Policy Priorities in Puget Sound: An Analysis of MPA Implementation

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Abstract

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Currently there are 110 officially recognized marine protected areas (MPAs) in Puget Sound that cover approximately 15% of the marine environment. This analysis focuses on how the natural resource management agencies of Washington State have implemented MPA policy and the degree to which experts perceive them to be effective. The large number of MPAs and multiple governing agencies involved in their management indicate different goals are being pursued. This study used a combination of purposive and snowball sampling to develop a candidate pool of informants. Thirty-four qualitative interviews were conducted in 2014 of federal and state policy managers, staffers, scientists, as well as nonprofit experts and members of the epistemic community. Interview transcripts were analyzed in conjunction with a Sabatier-Mazmanian policy implementation framework to identify gaps. Results indicate that some Puget Sound MPAs suffer from an inadequate or consistent justification for their existence, resource limitations stemming from the negative perceptions of senior leaders hampering monitoring and outreach, and the challenging, legally-mandated co-management process. This suggests

implementation of MPA policy is hindered by a lack of leadership and support. Also, policy has not consistently utilized appropriate site selection protocol or engaged co-managers on their concerns regarding spatial conservation tools. Implementation gaps are likely to remain until MPA policy follows from specific goals and needs, and levels of support are unlikely to increase unless public managers can unequivocally point to measurable improvements stemming from the policy.

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List of Abbreviations and Acronyms

Clallam	Clallam County, WA
LLtK	Long Live the Kings
MPA	Marine Protected Area
NRNC	Nisqually Reach Nature Center
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NW Straights	Northwest Straights Marine Conservation Commission
PSP	Puget Sound Partnership
RCW	Revised Code of Washington
SeaDoc	The SeaDoc Society
Seattle	Government of the City of Seattle
Tacoma	Government of the City of Tacoma
TNC	The Nature Conservancy
WAC	Washington Administrative Code
WDFW	Washington State Department of Fish and Wildlife
WDOH	Washington State Department of Health
WDNR	Washington State Department of Natural Resources
WEC	Washington Environmental Council
WECY	Washington State Department of Ecology
WPRC	Washington State Parks and Recreation Commission
USFWS	United States Fish and Wildlife Service
UW	University of Washington

Introduction

Marine Protected Areas (MPAs) are an important policy tool for the ongoing management of marine resources in Puget Sound. In the Puget Sound context, they are primarily resource conservation instruments implemented by public agency managers to constrain the actions of resource users to achieve long-term gains in the protection of specific resources and habitats and to foster non-extractive recreational activities such as SCUBA diving. The International Union for Conservation of Nature (IUCN) defines a protected area as: "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). Currently there are 110 recognized MPAs in Puget Sound that cover more than 366,500 acres of ocean and almost 600 miles of shoreline (Osterberg 2012). While approximately 15% of the marine environment of Puget Sound has been set-aside in an MPA, MPAs designated as "no-take", sites that forbid the harvesting of any resources, cover less than 500 acres or 0.07% (Osterberg 2012).

MPA policy in Washington State has been led by a diverse group of institutions over the course of several decades. The state Parks and Recreation Commission (WPRC), Fish and Wildlife Department (WDFW), Natural Resources Department (WDNR), and Department of Ecology (WECY) all oversee MPAs of various sizes with varying goals (Table 1). Their divergent institutional goals are provided and supported by distinct pieces of legislation. Subsequently, each agency manages their respective domain through varying rules with equally different measures of effectiveness. The Puget Sound Partnership (PSP) is a state agency responsible for the coordination of government, individual, non-governmental, and other stakeholder group efforts to recover Puget Sound by the year 2020. Part of their mission is to coordinate objectives and tasks across institutions to further good governance and sound-wide

recovery (PSP 2014: *vii*; PSP 2014a). PSP operates as a clearinghouse, with PSP personnel coordinating conservation and recovery of Puget Sound across all federal, state, and local governance agencies. They necessarily and regularly work with the Washington's land manager (WDNR) and living resources manager (WDFW).

Table 1: Managerial Authority for Puget Sound MPAs (Osterberg 2012: 15)

AGENCY	No. of MPAs	Size (Acres)	Shoreline (1,000's ft.)
Tacoma	2	13	1
Clallam	1	25	9
Seattle	6	108	11
USFWS	4	1,531	178
NPS	1	1,752	37
WDFW	24	1,946	129
WPRC	61	3,045	513
WECY	1	12,075	151
WDNR	9	30,177	396
UW	1	292,414	2,251
TOTAL	110	343,086	3,676

This analysis focuses on how the natural resource management agencies in Puget Sound have implemented MPAs and the degree to which experts perceive them to be "successful." An MPA may be a success and a failure simultaneously: meeting social goals is as important as biological goals in determining MPA success (Christie 2004). A manager's perceptions of MPA effectiveness can serve as a compliment to biological or social monitoring criteria (Pomeroy et al 2004). A useful and established policy-implementation framework is provided by Sabatier and Mazmanian (1980). This framework was designed to be applied across all policy arenas and refrains from being too narrowly focused on any one subject. It allows the researcher to consider the implementation of a particular policy using a framework based on past implementation successes. Sabatier and Mazmanian assert that disparate policies can be compared due to a similarity of socio-economic concerns and political realities that impact nearly all public decision

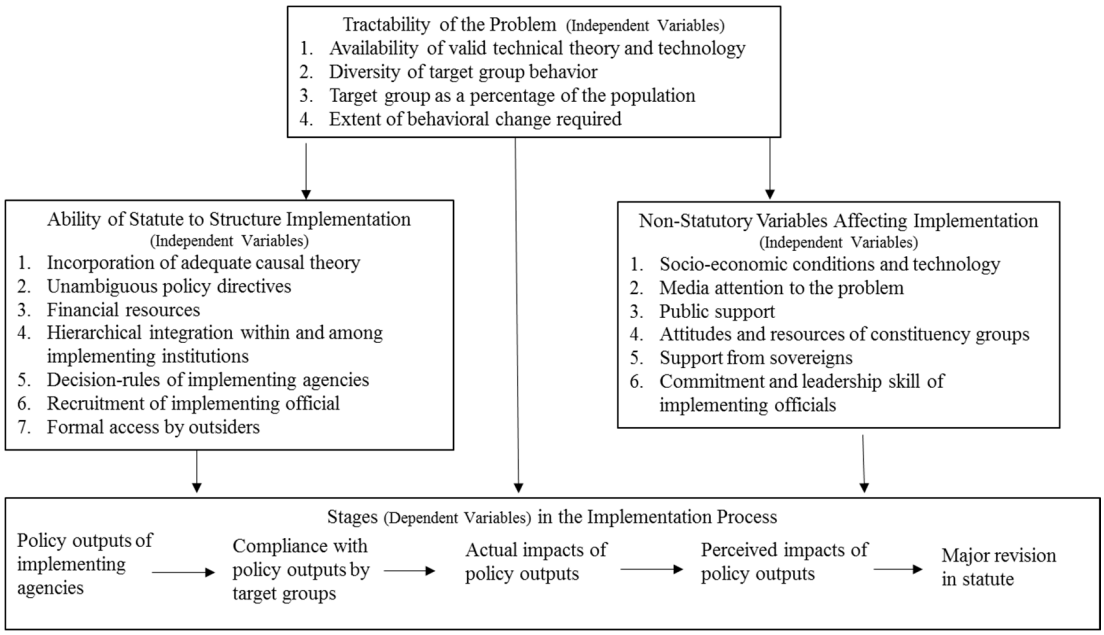
making (Sabatier and Mazmanian 1980). Specifically, their framework is designed to help the evaluation of policies that are meant to change how private citizens behave—in this case the creation of an MPA that forbids fishing. The framework includes contextual political variables that impact policy making and implementation (Sabatier and Mazmanian 1980).

Though the policy implementation framework created by Sabatier and Mazmanian is now 35 years old, policy scholars interested in a diverse spectrum of fields continue to use it. Google Scholar reports that the 1980 journal article has been cited 573 times, with an additional 442 citations of the book published one year after publication that also featured the framework (Google Scholar search, 2015; Sabatier and Mazmanian 1981). Most recently the framework has been used to study travel plans in Australian residential developments (De Gruyter et al 2015). Lowry (1985) used the framework to study the implementation of the Coastal Zone Management Act and noted the implementation gaps between the characteristics of the Act itself, the clarifying rules developed by administrators, and the probability of effective implementation (Lowry 1985). Similarly, Lester and Bowman (1989) used the framework to study elements that obstruct hazardous waste policy implementation across states. More recently, Wakita and Yagi (2013) used the framework to examine the failure of local Japanese governments to implement integrated coastal management principles into their larger development plans. These scholars identified the importance of having an adequate causal theory for the policy, the policy's ability to narrowly target the group whose behavior is affected, and the presence of sufficient resources to affect change.

The implementation framework (Figure 1) demonstrates three categories of (independent) variables that may affect the various stages of the implementation process (dependent variables). The variables are grouped by general category. The first category of variables relates to the ease

with which a policy may be implemented and tractable. For example, if a policy regulates a relatively small social group, the challenges are far less than a regulation aimed at a larger social group or multiple groups (Sabatier and Mazmanian, 1980). The policy is more tractable when applied to a smaller social group. The second category is concerned with the structure of the policy itself. For example, a policy that explicitly names its objectives is likely to have fewer long-term problems than a policy that sets only vague objectives as it allows for program evaluation more easily. The final category of variables revolves around the notion that broader political and social concerns can impact how a policy is implemented. A relevant example might be how a severe economic recession reduces a state government agency's budgets and staffing, thus limiting policy enforcement. The implementation process of any policy is dynamic and reflects both the actions of the implementing agency and the responses of the target audience. Given the dynamism of implementation, Sabatier and Mazmanian (1980) argue that the independent variables can affect the implementation process at any of the stages of implementation.

Figure 1 (Sabatier and Mazmanian 1980)



Many of the variables identified by the Sabatier and Mazmanian (1980) implementation framework correspond with principles outlined in the conservation project planning approach advocated by Margoluis and Salafsky (1998). Integral to their method is the notion that projects should revolve around a goal that is succinct yet visionary, while also measureable (Margoluis and Salafsky 1998). From the defining goal statement flows objectives that are designed to accomplish the goal. Preceding the project goal should be a conceptual model that explains the necessity of the project (Margoluis and Salafsky 1998). These factors of successful project development dovetail with the implementation framework. Sabatier and Mazmanian (1980) posit that a causal theory motivates the formation of the policy, which should produce specific changes that target a specific population, while be structured in such a way that success is achievable (Sabatier and Mazmanian 1980).

Much of the prior research on Puget Sound MPAs has examined the ways stakeholders perceive and engage the process of MPA development and governance (Hard et al 2012;

Hoelting et al 2013). The method used in this prior research employed a structured survey to capture the perceptions of groups of resource users in the larger Sound-wide environment. The prior research was designed to investigate the responses of local stakeholders who were involved with and affected by ongoing MPA management. Hard et al (2012) analyzed how different types of Puget Sound MPAs were established, the role of collaborative site-level implementation, and how different social groups responded to their site-level implementation. Hoelting et al. (2013) examined how different variables, including demographics, perceptions of the process of MPA creation, and perceived MPA benefits affected stakeholder support for MPAs across Puget Sound. These studies show that stakeholder perceptions of collaboration and biological "success" correlate with support for MPAs (Hard et al 2012; Hoelting et al 2013). Singleton (2009) points out that stakeholder participation processes can fail to give due weight to the special legal status and political capacities of native peoples, which is particularly true in Washington State (*United States v. Washington* 1974).

This research is distinct from prior research in its focus on resource managers rather than resource users. The thoughts, perceptions and beliefs of public resource managers are likely as instrumental in the success of MPA management as stakeholder groups. Managers' values, beliefs, and attitudes affect how they work with MPAs to achieve institutional goals. Additionally, policymakers are embedded within institutions with particular mandates, resources, and cultural norms. The degree to which each agency breaks out of its institutional silo and collaborates with other organizations is best explored with an in-depth research method so that specific instances of collaboration and their outcomes can be explored.

The WDFW manages three distinct types of MPAs: Conservation Areas, which are no-take sites; Marine Preserves, which allow for some level of fishing for certain species (e.g.,

salmon) on a site by site basis; and Sea Cucumber and Sea Urchin Commercial Harvest Exclusion Zones, which forbid the removal of sea cucumbers and sea urchins (WDFW 2014a). Fourteen Marine Preserves are managed in conjunction with either a local government, another state agency, or the University of Washington (UW), and abut public beaches. It is the agency's stated position that MPAs are a policy tool that will be used to further their institutional goals of conserving living resources, protecting important habitats, creating refuges, and providing research and educational sites (WDFW 2014b).

In 2010, the National Oceanic and Atmospheric Administration (NOAA) listed three species of rockfish (Bocaccio, *Sebastes paucispinis*; Canary, *Sebastes pinniger*; Yelloweye, *Sebastes ruberrimus*) in Puget Sound in need of recovery under the Endangered Species Act. The WDFW subsequently closed Puget Sound to fishing beneath the 120 foot depth line and forbade the harvest of any rockfish by nontribal fishers. In effect, they declared the Puget Sound an MPA closed to rockfish fishing (WDFW 2014c). This closure is primarily due to the natural low productivity levels of rockfish and the local history of over harvest by regional fishers (Williams et al 2010).

In 2008, the Washington State Legislator formed an MPA Working Group and asked the WDFW to lead an effort to inventory and assess the management of all MPAs in Washington. The working group also provided a series of recommendations to improve MPA management in anticipation of further use of the tool. These recommendations included: increase collaboration among managing organizations; provide adequate resources for their ongoing management; and increase the level of monitoring for effectiveness (Van Cleve et al 2009). These recommendations correspond to findings that increased levels of collaboration may improve

public support, and that monitoring which demonstrates effectiveness of a site can increase the positive sentiment of MPA stakeholders (Hard et al 2012; Hoelting et al 2013).

The WDNR is responsible for the management of 2.6 million acres of aquatic bedlands and tidelands in Washington State (WDNR 2015). The Aquatics Reserve program currently consists of seven sites in Puget Sound (WDNR 2014). As the state lands manager, the WDNR is institutionally focused more on aquatic lands than benthic resource management, and operates their program with the goals of preserving native ecosystems and providing funds for the enhancement or restoration of degraded spots. Concurrent with those goals, the WDNR has the stated aim to further the public use of state owned lands, improve public education about the environment, and allow for greater stakeholder feedback and consultation in the management of those state lands (WDNR 2015a). Since fisheries management is outside the WDNR purview, Aquatic Reserves do not restrict the harvest of most species. Currently, the Aquatic Reserves program is examining the possibility of expanding to an eighth, freshwater, site. This potential MPA would be their first outside of Puget Sound (WDNR 2014).

The primary mission of the PSP is to lead the environmental recovery of Puget Sound by the year 2020 (PSP 2014; PSP 2014a). Since the organization has no regulatory power, the main thrust of their efforts lies in coordinating ongoing work and developing programs and plans that best alight with PSP goals. The manifestation of their efforts are the biannual Action Agendas that serve as a map to the current state of recovery efforts and identify priorities for further work (PSP 2014b). In its role as a process facilitator and financial backer, the PSP has previously worked to support the WDFW's MPA Working Group recommendations by sanctioning the written report detailing Puget Sound MPAs (Van Cleve et al 2009). They have also worked towards an evaluation of their effectiveness (PSP 2012) and provided policy options and an

outline to develop a larger network of MPAs in Puget Sound (Osterberg 2012). This final report culminated in a workshop that brought together the state's MPA managers, NGO and tribal representatives, and some academics for the purpose of discussing the need for more MPAs in Puget Sound and whether its recovery would be facilitated by the development of a formalized MPA network. The workshop resulted in a summary report that described the appropriate next steps of continuing to improve collaboration across managing agencies, working to improving biodiversity conservation, and establishing a process to determine if a larger network of MPAs is needed and would facilitate Puget Sound recovery. The workshop report states that no mandate or resources exist for such a network (Keller 2012). The current edition of the Action Agenda notes that MPAs are a policy tool that can provide benefits to state agency managers and their goals, but that they should be supported by stakeholders, managed for effectiveness and designed properly (PSP 2014: 3B-22).

Essentially, both the Sabatier and Mazmanian (1980) and Margoluis and Salafsky (1998) frameworks are about governance. They both seek to outline how the formal and informal arrangements, institutions, and mores of society impact policy implementation and evaluate means of improving it (Juda 1999). Hard et al (2012), Hoelting et al (2013), and Singleton (2009) all describe how this institutionalized governance of MPAs interfaces with the public resource stakeholders in Puget Sound. Other scholars have focused on the governance and human dimensions of MPA managements in tropical contexts. Christie and White (2007) describe some common governance challenges, such as institutions having the capacity to manage MPAs on ecologically meaningful scales and a clear goal structure for their programs. Pollnac et al (2010) demonstrates that MPAs are inextricably linked social-ecological systems and that their effectiveness as a conservation instrument is tied to the actions of people who live

and work around them. As Caveen et al (2012) note, most of the research on MPAs stems from the tropics. The degree to which temperate region marine protected area managers evaluate the effectiveness of their work is a gap in the literature, and is not fully explored even in the rich literature on tropical MPAs. Grindle (2004) illustrates that "perfect" governance and implementation are unlikely scenarios, and that "good enough" governance is often sufficient for adequate public resource management.

To fill the abovementioned gap and describe how the resource managers of Puget Sound MPAs implement their policies, this research seeks to answer this research question, with incidental sub-questions:

1. Do marine resource managers and local policy experts consider the established marine protected areas of Puget Sound to be effective?
    A. How have past actions and events helped shape the current state of MPAs and their management?
    B. What challenges impair MPA management in Puget Sound?
    C. What opportunities exist to expand or improve MPA management in Puget Sound?
    D. Do Puget Sound MPAs have adequate leaders or proponents?
    E. Do the managing agencies collaborate well on MPA issues?

Answering these research questions should give insight into whether managers perceive Puget Sound MPAs as effective tools. These questions cover many of the variables in the Sabatier and Mazmanian (1980) implementation framework and their answers are likely to help identify implementation gaps (Lowry 1985).

Methods

In the summer of 2014, I conducted thirty-four semi-structured interviews each of approximately one hour in duration. The semi-structured interview is a set of open-ended questions that allows for other questions and points to be made during the course of the interview (Di-Ciccio-Bloom and Crabtree 2006). Informant employment sector and type were noted (Table 2). These interviews were structured around the themes of modern MPA management, collaboration between agencies and partners, and the expert's own perception of MPA effectiveness. The semi-structured interviews were all digitally recorded, transcribed, and then coded using the ATLAS.ti software package. The transcripts of the interviews were sorted and organized along topical themes that best represented the meaning of the text and its relationship to my broader research question (Patton 1990: 381, 383-384).

Interviewing is an inherently social interaction. Both the interviewer and informant participate and information can come from the verbal responses of the informant, the unspoken body language between the two parties, and also the setting of the interview itself. An interviewer should listen to the informant, watch their body language, and observe their surroundings to grasp the full meaning of the discourse (Lofland and Lofland 1995). Though qualitative interviews and case studies can be an excellent means of exploring the beliefs and perceptions of informants, they are not necessarily intended to develop generalized findings beyond the sampled population (Patton 1990: 486).

Table 2: Summary of Informants

Employment Sector		**Employment Type**	
Federal Gov't.	4	Scientist	7
1. NOAA	4		
State Gov't.	15	Program Manager	11
1. PSP	4		
2. WDFW	6		
3. WDNR	4		
4. WPRC	1		
Non-Gov't. Orgs.	10	Scientist &	6
1. National/International	4	Manager	
2. Local/Regional	6		
UW	4	Staff	6
Industry	1	Organizer/Advocate	4
TOTAL	34		

The interviewing process occurred in two steps. First, a series of six informational interviews were conducted in-person with well-known MPA policymakers and scientists from the University of Washington, WDNR, and WDFW. These interviews inductively led to a discovery of the initial themes that informed the rest of the research design and the development of the interview guide. Informational interviews allow the interviewer to examine the mindset of the informant without any other framework or paradigm being imposed. The presupposition at play is that what the informant has to say is worth knowing (Patton 1990: 278). The informational interview candidates were selected based on social contacts and referrals, and an initial literature review on Puget Sound MPAs that identified persons with extensive experience with the subject. The significant works identified in the literature review helped structure the series of questions (Appendix A) that were explored during the informational interviews.

Next, snowball sampling was used to identify additional interview candidates considered both knowledgeable and involved in the subject matter. Snowball sampling is a common sampling method when well-placed informants are identified and can recommend other knowledgeable persons (Biernacki and Waldorf 1981). Key informants can be identified as

specific names are repeated, giving them special importance (Patton 1990: 176). This can generate rich data, though the sample relies on having access to the informants and their willingness to talk. It also requires the researcher to verify the expertise of their prospective informants (Biernacki and Waldorf 1981).

In addition to the snowball sampling protocol, I also conducted a purposive sampling of interview candidates. Both sampling methods identify specific persons to interview rather than a randomized sample meant to be reflective of the general populations (Patton 1990: 169). The goal of purposive sampling is to select informants with subject matter expertise (Patton 1990: 169). The identification of interview candidates who are responsible for specific policies or programs is aided by agency website. These websites often name senior level staff and present the work of agency scientists. Furthermore, the 2012 workshop that followed the release of the Osterberg (2012) report also included a list of attendees. In addition to agency websites, that list signified who had direct experience of MPAs in Puget Sound from the managerial or technical point of view. Some of the workshop participants had moved on from the subject and others were unwilling to speak. But the list offered the opportunity to ensure that I spoke with persons who had been immersed in the subject for years and, therefore, more likely to have sophisticated and accurate knowledge. In many cases individual candidates were generated by both the snowball sampling and the purposive sampling. The sampling was sufficient as demonstrated by the repetition of names referred and information saturation in the interviews (Patton 1990: 183-186). Information saturation occurs when different informants frequently make the same general point and provide the same specific example; the interviews become redundant (Lincoln and Guba 1985).

A more fully designed, thematically consistent, semi-structured interview guide with additional clarifying questions was developed from the responses of the informational interviews (Appendix B). Some questions in this interview guide were similar to those used in the informational interviews in order to recreate the more successful aspects of the informational interviews. For example, in both rounds of interviewing the lead question asked the informant about their personal experience with the subject matter. This was useful as it allowed the informants to warm to the interview experience and express themselves freely. In other cases, responses to the original question encouraged the exploration of new themes and questions. The guide revolved around four broad MPA themes: General Knowledge; Collaboration; Resources and Capacity; and Management. Each theme had between two and five associated questions with prepared probe questions for further clarification. The goal was to remove interviewer biases and preconceptions about MPA management and listen to what each interviewer had to say (Dexter 2012). The cast of informants was diverse enough that it would have been unreasonable to expect each to provide expert-level information on each topic. Occasionally, informants would voice a thought on a topic of concern related to the four themes but not originally part of the guide. Therefore, it was sometimes necessary to deviate from the scripted questions and explore a particular subject with an informant (Patton 1990: 286-287).

All interview transcripts were coded using the ATLAS.ti software package. I first conducted an open coding of the transcripts. I assigned codes to passages of text according to the theme discussed by the informant. After I developed an initial set of codes to reflect the content of the transcripts I began to group individual codes into sets of codes. For instance, when different informants spoke of limited funds and not having enough staff time, I would group both passages under the code “Challenges”. This allowed me to begin to collect multiple data points

into manageable blocks for analysis. In other words, first I coded minutely, and then I coded systematically (Strauss 1987). This inductive approach allows for concepts to emerge from data analysis rather than precede analysis (Tuler et al 2002).

Coding is an iterative process that allows for concurrent data organization and theory development. Theory generated by this inductive method follows the grounded theory approach to qualitative data analysis (Glaser and Strauss 1967). Grounded theory is an inductive method of qualitative research that allows for the emergence of the theoretical explanations of observed phenomena (Glaser 1992). It requires that the researcher remain sensitive to new ideas and detail their thoughts with theoretical memos. These memos clarify analysis, define code categories and relate them to each other, and assign weight to them via their frequency and relevance. During the analysis, patterns emerged that required their own analytic memo. These memos organized the data further and permitted conclusions to be drawn (Christie et al 2007).

Results

A. How have past actions and events helped shape the current state of MPAs and their management?

> *"I think that if you look at the history of it* (Puget Sound MPAs)*, there has been a lot of discussions, the history of developing a network of* (MPAs) *in Puget Sound, it dates back to when they were looking at putting a Marine Sanctuary in the Strait of Juan de Fuca. And there was pushback in the community…"* (WDNR informant, August, 2014)

As the above informant stated, the interest in MPA development in Puget Sound has a long historical background and has never waned. Another WDNR informant demonstrated similar sentiment stated, "we have been asked to create a (MPA) system for the state….we have [been] enabling legislation….I take that to mean they want to see a statewide system". Yet, the absence of a Washington State legislative mandate for an MPA network—akin to the California Marine Life Protection Act—reappeared in numerous interviews across informant sectors. Many informants noted that they had watched the California process from afar and noted the opposition from user groups that led to a decision by the California Department of Fish and Game to increase their outreach efforts with a collaborative planning model (Weible and Sabatier 2005). While there is no similar legislation to create a network of MPAs in Washington, or Puget Sound, both the WDFW and WDNR have a legal basis for their MPA programs. WDNR's authority comes from Title 79, Chapter 10, Section 210 of the Revised Code of Washington (RCW 79.10.210), with further clarity in Title 332, Chapter 30, Section 151 of the Washington Administrative Code (WAC 332-30-151). The RCW is the body of active Washington State laws and the WAC is the compilation of state regulations. Though the WDFW has no statutory equivalent, they do have authority to regulate the harvest of fish in all state waters, and the use of MPAs as a policy tool was proscribed in a formal policy decision by the Fish and Wildlife Commission (WDFW 1998). One seasoned informant contextualized the formal rules:

> *"The marine reserve issue was nascent when I first came on. It came more into the fore in the late 90s when the concept was really defined…and we looked around and said, 'oh, we actually have some of these'…And as time went on we started to create more and see if there is a response between fished areas and* (MPAs)*".* (State Government informant, September, 2014)

Informants from both state management agencies described the development of the existing MPAs in Puget Sound as an agenda driven by stakeholders who advocated for their creation. One WDFW informant mentioned that recreational divers had approached the agency and proposed specific sites become MPAs, and according to them, "some of them were established to try to placate a vocal public". Another WDFW informant put it more succinctly, "(we) rode the wave" of support. A more critical opinion was expressed by an NGO informant who stated that there was an opportunity to create MPAs based on analysis of where the largest conservation gains could be made. But that, "despite that discussion, they chose a process that's citizen driven. And in a candid way, I call that a beauty contest for MPAs, not a scientific assessment of what Puget Sound needs". The placement of MPAs in Puget Sound often proceeded in a manner antithetical to what many natural science scholars suggest is appropriate (Roberts et al 2003). Though others have pointed out that the effectiveness of an MPA stems from more than biological indicators (Christie 2004).

The creation of no-take MPAs in Puget Sound, and their ongoing management, reached a pivotal moment in 2003. The Northwest Indian Fisheries Commission, a support organization for the twenty treaty tribes in western Washington, issued their policy statement on MPAs (NWIFC 2003). The statement asserted that the tribes, legally recognized co-managers of fisheries, had not been adequately involved in the implementation and management of MPAs. The statement also expressed concerns about how site-specific closures may not confront the real challenges of

resource conservation, which are region-wide and not solely based on harvest impacts. They doubted the scientific reasoning behind the existing MPAs and considered them a threat to their treaty rights to half the annual fishing harvest (NWIFC 2003). One informant described the impact the statement had on their agency thusly:

> *"Formally, when that policy statement came out…it essentially stopped us cold. And it goes back to what I said about having enough money to do the science right…and get the weight of evidence for that larger support. I think we're several years away from having that kind of support from the treaty tribes."*(WDFW informant, August, 2014)

The federally recognized treaty tribes in Puget Sound are more than stakeholders; they are legally recognized co-managers of living marine resources, and as such have a greater stake in their ongoing management than non-tribal fishers. In return for ceding much of their land, these tribes retained fishing rights in the treaties of Medicine Creek (1854), Point Elliot (1855), and Point No Point (1855) (NWIFC 2015). Though different stakeholder groups often attach different meanings to resources, the political institutions of the state should recognize that treaty tribes will likely approach space-based policies differently than other groups (Singleton 1998). The legal framework in place from *United States v. Washington* (1974) through the Centennial Accord requires the WDFW and WDNR to confer with federally recognized tribes on a government-to-government basis with full respect of their sovereignty (Centennial Accord 2015). Their sovereignty legally elevates tribal concerns past stakeholder complaints. Minimally, the government-to-government relations framework seems to require state agency managers consult with the treaty tribes prior to the implementation of an MPA in a "Usual and Accustomed" (U&A) fishing area (NWIFC 2015a).

The implied threat of MPAs is a reduction of tribal co-management by reducing their harvest allocation, which is tied to their spatial Usual and Accustomed fishing areas (Singleton

2009). As such, grounding MPA policy in the natural sciences alone may not alleviate tribal concerns, and has the potential to engender long-lasting opposition to the policy tool (Singleton 2009). In fact, MPAs may represent an attack on the culture of the treaty tribes, at least as perceived by the tribes themselves. Culturally, their long reliance on marine resources likely represents more than a mere fishing right. Rather, it is their right to exist as a people that they may consider at stake (Whitesell et al 2007). In this vein, any tribal opposition to MPAs is existential rather than instrumental and raises the burden on state managers beyond the ability of the natural sciences to resolve.

Nearly all public agency and non-governmental informants expressed their acknowledgement of the position of the treaty tribes, and take their concerns very seriously. Informants in every employments sector and position type stated that the tribal position was completely reasonable and expressed their respect for treaty rights. The WDNR officials especially, as geoduck permitting MPA managers, expressed the notion that they also try to engage tribes in the management of aquatic reserves and appreciated the engagement of local tribes in specific aquatic reserves. Often, though, informants at both resource management agencies and the NGO community would speak of acquiring tribal approval post facto rather than implementing the policy with them. One experienced state agency informant said:

> *"Well we just need to communicate with them. I think it was bad when* (a specific site) *was designated an MPA. The scuba alliance put our official* (logo) *out there saying we want this thing to be an MPA, and I went to several of those meetings, and as everything kind of grew I said, 'You know, you're going to have to get tribes involved in this discussion'. And they didn't. I warned them again I said, 'You need to get the tribes on board, bring them to the table, and get them involved. Let them have some say here.' They didn't. And sure enough when it came time to sign on the dotted line, out came the tribes.* (One specific) *tribe said, 'Hey we didn't know anything about this, what the hell is going on here?' And it started the process all over again. So we need to be on board with these guys from the*

> *get go when we're making these kinds of decisions.* (State agency informant, September, 2014).

This informant is pointing out the treaty tribes are interested in more than demonstrating MPAs can improve fishery numbers. Tribal co-managers are invested in being involved in the policy process as well as the fishery science. Effective and legitimate management of Puget Sound MPAs requires incorporating tribal viewpoints (Hard et al 2012). Singleton (2000) argues that co-management regimes usually serve as a replacement for a more combative regime, and that the long history of distrust presents many enduring challenges for government managers to overcome. Social science, rather than the natural sciences may best offer a way for tribal concerns to be alleviated. Christie (2004) points out the importance of conflict resolution mechanisms in the co-management of MPAs.

B. What challenges impair MPA management in Puget Sound?

Informants identified twenty-one unique challenges that MPAs face in Puget Sound. One of the most frequently cited challenges was limited resources available for MPAs. Not everyone referred to the availability of funds as the only relevant resource, though these was considered a significant stumbling block. One state agency informant expressed frustrations working on MPAs due to their perception that they were not a priority for their agency, and that since, "the current group of people (senior management at a state agency)…are not as interested in pursuing (MPAs). My frustration is…my time could've been spent on a project that was likely to get some larger traction." Though this informant bemoaned the opportunity to work on a project that was likely to receive support from their superiors, others stated that having the support of higher management alone was insufficient for good management:

> "*To really get a good picture of what a marine* (protected area) *would be doing, you would need a lot of bodies. And I think that really is kind of the biggest challenge. I mean if you identify your areas and say 'We're going to set these aside', there has to be a monitoring plan. So if there's going to be a monitoring plan, you've got to have some way to institute that monitoring plan, and that's going to need bodies, and that's going to need money, and that's going to need political support."* (WDFW informant, August, 2014)

The crux of their position was that they were resource challenged in three ways: funding, staffing, and political support. Nearly every agency manager identified lack of funds as a pressing concern. Mostly, though, they framed it in terms of how additional funds could be used. One state agency manager noted that they did not have enough money to support a rigorous monitoring element for their program, they considered current monitoring as base "baseline" data collection. They also made the connection between resources explicit; with more funding, more staff would be hired and they would conduct more monitoring for effectiveness.

Many informants thought that the relative lack of funding for MPAs in Puget Sound was due to how senior management or policymakers perceived their usefulness. One public agency scientist said, "Well, we have priorities, right, so we have adequate funds to do other priorities (of resource management). Marine (protected areas) haven't been the top priority on my to-do list. It's always there but it's not the top priority." The low priority of MPA declaration and management in Puget Sound is illustrated by recent history. A number of attendees of the 2012 MPA management and policy workshop expressed dismay that there had been no follow-up on the meeting by the PSP. One state official called it "a lost opportunity". Another informant at a management agency dismissively remarked that the results were likely written into a report that will see a small audience. One workshop attendee noted that the workshop was a positive example of collaborations; staff from the managing state agencies, members of several treaty tribes, and NGO partners all attended. This informant noted that they thought little had come

from the meeting because MPAs were a legacy issue and that current leadership at the State was not interested in changing current practices. In other words, the movement towards MPAs and MPA networks had passed by.

Further, the lack of prioritization of MPAs was reiterated by one state agency manager who asserted that they were unable to conduct the monitoring program they had developed due to the need to address other managerial concerns, and when they took their complaints to their supervisors, they heard, "Don't do the fieldwork". This illustrates how inadequate staffing levels, and higher-level management priorities, contribute to program difficulties. One WDFW informant mentioned two human resource issues they felt were directly related to the prioritization of their work and the availability of financial resources. The first was that retired staffers were not replaced, and the second was that not enough persons were hired, which leads to a loss of institutional capacity to manage MPAs:

> *"Nobody has picked up that ball and run with it as a dedicated program. Only loosely do I deal with it anymore. They're there.* (Part) *of my job is to work in the monitoring and science around them, but that hasn't really gone anywhere because I'm tasked with so many other things. You know, I just go from one thing to the next, which is difficult at times and frustrating. I'd like to* (spend more time on MPAs) *and see what the data is (sic) telling me. I don't even get a chance to look at it. I'm just too busy."* (WDFW informant, August, 2014)

The opinion of one PSP informant is that MPAs currently "are effective at what they do". Another PSP informant said one result of the 2012 workshop was that any MPA expansion, or network creation, would not be worth the resources it would require. Their point was that, "Sometimes, when we go for everything, we get nothing." This informant thought MPAs had been used without due consideration of management needs in the past and the decrease in MPA declaration reflected WDFW and WDNR using different policy tools to accomplish their larger aims.

Another human resources concern expressed across both state managing agencies was staff availability for public outreach. The 2008 state budget drastically reduced the funding for the WDFW. As a result, the public outreach staff tied to the marine resource management programs was dissolved and those duties were reassigned. Public outreach was described as a large percentage of the workload by personnel at both resource management agencies. One WDNR informant pointed out that the region is large, managing sites across it is inherently challenging. "One of the biggest things…we're down here in Olympia and we have sites all over and it's just really hard to be in so many places at once…it's a limiting factor." Yet, at the same time, public outreach was considered highly important to MPA management. Officials at the WDNR unanimously stressed its importance as a means of raising broad awareness about the environment and their Aquatic Reserves program. One reason it was considered so important is that agency personnel often encounter misconceptions about MPAs when they interact with the general public. A seasoned manager at WDNR stated, "The challenge is misunderstanding that results in resistance to what we are doing." They described combating the same misconceptions around aquatic reserves at public meetings for years. Many informants expressed hope that outreach efforts would help reduce controversy that has occurred occasionally with MPA declarations in Puget Sound. Many managers spoke of the actions taken to create MPAs in the San Juan Islands as a learning experience. In 2009, when NOAA proposed a "no-go" zone, an area off limits to watercraft as a part of their orca recovery plan, there was significant public outcry:

> *"It was highly controversial. Criticisms of the economic analysis, of the impacts of a no-go zone, there was not a lot of community support and it was not included in the final regulations…(The) concerns that were expressed were that this was just the beginning, that if this was allowed to go forward, even though it was a small area, it could open the door for no fishing areas."* (NOAA informant, October, 2014)

Both state and federal agency informants noted the strong degree of attachment stakeholders had to their fishing rights. An NGO informant who has attended many community outreach meetings noted that many stakeholders saw the creation of an MPA as a dangerous precedent that would inevitably lead to the creation of others. This person thought that many fishers were concerned about their rights and ability to fish and each MPA represented the slow erosion of that right, regardless of the rules for that site. Dudas (2005) describes the vehemence of non-tribal fisher reaction to *United States v. Washington*. State agency managers are sensitive to this perception. One senior manager reflected that the burden of proof was particularly heavy whenever regulators attempted to limit the use of a public, or common-pool resource.

Several senior level agency personnel described their public outreach and education efforts as highly important due to the potential to foster buy-in to their programs. A PSP informant asserted, "Anytime, for any reason, that we're limiting use of a shared resource, there are going to be groups that are against it." This point also ties to Hard et al (2012): public support of MPAs is linked to stakeholders wanting to be heard. The link between stakeholder buy-in and having the staffing resources was often made explicitly. Most informants expressed concerns about low levels of buy-in:

> "*I think if we're not constantly vigilant we would have everyone in there* (MPAs). *I was talking to someone downtown and they had a picture of this great big salmon they caught. And I asked them where they caught it, and he said Parks Bay. Parks Bay is over on Lopez and it's a marine protected area…and I said, do you know that's a marine protected area? And he said, oh no, there's no signs there. And so I said, okay, we need to put signs there. And I went over there two weeks later and there's signs everywhere that say 'don't fish'."* (UW informant, September, 2014)

Other informants pointed out that the necessary complement to public outreach was rule enforcement, which was a topic of concern for many resource managers and conservation

advocates. One fishery manager said, “Management challenges, I think for any marine resource, the biggest one is enforcement. Before they (MPAs) are established there is a whole bunch of work, once they are established, then the challenge is enforcement.” Most informants were skeptical that either the WDFW or NOAA had enough law enforcement personnel to adequately monitor rule compliance for Puget Sound. And since the entirety of the sound is closed to fishing beneath 120 feet, and also closed to the harvest of rockfish, the reality confronting resource managers is, “the capacity of enforcement to really enforce a no-take zone for the entirety of Puget Sound is just not there,” as one WDFW informant said. Other informants expressed similar worries about enforcement capacity. A NGO informant said, “We need ten times as many officers as we currently have”, though this informant noted that the amount of poaching in MPAs that they have witnessed has decreased in recent years. A UW informant reported that when they see crab pots placed illegally, they notify the WDFW and, “nine times out of ten they (will inform) us that no one is nearby (to address the situation).”

It seems self-evident that rule enforcement is integral to successful MPA implementation. As Sabatier and Mazmanian (1980) point out, policies are often concerned with changing the behavior of a targeted group, which in the case of an MPA is often a fisher. Pomeroy et al (2004) argue that enforcement is a key governance indicator of MPA effectiveness, both the coverage of law enforcement officers and the communication of rules to the general resource user audience. The fact that public managers in the state of Washington, at the state and federal levels, admitted to an insufficient number of enforcement officials indicates their concern that rule violation is common and that either their outreach is lacking, or the fishing community does not accept the official justification for the existence of the MPAs. The Ostrom (1990) framework of common-pool resource management explicitly links rule enforcement with management success. The

implications for Puget Sound MPAs seems to be that without rule compliance from fishers, regardless of the number of enforcement officers, effectiveness will be severely constrained.

C. What opportunities exist to expand or improve MPA management in Puget Sound?

The most repeated opportunity to improve MPA management in Puget Sound represents a lesson learned by public resource managers. The public debate about the "no-go zone" for orca recovery, and the passions inspired by other federal efforts to develop MPAs in the San Juan Islands, "educated everyone…about the emotion that marine reserves (MPAs) can engender, as did reading the headlines out of California." said a NOAA informant. The lesson, for them, is that MPA declarations, and their ongoing management in Puget Sound, needs "to be done in an appropriate way that gets as much public input as possible. To get buy-in and compliance." This perspective acknowledges that MPA management should be transparent and engaging to citizens. Many informants remarked that they prefer to use existing social networks to engage the public. One WDFW informant stated that they speak at SCUBA dive club meetings because of the preexisting level of interest in both the state of the Sound and the level of interest in MPAs, "I'll go and be the ears for that conversation and add information that could clarify misconceptions."

> *"It was very clear to me and the other partners we were working with that we needed to spend a lot of time going out and having targeted outreach, where we meet one on one with different groups that we've identified, engage them and inform them about the* (MPA)*, provide facts. That way, when you get to the point of having a big broadly publicized public meeting, people already know what it's about."* (WDNR informant, August, 2014)

One opportunity to expand MPAs in Puget Sound currently is the listing of Bocaccio (*Sebastes paucispinis)*, Yelloweye (*Sebastes ruberrimus*), and Canary (*Sebastes pinniger*) rockfish for protection under the Endangered Species Act. Some informants had participated in

the ongoing formulation of the recovery plan, others thought that space-based conservation instruments like MPAs might be the right policy tool to recover sessile fish species. One UW informant asserted that the case for MPAs and rockfish was clear and that their numbers are higher inside of MPAs than outside. Though other research has shown a more complicated recovery process (Eisenhardt 2001). One veteran government informant stated, "Well, I think for the no-take MPAs, for some of them, they do provide a safe area for rockfish and lingcod and rocky habitat species to build up and look somewhat natural." This person also mentioned that after large recruitment classes ten years ago, no-take sites continued to have higher numbers of rockfish than unprotected and presumably fished sites.

The potential of using MPAs as a tool for rockfish recovery speaks to comments other informants made regarding their strong ability to provide refuge for animals and to preserve, as close as possible, a more natural environment than areas more directly used by resource users. A federal employee offered that, "There is a biodiversity benefit, not just in terms of species, but in terms of preserving or perhaps mimicking the natural fish distribution, sizes and structures." One agency scientist commented that there is a poor understanding of what an undisturbed Puget Sound would look like, as there is no baseline for accurate comparisons. MPAs, they said, recreate that pristine condition as much as possible, which offers managerial benefits by enhancing the understanding of what the ecosystem naturally supports.

Similarly, some remarked how MPAs can allow for the re-creation of disturbed habitats. Their viewpoint is that many projects compete for limited funding, and one way for a project to potentially receive a more favorable consideration is if it helps restore or improve the condition of an MPA. "I think that we've seen a lot of projects that have been done that have benefitted habitats because of the designation of an MPA. You are able to engage in enhancement and

restoration projects, and partner with other groups to do projects like that," said a WDNR informant. This view was shared by other public agency managers and staff: Puget Sound is not pristine but MPAs protect habitats and allow managers to try to create efficiencies with their limited resources by targeting restoration efforts to specific sites that can offer improved ecological services. More than one manager mentioned that a project designed to restore an ecosystem function, or conduct environmental research would be more suited at an MPA because it helps make a site already demarcated as significant a little more so. Informants also mentioned that this type of work can raise public awareness and instill a greater sense of place, which they perceived to be a dividend on their investment.

D. Do Puget Sound MPAs have adequate leaders or proponents?

> *"I think that [leadership] speaks to one of the bigger issues of MPA management and establishment, and their use as a successful management tool in Puget Sound, there's no real leadership within the state to push for a big, coordinated establishment of MPAs and there needs to be. Because you've different agencies with different regulatory and proprietary management authority of the Puget Sound, you have to have an entity that can bring everybody together if you're going to look at coordinated management."* (State Agency informant, August, 2014)

The majority of informants thought that there was no definite leadership at the highest level of government in the use of MPAs as a resource management tool in Puget Sound, despite the presence of two distinct programs. When informants were asked to name any individual who they considered to be a strong leader in Puget Sound MPAs, the answers were usually unique. A sentiment shared by a senior manager at WDNR, was, "Strong leadership needs to be in place for anything to really happen." Some thought that MPAs needed a "figurehead" to publicly promote their use as a management tool. Others thought that leadership needed to come from the state legislature. A handful of informants speculated that the legislature should give a clear mandate

before more MPAs were established in Puget Sound. They thought the justification of setting aside areas from resource users was politically difficult for an agency to tackle without a broad mandate, although this view was not typically shared by informants affiliated with the WDNR. A veteran NGO informant contended that the legislature was unlikely to take further action on the topic since they had already commissioned an inventory (Van Cleve et al 2009) and failed to use it meaningfully. One senior state agency official pointed out that agenda items often needed to be pushed onto the legislature's radar, which requires a combination of internal and external government leadership. This person thought that the legislature's agenda would be dominated by education in the near term, with every other topic fighting for attention, "And right now I don't hear any big advocate pushing for MPAs as a recovery tool for Puget Sound."

In addition to the notion of leadership needed to elevate MPAs as an agenda item for the legislature, some mentioned that the Governor's office has been silent on the matter as well. Many program managers implied that with the apparent absence of guidance from policymakers at the state capitol, they were likely to continue to cope with resource challenges. One NGO informant who had worked with the agencies did not see the "strong personality" they thought was required to improve public outreach. One NOAA informant echoed their sentiment, "(It) would be fantastic to have a charismatic leader pop up. We just don't have that." They thought in the absence of a leader, regulatory agencies would have to "actively move forward" to improve public awareness and buy-in. Many informants noted that the job turnover of program managers and senior officials had not always been handled well, and that it led to project delays and priority shifts.

Others have demonstrated a clear link between leadership and MPA effectiveness. In the Philippines, for example, the presence of an MPA leader correlated strongly with increased fish

biomass, a strong enforcement presence, and an improved state of the local coral reef generally (Pietri et al 2009). Christie et al (2009) illustrate that leaders place a priority on MPA rule enforcement. The relative inability of Washington State policy managers to identify a Puget Sound MPA leader, or a consistent group of leaders, indicates that MPA policy implementation has been deficient. Lowry et al (2009) points out that resources devoted to community-level leadership can improve the management of MPAs. The improved effectiveness of Puget Sound MPAs, at least in terms of achieving governance goals, would likely follow from a similar program. One meta-analysis of the peer reviewed literature found that leadership was critical for fishery management and the success of co-management systems (Gutierrez et al 2011). Another study pointed out changes in institutional leadership can bring in new sets of goals, which makes maintaining older programs more difficult if they do not align with the new regime (Lowry et al 2005).

E. Do the managing agencies collaborate well on MPA issues?

There was a contrast in perceptions regarding how state agencies collaborated. Most of the WDFW and WDNR employees thought that they collaborated well with one another. One often cited example was the forage fish spawning site surveying work that they carried out jointly, including in aquatic reserves. However, members of both agencies found their collaboration with the Puget Sound Partnership either frustrating or lacking all together. Some government informants pointed out that the PSP had no regulatory authority and therefore likely did not see itself in a position to influence the regular management of established programs. One state agency informant pointed out that since the PSP are removed from daily management and in an advisory capacity, their definition of successful likely means fitting together the sometimes

disparate pieces of restoration work across all three tiers of government for the overall betterment of Puget Sound. However, that work is not always perceived favorably by other state agency managers:

> *"Well, I'll be frank. My interaction with the Partnership…has been combative in many ways. What tends to happen is that they decide, because of some decision made internally by them, and it may have been informed by their leadership council or science committee, a decision is made and now everybody else is on the hook to deliver what they ask for…What it comes down to often is a decision is made on high without any input from ground level staff and then it influences our work plan. And so a lot of people chafe under that…it doesn't come through the right channels, they just come out of left field and ask you for the moon."* (State Agency informant, August, 2014)

While some found the PSP hard to work with, others felt ignored by them. A state agency informant characterized it as such, "(Other state agencies) collaborate well with us, and local governments generally collaborate pretty well with us, but the big standout that we've had trouble with is the Partnership. They're the big 800 pound gorilla in the room that doesn't show up." Some other informants, outside of state government, reported that they thought the PSP was overly focused on process and not results:

> *"Our work group spent a lot of time talking about indicators, talking about monitoring…Identifying priorities and gaps, and I thought we got some useful work out of that but is there funding to actually fill some of those gaps? What's the next step? That's where I'm feeling a little, lack of love for the PSP…they are good at planning and coming up with lists of priorities, but finding resources or actually implementing these priorities that are identified, that's what I'm not seeing."* (Public Agency informant, October 2014)

Informants who worked outside of government mostly thought that inter-institutional collaboration was a struggle for all the resource management agencies. Hoelting et al (2014) have shown that collaboration in Puget Sound management and research has largely fractured

along a natural science, social science divide. The relative lack of cohesion across human dimensions research may reflect the split between different management agencies (Hoelting et al 2014). One local NGO informant was taken aback that state and local government agencies had ended up suing each other over a culvert removal. Another NGO informant perceived the collaboration surrounding MPA governance, and marine management in general, as inherently flawed due to the division of powers across agencies, i.e., the WDFW's responsibility for the fish, WECY for the water column, and WDNR for the marine bedlands:

> *"*(My) *position is that the MPAs in Washington in general have some real challenges. By and large they suffer from the fact that we have several agencies with balkanized authorities in the marine environment and the individual programs that are specific to those agencies are not able to comprehensively protect areas. So the result is that even in areas that have been designated in one form or another, there's a fairly low level of protection for that site."* (NGO informant, August, 2014)

The division of management authority across Puget Sound demands coordination and collaboration for anything resembling holistic, or ecosystem-based management. WDFW MPAs are limited to fishing restrictions and WDNR MPAs are limited to aquatic land management and usage restrictions. Though both programs have the potential to serve as a catalyst for other conservation projects, neither program by itself offers a policy option for complete conservation. When asked why their program did not work jointly with the other agency for improved protections of their MPAs this state employee informant said, "I've asked about that. And I've been told that were we to propose something like that, our program would be gone." This informant was concerned that resource user groups would fight a jointly protected MPA and overwhelm the agency's ability to garner buy-in. Layzer (2008) suggests that ecosystem-wide conservation projects require a regional entity empowered to facilitate and organize sister agency collaboration. Without one, she asserts, ecosystem-focused conservation and management

programs are unlikely to be fully effective (Layzer 2008: 272). Notably, the PSP, which represents such a regional entity, is controversial amongst other state agencies.

Discussion

This research has examined the question of whether marine resource managers and local policy experts consider the established Marine Protected Areas of Puget Sound to be effective. Results indicate that policy managers, agency staffers, non-governmental organization partners, and scientists both inside and outside of government consider Puget Sound MPAs to be only partly effective. The interview data suggests that the two main MPA programs in Puget Sound, led by WDFW and WDNR, exist along separate tracks with episodic interaction. Agency affiliated informants spoke highly of each other and often stated that they knew many employees working in the other agency, but that the two programs rarely interact given their distinct mandates. This analysis indicates that besides being separated by statute, MPA managers are also divided by larger collaboration hurdles such as the lack of institutional, or entrepreneurial, leadership, a gridlocked co-management regime, shared concerns of resource user resistance, and a near abandonment by regional policymakers.

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. This indicates that MPAs are not currently a priority for policymakers in Washington State. 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 future 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. Informants thought such a display of political support would be needed to develop a meaningful MPA

network. The lack of strong statement of support from either the state legislature or the governor also points to the low priority level of MPAs. Both Van Cleve et al (2009) and Osterberg (2012) made recommendations for improving the management of Puget Sound MPAs. The lack of movement towards those objectives leads to the conclusion that MPAs are not a high priority.

The first set of independent variables in the Sabatier and Mazmanian framework revolve around the tractability of a problem. The premise being a policy is more likely to be implemented successfully if it is based on a valid causal theory, affects relatively few people lightly and in few ways. Aquatic Reserves constrain behavior in relatively few ways. Though most WDFW MPAs prohibit fishing for some species, relatively few restrict salmon fishing. Yet informants repeated stated the most significant misperception they encounter are stakeholder concerns that any MPA represents a restriction of their right to fish. The framework suggests that effective implementation is likelier if a policy restricts a smaller segment of the population, and does so lightly. Though both MPA programs appear to satisfy those conditions, the fact managers continue to encounter these concerns suggest that the seriousness of stakeholder fears are not addressed. A likely explanation is that resource users do not accept the legitimacy of MPAs as a policy tool. As Hart et al (2012) demonstrated, process legitimacy is correlated with stakeholder perceptions of being listened to, which ties to their level of support for MPAs.

The 2003 Northwest Indian Fisheries Commission statement on MPAs also reflects legitimacy concerns. The statement led to a reevaluation at WDFW of MPAs as a policy option. Though they continue to try and answer the critique in the tribal statement, a reexamination of the natural science presupposition may be warranted. Instead of focusing on answering the question whether MPAs provide a fisheries management benefit, resource managers might be better served answering the question of how to improve stakeholder and co-manager legitimacy

doubts. MPAs are linked social-ecological systems and their effectiveness as a policy depends on considerations of legitimacy (Pollnac et al 2010; Christie et al 2009).

Inadequate levels of legitimacy may explain why state agency managers mentioned enforcement concerns. The discussion of enforcement ties to rule compliance of stakeholders. Often, the citing of enforcement revolved around policing and rule compliance. Enforcement of MPA rules is also influenced by factors like clearly demarcated boundaries, incentive structures, and graduated sanctions as well as community buy-in (Ostrom 1990). Addressing stakeholder legitimacy concerns would likely lead to improvements in enforcement. Increasing outreach and public discussion of MPA policy may lead to gains in stakeholder legitimacy (Hard et al 2012). Policing Puget Sound is probably the more expensive proposition.

The second set of variables, the policy characteristics that support its implementation, also presents challenges for officials. The incorporation of an adequate causal theory, the reason a policy is implemented in the first place, could help managers make a strong case to stakeholders about legitimacy. It could also explain why specific MPAs were created and their purpose. It is problematic that many informants both inside and outside government stated they did not know why some MPAs were created in the first place and indicates the lack of a strong causal theory. The implementation framework indicates that policy goals should be clear and backed by institutional priorities. Managers' assertions that MPAs can serve as a baseline monitoring station for Puget Sound may not satisfy the notion that an MPAs goals should be well articulated and direct and satisfy broader societal goals that are welcomed by more than agency managers (Pomeroy et al 2004). The notion that MPAs should be sited appropriately is connected to having clearly defined goals and a theory justifying their existence. The lack of an MPA siting protocol that incorporates both natural and social science principles, and details the

reasoning for choosing a site hampers policy effectiveness. Further, the Endangered Species Act listing of three rockfish populations in Puget Sound after the creation of nearly all Puget Sound MPAs lends weight that the sites are not performing the goals laid out in the WDFW MPA policy memorandum (WDFW 1998; WDFW 2014).

Another variable that affects a policy's ability to improve its implementation outcomes is the degree of collaboration between managing institutions. This idea is especially significant in Puget Sound because of the division of regulatory powers among agencies. Without strong collaboration, an ecosystem-based approach is not possible. Since the PSP is the agency designated to lead the recovery of Puget Sound, they should have a strong incentive to work towards improving the effectiveness of the existing 110 MPAs. The characterization by outside informants of PSPs disconnect indicates that no such incentive is in place. Or, policymakers have chosen not to prioritize this policy tool as they perceive it incapable of helping to meet its goals. The division of regulatory power and lack of collaboration indicates that MPA effectiveness is held back by poor institutional collaboration.

The third set of variables, the ways larger social, political and economic realities factor in implementation bear out agency staffers' complaints of repeated budget cuts limiting their work. MPA monitoring has been shown to be a key driver of effectiveness and important for a successful program (Pomeroy et al 2004; Pollnac et al 2001). Therefore the suggestion that scientists have been unable to complete their fieldwork, or publish the results of their monitoring indicates that any documented MPA effectiveness is not widely communicated. It also weakens or delays the scientific argument that managers are interested in making and likely constrains their outreach efforts. One can assume that were MPAs are a higher priority for policy makers resources are made available.

Another variable is the leadership skill of the implementing managers. Many informants, across levels of government and outside of government, expressed a desire to see an increase in the leadership around MPAs. The inability of informants across employment sectors to consistently identify a single leader signals that no such person exists. Literature suggests that leadership is a social variable that ties to resource management success (Ostrom 1990; Lowry et al 2009; Gutierrez et al 2011). Leaders can improve collaboration by advocating the benefits of a policy, foster trust and dialogue, and reduce collective uncertainty (Weber 1998). These factors are are social indicators that improve MPA implementation (Pomeroy et al 2004; Christie et al 2009). Though a legislative mandate or executive order from the governor's office could serve as a statement of leadership that might accomplish some of these aims and increase the priority of MPA policy, no informant stated that such a policy was forthcoming. The development of stronger leadership could raise the standing of MPAs, improve agency morale, mobilize support of stakeholder and co-manager groups, and institutionalize a normative position of improving MPA effectiveness (Sabatier and Mazmanian 1980).

Conclusion and Policy Recommendations

MPA policy implementation in Puget Sound appears to be a mixture of successes and failures. Informants indicated repeatedly that there was a lack of leadership for the policy at the highest managerial and political levels that limited policy implementation. Most informants thought that serious challenges afflicted MPA management in Puget Sound: managers asserted they required more staff; monitoring for effectiveness was lacking; MPA goal formulation should be improved; and the involvement of tribal co-managers was minimal. These variables coincide neatly with Sabatier and Mazmanian's (1980) framework for policy implementation and lead to the conclusion that the effectiveness of Puget Sound MPAs can be improved. Many scientists reported that they were optimistic that MPAs can serve groundfish management well by creating refugia for depressed fish stocks. Other informants thought that the bottom-up site selection process, though needing to be guided by scientific information, generally offered stakeholders an appropriate forum for participating in resource management. Table 3 is an empirically-generated list of frequently identified policy issues and some possible policy responses.

Table 3: MPA Policy Recommendations	
Issue	**Policy Response**
Capacity at agencies	Resource managers would likely benefit from a professional leadership development program. Curriculum should emphasize effective outreach strategies, program management and the application of social indicators in management.
Increase treaty tribe involvement	Include tribal officials in all major aspects of MPA management: site selection, goal development, monitoring, and evaluation.
Improve stakeholder relations	Utilize county Marine Resource Committees as stakeholder outreach platforms and consider partial devolvement of MPA management.
Prioritization of MPAs	Work with legislature and governor's office to improve visibility. Passage of legislative mandate for MPAs as policy option. Grant WDFW legislative mandate for their MPA program.
PSP is too insular	Reform PSP by strengthening collaboration with other state agencies. Improve accountability by granting co-management authority on Puget Sound matters.
Site selection	Develop a clear, coordinated protocol for MPA site selection. Work within previously used bottom-up approach.
Scientific backing	Produce clear guidelines outlining documented social and biological MPA effects in Puget Sound. Use for site selection and goal development.

This research suggests that MPA policy implementation has not been completely effective according to the Sabatier-Mazmanian framework. In addition to the recommendations made by informants, this analysis suggests that resource managers at Washington State agencies might benefit from a leadership and professional development program. Such a program could be offered in conjunction with the promotion of staff to place an institutional check that managers have the capacity effectively implement projects and guide them towards success. This program could incorporate conflict resolution into its curriculum so that resource managers might be

prepared for the spirited debates that can follow natural resource management. Increasing the focus on social science indicators and effectiveness has the potential to fill the MPA policy implementation gap and improve the management of Puget Sound Marine Protected Areas.

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Appendix A

INFORMATIONAL INTERVIEW QUESTIONS

1. How involved are you with MPAs in the Puget Sound?
2. What is happening with MPA planning and implementation in Puget Sound? (Probes: Is their momentum behind MPAs? What institutions are leading the way?)
3. What MPAs are you most familiar with? Are the MPAs that you are familiar with succeeding or failing in general? (Important so our sample has mix of success levels.)
4. Who (institutions/organization) do you most frequently communicate with about MPAs in the Puget Sound?
5. What MPA stakeholders do you most frequently interact with? Why do you interact with these stakeholders?
6. We're looking to evaluate the social drivers that result in effective MPAs in the Puget Sound. Can you tell me about some of the social/human dimensions associated with the MPAs you're most involved with? For example, can you talk about human use patterns in and around the MPAs? Are there MPAs in the Puget Sound that experience heavy recreational use in the interior or fishing on the boundaries or adjacent areas?
7. I've heard WDFW MPA boundaries aren't spatially demarcated. Is that true? If so, how are they enforced and monitored? If not, how are they marked and how do marine resource users know where the boundaries are located?
8. Are you aware of any stakeholder conflict related to the MPAs in Puget Sound? If so, can you provide details?
9. Who else would you recommend we talk to about these matters?

Appendix B

INTERVIEW GUIDE FOR PUGET SOUND POLICY INFORMANTS

Assumption: Informant works in government or has major influence on marine reserve policy in Puget Sound via their respective
Priority Themes: General Knowledge, Collaboration, Resources and Capacity, Management. These themes were crossed referenced with the structured surveys and are therefore complementary.
Note: Categorization is sometimes arbitrary, i.e., some questions may lead to discussion of other "themes". It may be necessary, advisable, and even required to deviate from the guide at some point.
Introduction Statement: Thank you very much for completing our survey. As I mentioned to you earlier, I would like to also interview you and record our conversation. The purpose of the interview is to ask additional questions related to themes we covered in the survey but in more detail. Our recorded conversation will be transcribed and analyzed in conjunction with the survey results to help illustrate a more complete understanding about the themes surrounding marine reserves in Puget Sound. Would you be willing to participate in an interview? The length of the interview will depend on your responses but I will do my best to keep it under 45 minutes.

Themes	Sample Questions	Clarifying Questions
General Knowledge (Determine what your informant knows.)	1A. Please tell me about your involvement with marine reserves in Puget Sound. 2A. How have discussions and peoples thinking about marine reserve in Puget Sound changed over time?	1B. In general, what is your agency's position on marine reserves in Puget Sound? Do reserves directly further your organization's management goals?

Themes	Sample Questions	Clarifying Questions
Collaboration	3A. How important is it to work with other organizations and stakeholders on marine reserves? 4A. How has your agency worked with tribal governments on matters related to marine reserves? Please provide examples. 5A. How does your agency engage the general public on matters related to marine reserves in Puget Sound? Is this level of engagement adequate? If not, how can it be improved? If so, why do you feel it is adequate? 6A. What are some challenges and opportunities for engaging and working with external stakeholders on marine reserves?	3B. How well do different agencies, such as DNR, WDFW, DoE and NOAA, work together on marine reserve related matters in Puget Sound? Can you provide examples where you've successfully worked together? 4B. How did the Northwest Indian Fisheries Commission Tribal Policy Statement on marine reserves influence the way your agency engages and collaborates with tribal governments?
Resources and Capacity	7A. Please describe the funding and resource needs to operate and manage a functional marine reserve agenda in Puget Sound. Are existing resources adequate to support a long-term agenda? 8A. What capacity and resource challenges exist with regard to marine reserves in Puget Sound? Can you please provide examples? (**NOTE: Probe into different challenges i.e., technical, personnel, funding, leadership, etc.**)	7B. Please elaborate, e.g. In what way? Why do you say that? 8B. How do you plan to overcome these capacity and/or resource challenges?

Themes	Sample Questions	Clarifying Questions
Management	9A. Are marine reserves an important tool for rockfish management? If so, why? If not, why not? 10A. Are marine reserves an effective approach for protecting against climate change and ocean acidification in Puget Sound? Why do you hold this opinion? 11A. What processes and/or options are currently in place for establishing new and/or managing existing marine reserves? Please provide examples. 12A. What factors contribute to a successful marine reserve in Puget Sound? Please provide examples in the Puget Sound context. 13A. What is the greatest challenge for establishing and managing marine resources in Puget Sound? Are there opportunities for developing new or expanding existing marine reserves?	11B. Does your agency generally involve the public in helping manage the marine reserves? If so, how? If not, why? 13B. How has historical management actions in Puget Sound influenced the current state of the marine environment? What was been done properly and how could things improve?