SUMMARY REPORT

Task Title: TASK NO: 5 Analysis of Existing Marine Water Quality Programs and Identification of Data Gaps and Trends

Project Partners:
Snohomish County Marine Resources Committee
(MRC)
Stef Frenzl

This report was funded in part through a cooperative agreement with the National Oceanic and Atmospheric Administration.

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Project Background

Snohomish County has a large and rapidly growing human population with significant known and potential sources of point and non-point marine water pollution. These sources include marine outfalls from various sources, including municipal sewage treatment plants, urban and rural stormwater drainage systems, railroad ditches, and residential on-site septic systems. However, there is no coordinated county-wide effort to monitor marine water quality and a county-wide assessment of marine water quality conditions has never been done. Such an assessment is essential to obtain a comprehensive understanding of water quality issues and to begin the effort to coordinate monitoring efforts with multiple agencies and organizations throughout the county when possible.

Project Objectives

Our objectives were to identify existing marine water quality monitoring programs and assess local marine water quality conditions by compiling and evaluating existing data. This evaluation will help the MRC identify data gaps and begin to identify local marine water quality trends (initial conversations with water quality agency personnel lead us to believe that existing data will not enable us to definitively identifying trends). Findings from this evaluation will serve as the foundation to identify water quality trends, and will serve as the basis for MRC recommendations to the Snohomish County Council and Executive where appropriate.

Additionally, our objectives were to identify and evaluate existing marine outfall inventories to identify data gaps. Findings from this compilation would give us the necessary information to develop an assessment of environmental health and habitat impacts from poor water quality sources in the future if the MRC deems necessary. We will also use findings from this assessment to serve as the basis for MRC recommendations to the Snohomish County Council and Executive.

Project Implementation

The MRC has identified a number of options about how to proceed with this effort to succinctly answer specific questions about existing water quality programs, and to analyze the data from these programs when looking from a regional perspective. Through the MRC's initial work on the project, we have learned that much of the existing data is in raw Excel spreadsheet form, and much is already in GIS shape files as well.

We've learned that a significant technical effort is needed to compile water quality data and analyze the data's usefulness by reviewing metadata and running technical analysis programs such as flow trace. Subcontracting this effort will be required.

Our plan to phase the project to continuously remain engaged in the analysis process is essential. We planed to use the funding to proceed with as many of the phases as possible below. Phases are outlined below:

1) Develop a specific list of potential water quality questions to help guide the consultant in data collection.
   - Product: list of potential questions to answer during our investigations.
2) Obtain outfall maps and water quality monitoring data (GIS, spreadsheets or other) from municipalities, tribes, ports, marinas, etc.
   - Product: water quality data sets, maps, etc
3) Compile and evaluate existing marine outfall inventory data from Snohomish County, municipalities, tribes, ports, marinas, etc.
   - Product: combined map of known marine outfalls within Snohomish County borders
4) Prioritize the list of questions (#1 above) based on the collected data sets to keep analyses focused on priority locations and pollutant types.
   - Product: Prioritized list of questions to guide analyses
5) Analyze each data set for usefulness, and to obtain a clear understanding of data limitations. Review metadata, conduct interviews with data collectors, etc.
   - Product: Report on each analyzed data set including metadata, limitations, etc.
6) Develop a comprehensive map of multiple data sets from the above entities of all available and relevant freshwater and saltwater quality data.
   - Product: GIS map and data layers of water quality data with relevant attributes of each data set
7) Run analyses on GIS, including the use of flow-trace software, to identify data gaps, trends and possible pollution sources that affect nearshore water quality.
   - Product: GIS map and report on data gaps, trends and possible pollution sources that affect nearshore water quality.
8) Develop plan to prioritize the following next steps:
   A) develop a prioritized list of data gaps in need of being addressed and/or filled (via additional data collection) before taking steps to improve water quality in freshwater and saltwater sources
   B) develop a list of saltwater and freshwater (localized marine watersheds) quality trends over time
   C) Develop a list of identified locations with consistent water quality problems and develop plans to identify pollutant sources
   D) Develop a list of water quality improvement projects that could be implemented without further study or analysis
   - Product: Marine Water Quality Prioritized Action Plan
9) Write summary report with recommendations for future assessments if necessary
   - Product: Final Report

Unfortunately, Snohomish MRC staff has been short-staffed over the past 9 months, and as a result, staff was unable to establish a contract and manage the consultant and project. As a result, the MRC was only able to complete a list of questions and begin a search for possible data sets. Additionally, a draft Request for Qualifications has been created. The MRC continues to prioritize this project and plans to continue with this project using funds from the MRC's 2007-2009 work program. Because so few deliverables have actually been met, a significant portion of the available grant funds will not be invoiced.

Discussion

Although we were unable to complete this project, the MRC remains highly interested in an effort to look at water quality issues at the "big picture" scale. The MRC is aware that the Puget Sound Partnership will likely be highly interested in this project, as there is a dearth of projects that strive to compile multiple data sets to obtain a more-comprehensive understanding of water quality data and effects. Snohomish MRC Staff is hiring on additional staff in July 2007, and the project is anticipated to begin immediately.

Recommendations

The NWSC has been very flexible with how we're planning this effort. We acknowledge that this project has many unknowns, and we truly value the opportunity to receive funding to do this type of research. We believe that these types of efforts may help us uncover problems and solutions that wouldn't be possible otherwise.

Resources/References

Attachments (see following page)

- Prioritized list of potential water quality questions
- Consultant Request for Qualifications
- Locations of WQ Data
- Draft Request for Qualifications for Professional Services

NOTICE OF REQUEST FOR QUALIFICATIONS

RFQ-XX-XXX

Consultant Services for Assessment of Existing Marine Water Quality Data

Snohomish County
Everett, Washington

Snohomish County invites interested, experienced, and qualified consultants to submit Statements of Qualifications to identify, compile, evaluate and analyze local marine water quality monitoring programs and associated data to asses local marine water quality conditions and data gaps. Through this evaluation, the consultant will assist Snohomish County and the Snohomish County Marine Resources Committee (MRC) by providing: 1) assessment of existing county-wide marine water quality conditions based on available data; 2) identification of marine and freshwater water quality data gaps; and 3) identification of possible sources of targeted water quality pollutants; and 4) where possible, identification of marine water quality trends within Snohomish County. Findings from this evaluation will serve as the basis for MRC recommendations to the Snohomish County Council and Executive where appropriate.

Project Deliverable Deadline: June 15, 2007

I. Request for Qualifications (RFQ) Process

A two-step selection process will be used:

Step One:

After *Statements of Qualifications* are received by the County's Purchasing Division, a selection committee will rank each RFQ submittal. The scoring criteria are shown below.

RFQ Scoring Criteria	Maximum Score
1. Experience identifying, collecting and compiling marine and freshwater water quality data sources from federal and state government agencies, municipalities, tribal governments, non-profit organizations and other potential data sources	10
2. Experience compiling and assessing water quality data collected from multiples sources that use different protocols, and in multiple data formats.	10
3. Experience analyzing marine and freshwater water quality, particularly for data trends, gaps and limitations	5
4. Experience with ESRI Geographic Information Systems Extensions: spatial and 3D analyst, network analyst, utlitly network analyst, and ArcHydro to develop data files and maps	20
5. Familiarity with various metadata formats. Ability to provide standardized metadata, converting County data (supplied in ISO or FGEC style sheet) when necessary	10
6. Experience developing detailed reports involving multiple data sets, complete with prioritized next steps and potential projects.	10

7. Ability to submit deliverables using Snohomish County datum requirements (see scope of work)	5
8. Ability to submit deliverables using Washington Department of Ecology GIS Standards (see scope of work)	5
9. Experience developing user-friendly reports and maps targeted to the general public	10
10. Capability to maintain good communications and productive ongoing working relationships with clients, and efficient task progress.	5
11. Ability to meet agreed-upon outcomes in time and within anticipated budget. Snohomish County acknowledges the tight timeframe and will phase deliverables to ensure separate, timely payments for each deliverable.	10
MAXIMUM SCORE	**100 points**

Step Two:

When step one scoring is completed, the two highest scoring consultant firms may be requested to participate in an interview to answer questions from the selection committee. If a single firm is determined to be clearly the most qualified after the initial scoring, the county reserves the right to immediately enter into negotiations with that most qualified firm.

Whereas the initial RFQ submittal packages should be primarily about the firm's qualifications, the presentations, if needed, should delve further into what each firm could do to meet the needs of Snohomish County and the MRC. The selection committee will evaluate each presentation as to the firm's abilities to fulfill those needs.

After the two highest ranked firms are interviewed, the county selection committee will select the most qualified firm to negotiate a mutually agreeable contract. If negotiations with the most qualified firm are not successful, the county reserves the right to negotiate with the next highest ranked firm.

II. Background

The MRC is a citizen-based advisory committee appointed by the Snohomish County Council. The purpose of the MRC is to address local marine issues and recommend remedial actions to the council, executive and, where requested by the council or executive, to other local governmental entities and tribes, guided by sound science and the needs of the marine ecosystem. The MRC is also a part of the Northwest Straits Commission, a federally funded organization that coordinates efforts to halt the degradation of marine ecosystems in the Northwest Straits region of Puget Sound.

The MRC Water Quality Subcommittee's long-term goal is to improve marine water quality conditions and decrease the impacts on marine habitat, biota and resource use (seafood consumption, recreation, etc). The Water Quality Subcommittee's first step in accomplishing this goal is to comprehensively understand: 1) existing water quality monitoring programs; and 2) baseline marine and Puget Sound tributary water quality conditions throughout Snohomish County. No entity currently tracks, compiles and analyzes data sets from a wide number of multiple sources to obtain a region-wide perspective on marine water quality and potential pollutant sources. Understanding existing conditions is the first major step in accomplishing this long-term goal.

More specifically, the MRC Water Quality Subcommittee developed a list of questions to shape this effort's direction. The consultant will work directly with the subcommittee and Snohomish County staff to answer these questions found below in the Scope of Work section.

III. Scope of Work

Initial questions to guide the consultant are as follows:

1. What entities can provide relevant water quality data?

The consultant would query and obtain relevant data sources from United States Environmental Protection Agency, Washington State Department of Ecology, Washington Department of Health, other agencies, Tribes, Cities, Counties, Health Districts, the Port of Everett, US Navy, universities, waste water treatment facilities, non-profit organizations, and other sources.

2. What marine and Puget Sound tributary water quality data exist? Which of these are available, and in what accessible form?

The MRC has identified the following water quality parameters to include in this search, but are interested in all relevant indicators with data:

<u>Water Column Indicators (marine and/or freshwater)</u>

Temperature, salinity, Density, dissolved oxygen, light transmission, pH, fecal coliform bacteria, phaeopigment, nitrate, nitrite, ammonium, orthophosphate, silicate, hazardous algal blooms, metals, persistent organics (PCBs, endocrine disruptors, hydrocarbons), and contaminants in biota (fish, mussels, marine mammals)

<u>Sediment Indicators</u>

Toxicity, chemistry and benthic infauna

3. What known point sources (domestic and industrial) exist with potential to impact marine water quality?

The MRC has identified outfalls and storm drains to be included in this search.

4. What known non-point sources exist with potential to impact marine water quality?

The MRC has identified the following sources to be included in this search:

- Rivers
- Marinas
- surface water run-off
- marine vessels
- septic systems
- atmospheric deposition

5. What hydrologic models exist that can help us identify how pollutants disperse through the marine ecosystem in Snohomish County?

6. What analyses can be accomplished with the existing data?

a.) Do the data show water quality trends?
b.) Are there statistical differences in water quality results between data sources?
c.) What are the major sinks of contamination (particularly in biota)?
d.) What is the mass loading (lbs/day) of each parameter?
We anticipate other questions arising as we better understand the available data.

7. What and where are the data gaps?

Intermediate Deliverables

The consultant will, time and funds permitting, complete the following intermediate deliverables with guidance from the above-stated list of potential water quality questions.

1) The consultant will document and report findings on sources of relevant water quality data and accessible forms of marine and Puget Sound tributary watershed data.

2) The consultant will obtain, compile and evaluate existing outfall maps and water quality monitoring data (GIS, spreadsheets, metadata, or other).

3) The consultant will analyze data parameters (trends, mass loading, metadata, etc.) and provide a statement of the usefulness and limitations of the analysis.

3) The consultant will develop a plan to prioritize the next steps to reach the MRC's long-term goal to improve marine water quality conditions and decrease the impacts on marine habitat, biota and resource use. The plan will include:

- Prioritized list of data gaps in need of being addressed and/or filled before taking steps to improve water quality in freshwater and saltwater sources.
- List of identified locations with consistent water quality problems
- Developed plans to identify pollutant sources
- Developed list of water quality improvement projects that could be implemented without further study or analysis

Final Deliverable

The final report will be a compilation of the intermediate deliverable reports, including a review of each data set, data gaps identified, list of prioritized next steps, and recommendations for future assessments and projects. This effort shall be finalized no later than June 15, 2007. Snohomish County acknowledges the tight project timeframe and will phase deliverables to ensure separate, timely payments for each intermediate deliverable submitted.

GIS Standards

Snohomish County's Datum Requirements

Projection: State Plane
Zone: 5601
Datum: NAD83
Spheriod:GRS1980
Units: Feet

Washington Department of Ecology's GIS Standards

ESRI's ARC/INFO Current version
ESRI's ArcView Current Version
Horizontal Datum
North American Datum 1983 (1991 adjustment) as defined by the National Geodetic Survey. (Also referred to as:NAD83/91)

Vertical Datum NGVD 29 or NGVD 88

Projection System Lambert Conic Conformal

Coordinate System & Zone
The system of plane coordinates established by the National Geodetic Survey for defining and stating the positions or locations of points on the surface of the earth within the state of Washington is referred to as the Washington Coordinate System of 1983.

The coordinate system standard is Washington Coordinate System of 1983 (WCS 83) zone appropriate for geo-datasets that are maintained fully within the WCS 83 North zone or, WCS 83 South zone.

The standard is Washington Coordinate System of 1983 South zone if the geo-dataset is maintained as a statewide layer or, a regional layer crossing zones.

Coordinate Units
US Survey Foot. The standard conversion of coordinates between the meter and the US survey foot shall be based upon the length of the meter being equal to exactly 39.37 inches.

Accuracy Standard +/-40 Feet (1:24,000) minimum accuracy to within a foot of the true North American datum system

Vector Import Format ArcExport, DLG and/or DXF, shapefile

Submittal Requirements

At a minimum, submit with the sealed Statement of Qualifications contact information of three recent client references for whom similar services have been provided.

Submit with sealed Statement of Qualifications any other pertinent information relevant to the services required and the scoring criteria, which will delineate the qualifications of your firm.

Any supplier planning to submit a response must obtain a complete, original copy of the Request for Qualifications (RFQ) directly from Snohomish County Purchasing (rather than a second party). If you did not receive this document directly from Purchasing or from our web site, please do so now from the link below under "View All Current Bids"

http://www1.co.snohomish.wa.us/Departments/Facilities/Divisions/Purchasing/default.htm

You may also obtain a Request for Qualifications that is not downloadable by contacting the Purchasing Division at 425-388-3344. By doing this you will automatically be included on our "Plan Holders List". If you are not on our Plan Holders List, we are unable to send amendments directly to you or communicate other important related information prior to the RFQ submittal deadline. The County is not responsible for any consequences resulting from a vendor's failure to register directly with the County for a specific Request for Qualifications.

Submittals received in response to this solicitation become County property
and are subject to Public Disclosure Laws.

Initial List: Locations of Water Quality data:

Stillaguamish River Watershed Fecal Coliform, Dissolved Oxygen, pH, Mercury, and Arsenic Total Maximum Daily Load Study (From Kathleen Thornburgh)
*hard copy

Outfall data (Steve Britsch)
*need to speak with him, making a map of stations

Sewage treatment plants
*call centers near coast, see if have WQ data

Ambient Stream Monitoring
*data on website (data.surfacewater.info)

City of Mukilteo WQ?
*call Tom Hansen or Heather to get data from Picnic Point

Warm Beach Fecal Coliform data from 2001
*one time sample, get from K. Thornburgh

Department of Ecology 303D and TMDL
*website
*http://www.ecy.wa.gov/apps/eap/marinewq/mwdataset.asp

Marine Flight water column data (Hat Island)
*Talk to Julia Bos? (also online?) 360.407.6000

Department of Health—water quality data for shellfish?
*talk to Scott Berbells—360.236.3379.0

Amendment 1 to Grant G0600109
Task 5
Subtask 5.2
Sub-subtask 1.0

Develop and prioritize a list of potential water quality questions to help guide the consultant in data collection

1. **Which water quality data are available and in what accessible form?**
Definition of water quality:
Water
Parameters monitored by WA DOE:

- Temperature
- Salinity
- Density
- dissolved oxygen
- light transmission
- pH
- fecal coliform bacteria
- chlorophyll a
- phaeopigment
- nitrate
- nitrite
- ammonium
- orthophosphate
- silicate
- Secchi disk depth.

Additional parameters to include:

- Hazardous algal blooms
- Emerging chemicals
- Vessel coating (copper/tin)
- Persistent Organics (PCBs, endocrine disruptors, hydrocarbons)
- Contaminants in biota (fish, mussels)

Sediments
Parameters monitored by WA DOE:

- chemistry
- toxicity
- benthic infauna

http://www.ecy.wa.gov/programs/eap/mar_sed/data/PSAMP-NOAA_list_of_paramerters.pdf

Water Movement

Sources:
Point (domestic and industrial)

- Outfalls
- storm drains

Non-point

- Rivers
- marinas

- surface water run-off
- marine vessels
- septic systems
- rainfall
- atmospheric deposition

2. **Which entities can provide this water quality data?**
   For example, the University Of Washington, Washington State Department of Ecology, the Environmental Protection Agency, Cities, Tribes, Counties, the Port of Everett, Navy, Waste Water Treatment Facility

3. **What analyses can be done with the existing data?**
   - What are the major sources (inputs) of water quality problems?
   - What are the major sinks of contamination (particularly in biota)?
   - What is the Mass loading (lbs/day) of contaminants, nutrients, etc?

4. **Where are the data gaps?**