

(Excerpt from the MSA Monitoring Strategy, June 27, 2011)



Part I

Marine Stewardship Area Prioritized Monitoring Strategy

Section 1. Background

1.1 The San Juan County Marine Resources Committee and the Marine Stewardship Area. Formed in 1996, the Marine Resources Committee (MRC) is a volunteer citizen advisory committee appointed by the San Juan County Council. The San Juan Board of County Commissioners (now County Council) designated the waters of the entire county a *Marine Stewardship Area* in 2004 with the stated objective: “to facilitate the protection and preservation of our natural marine environment for the tribes and other historic users, current and future residents, and visitors.” With this resolution, the Marine Resources Committee was charged with providing a formal study with detailed recommendations for achieving this goal. The MRC thus began collecting and mapping available marine resources data to get a better picture of San Juan County’s marine life and habitats, as well as potential measures that would help protect them.

During 2004-2006, the MRC developed a plan for the Marine Stewardship Area (MSA), following the 5-S planning process developed by The Nature Conservancy. This plan outlined the need for additional descriptive information for marine species and their habitats, and advocated systematic monitoring of selected parameters designed to yield status and trend information. Without this program, valuable ecosystem services may not be protected, thereby jeopardizing the sustainability of the MSA. The MRC science sub-committee completed a draft MSA Monitoring Plan December 2009 linking MSA Plan benchmarks, threats, target areas, and species and groups of concern. A database of all monitoring efforts in the MSA was also compiled at that time (updated June 2011), and resources relevant to local ecosystems and biological communities were referenced.

1.2 Targets of the MSA Plan. Defined as those groups of species and entire biotic communities that are critical to conserve and protect ecosystem services and biodiversity

within the MSA, and which must be monitored to determine their current status and direction of change. Some targets are chosen because the distribution and density of these species or communities are poorly known but population stability is threatened by particular activities that are on the rise (e.g. by-catch associated with fish harvest, stormwater discharge over intertidal communities). Others are targets because the link between human activity and species decline has been established (e.g., recreational harvest of groundfish, impact of over-water structures on nearshore benthic plant survival and juvenile fish migration). The MSA Plan identifies the following targets:

- Rocky intertidal communities
- Rocky subtidal communities
- Nearshore sand, mud and gravel communities
- Rockfish, lingcod and greenling
- Seabirds
- Marine mammals
- Pacific Salmon, forage fish

For each of these targets, the MSA Plan also identifies key ecological attributes (KEAs) linked with *indicators*, both of which are either species, groups of organisms, or chemical/physical processes which allow an assessment of ecosystem stability and biodiversity. Such species can be chosen because they are (1) charismatic, (2) commercially important, (3) rare and at risk of local extirpation or extinction, (4) respond negatively to environmental stress or perturbation, or (5) abundant and characterize the habitat or community. Expanding a monitoring program to include other species may be appropriate because results of ongoing research identify these species as important indicators of ecosystem change (e.g. use of lichen communities to monitor air quality).

1.3 Threats Affecting Marine Biodiversity. In addition to targets noted above, the MSA plan also identifies and defines sixteen *threats* affecting marine biodiversity targets within the MSA (Table 2, MSA 2007). These threats must also be monitored to determine their persistence and importance, to document the trajectory of influence and evaluate the effectiveness of regulations designed to protect ecosystem services and biodiversity.

1.4 Species and Groups of Concern. The MSA includes species considered endangered or threatened, as well as species whose populations have declined significantly over the past century or over recent decades. While we are concerned with the overall biodiversity of the MSA, we will also pay particular attention to species whose populations are in danger within the MSA or within the broader region. Example species include abalone, Chinook salmon eelgrass, native oysters, resident orcas, and rockfish. Species and groups of concern are also set out as targets in Table 1 of the MSA Plan (2007). For the larger region, PSAMP (2007, Table 2-1) lists 63 species of concern in Puget Sound (Gaydos 2004), defining them as those species that “require special initiatives to ensure protection and survival of their populations.” Of these, three were invertebrates, 27 were fishes, 23 were birds, nine were mammals and one was a reptile. Fourteen of these species are defined as threatened or endangered by the federal

government or by the state. Most, if not all, of these are species of concern for the SJC Marine Stewardship Area as well.

Effective monitoring determines which species indicate population stability and biodiversity, are easy to identify, and are representative of larger groups. Some monitoring protocols combine rapid field assessment and substantial taxonomic lumping, with extensive collections that can provide accurate species identification at a later date if needed (e.g. NAGISA, <http://www.coml.org/descrip/nagisa.htm>).

Successful monitoring programs are designed to alert resource managers that key ecosystem functions (air, water, soil, vegetation, wildlife and habitats) are in jeopardy, and to evaluate the effectiveness of protective measures. While the location of monitoring sites will depend on specific objectives (e.g. water quality assessment, population abundance and distribution, community structure, etc.), note the following:

Recommendations

- Consider the MSA as a functioning sub-unit within larger regional jurisdictions.
- Sample at suitable frequencies to compute status and trend estimates.
- Partnering with federal, state and tribal resource management agencies, NGOs and others is essential. For a list of actual and potential partners, (Table 1, SUMMARY of Local Monitoring Efforts).

1.5 Database of Monitoring Efforts in the MSA. Appendix D of the *MSA Monitoring Plan* lists all existing programs being conducted by local, state, regional, tribal, federal, and trans-boundary organizations in a database format known as the MRC Monitoring Database. The complete Database also lists programs that have been terminated.

Recommendation

- We strongly suggest that the future monitoring of the MSA targets must include the continuation of ongoing programs as well as the selective resumption of programs that have been terminated.

1.6 References to Ecosystems and Biological Communities. Many of the species, habitats and ecosystem components discussed in the *MSA Monitoring Plan* have also been covered in the *San Juan County MSA Plan* (2007) and the *San Juan County Best Available Science for Critical Areas* document (2007). For the broader Puget Sound Region, the 2007 *Puget Sound Update* (PSAT 2007) and Puget Sound Science (PSP) web-based status reports, PSS 2011) are extremely informative. These three documents contain excellent maps of biological resources, habitats, protected areas and other data relevant to the MSA monitoring program.

Fortunately, a number of monitoring programs already exist throughout the Puget Sound Region, detailed in the Puget Sound Ambient Monitoring Program (PSAMP

Update, 2007) and other recent compilations. In some cases, these programs are adequate to evaluate impact to the MSA (e.g. spawning biomass of Pacific herring, adult salmon populations, pinto abalone abundance, and resident orca populations), and in other cases, while there is a reasonably adequate regional monitoring program, data collection within San Juan County is not sufficient to evaluate impact within the county. There are also situations where a resource is monitored within the MSA, but at only one or a few sites; local 'place based' programs can enhance ongoing population monitoring. Finally, there will be many cases where species or groups of species, found to be locally important fall outside existing monitoring programs, and our task will require designing a program to adequately protect ecosystem health and biodiversity within the MSA. In each of these cases, we make the following recommendation.

Recommendation

- Regional, state, tribal, federal and trans-boundary organizations that are involved in monitoring efforts in the San Juan Islands, or that require monitoring within San Juan county, contribute funding to support locally based programs that will augment these monitoring efforts.

1.7 Recommendations of the MRC for Implementation of the Monitoring Program.

1. Establish current status and detect changes over time and the level of threat for: specific toxic chemicals and nutrients in coastal water, streams, stormwater and wastewater outflow areas, discharges from desalinization plants, contaminants present in intertidal and subtidal sediments (baseline for oil spills), and also for physical modification of shorelines, and increased sediment loading from construction.
2. Establish current status and detect changes in health over time for: rocky intertidal and subtidal communities and their component species (e.g. sea urchins, sea cucumbers, kelp), and soft sediment intertidal and subtidal communities and their component species (e.g. clams, worms, sand lance). This monitoring is not currently being conducted by state or federal agencies, and should include the presence of nonindigenous (invasive, exotic) species, overall biodiversity, changes in trophic structure (food webs), and response to environmental change (e.g. ocean warming, acidification).
3. Determine groundfish population health and viability by partnering with state agencies that are monitoring groundfish in mandatory (WDFW) as well as voluntary no-take (and comparison) areas established by the county, eelgrass in embayments and near/under over-water structures within the MSA, forage fish in nearshore habitats, juvenile salmon in nearshore habitats, salmonids in streams, and marine mammals in local habitats (including interactions with humans). Additional local monitoring will be needed here.
4. Determine environmental change and level of threats by partnering with state agencies to expand the number of sites that are being monitored for physical, chemical and biological characteristics of the water column (e.g. JEMS), also using local monitoring efforts.

5. Determine population health and viability using monitoring conducted by federal and state agencies – orcas (killer whales), abalone, adult salmon, forage fish in offshore habitats, floating kelp beds, many marine and coastal birds, and groundfish in marine preserves and certain non-preserve areas (probably without additional monitoring locally).

6. Sociocultural targets must be monitored locally to determine how MSA protection is affecting local stakeholders. These include: enjoyment of the marine environment, support for marine-based livelihoods and maintenance of cultural traditions including ceremonial, subsistence, and spiritual uses and aspects.

1.8 Need for a Monitoring Strategy. Managers and researchers are challenged in that a biological community contains hundreds to thousands of species, and it is not possible or desirable to monitor all species present. Consequently, well-defined criteria must be established to direct sampling from which spatial and temporal generalizations can be made. Management of marine resources is increasingly viewed from an *ecosystem perspective (ecosystem-based management)*, recognizing that single species management is not sufficient to detect ecosystem changes or to identify potential impacts of human activity. The objective of biodiversity monitoring is to determine species composition and relative abundance within a specified area, community, or habitat. Ideally, we would like to have data for all species present, but that is rarely possible, therefore

- **a strategy to focus monitoring efforts is crucial.**

Despite the best efforts of the MRC to document the county's marine resources, data do not exist to accurately assess the status or trends of priority species and key areas, much less all of the marine resources within the MSA. Frequently, data are only sufficient to describe the status of a particular species at one point in time and/or at one or very few sites. This handicaps efforts to determine the current status of knowledge regarding species, habitats and communities, and prevents an analysis of trends related to the threats from mismanaged human activity and development. Moreover, the influence of environmental change resulting from the predicted shift in hemispheric and regional climate (e.g. warmer temperatures, wetter winters) on the range and distribution of native species, and the spread of invasive species and diseases may not be detected. Therefore

- **prioritizing to fill known data gaps and needs is also crucial.**

The MRC is working with the University of Washington Friday Harbor Labs (FHL), marine and terrestrial resource managers, and other partners to develop a monitoring strategy to help assess and track the condition of habitats and species indicative of ecosystem health. We need a program that

- **tracks biodiversity and assesses ecosystem health**
- **measures the effectiveness of the MSA strategies and**

- **supports adaptive management of local natural resources.**

This program needs to incorporate, streamline and coordinate the monitoring efforts called out in the following local planning processes (see Appendix B, Criteria Lists, Relevant Plans):

Marine Stewardship Area Management Plan and MSA Monitoring Plan
San Juan Chapter (WRIA 2) of the Puget Sound Chinook Salmon Recovery Plan
Shoreline Master Plan updates (San Juan County; Town of Friday Harbor)
SJC Action Agenda (Puget Sound Action Plan); local Implementation Committee efforts

SJC Critical Areas Ordinance update

SJC Land Bank Habitat Conservation Plan

Stormwater Monitoring Plan

Watershed Management Action Plan & Characterization Report (WRIA 2)

Section 2. Development of a Prioritized Monitoring Strategy for the MSA

2.1 Coordination. In order to move monitoring efforts forward, the MRC contracted a part time monitoring coordinator May 17, 2010 through June 2011. On behalf of the MRC's monitoring and science sub-committees, the coordinator issued invitations to those involved in local monitoring efforts to join this process. The coordinator contacted these key individuals involved in monitoring efforts, or who use data, or who are involved in outreach and education plus select MRC members to form a Monitoring Group. Monitoring Group meetings were held throughout 2010 and 2011, and the coordinator conducted interviews with key people involved in monitoring in the Islands (for a list, see p. 5). The MRC held community monitoring roundtables on each of the major islands (Lopez, Orcas and San Juan) during the fall of 2010. Results from the interviews, meetings and community roundtables provided input for the initial draft and for the revision of this strategy. In addition, the coordinator reviewed the planning documents listed in Appendix F, References.

A draft *Prioritized Monitoring Strategy* for the MSA was submitted to the Northwest Straits Commission June 11, 2010, and a revised Strategy plus a SUMMARY of Local Monitoring Efforts were submitted June 2011. The strategy and summary are most importantly tools for adaptive management, and are therefore designed to be living processes (more of a verb than documents) that are updated annually by the MRC (Strategy) and continually by monitoring groups via the web (Summary). Partnerships and feedback loops are essential, as is communication between data collectors and data users.

This strategy is the beginning of a comprehensive effort to prioritize and coordinate monitoring that is linked to the implementation of the Marine Stewardship Area Plan. However, there is far more monitoring needed than can be accomplished with current resource levels. Therefore, an effort has been made to develop a 3 year timeline with

action items and next steps associated with 2011/2012, 2012/2013, and 2013/2014. These priorities are reflected in Section 3, Next Steps for a 3-Year Timeframe.

2.2 Local Guidance for the Prioritized Monitoring Strategy. The MRC’s monitoring sub-committee gave clear direction to focus prioritization efforts on the proposed monitoring elements called out in the *Marine Stewardship Area Monitoring Plan*, and to link prioritization to the implementation of the overall MSA Plan’s targets, benchmarks, strategies and threats. In addition, the coordinator conducted interviews with a cross section of those involved in monitoring and those who use the results. The following basic guidance statements have floated to the top across the spectrum.

- Build on what has and/or is occurring in the local monitoring arena, and “add value” to these programs.
- Incorporate “terrestrial” monitoring efforts, especially the impacts of managing runoff. It is a “short run to the sea” in the Islands, and what people do on the land impacts key nearshore and marine areas.
- Monitoring needs to “tell a story” about the health of our Islands ecosystem, and to lead to behavior change; to link personal choices, property management, and land use decisions to ecosystem health and the ecosystem services that support us (soil, water, vegetation, wildlife).
- Community participation is vitally important. People collecting data develop an understanding of our ecosystem, and of how their choices impact ecosystem health. Friends and neighbors talk to each other about what is going on and how to make it better.
- Support needs to go to monitoring that addresses local issues, that indicates what is happening locally, and that provides guidance to those who live and work here.
- Find the money to support a locally prioritized monitoring effort with a strong community volunteer component. Partnerships stand a better chance of getting funded.

2.3 Structuring a Monitoring Strategy. Building an effective monitoring program that generates meaningful information and contributes to adaptive management requires a process that incorporates the following seven aspects: assessing who needs the information and how it is used with feedback loops between all users, and identifying key questions that address local issues; identifying gaps and needs; prioritizing monitoring efforts; supporting *effective* existing monitoring efforts; establishing networks, partnerships and feedback loops at all levels; providing access to monitoring information; and finding funding sources.

1. Assessing Information Needs

Who uses the information (user groups) generated by monitoring and *how* it is used helps shape the design of monitoring programs. Key questions that address current local issues can also shape the design of monitoring programs.

Recommendations

- Establish a process to continually update monitoring needs and data gaps

- Establish feedback loops between all user groups that support adaptive management
- a. **User Groups** – the following is a partial list of who currently uses information generated by monitoring efforts.
 - 1) Resource managers (SJC) – water resources management, salmon recovery,
 - 2) Program managers (SJC) – pollution prevention, environmental health, Land Bank, stormwater utility, Conservation District farm and forest planning staff
 - 3) Local elected decision makers – county council members, Town of Friday Harbor council members and mayor, neighborhood associations
 - 4) Advisory boards (SJC) – Marine Resources Committee, Stormwater Advisory Committee, Agricultural Resources Council, Economic Development Council
 - 5) NGO's – Friends of the San Juans, Kwiaht, San Juan Nature Institute, San Juan Preservation Trust
 - 6) Other – WSU Beach Watchers, Stewardship Network
 - 7) Researchers, academic institutions and programs
 - 8) Regional, state, tribal, federal and trans-boundary entities
 - b. **Use of Monitoring Information** – the following are examples of how monitoring information is used locally.
 - 1) Program direction – Beach Watcher participation, focus for the SJC Pollution Prevention program, where to install stormwater infrastructure (rain gardens, wetland restoration, conveyance and infiltration systems), restoration projects, set local thresholds for non-point source pollutants and identify problem areas, track volumes of water being put to beneficial uses, conservation land acquisition.
 - 2) Local land use and policy decisions, changes in local laws and codes.
 - 3) Landowners and businesses - introduction or continuation of best management practices with regard to soil, water, stormwater, vegetation, wildlife; pollution prevention; guidance for property owners to maximize groundwater recharge with stormwater BMPs.
 - 4) Outreach and education – translation of monitoring information into understandable language for the public in order to inform product and/or behavior choices pertaining to homes, gardens, barns, businesses, property management, and vehicle maintenance.
 - 5) Enforcement – to prevent or trigger enforcement actions.
 - c. **Key Questions** – to be effective, data resulting from monitoring needs to be used. Following are important questions that monitoring programs can help answer at the local level.
 - 1) What are the impacts of single family residences on the ecosystem health of nearby shorelines, wetlands, groundwater recharge areas, stream courses, and wildlife habitat?
 - 2) What are the impacts of stormwater from urban growth areas on ecosystem health?

- 3) Which BMPs (best management practices) are working, and which are not?
- 4) Where are key habitat areas (forage fish beaches, eelgrass beds, shellfish beds, estuaries, feeder bluffs, wetlands, stream courses, etc.) and how are these areas being impacted?
- 5) How do threatened and endangered species use the Island ecosystem?
- 6) Are we maintaining appropriate habitat for the recovery of endangered or threatened species?
- 7) How do identified threats and stressors impact habitat function?
- 8) We want to protect what we have, but we don't know what we have. The question "what do we have?" underscores the need for establishing and monitoring *baselines* in key areas (MSA target areas and marine reserves, at a minimum).

2. Identifying Gaps and Needs – what additional data is needed to address local issues and contribute to adaptive management?

- a. The *MSA Monitoring Plan* proposed the following and contains additional information pertinent to each.
 - 1) Plankton – continue the Pelagic Ecosystems monitoring (Research Apprenticeship, UW FHL) through the year and expand the number of sites visited from 2-3 to 5-10.
 - 2) Aquatic Vegetation (seagrasses, kelp, and other marine algae) – in addition to monitoring stem density, characterize population sub-structuring and site-specific clonal diversity patterns to understand the impact of natural and anthropogenic disturbance events on the health and resilience of seagrass flora.
 - 3) Salt Marshes – map and monitor using aerial photography plus extensive groundtruthing.
 - 4) Rocky Intertidal Communities - maintain the UW FHL rocky intertidal sampling at Reuben Tarte, Cattle Point and Cantilever Point sites. Add sites at Cedar Rock and Pt. George on Shaw Island, and Argyle Lagoon and False Bay on San Juan Island. SJC could partner with FHL and the NPS to establish or maintain sites at American Camp and English Camp. Establish new intertidal monitoring sites on all the major islands, including rocky shores and soft sediment beaches or mudflats.
 - 5) Soft Substrate Subtidal Communities (nearshore sand, mud and gravel) - maintain the UW FHL sampling at Pt. Caution/Collins Cove sites. Add sites at Cedar Rock and Pt. George on Shaw Island, and near Argyle Lagoon and outside False Bay on San Juan Island. Establish subtidal monitoring sites at rocky shores and soft sediment habitats of all major islands, especially outside protected marine areas where monitoring sites don't currently exist. Complete a broad-scale survey and basemap of subtidal habitats within the MSA to establish species presence and map habitat types in conjunction with other monitoring efforts such as mapping rockfish habitat.

- 6) Rockfish, Lingcod and Greenling – broaden the range of sites and continue assessments of abundance and length distribution in regulatory, voluntary and open areas on a regular basis to test hypotheses about the efficacy of harvest controls. Conduct a one-time assessment of all suitable rockfish habitat in the San Juans.
 - 7) Surf Smelt and Pacific Sand Lance – periodic monitoring (every 5 years?) of documented spawning sites, and exploratory surveys of potential spawn habitat. Assess larval and adult distribution and abundance.
 - 8) Pacific Herring – annual spawning site surveys of documented sites and additional surveys of potential sites.
 - 9) Marine Birds – conduct surveys every three to five years using protocols developed by MESA and WDFW for PSAMP. Yearly monitoring of black oystercatchers and pelagic cormorants, which are indicator species as identified by the *Marine Stewardship Area Plan*.
 - 10) Desalinization Plant Outflows – field monitoring including impacts of effluent on fish movement and sampling of effluent water to be tested for salinity, chlorine and copper at the minimum.
 - 11) Sediments – collect and archive frozen sediment samples to document hydrocarbons and other contaminants prior to an oil spill or other contamination.
 - 12) Oil Spills – see Sediments above.
 - 13) Shoreline Vegetation – use existing vertical and oblique aerial photo data sets for different time periods to monitor change over time in shoreline vegetation type, cover and overhang.
 - 14) Docks, Marinas and Other Structures – a retrospective survey of existing docks, with data on distribution and abundance of eelgrass or other selected organisms under and at distances from docks; data on dock age, size, design and orientation; data on water depth; data on boats and boat use via interviews.
 - 15) Non-Indigenous Species (NIS) – determine the spread of established NIS via field sampling and/or aerial photo analysis where possible.
- b. **In addition, the following are gaps that were identified** during 2010 and 2012 through Monitoring Group meetings, the interview process, and Community Monitoring Roundtables.
- 16) More spatially diverse data on local precipitation inputs to accompany water quality and water quantity monitoring.
 - 17) Add details from the adaptive management and monitoring plan that is currently being developed by the WRIA2 Lead Entity for Salmon Recovery, Salmon Recovery staff from the Puget Sound Partnership, and the Puget Sound Recovery Implementation Technical Team (RITT).
 - 18) An accepted process of setting and reviewing quality assurance and quality control (QAQC).
 - 19) Funding to maintain volunteer coordination at current levels and increase volunteer coordination to the levels needed to carry out prioritized monitoring efforts.

- 20) Coordination and information sharing among these efforts and with monitoring at all levels.
- 21) Incorporation of monitoring results into the *MSA Monitoring Plan*, into local land use decisions, and into the implementation of other local plans.

3. Prioritizing Monitoring Efforts

There are limited resources (time, people, funding) available for monitoring. How do we prioritize monitoring efforts at the local level and tailor monitoring programs for best results?

a. Focusing Monitoring Efforts – certain “screening questions” may need to be answered before a monitoring effort goes through a more detailed ranking process. Following are questions that can effectively guide the design and prioritization of monitoring programs.

- 1) Is the monitoring effort sustainable (infrastructure, personnel, funding) over the long term?
- 2) Does the monitoring effort inform and steer forward current local planning efforts? See Appendix B, Criteria, Relevant Plans.
- 3) Does the monitoring program focus on early indicators of success, or failure?
- 4) Is this monitoring effort sequenced in the “right order?” Certain monitoring data may need to be collected before the next step in a monitoring plan.
- 5) Is there current funding available? Can this funding be leveraged? Is there potential funding coming down the pike?
- 6) Does the QAQC level (collection by K-12 students, community volunteers, college students, graduate students, PhD students, or professionals) match the use the data will be put to (outreach, decisions made by elected officials or program managers, enforcement)?

b. Criteria for Ranking Monitoring Efforts – there are an infinite number of variables to monitor, and limited money, time and people to do so. Developing a ranking process is one way to prioritize local monitoring efforts. This process provides a feedback loop between participants, gives direction to local efforts, and demonstrates that there is an effort to coordinate monitoring at the local level. Appendix A shows a draft monitoring matrix with the following criteria that has been developed collaboratively as a first step in local prioritization. The weighting of the criteria has yet to be developed. Appendix B lists elements of various criteria.

- 1) Required Monitoring - Is the monitoring project required of San Juan County, or within San Juan County, and if so, by which agency? See Appendix B.
- 2) Program Direction - Will the monitoring program inform local program managers or coordinators? See section 2.3.1.b. above, Use of Monitoring Information.
- 3) Outreach Impact – Indicate the level of public interest, awareness, and involvement. Will results help support behavioral change?

- 4) Protection Effort and/or Restoration Project – Is the monitoring project associated with a protection effort/s and/or restoration project/s?
- 5) Enforcement Component - Will results of the monitoring effort prevent (by providing information leading to behavior change) or trigger an enforcement action? If triggered, which agency will conduct the enforcement action? See Appendix B.
- 6) Relevant Plans - Is the monitoring program called for in current planning efforts, and if so by which plan? Specify “benchmarks” if appropriate. See Appendix B.
- 7) Priority Area &/or Target - Does the monitoring effort focus on a priority area/s or target/s that are called out in planning efforts? See Appendix B.
- 8) Beneficial Use - Does the monitoring effort focus on a beneficial use (as defined in WAC 173) related to water quality and quantity in marine and/or surface waters? See Appendix B.
- 9) Threats/Stressors - Does the monitoring effort focus on a threat/s that is/are called out in planning efforts? See Appendix B.
- 10) Baseline – Is the monitoring project establishing and/or tracking a baseline?
- 11) Estimated Cost – Include a cost range; this criterion may not be weighted.
- 12) Funding Status – Is the project currently funded? If so, how and how much?
- 13) Partners – Indicate actual and potential partners.

4. Supporting *Effective Existing Monitoring Efforts*

Monitoring efforts that are currently ongoing, and efforts that have ceased solely due to lack of funding may contain components that fit into the more comprehensive *MSA Monitoring Plan*. This plan “strongly suggests that future monitoring of MSA targets include the continuation of ongoing programs as well as the selective resumption of programs that have been terminated.” See Table 1, a three page SUMMARY of Local Monitoring Efforts compiled in spring of 2011.

- a. **Local Monitoring Groups** – those organizations with a local base that are or recently have been conducting monitoring throughout San Juan County or at specific locations within the county noted by parentheses.
 - Beam Reach – audio output of vessels; phytoplankton (including toxic varieties)
 - The Center for Whale Research – Southern Resident Killer Whale annual census
 - Fisherman Bay Marine Health Observatory (Lopez) – multiple marine, nearshore, freshwater and terrestrial projects
 - Friday Harbor Labs (UW) – multiple marine habitat and species assessments
 - Friday Harbor Marine Health Observatory (MHO) – multiple marine, nearshore, freshwater and terrestrial projects
 - Friends of the San Juans – project specific
 - Indian Island Marine Health Observatory (Orcas Island) - multiple marine, nearshore, freshwater and terrestrial projects

- Lopez Community Salmon Team - multiple marine, nearshore, freshwater and terrestrial projects
- Mike Kaill Port of Friday Harbor aquarium (San Juan Island) – aquarium water quality
- Kwiaht – multiple marine, nearshore, freshwater and terrestrial projects
- SJC Environmental Health Department – groundwater, septic systems
- SJC Land Bank – multiple terrestrial projects
- SJC Public Works - stormwater
- SeaDoc Society – multiple marine projects
- SJC Environmental Health Department – groundwater, septic systems
- SJC Land Bank – multiple terrestrial projects
- SJC Public Works – stormwater
- San Juan Nature Institute – multiple marine and terrestrial projects with schools
- San Juan Preservation Trust – multiple terrestrial projects
- Town of Friday Harbor – Trout Lake watershed and system water consumption
- Waldron Community Science (Waldron Island) - multiple marine, nearshore, freshwater and terrestrial projects
- Water Systems and Municipalities on all islands
- The Whale Museum (Soundwatch) - – Southern Resident Killer Whale and transient habitat use and behavior; vessel trends and compliance
- WSU Beach Watchers – providing training and coordination for volunteers who participate in many of the above countywide monitoring efforts

- b. All Other Monitoring Efforts** - Appendix D of the *MSA Monitoring Plan* lists all existing programs being conducted by local, regional, state, tribal, federal and trans-boundary entities in a database format known as the MRC Monitoring Database. The complete database also lists programs that have been terminated.

5. Establishing Monitoring Networks

There are myriad ways to monitor an infinity of details, and disparate groups have been conducting monitoring often without effective coordination. The result can be unproductive overlap and information that doesn't mesh into the larger picture. In addition, community volunteers are essential to accomplish needed data collection. As people are trained and participate in monitoring, they also gain knowledge about our local ecosystem and the results of personal and land use decisions on ecosystem health. Creating feedback loops and establishing monitoring networks at all levels with strong volunteer components will lead to more effective adaptive management and to a more informed public.

- a. Coordination** – How can we maximize our collective efforts so limited resources stretch further, and results are compatible at all levels? Coordination between local efforts and with monitoring conducted at the regional, state, tribal, federal and

trans-boundary levels is necessary. Asking the following questions on an annual basis is a start.

- 1) What monitoring is currently occurring in the San Juan Islands and what has occurred? Use MRC's Monitoring Database (Appendix 1, MSA Monitoring Plan, 2011), the CAO Best Available Science document (BAS 2008), and the Puget Sound Ambient Monitoring Program (PSAMP Update, 2007) as starting points.
- 2) What monitoring, assessment, and adaptive management **tools** are available at the regional, state tribal, federal and transboundary levels that can be utilized locally?
- 3) What additional species, biological communities, threats, and/or physical and chemical characteristics are being or will be monitored at other levels?
- 4) Which of the above also need monitoring at the local level?

b. Who Collects Monitoring Information – the level of training and QAQC can vary depending upon the intended use of monitoring information. Those collecting data can generally be divided into the following groups.

- 1) K-12 Students – currently trained and coordinated by Friday Harbor Labs (UW), Kwiaht, and San Juan Nature Institute.
- 2) Community Volunteers – currently trained and coordinated by Kwiaht, The Whale Museum, and WSU Beach Watchers
- 3) College and University – degree programs involving undergrads, graduates, PhDs
- 4) Professional – may be necessary if an enforcement element is involved

c. Partnerships – collaboration at the local, regional, state, tribal, federal and trans-boundary levels will maximize limited resources and reduce redundancy. Appendix C lists actual and potential partners. Feedback loops, coordination and strong partnerships between all partners are essential.

6. Providing Access to Monitoring Information

Both those who conduct monitoring and those who use the results must have easy access to all monitoring information. They also must have a way to communicate their needs and results in a feedback loop that supports adaptive management.

Monitoring data and the analysis or summary thereof often needs to be “translated” for the lay public, and for elected decision makers. Without a functioning infrastructure, monitoring information remains scattered, often does not reach those who need it most, and may be misinterpreted.

a. Infrastructure – what is needed in order for monitoring data to be effectively preserved, accessed and used?

- 1) A stable, well maintained and easily accessible **monitoring data library/archive**.
- 2) **Analysis and synthesis** of existing monitoring information related to local ecosystem functions and land use impacts. Translation of this information

for the lay public and elected officials. Graduate and PhD students could assist on an ongoing basis, however overall coordination is needed.

- 3) **Updates** of key websites with a summary of monitoring results and links to relevant monitoring data and programs. Graduate and PhD students could assist on an ongoing basis, however overall coordination is needed.
- 4) **Feedback loops** between those conducting the monitoring (the data “producers”) and those using the results (the information “consumers”).

7. Funding Support

Without funding support, true monitoring will not occur as monitoring inherently requires long term commitments of resources. Yet monitoring is essential to determine how we are impacting ecosystem health and services – what we are doing wrong, and most importantly, what we are doing right. State and federal grant programs need to incorporate monitoring components. Making the most of funding dollars necessitates coordination and collaboration at all levels, feedback loops, and a healthy community volunteer component. Communities will support monitoring efforts when the information that is generated is seen as useful, i.e. “when I make this choice, I am improving the quality of the water that I drink.”

See Part II for a complete listing of actual or potential funders for locally based monitoring efforts, current as of June 2011.

Section 3. Prioritized Monitoring Strategy for the MSA

3.1 Next Steps for a 3 Year Timeframe. How can we, at the local level, move monitoring forward so that adaptive management actually occurs? Following are collaboratively identified next steps to be undertaken over the next three years, many of which are or need to be occurring on a continuing basis. Note that the monitoring coordinator position will be unfunded as of June 2011. The Monitoring Group consists of members of the MRC’s monitoring and science subcommittees, with additional members involved in actual data collection, terrestrial monitoring efforts, local resource management, and outreach and education. Next steps that require group effort and process are indicated by (**Group**). Next steps that can be accomplished by a coordinator are indicated by (Coordinator). Next steps that could be accomplished by a graduate student assisting a coordinator are indicated by (Coordinator and Grad Student). Next steps that need work by both a coordinator and the group are indicated by (Coordinator and **Group**) Next steps that can be accomplished by the SJC Marine Resources Committee are indicated by (**MRC** and Coordinator).

1. Assessing Information Needs

- a. Continue asking key user groups what would be helpful information learned through monitoring. (Coordinator and Grad Student)
- b. Continue tracking data use. Who is using what? (Coordinator and Grad Student)

2. Identified Gaps and Needs

- a. Coordinate the development of a methodology, including the process of identifying indicators or ‘eloquent species,’ for assessing key biological communities. Partners include at a minimum the Friday Harbor Labs, Kwiaht, the REEF program, SeaDoc Society, and WSU Beach Watchers. Modeled after the Indian Island Marine Health Observatory, or Waldron template, this would include surveys by volunteers, plankton and camera tows, and REEF surveys further offshore. An additional model is the Rapid Shoreline Assessment protocol conducted through People for Puget Sound several years ago. (Coordinator)
- b. Work with other regional MRCs to petition the NW Straits Commission and Puget Sound Partnership to provide support for a community monitoring QAQC process. (MRC and Coordinator)
- c. Continue to refine and prioritize data needs and gaps. (Group)

3. Prioritizing Monitoring Efforts

- a. Identify the specifics of monitoring that is required of SJC, who is doing what, overlaps, gaps, needs, partners, and funding potential. (Group with coordinator)
- b. Identify how monitoring needs called out in planning efforts interrelate, who is doing what, overlaps, gaps, needs, partners, funding potential. (Coordinator and Group)
- c. Identify who is best suited for specific monitoring priorities. (Group)
- d. Develop a local prioritization process that has buy-in from both monitoring groups and user groups. This may include a ranking matrix, a flow chart, a series of questions, or a combination. (Group)
- e. Add the Adaptive Management and Monitoring salmon recovery elements to this strategy as they become available. (Coordinator)
- f. Continue to incorporate terrestrial information into the MSA monitoring plan. (Coordinator and Grad Student)

4. Supporting Effective Existing Monitoring Efforts

- a. Work with community monitoring groups (e.g. Kwiaht, WSU Beach Watchers, SJC Land Bank, SJ Preservation Trust, SJ Nature Institute) to help integrate these efforts into the *Prioritized Monitoring Strategy*. (Coordinator and Grad Student)
- b. Identify how to “add value” to existing monitoring programs and incorporate these ideas into program implementation and funding applications. (Group)
- c. Coordinate with the federal and state agencies developing monitoring and assessment protocols to bring those tools to San Juan County. (Coordinator)

5. Establishing Monitoring Networks

- a. Enlist the support of existing and potential monitoring partners. (Coordinator and Group)
- b. Encourage academic institutions (U.W., Huxley College, Western, Skagit Valley College, WSU, and University of Victoria) to incorporate San Juan

Islands' monitoring needs into masters and PhD thesis programs.
(Coordinator)

- c. Facilitate useful partnerships, coordinate with all levels of monitoring groups, and work towards streamlining monitoring efforts. (Coordinator and **Group**)
- d. Coordinate this strategy with the implementation of local action agendas, management plans, and outreach/educational efforts. (Coordinator and **Group**)

6. Providing Access to Monitoring Information

- a. Summarize prioritized monitoring efforts and results for MRC's website. Make sure that links are posted on key websites - SJC, Labs, local libraries, NGOs, state, feds. (Coordinator and Grad student)
- b. Publish monitoring results "fact sheets" in local newspapers, web news, key websites. (Coordinator)
- c. Give presentations of key monitoring information to decision makers and community groups. (Coordinator)
- d. Monitoring Workshop – partner with Islands Trust on a transboundary workshop, possibly in conjunction with the annual Marine Managers or Salmon Recovery workshops. (**MRC** and Coordinator)
- e. Include a "monitoring update" component in the local annual Stewardship Fair, County Fair, and other events. (Coordinator)
- f. Update the *draft Marine Stewardship Area Monitoring Plan* Excel table that to date includes primarily marine monitoring projects conducted in the San Juan Islands. (Coordinator and Grad Student)
- g. Partner with other MRC's in the Puget Sound Region and work with the NW Straits Commission and Puget Sound Partnership to fund needed monitoring infrastructure. (**MRC** and Coordinator)

7. Finding Funding Support

- a. Develop a timeline for upcoming grant opportunities that include prioritized monitoring components. (Coordinator and **Group**)
- b. Communicate with potential funders, and assist partners in coordination of applications. (Coordinator)
- c. Find funding for the training and coordination of volunteers involved in local community monitoring efforts. (Coordinator and **Group**)
- d. Coordinate at all levels to identify common needs and partner in funding requests. (**MRC** and Coordinator)