



Trumpeter swans utilizing an area in Willapa Bay previously infested with *Spartina*.

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

Executive Summary:

Spartina is an aggressive aquatic weed that negatively impacts Washington State's waters. The Washington State Department of Agriculture is the lead agency to eradicate *Spartina* using integrated pest management strategies (IPM). The legal use of herbicides for aquatic plant management requires maintenance of a National Pollution Discharge Elimination System permit (NPDES). As part of an approved monitoring plan under the NPDES permit, WSDA has monitored sediments at *Spartina* control sites in Willapa Bay to detect residue associated with herbicide use. Tower Slough, Kindred Island and two sites on the central Long Beach Peninsula were monitored for imazapyr and glyphosate residues. (Results Pending Analysis)

Background:

Spartina is a destructive biological invader with the potential to destroy the ecosystems and economies of our state's estuarine waters. WSDA leads the fight to eradicate *Spartina* from Washington State, partnering with federal, state and local agencies, tribal government and non-profit organizations to achieve this goal.

The use of herbicides in and around aquatic environments demands a high degree of caution to avoid unauthorized discharge of herbicides. The NPDES (#WAG-99300) permit for *Spartina* is maintained by WSDA as the lead agency for *Spartina* control activities.

Compliance with the NPDES permit requires a monitoring plan which WSDA uses to evaluate *Spartina* control activities involving restricted use herbicides containing the active ingredients imazapyr and glyphosate labeled for aquatic use. In 2010, sampling events were scheduled to occur in December. Due to inclement weather conditions, sediment sampling was unable to be conducted. With Department of Ecology concurrence and assistance, WSDA scheduled and conducted sampling on the first good tide run of 2011. On Jan 11 and 12 four sites were sampled to fulfill the Aquatic Noxious Weed Control National Pollutant Discharge Elimination System Permit (#WAG-99300).

Objectives:

- Determine the amount of imazapyr and glyphosate residue in the sediments at a *Spartina* control site with multiple years (2006 and 2007) of aerial application of herbicide and subsequent ground treatments.
- Determine the amount of imazapyr and glyphosate residue in the sediments at a *Spartina* control site with one year of aerial application of herbicide in 2006 and subsequent ground treatments.
- Determine the amount of imazapyr and glyphosate residue in the sediments at a *Spartina* control site with multiple years of ground application.
- Determine the amount of imazapyr and glyphosate residue in the sediments at a site that has not been treated for *Spartina* utilizing herbicide since 2007.

To evaluate these objectives sampling occurred at four sites; Kindred Island in north Willapa Bay, Tower slough in northeastern Willapa Bay, south of Nahcotta Port on the Long Beach Peninsula and east of Bay Avenue on the Long Beach Peninsula. Table 1 details the monitoring and treatments for each of these locations.

Table 1: 2011 sediment sampling and treatment regimes in Willapa Bay.

Sample Location	Application Method	Herbicide Used	Infestation Type	Sample Type
Kindred Island	Multiple aerial 2006 & 2007 Ground 2008-10	Imazapyr/Glyphosate	Small clones and individual plants	Composite Sediment
Tower Slough	Aerial 2006 Ground 2007-10	Imazapyr/Glyphosate	Small clones and individual plants	Composite Sediment
Long Beach Peninsula (South of Port)	Ground 2006-07 Manual 2008-10	Imazapyr/Glyphosate	Small clones and individual plants	Composite Sediment
Long Beach Peninsula (East of Bay Avenue)	Ground 2006-10	Imazapyr/Glyphosate	Small clones and individual plants	Composite Sediment

Treatments:

Spartina treatments involving herbicide occurred from June 1st through October 31st, 2010. All treatments were conducted by licensed applicators through WSDA. All applications were made following the appropriate federal and state approved product labels and all provisions of the NPDES permit.

Less than 18 solid acres of *Spartina alterniflora* were treated with imazapyr and glyphosate throughout the 2010 treatment season in Willapa Bay. Agencies conducting control made use of IPM strategies including chemical, manual and mechanical control methods in compliance with the WSDA statewide *Spartina* eradication plan.

Sample Locations:

Four sampling sites within Willapa bay were chosen for sediment monitoring. Kindred Island and Tower Slough are sites where past aerial applications have now moved to ground control methods. The two sites on the Long Beach Peninsula have had ground applications regimes. The monitoring performed in these locations is designed to detect any residual herbicide within the environment from past and current herbicide applications. Figure 1 shows the locations of these sites in Willapa Bay.

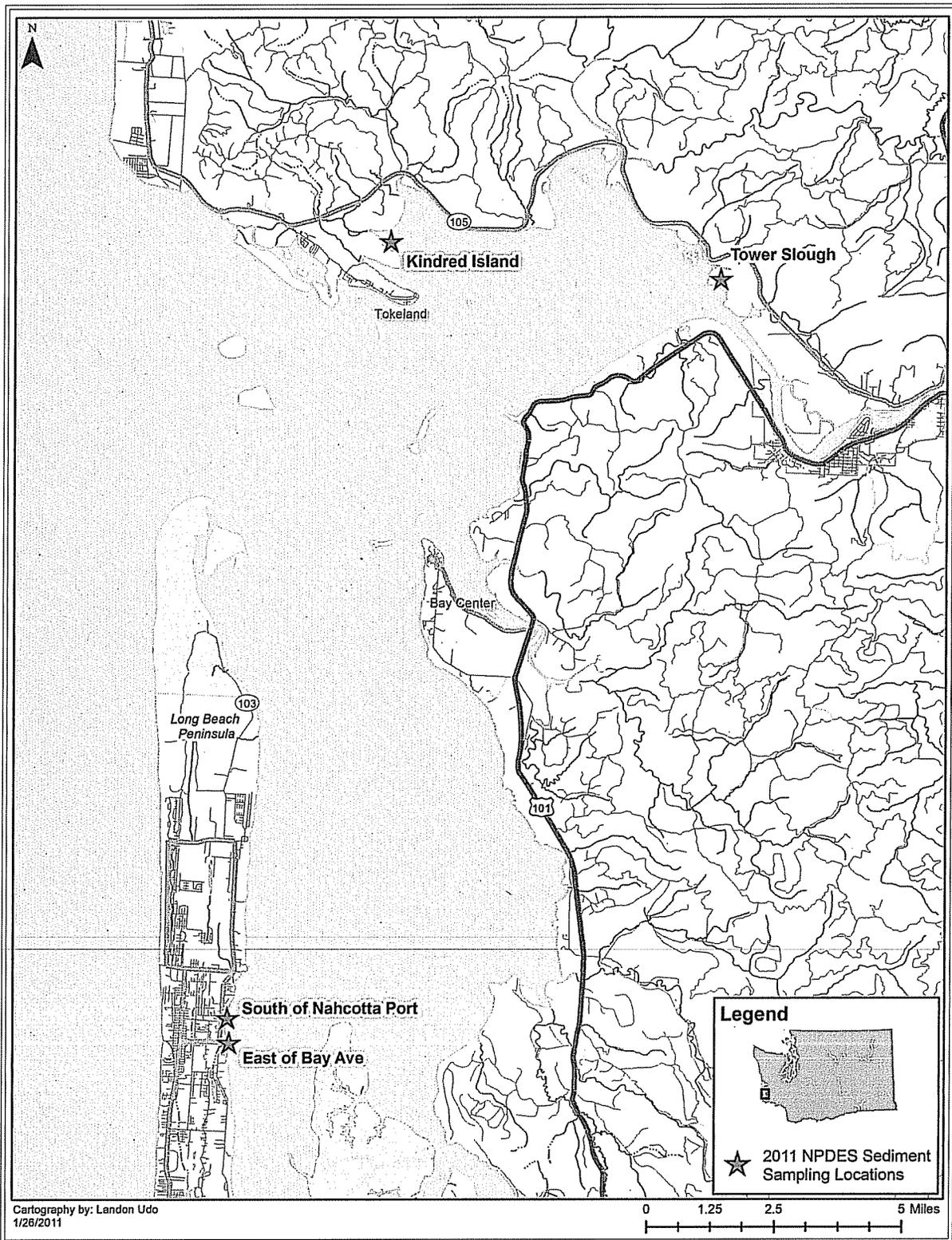


Figure 1: Willapa Bay 2011 sediment sampling sites for NPDES monitoring.

At each sample area, a sample consisting of ten individual sub-samples was obtained. The top ten centimeters of sediment were retained at each location to reflect recently deposited material. A sample was considered acceptable if the sediment surface was relatively flat and the desired depth penetration was achieved. Samples containing excessive root, stubble or other biomass negatively affected the sample protocol was rejected and another sub-sample was taken at a nearby location.

Upon retrieving a successful sample, the top ten centimeter layer of sediment was removed with a stainless steel spoon. Sediment which was in contact with the sampling devices was not retained. The sediment was then spooned into stainless steel bowls and stirred until homogenized. A sub-sample was then removed from the homogenate and placed in a glass sample container and immediately put on ice. Chain of custody documents were maintained. Figure 2 shows a macro sample taken in Willapa Bay where a smaller subsample will then be collected.



Figure 2: Macro sample taken with a stainless steel shovel in Willapa Bay.

Sample Handling:

Samples were sent to an accredited lab on ice, and shipped overnight. The samples were stored the night before in a refrigerator to maintain viability. All possible precautions were taken to avoid cross contamination. A Washington State Department of Ecology accredited laboratory analyzed the samples using the EPA methods EPA 547 for glyphosate and EPA 8321A for imazapyr.

Summary of Imazapyr Presence:

The sampling of imazapyr was designed to detect presence of imazapyr within the sediments at sites where herbicide control for *Spartina* was used. RESULTS PENDING...

Table 2: Summary of 2011 Imazapyr Monitoring Results

Location	Sample	Sample Date	Sample ID	Imazapyr (µg/l)
Kindred Island	Composite Sediment	Jan 11, 2011	1-11-11-1a	PENDING
Tower Slough	Composite Sediment	Jan 11, 2011	1-11-11-2a	PENDING
Long Beach Peninsula (South of Port)	Composite Sediment	Jan 12, 2011	1-12-11-1a	PENDING
Long Beach Peninsula (East of Bay Avenue)	Composite Sediment	Jan 12, 2011	1-12-11-2a	PENDING

The sampling of glyphosate was designed to detect the presence of chemical subsequent to treatment of *Spartina*. RESULTS PENDING...

Table 3: Summary of 2011 Glyphosate Monitoring Results

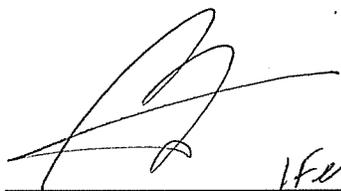
Location	Sample	Sample Date	Sample ID	Glyphosate (µg/l)
Kindred Island	Composite Sediment	Jan 11, 2011	1-11-11-1b	PENDING
Tower Slough	Composite Sediment	Jan 11, 2011	1-11-11-2b	PENDING
Long Beach Peninsula (South of Port)	Composite Sediment	Jan 12, 2011	1-12-11-1b	PENDING
Long Beach Peninsula (East of Bay Avenue)	Composite Sediment	Jan 12, 2011	1-12-11-2b	PENDING

Summary:

To protect Washington State's estuaries from the threat of *Spartina* WSDA employs a variety of techniques to manage this invasive species. The appropriate application of herbicides is one method utilized by WSDA and cooperators to eradicate *Spartina*. In order to satisfy the requirements of the Aquatic Noxious Weed Control NPDES Permit, WSDA monitors impact by *Spartina* control activities. During 2011, WSDA monitored for the presence of herbicides imazapyr and glyphosate in the sediments of Willapa Bay. RESULTS PENDING...

Signatory Page

I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiries of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations.



1 Feb 2011

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