

SUNSET BAY MANAGEMENT UNIT ROCKY SHORE AREAS



Nature
HISTORY
Discovery

Site Management Plan

2009



Sunset Bay Management Unit Rocky Shore Areas

Site Management Plan 2009

Oregon Parks & Recreation Department: Salem, Oregon

The mission of the Oregon Parks and Recreation Department is to provide and protect outstanding natural, scenic, cultural, historic and recreational sites for the enjoyment and education of present and future generations.

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EXECUTIVE SUMMARY

The Sunset Bay Management Unit State Parks are located approximately 10 miles southwest of Coos Bay, near Charleston, in Coos County, Oregon. The parks are located approximately 220 miles southwest of Portland and about 90 miles west of Roseburg. From north to south, the parks are: Yoakam Point State Natural Site (SNS), Sunset Bay State Park, Shore Acres State Park, and Cape Arago State Park.

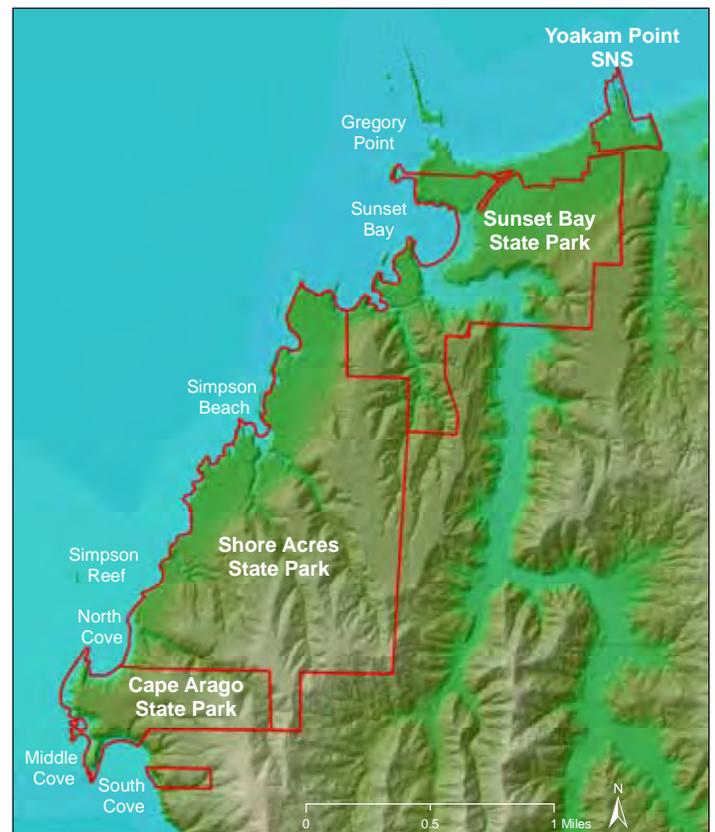
The focus of these plans is on improving management based on *existing* authorities and responsibilities. Current information is used, along with existing designations to work within Oregon Parks and Recreation Department (OPRD) jurisdiction, along with partner agencies to develop and implement this rocky shore areas site management plan. Upland issues not directly related to use of the ocean shore/rocky intertidal areas are not addressed in this plan. The plan will be used by OPRD staff, in consultation with its partners, to guide future rocky shore resource and recreation management, as well as minor facility improvements (e.g., trail maintenance, informational signage) and to improve interpretive opportunities. Advisory committees provided OPRD with their view of the issues and concerns, ideas and proposals for improving site management. Public input was used to refine the draft plan.

The reasons for a site planning process for these locations include the following primary objectives:

- Plan for public enjoyment and protection of state park and ocean shore resources
- Provide a forum for stakeholder discussion and participation about each site
- Understand the current management designations and what they mean for use and access for each site
- Direct and educate visitors through on-site interpretation about the importance of the rocky shore resource and the particular site designation
- Address current recreational use levels, activities and patterns, and determine how best to provide for recreational use without harming the rocky shore and state park resources.

A number of issues have been brought up through the public interview process, as well as staff and stakeholder

meetings regarding the parks within the Sunset Bay Management Unit. Issues that can be addressed in this planning process are reflected in the goals and/or resource management guidelines. Not every issue identified as part of this process is appropriate to address in this plan. For example, this is not a Master Plan, so no development proposals are being made. Therefore, those issues that cannot be reasonably addressed are mentioned for potential future consideration by OPRD in other appropriate programs. Some issues will be addressed through related follow-up work, including suggested future studies and work with agency partners. As an over arching principle, adaptive management will be employed to periodically review, and as appropriate update these goals and strategies.



Parks within the Sunset Bay Management Unit

Goals and Strategies Summary

The goals and strategies for management of the parks and adjacent rocky ocean shoreline are based on consideration of the recreation needs assessment, and evaluation of the issues identified in the planning process and summarized in this plan as well as statewide agency policies. Following

are summarized descriptions of the five main goals and potential strategies to achieve each goal. Strategies include individual steps or actions, which are designated with bullets and will be implemented when feasible and appropriate.

Goal 1: Provide recreation opportunities and experiences that are appropriate for the park resources and recreation settings.

Every effort will be made to provide visitors with an assortment of recreational experiences that continue to meet and exceed their expectations.

- Develop or rehabilitate recreational facilities, guided by indicators of need, the recreation settings, resource suitability, and the capacities of the parks to accommodate use without overcrowding, degradation of recreation experience, or conflicts with other uses.
- Discourage recreational activities that threaten to harm the natural, cultural or scenic resources and/or the safety of the visitors. Alternatively or in combination with discouragement, re-route them to alternate locations that are less sensitive.

The need for maintaining the current day-use experiences for park visitors is recognized, but potential future activities need to be anticipated. This is based on the anticipated increase in demand for recreation and recognizing parks needs to meet future visitor expectations. The current capacity for day-use in the management unit is at the right level given space and natural resource restrictions. There is no viable opportunity to increase parking capacity, therefore, there is the potential for the parks to be “at-capacity” more often than they are currently and those that experience crowding may increase.

- Explore the feasibility of options for monitoring access/tracking (e.g., a “trail log” book or check-in station for large groups). Consider whether crowding is occurring and needs to be managed.
- Provide information to visitors about other coastal parks and accesses that offer similar or complementary experiences.
- Coordinate with school groups to help minimize crowding and improve their educational experience at the parks. Determine the appropriate maximum number of busses and look at providing designated parking. Look at opportunities to work with the school districts

to coordinate scheduling of school visits.

- Explore options for improving services to visitors with disabilities.
- Investigate ways to improve facilities and services to accommodate Oregon’s youth. Work to develop partnerships with recreation providers that encourage youth outdoor exploration and interpretation.

The anticipated increase in future demand for recreational activities includes activities such as walking, hiking, tidepooling and generally ocean beach activities.

- Continue to provide and maintain opportunities for these key recreational activities. As new trends emerge, consider the feasibility of providing for those at the parks.

Goal 2: Protect, manage and enhance as appropriate, outstanding scenic, cultural and natural resources.

Enjoyment and appreciation of resources will be enhanced while protecting those resources from effects of overuse.

Scenic resources:

One important aspect of visiting the parks is the views of some of the major features at Gregory Point, Simpson Reef and the other offshore features in the area. These views focus on the ocean and more specifically, at the overlook, of the geologic features of the unique coastline of the Cape Arago area.

- Retain the scenic attraction of key natural features. Unforeseen future actions may impair views and efforts will be made to minimize the possibility for negative impacts on key viewsheds and features within the parks and adjacent ocean shore.
- Retain or restore existing vegetation when vital to scenic values.
- Avoid or minimize obstruction of existing views of the ocean and beaches.
- Blend new additions to the landscape with the existing shoreline scenery (e.g., type of construction, color).

Cultural resources:

The park land is an important traditional-use area of several tribes and their cultural heritage within the area is of considerable antiquity. In addition to pre-contact and historic archaeological sites, Oregon tribes who are affiliated with the area view cultural resources as those resources that continue to be used by Native peoples, such

as foods, medicines and basketry materials.

- Preserve and protect the cultural heritage of the parks in consultation with the tribes.
- Consult, as appropriate, with the various tribes to identify potential interpretive themes/stories to highlight at the parks.

Natural resources:

It will likely be necessary for OPRD to consult with other agencies and stakeholders to determine whether there are changes desired in ecosystem types or conditions over time and as new information becomes available. As resources become available, additional inventories and research will be completed and evaluated for the presence of threats and opportunities.

- Develop long-term monitoring of the high use intertidal areas (and complementary control areas) to track potential impacts of visitor use (this may be part of a coast-wide strategy).
- Determine if there are times when visitation has less/more of an impact and use that information to inform visitors about best times to visit.
- Study the recreational carrying capacity for the rocky shores within this area.
- Continue to monitor the effectiveness of the seasonal trail closure at North Cove and continue the closure to protect marine mammal pups.
- Work with partners to explore opportunities for monitoring impacts to wildlife.

The resources will be managed to minimize any unacceptable threats or to attain desired ecosystem conditions and types.

- Use scientific information to adaptively manage as new information becomes available.
- Continue to enforce current rules, including coordinating with partners on cross-jurisdictional issues. Explore partnership opportunities.
- Prohibit the harvest of seaweed without a research permit within the boundaries of the research reserve.
- On-site staff and/or volunteers will discourage illegal collection and efforts will be made to improve signage and increase voluntary compliance.
- As deemed appropriate based on monitoring and scientific research, and in coordination with appropriate agencies and stakeholders, implement temporary rotational area closures as necessary to allow recovery of intertidal areas receiving greatest use.

- Identify potential habitats for “species of interest” found within the park boundaries and adjacent ocean shore. Update the list and develop a monitoring plan, as appropriate.
- Work with Federal, State and Local agencies and other interested groups to protect at-risk species, their habitats, and identify opportunities to improve key habitats and minimize negative interactions with visitors to assist with species survival and recovery.
- Work with partners to develop a site response plan for introduced aquatic/marine invasive species (likely as part of a larger coastal or regional plan).
- Develop a site specific management procedure for strandings (e.g., marine mammals) and emergency response (e.g., beach safety, hazardous materials) on the beach and rocky shore.
- Work with partner agencies who are attempting to resolve environmental and safety risks associated with pollution that have the potential to effect park or ocean shore resources and/or present safety risks to park visitors.

Goal 3: Provide for adequate management, maintenance, rehabilitation, and park operations including safe, efficient, identifiable and pleasant access and circulation.

To the extent that resources are available, recreational activities and facilities will be managed, maintained, rehabilitated and operated as needed for the safety, satisfaction and enjoyment of visitors and local citizens. In allocating state park operational and facility investment funds, strive to provide adequate support for the maintenance and rehabilitation of existing facilities, and an adequate level of oversight and enforcement in the parks and adjacent ocean shore.

- Continue routine maintenance of the South and North Cove access trail.
- Routine maintenance of the parking lots (including striping) may be able to help with appropriate parking of larger vehicles.
- As necessary and practicable, develop a site assessment and beach recreation safety plan (this could be part of a larger coastal or regional plan).
- Consider long-term solutions as the North Cove trail continues to degrade.
- Temporarily close the North Cove trail should access

- be deemed hazardous for visitors and while solutions (temporary and long-term) are being sought.
- Continue to treat the access at Middle Cove as “unofficial” and un-maintained.
 - Maintain and install directional and informational signage to direct vehicular and pedestrian traffic.
 - Look at long-term solutions to parking issues as they develop, such as signage.
 - Plant, remove and prune designed landscape areas where needed to beautify roads and parking areas, retain scenic views, and provide visual buffers within the parks.

Goal 4: Promote public awareness, understanding, appreciation, and enjoyment of the recreation settings through resource interpretation.

OPRD will strive to share and interpret park and local history along with geologic and natural resources with a wider audience. The interesting local history, unique geology and ocean shore and marine resources make the Sunset Bay/Cape Arago area an outstanding location for interpretation. There is a great opportunity to educate visitors, especially since the majority of them have been to these sites before and plan to return in the future. Even those that are visiting for the first time believe that they are highly likely to return in the future.

OPRD has a wonderful opportunity to get in touch with visitors, particularly those to South Cove and the Sunset Bay Campground. The primary way visitors found out about South Cove is from either a state park flyer or staff. These points of contact needs to be capitalized upon as it would be possible to provide visitors with targeted information to improve their visit and reduce impacts to the rocky shore.

The vast majority of visitors to both sites (Sunset Bay and South Cove) surveyed indicated they are interested in learning more about rocky shores/tidepools on a future visit. The preferred method of receiving this information was through on-site staff (either by guided tour or roving ranger).

- Building upon the existing Coos I Interpretive Plan, develop a site specific rocky shore interpretive plan that includes themes, signage guidance, recommended programs and materials. In the meantime, use the

- existing plan as guidance for interpretive services.
- Work with partners to improve on-site interpretive services.
- Organize OPRD led groups so that they avoid peak visitation periods.
- Encourage groups to visit during days that do not necessarily have the lowest tides of the year. This will help spread out visitation and improve visitor experiences while helping to protect the resource.
- Improve visitor awareness and understanding of the special protected status of the marine protected area and research reserve.
- Deliver consistent messages about tidepool etiquette, including encouraging rocky shore recreation (including OPRD facilitated trips) to occur at the sand/rock interface.
- Determine the best method of reaching out to schools. Provide interpretive services to school groups to improve their educational experience at the parks.
- Coordinate with the tribes on any interpretive stories that relate to cultural resources.
- Provide information to harness the increasing availability and interest of aging Oregonians in volunteering in their communities.
- Communicate information about park resources and services on the OPRD website. Use social networking sites to provide up-to-date information, particularly interpretive events.
- Provide information on OPRD produced tide-charts (e.g., a link to access the tide-chart online, information on rocky shores etiquette and ecology).

Goal 5: Form partnership and agreements to aid in achieving goals

Many of the issues identified in the scoping for these parks identified partners as part of the solution.

- Identify and follow-through with viable potential partnerships, as practicable, to work through the above listed activities, and new ones that emerge in the future.
- Promote the use of the above goals and strategies when working with others as partners in joint activities.

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INTRODUCTION

Oregon's rocky intertidal areas are subject to increasing human disturbance as population and interest in coastal recreation in these areas grows. Tidepools, cliffs, rocks, and submerged reefs support an ecologically rich and diverse ecosystem at the boundary of the land and sea along 161 miles (41%) of Oregon's shoreline. These rocky shore areas, particularly the 82 miles (21%) of rocky intertidal habitat (fig. 1), attract thousands of visitors annually.

Oregon Parks and Recreation Department (OPRD) is charged with overseeing the management of Oregon's Ocean Shore State Recreation Area (Ocean Shore), which includes beaches and rocky intertidal areas along the coast. However, there is very little information about visitor use of Oregon's rocky shores and what impact visitors are having. OPRD recently completed a survey of Oregon's sandy beaches, however, the rocky shore segments of the coast were not covered (Shelby and Tokarczyk, 2002; OPRD, 2005). General day-use figures at coastal state parks indicate that use of rocky intertidal areas

is likely increasing with the possibility of hundreds of thousands of people visiting these areas annually (fig. 2).

People use the rocky shores to play, conduct scientific research, supplement their livelihoods, perform traditional tribal activities, harvest food, and to teach and learn about nature. From exploring the unique creatures of the rocky intertidal to fishing from rocky outcroppings and observing marine mammals, activities on Oregon's rocky shores are diverse. The rocky shores have ecologic, economic, and social value to a wide range of stakeholders, from local communities to citizens of the world.



Visitors learn about tidepools at Neptune State Scenic Viewpoint on Oregon's central coast

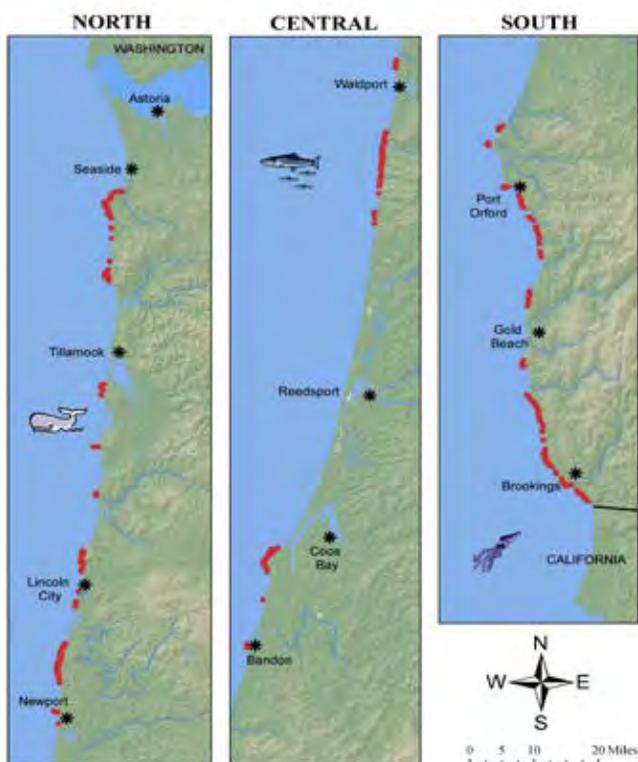


Figure 1. Rocky intertidal habitat along the Oregon Coast

Although sixty-one percent of the visitors to Oregon's beaches are Oregonians, a large number are from out of state, drawn for various reasons to the unique and beautiful coast (Shelby and Tokarczyk, 2002). Therefore, although Oregon's population increase is likely to be reflected in visitor use of coastal areas, out-of state visitors will also play a role. Tourist revenue in Oregon's coastal counties is increasing, which suggests that more out-of-state visitors are using Oregon's coast (Dean Runyan Associates, 2004). This increase in population and tourism is also reflected in visits to Oregon's state parks next to rocky shores (fig. 2).

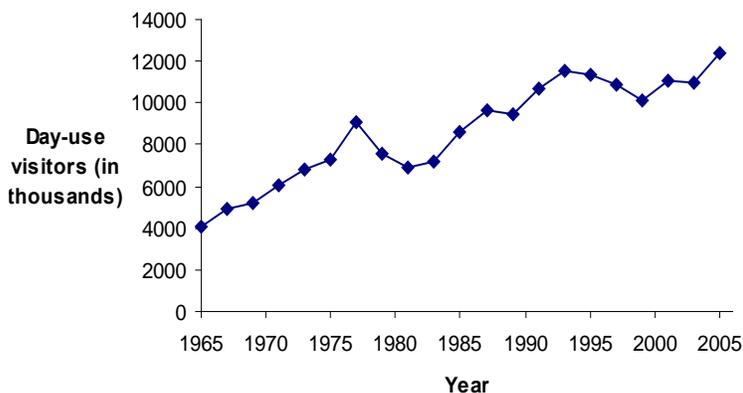


Figure 2. Human use trends for rocky shore adjacent Oregon State Parks from 1965-2005. Data comes from automated parking lots counters.

Two of Oregon's coastal resources that depend upon rocky shore areas (marine wildlife and tidepools) have been identified by coastal visitors as ones they are most interested in learning about (Shelby and Tokarczyk, 2002). Additionally, results from a study of recreation preferences of Oregon's aging population show that more than half (59%) of Oregonians aged 42-80 take part in ocean beach activities, and 37% spend time exploring tidepools (OPRD, 2007).

Oregonians age 42-80 rank ocean beach activities and exploring tidepools as their fifth and eighth favorite forms of outdoor recreation (OPRD, 2007). Based on the survey, that use is evenly distributed among income brackets, likely because it is virtually cost-free, except for traveling to the sites. Oregonians in this age bracket make up 42% of Oregon's population (PRC, 2005), which indicates at least approximately 600,000 people explore Oregon's tidepools each year. This is similar to the results from a recent survey on Fishing, Hunting, Wildlife Viewing, and Shellfishing in Oregon in which tidepooling was listed as a type of wildlife viewing (Dean Runyan Associates, 2009). Results relevant to rocky shores for the South Coast and statewide totals are shown in Table 1.

Impacts of human use on rocky shore areas range from the effects of trampling on sensitive intertidal habitat (Brosnan and Crumrine, 1994), to collection of intertidal resources (Castilla, 1999) and conflicts between humans and marine wildlife (Riemer and Brown, 1997). Comprehensive, interdisciplinary

Table 1. Wildlife Viewing Trips in Oregon by Type of Wildlife Viewed (in Thousands). Source: Dean Runyan Associates, 2009

	Marine		
	Birds	Mammals	Tidepools
South Coast			
Overnight	76	34	10
Day (50+ miles)	50	30	10
Local (under 50 miles)	69	33	25
TOTAL	195	97	45
Percent of statewide total	3.5	15.0	8.3
Statewide Total			
Overnight	1459	278	259
Day (50+ miles)	1063	159	129
Local (under 50 miles)	3032	208	154
TOTAL	5554	645	542

Note: Trip estimates are for Oregon residents and nonresidents.

management of rocky shores that recognizes the need to balance visitor use and natural resource stewardship is crucial to successful coastal management.

One of the potential impacts on rocky intertidal areas is human recreation; therefore, to better manage the interface between human use and natural resources, information about visitor use numbers, recreation types and impact of human use is needed. This information is also helpful when looking at ways to improve recreational and interpretive opportunities at these locations.

PURPOSE

As a first step towards achieving this goal of improved management, visitor use and biological data was collected at two rocky intertidal areas along the southern Oregon coast, South Cove Cape Arago and Sunset Bay State Park between May and August of 2008. This information, in conjunction with input from management and advisory committees was used to develop the following site management plan for those two sites, as well as the other rocky shore areas within the Sunset Bay District Management Unit. Those parks, from north to south are: Yoakam Point State Natural Site, Sunset Bay State Park,

Shore Acres State Park, and Cape Arago State Park. An overview diagram of the planning process is presented in figure 3.

The focus of this plan is on improving management based on *existing* authorities and responsibilities. Current information is used, along with existing designations to work within OPRD jurisdiction, along with partner agencies to develop and implement this rocky shore areas site management plan. Upland issues not directly related to use of the ocean shore/rocky intertidal areas, or upland activities that could impact the rocky shores, are not addressed in this plan. Rocky shores are a dynamic ecosystem in which a lot of change occurs naturally. However, for those activities that are managed, OPRD plans to use this document to help anticipate, adaptively manage, and reduce the negative impacts of future actions.

The plan will be used by OPRD staff, in consultation with its partners, to guide future rocky shore resource and recreation management, as well as minor facility improvements (e.g., trail maintenance, informational signage) and to enhance interpretive opportunities. Advisory committees provided OPRD with their view of the issues and concerns, ideas and proposals for improving site management. Public input accepted during a public meeting as well as a 30-day comment period was used to refine the draft plan.

Site management plan goals and objectives

The general goals presented in this site management plan are in keeping with OPRD's mission to "provide and protect outstanding natural, scenic, cultural, historic and recreational sites for the enjoyment and education of present and future generations." The following general goals and site planning objectives are fleshed out in more detail based on the specific sites and are intended to provide for an appropriate balance between rocky shore resource protection and public recreational access and enjoyment.

The general goals addressed in the following site management plan are the following:

- Protect, manage and enhance as appropriate,

outstanding natural, cultural and scenic resources in the parks.

- Provide recreation opportunities and experiences that are appropriate for the park resources and recreation settings.
- Provide for adequate management, maintenance, rehabilitation, and park operations.
- Provide for safe, efficient, identifiable and pleasant access and circulation.
- Promote public awareness, understanding, appreciation, and enjoyment of the recreation settings through resource interpretation.
- Form partnership and agreements to aid in achieving goals.

OPRD wants to take a closer look at how to best manage these sites, particularly the rocky shore resource and public use of it, as well as to learn how to best offer educational opportunities for visitors to understand the resource and its importance. In Oregon's Ocean Shore Management Plan, the need to do this type of site based management was recognized, and a recommendation was made to prepare such plans (OPRD, 2005). This effort is the first attempt to follow through with that recommendation. A review of Oregon's current management of rocky shore areas was also conducted, and completing site management plans was one of the primary recommendations (Hillmann, 2006).

The reasons for a site planning process for these locations include the following primary objectives:

- Plan for public enjoyment and protection of state park and ocean shore resources.
- Provide a forum for stakeholder discussion and participation about each site.
- Understand the current management designations and what they mean for use and access for each site.
- Direct and educate visitors through on-site interpretation about the importance of the rocky shore resource and the particular site designation.
- Address current recreational use levels, activities and patterns, and determine how best to provide for recreational use without harming the rocky shore and state park resources.

Site Planning Process

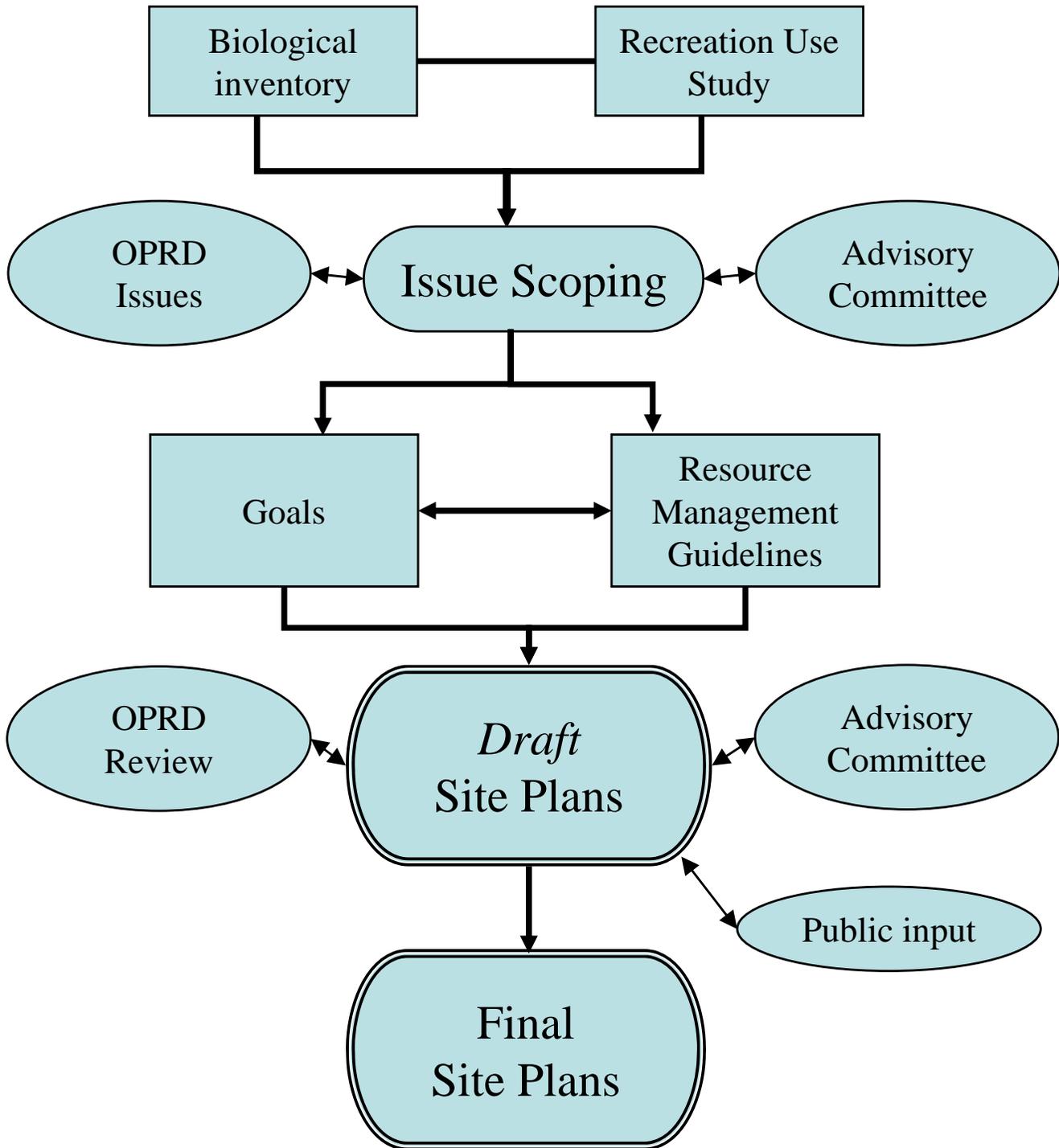
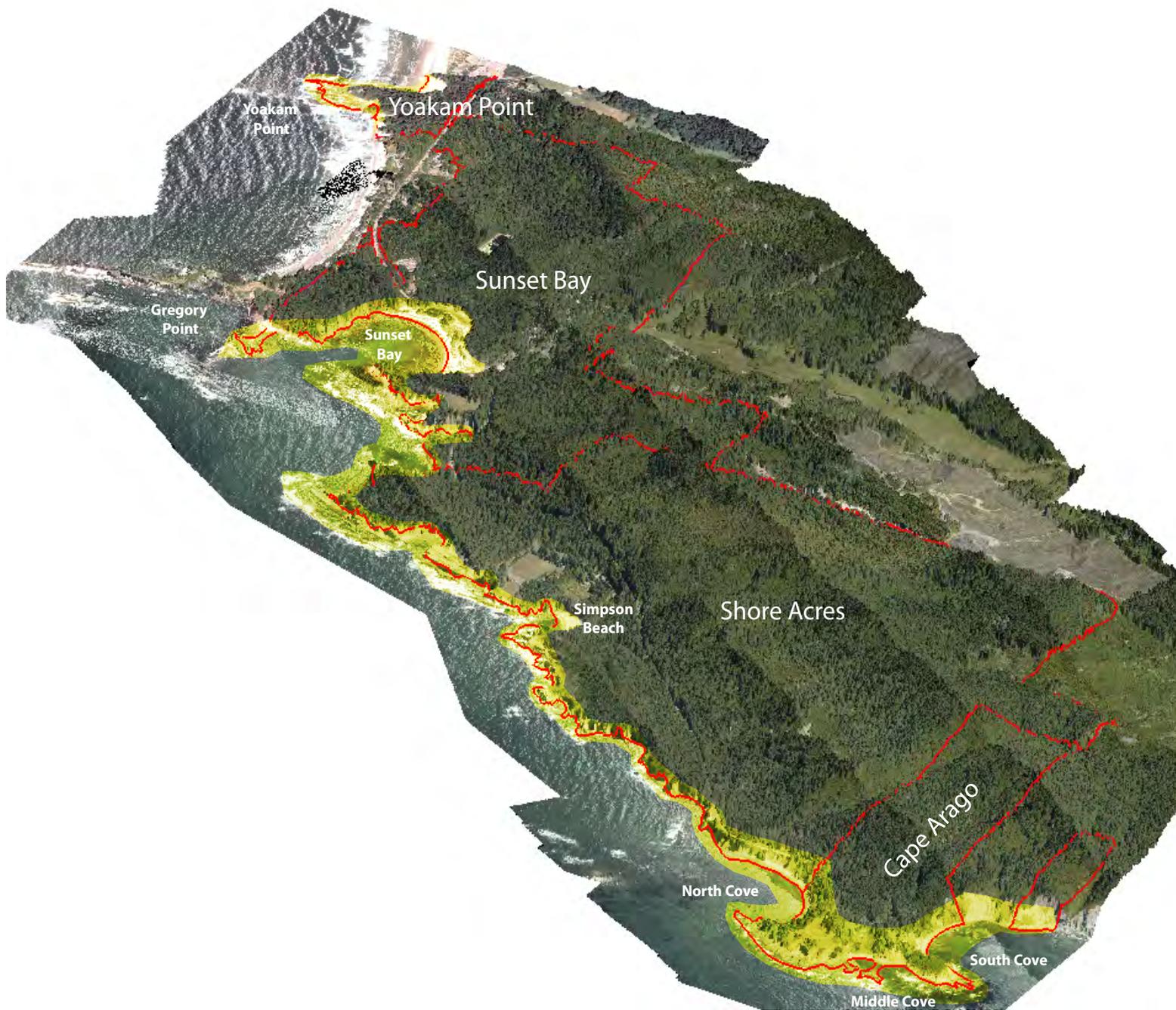


Figure 3. Flow chart showing the planning process for rocky shore site planning

Yoakum Point



Aerial photo of the Sunset Bay Management Unit Rocky Shore Parks from Yoakam Point to Cape Arago. The scope of this plan is the rocky shoreline and related issues (the approximate area of interest is highlighted in yellow on this map, approximate park boundaries are in red).



Aerial photo of Yoakam Point shoreline



Aerial photo of Sunset Bay shoreline



Aerial photo of Shore Acres shoreline



Aerial photo of Cape Arago shoreline

Existing Conditions

Location:

The Sunset Bay Management Unit State Parks are located approximately 10 miles southwest of Coos Bay, near Charleston, in Coos County, Oregon. The parks are located approximately 220 miles southwest of Portland and about 90 miles west of Roseburg (fig. 4). From north to south, the parks are: Yoakam Point State Natural Site (SNS), Sunset Bay State Park, Shore Acres State Park, and Cape Arago State Park.

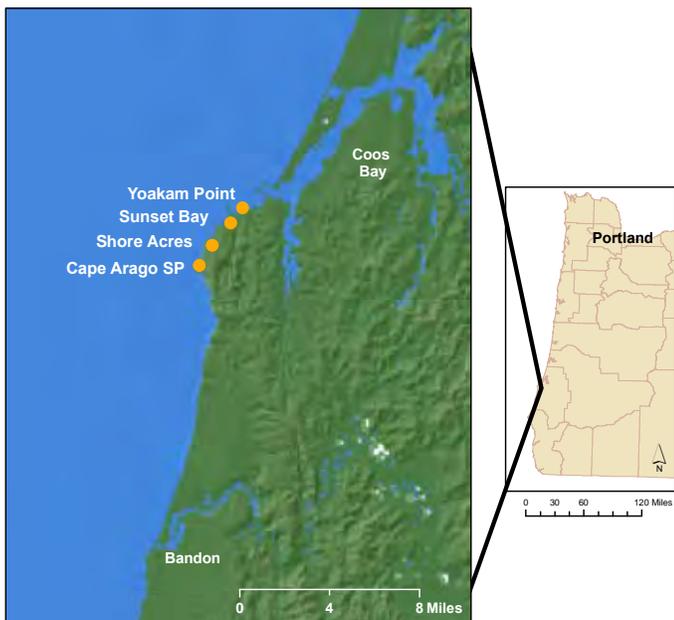
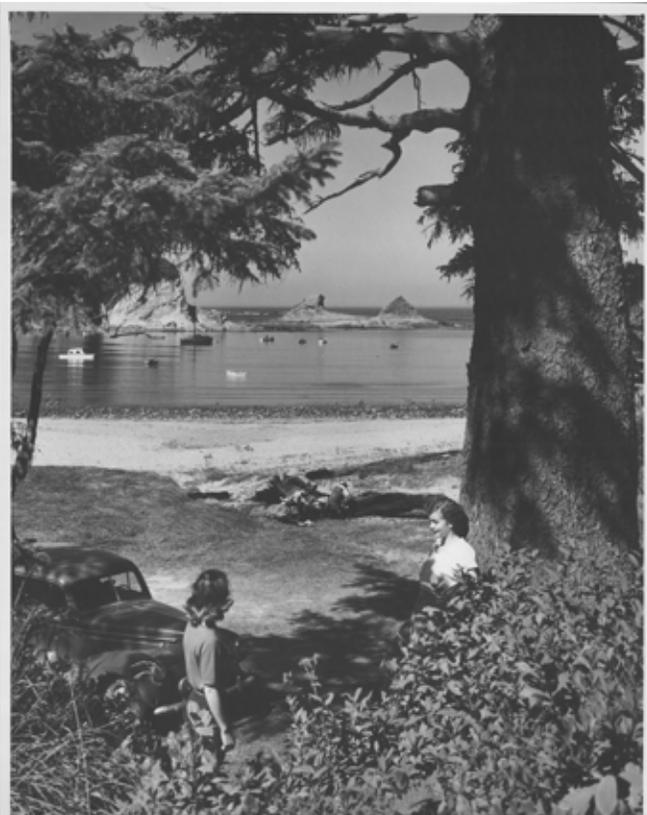


Figure 4. Location of Sunset Bay Parks on the Oregon coast

Description:

The Cape Arago headland is characterized by “steep cliffs, numerous offshore rocks, extensive rocky intertidal and subtidal reefs, and small sand beaches (Fox et. al., 1994).” The geology is primarily comprised of sandstone and siltstone, with low sloping platforms, small surge channels and cracks, along with boulder and cobble habitats (Fox et. al., 1994).

The Sunset Bay/Cape Arago parks have been a popular tourist destination since the early 20th century, but the Cape was “discovered” much earlier. Noted by Captain James Cook in 1778, he named the headland “Cape Gregory”, however, it was renamed



Sunset Bay, Oregon Highway Commission (circa 1950)

in 1850 as “Cape Arago” (Ehlen, 1967). Sunset Bay was named by Thomas Hirst, an early Coos Bay settler. Historically, it was used as a safe harbor during stormy weather. Some say, it was a haven for pirate ships. South Cove was possibly even a brief stop for the historical Drake circumnavigation in 1579 when Drake anchored in a “bad bay” somewhere on the west coast. Some have suggested that this could have been Chetco Cove, Whale Cove or possibly not in Oregon at all (Langille, 1947; Ehlen, 1967).

The headland is one of the most scenic in the state, with rugged shorelines, dramatic cliffs, and protected rocky coves and sandy beaches. The parks are a popular destination for tourists. Recreational pursuits include beachcombing, tidepooling, swimming, surfing, fishing, boating/kayaking, picnicking, wildlife viewing and sightseeing. Camping is available at Sunset Bay. The Cape Arago headland parks are “the” answer to the question “where should I go tidepooling” on the central south coast, with virtually no other significant areas until Florence to the north

Sunset Bay MU Rocky Shores: Existing Conditions

and Bandon to the south. Cape Arago attracts visitors from around the world.

Yoakam Point State Natural Site (SNS)

The 25.52-acre OPRD property known as Yoakam Point SNS provides public beach access on both the northern and southern ends of the small headland, also known locally as Mussel Point/Reef (fig. 5). From the north end, public access is via the southern end of Bastendorff Beach, from which the Oregon Coast Trail can be accessed. On the south end, access is via a pull-off on the Cape Arago Highway. The property is undeveloped, with access trails and a small parking pull-out being the only park provided amenities currently available.



Yoakam Point Shoreline

Sunset Bay State Park

The approximately 430-acre OPRD property known as Sunset Bay State Park provides easy public access to the entire bay (fig. 5). The northern intertidal area at Sunset Bay is primarily a large wave-cut bench, on which faults can be easily seen at low tide (ORE BIN, 1967). The southern intertidal area is also primarily a wave-cut bench with long ridges made of resistant sandstone (ORE BIN, 1967). Big Creek flows into the bay on the southern end after winding through the campground and the picnic/day-use area. Access to the shoreline is also possible at Norton Gulch, via a small pull-off and a portion of the Oregon Coast Trail.



Sunset Bay intertidal area, north end of the bay

Shore Acres State Park

The approximately 745-acre Shore Acre property provides beach access at Simpson Beach, accessible from a road pull-off and a trail near the formal gardens. The majority of the rocky shoreline, characterized by unique rugged sandstone cliffs, provides visual-only or very difficult access to the cliffs. The Oregon Coast Trail provides stunning views of this portion of the coastline, skirting along cliff's edges, particularly popular for storm and whale-watching. A viewing deck, with spotting scopes and interpretive signage, is provided by the US Fish & Wildlife Service for viewing the wildlife on Simpson Reef.



Simpson Beach, Shore Acres State Park

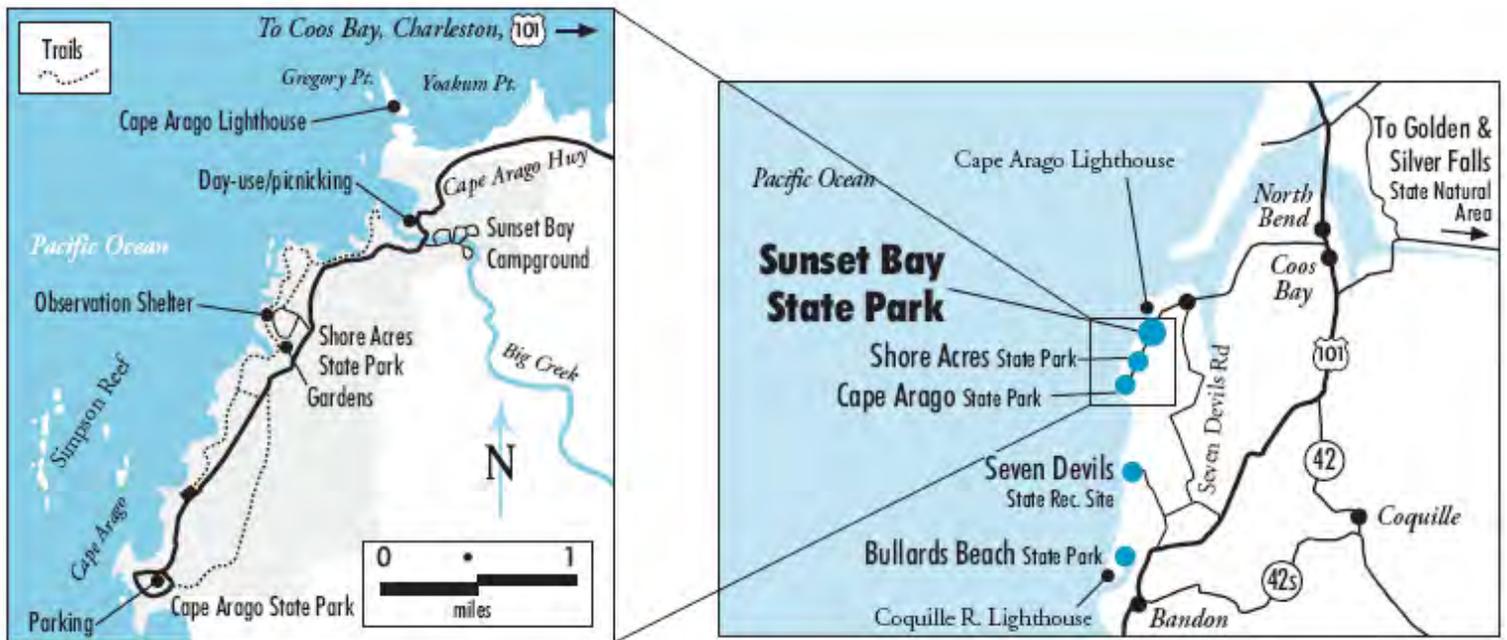


Figure 5. Maps showing the Yoakam Point to Cape Arago area and the immediate vicinity (Source: OPRD)

The park is well-known for the formal gardens, restored to continue the legacy of Louis J. Simpson, a pioneer lumberman and shipbuilder whose family donated the majority of the current park property. On the site of the former Simpson mansion, an observation building (containing interpretive panels about the local history) provides refuge from the often harsh coastal weather.

Cape Arago State Park

The 146-acre OPRD property known as Cape Arago State Park provides multiple public accesses to the rocky shore. The area is generally described as being separated out into three coves: North, Middle, and South Cove. In this plan, any mention of these coves (North, Middle, South) refers to the coves within Cape Arago State Park. The only developed, park maintained access trails are at North and South Cove. The trail down to North Cove is closed seasonally from March 1-June 30th to protect seal pups that use the beach. South Cove is on the southern boundary of the park and a steep, primarily paved trail winds down to provide beach access. Limited parking is available at the trailhead, but it is a

short walk to the multiple parking areas slightly to the north along the main road. South Cove is a popular destination for school field trips in the spring and early summer.



South Cove intertidal visitors, viewing the north end of the bay

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Classifications:

State Natural Sites

Yoakam Point is classified by OPRD as a State Natural Site (SNS). The primary purpose of a SNS is to protect important ecosystem components and provide public interpretation and education. Natural resources are the predominant resource at the property. "Natural" resources are defined as components of the larger ecosystem. A component could be a smaller ecosystem or a portion of an ecosystem such as a plant or animal community, a wetland, or single plant species occurrence. Components could also be important geological features or formations (OPRD, 1995).

Generally, use levels are intended to be low to moderate. However, public enjoyment and education is to be accommodated as is appropriate based on site and resource constraints. Management priorities at SNSs are to maintain long term resource quality and provide interpretive devices and structures (OPRD, 1995).

State Parks

The other properties in the area are all classified by OPRD as State Parks. The primary purpose of a state park is to provide a variety of general outdoor recreational uses within an extensive scenic setting. Scenic resources are the predominant resource at the properties. There are also likely to be general recreation as well as some natural, cultural or historic resources as well (OPRD, 1995).

Intended level of uses ranges from high to periodically moderate. Management priorities at State Parks are to protect the scenic values while providing high levels of visitor uses. This may include protecting special natural or cultural resource areas (OPRD, 1995).

Other classifications include the status of the site as an Oregon Department of Fish and Wildlife (ODFW) Research Reserve (fig. 6). Collection of shellfish and other marine invertebrates is prohibited in a portion of the reserve (Areas A and C), except that scientific research permits may be issued. The Cape Arago Research Reserve includes:

"Area A: All rocky areas, tide pools, and sand beaches situated between extreme high tide and extreme low tide lying between a line projected due west from the Cape Arago lighthouse and the southern tip of Norton Gulch.

Area B: All rocky areas, tide pools, and sand beaches situated between extreme high tide and extreme low tide lying between the southern tip of Norton Gulch and Simpson Reef overlook.

Area C: All rocky areas, tide pools, and sand beaches situated between extreme high tide and extreme low tide lying between Simpson Reef overlook and a point $\frac{3}{4}$ of a mile south of Cape Arago State Park (ODFW, 2009)."

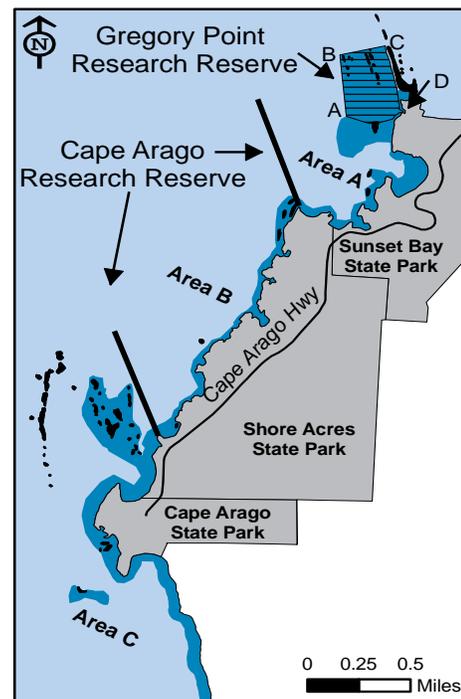


Figure 6. Research reserve boundaries (Source: 2009 ODFW Sport Fishing Regulations)

The Gregory Point area is also a subtidal research reserve, although it is entirely beyond the jurisdiction of OPRD, as it starts at extreme low tide. It is closed to the take of shellfish and marine invertebrates except by scientific research permit (ODFW, 2009).

These areas are also listed in the Oregon Territorial Sea Plan (TSP) as amended in 2001 in the section

entitled “Rocky Shore Management at Cape Arago” (OPAC, 2001). This site was a intertidal permit area prior to the TSP being published, and per the amended section, it remains, essentially the same by name but the restrictions differ slightly. The area is also now designated an “Intertidal Marine Protected Area” for public awareness purposes. This special identity is intended to promote responsible visitation and stewardship to intertidal areas by the public (OPAC, 2001). There are a few management guidelines that go along with listing in the TSP (OPAC, 1994). Those are discussed in the Natural Resource Management Section.



Signage at the top of the trail down to South Cove Cape Arago

The Simpson Reef and North Cove area is also proposed for designation in the Oregon Natural Heritage Plan as a Natural Heritage Conservation Area (Oregon Natural Heritage Program, 2003).

The Cape Arago/Seven Devil’s Area is also being considered as an area of interest for developing a proposal for a potential future marine reserve. However, this process is in the very beginning stages, and will not be addressed in this plan. Adaptive management will be necessary if any of the sites within this plan become part of a future marine reserve.

Facilities:

OPRD facilities at the sites are typical of beach access and scenic overlook day-use areas, with the addition of camping facilities at Sunset Bay State Park and the elaborate garden and historical features of Shore Acres State Park. For the purposes of this plan, the focus is on ocean shore access and interpretation, so facilities not pertinent to that topic are not described.

Since three of the four properties are contiguous, for the public, it almost seems like the entire area is one large park. This feeling is enhanced by the fact that the loop road ends at Cape Arago, giving the sense that the whole park complex is in its own special area (sometimes even described as the “end of the world”). Parking is dispersed in a variety of parking lots along the entire stretch of the Cape Arago Highway within the four parks.

Yoakam Point

Day use parking for approximately 6 vehicles is in a gravel lot adjacent to the Cape Arago Highway. It is from this parking lot that the trail winds down to the access point. Parking is essentially, along with the trail itself, the only amenity provided at this park property.

Sunset Bay

Four main day-use lots provide beach access, the north, middle, beach and south lots. The north lot is by the boat ramp (27 spots), the middle lot is near the restroom (32), the beach lot is on the south end of the beach (39) and the south lot is closest to the campground and the gazebo shelter (36). Together all of these lots provide a capacity for 134 vehicles.

A boat ramp consists of asphalt and concrete running up to the sandy beach and provides one of the only direct ocean access points in the area for launching boats where you do not have to cross a bar.

Other facilities at the park include a full-service campground with close proximity to the day-use area, a restroom building, an enclosed day-use/group picnic gazebo, and a variety of picnic tables and trails.

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Shore Acres

The main visitor parking lot provides paved parking for 72 vehicles. An overflow lot provides gravel parking for 48 vehicles. The Simpson Reef overlook parking area provides parking for 14 vehicles. Viewing telescopes are located at the Simpson Reef Overlook along with several interpretive panels. The facilities at the Overlook were developed through a partnership with the USFWS and the Friends of Shore Acres Inc.



Simpson Reef overlook interpretive panels, Shore Acres State Park

At the Shore Acres park proper, there is a partially enclosed observation building with interpretive panels. There is a beach access trail from the formal gardens to Simpson Beach. Access is also possible from a trail leading down from a small turn-out parking area off the highway.



Observation shelter, Shore Acres State Park (OPRD)

Cape Arago

The parking lot on the south end, by South Cove (19),

together with middle (9), north (3), picnic shelter (9), and west parking lots (30) provide for a capacity of 70 cars. The only shore level officially maintained trails are at North Cove and South Cove. They are paved, for at least a portion of the trail, although both degrade as they become susceptible to the forces of the Pacific at the end. A portion of the South Cove trail includes stairs.

There are a variety of benches, picnic tables, as well as a restroom facility and a covered picnic shelter. Picnic tables and benches provide a venue from which to enjoy the dramatic views.



Picnic tables near North Cove, Cape Arago State Park (OPRD)

Neighborhood and Zoning:

The parks are, for the most part, on their own out on the Cape Arago headland area, with the exception of Yoakam Point which sits adjacent to private property. The Cape Arago Highway runs from Charleston to the end of the road at Cape Arago State Park. The parks are fronted by the Pacific Ocean on one side and by private landowners. The park properties are zoned for recreation and park use (REC) by Coos County. These parks are included in a master plan for the "Sunset Bay District Parks" (OPRD, 1986). Most of Yoakam Point is under the "protection" category (either primary or secondary), with the remainder listed under "limited development" (the flat area around the existing parking area). No development is

proposed. The majority of Sunset Bay, Cape Arago and Shore Acres is also listed under “secondary protection.” Some “limited” and “major development” exists, mainly where there is currently development, including the day-use parking areas, campground and along the highway.

Acquisition and Ownership:

The state acquired these properties over a number of years through a combination of land purchases and donations from a variety of parties.

Yoakam Point

The entire property was purchased from two families in 1969.

Sunset Bay

This property was acquired between 1948 and 2007 through a combination of land sales from numerous private citizens/organizations, the federal government and one transfer from Coos County. The most recent acquisition was through a donation from The Nature Conservancy.

Shore Acres

This property was acquired through a combination of donations and purchases between 1942 and 1980. The majority of the property was donated to the state by the Simpson Family in 1942. Most of the rest was purchased by the Department of Interior or private owners in ensuing years.

Cape Arago

The entirety of the park property was donated, the majority from the Simpson family in 1932, and the remainder from the Thompson family in 1997.

Natural Resources:

Resources include diverse intertidal plant and animal communities, seabird nesting sites and use of the offshore rocks by marine mammals (OPAC, 1994). The Shell Island/Simpson Reef area is one of the most important areas in the state for marine mammals, for both hauling-out and pupping. It is the largest haulout for California sea lions (*Zalophus californianus*) in the state and outside the Columbia

River, the largest pupping site for harbor seals (*Phoca vitulina*) (OPAC, 1994). Threatened Steller sea lions (*Eumetopias jubatus*) also use the site, as well as the occasional northern fur seal (*Callorhinus ursinus*) and even the rarely sighted sea otter (*Enhydra lutris*) (ODFW, 2008). Northern elephant seals (*Mirounga angustirostris*) also use the site, with Shell Island being their northernmost breeding site on the Pacific coast (USFWS, 2009a).

The U.S. Fish and Wildlife Service’s (USFWS) Oregon Coast National Wildlife Refuge Complex manages many important and sensitive rocks and islands in the waters adjacent to the parks. These areas provide important breeding and resting habitat for seabirds and marine mammals. All of the rocks, reefs and islands that are surrounded by water at mean high tide are protected and managed by the USFWS and are closed permanently to all public use (Dawn Grafe, pers. comm., 2009).

Kelp beds are rich in this area, including both bull kelp (*Nereocystis*) and giant kelp (*Macrocystis*). It is the largest bed of giant kelp in the state, as it occurs very infrequently in Oregon. Gray whales (*Eschrichtius robustus*) use the offshore area for feeding and are frequently spotted by visitors during their migrations up and down the coast. Brown pelicans (*Pelecanus occidentalis*) sometimes use the offshore rocks for roosting.

A 2007 Catalog of Oregon Seabird Colonies notes that surveys of the area (including the various offshore rocks) have found pigeon guillemots (*Cepphus columba*), black oystercatchers (*Haematopus bachmani*), gulls, as well as pelagic cormorants (*Phalacrocorax pelagicus*) in the past (Naughton et. al., 2007). In the past, this included nesting for gulls, pigeon guillemots and pelagic cormorants. The most recent surveys (2003) have documented nesting for pelagic cormorants (Naughton et. al., 2007). Other species of seabirds and shorebirds that use the open water within the area include Harlequin Duck (*Histrionicus histrionicus*), Surf Scoter (*Melanitta perspicillata*), Black Scoter (*Melanitta americana*), Wandering Tattler (*Tringa incana*), Black Turnstone (*Arenaria melanocephala*), and Surfbird (*Aphriza*

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virgata) (Dawn Grafe, pers. comm, 2009).

Oystercatchers have been recorded in every survey conducted between 2005-2009 (Elise Elliott-Smith, pers. comm., 9/30/2009). Nesting attempts have been observed every year since the surveys began. However, successful nesting did not occur in 2008 or 2009 at any of the sites in the area (Elise Elliott-Smith, pers. comm., 8/12/2009 and 8/28/2009). Joint USGS/USFWS monitoring documented up to 12 black oystercatchers in the most recent survey conducted, including near Gregory Point, Sunset Bay/Qochyax Island and North Cove (USFWS, 2009b).



Black oystercatcher

Approximately 350 oystercatchers are counted annually in Oregon and there are an estimated 11,000 birds in the entire species (Elise Elliott-Smith, pers. comm., 9/30/2009). Although there is very little information about critical wintering habitat for oystercatchers, Cape Arago is potentially a very important site as 45 birds have been seen on Shell Island in January (Elise Elliott-Smith, pers. comm., 9/30/2009).

Table 2 shows the species documented during the intertidal biodiversity study conducted by the Partnership for Interdisciplinary Studies (PISCO) at Oregon State University. A detailed explanation of the results of the study can be found in Appendix B. Information about some of the key results are included in this section. The zones used by PISCO for this site are generally described here, but appear in more detail (including detail about methods and tidal heights) in Schoch et al. (2006).

High Shore

When it comes to sessile species, the high shore level (above the mussel beds) at Sunset Bay is dominated by cover of barnacles (*Balanus glandula*). For mobile species, the high shore at Sunset Bay has relatively low diversity and is strongly dominated by limpets (*Lottia spp.*) and periwinkles (*Littorina spp.*).

For sessile species at South Cove, the high shore level is dominated by cover of barnacles (*Balanus glandula*), and a combination of several algae species. In the southwestern portion of South Cove (CAN), this is predominately *Urospora sp.* In the southeastern portion of South Cove (CAS), several algae co-dominate with *Balanus*, including *Pelvetiopsis* and *Ulva spp.*

Like at Sunset Bay, for mobile species, the high shore at South Cove has low diversity and is strongly dominated by periwinkles (*Littorina spp.*) and limpets (*Lottia spp.*). The southwestern portion of South Cove (CAN) is almost evenly split between limpets and periwinkles, while the southeastern portion (CAS) is made up of almost entirely periwinkles in the high shore. Another relatively common species is the black turban snail, *Tegula funebris*.

Another interesting trend for the high shore is that it appears the high-visitation site at South Cove has quite a different species composition than the counterpart low-visitation site. Whether this is due to visitation or some natural variability between the sites has not been determined. At the high shore level, the two areas have no distinctive sessile species assemblages, but within-site variability is evident. High-shore level diversity of mobile animals is low at both sites and it is strongly dominated by periwinkles (*Littorina spp.*) and limpets (*Lottia spp.*).

Mid Shore

Generally, "mid shore" is used to describe the area of mussel beds. Rock cover in the mid-shore at Sunset Bay "North" (SBN) is dominated by beds of the mussel *Mytilus californianus*. The flat areas at mid-shore level in Sunset Bay (SBN2 and SBS2) have very different species cover than the sloping areas as they are dominated by the seagrass *Phyllospandix sp.*

and not the mussels.

The mid-shore mobile animal assemblage at all sites (except for SB2) is dominated almost entirely by the limpets, *Lottia spp.* One of the flat areas at mid-shore level in Sunset Bay (SBS2) is equally dominated by *Littorina* and *Lottia* unlike the sloping area that is dominated by *Lottia*. The only other mobile species that shows up in any numbers is the snail, *Nucella emarginata/ostrina* at both sites and turban snail, *Tegula funebris* at SBN2.

Again, at least on the southwestern portion (CAN) of South Cove, rock cover in the mid-shore is dominated by beds of the mussel *Mytilus californianus*. The barnacle, *Balanus glandula* is the second most abundant species. However, for the southeastern portion (CAS), the seaweed *Endocladia spp.* is the most abundant, along with two other algal species: *Mastocarpus spp.* and *Fucus spp.*

Again, like at Sunset Bay, the mid-shore mobile animal assemblage is dominated almost entirely either by limpets, *Lottia spp.*, or periwinkles, *Littorina spp.* CAS has an almost 50/50 split between the two species, with CAN having a slightly larger dominance by the limpets. No regional pattern is obvious and assemblages do not appear to be consistently different between high and low visitation sites for either sessile or mobile species.

Low/Mid Shore

The mobile animal assemblages at the low-mid shore level (a transitional zone between low and mid shore) are quite diverse and distinctively different among sites. The dominant species in most sites is *Lottia* limpets, however, their abundance changes dramatically among sites. It dominates at all of the sites except for the northern South Cove site (CAN), where the purple sea urchin, *Strongylocentrotus sp.*, is prevalent. At the southern South Cove site, the snail, *Amphissa sp.* co-dominates with the limpets. It is also relatively common at the northern Sunset Bay site (SBN).

Most sites are populated with a multitude of seaweed species at the low-mid shore level. *Hedophyllum*

sessile and *Mazzaella flaccida* can be dominant at some sites but almost absent at others. *Hedophyllum sessile* dominates on the “southern” site (SBS), and *Mazzaella flaccida* at the “northern” site (SBN). At the northern South Cove site (CAN), *Hedophyllum* and *Mazzaella* co-dominates but it is almost absent at the southern site.



Tidepool at Sunset Bay

Low shore

The low-shore (located below the mussel beds) is a highly diverse zone, and the dominating sessile species (predominately algae) change dramatically from site to site. The mobile animal assemblages are also quite distinctive between sites, although the dominant species at all but CAS is the purple sea urchin, *Strongylocentrotus purpuratus*. It is barely noticeable, in graphs of relative abundance at the southern South Cove site, where the snail, *Amphissa sp.* is the most abundant mobile species, followed by the *Lottia* limpets. However, at the northern South Cove site (CAN), it is the overwhelmingly dominant species, with hardly any showing of *Amphissa* or *Lottia*.

There is a high degree of variability between the areas surveyed (north vs. south) and the different tidal zones (high vs. low). Although for some areas, there is some indication that human visitation plays a role in the number and type of species present, no clear causation can be drawn from this initial, baseline data collection effort. A true experiment would be needed

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Table 2. Listing of species documented at Sunset Bay/Cape Arago during the intertidal biodiversity survey conducted by PISCO in 2008. Details can be found in Appendix B. This table is on this page and the following 3 pages.

Species	Common Name	Sites where present	If common, where (high, mid, low-mid, low intertidal)
<i>Acrosiphonia sp.</i>	green rope algae	CAN, CAS, SBN, SBS	CAN-low; SBN-mid
<i>Alaria marginata</i>	angel wing kelp (brown algae)	CAN, CAS	CAN low
<i>Amphissa sp.</i>	amphissa (snail)	CAN, CAS, SBN, SBS	
<i>Analipus japonicus</i>	fir needle (brown algae)	CAN, CAS, SBS	CAS-mid, SBS-mid
<i>Anisodoris nobilis complex</i>	Pacific sea-lemon	CAN, SBS	
<i>Anthopleura artemisia complex</i>	(anemone)	CAS, SBN	
<i>Anthopleura elegantissima</i>	clonal anemone	CAN, SBN, SBS	SBN-mid; SBS-mid
<i>Anthopleura xanthogrammica</i>	giant green anemone	CAN, CAS, SBN, SBS	
<i>Balanus glandula</i>	acorn barnacle	CAN, CAS, SBN, SBS	All sites-high/mid
<i>Bittium eschrichtii</i>	threaded cerith	CAS, SBN	
Bryozoans	bryozoan	SBN	
Calcareous tube worms	(tube worms)	CAN, CAS, SBN, SBS	
<i>Calliostoma sp.</i>	topsnail	CAN, SBN, SBS	
<i>Callithamnion sp.</i>	(red algae)	SBS	
<i>Cancer sp.</i>	(crab)	CAN, CAS, SBN, SBS	
<i>Ceratostoma foliatum</i>	foliate thornmouth	SBS	
<i>Ceramium sp.</i>	(red algae)	CAS	
<i>Chaetomorpha sp.</i>	(green algae)	CAN, CAS, SBN, SBS	
<i>Chondracanthus canaliculatus</i>	(red algae)	CAS	low-mid
<i>Chondracanthus sp.</i>	(red algae)	CAN, CAS, SBN, SBS	
<i>Chthamalus sp.</i>	(barnacle)	CAN, CAS, SBN, SBS	
<i>Cladophora sp.</i>	(green algae)	CAN, CAS, SBS	
<i>Constantinea simplex</i>	cup and saucer (red algae)	SBS	low
<i>Costaria costata</i>	(brown algae)	CAN, SBN, SBS	CAN-low
Crustose coralline algae	crustose coralline algae	CAN, CAS, SBN, SBS	low, low-mid
<i>Cryptochiton stelleri</i>	giant Pacific chiton	SBS	
<i>Cryptopleura spp.</i>	hidden rib (red algae)	CAN, CAS, SBN, SBS	CAN/SBS-low, low-mid
<i>Cryptosiphonia woodii</i>	(red algae)	CAN, CAS, SBN, SBS	CAN-low, low-mid; SBN-low-mid
<i>Cystoseira osmundea</i>	(brown algae)	SBS	
Diatoms	diatoms	CAN, CAS, SBN, SBS	CAN, SBN, SBS-low
<i>Dilsea spp.</i>	(red algae)	CAN, CAS, SBN, SBS	SBN-low, SBS-low, low-mid
<i>Dodecaceria fewkesi</i>	(terebellid polychaete)	CAN	

Species	Common Name	Sites where present	If common, where (high, mid, low-mid, low intertidal)
<i>Egregia menziesii</i>	feather boa (brown algae)	CAN, CAS, SBN, SBS	CAS/SBN low, low-mid
<i>Endocladia spp.</i>	sea moss (red algae)	CAN, CAS, SBN, SBS	CAS/SBN low, low-mid
<i>Epiactis prolifera</i>	brooding anemone	CAN	
Erect coralline algae	erect coralline algae	CAN, CAS, SBN, SBS	CAN/SBS low-mid
<i>Erythrophyllum sp.</i>	(red algae)	SBS	
<i>Farlowia spp.</i>	(red algae)	SBN	
Fleshy crustal algae	fleshy crustal algae	CAN, CAS, SBN, SBS	CAN low-mid; CAS mid
<i>Flustrellidra corniculata</i>	(bryozoan)	CAN, SBN, SBS	
<i>Fucus sp.</i>	rockweed	CAN, CAS, SBN, SBS	CAS/SBN/SBS mid
<i>Halosaccion glandiforme</i>	sea sack (red algae)	CAN, CAS, SBN, SBS	CAS mid
<i>Hedophyllum sessile</i>	sea cabbage (brown algae)	CAN, CAS, SBN, SBS	CAN/SBS low, low-mid
<i>Idotea sp.</i>	(isopod)	CAN, CAS, SBN, SBS	
<i>Katharina tunicata</i>	black leather chiton	CAN, SBS	
<i>Laminaria sp.</i>	oarweed (brown algae)	CAN, SBN, SBS	
<i>Leathesia/Colpomenia</i>	(brown algae)	CAS, SBN, SBS	SBS mid
<i>Lepidochiton spp.</i>	(chiton)	CAN, CAS, SBN, SBS	Low-Mid at CAN, SBS
<i>Leptasterias hexactis</i>	(sea star)	CAN, SBN, SBS	
<i>Littorina spp.</i>	periwinkle	CAN, CAS, SBN, SBS	All sites, High and Mid
<i>Lottia spp.</i>	(limpet)	CAN, CAS, SBN, SBS	All sites, all but Low
<i>Mastocarpus spp.</i>	(red algae)	CAN, CAS, SBN, SBS	CAN, CAS, SBN-varies
<i>Mazzaella flaccida</i>	rainbow leaf (red algae)	CAN, CAS, SBN, SBS	All sites, low-mid
<i>Mazzaella splendens</i>	rainbow seaweed (red algae)	CAN, CAS, SBN, SBS	All sites, low-mid
<i>Microcladia borealis</i>	sea lace (red algae)	CAN, CAS, SBN, SBS	All sites, low-mid
<i>Microcladia coulteri</i>	delicate sea lace (red algae)	CAN, SBN, SBS	
<i>Microcladia sp.</i>	(red algae)	CAN	
<i>Mopalia sp.</i>	(chiton)	CAN, SBN, SBS	
<i>Mytilus californianus</i>	California mussel	CAN, CAS, SBN, SBS	CAN/CAS/SBN mid
<i>Mytilus trossulus</i>	blue mussel	SBN	
Nemertean	ribbon worm	CAN, SBS	
<i>Neorhodomela spp.</i>	(red algae)	CAN, SBN, SBS	CAS-low-mid; SBN/SBS-mid
<i>Nucella canaliculata</i>	channeled dogwinkle	SBS	
<i>Nucella emarginata/ostrina</i>	dogwinkle	CAN, CAS, SBN, SBS	SBN/SBS mid
<i>Ocenebra sp.</i>	rocksnail	SBS	
<i>Ocinebrina sp.</i>	rocksnail	SBS	
<i>Odonthalia spp.</i>	seabrush (red algae)	CAN, CAS, SBN, SBS	All sites, low, low-mid
<i>Osmundea spectabilis</i>	sea fern (red algae)	CAN, CAS, SBS	

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Table 2 cont. (listing of Cape Arago/Sunset species)

Species	Common Name	Sites where present	If common, where (high, mid, low-mid, low intertidal)
<i>Pachycheles spp.</i>	porcelain crab	CAN, SBN, SBS	
<i>Pachygrapsus crassipes</i>	striped shore crab	CAN, CAS, SBN	
Peanut worms	peanut worm	CAN, CAS, SBN, SBS	
<i>Pelvetiopsis arborescens</i>	(brown algae)	CAN	
<i>Pelvetiopsis limitata</i>	little rockweed (brown algae)	CAN, SBS	
<i>Phyllospadix sp.</i>	surfgrass	CAS, SBN, SBS	CAS/SBN low, low-mid; SBS/SBN mid;
<i>Pisaster ochraceus</i>	ochre sea star	SBS	
<i>Plocamium sp.</i>	sea braid (red algae)	CAN, CAS, SBN	CAS/SBN low
<i>Pollicipes polymerus</i>	goose neck barnacle	CAN, SBN, SBS	CAN/SBS mid
<i>Polysiphonia spp.</i>	poly (red algae)	CAN, CAS, SBN, SBS	CAS/SBS low
<i>Porphyra sp.</i>	wild nori (red algae)	CAS, SBN, SBS	CAS mid
<i>Prionitis spp.</i>	bleach weed (red algae)	CAS	
<i>Ptilota sp.</i>	(red algae)	CAN, CAS, SBN, SBS	SBN/SBS low
<i>Pugettia spp.</i>	kelp crab	CAN, CAS, SBN, SBS	
Sandy tube complex	(tube worms)	CAN, CAS, SBN, SBS	
<i>Schizymeria spp.</i>	slimy leaf (red algae)	SBN, SBS	
<i>Semibalanus cariosus</i>	haystack barnacle	CAN, SBN, SBS	
Sponges	(sponge)	CAN, CAS, SBN, SBS	SBS low
<i>Strongylocentrotus purpuratus</i>	purple sea urchin	CAN, CAS, SBN, SBS	CAN-L/LM, SBN-L, SBS-L/LM
<i>Tegula funebris</i>	black turban snail	CAN, CAS, SBN, SBS	
<i>Tegula sp.</i>	turban snail	SBS	
<i>Tonicella lineata</i>	lined chiton	CAN, SBN, SBS	SBS-L/LM
<i>Ulva spp.</i>	sea lettuce (green algae)	CAN, CAS, SBN, SBS	varies
<i>Urospora sp.</i>	(red algae)	CAN, SBN, SBS	CAN high

to find causality and determine if human use has an effect on the community structure at this location, including controls and treatment areas. As funding is available (and need determined) this type of research may be possible.

A list of “species of interest” documented in the vicinity of the park is located in Table 3. For example, black oystercatchers are known to nest in the vicinity. Steller sea lions are regularly observed on the offshore rocks, reefs and islands adjacent to Sunset Bay State Park (Dawn Grafe, pers. comm., 2009).

A survey for these species has not been conducted as part of this process (except for a few rocky shore species that happen to have been found in the biodiversity study), so this list is based on existing data including inclusion on a state or federal watch list, such as the ODFW Nearshore Strategy. This list includes species that are federally or state listed (threatened or endangered) as well as those on other lists of “at-risk” or sensitive species. Definitions for these categories can be found in Appendix D. Species of interest that have been documented in the area that may potentially be impacted by

Table 3 Listing of “species of interest” that have been documented within one mile of the Sunset Bay MU parks. Details about ranking and status can be found in Appendix D. Detailed surveys for these species were not conducted at the sites for this project, therefore there may be other species within the vicinity that do not appear on this list. Species with an asterisk are those that reside (at least part time) in rocky shore areas.

	Scientific Name	Common Name	Heritage Global Rank	Heritage State Rank	Federal Status	State Status	ORNHIC List	Documented in vicinity
Vertebrates	<i>Eumetopias jubatus</i> *	Steller sea lion	G3S2	S2	LT	—	2	Simpson Reef
	<i>Enhydra lutris</i> *	Sea otter	G4	SH	LT	LT	—	Simpson Reef
	<i>Haemulonax boeckman</i> *	Black oystercatcher	G5	S3	SOC	SV	4	SB/SA/CA area
	<i>Mirounga angustirostris</i> *	N elephant seal	—	—	—	NRSr	—	Shell Island
	<i>Oncorhynchus kisutch</i>	Coho salmon	C4T2Q	S2	LT	SV	1	SB (Big Creek)
	<i>Oncorhynchus mykiss</i>	Steelhead	C5T2T3Q	S2S3	SOC	SV	1	SB (Big Creek)
	<i>Pelecanus occidentalis californicus</i> *	California brown pelican	G4T3	S2N	LE	LE	2	Gregory Pt/Whole area
	<i>Phoca vitulina</i> *	Pacific harbor seal	—	—	—	NRSr	—	Shell Island
Plants	<i>Albatrellus avelanensis</i>	Fungus	G2	S1?	—	—	1	SA/CA area
	<i>Brodiaea teresensis</i>	Dwarf brodiaea	G4G5	S2	—	—	2	SB, SA/CA area
	<i>Calopogon stansburyi</i>	Lichen	G2G3	S1	—	—	3	SB shoreline
	<i>Darlingtonia californica</i>	Pitcher-plant	G3G4	S3S4	—	—	4	SB upland
	<i>Heterodermia leucocoma</i>	Lichen	G4	S2S3	—	—	2	CA
	<i>Hypotrachyna revoluta</i>	Lichen	G3G4	S1	—	—	2	SB/SA/CA area
	<i>Lilium occidentale</i>	Western lily	G1	S1	LE	LE	1	SB/SA/YP
	<i>Macrocyfalis integrifolia</i> *	Giant lily	G5	S2	—	—	3	Simpson Reef
	<i>Microcalia coulteri</i> *	Delicate sea lace	G3G4Q	S2	—	—	3	SB/CA
	<i>Mercurocystis lucifera</i> *	Bull lily	—	—	—	NRSr	—	SB area
	<i>Mitella cephalota</i>	Lichen	G3G4	S2	—	—	2	CA
	<i>Phyllospadix</i> spp.*	Surf grass	—	—	—	NRSr	—	SB/CA
	<i>Posidonia palmatiformis</i> *	Sea palm	—	—	—	NRSr	—	SB/SA
	<i>Pyrenopeziza quezema</i>	Lichen	G4	S3	—	—	4	CA
	<i>Tortellia glutinosa</i> spp. glutinosa	Sticky tofieldia	G5T4T5	SNR	—	—	—	SB
Invertebrates	<i>Pisaster ochraceus</i> *	Ochre sea star	—	—	—	NRSr	—	SB
	<i>Strongylocentrotus purpuratus</i> *	Purple sea urchin	—	—	—	NRSr	—	SB/CA



Brown Pelican (Jamie Little, OPRD)



Elephant Seal Pup (Trisha Wymore, OPRD)

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rocky shore recreation and other related intertidal use include Steller sea lion, black oystercatcher, brown pelican, Pacific harbor seal, elephant seals, surfgrass (*Phyllospadix scouleri*), sea palm (*Postelsia palmaeformis*), the kelps (*Macrocystis* and *Nereocystis*), delicate sea lace (*Microcladia coulteri*), ochre sea star (*Pisaster ochraceus*), purple sea urchins and Western lily (*Lilium occidentale*) (Table 3). It is possible that the identification of *M. coulteri* is incorrect as there is a new species of *Microcladia* that occurs in the area that it could be confused with (Gayle Hansen, pers. comm., 2009).

Other species that are listed on the most recent update to Oregon's "Rare, Threatened, and Endangered" list and are possibly located within the area but were not identified below the genus level in this study include: *Calliarthron cheilosporioides* (ORNHIC List 3, G3S1), *Farlowia conferta* (ORNHIC List 3, G2G3S2), *Laminaria ephemera* (ORNHIC List 3, G3S2), and *Scytosiphon gracilis* (ORNHIC List 3, G5S1). All of these species are noted as occurring in Coos County and have been documented to the genus level within the Sunset Bay Management Unit (ORNHIC, 2009).

The beach at Sunset Bay is one of the state's regular water quality monitoring sites. The Department of Human Services (DHS) tests the water in several areas along the Sunset Bay shoreline including at the northern beach access, by the restrooms, and on the south end of the cove. Up-to-date results of the testing can be found on the Oregon Coastal Atlas as well as data going back to 2002 (DLCD, 2009). There are quite a few instances of detectable levels of contaminants with several resulting in water quality warnings at these stations, particularly on the south end by Big Creek. Bastendorf Beach, just north of Yoakam Point is also regularly tested with occasionally detectable levels of contaminants but no recorded levels to merit a warning against water contact (DLCD, 2009).

Interpretive Resources:

The Sunset Bay Management Unit parks offer unique interpretive opportunities ranging from wildlife viewing to geology. Currently, the parks are guided by an Interpretive Plan (The Acorn Group, 2007). The over-arching theme for the parks is "the Cape Arago Region is a dynamic edge where powerful forces shape the land and create a resource-rich environment." The plan also includes a variety of sub-themes, several of which are related to rocky shore resources:

Rocky Shore Sub-themes (The Acorn Group, 2007):

- Pinnipeds depend on this coastal edge to rest on offshore rocks and rear their pups in safety. Other communities thrive on this dynamic edge as well.
- People have used the resources along this coastal edge for thousands of years, as evidenced by middens, remnants of the timber industry, the Simpson Estate, and in more recent times, recreational activities.
- Intertidal and subtidal species are well adapted to the continual changes created by the forces of nature, but less resilient to changes caused by humans, including handling, collecting, and trampling.
- For the continued well-being of park resources as well as personal safety, each visitor holds the responsibility for being aware of and abiding by park rules and for demonstrating appropriate behavior.

Seasonally, the parks hire a temporary rocky shore interpretive ranger to provide guided tidepool tours and campground programs. Typically, these services are offered between late May and early September during low tide periods. Permanent regional interpretive staff also provide on-site services, including coordinating visits from school-groups that call ahead as well as occasional off-site programs. During "prime season", programs are offered 7 days a week (e.g., tidepools, star-gazing, nature walks, living history walks, fire safety, rehabilitated birds).

Existing on-site interpretive facilities include: day use picnic gazebos (Sunset Bay-SB, Cape Arago-CA), a



Visitors at rocky shore interpretive panel, Cape Arago State Park

small amphitheater (SB), a campground interpretive kiosk (SB), estate gardens and structures (SA), an information/gift center (Shore Acres-SA), an observation building (SA), an observation platform (CA), and the Simpson Reef overlook platform with viewing telescopes and interpretive panels (SA). The panels at the Simpson Reef overlook (Shore Acres State Park) describe the offshore rocks, marine mammals and provide maps of the area. The facilities at the overlook were developed through a partnership with the USFWS.

The non-profit group, Shoreline Education for Awareness (SEA) coordinates volunteer docents that provide seasonal on-site interpretive services on weekends (Fri-Sunday) from approximately May 1st-Labor Day weekend (Bill Binnewies, pers.

comm, 10/13/2009). USFWS staff assists with SEA volunteer coordination, including training and recruitment. SEA volunteers primarily provide interpretation at the Simpson Reef overlook, but have also done occasional beach walks and campground programs. OIMB students occasionally assist with tidepool walks. Some programs are reciprocated with South Slough National Estuarine Research Reserve (NERR).

At the Shore Acres park proper, there is a windowed observation building with interpretive panels. The focus is on the history of the area, mainly the Simpson Estate and family. The shelter provides refuge for storm watchers and sightseers. During “Whale Watch Spoken Here” Weeks, this area is used as a whale migration viewing location.

Sunset Bay interpretive signage is currently limited to a sign on tsunamis and a few focused on stream and forest ecology. Cape Arago signage includes several “Welcome to Our Home” rocky shore interpretive panels as well as regulatory signage discussing the “Marine Protected Area” and federal marine mammal protections.

The existing Coos I Regional Interpretive Plan details suggestions for improved interpretive services, including on-site media and thematic delivery of programs (The Acorn Group, 2007).



Simpson Reef Overlook, Shore Acres State Park

Sunset Bay MU: Existing Conditions

Scenic Resources:

All of the parks in the district are often used by visitors for enjoyment of the scenic nature of Oregon's coast and ocean. The scenic qualities of the parks are important to the recreational experience of visitors. The overlook areas are frequently used by visitors to get a quick glimpse of the powerful ocean, marine mammals and birds as well as the geologic features that make the site unique. Simpson Reef is one of the best places in the state to view marine wildlife. The natural features of the rocky shoreline and tidepool areas allow visitors to visually observe the ecosystems that live in the interface between the land and sea and the geologic features created by the passage of time.

Cultural Resources:

Evidence of cultural resources has been found in the vicinity of the park and the area is considered a "high probability" zone by the State Historic Preservation Office (SHPO). Reports for known sites are filed with SHPO. Pursuant to state law, this information is not available for public review.

The park land is an important traditional-use area for several tribes including the Coquille, Confederated Tribes of the Siletz Indians and the Confederated Tribes of the Coos, Lower Umpqua and Siuslaw Indians and their cultural heritage within the area is of considerable antiquity. In addition to pre-contact and historic archaeological sites, Oregon tribes who are affiliated with the area view cultural resources as those resources that continue to be used by Native peoples, such as foods, medicines and basketry materials (Nancy Nelson, pers. comm., 2009).

In the 1930's the Civilian Conservation Corps (CCC) built a stone overlook at Cape Arago as well as numerous other improvements such as trails, stoves, and a care-takers cottage (ODOT, 1947a). Erosion and the passage of time has since destroyed most of these features. During World War 2, the US Army used the park as a radio station. The entire headland and all the parks were closed during these years as they were occupied by the coast defense forces as their local headquarters (ODOT, 1947b).

Recreational activities:

Visitor day-use at the parks varies significantly from year to year since counts began in 1965 (fig. 7). At Cape Arago, although visitation fluctuates from year to year, there is an continuing upward trend evidenced by parking lot counts. At Sunset Bay, however, day-use appears to be on a slight downward trend following peak years in the 1970's.

Although it is not known what percentage of these visitors move beyond the parking lots, and the methodology assumes some things that may slightly overestimate or underestimate visitation (the counters count cars and a multiplier is used to determine the average number of passengers per car), it does give a general sense of site popularity. For example, the many school buses that are known to frequent these parks (primarily Sunset Bay and Cape Arago) are not

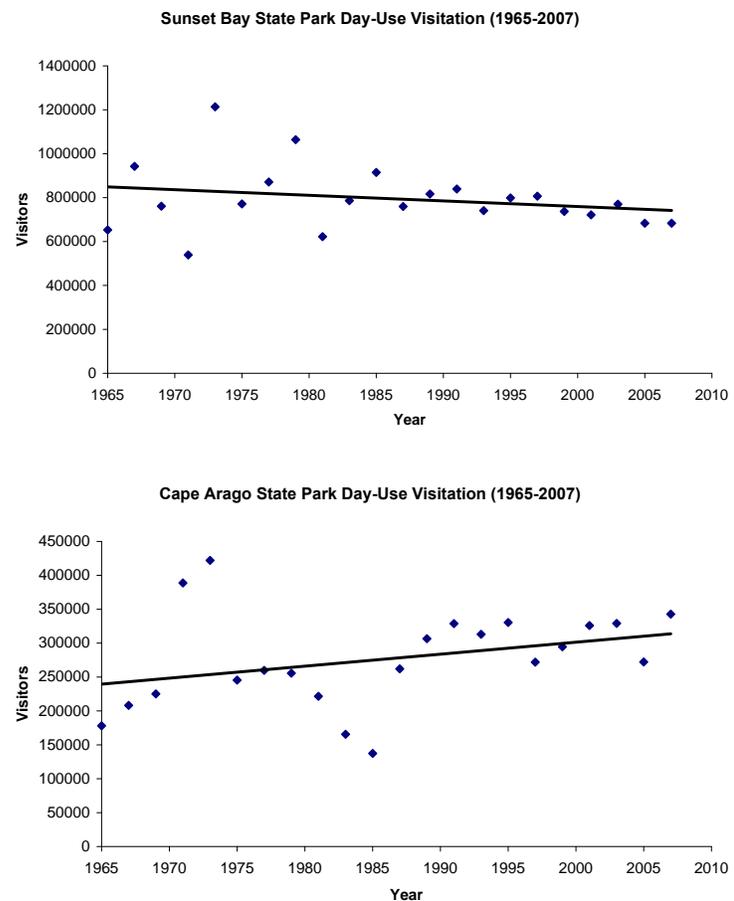


Figure 7. Visitor use based on day use parking lot data from Sunset Bay and Cape Arago State Parks (1965-2007).

fully accounted for in these numbers.

Visitor use numbers are not available for Yoakam Point. The day-use numbers for Shore Acres, while available, are not, for the most part, applicable since a large majority of visitors visit that park for the formal gardens, and do not go down to the beach. However, Shoreline Education for Awareness monitors the number of “contacts” their volunteer docents make seasonally (Friday-Sunday from May-Sept) and there were just under 15,000 made in 2009 (Bill Binnewies, pers. comm, 10/13/2009). SEA counts visitors to the Simpson Reef overlook that they talk to and use their spotting scopes, not all visitors to the overlook.

To help answer this question in more detail, visitor use surveys were conducted in the spring and summer of 2008 to measure actual visitation to the rocky shore and characterize types of visitor use. A full report (along with a description of methodology) is located in Appendix A and only key findings are summarized here. Due to funding limitations, data was only collected for the presumed high use areas of Sunset Bay and South Cove.

During the 33 day visitor survey period from May 21st-August 19th, 2008, a total of 2,769 visitors were observed recreating in the two separate intertidal areas. Counts include the entire span of low tide use as they occurred one hour before the predicted morning low tide to four hours after the low (Fox, 1994). A total of 293 visitor groups were interviewed during their visit at the two intertidal areas over the course of the survey (N=131 for South Cove, 162 for Sunset Bay).

Visitation

The average number of visitors per day is 84 with a range between 6 visitors on July 17th at South Cove and 298 on June 8th at Sunset Bay. During the 33 days sampled, the daily average hourly use at the two sites ranged from 1 to 60 persons with an average hourly visitation of 17 visitors per hour. Results for visitor use counts, distribution (temporally and spatially) and recreation types are summarized below for each site. Limitations of the survey methodology

(information is a snapshot in time) mean not all visitation is captured. The numbers from this survey simply demonstrate relative visitor use pressure.

Sunset Bay

The average number of visitors per low tide period at Sunset Bay is 101 with a range between 10 visitors on June 17th and 298 on June 8th (Table 4). During the 17 days sampled, the average number of visitors per hour ranged from 2 to 60 persons with an average hourly visitation of 20 visitors per hour.



Typical high tide recreational pursuits at Sunset Bay (OPRD)

On average, weekends (137 visitors/day) got more use than weekdays (83 visitors/day) and less visitors came during summer vacation (94 visitors/day) than when school is in session (113 visitors/day). Days that fall on weekdays when school is in session (WdS) appear to receive the lowest mean use (72 visitors/day) with weekends when school is in session (WeS) receiving the most visitors (217/day). It was only possible to sample on two weekend days when school was in session, both of which had high levels of visitation, however, this may be why that average is so high.

Bad weather may have been a factor on at least one of the observation days (August 16th), where only 28 visitors were observed during the observation period. That particular day had both rain and fog for the entire observation period. A few other days had

Sunset Bay MU Rocky Shores: Existing Conditions

Table 4. Visitor counts totals for each of the 17 survey dates at Sunset Bay. Rainy days are indicated by an asterisk.

Day Type	Dates	Number of visitors
WdS	May 21st	27
	May 23rd	25
	May 26th	60
	June 4th	39
	June 5th	208
	$X' \approx 72$	
WeS	June 7th	135
	June 8th	298
	$X' \approx 217$	
WdH	June 17th	10
	July 2nd	44
	July 3rd	105
	July 4th	237
	July 16th	105
	August 18th	51
	$X' \approx 92$	
WeH	June 22nd	166
	August 2nd	94
	August 16th*	28
	August 17th	100
	$X' \approx 97$	
TOTAL		1732
Average		$X' \approx 102$

some periods of rain and fog, but nothing lasting the entire period. For example, on June 5th, one of the busiest days (208 visitors), there was rain in the mid-morning but it was a relatively nice day otherwise.

South Cove Cape Arago

The average number of visitors observed per low tide period at the South Cove is 65 with a range between 6 visitors on a rainy June 3rd and 221 on June 6th (Table 5). During the 16 days sampled, the average number of visitors per hour ranged from 1 to 44 persons with an average hourly visitation of 13 visitors per hour.

On average, weekend days (65 visitors/day) received

Table 5. Visitor counts totals for each of the 16 survey dates at South Cove. Rainy days are indicated by an asterisk.

Day Type	Dates	Number of visitors
WdS	May 22nd	134
	June 3rd*	6
	June 6th	221
	June 9th*	27
	$X' \approx 97$	
WeS	May 24th	80
	May 25th	95
	$X' \approx 88$	
WdH	July 7th	66
	July 17th	6
	July 21st	57
	August 1st	22
	August 19th	46
	$X' \approx 39$	
WeH	June 21st	30
	July 5th	86
	July 6th	58
	July 20th	69
	August 3rd	34
$X' \approx 55$		
TOTAL		1037
Average		$X' \approx 65$

the same amount of use as weekdays (65 visitors/day). More visitors come when school is in session (94 visitors/day) than when school is on summer break (47 visitors/day). Days that fall on weekdays when school is in session (WdS) appear to receive the highest mean use (97 visitors/day) with weekdays when school is on vacation (WdH) receiving the least (39 visitors/day) amount of visitation pressure (Table 4-5). Rain may have been a factor as those were two of the least popular days (June 3rd and 9th). The other relatively low visitation days (June 17th and August 1st) also had relatively poor weather with clouds and breezy conditions in the morning changing to some rain as the morning progressed.

In previous surveys of rocky intertidal sites, it was

discovered that, as anticipated, most visitors schedule their visit to correspond to the time of low tide. However, during this survey, this was not the case for Sunset Bay. It remains the case for South Cove. Only 14% of visitors observed at Sunset Bay were seen during the period of one hour before to one hour after low tide. Slightly under half (45%) of visitors to South Cove, on the other hand, were observed in that time period. Regardless of the time of low tide, the most popular time to visit tends to be between 9-11 AM. At both sites, visitation is extremely low in the early morning with no visitors observed before 7 AM at South Cove and very few (less than 1% of visitors) at Sunset Bay.

Sunset Bay

Visitation at Sunset Bay peaks 2 to 4 hours after low tide with 65% of visitors choosing this time period to visit. Visitors do not appear to use the time of low tide to determine the time of their visit, although mid-to late morning (9-11 AM) is still the most popular time to visit (44% of visitors). Visitation does appear to be slightly more spread out over the low tide period than it is at South Cove, with more visitors choosing to visit later in the day.

These results are slightly different from those found at other rocky shore sites. At Seal Rock, the majority of visitors do base the time of their visits on the time of low tide, with the hour after low tide being the most popular time frame (OPRD, 2007). At Devil's Punchbowl, the highest counts were found between one and two hours after low tide (Fox, 1994; Hillmann, 2005). However, the time of day that is most popular remains very similar. At both Devil's Punchbowl and Seal Rock, the most popular time of day to visit was between 9 and 10 in the morning.

South Cove

Visitation at the South Cove peaks the hour after low tide with 37% of visitors choosing this time frame to visit the site. Visitors appear to base the time of their visits on the time of low tide, with 45% of visitors visiting during the peak time of one hour before to one hour after. The most popular time to visit is between 9-10 AM, with 41% of visitors observed during that

time frame. In general, visitation appears to increase when the time of low tide occurs in the mid-morning, with the busiest two days occurring on low tides that occurred between 8:00-9:00 AM.

Distribution

Distribution across the intertidal areas at the two parks is relatively evenly spread across the shoreline. However, visitors do favor certain segments of the two coves (fig. 8-9). At South Cove, visitors are drawn to the rocky intertidal area on the northwest side of the cove. At Sunset Bay, although slightly under one third of the visitors were observed on a sandy-only section of shoreline, another third was seen favoring the rocky shoreline on the north side of the bay.

Sunset Bay

The most popular section of the shoreline at Sunset Bay is the area between Big Creek to just north of the restrooms (fig. 8). This is area "C" as noted in figure 8 and receives approximately 29% of visitation. Area C is split into two sections, each of which receive approximately the same amount of visitation pressure (fig. 8). It is not surprising that this section receives the highest visitation as it is adjacent to the parking lots and is the easiest to access. Also, those visitors intending to go to sections D, must cross section C, as must those that park in two of the three parking lots, and then walk north to sections B and A. The shoreline in sections B2-C2 is primarily sandy.

While attempts were made to make the sections of shoreline approximately the same length, it was also necessary to pick easy to recognize "landmarks". Therefore, some sections are larger than others. For its size, section A2 receives the highest level of use. It is the rocky shoreline to the west of the northernmost parking lot (fig. 8). This section of shoreline is relatively easy to traverse as it is generally flat.

The area that receives the lowest visitation is area "D", to which approximately 16% of visitors venture. Area D is west of the stream mouth and often

Sunset Bay MU Rocky Shores: Existing Conditions

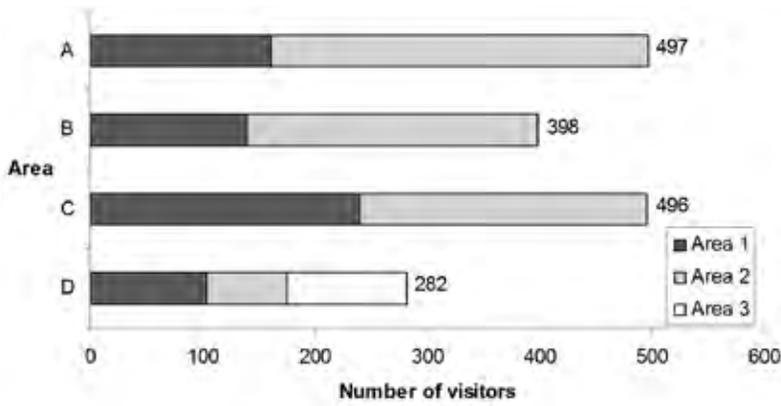


Figure 8. Distribution of observed visitors across survey areas A-D at Sunset Bay (n=1732)

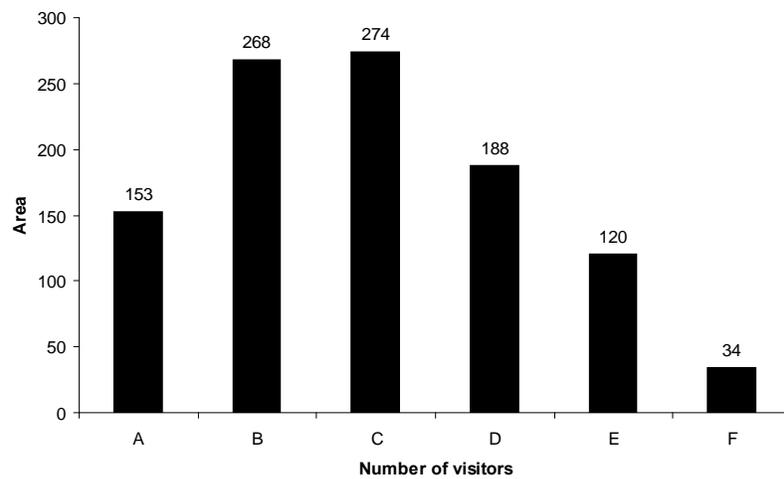
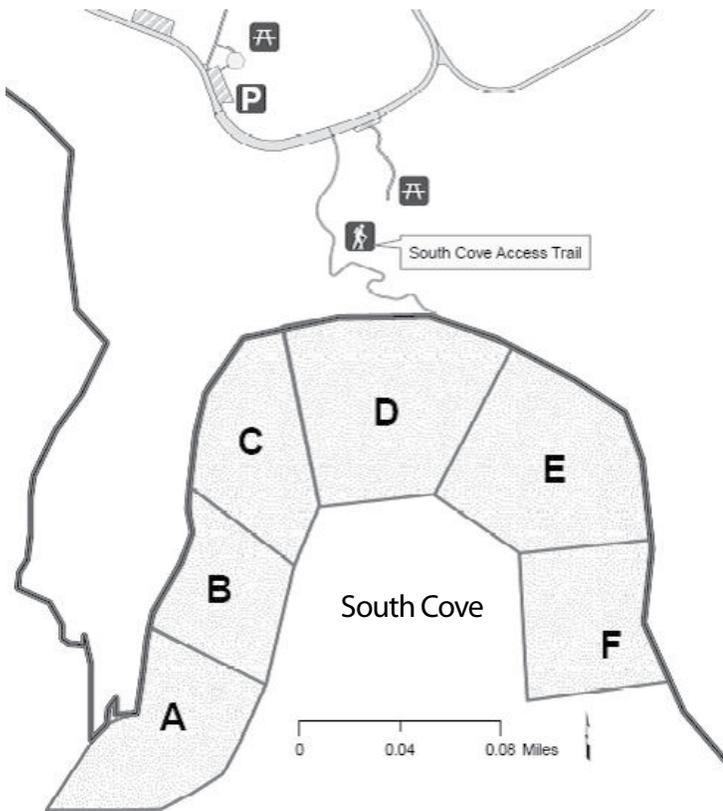
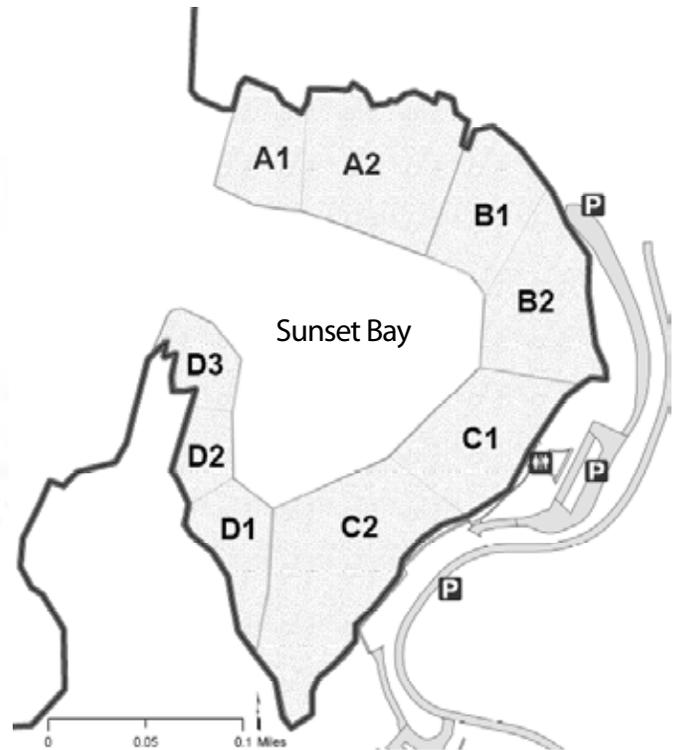


Figure 9 Distribution of observed visitors across survey areas A-F (n=1037)

requires getting ones feet wet. Additionally, most of this portion of the rocky shoreline is only accessible at reasonably low tides, and requires more difficult climbing than the other sections. Section D is split into three sub-sections (D1-D3), each of which receives approximately the same level of use (fig. 8).

South Cove

At the South Cove intertidal area, the most frequented area is the section to the west of the access trail (area “C” in figure 9). This area is frequented by slightly more than 26% of visitors to the site. The second most popular section is area “B”, which receives almost exactly the same amount of visitor pressure (slightly under 26%) as area C. Area B is also to the west of the access trail, but slightly to the south. The least visited section of shoreline was area “F”, to the east of the access point. It receives only 3% of the visitation pressure.

Types of recreation

South Cove

Active tidepool recreation (e.g., picking things up, handling organisms, touching organisms and/or turning over rocks) was the most common activity with 48% of visitors observed doing these types of activities (fig. 10). In second place, approximately 27% of the observed visitors appeared to be part of a school affiliated group.

Beach activities such as walking on the beach were the third most common activity (12%), however, many of these people were observed to simply be using the beach to access other sections of the rocky shore. For this reason, beach (non-rocky-shore) recreation was not omitted from the survey so as not to underestimate potential visitation to rocky areas. Approximately 5% of visitors were engaged in passive tidepool exploration (e.g., walking, observing, tidepooling without handling organisms or rocks), significantly lower than those conducting more active exploration.

Although collecting was not common at these sites during the survey period, it does occur. Collecting, for the most part, is not allowed without a scientific

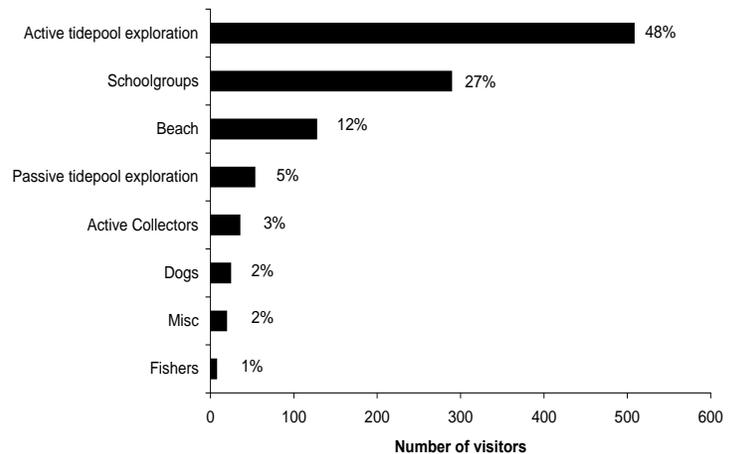


Figure 10 Recreational activities at South Cove (n=1037)

or educational permit. This is the case for the areas surveyed, however, some collecting is allowed within “Area B” which is mostly within Shore Acres State Park (fig. 10).

At South Cove, three percent of visitors were observed collecting. As with all observations, it is likely that this number is under-estimated since snapshots are unlikely to capture quick activities such as picking an item up. In these cases, it is most likely not possible to distinguish people collecting living vs. non-living organisms (such as urchin tests). However, they are more likely to capture activities of people who are out there with collecting as their main purpose since that takes more time and is more obvious (people tend to have equipment such as buckets for mussels, seaweed, shellfishing etc.). Although it was not possible to do so in all instances, the type of items being collected was noted. Items collected at South Cove include seaweed, shells and urchin tests.

Other activities noted included the presence of dogs (both on and off leash), fishing and “miscellaneous” (fig. 10). Slightly more than half of dogs were noted off leash at South Cove (54%). Fishing from shore does occur, although it does not make up a large percentage of visitor use noted during the survey (~1%). Miscellaneous activities noted included research, photography and ranger led-programs.

Sunset Bay

The characteristics of visitors observed at Sunset

Sunset Bay MU Rocky Shores: Existing Conditions

Bay are quite different from those at South Cove (fig. 11). Beach recreation is much more predominate, with 40% of visitors observed recreating on the sandy beach (walking, picnicking, sunbathing

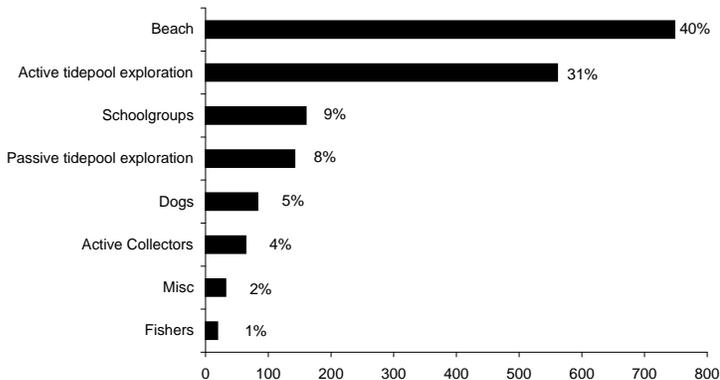


Figure 11. Recreational activities at Sunset Bay (n=1810)

etc.). A large portion of the shoreline in the bay is made up of a sandy beach so this is not surprising. Sunset Bay is known as a destination for beach recreation, especially given its proximity to the park campground. Slightly under one third of visitors were observed participating in active tidepool exploratory activities (31%). This is followed by 9% of visitors in an educational group. Although collecting was not common at this site during the survey period, it does occur. Collecting of living organisms is only legal with a scientific research permit issued by the Department of Fish and Wildlife (ODFW). Four percent of visitors were observed collecting during the survey period. Slightly more than half of dogs were noted on leash (58%) at Sunset Bay. As with South Cove, fishing from shore does not make up a large percentage of visitor use (~1%) but does occur. Miscellaneous activities noted included kite flying, kayaking, metal detecting, kayak fishing, host programs, swimming and putting in boats.

Demographics

South Cove

The average group size for visitors is 9 people with a range between 1-90 people. Over half of the visitors (54%) were with families, with 7% traveling with friends and only eleven percent visiting the intertidal

area alone. Fourteen percent of the visitor groups were traveling with an educational (school) group with an average group size of 42. School groups came from schools including those in Roseburg, Medford, and Coos Bay. University groups came from the Oregon Institute of Marine Biology (OIMB), the University of Oregon, and Oregon State University. Kids day camps came from South Slough Estuarine Research Reserve and Southern Oregon University.



Kayakers recreating near the mouth of Sunset Bay, with Gregory Point and the lighthouse in the background (OPRD).

Over half of the visitors (56%) said they were repeat visitors to the South Cove intertidal area. The average visit time for return visitors is two hours forty minutes with a range between less than one and eight hours. 51% of visitors spent between two to three hours at the site. 51 percent of return visitors indicated visiting the South Cove intertidal area between one to five times per year with an average of fourteen visits per year and a range between one and 150 days.

Of those visitors that came to South Cove for the first time, 32% indicated it was also their first visit to the Oregon Coast. The majority of visitors interviewed (75%) indicated they would return to South Cove at some time in the future. The average visit to the intertidal is two hours 11 minutes for first time visitors with a range of one half hour to six hours. Slightly more than one third (34%) of first-time visitors

indicated they spend between two and three hours at the site.

Sunset Bay

The average group size for visitors to Sunset Bay is six people with a range between 1-75 people. Approximately two thirds of visitors (69%) were with families, with 9% traveling with friends and 4% with a school group. School groups came from Brigham Young University (working from OIMB), North Bay (North Bend), University of Oregon, Lookingglass Elementary (Roseburg), Powers High School (Powers) and Lane Community College.

Over half of the visitors (55%) said they were repeat visitors to Sunset Bay. The average visit time for return visitors is two hours 39 minutes with a range between 17 minutes and 13 hours. Forty seven percent of return visitors indicated visiting Sunset Bay between one to five times per year with an average of 19 visits per year and a range between one-half and 350 days.

Of those visitors that came to Sunset Bay for the first time, 21% indicated it was also their first visit to the Oregon Coast. An overwhelming majority (80%) of first-time visitors indicated they would return to Sunset Bay at some time in the future. The average visit to the beach is two hours with a range of one-half hour to eight hours. 39% of visitors spend one to two hours at the site.

The typical visitor to the rocky intertidal at these sites

- Travels in a family group of two
- Is a return visitor who visits 1-5 times per year;
- Spends two to three hours at the site;
- Is an Oregonian from either the Coast or Southern Oregon;
- Travels 210 miles to reach the site;
- Comes to the site to explore the tidepools;
- Visits other rocky shore sites in the Cape Arago region or the Central Coast;
- Has an interest in learning more about tidepools, preferably via ranger-guided tour; and
- Believes there are special protections afforded to intertidal areas, which they strongly support.

Recreational activities at the other rocky shores was not studied. However, anecdotal information about relatively popular activities is available based on park staff knowledge of the sites. Yoakam Point: Beachcombing, commercial/recreational mussel collection, some scientific research, scuba-diving, rockfishing and surfing. Shore Acres (Simpson Beach): beachcombing, hiking/walking, birdwatching, marine mammal viewing, sightseeing, and surfing, Simpson Reef overlook: interpretation, wildlife viewing and wildlife photography. Shoreline Education for Awareness (SEA) docents provide interpretation in collaboration with OPRD and USFWS. North Cove: Beachcombing, tidepooling, hiking/walking, wildlife viewing/photography and sightseeing. South Cove and Sunset Bay are used regularly by scuba-divers, although this did not come out in the rocky shore survey which occurred during low tide periods.



Visitors explore the rocky shoreline at South Cove, Cape Arago

Sunset Bay MU Rocky Shores: Recreation Needs and Opportunities

Recreation Needs and Opportunities

An assessment of the recreation needs and opportunities is based on a review of the following information sources: 1) The 2003-07 and 2008-2012 Statewide Comprehensive Outdoor Recreation Plans (SCORP); 2.) The Oregon Ocean Shore Management Plan (OSMP); 3.) Oregon Trails Statewide Action Plan; and 4.) The Rocky Shore Recreational Use Study conducted as part of this planning process and summarized in the visitation section. Additionally, information collected from the advisory committee and staff team in the issue scoping process is factored into the goals and strategies involving recreation needs and opportunities.

2003-2007 SCORP

The Statewide Comprehensive Outdoor Recreation Plan (SCORP) for 2003-2007 looks at outdoor recreational demand and participation trends for a wide range of activities, both regionally and statewide (OPRD, 2003). The Sunset Bay District Parks are in SCORP Planning Region 4, which is the coastal area from just south of Florence to Brookings.

For each of the planning regions in the SCORP, estimates of recreational participation were measured (in "user occasions") in 2002. In some cases, it was possible to compare these numbers with data from 1987 to look at change in recreational demand over time. Activities that are potentially associated with these parks are presented in the below table, showing 2002 user occasions as well as, if available, change

Table 6. Recreation demand and change over time in SCORP Region 4

Recreation Activity	2002 User Occasions	% Change 1987-2002
Ocean beach activities	1,282,482	NA
Beach Activities, including swimming (fresh & salt)	1,147,085	38.50%
Bird watching	1,033,806	NA
Nature/Wildlife Observation	982,483	74.80%
Sightseeing/Driving for Pleasure	510,892	-45.40%
Non-motorized boating (ocean, lake & river)	376,800	-77.80%
Day Hiking	308,710	-45.40%
Running/walking for exercise on trails (all surfaces)	308,271	NA
Outdoor Photography	308,197	19.70%
Fishing from a bank or shore	301,837	NA
Walking for pleasure on trails (all surfaces)	278,887	NA
Picnicking	183,192	-69.30%
Clamming	88,556	NA
Camping on an ocean beach	98,330	NA
SCUBA diving or snorkeling	48,384	NA
Sea kayaking	6,422	NA

since 1987 (Table 6). Many of the activities did not have older data to determine change over time. The highest relevant growth activity for Region 4 is nature/wildlife observation (75%) followed by use of beaches (39%) (Table 6). Activities that appear to be decreasing the most in popularity regionally include non-motorized boating in an ocean, lake or river (-78%) and picnicking (-69%). Relevant popular activities in the region include ocean beach activities, bird watching, nature/wildlife observation, sightseeing for pleasure, and non-motorized boating (Table 6).

2007-2012 SCORP

Unlike previous SCORP planning efforts which focused on regional planning, in this SCORP, OPRD addressed a limited number of important demographic and social changes facing Oregon's outdoor recreation providers in the coming years including: a rapidly aging population, fewer youth learning outdoor skills, an increasingly diverse population, and the physical activity crisis (OPRD, 2007).

Important findings of relevance to this plan are summarized very briefly below and in tables 7 and 8, which show some results from these focused surveys (OPRD, 2007). Table 7 shows the top 10 recreation types that members of Oregon's aging population indicate they participate in at least once per year, along with how many times they say they participate and an average number of hours per day spent doing that activity (OPRD, 2007).

Aging Oregonians

- The most popular outdoor recreation activities for Oregonians between the ages of 42-80 included walking, picnicking, sightseeing, visiting historic sites and ocean beach activities (Table 7). Not too far behind, in 8th place (based on percent participating at least once a year) is exploring tidepools with 37% participation (Table 7). Other nature/wildlife observation is in 10th.
- The average number of days spent exploring tidepools is 1.5 with approximately 2.5 hours spent exploring each day (Table 7).

Table 7. Top 10 Outdoor Recreation Types (by percent participating) for Oregon's aging population.

Rank	Recreation Type	Percent participating	Mean days	Mean hours/day
1	Walking	80%	64.3	1.8
2	Picnicking	68%	5.2	3.2
3	Sightseeing	63%	9.9	4.1
4	Visiting historic sites	62%	3.6	3.1
5	Ocean beach activities	54%	4.1	3.9
6	Day hiking	52%	6.6	3
7	Children/grandchildren to playground	39%	5.7	2.1
8	Exploring tidepools	37%	1.5	2.5
9	Bicycling	33%	2.6	4.8
10	Other nature/wildlife observation	31%	5.4	2.8

Sunset Bay MU Rocky Shores: Recreation Needs and Opportunities

- The top five activities in terms of future participation intensity 10 years from now included walking, bicycling, jogging, bird watching and day hiking.
- The most important current motivations or reasons for participating in outdoor activities were to have fun and be in the outdoors.
- Ensuring clean and well-maintained parks and facilities was the most important management action that will lead to a large increase in recreation, followed by developing walking/hiking trails closer to home and providing more free-of-charge recreation opportunities.
- Over a third of Oregon “Boomers and Pre-Boomers” indicate they volunteer in their community, with an average time commitment of 5.3 hours per week (with 43% expecting changes in their activities, with most of the changes involving greater volunteerism, more time, and looking for new opportunities). Providing more information appeared to be the key to increase volunteerism.
- Oregon’s recreation managers can expect substantial increases in the number of visitors with a physical or mental disability using their recreational facilities and services.
- Priority should be given to trails, picnic areas, sightseeing areas, and historic sites in terms of where resources should be directed for providing

accessibility accommodations

- Coastal Oregon has been, and is likely to continue to be, one of the most popular destinations for people moving to Oregon from other states.
- On average across all activities, respondents expect to spend 28% more days recreation 10 years from now than they currently do (potentially breaking the trend of decreasing recreation with age).

Within the next decade, 15 percent of Oregon’s total population will be over the age of 65 and by 2030 that number will grow to nearly 20 percent. An enhanced focus on promoting and preserving the health of older adults is essential if we are to effectively address the health and economic challenges of an aging society. Clearly, Oregon’s park and recreation providers have the facilities and programs in place across the state to take a leadership role in promoting and preserving the health of older adults through encouraging and facilitating their involvement in active outdoor recreation activities. The Sunset Bay parks have the potential to provide opportunities to do a variety of the activities that aging Oregonians enjoy participating in.

Table 7 shows the top five outdoor recreation types, by numbers of people participating, for two other categories (minorities and youth) that were surveyed as part of the 2007-2012 SCORP (OPRD, 2007). For

Table 8. Top 5 Outdoor Recreation Types (by percent participating) for Oregon’s minorities and parents/youth (note: the children’s favorite activities do not correspond exactly with the other groups (for example, bicycling is tied for first for their favorite but isn’t listed in this table and viewing natural features is not in their top 5 because of the popularity of biking, outdoor sports/games and swimming).*

Recreation Type	Hispanic	Asian	Average	Parents	Youth*
Walking for pleasure	77%	80%	78%	74%	80%
Picnicking and family gatherings	74%	63%	70%	69%	77%
Relaxing, hanging out, etc.	67%	53%	63%	56%	64%
Viewing natural features	62%	56%	60%	60%	58%
Ocean/freshwater beach	56%	52%	55%	67%	73%

the minorities surveyed, an average figure is also presented.

A Growing Minority Population

- Walking for pleasure, fishing and hiking were the most commonly mentioned favorite activities.
- In terms of percent participating, walking, picnicking/family gatherings, and relaxing/hanging out were the top activities (Table 8).
- Over half of respondents indicated they participate in ocean/freshwater beach activities.
- The majority of respondents participated in their favorite activity with immediate family members
- The most common location to do their favorite activity was in a park or other area outside one's town or city.
- Ensuring clean and well-maintained parks and facilities were the most important management action followed by keeping parks safe from crime, providing more free-of-charge recreation opportunities and expanded facilities.
- The most commonly recommended facilities for development in parks were picnic tables, followed by trails and campgrounds.
- Overall, the internet was the most frequently noted as the desired information outlet.
- Lack of information and cost were reported as the main constraints to participation in children's outdoor programs.

Oregon Parents and Youth Study

- The most popular (highest average days in the past year) outdoor activities for parents was walking, viewing natural features, and relaxing/hanging out (Table 8). For children, the most popular were walking, followed by outdoor sports/games, relaxing/hanging out, and general play at neighborhood parks/playgrounds.
- 67% of parents and 73% of children indicated they participate in ocean or freshwater beach activities.
- The more a parent engages in an outdoor recreation activity, the more their child does.
- Almost all parents felt that it was a priority for their child to spend more time in outdoor activities.
- Youth preferred to do their favorite program activity with friends and in groups of 3-5 or 6-10

people.

- Recreation resource managers should attempt to understand if their existing and proposed facilities are appropriate for Oregon's youth
- Recreation resource managers should strive to develop partnerships with appropriate recreation entities.

Oregon Trails 2005-2014: A Statewide Action Plan

In 2003, OPRD staff completed a series of nine regional trail issues workshops across the state. Trail issues were defined as any high-impact issue related to providing recreational trail opportunities within the region. At each regional workshop, meeting participants voted to identify top priority issues.

The following top non-motorized trail issues were identified for the Southwest Trails Planning Region which includes Coos, Curry, Josephine, Jackson and Douglas Counties.

- Need for trail connectivity in the region including making trail connections within urban areas and to trails in adjacent public lands to connect communities with nearby parks and open spaces and connect land-based trails with water trails
- Need for funding and technical assistance for easements, permitting fee title, and acquisitions for trail projects. Population growth has increased the cost of land acquisition and easements and reduced the supply of available land acquisition opportunities.
- Need for additional funding for trail maintenance within the region. Increased grant funding priority should be given to maintaining what we currently have before adding additional trail facilities.

These issues point out the importance of a joint trails planning effort between OPRD and adjacent landowners (private, federal or state) to identify opportunities for trail linkages between systems. It also suggests that OPRD should, if funding is limited, focus on improving and maintaining existing trails before adding new trails. OPRD is currently working on improving connections in the region and will continue to do so in the future.

Sunset Bay MU Rocky Shores: Recreation Needs and Opportunities

Ocean Shore Management Plan

For the Ocean Shore Recreational Use Study conducted as a part of the Ocean Shore Management Plan, Sunset Bay Management Unit is in recreation segment 5. However, these beaches were not included in the survey because they are primarily rocky shorelines and rocky shores were not included in the survey. The closest area that was included was Bastendorf Beach, just north of Yoakam Point.

The average number of people/mile on a weekend day was 98 and 38 on weekdays at Bastendorf Beach. Most respondents did not feel crowded within this segment of beach with only 16% of respondents indicated they experienced crowding.

The primary activities noted during this study at Bastendorf Beach include walking (26%), scenic enjoyment (23%), relaxing in a stationary location (16%), and exercising dogs (12%) (OPRD, 2005).

Other activities noted include surfing/boogie-boarding/windsurfing, kite flying, beach camping, sports,

beachcombing, driftwood collecting, fishing from shore, and kayaking. Although these beaches were not surveyed, some anecdotal information is available from this study for the beach between Yoakam Point and Gregory Point (surfing, clamming), and Sunset Bay (surf fishing).



Family recreating on the high-tide beach at Sunset Bay (OPRD)

Issues

A number of issues have been brought up through the public interview process, as well as staff and stakeholder meetings regarding the parks within the Sunset Bay Management Unit. Issues that can be addressed in this planning process are reflected in the goals and/or resource management guidelines. Not every issue identified as part of this process is appropriate to address in this plan. For example, this is not a Master Plan, so no development proposals are being made. Therefore, those issues that cannot be reasonably addressed are mentioned for potential future consideration by OPRD in other appropriate programs. Some issues are addressed through related follow-up work, including suggested future studies and work with agency partners.

In this section, a list of issues is presented by general category and a matrix outlines potential solutions and barriers, and potential partners (Table 9). Then, as appropriate, issues are addressed in the goals and/or resource management guideline sections.

Facilities:

- The parking lot at Cape Arago is often over-capacity, especially with school busses in the spring and early summer.
- Except for Sunset Bay and Shore Acres, the day-use areas generally were not built to accommodate RV's, although they continue to use the site, especially during the summer.
- Potential future transportation methods (e.g., busses/trams) could possibly bring in more people than the site can handle (above and beyond existing parking capacity).
- There are no trash receptacles down at the beaches and some visitors complain about litter.
- The restrooms are not in close proximity to the beaches at South Cove and Yoakam Point and some visitors complain about distance to reach the restroom facilities.
- Beach access is in poor condition at the bottom of the trail at Yoakam Point, North Cove, and South Cove and continue to degrade. The general area (near the bottom of the trails) is eroding and may present a hazard.

- The trail at North Cove looks easy near the beginning but gets difficult when visitors are almost all the way down.
- ADA access to the beach is not possible, except possibly at Sunset Bay, if visitors are able to cross the sandy beach.
- Limited development (small vehicle capacity, no restrooms) at Yoakam point does not stop use. There is the potential for increased conflict between users and neighbors.
- The rocky shore is dynamic and the sand/rock has an impact on the parking lots.

Recreation:

- Some visitors experience crowding on the ocean shore.
- Dogs are frequently off-leash at all parks, even if owners are told to put them on leash. This results in conflicts with other users and dogs, as well as occasionally with marine mammals and birds.
- There is a potential human health concern when people do not pick up after their dogs.
- Recreational safety of visitors climbing over the barriers and other cliff areas, especially with ongoing erosion occurring in the area.
- Consistent use of "unofficial" and potentially dangerous trails in the area, particularly at Middle Cove and various points within Cape Arago, Sunset Bay and Shore Acres (some branching off of the Oregon Coast Trail).
- Rocks fall all around the bay at Sunset Bay, along the cliffs at North and South Cove, at Simpson Beach and Yoakam Point. This happens both naturally (e.g., erosion/storms) and from people (and dogs) climbing on the rocks/cliffs that exacerbates the problem.
- Visitors occasionally get stuck when they explore certain sections of rocky shoreline at low tide and then the tide comes in. This is generally a problem at all sites within the area. It is important that OPRD staff work with USFWS to deal with trespass issues on Refuge lands.
- The boat ramp at Sunset Bay receives high use during calm days. Occasionally there is conflict between users, particularly when vehicles are on the beach. Potential hazard for pedestrians and wildlife. Occasionally vehicles get stuck.
- Boaters (including kayakers) have the potential

Sunset Bay MU Rocky Shores: Issues

to disturb wildlife. The USFWS recommends all boaters keep a distance of 500 feet from all rocks, reefs and islands to reduce or eliminate disturbance.

- Increased boating recreation (e.g., if water trails are encouraged) could adversely impact wildlife without appropriate guidelines/interpretation/on-site presence to provide information to the public about appropriate viewing methods.
- There is poor emergency communication in the area (i.e., cell/radio coverage). In some areas cell phones work and in others radios do, and vice-versa.
- Beach safety issues at all sites (e.g., slippery rocks, sneaker waves, difficult access at bottom of trails, access via unofficial trails, getting stuck on outlying rocks at high tide, attractive nuisances, undercut cliffs on the trails). Most areas make alerts/reporting difficult because of lack of radio/cell communication and ability to access the sites.
- Access at Sunset Bay is constant and easy. It is open all the time, even when the day-use is closed. It is very easy to access the tidepools. This makes signage and management difficult but is good for accessibility.
- Adjacent landowners near Yoakam Point complain about visitors accessing the beach via the trail and getting confused and trespassing on their property.
- Recreational users of the trails in the area (Yoakam Point, Sunset Bay, Shore Acres) used to access rocky shore areas have the potential to inadvertently disturb sensitive species close to the trails. People go off trails, particularly when low areas are wet and may impact sensitive species.
- Human disturbance of marine mammals that are hauled out on accessible rocks (and occasionally the beach, particularly at Simpson Beach and North Cove), as well as shorebirds. This includes potential disturbance by dogs off leash.
- The beach access and boat ramp at Sunset Bay is used for those gaining access to the ocean on kayaks/trailer boats. This leads to the potential for disturbance to shorebirds/seabirds/mammals on close-by offshore rocks. Visitors sometimes access other sites in the area with kayaks, although this is not as common.

- Motorized vehicles in the water at Sunset Bay may introduce pollutants (e.g., oil, grease).
- The beach at Sunset Bay (particularly near Big Creek) frequently has warnings about water contact. This has implications for recreation but also possibly for the rocky shore species.

Natural Resource/Environmental:

- Level of direct human impact from trampling/collection to the rocky shore (intertidal) is not currently known. Often say we are “loving areas to death” but it is hard to get a handle on how much and what to do about it.
- Active tidepool recreation (e.g., picking things up, handling organisms, touching organisms and/or turning over rocks) was a common activity noted during the survey. 48% of visitors observed at South Cove were engaged in active recreation and 31% at Sunset Bay.
- Anecdotally, the “tidepools aren’t what they used to be” is heard frequently.
- Some small level of illegal collection occurs at the research reserve, particularly at Sunset Bay because of lack of signage. At both sites, 4% of visitors interviewed indicated they were there for the primary purpose of collecting something. These items include rocks, sand dollars, urchin tests, sea stars, beach glass, sand shrimp, mussels and seaweed. These percentages are very close to the number of people actually observed collecting something during the observation period. Three percent were observed collecting at South Cove and four percent at Sunset Bay. As with all observations, it is likely this number is underestimated since snap-shots likely will not pick up quick activities such as picking an item up.
- Potential disturbance of resident and migratory shorebirds and seabirds by visitors on the beach and rocky shore.
- There is potential for disturbance of shorebirds/seabirds/marine mammals by those flying by (e.g., USCG, recreational planes/helicopters). Wildlife harassment is against the law.
- Black oystercatchers, a USFWS species of concern, nest in the area (primarily Shore Acres

for nearshore sites) and could potentially be disturbed by recreating visitors. Oystercatcher habitat exists along the whole stretch of shoreline and all nests in 2008 and 2009 have failed for unknown reasons.

- There is possibly already disturbance of oystercatchers by overflight of helicopters and small planes. Volunteer oystercatcher monitors have observed disturbance that may/may not have led to nesting failure but did cause visible response by the chicks and the parents during the disturbance event (overflight of USCG helicopter doing training maneuvers).
- Predators of oystercatchers and other nesting seabirds/shorebirds are drawn to the area by human trash and may predate on nests and chicks (Dawn Grafe, pers. comm., 2009).
- Researchers leave items at sites that may not be active any more. Some items may be for long-term research but it appears there is equipment that is no longer in use (e.g., steel, plates, “scrubbies”).
- Few visitors are aware of rules and guidelines for protecting marine mammals and native birds (including seabirds and shorebirds) and occasional disturbance has been observed, including disturbance by dogs off-leash. During the survey, over half of dogs were noted off leash at South Cove (54%) and Sunset Bay (58%).
- The offshore rocks and islands are part of the Oregon Islands NWR and are managed as wilderness. Climbing or otherwise accessing these areas is against the law (Dawn Grafe, pers. comm., 2009).
- While it is not possible to patrol “24/7”, it is the interpretive message that is important to get across to visitors.
- Since we do not want to have to be forced to close the areas to the public (even temporarily) because of some unforeseeable issue in the future, we want to do everything possible to protect them for current and future recreational users.

Interpretation:

- Overall lack of interpretive signage at Sunset Bay (including regulatory signage). Existing signage at the access points at Sunset Bay does not

mention offshore rocks and shorebird/seabirds. Signage should be consistent along the coast and if in close proximity to the wildlife, designed not to attract additional visitors.

- Visitors are generally unaware of the areas protected status (marine protected area, research reserve). Very few visitors mentioned the protected status of the site (2-4%) as a marine protected area or research reserve. However, the majority of visitors do believe that the areas have restrictions on collection of plants and animals at South Cove. At Sunset Bay, this percentage is quite a bit lower, but still indicates the majority of visitors believe there are some protections in place at the site.
- The laws are confusing for the public and hard to explain (federal vs. state, various state agency rules). OPRD has no authority to enforce federal rules or even other state agency rules.
- Resources are not readily available for teachers (and the general public) to facilitate visits.
- School groups do not often coordinate with the park prior to their visits. It is hard to get in touch with schools (and more specifically the teachers that lead the field trips).
- Sunset Bay and Cape Arago need additional interpretive staff to provide an oversight presence at the rocky shores. It would be helpful to have an interpretive strategy that directly addresses rocky shore recreation more specifically than the Coos I Interpretive Plan.
- The public may confuse researchers (collecting with a valid scientific research permit) with those collecting illegally and not know that is why they are permitted to be collecting in an otherwise “closed” area.
- Those conducting scientific research are often questioned by the public and their time on-site is limited. Information about research (e.g., reasons, benefits) should be shared with the public and made available.

Cultural:

- The area is within a “high probability” and “known site” zone for cultural resources.

Sunset Bay MU Rocky Shores: Issues

Table 9. Issues matrix for Sunset Bay MU Rocky Shores. The table should be read across the spread and is continued on the next 10 pages. If possible the potential solutions, partners, and barriers are filled in.

Issue	Issue Type
Parking lot is sometimes over-capacity, mainly at South Cove (particularly a problem with busses and RVs in the spring/summer)	Facilities
No trash receptacles close to beaches at Cape Arago and Simpson Beach	Facilities
Restrooms are far from the beaches (all sites, except Sunset Bay)	Facilities
Access trail at North Cove is in poor condition near the bottom, poor ADA access throughout.	Facilities
Limited development at Yoakam Point does not stop use (has shifted from mostly fishing to mostly surfing). There is the potential for increased conflict between users and neighbors.	Facilities
Some visitors experience crowding on the ocean shore	Recreation
Dogs frequently are noted off leash at all sites. Results in conflicts with other users/dogs/marine mammals. There is also a human health issue if/when people do not pick up after their pets.	Recreation
Rocks fall at all sites both naturally and from people/dogs climbing on the rocks/cliffs	Recreation
Safety of visitors climbing over barriers near North Cove/Simpson Reef and other cliff areas, especially with ongoing erosion as well as consistent use of “unofficial” trails in the area.	Recreation
Visitors occasionally get stuck when they explore certain sections of rocky shoreline at low tide. Potential trespass issues if visitors end up on areas closed to the public (USFWS refuge lands).	Recreation
The boat ramp at Sunset Bay receives high use during calm days and occasionally there is user-conflict and hazards for pedestrians and wildlife. Kayakers and boaters potentially disturb wildlife. Wildlife disturbance and access to the Oregon Islands NWR Complex is illegal.	Recreation
Poor emergency communication in the area (i.e., cell/radio coverage).	Recreation
Beach safety issues at all sites. Lack of communication coverage compounds issue.	Recreation

Potential Solution(s)	Potential Barrier(s)	Potential Partners
New striping for busses, regular striping, encourage to use other sites with higher capacity (Sunset Bay), coordinate with schools	Funding, no room for expansion, staff time	OPRD Operations, OPRD RPP, Schools (Oregon and out-of-state)
Closely monitor any other means of transporting visitors to the park that may significantly increase visitation above existing capacity		
Install a bag dispenser for visitors to pick up beach trash to deposit at the trash cans by the restrooms	Funding, space to put the dispenser, cultural clearance required.	OPRD Operations, SOLV (?)
No viable solution	No viable location to place restroom	
Examine geological situation more thoroughly, close when deemed unsafe	Fortified in the past and continues to fail, funding, no location to relocate, instability of terrain/ongoing erosion, no affordable engineering solution (?)	OPRD Operations, DOGAMI
Work with neighbors and user groups to determine best course of action. Improve interpretation.	Staff time, funding to implement potential solutions, cooperation of partners	OPRD Operations, Neighbors, User groups
Do not increase parking capacity		OPRD Operations, OPRD RPP
Focus on asking visitors to keep dogs on leash as a courtesy to other visitors and natural resources. Provide doggie bag pick-up stations	Funding, staff time, lack of compliance	OPRD Operations, OPRD RPP, USFWS
Interpretive/warning signage	Funding	OPRD Operations, OPRD RPP
Interpretive/warning signage, on-site presence. Encourage access at developed trails (South Cove) and Sunset Bay	Funding, staff time	OPRD Operations, OPRD RPP
Interpretive/warning signage, on-site presence	Funding, staff time	OPRD Operations, OPRD RPP, USFWS
Interpretive/warning signage, on-site presence. Inform boaters about keeping a distance of 500 ft from all rocks, reefs islands	Funding, staff time	OPRD Operations, OPRD RPP, USFWS
Interpretive/warning signage	Funding	OPRD Operations, OPRD RPP
Interpretive/warning signage, on-site presence. Share information with partners for inclusion on their websites/publications (e.g., Chamber).	Funding, staff time	OPRD Operations, OPRD RPP

Sunset Bay MU Rocky Shores: Issues

Table 9. Issues matrix cont.

Issue	Issue Type
Adjacent landowners at Yoakam Point complain about visitors accessing the beach via the trail getting confused and trespassing on their property.	Recreation
Recreational trails users may inadvertently disturb sensitive species habitat.	Recreation/Environmental
Human disturbance of marine mammals that are hauled out on accessible rocks (and occasionally the beach, particularly at Simpson Beach and North Cove), including disturbance by dogs off leash. Disturbance of seabirds/shorebirds in accessible areas is also possible. Wildlife disturbance is illegal as is access to areas within the Oregon Islands NWR Complex.	Recreation/Environmental
Boat access (mainly at Sunset Bay) leads to potential disturbance of shorebirds/seabirds/mammals	Recreation/Environmental
Motorized vehicles in the water at Sunset Bay may introduce pollutants (e.g., oil, grease)	Recreation/Environmental
Pollution at Big Creek, frequent water quality warnings	Recreation /Environmental
Impact of visitors to rocky shore is unknown . However, anecdotal information indicates we are “loving it to death” and that the tidepools “aren’t what they used to be”.	Environmental
Potential future disturbance of nesting black oystercatchers and other shore/seabirds by airborne devices in the future.	Environmental

Potential Solution(s)	Potential Barrier(s)	Potential Partners
Signage (e.g., please stay on trail)	Funding	OPRD Operations
Signage (e.g., please stay on trail), trail engineering for wet areas, ensure staff is aware of location of known sites	Funding	OPRD Operations, Private Landowners, USFWS
Interpretive signage, on-site interpretive services, provide viewing guidelines online. Focus on asking visitors to keep dogs on leash as a courtesy to other visitors/natural resources.	Staff time, funding	OPRD Operations, OPRD RPP, NOAA/USFWS, SEA (for interpretation)
Interpretive signage/ on-site interpretation, including at the boat ramp. Include language about maintaining 500 ft distance	Lack of compliance, funding for new signage	OPRD Operations, OPRD RPP, USFWS
Determine the extent of problem	Staff time	OPRD Operations, OSMB, OUS
Coordinate with DEQ to determine the extent of problem, explore potential impacts to the rocky shore	Staff time	OPRD Operations, OPRD Safety Program, DEQ, Surfrider, ODA
Use baseline inventories/visitor surveys to develop more focused & long-term impact studies.	Funding, staff time	OPRD RPP, OPRD Operations, Oregon University System (e.g., OIMB).
Explore options like “hardscaping.” Encourage visitors to view things from the sand/bare rock. Parking may limit increases in use.	Funding, staff time, coordination	OPRD RPP, OPRD Operations, SEA, OIMB, Charleston Marina, Port of Coos Bay
Share information about other less sensitive sites (e.g., “from the docks”). Explore partnership opportunities		
Explore water trail opportunities and constraints		
Encourage these types of activities at sites without nesting seabirds so close by; see above (interpretive strategy). Interpretive signage.	Lack of compliance, lack of knowledge, staff time (enforcement and education), funding for new signage	OPRD Operations, OPRD RPP, USFWS/USGS

Sunset Bay MU Rocky Shores: Issues

Table 9. Issues matrix cont.

Issue	Issue Type
<p>Potential disturbance of resident and migratory shorebirds and seabirds by visitors on the rocky shore and beach. Also disturbance by those flying by (USCG, recreational planes/helicopters etc.). USFWS recommends aircraft flying below 2000 feet above ground level maintain a 0.5 mile lateral distance from all rocks, reefs, islands, and cliffs to avoid disturbance to marine wildlife. Wildlife harassment is against the law.</p>	<p>Environmental</p>
<p>Researchers leave “stuff” at sites that may not be in active use any more.</p>	<p>Environmental</p>
<p>Visitors access offshore rocks at low tide and are generally unaware of protections in place for seabirds, shorebirds and marine mammals.</p>	<p>Environmental/Interpretation</p>
<p>Active tidepool recreation (e.g., picking things up, handling organisms, touching organisms and/or turning over rocks) was a common activity noted during the survey.</p>	<p>Environmental/Interpretation</p>
<p>Some illegal collection occurs, particularly at Sunset Bay due to lack of signage</p>	<p>Environmental/Interpretation</p>
<p>Overall lack of interpretive signage at Sunset Bay (including regulatory signage)</p>	<p>Interpretation</p>
<p>Visitors are generally unaware of the protected status (marine protected area, research reserve)</p>	<p>Interpretation</p>

Potential Solution(s)	Potential Barrier(s)	Potential Partners
Coordinate with USFWS on development of interpretive strategy (signage, on-site message etc.)	Lack of compliance, lack of knowledge, staff time (enforcement and education), funding for new signage	OPRD Operations, OPRD RPP, USFWS
Coordinate with USCG/other local operators to encourage activities during non-sensitive periods; coordinate with USFWS on recreational disturbance issues	Lack of compliance, lack of knowledge, staff time (enforcement and education)	OPRD Operations, USFWS, local air tour operators, relevant recreational clubs
Require notification of project completion date as part of the permit. Require timely removal as part of the permit-and coordination with adjacent park/ocean shores program.	Cooperation of partners, compliance, coordination with ODFW/DSL permitting process	OPRD Operations, ODFW, DSL, Oregon University System (OSU/PISCO, OIMB etc), other researchers.
Interpretive signage explaining why the area is closed to public access, explain federal crime for larger effect, new interpretive signs, roving ranger effort, educate staff on protections	Lack of compliance, lack of knowledge, staff time (enforcement and education), funding for new signage	OPRD Operations, OPRD RPP, USFWS, SEA
Interpretive signage explaining appropriate etiquette, interpretive brochures, roving ranger can explain to visitors	Lack of compliance, lack of knowledge, staff time (enforcement and education), funding for new signage/brochures	OPRD Operations, OPRD RPP, ODFW, DSL
Interpretive signage explaining protections, interpretive brochures, roving ranger can explain to visitors	Lack of compliance, lack of knowledge, staff time (enforcement and education), funding for new signage/brochures	OPRD Operations, OPRD RPP, ODFW, DSL
Coordinate with other agencies to develop a sign strategy for the parks. Explore cooperative funding options for new interpretive panels. Restrooms are a great interpretive opportunity given that most people go there at least once.	Funding, lack of compliance/ interest, staff time (enforcement and education), funding for new signage	OPRD Operations, OPRD RPP, ODFW, USFWS
Improve signage-making it clear that no collecting is allowed; this is a protected area. On-site interpretation (roving ranger). Determine sign “hot-spots.” Educate staff on existing protections.	Staff time, funding	OPRD Operations, OPRD RPP, ODFW

Sunset Bay MU Rocky Shores: Issues

Table 9. Issues matrix cont.

Issue	Issue Type
The laws are confusing for the public and hard to explain (federal vs. state, various state agency rules). OPRD has no authority to enforce federal rules or even other state agency rules.	Interpretation
Information about on-site research (e.g., reasons, benefits) is not consistently shared with the public.	Interpretation
The public may confuse researchers with those collecting illegally	Interpretation
Those conducting scientific research are often questioned by the public. The public may simply be curious, may not understand the reason for the research or the potential benefits of the results.	Interpretation
Resources not readily available for teachers to facilitate intertidal visits	Interpretation



School group visiting South Cove, Cape Arago at low tide

Potential Solution(s)	Potential Barrier(s)	Potential Partners
Work with partners to help summarize the various rules/statutes/policies etc.	Staff time, partner coordination	OPRD Operations, ODFW, USFWS
Coordinate with researchers and permitting agencies to ensure this information is available and disseminated (at least in a summarized format).	Staff time, cooperation of partners	OPRD Operations, OUS/OIMB, ODFW
Coordinate with OIMB/OSU/PISCO/ODFW and others with research permits to determine a clear way to ID them (e.g., ID on bucket/person/vest)	Staff time, coordination and willingness of partners (could require as part of permit)	OPRD Operations, OPRD RPP, ODFW, DSL, OIMB, OSU/PISCO, other researchers
Coordinate with researchers to develop a hand-out about their research (general) to provide to interested public. OPRD, OSU/researchers could put this on their websites as well	Staff time, coordination and willingness of partners (could suggest requirements as part of permit(s))	OPRD Operations, OPRD RPP, ODFW, DSL, OIMB, OSU/PISCO, other researchers
Provide a location for researchers to put a flyer (e.g., a clear case on the clusterboards), which could be updated on a seasonal basis		
Have a teacher resource section on the OPRD website, including lesson plans and other tools for field trips	Staff time to develop content, coordination with schools	OPRD RPP, OPRD Operations, Schools (Oregon and out-of-state)



View of South Cove, Cape Arago from the trail

Sunset Bay MU Rocky Shores: Issues

Table 9. Issues matrix cont.

Issue	Issue Type
School groups do not often coordinate with the park prior to their visits. It is hard to get in touch with schools (and more specifically the teachers that lead the field trips).	Interpretation
Need additional enforcement/oversight/education	Interpretation
High probability and “known site” cultural resource site	Cultural

Potential Solution(s)	Potential Barrier(s)	Potential Partners
Discourage un-managed visits, consider a reservation system for large groups, explore option of a “control” station or check-in system (like a trail log book)	Staff time, volunteer compliance of request, funding if need to build/maintain something on the ground	OPRD RPP, OPRD Operations, Schools (Oregon and out-of-state), OIMB/OUS
Facilitate scheduling with schools to improve experience, avoid crowding by reaching out to the education community. Encourage visits not just at the lowest tides (any below +1 are good for tidepooling and will satisfy most visitors, especially younger groups)	Support infrastructure, staff time, funding	OPRD RPP, OPRD Operations, Schools (Oregon and out-of-state), OIMB/OUS
Provide oversight guidelines	Staff time	OPRD RPP, OPRD Operations
Encourage educational focus for visits	Staff time, volunteer compliance, resources to support teachers, teacher time, participation of parent supervisors	OPRD RPP, OPRD Operations, Schools (Oregon and out-of-state)
Expand rocky shore seasonal time-period (March-Sept)	Funding, currently not a committed resource (it is left up to parks to use existing funds)	OPRD RPP, OPRD Operations,
Interns	Housing, funding	OPRD Operations, OPRD RPP, OIMB/OUS
Volunteer docents/ “adopt a tidepool”/site monitors	Staff time to coordinate, need dedicated volunteers, training	OPRD RPP, OPRD Operations, Coastwatch, SEA
Partner with aquarium volunteer program	Staff time to coordinate, training	OPRD RPP, OPRD Operations, Oregon Coast Aquarium
Partner with the new OSU master naturalist program	Staff time, training	OPRD RPP, OPRD Operations, OSU Extension
Temporary signs with docents like at YHONA	Funding, staff time	OPRD Operations, OPRD RPP, YHONA
Rocky shore “hosts”	Campsite, staff support (e.g., oversight, training), safety issues	OPRD Operations, OPRD RPP, SEA, OIMB
Improve content on OPRD website including information on protections, etiquette, research occurring, when to come, information for school groups, permits needed etc.	Staff time, coordination with partners	OPRD RPP, OPRD Operations, OUS (OIMB/PISCO etc.)
Maintain current practices (e.g., require clearance forms, continue consultation for activities that could disturb resources such as signage). Coordinate on traditional harvest issues (if any).		OPRD Heritage Programs, OPRD Operations, tribes

Natural, Cultural and Scenic Resource Management

This section outlines general guidelines for management of natural, cultural and scenic resources in the park based on OPRD policies and statewide guidelines.

Statewide Natural Resource Policy:

It is the policy of the Oregon Parks and Recreation Department to plan, design and implement resource management practices consistent with the principles of conservation, energy efficiency, and sustainability.

The following policy guidelines have been established:

- Manage OPRD properties to preserve and protect Oregon's natural landscape; manage park properties to enhance the natural ecological processes that sustain natural resources in balance with current and future outdoor recreation interests.
- Manage natural resources in a manner emphasizing ecosystem-based approaches that protect the integrity of the natural environment and promote ecosystems that favor biodiversity, reduce ecological fragmentation, and promote native species.
- Comply with all applicable federal, state, and local rules and regulations, and seek ways to avoid or minimize ecological impacts that may occur as part of the implementation of operations and business systems. Where such impacts are unavoidable, OPRD will mitigate for such impacts.
- Develop and maintain an Environmental Management System (EMS) to conserve resources, reduce impacts to the environment, and implement sustainable operational policies and procedures.
- Implement energy conservation and efficiency measures in all aspects of agency operations including; facility design and maintenance, fleet and transportation systems, and department administration.
- Incorporate sustainable practices into all facets of

the department's mission, particularly: facility and site planning, design, construction, operation and maintenance; grant programs; contracting and procurement, and visitor programs and services.

- Reduce, and where possible eliminate, hazardous chemicals and toxic materials in construction, operations and maintenance activities.
- Reduce the department's contribution to atmospheric carbon dioxide and other pollutants.
- Create systems to eliminate waste in department operations.
- Train staff and volunteers to reinforce the agency's commitment to resource stewardship and conservation and to gain compliance with adopted practices.
- Conduct educational and interpretive activities to inform and inspire visitors and local communities to reduce their impact on the environment for the benefit of present and future generations.
- Support sustainable practices that strengthen local economies.
- Promote these guidelines to others for their adoption and use and, when working with others as partners in joint activities.

Oregon's Statewide Planning Goal 19 (Ocean Resources), applicable to the Territorial Sea, is to conserve marine resources and ecological functions for the purpose of providing long-term ecological, economic, and social value and benefits to future generations.

Statewide Cultural Resource Policy:

OPRD's policy relating to its cultural resources, which include, but are not limited to, tangible resources and cultural practices is to:

- Foster an understanding and appreciation of the cultural resources entrusted to OPRD's management, both within and outside the agency, through appropriate programs of training, research, identification, treatment, and interpretation.
- Conduct sufficient research to locate and evaluate OPRD's cultural resources, prior to making decisions on their treatment. Treat the agency's property as significant until a final determination

has been made.

- Evaluate all cultural resources that appear to meet the criteria for inclusion in the National Register of Historic Places. All those determined to be eligible will be nominated for listing.
- Employ The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings for any work that will be conducted on OPRD historic properties.
- Engage in active stewardship that ensures the agency's historic properties are preserved, protected and made available, when appropriate, for public understanding and appreciation.
- Consider cultural resource preservation intrinsically as a form of sustainable conservation.
- Encourage appropriate uses of historic properties that will allow for and ensure their long-term protection while minimizing harm to character-defining features. Discourage inappropriate uses or changes to historic properties that adversely affect an historic property's character-defining features.
- Preserve and protect the cultural heritage of this state embodied in objects and sites that are of archaeological significance.
- Seek the acquisition or lease of sites of historic significance for state use, in accordance with Oregon Revised Statute 358.653. Conversely, should OPRD surplus property of historic significance, attach all appropriate preservation covenants to ensure the property's long-term protection.
- Adhere to all other applicable OPRD Commission policies and OPRD Operations policies while implementing this policy, including, but not limited to, consultation with Oregon tribes regarding cultural resources and tribal traditions of interest to the tribes.
- Recognize agreements between the Heritage Conservation Division and Operations as the basis for defining how the two divisions work together in achieving the policies listed above.

Scenic Resource Standards:

Scenic resources are very important to OPRD and

are one of the primary factors considered by the ocean shore program when evaluating ocean shore permits. The following standards are part of state rule that applies to modifications to the ocean shore:

Projects on the ocean shore shall be designed to minimize damage to the scenic attraction of the ocean shore area. The following scenic standards shall be applied, where applicable:

- Natural Features -- Retain the scenic attraction of key natural features, for example, beaches, headlands, cliffs, sea stacks, streams, tide pools, bedrock formations, fossil beds and ancient forest.
- Shoreline Vegetation -- Retain or restore existing vegetation on the ocean shore when vital to scenic values.
- View Obstruction -- Avoid or minimize obstruction of existing views of the ocean and beaches from adjacent properties.
- Compatibility with Surroundings -- Blend new additions to the landscape with the existing shoreline scenery (type of construction, color, etc.).

Oregon's Statewide Planning Goal 5 (Natural Resources, Scenic and Historic Areas, and Open Spaces) also discusses conservation of scenic resources. Local governments and state agencies are encouraged to maintain inventories of scenic views and sites.



Family walking at twilight, Sunset Bay State Park (OPRD)

Sunset Bay MU Rocky Shores: Goals and Strategies

Goals and Strategies

This section establishes OPRD's goals and strategies for management of the parks in this management unit and adjacent rocky shoreline. The goals and strategies are based on consideration of the recreation needs assessment, and evaluation of the issues identified in the planning process and summarized in this plan as well as statewide agency policies. As an over arching principle, adaptive management will be employed to periodically review, and as appropriate update these goals and strategies.

Following are descriptions of the five main goals and potential strategies to achieve each goal. Strategies include individual steps or actions, which are designated with bullets and will be implemented when feasible and appropriate (note: These are not prioritized. Not all potential strategies are listed here, since they are discussed by issue in the above issue matrix).

Goal 1: Provide recreation opportunities and experiences that are appropriate for the park resources and recreation settings.

Every effort will be made to provide visitors with an assortment of recreational experiences that continue to meet and exceed their expectations.

- Develop or rehabilitate recreational facilities, guided by indicators of need, the recreation settings, resource suitability, and the capacities of the parks to accommodate use without overcrowding, degradation of recreation experience, or conflicts with other uses.
 - For example, continue to provide managed access to South Cove and Sunset Bay. This will require frequent maintenance of the trail at South Cove.
- Discourage recreational activities that threaten to harm the natural, cultural or scenic resources and/or the safety of the visitors. Alternatively or in combination with discouragement, re-route them to alternate locations that are less sensitive.
 - For example, continue to close the North Cove trail on a seasonal basis to protect marine mammals during pupping season.

The need for maintaining the current day-use experiences for park visitors is recognized, but potential future activities need to be anticipated. This is based on the anticipated increase in demand for recreation and recognizing parks needs to meet future visitor expectations. The current capacity for day-use in the management unit is at the right level given space and natural resource restrictions. There is no viable opportunity to increase parking capacity.

Given that parking capacity will not increase, the potential for future additional crowding is minimized. However, there is the potential for the parks to be "at-capacity" more often than they are currently. Therefore, those that experience crowding may increase.

- Explore the feasibility of options for monitoring access/tracking (e.g., a "trail log" book or check-in station for large groups). Consider whether crowding is occurring and needs to be managed.
- Provide information to visitors about other coastal parks and accesses that offer similar or complementary experiences.
- Coordinate with school groups to help minimize crowding and improve their educational experience at the parks.
 - Determine the appropriate maximum number of busses and look at providing designated parking.
 - Look at opportunities to work with the school districts to coordinate scheduling of school visits.
- Explore options for improving services to visitors



School bus back-up on a busy June day, near South Cove

- with disabilities (e.g., potential ADA access at Sunset Bay boat ramp, boardwalk facilities).
- Investigate ways to improve facilities and services to accommodate Oregon's youth. Work to develop partnerships with recreation providers that encourage youth outdoor exploration and interpretation.
- Any potential alternative methods of getting visitors to the parks that may significantly increase visitation above the current capacity will need to be closely followed to ensure resources are not adversely effected.

The anticipated increase in future demand for recreational activities includes activities such as walking, hiking, tidepooling and generally ocean beach activities.

- Continue to provide and maintain opportunities for these key recreational activities. As new trends emerge, consider the feasibility of providing for those at the appropriate park(s).
- Although general use may be declining, maintain facilities such as picnic tables and telescopes (for sightseeing) to accommodate the interest of groups including aging Oregonians and minority populations in these particular activities.

Goal 2: Protect, manage and enhance as appropriate, outstanding natural, cultural and scenic resources.

Enjoyment and appreciation of resources will be enhanced while protecting those resources from effects of overuse.

Scenic resources:

One important aspect of visiting the parks is the views of some of the major features at Gregory Point, Simpson Reef and the other offshore features in the area. These views focus on the ocean and more specifically, at the overlook, of the geologic features of the unique coastline of the Cape Arago area.

- Retain the scenic attraction of key natural features. Unforeseen future actions may impair views and efforts will be made to minimize the possibility for negative impacts on key viewsheds

- and features within the parks and adjacent ocean shore.
- Retain or restore existing vegetation when vital to scenic values.
- Avoid or minimize obstruction of existing views of the ocean and beaches.
- Blend new additions to the landscape with the existing shoreline scenery (e.g., type of construction, color).

Cultural resources:

The park land is an important traditional-use area of several tribes and their cultural heritage within the area is of considerable antiquity. In addition to pre-contact and historic archaeological sites, Oregon tribes who are affiliated with the area, view cultural resources as those resources that continue to be used by Native peoples, such as foods, medicines and basketry materials.

- Preserve and protect the cultural heritage of the parks in consultation with the tribes.
- Consult, as appropriate, with the various tribes to identify potential interpretive themes/stories to highlight at the parks.

Natural resources:

It will likely be necessary for OPRD to consult with other agencies and stakeholders to determine whether there are changes desired in ecosystem types or conditions over time and as new information becomes available. As resources become available, additional inventories and research will be completed and evaluated for the presence of threats and opportunities.

- Develop long-term monitoring of the high use intertidal areas (and complementary control areas) to track potential impacts of visitor use. This may be part of a coast-wide strategy.
- Determine if there are times when visitation has less/more of an impact (foot traffic/trampling etc). OPRD could use that information to inform visitors about best times to visit and have information about when is the most important time to manage visitor use.
- Study the recreational carrying capacity for the rocky shores within this area.
- As recommended in the Territorial Sea Plan,

Sunset Bay MU Rocky Shores: Goals and Strategies

continue to monitor the effectiveness of the seasonal trail closure at North Cove and continue the closure to protect marine mammals during sensitive times like pupping season.



Seasonal trail closure at North Cove, Cape Arago

- Work with partners such as the Oregon Institute of Marine Biology and the USFWS to explore opportunities to monitor impacts to marine mammals from foot, boat and aircraft activity per the Territorial Sea Plan.

The resources will be managed to minimize any unacceptable threats and to protect resources to ensure continued enjoyment and educational opportunities for current and future generations.

- Use scientific information to adaptively manage as new information becomes available.
- Continue to enforce current rules, including coordinating with partners on cross-jurisdictional issues. Explore partnership opportunities.
- As recommended in the Territorial Sea Plan, prohibit the harvest of seaweed (without a permit) within the boundaries of the existing research reserve to make restrictions for plants consistent with those for intertidal invertebrates.
- On-site staff and/or volunteers will discourage illegal collection and efforts will be made to improve signage and increase voluntary compliance.
- As deemed appropriate based on monitoring and scientific research, and in coordination with appropriate agencies and stakeholders, implement temporary rotational area closures as necessary to allow recovery of intertidal areas receiving greatest use.

- Explore water trail opportunities/constraints. This may relieve pressure on rocky intertidal species, but working with partners (e.g., interpretation on wildlife disturbance) would be crucial.
- Identify potential habitats for “species of interest” found within the park boundaries and adjacent ocean shore. Update the list of species and develop a monitoring plan, as appropriate.
- Work with Federal, State and Local agencies and other interested groups to protect at-risk species, their habitats, and identify opportunities to improve key habitats and minimize negative interactions with visitors to assist with species survival and recovery. Examples are included below.
 - Continue to coordinate with USGS/USFWS on the annual Black Oystercatcher surveys and track results to determine if issues with nest failures continue.
 - Coordinate with USCG and encourage them to do training exercises and overflights during non-sensitive periods (i.e., avoiding, if possible, May 1-August 30).
- Work with partners to develop a site response plan for introduced aquatic/marine invasive species (likely as part of a larger coastal or regional plan).
- Develop a site specific management procedure for strandings (e.g., marine mammals) and emergency response (e.g., beach safety, hazardous materials) on the shoreline.
- Work with partners agencies who are attempting to resolve environmental and safety risks associated with pollution that have the potential to effect park or ocean shore resources and/or present safety risks to park/ocean shore visitors.

Sustainable practices will be incorporated, to the extent practicable, in all aspects of OPRD’s mission, particularly: facility and site planning, design, construction, operation and maintenance, contracting and procurement, and visitor programs and services.

- If plantings are necessary, efforts will be made to use plants native to the Oregon coast.
- Minimize use of hazardous chemicals and toxic materials used in operation and maintenance.
- Coordinate with natural resources staff if there is the potential for impacts to “species of interest”.

Goal 3: Provide for adequate management, maintenance, rehabilitation, and park operations including safe, efficient, identifiable and pleasant access and circulation

To the extent that resources are available, recreational activities and facilities will be managed, maintained, rehabilitated and operated as needed for the safety, satisfaction and enjoyment of visitors. In allocating state park operational and facility investment funds, strive to provide adequate support for maintenance and rehabilitation of existing facilities, and an adequate level of oversight and enforcement in the park and adjacent ocean shore.

- Continue routine maintenance of the South and North Cove access trail.
- Routine maintenance of the parking lots (including striping) may be able to help with appropriate parking of larger vehicles.
- As necessary and practicable, develop a site assessment and recreation safety plan, including a more detailed discussion of emergency communication issues and response plans (this could be part of a larger coastal or regional plan).
- Consider long-term solutions as the North Cove trail, which is located in a geologically unstable and erosive area, continues to degrade.
- When access is deemed hazardous for visitors, temporarily close the North Cove trail while solutions (temporary and long-term) are being sought. Place signage to indicate to visitors the reason and expected length of the closure, along with contact information. Study, as the condition worsens, the feasibility of continuing to maintain the North Cove access trail and explore options.
- Continue to treat the access at Middle Cove as “unofficial” and un-maintained given the infeasibility of continuing to maintain it as a safe access.
- Maintain, and install directional and informational signage to direct vehicular and pedestrian traffic to recreational use areas and facilities within the park.
- Look at long-term solutions to parking issues as they develop, such as signage. As mentioned in goal 1, this may include designating bus specific parking areas.

- Coordinate with USFWS to ensure maintenance of USFWS constructed facilities at Simpson Reef.
- Plant, remove and prune designed landscape areas where needed to beautify roads and parking areas, retain scenic views, and provide visual buffers within the park. Ensure coordination with natural resources staff occurs if there is the potential for impact to “species of interest”.

Goal 4: Promote public awareness, understanding, appreciation, and enjoyment of the recreation settings through resource interpretation.

OPRD will strive to share and interpret park and local history along with geologic and natural resources with a wider audience. The interesting local history, unique geology and ocean shore and marine resources make the Sunset Bay/Cape Arago area an outstanding location for interpretation. There is a great opportunity to educate visitors, especially since the majority of them have been to these sites before and plan to return in the future. Even those that are visiting for the first time believe that they are highly likely to return in the future.



Interpretive tour at South Cove, Cape Arago

OPRD has a wonderful opportunity to get in touch with visitors, particularly those to South Cove and the Sunset Bay campground. The primary way visitors found out about South Cove is from either a state park flyer or staff. This point of contact needs to be capitalized upon as it would be possible to provide them with targeted information to improve their visit and reduce impacts to the rocky shore.

Sunset Bay MU Rocky Shores: Goals and Strategies

The vast majority of visitors to both sites (Sunset Bay and South Cove) surveyed indicated they are interested in learning more about rocky shores/tidepools on a future visit. The preferred method of receiving this information was through on-site staff, either via guided tour or a roving ranger.

- Using the existing “Coos I Plan” as a starting point, develop a rocky shore site specific interpretive plan that includes themes, recommended programs and materials. In the meantime use the existing plan as guidance for interpretive services.
 - The focus should be on improving on-site presence.
 - Use the information gained from the on-site recreation survey and staff knowledge to determine the optimal times for on-site presence and interpretive services.
- Work to improve on site interpretive services including roving rangers, signage etc. Work with partners to help accomplish this.
 - Coordinate with USFWS to place wildlife interpreters at Simpson Reef Overlook.
 - Work with USFWS, ODFW and others to decrease wildlife disturbance on refuge lands and adjacent shoreline by developing signs and other information to keep the public off rocks, reefs and islands that are accessible at low tide.
 - Explore water trail opportunities/constraints.
- As resources permit, increase coordination with large groups (e.g., school groups) to improve educational benefits of the visits and decrease impact to natural resources.
 - As practicable, organize OPRD-led groups so that they avoid peak visitation periods. This would mean having the groups visit before 9 AM or after 11 AM. At South Cove, the hour before low tide and 2-3 hours after are the least busy times. At Sunset Bay, the hour before and the hour after would be optimal times to lead groups, since they did not receive high levels of use during the survey.
 - Encourage groups to visit during days that do not necessarily have the lowest tides of the year. They will likely have a better experience since the area will not be as crowded, and

the resource will not be as heavily impacted. Low tides below +1 are acceptable for tidepooling, and will provide for the needs of the average person interested in this recreational activity. Days when the low tide occurs earlier in the morning also receive far less use than those that occur between eight and 11 AM in the morning.

- Improve visitor awareness and understanding of the special protected status of the marine protected area and research reserve.
- Deliver consistent messages about tidepool etiquette, including encouraging rocky shore recreation (including OPRD facilitated trips) to occur at the sand/rock interface.
- Determine the best method of reaching out to schools. Provide interpretive services to teachers leading field trips to the parks.
- Provide interpretive services to school groups to improve their educational experience at the site.
- Coordinate with the tribes on any interpretive stories that relate to cultural resources.
- Provide information to harness the increasing availability and interest of aging Oregonians in volunteering in their communities.
- Communicate information about park resources and services on the OPRD website. Use social networking sites to provide up-to-date information, particularly interpretive events.
- The majority of visitors that based their visit on the low tide (which is well over half at South Cove and slightly under half at Sunset Bay) used tide charts and/or the internet. Since OPRD produces tide charts that are distributed across the state, this is a potential avenue for information (which is currently limited to beach safety tips). This may be as simple as providing a web-link to allow visitors to access the tide-chart online as well as rocky shore information (e.g., etiquette, ecology).

Rocky shore specific interpretive goals from the “Coos I Plan” are included below for easy reference (The Acorn Group, 2007). The focus of the following rocky shore specific interpretive goals is on what OPRD would like its visitors to take from a visit to the shoreline at Sunset Bay Management Unit parks.

- Visitors will appreciate these parks and the role

they play in supporting marine habitats.

- Visitors will respect and value efforts directed at protecting park and ocean shore resources, including safeguards and protections that apply directly to visitor enjoyment, comfort, and safety.
- Visitors will understand that this region undergoes constant, gradual change caused by natural forces, processes, and cycles.
- Visitors will indicate awareness that tidepools and marine wildlife is protected.
- Visitors to Sunset Bay and Cape Arago will understand that intertidal organisms are adapted to constant fluctuations in water level, temperature, and salinity.
- Visitors will gain an understanding of how intertidal organisms, despite their resilience to daily and seasonal environmental change, are less resilient to human behavior which may cause injury.
- Visitors will gain an understanding of the various ways human populations have been connected to this site over time.
- Visitors will know the rules and regulations that help protect and manage state parks and coastal waters and the reasons they are in place.
- Visitors to Cape Arago State Park will understand why certain areas are closed seasonally.
- Visitors will demonstrate heightened awareness of, understanding of, and support for these parks through their adherence to rules and regulations. Park staff will seek voluntary compliance of rules whenever possible.
- Visitors will keep a safe distance between themselves and any marine mammals.
- Visitors will refrain from exploration that causes injury to organisms (e.g., prying off rocks, not returning items to their exact location after temporary removal, wading in tidepools, moving rocks, and collecting without a permit.)



View looking south from Cape Arago

Goal 5: Form partnership and agreements to aid in achieving goals

Many of the issues identified in the scoping for these parks identified partners as part of the solution.

- Identify and follow-through with viable potential partnerships, as practicable, to work through the above listed activities, and new ones that emerge in the future.
 - For example, one of the key issues is lack of staffing to provide on-site presence for interpretive purposes. Work with partners to improve volunteer opportunities, management, training, and recruitment to help supplement OPRD staffing needs.
 - Another key issue where partnerships is crucial is the coordination of research needs and implementation with other agencies and research institutions. Work with partners to improve the sharing of research results (current and future) and develop priority research and monitoring needs for the areas (e.g., recreational carrying capacity, direct impact of human use).
- Develop and formalize agreements as necessary to promote ongoing partnerships.
 - Coordinate with USFWS on implementation of items recommended in their recently released Comprehensive Conservation Plan including a potential MOU regarding the Simpson Reef Overlook area.
 - Explore an agreement with Shoreline Education for Awareness (SEA) regarding the current informal interpretive partnership.
- Promote the use of the above goals and strategies when working with others as partners in joint activities at the parks.

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Visitor Use of the Rocky Intertidal at Cape Arago and Sunset Bay

April 2009



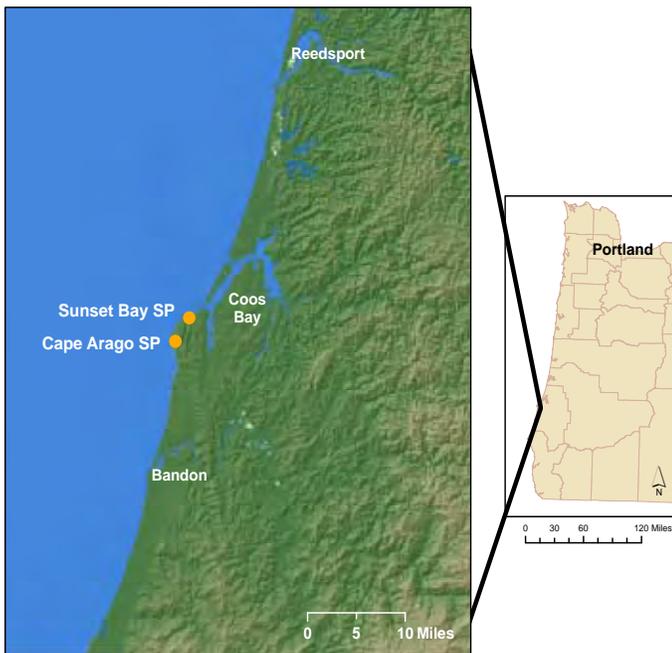
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I. EXECUTIVE SUMMARY

Introduction

This report describes the results of a visitor recreation use project conducted at two rocky intertidal sites on Oregon's south coast: Sunset Bay State Park and the south cove of Cape Arago State Park, both Oregon Parks and Recreation Department (OPRD) properties (see map).



Map of the 2 sites along the southern Oregon coast

The results are based on both observational data and on-site interviews of visitors to the intertidal areas adjacent to these two parks. The objective of the project was to obtain information about visitor use numbers, recreation types, and public awareness levels in intertidal areas adjacent to and near coastal state parks. This information will be used to determine whether there are conflicts between recreation use and resource protection. The results of this study are intended to complement biological inventories conducted at the same sites. Both inventories will inform future management plans for the sites.

Summary of Key Results

Visitation Rates

South Cove Cape Arago

The average number of visitors observed per low tide period at the South Cove is 65 with a range between 6 visitors on a rainy June 3rd and 221 on June 6th. During the 16 days sampled, the average number of visitors per hour ranged from 1 to 44 persons with an average hourly visitation of 13 visitors per hour.

Sunset Bay

The average number of visitors per low tide period at the Sunset Bay is 101 with a range between 10 visitors on June 17th and 298 on June 8th. During the 17 days sampled, the average number of visitors per hour ranged from 2 to 60 persons with an average hourly visitation of 20 visitors per hour.

**Average visitation
is 17 visitors
per hour**

Timing of Visits

In previous surveys of rocky intertidal sites, it was discovered that, as anticipated, most visitors schedule their visit to correspond to the time of low tide. However, during this survey, this was not the case for Sunset Bay. It remains true for South Cove. Only 14% of visitors observed at Sunset Bay were seen during the period of one hour before to one hour after low tide. Slightly under half (45%) of visitors to South Cove, on the other hand, were observed in that time period. Regardless of the time of low tide, the most popular time to visit tends to be between 9-11 AM. At both sites, visitation is extremely low in the early morning with no visitors observed before 7 AM at South Cove and very few (less than 1% of visitors) at Sunset Bay.

South Cove

Visitation at the South Cove peaks the hour after low tide with 37% of visitors choosing this time frame to visit the site. Visitors appear to base the time of their visits on the time of low tide, with 45% of visitors visiting during the peak time of one hour before to one hour after. The most popular time to visit is between 9-10 AM, with 41% of visitors observed during that time frame. In general, visitation appears to increase when the time of low tide occurs in the mid-morning, with the busiest two days occurring on low tides that occurred between 8:00-9:00 AM.

The most popular time to visit both sites is between 9-11 AM

Sunset Bay

Visitation at Sunset Bay peaks 2 to 4 hours after low tide with 65% of visitors choosing this time period to visit. Visitors do not appear to use the time of low tide to determine the time of their visit, although mid-to late morning (9-11 AM) is still the most popular time to visit (44% of visitors). Visitation does appear to be slightly more spread out over the low tide period than it is at South Cove, with more visitors choosing to visit later in the day.

Spatial Distribution

Distribution across the intertidal areas at the two parks is relatively evenly spread across the shoreline. However, visitors do favor certain segments of the two coves. At South Cove, visitors are drawn to the rocky intertidal area on the west side of the cove. At Sunset Bay, although slightly under 1/3 of the visitors were observed on a sandy-only section of shoreline, another 1/3 was seen favoring the rocky shoreline on the north side of the bay.

Activity Types

South Cove

Active tidepool recreation (e.g., picking things up, handling organisms, touching organisms and/or

turning over rocks) was the most common activity with 48% of visitors observed doing these types of activities. In second place, approximately 27% of the observed visitors appeared to be part of a school affiliated group. Approximately 12% of visitors were observed on the beach (although some may have simply been using it to access other portions of rocky shoreline).

Sunset Bay

The characteristics of visitors observed at Sunset Bay are quite different from those at South Cove. Beach recreation is much more predominant, with 40% of visitors observed recreating on the sandy beach (walking, picnicking, sunbathing etc.). Slightly under 1/3 of visitors were observed doing active tidepool exploratory activities (31%). This is followed by 9% of visitors in an educational group.

Top Recreation Types

- **Active tidepool exploration**
 - **Beach recreation**
 - **Educational groups**

Visitor Characteristics

The typical visitor to the rocky intertidal at these sites

- Travels in a family group of two
- Is a return visitor who visits 1-5 times per year;
- Spends two to three hours at the site;
- Is an Oregonian from either the Coast or Southern Oregon
- Travels 210 miles to reach the site;
- Comes to the site to explore the tidepools;
- Visits other rocky shore sites in the Cape Arago region or the Central Coast
- Has an interest in learning more about tidepools, preferably via ranger-guided tour; and
- Believes there are special protections afforded to intertidal areas, which they strongly support.

I. INTRODUCTION

Oregon's rocky intertidal areas are subject to increasing human disturbance as population and interest in coastal recreation in these areas grows. Tidepools, cliffs, rocks, and submerged reefs support an ecologically rich and diverse ecosystem at the boundary of the land and sea along 161 miles (41%) of Oregon's shoreline. These rocky shore areas, particularly the 82 miles (21%) of rocky intertidal habitat, attract thousands of visitors annually. Rocky shores are thus resources of high ecologic, economic, and social value to a wide range of stakeholders from local communities to state agencies and citizens of the world at large.

Oregon Parks and Recreation Department (OPRD) is charged with overseeing the management of Oregon's Ocean Shore Recreation Area, which includes beaches and rocky intertidal areas along the coast. However, there is very little information about visitor use of Oregon's rocky shores and what impact visitors are having. OPRD recently completed a survey of Oregon's sandy beaches, however, the rocky shore segments of the coast were not covered (Shelby and Tokarczyk, 2002; OPRD, 2005). General day-use figures at coastal state parks indicate that use of rocky intertidal areas is likely increasing with the possibility of hundreds of thousands of people visiting these areas annually.

People use the rocky shores to play, conduct scientific research, supplement their livelihoods, perform traditional tribal activities, harvest food, and to teach and learn about nature. From exploring the unique creatures of the rocky intertidal to fishing from rocky outcroppings and observing marine mammals, activities on Oregon's rocky shores are diverse. The rocky shores have ecologic, economic, and social value to a wide range of stakeholders, from local communities to citizens of the world.

Although sixty-one percent of the visitors to Oregon's beaches are Oregonians, a large number are from out of state, drawn for various reasons to Oregon's unique and beautiful coast (Shelby and Tokarczyk,

2002). Therefore, although Oregon's population increase is likely to be reflected in visitor use of coastal areas, out-of state visitors will also play a role. Tourist revenue in Oregon's coastal counties is increasing, which suggests that more out-of-state visitors are using Oregon's coast (Dean Runyan Associates, 2004). This increase in population and tourism is also reflected in visits to Oregon's state parks next to rocky shores.

Two of Oregon's coastal resources that depend upon rocky shore areas (marine wildlife and tidepools) have been identified by coastal visitors as ones they are most interested in learning about (Shelby and Tokarczyk, 2002). Additionally, results from a study of recreation preferences of Oregon's aging population show that more than half (59%) of Oregonians aged 42-80 take part in ocean beach activities, and 37% spend time exploring tidepools (OPRD, 2007).

Oregonians age 42-80 rank ocean beach activities and exploring tidepools as their fifth and eighth favorite forms of outdoor recreation (OPRD, 2007). Based on the survey, that use is evenly distributed among income brackets, likely because it is virtually cost-free, except for traveling to the sites. Oregonians in this age bracket make up 42% of Oregon's population (PRC, 2005), which indicates at least approximately 600,000 people explore Oregon's tidepools each year.

Impacts of human use on rocky shore areas range from the effects of trampling on sensitive intertidal habitat (Brosnan and Crumrine, 1994), to collection of intertidal resources (Castilla, 1999) and conflicts between humans and marine wildlife (Riemer and Brown, 1997).

One of the potential impacts on rocky intertidal areas is human recreation; therefore, to better manage the interface between human use and natural resources, information about visitor use numbers, recreation types and impact of human use is needed. This information is also helpful when looking at ways to improve recreational and interpretive opportunities at these locations.

II. METHODS

The two study sites are sections of rocky shoreline on Oregon's south coast just south of the Coos Bay/North Bend area. Each section is approximately 1/2 mile in length and lie adjacent to two different state parks: Sunset Bay State Park and Cape Arago State Park (fig. 1).

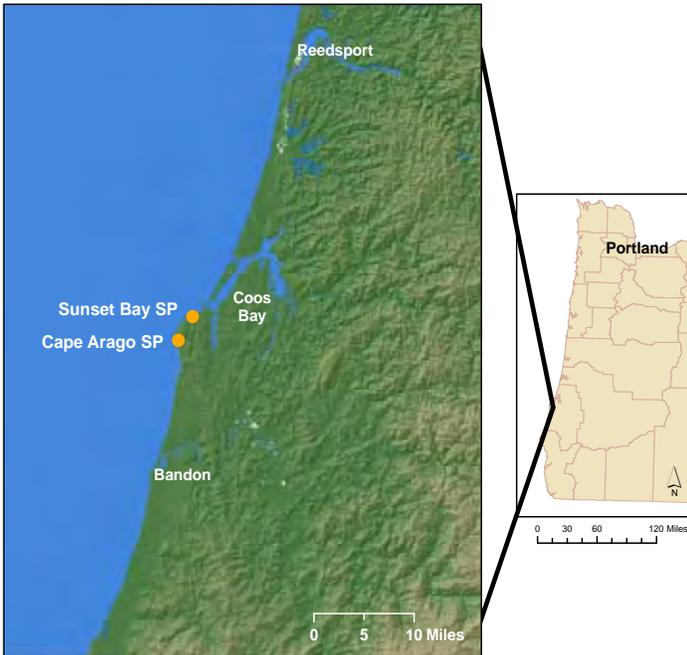


Figure 1. Map of the 2 sites along the southern Oregon coast

The Cape Arago headland is characterized by “steep cliffs, numerous offshore rocks, extensive rocky intertidal and subtidal reefs, and small sand beaches (Fox et. al., 1994).” The geology at Sunset Bay and South Cove is primarily comprised of sandstone and siltstone, with low sloping platforms, small surge channels and cracks, along with boulder and cobble habitats (Fox et. al., 1994).

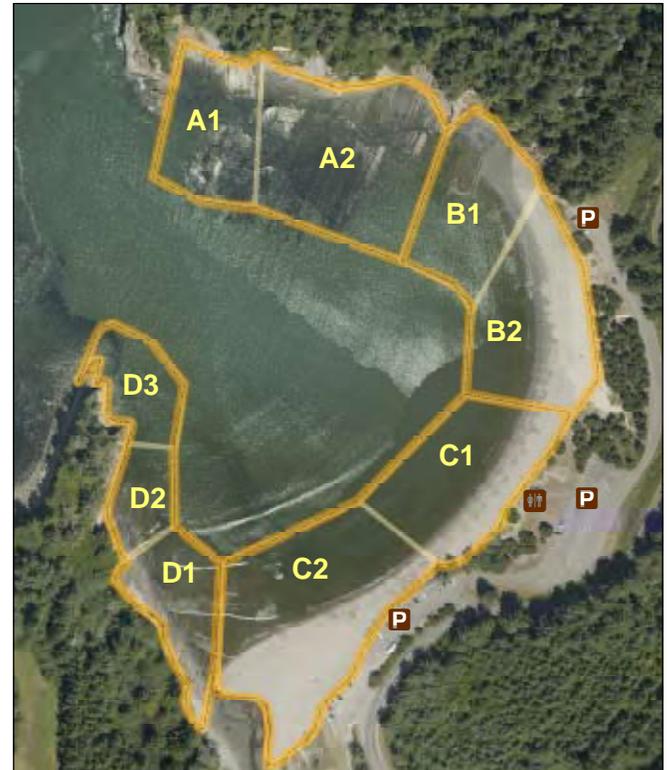
Sunset Bay

The approximately 430 acre OPRD property known as Sunset Bay State Park provides public access to the entire bay (fig. 2). The northern intertidal area at Sunset Bay is primarily a large wave-cut bench, on which faults can be easily seen at low tide (ORE BIN, 1967). The southern intertidal area is also primarily

a wave-cut bench with long ridges made of resistant sandstone (ORE BIN, 1967). The approximately 0.6 mile long study region is subdivided into four main study areas (A-D) which are further subdivided in two (and three in one case) to show where visitor activity is concentrated. Big Creek flows into the Bay on the southern end (between C2-D1).

SUNSET BAY
STATE PARK

Oregon Parks & Recreation Dept.
725 Summer St. NE, Suite C
Salem OR, 97301



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Figure 2. Map of Sunset Bay study site showing the nine sampling locations (A1-D3).

South Cove

The 146 acre OPRD property known as Cape Arago State Park provides multiple public accesses to the rocky shore. The south cove of the cape, hereafter referred to as ‘South Cove’, is on the southern boundary of the park (fig. 3). The ~0.4 mile long study region is subdivided into six study areas (A-F).

Two methods of on-site data collection are employed, observational data of visitor recreational activities

Appendix A: Rocky Shore Recreation Use Study

SOUTH COVE
CAPE ARAGO STATE PARK

Oregon Parks & Recreation Dept.
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Salem OR, 97301



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Figure 3. Map of South Cove showing the six sampling locations (A-F).

and a short interview. Information recorded includes location, time, number of users, and activity in the intertidal areas. The on-site interview collects information about recreation activities, knowledge of protections and restrictions, and access.

To gain an understanding about peak use periods, all on-site data is collected between May 21st and August 19th, 2008. In Oregon, late spring and summer low tides are generally accepted to be the best time to gain access to the rocky intertidal. Not only are the tides the lowest during this time period, but weather conditions tend to favor coastal recreation as does the timing of spring-time school field trips and

summer school vacation.

Sample Selection

Days and Times

To achieve the objective of quantifying human activity in the rocky intertidal, potential sampling periods were chosen to coincide with a relatively low predicted tide (at or below 0 MLLW) and daylight hours (between sunrise and sunset). To standardize time relative to predicted low tide and obtain counts over the entire span of low tide use, the survey period starts the hour before and ends four hours after the predicted low tide (Adessi, 1994; Fox, 1994).

Since visitor numbers and types of activity may be expected to vary between weekdays and weekends and also depending on whether schools are in session or not, it is necessary to stratify sampling over time (Underwood and Kennelly, 1990). Observations are divided into school weekdays (WdS), school weekends (WeS), summer holiday weekdays (WdH), and summer holiday weekends (WeH) to allow orthogonal comparisons (Underwood and Kennelly, 1990).

Potential days meeting the above mentioned criteria (low tides coinciding with daylight hours) were identified and separated out to allow for at least two replicates of each type of day (WdS, WeS, WdH, WeH) information is desired for. Ultimately, final sampling days should be randomly chosen, however, for the weekend category, there were not enough days available that met the criteria to randomly sample. The dates for school weekdays (WdS) and school holiday weekdays (WdH) were randomly selected. A full list of all potential (50) and chosen (33) survey dates is in the Appendix.

Area

Sampling is initiated from two different starting locations (on the north and south ends of each of the site) and begins in either a northward or southward direction, chosen randomly on each day. From the starting location, sampling follows a set route through the rocky intertidal at each of the study sites. Visitor

use observation and visitor interview periods alternate throughout the 5-hour sampling period as indicated in figure 4 . Whether or not the starting period is visitor counting or visitor interview is chosen randomly each day. There are three, 40-minute visitor counting periods, which alternate with three, hour-long visitor interview periods.

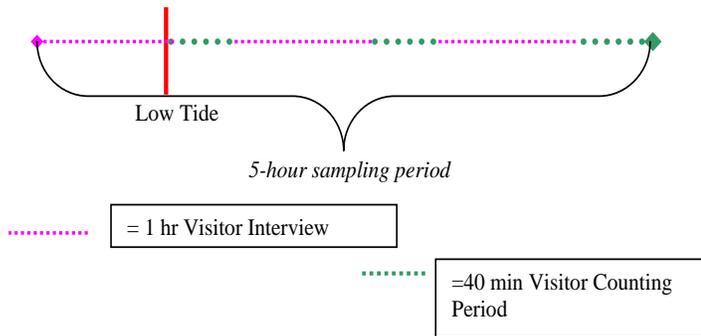


Figure 4. Schedule of Visitor Use Observation and Visitor Use Survey Periods during the sampling period. This figure depicts a day that starts with an interview period, for illustrative purposes only.

Visitor Observation and Counting Period

The first method of on-site data collection used is observational, whereby the surveyor observes visitor recreational activities and counts visitor numbers. The observations are brief “snap-shots” of the activities present at the site since the observer only notes activities as visitors pass through the rocky shore.

Observations are broken down into each of the observation sections and by activity. To monitor different types of use, activities are broken down into eight categories. These categories are as follows:

1. *Active, non-collectors* are people that are seen to be handling organisms (i.e. picking up a sea star, poking an anemone) and/or turning over rocks but it is not apparent that they are collecting organisms.
2. *Active, collectors* are people that are obviously collecting organisms. These people may have buckets or plastic bags and/or collecting tools such as knives. Any person seen putting something in their pocket

or utilizing any sort of collecting device (e.g., prying tools) is considered an active collector. At any given distance it is unlikely that the specific organism(s) is identifiable, but if it is, it is noted on the data sheet.

3. *Passive visitors* are those that are moving about in the intertidal (e.g., standing, kneeling, walking) but are not collecting or turning rocks. These types of visitors may be tidepooling, birding, taking photos etc.

4. *Fishers* are people observed to be rock fishing from shore. Offshore fishing (from boats) is not included in this category.

5. The *Other* category is used for all activities that do not fit within the other groups. They are described in as much detail as possible.

6. *Dogs* present at the site are noted, as are whether or not they are on or off-leash.

7. *School groups* present at the site are noted and the approximate size is included if possible.

8. *Beach* or non-rocky shore activities are noted if they are in the areas adjacent to the rocky shore observation areas.

Visitor Interview Period

The second method of data collection used was a short on-site interview, whereby the surveyor interviews visitors about recreational rocky shore activities and general knowledge of protections (see Appendix for survey instrument). Since it is not practical to interview all visitors to the site as use levels vary and visitor movements are not under the control of the interviewer, visitors are contacted at random (Shelby and Tokarczyk, 2002).

A standard script was utilized to contact visitors. The script informed potential respondents of the purpose of the study as a recreation use project being conducted by OPRD. The project was described as a way to gather information to help OPRD better

Appendix A: Rocky Shore Recreation Use Study

manage Oregon’s rocky shores for both recreation and natural resource preservation. Respondents were informed that participation in the interview was completely voluntary and confidential. Except for home zip codes, no personal information was collected about the participants. At the end of the interview, participants were provided with a copy of OPRD’s “Oregon’s Rocky Intertidal Area” brochure if they wanted one. The on-site script is located in the Appendix.

III. RESULTS

Observation Period

During the 33 day visitor observation period from May 21st-August 19th, 2008, a total of 2,769 visitors were observed recreating in the two separate intertidal areas (Table 1). Counts include the entire span of low tide use as they occurred one hour before the predicted morning low tide to four hours after the low (Fox, 1994).

The average number of visitors per day is 84 with a range between 6 visitors on July 17th at South Cove and 298 on June 8th at Sunset Bay. During the 33 days sampled, the daily average hourly use at the two sites ranged from 1 to 60 persons with an average hourly visitation of 17 visitors per hour. Results for visitor use counts, distribution (temporally and spatially) and recreation types are summarized below for each site.

Sunset Bay

The average number of visitors per day at the Sunset Bay intertidal area is 102 with a range between 10 visitors on June 17th and 298 on June 8th. This number is within close range of the counts done at nearby Bastendorf Beach during a previous survey of sandy beaches where daily totals ranged from 38 (weekdays) and 98 (weekends) on average (Shelby and Tokarczyk, 2002). Sunset Bay was not included in that survey, but if it had, based on this information, it probably would have been one of the top 15 highest use level beaches in the state. During the 17 days sampled, the average number of visitors per hour

Table 1. Time and height of predicted low tides for survey dates.

Date	Time	Height	Site
5/21/2008	7:51 AM	-0.9	Sunset Bay
5/22/2008	8:28 AM	-0.8	South Cove
5/23/2008	9:05 AM	-0.7	Sunset Bay
5/24/2008	9:45 AM	-0.5	South Cove
5/25/2008	10:27 AM	-0.3	South Cove
5/26/2008	11:11 AM	0.0	Sunset Bay
6/3/2008	6:29 AM	-2.4	South Cove
6/4/2008	7:18 AM	-2.6	Sunset Bay
6/5/2008	8:08 AM	-2.6	Sunset Bay
6/6/2008	8:57 AM	-2.3	South Cove
6/7/2008	9:46 AM	-1.8	Sunset Bay
6/8/2008	10:36 AM	-1.1	Sunset Bay
6/9/2008	11:26 AM	-0.3	South Cove
6/17/2008	6:22 AM	-0.9	Sunset Bay
6/21/2008	8:45 AM	-1.1	South Cove
6/22/2008	9:20 AM	-0.9	Sunset Bay
7/2/2008	6:18 AM	-2.4	Sunset Bay
7/3/2008	7:06 AM	-2.5	Sunset Bay
7/4/2008	7:53 AM	-2.5	Sunset Bay
7/5/2008	8:38 AM	-2.1	South Cove
7/6/2008	9:21 AM	-1.5	South Cove
7/7/2008	10:03 AM	-0.8	South Cove
7/16/2008	6:02 AM	-0.7	Sunset Bay
7/17/2008	6:39 AM	-1.0	South Cove
7/20/2008	8:18 AM	-1.1	South Cove
7/21/2008	8:49 AM	-2.0	South Cove
8/1/2008	6:50 AM	-2.0	South Cove
8/2/2008	7:32 AM	-1.8	Sunset Bay
8/3/2008	8:12 AM	-1.4	South Cove
8/16/2008	6:43 AM	-0.8	Sunset Bay
8/17/2008	7:14 AM	-0.8	Sunset Bay
8/18/2008	7:45 AM	-0.6	Sunset Bay
8/19/2008	8:16 AM	-0.1	South Cove

ranged from 2 to 60 persons with an average hourly visitation of 20 visitors per hour. Daily totals are shown in Table 2.

On average, weekends (137 visitors/day) got more use than weekdays (83 visitors/day) and less visitors came during summer vacation (94 visitors/day) than when school is in session (113 visitors/day). Days that fall on weekdays when school is in session (WdS) appear to receive the lowest mean use (72 visitors/day) with weekends when school is in session

(WeS) receive the most (217 visitors/day). It was only possible to sample on two weekend days when school was in session, both of which had high levels of visitation, however, this may be why that average is so high. Bad weather may have been a factor on at least one of the observation days (August 16th), where only 28 visitors were observed during the observation period. That particular day had both rain and fog for the entire observation period. A few other days had some periods of rain and fog, but nothing lasting the entire period. For example, on June 5th, one of the busiest days (208 visitors), there was rain in the mid morning but it was a relatively nice day otherwise.

Table 2. Visitor counts totals for each of the 17 survey dates at Sunset Bay. Rainy days are indicated by an asterisk.

Day Type	Dates	Number of visitors
WdS	May 21st	27
	May 23rd	25
	May 26th	60
	June 4th	39
	June 5th	208
		$X' \approx 72$
WeS	June 7th	135
	June 8th	298
		$X' \approx 217$
WdH	June 17th	10
	July 2nd	44
	July 3rd	105
	July 4th	237
	July 16th	105
	August 18th	51
		$X' \approx 92$
WeH	June 22nd	166
	August 2nd	94
	August 16th*	28
	August 17th	100
		$X' \approx 97$
TOTAL		1732
Average		$X' \approx 102$

South Cove Cape Arago

The average number of visitors per day at the South Cove intertidal area is 65 with a range between 6 visitors on a rainy June 3rd and 221 on June 6th (Table 3). During the 16 days sampled, the average number of visitors per hour ranged from 1 to 44 persons with an average hourly visitation of 13 visitors per hour.

On average, weekend days (65 visitors/day) received the same amount of use as weekdays (65 visitors/day). More visitors come when school is in session (94 visitors/day) than when school is on summer break (47 visitors/day). Days that fall on weekdays when school is in session (WdS) appear to receive the highest mean use (97 visitors/day) with weekdays when school is on vacation (WdH) receiving the least (39 visitors/day) amount of visitation pressure (Table

Table 3. Visitor counts totals for each of the 16 survey dates at South Cove. Rainy days are indicated by an asterisk.

Day Type	Dates	Number of visitors
WdS	May 22nd	134
	June 3rd*	6
	June 6th	221
	June 9th*	27
		$X' \approx 97$
WeS	May 24th	80
	May 25th	95
		$X' \approx 88$
WdH	July 7th	66
	July 17th	6
	July 21st	57
	August 1st	22
	August 19th	46
		$X' \approx 39$
WeH	June 21st	30
	July 5th	86
	July 6th	58
	July 20th	69
	August 3rd	34
		$X' \approx 55$
TOTAL		1037
Average		$X' \approx 65$

3). Rain may have been a factor as those were two of the least popular days (June 3rd and 9th). The other relatively low visitation days (June 17th and August 1st) also had relatively poor weather with clouds and breezy conditions in the morning changing to some rain as the morning progressed.

Low Tide

The “best time” to visit tidepools is generally thought to be one hour before to one hour after low tide. To determine if visitation corresponds to this belief, visitor counts are plotted against hours before or after low tide. The time of low tides varied between survey dates between 6:02 AM and 11:26 AM (Table 1).

South Cove

Visitation at South Cove peaks the hour after low tide with 37% of visitors choosing this time frame to visit the site (fig. 5). The least popular time to visit the site was almost evenly split between the hour before low tide (8%) and 3 to 4 hours after (9%). It appears that at South Cove, many (but not quite the majority) visitors base the time of their visits on the time of low tide, with 45% of visitors visiting during the peak time of one hour before to one hour after.

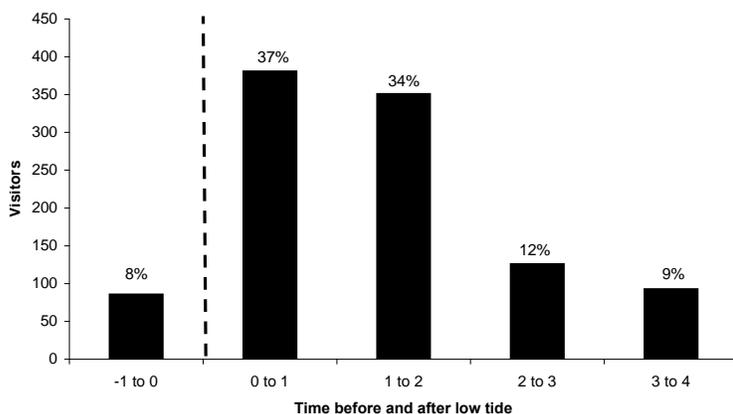


Figure 5. Visitor count levels before and after low tide at South Cove (May-August 2008). N=1037

Sunset Bay

Visitation at the Sunset Bay intertidal area peaks two to three hours after low tide with 33% of visitors choosing this time frame to visit the site (fig. 6). These results are quite different from previous

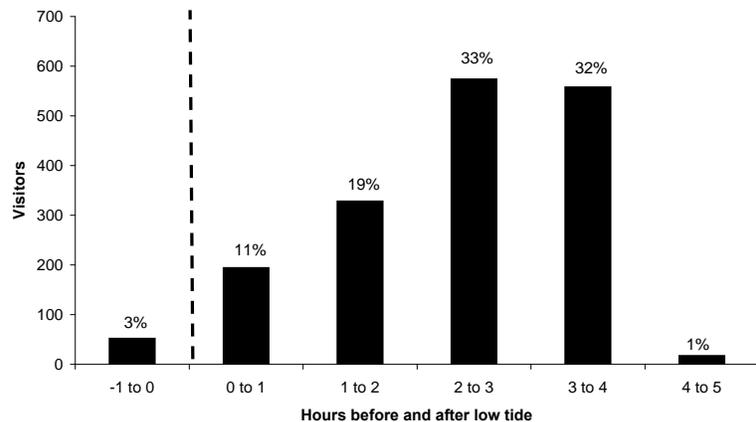


Figure 6. Visitor count levels before and after low tide at Sunset Bay (May-August 2008). N=1723

surveys at other sites, including the current study of South Cove during the same period (Fox, 1994; Hillmann, 2005).

The least popular time to visit the site was four to five hours after the time of low tide. However, this is tied closely with the hour before low tide (thought to be the optimal time for tidepooling). Only 14% of all visitors were observed in the “prime” tidepooling time of one hour before to one hour after low tide (fig. 6). The reason for the low visitation four to five hours after low tide is most likely because very few of the observations periods happened to fall within this time period, not that visitation was necessarily low.

Unlike previously studied sites, it appears that at Sunset Bay, the majority of visitors do not base the time of their visits on the time of low tide, with 65% of visitors visiting 2 to 4 hours after low tide. Inclusion of beach (non rocky shore) users is likely the main reason for this, as the site is popular for sandy beach recreational activities.

Time of Day

If visitation is not entirely dependent on the time of low tide, time of day may be the factor that primarily determines visitation rates at intertidal areas. Visitor counts are plotted against time of day between 5 AM and 3 PM in figures 7 and 9.

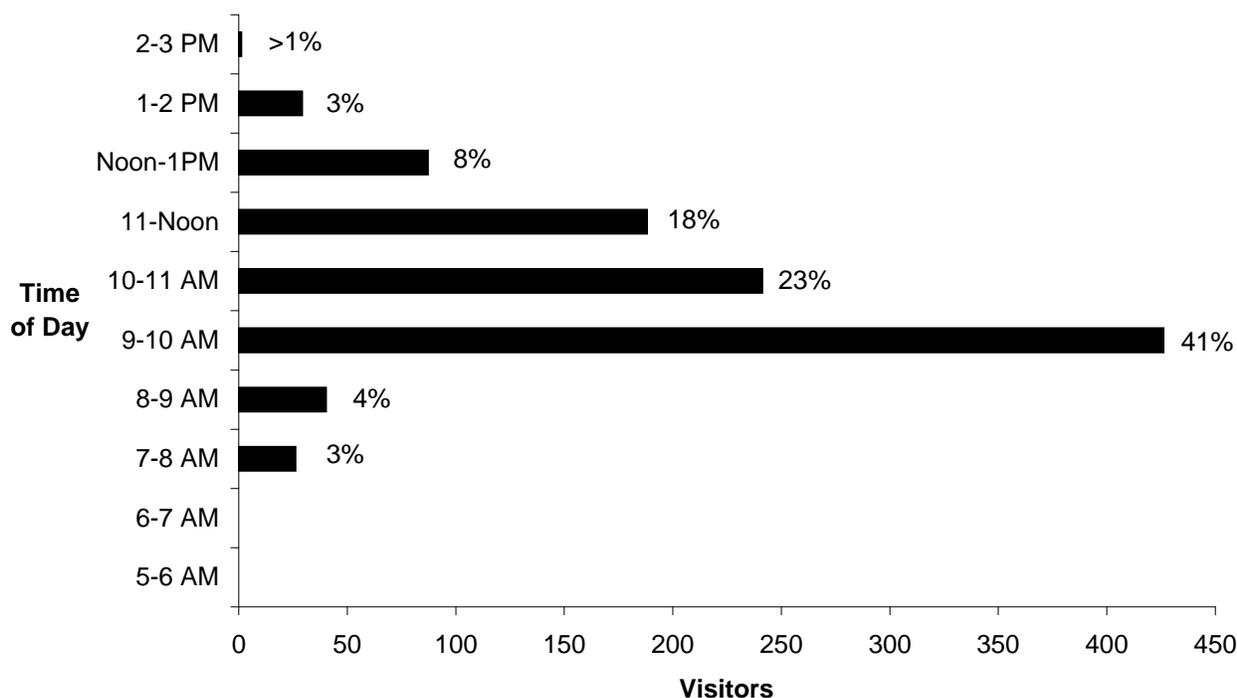


Figure 7. Number of visitors at different times of day at South Cove (May-August 2008). N=1037

Regardless of the time of low tide, at the two sites, there appears to be a general trend of increased visitation in mid-morning, especially between 9-10 AM. The early morning is the least popular time of day with no visitors observed before 7 AM at South Cove and very few (less than 1% of visitors) at Sunset Bay.

South Cove

The most popular time to visit South Cove during this survey was between 9 and 10 in the morning, with 41% of visitation occurring during that period (fig. 7). No visitors were observed between 5 and 7 in the morning. In general, visitation appears to increase when the time of low tide occurs in the mid-morning, with the busiest two days occurring on low tides that occurred between 8:00-9:00 AM (fig. 8). Likewise, those days on which the low tide occurred very early in the morning (before 7 AM) had the least amount of use.

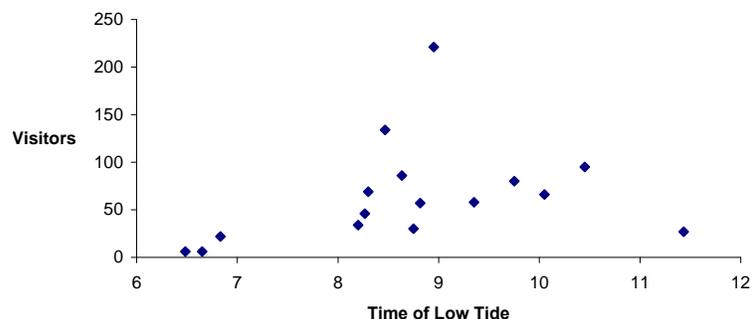


Figure 8. Number of visitors at South Cove for each day plotted against the time of peak low tide for that day. N=1037

Sunset Bay

As with other sites, the most popular time of day to visit Sunset Bay during this survey was between 9 and 11 in the morning, with 44% of visitation occurring during that time (fig. 9). However, visitation appears to be more evenly spread out over the day than for South Cove. Again, very few visitors were observed in the early morning, with less than 1% observed before 6 AM and only 4% between 7-8 AM. Unlike South

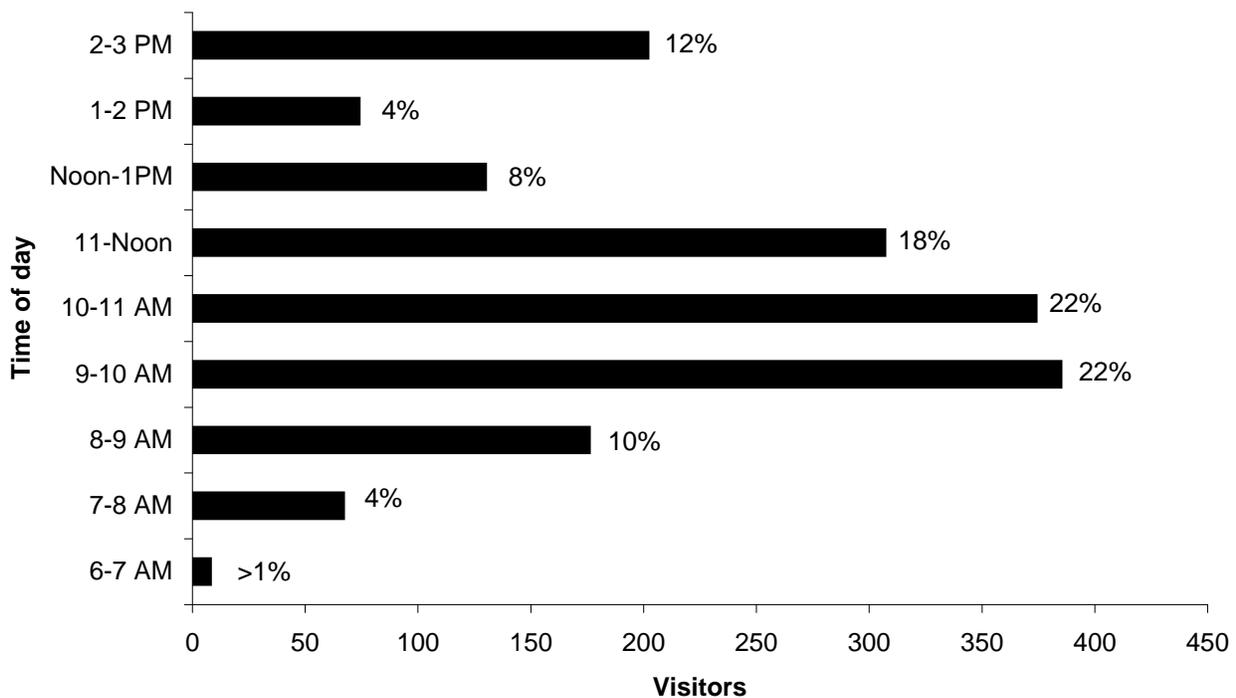


Figure 9. Number of visitors at different times of day at Sunset Bay (May-August 2008). N=1724

Cove, where less than 1% of visitors were observed after 2 PM, 12% of visitors at Sunset Bay visited during this time frame.

When visitation is plotted by time of low tide on any given day, the relationship between time of low tide does appear to occur with the highest visitation days happening when low tide occurs between 8 and 11 AM (fig. 10).

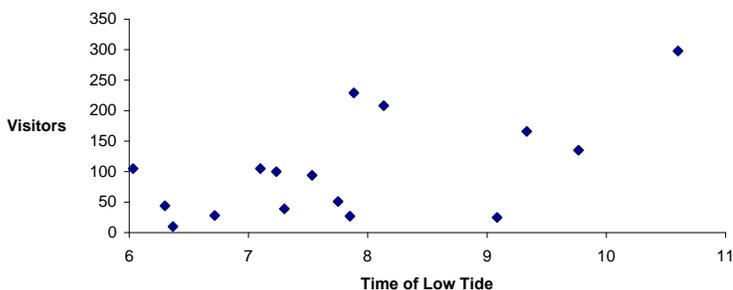


Figure 10. Number of visitors at Sunset Bay for each day plotted against the time of peak low tide for that day. N=1724

Spatial Distribution of Visitors

In addition to the patterns evident in the temporal distribution of visitors, how they distribute themselves spatially is important as well. Do certain areas get heavier use? How far do visitors travel from the access points? These are questions that can only be answered by looking at how visitors are distributed across the intertidal areas. Distribution across the intertidal areas at the two parks is not even. In general, visitors do not move very far away from access points.

South Cove

At the South Cove intertidal area, the most frequented area is the section to the west of the access trail (area "C" in figure 11). This area is frequented by slightly more than 26% of visitors to the site.

The second most popular section is area "B", which receives almost exactly the same amount of visitor pressure (slightly under 26%) as area C. Area B is also to the west of the access trail, but slightly to the south. The least visited section of shoreline was area

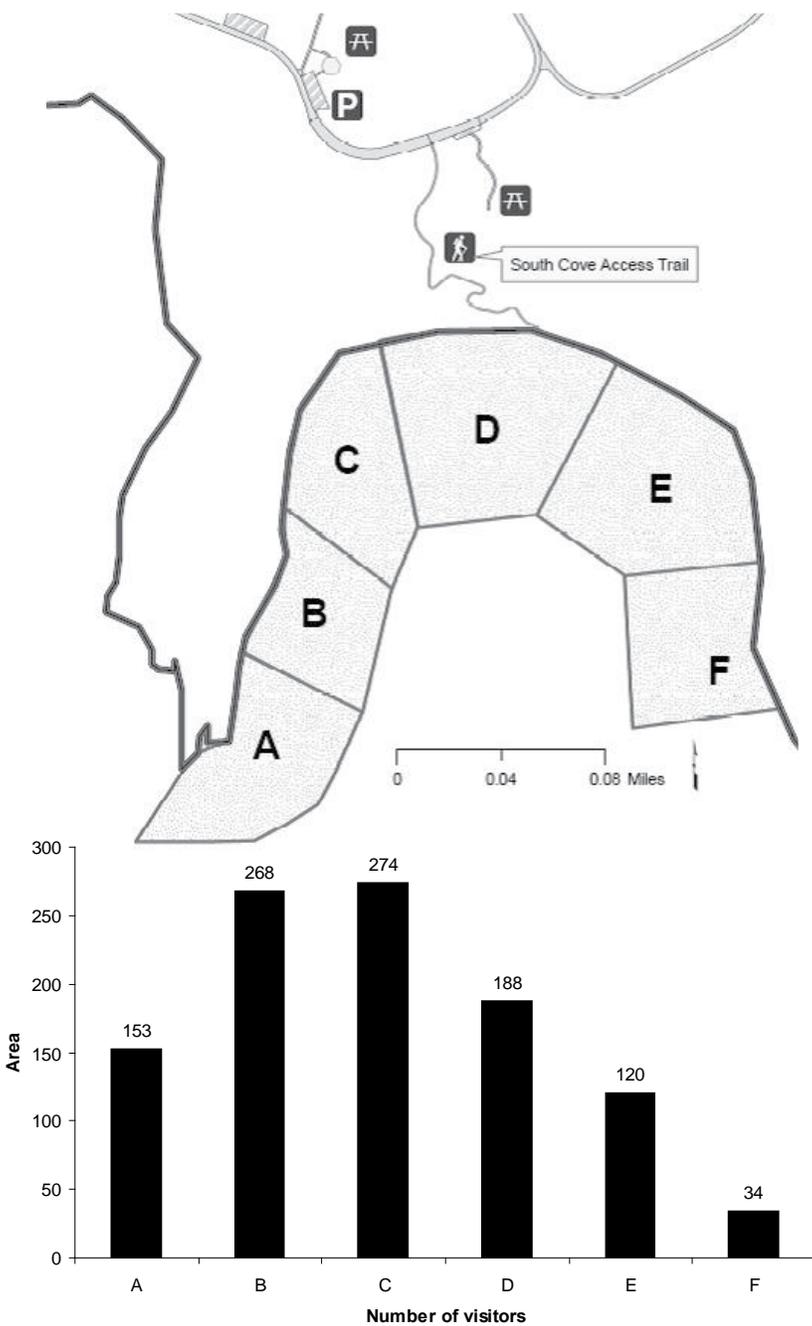


Figure 11. Visitor count levels in survey areas A-F at South Cove (n=1037)

“F”, to the east of the access point. It receives only 3% of the visitation pressure.

Sunset Bay

The most popular section of the shoreline at Sunset



View of the shoreline at South Cove, looking out from near the access trail into section “D”.



South Cove Cape Arago, looking at, primarily sections A-C, with A being in the distance near the base of the cliff.

Bay is the area between the stream to just north of the restrooms (fig. 12). This is area “C” as noted in figure 12 and receives approximately 29% of visitation. Area C is split into two sections, each of which receive approximately the same amount of visitation pressure (fig. 12). It is not surprising

Appendix A: Rocky Shore Recreation Use Study

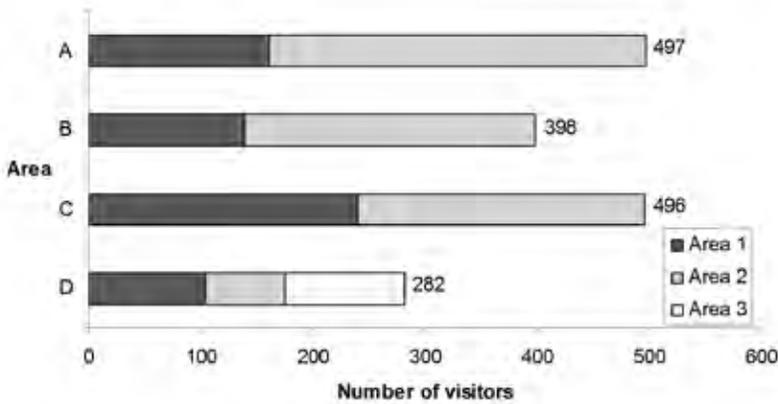
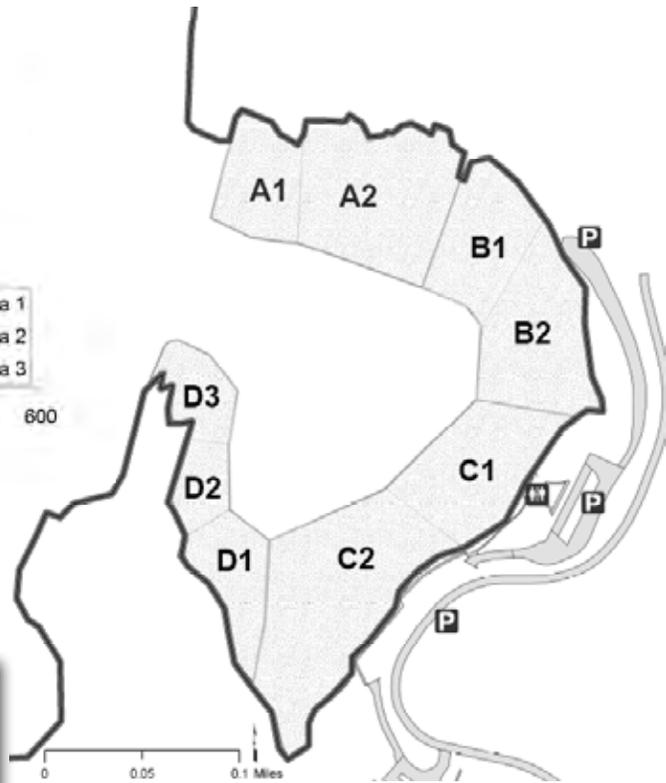


Figure 12. Visitor count levels in survey areas A-D at Sunset Bay (n=1724)



Aerial view of Sunset Bay, looking west.

that this section receives the highest visitation as it is adjacent to the parking lots and is the easiest to access. Also, those visitors intending to go to sections D, must cross section C, as must those that park in two of the three parking lots, and then walk north to sections B and A. The shoreline in sections B2-C2 is primarily sandy.

While attempts were made to make the sections of shoreline approximately the same length, it was also necessary to pick easy to recognize “landmarks”. Therefore, some sections are larger than others. For its size, section A2 receives the highest level of use. It is the rocky shoreline to the west of the northernmost parking lot (fig. 12). This section of shoreline is relatively easy to traverse as it is generally flat.



Sunset Bay intertidal, looking at, primarily sections A2-B2

The area that receives the lowest visitation is area “D”, to which approximately 16% of visitors venture. Area D is west of the stream mouth and often requires getting ones feet wet. Additionally, most of this portion of the rocky shoreline is only accessible

at reasonably low tides, and requires more difficult climbing than the other sections. Section D is split into three sub-sections (D1-D3), each of which receives approximately the same level of use (fig. 12).

Activity Types

Visitors were observed for the purpose of counting how many people were recreation at the various intertidal areas, but also to see what types of recreational activities they participate in.

South Cove

Active tidepool exploration (e.g., picking things up, handling organisms, touching organisms and/or turning over rocks) was the most common activity with 48% of visitors (fig. 13). Approximately 5% of visitors were engaged in passive tidepool exploration (e.g., walking, observing, tidepooling without handling organisms or rocks), significantly lower than those conducting more active exploration.

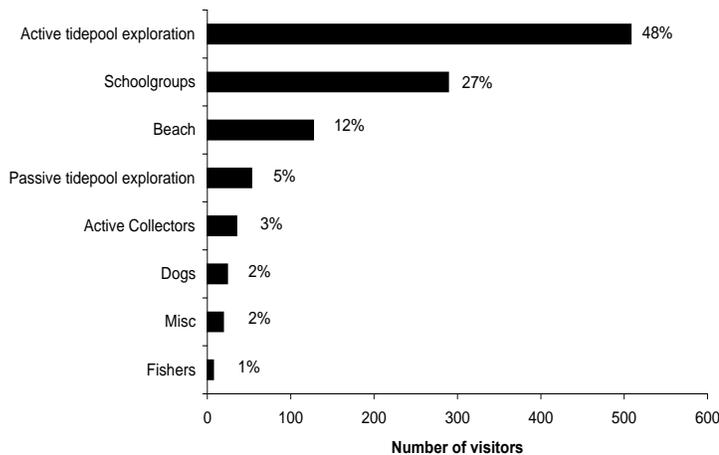


Figure 13. Recreational activities at South Cove (n=1062)

Educational (school group) visits make up one of the primary activities at South Cove (27%), especially during the spring low tide series that coincide with end of year field trips (fig. 13).

Beach activities such as walking on the beach were the third most common activity (12%), however, many of these people were observed to simply be using the beach to access other sections of the rocky shore. For this reason, beach (non-rocky-shore) recreation

was not omitted from the survey so as not to underestimate the potential (and likely) total pressure on the area.



Visitors at South Cove participating in a ranger led program

Although collecting was not common at this site, it does occur. While some limited amount of collection is of living organisms (which is illegal without a permit), in most cases it is not possible to distinguish people collecting living vs. non-living organisms (such as urchin tests). Therefore, the figure of 3% for collecting includes some non-living items. Although it was not possible to do so in all instances, the type of items being collected was noted. Items collected at South Cove include seaweed, shells and urchin tests.

Other activities noted included the presence of dogs (both on and off leash), fishing and “miscellaneous” (fig. 13). Slightly more than half of dogs were noted off leash (54%). Fishing from shore does occur, although it does not make up a large percentage of visitor use (~1%). Miscellaneous activities noted included research, photography and ranger led-programs.

Sunset Bay

Beach recreation was the most common activity with 40% of visitors (fig. 14). A large portion of the shoreline in the bay is made up of a sandy beach so this is not surprising. Sunset Bay is known as a destination for beach recreation, especially given its proximity to the park campground. Active tidepool exploration (31%) was the second most common activity (fig. 14). Educational (school group) visits make up approximately 9% of visitation.

Appendix A: Rocky Shore Recreation Use Study

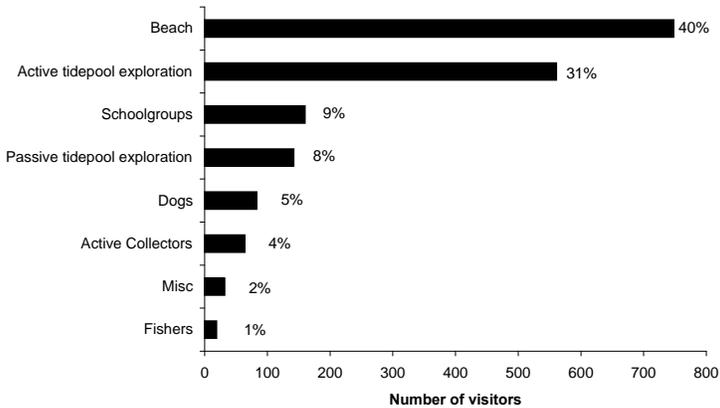


Figure 14. Recreational activities at Sunset Bay (n=1810)

Although collecting was not common at this site during the survey period, it does occur. Collecting of living organisms is only legal with a scientific research permit issued by the Department of Fish and Wildlife (ODFW). Four percent of visitors were observed collecting during the survey period. As with all observations, it is likely that this number is underestimated since snap-shots are unlikely to capture quick activities such as picking an item up. However, they are more likely to capture activities of people who are out there with collecting as their main purpose since that takes more time and is more obvious (people tend to have equipment such as buckets for mussels, seaweed, shellfishing etc.). Items noted as being collected included mussels, rocks, and seaweed.

Slightly more than half of dogs were noted on leash (58%). As with South Cove, fishing from shore does not make up a large percentage of visitor use (~1%) but does occur. Miscellaneous activities noted included Included kite flying, kayaking, metal detecting, kayak fishing, host programs, swimming and putting in boats.

Interview Period

A total of 293 visitor groups were interviewed during their visit at the two intertidal areas over the course of the survey (N=131 for South Cove, 162 for Sunset Bay). X% of visitors contacted agreed to participate in the interview. The following sections describe the results from the interview questions, which range from

demographics of the interviewees (e.g., group size, visits per year, and distance traveled) and reasons for visiting the site to awareness of rocky shore regulations and support of intertidal protections.

Demographics of Respondents

South Cove

The average group size for visitors is 9 people with a range between 1-90 people (fig. 15). One fourth of visitors (25%) came in groups of two, with the next most common size being groups of four (22%). Eleven percent travel alone and six percent travel in groups of more than 50 (fig. 15).

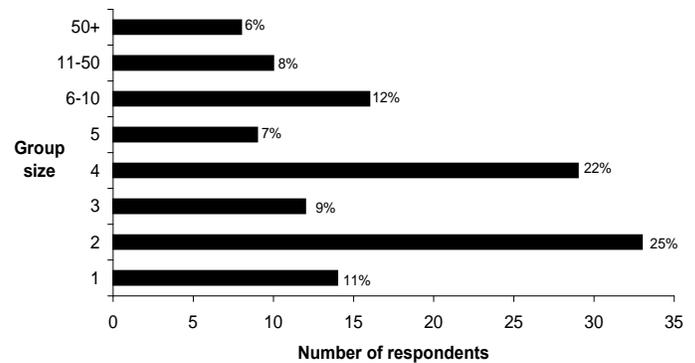


Figure 15. Group size at South Cove (n=131)

Over half of the visitors (54%) were with families, with 7% traveling with friends and only eleven percent visiting the intertidal area alone (fig. 16). Fourteen percent of the visitor groups were traveling with an educational (school) group with an average group size of 42. School groups came from schools including those in Roseburg, Medford, and Coos Bay. University groups came from the Oregon Institute of Marine Biology (OIMB), the University of Oregon,

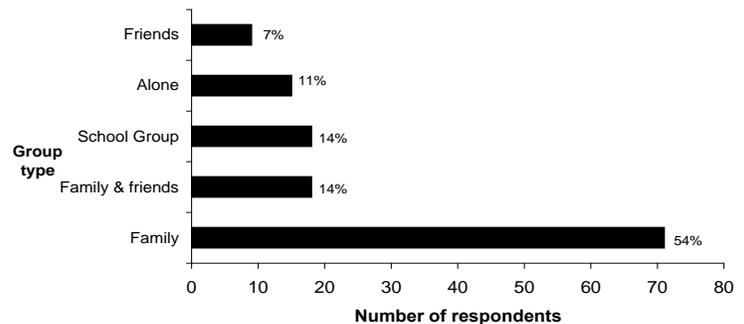


Figure 16. Group types interviewed at South Cove (n=131)

and Oregon State University. Kids day camps came from South Slough Estuarine Research Reserve and Southern Oregon University.

Over half of the visitors (56%) said they were repeat visitors to the South Cove intertidal area. The average visit time for return visitors is two hours forty minutes with a range between less than one and eight hours (fig. 17). 51% of visitors spent between 2 to 3 hours at the site.

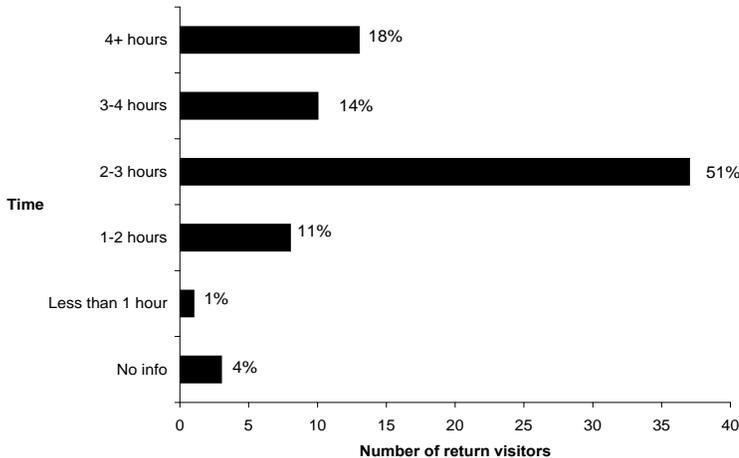


Figure 17. Time spent at South Cove by return visitors (n=72)

51 percent of return visitors indicated visiting the South Cove intertidal area between one to five times per year (fig. 18) with an average of fourteen visits per year and a range between less than one and 150 days.

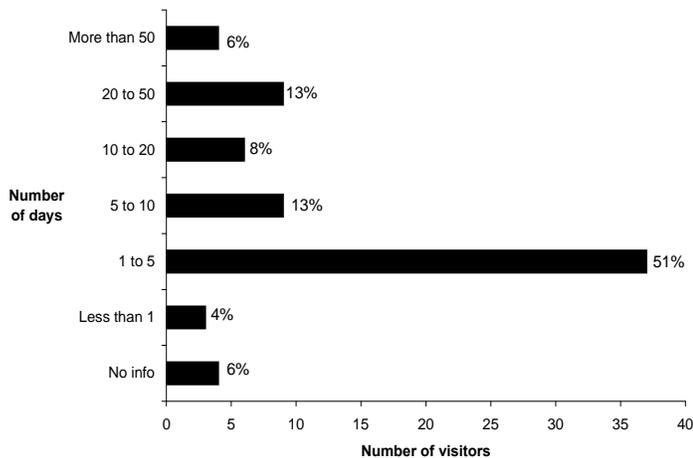


Figure 18. Days per year at South Cove by return visitors (n=72)

Of those visitors that came to South Cove for the first

time, 32% indicated it was also their first visit to the Oregon Coast. The majority of visitors interviewed (75%) indicated they would return to South Cove at some time in the future. The average visit to the intertidal is 2 hours 11 minutes for first time visitors with a range of one half hour to 6 hours (fig. 19). Slightly more than one third (34%) of first-time visitors indicated they spend between two and three hours at the site.

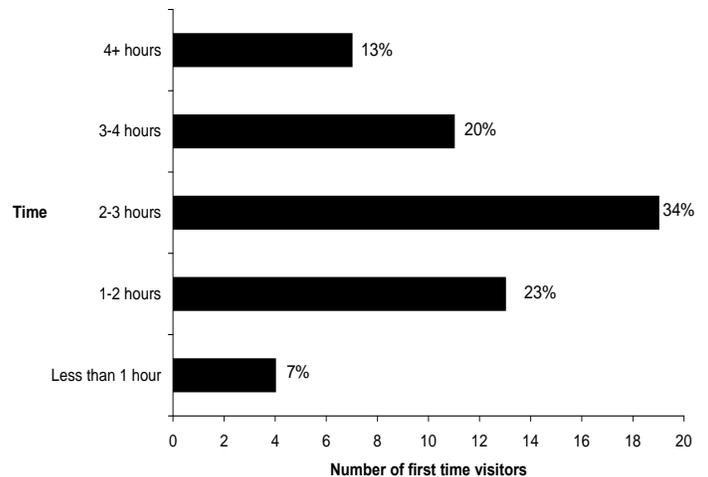


Figure 19. Time spent at South Cove by first-time visitors (n=56)

Sunset Bay

The average group size for visitors to Sunset Bay is six people with a range between 1-75 people. Slightly less than 1/4 of visitors (23%) came in groups of two, with only five percent traveling alone and two percent traveling in groups of 50 or more (fig. 20).

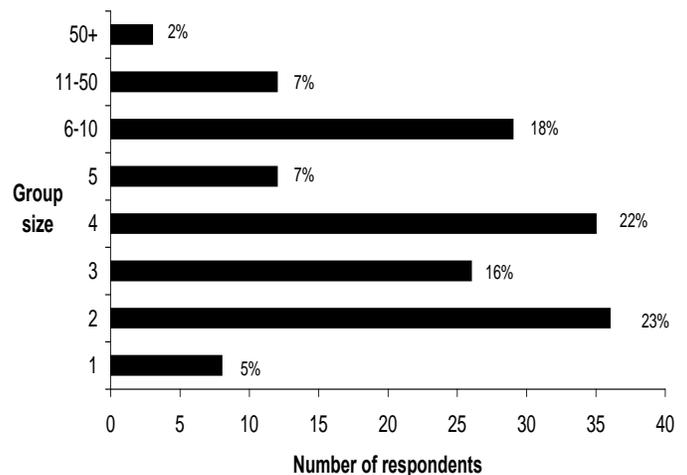


Figure 20. Group size at Sunset Bay (n=162)

Appendix A: Rocky Shore Recreation Use Study

Approximately two thirds of visitors (69%) were with families, with 9% traveling with friends and 4% with a school group (fig. 21). School groups came from Brigham Young University (working from OIMB), North Bay (North Bend), University of Oregon, Lookingglass Elementary (Roseburg), Powers High School (Powers) and Lane Community College.

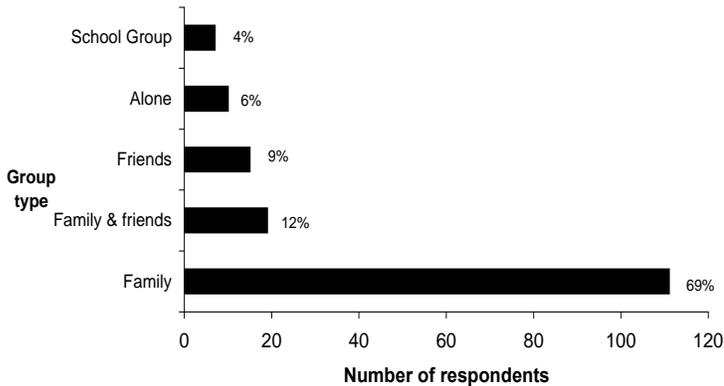


Figure 21. Group type at Sunset Bay (n=162)

Over half of the visitors (55%) said they were repeat visitors to Sunset Bay. The average visit time for return visitors is two hours 39 minutes with a range between 17 minutes and 13 hours (fig. 22). Forty

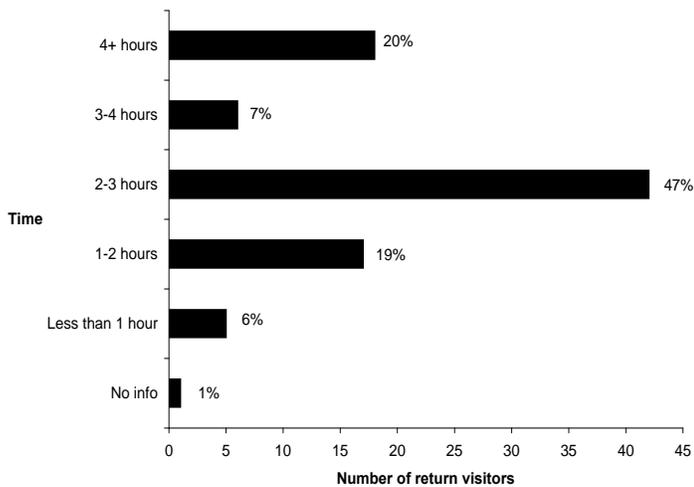


Figure 22. Time spent at Sunset Bay by return visitors (n=89)

seven percent of return visitors indicated visiting Sunset Bay between one to five times per year (fig. 23) with an average of 19 visits per year and a range between 1/2 and 350 days.

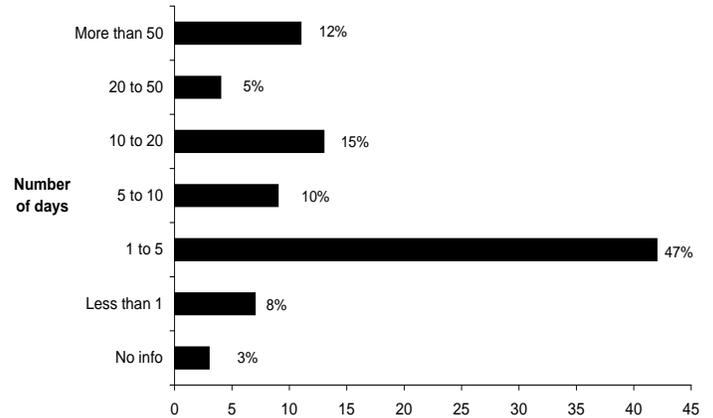


Figure 23. Days per year at Sunset Bay by return visitors (n=89)

Of those visitors that came to Sunset Bay for the first time, 21% indicated it was also their first visit to the Oregon Coast. An overwhelming majority (80%) of first-time visitors indicated they would return to Sunset Bay at some time in the future. The average visit to the beach is two hours with a range of one half hour to 8 hours. 39% of visitors spend one to two hours at the site (fig. 24).

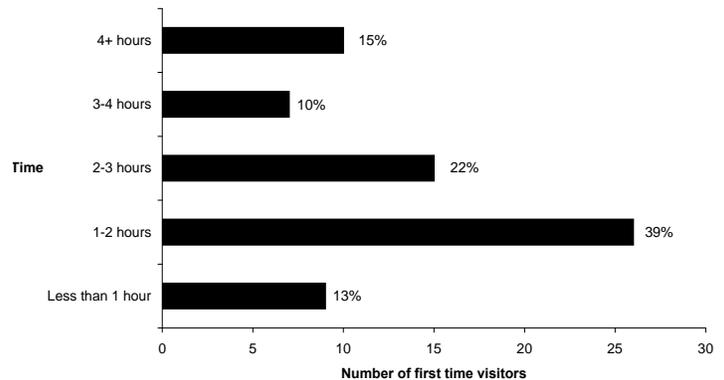


Figure 24. Time spent at Sunset Bay by first-time visitors (n=73)

Origin of Visitors

South Cove

The majority (66%) of visitors interviewed were Oregonians, the second largest group coming from California (8%) and 4% from Canada (fig. 25). The average one-way distance traveled was 525 miles with a range of twelve miles (Coos Bay, OR) to 3,256 miles (Mystic, CT). Other locations include those

with less than three visitor groups including Florida, Kansas, Maryland, Nevada, Texas, Utah, Colorado, Connecticut, Hawaii, Michigan and New York.

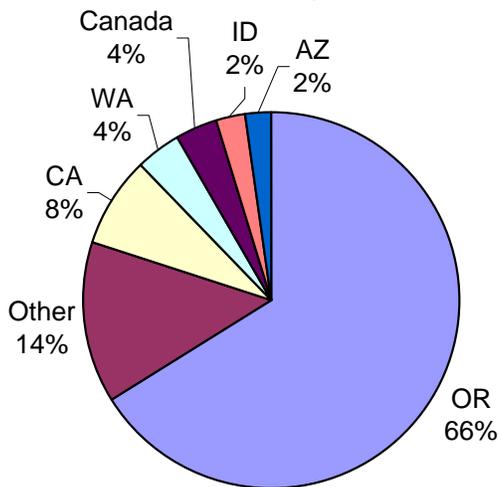


Figure 25. Origin of South Cove visitors (n=86)

Thirty seven percent of in-state visitors came from the Oregon coast, 27% from Southern Oregon, and 15% each from both the Portland Metro area and the Willamette Valley (fig. 26).

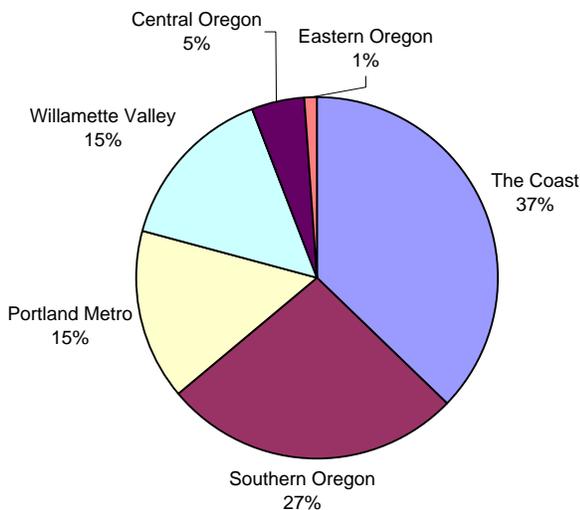


Figure 26. Origin of South Cove in-state visitors (n=86)

Sunset Bay

Approximately two thirds of visitors interviewed were Oregonians (65%) with 9 percent from California and 3% from Canada (fig. 27). The average one-way distance traveled to reach Sunset Bay was 481 miles with a range of 3 miles (Charleston, OR) to 5,200

miles (Germany).

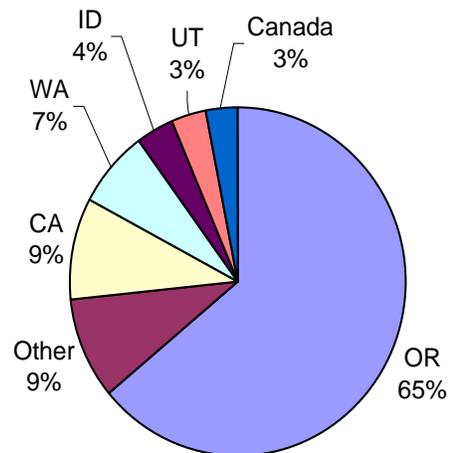


Figure 27. Origin of Sunset Bay visitors (n=162)

Thirty percent of in-state visitors came from Southern Oregon, 26% from the coast and 25% from the Willamette Valley (fig. 28). Thirteen percent came from the Portland Metro area and one percent each from Eastern and the Mt. Hood/Gorge area.

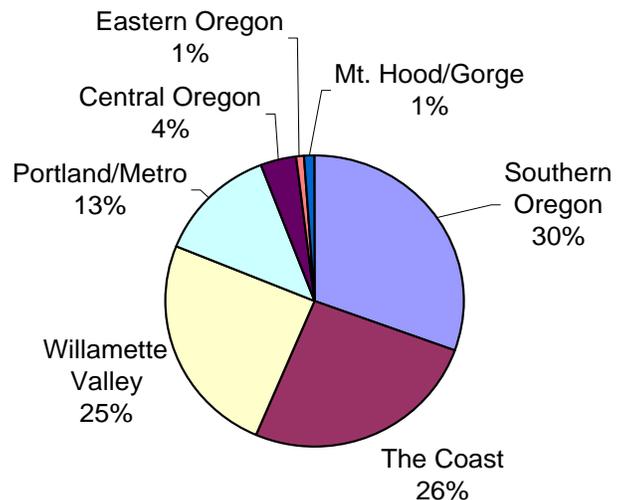


Figure 28. Origin of Sunset Bay in-state visitors (n=101)

Sources of Information

Original "discovery" of the site

Since the Cape Arago headland parks are quite a ways off the main highway, it is of interest how visitors locate the sites in the first place.

South Cove

The primary way visitors originally found out about the site (fig. 29) is from a state park flyer or staff (24%). Many visitors mentioned the flyers in the campground restrooms specifically, while some mentioned the campground program. The second most common way visitors find out about the site is through school (22%). Often mentioned is something to the effect of “I came as a kid” with my school group. Less common sources of information include living in the area (12%), from a family member or friend (9%), exploring (9%), and a guidebook or pamphlet (7%) among several others (fig. 29).

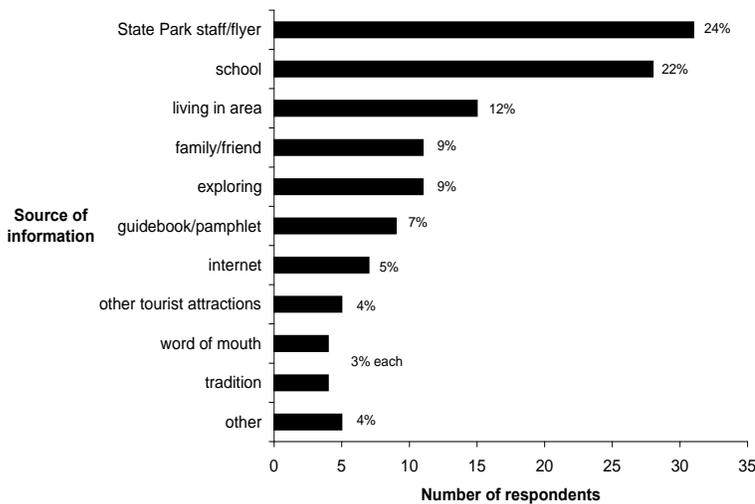


Figure 29. Method by which visitors found out about South Cove (n=130)

Sunset Bay

The beach at Sunset Bay is located almost directly across from the park campground, which makes it more visible than South Cove. However, the primary way visitors mention that they originally found out about the site (fig. 30) is from either a family member or friend (24%), exploring (or driving by) is cited a lot more frequently (17%) than for South Cove (9%). Living in the area (9%) and tradition (12%) are also popular way of discovering the site.

Time of Visit/Tidal Cycle

Many types of coastal recreation activities are not dependent on the tides; however, most rocky shore/intertidal recreation is highly dependent on how low the tide is and the time it occurs.

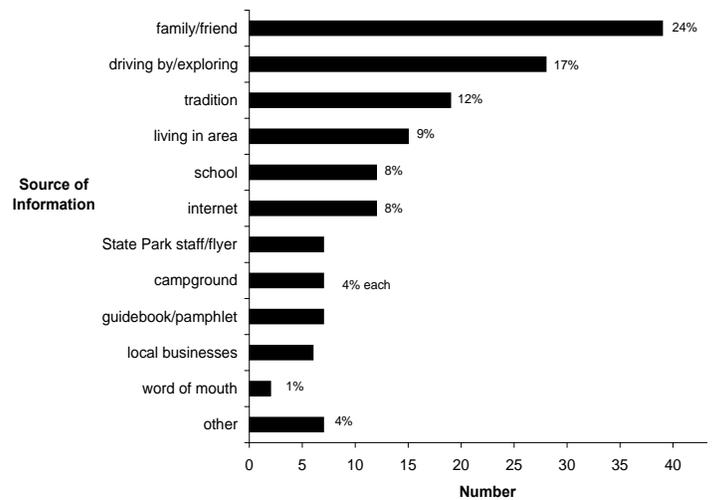


Figure 30. Method by which visitors found out about Sunset Bay (n=161)

South Cove

The vast majority of the visitors (72%) based the time of their visit on the low tide. The most common sources of information for determining when low tide occurs were through tide charts (29%), the Internet (23%), and through OPRD campground postings (13%) or discussions with staff (10%). Other methods include teachers, friends/family, observation and the newspaper.

Sunset Bay

Slightly under half (47%) of visitors based their visit on the predicted low tide. Again, tide charts/tables are the most popular method (46%) used to determine the timing of a visit followed by the internet (21%) and direct observation (9%). Other methods include school, family and friends, OPRD postings, the time of year and the newspaper.

Reason for Visit

Primary Reason for Visit

South Cove

At South Cove, the primary reason visitors indicated they came to the site is tidepooling (57%) followed by education (9%) and sightseeing (fig. 31). Other reasons given for visiting include exploration,

photography, exercise, and kite flying to name a few. Those that indicated collecting was their primary motivation to visit the site were collecting items ranging from “round rocks for a rock garden and traditional cooking” to fossilized sand dollars and urchin tests, sea stars and beach glass.

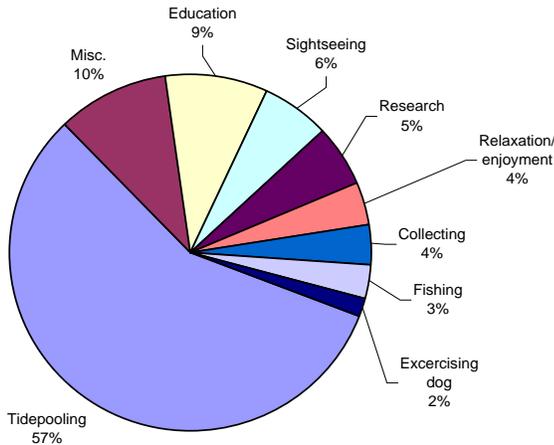


Figure 31. Primary reason for visit to South Cove (n=130)

Sunset Bay

Visitors to Sunset Bay did not deviate from those at South Cove in their primary motivation for visiting the beach (fig. 32). Again, tidepooling (35%) is the most popular reason for visiting, although it is not as predominate as at South Cove (fig. 32). The variety of responses was greater, including quite a few going for the beach (11%) and a range of “other” activities. Examples include recreational activities from

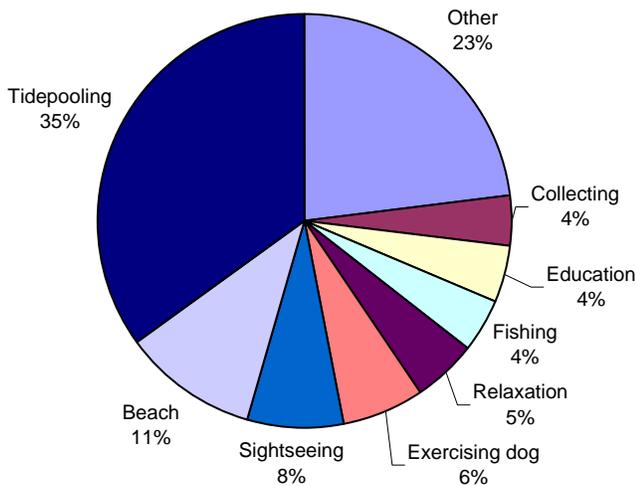


Figure 32. Primary reason for visit to Sunset Bay (n=162)

birdwatching, kayaking and photography to generally “just having fun” and other non-specific things like “I’m on vacation.”

Although collecting of living organisms is not allowed, approximately 4% of visitors indicated that as their primary purpose for visiting. Items being collected included living (sand shrimp for bait, mussels and seaweed) and non-living (shells, rocks, driftwood) items.



Sea urchins in Sunset Bay tidepool

What Visitors Liked Best and Least

South Cove

When asked the open ended question, “what do you like least”, for the most part visitors did not have a wide array of serious complaints. Many visitors could not come up with anything they did not like (39%), with 19% of comments citing the difficulty of navigating the slippery rocks and accessing the site (primarily the steepness of the hill and having to climb back up it-10%) along with the weather (8%). Unfortunately there is not much to be done about these complaints. Trash was the next most frequently mentioned “least favorite” thing about the site (4%). Only two percent of comments indicated concern about crowding. A smattering of other responses, none getting more than one mention each included things like the lack of a restroom, the prohibition on collection and the lack of interpretive signs (all comments are listed in the appendix).

Appendix A: Rocky Shore Recreation Use Study

When asked the opposite question, “what do you like best” about the site, visitors to South Cove indicated that the diversity of the marine life and specific tidepool species (18% each) are the things they like “best” (fig. 33). These were followed by general comments about the tidepools (10%), access (8%) and the beauty and scenery at the site (8%).

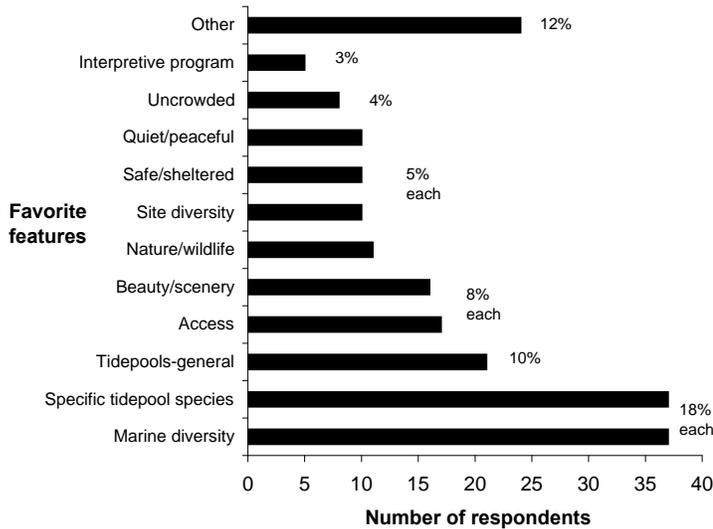


Figure 33. Favorite features at South Cove. Percentages may not add up to 100 due to rounding. Visitors sometimes had more than one response to this question (n=206 comments).

Sunset Bay

When asked about their least favorite aspect of their visit to Sunset Bay, like the visitor’s to South Cove, people found a hard time naming something. Many visitors (35%) said “nothing” was wrong with their visit, with 10% mentioning problems with slippery rocks/seaweed as the next most frequently mentioned “problem.” The bad weather and bad/fishy smells were cited next (7% each) followed by 5% having problems with the mud and a few with trash (4% each). Very few visitors cited crowding as a problem (4%), with an even number of respondents mentioning they were unable to see something (seastars, as much diversity as on previous visits etc.). A variety of other issues ranged from impacts from humans (trampling, contaminated water) to scratchy barnacles and the tide coming in too fast. All are listed in the appendix.

At Sunset Bay, visitors had somewhat similar

responses to the question about their favorite aspects of the site to South Cove visitors, however, the tidepools are less dominant (fig. 34). The easy access is at the top of the list at thirteen percent, followed closely by the beauty/scenery of the site (12%) and the fact that the area is safe and sheltered (10%). Marine diversity and tidepools fall to the 4th and 5th most popular aspects of the site (fig. 34). A full list of favorite things mentioned by visitors to Sunset Bay is located in the appendix.

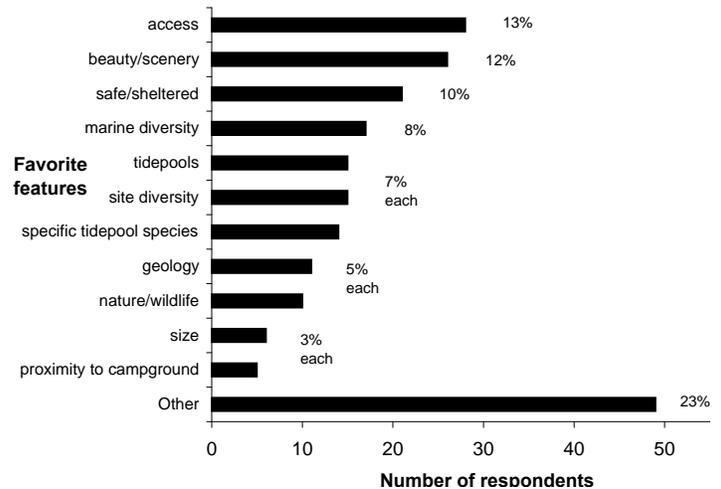


Figure 34. Favorite features at Sunset Bay. Percentages may not add up to 100 due to rounding. Visitors sometimes had more than one response to this question (n=217 comments).

Other Rocky Shores Visited

To get a sense of other popular rocky shore sites, visitor groups were asked, “do you visit other tidepool areas along the Oregon coast?”

South Cove

The vast majority of visitors (73%) indicated that they do visit other Oregon rocky shores with the central coast being the most popular region (45%) and south coast sites falling close behind (Table 4). Sunset Bay is the most frequently mentioned site, followed by the Newport area and Yaquina Head (Table 4).

Sunset Bay

Over half of visitors (61%) said that they visit other Oregon rocky shores with the slightly under half of

Table 4. Other Oregon rocky shores visited by interviewees at South Cove (n=163 comments). Respondents sometimes mentioned more than one location.

Rocky Shore	Times Mentioned
Sunset Bay	15
Newport	12
Yaquina Head	11
Brookings	8
Yachats	7
Cape Perpetua	6
Bandon	6
Strawberry Hill	5
Harris Beach	5
Gold Beach	5
Heceta Head	4
Cape Blanco	4
Cape Arago	4
Otter Rock/Devil's Punchbowl	4
Other sites, including mention of sections of the coast like the "central coast" and statements like "all up and down"	71

those responses (45%) being sites on the central coast. South Coast sites follow relatively close behind with 38% of sites mentioned being located between Coos Bay and Brookings. Other sites at Cape Arago were mentioned the most frequently, so like at South Cove, visitors tend to visit other sites within the Cape Arago headland area. Yaquina Head and Newport are again very popularly cited locations (Table 5).

Interest in Learning More About Rocky Shores

Visitor groups were asked if they were interested in learning more about tidepools on a future visit. Those that responded in the affirmative were then asked about their preferred method of learning (i.e., what type of interpretive method).

South Cove

Seventy eight percent of respondents indicated they were interested in learning more about tidepools on a future visit. As shown in figure 35, a large number (38%) listed their top preference to be a ranger-guided walk/tour. The learning method visitors were least interested in is trailside exhibits (10%). Other

Table 5. Other Oregon rocky shores visited by interviewees at Sunset Bay (n=174 comments). Respondents sometimes mentioned more than one location.

Rocky Shore	Times Mentioned
Cape Arago	25
Yaquina Head	12
Newport	12
Cannon Beach/Haystack Rock	9
Florence	8
Bandon	7
Strawberry Hill	6
Lincoln City	6
Brookings	5
Port Orford	5
Harris Beach	4
Bastendorff Beach	4
Pacific City	4
Yachats	4
Cape Perpetua	4
Other sites, including mention of sections of the coast like the "south coast" and statements like "all over"	59

methods mentioned as the top preference include information on a website, hands-on experiences, videos, and books for sale at the ranger station. Although not listed as the top preference, visitors had some interesting ideas such as having guides that people could check-out (or purchase) and return for use when down at the beach. Additionally, several

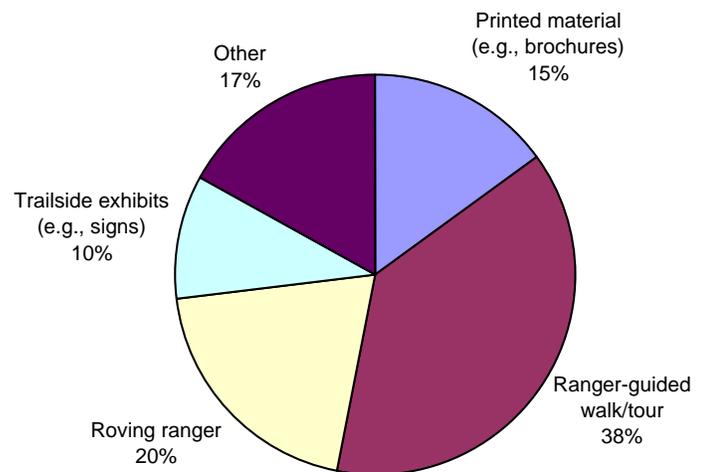


Figure 35. How visitors prefer to learn about tidepools at South Cove (n=100).

visitors mentioned the idea of having ipod downloads/podcasts that would provide a virtual “tour”, as well as having teacher resources for use in the classroom prior to fieldtrip visits.

Sunset Bay

The majority of visitors to Sunset Bay were also interested in learning more about rocky shores (fig. 36). Seventy four percent of visitors said they would like to learn more on a future visit, with ranger-guided walks again being the most popular option (26%) followed by printed materials (24%).

Again, trailside exhibits were the least popular learning method at twenty percent. “Other” types of methods mentioned as the top preference for learning included simply being in the tidepool, documentaries/videos (for example in the campground programs), and having a tidepool tank “on deck”. Several visitors also mentioned ipod downloads that could include “taped talks” available on the internet as well as videos, website pages and/or brochures individualized for each tidepool location.

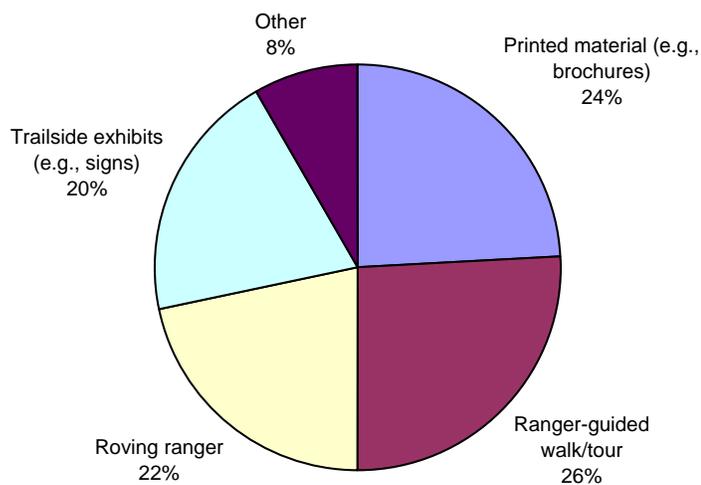


Figure 36. How visitors prefer to learn about tidepools at Sunset Bay (n=120).

Awareness of Rocky Shore Protections

The intertidal areas at South Cove and Sunset

Bay are part of specially managed areas (Intertidal Research Reserve, Area B and C respectively) where collection of intertidal animals is limited (no collection without a scientific and/or educational permit). To ascertain whether visitors are familiar with these protected areas or of other protected areas along the coast, interviewees were asked several questions about rocky shore restrictions and the status of intertidal protected areas along the coast.

Plant and Animal Restrictions

South Cove

The first question of this type asked whether they were aware of any restrictions (besides the general fish and wildlife regulations) on plants or animals in this particular section of the rocky shore. 81 percent of visitors indicated they were aware of restrictions on plants while 85 percent said they were aware of restrictions on animals.

Of the comments from visitors that believed restrictions were in place for animals, no collection was cited the most often at 50% (fig. 37). These were followed by a combination of comments tending toward tidepool etiquette and those that restrict collection somehow. Behavioral restrictions/etiquette included things like being careful (13%), putting things back if you pick them up (7%) and a smattering of other comments. Four percent of respondents mentioned that collection was limited due to the research reserve status. Another three percent “saw the signs” but it is unclear what restrictions they were aware of since they did not explain themselves further. For a full list of comments, see the Appendix.

Of the 81% of visitors that indicated they believed there are restrictions on marine plants, the variety of answers (and percentages) is very similar to those for marine animals. Most respondents replied with the same comments for plants as they did for animals. Again, the most popular response is that collection is not allowed (58%) followed by behavioral responses such as being careful (15%) and putting things back where you found them (7%).

It appears that the sign at the top of the access path

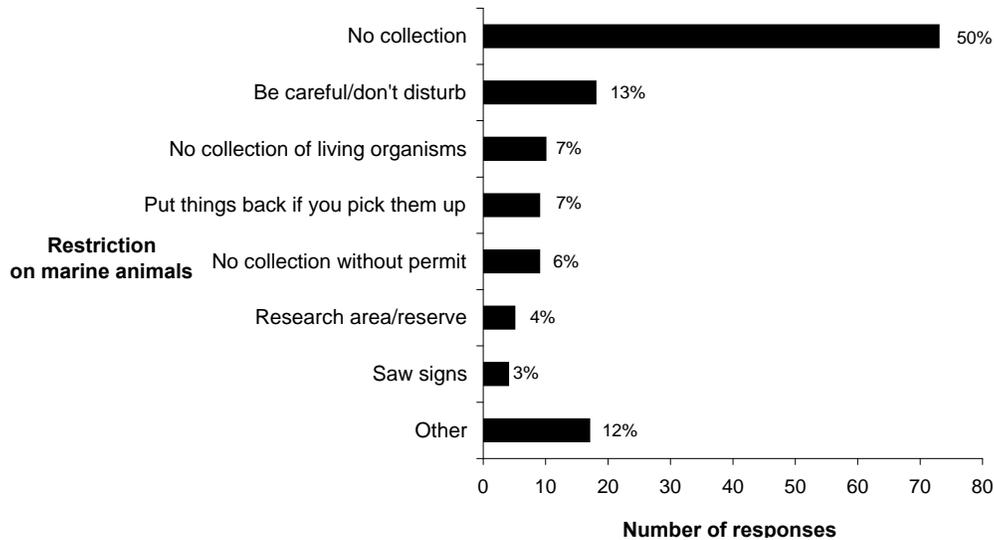


Figure 37. Restrictions visitors believe are in place for marine animals at South Cove (n=145 comments). Percentages may not equal 100 due to rounding. Some respondents had more than one comment.

is clearly visible and that the vast majority of visitors are getting the message that collection is not allowed at this location.

Sunset Bay

At Sunset Bay, 53% of visitors indicated they were aware of restrictions on plants and 58% indicated the same thing for animals (fig. 38).

Of the comments of those visitors that believe there are restrictions on marine animals at Sunset Bay, 42% believe that no collection is allowed. This is followed by a similar category of responses that indicate that restrictions on collection is limited, such as to tidepool animals (4%) and by permit only (3%). Additionally, there are a range of comments that imply that collection is not allowed such as not harming them (19%), pulling them off the rocks (4%), touching them (3%) and putting them back where you found them (3%) for a total of 78% of the comments indicating that visitors believe that collection of living tidepool animals is generally not permitted at the site. A few visitors (2%) mentioned the status of the site as a protected area/reserve. A full list of responses is located in the Appendix.

Of the 53% of visitors that believe there are

restrictions on marine plant collection, the majority mentioned no collection (46%), followed by a combination of comments related to tidepool etiquette/ personal behavior such as not harming/bothering the plants (16%) and not picking up/prying off the rocks (6%). There was also a rather large group that were not able to come up with a specific answer (9%). Very few visitors noted the status of the area as a research reserve/protected area (2%) with one visitor mentioning “state park rules” apply. It does appear that less visitors are aware of the protected status of Sunset Bay than at South Cove. This is not surprising, since there are currently no signs indicating the site’s status as an Intertidal Research Reserve.

Intertidal Protected Areas

The next question about rocky shore protections asked visitors whether they are aware of tidepool areas along the Oregon Coast having any special protections. If visitors indicated that they were aware of protected areas, they were then asked where those areas are and what kind of protections they have. Visitors were also asked if they support protections for intertidal areas.

The Cape Arago Headland area is all part of the

Appendix A: Rocky Shore Recreation Use Study

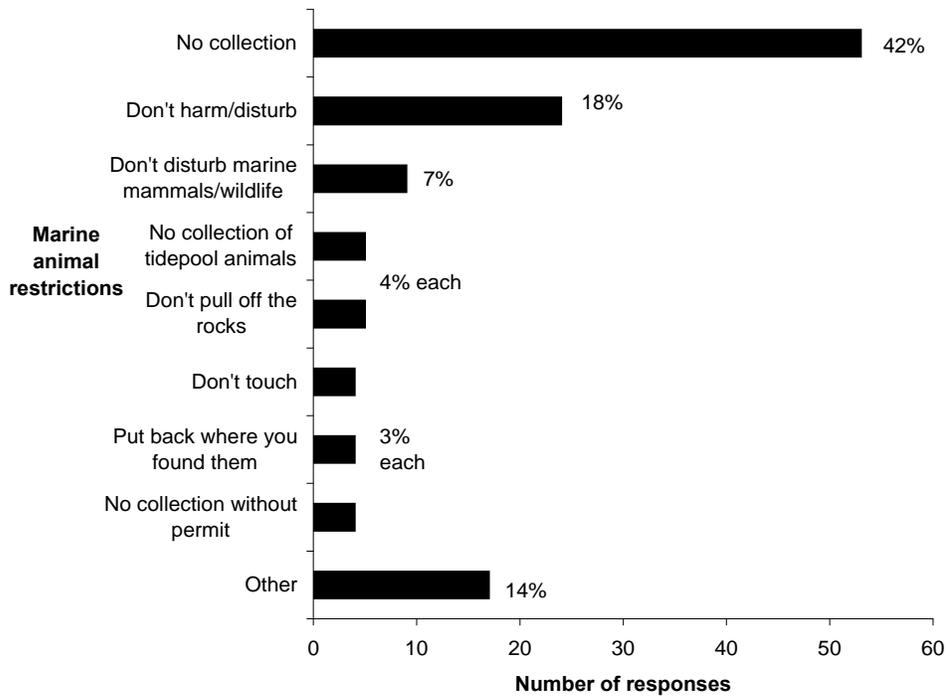


Figure 38. Restrictions visitors believe are in place for marine animals at Sunset Bay (n=125 comments). Percentages may not equal 100 due to rounding. Some respondents had more than one comment.

Cape Arago Research Reserve, with restrictions on collection of intertidal organisms. Sunset Bay is part of “Area A” and South Cove is part of “Area C”, both of which are closed to the “take of all shellfish and marine invertebrates” except by scientific and/or educational research permit.

South Cove

The large majority (75%) of visitors interviewed indicated they believe that there are intertidal areas that have some sort of special protections. When probed as to where those areas are and what types of protections are afforded within them, 59% of those visitors had said they were aware of locations and/or



Signs at South Cove Cape Arago trailhead. Brown “Intertidal Protected Area” sign is located behind the “Welcome to Our Home” interpretive panel along with the standard park “clusterboard” on the right.

protections afforded to those sites.

When asked to name specific areas, 45% had a response and 43% were able to name some sort of protection. South Cove Cape Arago was the most frequently mentioned protected area (16%) with the Cape Arago area in general (13%) following in second. When combined with a small number of people (3%) that mentioned Sunset Bay, the Cape Arago headland area made up 32% of comments. Quite a few people mentioned no specific sites, but simply said “where posted” or “where I see signs” (11%). Approximately 8% of comments indicate that some people believe all rocky intertidal/tidepools are protected. The only site specifically mentioned that received a few comments (3%) but is not actually protected, is Seal Rock.

The most frequently mentioned types of protection are limitations on collection (48%). Within that category were a range of comments from no collection (25%) to specific marine managed designations including research reserves (10%) and marine gardens (8%).

Visitors were also asked to what extent they favor or oppose having protected marine (tidepool) areas along the Oregon coast. An overwhelming majority (76%) of visitors indicated they were strongly in favor of some kind of protections for tidepools. 16% of respondents were somewhat in favor of protections, with approximately 5% neither in favor or opposition. Three percent of respondents were either somewhat opposed (2%) or strongly opposed (1%) to protections.

Sunset Bay

Slightly under two thirds of visitors (62%) indicated they believe that intertidal areas have some sort of special protections. When those visitors were probed as to where those areas are or what type of protections they have, 53% indicated an affirmative response.

However, when asked where those protected areas are, only 32% of visitors that indicated they believe there are protections were able to come up with some sort of response. The most frequent comment

was that areas that are protected “are posted” or have signs (32%). Cape Arago was the most frequently mentioned protected area (14%), although the percentage is higher if you include all the sites within the headland parks (Sunset Bay-4%, Simpson Reef-4%, North Cove Cape Arago-4%) for a total of 19%. Yaquina Head follows in third at six percent.

25% of those visitors that said they were aware of areas with protections actually were able to come up with what type of protections are afforded in those areas. The most commonly mentioned protection is that no collection is allowed (18%) followed by the seasonal trail closure to protect breeding marine mammals at North Cove (11%) and seabird/nesting protections and generally not disturbing/harming tidepools (13% each).

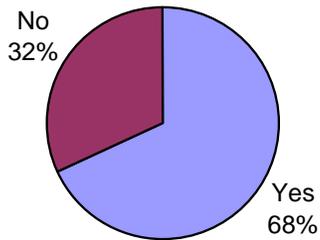
The majority (67%) of visitors indicated they were strongly in favor of some kind of protections for tidepools and almost everyone else said they “somewhat favor” protections (23%). Only three percent said they somewhat oppose protections and a few (1%) neither favor nor oppose protections.

When the answers for the two sites are combined, the responses are similar to those from each of the separate sites (fig. 39). The majority of visitors (68%) say they are familiar with the existence of intertidal protected areas. Of those visitors that indicate they know of areas that have protections, over half (62%) say they do not know where one or more of those areas are, and even more visitors (66%) are not aware of specific type of protections in those areas.

The main sites mentioned are also similar when the two sites are aggregated together (fig. 40). Areas within the Cape Arago Headland are the most commonly mentioned protected rocky intertidal sites (29%), with the majority of those comments directed to “Cape Arago” without a specific section of shoreline mentioned (14%). Again, a number of people did not mention a specific site, but noted that areas are posted if they are protected (9%). The South Cove of Cape Arago is called out specifically in eight percent of the comments. Yaquina Head is also a relatively frequently mentioned site (5%) as is the comment that

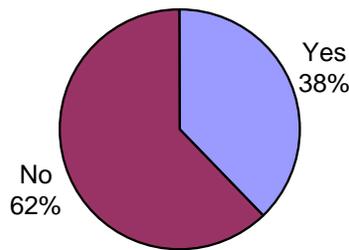
Appendix A: Rocky Shore Recreation Use Study

Awareness of protected tidepool areas



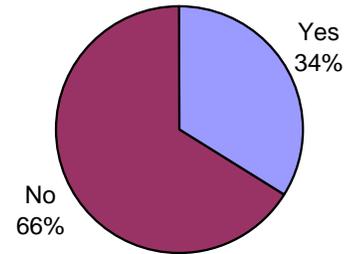
a.

Awareness of where protected areas are



b.

Awareness of type of protections



c.

Figure 39. Types of intertidal protections visitors believe exist at some intertidal areas (n=290 for "a", n=196 for "b" and 194 for "c"). Visitors sometimes had more than one response to these questions.

essentially "all" rocky intertidal areas are protected. A list of "other" sites is available in the Appendix.

The types of protections that are most commonly mentioned when the information is combined for the two sites is also relatively similar (fig. 41). The most popular answers relate to collection restrictions (45%). Of those, most people simply said that no

collection is allowed, however, some visitors specifically mentioned marine managed areas, including marine gardens (6%) and research reserves (9%). A few limited that restriction to only live organisms or with a permit only (3% each). A full list of comments is in the Appendix.

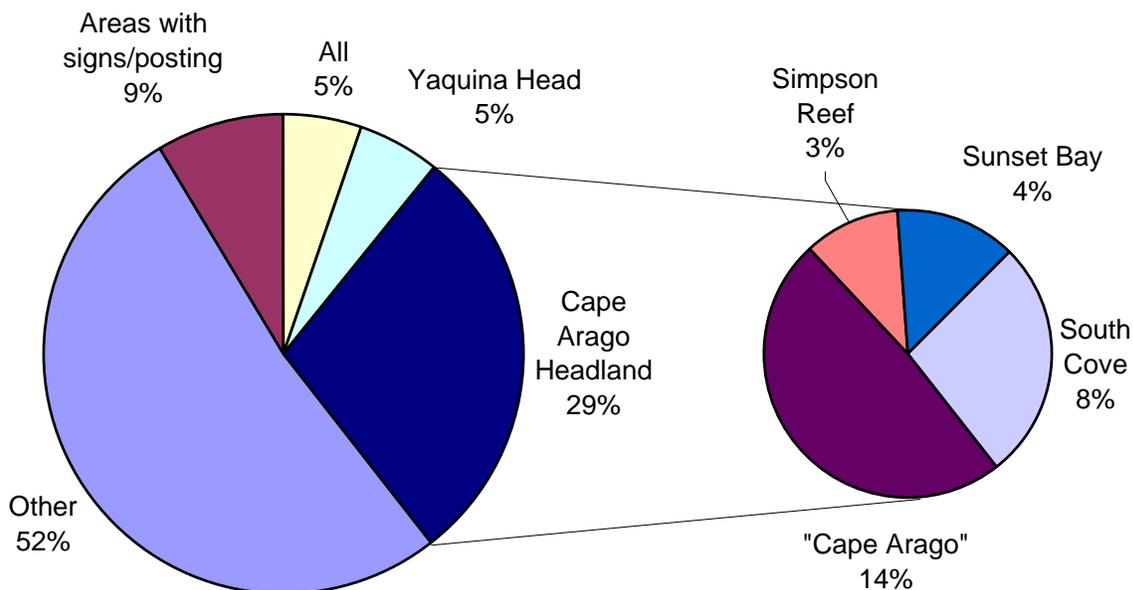


Figure 40. Intertidal (tidepool) areas visitors believe have special protections (n=129 comments). Percentages may not equal 100 due to rounding. Some respondents had more than one comment.

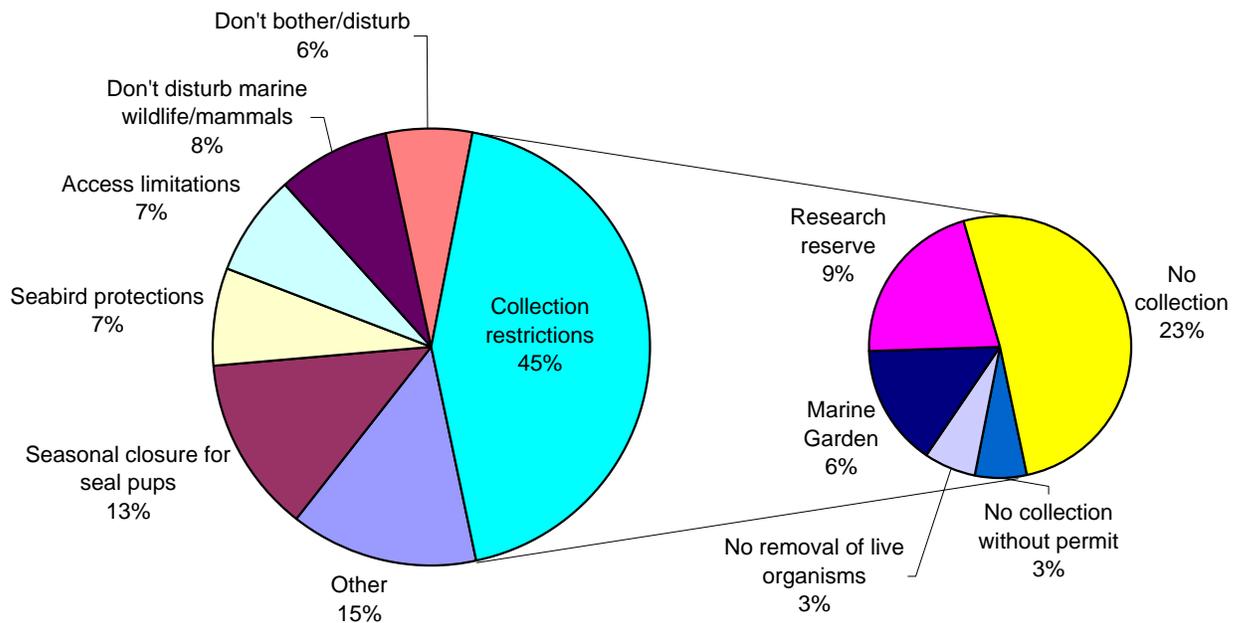


Figure 41. Types of protections visitors think that some intertidal (tidepool) areas have (n=108 comments). Percentages may not equal 100 due to rounding. Some respondents had more than one comment.

Other information

Suggestions for Improving Visit

South Cove

Only 34% of South Cove visitors had suggestions on ways to improve their visit (Table 6). Improving access (14%) was the most commonly mentioned suggestion, followed by adding more trash facilities (such as cans closer to the beach and baggies for trash pick-up).

Sunset Bay

The majority of visitors did not have any suggestions for improving their visit with only 38% citing specific recommendations. The most frequently mentioned suggestion involves improving on-site educational opportunities and interpretive services followed by improving beach (and the surrounding area) cleanup efforts to reduce the amount of trash (Table 7).

Appendix A: Rocky Shore Recreation Use Study

Table 6. Suggestions of visitors to South Cove (n=51 comments)

Category	Comment	Times Mentioned
Facilities	Improve access to South Cove (6) and Middle Cove (1)	7
	Place trash bags/cans near beaches	5
	Provide a closer restroom	1
	Provide a railing on part of the trail	1
	Remove spray painted graffiti in Norton Gulch	1
	Replace missing telescopes for observing sea lions	1
Signage	Improve wayfinding to find tidepools	5
	Improve interpretive signage (etiquette, ecology, history, geology, cultural resources, restrictions)	4
	Improve wayfinding to find the Cape Arago parks/what is available	4
	Post tide charts/good times to tidepool at top of trail	3
	Post sign asking visitors to pick up trash	1
Services	Contact school groups to coordinate their visits, have rangers accompany them, provide pre-trip educational materials/curriculum	4
	Have more regular trash clean-up	3
	Improve interpretive opportunities (interpretive/roving rangers)	3
	Provide information in the campground/when you check-in (about tidepools, such as brochures)	3
	Provide ranger-program for kids (and post it)	1
	Advertise special events and regular activities on website	1
Regulations	Have on-site beach rangers for enforcement/increase enforcement for removal from tidepools	2
	Implement rotational closures	1



Kayakers near mouth of Sunset Bay, with Gregory Point and the lighthouse in the background.

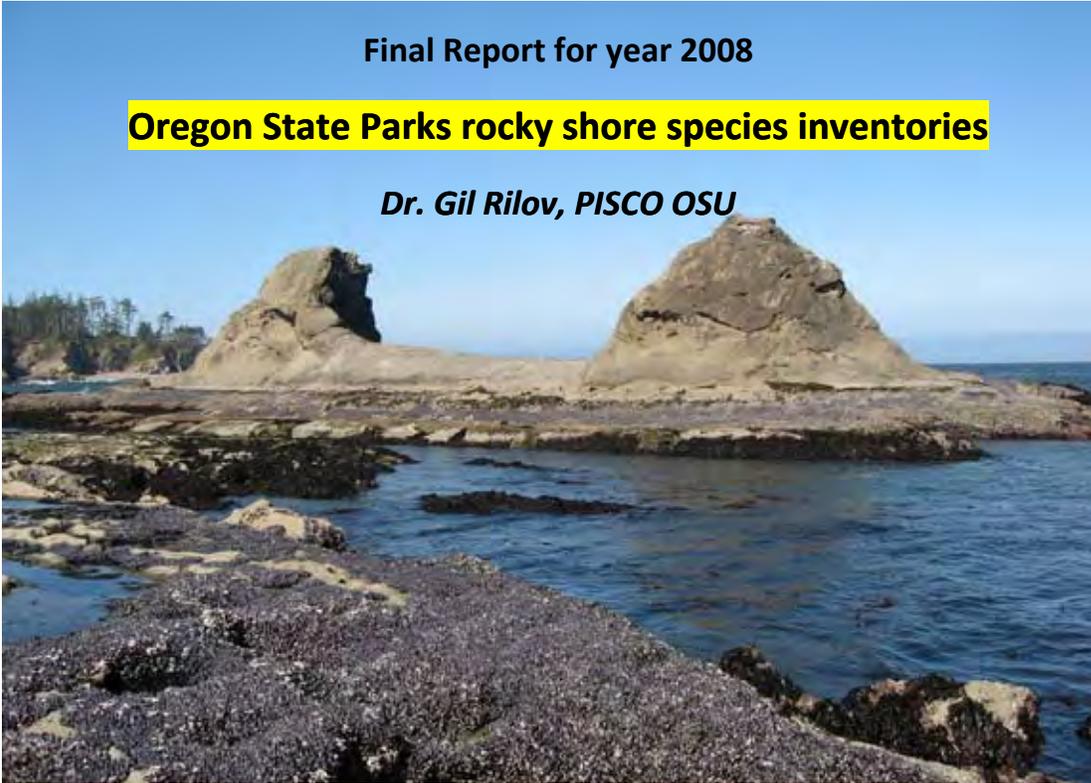
Table 7. Suggestions of visitors to Sunset Bay (n=62 comments)

Category	Comment	Times Mentioned
Signage	Add additional interpretive signs (tidepools, etiquette, geology)	7
	Add sign describing tidepool protections (no collection)	4
	Improve Highway 101 signs (name of parks, what is out here-tidepools etc.)	3
Services	Increase beach cleanup (trash)	5
	Provide ranger-guided tours/roving rangers	3
	Extend hours (of bathrooms, Jr. Ranger bldg, entire park)	3
	Publicize programs in the local paper	1
	Provide a local bird brochure	1
	Hand out list of activities when check-in/feature ocean/tidepools in campground guide	2
	Provide "more information"	1
	Have a short-wave radio channel with park information	1
	Include geology in interpretive programs	1
	Better information about where we can harvest mussels (received misinformation about Sunset Bay)	1
	Don't have employees leave trucks running (waste gas)	1
	Offer canoe rentals	1
	Don't advertise	1
Don't charge fees	1	
Regulations	Don't allow pallet burning-dangerous for bare feet (nails)	1
	Don't close the beach	1
	Allow higher limits for fish	1
	Increase littering fines	1
Facilities	Add a foot washing station	3
	Improve restroom facilities (changing table in men's restroom, better showers, working toilet)	3
	Offer food and beverages (for sale)	2
	Have more dispersed camping (smaller), more primitive	2
	Add a water fountain (for humans and dogs)	2
	Improve parking (people taking up more than one spot)	1
	Do not build anything else	1
	Improve beach access	1
	Improve road	1
	Provide laundromat	1
	Recycling should accommodate more items	1
	Provide an outdoor theater	1
	Provide a pay-phone for emergencies	1
Provide trash cans closer to the beach	1	

Final Report for year 2008

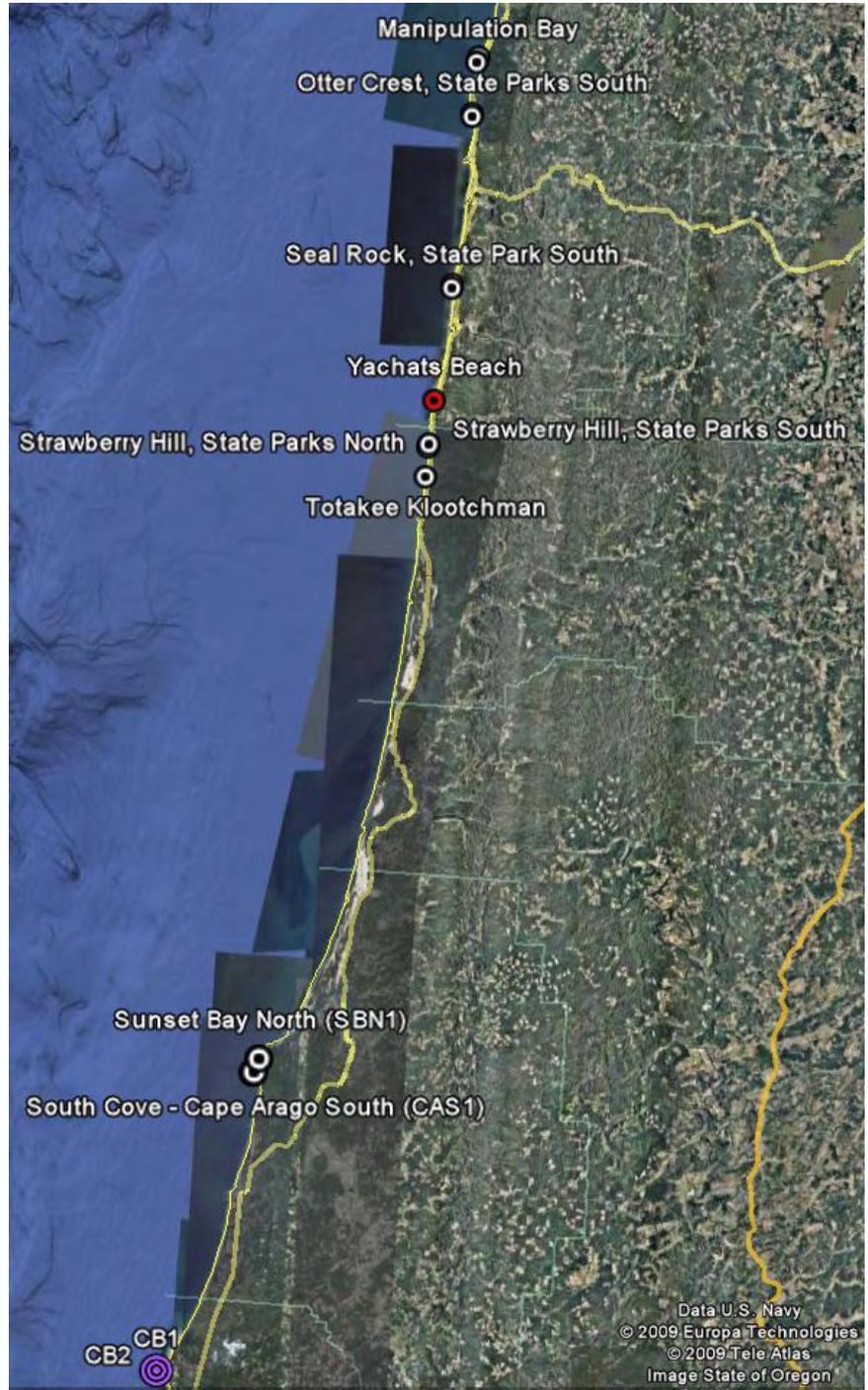
Oregon State Parks rocky shore species inventories

Dr. Gil Rilov, PISCO OSU



Surveys conducted during 2008

Intertidal community inventories (biodiversity surveys) were conducted over the summer of 2008 at 5 State Park areas, the three in central Oregon parks that were also surveyed during summer 2007 and two more in Southern Oregon, at Sandy Bay and Cape Arago's South Cove. In each park, one high and one low human-visitation site (visitation rate based on State Park surveys) were surveyed at 3-4 shore levels (0', 3-3.5, 7-7.5, 9 from the lowest low tide mean) in areas where the intertidal rocks have a gentle to moderate slope towards the ocean. At each shore level, Fifteen 15x22 inch quadrats were randomly selected along a 50 m long transect and surveyed for species percent cover (all algae and most sessile animals) or densities (all mobile animals and a few sessile ones such as sea anemones) in the field and photographed for archival purposes). Nine additional PISCO sites were surveyed using the same methodology. These sites were analyzed together with the State Park sites in community structure analysis and in the multivariate similarity analysis to examine coast scale variability. The State Park and most PISCO sites are shown in the map (some site names overlap and thus not seen).



State Park Study sites

The three central coast areas where the State Park sites are located were described in the 2007 report. Fig. 1 shows the general location of the sites at the two state parks in southern Oregon that were added in 2008.



Fig. 2 is an aerial map that shows the Sunset Bay study area divided to sections designated by OPRD for visitation surveys. The rocky areas with the highest (SBN1) and lowest (SBS1) visitation levels were designate for biological surveys. In these sites two additional mid shore transects were conducted in areas that were large and flat at that shore level and appeared to have very different communities than the communities at these shore levels in the sloping areas where the rest of the zones were sampled they are designated as SBN2 and SBS2.



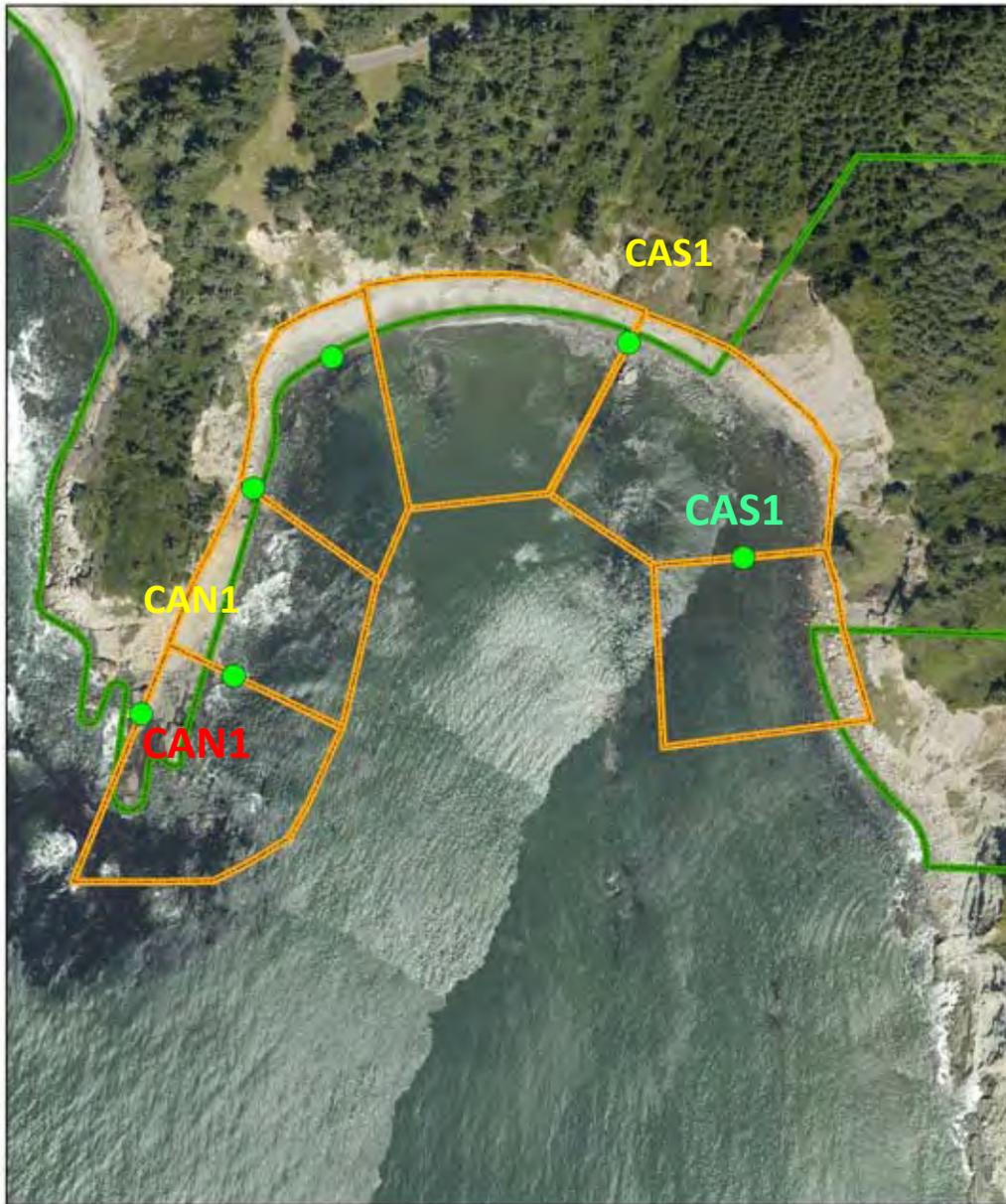
Appendix B: Biodiversity Survey

Fig. 3 is an aerial map that shows the Cape Arago South Cove study area divided to sections designated by OPRD for visitation surveys. The rocky areas with the highest (CAN1) and lowest (CAS1) visitation levels were designate for biological surveys.

Fig. 3

**SOUTH COVE
CAPE ARAGO**

Oregon Parks & Recreation Dept.
725 Summer St. NE, Suite C
Salem OR, 97301



This product is for informational purposes and may not have been prepared for, or be suitable for legal, engineering, or surveying purposes. Users of this information should review or consult the primary data and information sources to ascertain the usability of the information.

Oregon Lambert Projection
Datum NAD 83



0 0.05 0.1 Miles

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Community structure

Although the same species may occur at the same shore level at most sites along the coast, a community at a particular site is defined not only by the species list there but also by the relative abundance of the different species in each site. This relative abundance is the result of complex processes that include recruitment and growth rates as well as species interactions (competition, predation, facilitation) and random events such as a log hitting the rock and removing species from it (i.e., disturbance). Both absolute and relative abundance define the community structure that characterizes the site. The community structure of course changes seasonally and the results presented below represent summer communities only. In another project (the Gregory Slide project near Port Orford) it is well demonstrated how communities change seasonally but the highest diversity on the rocks is usually seen during the summer months. The entire species list and absolute mean abundances are given in the excel file appendix.

In the next set of figures, the relative abundance of the most abundant species at each shore level (based on a ranking of species from all sites combined at that particular zone) is presented separately for species whose abundance was estimated using percent cover (algae and sessile invertebrates) and whose abundance was estimated by counts (mostly mobile invertebrates and some sedentary ones such as sea anemones) at both the state park sites and the rest of the PISCO sites. For percent cover, only species whose maximum cover was > 4% are shown at all shore levels (bare rock is not included in the figures, therefore the total cover does not add up necessarily to 100% cover). For counts, all species are shown for the high and mid shore, and for the low-mid and low shore only species whose maximum mean abundance was > 1 are shown. For counts, additional figures show absolute abundance for the top 3-4 species at each shore level. Color pattern is different for each shore level. The sites are organized into three areas:

- (1) Cape Foulweather represents represent the north part of the central coast;
- (2) Seal Rock and Cape Perpetua represent the south part of the central coast;
- (3) Cape Arago and Cape Blanco (that have no high-shore data) represent the south coast.

In each area, the sites are organized from north to south (top to bottom). Sites in red font are the high-visitation sites in the State Park areas.

High-shore patterns

The pie charts in Fig. 4 show that the high-shore level is dominated by cover of barnacles, *Balanus glandula*, in most locations except for FC and CAN where the barnacle co-dominates with several algae species and SRN where the few high shore quadrates that were sampled there (there is very little high shore area in this site) were dominated by *Mytilus Californianus*. At this shore level, the three regions have no distinctive sessile species assemblages, but within-region variability among sites is evident. It also appears that the high-visitation sites in Cape Foulweather and Cape Arago have quite different species composition than their counterpart low-visitation sites. Cape Foulweather sites are generally richer in species than the two southern regions except for SHN.

Fig. 4. Relative percent cover in the high-shore level at the study sites. Site code names (relevant to all figures) are as follows: FC = Fogarty Creek, BB = Boiler Bay, MB = Manipulation Bay, OCN = Otter Crest North, OCS = Otter Crest South, SRN = Seal Rock North, SRS = Seal Rock South, YB = Yachats Beach, SHN = Strawberry Hill North, SHS, Strawberry Hill South, TK – Tokatee Kloochman, SBN – Sandy Bay North, SBS = Sandy Bay South, CAN = Cape Arago North, CAS = Cape Arago South, CBN = Cape Blanco North, CBS = Cape Blanco South. SRS have no high shore rocks, and CB1 and CB2 were not sampled in the high-shore and thus these sites are not shown for this zone.

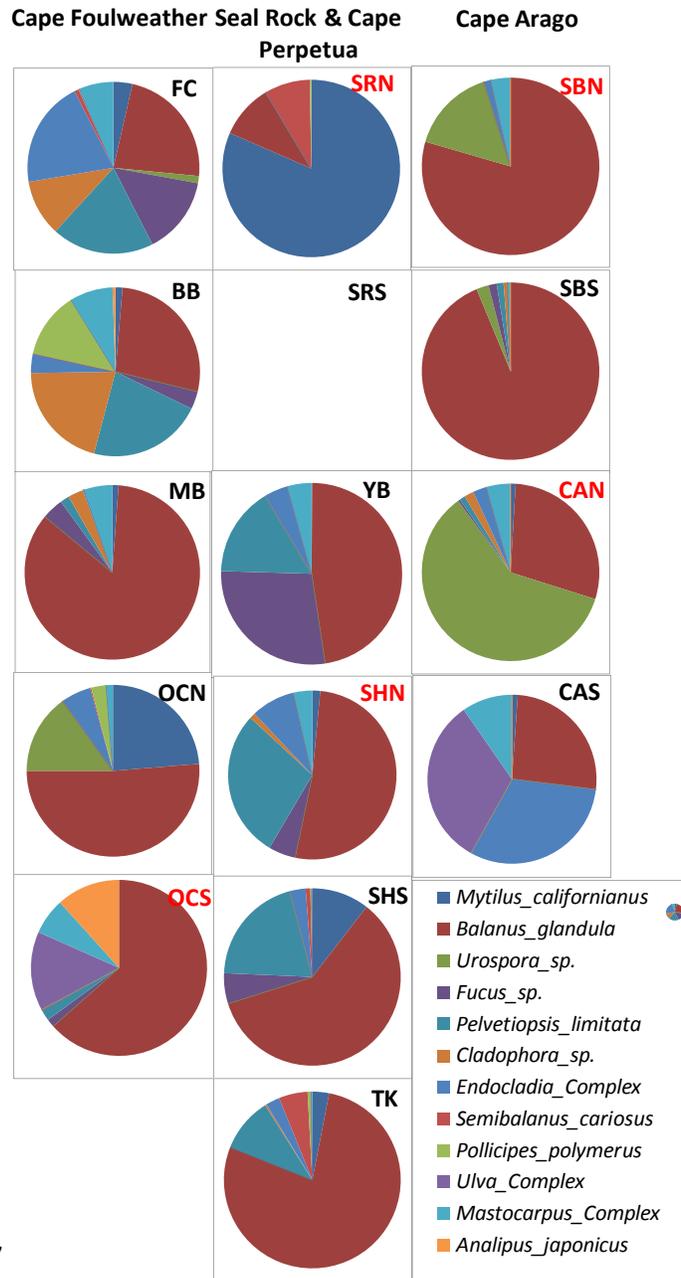


Fig. 5 demonstrates that at the high-shore level the diversity of mobile animals is low at all sites and it is strongly dominated by periwinkles (*Littorina* complex) and limpets (*Lottia* spp.) however littorinas fluctuate dramatically in absolute abundance among sites with the highest values at Yachats Beach (YB1, Fig. 6). There are no obvious trends with regard to high and low visitation sites and the regions do not seem distinctively different in the structure of the species assemblages.

Fig. 5. Relative abundance in counts of mobile animals in the high shore level at the study sites.

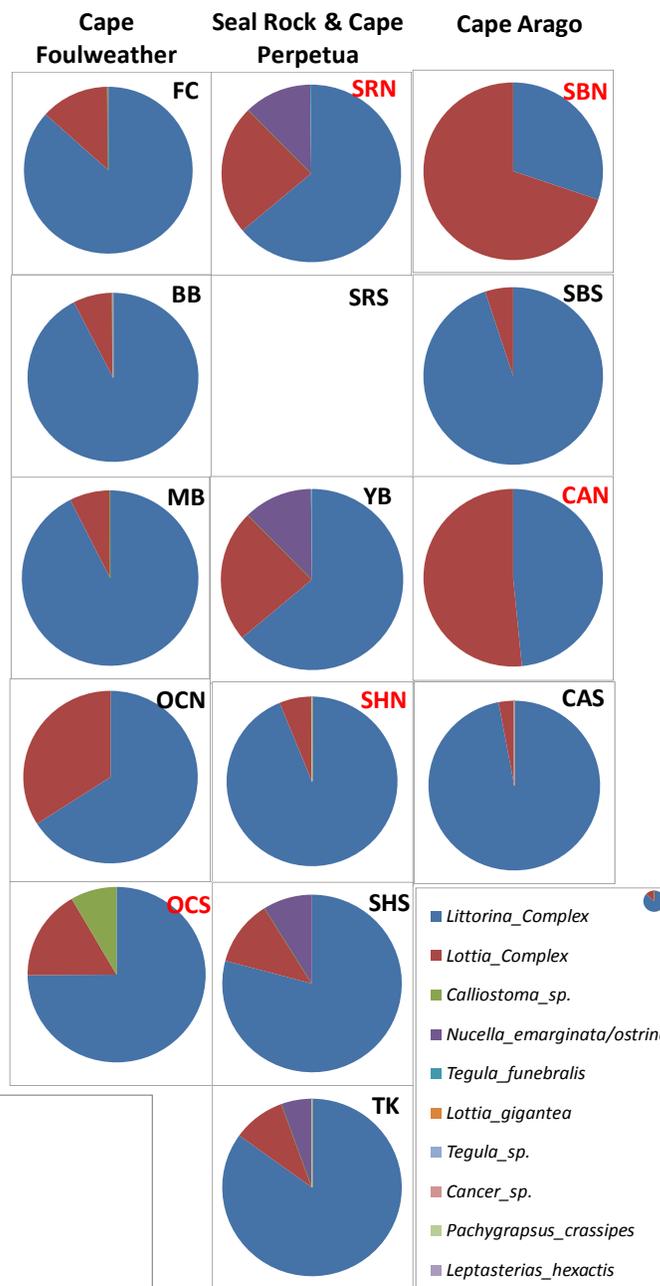
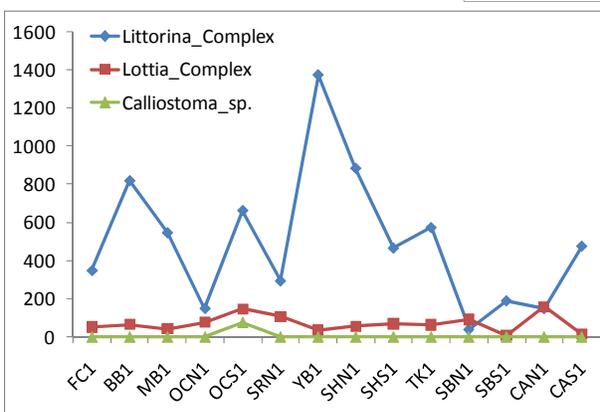


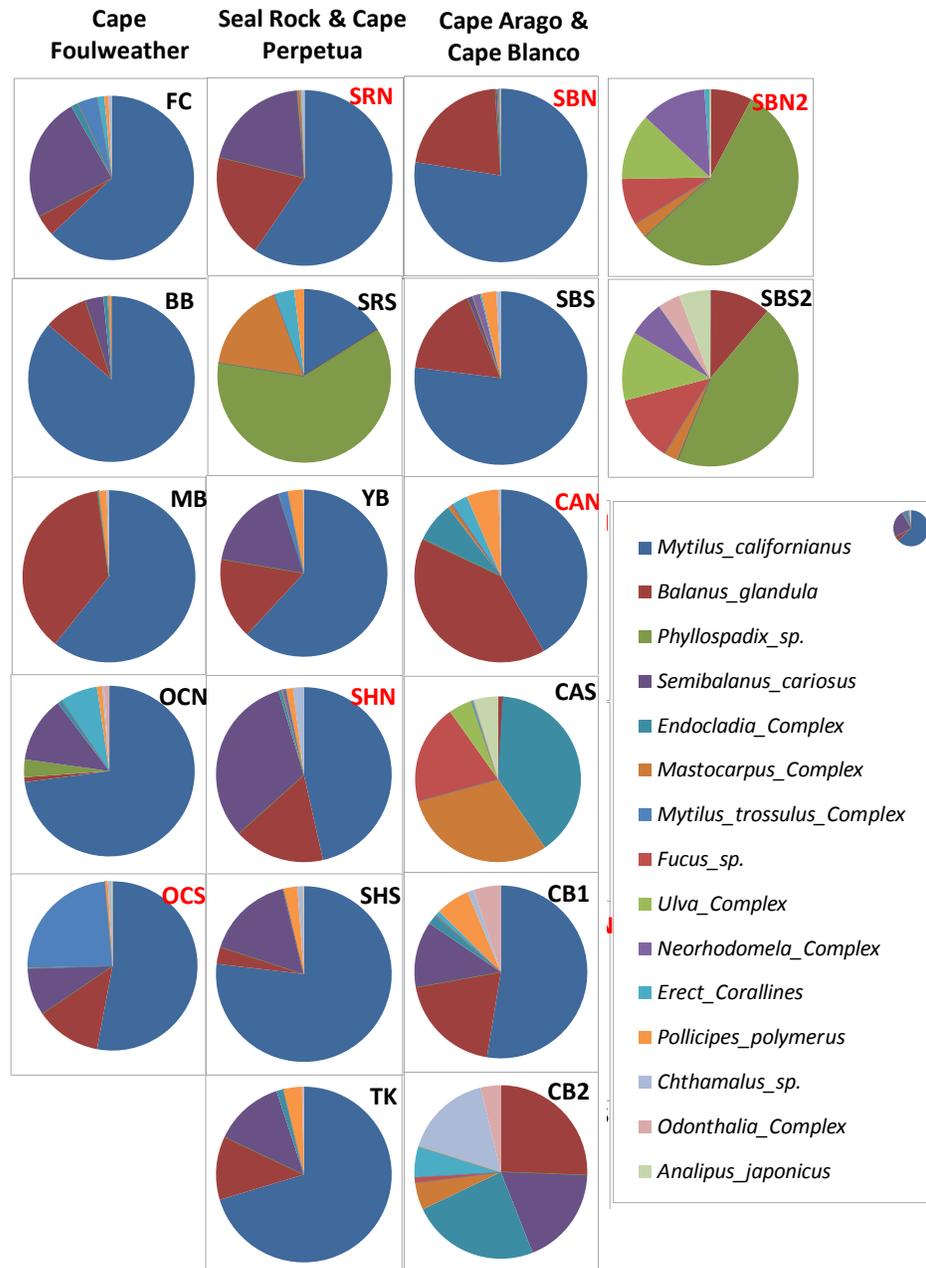
Fig. 6. Absolute abundance per quadrat of most abundant animals in the high shore level.



Mid-shore patterns

Fig. 7 demonstrates that the rock cover in the mid-shore is dominated by beds of the mussel *Mytilus californianus* at most sites except for SRS that is dominated by the seagrass *Phyllospadix* sp., CAS that was dominated by several species of seaweeds and CB2 that was dominated by the barnacle *Balanus glandula* and several seaweeds. The flat areas at mid-shore level in Sandy Bay (SBN2 and SBS2) have very different species cover than the sloping areas as they are dominated by the seagrass *Phyllospandix* sp and not the mussels. No regional pattern is obvious and assemblages do not appear to be consistently different between high and low visitation sites.

Fig. 7. Relative percent cover in the mid shore level at the study sites.

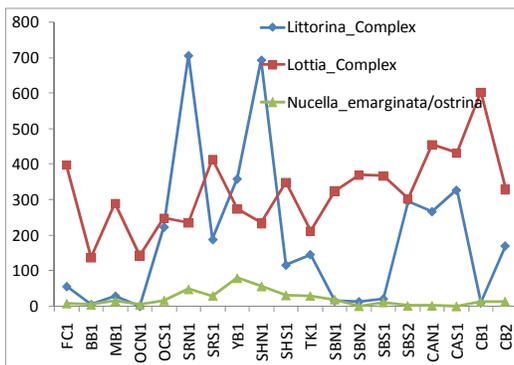
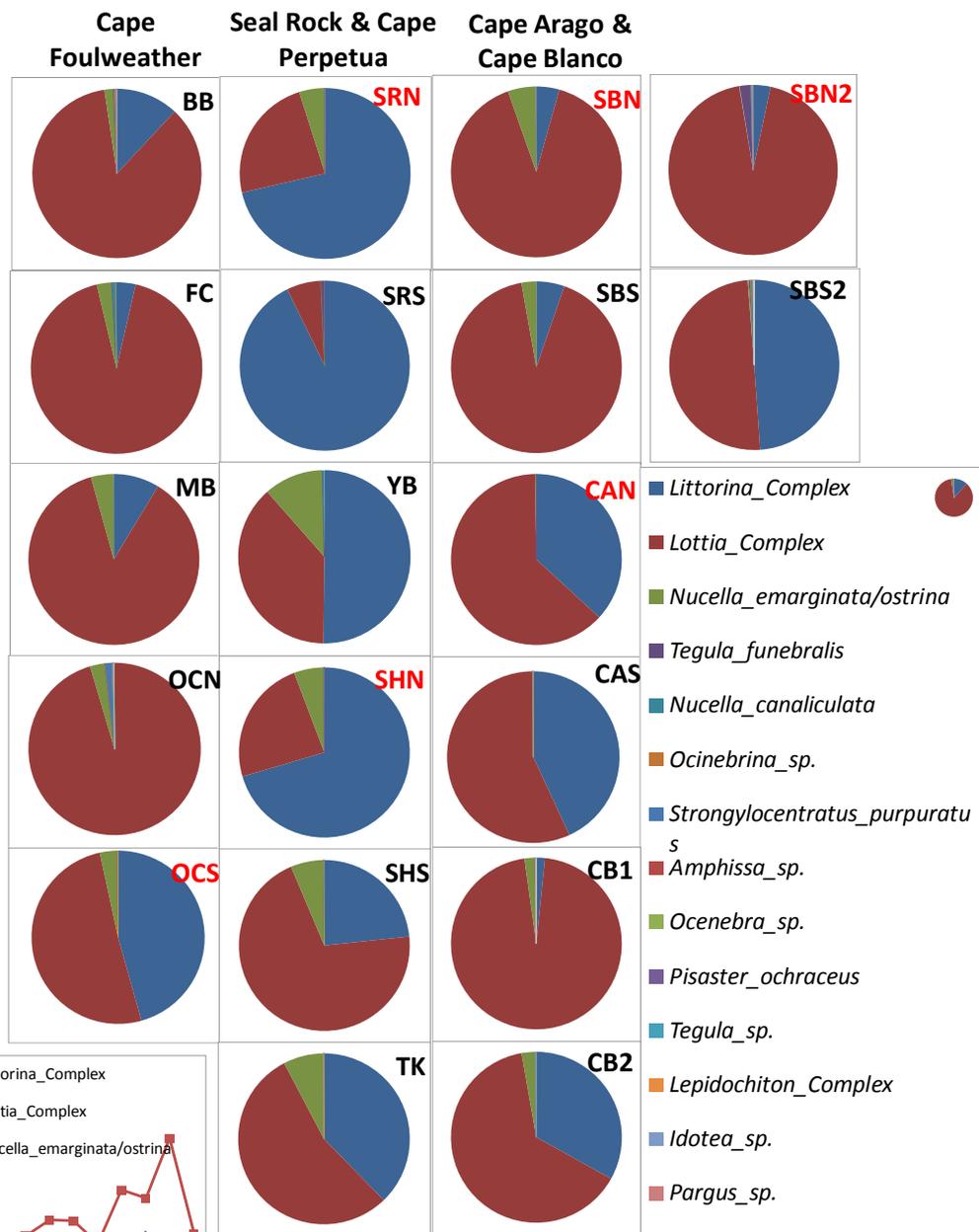


The mid-shore mobile animal assemblage is dominated either by limpets, *Lottia* complex, at most Cape Foulweather sites except the high-visitation site OCS, and at southern sites, or periwinkles, *Littorina* complex, at most Seal Rock and Cape Perpetua sites (Fig. 8). Absolute numbers of *Lottia* do not seem to be hugely different among sites or regions although they appear to be slightly more abundant in the southern sites (Fig. 9). The whelks *Nucella* spp. are more abundant in the Sea Rock and Cape Perpetua sites. One of the flat areas at mid-shore level in Sandy Bay (SBS2) is equally dominated by *littorina* and *lottia* unlike the sloping area that is dominated by *lottia*. Assemblages do not appear to be consistently different between high and low visitation sites.

Fig. 8. Relative abundance in counts of animals in the mid shore level at the study sites.



Fig. 9. Absolute abundance per quadrat of most abundant animals in the mid shore level.

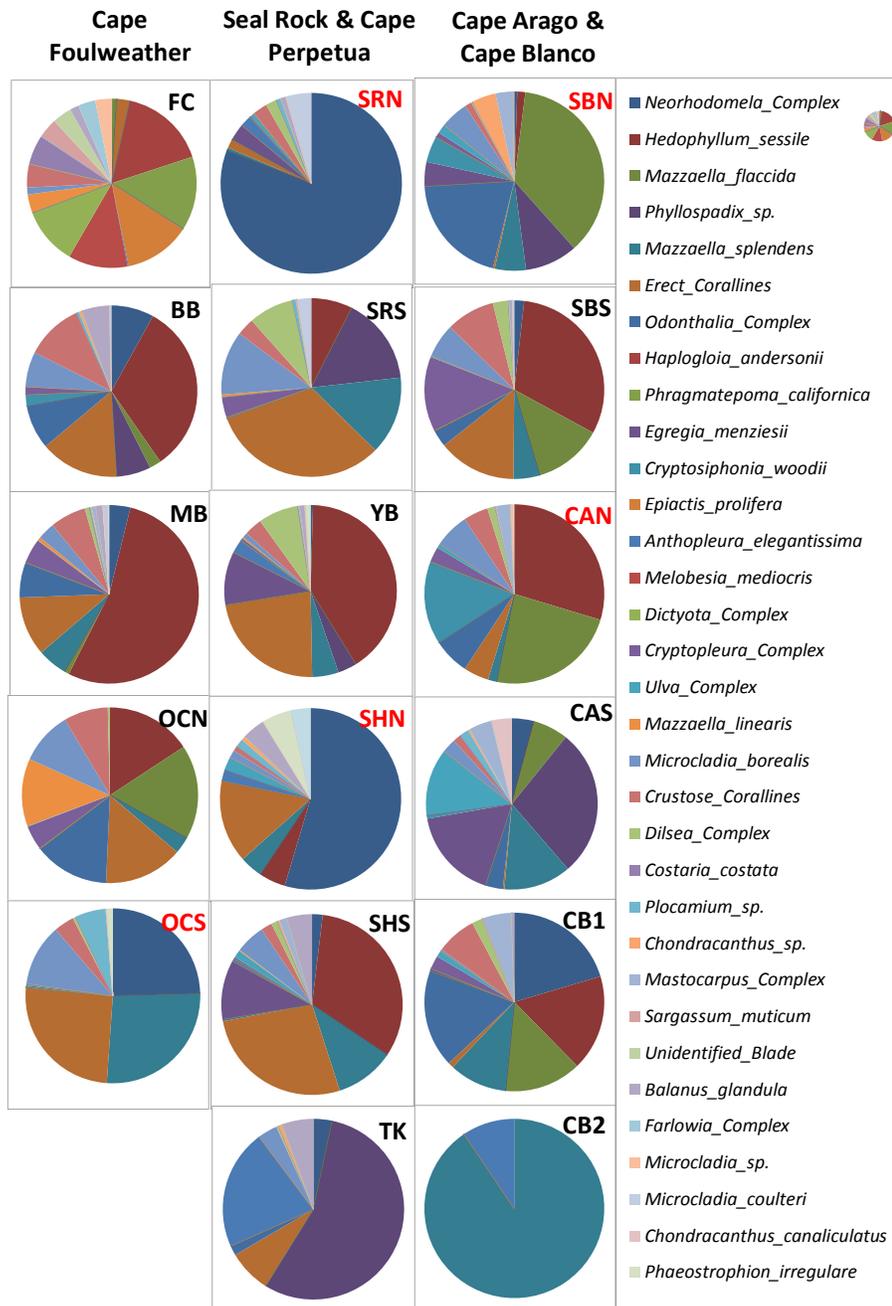


Low-Mid shore patterns

Most sites are populated with a multitude of seaweed species at the low-mid shore level (Fig. 10). Two sites stand out: SRN dominated by the red algae *Neorhodomela* (78% cover), and CB2 that had very poor overall cover and diversity, and the “dominate” algae there was *Mazzaella splendens* with little more than one percent covering the rocks. *Hedophyllum sessile* and *Mazzaella flaccida* can be dominant at some sites but almost absent at others with no apparent regional pattern.



Fig. 10. Relative percent cover in the low-mid shore level at the study sites.



The mobile animal assemblages at the low-mid shore level were quite diverse and were distinctively different among many sites (Fig. 11). The dominant species in most sites were *Lottia* limpets however their abundance change dramatically among sites (Fig. 12). It can be high or low in the two central coast regions and it is mostly low in the south. In Cape Foulweather, FC and OCN stand out as the most diverse sites. Cape Perpetua shows lower diversity with one site, SRN, standing out as being dominated by the large isopod *Idotea*. This site is also the most associated with sand that surrounds it and may affect species on the rock. Most southern sites seem more diverse than the two other regions.



Fig. 11. Relative abundance in counts of animals in the low-mid shore level at the study sites.

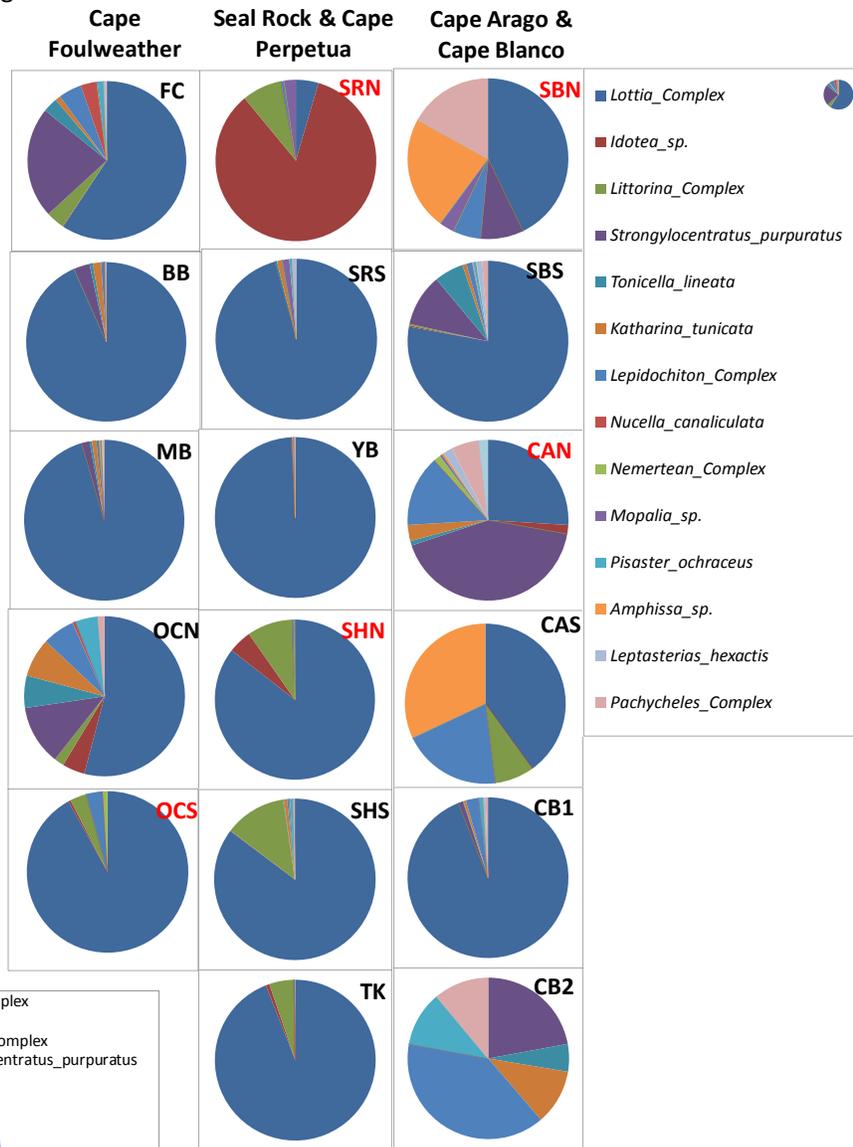
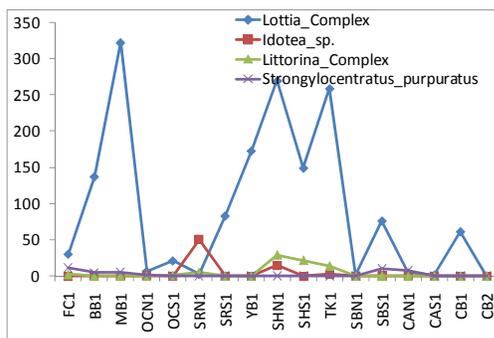


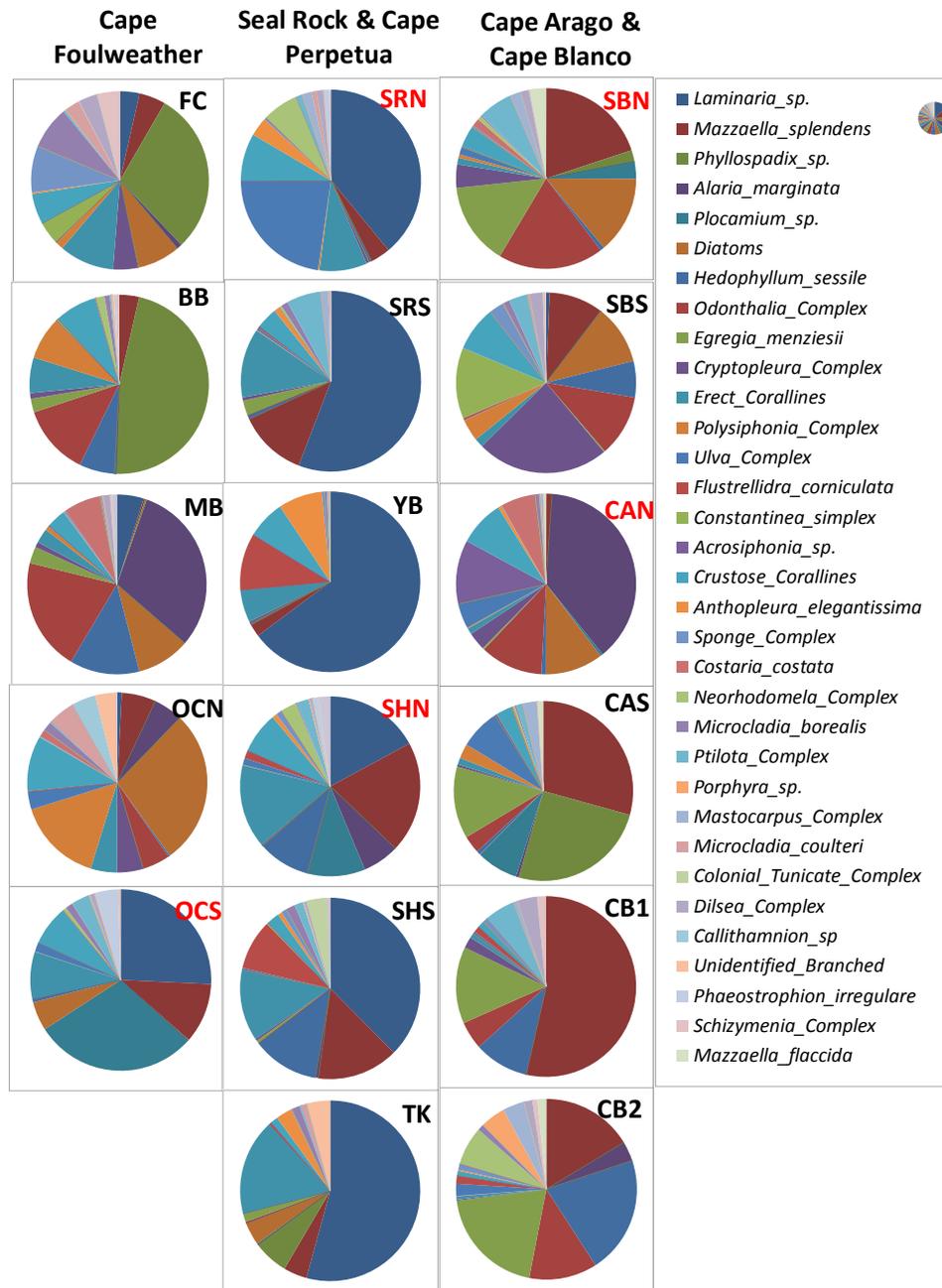
Fig. 12. Absolute abundance per quadrat of most abundant animals in the low-mid shore level.



Low-shore patterns

The low-shore is a highly diverse zone, and the dominating plant species change from region to regions and site to site (Fig. 13). The most noticeable general patterns are as follows: two northern sites in Cape Foulweather are dominated by the seagrass *Phyllospadix* and the three other sites in the regions have no seagrass and they are quite different from each other. Cape Perpetua sites are mostly dominated by *Laminaria* sp. except for SHN.

Fig. 13. Relative percent cover in the low shore level at the study sites.



The mobile animal assemblages at the low-shore level were quite distinctively different among regions (Fig. 14). The dominant species in most Cape Foulweather and half of the southern sites was the purple sea urchin *Stenogylocentratus purpuratus* and it was completely absent from the Cape Perpetua sites that were dominated by *Lottia* in most locations except for SHN and TK where it was almost absent (Fig. 15). *Littorina* is highly abundant in only one site, SHN. CB1 had very low numbers of mobile species and the most dominant species there at the time of sampling was the small slug *Onchidella borealis*.



Fig. 14. Relative abundance in counts of animals in the low shore level at the study sites.

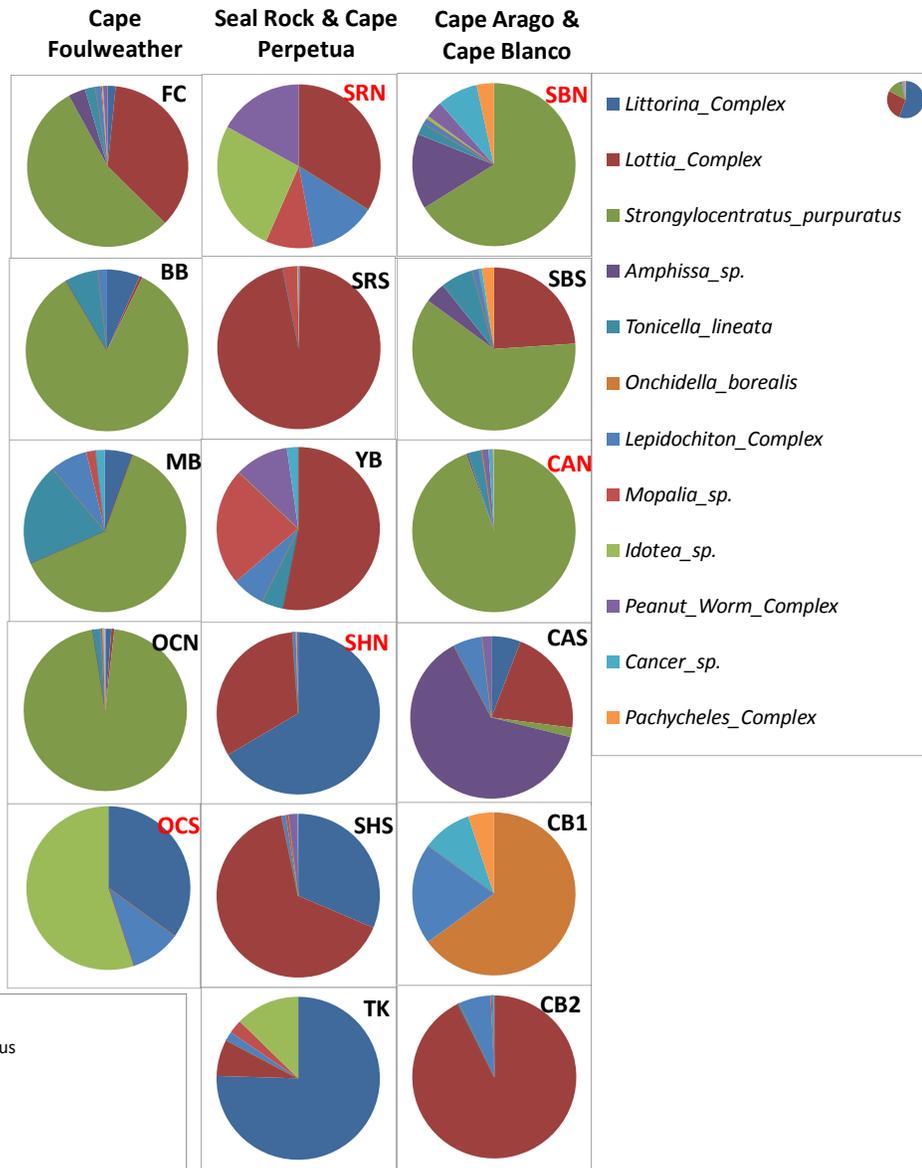
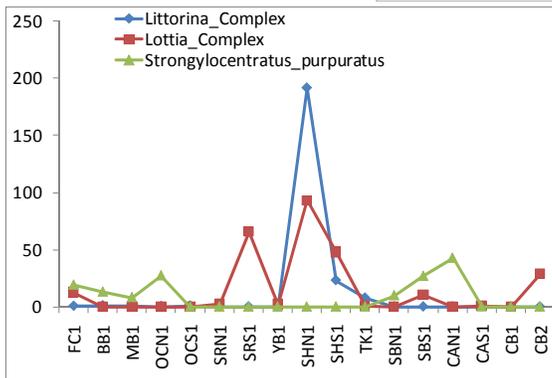


Fig. 15. Absolute abundance per quadrat of most abundant animals in the low shore level.

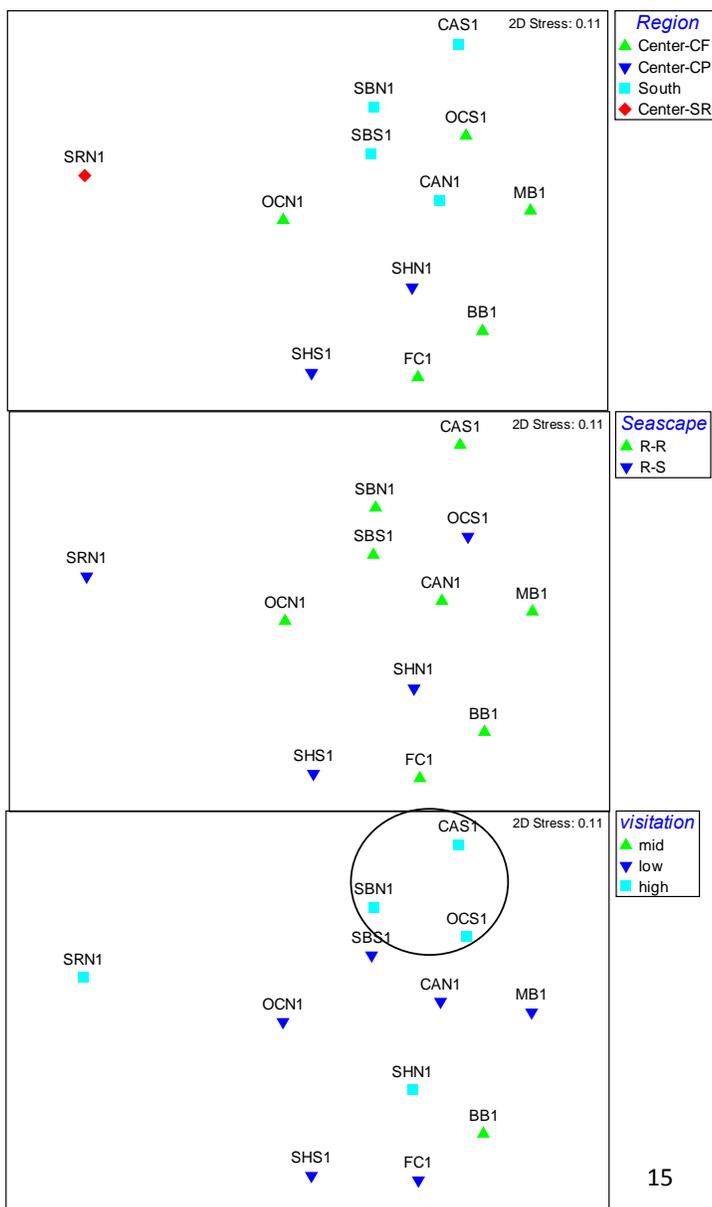


Community similarity analysis

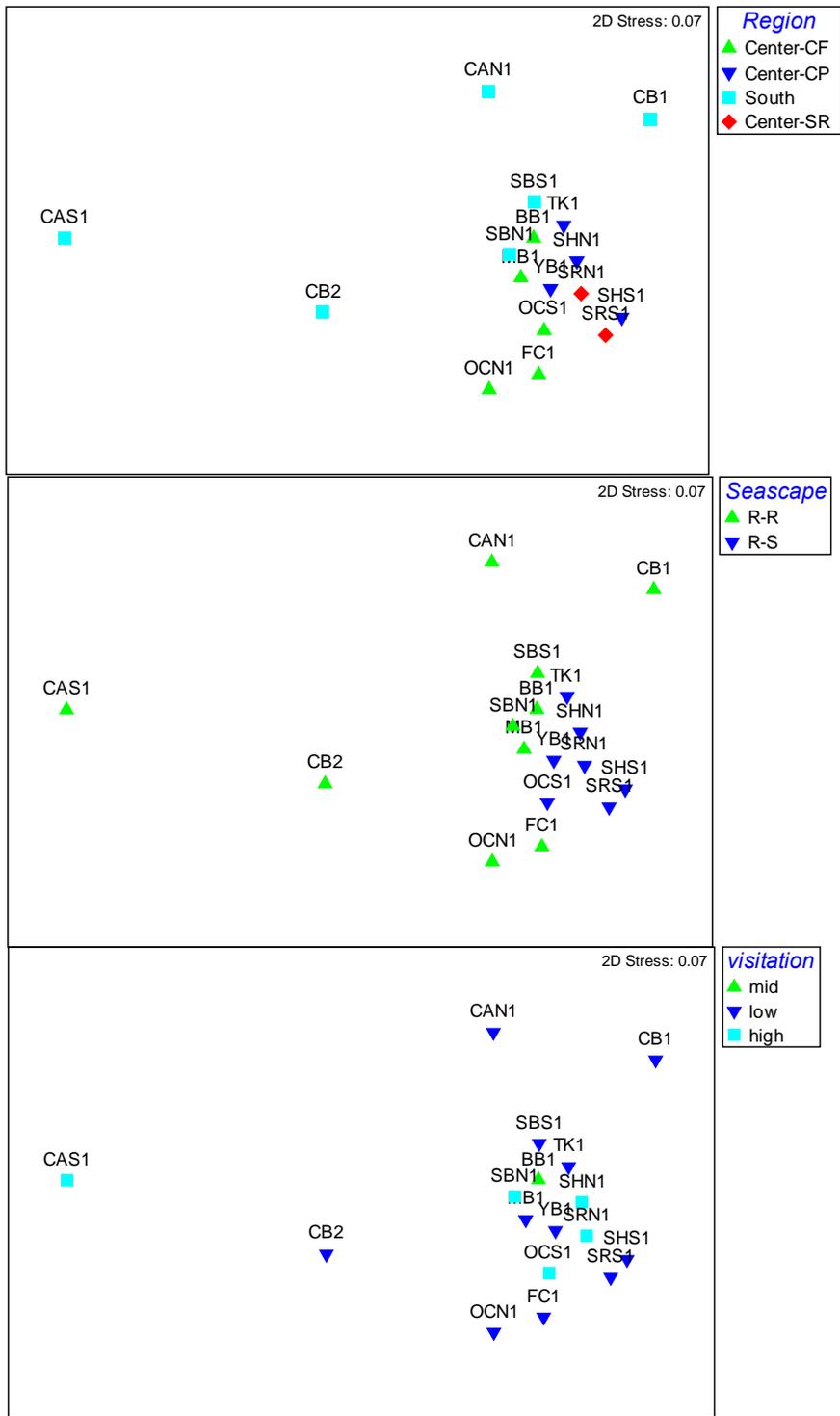
To assess how similar or different the sites/regions are from each other as well as to see if the high visitation sites stand out as different from the other sites we used a multivariate analysis. Specifically we used non-parametric multidimensional scaling (MDS) methods to visually illustrate community similarity as we did last year; only this year we included all of the PISCO sites in the analysis to achieve a more regional perspective. In this analysis we pooled the data for cover and count and preformed the analysis after a $\log(x+1)$ transformation to reduce the effects the use of these different abundance estimation methods may have on the results. For each shore level, we highlight the clustering of sites by region, seascape (whether a site has a sandy or a rocky subtidal bottom seaward of the intertidal rocks) and human visitation level. The local seascape may be an

important structuring force in intertidal communities and need to be considered. We designate site with a rocky reef bottom as reef-to-reef (R-R) seascape, and sites with a sandy subtidal as reef-to-sand (R-S) seascape. In this analysis, regions are as follows, Center-Cape Foulweather sites (Center-CF), Seal Rock sites (Center-SR), Cape Perpetua sites (Center-CP) sites and southern Site (south). With regard to visitation, Boiler Bay (BB) was considered to have intermediate visitation levels as this site is frequently visited not only by scientists but also by students (school and university).

At the high-shore level we see some clustering by region, no clustering by seascape and a clustering of the high visitation sites at CF and the southern sites (marked by an oval in the lower panel, Fig. 16).



At the mid-shore level, there appears to be more clustering on the regional level although most sites are quite similar to each other regardless of region except for the two Cape Blanco (South Cove) sites CAS1 and CAN1, and the two Cape Blanco sites CB1 and CB2 (Fig. 17). These four sites are characterized by lower cover of *Mytilus californianus* beds (see Fig. 7). Sites also appear to be somewhat clustered by seascape but visitation does not show any particular pattern.



visitation does not show any particular pattern.

Fig. 17. MDS ordinations for the mid shore level depicting the characterization of the sites by region, seascape and visitation level.

Appendix B: Biodiversity Survey

At the low-mid shore level, there appears to be some clustering on a regional level within the “cloud” of sites, but two sites standout, FC and CB2 and in opposite directions making them the most dissimilar species in this analysis (Fig. 18). FC had a very high diversity of species and he assemblage is quite different from other sites for both sessile and mobile species (see Figs. 10-11). CB2 has overall very low cover of biota on the rock and low species diversity. Sites also appear to be clustered by seascape. Sites with high-visitation appear to cluster separately within regions (see ovals in the lower panel).

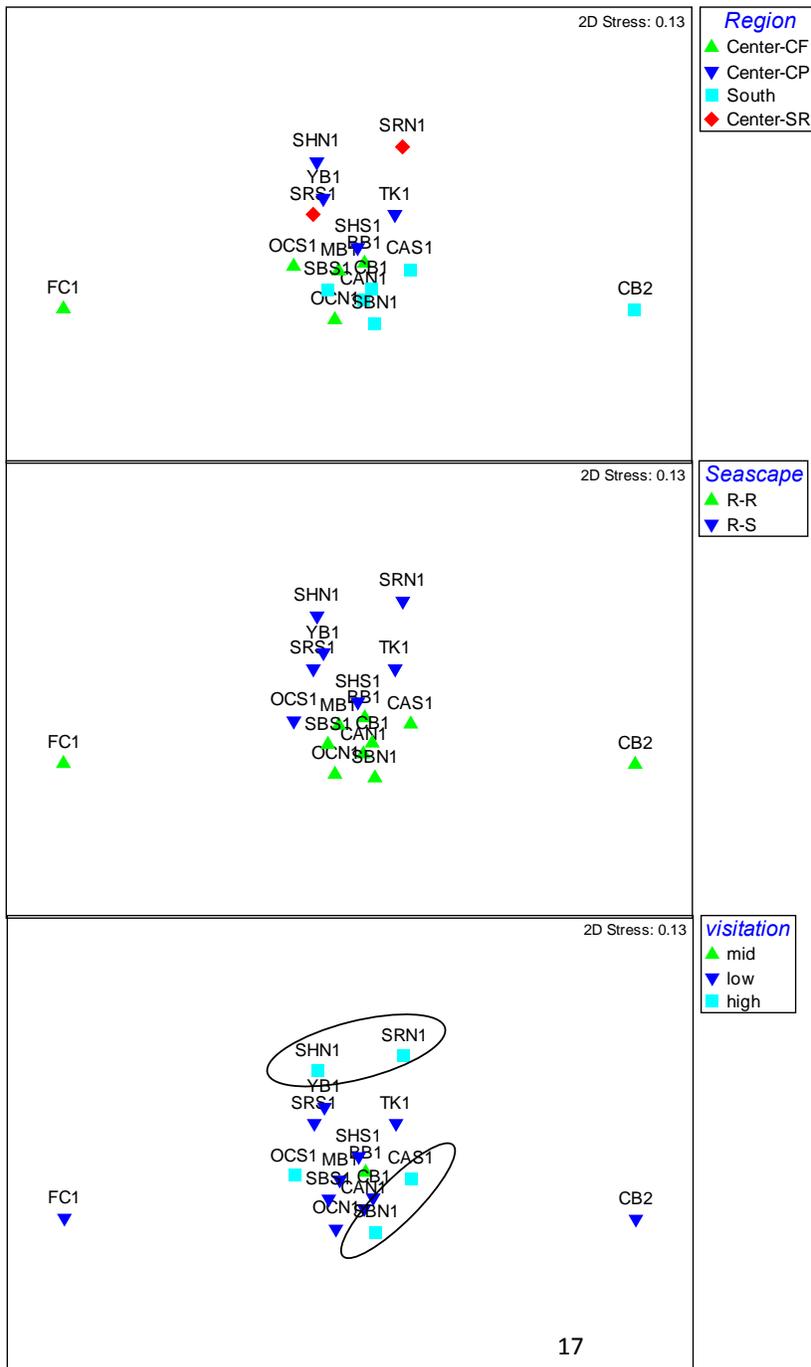


Fig. 18. MDS ordinations for the low-mid shore level depicting the characterization of the sites by region, seascape and visitation level.

In the low shore level, communities appear to cluster strongly by region and even more so by seascape. OCS, which has a sandy subtidal bottom (unlike the rest of the CF sites), is nicely clustered with the CF and Seal Rock sites, all having an R-S seascape (Fig. 19). The high-visitation sites at Cape Perpetua and Seal Rock as well as the southern region seem to be clustered separately from the rest of the sites in their respective region (see ovals in the lower panel) but are not clustered together suggesting that region is more important than visitation in structuring the communities.

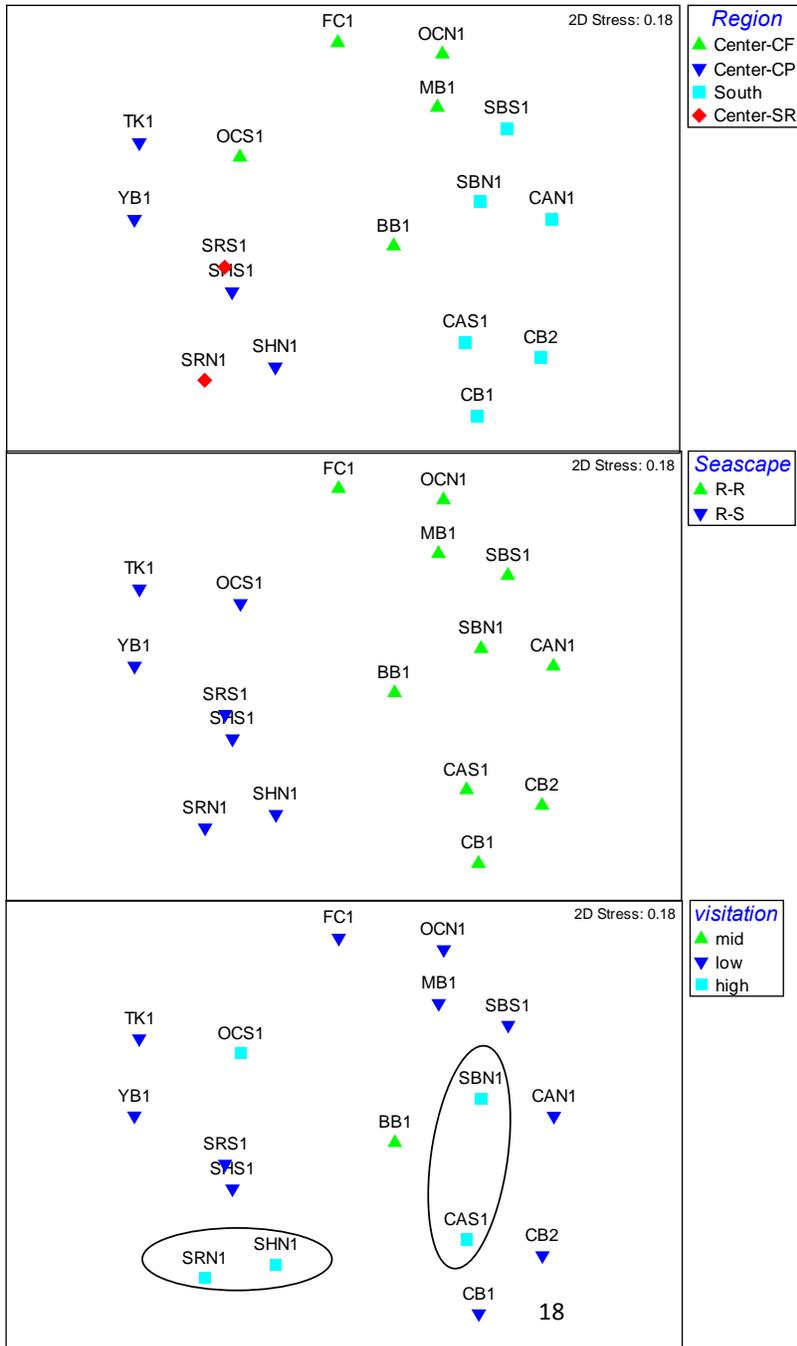


Fig. 19. MDS ordinations for the low shore level depicting the characterization of the sites by region, seascape and visitation level.

Species diversity

Figure 20 shows the species richness (number of species) at each site at each shore level. Sites are organized from north to south, the north-most site is FC1 (on the left). The high visitation sites are in red bars. No outstanding latitudinal patterns are seen in the number of species nor is there an obvious reduction of species in high-visitation sites.

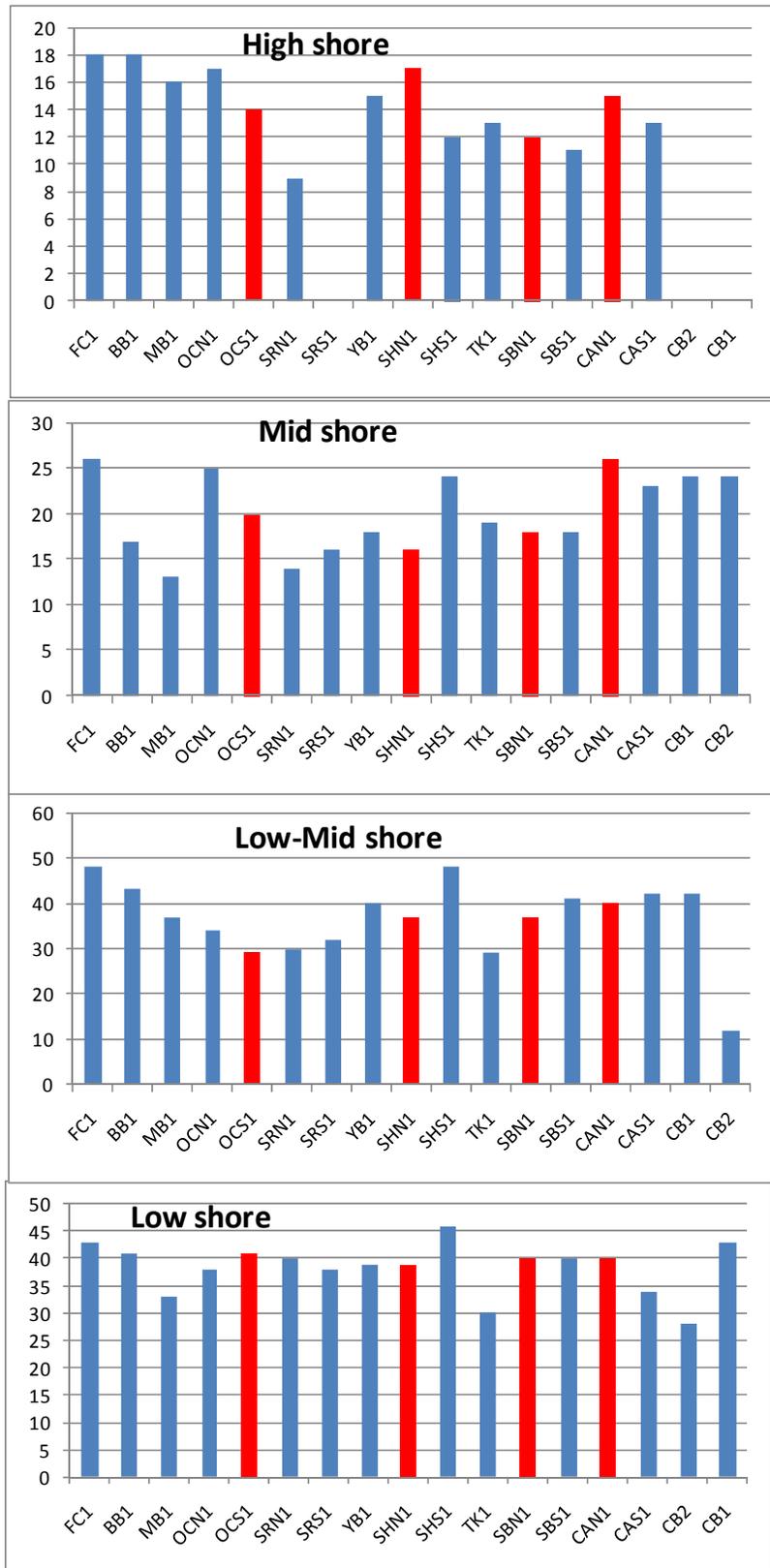


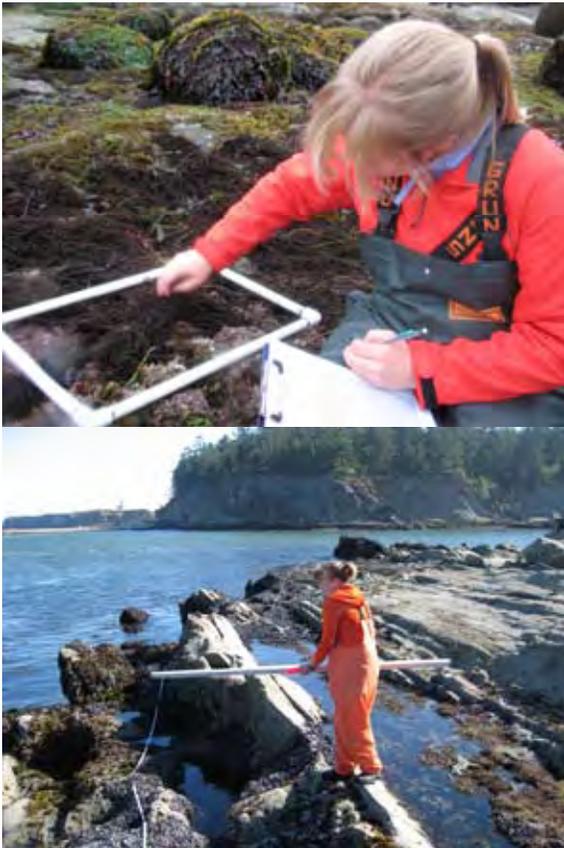
Fig. 20. Species richness at the different shore levels at the study sites. There is no data for some sites for the high-shore level.

Summary

2008's surveys, which included more State Park sites and also the PISCO sites, revealed very interesting regional patterns of community structure but also how sites vary greatly within region. The results nicely demonstrate how the different shore levels are structured differently with regard to region – the high shore is much more similar across regions and seascape than the lower shore levels and especially the low shore. This is perhaps related to the fact that the lower shore levels are more influenced by the local seascape which is quite different among regions and sites. High-visitation sites appear to be different from their counterpart sites in each park in the high, low-mid and low shore levels and not in all areas. The mid-shore may be less affected by visitation because mussels that dominate the area are more robust to trampling than other taxa. One again must realize that because these are surveys and not manipulated experiment causation is hard to determine.

Acknowledgements

After selecting the sites and marking the transects, all the biodiversity surveys and data entries were done by two very dedicated interns from OSU, Beth Lenker and Ashley Davidson to whom I am extremely thankful. Database processing was handled by the skillful hands and minds of Mike Frenock and Jerod Sapp of PISCO-OSU. Other OSU personnel have helped with the setup at some of the sites and Alexis Rife and Ben Campbell were hugely helpful in training Beth and Ashley with the methods.



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Appendix B: Biodiversity Survey

Abiotic Data from PISCO survey

Code	Site	Zone	Bare_Primary_Rock	Bare_Secondary_Rock	Roughness	Sand	Verticality
CAN1-H-Aug-08	CAN1	H	39.53	39.53	1.13	0	1.2
CAS1-H-Jul-08	CAS1	H	91	91	1.93	0	2.07
SBN1-H-Aug-08	SBN1	H	94	94	1.93	0	2.67
SBS1-H-Aug-08	SBS1	H	74.06	74.06	1.5	0	1.63
CAN1-L-Aug-08	CAN1	L	5.67	1.07	2.33	0.33	1.6
CAS1-L-Jul-08	CAS1	L	5.27	0.47	1.8	8.53	1.8
SBN1-L-Aug-08	SBN1	L	10.87	1.87	2.47	1.53	2.33
SBS1-L-Aug-08	SBS1	L	6.67	5.33	2.6	0.33	2.87
CAN1-LM-Aug-08	CAN1	LM	4.73	0.73	2.13	0.33	1.47
CAS1-LM-Jul-08	CAS1	LM	4.93	0.13	1.4	10.33	1.07
SBN1-LM-Aug-08	SBN1	LM	6.13	0.67	1.73	0.2	1.93
SBS1-LM-Aug-08	SBS1	LM	4.93	3	2.73	0	2.73
CAN1-M-Aug-08	CAN1	M	31.07	31.07	1.57	0	2.86
CAS1-M-Jul-08	CAS1	M	21.33	18.07	1.67	0	1.27
SBN1-M-Aug-08	SBN1	M	6.47	6.47	1.2	0	1
SBN2-M-Aug-08	SBN2	M	8.07	4.4	1.2	4.07	1
SBS1-M-Aug-08	SBS1	M	6.67	6.67	1.27	0	1.13
SBS2-M-Aug-08	SBS2	M	25.33	20.6	1.27	4.67	1

Species Cover (sessile species) from PISCO survey

Site	Zone	Level	<i>Acrosiphonia_sp.</i>	<i>Alaria_marginata</i>	<i>Analipus_japonicus</i>	<i>Anthopleura_artemisia_Complex</i>	<i>Anthopleura_elegantissima</i>	<i>Anthopleura_xanthogrammica</i>	<i>Balanus_glanduja</i>	<i>Bryozoan_Complex</i>	<i>Calcareous_Tube_Complex</i>	<i>Callithamnion_sp</i>	<i>Ceramium_sp.</i>	<i>Chaetomorpha_sp.</i>	<i>Chondracanthus_canaliculatus</i>	<i>Chondracanthus_sp.</i>
CAN1	H	low	0	0	0	0	0	16.73	0	0	0	0	0	0	0	0
CAN1	L	low	12.4	41.4	0	0	0.67	0.53	0	0	0.2	0	0	0	0	0
CAN1	LM	low	0.07	1	0.33	0	0	0.2	0.07	0	0.07	0	0	0	0	0.2
CAN1	M	low	0	0	0.07	0	0	0.33	31.67	0	0	0	0	0.2	0	0
CAS1	H	high	0	0	0	0	0	1.85	0	0	0	0	0	1.54	0	0
CAS1	L	high	0.4	0.67	0	0	0	0	0	0	0.07	0	0	0	0.87	0.27
CAS1	LM	high	0.13	0	0	0.07	0	0.07	0.07	0	0.07	0	0.2	0	4.33	0.4
CAS1	M	high	0	0	3.6	0	0	0.4	0.73	0	0	0	0	0.4	0	0.13
SBN1	H	high	0	0	0	0	0	5.08	0	0	0	0	0	0	0	0
SBN1	L	high	0.2	0	0	0	0	0.73	0	0	0.53	0	0	0	0	0.07
SBN1	LM	high	0	0	0	0	0	0.27	0.07	0.6	0	0	0	0	0	6
SBN1	M	high	0	0	0	0	0.07	0.07	26	0	0	0	0	0	0	0
SBN2	M	high	2.13	0	0	0.13	2.33	0.2	7.8	0	0	0	0	2.87	0	0.73
SBS1	H	low	0	0	0	0	0	23.56	0	0	0	0	0	0	0	0
SBS1	L	low	0.07	0	0	0	0	1.07	0	0	1	0	0	0	0	0.27
SBS1	LM	low	0.13	0	1.87	0	0.07	2	0.67	0	0.47	0.13	0	0	0	0.07
SBS1	M	low	0	0	0	0	0.07	0.13	20.13	0	0	0	0	0	0	0
SBS2	M	low	0	0	4.19	0	3.93	0	8.2	0	0	0	0	1.13	0	0.2
			15.53	43.07	10.06	0.2	7.14	5.73	142.8	0.07	3.01	0.13	0.2	6.14	5.2	8.34

Species Cover (sessile species) cont.

Site	<i>Chthamalus_sp.</i>	<i>Cladophora_sp.</i>	<i>Constantinea_simplex</i>	<i>Costaria_costata</i>	<i>Crustose_Corallines</i>	<i>Cryptopleura_Complex</i>	<i>Cryptosiphonia_woodii</i>	<i>Cystoseira_osmundea</i>	Diatoms	<i>Dilsea_Complex</i>	<i>Dodecaceria_fewkesi</i>	<i>Egrecia_menziesii</i>	<i>Endocladia_Complex</i>	<i>Epiactis_prolifera</i>
CAN1	0	1	0	0	0	0	0	0	0	0	0	0	1.47	0
CAN1	0	0	0	6.87	8.93	3.53	1.07	0	11.3	0.4	0.73	0.33	0	0.13
CAN1	0.13	0	0	0.2	5.8	3.53	19.67	0	0	1.67	0	0	0	0
CAN1	0.27	0	0	0	0	0	0.2	0	0	0	0	0	5.87	0
CAS1	0.92	0	0	0	0.23	0	0	0	0	0	0	0	2.23	0
CAS1	0	0	0	0	3.8	0.53	0.33	0	0.07	0.07	0	16.33	0	0
CAS1	0	0	0	0	1.73	0	0.8	0	1.53	0.07	0	20	0	0
CAS1	0.07	0.07	0	0	0.4	0	0	0	0	0	0	0	30.33	0
SBN1	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0
SBN1	0	0	0	2	5.47	6	0	0	19.7	2.2	0	21	0	0
SBN1	0	0	0	0	1.73	1.27	6.53	0	3	0.33	0	6	0	0
SBN1	0.13	0	0	0	0	0	0	0	0	0	0	0	0.33	0
SBN2	0	0	0	0	0.73	0	0	0	0	0.53	0	0	0	0
SBS1	0.31	0.19	0	0	0	0	0	0	0	0	0	0	0	0
SBS1	0.13	0	13	0.2	8.27	24.33	2.2	0.67	11	2.47	0	0.2	1.67	0
SBS1	0.2	0	0.2	0	10	15.2	0	0	0.67	3.13	0	0	0.07	0
SBS1	1	0.2	0	0	0	0	0.67	0	0	0	0	0	0.13	0
SBS2	0	1.2	0	0	0	0	0	0	0	0.2	0	0	0.07	0
	3.16	2.66	13.2	9.27	47.09	54.39	31.47	0.67	47.2	11.07	0.73	63.86	42.25	0.13

Appendix B: Biodiversity Survey

Species Cover (sessile species) cont.

Site	<i>Erect_Corallines</i>	<i>Erythrophyllum_sp.</i>	<i>Farlowia_Complex</i>	<i>Fleshy_Crusts</i>	<i>Flustrellidra_corniculata</i>	<i>Fucus_sp.</i>	<i>Halosaccion_glandiforme</i>	<i>Hedophyllum_sessile</i>	<i>Laminaria_sp.</i>	<i>Leathesia/Colpomenia</i>	<i>Mastocarpus_Complex</i>	<i>Mazzaella_flaccida</i>	<i>Mazzaella_splendens</i>
CAN1	0	0	0	0.2	0	0.2	0	0	0	0	2.53	0	0
CAN1	1.2	0	0	1.2	0	0	1.27	0.87	0.07	0	0.27	0.53	1.13
CAN1	5.93	0	0	2.13	0.2	0	1.47	38.67	0	0	3.33	30.67	2
CAN1	2.33	0	0	0.87	0	0	0.93	0	0	0	0.67	0	0
CAS1	0	0	0	1.85	0	0	0	0	0	0	0.69	0	0
CAS1	1.53	0	0	0.67	0	0	0	0.87	0	0	3.27	1.33	37
CAS1	0.33	0	0	0.53	0	0	0.4	0	0	0	5.07	7.67	14.73
CAS1	0.33	0	0	2.27	0	14.93	2.67	0	0	0.07	23.33	0.33	1.53
SBN1	0	0	0	0.08	0	0	0	0	0	0	0.23	0	0
SBN1	1.67	0	0	0.67	0.07	0.4	0	1	0.07	0	2.8	4.2	28.33
SBN1	0.47	0	0	0.53	0	0	0.07	2	0	0	4.4	50.33	7.73
SBN1	0	0	0	0.07	0	0	0	0	0	0.07	0.13	0	0
SBN2	1.07	0	0.73	1.13	0	8.73	0.27	0	0	0.73	2.87	0.2	1.27
SBS1	0	0	0	0.19	0	0.38	0	0	0	0	0.13	0	0
SBS1	1.67	1.4	0	1.4	0.4	0.27	0	6.67	0.67	0	0	0.07	10
SBS1	15.93	0.73	0	1.47	0	0	0	35.2	0	0	0.07	14.07	5.33
SBS1	0.33	0	0	0.47	0	0	0	0	0	0.47	0	0	0
SBS2	0	0	0	0.13	0	9	0.33	0	0	2.47	1.87	0	0.2
	32.79	2.13	0.73	15.86	0.67	33.91	7.41	85.28	0.81	3.81	51.66	109.4	109.25

Species Cover (sessile species) cont.

Site	<i>Microcladia_borealis</i>	<i>Microcladia_coulteri</i>	<i>Microcladia_sp.</i>	<i>Mytilus_californianus</i>	<i>Mytilus_trossulus_Complex</i>	<i>Neorhodomela_Complex</i>	<i>Odonthalia_Complex</i>	<i>Osmundea_spectabilis</i>	<i>Pelvetiopsis_arborescens</i>	<i>Pelvetiopsis_limitata</i>	<i>Phyllospadix_sp.</i>	<i>Plocamium_sp.</i>
CAN1	0	0	0	0.53	0	0	0	0	0	0.6	0	0
CAN1	0.8	0.07	0	0	0	0	12.27	0.87	0	0	0	0.53
CAN1	8.2	0.2	0.67	0	0	0	8.53	0	0	0	0	0
CAN1	0	0.67	0	32.8	0	0	0	0	0.07	0.07	0	0
CAS1	0	0	0	0.08	0	0	0	0	0	0	0	0
CAS1	0.4	0	0	0	0	0.53	4	0.33	0	0	31.73	9.53
CAS1	3.07	0	0	0	0	4.87	3.87	0.33	0	0	32.33	2
CAS1	0	0	0	0	0	0	0	0	0	0	0	0
SBN1	0	0	0	0	0.08	0	0	0	0	0	0	0
SBN1	0.33	0	0	0	0	1	27	0	0	0	3	4.33
SBN1	6.93	0	0	0	0	0.73	28	0	0	0	13.07	0
SBN1	0	0	0	93.67	0	0	0	0	0	0	0	0
SBN2	0	0.07	0	0.07	0	12.27	0	0	0	0	56.87	0
SBS1	0	0	0	0	0	0	0	0	0	0.31	0	0
SBS1	1.13	0.4	0	0	0	0	11.33	0.93	0	0	0	0
SBS1	6.87	0.4	0	0.27	0	2	3.53	0.07	0	0	0	0
SBS1	0	0	0	92.67	0	1.67	0	0	0	0	0	0
SBS2	0.07	0	0	0.07	0	4.87	3	0	0	0	33	0
	27.8	1.81	0.67	220.16	0.08	27.94	101.53	2.53	0.07	0.98	170	16.39

Appendix B: Biodiversity Survey

Species Cover (sessile species) cont.

Site	<i>Pollicipes_polymerus</i>	<i>Polysiphonia_Complex</i>	<i>Porphyra_sp.</i>	<i>Prionitis_Complex</i>	<i>Ptilota_Complex</i>	<i>Sandy_Tube_Complex</i>	<i>Schizymenia_Complex</i>	<i>Semibalanus_cariosus</i>	<i>Sponge_Complex</i>	<i>Ulva_Complex</i>	<i>Urospora_sp.</i>	
CAN1	0	0	0	0	0	0	0	0	0	0	34.73	
CAN1	0	0.2	0	0	0	0.4	0	0	0.07	4.93	0	
CAN1	0	0	0	0	0.2	0	0	0	2	1	0	
CAN1	4.73	0	0	0	0	0	0	0.07	0.07	0.13	0	
CAS1	0	0	0.46	0	0	0	0	0	0	2.31	0	
CAS1	0	3.33	0	0	1.47	0.07	0	0	0.13	9.27	0	
CAS1	0	0.07	0	0.07	0	0	0	0	0	14.67	0	
CAS1	0	0	3.73	0	0	0	0	0	0	3.53	0	
SBN1	0	0	0.08	0	0	0	0	0	0	0	1	
SBN1	0	0.87	0	0	8.8	0.33	0.07	0	0.4	1.93	0	
SBN1	0	0	0	0	0.2	0	0	0	0	2.27	0	
SBN1	0.27	0	0.33	0	0	0	0	0.4	0	0	0	
SBN2	0	0	0.73	0	0	0	0	0	0	12.47	0	
SBS1	0	0	0	0	0	0	0	0	0	0	0.56	
SBS1	0	4	0	0	3.47	0.6	0.47	0	2.67	0.07	0	
SBS1	0	0.13	0	0	0	0	0	0.07	0.4	0.27	0	
SBS1	3.33	0	0	0	0	0	0	1.13	0	0	0	
SBS2	0	0	0.73	0	0.07	0	0	0	0	9.33	0	
	8.33	8.6	6.06	0.07	14.21	1.4	0.54	1.67	5.74	62.18	36.29	

Species Counts (mobile species) from PISCO survey

site	zone	Level	<i>Amphissa</i> _sp.	<i>Anisodoris_nobilis</i> _Complex	<i>Bittium_eschrichtii</i>	<i>Calliostoma</i> _sp.	<i>Cancer</i> _sp.	<i>Cerastoma_foliatum</i>	<i>Cryptochiton_stellerii</i>	<i>Idotea</i> _sp.	<i>Isopod</i> _Complex	<i>Katharina_tunicata</i>	<i>Lepidochiton</i> _Complex	<i>Leptasterias_hexactis</i>	<i>Littorina</i> _Complex
CAN1	High	low	0	0	0	0	0	0	0	0	0	0	0	0	149.6
CAN1	Low	low	0.16	0.08	0	0.48	0.4	0	0	0	0	0	0.08	0.16	0
CAN1	Low-Mid	low	0.08	0	0	0	0	0	0	0.32	0	0.56	2.48	0.32	0
CAN1	Mid	low	0	0	0	0	0	0	0	0	0	0	0	0	266.88
CAS1	High	high	0	0	0	0	0	0	0	0	0	0	0	0	476.72
CAS1	Low	high	3.05	0	0.18	0	0	0	0	0	0.09	0	0.28	0	0.28
CAS1	Low-Mid	high	1.2	0	0	0	0.15	0	0	0	0	0	0.75	0	0.3
CAS1	Mid	high	0	0	0	0	0	0	0	0.24	0	0	0.16	0	327.04
SBN1	High	high	0	0	0	0	0	0	0	0	0	0	0	0	40.3
SBN1	Low	high	2.23	0	0	0.09	1.2	0	0	0.09	0	0	0.17	0	0
SBN1	Low-Mid	high	0.69	0	0	0.09	0.17	0	0	0	0	0	0.17	0	0
SBN1	Mid	high	0	0	0	0	0	0	0	0	0	0	0	0	15.6
SBN2	Mid	high	0.51	0	0.34	0	0	0	0	0.17	0	0	0.43	0.17	13.03
SBS1	High	low	0	0	0	0	0	0	0	0	0	0	0	0	190.73
SBS1	Low	low	1.8	0	0	0.34	0.34	0.26	0.09	0	0	0.09	0.51	0.09	0
SBS1	Low-Mid	low	0.08	0	0	0.08	0	0	0	0.24	0	0.8	1.12	1.12	0.32
SBS1	Mid	low	0	0	0	0	0	0	0	0	0	0	0	0	21.12
SBS2	Mid	low	0.48	0.08	0	0	0.08	0	0	0.4	0	0	0.32	0	295.92
			10.28	0.16	0.52	1.08	2.34	0.26	0.09	1.46	0.09	1.45	6.47	1.86	1797.84

Appendix B: Biodiversity Survey

Species Counts (mobile species) cont.

site	<i>Lottia</i> _Complex	<i>Mopalia</i> _sp.	Nemertean_Complex	<i>Nucella</i> _canaliculata	<i>Nucella</i> _emarginata/ostrina	<i>Ocenebra</i> _sp.	<i>Ocinebrina</i> _sp.	<i>Pachycheles</i> _Complex	<i>Pachygrapsus</i> _crassipes	Peanut_Worm_Complex	<i>Pisaster</i> _ochraceus	<i>Pugettia</i> _sp.	<i>Strongylocentrotus</i> _purpuratus	<i>Tegula</i> _funnebralis	<i>Tegula</i> _sp.	<i>Tonicella</i> _lineata
CAN1	159.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
CAN1	0	0	0.16	0	0.16	0	0	0.08	0.16	0.56	0	0.4	42.64	0	0	1.2
CAN1	4.48	0.08	0.24	0	0	0	0	0.96	0	0.32	0	0.32	7.28	0	0	0.16
CAN1	455.76	0	0	0	1.76	0	0	0	0	0	0	0	0	0.08	0	0
CAS1	14.32	0	0	0	0	0	0	0	0.16	0	0	0	0	0	0	0
CAS1	1.02	0	0	0	0.09	0	0	0	0	0.09	0	0.28	0.09	0	0	0
CAS1	1.5	0	0	0	0	0	0	0	0	0	0	0.15	0	0.15	0	0
CAS1	432	0	0	0	0	0	0	0	0	0	0	0	0	0.08	0	0
SBN1	93.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBN1	0	0	0	0	0	0	0	0.51	0	0.51	0	0.43	9.86	0	0	0.34
SBN1	1.29	0.09	0	0	0	0	0	0.51	0.09	0.09	0	0.09	0.26	0.09	0	0
SBN1	324.48	0	0	0	18.96	0	0	0	0	0	0	0	0	0.48	0	0
SBN2	370.29	0	0	0	0.26	0	0	0	0	0	0	0	0	8.4	0	0
SBS1	10.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SBS1	10.46	0	0	0.17	0	0	0	1.03	0	0	0.09	0.09	26.74	0	0	2.83
SBS1	76.08	0.08	0.08	0.08	0.08	0	0	1.12	0	0	0.56	0	10.24	0	0	5.76
SBS1	366.72	0	0	0	11.2	0	0	0	0	0	0	0	0	0	0	0
SBS2	301.76	0	0	0	1.36	0.96	1.92	0	0	0.08	0	0	0	1.68	0.32	0
	2622.76	0.25	0.48	0.25	33.87	0.96	1.92	4.21	0.41	1.65	0.65	1.76	97.11	10.96	0.32	10.29

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
Abietinaria spp.				L	
Acanthodoris rhodoceras			L		
Acmaea mitra		L	L	L	
Acrosiphonia coalita		L			
Acrosiphonia spp.		P	L		P
Acteocina harpa			L		
Adula californiensis		L	L		
Aeolidia papillosa		L			
Alaria marginata		L			P
Alcyonidium spp.			L		
Aldisa sanguinea			L	L	
Alia carinata			L		
Amphipoda		L	L		
Amphiporus imparispinosus		L	L		
Amphissa columbiana		L			
Amphissa spp.		P	L		P
Analipus japonicus	L	P/L	L		P
Anisodoris nobilis complex					P
Anomura		L	L		
Anthopleura artemisia complex		P/L	L		P
Anthopleura elegantissima	L	P/L	L		P
Anthopleura xanthogrammica		P/L	L		P
Anthozoa		L	L		
Aphriza virgata				L	
Arabella iricolor			L		
Archidoris odhneri				L	
Arctonoe vittata	L		L		
Arenaria melanocephala				L	
Artedius lateralis		L			L
Ascelichthys rhodorus					L
Axiothella rubrocincta			L		
Bacillariophyta		L			
Balanus glandula	L	P/L	L		P
Berthella californica				L	
Bittium eschrichtii		P			P
Bivalvia		L	L		
Blidingia minima		L	L		
Boccardia proboscidea					L
Bossiella plumosa	L	L			
Bossiella spp.		L	L		
Bryopsis spp.	L				
Bryozoan complex		P			
Calcareous tube complex		P			P
Calliarthron spp.			L		
Calliarthron tuberculosum			L		
Calliostoma ligatum		L			
Calliostoma sp.		P			P
Callithamnion pikeanum	L		L		
Callithamnion sp.		P			

Appendix C: Species Lists

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
Cancer antennarius		L	L		
Cancer jordani		L	L		
Cancer oregonensis		L	L		
Cancer productus		L	L		
Cancer spp.		P/L			P
Candelabrum fritchmanii					L
Ceramium gardneri	L				
Ceramium spp.	L	L	L		P
Ceratastoma foliatum		P/L			
Chaetomorpha sp.		P			P
Chondracanthus canaliculatus		L	L		P
Chondracanthus sp.		P			P
Chthamalus dalli	L	L	L		
Chthamalus sp.		P	L		P
Cirratulus cirratus			L		L
Cirriformia spirabranca			L		
Cirripedia		L	L		
Cladophora columbiana			L		
Cladophora spp.	L	P/L	L		P
Clinocottus globiceps		L			L
Collisella spp.	L	L			
Colpomenia spp.		L			
Constantinea rosa-marina			L		
Constantinea simplex		P			
Corallina officinalis	L				
Corallina spp.		L	L		
Corallina vancouveriensis	L	L	L		
Costaria costata		P			P
Crepidula adunca			L		
Crustose corallines		P			P
Cryptochiton stellerii		P	L		L
Cryptopleura spp.		P			P
Cryptopleura violacea	L				
Cryptosiphonia woodii	L	P/L	L		P
Cumagloia andersonii		L	L		
Cystoseira osmundea		P	L		
Decapoda		L	L		
Dendrobeania lichenoides		L			
Dendronotus albus				L	
Derbesia marina			L		
Dexiospira spirillum	L		L		L
Diatoms		P			P
Dialula sandiegensis		L	L		
Dilsea californica		L	L		
Dilsea spp.		P			P
Diodora aspera			L	L	
Dirona albolineata			L		
Dodecaceria fewkesi			L		P
Dodecaceria fistulicola	L				
Echinoidea		L			

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
Ectoprocta	L	L	L		
Egregia menziesii	L	P/L			P
Endocladia muricata	L	L	L		
Endocladia spp.		P			P
Enteromorpha intestinalis		L			
Enteromorpha linza		L	L		
Enteromorpha spp.		L			
Epiactis prolifera		L	L		P
Epitonium spp.			L		
Erect Corallines (algae)		P			P
Erythrophyllum delesserioides			L		
Erythrophyllum sp.		P			
Eulalia aviculiseta			L		
Eumetopias jubatus			L		
Eunice longicirrata			L		
Eurystomella bilabiata		L	L		
Evasterias troschelii		L			
Farlowia mollis	L	L			
Farlowia spp.		P			
Fissurella volcano			L		
Fleshy Crusts (algae)		P			P
Flustrellidra corniculata		P			P
Fucus distichus	L	L			
Fucus gardneri		L	L		
Fucus spp.		P	L	L	P
Gastropoda		L	L		
Gelidium coulteri		L	L		
Gigartina agardhii		L	L		
Gigartina papillata		L	L		
Gloiopeltis furcata			L		
Glycera americana			L		
Gobiesox maeandricus		L			L
Grapsidae		L	L		
Haematopus bachmani				L	
Halcampa decemtentaculata		L	L		
Halichondria panicea		L			
Haliclona spp.			L		
Halosaccion glandiforme		P/L	L		P
Halosydna brevisetosa	L		L		L
Halosydna johnsoni			L		
Hedophyllum sessile	L	P/L	L	L	P
Hemigrapsus nudus		L	L		
Hemilepidotus hemilepidotus					L
Hemipodia borealis					L
Hemipodia californiensis					L
Henricia spp.					
Heptacarpus spp.			L		
Hermisenda crassicornis			L		
Hildenbrandia spp.		L	L		
Hydroida		L	L		

Appendix C: Species Lists

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
<i>Idotea</i> spp.		P/L	L		P
<i>Iridaea flaccida</i>	L				
<i>Iridaea heterocarpa</i>		L	L		
<i>Iridaea splendens</i>		L	L		
<i>Iridaea</i> spp.		L	L		
Isopoda		L	L		P
<i>Janolus fuscus</i>		L	L		
<i>Katharina tunicata</i>		P	L	L	P
<i>Lacuna</i> spp.		L	L		
<i>Laminaria setchellii</i>			L		
<i>Laminaria sinclairii</i>			L		
<i>Laminaria</i> sp.		P			P
<i>Laurencia spectabilis</i>	L	L			
<i>Leathesia difformis</i>		L			
<i>Leathesia/Colpomenia</i>		P			P
<i>Lepidochiton</i> spp.		P			P
<i>Lepidochitona dentiens</i>		L	L		
<i>Lepidochitona hartwegii</i>			L		
<i>Lepidonotus squamatus</i>			L		
<i>Lepidozonia cooperi</i>		L	L		
<i>Leptasterias hexactis</i>		P/L	L		P
<i>Leptasterias</i> spp.			L		
<i>Lessoniopsis littoralis</i>			L		
<i>Lirabuccinum dirum</i>		L	L		
<i>Littorina keenae</i>			L		
<i>Littorina scutulata</i>		L	L	L	
<i>Littorina</i> spp.		P/L	L		P
<i>Lottia digitalis</i>		L	L	L	L
<i>Lottia paradigitalis</i>			L		
<i>Lottia pelta</i>		L	L	L	
<i>Lottia scabra</i>			L		
<i>Lottia scutum</i>			L		
<i>Lottia</i> spp.		P			P
<i>Lottia strigatella</i>	L	L	L	L	
<i>Marphysa stylobranchiata</i>			L		
<i>Marsenina</i> spp.			L		
<i>Mastocarpus</i> spp.		P/L	L		P
<i>Mazzaella cornucopiae</i>			L		
<i>Mazzaella flaccida</i>		P			P
<i>Mazzaella parksii</i>			L		
<i>Mazzaella splendens</i>		P			P
<i>Mazzaella</i> spp.			L		
<i>Microcladia borealis</i>	L	P/L	L		P
<i>Microcladia coulteri</i>		P	L		P
<i>Microcladia</i> sp.					P
<i>Monostroma oxyspermum</i>	L				
<i>Monostroma zostericola</i>		L			
<i>Mopalia ciliata</i>		L			
<i>Mopalia hindsii</i>		L			
<i>Mopalia lignosa</i>		L	L		

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
Mopalia muscosa		L	L		
Mopalia spp.		P	L	L	P
Mytilus californianus		P/L	L	L	P/L
Mytilus spp.	L	P/L	L		
Mytilus trossulus Complex		P/L	L		L
Nainereis laevigata	L		L		L
Nemertean		P			P
Neoamphitrite robusta	L		L		L
Neorhodomela larix	L	L	L		
Neorhodomela oregona		L			
Neorhodomela spp.		P			P
Nephtys californiensis					
Nereis vexillosa	L		L		L
Nereis zonata					L
Nothria elegans				L	
Notoacmea fenestrata				L	
Notoacmea persona				L	
Notoacmea scutum				L	
Nucella canaliculata		P	L		
Nucella emarginata/ostrina		P/L	L		P
Nucella lamellosa			L		
Nucella spp.			L		L
Nuttallina californica			L		
Ocenebra lurida		L			
Ocenebra sp.		P			
Ocinebrina sp.		P			
Odonthalia floccosa		L	L		
Odonthalia lyallii	L				
Odonthalia spp.		P/L	L		P
Oedignathus inermis			L		
Oligocottus maculosus		L			L
Oligocottus snyderi		L			L
Onchidella borealis		L	L		
Ophelia limacina			L		
Ophiuroidea			L		
Osmundea spectabilis		P	L		P
Osteichthyes			L		
Pachycheles spp.		P	L		P
Pachygrapsus crassipes		P/L	L	L	P
Pagurus hirsutiusculus			L		
Pagurus spp.		L	L		
Paracaudina chilensis		L			
Paranemertes peregrina		L			
Peanut worm complex		P			P
Pelvetiopsis arborescens					P
Pelvetiopsis limitata		P	L		P
Pelvetiopsis spp.			L		
Perophora annectens		L			
Petalonia fascia	L				
Petrocelis spp.		L	L		

Appendix C: Species Lists

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
<i>Petrolisthes cinctipes</i>			L		
<i>Petrolisthes eriomerus</i>			L		
<i>Petrolisthes</i> spp.			L		
<i>Phaeostrophion irregulare</i>	L	L			
<i>Phoca vitulina</i>		L	L		
Pholidae		L			
<i>Phyllospadix scouleri</i>	L	L	L		
<i>Phyllospadix serrulatus</i>		L			
<i>Phyllospadix</i> sp.		P			P
<i>Phyllospadix torreyi</i>		L	L		
<i>Pisaster ochraceus</i>		P/L	L	L	L
<i>Pista elongata</i>	L	L	L		L
<i>Platynereis agassizi</i>	L		L		L
<i>Plocamium cartilagineum</i>	L	L	L		
<i>Plocamium</i> sp.		P			P
<i>Plocamium tenue</i>	L				
<i>Plocamium violaceum</i>		L	L		
Plumularia spp.			L		
<i>Pollicipes polymerus</i>		P	L	L	P
Polychaeta		L			
Polyplacophora		L	L		
Polysiphonia spp.		P/L	L		P
Porifera		P/L	L		P
Porphyra spp.		P/L	L		P
<i>Potamilla ocellata</i>	L		L		L
<i>Prionitis lanceolata</i>			L		
<i>Prionitis lyallii</i>			L		
<i>Prionitis</i> spp.		L	L		P
<i>Pterosiphonia bipinnata</i>			L		
<i>Pterosiphonia</i> spp.			L		
<i>Ptilota filicina</i>		L	L		
<i>Ptilota</i> spp.		P			P
<i>Pugettia gracilis</i>		L	L		
<i>Pugettia producta</i>		L	L		
<i>Pugettia</i> spp.		P/L	L		P
Pycnogonida			L		
<i>Pycnopodia helianthoides</i>		L		L	
<i>Pyura haustor</i>		L			
<i>Ralfsia</i> spp.	L	L	L		
Ralfsiaceae			L		
<i>Rhizoclonium riparium</i>	L				
<i>Sabella media</i>	L				
<i>Sabellaria cementarium</i>	L		L		L
Sabellariidae		L			
Sabellidae		L			
Sandy Tube Complex (worm)		P			P
<i>Schistocomus hiltoni</i>			L		L
<i>Schizyenia</i> spp.		P			
<i>Scoletoma zonata</i>			L		L
<i>Scoloplos acmeceps</i>			L		

Species	Gregory Pt	Sunset Bay	North Cove	Middle Cove	South Cove
Scytosiphon lomentaria		L			
Scytosiphon spp.	L				
Semibalanus cariosus	L	P	L		P
Serpula vermicularis	L	L	L		L
Solaster dawsoni				L	
Soranothera ulvoidea		L			
Spirorbis borealis	L		L		L
Spirorbis spp.		L	L		
Spongomorpha spp.	L				
Strongylocentrotus purpuratus		P/L	L		P/L
Stylaroides plumosa			L		
Tectura persona		L	L		
Tectura scutum		L	L		
Tegula funebris	L	P/L	L	L	P/L
Tegula sp.		P			
Terebella californica					L
Terebellidae			L		
Thais emarginata		L		L	
Thelepus crispus		L	L		L
Thoracophelia mucronata			L		
Tonicella lineata		P/L	L		P
Tricellaria occidentalis		L			
Trypanosyllis admanteus	L		L		L
Trypanosyllis gemmipara			L		
Tubulanus polymorphus		L			
Tunicata			L		
Ulva spp.	L	P/L	L		P
Urospora sp.		P			P
Urticina coriacea		L	L		
Urticina felina		L			
Xiphister atropurpureus					L

P=2008 PISCO survey
L=Literature documented

The species lists on the preceding seven pages are a combination of those documented in the 2008 PISCO biodiversity survey conducted as part of this project (P) and a literature search (L). Please note that an extensive effort to ensure there are not synonymous species in this list, or those that have had name changes has not occurred.

Appendix D: Species ranking definitions

DEFINITIONS (ORNHIC, 2007)

LE = Listed Endangered. Taxa listed by the USFWS or the National Marine Fisheries Service (NOAA Fisheries) as Endangered under the Endangered Species Act (ESA), or by the ODA or ODFW under the Oregon Endangered Species Act of 1987(OESA). LT = Listed Threatened. Taxa listed by the USFWS, NOAA Fisheries, ODA, or ODFW as Threatened. PE = Proposed Endangered. Taxa proposed by the USFWS or NOAA Fisheries to be listed as Endangered under the ESA or by ODFW or ODA under the OESA. PT = Proposed Threatened. Taxa proposed by the USFWS or NOAA Fisheries to be listed as Threatened under the ESA or by ODFW or ODA under the OESA. C = Candidate. Taxa for which NOAA Fisheries or USFWS have sufficient information to support a proposal to list under the ESA, or which is a candidate for listing by the ODA under the OESA. SOC = Species of Concern. Taxa which the USFWS is reviewing for consideration as Candidates for listing under the ESA.

ORNHIC List Ranking Criteria:

- List 1 contains taxa that are threatened with extinction or presumed to be extinct throughout their entire range.
- List 2 contains taxa that are threatened with extirpation or presumed to be extirpated from Oregon. This includes extremely rare species.
- List 3 contains taxa for which more information is needed before status can be determined, but which may be threatened or endangered in Oregon or throughout their range.
- List 4 contains taxa which are of conservation concern but are not currently threatened or endangered. This includes taxa which are very rare but are currently secure, as well as taxa which are declining in numbers or habitat but are still too common to be proposed as threatened or endangered.

NatureServe/Natural Heritage Network Ranks

The ranking is a 1-5 scale, based primarily on the number of known occurrences, but also including threats, sensitivity, area occupied, and other biological factors. The top line is the Global Rank and begins with a "G". If the taxon has a trinomial (a subspecies, variety or recognized race), this is followed by a "T" rank indicator. The second line is the State Rank and begins with the letter "S". The ranks are summarized below:

- 1 = Critically imperiled because of extreme rarity or because it is somehow especially vulnerable to extinction or extirpation, typically with 5 or fewer occurrences.

- 2 = Imperiled because of rarity or because other factors demonstrably make it very vulnerable to extinction (extirpation), typically with 6-20 occurrences.
- 3 = Rare, uncommon or threatened, but not immediately imperiled, typically with 21-100 occurrences.
- 4 = Not rare and apparently secure, but with cause for long-term concern, usually with more than 100 occurrences.
- 5 = Demonstrably widespread, abundant, and secure.

H = Historical Occurrence, formerly part of the native biota with the implied expectation that it may be rediscovered; X = Presumed extirpated or extinct; U = Unknown rank; NR = Not yet ranked.

Rank Qualifiers: Q = Questionable taxonomy. Global ranks sometimes have a "Q" at the end. This indicates that there are questions related to the taxonomic validity of the taxon. Range Ranks = Ranks with more than one value. These can be G1G2, G1G3, etc. These indicate that the predicted final rank would be within the range, but with no indication of preference among the possibilities.

More details on the Heritage Ranking system and more definitions can be found at the NatureServe web site: <http://www.natureserve.org/explorer/ranking.htm>

ODFW Sensitive Species List categories:

VULNERABLE (SV) - "Vulnerable" sensitive species are not in imminent danger of being listing as threatened or endangered, but could become "sensitive-critical," "threatened," or "endangered," with changes in populations, habitat or threats.

ODFW Nearshore Strategy Species (NRStr) are also listed in this plan. Strategy species are nearshore species that were identified to be in greatest need of management attention. Identification as a strategy species does not necessarily mean the species is in trouble. Rather, those identified as a strategy species have some significant nearshore management and/or conservation issue connected to that species that is of interest to managers (ODFW, 2006).

Stakeholder and Public Involvement

Stakeholder Meeting

A stakeholder meeting of invited participants was held on June 22nd, 2009. The meeting notes are included in this Appendix (E) which includes a list of the eight people that attended. Several more people were invited but did not attend. In addition to having the option to provide input at the meeting, all invited members (including those that did not attend) were kept up-to-date with information about submitting comments on the draft plan and the public meeting. They were all presented with the option for a face-to-face meeting to provide input directly (in the event that they couldn't attend the committee meeting). Several members provided written comments on draft versions of the plan and are all acknowledged in the plan.

Public Meeting

A press release was issued noting the subject, time and location of the public meeting (a copy is included in Appendix E). A brief notice appeared in several local papers prior to the meeting. A note about the meeting was posted on OPRD's Facebook page (~700 friends) and a "tweet" was issued on OPRD's Twitter account (~3200 followers). An e-mail was sent out to the stakeholder e-mail list, which includes all members of the stakeholder committee and anyone that has indicated an interest in this process. The e-mail recipients were asked to share information about the meeting.

Ten people attended the meeting on January 13th 2010. The meeting notes are included in this Appendix (E). The Coos Bay World, who had a reporter attend the meeting, had a brief follow-up article a few days after the meeting.

Public Comment Period

Following the public meeting, there was a 30-day written comment period. Information for submitting public comments was presented at the public meeting and posted on the OPRD website. Information was also included in the news release issued prior to the public meeting. A brief notice

appeared in several local papers regarding the meeting and comment period. No written comments were received during the public comment period.

Sunset Bay Management Unit Rocky Shores Site Management Plan Meeting
Stakeholder Committee Meeting Notes

June 22nd 2009 10:00 AM-1:00 PM
Shore Acres State Park, Garden House

Attendees: Scott Groth, Richard Embley, Dave and Diane Bilderbeck, Marty Giles, Laurel Hillmann, Kathy Schutt, Preson Phillips.

Introductions

The group introduced themselves

Presentation

Laurel Hillmann gave a brief presentation on the purpose of the site management plans and existing information

Issue Scoping

The group engaged in a discussion and issue scoping session for the rocky shores areas/parks in the management unit.

General Discussion

- Biological survey
 - Pay attention inventorying (boulder fields)
 - PISCO method may miss rare species
 - Are species lists available (lit search)
 - Need to check sampling not to miss rare species
 - Sample kelp as well and check literature (seaweeds)
 - Quantitative shows use over time but don't miss species
- Visitor use
 - What was the survey method/timeline? For visitation
 - Percent coming from within the state or outside. Different approach for marketing and education.
 - What kind of psychographic info is gathered? Need to understand motivations and value of resource or place
 - Some profiles would be receptive of direction for appropriate behavior and others will not. Good to identify differences and how best to reach them to change their behavior
 - Level of risk
 - Personal needs vs. public/group needs
 - Lead to better marketing and effectiveness

Sunset Bay

- Distinction between shells and living creatures in rules creates errors and what can be taken (critters can still be in there)
- Interested in black oystercatchers and algae
- No signs to instruct visitors on rules, access is all along which makes signage a problem, don't want them all along (ugly)
 - Need to determine "hotspot" areas for signs. The main spots to capture the most people
 - How does a sign get you to protect an area?
 - Need to couple with interpretation (on-site)

Appendix E: Stakeholder and Public Involvement

- Interpretive approach that can inspire compliance with understanding.
- Currently lots of uninformed collecting
- Realize it's hard to catch all locations. Keep signs up and get people to notice
- Mark permit-holders so that other visitors can see and can point out distinction from rules for most visitors (need a way to ID researchers vs. illegal collectors)
 - ID on bucket or person (needs to be clear)
 - Info hand-out on research (general?) for interested folks
 - Have permit handy
 - Like the marine mammal volunteer vests?
 - Regular public sees them collecting and thinks it's okay
 - Lets visitors watch, explain to them (takes up time)
 - Could become part of the permit
 - OK to have containers to briefly share with group, but not take critters away or to new sites (?)
 - Have to let go, not collect. On-site observation. May still have an impact.
 - ODFW-if picking it up, it is take
 - Complexities of rules hard for signage
 - May be hard to portray nuances of rules, can be easier to encourage people to not pick critters up, if plan on harvesting, should be responsible to know rules
 - Avoid "no take" intent through education and voluntary appreciation
 - Could get an educational permit to be "official" in putting critters in bucket
 - May be good to have the one or two heavy use sites that absorb the impact, don't direct masses to more remote/intact areas
 - Need to find a point in management where sacrificial site retains resources to see
 - Access on sand can be ideal-lead visitors to identified sites
 - Don't want to sacrifice to bare rock, want to be good enough, education wise, stewardship. Need to protect these use areas too.
 - Rules discussion
 - What's the best way to convey rules to visitors?
 - Too many people to allow inadvertent take
 - Need to find most captivating sign, location, staff/docent presence.
 - What are rules on kelp harvest, commercial/individual? DSL vs. OPRD
 - Individual harvest allowance was questioned
 - Certain sites draw visitors who are specifically going to them for low tides or intertidal
 - Some places end up with legal uses that can be impacting wildlife, fishermen below nesting areas etc.
- Emergency response or training on oystercatchers (USCG choppers etc)
- Get permits for training and schedule to avoid impact on nesting (can't do for emergencies)
- Are agencies that may benefit from more info etc.
- Paragliders? Not happening here yet

- Whiskey Run can be an alternative site to send folks to since it is possible to see things from the sand. Not that easy to access/hard to drive
- Disturbance of birds by fishermen.
- Black oystercatchers nesting in Norton Gulch
- Disturbance of birds/mammals from USCG helicopters?
 - When doing training, encourage them to do it in less sensitive times of the year (no reproductive times)
 - Flights out of Coos Bay
 - Encourage them to stay far enough way to minimize disturbance. Educational opportunities there
 - Paragliders/ultralights at Bandon (in the future here?)
- Restrooms are a great interpretive opportunity (most go there at least once)
- Safety issues on slippery rocks
- Need signage about safety issues?
- Access looks so easy it is tempting for people with low abilities or knowledge
- Get sign about Gregory point subtidal research reserve at the boat ramp?
- Water quality issues/monitoring
 - Testing weekly, 24 hr alerts
 - Need education on cause, when closures left/behavior
 - Better education about water quality, threshold issues
 - Tourism impact of closures, when not always a huge deal (media etc.)
- Should be a sign at the Sunset Bay boat ramp about marine mammal and bird disturbance.

Yoakum Point

- Coast trail now has trail connection across it for beaches to north and south. Improved OCT, drops down to Lighthouse Beach.
- Improved surfer trail
- No signing currently
- Has lily
- No signage
- No official parking
- May have unusual invertebrates, uncommon shells?
- Private land here (adjacent)
- Have shell middens
- Consolidated ad hoc trails?
- Some commercial mussel collection
- No OPRD resource analysis
- Most use: rockfishing, mussels (in large numbers), surfers
- OIMB goes there occasionally, could to use for research collection. Too dangerous to take students down frequently.
- PISCO? OIMB leave “stuff” at sites, may not be active any more (permit directs removal or put in w/out permit). Some could be for long term research. Strainless steel, plates, scrubbies etc. Things that may not be active and some that don’t appear to be. Need to get the stuff back OUT when done with it.

Appendix E: Stakeholder and Public Involvement

- Confusion about where researchers need to get permits for what (DSL/OPRD/ODFW/Marine board?)
 - Could park management be informed, get an eye on it and who is doing what?

Shore Acres

- High use park but not a popular or easy to reach intertidal for the most part
- Has beach safety issue for sneaker waves, difficulty for alerts for accidents
- Is close to popular area, so X people nearby
- Harder to enforce, poor access
- Need to warn, block unsafe accesses
- Elephant Seal pups are an attractant, marine mammal interface here (baby pups).
Hard to enforce
- Full barriers can't keep everyone off
- Good to use universal symbols to reach everyone (signs)
- Fishermen use the rocks in the area
- Sign for undercut cliffs on OCT? Was a guy who fell off the cliff

North Cove, Cape Arago

- Simpson Reef-at your own risk, surfer trail
- Trail takes them to steep part
- Very difficult access, but attractive
- No official access during the pup season. Good and safer
- Dogs issue
- Has a sign and explain closure
- Need to beef up education about the impact on wildlife from inadvertent disturbance, opportunity for improved education about what disturbance means
- Sign interpretation at boat ramp to get kayakers
- Dogs/marine mammals
- Out of seasonal elephant seal haulouts sometimes. Set people up for getting in contact with them (can get close without even knowing they are there sometimes).
- Official trail gets rough as approach the end, people think it's easy at the beginning and get most of the way down and have a hard time (but already there..)

Middle Cove/South Cove

- No official trail, hard to get around point
- Are OIMB research areas vandalized (not much)
- Don't sign them, to not draw attention
- Middle Cove become overflow for south cove, especially in summer (June) low tides, especially groups and school buses
- Many groups that do annual trips
- We discourage use of middle cove
- Most scramble down the "trail", some go around the edge from south cove at low tide
- Encourage access to south cove instead
- Provide info to public on research, at some central location (PISCO/OIMB info).

- Could interpret (OPRD could share messages too). but not disclose info that could threaten research or don't broadcast-respond to visitor questions put together info sheet for the lay person
- If there was an empty glass board they could be put into kiosks/clusterboards and updated as applicable (per consultation and approval by park staff)
- Use OSU/UO undergrad/grad student to prepare, could use OPRD website
- Kinds of research and behavioral message
- People should know not to turn over boulders or turn the back if they do
- Could be part of general message to "leave it as you find it"
- Seems to be pretty resilient at south cove, even with so much visitation. Seems rich, wonder how rich it might be with less use
- May want to survey earlier in the season to catch true visitation
- Schools are not communicating with OPRD. Could seek avenues to get school districts statewide and education on timing, distribution, behavior, lessons
- Match tide level to correct group size and age group
- Arago is destination and microcosm intertidal and islands
- Boulder fields, need to encourage folks to turn things back over if they move it. Encourage not to turn over at all. Leave as you found it.

Research

- How many hit the website before they come?
 - Let people know that research is going on here
 - No take area
 - Facilitate with PISCO/OPRD/UO...why no take, why it's an important research area
- OPRD should know more specifically WHERE research is going on and when it is anticipated to be removed, so can know when it needs to be cleaned up. Need to coordinate with ODFW on this topic. Need to ASK them in the permit about removal. Need to coordinate between agencies. DSL may have permitting here too?

Schoolgroups

- Need to coordinate better
- Encourage to go not just at extreme low tides
- Any below plus 1 is good for tidepooling and will satisfy most visitors
- Younger the group, the higher the tide can be
- This is a destination for the whole state!

Wrap up and Next Steps

Laurel discussed the next steps, including time for committee commenting on the draft plan (including those members that were invited but were not able to attend today) and a public meeting to discuss/present the draft plan and allow time for comments from the public.

Sunset Bay Management Unit Rocky Shores Area Public Meeting Meeting Summary

Wednesday, January 13th, 2010 (10:30 a.m. - 12:30 p.m.)
OIMB Boathouse Auditorium, Charleston, OR

Attendees: Larry Becker, Bill Binnewies, Katie Etienne, Laurel Hillmann, Stuart Love, Stephanie Miller, Preson Phillips, Kathy Schutt, Robin Sears, and Meghan Walsh.

Introduction & Presentation of Draft Plan

- Laurel Hillmann (OPRD planning staff) presented a PowerPoint presentation on the purpose of the site management plan, draft goals and strategies. The entire presentation is included at the end of this summary.

Public input opportunity

- Meeting participants engaged in a issue scoping/brainstorming/discussion session based on *5 main goals* presented in the draft plan:
 - **Recreation**
 - Provide recreation opportunities and experiences that are appropriate for the park resources and recreation settings.
 - **Resources**
 - Protect, manage and enhance as appropriate, outstanding natural, cultural and scenic resources.
 - **Operations**
 - Provide for adequate management, maintenance, rehabilitation, and park operations including safe, efficient, identifiable and pleasant access and circulation.
 - **Interpretation**
 - Promote public awareness, understanding, appreciation, and enjoyment of the recreation settings through resource interpretation.
 - **Partnerships**
 - Form partnership and agreements to aid in achieving goals
- Comments about each of the goals are presented below. Some of the comments are applicable in more than one category, but they are only presented under the section in which they were mentioned during the public input opportunity.
 - **Recreation**
 - Limited parking will self impose capacity (related to potential to overuse of the intertidal areas)

- Is there the potential that satellite parking would be provided in the future (e.g., with trams bringing in people when the parking is full)?
 - Water trails (e.g., by kayak) could be encouraged so that visitors could view and enjoy the park and rocky shoreline from the water. This could reduce impacts to tidepool areas. However, it was also mentioned that this could lead to increasing conflicts with wildlife (birds/mammals). Wildlife viewing from the water would necessitate increased information about appropriate viewing guidelines. Check on Coquille study that looked at photo monitoring of murre (off-site).
 - ADA access at Sunset Bay might be a possibility. Call out the north side of the bay (where the boat dock is currently). Look into this possibility and maybe a boardwalk?
 - Encourage “tidepooling” at the docks-this could reduce impact to the intertidal areas while providing close-contact with marine organisms. This could be tied to OPRD’s existing programs and would likely require work with partners (including port staff).
 - Need to recognize the potential (likely) for future conflict and the importance of being good neighbors (mainly at Yoakam Point). At Yoakam Point, the property is surrounded by private property. There is limited development but the user type has shifted from fishing to surfing (mostly). Limited parking hasn’t stopped activity. Want to make sure we don’t lose the opportunity to have public access in this area. Need to work with user groups, some have tried to “fix” the situation themselves (e.g., improving access).
 - There is a new path to the Bastendorf beach side.
 - Some issues with the RV park (??)
 - On the south end, some people use private property and there is concern about trespass issues.
 - An extension of the Oregon Coast Trail is planned to provide access into Sunset Bay from Yoakam Point.
- **Resources**
 - Sunset Bay has several thousand visitors with a broad range of recreation activities. If activities and use expands, there will be a certain carrying capacity beyond which there will be damage. Amazed that it has “survived” so well with current use levels. There are trails/the overlook/beach access. Most is day-use but maybe there could be more future use at night. Don’t know if it will be an issue. If there are extreme adverse impacts in the future, may need to limit access. Now it is in pretty good shape-need to be careful we don’t stretch the resource.

- The scenic features of these parks are dynamic, things will change. This effects how you view the parks. What period of time do you go from (related to interpretation and other things like maintenance). There is a lot that happens that is not within OPRD control, rocky areas are dynamic and largely formed/impacted by natural processes.
 - Stress that this plan relates to upland management that *could* affect rocky areas. Obviously there is a lot beyond OPRD's control.
 - OPRD will use the plan to help anticipate consequences of proposed future actions.
- **Operations**
 - The rocky shore is dynamic and the sand/rock has an impact on the parking lots.
 - Facilities at Yoakam Point may be a “wish-list” item. Acknowledge the use, improve interpretation. Share message with users. Only a few don't “play by the rules” but it could be a problem in the future. Try to get folks off the highway (parking issues). Work with Surfrider/tribes/other agencies.
 - There are plans to improve the area at Yoakam Point a bit including the trail system and possibly a restroom.
- **Interpretation**
 - The benefits of research projects conducted at the sites should be shared with the public (possibly via the OPRD website, with links to appropriate documentation and research entities).
 - Established guidelines for wildlife viewing should be provided for the public online (e.g., links to existing documents, interpretive materials) and should be easy to find, including on the relevant park pages. Information should include the thresholds since many people don't know if what they are doing affects wildlife.
 - Information should be provided (e.g., online) about other locations people can visit where they can get a similar tidepooling experience. OPRD should work with *partners* to share this information.
 - It would be helpful to provide “live” tide information to potential visitors so that they know if and when it is safe to go tidepooling. This information should be accompanied with guidelines about tidepooling (e.g., etiquette, safety, best times to come). Links should be provided on relevant *partner* websites, such as the chamber of commerce.
- **Partnerships**
 - OPRD should work more closely with the Oregon Institute of Marine Biology (staff/students) to coordinate on research projects and providing information to the public.

- Make sure to work with the relevant tribes on issues related to traditional harvest of resources within intertidal areas.
- OPRD should make sure to work with relevant user groups related to the trail issues at Yoakum Point.

Wrap up and next steps

- Participants were informed that any comments they had after the meeting could be submitted in writing before February 12th. Questions could be directed to OPRD staff, and contact information was provided on the handout, along with information about how to submit comments.
- All comments received at the public meeting will be included in the meeting record.

Oregon Parks and Recreation Department

Jan. 6, 2010

MEDIA CONTACTS:

Laurel Hillmann

503-986-0700; Laurel.Hillmann@state.or.us

Charleston meeting to focus on managing rocky shores of oceanside parks

The Oregon Parks and Recreation Department (OPRD) will seek advice on improving management of rocky shore intertidal areas in Coos Bay area state parks at a Jan. 13 public meeting in Charleston. The meeting will be from 10:30 a.m.-12:30 p.m. at the Oregon Institute of Marine Biology (OIMB) Boathouse, 63466 Boat Basin Drive.

OPRD will introduce a draft of a Rocky Shore Areas Site Management Plan for the area—a plan focusing on management improvements at Yoakam Point State Natural Area, and Cape Arago, Shore Acres and Sunset Bay state parks.

Proposed management changes in the plan do not include any new rules or designations. OPRD will use public comments from the meeting to help finalize a plan that guides minor facility improvements, enhances on-site interpretation, and outlines ways to manage recreation in harmony with protecting natural resources. No decisions will be made at the meeting.

A 30-day period for written comments will begin Jan. 13. The draft plan will appear online beginning Jan. 6 at <http://www.oregon.gov/OPRD/PLANS/index.shtml> along with instructions on how to make comments.

More information is available by contacting Coastal Resource Planner Laurel Hillmann (503-986-0700, or Laurel.Hillmann@state.or.us).

The meeting site is accessible to people with disabilities. Special accommodations may be arranged up to 72 hours in advance by calling 503-986-0655. ###



Rocky Shore Site Management Plan-Public Input Opportunity

*Draft Site Management Plan for
Sunset Bay Management Unit Parks
Rocky Shore Areas*

January 13th (10:30 AM-12:30 PM)
OIMB Boathouse, Charleston



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Agenda

- 10:30-11:00: **Introduction & Presentation of Draft Plan**
 - Purpose of the site management plan, draft goals and strategies
- 11:00-12:20 **Public input opportunity**
 - Issue scoping/brainstorming based on *5 main goals*
 - Discussion, Q&A
- 12:20-12:30: **Wrap up and Next Steps**

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Why are we doing this?

- Park management wants to take a closer look at how best to manage the rocky shore resource and public use of it, and to offer educational opportunities for visitors to understand the resource and its importance



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Top 10 Outdoor Recreation Types*

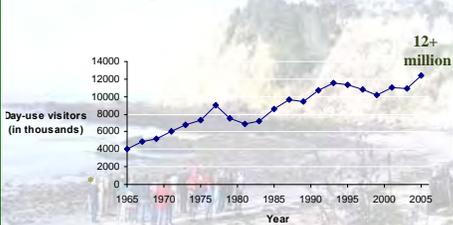
Rank	Recreation Type	Percent participating
1	Walking	80%
2	Picnicking	68%
3	Sightseeing	63%
4	Visiting historic sites	62%
5	Ocean beach activities	54%
6	Day hiking	52%
7	Children/grandchildren to playground	39%
8	Exploring tidepools	37%
9	Freshwater beach activities	33%
10	Other nature/wildlife observation	31%

*By percent participating (SCORP recreation study of Oregonians aged 42-80)

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Use of rocky shores is increasing



Day-use visitors (in thousands)

Year

12+ million

~700,000 to Sunset Bay
~350,000 to Cape Arago

*Day-use figures for parks adjacent to rocky shores

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What is the purpose of this meeting?

- Introduce key points about the draft plan
- Have a dialog with interested parties
 - *On the draft*
 - *Hear your comments, suggestions*
- Provide information about getting and staying involved

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Key Assumptions

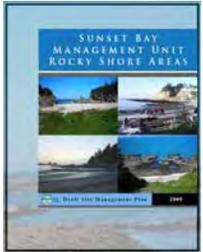
- Support **existing** rules
- Work within OPRD jurisdiction
- Work with **current** information & designations
- **Will not** address potential future designations

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What is it?

- Adaptively managed plan for OPRD use
- Narrative & illustrated document
- Conceptual guide
 - for park rocky shore use
 - for resource management



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Plan Objectives

- Forum for stakeholder discussion and participation
- Understand the designations and what they mean for park management
- Direct and educate visitors through on-site interpretation
- Determine how best to provide for recreational use without harming the rocky shore resource

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What is the process?

```

    graph TD
      BI[Biological Inventory] --> IS[Issue Scoping]
      RUS[Recreation Use Study] --> IS
      OI(OPRD Issues) --> IS
      AC1[Advisory Committee] --> IS
      IS --> G[Goals]
      IS --> RMO[Resource Management Objectives]
      G --> DSP[Draft Site Plans]
      RMO --> DSP
      OPRD(OPRD Review) --> DSP
      AC2[Advisory Committee] --> DSP
      PI[Public Input] --> DSP
      DSP --> FSP[Final Site Plans]
    
```

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Who is involved?

- Oregon Parks and Recreation staff
- Advisory Committee
- Technical contacts
- Public
 - On-site visitor interviews during peak use periods (n=293)
 - Public input meeting
 - Written comment period

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The plan describes

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Background & park resources

Existing uses & needs/ opportunities

Issues, goals & strategies

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Examples of general issues identified

- Environmental
 - Direct human impact to intertidal
 - Trampling
 - Collection
 - Wildlife disturbance
 - Lack of awareness about current wildlife protections
 - Decline of seabird colonies
- Recreation
 - Beach safety issues
 - Human/wildlife interaction
 - Water quality issues
- Facilities
 - Parking lot capacity
 - No trash receptacles or restroom close to beach
 - Beach access trail condition
- Interpretation
 - Lack of awareness of protected status/rules
 - School group coordination with park
 - Need additional/improved interpretation/enforcement
 - Coord. w/ researchers
- Cultural
 - High probability area

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Issue Matrices

- Issues, Potential Solutions, Barriers, Partners
 - Facilities, Recreation, Environmental, Interpretation

Issue	Potential Solutions	Barriers	Partners
Issue 1: Lack of parking spaces for visitors	Expand parking lot, use alternative sites	High cost of land, limited space	Local businesses, community groups
Issue 2: Limited interpretive programs	Hire rangers, develop self-guided tours	Lack of staff, limited budget	Local schools, volunteer groups
Issue 3: Poor trail conditions	Regular maintenance, use local contractors	Weather damage, limited funds	Local construction firms, park volunteers
Issue 4: Limited public awareness	Develop website, social media, signage	Limited budget, competing priorities	Local media, community organizations
Issue 5: Limited recreational opportunities	Develop new trails, facilities, programs	Limited land, high maintenance costs	Local recreation groups, park users

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5 General Goals

- Provide recreation opportunities and experiences that are appropriate for the park resources and recreation settings.
- Protect, manage and enhance as appropriate, outstanding natural, cultural and scenic resources.
- Provide for adequate management, maintenance, rehabilitation, and park operations including safe, efficient, identifiable and pleasant access and circulation.
- Promote public awareness, understanding, appreciation, and enjoyment of the recreation settings through resource interpretation.
- Form partnership and agreements to aid in achieving goals

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We want your input!

- Comments directly on the draft
- Site specific issues not already addressed
- Suggestions




Issue Scoping

- No decisions at this meeting
 - Forum for discussion & raising awareness
- To cover all issues we must be brief, get to the point and keep on track
- Comments recorded, retained and incorporated into plan (flip chart, post-its)
- Written comments encouraged
- All comments summarized in plan

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The Parks

- Yoakam Point
- Sunset Bay
- Shore Acres
- Cape Arago



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Next steps

- Please submit any *written* comments by **Friday, February 12th**
 - By e-mail or via regular mail
 - The draft plan is available online at: www.oregon.gov/OPRD/PLANS/
 - If you do not have internet access, limited copies are available on CD, please contact Laurel for a copy
- For questions or to submit comments, contact:
 - laurel.hillmann@state.or.us
 - By mail:
Laurel Hillmann, Planning Section
Oregon Parks and Recreation Department
725 Summer Street N.E. Suite C
Salem, OR 97301
 - Also, for questions feel free to call: (503) 986-0700

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Thank You!

Nature
HISTORY
Discovery



