

Methods and Criteria for Analysis of Ecological Sideboard

The ecological sideboard is a threshold that sites need to reach, individually or collectively, to be large enough to allow scientific evaluation of ecological benefits (Executive Order 08-07). Ultimately, marine reserve evaluation will determine if they are effective management tools for conserving marine habitats and biodiversity and providing a framework for scientific research and effectiveness monitoring¹. Ecological benefits are further defined by the following ecological components of the OPAC marine reserve objectives¹:

1. Protect areas within Oregon's Territorial Sea that are important to the natural diversity and abundance of marine organisms, including areas of high biodiversity and special natural features.
2. Protect key types of marine habitat in multiple locations along the coast to enhance resilience of nearshore ecosystems to natural and human-caused effects.
3. Site fewer than ten marine reserves and design the system in ways that are compatible with the needs of ocean users and coastal communities. These marine reserves, individually or collectively, are to be large enough to allow scientific evaluation of ecological effects, but small enough to avoid significant adverse social and economic impacts on ocean users and coastal communities.
4. Use the marine reserves as reference areas for conducting ongoing research and monitoring of reserve condition, effectiveness, and the effects of natural and human-induced stressors. Use the research and monitoring information in support of nearshore resource management and adaptive management of marine reserves.

Ecological Characteristics Needed to Meet the Sideboard

For a marine reserve and complementary MPA site (if any) to individually meet the sideboard, it generally needs the following characteristics:

- Large enough to encompass a variety of habitats and depth ranges. Diversity of habitats and depth is a direct indicator of overall species biodiversity.
- Individual habitat areas are large enough to have many of the species typically found in that habitat type.
- Habitat areas are large enough to encompass home ranges or typical movement areas of species of interest, including movement patterns needed for growth and or seasonal use, and, for complementary MPAs, those species are proposed for protection from extraction or disturbance.
- Seafloor types and depth ranges, and their relative proportions, are representative of the general region where the site is located.

If the above characteristics are generally met, the site would be large enough to allow scientific evaluation of ecological effects of marine reserves and could serve as a reference area for monitoring the effects of natural and human-induced stressors.

¹ OPAC Marine Reserves Policy Guidance document

For the sites to collectively meet the sideboard, they generally need the following characteristics:

- Sites protect key types of marine habitat in multiple locations along the coast.
- Sites are distributed along the coast in order to represent each biogeographical region, collectively provide replication for scientific evaluation, and enhance resilience of nearshore ecosystems to natural and human-caused effects.
- Sites collectively represent habitat types within their biogeographical region and include areas of high biological diversity and special natural features.
- Sites generally avoid being spaced more than 50 – 100 km (27 -54 nautical miles) apart to increase the likelihood for larval connectivity from one site to the next.

If the above characteristics are generally met, the sites collectively would allow scientific evaluation of ecological effects and could serve as reference areas for monitoring the effects of natural and human-induced stressors.

Evaluation of Site Characteristics Needed to Meet the Sideboard

This analysis uses a set of guidelines (described below) to evaluate the degree to which the original OPAC site and the scenarios meet the ecological sideboard. The guidelines were derived from the STAC Size and Spacing report, as it applies to the ecological sideboard. The guidelines are not considered individually as simple pass-fail criteria. Instead the guidelines are examined collectively to assess overall ecological merit toward meeting the sideboard.

Overall size of the site: The site's size is measured both in alongshore length and extent across the width of the territorial sea. The Size and Spacing report provides overall size guidelines including a minimum site alongshore length of 5-10 km, preferred site alongshore length of 10-20 km, and designing the site to include all areas from the rocky intertidal out to the full extent of the territorial sea. There are practical limits to having the western boundary of the site follow the territorial sea line (a complex, curved line) because the western boundary need to be straight for enforcement purposes. A site that has a straight western boundary just inside of the territorial sea line is deemed to have met this guideline due to these practical limitations. These overall size guidelines help ensure that the site contains a variety and complexity of habitats at all depth ranges, is large enough to include a variety of species and home ranges, and adequately represents an area of the coast. In addition, extending the site across the width of the territorial sea (to the degree practical) enhances the protection of species that move to greater depth as they grow or seasonally move, which includes approximately 2/3 of managed groundfish species.

Seafloor Types and Depth Ranges: The STAC Size and Spacing report recommends including a variety of habitats in a site, and ensuring the habitats are large enough to contain as many species as possible and encompass home ranges of at least some of the species. This guideline first examines the variety of seafloor types and depth ranges as proxy for the potential number of different habitat types that would occur at a site. Species of algae, invertebrates and fishes are often associated with a particular habitat type and depth range. Including a greater variety

of habitats across depth ranges increases the potential of a higher number of species to utilize the site. Having variety of habitat types is a good indicator of potential biodiversity of a site. Complex arrangements of habitats create additional niches that allow for additional species specializing in those environments to occupy the site. For purposes of this analysis, the seafloor types include rock, sand, and mixed (including primarily gravel, but also shell and cobble), and depth ranges include intertidal, 0-25 m, 25-55 m, over 55 m.

This guideline also examines surface area covered by the seafloor types and depth ranges. Different categories of habitats within a site need to be large enough to contain a variety of species and adequate numbers of individuals to represent a natural density of that species and to ensure reproductive success. Generally, the larger the area, the more species, and numbers of individuals within a species, associated with those seafloor or depth characteristics will exist there. Habitat areas also should be large enough to encompass a species' home range; that is the typical area a species utilizes during most of the year.

Representation of Seafloor Types and Depth Ranges: Sites need to be individually representative of the general region where the site is located and collectively representative of their biogeographic region (north of Cape Blanco or south of Cape Blanco). For a site to represent seafloor types and depth ranges individually, it should include all major types and depth ranges in similar proportions as the nearby territorial sea. This analysis evaluates individual representation by comparing the area coverage of seafloor types and depth ranges to the segment of the territorial sea that includes the site plus 10 km north and south of the site. Collective representation is achieved when all sites taken together have all major seafloor types and depth ranges in similar proportions as the territorial sea within their biogeographic region.

Species Representation: To evaluate species found in a given area we examine the seafloor types and depth ranges of an area in combination with known species-habitat and species-depth correlations, and species home range information to predict which species are likely to be represented in an area. An increase in the variety of seafloor types and depth ranges of an area will increase the potential of a greater number of organisms to use the area. The nearshore rocky reef fish table (Appendix 1.III) and the STAC Size and Spacing report list depth and home range information for several species and species groups. For invertebrate species special attention should be paid to habitat forming species and long lived species that could be affected from extractive use. Keystone and top-down predatory invertebrate species should also be recognized as important players when evaluating a site. Fish species that move into different habitats and or depth ranges for growth and or seasonal needs should also be taken into consideration.

Special Features: The STAC Size and Spacing report describes special features as areas that have high biological diversity, rare or specific oceanographic characteristics and include rare or distinctive habitats. Emergent rocks often form complex underwater habitat, with steep or vertical faces, a variety of depth ranges (from surface to bottom depth at rock site), and variety of wave/current exposures. As a result, the sub-surface portion of these rocks often include areas of high biodiversity. Seabird nesting colonies and pinniped haulouts are also areas of special interest.

Treatment of Marine Protected Areas (MPAs) in the Analysis of the Ecological Sideboard

We consider MPAs as a complement to a marine reserve site if the MPA is necessary to help mitigate socioeconomic impacts while ensuring the reserve and protected area is large enough to evaluate ecological benefits. Thus, for an MPA to be considered, it must complement the marine reserve in its protection of species and habitats most likely to respond to closures. An MPA provides additional value or merit to meet the ecological sideboard when it:

- provides protection to fish and invertebrate species that are likely to benefit from, or show a response to, protection,
- provides a protective species buffer area to a marine reserve,
- provides an ecological corridor for fish species growth-related or seasonal movement,
- protects habitat forming and long lived invertebrate species from habitat destructive extractive activities or development.

If the MPA complements the marine reserve, this analysis adds its protective characteristics to the accompanying marine reserve when evaluating how well the scenario meets the ecological sideboard.

Information Sources

Several sources of information provided material for this review, including:

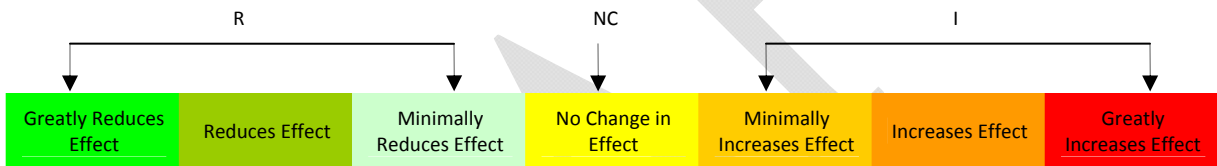
- the Scientific and Technical Advisory Committee (STAC) 2008 document entitled “Size and Spacing of Marine Reserves Workshop Report,”
- new scientific information about sites since the size and spacing report was written (seafloor habitat mapping, new information on species home ranges and species-area curves),
- input received from STAC and select scientists at the September 20, 2010, workshop in Corvallis examining the agency draft analysis of scenarios, and a subsequent November 29, 2010, meeting to review analysis of community team final recommendations, and
- relevant scientific literature and consultation with local experts.

Cape Perpetua Final Proposal Agency Analysis Report

Methods and Analysis: Socioeconomic methods and analysis

This is the social and economic assessment of the Cape Perpetua Community Team final marine reserve site proposal. The following categories of use were assessed for each scenario presented during the community team process. Each was assessed in comparison to the OPAC original proposal. Looking at the change in specific criteria for each user group in association with the change in boundary or restrictions from the OPAC original proposal we were able to code the level of effect for each category within a specific scenario. The color-coded bar below shows the different levels of effects and are applied to the effects tables shown here. A more in-depth discussion of any “issues” relating to the OPAC original proposal can be found in the *Cape Perpetua ODFW Agency Analysis of Scenarios Developed by the Marine Reserves Community Team* (Section 1.III).

This analysis does not make a judgment as to whether any effect is considered “significant” to anyone individual, community, or user group. This designation is left to the community teams to decide through their consensus process.



Effect Description	Commercial Crab Definition	Commercial Salmon Definition	Recreational Fisheries Definition	Charter Operations Definition	Communities of Place Definition
Greatly Reduces Effect	71% to 100% regain of opportunity	All or most opportunity regained	All or most opportunity regained	71% to 100% regain of opportunity	All or most opportunity regained
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No Change in Effect	+ /- 10% regain or additional loss of opportunity	No change from OPAC effect	No change from OPAC effect	+ /- 10% regain or additional loss of opportunity	No change from OPAC effect
Minimally Increases Effect	11% to 40% additional loss of opportunity	Minimal additional loss of opportunity	Minimal additional loss of opportunity	11% to 40% additional loss of opportunity	Minimal additional loss of opportunity
Increases Effect	41% to 70% additional loss of opportunity	Some additional loss of opportunity	Some additional loss of opportunity	41% to 70% additional loss of opportunity	Some additional loss of opportunity
Greatly Increases Effect	71% to 100% additional loss of opportunity	All or most opportunity lost	All or most opportunity lost	71% to 100% additional loss of opportunity	Additional loss of opportunity

The matrix below presents a number of data sources or types that were used as the basis for this analysis. Some of the sources were more heavily used to assess effects on the different stakeholder groups but all of the referenced sources of information were used throughout this process to lend both a historical and current perspective of the area and stakeholders, show social and cultural importance, and give examples of possible future benefits. For example, when assessing the effects to commercial fishermen the primary data source used was logbook data, however experiential knowledge and expert input were leveraged to assess possible effects of displacement, short and long term fleet wide impacts, individual impacts, social and cultural impacts, and other factors. Actual source references and analysis specifics (sampling years, sample size, etc) can be found in the previous agency analysis performed by ODFW in September 2010, available online at the www.oregonocean.info/marinereserves website.

Table1. Matrix of information and data used and referenced in analysis

	Logbook Data	Sport Observer Data	Stakeholder Data Collection ¹	Demographic Data	Historical Data/Information	Existing Data/Information (state/federal)	Experiential Knowledge	Expert Input
Commercial Fishing	X		X	X	X	X	X	X
Recreational Fishing		X	X	x	x	X	X	X
Charter Fishing		X	X			X	X	X
Communities Of Place	X	X	X	X	X	X	X	X

1. Stakeholder Data Collection refers to the use of any questionnaire, survey, phone interview, or information request made by ODFW. Examples of these tools are the commercial fishing interviews done by phone with those individual identified as users of the proposed area and the business survey conducted with local Yachats businesses.

1. COMMERCIAL FISHERIES ANALYSIS

The analysis of the effects in relation to any change from the OPAC original proposal were based on a fleet wide analysis rather than an individual vessel analysis. To assess the level of impact to the commercial fishing fleets each ODFW logbook program was analyzed for pounds (lbs) caught inside the different scenarios. For all relevant fisheries --other than Salmon and Crab which are analyzed separately because of the community teams' assertion that they are important fisheries to the areas--the catch represented by each scenario was calculated as a percentage of total fleet wide catch for the state. If the logbook analysis showed that total catch within the area was <0.5%¹ of the total fleet wide catch the fishery was considered un-effected by a MR or MR/MPA and excluded from further evaluation. Using this criteria the following fisheries, where logbooks are kept², were deemed un-effected by any area closure or restrictions on commercial use

- Nearshore Limited Entry
- Fixed Gear
- Shrimp
- Sardine
- Trawl³

Further analysis was performed for the commercial crab and commercial salmon fisheries for these areas. Each fishery was analyzed separately and each scenario given its own level of effect. A quantitative analysis was performed for the commercial crab fishery in the area using logbook data to evaluate percentage of opportunity lost or regained in each scenario and this was supported by qualitative information gathered from the fishermen and other expert and stakeholder experiential knowledge of the site. A qualitative assessment was done for the commercial Salmon fishery due to no spatial information or logbook data being available. This qualitative analysis was performed using expert input and experiential knowledge given by stakeholders as to how the effects on the commercial Salmon fishery in the area may change given a change in boundary or prohibitions from the OPAC original proposal.

1. This threshold was chosen because of its use in ODFW confidentiality representation and because it is believed to be the most appropriate threshold for measuring effect to these fisheries at these sites.

2. To view a more detailed listings of what species are included in the above logbook programs please see the "Fisheries Logbooks – Reference Guide" in Appendix 1.

3. To accurately assess the most current trends in use for the proposal area and scenarios only the last ten years of trawl data was analyzed. It should be noted that future management changes could allow for increased opportunity in some of these areas and the effects would need to be reassessed.

a. Assessing Effects on the Commercial Crab Fishery

The effects of the change from the OPAC original proposal to the final proposal were assessed by finding and displaying the percentage of opportunity regained by the commercial crabbers that have been shown to use the area¹. The formula used for this assessment is listed below and it should be explained that the effects of any MPA were considered to be a total regain due to commercial crabbing being allowed in all the MPAs. The formula used to assess the change in commercial crab effects was:

Step 1: $TFC - MRC = TR$

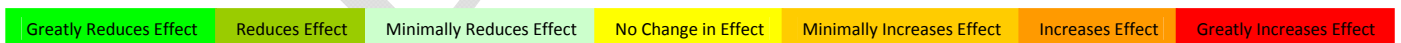
Step 2: $TR/TFC = TPR$

Where: TFC = Total Fleet Catch in OPAC original Proposal
MRC = Marine Reserve Catch for scenario
TR = Total Regained Opportunity (Lbs) by fleet
TPR = Total Percentage Opportunity Regained by fleet

It should be noted that these effects were not applied at the individual vessel level and that the consensus of all reviewers and analysts is that the commercial crabbing effect shown below do not represent the true opportunity of the fleet. Because crab are considered a migratory and mobile species it is expected that those potential opportunity losses to the fleet from any proposed marine reserve (OPAC or scenario) would be accounted for and the effects balanced over the season as the fleet continues to crab at the same or similar level along the coast.

Table2. Change in commercial crab opportunity from OPAC original proposal

	<u>OPAC</u> Lost Opportunity (lbs)	<u>OPAC</u> % of Total Fleet Wide Catch	<u>Final Proposal</u> Lost Opportunity (lbs)	<u>Final Proposal</u> % of Total Fleet Wide Catch	<u>Final Proposal</u> Percent change in opportunity
CP	297,879	3.5%	72,052	0.9%	76%



1. This crab analysis was based on a single season data set and should be viewed as a snapshot in time of the crabbing activities at these sites.

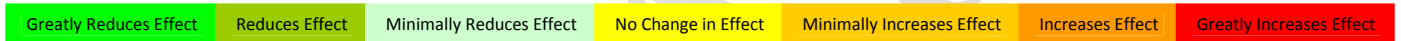
b. Assessing the Effects on the Commercial Salmon Fishery

No spatial data exists at this time to accurately assess the commercial Salmon fishery for the final proposal area. Therefore, a qualitative assessment of effect was based on the configuration of the final proposal boundary and informed by experiential knowledge given by stakeholders and expert input. It should be noted that the effects presented below could vary with additional information.

Due to the allowance of the commercial salmon fishery in the MPA areas and experiential knowledge of assumed “hotspots” for the fishery, it was determined that the final proposal “reduces” the effects of the OPAC site. This designation is defined as “some opportunity regained”. The MPAs reduce the effects of a closure to the fishery but the marine reserve continues to pose some issues for the commercial salmon fishery by restricting known “hotspots”.

Table3. Change in commercial salmon opportunity from OPAC original proposal

	<u>OPAC</u> Assumed Effect	<u>Final Proposal</u> Expected Change in Opportunity
CP	100% loss of opportunity	R



2. RECREATIONAL FISHERIES ANALYSIS

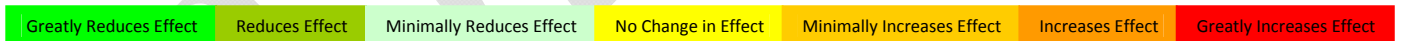
No spatial data exists at this time to accurately assess the recreational fisheries for the final proposal area. Therefore, a qualitative assessment of effect was based on the configuration of the final proposal boundary and informed by experiential knowledge given by stakeholders and expert input. It should be noted that the effects presented below could vary with additional information.

The effects depicted below were done by first designating a baseline effect of the OPAC site and then assessing the change in effect to different user groups over different scenarios. Categories considered were distance from recreational boat ports, alternate areas of opportunity, experiential knowledge of area use, and charter boat use analysis was used as a proxy for the groundfish fishery in the area.

Due to the allowance of shoreside fishing and recreational boat capture of crab and salmon in the northern MPA and the additional allowance of recreational boat groundfish capture in the southern MPA the effects, in comparison to OPAC, have been reduced across the board.

Table4. Change in recreational fisheries opportunity from OPAC original proposal

	OPAC Recreational Fisheries Assumed Effected	OPAC Assumed Effect	Final Proposal Expected Change in Opportunity
CP	Crab	Minimally Effected	R
	Salmon	Minimally Effected	R
	Groundfish	Minimally Effected	R
	Shoreside	Highly Effected	R



3. CHARTER OPERATIONS ANALYSIS

Using the Sport Observer Program data the final proposal was compared with the OPAC original proposal to determine what effect the change had. Using the OPAC site as the baseline of charter usage the percent (%) increase or decrease in trip opportunity was determined and a level of effect designated. The table below shows that the OPAC site was designated as having a minimal effect on the charter fleet and the final proposal shows no change in this effect. Both the OPAC site and the final proposal had the same percentage of use and the exact same trips took place in both sites.

It should be noted that the Sport Observer Program is a voluntary program and some charter operators have decreased their participation over the years and others have not allowed observers to record spatial information while on board. It is still assumed to show a reliable depiction of use by the charter industry in these areas.

The formula used to assess the effects on the charter industry is seen here.

Step 1: $TP - TPS = TPD$

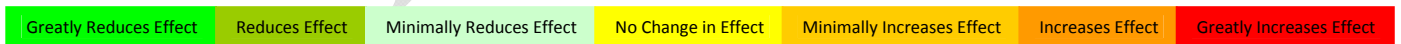
Step 2: $TPD/TP = TPC$

Where:
 TP = Total Percent Charter Use in OPAC
 TPS = Total Percent Charter Use in Scenario
 TPD = Total Percent Difference
 TPC = Total Percent Change in Use (gain or loss)

Table5. Change in charter operations opportunity from OPAC original proposal¹

	<u>OPAC</u> Lost Opportunity (% Trips)	Effect	<u>Final Proposal</u> Lost Opportunity (% Trips)	<u>Final Proposal</u> Change in Opportunity	Effect
CP	1.0%	Minimally Effected	1.0%	No Change	NC

1. The table shows the level of baseline effect of the OPAC originally proposed site and the percentage of regained or additionally lost opportunity.



4. COMMUNITIES OF PLACE ANALYSIS

Using experiential knowledge gathered from stakeholders (full & part-time residents, businesses, and other individuals familiar with the site) and expert testimony garnered from the STAC workshop, an assessment of effects was based on an estimate of the social and economic effects to a select number of communities¹. Four criteria were used to assess the level of effect and whether the effect would INCREASE, be REDUCED, or have NO CHANGE from the original OPAC proposal. The four criteria used were:

1. Traditions/Family Connection to Site
2. Religious/Spiritual Activity at Site
3. Subsistence Use at Site
4. Economic Income from Visitation to the Site or Extraction of Resources to the Community of Place.

Each community of place was assessed as to which of the four criteria best described its connection or association with the OPAC site and what effect the OPAC site had on the community. The criteria were weighted differently for each community of place to better assess the effects, for example Newport was assessed using “Economic Income from Visitation to the Site or Extraction of Resources” (criterion 4) as the more heavily weighted criteria. Those criteria more heavily weighted are shown in **bold** in the table below.

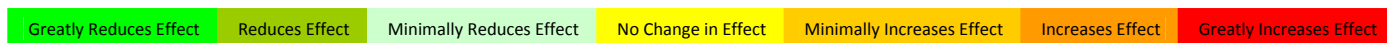
For all the communities of place effects of the final proposal were reduced at some level from the OPAC site. Due to shoreside fishing being allowed in the MPA portion of the site Yachats sees a “greatly reduced effect” contingent on the visiting shoreside fishers continuing to frequent the Yachats River area. Newport and Florence see “reduced effects” from OPAC due to the commercial, sport, and charter allowances in the MPA areas.

Table6. Change in community of place effects from OPAC original proposal

	Communities of Place	<u>OPAC</u> Baseline Criteria Met	<u>OPAC</u> Baseline Effect	<u>Final Proposal</u> Change in Effect
CP	Newport	1, 4	Moderately Effected	R
	Yachats	1, 3, 4	Highly Effected	R
	Florence	1, 4	Moderately Effected	R

KEY:

- 1) Traditions/Family Connection
- 2) Religious/Spiritual Activities
- 3) Subsistence Use
- 4) Economic Income from Visitation to the Site or Extraction of Resources



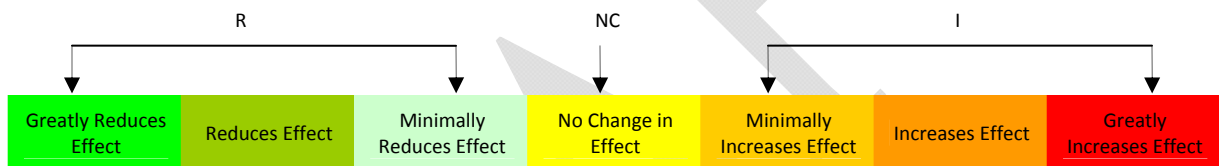
1. The “Communities of Place” shown in the table were chosen for this analysis because they were deemed to represent the spectrum of communities possibly affected by a MR or MR/MPA at the site

Cascade Head Final Proposal Agency Analysis Report

Methods and Analysis: Socioeconomic methods and analysis

This is the social and economic assessment of the Cascade Head Community Team final marine reserve site proposal. The following categories of use were assessed for each scenario presented during the community team process. Each was assessed in comparison to the OPAC original proposal. Looking at the change in specific criteria for each user group in association with the change in boundary or restrictions from the OPAC original proposal we were able to code the level of effect for each category within a specific scenario. The color-coded bar below shows the different levels of effects and are applied to the effects tables shown here. A more in-depth discussion of any “issues” relating to the OPAC original proposal can be found in the *Cascade Head ODFW Agency Analysis of Scenarios Developed by the Marine Reserves Community Team* (Section 1.III).

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Recreational Fishing		X	X	x	x	X	X	X
Charter Fishing		X	X			X	X	X
Communities Of Place	X	X	X	X	X	X	X	X

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Further analysis was performed for the commercial crab and commercial salmon fisheries for these areas. Each fishery was analyzed separately and each scenario given its own level of effect. A quantitative analysis was performed for the commercial crab fishery in the area using logbook data to evaluate percentage of opportunity lost or regained in each scenario and this was supported by qualitative information gathered from the fishermen and other expert and stakeholder experiential knowledge of the site. A qualitative assessment was done for the commercial Salmon fishery due to no spatial information or logbook data being available. This qualitative analysis was performed using expert input and experiential knowledge given by stakeholders as to how the effects on the commercial Salmon fishery in the area may change given a change in boundary or prohibitions from the OPAC original proposal.

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2. To view a more detailed listings of what species are included in the above logbook programs please see the "Fisheries Logbooks – Reference Guide" in Appendix 1.

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Step 2: $TR/TFC = TPR$

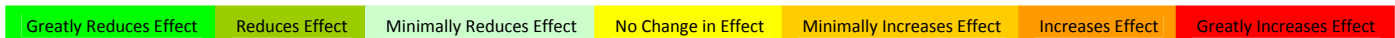
Where: TFC = Total Fleet Catch in OPAC original Proposal
MRC = Marine Reserve Catch for scenario
TR = Total Regained Opportunity (Lbs) by fleet
TPR = Total Percentage Opportunity Regained by fleet

The proposal shows a reduced change in effect from the OPAC site due to the size and location of the MR and the allowances for commercial crabbing in the MPAs. The commercial crab fishery for this area represent less than 2% of the total fleet wide and the MPAs restore important crabbing grounds to those commercial fishermen that use this area.

It should be noted that these effects were not applied at the individual vessel level and that the consensus of all reviewers and analysts is that the commercial crabbing effect shown below do not represent the true opportunity of the fleet. Because crab are considered a migratory and mobile species it is expected that those potential opportunity losses to the fleet from any proposed marine reserve (OPAC or scenario) would be accounted for and the effects balanced over the season as the fleet continues to crab at the same or similar level along the coast.

Table2. Change in commercial crab opportunity from OPAC original proposal

	<u>OPAC</u> Lost Opportunity (lbs)	<u>OPAC</u> % of Total Fleet Wide Catch	<u>Final Proposal</u> Lost Opportunity (lbs)	<u>Final Proposal</u> % of Total Fleet Wide Catch	<u>Final Proposal</u> Percent change in opportunity
CH	117,260	1.4%	18,067	0.2%	85%



1. This crab analysis was based on a single season data set and should be viewed as a snapshot in time of the crabbing activities at these sites.

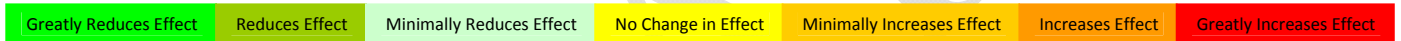
b. Assessing the Effects on the Commercial Salmon Fishery

No spatial data exists at this time to accurately assess the commercial Salmon fishery for the final proposal area. Therefore, a qualitative assessment of effect was based on the configuration of the final proposal boundary and informed by experiential knowledge given by stakeholders and expert input. It should be noted that the effects presented below could vary with additional information.

Due to the allowance of the commercial salmon fishery in the MPA areas and experiential knowledge of assumed “hotspots” for the fishery, it was determined that the final proposal “reduces” the effects of the OPAC site. This designation is defined as “some opportunity regained”. The MPAs reduce the effects of a closure to the fishery but the marine reserve continues to pose some issues for the commercial salmon fishery by restricting known “hotspots”.

Table3. Change in commercial salmon opportunity from OPAC original proposal

	OPAC Assumed Effect	Final Proposal Expected Change in Opportunity
CH	100% loss of opportunity	R



2. RECREATIONAL FISHERIES ANALYSIS

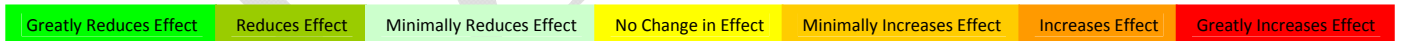
No spatial data exists at this time to accurately assess the recreational fisheries for the final proposal area. Therefore, a qualitative assessment of effect was based on the configuration of the final proposal boundary and informed by experiential knowledge given by stakeholders and expert input. It should be noted that the effects presented below could vary with additional information.

The effects depicted below were done by first designating a baseline effect of the OPAC site and then assessing the change in effect to different user groups over different scenarios. Categories considered were distance from recreational boat ports, alternate areas of opportunity, experiential knowledge of area use, and charter boat use analysis was used as a proxy for the groundfish fishery in the area.

Due to the allowance of recreational boat capture of crab, salmon, and groundfish in the northern MPA and the allowances for recreational boat capture of crab and salmon in the western and southern MPAs the effects, in comparison to OPAC, have been reduced across the board. Only shoreside fishing continues to see minimal effects due to the location of the MR.

Table4. Change in recreational fisheries opportunity from OPAC original proposal

	OPAC Recreational Fisheries Assumed Effected	OPAC Assumed Effect	Final Proposal Expected Change in Opportunity
CH	Crab	Highly Effected	R
	Salmon	Highly Effected	R
	Groundfish	Minimally Effected	R
	Shoreside	Minimally Effected	NC



3. CHARTER OPERATIONS ANALYSIS

Using the Sport Observer Program data the final proposal was compared with the OPAC original proposal to determine what effect the change had. Using the OPAC site as the baseline of charter usage the percent (%) increase or decrease in trip opportunity was determined and a level of effect designated. The table below shows that the OPAC site was designated as having a minimal effect on the charter fleet and the final proposal shows a minimal increase in this effect. This is due to the southern boundary of the marine reserve being moved lower than the OPAC site.

It should be noted that the Sport Observer Program is a voluntary program and some charter operators have decreased their participation over the years and others have not allowed observers to record spatial information while on board. It is still assumed to show a reliable depiction of use by the charter industry in these areas.

The formula used to assess the effects on the charter industry is seen here.

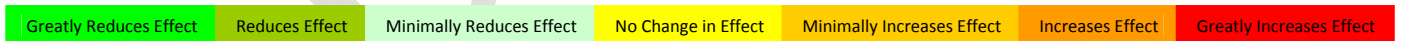
Step 1: $TP - TPS = TPD$

Where: TP = Total Percent Charter Use in OPAC
 TPS = Total Percent Charter Use in Scenario
 TPD = Total Percent Difference

Table 5. Change in charter operations opportunity from OPAC original proposal¹

	<u>OPAC</u> Lost Opportunity (% Trips)	Effect	<u>Final Proposal</u> Lost Opportunity (% Trips)	<u>Final Proposal</u> Change in Opportunity (% Trips)	Effect
CH	4%	Minimally Effected	15%	11%	I

1. The table shows the level of baseline effect of the OPAC originally proposed site and the percentage of regained or additionally lost opportunity.



4. COMMUNITIES OF PLACE ANALYSIS

Using experiential knowledge gathered from stakeholders (full & part-time residents, businesses, and other individuals familiar with the site) and expert testimony garnered from the STAC workshop, an assessment of effects was based on an estimate of the social and economic effects to a select number of communities¹. Four criteria were used to assess the level of effect and whether the effect would INCREASE, be REDUCED, or have NO CHANGE from the original OPAC proposal. The four criteria used were:

1. Traditions/Family Connection to Site
2. Religious/Spiritual Activity at Site
3. Subsistence Use at Site
4. Economic Income from Visitation to the Site or Extraction of Resources to the Community of Place.

Each community of place was assessed as to which of the four criteria best described its connection or association with the OPAC site and what effect the OPAC site had on the community. The criteria were weighted differently for each community of place to better assess the effects, for example Depoe Bay was assessed using “Economic Income from Visitation to the Site or Extraction of Resources” (criterion 4) as the more heavily weighted criteria. Those criteria more heavily weighted are shown in **bold** in the table below.

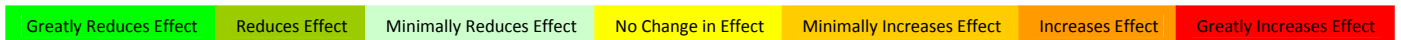
Pacific City and Lincoln City see a continued minimal effect from this proposal while Depoe Bay sees a minimal increase in the effect due to the increase in charter opportunity lost in the marine reserve. However the local Salmon River communities see a great reduction in effect due to the sport allowances in the northern MPA for crab, salmon, and groundfish.

Table6. Change in community of place effects from OPAC original proposal

	Communities of Place	OPAC Baseline Criteria Met	OPAC Baseline Effect	Final Proposal Change in Effect
CH	Pacific City	1,3, 4	Minimally Effected	NC
	Lincoln City	1,4	Minimally Effected	NC
	Otis/Salmon River	1,3, 4	Highly Effected	R
	Depoe Bay	1,4	Minimally Effected	I

KEY:

- 1) Traditions/Family Connection
- 2) Religious/Spiritual Activities
- 3) Subsistence Use
- 4) Economic Income from Visitation to the Site or Extraction of Resources



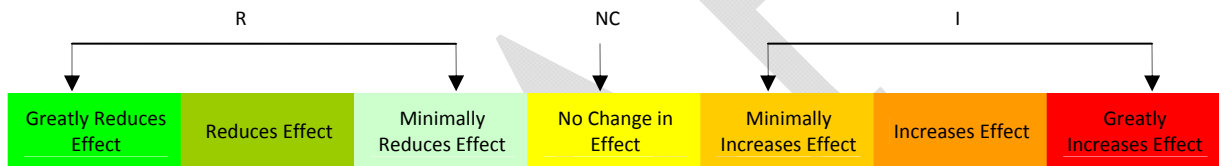
1. The “Communities of Place” shown in the table were chosen for this analysis because they were deemed to represent the spectrum of communities possibly affected by a MR or MR/MPA at the site

Cape Falcon Final Proposal Agency Analysis Report

Methods and Analysis: Socioeconomic methods and analysis

This is the social and economic assessment of the Cape Falcon Community Team final marine reserve site proposal. The following categories of use were assessed for each scenario presented during the community team process. Each was assessed in comparison to the OPAC original proposal. Looking at the change in specific criteria for each user group in association with the change in boundary or restrictions from the OPAC original proposal we were able to code the level of effect for each category within a specific scenario. The color-coded bar below shows the different levels of effects and are applied to the effects tables shown here. A more in-depth discussion of any “issues” relating to the OPAC original proposal can be found in the *Cape Perpetua ODFW Agency Analysis of Scenarios Developed by the Marine Reserves Community Team* (Section 1.III).

This analysis does not make a judgment as to whether any effect is considered “significant” to anyone individual, community, or user group. This designation is left to the community teams to decide through their consensus process.



Effect Description	Commercial Crab Definition	Commercial Salmon Definition	Recreational Fisheries Definition	Charter Operations Definition	Communities of Place Definition
Greatly Reduces Effect	71% to 100% regain of opportunity	All or most opportunity regained	All or most opportunity regained	71% to 100% regain of opportunity	All or most opportunity regained
Reduces Effect	41 to 70% regain of opportunity	Some opportunity regained	Some opportunity regained	41% to 70% regain of opportunity	Some opportunity regained
Minimally Reduces Effect	11% to 40% regain of opportunity	Minimal opportunity regained	Minimal opportunity regained	11% to 40% regain of opportunity	Minimal opportunity regained
No Change in Effect	+ /- 10% regain or additional loss of opportunity	No change from OPAC effect	No change from OPAC effect	+ /- 10% regain or additional loss of opportunity	No change from OPAC effect
Minimally Increases Effect	11% to 40% additional loss of opportunity	Minimal additional loss of opportunity	Minimal additional loss of opportunity	11% to 40% additional loss of opportunity	Minimal additional loss of opportunity
Increases Effect	41% to 70% additional loss of opportunity	Some additional loss of opportunity	Some additional loss of opportunity	41% to 70% additional loss of opportunity	Some additional loss of opportunity
Greatly Increases Effect	71% to 100% additional loss of opportunity	All or most opportunity lost	All or most opportunity lost	71% to 100% additional loss of opportunity	Additional loss of opportunity

The matrix below presents a number of data sources or types that were used as the basis for this analysis. Some of the sources were more heavily used to assess effects on the different stakeholder groups but all of the referenced sources of information were used throughout this process to lend both a historical and current perspective of the area and stakeholders, show social and cultural importance, and give examples of possible future benefits. For example, when assessing the effects to commercial fishermen the primary data source used was logbook data, however experiential knowledge and expert input were leveraged to assess possible effects of displacement, short and long term fleet wide impacts, individual impacts, social and cultural impacts, and other factors. Actual source references and analysis specifics (sampling years, sample size, etc) can be found in Section 2.III and in the community team contextual packet provided by ODFW and available online at the *oregonocean.info* website.

Table1. Matrix of information and data used and referenced in analysis

	Logbook Data	Sport Observer Data	Stakeholder Data Collection ¹	Demographic Data	Historical Data/Information	Existing Data/Information (state/federal)	Experiential Knowledge	Expert Input
Commercial Fishing	X		X	X	X	X	X	X
Recreational Fishing		X	X	x	x	X	X	X
Charter Fishing		X	X			X	X	X
Communities Of Place	X	X	X	X	X	X	X	X

1. Stakeholder Data Collection refers to the use of any questionnaire, survey, phone interview, or information request made by ODFW. Examples of these tools are the commercial fishing interviews done by phone with those individual identified as users of the proposed area and the business survey conducted with local Yachats businesses.

1. COMMERCIAL FISHERIES ANALYSIS

The analysis of the effects in relation to any change from the OPAC original proposal were based on a fleet wide analysis rather than an individual vessel analysis. To assess the level of impact to the commercial fishing fleets each ODFW logbook program was analyzed for pounds (lbs) caught inside the different scenarios. For all relevant fisheries --other than Salmon and Crab which are analyzed separately because of the community teams' assertion that they are important fisheries to the areas--the catch represented by each scenario was calculated as a percentage of total fleet wide catch for the state. If the logbook analysis showed that total catch within the area was <0.5%¹ of the total fleet wide catch the fishery was considered un-effected by a MR or MR/MPA and excluded from further evaluation. Using this criteria the following fisheries, where logbooks are kept², were deemed un-effected by any area closure or restrictions on commercial use

- Nearshore Limited Entry
- Fixed Gear
- Shrimp
- Sardine
- Trawl³

Further analysis was performed for the commercial crab and commercial salmon fisheries for these areas. Each fishery was analyzed separately and each scenario given its own level of effect. A quantitative analysis was performed for the commercial crab fishery in the area using logbook data to evaluate percentage of opportunity lost or regained in each scenario and this was supported by qualitative information gathered from the fishermen and other expert and stakeholder experiential knowledge of the site. A qualitative assessment was done for the commercial Salmon fishery due to no spatial information or logbook data being available. This qualitative analysis was performed using expert input and experiential knowledge given by stakeholders as to how the effects on the commercial Salmon fishery in the area may change given a change in boundary or prohibitions from the OPAC original proposal.

1. This threshold was chosen because of its use in ODFW confidentiality representation and because it is believed to be the most appropriate threshold for measuring effect to these fisheries at these sites.

2. To view a more detailed listings of what species are included in the above logbook programs please see the "Fisheries Logbooks – Reference Guide" in Appendix 1.

3. To accurately assess the most current trends in use for the proposal area and scenarios only the last ten years of trawl data was analyzed. It should be noted that future management changes could allow for increased opportunity in some of these areas and the effects would need to be reassessed.

a. Assessing Effects on the Commercial Crab Fishery

The effects of the change from the OPAC original proposal to the final proposal were assessed by finding and displaying the percentage of opportunity regained by the commercial crabbers that have been shown to use the area¹. The formula used for this assessment is listed below and it should be explained that the effects of any MPA were considered to be a total regain due to commercial crabbing being allowed in all the MPAs. The formula used to assess the change in commercial crab effects was:

Step 1: $TFC - MRC = TR$

Step 2: $TR/TFC = TPR$

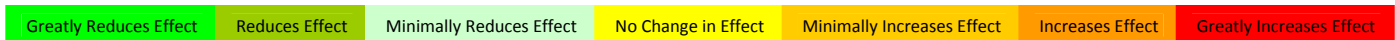
Where: TFC = Total Fleet Catch in OPAC original Proposal
 MRC = Marine Reserve Catch for scenario
 TR = Total Regained Opportunity (Lbs) by fleet
 TPR = Total Percentage Opportunity Regained by fleet

The proposal shows no change in effect from the OPAC site due to the size and location of the MPA. The commercial crab fishery for this area represent less than 1% of the total fleet wide catch but the MPA does not restore any real crabbing grounds to those commercial fishermen that use this area.

It should be noted that these effects were not applied at the individual vessel level and that the consensus of all reviewers and analysts is that the commercial crabbing effect shown below do not represent the true opportunity of the fleet. Because crab are considered a migratory and mobile species it is expected that those potential opportunity losses to the fleet from any proposed marine reserve (OPAC or scenario) would be accounted for and the effects balanced over the season as the fleet continues to crab at the same or similar level along the coast.

Table2. Change in commercial crab opportunity from OPAC original proposal

	<u>OPAC</u> Lost Opportunity (lbs)	<u>OPAC</u> % of Total Fleet Wide Catch	<u>Final Proposal</u> Lost Opportunity (approx. lbs)	<u>Final Proposal</u> % of Total Fleet Wide Catch (approximation)	<u>Final Proposal</u> Percent change in opportunity (approx, %)
CH	66,826	0.79%	49,016	0.6%	27%



1. This crab analysis was based on a single season data set and should be viewed as a snapshot in time of the crabbing activities at these sites.

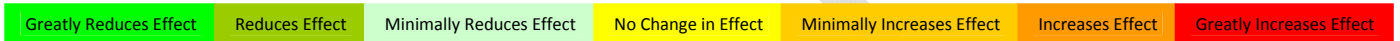
b. Assessing the Effects on the Commercial Salmon Fishery

No spatial data exists at this time to accurately assess the commercial Salmon fishery for the final proposal area. Therefore, a qualitative assessment of effect was based on the configuration of the final proposal boundary and informed by experiential knowledge given by stakeholders and expert input. It should be noted that the effects presented below could vary with additional information.

There is an expected reduction in effect to the commercial salmon fleet due to the location and allowances of the MPA. The MPA is expected to return important fishing grounds to the salmon fleet in this area. However, there is no data to prove that this area is used presently by the commercial salmon fishery.

Table3. Change in commercial salmon opportunity from OPAC original proposal

	<u>OPAC</u> Assumed Effect	<u>Final Proposal</u> Expected Change in Opportunity
CP	100% loss of opportunity	R



2. RECREATIONAL FISHERIES ANALYSIS

No spatial data exists at this time to accurately assess the recreational fisheries for the final proposal area. Therefore, a qualitative assessment of effect was based on the configuration of the final proposal boundary and informed by experiential knowledge given by stakeholders and expert input. It should be noted that the effects presented below could vary with additional information.

The effects depicted below were done by first designating a baseline effect of the OPAC site and then assessing the change in effect to different user groups over different scenarios. Categories considered were distance from recreational boat ports, alternate areas of opportunity, experiential knowledge of area use, and charter boat use analysis was used as a proxy for the groundfish fishery in the area.

There is no real change in effects from the OPAC site due to the position of the MPA making it difficult to know if this MPA will return any recreational fishing opportunity to users of this area. There is no data to prove that this area is used presently by recreational boat fishermen but it is assumed that the MPA is too far offshore for regional fishermen to access and the distance from major ports reduces the chance that fishers out of Astoria or Garibaldi areas will be impacted. Shoreside fishers see a reduced effect from OPAC due to the fishing allowances in the Falcon Cove beach area.

Table4. Change in recreational fisheries opportunity from OPAC original proposal

	OPAC Recreational Fisheries Assumed Effected	OPAC Assumed Effect	Final Proposal Expected Change in Opportunity
CP	Crab	Moderately Effected	NC
	Salmon	Moderately Effected	NC
	Groundfish	Minimally Effected	NC
	Shoreside	Moderately Effected	R

Greatly Reduces Effect

Reduces Effect

Minimally Reduces Effect

No Change in Effect

Minimally Increases Effect

Increases Effect

Greatly Increases Effect

3. CHARTER OPERATIONS ANALYSIS

Using the Sport Observer Program data the final proposal was compared with the OPAC original proposal to determine what effect the change had. Using the OPAC site as the baseline of charter usage the percent (%) increase or decrease in trip opportunity was determined and a level of effect designated. The table below shows that the OPAC site was designated as having a moderate effect on the charter fleet and the final proposal greatly reduces this effect. The final proposal returns the northern area of use to the charter fleet out of Garibaldi which was shown to be more highly used than any other.

It should be noted that the Sport Observer Program is a voluntary program and some charter operators have decreased their participation over the years and others have not allowed observers to record spatial information while on board. It is still assumed to show a reliable depiction of use by the charter industry in these areas.

The formula used to assess the effects on the charter industry is seen here.

Step 1: $TP - TPS = TPD$

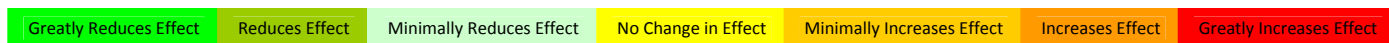
Step 2: $TPD/TP = TPC$

Where:
 TP = Total Percent Charter Use in OPAC
 TPS = Total Percent Charter Use in Scenario
 TPD = Total Percent Difference
 TPC = Total Percent Change in Use (gain or loss)

Table5. Change in charter operations opportunity from OPAC original proposal¹

	OPAC Lost Opportunity (% Trips)	Effect	Final Proposal Lost Opportunity (% Trips)	Final Proposal Change in Opportunity (% Trips)	Effect
CP	18%	Moderately Effected	1.4%	92%	R

1. The table shows the level of baseline effect of the OPAC originally proposed site and the percentage of regained or additionally lost opportunity.
 2. Beginning in 2008 charter observers out of Garibaldi have not been allowed to record spatial information for most observed charter trips. Any information recorded from these observed trips for years 2008 & 2009 have been excluded from the analysis and may cause use in the proposed area to be underestimated.
 3. Percentages based on Bottomfish charter trips out of Garibaldi as recorded by the Oregon Recreational Boater Survey (ORBS) data for the sampling time period of March – Oct/Nov. No ORBS data is recorded for Garibaldi from December – February.
 4. General area is defined as 5nm North & 30nm South of the proposed boundaries. These numbers represent only those years that observers recorded spatial information for most observed trips and drifts.
- * The observed data does not include those recorded outside of 40fms, that did not have spatial data connected, and only included start points for drifts made inside the proposed general and reserve area.
 * *Fishing regulations, like the 20fm RCA closure, have an effect on available fishing grounds for the charter industry and may increase use inside of the proposed areas.



4. COMMUNITIES OF PLACE ANALYSIS

Using experiential knowledge gathered from stakeholders (full & part-time residents, businesses, and other individuals familiar with the site) and expert testimony garnered from the STAC workshop, an assessment of effects was based on an estimate of the social and economic effects to a select number of communities¹. Four criteria were used to assess the level of effect and whether the effect would INCREASE, be REDUCED, or have NO CHANGE from the original OPAC proposal. The four criteria used were:

1. Traditions/Family Connection to Site
2. Religious/Spiritual Activity at Site
3. Subsistence Use at Site
4. Economic Income from Visitation to the Site or Extraction of Resources to the Community of Place.

Each community of place was assessed as to which of the four criteria best described its connection or association with the OPAC site and what effect the OPAC site had on the community. The criteria were weighted differently for each community of place to better assess the effects, for example Garibaldi was assessed using “Economic Income from Visitation to the Site or Extraction of Resources” (criterion 4) as the more heavily weighted criteria. Those criteria more heavily weighted are shown in **bold** in the table below.

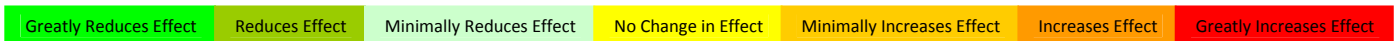
The final proposal reduces effects for Falcon Cove, Garibaldi, and Astoria but Nehalem sees no real change from the OPAC effects. This is a result of the northern boundary being lowered to allow for charter fishing and the allowance of shoreside fishing in the Falcon Cove area. The designation of “no change in effects” to Nehalem is mostly due to the size and location of the MR which is restricting most regional fishing grounds for this community. Commercial fishers out of Nehalem may be less impacted by this scenario due to the designation of the MPA.

Table6. Change in community of place effects from OPAC original proposal

	Communities of Place	OPAC Baseline Criteria Met	OPAC Baseline Effect	Final Proposal Change in Effect
CP	Astoria	1, 4	Minimally Effected	R
	Falcon Cove/ Cove Beach	1, 3, 4	Highly Effected	R
	Nehalem	1, 3,4	Moderately Effected	NC
	Garibaldi	1, 4	Minimally Effected	R

KEY:

- 1) Traditions/Family Connection
- 2) Religious/Spiritual Activities
- 3) Subsistence Use
- 4) Economic Income from Visitation to the Site or Extraction of Resources



1. The “Communities of Place” shown in the table were chosen for this analysis because they were deemed to represent the spectrum of communities possibly affected by a MR or MR/MPA at the site.