ERRATA

For the Fact Sheet Addendum for the *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay NPDES and State Waste Discharge General Permit Draft Permit Modification

State of Washington
Department of Ecology

February 6, 2017

In the study cited in this fact sheet (Grue, Christian and Conquest, Loveday. 2015. *Impacts of Imazamox on Native Eelgrass Following Application to Control Exotic Eelgrass in Willapa Bay, Washington: An Evaluation of Buffer Width)* page 6 incorrectly states the application rate of imazamox to the test sites. The study incorrectly states that the treated beds received 11.5 - 11.7 oz active ingredient per acre. The treated beds received 11.5 – 11.7 oz of product (Clearcast®, SePRO Corporation, Carmel, IN) per acre. The effect of this was to overstate the amount of active ingredient applied to the treatment sites by more than eight (8) fold.

The following language replaces the redline language on page 5 of this fact sheet:
The treatment rate was below maximum allowed by the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) Label and reflected the actual use rates of 10 - 12 oz. per acre of product. An applied rate of 11.5 – 11.7 oz. per acre of product was used. The Clearcast® product used contains 12.1% imazamox (active ingredient) which means that an applied rate of approximately 1.4 oz of active ingredient per acre was used on the treated beds.

FACT SHEET ADDENDUM FOR THE *ZOSTERA JAPONICA* MANAGEMENT ON COMMERCIAL CLAM BEDS IN WILLAPA BAY NPDES AND STATE WASTE DISCHARGE GENERAL PERMIT

DRAFT PERMIT MODIFICATION

State of Washington
Department of Ecology

December 7, 2016

Permit Modification

The Washington State Department of Ecology (Ecology) is modifying the *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay General Permit. The permit is a joint National Pollutant Discharge Elimination System (NPDES) and State Waste Discharge General Permit. Ecology issued the permit April 2, 2014. It will expire May 2, 2019. This addendum supplements the January 2, 2014 Fact Sheet available at: http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html.

The permit covers the discharge of the herbicide imazamox used to control the non-native eelgrass, *Zostera japonica*, on commercial clam beds in Willapa Bay, WA.

This permit prohibits the discharge of imazamox after the third year of permit issuance and requires a permit modification to allow for continued discharge of imazamox. The scope of this permit modification is to implement the appropriate buffer width in the permit to protect off-site *Zostera marina* based upon the buffer validation study data.

To determine the appropriate buffer distance to implement in this permit, Ecology required that the Permittees conduct the Buffer Validation Study as described in Appendix B of the Factsheet. Based upon the study results, Ecology is modifying this permit to allow continued discharge of imazamox after the third year of issuance (Special Condition S1.A).

By removing the prohibition on the discharge of imazamox after the third year of permit issuance, Ecology is maintaining the 10 meter buffer as required in permit Special Condition S4.B.

Summary of permit modifications

S1. Permit Coverage
Ecology removed language (Red strikethrough) from this section to allow for the continued discharge of imazamox after the third year of permit issuance:

S1. PERMIT COVERAGE

A. Activities Covered Under This Permit

This general permit covers all ***Zostera japonica*** (*Z. japonica*) management activities that result in a ***discharge*** of ***aquatic herbicides*** containing the ***active ingredient*** imazamox and ***marker dyes*** from ***treatment*** of ***commercial clam beds*** (excluding geoduck culture) to ***surface waters of the state of Washington***.

This permit will be issued for a duration of 5 years from the effective date. ~~The application of aquatic herbicides and marker dyes is prohibited after the third year. Based on study (Fact Sheet Appendix B) and monitoring results, the Washington State Department of Ecology (Ecology) will make a determination to modify the permit to allow continued application of aquatic herbicides or terminate the permit after the third year.~~

Permittees may apply chemicals not listed in this permit on a limited basis in the context of a research and development effort under the jurisdiction of the Washington State Department of Agriculture through the issuance of a ***state experimental use permit*** (EUP). Project proponents must obtain coverage under this general permit for any projects conducted under a state EUP (special condition S4.H).

S7. Reporting

S7.B.2.b. - Added Language (Blue):

B. Annual Report

1. Permittees must submit an annual report to Ecology by December 31 each year, regardless of whether treatment or monitoring occurred.

2. The annual report must include:
   a. Locations of acreage treated, including GPS coordinates of each corner of the area.
   b. The distance from the property, parcel or lease boundary that treatment occurred for each edge of the treated site. If the treatment occurred more than 50 m from the property, parcel or lease boundary, the Permittee only needs to indicate that treatment occurred more than 50 m from the boundary. Indicate where a 10 m buffer was not required due to cooperation with an adjacent commercial shellfish grower as allowed by Special Condition S4.B.
   c. The size, in acres, of each treated area.
   d. Date treatment occurred on each area treated.
   e. The amount of active ingredient applied to the treated area.
   f. The results of the monitoring required in special condition S5.A.

Rationale for Removing the Prohibition on Discharge after the 3rd Year of Permit Issuance (Permit Special Condition S1.A)

Results and data were submitted for the Buffer Width Study, as required in Appendix B of the January 2, 2014 *Zostera japonica* Management on Commercial Clam Beds in Willapa Bay NPDES General Permit Factsheet.
(http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass/docs/01022014ZjDraftFactSheet.pdf)

Summary of Buffer Width Study Results
Buffer width study results can be found on the permit website:
http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html

Three (3) studies were submitted in support of setting an appropriate buffer width based on the study requirements in Appendix B of the Factsheet.

1. **Impacts of Imazamox on Native Eelgrass Following Application to Control Exotic Eelgrass in Willapa Bay, Washington: An Evaluation of Buffer Width.**
   Grue and Conquest. 2015.

- ~~The treatment rate was below maximum allowed by the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) Label (16 oz. per acre) and reflected the actual use rates of 10-12 oz. per acre. An applied rate of 11.5 oz. per acre was used.~~
- Imazamox concentrations in the sediment ranged from 3.2 ppb to below detection limit.
- Upper Elevation Transects
    - Average change in leaf percent coverage of the treated beds relative to the control beds 30 days after treatment: -13.3%
    - Average change in stem density of the treated beds relative to the control beds 30 days after treatment: 4.3%
- Lower Elevation
    - Average change in leaf percent coverage of the treated beds relative to the control beds 30 days after treatment: -22.6% (not statistically significant)
    - Average change in stem density of the treated beds relative to the control beds 30 days after treatment: -0.8%

2. **Impacts of the Control of Exotic Eelgrass on Native Eelgrass in Willapa Bay, Washington. Evaluation of Property Buffer Width One-year Post-Application.** Novak, Grant. 2016. Confluence Environmental Company.

    - No statistically significant reductions in native eelgrass stem density were detected 365 days after treatment.
    - Upper Elevation Transect 365 Days Post Treatment versus Pre-treatment
        - Mean change in stem density: 8.6%
    - Lower Elevation 365 Days Post Treatment versus Pre-treatment
        - Mean change in stem density: -6.9%

3. **Supplemental information and 2016 monitoring on the Buffer Validation Study for the use of imazamox to control Japanese eelgrass in Willapa Bay.**
   Patten, Kim. 2016. WSU Long Beach Research and Extension Unit

    - Average percent cover of the 19 most affected quadrats was 61% in May 2014. Following treatment, it was reduced to 39% in June 2014, and then increased to 81% cover in May 2016.
    - Stem density in these 19 most affected quadrats declined from an initial density of 30 stems/0.25 m2 before treatment to 23 stems/0.25 m2 following treatment. It remained at that density when recounted in May 2016.

Conclusions from Buffer Width Study Results

Sediment: Imazamox residues in the sediments were below the 50 parts per billion (ppb) cutoff in the study for additional testing. Imazamox concentrations below 50 ppb are not expected to have herbicidal effects.

Z. marina **Stem Density:** Measured reductions in stem density, due to imazamox treatment, did not exceed the 20% reduction threshold set in the Buffer Width Study (Grue and Conquest 2015).

***Z. marina* Percent Leaf Cover:** Reduction in the percent leaf cover metric did not exceed 20% for the upper elevation transects of the treated sites. On the lower elevation transects percent leaf cover was reduced by 22.6% (Grue and Conquest 2015).

The percent leaf cover metric was included to identify sub-lethal impacts to *Z. marina* due to imazamox treatment. Though stem density was not as affected as leaf percent cover, there was concern that the sub-lethal impact, resulting in a reduction of leaf cover, may lead to plant lethality over time. Due to this concern, additional studies were conducted to determine if the reduction in leaf percent cover resulted in a reduction in stem density, one and two years post treatment.

The reduction in stem density one year after treatment was below the 20% threshold identified in the Buffer Width Study (Novak 2016). Stem densities in the 19 most affected quadrats of the lower elevation of the treated sites remained consistent between 30 days post treatment and approximately 730 days post treatment (Patten 2016).

Follow-up studies by Confluence Environmental and Dr. Kim Patten do not indicate that the sub-lethal impacts of imazamox application on *Z. japonica*, measured as a reduction of leaf percent cover, resulted in plant mortality as measured by a reduction in stem density.

Comments from Agencies Reviewing Study Data

Ecology solicited expertise and input in reviewing the Buffer Width Study data from Washington Department of Natural Resources (DNR), Washington Department of Fish and Wildlife (WDFW) and National Oceanic and Atmospheric Administration - National Marine Fisheries Service (NOAA-NMFS). The scope of this permit modification is to implement the appropriate buffer width in the permit to protect off-site *Zostera marina* based upon the buffer validation study data.

Below is a summary of the comments and recommendations from the review of the Buffer Width Study data. Agency comments can be viewed here: http://www.ecy.wa.gov/programs/wq/pesticides/eelgrass.html.

Comments

Comments provided to Ecology indicated that the 10m buffer in the permit is adequate and that there was not strong evidence to modify the buffer distance in the permit. There was concern that the small sample size in the buffer validation study makes the conclusions about an adequate buffer distance inconclusive. Additional concerns with the buffer validation study were that the potential flow of tidal inundation onto the treatment bed was not perpendicular to the beach and that impacts to *Ruppia maritima* were not measured.

Recommendations

The following recommendations were received from the reviewing agencies:

1. Report the distance from the 10 m buffer edge where spraying occurred.
2. Monitoring should occur when permittees treat within 12 m of the property boundary.

3. Observation of *R. maritima* should be required when reporting of *Z. marina* is required.
4. Impacts to *Z. marina* or *R. maritima* beyond the 10 m buffer must be reported, regardless of the distance from the 10 m property line buffer edge that direct spraying occurred.
5. Future studies on the buffer width should include an increase in sample size and greater range of environmental variability.
6. Additional studies should determine whether the 20% stem density reduction threshold used in the buffer validation study ensures continued biological function of the eelgrass bed.
7. Additional studies should test imazamox at the maximum application rate allowed by the product label.
8. Future studies should address preventing impacts to *Z. marina* that occur as a result of real applications, such as drainages and insufficient dry times.

Based upon this input Ecology is incorporating recommendation #1 into the permit through the changes to Special Condition S7 Reporting.

The purpose of the Buffer Width Study was to determine if the 10 m buffer, included in the permit, is protective of *Z. marina* off of the treatment site. The Buffer Width Study was not designed to inform the monitoring as required in Special Condition S5 of the permit. Changes to the monitoring section of the permit and additional requirements to conduct studies are out of scope for this permit modification. Proposed changes to the monitoring requirements of the permit will be considered during the permit re-issuance process, which is scheduled to occur in 2019.

Rationale for Adding the Reporting Requirement for the Distance of the Treatment Edge from the Property Boundary (Permit Special Condition S7.B.2.b)

When Permittees treat up to 10 meters from the property boundary they must conduct monitoring in accordance with permit Special Condition S5. In order for Ecology to determine compliance with this condition we need to know the distance from the property boundary that treatment occurred. The addition of the proposed language for reporting the distance from the property boundary that treatment occurred in permit Special Condition S7.B.2.b will allow Ecology to track compliance with the monitoring requirements in Special Condition S5.

Bibliography

Documents prepared after June 12, 2014 also identify information sources by the following 11 categories:

1. Peer review is overseen by an independent third party.

2. Review is by staff internal to Department of Ecology.

3. Review is by persons that are external to and selected by the Department of Ecology.
4. Documented open public review process that is not limited to invited organizations or individuals.
5. Federal and state statutes.
6. Court and hearings board decisions.
7. Federal and state administrative rules and regulations.
8. Policy and regulatory documents adopted by local governments.
9. Data from primary research, monitoring activities, or other sources, but that has not been incorporated as part of documents reviewed under other processes.
10. Records of best professional judgment of Department of Ecology employees or other individuals.
11. Sources of information that do not fit into one of the other categories listed.

References

Grue, Christian and Conquest, Loveday. 2015. *Impacts of Imazamox on Native Eelgrass Following Application to Control Exotic Eelgrass in Willapa Bay, Washington: An Evaluation of Buffer Width*. University of Washington: Washington Cooperative Fish and Wildlife Research Unit School of Aquatic and Fishery Sciences. [9]

Novak, Grant. 2016. *Impacts of the Control of Exotic Eelgrass on Native Eelgrass in Willapa Bay, Washington. Evaluation of Property Buffer Width One-year Post-Application*. Confluence Environmental Company. [9]

Patten, Kim. 2016. *Supplemental information and 2016 monitoring on the Buffer Validation Study for the use of imazamox to control Japanese eelgrass in Willapa Bay*. WSU Long Beach Research and Extension Unit. [9]