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PROJECT TITLE: Island County Marine Resource Committee

TASK NUMBER: 2.3 – Monitor shoreline restoration projects

DELIVERABLE: 2.2 – QAPP for each monitoring project

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This project has been funded wholly or in part by the United States Environmental Protection Agency. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

QUALITY ASSURANCE PROJECT PLAN: Island County Marine Resources Committee Beach Seining Program

Prepared by: Anna Toledo

Prepared for:

Washington Department of Ecology

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Based on EPA guidance CIO 2106-G-05 (2012)

Publication Information

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Each study conducted for the EPA or Ecology must have an approved Quality Assurance Project Plan (QAPP) describing the objectives of the study and the procedures to be followed to achieve those objectives. This generic QAPP serves as an umbrella under which multiple data collection, production and use activities will be conducted over an extended period of time at several different project sites. The plan and final reports for this program will be available on Island County Marine Resources Committee's website at www.islandcountymrc.org. Neither document necessarily reflects the views and policies of the EPA, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

Data for this project will be available on the Island County Marine Resources Committee's website at www.islandcountymrc.org

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Quality Assurance Project Plan
Island County Marine Resources Committee
Beach Seining Program

March 2015

Approved by

Signature: _____ Date: _____

Sasha Horst, Project Officer, Washington State Department of Ecology

Signature: _____ Date: _____

Frances Wood, Chair, Island County Marine Resources Committee

Signature: _____ Date: _____

Lenny Corin, Island County MRC Representative, Northwest Straits Commission

Signature: _____ Date: _____

Keith Higman, Health Services Director, Island County Public Health

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Acronyms

DO – Dissolved Oxygen

ESA – Endangered Species Act

GPS – Global Positioning System

IC DNR – Island County Department of Natural Resources

MRC – Island Marine Resources Committee

MRC PM – Marine Resources Committee Project Manager

NOAA – National Oceanic and Atmospheric Administration

QAPP – Quality Assurance Project Plan

SRSC – Skagit River System Cooperative

WDFW – Washington Department of Fish and Wildlife

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Project Management *(Plan)*

Project Organization

Position/Role	Who is Responsible	As of 1/1/2015
Program Manager	MRC PM	Anna Toledo
Project Manager	MRC liaison	Jim Somers
Lead Scientist	MRC PM or designee	Dawn Pucci
Researchers	Island County volunteers, employees	MRC volunteers, Lead Entity Coordinator
Data Manager	Project Manager or designee	Jim Somers
Report Producer	Project Manager or designee	Anna Toledo
Permit Holder	MRC PM or designee	Anna Toledo

Project Schedule

Date	Event
Winter	Seining schedule is set QAPP reviewed
2 weeks prior to first day of seining	Verify volunteer paperwork is current Train volunteers Calibrate water quality meters Equipment is checked
February – June	Seining
July – late Fall	Report Produced Equipment repaired, cleaned and stored
Fall	Complete reports for permitting agencies (online form for NOAA, written form for WDFW)
Fall	Submit application(s) for next year's permit(s)

Project Background & Intended Use of Data

(Why are we doing this?)

Degradation of Washington's salmonid habitat, including nearshore habitats, has contributed to the decline of salmon, steelhead, and trout populations, resulting in Endangered Species Act (ESA) listings throughout most of the state. In response to ESA listings, substantial resources to restore and protect the ecological function of habitats have been invested.

Evaluating the response of salmonids to nearshore restoration efforts will enable the quantification of the effectiveness of nearshore restoration projects. The data collected from beach seining efforts will be used in population presence/absence and density analyses. The data will also be used to evaluate population trends as this is a long term data collection project occurring over many years.

Data Quality Objectives

(How accurate, precise and complete do we need to be? How might it be biased? What are the effects on the data?)

Bias: The difference between the population mean and the true value.

Bias is reduced by being trained in, and following, protocols consistently.

Precision: A measure of how close the computed value is to the same quantity measured several times.

Replication of samples to assess precision is not possible with beach seining. The act of data collection affects the fish behavior resulting in a different set of environmental factors to the second sample.

Accuracy: The degree of agreement of a measurement result and a true value.

Accuracy in the seining data is obtained with consistent training and following of protocols by volunteers. Fish identification charts and photos are used when necessary. When a species of fish is not clearly discernable, a photo is taken and noted on the field data sheets. The photo is then sent to fish biologist specialists for species verification. Well maintained equipment also ensures that maximum accuracy in varying environmental conditions is achieved as much as possible.

Accuracy with the water quality data is obtained with daily calibration of the YSI meter being used. The instrument's accuracy, when properly calibrated and according to the YSI Operations Manual, is a maximum of +/- 2%.

Completeness: The measure of the amount of valid data needed to be obtained.

This monitoring program is not designed to test a specific hypothesis. It is designed to collect information to detect trends across time, potentially in a variety of locations. Additionally, the data collection for this monitoring program is designed to coincide with tides and not weather or time of day. Some days of sampling may be missed due to extreme weather or inadequate staffing. These occurrences are expected to occur less than 5% of the time. Missed sampling days will be made up as soon as possible after the cancelled sampling day.

Water quality data will be measured at 100% of the sample sites each time it is sampled. Should there be an equipment failure and water quality data are unable to be collected, the fish data will still be usable for most analyses (absence/presence, density, status and trends) but will not be able to be used when examining what environmental factors affect absence/ presence or status and trends.

Special Training Requirements

(What training does those involved need to have to make sure data quality is high?)

All volunteers that are in contact with nets, fish, water quality meters or data sheets will be trained in the protocols detailed in the QAPP by someone who received the training directly from National Oceanic and Atmospheric Administration (NOAA), Washington Dept. of Fish and Wildlife (WDFW) or Tribal field scientists experienced and trained in beach seine sampling protocols.

Annual review of protocols will occur prior to the first seining day of the new year and is required for all volunteers that are in contact with nets, fish, water quality meters or data sheets.

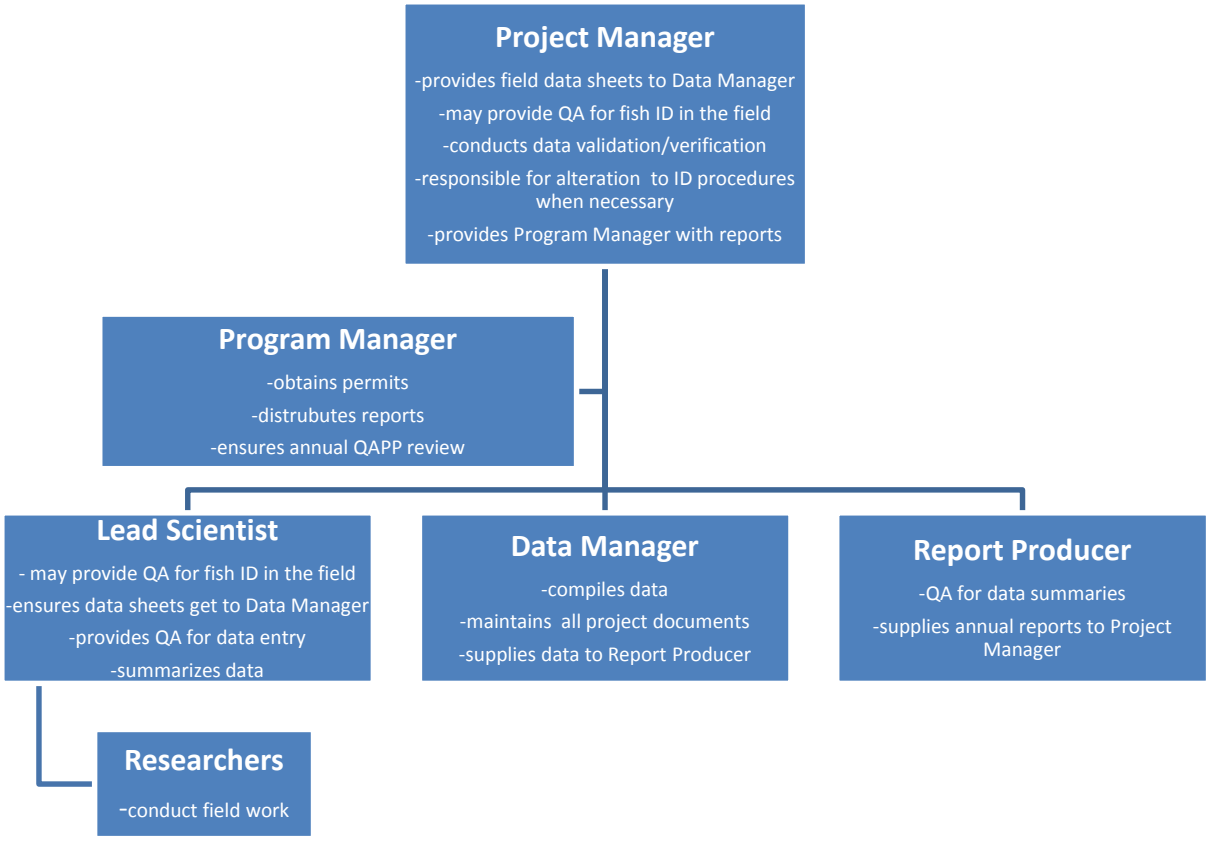
Documentation and Records Requirements

(How will the project be documented? Who is responsible?)

All project documents will be maintained by the Data Manager. The project documents include this QAPP, data sheets, electronic files, permits, equipment manuals, any photo documentation and annual reports. The Project Manager will be responsible for providing the data sheets to the Data Manager. The Data Manager will be responsible for compiling the data, maintaining the electronic files, and supplying the data to the Report Producer as necessary. The Report Producer will be responsible for supplying the completed annual reports back to the Data Manager and Project Manager. The Program Manager will be responsible for distributing the reports as necessary.

The Program Manager is responsible for acquisition of necessary permits for data collection.

The Program Manager is responsible for ensuring QAPP reviewed annually and modified and approved as necessary.



Data Acquisition *(Do)*

Sample Collection Procedures

(What kind of sampling is used – probability based or judgmental? Where and when are the samples collected?)

Fish presence will be sampled using a small beach seine following protocols established by Skagit River System Cooperative and NOAA. Beach seining with a small beach seine net samples the shallow intertidal zone on a slack or ebb tide. Sampling sites at each study location are chosen so that the nearshore is sampled equally, regardless of substrate or adjacent land use.

Sampling site location selection is affected by site access permission. For example, there may be unequal distances between sampling sites if the study location spans multiple ownerships and permission is not obtained for some parcels. Topographical qualities also affect sampling site location selection. For example, a large boulder in the intertidal area will be avoided by shifting the sampling site to one side or another so the net will not be hooked up on the rock and prevent the net from functioning.

Water quality parameters are recorded at each sample site at the time the site is seined.

At Cornet Bay, 10 sites are sampled biweekly from February to June when juvenile salmonids are expected to be using the shallow intertidal area. The 10 sites are located at equal intervals along the Cornet Beach. Each site is located by global positioning satellite (GPS) readings and marked with flagging tape prior to the first day of sampling. By locating each site with GPS, it is assured that sampling is happening at the same locations every year.

Sampling Procedures

(How, exactly, are the samples collected? Describe the protocols)

The areas seined are typically less than 4ft deep (1.2m). The small net beach seine protocol uses an 80' (24.4m) by 6' (1.8m) by 1/8" (0.3cm) mesh knotless nylon net. The net is set in "round haul" fashion by holding one end of the net on the beach while the other end is deployed by wading the net "upstream" against the water current using a floating tote, and then returning to the shoreline in a ½ circle. Both ends of the net are then retrieved yielding a catch. Nets and equipment are repaired between sampling days as necessary.

The time the net is deployed is recorded for each set. The estimation of the percent of net used in each deployment is also recorded.

If the catch yields a large number of fish, it is transferred to buckets or net tote for processing. Aerators are used in the buckets when necessary. Smaller catch yields are sampled directly out of the net to avoid extra handling. Fish are caught with dip nets and measured on a length board. The catch is then identified by species. The first 20 fish of each species are measured by fork-length in millimeters. After 20 have been measured, the rest of the species is counted. Fish are handled as little as possible, with wet and bare hands, and then returned directly to the water. No samples are kept. If the species of a particular fish is in question, it is placed in a Photarium and a photograph is taken for verification later.

If a very large number of fish are caught (i.e. pink juvenile outmigration year), a sub sampling protocol may be used. A sub sampling dip net will be filled to the seam with fish directly from the net or tote and placed in a bucket of water. The remaining fish in the net or tote will be caught with the same sub sampling dip net filled to the same seam, and returned to the bay. The number of nets will be counted and noted on the field data sheet. Each dip net sub sample will be assessed for uniformity with previous dip net sub samples at that site on that day, particularly looking for less abundant salmonids or other species. The sample in the bucket will be identified, measured and counted as detailed above. Final numbers of each species will be multiplied by the number of sub sample net catches were returned to the bay. One researcher will conduct and count the dip net sub sample from the net per site. Multiple researchers can sample the bucket containing the first dip net sub sample and may do this while the single researcher is quantifying the dip net sub samples.

The maximum depth of the net is recorded at each sample site. This is taken with a meter stick at the point farthest from the beach that the net was set in that day. Water quality parameters –temperature and salinity are taken on the bottom and on the surface of the water column at the maximum depth (called 'full length') and then again at the estimated halfway point back to shore (called 'half length'). Dissolved Oxygen (DO) measurement is taken at the net edge farthest from shore with the bottom measurements.

		Date
Water Temp	Full length Surface	°Celsius
	Full length Bottom	°Celsius
	Half-length Surface	°Celsius
	Half-length Bottom	°Celsius
Salinity	Full length Surface	ppt
	Full length Bottom	ppt
	Half-length Surface	ppt
	Half-length Bottom	ppt
DO	Full length Bottom	mg/l

The water quality samples are collected with a YSI meter. The DO is calibrated at the beginning of each seining day. The meter is maintained annually by the Island County Department of Natural Resources (IC DNR) water quality technicians.

Sample Documentation

(How are the data and any samples taken, recorded/documented and handled?)

Data are recorded on data sheets that are printed on waterproof paper. One researcher conducts the data recording throughout sampling day. The data sheets are kept by the Data Manager and entered into an excel spreadsheet after each seining day. Data sheets are archived by year and maintained by the Data Manager.

Analytical Methods Requirements

(What analysis methods are used to analyze the samples? Most applicable to samples sent to a lab)

Water quality data will be measured with meters and probes. No further analysis of data is required.

Quality Control Requirements

(How can we be sure the data collected is accurate?)

Repeated counts of the catch or repeat sampling to ascertain accuracy is not possible when beach seining. The act of sampling with a seine net changes the presence of fish in the local vicinity for a period of time so that repeat sampling in the same area immediately following the first seining effort would result in different results. A researcher with experience in sampling watches to verify species, measurement and counts. Identification of unknown species that are photographed is verified by two different sources.

A randomly selected fish (based on random numbers table and corresponding # of fish viewed) for each site will be photographed and identified. The photo number will be recorded on the field datasheet. The 10 photographs will be sent to a NOAA Fisheries Biologist for identification for verification after each sampling day.

Instrument/Equipment Testing, Inspection and Maintenance Requirements

(How do we know that the equipment being used is in good enough shape to be able to do the job with enough accuracy?)

Meters will be tested for proper operation as outlined in operating manuals. Inspections will occur prior to first sampling day of the year. Equipment that is not operating correctly will not be used. A duplicate meter is available. The Program Manager or the Lead Scientist will be responsible for ensuring all inspections are performed.

Nets, measurement boards and totes are inspected visually and repaired after each sampling day.

Instrument Calibration and Frequency

(How do we know if the instruments are collecting the data accurately?)

Meters will be calibrated by IC DNR prior to the first sampling day of each new year. Dissolved Oxygen will be calibrated on site prior to each sampling day. The Project Manager or the Lead Scientist will be responsible for ensuring calibrations are performed.

Inspection/Acceptance Requirements for Supplies and Consumables

(How do we know the sampling equipment being used is good enough? This applies to bottles, jars, solutions, etc.)

Not applicable.

Data Acquisition Requirements

(Are other data being used that weren't collected in this study? Where did it come from?)

Data from other sources, which may include water quality measurements and seining results from other nearby locations performed by other groups or agencies, may be used for comparison in the report. These sources will be verified as having been collected under the same or comparable protocols.

Data Management

(How is the data handled and by whom?)

Field data will be entered onto field data sheets. The Project Manager or Lead Scientist will ensure the forms are completed and check for any errors. The data sheets will be given to the Data Manager who will enter the data into Excel spreadsheet files. One hundred percent of the fish data collected on the field forms is entered into Excel spreadsheets. The temperature and salinity are averaged across the 10 sampling sites for each of the bottom 2 and the surface 2 measurements and entered into a separate Excel spreadsheet from the fish data. Dissolved Oxygen measurements are averaged across the 10 sites and recorded in the water quality Excel spreadsheet. The Lead Scientist will use photocopies of the datasheets and enter data into an Excel spreadsheet in the same manner as described above. The Lead Scientist will compare the summary results with results from the Data Manager's spreadsheet. If any errors are found, the Data Manager and Lead Scientist will identify the source of discrepancy and agree on the resolution of the error. The Lead Scientist will summarize the data. The Report Producer will verify the summaries and produce the final report, which will be proofed by the Lead Scientist and 2 other peer reviewers.

Assessments *(Check)*

Assessments and Response Actions

(Who checks to make sure this QAPP is being followed?)

The Project Manager or the Lead Scientist will accompany researchers in the field to review field practices.

Reports to Management

(How and when is the management team informed of progress?)

Bimonthly reports are produced after each sampling day and will contain the summary derived by the Lead Scientist. The Report Producer will write the annual final report. After the report has been reviewed as above, the Report Producer will send it to the Program Manager who will distribute it to the Island Marine Resources Committee and the Northwest Straits Commission, Island County Lead Entity and other interested parties.

Review, Evaluation of Usability, and Reporting Requirements *(Act)*

Data Review, Validation and Verification

(Who reviews the data and makes sure it is all accurate and complete?)

The Lead Scientist and Data Manager will conduct data review and validation as described above in *Data Management*. In addition, a NOAA Fisheries Biologist will review the randomly selected photos and

determine the species. The Data Manager will compare the NOAA Fisheries Biologist's determination to ensure they match. If discrepancies are found in the species identification, the NOAA Fisheries Biologist's determination will be used in the Excel Spreadsheet and an explanatory note will be added. If discrepancies are found in 2 concurrent sampling data sets, the Project Manager will reassess the identification protocols and, in concurrence with the Lead Scientist and NOAA Fisheries Biologist, develop a plan to address as appropriate depending on tools and opportunities available at that time. Possibilities may include, but are not limited to, retraining of a number of core volunteers, restricting who can determine the species identification to a very limited number of specific volunteers, or increasing the number of randomly selected fish that will be verified via photograph by off-site NOAA fish biologists.

Non-salmonid species will be identified to species when possible. Juvenile non-salmonids may be lumped by genus or family when identification is unclear. For the report, the non-salmonid species are lumped and averaged by genus or family (i.e. Cottidae sp., Pholidae sp., etc). A list of positively identified non-salmonid species is provided in the final report.

Validation and Verification Methods

(How is the data validated/verified as being complete? What happens if errors are found?)

The Project Manager, Lead Scientist and Data Manager will conduct data validation and verification. The Data Manager will enter all data from field data sheets into Excel spreadsheet files. The Data Manager will double-check entries to ensure they are correct. The Lead Scientist will enter the data into a separate spreadsheet and compare the summarized results to identify any errors. The Data Manager and Lead Scientist will enter all formulas for calculation of parameters and basic statistics. The Lead Scientist will check all the formulas. If any errors are found, the Lead Scientist or the Data Manager will correct the errors and the Lead Scientist will verify corrections have been made. The Report Producer will organize and write the final report.

Reconciliation with Data Quality Objectives

(How is the data compared to the expected data quality objectives – accuracy, precision, completeness and bias? What happens if inconsistencies are found?)

The project results and associated variability and accuracy will be compared with project objectives. If results do not meet criteria, then they will be explicitly stated in the final report. Based upon data accuracy, some data may be discarded and the reasons will be reported. If project criteria needs to be modified, then details of and justification for the modification will be reported.