CITIZEN-BASED MONITORING:

AN OPPORTUNITY FOR THE MAURY ISLAND AQUATIC RESERVE

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1.0 INTRODUCTION

Marine protected areas (MPAs) have recently come to the head of marine environmental management and recovery strategies. MPAs are recommended tools for preserving habitat and biodiversity, enhancing the aesthetic, recreational, and educational value of marine areas, providing scientific research sites, and improving fisheries management.[1] However, the use of MPAs can be seen as conflicting with the traditional public beliefs of 'open-access' and 'public good' liberties. Special interest groups and the general public alike prize the 'right of use' without restriction of the sea.[2] There is a customary (and in the U.S. relatively negative) attitude towards marine protected areas, which are viewed to have possible affects on user access to marine resources. One of the greatest challenges for marine resource managers is changing these public attitudes towards MPAs. One possible tool for addressing these issues is the use of citizen-based monitoring in marine protected areas and reserves.

1.1 THE NEED FOR MONITORING

In the book, *Marine Reserves: A Guide to Science Design and Use*, thirteen principles are described for marine reserve design. Three of these principles relate directly to monitoring activities;

- **Principle 8** - *Monitor Reserve Performance-Environmental and Social*.
  This principle stresses the importance of tracking the environmental and social dimensions of marine reserve performance to provide the basis for adaptive management.
- **Principle 9** - *Make Research and Monitoring Participatory*.
  Enlisting stakeholders, including resource users, in data collection and analysis is and important step that educates participants, builds capacity, and fosters trust.
- **Principle 10** - *Share Monitoring Results*.

[1] NRC, 1
[2] NRC, 20

The sharing information regarding the environmental and social performance of marine reserves is crucial and can enhance reserve legitimacy or provide the impetus for necessary policy reform.

Citizen monitoring programs can help achieve the goals of the aforementioned principles through providing much needed data for reserve managers, increasing trust and confidence of community members in reserve management and fostering greater buy-in on the part of the public and policy makers. Monitoring assessments can provide information for future policy and management decisions and also enhance confidence in current management practices and reserve policies. Protected areas have been shown to benefit from the attention and stewardship provided by numerous citizens groups who are focusing on chemical, physical and biological monitoring.[3] Citizen data can help agencies and the public to identify and address contamination of coastal waters and other problem areas. Moreover, long-term citizen efforts can show trends that will allow for better problem solving strategies also known as adaptive management. By maximizing the quantity and quality of government and citizen monitoring efforts into one united effort, the overall health of Washington's MPAs and their watersheds will be improved.

Citizen monitoring groups in Washington State are already making an important difference by increasing public awareness and assisting resource agencies with watershed data collection. There is a strong need to obtain consistent and reliable data on marine ecosystems and water quality. Due to lack of financial and personnel resources agencies are increasingly turning to citizen monitoring groups for data collection. Expanding these efforts to marine reserves is a logical step for resource managers.

1.2 WHAT ARE MARINE RESERVE MONITORING SYSTEMS?

Marine reserve monitoring systems track changes in the state of the reserve and can be social and environmental in scope. These systems can vary in what they measure and who does the monitoring. Data can provide insight into changes in environmental and social systems due the reserve establishment. The majority of marine protected areas today lack formal systems for monitoring environmental and especially social

[3] Citizen Monitoring Guide. Central Coast Regional. June 2000

phenomena.[4] As a result managers, resource users, and other stakeholders often informally monitor social and environmental and indicators to assess protected area performance.

Currently, the most common identified and monitored parameters are temperature, pH, turbidity, dissolved oxygen, invertebrates, birds and wildlife, weather, photographic and visual surveys, sediment and habitat assessments, and data from restoration and cleanup activities. The frequency with which these parameters are collected varies widely, from daily to "irregularly." Monitoring groups use the collected data for education (the most often reported use), baseline information, restoration projects, research, and decision-making.[5] The most common gatherers and users of citizen monitoring data are K-12 schools. Other users include non-profits, advocacy groups and local governments.

There are three different monitoring strategies that citizen groups can choose to pursue. 1) Ambient monitoring describes existing or long-term trends in water quality or the environment. 2) Baseline monitoring describes conditions that exist before some event or change. This could be before an oil spill or development project and be used to monitor changes. 3) Compliance monitoring assesses whether specific standards or requirements are being met. This could include monitoring the outfall of an industrial plant or septic tanks for leakage.

There are many challenges for citizen monitoring groups to address. Perhaps the most common is lack of resources to store and/or share data electronically. Surveys have found that for many agencies key data needs are not being met, and that there is a lack of consistency in volunteer protocols and data collection. This indicates that there is greater need for coordination between citizen-monitoring groups and resource agencies. Another concern is that sampling techniques, and the procedures for the training of volunteers also vary greatly between groups. Some have consistent volunteer training, while others have none. This results in data that cannot be used for policy change of management action. To address this issue there has recently been an increase in the development of monitoring protocols by many groups.

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[4] *Marine Reserves: A Guide to Science Design and Use*. Sobel, 170
[5] Citizen Monitoring Guide. Central Coast Regional. June 2000

Citizen-based monitoring programs can benefit much more then resource managers and state and federal agencies. It can also be of great source of pride and satisfaction for the volunteers. Findings from a report evaluating the impacts on participants in the Seattle Aquarium's monitoring program 'Citizen Science' found through interviews and surveys that the project generated,

- Changes in participant attitudes or stewardship for the beach and animals
- Increased knowledge of different species
- An appreciation of the concept of a citizen scientist as a way of preserving the habitat for the next generation
- An interest in doing the activity again
- Gratitude for being able to apply skills and knowledge learned through training.[6]

1.3 CITIZEN-BASED MONITORING AND THE MARINE ENVIRONMENT

There are some impressive examples of citizen monitoring programs related to marine and coastal environments and issues. In 1993 the Santa Cruz Chapter of the Surfrider Foundation formed the "Blue Water Task Force" (BWTF), a volunteer group to monitor water quality at a number of favorite beaches and surf spots along the coast. . The BWTF began a monitoring a database in 1994 on fecal coliform and total fecal coliform. Fecal coliform, is found in contaminated water, and is an indicator of disease causing pathogens. The recent passage of two water quality related bills in the California State Assembly and Senate, AB 411 and SB 65 are largely a result of this citizen-generated database. Prior to SB 65, local jurisdictions had posted health warnings on beaches. However, these signs were mostly posted in hard to see places. SB 65 requires that beaches, which violate health and safety standards more than twenty percent of the time, must post warning signs at primary access locations. AB 411 requires California's coastal counties to sample water, at least once a week, on beaches, which receive more than 50,000 visitors per year. They must then release these data to the public. Surfrider publishes data visibly in local magazines, Internet and newspapers. Water quality testing

[6] Evaluating 'Citizen Science' and its impact on high school students, 2004

conducted simultaneously by nongovernmental groups provides a check on governmental data. The BWTF's testing expands the amount of data available to the public by testing at a higher number of beaches than local jurisdictions have capacity to test. This program illustrates how both the public and the local government benefit from citizen based monitoring and continued participation in this process.

Another example of citizen based monitoring also based in California is the "Urban Watch Program," a cooperative project of the City of Monterey, the Monterey Bay National Marine Sanctuary and the Coastal Watershed Council. The Urban Watch Program works to identify common pollutants flowing into the Monterey Bay National Marine Sanctuary from urban storm drains. Citizen volunteers collect water samples from designated storm drains over a 24-hour period do the monitoring. The samples are tested for detergents, copper, phenols, chlorine, turbidity, ammonia, color and odor. Since 1996, the Urban Watch Program has documented the pollutants such as detergents, copper, phenols and chlorine along with concentrations. The City of Monterey and the Monterey Bay National Marine Sanctuary have used this data to develop targeted educational materials and training programs for residents, business owners and municipalities to help reduce urban runoff. Annual monitoring has shown a decrease in certain pollutants corresponding to the educational materials and programs developed by the Sanctuary and City of Monterey. The Urban Watch Program is an example of how citizen monitoring can provide valid data for targeting public education.

2.0 BACKGROUND ON THE MAURY ISLAND AQUATIC RESERVE

In 2004 the Maury Island Aquatic Reserve was established. It is located in central Puget Sound and southwestern King County. The reserve includes approximately 5,530 acres of state owned aquatic bedlands and tidelands in Quartermaster Harbor and along the east and south shore of Maury Island. The reserve and its associated habitats and species are important components for conservation in the central Puget Sound sub-basin. There are several unique ecological features that led to the establishment of the reserve including; the existence of herring stock spawning grounds (one of only 18 in the Puget

Sound), Chinook salmon migratory corridors and rearing areas, habitat for wintering marine birds, an uninterrupted drift cell, eelgrass beds and sand lance spawning grounds.[7]

2.2 WHY USE CITIZEN-BASED MONITORING FOR THE MAURY ISLAND RESERVE?

In the "State of the Nearshore" report, completed by Battelle Marine Sciences Laboratory for the King County Department of Natural Resources and Parks, attention was called for the need to integrate citizens into the scientific process. It stated, "*The public lacks awareness, understanding, and involvement in habitat protection issues and programs*." The report also stated, "*….it is apparent that there are a number of general and specific actions that need to be taken to better understand and protect individual elements within the ecosystem and the nearshore ecosystem as a whole. For example, it is clear that a number of anthropogenic influences are responsible for habitat loss and species declines.*" It is clear that it is necessary for managers and policy makers to recognize the need to involve community stakeholders in resource management through building awareness and understanding of scientific issues. The DNR has also seen the need to address these issues and has specifically identified goals of education, outreach and monitoring in the Maury Island Aquatic Reserve Management Plan.

GOAL III. *Promote stewardship of riparian and aquatic habitats and species by providing education and outreach opportunities and promoting coordination with other resource managers.*

The management plan further details that this goal can be achieved by *1)* promoting voluntary habitat conservation efforts within and adjacent to the reserve, 2)

[7] Maury Island Environmental Aquatic Reserve Final Management Plan. (2004) Washington Department of Natural Resources.

creating opportunities for public involvement in the management of the reserve, and 3) supporting scientific research and education related to management of the reserve, including hosting at least one regionally based environmental education field trip, workshop seminar or study course each year.

Citizen-based monitoring is an obvious strategy to achieve these stated objectives. Not only does it support scientific research and education, but also through the involvement of community members in monitoring activities it can increase awareness and promote voluntary conservation measures of adjacent landowners and reserve users. Citizen-based monitoring is the prefect opportunity to give the public a role in establishing baseline conditions that can serve for future management of the reserve. The long-term goals and management strategies for the reserve depend on an understanding of the baseline conditions within the area and there is a critical need to establish these conditions. The reserve is highly impacted by activities that are not managed by the DNR such as leaky septic systems, runoff and shoreline modification. Therefore, it is imperative that research and management be collaborative with local governments and citizens.

2.3 BEST MANAGEMENT PRACTICES FOR CITIZEN-BASED MONITORING

There have been many examples of failed and successful citizen-monitoring projects. Based on literature reviews, personal interviews and experience I have developed a list of Best Management Practices for Citizen-Based Monitoring Projects.

1. **Take good care of the volunteers!** It is important to remember that people are volunteering their time. Feedback and rewards are important to keep volunteers committed and consistent. Small rewards work, a party, t-shirts, thank-you cards are great. The point is for the volunteer to feel valued.
2. **Set goals and have a clear description of your program.** When designing a monitoring program it is important to answer the following questions; *What do you want to know with monitoring? What do you hope to accomplish with monitoring? What do you want to be your final outcome? How will the data be*

used? Will you want to present the data to agency or decision makers? Who will interpret the data? What are you expecting from agencies and organizations, politicians and decision makers? The answers to these questions will determine the type of monitoring program design, the quality of data required, the people who need to be involved, and level of involvement required of partners and volunteers.

3. **Make it Fun!** In order to keep volunteers coming back it is important to identify dynamic and enjoyable activities. Remember citizen-based monitoring has a large social component. By supporting interactions and sharing between volunteers the monitors themselves will have a greater sense of purpose and commitment. This will help maintain the volunteer base over time.
4. **Provide good usable data.** The link between collected data and policy is often difficult for citizen monitoring groups to achieve. Early partnership with agencies and organizations that make and influence policy are key to achieving this goal. By determining the data needs and protocols early on and establishing a plan to use data there is a greater opportunity for connection to action.
5. **Plan how and when you will use and present your data**. It is necessary to determine w[8]hen your reports should be prepared and published. (Weekly (fecal coliform), yearly for baseline data), and make the schedule of publication consistent. The presentation of data is crucial to the success of the monitoring program. To create community support it is necessary that volunteers and local citizens have access and understand the data collected. The compilation of results in an easy to read, attractive format, will result in effective outreach to a wider community. This should include qualitative descriptions, and visuals including, a map of site and/or photos.
6. **Realize that communities are different.** Locals in an area have a better idea what will work and what will not work in their community. It is important to correlate the design and goals of monitoring with interests of the community and or resource users to achieve long-term project success.

3.0 RECOMMENDATIONS FOR CITIZEN-BASED MONITORING AND INVLOVEMENT PROJECTS FOR THE MAURY ISLAND AQUATIC RESERVE

Stakeholder and expert interviews were conducted to determine the appropriate type and scale of citizen-based monitoring program for the Maury Island Aquatic Reserve. This provided a forum to encourage collaboration and solicit feedback from possible partner organizations and local citizens. Three key questions were asked in workshops, meetings and personal interviews to gather important information and help guide design criteria for successful monitoring at the aquatic reserve:

- **What does the aquatic reserve need in terms of monitoring?**
- **Who could contribute and or partner with monitoring efforts? Who are the logical players?**
- **What would resonate with islanders and get them involved?**

Feedback from these questions provided direction for the development of the Best Management Practices for Citizen-Based Monitoring and a multitude of possible contacts for partnerships. (See Appendix A-Workshop Feedback and Appendix B-Island Interview Feedback) This process has lead to the development of several recommendations for possible citizen-based monitoring efforts at the aquatic reserve. The recommendations can be divided into two distinct areas, Citizen Involvement and Citizen Monitoring.

When evaluating proposed recommendations the following criteria were taken into consideration:

- Contribution to the management goals of implementation, monitoring, research and outreach
- Ability to further goals of real data collection, by citizens contributing to reserve policy
- Creation of a successful place for the reserve in the community
- Feasibility of recommendation in regards to tight budget realities
- Feasibility due to lack of DNR staff time

- Ability to leverage the work of others and other programs

3.1 OVERALL RECOMMENDATION

Project Objective:

- Implement monitoring, research, outreach and citizen involvement projects at the aquatic reserve
- Coordinate monitoring activities at the aquatic reserve
- Coordinate DNR's role in the Annual Nearshore Festival
- Support partnerships for citizen-based monitoring projects at the aquatic reserve
- Develop models for citizen-based monitoring to be implemented at other aquatic reserves in Washington
- Work with community members to further identify and implement monitoring goals of the reserves management plan

Project Description: Aquatic Reserve Monitoring Coordinator

The creation and acquisition of a DNR employee to coordinate monitoring activities at the reserve is a necessary step to effectively implement citizen-based monitoring programs. Current DNR reserve staff lack time to devote to the organization and implementation of successful citizen monitoring. As seen in the Best Practices for Citizen-Based Monitoring in order to achieve the short and long-term goals of a program it is necessary to coordinate and work closely with volunteer monitors. Successful citizen monitoring will include personal phone calls to participants and feedback for their work. Another important part of citizen monitoring is the final use and compilation of data. It is critical that data be processed and fed back into the community in order to maintain volunteer participation in the program.

As can be seen by the proposed recommendations the DNR has many different options for monitoring collaboration to work toward reserve management goals. Each project addresses different aspects and community concerns in regards to the aquatic reserve, and a combination of these projects will be the most successful in achieving

long-term benefits and increased reserve health. For example, partnership in the nearshore festival, although a great step to increase community involvement and awareness of reserve issues, will not directly advance monitoring needs of the reserve. However, by implementing a year long monitoring program and using the Nearshore Festival to share results with the larger community each project is enhanced.

Outcome:

- Implementation of reserve monitoring, outreach and citizen involvement projects
- Coordination of various monitoring activities at the aquatic reserve
- Participation and partnership of DNR in the Annual Nearshore Festival
- Enhancement and development of partnerships for citizen-based monitoring
- Development and export of models for citizen-based monitoring to other aquatic reserves in Washington
- Support and outreach to community members to implement monitoring goals of the reserves management plan

3.2 RECOMMENDATIONS FOR CITIZEN INVOVLEMENT

3.2.1 Recommendation: ANNUAL NEARSHORE FESTIVAL (partnership with Island Audubon)

Project Objective:

- Celebrate the Maury Island Aquatic Reserve, and it's unique place in the Puget Sound!
- Increase community involvement and excitement about the nearshore environment and the Aquatic Reserve
- Form partnerships to enhance long-term reserve management goals
- Support activities of island organizations
- Provide a forum to share information on future monitoring efforts and identify interested participants

- Provide an opportunity for community members to come together, learn and have fun

Project Description: NEARSHORE FESTIVAL 2006

This festival is based on a popular past island event. The Island Audubon is working to bring back and expand the annual beachwalk into a festival to celebrate the unique island nearshore environment.

Activities may include:

- Beach walks led by experts
- Nature plantings
- Ice cream social
- Citizen-based monitoring activities
- Expert discussions
- Information displays about environmental activities on the island, reserve activities and the health of the nearshore
- Displays by students, UW, Highline CC, UW-Tacoma, and agency scientists to discuss their research in the aquatic reserve
- Moderated discussions with elected officials about nearshore issues
- Workshops for landowners
    - Alternatives practices for shoreline owners
    - Site visit of alternate bulkhead options

Potential Project Partners: Project sponsor-Island Audubon, other partners include People for Puget Sound, Vashon Parks, Vashon Allied Arts, Seattle Aquarium and the Vashon-Maury Land Trust.

When: Annual 1-2 day festival in August on a low tide weekend, 10 A.M. – 4 P.M.

Where: At Jensen Point Park and other appropriate locations around the island

	ACTIVITY EVALUATION	
Activity	**Benefits**	**Costs**
Beach walks led by experts	• Raising awareness and increase citizen connection to the reserve and nearshore • Increasing excitement about the beach and the ocean • Activity is open to all ages	• Minor costs associated with liability of a public event • Consider impacts on shore life
Nature plantings	• Hands on citizen involvement • Activity contributes directly to reserve health • Sense of completion and satisfaction by volunteer	• Liability • Staff time • Funds for plants
Ice cream social	• Enhances social aspect of event • Attracts a larger portion of community to event	• Liability • Funds for ice cream
Citizen-based monitoring activities	• Hands on involvement for citizens • Creates connections to larger reserve issues • Activity serves a wide range of ages and interests • Attracts participants for long-term monitoring projects in the reserve	• Liability • Initial cost of monitoring equipment • Staff time for event and coordination of volunteers

Expert discussions	• Supports expressed community interests • Educates public about nearshore issues • Opportunity to recruit participants in monitoring projects	• Funds for speaker • Lack of control over content
Information displays	• Increases the visibility of the reserve in the community • Educates the public • Enhances the place of DNR in the community and strengthens partnerships • PR for the DNR	• Funds for booth • Staff time • Possible opportunity for groups opposed to DNR to raise conflicting issues
Displays discuss their research in the aquatic reserve	• Involves a wider community in the reserve • Enhances communication and collaboration between monitoring activities • PR • Educates the community about reserve health and activities	• Staff time for organization • Cannot control content • Possible display of research causing community concern about DNR management of the aquatic reserve
Moderated discussions with elected officials about nearshore issues	• PR for officials • Opportunity for community members to interact with elected officials	• Staff time for organizing • Venue for conflicting political

	• Educates community	views
Workshops for landowners	• Engages community members in solutions for better reserve health • Addresses issues critical to reserve health • Supports community interests and needs • Educates shoreline property owners to enhance reserve management goals • Supports partnerships with other island organizations	• Staff time • Funds for workshop speakers and materials

Project Contributions from DNR:

There are several opportunities for the DNR to collaborate and partner for the Nearshore Festival.

- Partner with island organizations in the design, organization and promotion of the festival
- Plan and run citizen monitoring component of festival
    - Rapid beach assessments
    - Water quality monitoring including turbidity, ph, nitrates
    - Marine bird observation/monitoring
- Contribute funds and or send expert speakers for festival
- Contribute funds for ice cream to increase social aspect of event
- Organize and staff festival booth with activities and information about the health of the reserve and DNR/community monitoring activities
- Organize and participate in a festival display to showcase current research activities in the reserve

The activities organized by the DNR would be simple 'participatory' monitoring.

Monitoring would focus on 1-3 of the following parameters (nutrients, plankton, finfish, shellfish, marine birds, submerged aquatic vegetation, invasive species, freshwater flows, water temperature, clarity, salinity or dissolved oxygen). The experience would be a combination of learning and monitoring. Participants would be taught to look at one or two of the parameters and then be lead to take measurements at different parts of Quartermaster Harbor. People would then come back to the main festival site to report and compare results. It is estimated that these activities should be planned to accommodate approximately 40 people.

The Audubon has stated that the ideal role for the DNR in the nearshore festival would be to 1) help fund expert speakers like Jim Johanessen, 2) send requested agency speakers to the festival 3) organize a booth about the reserve 4) help identify partners for field trip and beachwalk activities and 5) organize and run the citizen monitoring activities at the festival. The following section is a discussion of the pros and cons of the activities requested by the Island Audubon:

Activity	**PRO**	**CONS**
Fund expert speakers	Good PR, increased education about the nearshore and the Puget sound	Cost, unable to control content
Send requested agency speakers to festival	Good PR, increased education about agency activity, increased partnership with island organizations,	Staff time, possible conflicts with community members
Organize a DNR booth	PR, increased education	Cost, staff time
Identify partners for field trip and beachwalk activities	Increased partnership and goodwill with island organizations, PR, increased	Liability

	community education	
Organize and run the citizen monitoring component of festival	Interact with community members and increase knowledge of aquatic reserve, identify possible monitoring participants, opportunity to connect monitoring to larger reserve issues	Cost, liability, staff time

Outcomes:

- Partnership building that will enhance the success of the reserve
- Increased community awareness and understanding about the health of the Aquatic Reserve and the nearshore
- Establishment of a forum to share future results of monitoring (both citizen and agency based) within community
- Creates a positive image of the Aquatic Reserve and the DNR
- Increased awareness about the importance of the reserve in the region, and current activities
- Identification of possible participants for future citizen-based monitoring efforts

Project Logistics:

TASK	**DATE**
Island Audubon meets with local partners to determine vision and resources	July- October 2005
DNR planning of festival activities for citizen-based monitoring Recruit monitoring leaders Organize equipment	Winter 2005

Prepare Booth Prepare media	
Meet with island partners to finalize contributions to festival Monitoring component and presentation of results from programs conducted during the year Work with partners to secure event location, publicize event, and develop event day logistics and schedule Funding or contribution of speakers Secure ice cream	Spring 2006
Event Post event evaluation and 'lessons learned'	Summer 2006

Project Contact Information:

Name: Rayna Holtz

Organization: Vashon Island Audubon

Tel: (H) (206) 463-3153

(W) (206) 296-1391

Email: raynaholtz@aol.com

Comments:

In order for the DNR to contribute to the development of the design and components of the Nearshore Festival it is important that from the beginning the agency commits time and energy to being a full partner in the event. At the same time there are opportunities to play a smaller role by solely contributing to the monitoring activities, and perhaps funding or sending expert speakers for the festival.

3.2.2 Recommendation: PARTNERSHIP WITH SHORESTEWARDS PROGRAM

Project Objective:

- To address the impacts of shoreline property use
- To engage and educate shoreline property owners in best practices and encourage them to play a positive role in the creation and preservation of a healthy nearshore ecosystem
- To encourage voluntary changes in land use and other activities affecting the aquatic reserve
- Create stewardship by community members of the reserve

Project Description: WSU EXTENSION SHORESTEWARDS PROGRAM

This program is a component of WSU extension, to certify landowners and provide connections to the appropriate groups to make land use changes. The program is based on Backyard Wildlife Habitat Program and is currently operating in Hood Canal, Camano and Whidbey Island. There are plans to develop a turnkey model of the shorestewards program to enable other communities around the region to implement the program. (See appendix for detailed program information) The program is open to all shoreline property owners and those who have access to the shoreline through their community association. The program includes educational programs taught by experts in their fields. The program is strictly educational with the goal to help property owners learn more about shoreline stewardship.

Potential Project Partners: KCD, Vashon Land Trust, advised by Island Country Shoresteward Program

When: 2006

Where: The project could possibly be based out of the office of the Vashon Land Trust or the King County Conservation District

Project Contributions from DNR:

- Contribute to development of manual appendix on regional resources and contacts for landowners
- Contribute to funds for printing of manual and signs
- Contribute to workshops for landowners
- Support program coordination with the Vashon Land Trust or KCD

Outcomes:

- Engagement of shoreline landowners to achieve the long-term goals of the aquatic reserve
- Identification of landowners interested in nearshore issues and management
- Identification of possible participants for annual monitoring programs
- Increase awareness of effects of shoreline property use
- Provide resources for the community for alternative shoreline use

Project Logistics:

TASK	TIME
Meet with partners to determine roles and funding obligations	Fall 2005
Develop appendix of island resources for manual and application forms	Winter 2006
Beginning recruitment	Spring 2006
Collaborate for a series of landowner workshops	Spring 2006

BUDGET

ITEM	COST
Books	$2 per book at 1500 quantity
Signs for members	$7 per sign
Landowner workshops	

Project Contact Information:

Name: Scott Chase

Organization: Shorestewards, Washington State University Extension and Island County Marine Resources Committee

Tel: (360) 629-4522 ext. 6012

Email: schase@wsu.edu or shorestewards@wsu.edu

Website: www.shorestewards.org

Name: Tom Dean

Organization: Vashon Land Trust (Executive Director)

Tel: (206) 463-2644

Email: tom@vashonlandtrust.org

Name: Brandy Reed

Organization: King County Conservation District

(District Coordinator Watershed Projects)

Tel: (425) 277-5581 ext. 120

3.2.3 Recommendation: ART CONTEST FOR RESERVE INFORMATION

Project Objective:

- To engage the large artist community on Vashon Island
- To increase community involvement and awareness about the aquatic reserve
- To develop educational materials for the reserve

Project Description: ISLAND ART CONTEST FOR RESERVE SIGNAGE

This project would engage the larger island community. By fostering a project aimed at the islands large population of artists to create a design for reserve materials a new group of citizens will become stewards of the aquatic reserve. The photo/image contest can be a partnership with the Vashon Allied Arts where the contestant's work can be displayed before the final selection. For this activity it is important to have a theme that artists can interpret. The winner's piece could be the design for one or all of the following items:

- A information brochure or pamphlet for the aquatic reserve
- Entry sign with description of the aquatic reserve placed at one of the Vashon parks
- Mural or markers at different spots of the reserve

Potential Project Partners: Vashon Allied Arts (the oldest community arts organization, holds year round workshops), Vashon Parks

When: Dedication of final product August 2006

Where: Art contest display can be at the Vashon Allied Arts Center. The final sign or marker placement will be a later determined site on the reserve

Project Contributions from DNR:

Funding for the completed product (sign, brochure etc)

Promotion of the contest

Outcomes:

- Increased community awareness of the aquatic reserve
- Education about the nearshore environment
- The involvement of a wider island community in reserve management goals
- Increased stewardship of the reserve
- Enhanced place of the reserve in the island community

Project Logistics:

TASK	**TIME**
Meet with Parks Department to determine options for sign placement	Fall 2005
DNR determine funds and what type of sign, marker or product	Fall 2005
Meet with Vashon Allied Arts to determine PR needs for contest and criteria for entries	Fall 2005
Advertise Contest	Winter 2006
Contest Submissions and Final decision	May 2006
Dedication of sign or product	August 2006

Project Contact:

Name: Jason Everett

Organization: Vashon Allied Arts

Tel: (206) 463-5131

Name: Wendy Bricks

Organization: Vashon Parks (Executive Director)

Tel: 463-9602

3.3 CITIZEN MONITORING RECCOMENDATIONS

3.3.1 Recommendation: Water Quality Testing

Project Objective:

- To involve citizens in reserve monitoring tasks
- To create connections between the monitoring task and larger reserve issues
- To support monitoring interests of the community
- To establish trends in water quality, assess effectiveness of pollution management projects, and gather baseline water quality information.
- To connect monitoring data with reserve management

Project Description: WATER QUALITY MONITORING PROGRAM (partnership with People for Puget Sound in Quartermaster Harbor)

To conduct water quality monitoring for the following parameters

- DO
- Ph
- Nitrates
- Temp
- Turbidity

This project would be a partnership with People for Puget Sound for water quality testing in Quartermaster Harbor. This activity would involve the use of a Secchi disk, and water quality testing kits by community members who have expressed interest in conducting water quality monitoring. Participants would be trained to conduct tests and would take monthly samples to contribute to baseline data. Each quarter an educational workshop would be conducted for monitors on some aspect of water quality. This event would also be open to the community at large. Initial results of monitoring would be reported at the 2006 nearshore festival.

This project can help the community realize that the state of a local water body reflects the health of the surrounding environment. Water quality monitoring allows people to see almost everything they do has some impact on their watershed. In the past water quality monitoring has often excluded the majority of people due to the need for significant funding and advanced technical training. Data collected on water quality, by trained professionals, is often summarized in reports that are incomprehensible to the average public. There are however now many ways to measure water quality that require little or no funding and only a few well-designed workshops. Access to lower-cost monitoring activities can lead to an understanding of not only water quality problems but the sources of thee problems. This understanding helps citizens affected by water quality problems evaluate and work to change the situation. There are many examples of monitoring programs that use the making of equipment, use of computers, aerial and satellite images to engage participants.

In order to decide on a water quality-monitoring program was important to ask the following questions:

- Why assess water quality? What questions will we address?
- What do we want to assess? What indicators need to be measured or observed?
- How will we make those assessments/ what approaches and methods should be used?
- Where do we want to make our measurements and observations?
- When do we want to make our measurements and observations?

It is also important to look at the human dimensions of the program and evaluate 1) who will use the surveys and water quality measurements? What are their quality control needs? 2) What are the resources available to the group? and 3) What is the general skill level in terms of taking measurements and interpreting observations?

The majority of land use around the reserve is residential. Therefore, potential pollutants include nutrient runoff, human/pet waste and stormwater runoff. Primary and secondary indicators of these pollutants are summarized in the following chart.

Area land uses	Potential Pollutants	Primary indicators	Secondary indicators
Residential	Nutrient runoff	Nitrates Phosphates	Phytoplankton Dissolved oxygen BOD
	Human/pet waste	Fecal coliform	Nitrates
	Stormwater runoff	Temperature Total solids Turbidity	Phosphates BOD

After gathering baseline water quality data then participants can begin to look at the root causes of water quality problems, who is affected by the problem and who is responsible.

The program will include training for monitors that teaches
Introduction to Types of Pollutants (See Appendix C)
Introduction to Land Practices in your area

- Learn to interpret aerial photos and satellite imagery
- Develop a basic understanding of the structure of the water systems of t he Maury island aquatic reserve
- View the area holistically
- Gain comprehension of drainage, streams, discharge, drift cells and flow
- Develop an understanding of how land uses affect water quality
- Gain awareness of human impact on water quality

Curriculum for these classes including materials and time needed can be found in GREEN's book, *A Field Manual for Global Low-Cost Water Quality Monitoring.* Stapp (Chapter 7 and Chapter 8)

Potential Project Partners: People for Puget Sound, Quartermaster Harbor Shorewatchers Pod. Another potential future partner is KCDNR, which has expressed some interest for future monitoring activities.

When: Fall 2005 – Fall 2006

Where: Locations in Quartermaster Harbor

Project Contributions from DNR:

- Provide equipment
- Support coordination with People for Puget Sound
- Conduct participant training
- Provide data management and publishing of results

Outcomes:

- Increased awareness by community members of water quality
- Improved baseline water quality data for reserve managers
- A venue to discuss connections of water quality to larger reserve problems.
- Education of participants on what is affecting water quality in the reserve
- Develop a sense of watershed stewardship on the part of community members
- Recognition of water quality problems and work toward local solutions.
- Increase first hand knowledge and experience, continual monitoring helps people notice change

Project Logistics:

TASK	TIME
Meet with People for Puget Sound to determine roles for project, determine when data will be collected and what data	Summer 2005
Participate in Water Quality Potluck	July 30th 2005
Start monitoring project Initial training	Fall 2005, monthly collection by members and quarterly group workshop and reporting of results
Winter quarter educational workshop	Winter 2006
Spring monitoring educational workshop	Spring 2006
Summer reporting of results at nearshore festival and recruitment of new members	August 2006
Continued monitoring by pod members and training of new participants	Fall 2006

Project Contacts:

Name: Mary Beth Doles

Organization: People for Puget Sound (Shorewatch coordinator)

Tel: 382-7007

Name: Ray Heller

Organization: King County

Tel: (206) 296-8391

ray.heller@metrokc.gov

3.3.2 Recommendation: BIRD MONITORING PROGRAM

Project Objective:

- Create a partnership for citizen monitoring at the aquatic reserve.
- Collect baseline data on bird populations in the aquatic reserve
- Involve citizens in a monitoring task that is easy, can be done on their own time, and requires minimal training and equipment.
- Collect data of interest to both community members and reserve managers
- Conduct monitoring tasks that are fun and dynamic for participants.

Project Description: PARTNERSHIP WITH COASST PROGRAM TO MONITOR BIRDS

This activity would involve a partnership between the DNR and the Vashon Audubon to generate a list of 12 birds that should be monitored in the reserve. Data could be collected jointly with the COAAST activities by asking participants to target certain species live birds also. It would involve training on bird identification and resources for data collection and management.

Potential Project Partners: COASST, Island Audubon

When: Fall 2005-Fall 2006

Where: Locations designated with in the aquatic reserve boundaries

Project Contributions from DNR:

- Coordinate partnership with COASST program managers
- Collaborate with Island Audubon to formulate list of 12 birds to monitor at the reserve
- Develop monitoring materials
- Provide basic training for participants on bird identification

- Provide field guide for bird identification

Outcomes:

- Utilization and collaboration with the large birding community on the island
- Support of management goals to gather data on bird populations in the reserve
- Collection of baseline data on an area that Audubon has identified as an Important Bird Area.

Project Logistics:

TASK	**TIME**
Meet COASST to discuss collaboration, identify areas already monitored in the reserve, and formulate protocol	Fall 2005
Meet with Island Audubon and begin process of generating a list of 12 birds, Identify person to be in charge of email newsletter about the project	Fall 2005
Prepare data sheets, field guide and collection process	Winter 2006
Conduct Training	Spring 2006
Start monitoring (monthly by participants) Send quarterly newsletter	Summer 2006 – Summer 2007
Report Results	August 2007 nearshore festival

Project Contacts:

Name: Ed Swan
Organization: Vashon Audubon
Tel: 463-7976

Name: Todd Hass
Organization: COASST, School of Aquatic and Fisheries Sciences
Tel: (206) 221-6893
Email: thass@u.washington.edu

3.3.3 Recommendation: SPECIES REINTRODUCTION AND MONITORING

Project Objective:

- Foster citizen-based monitoring at the aquatic reserve
- Increase awareness about environmental issues affecting the health of the reserve and species in the Puget Sound
- Collect important reserve baseline data
- Support current projects and enhance partnerships in the reserve

Project Description: MONITORING OF REINTRODUCED OYSTERS

This project is a partnership with the Puget Sound Restoration Fund beginning in August 2005 to reseed three locations in the reserve with oysters. Monitoring activities may include the measurement of water quality parameters (temperature, salinity and fecal coliform) and macro invertebrate transects. Possible citizen monitors could be found in the group of Shorewatchers from People for Puget Sound. Another likely partner is KCDNR who has expresses interest in conducting monitoring activities beginning in 2006.

Potential Project Partners: Sponsor-Puget Sound Restoration Fund, People for Puget Sound Shorewatchers, KC DNR.

When: Reseeding is proposed for the end of August 2005. The monitoring should begin before the reseeding.

Where: Three sites in Quartermaster Harbor (Rabbs Lagoon, Shawnee Beach, Magnolia)

Project Contributions from DNR:

- Collection of baseline data before reseeding in August 2005
- Development of monitoring protocol and materials

- Training and supervision of citizen monitors for monthly or quarterly data collection
- Providing expert staff to train citizen monitors

Outcomes:

- Community involvement in reserve monitoring
- Increased awareness about connections between human uses and environmental effects and the marine life in the reserve
- The implementation of monitoring in 2005!
- Enhanced partnerships with area organizations
- Creation of a model for citizen monitoring of reintroduced species

Project Logistics:

TASK	**DATE**
Collection of baseline data at reseeding sites (DNR scientists)	July/August 2005
Determine parameters to be measured, protocol and training needs	Summer 2005
Meeting with possible partners and recruitment of monitors	Summer 2005
Train monitors	Fall 2005
Begin Monitoring on monthly or quarterly basis	Winter 2006 -2007
Report initial results at nearshore festival	August 2006
Compile data and train new volunteers	Fall 2006

Project Contacts:

Name: Betsy Peabody
Organization: Puget Sound Restoration Fund
Tel: 780-6947

Name: Mary Beth Doles
Organization: People for Puget Sound (Shorewatch coordinator)
Tel: 382-7007

Name: Ray Heller
Organization: King County
Tel: (206) 296-8391
ray.heller@metrokc.gov

4.0 CONCLUSION

It is clear that there are many opportunities for citizen-based monitoring efforts at the Maury Island Aquatic Reserve. It has the potential to create personal commitment and involvement on the part of community members and satisfy the current need for baseline scientific data. The citizens are the eyes and ears of the area and by using local knowledge resource managers are better informed of resource problems. Citizen-based monitoring can create advocates and most importantly start to improve relationships between the Maury-Vashon island community and the DNR. It is a win-win strategy for monitoring that will increase citizen education and awareness and meet the goals of the management plan for the aquatic reserve.

5.0 SOURCES

GREEN. 1996, *Field Manual for Water Quality Monitoring An Environmental Education Program for Schools*. Mitchell and Stapp.

GREEN. 1996. *Field Manual for Global Low-Cost Water Quality Monitoring*. Mitchell and Stapp.

Global Coral Reef Monitoring Network. 2000. *Socioeconomic Manual for Coral Reef Management*. Bunce, Townsley and Pollnac.

Department of Natural Resources- www.dnr.wa.gov
People for Puget Sound- www.pugetsound.org
The Seattle Aquarium-www.seattleaquarium.org
Department of Health- www.doh.wa.gov
Puget Sound Action Team- www.psat.wa.gov
Department of Ecology, A citizen's guide to Understanding and Monitoring Lakes and Streams www.ecy.wa.gov
King County Natural Resources and Parks- www.dnr.metrokc.gov
Shorestewards- www.shorestewards.org
Vashon-Maury Island Land Trust- www.vashonlandtrust.org
Reef Environmental Education Foundation- www.reef.org
Island Country Beachwatchers- www.beachwatchers.wsu.edu

APPENDIX A

WORKSHOP FEEDBACK

Building Partnerships for Citizen Based Monitoring
Vashon-Maury Island Aquatic Reserve
Meeting April 29th, 2005

SUMMARY OF RECOMMENDATIONS

1) Monitoring needs for the aquatic reserve

- Assemble historical baseline data for area find out what has been done, choose monitoring goals to fill in gaps
    - Dept. of Ecology- Data from QMH station, 2004, sediment data, modeling
    - DOH – Shoreline survey quartermaster harbor – all others
- Shoreline Surveys
    - Bulkheading
    - Beach Nourishment
    - Sediments
    - Beach Slope
- Compile flushing rate data (Skip Abertsen, DOE-Olympia)
- Pre-spill monitoring
- Water quality (does it meet the standards?)
- Debris
- Birds
- Invertebrates
- Riparian
- Eelgrass
- Invasive species
- General plant and animal inventory

2) Partners and Players for Citizen-Based Monitoring

- Artists on Vashon Island
- Sea Grant (Jim Brennan, Anne Nelson, co-leads workshops in KC)
- Beach Watchers (Don Meehan)
- King County (Ray Heller, Kollin Higgens)
- Surfrider (Ian Miller 360-808-1103, successful at getting volunteers onto the beach to sample)
- Waterfront landowners
- Non-profits
- Parks programs (possible programs that engage families and citizens)

- Schools
- Universities, biology honor societies
- Employ a Community Coordinator on the island who is really interested, to maintain a core group going long term.
- Public Utility District (They can provide information to landowners with mailings)

3) Recommendations to involve islanders in monitoring

- Connect to Oil spills- Use the idea that it is better know what's on your beach incase there is an oil spill, etc. for restoration. There may not be much money but if there is and you know what was lost (EX: sea grass beds),
- Conduct a survey to find out what is important to them
- Implement the stakeholder group indicated in the management plan
- A special guidebook for residents out there on the island
- Find something for the community to celebrate together (spawning celebration)
- Use Incentives- what's in it for them?
    - Conservation easements
    - Backyard sanctuary program- maybe one for beaches
    - Web-based resource list for landowners (who they can call for information and advice to take out a bulkhead or deal with a septic tank. The State agency can't legally recommend a consultant, but they can provide list. Possibly on the website (PFPS).)
- Arts (large artist community on the island)
    - Mostly artists are arguing for the connection of the living waters, even though they don't necessarily know much about the natural resources. They have a different method of communicating than scientists
        - Puget Sound Basin Conference- Money for resource mapping on BC Island. They engaged the arts community, taught them about the natural resources, and produced **resource maps** in an artsy way. They are tied to the local community, where they live. Really engaged the artistic community, tied in resources and local history, engaged others in the community as well.
    - **Art contest** to design entry signs, mural and or markers for the aquatic reserve. Encourage cultural development using for example a salmon festival, etc.
        - EX: School district project with Native Indians contributing crafts, etc. on natural resources, salmon, etc.

4) Recommendations for training landowners for monitoring

- Workshops
    - Hood Canal has an excellent example of training for septic systems, etc. Provides guidelines on how too for landowners.
- Use a Demo project

- Web-based training and data collection (would be easy, more cooperation so that people don’t have to go to meetings/workshops on weekends)

5) Recommendations for providing access to data collected

- With citizen monitoring, you need a specific group to monitor and give feedback
- Measurable statements.
- Use a few things that you can monitor long term to report each year

6) Other Recommendations and Words of Wisdom

- Start small with a pilot project and build success with citizen monitoring
- Use visuals and photos, creating maps,
- Map based monitoring to communicate to people
- Address property owners individually, they can monitor their own beaches and will do it on their own free time.
- Try to address, what is preventing people from making improvements to their septic systems?
- Make it EASY for people to do this
- Monitoring might not necessarily need to be part of a large organization with commitments
- Locals to an area has a better idea what will work and what will not work in the area
- Important to realize that communities are different

MEETING PARTICIPANTS

Philip Bloch-DNR Aquatic Reserves

- www.dnr.wa.gov

Patrick Christie-Professor, School of Marine Affairs

- www.sma.washington.edu

Robin Clark, People for Puget Sound

- Rapid Shoreline Inventory, Shorewatch
- www.pugetsound.org

Monica Durkin and Wynnae Wright, DNR South Puget Sound Region

- Citizen monitoring of eel grass to identify locations
- www.dnr.wa.gov

Sharon Holley -DNR Aquatic Land Manager

- www.dnr.wa.gov

David Fluharty-Professor, School of Marine Affairs

- www.sma.washington.edu

Petra MacGowan-Masters Candidate, School of Marine Affairs

- www.sma.washington.edu

David Palazzi-DNR, Aquatic Resources

- www.dnr.wa.gov

Mark Plunkett- Seattle Aquarium

- Citizen science, using 100 students to conduct habitat characterization, similar to RSI, beach slope and sediment, temp and salinity, taking digital images
- www.**seattleaquarium**.org

Steve Ruden, Pacific Ecological Institute

- Monitoring Program – Leland watershed water quality monitoring project 2001-2003 Grant Dept. of Ecology centennial Clean Water Act Section 319 Grant
- www.peiseattle.org

Lynn Schneider- Department of Health

- BEACH program,works with counties, Surfrider, citizens for sample collection
- www.doh.wa.gov

Robin Spears-University of Puget Sound

Kathy Taylor-Puget Sound Action Team

- Public involvement and education

- www.psat.wa.gov

APPENDIX B

ISLAND INTERVIEW FEEDBACK

Summary of Meetings/Maury Island Aquatic Reserve
With Tom Dean, Rayna Holtz and Pat Collier
May 16&17 2005

MOTIVATION FOR ISLANDERS

1. Tie in a celebration
    - Beach Days/Celebrate the nearshore
        - Experts for shore walks
        - Site visits
        - Nature plantings
        - Expert discussions (octopus/inverts)
        - Workshops for landowners on what you can do!
        - Rapid assessment of beaches
        - Art/Poetry

2. Matching funds for islanders to make land changes
3. A brochure for the reserve designed by islanders
4. Stewardship award designed by local artist

Monitoring IDEAS

For successful citizen monitoring efforts:

- Usable information
- Practical information
- Dynamic/iconic item to monitor
- Make the activity physical and fun
- Connect the community to the work
- Realize it is a social activity, it is more then just the numbers and charts, it is important to share experiences and narratives through email, gatherings etc.
- The best way to study something static is with a rapid assessment
- Generate a big data set every five years, smaller amounts in-between
- Physically share the results
    - Use a brochure to summarize, make it brief and attractive
- Must explain the use of the data
    - What is the goal to restore to? Or why is this data useful for future efforts

Communicate to landowners the importance of native plants and the effects of impervious surfaces

- Self guided books, workshops, videos might be useful tools to involve landowners
- Kits

Possible monitoring ideas for the Aquatic Reserve

- Comparison monitoring
  - Bulkheads vs. natural beaches
  - Monitor a no-take zone
- Generate a good baseline data
  - Water quality
  - Birds
  - Inverts
  - Diver transects
  - Eel grass
- Do a project that can tie back into septic
  - For example water quality/clarity (use a secchi disk) kayakers, anyone with a dock
- Septic
- Goeducks
- Forage Fish-are experts needed to identify and monitor sites?
- Reintroduce something and then monitor it
  - Olympic oysters
- Focus on target species
  - 10% of wintering grebes are found in the reserve, this is a sign of diversity,
  - Pick 12 birds they can see to monitor. Have the Audubon community generate the list
  - Combine work with COAAST – targeting certain species live birds (invite the birding community
- Riparian systems
  - Importance is not well understood,
  - Identify the most significant stream mouths to monitor, see if they are blocked

Other notes

- There seems to exist a lot of misinformation about regulations for landowners about the critical area ordinance, permits needed to clear brush or land etc.
- Possible survey questions
  Where would we monitor for spawning?
  Considering the possibility of regulations would you be willing to let people survey your land?
- Give a survey with already established choices.
- There exists a disconnect between science and the community
- Teach photography classes related to the aquatic reserve. Have the class culminate with a display
- run articiles to find interested islanders for monitoring

Suggested Partners and Contacts

- Fishpro-did consulting for eelgrass beds, inventory
- Karlista Rickerson- diver, underwater photographer
- Nina Raginsky- Salt Spring Island, Water Bird Watch Organizer (used cards with birds for fundraiser)
- Ray Pforner-photographer
- Jim Johanessen- soft bulkheads coastal geomorpholigist
- Judith Lawrence-Betty McDonald Bed and Breakfast
- Park District for a Nearshore Days (Wally May Memorial)
- Bob Furstenberg (KC) – formerly EPA
- Ray Heller (KC)- identifying stream mouths (wa trout website?)
- Sandy Noel – professor/ illustration artist
- Vashon Allied Arts (oldest community arts organization, year round workshops, pull in artists component)
- Audobon-2006 importance of nearshore
  Bird watching
  Shoreline nesting
- Jason Everett- Blue Heron facility, director of allied arts
- Abel Echart-Shoreline focus, habitat
- Anne Spires, poet, writer, (Frank, David is husband)
- Sharon Nelson (assistant to Dow Constantine) – founded preserve our islands
- Barbara Gusterson- educator, nature and science organized science fair
- Lisa Chambers-Island Oil Spill Association (IOSA)_ beachwatcher training
- KC Conservation District – workshops for property owners
- Meredith Doels-
- Kollin Higgins (KC) bulkheading info
- Jen Belcher-Doug Sutherland – previous commissioner and current republican
- Betsy Peabody-Puget Sound Restoration Fund, oyster and citizen based monitoring) (780-6947)

Jacque white- n cove aquatic – Nature Conservancy

Appendix C

TYPES OF POLLUTION

Organic Pollution
Comes from the decomposition of living organisms, plants, animals and their by-products. Grass clippings, leaves, human sewage, and pet wastes are all examples. Organic pollutants use oxygen from the aquatic system in the decomposition process when there is an excess of organic pollutants, they can deplete the oxygen in the system, making the river an anaerobic system.

Inorganic Pollution
Inorganic pollution consists of suspended and dissolved solids such as silts, salts and other minerals carried into streams from streets or exposed soil. Common sources of inorganic pollution include the runoff from roads that have been salted, construction sites, and croplands. This type of pollution can cover up the effects of spawning fish and suffocate other plant and animal life causing a decline in the diversity of the ecosystem.

Toxic Pollution
These are heavy metals such as cadmium, mercury, chromium, iron and lead. And organic compounds PCBs and DDT that are lethal to organisms of interfere with their normal biological processes at certain concentrations. Toxic pollutants are often produced, as by products of industry another source is household products, such as drain cleaners, pesticides, and bleach. Street runoff and airborne containments can also carry toxins into waterways and standard farming practices contribute herbicides and insecticides to surface waters.

Thermal Pollution
Thermal pollution is heat. It is often a consequence of using water to cool industrial power generation processes and then returning it a much higher temperature into local waters. A nonpoint source of thermal pollution comes from urban runoff. Smaller streams are more vulnerable to thermal pollution than large rivers. Thermal pollution increases water temperatures, speeds up life cycles of animals and affects food sources of migratory birds. It also affects the DO levels of the water

APPENDIX D

DETAILS OF NEARSHORE FESTIVAL

The festival will have five main components:

1. Beach walks (led by experts)
2. Speakers
3. Field Trips
4. Reports
5. Monitoring Activities

Experts for Beach walks

Barbara Gustafson
Sandy Noel
Bob Furstenberg
Beach Naturalists from Seattle Aquarium

Expert Speakers takes place at Middle School

Streams
Soft Beach Solutions – Jim Johansson
Eel grass- Sandy Echevvirea

Possible Speakers Jim Brennan, Karlista Rickerson, Dan Pentilla

Field Trip Topics

Seaweeds
Seabirds (Ed Swan and Dan Willse)
Invasive Species Identification

NEARSHORE FESTIVAL		
Event	**Who**	**Time**
Displays Open	Partners	10 – 4
Expert Speakers		10:30 – 12
Monitoring activities	DNR	10:30 – 12 & 2 - 4
Beach walks		12 - 2:00
Ice Cream	DNR	2:00 – 3:00
Workshops for landowners Site visits	People for Puget Sound Shorestewards	2:00 - 4:00

APPENDIX E

BACKGROUND ON CURRENT MONITORING EFFORTS IN THE PUGET SOUND

When determining possible citizen-based monitoring projects for the Maury Island Aquatic Reserve it was necessary to establish who and what parameters are currently being monitored in Puget Sound. The following agencies and groups are involved in a diverse set of monitoring efforts in the Puget Sound:

- The Puget Sound Action Team (PSAT) is responsible for implementation of the Puget Sound Ambient Monitoring Program (PSAMP). This program consists of the collection of data on sediments, biological populations (marine mammals, fish etc.), water quality and habitat. Monitoring by citizens is a requirement of the PSAMP program.
- The Washington Department of Ecology (DOE) has the primary responsibility to protect waters of Washington State. The DOE has conducted marine water quality monitoring at a number of stations in Puget Sound, Grays Harbor and Willipa Bay since 1973. About 40 stations are monitored each year on a monthly basis. Some stations are monitored every year while some are monitored on a rotating schedule. Most of the water quality monitoring is conducted through surface water sampling programs. They also conduct ambient monitoring at the mouths of major rivers and key locations in Puget Sound, a few coastal bays. Compliance monitoring is done by direct sampling of effluent (discharge) at specific sites to ensure that permit holders meet state and federal requirements.

Finally, investigative studies are done in the region of suspected areas of concern. The parameters monitored include profiles of temperature, salinity, density, dissolved oxygen, light transmission, pH, as well as samples at various depths for fecal coliform bacteria, chlorophyll a, phaeopigment, nitrate, nitrite, ammonium, orthophosphate, silicate and Secchi disk depth.

- The Washington Department of Health (DOH) is responsible for monitoring bays and inlets in Puget Sound where shellfish are collected for commercial and private use. Shellfish harvesting is allowed only where waters meet federal water quality standards.
- The Department of Fish And Wildlife monitors contaminant concentrations in English sole, quillback and copper rockfish, Coho salmon and Pacific herring. They also evaluate liver disease in English sole as an indicator of toxic impacts on fish health and conduct bottom trawls to collect specimens and to estimate ground fish abundance. Aerial surveys of marine birds are done to develop estimates of the population size of marine diving ducks and other marine birds. Harbor seal population and condition including contaminant concentration in blubber are also monitored.
- The King County Department of Natural Resources (KCDNR) monitors water column, sediment and nearshore resource conditions at locations in central Puget Sound. Some of the parameters measured include nutrients, pathogens and toxic contaminants.
- The Washington State Department of Natural Resources (DNR) maps aquatic vegetation and a series of physical shoreline attributes that strongly affect the

distribution of marine plants and animals. They also conduct a number of inventory and monitoring efforts.

- Local Governments
- Tribes also have a wide diversity of monitoring programs and degree of citizen involvement.
- Elementary, junior and high schools are including environmental monitoring in curriculum. This may be one time event, or conducted throughout school year.
- Environmental organizations and citizen groups including the Seattle Aquarium and Audubon Society have begun citizen-based monitoring efforts in the region.

APPENDIX F

ORGANIZATIONS CONTACTED AND RESEARCHED

The **Waterbird Watch Collective**

Involves over 100 participants who count birds and keep an eye on foreshore disturbance and water pollution at 23 sites around the island. The group hopes to prevent further habitat loss and encourage the community to learn what species are there and what it is losing. ESP has donated many books, handbooks, videos, pamphlets and scientific documents on water and land stewardship to the Mary Hawkins Public Library. Their on-going public lecture series has included a number of speakers lately on issues such as estuaries, voluntary land stewardship, coastal management and local government protection of archeological, historical and aboriginal heritage sites. An environmental street theater group is evolving out of ESP's environmental studies workshop with high school students. Work is also underway to develop a proposed marine resource protection strategy.

Contact: **Nina Raginsky**,
Tel; 250-537-4515
272 Beddis Rd.
Salt Spring Island, BC V8K 2J1

Vashon Parks

(Event description) June 12 is Water Daze at Jensen Point! Want to try out kayaking? What about rowing or the Longboat? All of these spectacular human powered craft activities are offered through Vashon Park District. On June 12, you can try each of them for free! Just come to Jensen Point Park between one and four PM to get involved. This day is provided with the help of Vashon Island Kayaks, the Vashon Island Rowing Club and John Burke with the Vashon Maury Island Maritime Heritage Association. All participants will need to fill out a waiver before getting in a craft. Water socks or some other water shoe is recommended for your comfort. Drop by Jensen Point's Boathouse for an afternoon of water fun. This is what living on an island is all about

Steve Ruden Pacific Ecological Institute –

Implemented Monitoring Program – Leland watershed water quality monitoring project
2001-2003 Grant Dept. of Ecology centennial Clean Water Act Section 319 Grant

Program to engage high school students
Small water quality program
Verge of gathering data
The project has been sampling 1 year in freshwater
Elementary through high school

Gates foundation for GIS at the Quilcene School– integrate water quality

Robin Clark People for Puget Sound

Rapid shoreline inventory
Break the shoreline into segments, characterize, habitat focused, Conducted RSI of Vashon and quartermaster harbor. Doing all of Guemes this summer
Combines with GIS process/ blueprints
Characterize potential for conservation efforts, for each 150 feet along shoreline
Shorewatch
Possible collaborations…….
Interested in using pods
After oil spill interest in early response to oil spill/ perhaps a citizens oil response council
Septic bill and financial assistance
Eel grass beds planting eelgrass,
Water quality!!!
Nitrates monitoring

Monica Durkin –DNR

Native eel grass seeds, identify locations,
Which month is peak seed release? To be determined
Get volunteers to answer questions that is where they would naturally seed,
Many known eelgrass beds on islands
Identifying month these are released,
Public lecture at UPS and to collect seed

Mark Plunkett- Seattle Aquarium

Protocol to monitor MPA's , newly created reserves,
Needed resources to expand effort
Citizen science, - Pilot project, 35 students and a few adults,
We could use high school students if properly trained. 5 schools,
These beaches are the MPA areas
100 students
Habitat characterization, similar to RSI, beach slope and sediment, temp and salinity, taking digital images before ad after, broad biodiversity assessment if things are presence or absence
seahurst high is doing forage fish sampling…
Biological assessment, count individual or percent covered, 20 different species
15 years,,,,,
Database managed by aquarium
Now not a clear indication of how the info will be used
20 hours to training
14 marine science people on the technical advisory committee
Share raw data with partners, KC dept of natural resources,
Fall for report
Interest for private and non-profits, can contract with NGO…

Lynn Schneider- Department of Health

Has used the Surfrider organization

BEACH act - Washington department of health, BEACH program

Want counties to be involved with sampling

Surfrider, half moon bay did citizen monitoring, first conducted by Dept. of Ecology, then surfrider did the rest.

Lack of trust, can build trust through monitoring – 13 counties participating

Some counties used volunteers

Boy scout troop

Weekly sampling

Clallam, surfrider in organizing volunteers and

Makah and Snohomish

Beachwatchers (Island county)

Don Meehan –

Port Townsend water facility (supplies and quality control)

Three samples for something similar to fecal coloform, enterococci

Data flow – can enter data online,

One site monitoring done in quartermaster harbor this year, not affordable to send to

Quartermaster harbor, Stan Merrell, will bring sample

King County does not allow volunteers

Will see more bacteria problems

Permit works, storm water issues

Sediment growth

Kathy Taylor-Puget Sound Action Team

PSAT part of the governor's office
She is the local liaison for Pierce and King country

Interested in building partnerships, will work with who is interested in cleaning Puget Sound
Public involvement and education and funding source
Locals to an area has a better idea what will work and what will not work in the area,
Important to realize that communities are different

Shoreline owners of private property, how will it benefit you and Puget Sound?
Learning about shoreline property, because they like it
Workshop series – gig harbor island, unincorporated king country
Partnered with sea grant, watershed council, utility,
Incentives for attending workshop
Weeknight workshop on storm water
Landowner incentives handling registration, direct mailing for every shoreline landowner

Shellfish downgrades
Shoreline landowner's guidebook

King county shoreline stewardship guide

Build partnerships and resources, lack staff, partner, strength partnering with local counties and conservation districts willing to partner, with effort, have not yet get into citizen monitoring
Vashon land trust, forest, 4 shoreline workshops with the land trust
Scholarships for the conference, to participate, to present and allow them to participate with the conference