

FACT SHEET FOR THE STATE OF WASHINGTON

***ZOSTERA JAPONICA* MANAGEMENT ON COMMERCIAL CLAM BEDS
IN WILLAPA BAY NPDES GENERAL PERMIT**

January 2, 2014

IMAZAMOX

Background

A number of shellfish growers have proposed application of the EPA-registered aquatic herbicide imazamox to control *Z. japonica* on commercial clam beds. These growers selected imazamox as the herbicide of choice after research trials conducted by Washington State University Extension, under WSDA Experimental Use Permits showed the herbicide to be effective on dewatered *Z. japonica* plants with minimal impacts to nearby native eelgrass beds. Currently, imazamox has a marine/estuarine label from the EPA, one of only three aquatic herbicides with this use designation. EPA also considers imazamox to be a reduced risk herbicide. To support the use of imazamox to manage *Z. japonica* in the marine/estuarine environment, Washington State University contracted with ENVIRON International Corporation of Seattle to develop a risk assessment for imazamox. The risk assessment, *Screening-Level Ecological Risk Assessment of the Proposed Use of the Herbicide Imazamox to Control Invasive Japanese Eelgrass (Zostera japonica) in Willapa Bay, Washington State*, is available at: <http://www.ecy.wa.gov/programs/wq/pesticides/eelgrassdocs/riskassessmentimazamox110712.pdf>

As SEPA lead agency Ecology has made the determination that the issuance of this permit could have significant adverse environmental impact and determined that an Environmental Impact Statement (EIS) was required. At Ecology's request, shellfish growers prepared a draft EIS for the use of imazamox to manage *Z. japonica* on shellfish beds. The EIS analyzes alternatives for *Z. japonica* management including a no action alternative, chemical management, and an **integrated pest management** approach. The document is the SEPA documentation for the issuance of this permit. Ecology made the draft EIS document available on its website at: <http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html>

Information about environmental and human health impacts of imazamox in a freshwater environment is available in Ecology's *Environmental Impact Statement for Penoxsulam, Imazamox, Bispyribac-sodium, Flumioxazin, and Carfentrazone-ethyl: Addendum to the Final Supplemental Environmental Impact Statement for Freshwater Aquatic Plant Management*. This document is available at www.ecy.wa.gov/biblio/0010040Addendum1.html. Although this document refers to imazamox use in freshwater systems, toxicity, and other information about the herbicide in the document is relevant to its uses in a marine environment.

The risk assessment and the *Z. japonica* EIS provide a comprehensive overview of imazamox and its use in a marine/estuarine environment. Ecology provides a short summary of imazamox below, but refers the reader to the above documents for a more thorough evaluation of imazamox toxicities and effects. For more information about imazamox, also see the documents listed in the following reference section. Growers do not propose to use adjuvants, so Ecology does not discuss the toxicity of adjuvants in this summary.

The shellfish industry has research trial data that indicates that it can exploit dissimilar environmental niches to remove invasive *Z. japonica* with minimal disruption to native eelgrass

REGULATORY INFORMATION

Regulatory Pollution Reduction Requirements

Federal and state regulations require that effluent limits in an NPDES permit must be either technology-or-water-quality-based.

- Technology-based limitations are based upon the methods available to treat specific pollutants. Technology-based limits are set by EPA and published as a regulation or Ecology develops the limit on a case-by-case basis (40 CFR 125.3, and chapter 173-220 WAC).
- Water quality-based limits are calculated so that the effluent will comply with the Surface Water Quality Standards (chapter 173-201A WAC), Ground Water Standards (chapter 173-200 WAC), Sediment Quality Standards (chapter 173-204 WAC) or the National Toxics Rule (40 CFR 131.36).
- Ecology must apply the more stringent of these limits to each parameter of concern. These limits are described below.

Technology-Based Water Quality Protection Requirements

Sections 301, 302, 306, and 307 of the CWA establish discharge standards, prohibitions, and limits based on pollution control technologies. These technology-based limits are *best practical control technology* (BPT), *best available technology economically achievable* (BAT), and *best conventional pollutant control technology economically achievable* (BCT). Permit writers may also determine compliance with BPT/BAT/BCT using their *best professional judgment* (BPJ). EPA has stated that for pesticide application to water (in its aquatic pesticide NPDES general permit issued October, 2011) that technology-based requirements are Best Management Practices (BMPs); not numeric limits.

Washington has similar technology-based limits that are described as *all known, available, and reasonable methods of control, prevention, and treatment* (AKART) methods. State law refers to AKART under RCW's 90.48.010, 90.48.520, 90.52.040, and 90.54.020. The federal technology-based limits and AKART are similar but not equivalent. Ecology may establish AKART:

- For an industrial category or in an individual permit on a case-by-case basis.
- That is more stringent than federal regulations.
- That includes BMP's such as prevention and control methods (e.g., waste minimization, waste/source reduction, or reduction in total contaminant releases to the environment).

Ecology and EPA concur that AKART may be equivalent to best professional judgment (BPJ) determinations.

Historically, EPA has regulated the pesticide application industry under FIFRA. EPA developed label use requirements to regulate the use of pesticides. EPA also requires the pesticide manufacturer to register each pesticide, provide evidence that the pesticide will work as promised, and minimize unacceptable environmental harm.

The Pesticide Management Division of the Washington State Department of Agriculture (WSDA) ensures that applicators use pesticides legally and safely in Washington. WSDA registers pesticides for use in Washington (in addition to EPA registration); licenses pesticide applicators, dealers and consultants; investigates complaints such as label violations; maintains a registry of pesticide sensitive individuals; and administers a waste pesticide collection program. These duties are performed under the authority of the Washington Pesticide Control Act (chapter 15.58 RCW), the Washington Pesticide Application Act (chapter 17.21 RCW), the General Pesticide Rules (chapter 16-228 WAC), the Worker Protection Standard (chapter 16-233 WAC) and a number of pesticide and/or county specific regulations (<http://agr.wa.gov/PestFert/Pesticides/default.htm>).

The standards for environmental protection are different between the CWA and FIFRA. In compliance with the *National Cotton Council, et al. v. EPA* court decision, all aquatic pesticide applications in the United States occur under NPDES permits (as of October 31, 2011). EPA-delegated states, such as Washington, developed their own state NPDES permits for these activities. EPA developed a general aquatic pesticide NPDES permit for the non-delegated states and federal and tribal lands not delegated under state permitting authority. In Washington, all aquatic pesticide activities taking place on tribal lands must follow EPA permitting guidelines. All federal agency actions taken by federal agencies on federal lands must occur under the EPA permit. Aquatic pesticide applications occurring on federal lands where the federal agency is not the decision maker or applicator may occur under state NPDES permits instead of the EPA permit (by agreement between EPA and Ecology).

After the *Headwaters Inc. v. Talent Irrigation District* decision (2001), Ecology regulated aquatic pesticide application under NPDES permits. Ecology issued its first aquatic pesticide permits in 2002. Since 2002, Ecology has revised and reissued several of its aquatic pesticide permits. It is Ecology's intent that issuing this permit will authorize *Z. japonica* management using the aquatic herbicide imazamox in a manner that complies with federal and state requirements.

All wastewater discharge permits issued by Ecology must incorporate requirements to implement reasonable prevention, treatment, and control of pollutants. Ecology acknowledges that applicators could treat the pollutants addressed in this permit only with great difficulty due to the diffuse nature and low concentrations that exist after the pesticides have become waste. The *Headwater, Inc. v. Talent* ruling established that aquatic pesticides become waste in the water after the pesticide has performed its intended action and the target organisms are controlled or if excess pesticide is present during treatment.

Integrated Pest Management (IPM)

EPA regards IPM as meeting technology-based-effluent-limits for aquatic pesticide application (see the EPA general permit). EPA's permit requires that all applicants required to file a ***Notice of Intent (NOI)*** under its general permit develop and implement ***Pesticide Discharge Management Plans*** that include comprehensive IPM practices. EPA also requires any state-issued aquatic pesticide NPDES permits to be at least as stringent as its permit. Therefore, Ecology's permit requires that applicants develop ***Discharge Management Plans (DMP's)*** for

the use of imazamox to manage *Z. japonica* on commercial clam beds. Appendix D of the draft permit sets out the minimum standards and guidelines for plan development. Because the EIS prepared for the issuance of this permit covers many of the elements required in the DMP, Ecology will allow substitution of the EIS for some of the DMP plan elements, where appropriate.

Experimental Use Permits

Entities operating under WSDA-issued *experimental use permits* (WSEUP) need coverage under this permit. WSDA requires WSEUP for all research experiments involving pesticides that are not federally registered or for uses not allowed on the pesticide label. WSDA experimental use permits limit the area that a Permittee can test to one acre or less. WSDA grants experimental use permits for gathering data in support of registration under FIFRA Section (3) or Section 24(c).

When a researcher conducts a test on more than one surface acre of water (per pest), he or she must operate under a federal experimental use permit as well as a state experimental use permit. Any person may apply to the EPA for a federal experimental use permit for pesticides. These permits are usually valid for only one year. Persons holding a federal experimental use permit must also apply for and obtain a state experimental use permit before initiating any shipment of the pesticide to Washington. Ecology requires coverage under the appropriate aquatic pesticide permit for persons operating under a federal experimental use permit. This permit will limit experimental use activities to one acre or less regardless of whether the Permittee has a state or a federal EUP.

Water Quality-Based Requirements

Surface Water Quality-Based Effluent Limits

The Washington State Surface Water Quality Standards (chapter 173-201A WAC) were designed to protect existing water quality and preserve the *beneficial uses* of Washington's surface waters. Waste discharge permits must include conditions that ensure the discharge will meet established surface water quality standards (WAC 173-201A-510). Water quality-based effluent limits may be based on an individual waste load allocation or on a waste load allocation developed during a basin-wide total maximum daily loading study (TMDL).

Ecology conditions NPDES and waste discharge permits in such a manner that authorized discharges meet water quality standards. The characteristic beneficial uses of surface waters include, but are not limited to, the following: domestic, industrial and agricultural water supply; stock watering; the spawning, rearing, migration and harvesting of fish; the spawning, rearing and harvesting of shellfish; wildlife habitat; recreation (primary contact, sport fishing, boating, and aesthetic enjoyment of nature); commerce; aesthetics and navigation.

Numeric Criteria for the Protection of Aquatic Life and Recreation

Numeric water quality criteria are published in the Water Quality Standards for Surface Waters (chapter 173-201A WAC). They specify the levels of pollutants allowed in receiving water to protect aquatic life and recreation in and on the water. Ecology uses numeric criteria along with

chemical and physical data for the wastewater and receiving water to derive effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limits, the discharge must meet the water quality-based limits.

The EPA has published 91 numeric water quality criteria for the protection of human health that are applicable to dischargers in Washington State (40 CFR 131.36). EPA designed these criteria to protect humans from exposure to pollutants linked to cancer and other diseases, based on consuming fish and shellfish and drinking contaminated surface waters. The Water Quality Standards also include radionuclide criteria to protect humans from the effects of radioactive substances.

Narrative Criteria

Narrative water quality criteria (e.g. WAC 173-201A-240(1); 2006) limit the toxic, radioactive, or other deleterious material concentrations that may be discharged to levels below those which have the potential to:

- Adversely affect designated water uses.
- Cause acute or chronic toxicity to biota.
- Impair aesthetic values
- Adversely affect human health

Narrative criteria are statements that describe the desired water quality goal, such as waters being “free from” pollutants such as oil and scum, color and odor, and other substances that can harm people and fish. Ecology uses these criteria for pollutants for which numeric criteria are difficult to specify, such as those that offend the senses (e.g., color and odor). Narrative criteria protect the specific designated uses of all freshwaters (WAC 173-201-A-200; 2006) and of all marine waters (WAC 173-201A-210; 2006) in the State of Washington.

Antidegradation Analysis and Antidegradation Plan

The following narrative represents Ecology’s antidegradation analysis and antidegradation plan for the *Z. japonica* Management on Commercial Clam Beds in Willapa Bay General Permit. The purpose of Washington’s Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

- Restore and maintain the highest possible quality of the surface waters of Washington.
- Describe situations under which water quality may be lowered from its current condition.
- Apply to human activities that are likely to have an impact on the water quality of surface water.
- Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply AKART.
- Apply three Tiers of protection (described below) for surface waters of the state.

Tier I ensures existing and designated uses are maintained and protected and applies to all waters and all sources of pollution. Tier II ensures that dischargers do not degrade waters of a higher quality than the criteria assigned unless such lowering of water quality is necessary and in the overriding public interest. Tier II applies only to a specific list of polluting activities. Tier III

prevents the degradation of waters formally listed as “outstanding resource waters” and applies to all sources of pollution.

WAC 173-201A-320(6) describes how Ecology implements Tier I and II antidegradation in general permits. All Permittees covered under the general permit must comply with the provisions of Tier 1. Ecology determined that the permit does not cover discharges to Tier III waters.

Under state law, the use of herbicides is in the public interest.

“Many commercially available herbicides have been demonstrated to be effective in controlling nuisance and noxious aquatic weeds and algae and do not pose a risk to the environment or public health. The purpose of this act is to allow the use of commercially available herbicides that have been approved by the environmental protection agency and the department of agriculture and subject to rigorous evaluation by the department of ecology through an environmental impact statement for the aquatic plant management program”. (RCW 90.48.447)

See also the Biological Background Section for information about how *Z. japonica* affects shellfish aquaculture activities.

The water quality standards at WAC 173-201A-320(6) describe how Ecology should conduct an antidegradation Tier II analysis when it issues NPDES general permits. This section of the rule requires Ecology to:

Use the information collected, from implementation of the permit, to revise the permit or program requirements.

- Ecology developed the proposed permit based on written and oral feedback from potential Permittees, parties potentially affected by the proposed permit, internal agency staff, natural resource scientists from other government agencies, and academia. Ecology will further revise the draft permit based on a formal public comment period and testimony received at public hearings.
- Ecology may modify or revoke the permit if monitoring data show significant adverse impacts to *Z. marina* beds off of the treatment site, through the continued use of imazamox. In addition, the permit requires immediate reporting of any adverse impacts from treatment to fauna or humans. Ecology investigates these reports and determines if the treatment caused or contributed to the problem.
- Ecology has requested a buffer validation study (Appendix B) and requires monitoring (special condition S.5 of the permit) to answer the following questions:
 - What is the concentration and degradation of imazamox in sediment within the treated sites?
 - What are the effects of imazamox treatment on native eelgrass plants growing on properties adjacent to treated commercial clam beds?

Review and refine management and control programs in cycles not to exceed five years or the period of permit reissuance.

- This is the first issuance of this permit. It expires (date five years from effective date). Permit issuance includes a public involvement process as described below.
- Ecology spent several years prior to permit issuance soliciting input from users and affected parties, writing and revising permit conditions, reviewing relevant data and literature, and collaborating with natural resource scientists before soliciting public comment on the permit and accompanying documents and finalizing the permit. In addition, Ecology required the potential applicants to develop an EIS to support the use of imazamox to treat *Z. japonica* in a marine/estuarine environment.

Include a plan that describes how Ecology will obtain and use information to ensure full compliance with water quality standards. Ecology must develop and document the plan in advance of permit or program approval.

- The information in the Fact Sheet and in the antidegradation section of this Fact Sheet constitute Ecology's antidegradation plan for the *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay General Permit. This is despite language in Ecology's guidance document implementing Tier II antidegradation requirements that indicates such a plan may not be required. Ecology *Supplementary Guidance Implementing the Tier II Antidegradation Rules* dated September 2011 (<https://fortress.wa.gov/ecy/publications/SummaryPages/1110073.html>). A Tier II analysis is not required in association with activities regulated under a short-term modification (WAC 173-201A-410) such as what would occur with construction and maintenance activities or the periodic use of herbicides to control noxious aquatic weeds.
- Imazamox and marker dyes are not chemicals of concern.
- Willapa bay is not a **303(d)-Listed water body** because of imazamox or marker dyes. The Permittee will not apply imazamox directly to the water but will apply it to *Z. japonica* beds exposed by low tides. As the rising tide covers the treated vegetation, some herbicide will enter the water from the sprayed foliage. Based on monitoring data, Ecology anticipates that the concentration of the herbicide in the water off the treated beds will be under the in-water label rate for imazamox. The permit requires monitoring of nearby *Z. marina* beds.
- Ecology will review and approve buffer validation study data, review monitoring information and reports, and if non-target impacts to *Z. marina* beds, located off of the commercial clam bed property, are unacceptable or other adverse impacts become apparent, may modify the permit or terminate permit coverage.
- Ecology plans to form a team of scientists from state resource agencies to help it evaluate monitoring data and to advise on future monitoring.
- Ecology required Permittees to develop a DMP for this activity.
- As SEPA lead agency, Ecology made a Determination of Significance and asked the applicants to prepare an EIS that meets agency standards.

Short-Term Water Quality Modification Provisions

The short-term water quality modification provision of the draft permit allows the authorized discharges to cause a temporary diminishment of some designated beneficial uses while it alters the water body to remove the state-listed noxious weed *Z. japonica* from commercial clam beds

in Willapa Bay. The conditions of this permit constitute the requirements of a short-term water quality modification.

A short-term exceedance only applies to short lived (hours or days) impairments, but short-term exceedances may occur periodically throughout the five-year permit term. Short-term exceedances may also extend over the five-year life span of the permit (long-term exceedance) provided the Permittee satisfies the requirements of WAC 173-201A-410.

Washington's Water Quality Standards include 91 numeric health-based criteria that Ecology must consider when writing NPDES permits. The EPA established these criteria in 1992 in its National Toxics Rule (40 CFR 121.36). Ecology has determined that the Permittee's discharge does not contain chemicals of concern based on existing data or knowledge.

Sediment Quality Standards

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health. Under these standards, Ecology may require a Permittee to evaluate the potential for the discharge to cause a violation of sediment standards (WAC 173-204-400). Readers may obtain additional information about sediments at the Aquatic Lands Cleanup Unit website www.ecy.wa.gov/programs/tcp/smu/sediment.html

Ecology has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards. However, Ecology will require sediment monitoring to determine imazamox sediment concentrations within treated beds.

Ground Water Quality Standards

The Ground Water Quality Standards, (chapter 173-200 WAC), protect beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards. This permit does not allow the use of any pesticides expected to contaminate groundwater. In the event there are additional concerns, Ecology can issue orders requiring groundwater monitoring for imazamox under this permit.

SEPA Compliance

Because this is a new use of an aquatic herbicide in a sensitive environment, as lead agency, Ecology determined that this activity will have a significant adverse environmental impact and required that potential applicants develop an EIS for this activity. The EIS must meet Ecology standards as an Ecology document. The EIS is the SEPA compliance for the issuance of this permit.

Endangered and Sensitive Species

EPA has implemented an Endangered Species Protection Program (ESPP) to identify all pesticides that may cause adverse impacts on threatened/endangered species and to implement measures that will mitigate these impacts. When the ESPP identifies an adverse impact, it requires use restrictions to protect these species at the county level. EPA will specify these use

lands and EPA has not delegated regulatory authority to Ecology to issue NPDES permits on federal and “Indian Country” as defined in 18 USC Sec. 1151.⁵

S2. PERMIT ADMINISTRATION

Who May Obtain Permit Coverage

A definition of “Permittee” is not provided in chapter 90.48 RCW, chapters 173-216, 173-220, or 173-226 WAC, nor is one provided in 40 CFR 122 (EPA NPDES Permit Program) or State NPDES Permit Programs. Based upon the usage of Permittee in federal and Washington State law, Ecology understands the term “Permittee” to mean the person or entity that discharges or controls the discharge of pollutants to waters of the state (surface or ground) and holds permit coverage allowing that specific discharge.

For this permit, Ecology has established that the Permittee is the aquatic licensed applicator. The permittee must have a project sponsor for each permit coverage (although in some cases the applicator and the sponsor may be the same individual). A sponsor is typically any commercial shellfish farmer holding a current business license that conducts *Z. japonica* management on its commercial clam beds in Willapa Bay. A state agency may treat its commercial clam beds under this permit if the agency specifically requests to treat under the permit. However, this permit does not allow treatment on state-owned lands where clams are not being commercially grown for sale (e.g., lands managed for public harvest of clams). A state-licensed applicator or an applicator under the direct supervision of a state-licensed applicator must conduct the actual herbicide application.

This permit does not limit treatment on commercial clam bed lands leased from DNR. However, the Permittee is responsible for ensuring that they are not violating any aspect of their lease agreement with DNR by controlling *Z. japonica* under this permit.

WDFW manages a shellfish reserve in Willapa bay where rights to harvest the available shellfish are sometimes auctioned off. It is Ecology’s opinion that the shellfish reserve managed by WDFW does not constitute a commercial clam bed per the requirement of this permit.

How to Obtain Coverage

Applicants must submit a complete application for permit coverage to Ecology a minimum of 60 days before applying imazamox.

A new permit applicant must submit a complete application to Ecology including a NOI. An official who has signature authority (WAC 173-226-200) for the entity applying for permit coverage must sign all documents. Ecology must receive the complete application for permit coverage on or before the publication date of the public notice the permit applicant posted in a newspaper of general circulation (WAC 173-226-130). Ecology considers a newspaper of general circulation as the major newspaper publication for a region.

⁵ Entities conducting herbicide treatment on federal lands can operate under state-issued NPDES permits where the decision maker is not a federal entity and the federal entity is not the applicator (e.g., irrigation districts operating on Bureau of Reclamation lands can operate under the state Irrigation District Permit).

implement an IPM plan. The Permittee must develop the plan following the Administrative Procedures Act for public involvement (chapter 34.05 RCW) and must complete a State Environmental Policy Act (chapter 43.21C RCW and chapter 197-11 WAC) review of the proposed activity. Permittees who do not meet these requirements must ensure that the short-term exceedance of water quality standards is limited to only hours or days. Ecology may also request updated plans and addendums to existing plans. However, Ecology believes that any activities conducted under this permit are unlikely to exceed the Water Quality Standards for more than hours or days since tidal exchange will rapidly dilute the herbicide within this period.

Application Requirements

Under state laws administered by WSDA, all aquatic herbicides are restricted use (WAC 16-228-1231). Only Washington-aquatic licensed applicators or applicators under direct supervision of an aquatic licensed applicator may apply pesticides to water. The permit requires that all applicators use appropriate application methods, have training in application techniques, and that trained personnel calibrate the application equipment to ensure appropriate label treatment rates.

Impaired Water bodies

Ecology periodically reviews water quality data to determine if water bodies meet criteria. Section 303(d) of the CWA requires that waters not meeting criteria undergo an evaluation of the cause and amount of the contaminant. Ecology publishes Total Maximum Daily Load (TMDL) reports, which may establish limits on the amounts of pollutants contributors may discharge. Willapa Bay is on the 303(d) list for several parameters; however, Ecology believes that further impairment to Willapa Bay is unlikely through activities permitted under this permit. Treatment will have no effect on most of the listed parameters, such as legacy chemicals. Imazamox treatment is unlikely to impair parameters such as dissolved oxygen or nutrients. Noxious weeds dying from treatment on the tide flats should not cause low oxygen conditions or substantial nutrient nitrogen release in Willapa Bay with its dynamic tidal systems and substantial dilution potential.

Sensitive, Threatened, or Endangered Plants and Priority Habitats and Species

Currently, no state law protects *sensitive, threatened, or endangered plant* species (rare plants) in Washington. However, many federal and state land-management agencies have policies to protect rare plants. In 1982, the state legislature recognized the need for a systematic and objective approach to protect those features of natural ecosystems most at risk and created the Natural Heritage Program within the Department of Natural Resources to assume this task (RCW 79.70.060). In addition, local jurisdictions may provide protection for rare species and high quality ecosystems through ordinances, regulations, and permitting requirements. This permit does not authorize Permittees to cause permanent harm to rare plant populations and priority species. It requires the Permittee to take care to minimize harm to native plant species while treating noxious weeds.

There are sensitive habitats (high salt marsh) in Willapa Bay. However, Ecology does not believe that vascular plants, other than *Z. marina* would be exposed to concentrations of imazamox high enough and for long enough to cause impacts from treatments under this permit because clams typically grow in tidal flats at lower elevations than salt marsh vegetation. WDFW lists *Z. marina* as a priority species and habitat, although it is not a rare or threatened species in

Washington. However, *Z. marina* is highly valued for its ecological benefits (see the *Z. japonica* section of this fact sheet). For example, the Puget Sound Partnership has set a goal to increase the amount of eelgrass (did not specify which species) in Puget Sound by 20 percent by 2020.

Ecology believes that the plant most at risk from treatment of *Z. japonica* on commercial clam beds in Willapa Bay is *Z. marina*. Permittees, and Ecology through the issuance of the permit, must ensure that treatment of *Z. japonica* with imazamox does not cause permanent harm to *Z. marina* populations in Willapa Bay. The goal is no net loss of *Z. marina*, off of commercial clam bed properties, in Willapa Bay due to permit activities. Buffer and application requirements set out in the permit will mitigate impacts and the monitoring requirements of this permit will establish if these mitigation requirements are sufficient. Additionally, Ecology is asking the Willapa Grays Harbor Oyster Growers Association, as the proponents of the permit, to complete the buffer width validation study in Appendix B. The buffer width validation study is designed to determine what buffer distance will be protective of *Z. marina* located off of a treated commercial clam bed. Three years after permit issuance Ecology may modify the permit based on the results of the monitoring in the permit and the results of the buffer width validation study (see also S5. MONITORING section of this Fact Sheet). .

Discharge Management Plans

Integrated pest management is AKART for this permit. DMP's are plans to help applicants determine appropriate pest management methods, set ***action thresholds***, incorporate principles of IPM, and help reduce pesticide use. EPA requires the development of a DMP in its NPDES permit for aquatic pesticide application and state permits must not be less stringent than federal permits. Because Ecology required an Environmental Impact Statement as the SEPA documentation for the issuance of this permit, Ecology will allow elements of this EIS to substitute for applicable DMP elements. DMP's also sets out lines of responsibility by identifying responsible parties and applicators and provides up-to-date contact information.

S4. PRODUCT USE

Prohibited Discharges

RCW 90.48.080 states that: *"It shall be unlawful for any person to throw, drain, run, or otherwise discharge into any of the waters of this state, or to cause, permit or suffer to be thrown, run, drained, allowed to seep, or otherwise discharged into such waters any organic or inorganic matter that shall cause or tend to cause pollution of such waters according to the determination of the department."*

Ecology prohibits treatment that causes oxygen depletion to the point of stress or lethality to aquatic biota from plant die-off, unintended impacts to water quality or biota, or the mortality of aquatic vertebrates. After evaluating toxicity data, the EPA risk assessment, and other relevant documents, Ecology believes that imazamox treatments allowed under this permit would be highly unlikely to cause any of the above impacts to aquatic biota from treatment of *Z. japonica* on tide flats in Willapa Bay. Imazamox is practically non-toxic to both vertebrates and

invertebrates and the EPA level of concern was for adverse impacts to rare plant species and not animals.

Authorized Discharges

This permit allows the use of the liquid, aquatic-labeled formulation of the herbicide imazamox and marker dyes on commercial clam beds in Willapa Bay. Ecology authorizes these discharges in accordance with WAC 173-201A-410 and chapter 90.48 RCW. EPA regulates imazamox under FIFRA and under its general Aquatic Pesticide Permit on federal and tribal lands in Washington.

Permittees must comply with the herbicide label requirements and all applicable permit conditions. **Coverage under this general permit does not supersede or preempt federal or state pesticide product label requirements or any other applicable laws and regulations.** It is the responsibility of the Permittee to determine if there are other applicable requirements pertaining to this activity and to comply with these requirements. General Condition G9 reminds the Permittee of this fact. The permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights. Permittees treating under this permit must obtain proper permissions to access and treat on private land (see RCW 17.10.160 right of entry).

Active Ingredient: The permit allows for and conditions the use of the aquatic herbicide imazamox, a federally registered active ingredient (Clearcast® specimen label - <http://www.cdms.net/LDat/ld7J8007.pdf>). The FIFRA label allows the use of imazamox in the marine/estuarine environment. Imazamox has undergone review by Ecology and WSDA prior to approval (see www.ecy.wa.gov/programs/wq/pesticides/seis/risk_assess.html). In addition, Washington State University contracted with ENVIRON International Corporation to prepare a document called *Screening-Level Ecological Risk Assessment of the Proposed Use of the Herbicide Imazamox to Control Invasive Japanese Eelgrass (Zostera japonica) in Willapa Bay, Washington State*. Ecology has made this document available on its website at: <http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html>.

Ecology determined that, if used according to the EPA label and in compliance with the conditions of this general permit, imazamox would not violate water quality standards. By approving the active ingredient rather than trademarked product, Ecology does not plan to conduct additional review for each new trade name of imazamox marketed. However, this permit allows only the liquid formulation of imazamox to be used.

Marker Dyes: The permit allows the use of marker dyes. Marker dyes are typically food grade dyes and do not have any herbicidal activity by themselves. EPA does not label or regulate marker dyes as pesticides. Applicators use marker dyes to distinguish treated areas from untreated areas when applying herbicide. Marker dyes help keep applicators from over applying herbicides and facilitate reduced pesticide use.

Experimental Use

EPA regulates federal EUP's under section 5(f) of FIFRA and WSDA regulates both state and federal EUP's under RCW 15.58.405(3). Entities operating under a state EUP need coverage

under this permit because discharge of pollutants to waters of the state requires an NPDES permit. Additionally, entities operating under a federal EUP must obtain permit coverage. Federal EUP's typically allow treatment of up to several hundred acres. The permit allows entities operating under a federal EUP to use chemicals/products not listed in the permit so long as their use is solely for research and monitoring. Entities operating under a federal EUP must also obtain and operate under a state EUP.

Application Restrictions

Ecology conditions the permit to limit impacts. Growers initially expected that Ecology would allow the treatment of *Z. japonica*, a Class C noxious weed, under the Aquatic Noxious Weed Management General Permit. Instead, Ecology declined to cover that activity under that permit. In a letter to Ecology dated August 4, 2011, the President of the Willapa-Grays Harbor Oyster Growers Association formally requested that Ecology develop a permit that would allow treatment of *Z. japonica* with imazamox on commercial shellfish beds statewide. In response to the letter, Ecology made a preliminary determination to develop a general permit for that activity (WAC 173-226-130). Ecology provided public notice of its preliminary determination in the Washington State Register (WSR 12-03-097) and on its website (WAC 173-226-060).

In response to subsequent public comments and concerns from natural resource scientists and others about possible impacts to *Z. marina* populations, Ecology narrowed the scope of this permit to affected commercial clam beds in Willapa Bay and decided to proceed with permit development. Ecology understands that Manila clam culture in Willapa Bay has been the most affected activity and location at this time. The agency solicited further public comment on the revised proposal from October 3 to November 2, 2012.

Ecology limited the active ingredient to the liquid formulation of the aquatic herbicide imazamox and marker dyes. Research trials show that imazamox is effective on controlling *Z. japonica* without the use of adjuvants. Many adjuvants are more toxic than the active ingredient and can increase the toxicity of the formulation. In this case, the only toxicity to consider is from the active ingredient itself (see also the [imazamox section](#) of this Fact Sheet).

The Permittee may not apply other pesticides to commercial clam beds during the four days before and after application of imazamox. The purpose of this limitation is to avoid synergistic or additive effects from imazamox and the discharge of pesticides to control burrowing shrimp. An application has been submitted to Ecology for an NPDES permit to be developed that would condition the use of imidacloprid to treat burrowing shrimp (ghost shrimp and mud shrimp) on commercial clam and oyster beds in Willapa Bay and Grays Harbor.

Permittees must apply herbicide only when the action threshold, as identified in their DMP, is met. Applicators must only treat plants when there is at least an hour of dry time before tidal inundation. This allows adequate time for plants to take up the herbicide before the incoming tide washes herbicide residues off the plants. Ecology limited the application period to daylight hours during April 15 through June 30 and only one application per season per treated area. The application window occurs after the herring-spawning season in Willapa Bay, but is an optimal time for germination and rapid growth of *Z. japonica*. The application window is also within the

work windows set by WDFW for their regulatory Hydraulic Project Approval Program to protect fish life. To avoid potential overlap with pesticide applications to control burrowing shrimp, this permit will not allow discharge of other pesticides to commercial clam beds on the four days before and after imazamox application. Limiting the treatment to one application per season, helps reduce the amount of herbicide applied per area and may reduce the potential for *Z. japonica* to become resistant to imazamox.

To help control non-target impacts to nearby organisms through any spray drift that may occur through treatment activities, Ecology prohibited the aerial application of imazamox and limited ground broadcast applications to times when the wind speed is 10 miles per hour or less.

To help limit impacts to non-target *Z. marina* populations off the commercial clam bed property, Ecology imposed a 10-meter buffer along property boundaries that are part of the treatment site. Ecology imposed the buffers along property boundaries because information and photographs from test trial plots of imazamox showed occasional damage to adjacent *Z. marina* plants seaward from these treated trial sites, particularly in drainages. Direct application of imazamox into any drainage that contains *Z. marina* and is moving water off the treatment site is not allowed.

Ecology has asked the Willapa Grays Harbor Oyster Growers Association to complete a study to determine what buffer width is necessary to protect off property *Z. marina* (Appendix B). The results of that study along with the monitoring required in the permit (permit special condition S5) will be used by Ecology to consider modification of the permit three years after the date of issuance (permit special condition S1.A). Until the permit is modified, to reflect the results of the buffer validation study and the permit monitoring a buffer distance of 10m will be required on all treated clam beds.

Since *Z. japonica* beds typically lie at higher tidal elevations than do *Z. marina* plants, incoming tides will tend to submerge *Z. marina* before inundating treated *Z. japonica* beds. This will help dilute and lower imazamox water concentrations around nearby downslope *Z. marina* beds and imposing a 20m buffer around the property line should protect these plants from imazamox damage.

Studies of many aquatic plant species and many aquatic herbicides have demonstrated a relationship between exposure (time exposed to a chemical), water herbicide concentration, and plant response. With short duration exposures, even high herbicide concentrations may not cause impacts to normally sensitive species. The leading edge of the incoming tide during a 2012 study carried imazamox concentrations as high as 83 ppb, but the duration of the exposure was short (based on dilution data from imidicloprid and imazamox experiments in Willapa Bay). While concentration/time studies have not been done for imazamox and *Z. marina*, the Clearcast® label allows treated water to be used for irrigation purposes when imazamox concentrations are ≤ 50 ppb. This indicates that the manufacturer did not perceive any liability risk from allowing imazamox treated water at this concentration or lower to be used to irrigate terrestrial plants. Given the large tidal ranges in Willapa Bay, Ecology expects that contact of *Z. marina* with concentrations higher than 50 ppb will be transitory, particularly with the imposition of 10 m

buffers. However, to check for any sub-lethal impacts of herbicide exposure, Ecology requires documentation of unusual plant growth or appearance of *Z. marina* in its study requirements.

To further limit impacts to *Z. marina* growing in drainages on a commercial clam bed, Ecology does not allow any direct application into these waters if there is *Z. marina* present.

Treated acreages are likely not completely contiguous, but rather consist of commercial clam beds from different areas within the estuary. Treatment can occur over a two and a half month time period so effects should be staggered. Growers expect that the acreage treated each year will decline as beds are treated and go into clam-growing production.

ANNUAL PUBLIC NOTICE AND SHORELINE POSTING

Notification and Posting Requirements

The requirement of public posting in the proposed permit is consistent with posting and notification requirements in other aquatic pesticide permits. Ecology considered input from interested parties and Permittees when developing posting and notification requirements in its aquatic pesticide permits. Ecology based these requirements on its BPJ and the public's right-to-know.

The intent of notification is to make people aware of those activities taking place that have the possibility of affecting them. The public has the right to know about possible chemical applications so they can make informed decisions about limiting their exposure. Under this permit, treatment will typically occur on privately owned tidelands used for commercial clam farming at a time when *Z. japonica* beds are exposed by the low tide. It is unlikely that public exposure to treated plants on these private tidelands would occur. Even if there were exposure, concentrations of imazamox carried on the leading edge of the flood tide should be under the maximum in-water label rate used when treating freshwater lakes. In freshwater applications, people may swim and fish in waters treated with imazamox immediately after application. There is a drinking water tolerance of 50 ppb for humans and 500 ppb for livestock, but because it is brackish, Willapa Bay water is not potable. Regardless of the lack of use restrictions associated with the use of imazamox, Ecology requires Permittees to post all corners of the treatment site and will publish all Permittees annual pre-treatment plans 30-days prior to the first application of the season on the *Z. japonica* Management on Commercial Clam Beds in Willapa Bay website. Individuals wishing to prevent any contact with treated water or beds could avoid the area. Because imazamox has minimal human health risks, there are no water use restrictions in Willapa Bay, including consumption of food items such as fish and shellfish. This means that humans can consume shellfish from treated beds the day of treatment, if they wanted to. Based on low toxicities to mammals and lack of use restrictions combined with low potential for exposure, Ecology does not perceive any human health risks from the use of imazamox to treat *Z. japonica* in Willapa Bay.

SPILL PREVENTION AND CONTROL

WAC 173-226-070 allows Ecology to place permit conditions to prevent or control pollutant discharges from runoff, spillage or leaks, sludge or waste disposal, or materials handling or

storage. It also allows Ecology to require the use of BMPs that includes schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of the waters of the state. BMPs also include treatment requirements, operating procedures, and practices to control runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. The Permittee must be prepared to mitigate for any potential spills and, in the event of a spill, perform the necessary cleanup, and notify the appropriate Ecology regional office (see RCW 90.48.080, and WAC 173-226-070).

S5. MONITORING

RCW 90.48.260 gives Ecology the authority to establish inspection, monitoring, entry, and reporting requirements. WAC 173-220-210 gives Ecology the authority to require monitoring of treated waters to determine the effects of discharges on surface waters of the state.

With the exception of certain parameters (pH, temperature, alkalinity), Ecology requires that all monitoring data be analyzed and prepared by a laboratory registered or accredited for the active ingredient under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

Monitoring

Permittees must record the amount of pesticide active ingredient they use at each site, and the amount of acreage treated to Ecology in an annual report. Measurement of the distance that herbicidal effects are seen going into the buffer as well as photographs will be required in the annual report. The number of measurements and photographs taken will be dependent on the acreage treated (permit special condition S5.A). These measurements will help to provide verification that the 10m property line buffer is effectively protecting off-site *Z. marina* from imazamox applications on commercial clam beds.

Buffer Validation Study

Because this is the first permit issued for *Z. japonica* treatment in a marine/estuarine environment, Ecology has asked the Willapa Grays Harbor Oyster Growers Association (WGHOGA) to conduct a study to determine an effective buffer distance that will protect *Z. marina* located on properties adjacent to the treatment site. Ecology expects the WGHOGA to follow the buffer validation study methodologies outlined in Appendix B of this fact sheet. Working with academia and natural resource scientists from several agencies, Ecology designed the study protocols. To ensure that the study would provide statistically significant data Ecology partially funded an evaluation of the proposed study design, which was performed by Dr. Chris Grue from the University of Washington School of Aquatic and Fisheries Sciences (Grue et. al. 2013). The Buffer Validation Study should adequately characterize the following:

- Concentration and degradation of imazamox in sediment within treated sites.
- The appropriate buffer distance for imazamox treatments to protect non-target, offsite *Z. marina* plants located on adjacent properties.

Because imazamox is of low toxicity to animal species, and imazamox concentrations will be diluted soon after application, Ecology will not require monitoring for impacts to animals.

Based on previous trials of imazamox conducted under experimental use permits and the water quality data included in the imazamox review section of this document, Ecology does not expect significant damage to occur to *Z. marina* plants adjacent to treated clam beds. However, because these trials occurred on test plots of less than one acre, Ecology has asked for the buffer validation study to determine an effective buffer width to protect *Z. marina* located on adjacent properties. Ecology will require samplers to note any changes to *Z. marina* growth habits such as twisted or club-like growth or yellow or brownish coloration.

Testing sediments within the treated study sites at 24-48 hr post treatment and 30 days post treatment, will characterize the persistence of imazamox within the treated sediment. The requirement for taking a second sediment sample at 30 days will be suspended if the result of the first sediment test (24-48hr post treatment) is at or below 50µg/L. Imazamox, applied according to the FIFRA label only exceeds the EPA's LOC for vascular plants. According to the SePro Clearcast label, water treated with imazamox can be used for irrigation once the level of imazamox is less than or equal to 50ppb (50µg/L). When the level of imazamox in sediments falls to 50 µg/L or less, it is not expected to have an herbicidal effect on vascular plants.

The Buffer validation Study details and statistical analysis methods are included in Appendix B – Buffer Validation Study.

Permit monitoring results and results from the buffer validation study will be used to make a decision on whether to modify the permit to allow continued discharge of imazamox after the third year of permit issuance (see permit special condition S1.A). Based on monitoring and study results, Ecology may modify the permit to allow continued application of imazamox with appropriate changes to the buffer distance requirement. If the buffer validation study is not completed at the end of three years Ecology may not modify the permit to allow continued discharge of imazamox.

References

Grue, C.E., J.M. Grassley, and L. Conquest. 2013. Evaluation of Sampling Design for Monitoring Impacts of the Control of Exotic Eelgrass on Native Eelgrass in Willapa Bay, Washington. Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle, WA. 27 pp.

S6. Records

Ecology based this permit condition on its authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-226-090). Applicators must keep all records and documents required by this permit for five years. If there is any unresolved litigation regarding the discharge of pollutants by the Permittee, they must extend the period of record retention through the course of the litigation (WAC 173-226-090).

S7. REPORTING

Special condition S7 of the permit contains specific conditions based on Ecology's authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-226-090).

Report Submittal

Permittees meet part of their reporting requirements through annual treatment reporting. Permittees must submit their signed annual reports to Ecology by December 31 of each year.

Annual Pre-Treatment Plan

The pre-treatment plan includes maps and acreages proposed for treatment during the upcoming season.

Annual Report

The annual post-treatment report summarizes the amount of imazamox (in pounds of active ingredient) used during the course of each treatment season per coverage and locations where imazamox was used. All monitoring results are included in the annual report.

Noncompliance Notification

WAC 173-226-080 (1) (d) states that a discharge of any pollutant more frequently or at a level in excess of that authorized is a permit violation. Ecology requires that if a Permittee violates permit conditions, it must take steps to stop the activity, minimize any violations, and report those violations to Ecology. For pesticide applications authorized in the permit, applicators must report violations to the Aquatic Pesticide Permit Manager and the Regional Spills Hotline (ERTS Hotline) within 24 hours. This allows Ecology to determine if more action is necessary to mitigate the permit violation.

GENERAL CONDITIONS

Ecology bases the General Conditions on state and federal law and regulations.

DUTY TO REAPPLY

All NPDES permits require Permittees to reapply for coverage 180 days prior to the expiration date of the general permit in accordance with 40 CFR 122.21 (d), 40 CFR 122.41(b), and WAC 183-226-220(2).

PERMIT ISSUANCE PROCEDURES

Permit Modifications

Ecology may modify this permit to impose new or modified numerical limits, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters. Ecology would base any modifications on new information obtained from sources such as inspections, imazamox monitoring, or Ecology-approved reports. Ecology may also modify this permit because of new or amended state or federal regulations. Ecology may terminate the permit if monitoring shows significant adverse impacts to non-target species from *Z. japonica* treatments using imazamox.

Recommendation for Permit Issuance

The general permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. Ecology proposes to issue this general permit for five (5) years.

APPENDIX A: DEFINITIONS

All definitions listed below are for use in the context of this permit only.

303(d) List: Means the list of water bodies in Washington State that do not meet the current water quality standards set in Chapter 173-201A WAC.

Action threshold: The density or number of individuals in a pest population that trigger management activities.

Active ingredient: The ingredient(s) in a pesticide product that provides the pesticidal effects.

All known, available, and reasonable methods of prevention, control, and treatment (AKART): A technology-based approach to limiting pollutants from discharges. Described in chapters 90.48 and 90.54 RCW and chapters 173-201A, 173-204, 173-216 and 173-220 WAC.

Applicant: The aquatic licensed pesticide applicator and sponsor applying for permit coverage.

Aquatic License: Means as defined in WAC 16-228-1545(3)(u).

Beneficial uses: As defined in WAC 173-201A-200.

Commercial clam beds: Marine or estuarine areas where clams (excluding geoduck and oysters) are raised and harvested for commercial sale under a current Washington State business license.

Direct Supervision: Means as defined in RCW 17.21.020(13).

Discharge: The addition of any pollutant to a water of the state.

Discharge Management Plan: A plan that documents intended pest management strategies based on action thresholds using the principles of *integrated pest management*.

Experimental Use Permit: Federal and state permits that allow the use of unregistered pesticides in the context of research and development for registration of the pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) Section 3, or for registration of a new use of a currently registered pesticide under FIFRA Section 3.

The Washington State Department of Agriculture would issue experimental use permits for aquatic applications limited to a maximum of 1.0 acre in size.

The U.S. Environmental Protection Agency would issue experimental use permits for aquatic applications that may exceed 1.0 acre in size.

Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): A set of EPA regulations that establishes uniform pesticide product labeling, use restrictions, and review of new pesticides.

General Permit: A permit that covers multiple discharges of a point source category within a designated geographical area, in lieu of individual permits being issued to each discharger.

Herbicide: Any substance or mixture of substances intended to prevent, destroy, repel, or mitigate any weed or other higher plant (see chapter 17.21.020 RCW).

Individual permit: A discharge permit specific to a single point source or facility.

Integrated Pest Management: RCW 17.15.010 defines integrated pest management to mean a coordinated decision-making and action process that uses the most appropriate pest control methods and strategy in an environmentally and economically sound manner.

Marker dyes: Colorants sprayed onto the targeted weed along with the herbicide to mark the areas already treated.

Notice of Intent (NOI): The application form that Ecology specifies the applicant must use to apply for permit coverage.

Noxious weed: means a plant that when established is highly destructive, competitive, or difficult to control by cultural or chemical practices. RCW 17.10.010

Permittee: An aquatic licensed pesticide applicator with coverage under this permit.

Pesticide: Means as defined in RCW's 15.58.030(31) and 17.21.020(36)

Pesticide Applicator: An individual licensed by Washington Department of Agriculture under chapters 17.21 RCW and 16-228 WAC to apply pesticides.

Pollutant: Means any substance discharged that would alter the chemical, physical, thermal, biological, or radiological integrity of the waters of the state or would be likely to create and nuisance or renders such waters harmful, detrimental, or injurious to the public health, safety, or welfare, or to any legitimate beneficial use, or to any animal life, either terrestrial or aquatic. Pollutants include, but are not limited to the following: dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, pH, temperature, total suspended solids, turbidity, color, biological oxygen demand, total dissolved solids, toxicity, odor, and industrial, municipal, and agricultural waste.

Sensitive, threatened, or endangered:

Sensitive: Any species that is vulnerable or declining and could become endangered or threatened in the state without active management or removal of threats.

Threatened: Any species likely to become endangered in Washington within the foreseeable future if factors contributing to its population decline or habitat degradation or loss continue.

Endangered: Any species in danger of becoming extinct or extirpated from Washington within the foreseeable future if factors contributing to its decline continue. Populations of these species are at critically low levels or their habitats have been degraded or depleted to a significant degree.

Sponsor: An individual entity in the business of commercial production and sale of clams who has the legal authority to make the decision to apply herbicide to its owned or leased clam beds.

State Environmental Policy Act (SEPA): Chapter 43.21C RCW and Chapter 197-11 WAC.

State experimental use permit: A permit issued by WSDA that allows the use of pesticides that are not registered or labeled for a particular use pattern for the purposes of research and development.,

Surface waters of the state of Washington: Means all waters within the geographic boundaries of the state of Washington defined as “waters of the United States” in 40 CFR 122.2, and all waters defined as “waters of the state” in RCW 90.48.020 excluding underground waters. These include lakes, rivers, ponds, streams, inland waters, wetlands, and all other fresh or brackish waters and water courses within the jurisdiction of the state of Washington, plus drainages to those surface waters.

Treat: To apply a pesticide to a pest population.

Washington Pesticide Application Act: Chapter 17.21 RCW.

Washington Pesticide Control Act: Chapter 15.58 RCW.

Zostera japonica: A seagrass species in the family Zosteraceae listed as a Class C noxious weed in Washington.

In the absence of other definitions set forth herein, the definitions set forth in 40 CFR Part 403.3 or in chapter 90.48 RCW apply.

APPENDIX B –BUFFER WIDTH STUDY REQUIREMENTS

The purpose of this study is to determine:

- The effective buffer width for preventing off property impacts to *Z. marina* after treatment of commercial clam beds with imazamox.
- The concentration and rate of imazamox degradation in sediment within treated sites.

The duration of the study:

- The study will be complete when a studied buffer width returns a determination of non-significance for the stem density metric.

Imazamox Concentration in Sediments

All samples must be analyzed by a laboratory registered or accredited under the provisions of *Accreditation of Environmental Laboratories*, Chapter 173-50 WAC.

1. Collect composite sediment samples from three treated sites for analysis of imazamox residues 24- 48 hours after the application of imazamox. (Laboratory analysis must have a quantitation limit below 50ppb)

If the imazamox residue concentration is above 50µg/kg (50ppb), then a second composite sample must be taken approximately 30 days post application. The second set of composite samples must come from approximately the same location as the first samples and must be of similar sediment type (e.g. sandy, gravelly, loamy, etc). The sediment type must be categorized from each site, treated and reference, using ASTM Protocol D422 (<http://www.astm.org/Standards/D422.htm>), the standard test method for particle size of soils.

2. Collect the sediment cores for the composite samples from the approximate middle of the treated area.
3. Each composite sample must be made up of three sub-samples (sediment cores). Composite the top 2 cm from each core and follow the protocols, given by the accredited laboratory they have chosen, for preservation, handling, and chain of custody. The laboratory must homogenize the composite sample before analyzing it for percent moisture and total imazamox.

Imazamox Treatment Buffer Width Methodology

Purpose:

This study will determine what buffer distance will be protective of *Z. marina* located off the commercial clam bed property. The buffer distance that is determined to be protective may be incorporated as the required buffer distance in special condition S4.B of the *Zostera japonica* management on Commercial Clam Beds in Willapa Bay General Permit through modification of the permit by Ecology. Ecology designed the following sampling methodology with input from scientists in academia and government agencies charged with natural resource management.

Monitoring Site Selection:

Study proponents, in collaboration with Ecology, must select three treated sites and three untreated reference sites to monitor for imazamox effects on *Z. marina*. Reference sites are necessary to ensure that any changes in measured *Z. marina* metrics are due to imazamox application and not uncontrollable environmental effects.

Treated sites selected for monitoring and reference sites must be of similar size and sediment type. They must also contain *Z. marina* at the outer edge of the buffer area. Selected treated sites must be located so the incoming tide will wash imazamox off treated areas toward *Z. marina* plants located immediately beyond the buffer. Reference sites must be a minimum of 60m from the treated sites and approximate the conditions at the treated site.

Selection of monitoring sites with dense and homogenous *Z. marina* at the edge of the buffer is best for reliable results.

Sampling Event Timing:

The study proponent must conduct two sampling events for each year of the study:

1. One sampling event 1-3 days prior to treatment.
2. A second sampling event approximately 30 days after herbicide application.

Note: Dye must be used to determine the direction of tidal flow to inform the decision of where best to place transects to capture the worst-case scenario of imazamox interception by off-site *Z. marina*.

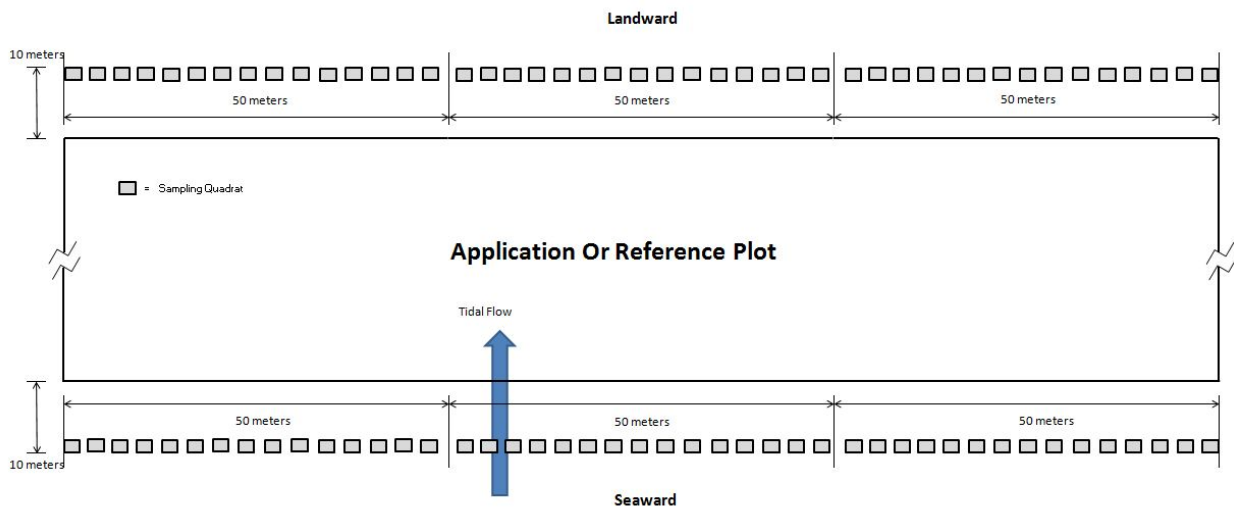
To allow for appropriate tidal cycles, Ecology provides some latitude to adjust the second sampling interval (e.g., allow sampling at 28 or 32 days instead of 30 days). Ecology also allows sampling to be done within a three-day time window within each sampling period (e.g., start sampling at 28 days and finish sampling at 31 days post-treatment). Sampling must be done on foot on tides that uncover the entire monitoring site. The samplers must be trained to identify the differences between *Z. japonica* and *Z. marina*.

Sampling Transect Location: See Figure 3

1. The study proponent must set up three in-line transects for the seaward side and three in-line transects for the shoreward side of both the treated and reference sites. Each transects must be 50 meters in length and contain 15 quadrats. Reference sites should approximate the site conditions on the treated sites (e.g. elevation, *Z. marina* density, etc).
2. Transect set 1 must be on the shoreward side of the treated area where incoming tide water's will inundate the treated site before washing over *Z. marina*.
3. Transect set 2 must be on the seaward side of the treated area where *Z. marina* will be exposed to water containing imazamox flowing off the treated site as it dewateres at low tide.

4. Each transect must be located parallel to the seaward and shoreward edge of the treatment and reference site at a distance of 10 meters.
5. End points of each transect line must be permanently fixed for the duration of the study at each treated and reference site. End-points must also be marked using a GPS unit. Endpoints must be fixed to ensure that the same transect lines are monitored for the second monitoring period at 30 days after treatment. Options for fixing the end-points include, but are not limited to, white PVC posts or helical anchor screws.
6. To mark the transect line for monitoring, place a post or other visible marker at each end of the transect line and stretch a 50 m measuring tape between the posts.
7. Along each transect line (marked by the measuring tape) the Permittee must sample 15 quadrats. The inner diameter of the quadrats must be 0.25 square meters. Quadrats must be spaced equidistantly from each other.
8. The location of each quadrat must be marked so that the same quadrat is monitored during the second monitoring period at 30 days after treatment.

Figure 1: Sampling Transect Locations. All transects are 50m in length and contain 15 quadrats.



Sample Data Collection:

For each quadrat, the Permittee must collect and record the following data on *Z. marina*:

1. The number of stems using method in Appendix C.
2. Estimate the percent coverage (0-100%). Percent cover will be determined by the method provided in Appendix C.
3. Make note of any apparent characteristics associated with herbicide damage (e.g. twisted or club-like growth).

On 20% of the quadrats, selected at random, take 1 overhead photograph. Each photograph must be labeled by placing a card with the date, sample site, transect distance (10, 15, or 20m) and quadrat number within the photographed area. Photographs must be archived for future reference.

Data Submittals:

1. *Z. marina* quadrat sampling data
2. Photographs from 20% of the quadrats
3. Notes about any sub-lethal impacts to *Z. marina*.

Study Report:

1. The Annual Study Report is required only for as long as it takes to complete the study.
2. The report must include these elements:
 - a. Executive summary
 - b. Study objectives
 - c. Methodology (e.g., sample locations, sample handling, laboratory methods, statistical tests)
 - d. Summary of all imazamox study treatments made in Willapa Bay each season (maps, locations, acres, and dates treated if monitoring as a group)
 - e. Results (data summary of the required study parameters)
 - f. Discussion (determination of significance and decision making matrix)
 - g. Conclusions
 - h. References
 - i. Signatory page, with signatures of all Permittees that are study participants.
 - j. Appendixes with raw data (preferred in electronic format)

Data and reports must be submitted annually to Ecology by December 31st. Hand-delivery or mailing is accepted. Ecology's mailing address is:

Department of Ecology
Water Quality Program
Attn: Aquatic Pesticide Permit Manager
PO Box 47696
Olympia, WA 98504-7696

Data Evaluation:

Ecology will form a committee composed of agency scientists and scientists from other state natural resource agencies to help evaluate study results and to help guide the next years study requirements if necessary.

Data Analysis:

A paired T-test should be the basis for all data analysis. The change in the stem density metric in each specific quadrat from one sample event to the next is the basic unit of analysis. Examine whether a decrease in the stem density metric occurred and the size of the change. Changes from treated plots versus reference plots must be analyzed. Changes in percent coverage between reference and treated sites and photographs will help determine any non-lethal impacts to *Z. marina* due to imazamox application.

The null hypothesis to be tested is that any change in the measured *Z. marina* stem density pre- to post-treatment will be similar to changes in the untreated reference plots. If, after taking reference sites into account, differences are statistically significant, with a measured reduction in stem density greater than 20 percent, at an alpha of 0.10 and a power of 0.80, Ecology will determine that ecologically significant changes in measured *Z. marina* populations in Willapa Bay are due to imazamox treatment. However, the goal is no net loss of *Z. marina*, due to imazamox application, outside of the treatment locations. Ecology will consider stem density reductions of 20 percent or less to be statistically non-significant. If a studied buffer width results in a determination of statistically non-significant then the study is complete.

Ecology recognizes that natural variance in *Z. marina* populations may make it difficult to measure a 20% change in stem density. For this reason, Ecology has set the requirements in this section as the minimum amount of sampling required to conduct the study. For each location that the study proponent intends to use for this study an analysis of variance should be conducted to determine what the sampling intensity should be so that a 20% change in *Z. marina* stem density can be measured. The study proponent may choose to include more than three paired sites (treatment and reference) or take measurements at more than 15 quadrats per transect if the minimum sampling requirement will not allow them to detect a 20% change in *Z. marina* stem density. If the study proponent is not able to detect a 20% change in *Z. marina* stem density during any part of this study, they must repeat that portion of the study in the following year. Any additional monitoring must be included in the annual monitoring report.

It is possible that the 10m buffer outlined in the study above may not be protective of off-site *Z. marina*. If the study proponent chooses, they may study additional buffer widths using the same methodology outlined above. Alternative buffer distances may be studied concurrently with the 10m buffer distance or may be studied in subsequent years if the 10m buffer results in significant impacts to *Z. marina*.

APPENDIX C – COVERAGE AND SHOOT DENSITY DETERMINATION

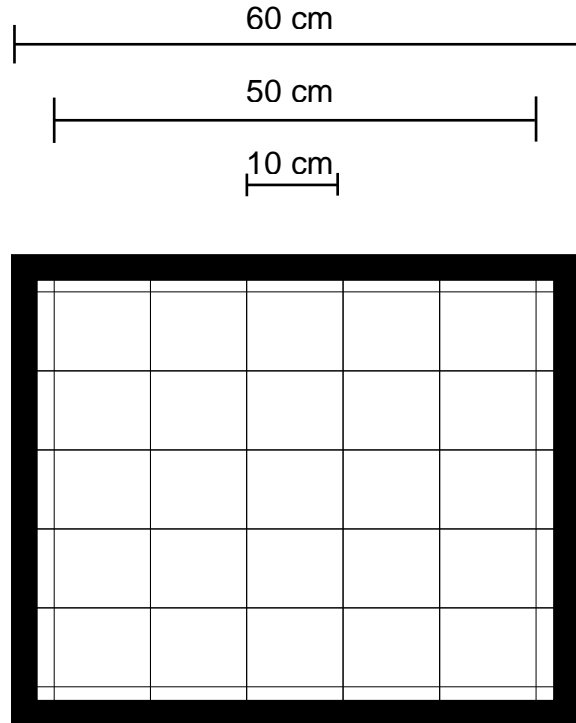


Figure 2. Sampling frame (0.25 m²) used to determine percent cover and shoot density of *Zostera marina*. Cover was quantified by counting the number of line intersections ($n = 36$) formed by the 25 10-cm cells under which live (green) *Z. marina* was present (potential values = 0-36 with 36 = 100% cover). Shoot density (number live shoots) was determined by counting all present within the 0.25 m² frame (outer line boundary).

Cover was quantified by counting the number of line intersections ($n = 36$) formed by the 25 10-cm cells within each 0.25 m² sampling frame (Fig. 2) under which live (green) *Z. marina* was present (potential values = 0-36 with 36 = 100% cover). Shoot density (number live shoots) was determined by counting all present within the 0.25 m² frame (outer line boundary; Fig. 2).

Figure and methods taken from: Grue, C.E., J.M. Grassley, and L. Conquest. 2013. Evaluation of Sampling Design for Monitoring Impacts of the Control of Exotic Eelgrass on Native Eelgrass in Willapa Bay, Washington. Washington Cooperative Fish and Wildlife Research Unit, University of Washington, Seattle, WA. 25 pp.

APPENDIX D: PUBLIC INVOLVEMENT INFORMATION

All comments about the proposed permit must be received or postmarked by 5:00 p.m. on February 15, 2014 to be considered.

Ecology has tentatively determined to issue the *Zostera japonica* on Commercial Clam Beds on Willapa Bay General Permit as identified in Special Condition S1. Permit Coverage.

Ecology will publish a Public Notice of Draft (PNOD) on January 2, 2014 in the Washington State Register. The PNOD informs the public that the draft permit and fact sheet are available for review and comment.

Ecology will also email the notice to those identified as interested parties.

Copies of the draft general permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the Ecology offices listed below, may be obtained from Ecology's website, or by contacting Ecology by mail, phone, fax, or email.

Permit website: <http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html>

Ecology Headquarters Building Address:
300 Desmond Drive
Lacey, WA 98503

Contact Ecology:

Department of Ecology
Water Quality Program
Attn: Aquatic Pesticide Permit Manager
PO Box 47696
Olympia, WA 98504-7696

Nathan Lubliner
Email: nathan.lubliner@ecy.wa.gov
Phone: 360-407-6563
Fax: 360-407-6426

Submitting Written and Oral Comments

Ecology will accept written comments on the draft *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay General Permit and Fact Sheet. Ecology will also accept oral comments at the public hearing starting at 10:00 a.m. on February 1, 2014 at:

Willapa Harbor Community Center
916 W First Street
South Bend, WA 98586.

Comments should reference specific text when possible. Comments may address the following:

- Technical issues
- Accuracy and completeness of information
- Adequacy of environmental protection and permit conditions
- Any other concern that would result from the issuance of this permit.

Ecology prefers comments be submitted by email to Nathan.lubliner@ecy.wa.gov

Ecology must receive written comments (via email or postmarked February 15, 2014) no later than 5:00 p.m. on February 15, 2014.

Submit written, hard copy comments to:

Nathan Lubliner
Department of Ecology
PO Box 47696
Olympia, WA 98504-7696

You may also provide oral comments by testifying at the public hearing. Written comments will receive the same consideration as oral testimony.

Open House, Workshop, and Public Hearing

Ecology will hold an open house, workshop, and public hearing on the draft general permit at the location below. The public hearing provides an opportunity for people to give formal oral testimony and comments on the draft permit. The open house and workshop, held immediately prior to the public hearing, will explain the special conditions of the *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay General Permit.

Open House, Workshop, and Public Hearing

February 1, 2014 (10:00 a.m.)
Willapa Community Center
916 W First Street
South Bend, WA 98586

Issuing the Final Permit

Ecology will make a determination whether to issue the final permit after it receives and considers all public comments. Ecology expects to make a decision on issuing the new general permit in spring 2014. It will be effective one month after the issuance date.

For further information, contact Nathan Lubliner at nathan.lubliner@ecy.wa.gov, or 360-407-6563, or by writing to Ecology at the Olympia address listed above.

APPENDIX E: APPEAL

This permit may be appealed to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of the final permit. The appeal process is governed by chapter 43.21B RCW and chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2) (also see glossary).

To appeal, the following must be done within 30 days of receipt of this permit:

- File the appeal and a copy of this permit with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.
- Serve a copy of the appeal and this permit on Ecology in paper form - by mail or in person (see addresses below). **E-mail is not accepted.**

The appeal must also comply with other applicable requirements in chapter 43.21B RCW and chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
<p>Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503</p> <p>Pollution Control Hearings Board 1111 Israel RD SW Suite 301 Tumwater, WA 98501</p>	<p>Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608</p> <p>Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903</p>

APPENDIX F: RESPONSE TO COMMENTS

Look for the Response to Comments document on the *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay General Permit web page:

<http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html>.