

# **Evaluating Puget Sound Marine Protected Areas to Increase Social Ecological Resilience**

## ***Mid Term Progress Report (Year 1)***

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## **Background**

MPAs are an important marine spatial planning tool defined in the following manner: "A clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values." (Dudley 2008:8). While the US government has now declared a national MPA system with 24 sites

located in Puget Sound, little is known about how well these MPAs are managed or how to improve their effectiveness.

MPAs have been present in Puget Sound since the early 1900s, although most were established after the 1960s (Whitesell et al. 2008, Van Cleve 2009). By 1998 there were at least 102 intertidal and subtidal protected areas in Puget Sound, created and managed by at least 12 different agencies or organizations at the local, county, State and Federal level (Murray and Ferguson 1998). A 2009 inventory found a total of 127 MPAs in Washington, of which 16% were no-take areas in which all resource harvest is prohibited. In addition to areas restricting harvest, some MPAs involve habitat protections or restrict non-harvest activities such as vessel anchoring or recreational access (Van Cleve et al. 2009). There are 110 officially designated MPAs in Puget Sound (366,503 acres and almost 600 miles of shoreline) of which 24 are within the national MPA system (Osterberg 2012).

MPA sites in Puget Sound have not been systematically evaluated even against their designation objectives although some efforts have been made to evaluate biological response, e.g., Palsson, et al. 2009 and Williams et al. 2010. Osterberg (2012) provides a policy assessment to realize different forms of a network that should be complemented with multi-site research. The lack of progress in some of the MPA policy dimensions can be attributed in part to a lack of understanding of how management is taking place and the basis for public interest and support for management measures.

More recently, the declines in abundance of certain species of rockfish drove development of a new spate of no-take fisheries zones under WDFW auspices. In further action to protect declining rockfish populations, WDFW developed the Puget Sound Rockfish Conservation Plan (WDFW 2011) where a lead option for management is designation of considerably more no-take fisheries reserves. With the 2010 federal listing of three species of rockfish under the Endangered Species Act, the impetus to develop critical habitat designation and the likely measures under consideration for rockfish recovery planning are likely to include no-take rockfish habitat protection. The National Marine Fisheries Service is leading a

Rockfish Recovery Working Group and MPAs are frequently discussed as an important potential recovery tool.

The choice of policy measures employing MPAs for rockfish or other goals is not one that can be taken lightly or without support of a solid social, economic and ecological science based approach. A principal reason for this is the national and state commitment to the interests of the Treaty Tribes and fishing rights of Native Americans and controversies that MPAs create. As co-managers of fisheries the tribes are prepared to work to restore fisheries but would prefer methods that do not impinge on their rights to fish in their Usual and Accustomed Fishing areas, and methods that would accord full respect and support to their role as co-managers (Whitesell et al. 2008). While interest in new MPA declarations may be increasing among proponents, tribes and other social groups such as recreational fishing organizations have expressed concern about an MPA policy. Tribes are concerned that MPAs will impinge on their treaty fishing rights and usage. While tribes are likely unwilling to *formally* give up fishing rights anywhere in Puget Sound, 2010 interviews indicate that tribal members have followed MPA no-fishing rules in at least two of the seven studied no-fishing sites (Hard et al. 2012). Recreational fishing groups, such as the Coastal Conservation Alliance and Puget Sound Anglers, are similarly ambivalent about MPAs. Recreational fishing groups have been vocal in the protection of recreational fishing access, and have opposed the designation of marine reserve networks in California (Mize 2006).

Here we report on some of the finding and progress made toward addressing the following research questions:

- 1) What are the conditions and processes that lead to successful MPA implementation in diverse contexts?
- 2) What are the opportunities for the Puget Sound Partnership and other Puget Sound MPA planning processes to improve MPA management effectiveness?
- 3) Should and can MPAs be used to increase social and ecological resilience in response to rockfish recovery needs, habitat loss, changing use patterns of Puget Sound resources, ocean acidification, and concomitant climate stresses?

The information presented in this report is preliminary and not exhaustive. We present selected variables that are commonly believed to influence MPAs success. Additionally, we present data illustrating progress made toward accomplishing the objectives outlined in the proposal.

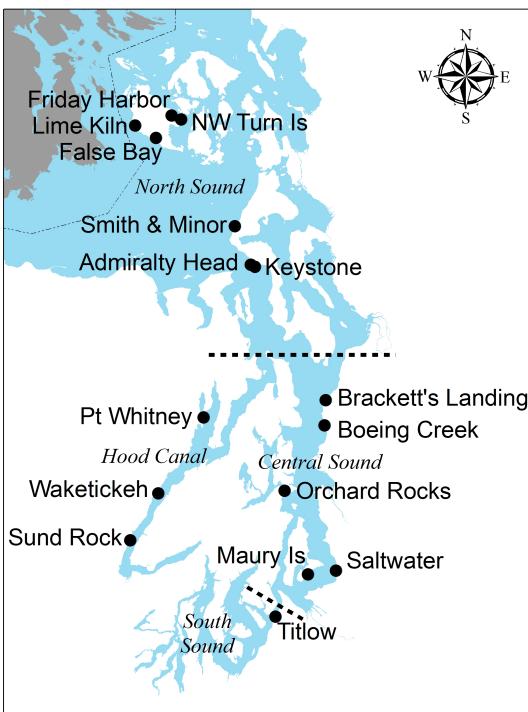
## **Materials and Methods**

Initial exploratory interviews were performed over the phone with individuals who were actively engaged in MPA science, policy and management in Puget Sound. These interviews were used to inform the development of our more formal survey instruments. We also collated relevant literature pertaining to MPAs in Puget Sound and mined these documents for themes and topics to help frame our survey instruments and interview guidelines as well as identify initial field sites.

We used structured interviews to survey community members, resource users, key informants, and policy makers. Community members were intercepted along the shoreline, at their homes, or grocery stores within the vicinity of a surveyed MPA or reference site. Resource users were self identified as fishers or recreational SCUBA divers and intercepted along the shoreline, boat launches, shoreline or other locations within the vicinity of a surveyed MPA or reference site. Key informants were people who were more engaged on issues pertaining to a given MPA (i.e., formation, implementation or management) and had significant historical knowledge about the areas. Policy makers were those who directly influenced policy or had significant influence on shaping policies on MPA implementation and management. These people often worked for a state or federal agencies, non-governmental organizations, or academic institutions. The structured interviews were conducted in-person using Open Data Kit (ODK) digital data collection software on Android-based cell phones. We used a modified simple random sampling approach commonly used in field-based social sciences to sample community and resource user informants, while we used purposive sampling to sample key informants.

In addition to structured interviews, we conducted semi-structured, qualitative interviews to complement the quantitative surveys to access the detailed

nuances associated with perceptions on Puget Sound MPAs. These interviews were only performed on policy maker informants to understand issues such as collaboration, management, enforcement, and other relevant thematic topics. We used purposive sampling to sample policy makers. The interviews were transcribed, uploaded to Atlas.ti software, coded based on themes, and analyzed. These interviews were conducted in-person whenever possible, and over the phone when the informant was unreachable for an in-person.



**Figure 1:** MPA and reference site locations, and four sub-basins: 1) Hood Canal, 2) Central Puget Sound, 3) North Puget Sound, and 4) South Puget Sound.

informants, and policy makers). With the exception of the policy surveys, the surveys were utilized at the following MPA locations.

## Site Selection

The sites where we conducted the community, resource user, and key informant interviews were distributed across the Puget Sound (Figure 1). These sites were selected because they represented different management approaches, use patterns, and community involvement, albeit we focused on sites that were managed by WDFW. Some locations were specifically selected to complement WDFW fish monitoring efforts.

Distinct survey instruments were developed for each informant type (i.e., community members, resource users, key

MPA Name	Date Est.	Area (ha.)	Dive Usage	Management (Agency)
Admiralty Head	2002	35.77	Low	Preservation Area (WDFW/State Parks)
Brackett's Landing	1970	23.81	Very High	Conservation Area (WDFW/City of Edmonds)
False Bay	1990	129.60	None, intertidal	Preservation Area (WDFW/UW)
Friday Harbor	1990	172.21	Medium-research divers	Preservation Area (WDFW/UW)
Keystone	2002	4.61	High	Conservation Area (WDFW/State Parks)
Lime Kiln	1997	22.06	Low	Voluntary No-Take (San Juan County/State Parks)
Maury Island	2000	2.02	Low	Aquatic Reserve (WDNR)
Orchard Rocks	1998	41.93	Low	Conservation Area (WDFW)
Saltwater State Park	2009	4.30	High	Preservation Area (WDFW/State Parks)
Smith & Minor	2010	14.57	Low	Aquatic Reserve (WDNR)
Sund Rock	1994	28.81	Very High	Conservation Area (WDFW/Private)
Titlow Beach	1994	16.86	High	Preservation Area (WDFW/City of Tacoma)
Waketickeh	2000	59.22	Medium	Preservation Area (WDFW/Private)

In addition to MPA sites, we employed community and resource user surveys at three reference sites without MPA designation for comparative purposes. The sites we used as reference locations included: 1) Turn Island near Friday Harbor, San Juan Island; 2) Pt. Whitney in Hood Canal; and 3) Richmond Beach State Park near Brackett's Landing. Turn Island was selected because WDFW has been monitoring biological variables in that region for a number of years and we remain confident we will eventually gain access to those data for inclusion into our final analysis. Pt Whitney was selected because the region experience heavy use by tribal and other fishers as well as SCUBA divers, and the area has also been slated for future conservation as an Aquatic Reserve under DNR's management authority. Last, Richmond Beach State Park was selected because it neighbors Brackett's Landing MPA, experiences heavy use, and neighbors WDFW's Boeing Creek biological monitoring site.

We augmented our community surveys by interviewing informants at nearby grocery stores in Hoodsport and near Pt. Whitney. Augmenting our community surveys in this manner was pursued because some locations required users to pay an access fee and largely attracted SCUBA divers wanting to use the resource, which limited the number of community and resource user informants.

## Preliminary Results

We completed a total of 1,532 community, resource user and key informant surveys and an additional 28 policy makers surveys and 34 semi-structured, qualitative interviews. The number of community members, resource users and key informants intercepted by at each site varied widely (Table 1).

**Table 1. Number of Community, Resource User and Key Informant Surveys Completed per site for each Site Category**

Site Name	Site Category						Total
	WDFW Conservation Area	WDFW Preservation Area	WDNR Aquatic Reserve	Reference Site	Volunteer BRZ	No Reserve	
Admiralty Head	0	85	0	0	0	0	85
Boeing Creek	0	0	0	121	0	0	121
Bracketts Landing	159	0	0	0	0	0	159
False Bay	0	82	0	0	0	0	82
Friday Harbor	0	96	0	0	0	0	96
Keystone	108	0	0	0	0	0	108
Lime Kiln	0	0	0	0	81	0	81
Maury Island	0	0	83	0	0	0	83
NWS Turn Island	0	0	0	66	0	0	66
Orchard Rocks	109	0	0	0	0	0	109
Salt Water State Park	0	83	0	0	0	0	83
Smith & Minor	0	0	92	0	0	0	92
Sund Rock	51	0	0	0	0	0	51
Titlow Beach	0	92	0	0	0	0	92
Waketickeh Creek	34	0	0	0	0	0	34
Pt Whitney	0	0	0	64	0	0	64
Pt Whitney <sup>1</sup>	0	0	0	0	0	28	28
Hoodsport <sup>1</sup>	0	0	0	0	0	98	98
<b>Total</b>	<b>461</b>	<b>438</b>	<b>175</b>	<b>251</b>	<b>81</b>	<b>126</b>	<b>1,532</b>

<sup>1</sup>Grocery store' survey locations where surveys were used to augment community and resource user interviews

## *Perceptions of Resource Conditions and Change*

We examined perceptions of resource conditions and change using five 5-point likert scaled questions (Table 2).

**Table 2.**

<b>Question</b>	<b>Measurement Scale (1-5)</b>
In your opinion, what is the overall condition of the marine environment of Puget Sound?	Very poor to very good
In your opinion, what is the condition of the marine environment here compared to the rest of Puget Sound?	A lot worse to a lot better
In the last 10 years, how have eelgrass beds changed in this area?	Significantly decrease to significantly increase
In the last 10 years, how have the number of shellfish changed in this area?	Significantly decrease to significantly increase
Has the number of fish inside this reserve changed since this reserve was established?	Significantly decrease to significantly increase

Table 3 shows the percent distributions of scale values for each question of the total Puget Sound sample.

**Table 3. Perceptions of Conditions and Changes in Resources for Puget Sound**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>Mean</b>	<b>N</b>
Condition of Puget Sound <sup>1</sup>	2.38	12.62	34.10	36.89	14.02	3.48	1220
Condition of Location <sup>2</sup>	1.10	4.85	40.53	35.59	17.93	3.64	1093
Shellfish Change <sup>3</sup>	20.65	32.39	34.41	9.31	3.24	2.42	247
Eelgrass Change <sup>3</sup>	15.82	22.60	39.55	16.95	5.08	2.73	177
Fish in Reserve Change <sup>4</sup>	9.76	9.76	26.83	26.83	26.83	3.51	41

<sup>1</sup>Very Poor to Very Good, <sup>2</sup>A Lot Worse to A Lot Better,

<sup>3</sup>Past 10 years significantly decrease to significantly increase,

<sup>4</sup> Significantly decrease to significantly increase since reserve established

Differences in sample sizes (N) are due to the fact that different questions apply to various sub-samples of the total sample and missing data (see description of sample above). Most respondents perceive conditions and changes to be on the neutral or positive side for the general condition of Puget Sound, the general condition of their location in comparison with the entire sound and changes in the numbers of fish in their reserves (Table 3). In contrast, most perceive neutral or negative changes with regard to eelgrass and shellfish (Table 3).

Next, we examined responses to the same variables in different geographical sub-regions of Puget Sound (Table 4).

**Table 4. Mean Values for Perceived Conditions and Changes in Resources in Sub-Regions of Puget Sound.**

	North PS		Central PS		South PS		Hood Canal		Kruskal Wallis H	P
	Mean	N	Mean	N	Mean	N	Mean	N		
Condition of Puget Sound <sup>1</sup>	3.54	525	3.38	423	3.60	77	3.48	195	9.03	<b>0.03</b>
Condition of Location <sup>2</sup>	3.85	460	3.43	392	3.46	65	3.64	176	54.62	<b>&lt;0.01</b>
Shellfish Change <sup>3</sup>	2.54	87	2.22	67	2.00	10	2.51	83	7.07	0.07
Eelgrass Change <sup>3</sup>	2.86	77	2.69	49	2.60	10	2.58	41	2.86	0.41
Fish in Reserve Change <sup>4</sup>	3.63	8	3.18	17	3.00	2	3.93	14	4.18	0.24

<sup>1</sup>Very Poor to Very Good, <sup>2</sup>A Lot Worse to A Lot Better,

<sup>3</sup>Past 10 years significantly decrease to significantly increase,

<sup>4</sup>Since Reserve significantly decrease to significantly increase.

Sub-regions of Puget Sound are significantly different with regard to perceptions of the overall condition of Puget Sound and the respondents' perceptions of the general condition of their location in comparison with the entire sound (Table 4). The differences are small, but statistically significant, indicating slightly more negative perceptions in central Puget Sound for the whole sound and the respondent's locale and higher evaluations of the respondents' locale in North Puget Sound and Hood Canal. Central Puget Sound (including Seattle and Tacoma) is the most developed/ altered portion of Puget Sound.

We further examined responses to the same variables associated with different marine reserve types (Table 5).

**Table 5. Mean Values for Perceived Conditions and Changes in Resources by Reserve Type.**

	Condition Puget S.	Condition Site	Shellfish Change	Eelgrass Change	Fish Change in Reserve
<b>No Reserve</b>	<b>3.51</b>	<b>3.38</b>	<b>2.48</b>	<b>1.88</b>	<b>3.00</b>
N of Cases	68	55	23	8	1
<b>WDFW Conservation Area</b>	<b>3.40</b>	<b>3.56</b>	<b>2.37</b>	<b>2.77</b>	<b>3.78</b>
N of Cases	339	306	76	53	23
<b>WDFW Reference Site</b>	<b>3.50</b>	<b>3.65</b>	<b>2.43</b>	<b>2.54</b>	.
N of Cases	210	195	51	28	0
<b>WDNR Aquatic Reserve</b>	<b>3.38</b>	<b>3.61</b>	<b>2.37</b>	<b>2.88</b>	<b>2.86</b>
N of Cases	159	143	30	26	7
<b>WDFW Marine Preserve</b>	<b>3.51</b>	<b>3.75</b>	<b>2.45</b>	<b>2.86</b>	<b>3.33</b>
N of Cases	371	331	58	56	9
<b>Lime Kiln</b>	<b>3.74</b>	<b>3.83</b>	<b>2.67</b>	<b>2.50</b>	<b>4.00</b>
N of Cases	73	63	9	6	1
<b>Kruskal Wallis H</b>	<b>11.16</b>	<b>11.78</b>	<b>1.76</b>	<b>7.46</b>	<b>4.83</b>
<b>P</b>	<b>0.05</b>	<b>0.04</b>	<b>0.88</b>	<b>0.19</b>	<b>0.31</b>

Once again the between group differences are minimal, and the only statistically significant relationship is found with regard to the respondents'

perceptions of the general condition of their location in comparison with the entire sound.

#### *Marine Protected Area Enforcement*

The degree of MPA rule enforcement is a logical measure of MPA management effectiveness. When rules are not enforced, positive social or biological changes are unlikely. We asked community members, resource users, and key informants their perceptions on MPA enforcement adequacy using a 5-point Likert scale question, where responses ranged from 'strongly disagree' to 'strongly agree.' The level of management and the level of enforcement are highly correlated (Spearman's Rho =0.42, p<0.001). Sites where 50% of respondents rated enforcement adequacy  $\geq 3$  were considered enforced, and the remaining sites were considered non-enforced (Table 6).

**Table 6: Enforced and Non-Enforced MPA**

**Site Locations**

<b>Enforced</b>	<b>Non-Enforced</b>
Admiralty Head	Orchard Rocks
Bracketts Landing	Titlow Beach
False Bay	Waketickeh Creek
Friday Harbor	
Keystone	
Lime Kiln	
Maury Island	
Salt Water State Park	
Smith & Minor	
Sund Rock	

We examined the correlation between the level of enforcement and 20 other variables using Pearson Correlation (Table 7). The three variables that were correlated with level of reserve enforcement included the level of support for the reserve, rule clarity, and rule adherence, which are common predictive variables for MPA success.

**Table 7. Analyzed Variables in Relationship to the Level of Enforcement**

Variable	N	R	P
Support Level During Establishment	11	0.18	0.59
Opinion had Impact	11	0.21	0.53
Level of Support Now	124	-0.07	0.41
<b>Majority Support Reserve</b>	<b>94</b>	<b>0.30</b>	<b>&lt;0.010</b>
Boundary Clear	113	0.18	0.06
Condition in MPA After	111	0.06	0.52
Change in Fish in Reserve	24	0.03	0.90
Threat Reduced	36	-0.05	0.77
Change in Catch Near Reserve	24	0.13	0.55
	<b>86</b>	<b>0.33</b>	<b>&lt;0.001</b>
<b>Rules Clear</b>			
<b>Frequency Follow Rules</b>	<b>114</b>	<b>0.38</b>	<b>&lt;0.001</b>
Community MPA Leader	74	0.00	0.98
Shellfish Change	62	-0.03	0.81
Eelgrass Change	57	-0.06	0.67
Tribe Past Involvement	10	-0.49	0.15
Tribe Present Involvement	13	-0.40	0.18
Level of Tribe Agreement with MPA Regulations	5	0.28	0.65
Level of Tribal Compliance with MPA Regulations	21	0.02	0.94
Strength of Collaborative Process	16	-0.05	0.85
Sufficient Funds for Collaborative Process	17	0.29	0.25

### *Climate Change and Ocean Acidification*

We examined twelve variables (Table 8) across the four Puget Sound sub-basins illustrated in Figure 1 and by level of enforcement. We present the descriptive statistics grouped by sub-basin and level of enforcement. Our intent is to examine spatial and MPA-influenced patterns for perceptions related to climate change and ocean acidification.

**Table 8. Twelve Analyzed Variables Examining Spatial and MPA-Influenced Patterns Related to Climate Change and Ocean Acidification**

<b>Question</b>	<b>Measurement Scale</b>
(Q1) What is the condition of the marine environment here compared to the rest of Puget Sound?	Very poor [1], Poor [2], Average [3], Good [4], Very good [5]
(Q2) Do you think the climate in this area is changing?	No [0], Yes [1]
(Q3) Is this change:	Very Bad [1]    Bad [2]    Neutral [3]    Good [4] Very good [5]    Don't know [ ]
(Q4) In your lifetime, do you think there will be impacts in Puget Sound due to a changing climate?	No [0], Yes [1]
(Q5) Have you heard of ocean acidification?	No [0], Yes [1]
(Q6) Prior to the establishment of this reserve, what was the condition of the marine environment within this reserve?	Very poor [1], Poor [2], Average [3], Good [4], Very good [5]
(Q7) Currently, what is the condition of the marine environment within this reserve?	Very poor [1], Poor [2], Average [3], Good [4], Very good [5]
(Q8) Has the number of fish inside this reserve changed since this reserve was established?	Decreased a lot [1], Decreased a little [2], No change [3], Increased a little [4], Increased a lot [5]
(Q9) Has the catch near this reserve changed since this reserve was established?	Decreased a lot [1], Decreased a little [2], Not changed [3], Increased a little [4], Increased a lot [5]
(Q10) Have these threats been reduced by the presence of this reserve?	No [0], Yes [1]
(Q11) In the last 10 years, how have the number of shellfish changed in this area?	Significantly decreased [1], Decreased [2], No change [3], Increased [4], Significantly increased [5]
(Q12) In the last 10 years, how have eelgrass beds changed in this area?	Significantly decreased [1], Decreased [2], No change [3], Increased [4], Significantly increased [5]

The majority of respondents believed they would experience impacts from climate change within their life across sub-basins and enforced MPAs (Tables 9 and 10); however, most felt the condition of the marine environment within the reserves was good. Many people felt shellfish and eelgrass - two important biological variables associated with climate change and ocean acidification – had decreased in the last 10 years (Tables 9 and 10). These results suggest people are concerned about climate change and ocean acidification but they feel things are largely stable within the MPAs.

**Table 9. Descriptive Statistics for Climate Change and Ocean Acidification Related Variables for Sub-Basin Regions**

Sub-Basin		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Hood Canal	N	176	165	90	101	202	16	50	14	6	12	83	41
	Mean	3.64	0.56	2.62	<b>0.70</b>	0.52	3.56	4.10	3.93	2.83	<b>0.83</b>	2.51	2.56
Central Puget Sound	N	392	375	249	158	435	23	55	17	17	21	67	49
	Mean	3.43	0.70	2.46	<b>0.78</b>	0.51	2.83	3.85	3.18	2.76	0.62	2.22	2.69
North Puget Sound	N	460	417	272	238	544	23	68	8	19	29	87	77
	Mean	3.85	0.68	2.40	<b>0.75</b>	0.60	3.78	3.97	3.63	3.11	0.72	2.54	2.86
South Puget Sound	N	65	66	44	31	78	2	10	2	3	3	10	10
	Mean	3.46	0.70	2.55	<b>0.81</b>	0.42	3.50	4.00	3.00	2.33	0.67	2.00	2.60

**Table 10. Descriptive Statistics for Climate Change and Ocean Acidification Related Variables for Enforced MPAs**

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
N	548	511	322	268	629	46	139	28	31	45	113	97
Mean	3.66	0.67	2.44	0.74	0.54	3.20	4.03	3.64	2.97	0.69	2.41	2.84

An initial analysis of the qualitative interview data suggests that the two main MPA programs in Puget Sound, led by WDFW and WDNR, exist along separate tracks with little interaction. Informants affiliated with WDFW and WDNR spoke highly of each other and often stated that they knew many employees working in the other agency, but that the two agency's programs rarely interact given their separate mandates. Interestingly, the concerns and sources of optimism offered by informants fell into similar themes. Many of the concerns revolved around resource limitations: both the practical need for ongoing funding and staff time, and higher level, programmatic, needs. Informants pointed out that Washington did not have a formally organized MPA network, as in neighboring states and provinces, backed by a legislative mandate to create and provide for such a network. The interviews also suggested that any networking of MPAs, either programmatically linking existing sites or developing new sites within an ecological network design, was unlikely without a legislative mandate or a strong statement of support from the governor's office. Most other MPA concerns that were shared revolved around the reasoning behind site selection, the degree to which collaboration with sister agencies and co-

manager tribes occurred, and the ongoing efforts to engage the public and increase awareness of MPAs and improve the enforcement.

The selection of MPA sites was often described as unscientific. One interviewee stated that the use of a science-informed selection process “(n)ever happened...Some were established because of political pressures. I don’t want to say none, but the ones that I’m aware of, they were not established based on solid scientific questions and there is no survey(ing) established to monitor if a question is being answered.” Another interviewee described site selection as a “beauty contest...that’s not a scientific assessment of what Puget Sound needs.” Nonetheless, most informants were optimistic about MPAs as a policy tool. Informants felt that MPAs can serve as effective tools for protecting habitats, raise the public conscious about Puget Sound, provide reference sites, and support restoration efforts.

Several interviewees reported that the creation and management of MPAs has fostered community engagement in Puget Sound recovery. But as with any participatory process, MPA designations can serve to bring diverse user groups to the bargaining table resulting in complex and conflicted planning processes. Many interviewees spoke highly of participatory processes and saw social value in engaging resource users in the management of Puget Sound. Other resource managers suggested that MPAs have helped preserve some important habitats that are used by groundfish, and that larger fish are found in these sites than outside of them. Similarly, many informants suggested that MPAs could serve as important tools in the recovery of the three ESA-listed species of rockfish. As one person pointed out, “It’s just a decrease in the take...once you stop the take those fish are just going to get bigger. And in most cases they do.”

The survey and interview results are generally aligned and will be further analyzed.

## **Next Steps:**

### *Research and Outreach on Tribal Perspectives*

Washington’s treaty Indian tribes hold important authorities over marine resources and function not only as stakeholders, but as managers and even (as some

tribal managers frame it) functional owners of resources that can be affected by MPAs. For that reason, the PIs for this study regard tribal participation as a precondition for developing a sound understanding of the past performance and future prospects of spatial conservation strategies in Puget Sound. In particular, we hope that they will participate in interviews. Obtaining permission from tribal governments for them to participate has proved to be no small hurdle. It has required a patient and strategic approach to understand tribal concerns, influential decision factors that arise from internal and inter-tribal relations, and appropriate protocols for cultivation of sources. The PIs for this study have embraced a policy that permission from tribal governments is a prerequisite to engaging tribal members or resource managers as informants. We take this view because tribes and scholars have voiced two distinct concerns that pertain to any study seeking tribal perspectives on MPAs. These concerns focus on (1) potential for loss of access and management authority over natural resources, and (2) potential for “misuse or appropriation” of tribal knowledge by researchers (Chief et al. 2014). The Northwest Indian Fishery Commission in 2003 (NWIFC 2003, Frank 2003) expressed the view that MPAS and spatial conservation measures were being planned “with no apparent regard for tribal interests.” The Commission, representing 20 treaty tribes, laid down a list of criteria for any new MPAs, reserves or sanctuaries.

Several members of the team have engaged in the effort to understand tribal concerns and to secure permission for tribal participation in the study. Building on working relationships with several tribal resource managers and advisors, the project PIs developed and pursued a careful strategy. To inform this initiative, project PIs has conducted a series of off-record interviews and consultations with senior level staff and advisors at tribes and the commission; pursued tribal staff recommendations to seek support from a small group of recognized thought leaders among tribal managers; and arranged an off-record meeting with the commission’s executive director.

In these discussions tribal managers and elected leaders generally have started by expressing reluctance to re-open any discussion of MPAs. However, some

have warmed to the subject as they learned more about the potential for tribes to participate in evaluating past MPA performance and designation processes and to help frame new objectives for future spatial conservation measures in the context of geochemical and climatic change. Past MPA and sanctuary designation processes have generated a backlog of skepticism and anger among tribal leaders, and we have received some indications that managers are weighing the cost in political capital that they may need to expend in order to seek approval to participate.

At this writing it appears that several tribal resource managers nonetheless are interested in participating, so long as the principles of the 2003 statement are recognized, the intended uses of data are clear, and the provisions for pre-disclosure review of tribal content are acceptable. The project team continues to work with tribal staff and leaders on several avenues of engagement. A significant development occurred in December 2014 when Terry Williams, Director of the Tulalip Tribes' Office Treaty Rights, agreed to endorse and convey our letter to the Tulalip Board of Directors, requesting permission for Tulalip managers to participate in the study.

## References

Chief, Karletta, AM Chischilly, P Cochran, P Hardison, K Lynn, G Morishima, J St Arnold, G Voggesser, KP Whyte, D Wildcat, S Wotkins, Guidelines for Considering Traditional Knowledges in Climate Change Initiatives, Version 1.0, September 2014, Climate and Traditional Knowledges Workgroup, <http://climatekw.wordpress.com>

Frank, Billy Jr, letter to US Secretary of Commerce conveying Tribal Policy Statement from the chairman of the Northwest Indian Fisheries Commission, July 2003.

Hard, C.H., K.R. Hoelting, P. Christie, and R.B. Pollnac. 2012. Collaboration, legitimacy and public awareness: A case study of Puget Sound MPAs. *Coastal Management* 40:312-326.

Mize, J. 2006. Lessons in state implementation of marine reserves: California's Marine Life Protection Act initiative. *Environmental Law Reporter* 36 ELR 10376.

Murray, MR and Ferguson L. 1998. The *Status of Marine Protected Areas*. Proceedings of the Puget Sound Research Conference, Seattle, WA. Puget Sound Water Quality Action Team. 1998 pp. 783-793.

NWIFC, 2003, Tribal Policy Statement: Marine Protected Areas, Marine Sanctuaries, and Fishery Conservation Zones, Northwest Indian Fisheries Commission, Olympia WA, June 26, 2003.

Osterberg, A. 2012. *Developing a Network of Marine Protected Areas in Puget Sound. A Synthesis Report on Challenges, Opportunities and Policy Options.* A report prepared for the Puget Sound Partnership under WA Sea Grant Hershman Fellowship program.

Palsson, W.A., Tien-Shui Tsou, Greg G. Bargmann, Raymond M. Buckley, Jim E. West, Mary Lou Mills, Yuk Wing Cheng, and Robert E. Pacunski. 2009. *The Biology and Assessment of Rockfishes in Puget Sound.* Fish Management Division, Fish Program Washington Department of Fish and Wildlife. Olympia, WA.

Puget Sound Partnership, 2013 State of the Sound: A Biennial Report on the Recovery of Puget Sound, October 2013.

Van Cleve, FB, G Bargmann, M Culver, and the MPA Work Group. 2009. *Marine Protected Areas in Washington: Recommendations of the Marine Protected Areas Work Group to the Washington State Legislature.* Washington Department of Fish and Wildlife, Olympia, WA.

Washington Department of Fish and Wildlife (WDFW). 2011. *Final Puget Sound Rockfish Conservation Plan, Policies, Strategies and Actions including Preferred Range of Actions.* WDFW, Olympia, WA.

Whitesell, EH, FW Schroeder and P. Hardison. 2008. Protecting Washington Marine Environments: Tribal Perspectives. Olympia, WA. 43 pp. Unpublished Report.

Williams, GD, PS Levin and WA Palsson. 2010. Rockfish in Puget Sound: an ecological history of exploitation. *Marine Policy* 34:1-1010-1020.