

2004 Washington State *Spartina* Control Monitoring Plan For Aquatic Noxious Weed Control National Pollutant Discharge Elimination System Permit

Submitted by Washington State Department of Agriculture

Background

The Washington State Department of Agriculture (WSDA) has been issued a National Pollution Discharge Elimination System (NPDES) permit for the use of control aquatic noxious weeds (#WAG - 993000), which covers *Spartina* control activities. *Spartina* control will be carried out in Puget Sound, Strait of Juan de Fuca, Hood Canal, Grays Harbor and Willapa Bay. This monitoring plan addresses the control of *Spartina* using the herbicides glyphosate and imazapyr. The compliance schedule contained in the NPDES permit requires water quality monitoring (section S2). In addition, the WSDA will perform pre-treatment monitoring to identify any background levels of glyphosate or imazapyr in the water column due to other sources not related to the *Spartina* control activities.

Monitoring Plan Objectives

- Test for imazapyr concentration in surface water at different types of treated locations and when applied using different application methods in Willapa Bay.
- Test for imazapyr and glyphosate concentrations through time at one site each in Washington State.
- Test for glyphosate off-site transport concentrations in surface water at different types of treated locations and when applied using different application methods in Puget Sound.
- Test for glyphosate concentrations in the surface water at the Rose Ranch site in Willapa Bay. This is being done to resample at a sample site in 2003 where unusually high concentrations were found.

Design

Study sites were selected based on the multiple objectives of the monitoring plan; requirements listed in the NPDES permit, and the locations of previous treatment activities. To verify the source of any detection, pre-treatment sample stations were selected at or near sites where post treatment sampling will occur. The pretreatment sampling will take place prior to any treatments to any sites within the listed water bodies. To determine where to collect water quality samples for off-site transport, a dye release will be conducted at the listed sites in Puget Sound. The dye release will identify the area where the herbicide is most likely to move to with an outgoing tide after the application has taken place. This plan will fulfill the requirement of Ecology for the second year monitoring required by the NPDES permit.

Sample Sites

Locations, times, and dates of samples will conform to the anticipated schedule for glyphosate and imazapyr treatments within each general area (Tables 1). Pre-treatment samples will be taken at least 12 hours before the first herbicide application of each season. Pre-treatment samples will be taken from at least two locations in both Willapa Bay and Puget Sound. Post treatment sampling will be dependent on the completion date of treatment applications being carried out. For imazapyr and glyphosate concentration sampling, samples will be collected at the treatment site after the rising tide passes through the treated zone, therefore sampling at sites situated in the upper intertidal may not occur for several days due to the height of the subsequent high tides.

For imazapyr and glyphosate concentration-through-time sampling, two samples will be collected, one during the first incoming high tide after application is complete and one between 12 and 48 hours after the final application.

For glyphosate off-site transport sampling, samples will be collected at two locations near the treatments sites on the first outgoing high tide after applications have taken place. The sampling locations will be identified through a pre-sampling dye release at each site to determine the most likely path of transport from the treatment site.

To ensure personnel safety, all samples will be collected during daylight hours, therefore sampling may be delayed and occur on the following day if the high tide will occur in hours of darkness or during severe weather. In addition, WSDA reserves the right to change sampling locations and application methods, depending on management or unforeseen circumstances. Written notice will be made to DOE prior to a change in location.

Table 1. Proposed locations of sample stations for 2004 off-site transport sampling

Treatment Date	Post Treatment Sample Date	Sample Location/lat long (To be added)	Application Type	Infestation Type
6/1 –		Leque Island, Snohomish County	Ground Broadcast, imazapyr	Meadow
6/1 –		Whalen Point, Jefferson County	Hand Held, glyphosate	Scattered Regrowth

* Sample times depend on occurrence of high tide. Samples will be collected during the first outgoing tide after all applications to site are complete as safety permits.

Table 2. Proposed locations of sample stations for 2004 imazapyr concentration sampling

Treatment Date	Post Treatment Sample Date	Sample Location/lat long (To be added)	Application Type	Infestation Type
6/1 -		Palix Meadow, Willapa Bay	Aerial Broadcast	Meadow
6/1 -		Seal Slough, Willapa Bay	Aerial/Ground Broadcast	Scattered Regrowth/ Meadow
6/1 -		Leque Island, Snohomish County	Ground Broadcast	Meadow

* Sample times depend on occurrence of high tide. Samples will be collected during the first incoming high tide after all applications to site are complete as safety permits.

Table 3. Proposed location of sample stations for 2004 glyphosate and Imazapyr concentration through time sampling

Treatment Date	Post Treatment Sample Date	Sample Location/lat long (To be added)	Application Type	Infestation Type
6/1 -		Rose Ranch, Willapa Bay	Ground Hand Held	Scattered Regrowth/ Clones
6/1 -		Leque Island, Snohomish County	Ground Broadcast	Meadow

* Sample times depend on occurrence of high tide. Samples will be collected during the first and second or third incoming high tide after all applications to site are complete as safety permits.

Table 3. Proposed location of sample stations for 2004 glyphosate concentration re-sampling

Treatment Date	Post Treatment Sample Date	Sample Location/lat long (To be added)	Application Type	Infestation Type
6/1 -		Rose Ranch, Willapa Bay	Ground hand-held	Scattered Regrowth

* Sample times depend on occurrence of high tide. Samples will be collected during the first incoming high tide after all applications to site are complete as safety permits.

Activity Schedule

Key activities in the project (e.g., the sample process, sample delivery, sample analysis, results interpretation, and preparation of reports) will occur according to an activity schedule to be completed by the Water Monitoring Coordinator. Reporting for the 2003 - 2007 *Spartina* control program will be completed by February 1, to meet NPDES requirements for annual reporting.

Project organization

The following individuals and agencies will be involved in this project.

Washington State Department of Agriculture
Washington State Department of Fish and Wildlife
Washington State Department of Natural Resources
Washington State Department of Ecology
U.S. Fish and Wildlife Service
Snohomish County Noxious Weed Control Board
Island County Noxious Weed Control Board
Wildlands Management
U.S. Navy
TNC

Data Quality Objectives and Analytical Procedures

Data quality will be ensured using written sampling procedures and checklists. The Water Sampling Coordinator will be responsible to ensure test logs; checklist, data sets, etc. are completed as required at key points during each sampling activity. The Water Sampling Coordinator will assure all chain of custody and other security and quality control requirements and procedures are followed. Samples will be immediately sent to the processing lab, if this is not possible samples will be stored in a refrigerator until they can be sent. All interfaces with transported and stored samples will be recorded in the field notebook so as to adhere to chain of custody protocol. The method used to quantify glyphosate will be EPA method number 547. Imazapyr samples will be processed using an HPLC method. The method used to quantify imazapyr samples will be Anatek Labs will process Samples, Incorporated in Moscow, Idaho, which is fully accredited by Washington State Department of Ecology for these methods and will further ensure chain of custody.

Sampling procedures

Sampling procedures are detailed in the Standard Operating Procedures (SOP) (Table 2). In general, SOPs conform to USGS guidelines (Wilde et al. 1999). Water will be sampled by hand directly into a sample bottle furnished by EHL and cleaned to EPA QA/QC specification per guidelines obtained from DOE report number 01-03-005. To prevent contamination from surface debris, the bottle will be inserted beneath the water surface while still capped, then opened, allowed to fill, and recapped all while under water.

General USGS guidelines “clean hands / dirty hands” procedures will be followed as part of the SOP. The sampling team will comprise two people, one (“clean hands”) dedicated to protocols that involve direct contact with the water sample, while the other (“dirty hands”) handles and labels sample container jars, stores equipment, records data, and executes tasks to characterize

the sample site. Both persons will wear disposable gloves that will be changed at least after every sample.

Table 2. Standard Operating Procedures. The following sequence of procedures will be observed at each sample station and time.

Water samples

- Remove sterile sample bottle from sample kit, place bottle at mid-depth of water column or six inches below surface with position of the mouth parallel to the water's surface. Open cap and draw sample. Replace cap while the bottle is still under water.
- Wipe sample bottle with clean paper towel and label the jar appropriately according to date / sample station number / sample number / sample time.
- Seal each sample jar inside plastic bag to prevent cross-contamination among samples.
- Store sample container in ice-chest at 4° C.

Characterize sample site

- Note and record any anomaly (e.g., excessive turbidity, upstream disturbance, floating debris, wind/wave).
- Note the precise location of the sample site with a GPS unit.

Quality control procedures

The WSDA will provide or secure an experienced boat operator for each sample event requiring on-the-water transport. The operator will ensure specified collection sites are located in a safe and reliable manner. Once on site, the boat operator may act as part of the collection team under the direction of the Water Monitoring Coordinator (WMC) as the “dirty hands” handler of samples. The WMC will act as the lead and be the “clean hands” handler during the collection, transport, and monitoring of all samples. The WMC will complete pre-sampling event checklist(s) created so as to ensure all equipment is present; and clean, and all personnel, boat, and equipment are free of contamination (Checklist-1).

Field quality assurance procedures include the submission of equipment blanks, and replicate samples (Table 3). Each of these procedures will be completed at least once during the season. The blanks sampled will be labeled as another randomly chosen sample, but will include an identifier known only to the WMC. The equipment blank will be prepared by transferring an unopened bottle of clean water to the sample area and using this water to fill a sample container. At least one replicate sample will be collected during the 2003 season. The replicate samples will be collected at one randomly chosen sample site within 5 minutes of the first sample taken. Again, the sample will be identified so only the WMC knows it is a replicate sample. The replicate sample will be identified so as to be tied to the appropriate field sample. Accepted criteria for statistical variability analysis will be used to evaluate correlation between these two related samples. In all cases, samples will be sealed, identified, and placed on ice with other samples.

Table 3. Field quality assurance samples per spray event.

Type	Description	Purpose
Equipment Blank	Transfer blank into new container using sampling equipment	Evaluate contamination of sampling equipment
Replicate Sample	Sample at same location and time as 1 other sample.	Provide comparison between samples to assure lab QA/QC.

Data Handling Protocols

Field data (e.g. time of sample, water depth at sample, anomalies) will be recorded into a field notebook upon measurement, copied after each field day, and stored at two different locations. Laboratory results will be copied upon receipt and stored at two different locations. Results will be entered into spreadsheets and analyzed using a standard statistical package.

References

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- Oppenhuizen, M.E. and J.E. Cowell. 1991. Liquide chromatographic determination of glyphosate and aminomethylphosphonic acid (AMPA) in environmental water: Collaborative study. *J. Assoc. Off. Anal. Chem.* 74:317-323.
- Davis, D. 1996a. Washington State Pesticide Monitoring Program: 1994 Surface Water Sampling Report. Washington State Department of Ecology. Ecology Publication No. 96-305.
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- Paveglio F.L., K.M. Kilbride, C.E. Grue, C.A. Cimenstad, and K.L. Fresh. 1996. Use of Rodeo and X-77 Spreader to control smooth cordgrass (*Spartina alterniflora*) in a southwestern Washington estuary: I. Environmental fate. *Environ. Toxicol. Chem.* Vol 15. No. 6 pp. 961-968
- Wilde, F.D., D.B. Ratke, Jacob Gibs, and R.T. Iwatsubo(eds). 1999. Ch. A4. Collection of water samples. *In* USGS National field manual for the collection of water-quality data, Book 9 Handbooks for water-resources investigations. USGS.

Checklist-1: 2004 Spartina Program Water Sampling Checklist

Water Monitoring Coordinator: _____

Boat Operator/Sampling Team Member: _____

Date of sampling _____ Area(s) Sampled _____

Time of Departure: _____ Time of Return _____

Type of Sampling; Off-Site Transport ____ Concentration Through Time ____

Concentration ____ Rose Ranch Re-Sampling ____

Assure each person participating in this sampling event is directly questioned on each item.

_____ 1) Have any of the monitoring participants been in the proximity of any glyphosate or other pesticide within the past 2 weeks?

_____ 2) Has each monitoring participant cleaned themselves and their clothing since last in contact with any glyphosate or other pesticide, or shortly before this sampling event (e.g. showered/bathed, hats, belts, shoes, boots, gloves, glasses, rain gear, etc.)? If no, do not continue until this cleaning is complete.

_____ 3) Has the transport vehicle/vessel been in the proximity of glyphosate or any other pesticide (e.g. in water where treatment occurred, near pesticide storage area, in proximity where mixing occurred)? If yes, do not continue until the answer to item 4 is "YES"

_____ 4) Has all transport equipment been thoroughly cleaned of any pesticide residue per relevant pesticide label directions? If no, do not continue until this cleaning is complete.

_____ 5) Has any of the other equipment to be used in this monitoring event been used in previous monitoring events? If yes, do not continue until the answer to question 6 is "YES".

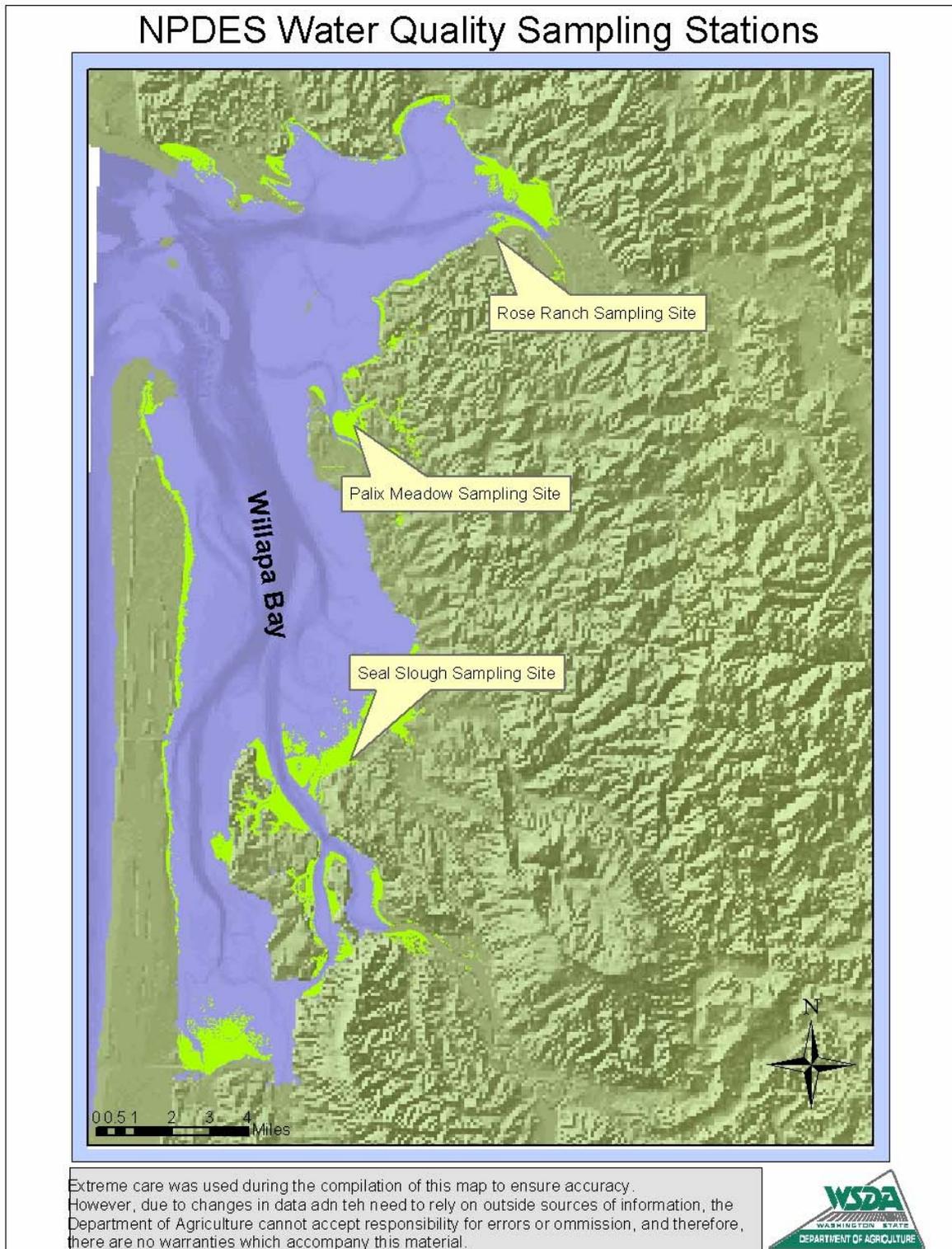
_____ 6) Has all reusable equipment been cleaned, and is other equipment free of any potential contamination?

_____ 7) The purpose of this checklist is to assure there are no pesticide residue present on people, boats, equipment, or other that could possibly contaminate samples taken. With this in mind, are there any other potential contaminating sources that need to be addressed? If "YES", do not proceed until these source are cleaned or addresses as appropriate.

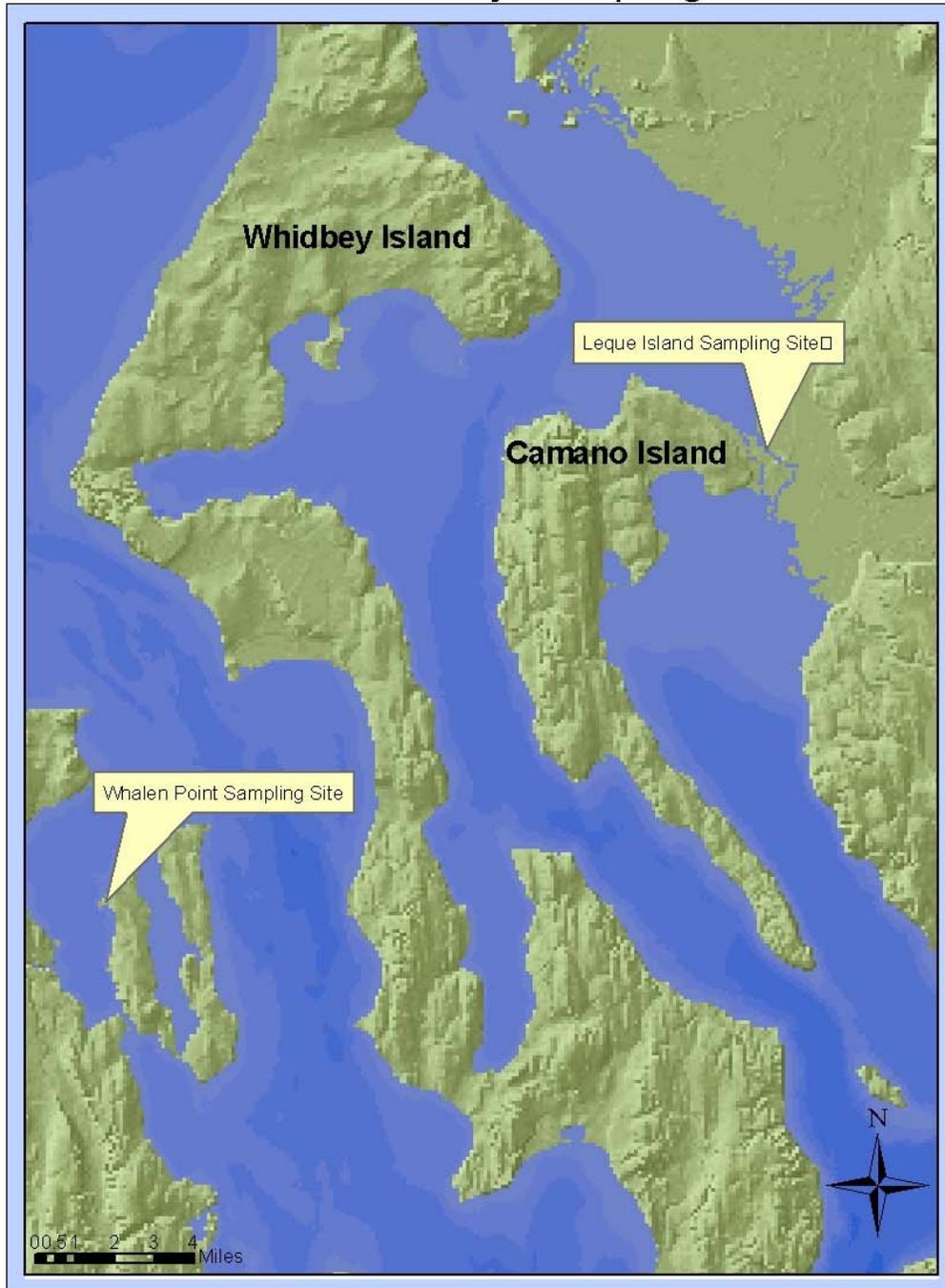
Water Monitoring Coordinator Signature: _____

Date: _____

Appendix A (Sample Station Maps)



NPDES Water Quality Sampling Stations



Extreme care was used during the compilation of this map to ensure accuracy. However, due to changes in data and the need to rely on outside sources of information, the Department of Agriculture cannot accept responsibility for errors or omission, and therefore, there are no warranties which accompany this material.

