

APPENDIX 3

GENERAL SITE SAFETY & MATERIALS HANDLING GUIDELINES AND PROCEDURES FOR SPARTINA CONTROL PROJECTS IN THE SAN FRANCISCO ESTUARY

General Site Safety & Materials Handling Guidelines and Procedures for *Spartina* Control Projects in the San Francisco Estuary

Invasive *Spartina* Control Plan ATTACHMENT 4

IMPORTANT DISCLAIMER AFFECTING LEGAL RIGHTS. *The San Francisco Estuary Invasive Spartina Project (ISP) compiled this document to provide a suggested set of general guidelines and procedures that are consistent with the mitigation measures required by the ISP EIR [spelled out] (“PEIR”). These guidelines may be used by ISP partners and contractors as a minimal baseline, consistent with the PEIR, for planning and implementing site-specific Spartina control work in the San Francisco Estuary.*

These general guidelines are not intended to cover all safety procedures and precautions that may be necessary, nor are they intended to substitute for a comprehensive set of safety procedures and precautions for any particular control work or site. The ISP and the Conservancy make no warranties, assurances or representations of any kind with respect to the scope, extent, propriety or effectiveness of the suggested procedures that are described in these guidelines. Each ISP partner is responsible for and should independently develop and implement all appropriate safety precautions and procedures needed for the control work it undertakes. As a condition to use of these guidelines, each ISP partner and any of its contractors agree that the ISP and the State Coastal Conservancy (“Conservancy”) shall not be responsible for the acts or omissions of any ISP partner, or its contractors or volunteers, and agree to release and hold harmless the ISP and the Conservancy from any claims or liability, in connection with the development or implementation of site-specific safety procedures and precautions.

May 2005

Updated June 2008

Table of Contents

Table of Contents.....i

Emergency Information 1

 Emergency Phone Numbers..... 1

 Nearest Hospital..... 1

Sensitive Receptors.....2

 Listing of Sensitive Receptors 3

Site Safety Protocols for Working in Marshes, Mudflats, and other Tidal areas of the San Francisco Estuary4

 Teams 4

 Channels..... 4

 Mudflats 5

 Chemical or Physical Hazards 5

 Tides..... 5

 Weather 6

 Communication..... 6

Herbicide Handling, Spill Prevention and Spill Response7

 Herbicide Use..... 7

 Herbicide Storage..... 7

 Container Disposal..... 7

 Spill Response..... 8

 Preventing Spills 9

Spray Drift Reduction 11

Petroleum Fuel Spill Prevention and Response..... 13

Herbicide Information..... 14

Emergency Information

Emergency Phone Numbers

- **In case of any emergency, call 9-1-1, and follow dispatcher instructions**
- **Pesticide Emergency:**
 - Call the ChemTrec (Chemical Transportation Emergency Center) emergency number, 1-800-424-9300, for instructions on how to handle any pesticide emergency
 - Emergency involving the BASF product (Habitat): 800-832-HELP (800-832-4357)
 - Emergency involving the Nufarm product (Polaris AQ): 877-325-1840
 - Emergency involving Monsanto products (Aquamaster): 314-694-4000
 - Emergency involving Dow products (Rodeo): 800-369-2436 or 979-238-2112
- **Chemical Spill into Marsh or other Waters:**
 - Report all spills within 24 hours to the San Francisco Regional Water Quality Control Board: 510-622-2369

Nearest Hospital

The following space is provided for the ISP grant recipient or its contractor(s) to provide the location and directions to the closest hospital.

Name: _____

Address: _____

Phone: _____

Directions to hospital: _____

A map should be attached or otherwise made available on site.

Sensitive Receptors

When applying herbicides for non-native *Spartina* control, care must be taken to protect human health, and particularly “sensitive receptors” that may be located near the application area.

Sensitive receptors include hospitals, schools, and residences near the Bay margin that are in close proximity (e.g., within 0.25 mile) to areas being treated with herbicide. The potential presence of sensitive receptors must be evaluated on a site-specific basis. The *Adjacent Land Uses* section in the site-specific Invasive *Spartina* Control Plan contains some information regarding potential sensitive receptors at each sub-area. In general, sensitive receptors are most likely to occur at sites located in the Corte Madera Creek watershed in Marin County, and along the shorelines of Alameda, Hayward and San Leandro in Alameda County. Birders, bicyclists, joggers, pedestrians, and users of recreational facilities (including parks, marinas, launch ramps, fishing piers, and beaches) that surround the Bay also could be sensitive receptors. The ISP grant recipient(s) and their contractors are responsible for fully identifying and protecting sensitive receptors.

To minimize risks to the public, mitigation measures for herbicide treatment methods must be implemented by entities engaging in treatment activities. Such measures include, but are not limited to, the following:

1. Post signs for sensitive receptors within 500 feet. At least one week prior to application, post signs informing the public of impending herbicide treatment at prominent locations within a 500-foot radius (approximately 1/10 mile) of treatment sites where homes, schools, hospitals, or businesses could be affected. Schools and hospitals within 500 feet of any treatment site should be separately noticed at least one week prior to the application.
2. Avoid aerial spraying near sensitive receptors. Do not conduct aerial spraying within 0.25 mile (1,320 feet) of a school, hospital, or other sensitive receptor location.
3. Minimize drift. Manage herbicide application to minimize potential for herbicide drift (See *Spray Drift Reduction*, page 11 of this document). Herbicide must not be applied when winds are in excess of 10 miles per hour or when inversion conditions exist, or when wind could carry spray drift into inhabited areas.
4. Post signs at access points. Post colored signs at and/or near any public trails, boat launches, or other potential points of site access 24 hours prior to treatment. The signs should inform the public that the area is to be sprayed with glyphosate and/or imazapyr herbicide for weed control, and that the spray is harmful if inhaled. The signs should advise “no entry” for humans and animals until eight (8) hours after treatment, and the treatment date and time should be stated. A 24-hour ISP contact number may be provided.
5. Avoid high use areas. Avoid application of herbicides near areas where the public is likely to contact water or vegetation. For example, avoid applying herbicide in or adjacent to high use areas within 24 hours of high use times, such as weekends or certain holidays. If a situation arises that makes it necessary to treat high-use areas during such times, the areas should be closed to the public before, during, and after treatment.

Listing of Sensitive Receptors

The following spaces are provided for the ISP grantee and its contractors to list sensitive receptors within 0.25 mile of the herbicide treatment site. This information should be made available in advance to herbicide application contractors.

	Schools	Hospitals
Name		
Address		
Contact		
Phone		
Name		
Address		
Contact		
Phone		
Name		
Address		
Contact		
Phone		

Residences

Name		
Address		
Contact		
Phone		
Name		
Address		
Contact		
Phone		
Name		
Address		
Contact		
Phone		

Site Safety Protocols for Working in Marshes, Mudflats, and other Tidal areas of the San Francisco Estuary

Tidal lands of the San Francisco Estuary present many unique hazards to workers who must access intertidal areas during the performance of their activity. The following is a summary of some of the hazards one may encounter when accessing these areas, and suggested precautions. There is no assertion made here, either stated or implied, that this list is comprehensive of all hazards that could possibly be encountered while in intertidal areas of the Estuary. Caution should be exercised at all times while in these areas, and common-sense danger avoidance techniques should be employed.

Teams

Always travel with a partner when entering or working in marshlands. There are many hidden hazards associated with marshland travel and work that are not readily discernable at first glance. A team of at least two individuals adds a necessary level of safety for any work or activity taking place in the marsh.

Supervisors should provide daily worker safety briefings prior to commencing work on site. These briefings need not be exhaustive, but should include any new information the supervisor may have obtained about the work conditions on the site, weather conditions, team assignments, equipment condition, or other pertinent issues.

Channels

Watch for hidden channels and holes in the marsh plain as you traverse the marsh. Often smaller channels in the marsh are obscured by vegetation. These channels can be quite deep, and may result in a sprain or pulled muscle, or possible fractures. Use a probe, like a stick or staff to check ahead of your path for unseen channels. Keep alert for vegetation changes, like *Grindelia* sp. (Gumplant), which grows along channel edges and may indicate a hidden channel.

Channel banks can sometimes be quite soft, and the mud that lines the channel can often be unstable. It is not unusual to sink deeply into these muds. This could be dangerous during an incoming tide. Always probe the mud within channels to test its ability to support your weight before stepping forward.

Channels often block direct routes through the marsh. These channels can be quite small or very large. Great caution should be observed when considering crossing these channels. It may seem worthwhile in most cases to leap across the channel to get to the other side. This should only be done on the smaller channels, when your partner is able to follow, when you have surveyed the route for alternate paths around the channel, and at low tide. Large channels should be avoided entirely, and placing driftwood bridges over these channels is not advised. Workers may fall from unstable bridges into larger channels and risk injury, drowning, hypothermia, or equipment destruction. It is best in these situations to find a way around the channel.

Mudflats

Mudflats at low tide can be quite dangerous to the unprepared. Often these flats are extremely soft, making travel over them slow and messy. Without proper footwear made for travel over mudflats (called “mudders”), workers may sink up to their thighs in mud.

If stuck deeply in a mudflat or channel bottom, you can often extract yourself by spreading out your weight over the mud by, in effect, laying or crawling on the muddy surface. Rocking your boots or waders back and forth to open space around your boot can also work to extract your feet from the mud. Assistance from your partner in the marsh can be essential during these situations. If feet sink into soft mud or quicksand, do not make violent movements in an attempt to get free. If boots or waders become stuck, slip one foot out gradually, rest the leg on the surface and gradually free the other leg. Lying on the surface and spreading the weight can avoid sinking. Move to firm ground using a “leopard crawl” (spread eagled, face down, keeping the maximum area of the body in contact with the ground at all times).

Chemical or Physical Hazards

Many marshland areas have been historic sites of dumping or disposal. Many marshes have accumulated debris or wrack that contains all manner of refuse. As a result, some areas have large amounts of this waste material, and in some cases, toxic waste or hazardous chemicals. Supervisors should be made aware of any known chemical or toxic waste issues associated with a site and take appropriate precautions. Workers should be notified prior to the beginning of operations within the marsh what the condition of the marsh is relative to toxic or hazardous substances, and be appropriately equipped.

Wear footwear capable of resisting puncture by sharp objects. Nails, glass, chunks of concrete, rusty metal and other debris can severely injure workers without appropriate footwear. Ideally, workers should wear hip or chest waders with reinforced soles, that are resistant to puncture, tearing or chemicals.

In areas where there are known concentrations of toxic or hazardous substances, a site-specific safety plan should be prepared and an appropriately trained hazardous materials expert should supervise work. At a minimum, workers should wear protective gloves and eyewear, long-sleeve shirts, and thoroughly wash all clothing subsequent to work in the marsh. Workers should also thoroughly wash themselves with soap and water following work activities.

If potentially toxic or hazardous materials are discovered during work activities, the area should be marked and reported to the appropriate authorities (the County Hazardous Materials Office and/or the Regional Water Quality Control Board). The area should be avoided until the material has been assessed and/or removed from the site.

Tides

All workers in the marsh shall be made aware of the tidal schedule prior to work in the marsh. Work shall commence on an ebb tide and cease on the incoming tide or earlier. Allow ample time to return to non-tidal areas before the incoming tide starts to advance

across the work site. This general rule may be modified in higher marsh habitats where tidal action is lessened, but workers should always be alert and mindful of working in situations where the incoming tides may trap them, and allow ample time for exiting the marsh prior to an incoming tide. *If in doubt, get out.* Tides can rise extremely quickly in some areas, and it is possible that rising tides may outpace the ability of workers to outrun the increasing water levels, especially in soft muds or heavily vegetated marsh plains.

Weather

It is always important to monitor weather conditions prior to and during work activities within the marsh. Wind, rain, fog or other inclement weather can mean the difference between a safe work site and an extremely dangerous one. Winds usually occur in the early afternoon or late morning during the summer months, though dangerous weather patterns can occur at any time of the year. Rainfall may subject workers to hypothermia if unprepared, or may result in potentially dangerous floodwaters. Winds can increase wave action, whip up salt spray or dust. Fog can decrease workers ability to communicate or discern potential hazards in the marsh. It is ill advised to go into marshland terrain in bad visibility. For all work performed in the intertidal areas of the Estuary, workers or supervisors should check weather forecasts prior to commencing work on the site, should monitor weather conditions for any changes while on site and should modify work plans accordingly to insure the safety of all personnel.

Communication

Open lines of communication between workers in the marsh must be maintained. When more than one team will be working in the marsh at any one time, it is advisable to have a communication link to a land base and between individual teams for safety. In the case of injury, discovery of hazardous materials, endangered species, or cultural artifacts, or for other reasons, land-based assistance can be contacted from the field for immediate help or first aid. On the ground coordination via phone or walkie-talkie when crews are spread out over the marsh can help to avoid dangerous situations.

Herbicide Handling, Spill Prevention and Spill Response

The following information and practices are to be incorporated into herbicide-based *Spartina* control operations associated with the San Francisco Estuary Invasive *Spartina* Project (ISP).

Herbicide Use

- All herbicides shall be applied by or under the direct supervision of trained, certified or licensed applicators and in accordance with the product label
- On-site mixing and filling operations shall be confined to areas appropriately bermed or otherwise protected to minimize spread or dispersion of spilled herbicide or surfactant into surface waters

Herbicide Storage

Proper herbicide storage is one of the keys to using herbicides safely. Always wear rubber gloves when handling herbicides in storage, and review product labels for specific storage instructions.

General rules for herbicide storage include:

- Keep all herbicides in their original containers.
- Store herbicides in a locked shelter away from children and animals.
- Store herbicides in a dry, cool and well-ventilated area.
- DO NOT subject herbicides to freezing or extremely high temperatures.
- Store herbicides separately from seed, fertilizer, insecticides and food.
- Make periodic inspections of storage facilities and storage containers. Check for possible leaks, spills and other similar problems.
- Keep appropriate absorbent material in the storage area at all times as well as a plastic container for storing damaged material.
- Reject any broken or leaking containers when herbicides are delivered.
- Do not store herbicides in office or break areas where employees congregate.

Container Disposal

Empty herbicide containers must be disposed of according to government regulations or be returned to the manufacturer for disposal. Empty containers not returned to the manufacturer can be handled according to the procedures below, as long as local, state and federal laws are followed:

- Triple rinse containers with water at the application site. Always pour the rinse-water into an appropriate receptacle.
- Rinsed containers should be disposed of in a landfill approved for pesticide disposal or in accordance with applicable government procedures. Check with your

supervisor to find out if and when herbicide containers may be handled in this manner.

Spill Response

Under all circumstances, it is the responsibility of the applicator to assure that all precautions are taken prior to initiating work to assure protection of water quality and the environment. The applicator is also responsible for the provision of a Spill Response Kit that is appropriate for the work being undertaken.

The following procedures should be followed in the case of a non-petroleum chemical spill:

- Put on protective gloves, eyewear, a long-sleeved shirt and pants before cleanup
- If a container is leaking, immediately transfer the remaining herbicide to another appropriate container to prevent further spillage
- If the herbicide was spilled on a person, remove the contaminated clothing and rinse the product from the body. If necessary, perform appropriate first aid.
- Cover the spill area with an absorbent material to soak up the herbicide. Common cat litter, sawdust, soil or sand can all be used for this purpose. Consult the manufacturer for more specific clean up recommendations.
- Remove any contaminated items from the spill area to prevent further contamination
- Remove the absorbent material with a broom and or shovel after the spill has been absorbed. Make sure all contaminated soil is removed from the spill area as well.
- Place the contaminated soil and absorbent material into a suitable container, and dispose of the container in an approved landfill area
- ***Do not wash down the area with water*** using a high pressure hose. You may spread the spill and make the herbicide more difficult to contain and clean up.
- When a spill occurs on a site, or is large enough that you need help to contain or clean it up, contact a supervisor immediately. In case of a major spill, call the manufacturer or ChemTrec (Chemical Transportation Emergency Center), 1-800-424-9300.

Spill Response Kit

A Spill Response Kit should be provided at the work site and be immediately accessible to all personnel. Some or all of the following items may be included in a Spill Response Kit. Consider site-specific conditions and the chemicals to be used to determine which of the following items are appropriate.

- PVC Gloves or equivalent (to mid forearm)
- Half-face respirator equipped with approved pesticide cartridge
- PVC boots or equivalent
- Chemical resistant splash goggles

- Vice grip pliers
- Phillips head screwdriver (2)
- Shovels
- Brooms, dustpan
- Clay granules or a sawdust
- Activated charcoal or other appropriate absorbent material
- First aid kit
- Tyvek coveralls (2 pair) or neoprene coveralls
- Recovery drums
- DOT triangular reflector kit
- Source of clean water and soap
- In the case of refueling or mixing activities planned on open mudflats the spill response kit should include a portable wet vacuum or other pumping equipment

Preventing Spills

The following procedures will help to minimize the risk of spills occurring:

- Keep bags and cardboard containers dry at all times
- Prevent or correct leaks in herbicide containers and application equipment
- Properly dispose of all empty pesticide containers
- Tie down or otherwise secure containers when transporting pesticides to prevent them from falling from a vehicle
- Store herbicides only in their original containers or properly labeled service containers
- Stay alert and attentive when handling or using herbicides
- Where on-site or in-field transfer of liquid chemicals (herbicide mixtures, fueling operations) is planned, the transfer will occur at an appropriate upland site (staging area) to avoid contamination of the marsh or adjacent surface waters. A closed transfer system with a dry lock is preferred for these operations.

Procedures for Liquid Spill Response

The following procedures should be followed in the case of a non-petroleum spill:

- Put on protective gloves, eyewear, a long-sleeved shirt and pants before cleanup
- If a container is leaking, immediately transfer the remaining herbicide to another appropriate container to prevent further spillage
- If the herbicide was spilled on a person, remove the contaminated clothing and rinse the product from the body. If necessary, perform appropriate first aid or seek immediate medical attention.
- Cover the spill area with an absorbent material to soak up the herbicide. Common cat litter, sawdust, soil or sand can all be used for this purpose. Consult the manufacturer for more specific clean up recommendations.

- Remove any contaminated items from the spill area to prevent further contamination
- Remove the absorbent material with a broom and or shovel after the spill has been absorbed. Make sure all contaminated soil is removed from the spill area as well.
- Place the contaminated soil and absorbent material into a suitable container, and dispose of the container in an approved landfill area
- ***Do not wash down the area with water*** using a high pressure hose. You may spread the spill and make the herbicide more difficult to contain and clean up.
- When a spill occurs on a site, or is large enough that you need help to contain or clean it up, contact a supervisor immediately. In case of a major spill, call the manufacturer or ChemTrec (Chemical Transportation Emergency Center).

Under all circumstances it is the responsibility of the applicator to assure that all precautions are taken prior to initiating work to assure protection of water quality and the environment. The applicator is also responsible for the provision of a Spill Response Kit that is appropriate for the work being undertaken.

Spray Drift Reduction

Definition of pesticide drift	The Department of Pesticide Regulation (DPR) defines pesticide drift as the pesticide that moves through the air and is not deposited on the target area at the time of application. Drift does NOT include movement of pesticide and associated degradation compounds off the target area after application (e.g., translocation, volatilization, evaporation, or the movement of pesticide dusts or pesticide residues on soil particles that are windblown after application.)
The pesticide drift issue	Pesticide drift, particularly from agricultural fields, has been known to impact adjacent residential areas, cause damage to non-target crops, and contaminate the environment.
How does pesticide drift occur?	Low levels of pesticide drift may occur from all types of pesticide applications. Pesticide drift becomes unacceptable when pesticides are applied by imprecise methods or under environmental conditions that prohibit the applicator from maintaining control over the path the pesticide takes once it leaves the application equipment.

The San Francisco Estuary Invasive *Spartina* Project (ISP) has identified the use of herbicide as a critical component of its *Spartina* Control Program. The herbicide used for *Spartina* Control is imazapyr (Habitat® or Polaris AQ™), a product with exceptionally low toxicity, approved by U.S. EPA and the State of California for use in sensitive aquatic and estuarine environments. The human health risks associated with imazapyr are very low, and it requires no special personal protection measures for handling and application. In any case, it is desirable to minimize exposure of humans or non-target plants to pesticide drift.

The ISP requires that all herbicide application under the Control Program be managed to minimize spray drift to protect human health and the environment. Application of herbicide and surfactants in accordance with product labels (including the Supplemental Labeling for Aerial Application in California) will minimize spray drift. In addition, the ISP recommends the following:

1. For aerial application of herbicide mixtures:
 - a. Application should be by helicopter; no airplane application should be used.
 - b. Nozzle orifices of broadcast sprayers should be directed backward.
 - c. Flow of liquid from each nozzle should be controlled by a positive shutoff system.
 - d. Spray nozzles should be adjustable to allow control of droplet size. Use up to 1500 microns for windy conditions.
 - e. Boom pressure should not exceed the manufacturer's recommended pressure for the nozzles being used.
 - f. Herbicide should be applied only when wind speed is three to 10 miles per hour at the application site, as measured by an anemometer positioned four feet above the ground.

- g. Discharge should start only after entering the target site; discharge height should not exceed 10-15 feet above the target vegetation; discharge should be shut off whenever necessary to raise the equipment over obstacles; discharge should be shut off before exiting the target site.
2. For ground application of herbicide mixture by vehicle-mounted or towed ground equipment:
 - a. Herbicide should be applied only when wind speed is 10 miles per hour or less at the application site, as measured by an anemometer positioned four feet above the ground.
 - b. Discharge should start after entering the target site; discharge should be shut off before exiting the target site.

Petroleum Fuel Spill Prevention and Response

Spills of gasoline or other petroleum products, required for operation of motorized equipment, into or near open water could degrade water quality, with potential for bioaccumulation of contaminant toxicity. Several types of equipment used for treatment of *Spartina* may present opportunities for petroleum spills. Equipment used in *Spartina* control activities include:

- Amphibious tracked vehicles
- Spray trucks
- Water-based excavators (e.g. Aquamog)
- Gas-powered mowers (e.g. Weed-Whackers)
- Air boats and outboard motor boats

Fueling

Fueling of amphibious tracked vehicles, spray trucks or land-based excavators should be done offsite at fueling stations or suitable staging areas. A suitable staging area shall be equipped with sufficient protection to prohibit a petroleum spill from migrating beyond the immediate fueling area (e.g., an impermeable plastic tarp set between raised berms, a catch basin or similar portable device).

Water-based excavators, airboats and outboard motor boats shall be fueled offsite at commercial fueling stations or designated locations such as equipment maintenance yards. When fueling is done on or adjacent to treatment sites, a spill prevention and response plan must be prepared and implemented. A copy of this plan shall be provided to the Invasive *Spartina* Project at fieldops@spartina.org.

Gas powered, hand held machinery (e.g., weed whackers) shall be refueled on a non-absorbent tarp or mat placed under machinery to catch any spills.

In addition to spills during refueling operations, small amounts of oil or fuel may leak from improperly maintained equipment. Before using any equipment in the marsh, check to make sure that it is in good working order with no signs of leakage or corrosion that might indicate the potential for inadvertent spills on the work site.

Transport vessels and vehicles, and other equipment (e.g., mower, pumps, etc.) shall not be serviced or fueled in the field except under emergency conditions.

Under all circumstances, it is the responsibility of the applicator to assure that all precautions are taken prior to initiating work to assure protection of water quality and the environment. The applicator is also responsible for the provision of a Spill Response Kit that is appropriate for the work being undertaken.

Herbicide Information

This section provides product labels and Material Safety Data Sheets (MSDS) for herbicides and adjuvants that have been evaluated and approved for use in controlling non-native *Spartina* in the San Francisco Estuary. Product labels and MSDSs contain important information to help protect human health and the environment, and they should be included as a part your Site Safety Plan. Included in this section are the following products:

Aquatic Herbicides:

1. **Habitat®** (imazapyr-based herbicide) – Product label and MSDS.
2. **Polaris AQ™** (imazapyr-based herbicide) – Product label and MSDS.

Surfactants:

1. **Competitor®** (methylated seed oil) – Product label and MSDS.
2. **Liberate®** (non-ionic surfactant/drift retardant) - Product label and MSDS.
3. **DyneAmic®** (silicone-based surfactant) – Product label and MSDS.
4. **Kinetic®** (silicone-based surfactant) – Product Label and MSDS.

Colorants:

5. **Blazon®** (spray pattern indicator) - Product label and MSDS.

Please note that **ONLY** the aquatic herbicides and surfactants that are listed here are approved for use in *Spartina* control in the San Francisco Estuary. There are, however, other adjuvants (excluding surfactants), such as drift retardants, anti-foaming agents, and acidifiers, that may be used, provided the ISP Partner has reviewed the product information and found the product to pose no significant risk to human health or the estuarine environment.

It is the responsibility of the applicator to obtain product labels and MSDSs for any products not included in this document.

It is the responsibility of the applicator to assure that the most current product labels are obtained and followed.