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Issuance Date:  
Effective Date:  
Expiration Date:

***Draft***  
**FISHERIES RESOURCE MANAGEMENT GENERAL PERMIT**

National Pollutant Discharge Elimination System and  
State Waste Discharge General Permit

**State of Washington**  
**Department of Ecology**  
Olympia, Washington 98504

In compliance with the provisions of  
Chapter 90.48 Revised Code of Washington  
(State of Washington Water Pollution Control Act)  
and  
Title 33 United States Code, Section 1251 et seq.  
The Federal Water Pollution Control Act (The Clean Water Act)

Until this permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this general permit are authorized to discharge in accordance with the special and general conditions that follow.

The Permittee must reapply for permit coverage on or before **DATE**, 180 days before the expiration of this permit if the Permittee intends to continue operations and discharges beyond the term of this permit.



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to permit webpage

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Water Quality Program Manager  
Washington State Department of Ecology

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## SUMMARY OF PERMIT REPORT SUBMITTALS

Refer to the Special and General Conditions of this permit for submittal requirements.

Permit Section	Submittal	Frequency	Due Date(s)
S1.D.	Zooplankton study	Once per permit cycle	within 3 years of permit issuance
G21.	Re-Application for permit coverage	Once per permit cycle	At least 180 days prior to the permit expiration date
S3.C.	Discharge Management Plan (DMP)	Once per permit cycle, or when DMP is updated	30days prior to first discharge conducted under this permit.
S5.A.	Notification of adverse incidents	As necessary	As necessary
S7.A.	Post-treatment report	Annually	December 31
S7.A.	Pre-treatment report	Annually	April 1
S7.E.	Noncompliance notification	As necessary	As necessary
S8.	Annual SEPA Process	Annually	Prior to Treatment
S.9.C.	Spill notification	As necessary	As necessary
G3.	Permit modification and revocation	As necessary	Within 14 days of request
G3.B.5.	Request for modification	As necessary	As necessary
G7.	Request for transfer of coverage	As necessary	As necessary

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## **SPECIAL CONDITIONS**

The text of this permit contains words or phrases in *bold and italics*. These words or phrases are the first usage in the permit and are defined in Appendix A.

### **S1. PERMIT COVERAGE**

This permit covers activities of the Washington Department of Fish and Wildlife (WDFW) used to manage fish populations in surface waters of the state. This general permit covers discharge wastes from aquatic *piscicide (rotenone)* applications and the discharge of potassium permanganate for the deactivation of rotenone.

WDFW may cooperate with state, county and municipal governments, and with private citizens to conduct fisheries management projects under coverage of this permit.

#### **A. Activities Covered under this Permit**

This permit allows the use of rotenone and potassium permanganate in *surface waters of the state of Washington* for fish management activities.

#### **B. Geographic Area Covered**

This general permit applies to the application of piscicide to waters of the state throughout the state of Washington. *Permittees* operating on federal lands may be covered under this permit provided that the Permittee follows any land management agreements and complies with the conditions below.

This permit does not apply to:

1. Federal lands where a federal agency provided funding, made the decision to apply piscicides, or is the entity applying piscicides.
2. *Indian Country* and *trust or restricted lands* except portions of the Puyallup Reservation as noted below.
3. Puyallup Exception: Following the Puyallup Tribe of Indians Land Claims Settlement Act of 1989, 25 U.S.C. §1773; this permit does apply to land within the Puyallup Reservation except for discharges to surface water on land held in trust by the federal government.

#### **C. Zooplankton Study**

The Permittee must complete the zooplankton study as outlined in Appendix C and submit a final report to Ecology by Insert Date, within three (3) years of the permit issuance date.

## **S2. PERMIT ADMINISTRATION**

Coverage under this general permit is available to the Washington State Department of Fish and Wildlife (WDFW) only.

### **A. How to Terminate Permit Coverage**

A Permittee may request termination of permit coverage by submitting a written request for permit coverage termination. The request for permit coverage termination must include the date that permit coverage termination becomes effective and must be signed by a WDFW representative according to General Condition G1.D.

The Permittee will continue to incur an annual permit fee unless it submits a written request for permit coverage termination. Once permit coverage is cancelled, the Permittee may no longer discharge rotenone or potassium permanganate to waters of the state unless it applies for, and gains coverage under this permit again.

## **S3. DISCHARGE LIMITS**

### **A. Compliance With Standards**

Other than through the temporary exceedance of water quality criteria allowed under Special Condition S3.B, application of liquid or powdered rotenone formulations, and potassium permanganate must not cause or contribute to a violation of the Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A), Ground Water Quality Standards (WAC 173-200), Sediment Management Standards (WAC 173-204) and human health-based criteria in the National Toxics Rule (40 CFR 131.36). Ecology prohibits discharges that do not comply with these standards.

### **B. Temporary Exceedance of Water Quality Criteria**

Temporary exceedance of water quality criteria are allowed under this permit provided the Permittee complies with the provisions of WAC 173-201A-410.

### **C. Discharge Management Plan (DMP)**

The Permittee must develop a DMP that addresses water bodies managed for sport fisheries and water bodies managed for native fish and habitat restoration. Required elements of the DMP are given in Appendix B.

The Permittee must submit the DMP to Ecology 30 days prior to the first discharge conducted under this permit. Mail the complete DMP to:

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

The Permittee must follow its DMP. Significant deviation from the DMP during *treatment* projects must be documented and submitted to Ecology along with the Permittee's annual report, with a statement that the DMP has been updated to account for the deviation in the future.

After the effective date of this permit, the Permittee must keep the DMP updated. The Permittee should update the DMP when significant project changes occur. The Permittee must keep an updated copy of the DMP at its business office and make it available upon request by Ecology or the public.

#### **D. Impaired Water Bodies**

The Permittee must not cause further impairment of any *303(d)-listed water body* as a result of the application of any piscicide. Permittees must get Ecology approval for treatments to water bodies on the 303(d) list for dissolved oxygen, phosphorous and nitrogen.

### **S4. The Application of Products**

The Permittee must comply with all the requirements on the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) product label. Permit requirements do not reduce the requirements on the FIFRA label.

#### **A. Pesticide Application Requirements**

The Permittee must ensure that:

1. The application or direct supervision of the application of piscicide and potassium permanganate is performed by an *aquatic licensed pesticide applicator*.
2. All pesticide applicators must have current training in the use of equipment necessary to apply piscicides correctly.
3. Appropriately trained personnel calibrate the application equipment prior to each application.

#### **B. Authorized Discharges**

1. Piscicide products must be labeled for use as a fish toxicant in the State of Washington at the time of treatment.
2. This permit allows the use of the active ingredient rotenone as a piscicide.
3. The use of liquid rotenone is only authorized for treatments in areas where the application of powdered rotenone in slurry form is not practical by pumper boat equipped with outboard motor. Waters typically treated with liquid formulations of rotenone include *flowing water* (e.g., rivers, streams, creeks), areas inundated with

*emergent vegetation*, thick *submerged vegetation*, shallow areas, and areas where boats cannot be transported or launched. WDFW must treat open water areas that are accessible by boat with powdered rotenone that is mixed with water and applied as slurry, as described in Special Condition S.10.B.

4. This permit authorizes the use of potassium permanganate to deactivate piscicide-treated waters when necessary to prevent damage to *non-targeted organisms* and to maintain water quality outside of the treatment area and *deactivation zone*. Other uses of potassium permanganate are not authorized.

Use of potassium permanganate to deactivate piscicide treated waters is required for the following situations.

- a. When a treated lake has an outlet, the outflow water must be deactivated.
  - b. When treating rivers and streams the water downstream of the intended treatment area must be deactivated.
5. Piscicides treatments may be applied by pumper boat, airboats, canoe, trucks, ATV's, backpack sprayer, *drip cans*, *gelatin/sand mixtures*, and under certain conditions by helicopter. Helicopters may be used for liquid rotenone application on water bodies where use of boats and backpack sprayers are not practical, such as remote lakes and streams.

### C. General Application Restrictions

The Permittee must avoid treatments that restrict public water use during the opening week of fishing season or during tribal fisheries, Memorial Day weekend, Independence Day weekend, and Labor Day weekend and must minimize treatments that restrict public water use during weekends.

## S5. NOTIFICATION AND POSTING REQUIREMENTS

### A. Ecology Notification Requirements for *Adverse Incidents* or Chemical Spills

The Permittee must immediately call Ecology headquarters or 1-800-645-7911 when they are aware of any of the following conditions occurring during or after treatment:

1. Any person(s) exhibiting or indicating any toxic and/or allergic response due to treatment.
2. Any non-targeted organisms exhibiting stress or dying outside of a treatment or neutralization area.
3. Any spill of chemicals covered under the permit that occurs into the water or onto land with a potential for entry into waters of the state.

## B. Notification and Posting Requirements

### 1. Residential and Business Notice Procedures

- a. WDFW must notify residents and businesses, within the area defined in S5.B.1.b, 14 to 45 days prior to treatment.
- b. Prior to the start of any treatment, the Permittee must notify all property owners, other than the Permittee, within one-quarter ( $\frac{1}{4}$ ) mile in each direction along the shoreline or bank of the water bodies affected by the piscicide treatment, including downstream waters treated with potassium permanganate to deactivate piscicide treated waters.
- c. The Permittee must provide notice to residences or businesses by mail, newsletter, or handbills delivered directly to the residences or businesses. If the Permittee uses handbills, it must secure the notices to the residences' or businesses' doorknob in a fashion that will hold them in place but will not damage property. If the residence or business is gated or guarded by watchdogs, the Permittee may secure the notice in clear view on the outside of the gateway or may attach the notice to the outside of the residence in a fashion that will hold it in place but will not damage property.
- d. Notification information must include:
  - i. The name and location of the lake or stream to be treated;
  - ii. The name of the piscicide (and potassium permanganate, when applicable);
  - iii. The purpose of the treatment;
  - iv. Any public use or water use restrictions;
  - v. The date(s) of treatment/restricted use;
  - vi. The names and phone numbers of designated contact people for the Permittee and Ecology so that interested parties can obtain additional information.
  - vii. When the chemical or product's label has restrictions and/or precautions for potable or domestic water use, irrigation use, or livestock watering, the Permittee must not treat an area until the Permittee has notified people who legally withdraw surface water and:

For potable water rights:

Provide an alternative potable water supply for human consumption from the time of rotenone application until the treated water body is shown to be below 40 ppb rotenone (Special Condition S6.E).

For treatments using liquid rotenone formulations that contain volatile organic compounds (VOC's), as identified by the product Material Safety Data Sheet (MSDS); provide an alternative potable water supply for human consumption from the time of piscicide application until the treated

water body is shown to have returned to pre-treatment levels for VOC's or VOC levels are below 0.5 ppb (Special Condition S6.E).

For irrigation and livestock watering rights:

Provide an alternative water supply for irrigation and livestock use from the time of piscicide application until the treated water body is shown to meet the standards applicable to crop irrigation and livestock watering required by the FIFRA label (Special Condition S6.E).

- e. The Permittee must maintain a copy of the notice and a list of locations or addresses to which the notice was sent or delivered for five years. The Permittee must hand deliver or mail a copy of the notice and list of recipients to Ecology within five business days upon request.

## 2. Newspaper Notification

- a. The Permittee must publish announcements in a newspaper of general circulation within the county where treatment will occur 14-45 days prior to the initial treatment.
- b. The notice must include:
  - i. The name and location of the water body to be treated.
  - ii. The name of the piscicide (and oxidizer, when applicable) to be used.
  - iii. The purpose of the treatment.
  - iv. Any public use or water use restrictions.
  - v. The posting procedures.
  - vi. The date(s) of treatment and use restrictions.
  - vii. The names and phone numbers of designated contacts at WDFW and Ecology from whom additional information can be obtained.
- c. The Permittee must keep documentation of the newspaper announcement for five years.

## 3. Shoreline Posting Procedures

- a. The Permittee must use the shoreline posting templates provided on the Fisheries Resource Management General Permit website. The Permittee must post signs, as specified below, no more than 72 hours prior to the application of products covered under this permit.
- b. The Permittee must use good faith and reasonable effort to ensure that posted signs remain in place until the end of the period of water use restrictions, or until the chemical applied and its breakdown product(s) are no longer detectable by bioassay (Special Condition S6.C and S6.D), whichever occurs first.

- c. The Permittee must remove all old signs after bioassays and/or toxicity testing has determined that the chemical applied and its breakdown products are no longer present at toxic levels (Special Condition S5.B.1.d.vii and S6).
- d. All posted signs must explicitly state restriction(s) or precaution(s) when the EPA label restricts human consumption of fish, swimming, irrigation, livestock watering, or any other precaution(s) relevant to public or private water use.
- e. Posting Publicly-Owned Property
  - i. The Permittee must post *publicly accessible* shorelines at all reasonable *public access* points.
  - ii. The Permittee must use the templates provided on the Fisheries Resource Management General Permit website and post signs that are a minimum of eight and one-half (8 ½) by eleven (11) inches in size.
  - iii. The Permittee must post signs to face all points of normal public access to the shoreline or stream bank; or WDFW must post one sign for every one-hundred (100) feet of shoreline and within 25 feet of the *ordinary high water mark*.
  - iv. The Permittee must post signs that are secure from the normal effects of weather and water currents, but cause no damage to private or publicly owned shoreline.
- f. Posting Public and Private Boat Access Areas:
  - i. The Permittee must post signs at all open *boat launches* on the water body to be treated.
  - ii. The Permittee must use the templates provided on the Fisheries Resource Management General Permit website and post signs that are a minimum of two (2) feet by three (3) feet in size and constructed of a durable weather-resistant material.
  - iii. WDFW must post signs within twenty-five (25) feet of the ordinary high water mark, facing the entrance to the boat launch.
  - iv. Where the public access has a shoreline length greater than one hundred fifty (150) feet, the Permittee must place signs so that they are clearly readable by all people using the access areas.
  - v. Signs must be posted so they are secure from the normal effects of weather and water currents but cause no damage to private or public property.
- g. Posting Private Residences and Businesses:
  - i. For each residence or business located on the affected water body the Permittee must post signs or deliver handbills directly to the residences or businesses. If the Permittee uses handbills, it must secure the signs to the residences or businesses doorknob in a fashion that will hold them in place but

will not damage property. If the residence or business is gated or guarded by watchdogs, the Permittee may secure the sign in clear view on the outside of the gateway or may attach the sign to the outside of the residence in a fashion that will hold it in place but will not damage property.

- ii. The Permittee must use the templates provided on the Fisheries Resource Management General Permit website and post signs that are a minimum of eight and one-half (8 ½) by eleven (11) inches in size.

## S6. MONITORING

Sampling and analytical methods used to meet the monitoring requirements specified in this permit must conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 (or as applicable in 40 CFR subchapters N [Parts 400–471] or O [Parts 501-503]) unless otherwise specified in this permit.

All samples must be analyzed by a laboratory registered or accredited under the provisions of *Accreditation of Environmental Laboratories*, WAC 173-50. The following parameters need not be accredited or registered:

- a. Flow;
- b. Temperature;
- c. Settleable solids;
- d. Conductivity, except that conductivity must be accredited if the laboratory must otherwise be registered or accredited;
- e. pH, except that pH must be accredited if the laboratory must otherwise be registered or accredited;
- f. Turbidity, except that turbidity must be accredited if the laboratory must otherwise be registered or accredited; and
- g. Parameters which are used solely for internal process control.

Documentation of monitoring activities and results must include (if applicable):

- a. The date, exact place, and time of sampling.
- b. The date analyses were performed.
- c. Who performed the analysis.
- d. The analytical techniques/methods used (if any).
- e. The results of such analyses.

The Permittee must take *representative* samples and measurements to meet the requirements of this permit (i.e., representative of the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including spills, *upsets*, and maintenance-related conditions affecting water quality).

### A. Monitoring

The Permittee must conduct monitoring on each contiguous site (this includes but is not limited to lakes, chains of lakes, reservoirs, rivers, streams or ponds) treated with piscicides to determine the extent and duration of the treatment. The Permittee must:

1. Use the actual piscicide concentration, as provided by the vendor for each batch, to ensure accuracy in application rates.
2. Conduct monitoring as specified in Tables 1-5 in Special Conditions S6.C and S6.D.

### B. Monitoring a Chain of Lakes

When monitoring a *chain of lakes*, each individual water body need not be monitored. The Permittee must submit a sampling plan, for monitoring lake chains, for Ecology approval at least one month prior to treatment. The Permittee must monitor treatments on a chain of lakes according to the Ecology approved sampling plan.

### C. Monitoring Schedule *Still Water*

**TABLE 1. PRE-TREATMENT MONITORING**

Monitoring to occur within 48hours prior to treatment

Parameters	Units	Minimum Sampling Frequency	Type	Sampling Point
pH	Standard	Once pre-treatment	Grab	Representative
Temperature	°F	Once pre-treatment	Grab	Representative
Organic demand <sup>1,2</sup>	Standard <sup>2</sup>	Once pre-treatment <sup>1</sup>	Grab	Representative
Dissolved Oxygen	mg/L	Once pre-treatment	Grab	Representative
<sup>1</sup> WDFW need monitor only when potassium permanganate is used to deactivate the treatment.				
<sup>2</sup> WDFW must use the guidelines provided in Engstrom-Heg (1971) to determine organic demand for KMnO <sub>4</sub> .				

**TABLE 2. POST-TREATMENT MONITORING**

Monitoring to occur immediately after treatment event but must not exceed 24 hours post-treatment event unless specified otherwise in the table.

Parameters	Units	Minimum Sampling Frequency	Type	Sampling Point
pH	Standard	Once post-treatment	Grab	Representative
Temperature	°F	Once post-treatment	Grab	Representative
Dissolved Oxygen	mg/L	Once post-treatment	Grab	Representative
Trout Toxicity Bioassay: 48-hr live box test (5 trout); 100% trout survival	trout survival	24 hr, 7 days and weekly until 100% trout survival	Observation (No lab accreditation required)	<i>Worst-case scenario</i>

**TABLE 3. MONITORING OF DOWNSTREAM AND DEACTIVATED WATERS**

Pre-treatment sampling to occur within 48 hours prior to treatment event unless specifically stated. Post-treatment monitoring to occur immediately after treatment but not to exceed 24 hours after the treatment event unless specified otherwise in the table.

Parameters	Units	Minimum Sampling Frequency	Type	Sampling Point
pH	Standard	Twice: once pre-treatment and once post-treatment	Grab	Representative
Temperature	°F	Twice: once pre-treatment and once post-treatment	Grab	Representative
Dissolved Oxygen	mg/L	Twice: once pre-treatment and once post-treatment	Grab	Representative
Organic demand <sup>1,2</sup>	Standard <sup>2</sup>	Once pre-treatment <sup>1</sup>	Grab	Worst-case scenario
Potassium Permanganate <sup>3</sup>	mg/L	Hourly during the period of deactivation	Grab	Downstream of Deactivation Zone
Trout Toxicity Bioassay: 24-hr live box test (5 trout) 100% trout survival	100% trout survival	Every 2-4 hours until 100% of trout survive	Observation (No lab accreditation required)	Upstream and Downstream of Deactivation Zone
<sup>1</sup> Only required when potassium permanganate is used to deactivate the treatment.				
<sup>2</sup> Must use the guidelines provided in Engstrom-Heg (1971) to determine organic demand for KMnO <sub>4</sub> .				
<sup>3</sup> Must measure KMnO <sub>4</sub> in waters downstream of the deactivation zone using one of the two techniques given in Finlayson (2010). *				

<sup>1</sup> Finlayson, B., R. Schnick, D. Skaar, J. Anderson, L. Demong, D. Duffield, W. Horton, and J. Steinkjer. 2010. Planning and Standard Operating Procedures for Use of Rotenone in Fish Management. American Fisheries Society, Bethesda, MD.

**D. Monitoring Schedule for Treated Flowing Water**

**TABLE 4. PRE-TREATMENT MONITORING OF TREATED WATER**

Pre-treatment sampling to occur within 24 hours prior to treatment event unless specified otherwise in the table.

Parameters	Units	Minimum Sampling Frequency	Type	Sampling Point
pH	Standard	Once pre-treatment	Grab	Representative
Temperature	°F	Once pre-treatment	Grab	Representative
Dissolved Oxygen	mg/L	Once pre-treatment	Grab	Representative
Organic demand <sup>1,2</sup>	Standard <sup>2</sup>	Once pre-treatment <sup>1</sup>	Grab	Representative
<sup>1</sup> Monitor only when potassium permanganate is used to deactivate the treatment.				
<sup>2</sup> Must use the guidelines provided in Engstrom-Heg (1971) to determine organic demand for KMnO <sub>4</sub> .				

**TABLE 5. POST TREATMENT MONITORING OF TREATED AND DEACTIVATED WATERS**

Post-treatment monitoring to occur immediately after treatment but not to exceed 24 hours post-treatment event unless specified otherwise in the table.

Parameters	Units	Minimum Sampling Frequency	Type	Sampling Point
pH	Standard	Once post-treatment	Grab	Representative
Temperature	°F	Once post-treatment	Grab	Representative
Dissolved Oxygen	mg/L	Once post-treatment	Grab	Representative
Potassium Permanganate <sup>1</sup>	mg/L	Hourly during the period of deactivation	Grab	Downstream of Deactivation Zone
Trout Toxicity Bioassay: 24-hr live box test (5 trout) 100% trout survival	100% trout survival	Every 2-4 hours until 100% of trout survive	Observation (No lab accreditation required)	Upstream and Downstream of Deactivation Zone

<sup>1</sup> Must measure KMnO<sub>4</sub> in waters downstream of the deactivation zone using one of the two techniques given in Finlayson (2010).\*

Finlayson, B., R. Schnick, D. Skaar, J. Anderson, L. Demong, D. Duffield, W. Horton, and J. Steinkjer. 2010. Planning and Standard Operating Procedures for Use of Rotenone in Fish Management. American Fisheries Society, Bethesda, MD.

**E. Monitoring For Water Bodies with Potable Water Users or With Surface Water Rights**

When the chemical or product’s label has a restriction and/or precautions for potable or domestic water use, irrigation use, or livestock watering the following monitoring must be completed prior to the Permittee notifying people who withdraw surface water that they may resume withdrawal (See Special Condition S5.B.1.d.vii).

1. For potable water rights:
  - a. Permittees must test the treated water body until it is shown to be below the EPA estimated drinking water level of concern of 40 ppb for rotenone. Permittees must use one of the methods given in SOP: 16 in the Rotenone SOP Manual\*. The Permittee must test either three locations or test a number of locations equivalent to 20% of the potable water intakes on the water body, whichever is greater. Testing must occur in locations that are representative of the potable water intakes located on the water body.
  - b. For treatments using liquid rotenone formulations that contain VOC’s: Permittees must demonstrate that the treated water body has returned to pre-treatment levels or is below 0.5 ppb for any VOC identified by the Material Safety Data Sheet (MSDS) for the product used. Permittees must conduct pre-treatment VOC testing to determine if VOC’s are present in the water body prior to treatment (background levels of VOCs). Permittees are responsible for ensuring VOC’s discharged to the water body from treatments have dissipated to background levels or dropped below 0.5 ppb before surface water withdrawal can resume.

Analytical methods used for VOC monitoring must have a 0.5 ppb lower detection limit.

2. For irrigation and livestock watering rights: Permittees must demonstrate that the treated water body meets the standards applicable to crop irrigation and livestock watering required by the FIFRA label for the rotenone product used.

<sup>\*</sup>Finlayson, B., R. Schnick, D. Skaar, J. Anderson, L. Demong, D. Duffield, W. Horton, and J. Steinkjer. 2010. Planning and Standard Operating Procedures for Use of Rotenone in Fish Management. American Fisheries Society, Bethesda, MD.

## **S7. REPORTING AND RECORDKEEPING REQUIREMENTS**

### **A. Report Submittal**

1. The Permittee must submit the Pre-treatment Plan to Ecology no later than April 1 of each year prior to treatment. The Permittee must submit the Post-Treatment Discharge Monitoring Report to Ecology no later than December 31 of each year following treatment. Send the reports to:

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

2. The Pre-treatment Plan must contain the following information for each surface water proposed for treatment:
  - a. Name of surface water;
  - b. County;
  - c. Section, township, range and the decimal latitude and longitude of the approximate center of the lake;
  - d. If the water body to be treated is a still water, a surface water description: Surface acreage, number of acre-feet, maximum depth and estimated average depth;
  - e. If the water body to be treated is flowing water, a stream description: Width, length, flow rate of stream/outlet (cu. ft. per sec.) and volume;
  - f. Description of any surface water withdrawal for potable, irrigation or livestock watering uses;
  - g. Identify any analytical methods to be used in the monitoring for the proposed treatments.
  - h. If not included in the amendment to the Final Supplemental Environmental Impact Statement for the lakes/streams treated during the reporting period, the following information must be provided in the Pre-treatment Plan:
    - i. Purpose of treatment;
    - ii. Description of fish species to be eradicated and how the action threshold defined in the DMP was met;
    - iii. Description of the intended outcome and measures of success;

- iv. Description of resource impacts;
  - v. Mitigation for adverse impacts;
  - vi. Description of recreational impacts;
  - vii. Description of economic impacts;
  - viii. Related management actions; such as fish stocking and methods to control re-introduction of undesirable fish species.
3. Post-Treatment Discharge Monitoring Reports must contain the following information:
- a. Name of surface water;
  - b. County;
  - c. Section, Township and Range and the decimal latitude and longitude of the approximate center of the lake;
  - d. Date(s) treatment occurred;
  - e. Purpose of treatment;
  - f. Name of licensed applicator(s);
  - g. Surface water description: Surface acreage, number of acre-feet, maximum depth and estimated average depth;
  - h. Stream description: Width, length, flow rate of stream/outlet (cu. ft. per sec.) and volume;
  - i. Name of fish toxicant product used;
  - j. Quantity of fish toxicant active ingredient applied (pounds);
  - k. Concentration of active ingredient in formulated product (percentage (%));
  - l. Maximum concentration of the active ingredient in the water (ppb);
  - m. Description of treatment method(s);
  - n. Water conditions/quality (temperature, pH, alkalinity – and any other additional data collected);
  - o. Deactivation of piscicide treated water (if required): Description of deactivation methods/equipment; potassium permanganate application rate (pounds per hour);

flow rate of stream/outlet (cu. ft. per sec.); measurement of average concentration downstream of the deactivation zone;

- p. Description of lake inlet(s)/outlet(s) and any temporary water control measures (if required);
- q. Period of toxicity (duration of water quality reduction);
- r. Eradicated fish species;
- s. Results of pre- and post-treatment monitoring;
- t. Summary of impact on non-targeted organisms;
- u. A copy of the amendment to the Final Supplemental Environmental Impact Statement for the lakes/streams treated during the reporting period including all *State Environmental Policy Act (SEPA)* comments, results and decisions.

#### **B. Additional Monitoring by the Permittee**

If the Permittee monitors any parameter not specified by this permit or monitors a parameter more frequently than required by this permit using test procedures specified by Special Condition S6, it must include the results of this monitoring in the calculation and reporting of the data submitted in its Post Treatment Discharge Monitoring Report.

#### **C. Records Retention**

1. The Permittee must retain records of all monitoring information for a minimum five (5) years. Such information must include all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit.
2. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by Ecology.
3. The Permittee must make records, reports, surveys, plans, public notices, and other information required by this permit available to Ecology on request.

#### **D. Noncompliance Notification**

Compliance with the requirements of this special condition does not relieve the Permittee from responsibility to maintain continuous compliance with the terms and conditions of this permit or the resulting liability for failing to comply.

In the event the Permittee is unable to comply with any part of this permit, which may threaten human health or the environment, the Permittee must:

1. Immediately take action to minimize potential pollution or otherwise stop the noncompliance and correct the problem.
2. Immediately notify the appropriate Ecology regional office and the aquatic pesticides permit manager of the failure to comply via the regional spills telephone hotline and the aquatic pesticides permit manager's phone number below.

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**Central (CRO)** ----- **509-575-2490**

Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, and Yakima counties

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**Eastern (ERO)** ----- **509-329-3400**

Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman counties

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**Northwest (NWRO)** ----- **425-649-7000**

Island, King, Kitsap, San Juan, Skagit, Snohomish, and Whatcom counties

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**Southwest (SWRO)** ----- **360-407-6300**

Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Mason, Lewis, Pacific, Pierce, Skamania, Thurston, and Wahkiakum counties

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**Aquatic Pesticide Permit Manager** ----- **360-407-6283**

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3. The Permittee must provide a written report to Ecology within five (5) days of the time that the Permittee becomes aware of any permit non-compliance unless Ecology requests and earlier submission. The report must contain a description of the noncompliance and its cause, the exact date(s), time(s), place(s), and duration(s) of the noncompliance, whether the noncompliance has been corrected and, if not, when the noncompliance will be corrected, and the steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.
4. The Permittee must submit noncompliance notifications to:

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

## **S8. ANNUAL SEPA PROCESS**

All waters proposed for treatment must be included in an *addendum* to the Final Supplemental Environmental Impact Statement (FSEIS). The FSEIS is subject to a public comment period. WDFW must complete an annual State Environmental Policy Act (SEPA) process prior to conducting surface water treatment activities.

## **S9. SPILL PREVENTION AND CONTROL**

### **A. Spill Prevention**

The Permittee must:

1. Handle, store, and use all oil, fuel, chemicals, and products authorized under this permit in a manner that prevents spills.
2. Ensure that they maintain all mobile equipment to prevent leaks or spills of petroleum products.
3. Report significant spills into waters of the state, spills on land with a potential to enter into waters of the state, and other significant water quality impacts to the appropriate Ecology regional office as soon as possible after the spill takes place.
4. Implement the Spill Plan developed under Special Condition S9.B.

### **B. Spill Plan**

1. At least 30 days prior to the first treatment conducted under this permit, The Permittee must submit a Spill Prevention and Response Plan to Ecology that addresses all piscicide treatments. Submit the plan to:

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

2. The plan must address the following:
  - a. Prevention, containment, and control of spills or unplanned discharges from the application, storage and transportation of the piscicide and potassium permanganate.
  - b. Spills and drips of oils, gasoline and other petroleum products from application equipment including boats. Based on the severity of the spill, the plan must describe when to report certain magnitudes of spills along with a list of names and telephone numbers of spill respondent teams for both the Permittee and Ecology.

### C. Spill Notification Requirements

Report spills immediately to the following appropriate state and federal contacts:

National Response Center (Federal): 800-424-8802, and  
Emergency Management Division (State): 800-258-5990, and  
the appropriate Ecology regional office:

- Northwest Office, Bellevue: 425-649-7000
- Southwest Office, Olympia: 360-407-6300
- Central Office, Yakima: 509-575-2490
- Eastern Office, Spokane: 509-329-3400

See <http://www.ecy.wa.gov/programs/spills/other/reportaspill.htm> for environmental reporting requirements.

### D. Spill Cleanup Requirements

1. In the event of a spill, Permittees must begin immediate containment and cleanup using appropriate materials. Cleanup takes precedent over normal work.
2. Cleanup includes proper disposal of any spilled materials and used cleanup materials.

## S10. BEST MANAGEMENT PRACTICES

The Permittee must follow the best management practices defined below for piscicide application.

### A. The Permittee must comply with the product label.

1. When application requirements specified in this permit differ from those on the label, the Permittee must comply with the more restrictive of the two requirements.
2. The Permittee is responsible for ensuring that it follows applicable federal, state and local laws and ordinances.

### B. The Permittee must apply powdered rotenone formulations using the best available and practical technology.

The Permittee must use the best available and practical rotenone application technology that minimizes airborne dust, such as the method outlined in Finlayson et al. 2010. "Operation of Semi-Closed Aspirator Systems for Application of Powdered Rotenone SOP: 9.0," in *Planning and Standard Operating Procedures for Use of Rotenone in Fish Management*, (American Fisheries Society, 2010), pp 81-85.

**C. The Permittee must prevent a discharge to downstream waters that results in an exceedance of water quality criteria by:**

1. Installing adequate temporary water control measures.
2. Conducting pre-treatment water quality and biological monitoring, as specified in the permit monitoring section (Special Condition S.6).
3. Effectively deactivate treated waters using potassium permanganate so that water quality criteria are not exceeded outside of the deactivation zone.
4. Ensuring that rotenone is totally deactivated and residual potassium permanganate levels are maintained at a level of 1 mg/L outside or downstream of the deactivation zone.
5. Using calibrated equipment during deactivation procedures to achieve the minimum effective concentration of potassium permanganate to oxidize the piscicide within the deactivation zone. The Permittee must closely monitor potassium permanganate concentrations using methods provided in the Rotenone SOP Manual (Finlayson 2010) to keep residual permanganate levels at a concentration that effectively deactivates rotenone while preventing damage to aquatic life downstream of the treatment area and deactivation zone.

## **S11. APPENDICES**

The attached appendices are incorporated by reference into this permit.

APPENDIX A - DEFINITIONS

APPENDIX B - DISCHARGE MANAGEMENT PLAN

APPENDIX C – ZOOPLANKTON STUDY DESIGN

## **General Conditions**

### **G1. SIGNATORY REQUIREMENTS**

All applications, reports, or information submitted to Ecology must be signed and certified.

- A. In the case of corporations, by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:
  - 1. A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision making functions for the corporation, or
  - 2. The manager of one or more manufacturing, production, or operating facilities, provided, the manager is authorized to make management decisions which govern the operation of the regulated facility including having the explicit or implicit duty of making major capital investment recommendations, and initiating and directing other comprehensive measures to assure long term environmental compliance with environmental laws and regulations; the manager can ensure that the necessary systems are established or actions taken to gather complete and accurate information for permit application requirements; and where authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.
- B. In the case of a partnership, by a general partner.
- C. In the case of sole proprietorship, by the proprietor.
- D. In the case of a municipal, state, or other public facility, by either a principal executive officer or ranking elected official.
- E. All reports required by this permit and other information requested by Ecology must be signed by a person described above or by a duly authorized representative of that person. A person is a duly authorized representative only if:
  - 1. The authorization is made in writing by the person described above and is submitted to Ecology at the time of authorization, and
  - 2. The authorization specifies either a named individual or any individual occupying a named position.
- F. Changes to authorization. If an authorization under paragraph E above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization must be submitted to Ecology prior to or together with any reports, information, or applications to be signed by an authorized representative.

G. Any person signing a document under this section must make the following certification:

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

## **G2. RIGHT OF ENTRY AND INSPECTION**

Representatives of Ecology must have the right to enter at all reasonable times in or upon any property, public or private, for the purpose of inspecting and investigating conditions relating to the pollution or the possible pollution of any waters of the state.

Reasonable times include normal business hours; hours during which production, treatment, or discharge occurs; or times when Ecology suspects a violation requiring immediate inspection.

Representatives of Ecology must be allowed to have access to, and copy at reasonable cost, any records required to be kept under terms and conditions of the permit; to inspect any monitoring equipment or method required in the permit; and to sample any discharge, waste treatment processes, or internal waste streams.

## **G3. PERMIT ACTIONS**

This permit may be modified, revoked and reissued, or terminated either at the request of any interested person (including the Permittee) or upon Ecology's initiative. However, the permit may only be modified, revoked and reissued, or terminated for the reasons specified in 40 CFR 122.62, 122.64 or WAC 173-220-150 according to the procedures of 40 CFR 124.5.

- A. The following are causes for terminating permit coverage during its term, or for denying a permit renewal application:
1. Violation of any permit term or condition.
  2. Obtaining a permit by misrepresentation or failure to disclose all relevant facts.
  3. A material change in quantity or type of waste disposal.
  4. A determination that the permitted activity endangers human health or the environment or contributes to water quality standards violations and can only be regulated to acceptable levels by permit modification or termination [40 CFR part 122.64(3)].

5. A change in any condition that requires either a temporary or permanent reduction or elimination of any discharge or sludge use or disposal practice controlled by the permit [40 CFR part 122.64(4)].
  6. Nonpayment of fees assessed pursuant to RCW 90.48.465.
  7. Failure or refusal of the Permittee to allow entry as required in RCW 90.48.090.
- B. The following are causes for modification but not revocation and reissuance except when the Permittee requests or agrees:
1. A material change in the condition of the waters of the state.
  2. New information not available at the time of permit issuance that would have justified the application of different permit conditions.
  3. Material and substantial alterations or additions to the permitted facility or activities which occurred after this permit issuance.
  4. Promulgation of new or amended standards or regulations having a direct bearing upon permit conditions, or requiring permit revision.
  5. The Permittee has requested a modification based on other rationale meeting the criteria of 40 CFR Part 122.62.
  6. Ecology has determined that good cause exists for modification of a compliance schedule, and the modification will not violate statutory deadlines.
  7. Incorporation of an approved local pre-treatment program into a municipality's permit.
- C. The following are causes for modification or alternatively revocation and reissuance:
1. Cause exists for termination for reasons listed in A1 through A7, of this section, and Ecology determines that modification or revocation and reissuance is appropriate.
  2. Ecology has received notification of a proposed transfer of the permit. A permit may also be modified to reflect a transfer after the effective date of an automatic transfer but will not be revoked and reissued after the effective date of the transfer except upon the request of the new Permittee.

#### **G4. REPORTING PLANNED CHANGES, CAUSE FOR MODIFICATION**

The Permittee must, as soon as possible, but no later than sixty (60) days prior to the proposed changes, give notice to Ecology of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in:

- A. The permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b).
- B. A significant change in the nature or an increase in quantity of pollutants discharged.
- C. A significant change in the Permittee's sludge use or disposal practices.

Following such notice, and the submittal of a new application or supplement to the existing application, along with required engineering plans and reports, this permit may be modified, or revoked and reissued pursuant to 40 CFR 122.62(a) to specify and limit any pollutants not previously limited. Until such modification is effective, any new or increased discharge in excess of permit limits or not specifically authorized by this permit constitutes a violation.

#### **G5. PLAN REVIEW REQUIRED**

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications must be submitted to Ecology for approval in accordance with WAC 173-240. Engineering reports, plans, and specifications must be submitted at least one hundred eighty (180) days prior to the planned start of construction unless a shorter time is approved by Ecology. Facilities must be constructed and operated in accordance with the approved plans.

#### **G6. COMPLIANCE WITH OTHER LAWS AND STATUTES**

Nothing in this permit must be construed as excusing the Permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

#### **G7. TRANSFER OF THIS PERMIT**

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee must notify the succeeding owner or controller of the existence of this permit by letter, a copy of which must be forwarded to Ecology. This permit is automatically transferred to a new owner or operator if:

- A. A written agreement between the old and new owner or operator containing a specific date for transfer of permit responsibility, coverage, and liability is submitted to Ecology;
- B. A copy of the permit is provided to the new owner and;
- C. Ecology does not notify the Permittee of the need to modify the permit.

Unless this permit is automatically transferred according to section A. above, this permit may be transferred only if it is modified to identify the new Permittee and to incorporate such other requirements as determined necessary by Ecology.

## **G8. REDUCED PRODUCTION FOR COMPLIANCE**

The Permittee, in order to maintain compliance with its permit, must control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

## **G9. REMOVED SUBSTANCES**

Collected screenings, grit, solids, sludge, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters must not be resuspended or reintroduced to the final effluent stream for discharge to state waters.

## **G10. DUTY TO PROVIDE INFORMATION**

The Permittee must submit to Ecology, within a reasonable time, all information which Ecology may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Permittee must also submit to Ecology upon request, copies of records required to be kept by this permit.

## **G11. OTHER REQUIREMENTS OF 40 CFR**

All other requirements of 40 CFR 122.41 and 122.42 are incorporated in this permit by reference.

## **G12. ADDITIONAL MONITORING**

Ecology may establish specific monitoring requirements in addition to those contained in this permit by administrative order or permit modification.

## **G13. PAYMENT OF FEES**

The Permittee must submit payment of fees associated with this permit as assessed by Ecology. Ecology may revoke this permit if the permit fees established under WAC 173-224 are not paid.

## **G14. PENALTIES FOR VIOLATING PERMIT CONDITIONS**

Any person who is found guilty of willfully violating the terms and conditions of this permit is deemed guilty of a crime, and upon conviction thereof will be punished by a fine of up to ten thousand dollars (\$10,000) and costs of prosecution, or by imprisonment in the discretion of the court. Each day upon which a willful violation occurs is a separate and additional violation. Any person who violates the terms and conditions of a waste discharge permit incurs, in addition to any other penalty as provided by law, a civil penalty in the amount of up to ten thousand dollars (\$10,000) for every such violation. Each and every such violation is a separate and distinct offense, and in case of a continuing violation, every day's continuance is deemed to be a separate and distinct violation.

## **G15. UPSET**

Definition – "Upset" means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment

facilities, lack of preventive maintenance, or careless or improper operation. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limits if the requirements of the following paragraph are met. A Permittee who wishes to establish the affirmative defense of upset must demonstrate, through properly signed, contemporaneous operating logs or other relevant evidence that: 1) an upset occurred and that the Permittee can identify the cause(s) of the upset; 2) the permitted facility was being properly operated at the time of the upset; 3) the Permittee submitted notice of the upset as required in condition S5.A; and 4) the Permittee complied with any remedial measures required under S9.D of this permit. In any enforcement proceedings the Permittee seeking to establish the occurrence of an upset has the burden of proof.

#### **G16. PROPERTY RIGHTS**

This permit does not convey any property rights of any sort, or any exclusive privilege.

#### **G17. DUTY TO COMPLY**

The Permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

#### **G18. TOXIC POLLUTANTS**

The Permittee must comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants within the time provided in the regulations that establish those standards or prohibitions, even if this permit has not yet been modified to incorporate the requirement.

#### **G19. PENALTIES FOR TAMPERING**

The Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit will, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than two years per violation, or by both. If a conviction of a person is for a violation committed after a first conviction of such person under this Condition, punishment will be a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than four (4) years, or by both.

#### **G20. COMPLIANCE SCHEDULES**

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit must be submitted no later than fourteen (14) days following each schedule date.

#### **G21. REPORTING ANTICIPATED NON-COMPLIANCE**

The Permittee shall give advance notice to Ecology by submission of a new application, or supplement to the existing application, at least 45 days prior to commencement of such discharges, of any facility expansions, production increases, or other planned changes, such as process modifications, in the permitted facility or activity which may result in noncompliance with permit limits or conditions. Any maintenance of facilities, which might necessitate

unavoidable interruption of operation and degradation of effluent quality, shall be scheduled during non-critical water quality periods and carried out in a manner approved by Ecology.

**G22. Duty to Reapply**

The Permittee must reapply for coverage under this general permit at least one hundred and eighty (180) days prior to the specified expiration date of this general permit. An expired general permit and coverage under the permit continues in force and effect until Ecology issues a new general permit or until Ecology cancels it. Only those Permittees that reapply for coverage are covered under the continued permit.

## **APPENDIX A – DEFINITIONS**

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

### **303(d)-listed water body:**

Section 303(d) of the federal Clean Water Act requires states to develop a list of polluted water bodies every two years. For each of those water bodies, the law requires states to develop Total Maximum Daily Loads (TMDLs). A TMDL is the amount of pollutant loading that can occur in a given water body (river, marine water, wetland, stream, or lake) and still meet water quality standards.

### **Addendum:**

See also the definition for the State Environmental Policy Act (SEPA).

"Addendum" means an environmental document used to provide additional information or analysis that does not substantially change the analysis of significant impacts and alternatives in the existing environmental document. The term does not include supplemental EISs. An addendum may be used at any time during the SEPA process (WAC 197-11-706)." A SEPA addendum provides additional site-specific information about a project.

### **Adverse incident:**

An unusual or unexpected incident in which:

1. There is evidence that a person or non-target organism has likely been exposed to a pesticide residue, and
2. The person or non-target organism suffered a toxic or adverse effect. Toxic or adverse effects include effects that occur within waters of the State on non-target plants, fish, or wildlife that are unusual or unexpected (e.g., effects are to organisms not otherwise described on the product label or otherwise expected to be present) because of exposure to a pesticide residue, and may include:
  - Distressed or dead fish.
  - Unexpected stunting, wilting, or desiccation of non-target submersed or emergent aquatic plants.
  - Other dead or visibly distressed non-target aquatic organisms (amphibians, turtles, invertebrates, etc.).

The phrase, "toxic or adverse effects", also includes any adverse effects to humans (e.g., skin rashes) or domesticated animals that occur either from direct contact with, or as a secondary effect from a discharge (e.g., sickness from consumption of plants or animals containing pesticides) to waters of the State that are temporally and spatially related to exposure to a pesticide residue (e.g., vomiting, lethargy).

### **Aquatic licensed pesticide applicator:**

Any individual with an aquatic pesticide endorsement who is licensed as a commercial pesticide operator, public operator, private-commercial applicator, demonstration and research applicator, or certified private applicator, or any other individual who is certified by the director of WSDA to use or supervise the use of any pesticide which is classified by the EPA as a restricted use pesticide or by the state as restricted to use by certified applicators only.

**Boat launches:**

Publicly designated and/or privately owned community access launches for boats.

**Chain of lakes:**

Lakes that are physically connected by a channel of surface water but have different names or are un-named.

**Deactivation zone:**

The downstream waters where potassium permanganate has been applied but has not yet fully deactivated the rotenone, due to the lag time normally associated with deactivation. The distance that water can be expected to travel in 20 minutes. Since the deactivation zone may contain toxic levels of rotenone and potassium permanganate, some fish mortalities may occur in this zone.

**Drip Cans:**

A container filled with diluted piscicide solution, equipped with a nozzle that meters out the solution to deliver a known amount of piscicide over a given time period.

**Emergent vegetation:**

Plants that are rooted within sediment covered or saturated by water but whose upper parts (e.g., leaves) are above the surface of the water (e.g., sedges, rushes, and grasses). Emergent vegetation does not include submersed aquatic plants that have only flowering or reproductive structures above the water surface.

**Flowing Water:**

Rivers, streams, creeks and other water bodies where water is moving down an elevation gradient.

**Gelatin/sand mixtures:**

Rotenone powder/gelatin/ sand mixture for treating sources of upwelling groundwater in springs, streams and lakes and other areas with limited water circulation (e.g., dense weed beds). See SOP 13.0 in the Rotenone SOP Manual, Finlayson et. al. 2010.

**Indian Country:**

Indian Country includes: All land within any Indian reservation notwithstanding the issuance of any patent, and, including rights-of-way running through the reservation. This includes all federal, tribal, and Indian and non-Indian privately owned land within the reservation. All off-reservation Indian allotments, the Indian titles to which have not been extinguished, including rights-of-way running through the same. All off-reservation federal trust lands held for Native American tribes.

**Non-targeted organism:**

Organisms other than that which the pesticide is intended to kill.

**Ordinary high water mark:**

The point that represents the maximum rise of a body of water over land.

[http://www.ecy.wa.gov/programs/sea/sma/st\\_guide/jurisdiction/ohwm.html](http://www.ecy.wa.gov/programs/sea/sma/st_guide/jurisdiction/ohwm.html)

**Permittee:**

WDFW, who may apply for and gain coverage under this permit and has control of, or causes a discharge under coverage of this permit.

**Piscicide:**

A chemical applied to fresh water to kill undesirable fish species.

**Public access:**

The point of entry to a location that all members of the community may use.

**Publicly accessible:**

A location that all members of the community may use. There may be limited restrictions such as required passes or fees, or use may be limited to certain hours (e.g. daylight hours).

**Representative:**

Representative of the volume and nature of the monitored parameters, including representative sampling of any unusual discharge or discharge condition, including spills, upsets, and maintenance-related conditions affecting water quality.

**Rotenone:**

2R,6aS,12aS)-1,2,6,6a,12,12a-hexahydro-2-isopropenyl-8,9-dimethoxychromeno[3,4-b]furo[2,3-h]chromen-6-one.

**State Environmental Policy Act (SEPA):**

A state policy that requires state and local agencies to consider the likely environmental consequences of a proposal before approving or denying the proposal (See RCW 43.21C and WAC 197 -11).

**Still water:**

A water body where the water is not moving down an elevation gradient.

**Submerged vegetation:**

Submerged plants generally always remain under water, although many submersed species produce above-water flowers (e.g., pondweed, milfoil).

**Surface waters of the state of Washington:**

All waters defined as "waters of the United States" in 40 CRF 122.2 within the geographic boundaries of the state of Washington. All waters defined in RCW 90.48.020. This includes lakes, rivers, ponds, streams, inland waters, and all other fresh or brackish surface waters and water courses within the jurisdiction of the state of Washington, plus drainages to those surface waters.

**Treatment:**

The application of a piscicide product to waters of the state for the purpose of removing non-desirable fish species.

**Trust or Restricted Lands:**

Means as defined in 25 USC 2201(4): “(i) “trust or restricted lands” means lands, title to which is held by the United States in trust for an Indian tribe or individual, or which is held by an Indian tribe or individual subject to a restriction by the United States against alienation; and (ii) “trust or restricted interest in land” or “trust or restricted interest in a parcel of land” means an interest in land, the title to which interest is held in trust by the United States for an Indian tribe or individual, or which is held by an Indian tribe or individual subject to a restriction by the United States against alienation.”

**Upset:**

An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limits because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

**Worst-case scenario:**

This refers to sampling points. WDFW must monitor at the point where, based on wind and application, the rotenone concentration should be the highest. This location is based upon the best professional judgment of WDFW.

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

## **APPENDIX B – DISCHARGE MANAGEMENT PLAN**

The following elements are minimum requirements for a Discharge Management Plan (DMP). The applicant must prepare a DMP and submit it to Ecology 30 days prior to the first treatment conducted under this permit. The Permittee must revise the DMP whenever there is a significant change in the quantity or type of chemicals discharged or if it adds additional management activities. Changes to the DMP must be made prior to the discharge or as soon as possible thereafter. The Permittee must follow its DMP.

For sections B., C., and D. the Permittee must provide information that addresses projects managed as recreational fisheries as well as projects managed for habitat and native fish restoration.

### **A. Discharge Management Plan Team**

The DMP must identify the people (by name and contact information) that compose the team as well as each person's individual responsibilities, including the person(s) responsible for:

1. Managing the fishery rehabilitation project.
2. Developing and revising the DMP.
3. Developing, revising, and implementing corrective actions and other permit requirements.
4. Applying the piscicide (licensed applicators with license numbers and license expiration dates).

When changes to the DMP team occur, the Permittee must provide updated contact information to Ecology.

### **B. Fisheries Resource Management**

The DMP must:

1. Include a general location map or maps that identify the geographic boundaries of the area to which the plan applies. For example: If management goals or options change by eco-region.
2. Establish action thresholds that trigger the need to remove introduced fish. Include the data used in developing the action thresholds and the methods to determine when the action threshold has been met.
3. Consider the timing of piscicide treatments to avoid treatments of lakes that will freeze-over prior to the monitoring requirements being completed.

### C. Piscicide Use

Identify standard operating procedures to be followed before, during and after piscicide application.

The DMP must detail the surveillance procedures that the Permittee will use to determine:

1. When the action threshold is met.
2. Treatment efficacy.
3. Non-target impacts.

### D. Response Procedures

The DMP must detail procedures that the Permittee will use to determine:

1. Compliance with labeled rates (equipment calibration and maintenance).
2. The procedures for preventing spills and leaks of chemicals or petroleum products (oil, gasoline, and hydraulic fluid) associated with the chemical application.

### E. Signature Requirements

The DMP must include a signature statement and the signature of Permittee. The signature statement shall read:

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

\_\_\_\_\_  
Signature

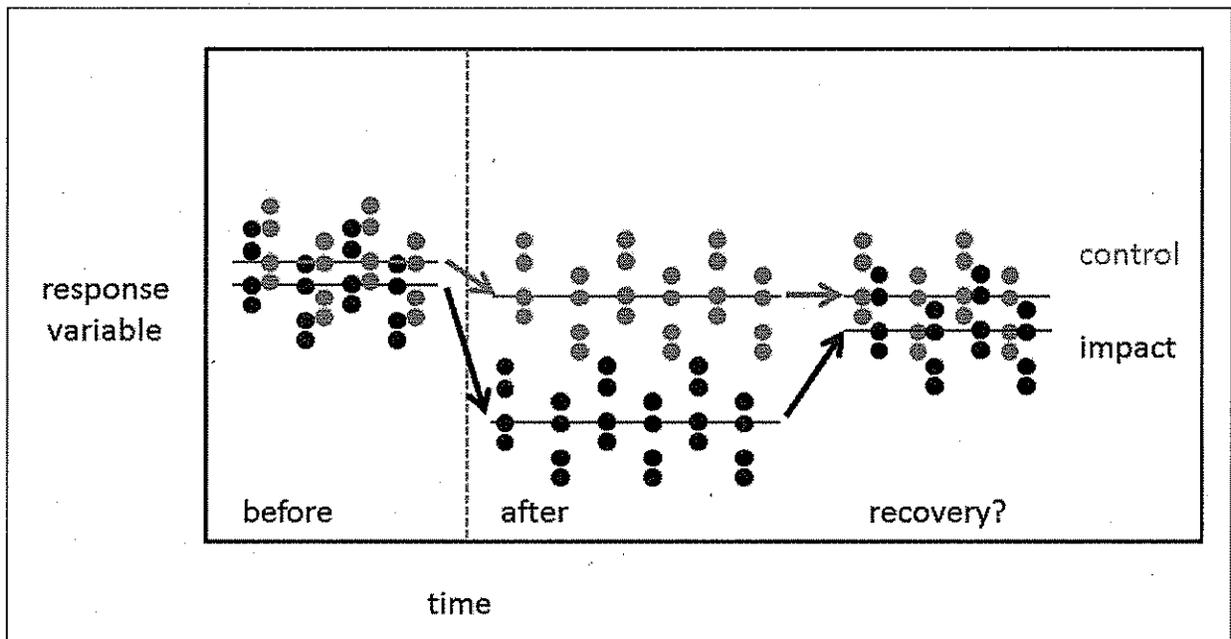
\_\_\_\_\_  
Date

## **APPENDIX C – ZOOPLANKTON STUDY DESIGN**

### **Washington Lakes Recovery Study**

The proposed study that the Washington Department of Fish and Wildlife and Portland State University are undertaking will assess recovery of zooplankton communities in lakes following rotenone treatments to remove unwanted fish populations as a management action. Recovery is notoriously difficult to define; here we will define recovery as no significant difference between impact and control lakes following treatment for four key metrics of zooplankton communities (abundance, composition, species richness, and species diversity). We will not assume that zooplankton will recover to a pre-treatment state; rather that zooplankton in treatment lakes will be no different than zooplankton in control lakes following rotenone treatment ([Figure 1](#)). For this reason, we have chosen lakes that contain stocked trout species as our controls; treatment lakes will be re-stocked with trout in the spring, making this the most direct comparison (control trout-stocked lakes vs. treatment trout-stocked lakes).

In order to understand the effect of rotenone treatments on zooplankton communities, we will employ a BACI design. BACI stands for Before-After-Control-Impact, and is a commonly used study design to test the effects of environmental impacts (Underwood 1991, 1993; McDonald et al. 2000). In its simplest form, a single site is monitored both before and after an environmental event for changes in a response variable (e.g., nutrients, temperature, and biomass). However, this design suffers from lack of understanding of other concurrent factors that could be driving these changes. The addition of a control site helps to rectify this problem by studying a reference site to detect any baseline changes over the study time frame. An additional issue is that single sites or single sampling periods may not be representative of reference conditions. This is particularly true for biotic responses, which may be quite variable. Therefore, the best design for a BACI study is to have multiple control and impact sites that are monitored several times before and after the impact to examine changes in the response variable (Underwood 1994). This design is illustrated in [Figure 1](#).



**Figure 1.** A response variable is measured in four impact (black) sites and four control (grey) sites both before (n=4 dates) and after (n=10 dates). In this conceptual diagram, both the control sites and impact sites decrease after the environmental impact, perhaps because of some other confounding factor; however, the change in the impact sites is much more substantial. This highlights the need for having multiple control sites and sampling prior to the impact in both the control and impact to understand the baseline variability. Recovery will be determined when the control and impact sites are no longer significantly different.

This study will employ seven (7) control lakes and seven (7) impact lakes, which will be monitored for 6 months prior to the rotenone treatment, which is scheduled to be applied in October 2015 (described in [Study-Table 1](#)). Control lakes that are currently stocked with trout were chosen for the study. Control lakes will not be altered in any other significant way during the course of the study. Although ideally control and treatment lakes would be as similar as possible in regards to basic physical and chemical characteristics, very little baseline data exists for these lakes. The data that does exist suggests that for the most part these lakes are generally small (<100 acres), shallow (<25m max depth), and moderately productive (Secchi disc depths of 2-8m). Control lakes are slightly larger and at higher elevations compared to treatment lakes. Both sets of lakes encompass similar areas, with the maximum distance between treatment lakes at 218 km and the maximum distance between control lakes at 222 km. The study was started in April 2014, shortly after ice-off in order to capture the period of hatching and growth of zooplankton communities. Samples are taken from impact and control lakes once per month, except immediately following the treatment, at which time impact lakes will be monitored every two weeks. The study will conclude in May 2016.

**Study-Table 1. Study lakes, treatments, districts, and timeframe of study.**

Lake	Treatment	District	Sampling events per month																							
			2014									2015									2016					
			A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
Browns	control	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Bayley	control	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Cedar	control	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Amber	control	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Dry Falls	control	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Big Twin	control	5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lost	control	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
McDowell	treatment	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
No Name	treatment	1	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Upper Hampton	treatment	5	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Lower Hampton	treatment	5	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Widgeon	treatment	5	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Katy	treatment	5	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Susan	treatment	5	1	1	1	1	1	2	2	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Zooplankton samples and environmental data will be collected as described below (*Sampling Plan Summary*). At the conclusion of the study, community-level attributes, such as abundance, biomass, richness, and diversity, and species-level attributes, such as abundance and biomass, will be summarized in spreadsheets. These data will be analyzed for differences using a mixed-effects ANOVA model, with time period, treatment, and site as variables. Community composition will be evaluated visually with a redundancy analysis and statistically with a permutational MANOVA.

## Sampling Plan Summary

### Field Sampling

On first visit, three sampling sites should be chosen and marked with a GPS unit. The three sites (deep, intermediate, relatively shallow), will each be sampled for zooplankton, while only the deep site will be sampled for other physical and chemical parameters. Sampling at multiple sites within a lake, especially at shallower sites, maximizes the ability to detect rare species, particularly of littoral taxa (Arnott et al. 1998). The deep site should be selected using a bathymetric map and known value of maximum depth. At the deep site, record the lake name, sampling crew, time, date, weather conditions, and maximum depth on waterproof paper (Rite in the Rain). Take a Secchi disc reading from the shaded side of the boat, as recommended by Wetzel and Likens (2000) (no sunglasses) and record. Using a HydroLab or YSI meter, record temperature, dissolved oxygen, pH, and conductivity at 1m intervals, starting at the surface. In July, water samples will be taken from the epilimnion for nutrient analysis. Samples will be integrated across depths using a tube sampler, which will be lowered to the bottom of the epilimnion, corked, and pulled up by a line attached to the bottom of the tube, which will be weighted to ensure it descends vertically. This integrated sample will be consolidated in a bucket and subsampled. The epilimnion is defined by temperature changes of  $<1^{\circ}\text{C}$  per meter. For example, in this table of data, the epilimnion would be defined as the upper 4m, as the temperature drops by  $>1^{\circ}\text{C}$  between 4 and 5 meters.

Depth (m)	Temperature ( $^{\circ}\text{C}$ )
0	20.0
1	19.7
2	19.1
3	18.5
4	18.0
5	16.0

At each of the three sites, zooplankton will be sampled with an 80  $\mu\text{m}$ -mesh net. The length of the net will determine how many meters deep the sample can be. The net should be lowered to the predetermined depth, and after waiting ~30-60 seconds for turbulence to subside, net should be pulled up at a steady rate (~0.5m/s). If the net is pulled up too fast, filtration efficiency is low as the hydraulic head displaces plankton. Depth should be recorded to calculate the volume of water sampled. Zooplankton density can then be computed from the known volume in the sample and expanded to number/liter. To reduce the error of overestimating zooplankton abundance, each sample should be taken from an anchored site, from the bottom of the lake straight up to the lake surface, rather than at an angle. If a sample contains benthic debris, the sample should be emptied and taken again, adjusting the depth of the tow as necessary. In addition, each sample should contain a label tag written in pencil on waterproof paper (e.g., "Rite in the Rain"<sup>®</sup>) for site identification. Some of the sample bottles were labeled in permanent ink, which dissolves in ethanol. Consequently, some of the sample bottles lacked pertinent information regarding area of collection and depth. The following information should be recorded on a label tag:

- Lake Name
- Location of Sample (description or coordinates)
- Date
- Time
- Depth

**Preservation**

Immediately following a tow, each sample should be flushed into an open-ended nitex mesh cup designed to capture all zooplankton within the sample while allowing the water to pass through. Once the majority of water has drained from the sample, the sample contents should be transferred to a 125 or 250 mL plastic bottle. Samples should be topped up to a final concentration of 70% ethanol. To prevent samples from drying, an adequate volume of ethanol should be used to fill the storage vessel.

**Laboratory Analysis**

Preserved samples from each of the sites within each lake will be kept separate, but a volume-weighted composite sample will likely be taken to reduce the overall total number of samples. The volume-weighted composite sample will account for the different volumes of water that were sampled in the different lake zones (deep, intermediate, shallow). Sample enumeration will follow Strecker and Arnott (2005). Samples will be homogenized using a plankton splitter and subdivided until a reasonable subsample can be enumerated. A total of 250 individuals will be counted, with no more than 50 individuals per taxa, and no more than 50 individuals of juvenile life stages. This sampling protocol is designed to detect rare species, thus, if the sample is dominated by a few taxa, more fractions of the entire sample will be scanned for increasingly rare species (see Study-Table 2 for example). Based on the fraction of the sample counted, counts will be extrapolated to the entire sample and densities calculated on a per liter basis. Samples will also be scanned for rare species that may be present in low densities.

**Study-Table 2. Counting protocol in which subsamples (e.g., a quarter of the sample volume) are counted sequentially. After counting half of the sample, spp A is no longer counted. This allows more of the sample to be analyzed for rare species (e.g., spp D). In this example, the entire sample is counted, as the threshold of 250 individuals was not met.**

Taxa	Sample fraction				species total #	species fraction analyzed
	1/4	1/4	1/4	1/4		
1) spp A	12	40	stop	stop	52	1/2
2) spp B	15	20	18	stop	53	3/4
3) spp C	1	5	7	4	17	1
4) spp D	0	0	0	4	4	1
<b>Total # in fraction (running total)</b>	28 (28)	65 (93)	25 (118)	8 (126)		
<b>Total fractions analyzed</b>	1/4	2/4	3/4	4/4		

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F-2

**Draft**  
**Fisheries Resource Management NPDES and**  
**State Waste Discharge General Permit**  
**Fact Sheet**

**June 3, 2015**



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## Summary

This fact sheet is a companion document to the *National Pollutant Discharge Elimination System (NPDES)* general permit for fisheries resource management. It explains the nature of the proposed *discharge*, the Washington State Department of Ecology's (Ecology) decisions on limiting pollutants in the receiving water, and the regulatory and technical basis for these decisions.

Ecology has tentatively determined to issue a permit for the application of the aquatic pesticide rotenone, used to manage fish populations in lakes and streams in the state of Washington. Short-term impacts to existing or designated uses are allowed under the terms of the permit and the surface water quality standards where greater benefits to the health of the aquatic system in the long term are provided WAC 173-201A-410. Short-term modification of the water quality standards is necessary to accommodate the application of rotenone. The permit requires the Washington Department of Fish and Wildlife (WDFW) to conduct monitoring to determine the extent and duration of the short-term water quality reduction resulting from rotenone applications.

Since the *Headwaters, Inc. v. Talent Irrigation District* Ninth Circuit Court decision, Ecology has maintained that to discharge chemicals to *waters of the state*, coverage under an NPDES permit is required. Ecology has issued general and individual NPDES permits for discharges of aquatic *pesticides* and other chemicals since 2002. In 2009, the Sixth Circuit Court ruled in *National Cotton Council et al. v. The Environmental Protection Agency (EPA)* that the discharge of pesticide residues to waters of the state requires NPDES coverage. EPA developed a general NPDES permit for this purpose (effective October 31, 2011). In Washington, the EPA permit covers aquatic pesticide applications on federal and Tribal Lands.

Ecology may change the proposed terms, limits, and conditions contained in the draft permit subsequent to written public comments it receives and from testimony provided at the public hearing. This permit does not authorize a violation of surface water quality standards or the violation of any other applicable local, state, or federal laws or regulations.

Ecology will consider any person who applies rotenone to surface waters of the state without coverage under this general permit, another applicable general permit, or a *state experimental use permit* to be operating without a discharge permit and subject to potential enforcement action.

Ecology proposes to issue this general permit so that WDFW dischargers operating under coverage of this permit will comply with the *Federal Clean Water Act (CWA)* and with the Washington Water Pollution Act chapter 90.48.080 Revised Code of Washington (RCW).

## **Brief Review of Regulatory Authority**

This review is not intended to be exhaustive. It is to give a broad overview of the laws and rules under which Ecology is given authority to regulate discharges to waters of the state.

### **The Federal Clean Water Act (CWA)**

The CWA, as amended, establishes water quality goals for navigable surface waters of the United States. One of the mechanisms for achieving the goals of the CWA is the NPDES system of permits, which the EPA administers. The EPA has delegated responsibility for administering the NPDES permit program to the State of Washington. In addition to this delegation under the CWA, the state legislature in RCW 90.48.260 defines Ecology's authority and obligations in administering the NPDES permit program. Ecology directly implements the Code of Federal Regulations (CFRs) when developing state NPDES permits.

### **RCW Chapter 90.48 - the State Water Pollution Control Act**

RCW 90.48 declares that maintaining the highest possible standards to ensure purity of all waters of the state is the policy of the State. Healthy water quality must be maintained for public health, public enjoyment, protection of terrestrial and aquatic life, and the industrial development of the state. All known, available, and reasonable methods must be used by industries and others to prevent and control pollution.

In addition, it is unlawful for any person to discharge pollutants to waters of the state. The only time a discharge is lawful is when a permit to discharge is obtained from Ecology prior to the discharge occurring (Chapters 90.48.080 and 90.48.160).

### **WAC 173-226 - Waste Discharge General Permit Program**

The purpose of WAC 173-226 is to establish a state general permit program for the discharge of pollutants to waters of the state under the authority granted to Ecology in RCW 90.48. Permits must satisfy both state and federal laws governing water pollution control.

### **WAC 173-200 - Water quality standards for ground waters of the state of Washington, and WAC 173-201A, Water quality standards for surface waters of the state of Washington**

The water quality standards for the state of Washington determine the existing and beneficial uses of waters of the state. Any permits issued must include effluent limits so that allowed discharges meet the water quality standards, including antidegradation.

## **Aquatic Pesticide Legal History**

### **The Federal Clean Water Act (CWA)**

The Federal Clean Water Act (CWA), 33 U.S.C. §§1251 et seq., (1972, with major amendments enacted in 1977 and 1987), established water quality goals for navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the NPDES system of permits, which the EPA administers. The EPA has delegated responsibility for administering the NPDES permit program to the State of Washington. EPA delegated authority to Ecology based on chapter 90.48 RCW that defines Ecology's authority and obligations in administering the NPDES permit program. Ecology does not have the authority to issue NPDES permits to federal facilities or to facilities on Tribal Lands.

### **Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. §§136 et seq. (1979)**

The following excerpt is from the EPA 2010 NPDES Pesticides General Permit Fact Sheet, Sec. I.3. History of Pesticide Application Regulation:

EPA regulates the sale, distribution, and use of pesticides in the U.S. under the statutory framework of the Federal Insecticide, Fungicide, and Rodenticide Act of 1979, to ensure that when used in conformance with the label, pesticides will not pose unreasonable risks to human health and the environment. All new pesticides must undergo a registration procedure under FIFRA during which EPA assesses a variety of potential human health and environmental effects associated with use of the product. Under FIFRA, EPA is required to consider the effects of pesticides on the environment by determining, among other things, whether a pesticide will perform its intended function without unreasonable adverse effects on the environment, and whether when used in accordance with widespread and commonly recognized practice [the pesticide] will not generally cause unreasonable adverse effects on the environment. 7 U.S.C. 136a(c)(5). In performing this analysis, EPA examines the ingredients of a pesticide, the intended type of application site and directions for use, and supporting scientific studies for human health and environmental effects and exposures. The applicant for registration of the pesticide must provide specific data from tests done according to EPA guidelines.

When EPA approves a pesticide for a particular use, the Agency imposes restrictions through labeling requirements governing such use. The restrictions are intended to ensure that the pesticide serves an intended purpose and avoids unreasonable adverse effects. It is illegal under Section 12(a)(2)(G) of FIFRA to use a registered pesticide in a manner inconsistent with its labeling. States have primary authority under FIFRA to enforce "use" violations, but both the States and EPA have ample authority to prosecute pesticide misuse when it occurs. EPA 2010 NPDES Permit Fact Sheet, Sec. I.3, pg. 5.

After a pesticide has been registered, changes in science, public policy, and pesticide use practices will occur over time. FIFRA, as amended by the Food Quality Protection Act of 1996, mandates a registration review program, under which [EPA] periodically reevaluates pesticides to make sure that as the ability to

assess risk evolves and as policies and practices change, all registered pesticides continue to meet the statutory standard of no unreasonable adverse effects to human health or the environment. [EPA] is implementing the registration review program pursuant to Section 3(g) of FIFRA and will review each registered pesticide every 15 years to determine whether it continues to meet the FIFRA standard for registration. Information on this program is provided at [http://www.epa.gov/oppsrrd1/registration\\_review/](http://www.epa.gov/oppsrrd1/registration_review/). EPA 2010 NPDES Permit Fact Sheet, Sec. III.3, pg. 95.

FIFRA, as administered by the EPA and the Washington State Department of Agriculture (WSDA), requires that all persons that apply pesticides classified as restricted use be certified according to the provisions of the act, or that they work under the direct supervision of a certified applicator. Commercial and public applicators must demonstrate a practical knowledge of the principles and practices of pest control and safe use of pesticides, which they accomplish by means of a “core” examination. In addition, applicators using or supervising the use of any restricted use pesticides purposefully applied to standing or running water (excluding applicators engaged in public health related activities) must pass an additional exam to demonstrate competency as described in the code of federal regulations as follows:

“Applicators shall demonstrate practical knowledge of the secondary effects which can be caused by improper application rates, incorrect formulations, and faulty application of restricted pesticides used in this category. They shall demonstrate practical knowledge of various water use situations and the potential of downstream effects. Further, they must have practical knowledge concerning potential pesticide effects on plants, fish, birds, beneficial insects, and other organisms which may be present in aquatic environments. These applicators shall demonstrate practical knowledge of the principals of limited area application (40 CFR 171.4).”

Any person wishing to apply pesticides to waters of the state must obtain an aquatic pesticide applicator license from the Washington State Department of Agriculture, or operate under the supervision of a licensed applicator. See <http://agr.wa.gov/pestfert/licensing/> for information on Washington State licensing requirements and testing.

**Headwaters, Inc. v. Talent Irrigation District**, 243 F.3d 526 (9th Cir. 2001)

In May 1996, as part of routine vegetation management, the Talent Irrigation District (TID) in southern Oregon applied the pesticide acrolein to a system of irrigation canals. Acrolein-treated water discharged into a fish-bearing creek causing a fish kill. Subsequently, Headwaters, Inc. and Oregon Natural Resources Council Action filed a Clean Water Act citizen suit against the TID for applying a pesticide into a system of irrigation canals without an NPDES permit.

The Ninth Circuit in *Headwaters* held that the applicator should have obtained coverage under an NPDES permit prior to application of aquatic pesticides to an irrigation canal, because the residual acrolein remaining in the waters was a pollutant, and because the pollutant had leaked into waters not intended to be treated. The Ninth Circuit also held that application of the pesticide in compliance with the FIFRA labeling requirements did not exempt TID from having to obtain an NPDES permit.

Based on the TID court decision, Ecology determined that all pesticide applications to state surface waters required coverage under NPDES permits. Ecology issued its first NPDES general permits for pesticide applications to Washington's surface waters in 2002. Prior to 2001, Ecology regulated the application of aquatic pesticides to most surface waters by issuing administrative orders (called Short-Term Modifications of Water Quality Standards) to Washington-state licensed applicators. Since the *Talent* decision, there have been further court challenges about the applicability of NPDES permits to aquatic pesticide application as discussed below in this section of the Fact Sheet.

**League of Wilderness Defenders et al. v. Forsgren**, 309 F.3d 1181 (9th Cir. 2002)

In the 1970's, the Douglas fir tussock moth defoliated approximately 700,000 acres of Douglas fir in Idaho, Oregon, and Washington. In response to this outbreak, the United States Forest Service (USFS) developed a system to predict tussock moth outbreaks and control them via aerial spraying of insecticides. Based on its warning system, the USFS predicted an outbreak in 2000-2002 and designed a spraying program.

In 2002, the League of Wilderness Defenders et al. filed suit against the USFS for failing to obtain a NPDES permit under the Clean Water Act for the application of insecticides directly above surface waters. The USFS argued that spray application of insecticides by an airplane was nonpoint pollution and that the discharges fell under federal exemptions (40 CFR 122.3) for silviculture activities.

The Ninth Circuit held that aerial spraying (from an aircraft fitted with tanks) directly to, and over, surface water is a point source of pollution and requires an NPDES permit.

**Fairhurst v. Hagner**, 422 F.3d 1146 (9th Cir. 2005)

The Montana Department of Fish, Wildlife, and Parks (Department) began a ten-year program to reintroduce threatened native westslope cutthroat trout into Cherry Creek. The Department used antimycin A, a *piscicide*, to remove nonnative trout from Cherry Creek over several years, after which they planned to reintroduce native trout.

The Department was sued under the citizen suit provision of the CWA for failing to obtain an NPDES permit before applying antimycin-A to surface waters. On appeal, the Ninth Circuit concluded that:

“A chemical pesticide applied intentionally, in accordance with a FIFRA label, and with no residue or unintended effect is not ‘waste,’ and thus not a ‘pollutant’ for the purposes of the Clean Water Act. Because [the Department’s] application of antimycin-A to Cherry Creek was intentional, FIFRA compliant, and without residue or unintended effect, the discharged chemical was not a pollutant and [the Department] was not required to obtain a NPDES permit.” *Fairhurst*, 422 F.3d at 1152.

Neither the Court nor the EPA offered any guidance regarding which pesticide applications would result in no residue or unintended effect.

**Northwest Aquatic Ecosystems v. Ecology**, PCHB 05-101 (Feb. 15, 2006)

In February 2006, the Pollution Control Hearings Board (PCHB) issued a final order in PCHB05-101. This case focused on a number of issues, one of which was whether an NPDES permit is required for the use of federally registered pesticides. The PCHB ruled on summary judgment that the *Fairhurst* decision did not provide a blanket exemption from permit coverage for the application of aquatic pesticides. A pesticide application must meet the conditions identified by the *Fairhurst* court before Ecology can consider it outside the category of a pollutant under the CWA. The pesticide must:

- (1) Be applied for a beneficial purpose,
- (2) Be applied in compliance with FIFRA,
- (3) Produce no pesticide residue, and
- (4) Produce no unintended effects.

At hearing, Northwest Aquatic Ecosystems failed to provide any evidence specifically addressing how the use of the aquatic herbicides diquat and endothall on the proposed sites would meet the four conditions identified in *Fairhurst*. In the absence of such evidence, *Fairhurst* provided no basis for the PCHB to conclude that an NPDES permit is not required for the proposed pesticide applications.

**EPA Final Rule**

In November 2006, EPA issued a final rule under the CWA entitled *Application of Pesticides to Waters of the United States in Accordance with FIFRA*. This rule replaced a draft interpretive statement EPA issued in 2003 concerning the use of pesticides in or around waters of the United States. The rule stated that any pesticide meant for use in or near water, applied in accordance with the FIFRA label, is not a pollutant under the CWA. Therefore, such applications are not subject to NPDES permitting.

After EPA issued the rule, Ecology met with stakeholders to seek input on how it should regulate the use of aquatic pesticides. Ecology also provided the public with a three-week comment period. Stakeholders affiliated with each of the seven affected permits (Mosquito, Noxious Weeds, Aquatic Plant and Algae, Irrigation, Oyster Growers, Fish Management, and Invasive Moth) commented. The consensus of these stakeholders was that Ecology should continue to issue joint NPDES/state waste permits to regulate aquatic pesticide applications.

Because of stakeholder consensus and the need for a permit to implement short-term modifications, Ecology decided that Washington would continue to use NPDES permits as the legal vehicle to regulate the use of aquatic pesticides in and around Washington state waters. Ecology believes that these permits provide the best protection of water quality, human health, and the environment.

**National Cotton Council, et al. v. EPA**, 553 F.3d 927 (6th Cir. 2009)

EPA's final rule (described above) was challenged in 11 of the 12 federal circuit courts that are able to hear regulatory arguments. The federal courts combined the petitions into one case at the Sixth Circuit.

The Sixth Circuit vacated the EPA rule, finding that EPA had exempted discharges from the requirement to have a permit that the CWA clearly included within the permit requirement. First, it agreed with the Ninth Circuit's *Fairhurst* decision that if a chemical pesticide is intentionally applied to water for a beneficial purpose, and leaves no waste or residue after performing its intended purpose, the discharge would not require an NPDES permit. Second, the court found excess pesticides and residues that make their way into waters during and after any pesticide application constitute wastes under the CWA and must have NPDES permit coverage before discharge occurs.

The Sixth Circuit granted EPA a stay on the effective date of this ruling for 24 months to allow the agency to develop an NPDES permit for aquatic pesticide discharges. EPA issued its general permit on October 31, 2011, for the discharge of pesticides to manage aquatic plants and algae, aquatic animals, mosquitoes and flying insects, and forest canopy pests. In Washington, EPA's general permit covers aquatic pesticide activities conducted on federal facilities, on federal lands when federal entities conduct or authorize the treatment, and on tribal facilities and lands. The state regulates aquatic pesticide application to all other lands/waters.

### **Piscicide Use in Fisheries Management**

Over the years, fisheries biologists have utilized a number of techniques in efforts to eliminate nuisance fish from lakes (e.g., nets, traps, dynamite, electro-shocking, predator stocking, and even complete drainage). Fisheries biologists believe that the use of fish toxicants has been the most successful; and of these poisons, rotenone is the most commonly used today. In most cases, the technique is relatively simple; all fish in a waterbody are killed so that sport fish, usually trout, can then be stocked, free from predation or competition from other fish species (Bradbury 1986, cited in WDW 1992).

Rotenone is an alkaloid toxicant contained in the roots of certain South American and Asian plants. For centuries, people in those areas have obtained food fish by scattering rotenone in ponds and rivers (Bradbury 1986, cited in WDW 1992).

Michigan biologists in the 1930's were the first to make extensive use of rotenone for fisheries management, and it quickly became popular nationwide (Bradbury 1986, cited in WDW 1992). By 1949, 34 states and several Canadian provinces routinely used rotenone for the management of fish populations (Finlayson et al. 2000). A survey of rotenone use from 1988-2002 showed that rotenone was used by 38 states and 5 Canadian provinces (McClay 2005). Though an initial survey report (1988-1997) pointed to a decline in rotenone use, five additional years of survey data (1988-2003) makes it difficult to determine trends in rotenone usage (McClay 2005).

Agencies place the greatest emphasis on the use of powdered rotenone, especially for treating standing waters. This is probably due to the reduced cost of, and improved distribution techniques for, the powdered formulation, as well as increased environmental and public health concerns for the inert ingredients contained in liquid formulations. Some agencies have found it more difficult to plan and execute treatments using liquid formulations because of the demands for environmental monitoring studies not generally required for projects that utilize the powder

formulation (McClay 2000). In 2004, a new liquid formulation of rotenone (CFT Legumine) was registered which contains significantly fewer volatile organic compounds (VOCs) than previous formulations (McClay 2005).

### **Current Piscicide Use by the Washington Department of Fish and Wildlife**

This section provides information about WDFW's current fishery management program. It was adapted from the following documents:

Washington Department of Wildlife – *Final Supplemental Environmental Impact Statement (FSEIS)*, Lake and Stream Rehabilitation, 1992-1993, Report #92-14.

Washington Department of Fish and Wildlife – Final Supplemental Environmental Impact Statement (FSEIS), Lake and Stream Rehabilitation: Rotenone Use and Health Risks, January, 2002.

Washington Department of Fish and Wildlife – Final Programmatic Environmental Assessment For WDFW: Statewide Lake and Stream Rehabilitation Program.  
As funded by the USFWS Wildlife and Sportfish Restoration Program  
September 30, 2008.

To satisfy the annual demand for productive freshwater fishing, WDFW stocks selected waters with trout and select warmwater gamefish from hatcheries and/or fish from other waters. Many waters are managed for specific fisheries, such as trout-only or warmwater species. The management emphasis for state waters is determined according to habitat parameters, public desires, recreational demands, and previous management efforts. Occasionally, these waters become overpopulated with fish species which are incompatible with the fisheries emphasis. This leads to situation of increased predation and competition with desired gamefish, resulting in poor growth and survival. For example, if carp overpopulate, fish survival decreases and nesting bird habitat is degraded due to siltation and uprooting of emergent vegetation. Infestations by undesirable fish species may occur through migration from other waters or through illegal transport and introductions. When undesirable fish species impact the desired gamefish population, three management options are available:

1. No action;
2. Establish new fisheries management objectives;
3. Eliminate competing species and stock with desired gamefish species.

Option 1 will lead to an increase in undesirable fish population(s), resulting in a waterbody that no longer supports a viable gamefish fishery.

Option 2 may allow for a viable fishery, but can be relatively costly. For example, to establish a trout fishery, the cost of producing *fingerling trout* in a state hatchery is about 25% of the cost of producing a *catchable-size trout* (WDFW, 1983). In competition with warmwater fish, fingerling trout survival is lower when compared to catchable-size trout. However, catchable-size trout are generally considered to be of lower quality than fingerling trout.

Option 3 allows the lake to continue to provide a viable fishery for the managed fish species. Rotenone is the tool currently used by WDFW to eliminate fish in lakes and is far more economical than options 1 or 2.

Washington Department of Game (1983) compared the costs of three different management strategies for a typical lowland trout lake in western Washington (Lake Erie, Skagit County).

These options were:

1. Trout-only lake maintained by fry stocking and periodic rotenone treatment;
2. Mixed-species lake maintained by trout fry stocking (no rotenone); and
3. Mixed species lake maintained by catchable-size trout stocking (no rotenone).

The cost of a piscicide treatment was about 25% of the cost of either option 2 or 3. Also, note that option 2 is unlikely to be a viable alternative in many lakes for the reasons already discussed.

An analysis of the costs of rotenone treatment, combined with trout stocking in six eastern Washington lakes, estimated that for each dollar spent on rotenone and stocked trout, anglers spent between \$32 and \$105. On non-treated trout lakes, the estimated economic gain per dollar spent on trout stocking was between \$10 and \$15 (Breithaupt, as referenced in Bradbury 1986).

Similar results have been documented in other northwestern states. In 2006, the Oregon Department of Fish and Wildlife used rotenone to remove tui chub from Diamond Lake in order to improve the recreational rainbow trout fishery. Based on 2009 data, an estimation of return on investment for various use-scenarios was conducted and ranged from 309% to 2,454% (Andrew Loftus Consulting 2011). The same study used an estimate of \$91.75 spent per angler trip. If the number of angler trips per year decreases due to a decline in the quality of a fishery, then sales and labor income are negatively affected.

## **Restoration of Native Fish and Habitat**

Not all rotenone treatments conducted by WDFW have been conducted to support gamefish management objectives. WDFW has conducted rotenone treatments to support native fish and habitat restoration. Examples of native fish and habitat restoration include:

WDFW has successfully used rotenone to eliminate illegally planted, non-native fish (i.e., northern pike) from lakes where they are likely to negatively impact native fish populations (i.e., Coho salmon) through predation and downstream migration to other waters. Illegally planted fish populations can also serve as a source for additional illegally planted fish into other lakes.

Non-native fish species may also out-compete native fish populations, reducing their population levels or causing them to disappear from a waterbody. WDFW used rotenone to remove brook trout from 5.5 miles of Cee Cee Ah Creek (2008- 2010), allowing for restoration of native cutthroat trout in this stream reach.

Some fish, such as carp, can reduce the quality of waterfowl habitat by destroying aquatic plants and causing turbidity (Ivey et al. 1998). WDFW used rotenone to remove fish populations in Byron Ponds (2008) to improve waterfowl nesting and rearing.

The Northern Leopard Frog is listed as endangered species by Washington State and is listed as a species of concern at the federal level. In 2008, WDFW used a rotenone treatment to remove fish from a portion of the Northern Leopard Frog Management Area in the Potholes Wildlife Area.

## **Evaluation of Available Fish Control Options**

The WDFW Final Supplemental Environmental Impact Statement (FSEIS) – Lake and Stream Rehabilitations (1992) and Appendix II of the FINAL PROGRAMMATIC ENVIRONMENTAL ASSESSMENT (EA) for WDFW Statewide Lake and Stream Rehabilitation Program As funded by the USFWS Wildlife and Sportfish Restoration Program (2008) identifies and evaluates all available control methods for targeted pest (fish) species. These options include the use of fish toxicants (piscicides); predator/competitor stocking; and mechanical means, such as water level drawdown, netting and trapping, dams and barriers, electrofishing, and removing congregations of spawning fish. These options, which are evaluated in the FSEIS and EA, are summarized as follows:

### **Predator Stocking**

The use of apex predators (i.e., Tiger Muskie) for pest control has been used on an experimental basis in some systems with mixed species management goals with varying degrees of success. Large apex predators also eat trout and are not the most desirable option in “trout only” managed waters.

### **Modification of Regulations**

Angling regulations may be modified to address low fish survival and growth in the presence of competing or predatory species. Advantages of this method are that it is low in cost, acceptable to the public, and the fish can be used as food. Limitations are that even successful regulation changes take years to achieve favorable results. Often, because fishing success is poor in compromised waters, the angler effort in a compromised lake is insufficient to effect population changes. Furthermore, many species of fish targeted for control cannot readily be caught by angling or are not considered desirable by anglers.

### **Mechanical Means**

Water level drawdown: Very few lakes have water level control facilities. Accordingly, this is not regarded as an effective option in most situations.

### **Lake-wide Netting and Trapping**

Some accounts show this method to be effective. Most attempts using commercial fishing gear have failed because they are extremely labor intensive and therefore not cost effective. Any benefits are of short duration; as escapement of target fish results in juveniles and other fish filling the niches of the fish that were removed. Removal of all targeted fish is highly unlikely using these methods.

### Dams and Barriers

This method prohibits the migration of undesirable spawning fish to their spawning grounds; has little practical value since many undesirable fish species are lake-spawners; and, is less effective under flood conditions, ineffective against downstream migrations of fish and illegal plantings, and is costly to maintain.

### Electrofishing

This method has not been practical as a long-term control measure for the same reasons that netting and trapping typically fail.

### Removing Congregations of Spawning Fish

Adult fish congregate in spawning areas which are subsequently blocked off. The fish are then poisoned, electroshocked, or netted. This method is rarely appropriate, since most of the species targeted by WDFW spawn lake-wide or over broad areas of the lake rather than congregating in any one section of the water. Similar to the above mentioned physical-removal techniques, this is labor-intensive and would have to be repeated yearly, creating a long-term time and labor investment.

In an email to Ecology, dated August 20, 2014, the WDFW provided a comparison of available fish control methods (Table 1).

**Table 1: Comparison of fish control methods**

Criteria	Rotenone	Predator / Competitor Introduction (Biological Control)	Mechanical Fish Removal (nets, electrofishing, etc.)
<b>Impact on aquatic environment (water quality and chemically)</b>	Moderate and short term. Total detoxification through natural breakdown takes place normally within 5 weeks (Finlayson et al. 2000), Detoxification time can be reduced with the use of an oxidizer e.g., potassium permanganate.	Minimal and long term.	Minimal and long term.
<b>Ability to meet water quality standards</b>	Excellent – Concentrations of rotenone for proposed work is not toxic to humans (Finlayson et al. 2000) and is difficult to detect after approximately five weeks.	Excellent, since there are no introductions of chemicals.	Excellent, since there are no introductions of chemicals.

<b>Effectiveness for goal</b>	Good to excellent, depending on the target species, the concentration of the rotenone during application and the thoroughness of the application.	Low to significant, depending on the introductions (species and numbers). Results generally are not seen in the short term and can be unpredictable, depending on the target and introduced species.	Low to significant. It can be most effective in smaller waters but is labor intensive and requires a long-term commitment. It is usually only a short-term solution. Success can depend on target species and the target number to remove.
<b>Cost effectiveness</b>	WDFW estimated that for every dollar spent on rotenone and trout stocking, anglers gain between \$32 - \$105 worth of fishing.	Moderate to good, depending on the numbers of fish introduced.	High cost, labor intensive – low return in most cases.
<b>Suitability for treatment sites</b>	Suitable for most sites.	Suitability is dependent upon the target species and the species introduced and the size of the water. Proper planning is key.	Suitable for very few sites because of drawbacks mentioned.
<b>Protection for human health concerns</b>	Human health concerns can be adequately addressed by following label restrictions, SOP manual and safety procedures, which are part of permit requirements.	No human health concerns.	No human health concerns.
<b>Response to emergency</b>	Can be adequately addressed. Contingency plans are part of permit requirements.	No emergency response necessary.	No emergency response necessary.

## Wastewater Characterization

The proposed wastewater discharge is characterized for the following parameters:

**Table 2: Pollutant Characterization – Powdered Rotenone Formulations**

Product Name	Application Rate	Active Ingredient Concentration in Treated Waters
Prentox <sup>®</sup> Prenfish <sup>™</sup> Fish Toxicant Powder or Peru Cube Powder <sup>®</sup>	Application rates on label range from 0.10 - 5 ppm (based upon 5% active rotenone).	0.005 - 0.20 ppm.
Potassium Permanganate (if deactivation is required)	Variable application rate depending on concentration of rotenone, total alkalinity, and organic demand. Application rates will be calculated and applied in accordance with "Rotenone SOP Manual" by Finlayson et al. (2010a).	Variable concentration in the rotenone <i>deactivation zone</i> , based upon formulas in Finlayson et al. (2010a). Outside of the deactivation zone the concentration shall not exceed 1 ppm.

**Table 3: Pollutant Characterization – Liquid Rotenone Formulation**

Product Name	Application Rate	Active Ingredient Concentration in Treated Waters
Prentox <sup>®</sup> Prenfish <sup>™</sup> Toxicant <sup>1</sup>	Application rates on label range from 0.10 - 5 ppm (based upon 5% active rotenone).	0.005 - 0.20 ppm active rotenone.
CFT Legumine <sup>™</sup> Fish Toxicant <sup>2</sup>	Application rates on label range from 0.10 - 5 ppm (based upon 5% active rotenone).	0.005 - 0.20 ppm active rotenone.
Potassium Permanganate (if deactivation is required)	Variable application rate depending on concentration of rotenone, total alkalinity, and organic demand. Application rates will be calculated and applied in accordance with "Rotenone SOP Manual" by Finlayson et al. (2010a).	Variable concentration in the rotenone deactivation zone, based upon formulas in Finlayson et al. (2010a). Below, the deactivation zone, the concentration will not exceed 1 ppm.

<sup>1</sup>Inert ingredients include aromatic petroleum solvent, not to exceed 80% (9.9% naphthalene, 1.7% 1,2,4-trimethylbenzene, and 7.5% acetone (Material Safety Data Sheet, U.S. Dept. of Labor)

<sup>2</sup>Inert ingredients include petroleum distillates, specifically N-Methylpyrrolidone (Material Safety Data Sheet, CWE Properties Ltd.)

The permit does not shield inerts or adjuvants for which the chemical composition has not been disclosed to Ecology.

## **WDFW Lake and Stream Rehabilitation Policy and Procedures**

WDFW Policy POL-C3010 Lake and Stream Rehabilitation authorizes the use of rotenone to conduct lake and stream rehabilitation activities. This policy identifies the various roles and actions of WDFW staff involved in the rehabilitation program including relevant deadlines. (Appendix B)

WDFW's document entitled "Schedule of Activities" is an internal WDFW document that summarizes the general timeline involved in the lake rehabilitation program including the schedule of planning, public notification, approval, treatment and post-rehabilitation reporting. (Appendix C)

## **Pre-Treatment Procedures**

WDFW selects lakes or streams for piscicide treatment when a viable fishery can only be maintained with introductions of catchable-size fish, or when removal of non-native fish is necessary to restore native fish or wildlife habitat. The WDFW District Fish Biologist, directly charged with managing recreational fisheries within a geographic area of responsibility, determines which lakes are proposed for treatment. To make this determination, standard indicators of fishery performance are evaluated: average angler catch rate on Opening Day, fish size, and fish population relative abundance. When fishery performance declines and fish sampling data indicate that undesirable fish species are the cause, the District Fish Biologist recommends treatment of the water(s) to his or her supervisor, the Regional Fish Program Manager.

The District Fish Biologist must then complete a pre-rehabilitation plan(s) containing vital information on the proposed treatment(s). In calculating the required concentration for a rotenone treatment, the biologist considers a variety of factors (e.g., target species, water chemistry, past successes or failures, presence of weedy shorelines). Planned rotenone concentrations for a treatment do not exceed that allowed by the FIFRA label and NPDES permit.

The Regional Fish Program Manager presents a list of proposed treatments along with justifications for each waterbody to the Fish Management Division of WDFW. Approval at this stage may depend not only on biological justification, but on other considerations such as the waterbody's public use, its importance as a recreational fishery, and availability of piscicide. WDFW establishes statewide priorities and creates a list of candidate lakes on an annual basis.

After developing a list of candidate lakes, WDFW notifies the public of proposed treatments as well as an opportunity to comment through the *State Environmental Policy Act (SEPA)* process through a general news release, usually in early summer. District Fish Biologists also solicit public opinion from lakeshore residents and other interested parties. Public meetings are conducted in the vicinity of the waters proposed for treatment as well as the headquarters office

in Olympia. After opportunities for public comment are completed, WDFW issues a final list of candidate waters as an addendum to the 2002 FSEIS to meet State Environmental Policy Act requirements.

The WDFW Director grants final agency approval of the list of candidate lakes. Even with the Director's approval, WDFW may elect not to treat a lake if all the pre-treatment steps, such as outlet deactivation and/or water control (e.g., diking or damming) have not been completed or other conditions have changed at the intended time of treatment.

Fishing regulations are liberalized through emergency regulation when possible to allow harvest opportunity in waters scheduled for rehabilitation. In some instances, warmwater gamefish, such as bass or panfish, may be collected and transported prior to treatment, to other waters to help enhance their warm-water fishing opportunities.

For a detailed list of treatment-related activities see Appendix C.

### **Treatment Procedures**

The powdered rotenone application method, pioneered by the Utah State Department of Natural Resources – Division of Wildlife Resources, involves mixing powdered rotenone with lake water, using a pump and aspirator, to create a slurry. Standard packaging for powdered rotenone is a sealed, heavy gauge, removable plastic liner inside sealed, pressed fiber 25 or 50 kilogram container. The slurry is discharged directly in to the lake or water body surface (Thompson et al, 2001). For a detailed description of the application procedure, refer to Finlayson et al. 2010a. "Operation of Semi-Closed Aspirator Systems for Application of Powdered Rotenone SOP: 9.0," in Planning and Standard Operating Procedures for Use of Rotenone in Fish Management.

In 2007, the EPA issued a Re-registration Eligibility Decision (RED) for Rotenone (EPA 2007). As a result of the RED for rotenone, the "Operation of Semi-Closed Aspirator Systems for Application of Powdered Rotenone SOP: 9.0" was adopted as a component of the FIFRA label for rotenone.

Application of liquid rotenone occurs where use of pumper boats capable of mixing the powdered rotenone is impractical. Liquid rotenone formulations are mixed with water, according to the FIFRA label, prior to discharge. WDFW uses backpack sprayers, canoes, airboats and helicopters to apply liquid rotenone to areas where access is limited due to shallow water, vegetation or remoteness of the waterbody.

Treatments conducted under this permit must follow all requirements in the FIFRA label for the product being used.

### **Post-Treatment Procedures**

In lakes with a stream outlet, WDFW must control or detoxify runoff from the lake. In some cases, the runoff is minimal and can be dammed off (using sandbags, for example) until the rotenone naturally degrades. When runoff cannot be contained, WDFW applies potassium permanganate into the outlet stream to neutralize the rotenone before it can harm fish and invertebrates downstream. Between 1977 and 1984, WDFW required deactivation by potassium

permanganate in only 16% of the lakes treated. Pfeifer (1985) provides a detailed account of outlet deactivation procedures, including dosage/deactivation curves and case histories in Martha and Silver Lakes, Snohomish County (WDW 1992).

Rotenone typically degrades within a few days to eight weeks in lowland lakes, and may persist somewhat longer in sub-alpine or alpine lakes (WDFW 2002). WDFW District Biologists perform live-fish bioassays to determine toxicity levels in recently-treated lakes. Hatchery trout (5-10 fish) held in live boxes are placed into previously treated waters. Live boxes are checked 48 hours later to determine survival.

The District Fish Biologist submits a post-rehabilitation report to Ecology for each treated water. It describes the efficacy of the treatment, water conditions at the time of treatment, target and non-target species observed post-treatment, amount of rotenone (liquid and powder) used, and any deactivation measures taken (WDW 1992).

WDFW typically restocks fish following piscicide treatment when it fits the management plan for the waterbody. During the post-treatment years, the District Fish Biologist continues to monitor fish survival and growth, as well as catch rates for the water (WDW 1992).

### **Rotenone and Human Health**

A WDFW internal memo summarizes WDFW's human health and safety procedures (February 3, 2001). This memo is included in WDFW's 2002 FSEIS as Appendix C.

Additionally, WDFW follows the American Fisheries Society rotenone standard operating procedures (SOP) manual which provides direction to applicators regarding project planning and safety (Finlayson et al. 2010a). The SOP manual is considered to be part of the FIFRA label for rotenone.

#### **Potential of rotenone to cause Parkinson's disease**

*The EPA review of rotenone for assessing its eligibility for re-registration (EPA, 2006a) has raised a concern because the extensive research on Parkinson's disease includes a paper that shows a Parkinson's disease-like effect resulting from rotenone exposure (Betarbet et al., 2000). Turner, L., et al. 2007 at 76.*

*Although rotenone-induced Parkinsonism is a useful research tool, Betarbet et al. (2000) cautioned that Rotenone had little toxicity when administered orally. A continuous, intravenous administration of rotenone for 1-5 weeks is not representative of any likely exposure to rotenone. However, EPA (2006a) stated that intravenous injection may mimic the inhalation route of exposure because it is a fairly direct route of exposure that avoids any metabolic breakdown that occurs from gut uptake. A subchronic neurotoxicity study via inhalation was recommended for rotenone because inhalation is a potential route of exposure to rotenone. However, with only piscicidal uses of rotenone remaining, the requirement has been placed "in reserve" since chronic exposure to rotenone is most likely from garden, agricultural, and animal uses. For piscicidal uses, chronic inhalation is likely only for handlers and applicators of rotenone who do not wear the required Protective Personal Equipment. It is also possible that inadvertent overspray could result in inhalation exposure of rotenone, but such an event would be a one-*

time, acute event because treatment of an individual lake would only re-occur after at least a year, and likely several years. For applicators and other regular handlers of rotenone, the required PPE would preclude any consequential exposure to rotenone, thus removing any possibility of a Parkinson like effect. Turner, L., et al. 2007 at 77.

Finlayson et al. 2012 at 473 concluded that: *Collectively, the toxicology and epidemiological studies present no clear evidence that rotenone is causally linked to PD (Parkinson's Disease). Even if there were clear evidence, it would have little impact on the current and proposed use of rotenone in fish management. This is because the toxicology studies demonstrating PD-like effects were conducted using routes of exposure (e.g., intraperitoneal or intravenous injection or oral dosing with solvents) and exposure regimes (e.g., weeks to months) not germane to potential human exposure associated with fishery uses. The epidemiological studies on pesticide use by farmers assessed historical application scenarios that paid little or no attention to personal hygiene, safety, and safety equipment. For the applicator, the use of required PPE will significantly reduce, if not eliminate, exposure. For the general public, restricted access to the treatment area until rotenone subsides to safe levels and the use of potassium permanganate to detoxify water leaving the treatment area will greatly minimize exposure. Although everyone is at some risk of developing PD, the risk of developing PD-like symptoms as a result of rotenone exposure from use in fisheries management is negligible because with recommended care, rotenone exposure has been effectively eliminated.*

#### **Mobility of rotenone and considerations for use in fractured basaltic areas**

*Rotenone does not create a ground water concern. The strong tendency of rotenone to adsorb to soils, sediments, and other particulate matter precludes leaching almost entirely. The soil-water partition coefficients,  $K_d$ , range from 4.2 to 122 Kg/L for a variety of soil types. There is some potential for leaching only when rotenone reaches the most vulnerable soils, i.e., "very sandy soils with low organic content" (USEPA, 2006c); even then, mobility should be limited, and hydrolysis should degrade any rotenone that does reach water. Turner, L., et al. 2007 at 54. In a recent (2006) treatment of Diamond Lake, Oregon, groundwater samples have been taken in three wells, and no rotenone has been found at the detection limit of 2 ppb. (David Loomis, Project Manager, Oregon Department of Fish and Wildlife, telephone communication, May 14, 2007). Turner, L., et al. 2007 at 55.*

*No information on groundwater sampling for rotenone was located for Washington State. Despite the lack of detection anywhere that sampling has been done, the geology of eastern Washington has large expanses of fractured basalt substrate similar to volcanic areas of the Pacific Northwest, California and the Great Basin. Specifically concerns have been raised about the potential migration of rotenone through the fractured basalts of the Columbia plateau. Turner, L., et al. 2007 at 55.*

*To enter the fractured basaltic geologic system, rotenone would have to move through the lake bed into the fractured basalt area. Once it entered the fractured basalt area, it could move either laterally or vertically through openings, fissures and cracks in the rocks. However, the potential for that movement is expected to be zero because of adsorption to sediments in the lake bottom, and the immobility of rotenone. Turner, L., et al. 2007 at 56.*

*Lake bottoms are not simply underwater soils. Lakes have some level of algae and aquatic macrophytes. Decaying plant material and waste materials from aquatic animals, accumulate over time and most go to the bottom of the lake creating a lake sediment that is typically rich in organic material. Even a thin sediment layer would create a barrier for rotenone movement since it binds to particulate matter and does not leach.* Turner, L., et al. 2007 at 57.

## **Frequency of Piscicide Treatments**

Lakes or ponds treated with rotenone rarely remain free from undesirable fish species. Some undesirable species repopulate the lake from connected surface waters naturally over the course of time. Occasionally, some fish may avoid lethal concentrations of rotenone by taking refuge near underwater springs or freshwater inlets. In addition, intentional illegal introductions of undesirable fish species sometimes occur. Regardless of origin, the effect of undesirable fish species is fairly consistent in trout-managed waters. Trout production tends to decline, and the waterbody may need rehabilitation again. From 1940 to 1984 the average length of time between rotenone treatments, on lakes treated more than once, was 7.74 years (Bradbury 1986).

## **Target Species**

In the eastern half of the state, WDFW has targeted pumpkinseed sunfish for elimination most frequently. In the western half of the state, WDFW has targeted yellow perch most frequently. No piscicide treatments have occurred in Western Washington since Crocker Lake in Jefferson County was treated in 1998 for removal of Northern Pike. Other important target species include Common Carp, Tench, Brown and Yellow Bullhead catfish, Largemouth Bass and Smallmouth Bass. All are non-native species. Native fish and wildlife restoration treatments are anticipated and may include removal of Common Carp to enhance waterfowl habitat or removal of non-native trout to restore native trout populations, and removal of fish to restore amphibian habitat.

A particular lake may experience recurring problems with the same target species over the course of many years. Often, however, the target species on frequently treated lakes changes over the years. This is often the case in "urban" lakes which frequently receive illegal fish introductions.

## **Timing of Piscicide Treatments**

The majority of rotenone treatments occur in the fall months with only a small percentage of treatments occurring in spring. All spring treatments conducted by WDFW have occurred on eastern Washington lakes. From 2002 to 2012, only three treatments were performed in the spring; all others took place in the fall.

WDFW applies rotenone in the fall because water levels are low, aquatic vegetation is sparse, recreational use of the lake is reduced, and thermal stratification has ended in most lakes (allowing rotenone to circulate throughout the water column). WDFW also prefers fall treatments when they are targeting early spring spawners (e.g., perch). WDFW performs occasional spring rotenone treatments on certain lakes with extensive shallow or weedy areas. Higher water levels in the spring make these areas more accessible by boat. Where irrigation water storage affects water level, WDFW treats in early spring when water levels and flows are lowest.

## Permit Status

Ecology has permitted the application of rotenone for fish management under the NPDES program. Ecology first issued an individual permit to WDFW for rotenone use on June 5, 2002 which expired on July 5, 2007. As required by law and the permit, WDFW submitted an application for continuing permit coverage 180 days prior to the expiration of the 2002 permit. Ecology administratively extended the permit to allow more time for developing the draft permit. Ecology anticipates making a decision on issuance of this proposed NPDES general permit for fisheries resource management in 2015.

## Regulatory Limitations

### Introduction to Legal Requirements for Effluent Limitations to Control Pollutants in Discharges

Section 502(11) of the CWA defines “effluent limitation” as any restriction on the quantity, rate, and concentration of chemical, physical, biological, and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean, including schedules of compliance. Effluent limitations are among the permit conditions and limitations prescribed in NPDES permits issued under Section 402(a) of the Act, 33 U.S.C. §1342(a). Delegated states (such as Washington) must meet, at a minimum, the requirements set by EPA; however, they have the option of adopting more-stringent requirements.

### Types of Effluent Limitations: Technology-Based, and Water-Quality Based

The CWA requires that discharges from existing facilities, at a minimum, meet *technology-based effluent limitations* reflecting, among other things, the technological capability of Permittees to control pollutants in their discharges which are economically achievable. State laws (RCW 90.48.010, 90.52.040 and 90.54.020) require the use of “*all known, available, and reasonable methods of prevention, control and treatment*” (AKART).

### Water quality-based effluent limitations (WQBELs)

*Water Quality-based effluent limitations* (WQBELs) are required by CWA Section 301(b)(1)(C) and in Washington State are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Quality Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC), the National Toxics Rule (40 CFR 131.36) National Primary Drinking Water Regulations (40 CFR Chapter 1, Part 141) and Group A Public Drinking Water Supplies Source Water Protection and Maximum Contaminant Levels (WACs 246-290-135 and 246-290-310). The more stringent (and practicable) of these two limits (technology or water quality-based) must be chosen for each of the parameters of concern, and implemented through NPDES permits. [CWA sections 301(a) and (b)].

Effluent limits in NPDES permits may be expressed as numeric or non-numeric standards. Courts have recognized that there are circumstances when numeric effluent limitations are infeasible and have upheld EPA’s regulations allowing permits issued with conditions (e.g., Best Management Practices or “BMPs”) designed to reduce the level of effluent discharges to acceptable levels. 40 C.F.R. 122.44(k)(3).

*Natural Resources Defense Council v. EPA*, 673 F.2d 400 (D.C. Cir. 1982)

In this case challenging EPA's permit regulations the court said that section 502(11) defined "effluent limitation" as "any restriction" on the amounts of pollutants discharged, not just a numerical restriction.

*Natural Res. Def. Council, Inc. v. Costle*, 568 F.2d 1369 (D.C. Cir. 1977)

While in this case the D.C. Circuit invalidated EPA's regulations to the extent those regulations attempted to exempt certain point source dischargers from regulation, the court nonetheless stressed that when numerical effluent limitations are infeasible, EPA may issue permits with conditions designed to reduce the level of effluent discharges to acceptable levels.

### ***Deactivation of Piscicide Treated Waters***

WDFW typically treats "closed basin" lakes that do not discharge (no outlets). However, when rotenone-treated waters may discharge and impact aquatic life outside the area, or when flowing waters are treated, this permit requires rapid deactivation. From 1992 through 2002, such deactivation has been necessary in 3.6% of the lakes treated in Washington (WDFW 2002). From 1992 through 2013, less than 2 percent of outlet streams from rotenone-treated lakes have needed deactivation (email from WDFW's Bruce Bolding August 2014).

Potassium permanganate (KMnO<sub>4</sub>) quickly deactivates (oxidizes) rotenone formulations (WDFW 2002; Finlayson, et al. 2000; MacMillan 2009). Rotenone degrades naturally within one to eight weeks depending on *pH*, alkalinity, and temperature (Schnick 1974, cited in WDFW 2002). Rotenone toxicity may last longer in cooler, more sterile sub-alpine or alpine lakes. WDFW has seldom needed potassium permanganate to deactivate rotenone applications. WDFW selects rotenone treatment so that periods of very low or no flow exist during the time that treated waters remain toxic to fish. This permit allows WDFW to apply potassium permanganate by two methods. One method entails dissolving the crystals in water and dripping the solution into the water. The second method meters the crystalline chemical into the receiving water. Archer (2001) found that the free flowing crystalline form used in potable water treatment plant applications was the best product to use for dripping the crystalline form. He stated the ease of controlling application rates as the advantage. Finlayson et al. (2010a) and in Archer (2001) describes the procedure to determine the amount of potassium permanganate required to detoxify a rotenone treatment.

The proposed permit requires that WDFW effectively deactivate treated waters using potassium permanganate so that water quality standards are not exceeded outside of the deactivation zone. For purposes of this permit, deactivation zone is defined as the downstream waters where potassium permanganate has been applied but has not yet fully deactivated the rotenone, due to the lag time normally associated with deactivation. The deactivation zone is typically considered the distance that water would be expected to travel in 20 minutes (Finlayson et al. 2000; Horton 1997). Since the deactivation zone may contain toxic levels of piscicide and potassium permanganate, some fish mortalities will likely occur within this zone.

Since potassium permanganate itself may be toxic to non-targeted organisms at 2 mg/L (Marking and Bills 1975, cited in Archer 2001), deactivation procedures must utilize methods outlined in the Rotenone SOP Manual Finlayson et al. (2010a) to achieve the minimum effective

concentration of potassium permanganate to oxidize the piscicide within the deactivation zone. Outside of the deactivation zone, WDFW must ensure that the piscicide is totally deactivated and residual potassium permanganate levels are maintained at a non-toxic level of 1 mg/L (Finlayson et al, 2010a). Deactivation is most effective for rotenone concentrations of up to about 1 ppm of 5% formulation but is nearly impossible at concentrations greater than 3.2 ppm (Horton 1997). WDFW must closely monitor potassium permanganate concentrations using methods in the Rotenone SOP Manual (Finlayson et al. 2010a) to keep residual permanganate at a level that effectively deactivates piscicides while preventing damage to aquatic life downstream of the treatment area and deactivation zone.

### **Technology-based limitations**

Technology-based effluent limits are in many cases established by EPA in regulations known as effluent limitations guidelines, or “ELGs.” EPA establishes these regulations for specific industry categories or subcategories after conducting an in-depth analysis of that industry. The CWA sets forth different standards for the effluent limitations based upon the type of pollutant or the type of permittee involved.

The CWA establishes two levels of pollution control for existing sources. In the first stage, existing sources that discharge pollutants directly to receiving waters were initially subject to effluent limitations based on the “best practicable control technology currently available” or “BPT.” 33 U.S.C. § 1314(b)(1)(B). BPT applies to all pollutants. In the second stage, existing sources that discharge conventional pollutants are subject to effluent limitations based on the “best conventional pollutant control technology,” or “BCT.” 33 U.S.C. §1314(b)(4)(A); see also 40 C.F.R. §401.16 (list of conventional pollutants) while existing sources that discharge toxic pollutants or “nonconventional” pollutants (*i.e.*, pollutants that are neither “toxic” nor “conventional”) are subject to effluent limitations based on “best available technology economically achievable,” or “BAT.” 33 U.S.C. §1311(b)(2)(A); see also 40 C.F.R. §401.15 (list of toxic pollutants).

The factors to be considered in establishing the levels of these control technologies are specified in section 304(b) of the CWA and EPA’s regulations at 40 CFR §125.3.

All NPDES permits are required to consider technology-based limitations (water quality-based effluent limitations may be more stringent). 40 CFR §§122.44(a)(1) and 125.3. CWA sections 301(b)(1)(A) for (BPT); 301(b)(2)(A) for (BAT); and 301(b)(2)(E) for (BCT).

Washington has similar technology-based limits that are described as 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 BMPs such as prevention and control methods (e.g., waste minimization, waste/source reduction, or reduction in total contaminant releases to the environment).

### ***Authority to Include Non-Numeric Technology-Based Limits in NPDES Permits***

Permits may include BMPs to control or abate the discharge of pollutants when: (1) “[a]uthorized under section 402(p) of the CWA for the control of stormwater discharges”; or (2) “[n]umeric effluent limitations are infeasible.” 40 C.F.R. § 122.44(k).

EPA has substantial discretion to impose non-quantitative permit requirements pursuant to Section 402(a)(1)), especially when the use of numeric limits is infeasible. *See Natural Resources Defense Council v. EPA*, 822 F.2d 104, 122-24 (D.C. Cir. 1987). As recently as 2006, The U.S. Court of Appeals for the Sixth Circuit has once again held that the CWA does not require the EPA to set numeric limits where such limits are infeasible. *Citizens Coal Council v. EPA*, 447 F.3d 879 (6th Cir. 2006). The court stated “site-specific BMPs are effluent limitations under the CWA.” *Citizens* 399 F.3d at 895 (citing *Waterkeeper Alliance, Inc. v. EPA*, 399 F.3d 486, 502 (2nd Cir. 2005)).

Ecology believes that implementing the applicant's Discharge Management Plan (DMP), following all permit conditions, the Washington Pesticide Control Act, the Washington Pesticide Application Act and the FIFRA label will meet AKART for this permit.

According to the Material Safety Data Sheets (MSDS) provided by WDFW, the liquid rotenone product Prentox<sup>®</sup> Prenfish<sup>™</sup> Toxicant contains 80% inert ingredients, including aromatic petroleum solvents (naphthalene, trimethylbenzene, and acetone). The powdered formulations do not contain these chemicals. CFT Legumine<sup>™</sup> Fish Toxicant, the other liquid formulation of rotenone registered in Washington State contains 90% other inert ingredients, including petroleum distillates (n-Methylpyrrolidone). The permit will restrict the use of liquid rotenone (e.g., Prentox<sup>®</sup> Prenfish<sup>™</sup> Toxicant and CFT Legumine<sup>™</sup> Fish Toxicant) because:

According to EPA's IRIS database, benzene is classified as a “known” human carcinogen for all routes of exposure based upon convincing human evidence as well as supporting evidence from animal studies. (U.S. EPA, 1979, 1985, 1998; ATSDR, 1977).

VOCs contained in liquid formulations could cause air quality problems, especially in urban areas classified as non-attainment zones.

When compared to liquid rotenone, powdered rotenone applied using the Utah method, is effective in meeting fish control objectives.

To minimize the release of VOCs the proposed permit limits the use of liquid rotenone products to spot applications and stream treatments in areas that are not practicably accessible by boats used for application of powdered rotenone. WDFW must treat open water areas on lakes that are accessible by pumper boats with powdered rotenone formulations, mixed with water, and applied using the method pioneered by the Utah State Department of Natural Resources – Division of Wildlife Resources. This method involves mixing powdered rotenone with lake water, using specialized equipment, to form slurry that is applied to the surface of the water. This method is defined in Finlayson et al. 2010a. “Operation of Semi-Closed Aspirator Systems for Application

of Powdered Rotenone SOP: 9.0,” in *Planning and Standard Operating Procedures for Use of Rotenone in Fish Management*, (American Fisheries Society, 2010), pp 81-85 and is considered part of the pesticide label.

## Surface Water Standards

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).

Ecology conditions NPDES and waste discharge permits so that authorized discharges meet water quality standards. The characteristic beneficial uses of surface waters include, but are not limited to, the following (all uses have equal weight): 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 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 drinking water uses, aquatic life and recreation in and on the water. The standards may be elevated further if the waterbody has been identified as being impaired (303(d) listed) or has had a TMDL completed for the watershed. 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. Ecology has determined that a Permittee’s discharge under this Permit does not contain chemicals of concern based on existing data or knowledge.

WAC 173-201A-240 states that “toxic substances shall not be introduced above natural background levels in waters of the state which have the potential either singularly or cumulatively to adversely affect characteristic water uses, cause acute or chronic toxicity to the most sensitive biota dependent upon those waters, or adversely affect public health, as determined by the department.” This narrative water quality criteria limits 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. These criteria are used 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 173-201A-200) and of all marine waters (WAC 173-201A-210) in the State of Washington.

## **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 fish in waters of the state. 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.

### **303(d) IMPAIRED WATER BODIES**

Ecology periodically reviews surface water quality data to determine if water bodies meet criteria. Section 303(d) of the Clean Water Act requires that waters that do not meet the criteria undergo an evaluation of the cause and amount of the contaminant. Ecology places limits on the amounts of pollutants allowed to be discharged and published in Total Maximum Daily Load (TMDL) reports.

The current EPA approved assessment and 303(d) list can be found at:

<http://www.ecy.wa.gov/programs/wq/303d/index.html>

Pesticide applications under the permit in 303(d)-listed water bodies may have additional limits and conditions imposed upon them. The parameters of concern identified in the permit are dissolved oxygen, phosphorus and nitrogen. Water bodies listed on the 303(d) list as impaired for dissolved oxygen are either year-round problems, or seasonally low dissolved oxygen levels. Piscicides, which will kill fish, benthic macro invertebrates and zooplankton, have the potential to adversely affect dissolved oxygen concentrations within a water body. The goal of a piscicide treatment is usually to kill all of the target fish from a specific area for the purposes of lake or stream rehabilitation. As a result of the treatment, a massive die-off of fish can occur in a specific area, creating an oxygen depleting sequence of dead fish – nutrient release – greater plant and phytoplankton growth – greater bacterial biomass. The increased bacteria can consume dissolved oxygen normally available in the system for other organisms. However, with many of the organisms that usually rely on dissolved oxygen being eliminated by the piscicide treatment, the demand for dissolved oxygen is likely less than it would have been prior to the piscicide treatment.

When fish die after a piscicide treatment, they release sequestered nutrients into the water column. The rapid release of nutrients can trigger algae blooms, which can adversely impact water quality and human and environmental health. This response is usually short lived. As zooplankton populations rebound, in the weeks and months after the piscicide treatment, they will often reduce the algae population through grazing (Bradbury 1986).

For treatments on 303 (d) listed water bodies WDFW must develop appropriate mitigation measures in consultation with Ecology. Some mitigation measures may include:

1. Timing of treatment (early vs. late in the season). Avoid treating impaired water bodies during the summer months, when water quality is already lowered.
2. Limiting the area treated at any one time (i.e., partial water body treatments).
3. Manual removal of dead fish *as practical* following chemical treatment.

## Ground Water Standards

Similar to the Surface Water Quality Standards discussed above, the Ground Water Quality Standards (chapter 173-200 WAC) protect existing and future beneficial uses of ground water. Permits issued by Ecology must not allow violations of those standards except where an overriding public interest is served, and that all pollutants proposed for entry into ground water are provided with AKART treatment prior to entry.

Existing and future beneficial uses of ground water include: drinking water, stream flows through hydrologic connection, stock watering, industrial, commercial, agricultural, irrigation, mining, fish and wildlife maintenance and enhancement, recreation, generation of electric power and preservation of environmental and aesthetic values, and all other uses compatible with the enjoyment of the public waters of the state. At a minimum, to protect all existing and beneficial uses, ground water must be protected to drinking water standard levels.

The ability of rotenone to move through soil is low to slight. Rotenone moves only 2 cm through most types of soils before being bound by organic matter and rapidly degrading (WDFW 2002). An exception would be in sandy soils where it may move about 8 cm. Rotenone binds strongly to organic matter in soil so is unlikely to enter groundwater (Finlayson et al. 2000, Dawson et al. 1991, Turner 2007).

California Department of Fish and Game has monitored rotenone applications for 15 years and has concluded that toxicity and other effects were confined to the treatment and deactivation areas and ground waters were not contaminated (Finlayson et al. 2001).

Based on these properties of rotenone, and because WDFW has no discharge to ground, the permit does not require limits based on potential effects to ground water.

## Drinking Water Standards

Federal and State drinking water regulations and standards (WAC 246-290-310 and 40 CFR Chapter 1, Part 141) are legally enforceable and apply to public drinking water supplies. They protect public health by limiting the levels of certain contaminants in drinking water. Potential drinking water contaminants include microorganisms (such as cryptosporidium, Giardia, and E. coli), disinfectants, disinfection by-products, inorganic chemicals (such as nitrates, lead and copper), organic chemicals (such as pesticides), and radionuclides. Federal and State drinking water regulations establish Maximum Contaminant Levels (MCL's), which are numeric limits that cannot be exceeded in the public drinking water supply. For EPA's current list of drinking water standards, see <http://water.epa.gov/drink/contaminants/index.cfm#Primary>.

Many contaminants are not regulated by drinking water standards, but EPA is considering some as candidates for regulation. See: <http://water.epa.gov/scitech/drinkingwater/dws/ccl/index.cfm>.

State Regulations also require source water protection around public drinking water supplies (WAC 246-290-135). Source water protection includes maintaining a protective Sanitary Control Area around ground water wells (100 feet for wells and 200 feet for springs) and a wellhead protection area around wells. Land uses or practices that could potentially contaminate a well are not allowed within the Sanitary Control Area, and are strongly recommended against within the six-month time of travel zone of the wellhead protection area.

Permittees must notify water rights holders of treatment when the chemical or product's label has restrictions and/or precautions for potable or domestic water use, irrigation use, or livestock watering.

For potable water rights, the Permittee must provide water for human consumption from the time of treatment until they can demonstrate that rotenone levels have dropped to EPA's drinking water level of concern (LOC) of 40ppb.

For treatments using liquid rotenone formulations that contain VOCs the Permittee must provide an alternative potable water supply for human consumption from the time of piscicide application until VOC levels in the treated water body have dissipated to background levels or fall below 0.5 ppb.

## **Sediment**

The aquatic sediment standards (chapter 173-204 WAC) protect aquatic biota and human health from chemicals that may build up in sediments and cause impacts to aquatic biota over the long term. WAC 173-204-340 (Freshwater sediment quality standards) directs Ecology to determine on a case-by-case basis what criteria, methods, and procedures are necessary to prevent exceedance of the standards criteria. Ecology has determined through a review of the discharger characteristics and rotenone characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards criteria and is not likely to have impacts beyond the short-term water quality modification allowed by the draft permit.

Rotenone toxicity to aquatic invertebrates has been shown to range from 1.8 ppb to 1,700 ppb for 6 h Lethal Concentration<sub>50</sub> (*LC*<sub>50</sub>) values (Finlayson et al. 2010b). Impact from rotenone treatments on benthic organisms are typically less severe than impacts to zooplankton. Adverse effects have been shown on some groups such as midges, clams, and worms (Durkin 2008).

*Rotenone is likely to be adsorbed to the surface of sediment particles when contacted. Such sorption will limit both the movement of the residue and its availability to the flora and fauna in the water body.* Temple and Anderson 2008 at 21. Figure 19 in WDFW 1992 illustrates the effect of bottom mud in reducing rotenone toxicity to midge larvae.

*Because rotenone is not persistent and is strongly bound to sediments until it breaks down, its use is not considered a concern relative to sediment-dwelling organisms in lakes and streams.* Temple and Anderson 2008 at 22.

In a study looking at rotenone toxicity to aquatic invertebrates at both treated and untreated sites on a pair of creeks in California Finlayson et al. (2010b) saw total assemblage abundance decrease as a result of treatment; however, no statistical difference was measured for taxa richness, genera richness, number of individuals within the major insect orders and the number of rare taxa.

## **Antidegradation**

Federal regulations (40 CFR 131.12), the Water Quality Standards for Surface Waters of the State of Washington (WAC 173-201A-300, 310, 320, 330) and Water Quality Standards for Ground Waters of the State of Washington (chapter 173-200 WAC) establish a water quality antidegradation program.

This program establishes three tiers of protection for surface water quality. These three tiers function 1) to protect existing and designated in-stream uses, 2) to limit the conditions under which water of a quality higher than the state standards can be degraded, and 3) to provide a means to set the very best waters of the state aside from future sources of degradation entirely. WAC 173-201A-320 contains the Tier 2 antidegradation provisions for the state's surface water quality standards at <http://apps.leg.wa.gov/WAC/default.aspx?dispo=true&cite=173-201A-320>.

The antidegradation program also establishes protection for ground water quality, but it does not require a Tier 2 analysis as the Surface Water Quality Standards do. For ground water, existing and future beneficial uses must be maintained and protected against degradation that would prevent or interfere with the use of ground water for a beneficial use. Degradation of ground water is not allowed in national or state parks, wildlife refuges, or waters of exceptional quality (tier 3 waters). If the ground water is of better quality than the criteria assigned to the waters, the better quality waters must be protected against degradation to the existing background quality. The exception to the better quality water protection is if there is an overriding public benefit, and any pollutants allowed into better quality waters is provided with AKART.

A Tier 2 analysis is required when new or expanded actions are expected to cause a measurable change in the quality of a receiving water that is of a higher quality than the criterion designated for that waterbody in the water quality standards (WAC 173-201A-320(1)). WAC 173-201A-320(3) defines a measureable change as specific reductions in water quality, and defines "new or expanded actions" as "human actions that occur or are regulated for the first time, or human actions expanded such that they result in an increase in pollution, after July 1, 2003." This definition includes facilities that first began to discharge pollutants, or increased the discharge of pollutants, after July 1, 2003. The definition also applies to those facilities that discharged pollutants prior to July 1, 2003, but were regulated by Ecology for the first time after July 1, 2003.

### **Antidegradation Analysis and Antidegradation Plan**

The following narrative represents Ecology's antidegradation analysis and antidegradation plan for the Fisheries Resource Management General Permit. The purpose of Washington's Antidegradation Policy (WAC 173-201A-300-330; 2006) is to:

1. Restore and maintain the highest possible quality of the surface waters of Washington.
2. Describe situations under which water quality may be lowered from its current condition.

3. Apply to human activities that are likely to have an impact on the water quality of surface water.
4. Ensure that all human activities likely to contribute to a lowering of water quality, at a minimum, apply AKART.
5. 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.

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 WDFW, internal agency staff, and natural resource scientists from other government agencies. Ecology will further revise the draft permit based on a formal public comment period and testimony received at public hearings.

Ecology has required WDFW to complete a zooplankton study (Permit Appendix C) within the first three years from the date of permit issuance. The zooplankton study will provide data for zooplankton populations in treatment and reference lakes and will be used to determine how zooplankton populations recover following piscicide treatment.

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 general permit; the previous issuance was as an individual permit. It expires (date five years from effective date). Permit issuance includes a public involvement process as described below.

Prior to permit issuance Ecology solicited input from users, developed and revised permit conditions, reviewed relevant data and literature, and collaborated with natural resource scientists before soliciting public comment on the permit and accompanying documents and finalizing the permit.

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, particularly this antidegradation section, constitutes Ecology's antidegradation plan for the Fisheries Resource Management 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 piscicides to control nuisance fish populations.
- Ecology will review the zooplankton study data and review monitoring information and reports.
- Ecology requires Permittees to develop a DMP for this activity.
- As SEPA lead agency, WDFW has made a SEPA determination of significance with adoption of environmental documents. The SEPA determination document issued by WDFW can be found on Ecology's Fisheries Resource Management website.

## **SEPA Compliance**

Piscicide use related to fish management activities has undergone environmental impact evaluations by WDFW in 1992 and 2002. This general permit conditions the use of pesticides to mitigate environmental impacts of concern noted in these evaluations.

For each water proposed for rehabilitation, WDFW provides public announcements including local newspaper notices, internet/web site information, and news releases. WDFW also conducts local public meetings to solicit public input regarding each proposed treatment. WDFW includes all waters proposed for treatment in an annual addendum to the Final Supplemental Environmental Impact Statement (FSEIS) – Lake and Stream Rehabilitations. The FSEIS also provides information about the other options considered prior to choosing pesticides. The FSEIS is subject to a public comment period.

WDFW must complete the annual SEPA process prior to conducting lake or stream rehabilitation activities each year. It is the intent of this permit to authorize fisheries resource management treatments in a manner that also complies with federal and other state requirements.

## **Integrated Pest Management (IPM)**

All NPDES permits issued by Ecology must incorporate requirements to implement reasonable prevention, treatment and control of pollutants.

The legislature established in the Washington Pesticide Control Act (chapter 17.15 RCW) that prevention of pollution in this case is reasonable only in the context of an Integrated Pest Management (IPM) plan. IPM plans require the investigation of all control options, but do not

require non-chemical pest controls as the preferred option. The goal of IPM is to establish the most effective means of control whether chemical, non-chemical, or a combination.

WDFW's fisheries resource management program currently utilizes integrated pest management (IPM) strategies. IPM programs include preventing pest problems, monitoring for the presence of pests, setting a population density at which treatment occurs, and evaluating efficacy of treatments. WDFW has worked to prevent illegal introductions through the creation of education materials, and conducts annual monitoring of fish populations and fish size. WDFW selects lakes or streams for piscicide treatment when a viable fishery can only be maintained with introductions of catchable size fish, or when removal of non-native fish is necessary to restore native fish populations. The DMP, that will be required as a condition of the permit, requires WDFW to develop an action threshold that sets the parameters for when WDFW may use piscicides to control fish populations.

The treatment strategy of an IPM program is chosen after giving equal weight to all control strategies. The chosen control option will best fit the parameters of an individual situation after the ecologic and economic consequence of each option is considered. The treatment alternatives considered for fisheries resource management are fish toxicants, predator stocking, and mechanical removal (Table 1).

The treatment that has been preferred for most situations in the past is application of piscicide. This strategy is thought to give the best chance of eradicating infestations of non-native fish while minimizing risks to human health and to the environment. The success of the treatments is confirmed by fish population sampling and creel surveys.

WDFW will be required to submit a DMP prior to conducting treatments under coverage of this permit. The DMP will serve as the IPM plan for this general permit.

## **Special Conditions**

### **S1. Permit Coverage**

The Fisheries Resource Management Permit was previously an individual permit issued to WDFW for statewide management of fisheries resources. Ecology decided to re-develop the Fisheries Resource Management Permit as an NPDES and State Waste General Permit rather than an individual permit since the activities and the discharges occur statewide and therefore the permit model more closely resembles a general permit.

WDFW is the only entity that may apply for coverage under this permit. Fish are property of the state and WDFW is the agency responsible for management of fish in waters of the state (RCW 77.04.012). Furthermore WDFW is authorized to eradicate undesirable fish species in waters of the state (RCW 77.12.420). WDFW may cooperate with state, county, municipal, federal agencies, and private citizens to conduct fisheries management projects under coverage of this permit.

### **Activities Covered Under This Permit**

Washington's Water Quality statutes and regulations do not allow the discharge of pollutants to waters of the state without a discharge permit (RCW 90.48.080, 90.48.160, 90.48.260, WAC 173-201A).

Piscicides used in water for fisheries management are potential pollutants, and therefore require a discharge permit before application to Washington State surface waters.

The proposed permit limits chemical application to the use of rotenone, and potassium permanganate in fish management activities deemed necessary by WDFW in Waters of the State of Washington.

Ecology proposes to issue this permit for a duration of 5 years from the effective date of the permit.

### **Geographic Area Covered**

The draft permit applies to the application of piscicide for fisheries management, to surface waters of the state of Washington, where Ecology has authority. Surface waters include lakes, rivers, ponds, streams, inland waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the state of Washington (RCW 90.48.020, WAC 173-201A-020 and WAC 173-226-030).

EPA has not delegated regulatory authority to Ecology to issue NPDES permits on federal land or "Indian Country" as defined in 18 USC Sec. 1151.

### **Additional Requirement to Conduct a Zooplankton Study**

In the past the Fisheries Resource Management Individual Permit required zooplankton monitoring to examine impacts to zooplankton from rotenone treatment. The data collected was of limited use for describing impacts to zooplankton populations and their recovery after piscicide treatment due to the lack of control sites and the limited number of samples taken. The proposed permit requires WDFW to complete a Zooplankton Study focused on impacts and recovery of zooplankton populations from piscicide treatments in multiple lakes over multiple years. WDFW must complete the Zooplankton Study within three years of permit issuance. See the Fisheries Resource Management Permit Appendix C for an outline of the study.

## **S2. Permit Administration**

Coverage under this general permit is available to the Washington State Department of Fish and Wildlife only.

Ecology received WDFW's re-application for permit coverage under the Fisheries Resource Management NPDES Individual Permit on December 20, 2006, before the 180-day requirement. Ecology considers the WDFW re-application for permit coverage as the application for coverage under the draft Fisheries Resource Management NPDES General Permit.

WAC 173-226-200 contains the requirements for applications for coverage under a general permit. In part, this WAC requires that the applicant submit their application for coverage on a form prescribed by Ecology. The form used by WDFW for their renewal is the form prescribed by Ecology at the time that renewal was required. It contains all the information required in WAC 173-226-200 that Ecology requires to issue permit coverage. A new application form, as required by WAC 173-226-200(4) was developed for this permit and will be available during the public comment period.

### **How to Terminate Permit Coverage**

Ecology plans to issue the permit for a period of up to five years, starting on the effective date of the permit (WAC 173-226-220). Coverage will last from the date of coverage to the date of permit expiration, which may be up to five years, unless the Permittee terminates coverage by submitting a notice of termination or unless Ecology terminates the permit early. If the Permittee does not terminate coverage, the Permittee will continue to incur an annual permit fee, even if it does not treat. If the Permittee terminates its coverage; it will no longer be allowed to discharge piscicides to waters of the state unless it re-applies for a new permit coverage.

## **S3. Discharge Limits**

### **Compliance with Standards**

Permittees must use AKART when applying piscicides. Compliance with this permit, the *Washington Pesticide Control Act*, the requirements of the *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA) label, and all other applicable federal and state laws constitute AKART

See also the section "Technology-Based Water Quality Protection Requirements" for a discussion about AKART.

Ecology based the DMP planning requirements on:

1. A similar planning requirement in EPA's NPDES Pesticides General Permit application.
2. In its fact sheet, EPA considers Integrated Pest Management (IPM) to meet technology-based standards.
3. Integrated Pest Management statute (RCW 17.15).
4. Washington's Water Quality Standards (WAC 173-201A-110).

### **Temporary Exceedance of Water Quality Standards**

State Water Quality Standards allow for nonattainment of water quality standards in specific water bodies for short periods (hours or days) to accommodate essential activities and protection of the public interest. WAC 173-201A-410. WAC 173-201A-410(2) allows Ecology to authorize a longer period of nonattainment "where the activity is part of an ongoing or long-term operation and maintenance plan, integrated pest or noxious weed management plan, water body or watershed management plan, or restoration plan." The longer period may be authorized for the duration of the plan, or for five years, whichever is less. 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. Ecology may also request updated plans and addendums

to existing plans. The DMP that WDFW is required to develop under Permit Condition S3.C meets the requirements in WAC 173-201A-410 for the type of plan necessary to authorize a longer duration short-term modification.

### **Discharge Management Plan (DMP)**

Integrated pest management is AKART for this permit. DMPs 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. Ecology will allow elements of the EIS to substitute for applicable DMP elements. DMPs also set out lines of responsibility by identifying responsible parties and applicators and provides up-to-date contact information.

### **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.

Applications to water bodies listed on the 303(d) list have additional limits and conditions imposed upon them. The parameters of concern identified in the permit are dissolved oxygen, phosphorous and nitrogen. The Permittee must not cause or contribute to further impairment of 303(d) listed water bodies for the water quality parameter for which the water body is listed.

Chemicals that cause a rapid die-off of animals may trigger release of phosphorus and other nutrients that in turn may trigger algae or cyanobacteria blooms. This may lead to low oxygen conditions developing in the water body.

### **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 restrictions on the product label or by distributing a county-specific Endangered Species Protection Bulletin. Bulletins are enforceable under FIFRA. General Condition G6 of the Fisheries Resource Management Permit requires the Permittee to comply with all applicable federal regulations. See [www.epa.gov/espp/frequent-ques.htm](http://www.epa.gov/espp/frequent-ques.htm) for more information.

The U.S. Fish and Wildlife Service and National Marine Fisheries Service are involved in EPA's processes to protect listed species and designated critical habitat in several ways: by consulting with EPA on specific endangered species concerns; by issuing Biological Opinions on certain species; or other ways, as necessary. For details on how EPA evaluates the potential risks from pesticides to listed species and consults with the Services, see their risk assessment process web page at [www.epa.gov/espp/litstatus/riskasses.htm](http://www.epa.gov/espp/litstatus/riskasses.htm).

The issuance of this permit does not have a federal nexus that would trigger formal ESA consultation with the federal services.

WAC173-226-140 requires that Ecology submit all draft general NPDES permits for federal agency review and recommendations. Federal agencies include the EPA, the US Army Corps of Engineers, the US Fish and Wildlife Service, the National Marine Fisheries Service, and any other federal agency upon their request.

## **S4. The Application of Products**

### **Application Requirements**

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

### **Authorized Discharges**

This permit allows the Permittee, to use chemicals or products identified in the permit that are regulated under FIFRA (Special Condition S4.B). Ecology authorizes these discharges in accordance with WAC 173-201A-410 and chapter 90.48 RCW.

The Permittee must comply with both the pesticide label requirements and the general permit conditions. Coverage under this general permit does not supersede or preempt federal or state label requirements or any other applicable laws and regulations. General permit Condition G6 reminds the Permittee of this fact.

Treatment limitations help mitigate adverse impacts from chemical treatments and Ecology based these limits on the best scientific information available and its best professional judgment.

### **Chemicals and Products Allowed For Use under this Permit**

This permit authorizes and conditions the use of rotenone as a piscicide for fisheries management. In order to deactivate rotenone, this permit authorizes the use of potassium permanganate as an oxidizing agent to deactivate piscicide in downstream waters.

The rotenone product label contains application directions, including a table with various application rates for lakes and ponds. Since these application rates are based upon a concentration of 5% active rotenone, WDFW must make adjustments because the rotenone powder used by WDFW rarely contains exactly 5% active rotenone. To ensure correct application rates, the distributor tests each shipment from the supplier for rotenone content. Powder formulations used in recent years have assayed between 6% and 8% active rotenone. This draft permit requires WDFW to follow all label requirements. WDFW will continue rotenone shipment testing. WDFW will submit information regarding specific treatments to Ecology in an annual report, including the quantity and concentration of rotenone applied to each waterbody and the chemical assay performed by the supplier.

### **Specific Restrictions on the Application of Pesticides**

Unless it is an *emergency*, Ecology requires the Permittee to minimize treatments that restrict public water use during high use holidays (e.g., Memorial Day, July 4, and Labor Day) and on weekends (173-201A-410 WAC). Water use restrictions occurring during those times will disproportionately impact public use of the waters. While situations may occur when this is the only appropriate time to treat, Ecology strongly encourages the Permittee not to treat during high use times when chemical application may have greater effect on recreational water use.

### **S5. Posting and Notification Requirements**

Ecology based the posting and notification requirements in the Fisheries Resource Management Permit on similar requirements for posting and notification in the Aquatic Plant and Algae Management NPDES permit, the Noxious Weed Control NPDES permit and the Planning and Standard Operating Procedures for Use of Rotenone in Fish Management, 2010 included as part of the FIFRA label.

The Permittee must notify those who legally withdraw surface waters (through a registered surface water right or claim) 14-45 days before treatment. This notification must identify the chemical(s) or product(s) it plans to use, the date(s) of expected treatment, and all water use restrictions and precautions. The Permittee must not treat an area until it has notified people who legally withdraw surface water and it has provided an alternative water supply, when the product's label has restrictions and/or precautions, for potable or domestic water use, irrigation use, or livestock watering.

### **S6. Monitoring Requirements**

Ecology requires monitoring, recording, and reporting (WAC 173-226-090 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and that the discharge complies with the permit's effluent limits. Permittees with coverage under the Permit must monitor the amount of pesticides they use and report this information to Ecology in an annual report (S7.A.3).

#### **Monitoring**

The WDFW will conduct monitoring to determine the extent and duration of the short-term water quality reduction resulting from rotenone applications. Monitoring will be adequate to determine if non-target organisms downstream from the treatment area have been adversely impacted by the treatment.

The permit requires monitoring of residual pesticides and oxidizers (i.e., potassium permanganate) if used. The intent is to gather information to confirm the assumptions of persistence and toxicity relative to the rate of application.

Pesticide treatments occurring on a *chain of lakes* may be treated as a single waterbody for the purposes of monitoring; each individual water body need not be monitored. If the Permittee chooses not to monitor each individual lake in a lake chain then they must submit a monitoring plan to Ecology for approval one month prior to treatment. A chain of lakes that are physically connected by surface water will have biological connectivity and should have similar water

quality characteristics. Rotenone applied to the upper elevation lakes in a chain of lakes will flow down gradient to the other lakes in the chain. For these reasons, Ecology is allowing for different monitoring requirements when a chain of lakes is treated.

Additionally, the proposed permit requires WDFW to conduct a study to determine the impacts to zooplankton (Permit Appendix C). This information will define the period of temporary diminishment of beneficial uses. Zooplankton sampling at each treatment site will not be part of the monitoring requirements in this permit; instead Ecology will rely on the zooplankton study to characterize the population impacts and recovery of zooplankton in response to rotenone treatment. The zooplankton study can be found in Appendix C of the Draft Fisheries Resource Management NPDES General Permit

For potable water rights the Permittee must demonstrate that rotenone levels have dropped to EPA's estimated drinking water level of concern (LOC) of 40ppb. Permittees must use one of the methods provided in Finlayson et al. 2010a, SOP:16.0.

Rainbow trout have been shown to have LC<sub>50</sub> values for rotenone that range from a 3 hr LC<sub>50</sub> of 8.8 ppb to a 96 h LC<sub>50</sub> of 2.2 ppb (Ling 2003). The EPA reported a 96 h LC<sub>50</sub> for rainbow trout of 1.94 ppb in the Re-registration and Eligibility Decision (RED) for Rotenone (EPA 2007). These data indicate that rainbow trout will provide a reliable indicator of rotenone toxicity based on measured mortality in a live box bioassay. The trout toxicity bioassay will show that the rotenone concentrations have fallen below the EPA estimated LOC for drinking water (40 ppb) when trout survive in a live box bioassay. The Rotenone SOP Manual (Finlayson et al 2010a), included as part of the FIFRA Label, indicates at SOP:16.0 that trout survival in treated water for 24 h is an acceptable test to demonstrate that rotenone levels are below 40 ppb.

The Individual NPDES Permit for Fisheries Resource Management issued in 2002 required testing of volatile organic compounds (VOCs) and semi-volatile organic compounds (semi-VOCs) when liquid rotenone was used. WDFW has been testing and collecting data on VOCs associated with the use of liquid rotenone since 2002. Ecology has determined that the data reported on VOCs associated with the use of liquid rotenone formulations has been adequately characterized. Ecology will require VOC monitoring when liquid rotenone applications occur on water bodies with surface water rights for potable water, to ensure that surface water withdrawal only resumes after VOC levels have returned to background levels, as determined by pretreatment testing, or have fallen below 0.5 ppb. The results of the VOC testing conducted under the Individual Permit for Fisheries Resource Management can be reviewed in the post-rehabilitation reports submitted by WDFW on the Fisheries Resource Management Permit website.

The concentration of powdered rotenone products may vary by lot (Finlayson et al. 2000). The rotenone supplier analyzes each lot to determine the concentration of active rotenone. WDFW will use the assay to adjust the application rate stated on the label, which contains a general guide that is based upon 5% product. WDFW must report the concentration of active rotenone in the formulation to Ecology in annual Post Treatment Reports.

### **Analytical Procedures**

Sampling and analytical methods used to meet the monitoring requirements specified in this permit must conform to the latest revision of the Guidelines Establishing Test Procedures for the Analysis of Pollutants contained in 40 CFR Part 136 (or as applicable in 40 CFR subchapters N [Parts 400-471] or O [Parts 501-503]) unless otherwise specified in this permit.

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 under the provisions of chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

## **S7. Reporting and Record Keeping**

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).

### **Annual Post-Treatment Monitoring Report**

The annual Post-treatment Monitoring Report (due December 31) summarizes the results of any monitoring. The annual report summarizes the amount of each chemical used during the course of each treatment season. It allows Ecology to track how much pesticide is used in Washington for a specific use.

### **Annual Pre-Treatment Plan**

The annual Pre-treatment Plan (due April 1) identifies lakes proposed for piscicide treatment, why proposed lakes aren't meeting fisheries management goals, intended outcome measures and a description of impacts. WDFW may decide not to treat all of the lakes proposed in the Pre-treatment Plan.

### **Records Retention**

Applicators must keep all records and documents required for five years. If there is any unresolved litigation regarding the discharge of pollutants by the Permittee, the period of record retention must be extended during the course of the litigation (WAC 173-226-090).

### **Reporting Permit Violations**

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 violated the permit conditions, it must take steps to stop and 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 (ERTS Hotline) within 24 hours. This allows Ecology to determine if more action is necessary to mitigate the permit violation.

## **S8. Annual SEPA Process**

The annual SEPA process shall include reference to all methods considered for fish management at each project site, and the advantages and disadvantages of each method evaluated. The SEPA

process is subject to public review during the public comment period on the addendum to the Final Supplemental Environmental Impact Statement.

## **S9. Spill Prevention and Control**

Permittees must handle chemicals and maintain equipment in such a way as to prevent spills, and all significant spills must be reported. WDFW shall submit a spill prevention and response plan to Ecology as part of the permit process.

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).

## **S10. Best Management Practices**

WAC 173-226-070 allows Ecology to place permit conditions to prevent or control pollutant discharges from plant site run off, spillage or leaks, sludge or waste disposal, or materials handling or storage and allows Ecology to require the use of *Best Management Practices (BMPs)*.

WDFW will continue to examine the possibility of alternatives to reduce the amount of pesticides needed for fisheries resource management. Such methods include:

1. Prevention of an exceedance of water quality standards outside the area intended for rehabilitation.
2. Application of powdered rotenone formulations using the best available and practical technology that minimizes airborne dust.
3. Use of liquid rotenone formulation which contains fewer hydrocarbons (McClay 2005).
4. Informing the public of planned treatment activities.
5. Applying a decision matrix concept to the choice of the most appropriate lakes for treatment.
6. Staff training in the proper application of pesticides and handling of spills.
7. Following the US Fish and Wildlife Service's Standard Operating Procedures Manual for rotenone application (Finlayson et al. 2010a).
8. Preventing the reintroduction of undesirable fish species.

A reduction in the discharge of pollutants to waters of the state can be achieved by using proper BMPs, which include integrated pest management and alternative pest control procedures.

## **General Conditions**

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

### **Duty to Reapply**

All NPDES permits require the Permittee 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 173-226-220(2).

**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, effluent monitoring, or Ecology-approved engineering reports. Ecology may also modify this permit because of new or amended state or federal regulations.

## 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.

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<http://www.epa.gov/oecaerth/civil/fifra/fifraenfstatreq.html>. [7]

## **Revised Code Washington (RCW)**

Chapter 17.15 RCW: Integrated Pest Management [7]

Chapter 17.21 RCW: Washington Pesticide Application Act [7]

Chapter 34.05 RCW: Administrative Procedure Act [7]

Chapter 43.21B RCW: Environmental and Land Use Hearings Office — Pollution Control Hearings Board [7]

Chapter 43.21C RCW: State Environmental Policy [7]

Chapter 77.04 RCW: Department of Fish and Wildlife [7]

Chapter 77.12 RCW: Department of Fish and Wildlife - Powers and Duties [7]

Chapter 90.48 RCW: Water Pollution Control [7]

Chapter 90.52 RCW: Pollution Disclosure Act of 1971 [7]

Chapter 90.54 RCW: Water Resources Act of 1971 [7]

## **Washington Administrative Code (WAC)**

Chapter 16-228 WAC: General Pesticide Rules [5]

Chapter 173-50 WAC: Accreditation of Environmental Laboratories [5]

Chapter 173-200 WAC: Water Quality Standards for Groundwaters of the State of Washington [5]

Chapter 173-201A WAC: Water Quality Standards for Surface Waters of the State of Washington [5]

Chapter 173-204 WAC: Sediment Management Standards [5]

Chapter 173-226 WAC: Waste Discharge General Permit Program [5]

Chapter 197-11 WAC: SEPA Rules [5]

Chapter 246-290 WAC: Group A Public Water Supplies [5]

Chapter 371-08 WAC: Pollution Control Hearings Board – Practice and Procedure [5]

## Appendices

### Appendix A – Definitions

**AKART:** An acronym for “all known, available, and reasonable methods of treatment”.

**Best Management Practices (BMPs):** Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**Catchable-size trout:** A trout raised in a hatchery to a size desirable and easily caught by recreational anglers immediately after release. WDFW defines the size of a catchable trout to be greater than 2.5 fish per pound (fpp) or between 11-13 inches in length.

**Chain of lakes:** Lakes that are physically connected by a channel of surface water but have different names or are un-named.

**Deactivation zone:** The downstream waters where potassium permanganate has been applied but has not yet fully deactivated the rotenone, due to the lag time normally associated with deactivation. The distance that water can be expected to travel in 20 minutes. Since the deactivation zone may contain toxic levels of rotenone and potassium permanganate, some fish mortalities may occur in this zone.

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

**Federal Clean Water Act (CWA):** The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; U.S.C. §§ 1251 et seq.

**Fingerling trout:** A trout raised in a hatchery for a short period of time (e.g., usually between 4-6 months) and then released into a lake, pond, reservoir, and/or stream. Fingerling trout utilize a water's natural food base to grow to a catchable size (usually 11-13 inches) by year one. WDFW defines the size of a fingerling trout to be less than 2.5 fish per pound (fpp). Most fingerling trout range between 75-100 fpp (2 to 4 inches) at release.

**FSEIS:** Final Supplemental Environmental Impact Statement

**LC<sub>50</sub>:** Concentration of the test chemical in water in mg/L that causes 50% of the tested organisms to die after a given amount of time.

**National Pollutant Discharge Elimination System (NPDES):** The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the

authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**Pesticides:** "Pesticide" means, but is not limited to: Any substance or mixture of substances intended to prevent, destroy, control, repel, or mitigate any insect, rodent, snail, slug, fungus, weed, and any other form of plant or animal life or virus, except virus on or in a living person or other animal, which is normally considered to be a pest or which the director (of Agriculture) may declare to be a pest (RCW 17.21.020).

**pH:** The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral and large variations above or below this value are considered harmful to most aquatic life.

**Piscicide:** Fish poison or toxicant such as rotenone, used for fish control, eradication or sampling.

**ppm:** Parts per million (equivalent to mg/L or mg/kg).

**Technology-based Effluent Limit:** A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**SEPA:** State Environmental Policy Act, chapter 43.21C RCW.

**State experimental use permit:** A permit issued by WSDA allowing use of pesticides that are not registered, or for experiments involving uses not allowed by the pesticide label. Aquatic applications are limited to one acre or less in size.

**Waters of the state:** Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Water Quality-based Effluent Limit:** A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into receiving water.

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 – WDFW Policy C-3010

FISH AND WILDLIFE COMMISSION

POLICY DECISION

POLICY TITLE: Lake and Stream POLICY NUMBER: POL-C3010 Rehabilitations

Cancels:

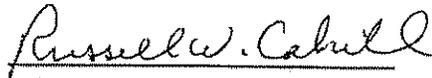
Effective Date: February 8, 2002

Termination Date (if applicable):

See Also:

Approved by:

Fish and Wildlife Commission Chair



### GENERAL POLICIES:

The control of undesirable fish populations using chemical piscicides is a valuable and cost effective management tool for providing quality fishing opportunities and protecting native species in many waters of the state.

Specific policies:

#### **All lake and stream rehabilitations will follow state and federal laws.**

All proposed rehabilitations will adhere to state water quality requirements (WAC 173-201A), the Washington Pesticide Control Act (RCW 15.58), State Environmental Policy Act (SEPA) and Federal Clean Water Act.

#### **All applicable environmental, health and safety regulations will be followed.**

All proposed rehabilitations will follow and adhere to chemical piscicides labeling restrictions and chemical materials safety data sheet requirements to ensure protection of the public, Department personnel and environment during rehabilitation treatments.

#### **Waters will not be treated in ways which would cause significant negative impacts to fish or wildlife which are state or federally listed as Threatened, Endangered, Sensitive or Candidate Species.**

An exception may be granted in the case of a biological emergency.

#### **The public will be part of the decision-making process.**

A public meeting will be held in the vicinity of the proposed rehabilitation(s) before a final decision is made.

**An appropriate assessment of existing fish populations and associated risks will be undertaken for all natural bodies of water proposed for treatment if they have not been previously treated.**

## Appendix C – Schedule of Activities

Step	Actions & Timeline for WDFW Rehabs	Approx Date
1	Prioritized list of Waters to Inland Program Manager	March 1
2	Statewide prioritized list of waters to be treated this year	March 1
3	Treatment list based on available piscicide	April 30
4	Order piscicide based on available funds & inventory	April 30
5	Pre-rehab materials to Inland Program Manager	May-June 30
6	Landowner and water rights search	May-June 30
7	First contact letters to landowners and water rights holders announcing intent to treat and meeting dates	May-June 30
8	Inform District/Regional Programs of potential rehabs	May-June 30
9	Survey of shoreline for water withdrawals	May-July 31
10	Final list of waters for public meetings	June-July 1
11	Begin collecting water withdrawal agreement letters	June-July 31
12	Regional Approval Letter and sign-off	June-July 31
13	Agency News Release announcing rehabs and public meetings	July 1 - 21
14	General public meetings	July 7-31
15	Preparation of the SEPA Addendum	July 7-11
16	Schedule meetings with Program Director and Director/Deputy	July 14-18
17	Publish SEPA Addendum for 21-day public review	July 14-18
18	Safety equipment inventory and review	July 31
19	Completion of SEPA 21-day review: respond to any comments	August 15-20
20	Schedule treatments	August 18-31
21	Draft Emergency fishing regulations to HQ office	August 19-25
22	Director & Fish Program AD review and approval	August 25-Sept 5
23	Emergency fishing regulations and news release	Post-Dir Approval
24	Rehab binder updates and completion	Post-Dir Approval
25	Update spill response plans, if needed	September 7
26	Publish legal notifications regarding rehabs	10-21 days prior to treatment
27	Regions notify residents and businesses	10-21 days prior to treatment
28	Posting of waters to be treated	24-48 hours prior to treatment
29	Field staff conduct pre-treatment sampling & water chemistry	Immediately before treatment
30	Application of piscicide w/review of Spill Plan, Safety Plan, Respiratory Protection Plan	Per treatment schedule
31	Post-treatment water sampling	24 hr + 4 wk post-treatment
32	Post-treatment bio-assay	3-8 week post-treatment
33	Post-treatment zooplankton sampling	6 + 12 month post-treatment
34	Post-treatment critique meeting	January
35	DJ Report to USFWS	January 28
36	Post-treatment reports to HQ coordinator	May 1
37	Post-treatment report to DOE	May 31

## Appendix D – Public Involvement Information

All comments about the proposed permit must be received or postmarked by 5:00 p.m. on July 17, 2015, to be considered.

Ecology has tentatively determined to issue the Fisheries Management General Permit as identified in Special Condition S1. Permit Coverage.

Ecology will publish a Public Notice of Draft (PNOD) on June 3, 2015, 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 individual 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/final\\_pesticide\\_permits/fish/fish\\_index.html](http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/fish/fish_index.html)

**Ecology Headquarters street address:**

300 Desmond Drive  
Lacey, WA 98503

**Contact Ecology:**

Department of Ecology  
Water Quality Program  
Attn: Nathan Lubliner  
PO Box 47696  
Olympia, WA 98504-7696

Nathan Lubliner  
Email: [nathan.lubliner@ecy.wa.gov](mailto: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 Fisheries Management Individual Permit and Fact Sheet. Ecology will also accept oral comments at the public hearing on July 8, 2015, at the Moses Lake Fire Station 1 starting at 12:00 noon.

Comments should reference specific text when possible.

Ecology prefers comments be submitted by email to: [nathan.lubliner@ecy.wa.gov](mailto:nathan.lubliner@ecy.wa.gov).

Ecology must receive written comments via email or postmarked no later than 5:00 p.m. on July 17, 2015.

Submit written, hard-copy comments to:

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

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

### **Public Workshop and Hearing**

Ecology will host one public workshop and hearing on the draft general permit at the location below. The workshop, held immediately prior to the public hearing, will explain the special conditions of the Fisheries Management Individual Permit and answer questions in order to facilitate meaningful testimony during the hearing. The hearing provides an opportunity for people to give formal oral testimony and comments on the proposed draft permit.

#### **July 8, 2015 (12:00 noon)**

##### **Moses Lake:**

Moses Lake Fire Station 1  
701 E. Third Avenue  
Moses Lake, WA 98837

### **Issuing the Final Permit**

Ecology will issue the final permit after it receives and considers all public comments. Ecology expects to make a decision on whether to issue the general permit in summer 2015. It will be effective one month after the issuance date.

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

## Appendix E – Your Right to Appeal

You have a right to appeal this permit 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 RCW 43.21B and WAC 371-08. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of receipt of this permit:

File your 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 your appeal and this permit on Ecology in paper form - by mail or in person (see addresses below). **Email is not accepted.**

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

### ADDRESS AND LOCATION INFORMATION

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

## **Appendix F – Response to Comments**

Look for the Response to Comments document on the Fisheries Management Permit web page.  
[http://www.ecy.wa.gov/programs/wq/pesticides/final\\_pesticide\\_permits/fish/fish\\_index.html](http://www.ecy.wa.gov/programs/wq/pesticides/final_pesticide_permits/fish/fish_index.html)

