td>Nuttal's Cockle</td>
<td>Cockle</td>
</tr>
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<td>Flat-Tipped Piddock Clam</td>
<td>Rock</td>
</tr>
<tr>
<td></td>
<td>Oyster*</td>
</tr>
<tr>
<td>Giant Western Massock</td>
<td>Beaded</td>
</tr>
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<td>Nessaria</td>
</tr>
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<td>Purple Mahogany Clam</td>
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<td>CRAB</td>
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<td>Shield Back Crab</td>
<td>Kelp Crab</td>
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<td>Spot-Bellied Cancer Crab</td>
<td>Brown Rock Crab</td>
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<td>OTHER INVERTEBRATES</td>
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<tr>
<td>Boreal Wintletrap</td>
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<td>Vermillion Rock Fish</td>
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<td></td>
<td>Ribbon Kelp</td>
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</table>


APPENDIX C

Table 2A: Frequency (number of interviews) with which species uses were observed in total and by tribe, ordered by taxonomic group and from most reported in interviews to least. * No maps associated with this species or species groups. For all other species groups maps, see Chapter 3 or Appendix E. **Participant name for species, could not be matched with widely accepted regional or official name.

<table>
<thead>
<tr>
<th>Species</th>
<th>Total (n = 23)</th>
<th>Coquille (n = 5)</th>
<th>Siletz (n = 7)</th>
<th>CTCLUSI (n = 11)</th>
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<tbody>
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APPENDIX D

The following narrative is a synthesis of interview transcripts, based off the numbers reported in Appendix B. Numbers in parentheses denote the number of interviews that reported the trend or statement discussed.

**Historic/Present Use**

**INVERTEBRATES**

**Clams**

Used here are the widely accepted common names; see Appendix A for regional names.

The most commonly gathered clam and clam-like species were Gaper Clams (Fat and Pacific) (18), Nuttal’s Cockle (16), Razor Clam (15), Butter Clam (13), Soft Shell Clam (8) (including the Mud Clam) and a non-native Purple Varnish Clam (6) (which Coquille did not report using). None were harvested commercially; the most common use was for subsistence, although there were also community and youth camp digs, in which tribal members participated in large group shellfish gatherings. These more commonly involved the Purple Varnish Clams, but other species were used as well. The aforementioned clam species were cited as a traditional food in many interviews, and have cultural ties.

Gaper Clams were not always able to be identified as Pacific (Gaper) or Fat (Gaper) based on the field guides provided, so they are combined for this analysis. All except three (3) interviews reported dates gathering Gaper Clams through the present decade. Two (2) interviews mentioned areas where Gaper Clams were decreasing in number, and one (1) interview mentioned a bed that had gone extinct. Five (5) interviews reported no changes in the numbers, size, or health of the clams or habitat. One (1) interview mentioned that siltation was a problem.
for a clam bed. All interviews reported the Gaper Clams used for subsistence and several (3) to supply tribal events. The majority of participants who reported seasons only gather during the spring and summer (9) and only three (3) reported harvesting Gaper Clams all year. One (1) participant explained that Gaper Clams are exhaustive breeders so once they spawn the meat is not desirable for several months. All interviews that named specific teachers for these activities reported male relatives, except one (1) interview which mentioned tribal staff in general. Access to areas (2) and greater harvest pressure (more non-tribal people digging) (3) were reported as affecting gathering practices.

Nuttal’s Cockles were reported as frequently harvested, from multiple times a year to 30-40 times a year. Teachers were closer to being equal male and female family members, and extended family (grandparents, aunts, uncles, cousins, nieces, nephews) were reported as both teachers and participants, so this is a particularly important species for social gathering events. All interviews reported the cockles used for subsistence, one (1) interview reported using the shells for regalia, and two (2) interviews reported using cockles to supply tribal events. A majority of interviews who reported seasons gather cockles all year round (6) while a few reported focusing on spring and summer months (4). Several interviews reported smaller size and/or number (5), and two (2) interviews reported extinctions of beds. Half of the interviews reported collecting cockles through the present or up to the current decade (8). Four (4) interviews reported areas where they had been collecting cockles since childhood through to present day.

Razor Clams were reported as being gathered frequently; from 2-6 times a year to “very frequently”. Participants in all three tribes reported that numbers had decreased in some areas, and two (2) interviews reported extinction of a clam bed. The closures due to domoic acid (red
tide) toxicity have heavily impacted gathering, to the point where several interviews reported all their gathering spots were closed (4). But several participants admittedly ignored the closures and continuing to gather. The majority of interviews that reported seasons (6) reported gathering in the spring and summer, and only two (2) all year. Red tides are most prevalent during the hottest months (Tester, 1991) so this is a particularly poignant problem with rising average ocean temperatures and a persistent high pressure system, a condition that was present on the North American west coast from 2013-2014 (Bond, 2015) and through 2015, spurring an “unprecedented” diatom bloom and domoic acid toxicity which caused numerous fisheries to close and marine mammals to beach (McCabe, 2016). Razor Clams were among the affected species of domoic acid toxins. Nine (9) interviews reported gathering Razor Clams through the current decade. There are two distinct groups, one of which ignores the domoic acid toxicity closures and continues to collect Razor Clams, and another that has ceased gathering due to the closures; for the second group, the red tide blooms have affected a heavily used resource. Although several interviews reported male relatives as the primary teachers (4), several reported they had learned through harvesting events with the whole family (3). This pattern suggests the social importance of this practice.

Butter Clams were reported as being harvested very frequently, from multiple times a year to 30-40 times a year; the clams were reportedly harvested year-round. One (1) interview reported the shells were traditionally used for beads. All reported teachers except one (1) were male (father, uncle, grandfather). Four (4) areas (but not all gathering spots for a participant) were reported as either decreased in number or extinct. All interviews reported the clams gathered as subsistence for themselves and family, and commonly for elders or to supply community/cultural events for the tribe (6). For those that reported dates, interviews mostly
reported gathering Butter Clams either to the present or within the last several years (7). Of those, three (3) reported this as a life-long activity (spanning childhood to recent activity).

Soft Shell Clams will be combined with the Mud Clams for this analysis because the two were not reliably named as separate species. Soft Shell Clams were reportedly gathered through the present by most of the interviews that reported dates (5), though some reported stopping the practice (3). All who reported frequency reported gathering them “multiple times a year” (5). Teachers were very diverse, including stepfathers (1), fathers (1), mothers (2), grandparents (2), aunts and uncles (2). Only one (1) interview reported a decrease in numbers. All interviews reported using the clams for subsistence (5), and three (3) reported using them for tribal events. The seasons were split evenly between spring/summer (2) and all year round (2), with one interview reporting different seasons for different gathering spots.

The Purple Varnish Clam was reported by both tribal members and tribal staff trained in the biological sciences as a non-native species. Coquille did not report gathering any Purple Varnish Clams, although CTCLUSI and Siletz did. They were gathered for subsistence (3) as part of an annual youth clam dig (1), incidental take (1), and observed but not eaten (1). All reported dates are recent (2) and none reported these clams as a childhood species.

Crab

The Coquille tribe utilizes both Dungeness Crab and Red Rock Crab, although Dungeness Crab is more common (3) than the Red Rock Crab (2). For the Siletz tribe, four of seven (4/7) interviews reported utilizing Dungeness Crab, two of seven (2/7) Red Rock Crab. At CTCLUSI, seven of eleven (7/11) interviews reported Dungeness Crab, and four of eleven (4/11) for Red Rock Crab. In all tribes, crabs were caught primarily for personal, family, and
community (elder) consumption. Dungeness Crab were caught primarily by crab pot, and Red Rock Crab was caught both as incidental catch in crab pots and by hand. Crab pots were baited with fish heads/carcasses (3) or chicken or turkey legs (2). Both species of crab were targeted frequently during the crab season, although the preferred season varied across participants. Only one CTCLUSI interview reported commercial crab fishing. All three tribes reported less use of Red Rock than Dungeness Crab. Reasons were commonly more and better meat in the Dungeness Crab, and that the Red Rock Crab shell was hard to open. Most reported teachers and other participants were male relatives. Two (2) interviews reported that numbers of both species of crabs that could be harvested had decreased. The interviewees were catching a higher ratio of females, which had to be thrown back and could not be consumed. But most did not report changes to crab populations. Few dates were given for Dungeness Crab harvesting (4), and Red Rock Crab was reported as still being harvested to present day (2).

**Mussel**

Although some participants were able to separate the three species of mussels (California, Pacific, and Blue), several participants admitted they looked too similar to separate their past gathering. In this section, all mussels have been combined.

Mussels were cited as a heavily used subsistence food historically and through the present. Shells were also noted by many participants as being used for tools (3) and, occasionally regalia (1), although use of the shells is less common today (although still practiced). Eight (8) interviews reported gathering the mussels through the present decade. All interviews reported using the mussels for sustenance, although some also reported using them to supply tribal or community events (3). Teachers were split evenly between male relatives (2) and female relatives/whole family (2) as well as one (1) who cited other tribal members (not family) as their
main teachers. Six (6) interviews reported numbers were down and one (1) reported a bed that had been completely wiped out due to overharvest, although it is coming back. Four (4) interviews reported non-tribal harvesters as the main overharvest culprits, and one (1) interview reported tourists in general gathering all mussels at a particular spot. This deviated from what the participant was taught (and was also described by a couple of other interviews) that only the large or a specific size of mussel is targeted, instead of prying off whole sections of the mussel beds. The best time to harvest mussels was variable; three (3) reported spring/summer, two (2) reported winter, and two (2) reported all year depending on the tides.

**Large Mollusks**

Abalone (6) was mentioned as a traditionally important species primarily for its shell (although it was also eaten) but is rarely eaten presently. Both the Red Abalone and Flat Abalone reportedly were observed in rocky intertidal areas. However, these are not usually eaten (only observed or empty shells taken) due to their low numbers.

Both the Gumboot Chiton and the Black Katy Chiton were listed as occasional subsistence foods. Historically they were eaten more, although the practice is almost nonexistent; only one (1) interview reported successfully cooking them so they were palatable. CTCLUSI staff are collecting and experimenting with recipes for the Black Katy Chiton to make it a more commonly utilized food source. The platelets from the same chiton were widely reported for use in jewelry (2) and regalia (1), and were historically used as tools (1). Chiton were listed as being gathered in the spring (1) and the access to the primary gathering place for one (1) interview is being heavily affected by erosion (of the path down to the beach).

**Olivella**
Olivella shells have historically been used on regalia and jewelry (7) and are still being gathered through the present decade (2). No eating of the snail was reported, and all but one interview reported collecting the shells with no snails inside. Although still considered a common shell, access to areas where the shells are easily found was reportedly more difficult. In particular, one popular area has been experiencing damage due to erosion of the access path (1).

Shells are usually gathered in spring and summer (2) during low tide. Shells were reported as being gathered multiple times a year (1) to as frequently as several times a month (1).

*Barnacles*

Barnacles, although mentioned by participants as very tasty, were not harvested commonly. Acorn Barnacles (1), Giant Barnacles (2), Goose Barnacles (3) and barnacles in general (2) were reported as harvested, although the few interviews that mentioned frequency reported barnacles as a rare target. Even the participants who did report harvesting them hinted the amount of work did not justify the small amount of meat.

*Oysters*

There were a couple harvest events of Olympia Oysters noted by one (1) interview, but most recent gathering has been the non-native oyster species (6). The Olympia Oysters were both harvested to eat and the shells were found and could be used for regalia; but this was reported as an uncommon find. All non-native oysters reported are eaten (5). The interviews that reported the non-Olympia oysters reported harvesting them up through the present decade (3). Teachers varied among stepfather (1), uncle (1), and whole family (1). Although not reported by a large number of interviews, the historical significance of oysters to tribal members is noteworthy.

*FISH*
Rockfish

A variety of Rockfish were reported: Black Rockfish (9), Vermillion Rockfish (5), Copper Rockfish (5), Blue Rockfish (3), Yellow Tail Rockfish (2), Dark Dusky Rockfish (2), Canary Rockfish (2), Brown Rockfish (2), China Rockfish (1), Grass Rockfish (1), and Rockfish in general (6). Although Black Rockfish was the most commonly reported species, many rockfish species were kept even if they were not the target species for the fishing trip; unless there was a law prohibiting take for a type of rockfish. These were not considered a traditional food since they are not a shallow water fish and most require a boat to catch; two (2) interviews reported shore fishing. Since most of the rockfish are similar from a use and habitat standpoint, they are lumped together for this study.

All rockfish species had at least one interview reporting decreased numbers and/or size, except Grass Rockfish which had no information on this subject. The frequency that rockfish are fished varied greatly from frequently during the season to once a year (or uncommon if bycatch species). Teachers were overwhelmingly male, either relatives (5) or friends (2); only one (1) interview reported learning and participating with the whole family. Two (2) reported fishing rockfish through the present decade and five (5) reported stopping earlier. Bait was reported sparsely; Ghost Bay Shrimp (1) and squid bought at a market (1) were the only ones reported. Almost all interviews reported using the fish as sustenance for family, one (1) reported commercially fishing rockfish and one (1) reported participating in sport fishing for rockfish.

Salmon

There is a plethora of research and literature on the historic and present importance of salmon to the subsistence of northwest tribes. All three tribes reported heavy fishing and use of
several salmon species, with Coho and Chinook by far the most popular. Declines in catch were reported across most interviews (5) who mentioned salmon. Several closures and tag limitations were also noted (3). The majority of salmon catch reported was either off the coast or in large channels, always in boats. This change marks an access issue that was noted in a group interview in Siletz; only those who had access to a boat could utilize this traditional food source. Salmon are fished very frequently during the season (6). Dams (1) and pulp mill effluent (1) were reported as part of the reason for decline. Commercial fishing occurred in youth (2) and back through parent’s (1) and grandparent’s (2) generations; there is a strong history of multi-generation salmon fishing. Only one (1) interview reported sport fishing for salmon. Two (2) interviews reported salmon fishing in their lifetime back to the 1940’s and one (1) cited back to the 1930’s. All reported teachers (7) were male, a mixture of grandfathers, fathers, and brothers. Both the spring (6) and fall (6) runs are fished. Rod (5), gillnet (1), trolling (2), and dip net/gaff (1) are used for salmon fishing.

**Smelt/Herring**

Small, silver, schooling fish with high oil content were tied heavily with traditional subsistence foods (4). Since the different species of smelt, herring, and similar species are not easily identified, these species have been combined for this narrative.

Presently there are few spots these forage fish are found in large enough numbers to dip net (4), and sometimes they are caught by jig (hand line with multiple hooks bobbed up and down or “jigged”) for bait (1). They are usually running in spring/summer; it varied whether a single run could yield enough catch for the year (2) or if multiple attempts were necessary (2). Both south of Coos Bay and at Yachats there were large smelt runs until the 1960’s and then there was a dramatic crash (2). Runs are considered extinct or nearly so (2) or severely down in
number (3). One story in particular drew a line between the fishing practices for other species and the overharvest of smelt via bycatch in the 1950’s. “When I first moved out to where we are now, most high tides I could just walk across the street with smelt nets, walk down just before high tide, it didn't matter what time of the day or night, and take a couple of dips and have all the smelt I would need for a month. In the last few years that there's been small runs, once or twice a season. And that's it…I noticed a big change and I listened to what happened in the fishermen's perspective. [they would complain] ‘Well I spent all night shoveling smelt over the side’ because what happens is the smelt feed in the same part of the water column as the shrimp. And so they were targeting the shrimp. They didn't want the smelt. But they automatically got them when they were dragging because they got a better signal back on the sonar from those fish than they did the shrimp. So they would target those areas and then by the time the fish comes up in a trawl it's dead…And so they would just dump it overboard. That went on for a couple, 3 years and then you didn't hear it so much anymore because they had killed the population down to the level that they weren't getting very many anymore. And that became evident when you had the high tides because only 2 or 3 tides during the year would you see any smelt at all in the surf. They just disappeared along with everything else. And what was really criminal about it was it was for no gain. There was no market or anything. They just shoveled it overboard.”

Starry Flounder

Starry Flounder was mentioned by all three tribes and was noted by many participants as a highly desirable fish historically, and was common through the 1940’s and 1950’s (4) with a decreased number through the 1980’s and 1990’s (3) and one (1) interview reported some recovery since 2008. But there was a drastic decline in the prevalence of the fish for several decades, to the point that the fish was considered locally extinct (7). A couple participants from
the Coos Bay area (2) noted that the numbers seem to be slowly increasing, which may be a sign of a slow recovery in the Coos Bay area. All teachers (5) for fishing Starry Flounder were reported as male relatives, either fathers, uncles, or grandfathers.

The increase in the seal and sea lion populations was linked to the time of the crash of the Starry Flounder (5). The Marine Mammal Protection Act (1) was linked as a factor in the decline. Another interview (1) reported that siltation of estuaries from logging killed off the eel grass that the flounder hid in, making it even harder to avoid the increased sea lion population.

**Lamprey**

Lamprey is a traditional protein staple. There were several accounts of concentrated night fishing groups during the older participants’ childhood and teenage years (4), but there has been a drastic decline (3) in size and number, and extinctions (3) of the species in near-coast river systems. All except one (1) interview reported that the participants could not find the adult lamprey in present day. The population crash is reported to have happened more than two decades ago; reports varied across the 1990’s (1), the 1970’s (2), and the 1950’s (2). Access was cited as an issue before the population crashes (2) because river access was cut off as land adjacent to the rivers was developed. Although juvenile lamprey (ameocytes) are still reported (3), almost no adults have been seen in the last several decades. These were included in the study due to the part of the life cycle when lamprey migrate to the ocean (similar to salmon) and return for breeding. Several chemical and logging events have coincided with lamprey declines. One (1) interview reported that several decades ago the “government” thought the lamprey were affecting the salmon populations and culled the lamprey. Other reported sources of the lamprey decline included siltation from logging (1), herbicide spray from logging (1), and the Valsetz
Dam. One thing these factors agree on is that the problem is coming from upstream of gathering areas.

PLANTS

**Seaweed/algae**

Seaweed is a traditional food that continues to be utilized, although not to the same degree as several decades ago. One (1) interview reported harvesting it through the present day, and two (2) reported starting in childhood and stopping several decades ago. Bull Kelp was cited as being pickled (3) or as a thickener in soups. Hairy Seaweed (1), Three Ribbed Kelp (1), and Purple Laver (3) were described as being dried and eaten like a cracker (1). Pickleweed can be put into salads (1); one interview described seaweed being used by a neighbor as fertilizer several decades ago. Winged Kelp is used in basketry (1). One (1) interview reported seeing a non-tribal member carrying a five-gallon bucket of seaweed across the beach; the participant pointed out that is a much larger quantity than they harvest at a single location.

MAMMALS

**Marine Mammals**

Marine mammals were discussed briefly in a few interviews; the gathering taking place in the participants’ lifetimes has been limited to remains (4) and is infrequent, with no reports of harvesting live animals. Hunting was discussed briefly, but only in a historical context before the participants’ lifetime.
APPENDIX E

*How has enforcement of “take” regulations affected tribal members? (ENFORCEMENT)*

Several interviews told similar stories of ticketing (2) and lawsuits (2), and a majority of incidents were during gathering done for tribal events (1). One (1) interview described that a tribal member who gathered clams to feed a tribal function was ticketed; although many tribal members wanted to take it to court it was not brought before a judge. Two (2) interviews talked of this event; one reported that Oregon Department of Fish and Wildlife (ODF&W) didn’t want to prosecute the individual because the clams were to supply a tribal elders’ dinner. This incident happened around 2012, and was a relatively important issue in these interviews.

Another issue that came up several times was the tradition of gathering by proxy (2). When family members (or other elders in the community) have become unable to gather or fish themselves, younger family or tribal members will fish/hunt/gather enough to supply their own needs as well as that of the elders. But catch limits interfere with this practice. Another (1) interview reported that tribal members have stopped gathering at some traditional spots altogether because they don’t want to be harassed or risk being ticketed.

There are several examples of lack of understanding on what permits are required from the state for sustenance gathering. One (1) interview told a story in which a tribal member got a commercial license before collecting a large amount of clams for a tribal dinner. When he was stopped and questioned by law enforcement, the tribal member thought he was okay because he had obtained a license. The officer then asked for his Oregon Agricultural permit; the tribal member replied that since he wasn’t selling them he didn’t think he needed it. The officer replied that only family can do that, to which the tribal member replied, the event was for family. The
officer did not accept the explanation and gave him a ticket, “which would be for up to $6,000 and a year in jail”. When the court date came around it was postponed, twice. The third time the tribal member had to be out of the state for work for the tribe; his lawyer advised to plead “no contest”, and the violation is now on the tribal member’s record. Another interview reported that a tribal member had a tribal shellfish license and attempted to gather mussels at Seal Rock. The tribal member was told that they had to have a ceremonial take license from the tribe in order to exceed the state limit.

One place that was the center of several incidents was Yaquina Head. Most interviews that mentioned this area called the restricted area a “marine garden”. This area was a very heavily used area by tribal members, and is one “no take” designation that has significantly affected traditional practices. There were some differences of opinion as to whether the tribes were consulted appropriately when the marine garden no take restrictions were implemented. There are still tribal ordinances that allow gathering because the tribe does not recognize the marine garden designation. When tribal members were ticketed, the tribe engaged the Department of Justice, the U.S. Attorney’s Office, and the Bureau of Indian Affairs (BIA). By the participant’s recollection, ODF&W was in support of the tribe, and the state representatives were refusing the federal agencies’ requests for meetings. The issue of the tickets was resolved, but not regarding the marine gardens designation for tribal member gathering. One group interview involved several tribal members disagreeing on whether a state license was required within the area because the consent decree was in place as well. These examples highlight the lack of clarity for resource users in the implementation of overlapping policies.

Another issue that arose was the different law enforcement agencies’ approaches to enforcement. One interview reported that in the mid-1990’s a Bureau of Land Management
(BLM) officer called the state police to cite the tribal member on a “take” violation. The state police did not show up, and eventually the tribal member was let go. According to the participant, later the state director for the BLM contacted the tribe and “said it was not the BLM officer’s place to call state police.”

This has led to difficulties for enforcement officers as well. One (1) interview reported that when tribal members were digging clams, their group was between two other non-tribal member groups, one about 300 yards north, the other a couple hundred yards south. Game wardens came down and checked everyone in the group to the north, made a wide circle around the tribal member group, and checked everyone in the southern group. The game warden did not approach the tribal member group.

An interview (1) within the CTCLUSI reported a story on enforcement that bears retelling. The interview reported that years ago, game wardens ticketed them for overharvest, and CTCLUSI threatened to take the infraction to federal court; the case was dropped. When court cases are brought up now, the tribe’s stance has been to educate their tribal members to always carry their tribal ID to present to any law enforcement when it comes to take regulations. If the tribal ID is not accepted, then the tribe will support their members in court.
APPENDIX F

Cultural/Subsistence

The first set of maps are those species that were mentioned by participants as having importance, either for cultural or traditional subsistence uses. The sequence is by alphabetical order of the species group, not by the importance or significance of the species.

Figure 1A: Lamprey use by tribal members reported across the Oregon coast; A) Siletz and B) Coos River. Numbers correspond to number of times lamprey was reported.
Figure 2A: Salmon use by tribal members reported across the Oregon coast; A) Newport, B) Florence, C) Coos Bay. Numbers correspond to number of times a salmon species was reported.
Figure 3A: Starry Flounder use by tribal members reported across the Oregon coast; A) Newport, B) Coos Bay. Numbers correspond to number of times Starry Flounder was reported.
Figure 4A: Bass use by tribal members reported across the Oregon coast. Numbers correspond to number of times a bass species was reported.
Figure 5A: Flatfish use (incl. flounder, sole, sand dab, halibut) by tribal members reported across the Oregon coast; A) south of Tillamook, B) Newport, C) Coos Bay, D) Port Orford, E) whole coast (nearshore/offshore only). Numbers correspond to number of times a flatfish species was reported.

ODFW Designations

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Shoreline/Nearshore Tribal Use

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Nearshore/Offshore Tribal Use

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No data available for D) and E).
Figure 6A: Smelt and herring use by tribal members reported across the Oregon coast; A) Newport, B) Yachats, C) Coos Bay. Numbers correspond to number of times smelt or herring were reported.
Figure 7A: Greenling use by tribal members reported across the Oregon coast; A) Reedsport, B) Coos Bay, C) Port Orford. Numbers correspond to number of times a greenling species was reported.
Figure 8A: Sturgeon use by tribal members reported across the Oregon coast. Numbers correspond to number of times a sturgeon species was reported.
Figure 9A: Common crab use (incl. Dungeness Crab and Red Rock Crab) by tribal members reported across the Oregon coast; A) Tillamook, B) Lincoln City, C) Newport, D) Reedsport, E) Florence, F) Coos Bay. Numbers correspond to number of times a crab species was reported.
Figure 10A: Other crab species use (incl. Pea Crab, Spot-bellied Crab, Shield Back Crab, Purple Shore Crab, Japanese Red Rock Crab, Hermit Crab) by tribal members reported across the Oregon coast; A) Newport, B) Coos Bay. Numbers correspond to number of times an echinoderm species was reported.

Figure 11A: Olivella use by tribal members reported across the Oregon coast; A) Florence and B) Coos Bay. Numbers correspond to number of times Olivella was reported.
Figure 12A: Mussel use by tribal members reported across the Oregon coast; A) Lincoln City, B) Newport, C) Yachats, D) Reedsport, E) Coos Bay. Numbers correspond to number of times a mussel species was reported.
Figure 13A: Large mollusk use (incl. abalone and chiton) by tribal members reported across the Oregon coast; A) Yachats, B) Coos Bay, C) Port Orford. Numbers correspond to number of times an abalone or chiton species was reported.
Figure 14A: Echinoderm use (incl. sand dollar, red and purple urchin) by tribal members reported across the Oregon coast; A) Florence, B) Coos Bay, C) Port Orford. Numbers correspond to number of times an echinoderm species was reported.
Figure 15A: Beach shrimp (incl. Mud Shrimp and Sand Shrimp) use by tribal members reported across the Oregon coast; A) Newport, B) Florence, C) Coos Bay. Numbers correspond to number of times a beach shrimp species was reported.
Figure 16A: Shrimp use by tribal members reported across the Oregon coast; A) Newport, B) whole coast (nearshore/offshore only). Numbers correspond to number of times a shrimp species was reported.
Figure 17A: Barnacle use by tribal members reported across the Oregon coast: A) Florence, B) Coos Bay, C) Port Orford. Numbers correspond to number of times a barnacle species was reported.
Figure 18A: Oyster use (incl. native and non-native species) by tribal members reported across the Oregon coast. Numbers correspond to number of times an oyster species was reported.
Figure 19A: Seagrass use (incl. Eelgrass and Surf grass) by tribal members reported across the Oregon coast. Numbers correspond to number of times a sea grass species was reported.
APPENDIX G

Full References: All Chapters


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