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FISHERY RESOURCE MANAGEMENT
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE INDIVIDUAL PERMIT No. WA0041009
WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504-7600

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

Washington Department of Fish and Wildlife
600 Capitol Way N.
Olympia, WA 98501-1091

is authorized to discharge in accordance with the special and general conditions which follow.

Megan White, P.E., Manager
Water Quality Program
Department of Ecology

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SUMMARY OF PERMIT REPORT SUBMITTALS

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

Permit Section	Submittal	Frequency	First Submittal Date
S3.A	Post-Treatment Report / Discharge Monitoring Report	Annually	June 1, 2003
S3.E	Noncompliance Notification	As necessary	
S5.	Antimycin SEPA Review	One time	June 1, 2005
S7.	Spill Prevention and Response Plan	One time	Prior to first treatment
G1.	Notice of Change in Authorization	As necessary	
G4.	Permit Application for Substantive Changes to the Discharge	As necessary	
G7.	Application for Permit Renewal	1/permit cycle	January 5, 2007
G8	Notice of Permit Transfer	As necessary	
G21	Notice of Planned Changes	As necessary	
G22.	Reporting Anticipated Non-compliance	As necessary	

SPECIAL CONDITIONS

S1. DISCHARGE LIMITATIONS

A. Water Quality Standards

All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit.

Use of any liquid or powder rotenone formulation shall not result in an exceedance of water quality standards as specified in WAC 173-201A.

B. Temporary Water Quality Modification

The application of chemicals listed in this permit to perform fish pest control activities is allowed so long as the conditions of this permit are satisfied and the transitory water quality impact is limited to the minimum time necessary to accomplish the desired pest control objectives.

This temporary water quality modification is allowed throughout the permit term, but its effect shall be temporary in a specific location, though locations where it is in effect may be widespread throughout the state, anywhere lakes or streams are subject to fish control activities by WDFW.

C. Permitted Chemicals

Rotenone is the only chemical permitted for use as a fish toxicant under this individual permit. The rotenone product used must be licensed for use as a fish toxicant in the State of Washington at the time of treatment.

The use of liquid rotenone is only authorized for spot applications in areas that are not practicably accessible by boat. Open water areas that are accessible by boat will be treated with powdered rotenone that is mixed with water and applied as a slurry, as described in S.6. Best Management Practices.

Potassium permanganate is the only chemical permitted to neutralize rotenone treated waters when necessary to prevent damage to non-targeted organisms and maintain water quality outside of the area intended for rotenone treatment.

Other pesticides may be applied on a limited basis in the context of a research and development effort under the jurisdiction of the Washington State Department of Agriculture (WSDA) through the issuance of a Washington State Experimental Use Permit. Limited amounts of an experimental use pesticide may only be distributed or used for testing purposes after a written permit has been obtained from WSDA for purposes which include gathering data in support of registration under the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) Section (3) or Section 24(c).

All other conditions of this permit apply as to appropriate monitoring and public notification procedures.

S2. MONITORING REQUIREMENTS

A. Monitoring

The WDFW shall conduct monitoring on each water body treated with aquatic pesticides to determine the extent and duration of the short-term water quality reduction resulting from rotenone applications.

B. Monitoring Schedule

TABLE 1. MONITORING – ROTENONE TREATED WATERS

Parameters	Units	Minimum Sampling Frequency	Sample Type
Rotenone Toxicity - Trout Bioassay: 48-hr live box test (5 trout); 100% survival of rainbow trout	Number of days until 100% survival	Once post-treatment, approximately 3-8 weeks after treatment	Observation (no lab accreditation required)
<u>*If liquid rotenone is used</u> : VOC, semi-VOC, plus any other inert ingredients listed on MSDS ¹	µg/L	1. 24 hours after treatment, and 2. four weeks after treatment	Grab
pH	Standard	Once pretreatment	Grab
temperature	°F	Once pretreatment	Grab
Alkalinity ²	mg/L CaCO ₃	Once pretreatment ²	Grab
Organic demand ^{2,3}	Standard ³	Once pretreatment ²	Grab
Zooplankton sampling	See below ⁴	1. Pre-treatment, 2. Six months after treatment, and 3. One year after treatment	Composite ⁴
¹ If liquid rotenone formulation is utilized, test for the following parameters: VOC (EPA method 8310) and semi-VOC (EPA method 502.2). Also test for any other inert ingredients listed on MSDS (i.e. the MSDS for Prentox [®] Prenfish [™] Toxicant lists naphthalene; 1,2,4-trimethylbenzene; and acetone).			
² Only if neutralization of rotenone with potassium permanganate is required.			
³ Use the guidelines provided in Engstrom-Heg (1971) to determine organic demand for KMnO ₄ .			
⁴ Lakes only. Zooplankton sampling protocols set forth on Page 4-5 of “Water Quality Assessments of Selected Lakes within Washington State - 1998” Department of Ecology, December 2000, Publication No. 00-03-039 (Appendix B).			

TABLE 2. MONITORING – RECEIVING WATERS DOWNSTREAM OF TREATED WATERS AND NEUTRALIZATION ZONE

Parameters	Units	Minimum Sampling Frequency	Sample Type
Rotenone Toxicity - Trout Bioassay: 48-hour live box test (5 trout)	% survival	1. Begin test at time of treatment and 2. Repeat at one week intervals until upstream treated water is detoxified per upstream bioassay.	Observation (no lab accreditation required)
Rotenone ¹	mg/L	Once 24 hours following treatment	Grab
<u>*If liquid rotenone is used</u> : VOC, semi-VOC, plus any other inerts ²	µg/L	1. 24 hours after treatment, and 2. four weeks after treatment	Grab
pH	Standard	Once pretreatment	Grab
temperature	°F	Once pretreatment	Grab
Alkalinity ³	mg/L CaCO ₃	Once pretreatment ³	Grab
Organic demand ^{3,4}	Standard ⁴	Once pretreatment ^{3, 4}	Grab
Zooplankton sampling	See below ⁵	1. Pre-treatment, 2. Six months after treatment, and 3. One year after treatment	Composite ⁵
Macroinvertebrate monitoring (Only required for <u>wadeable streams</u>)	See below ⁶	1. Pre-treatment, between August and September and 2. Post-treatment, approximately 1 year after treatment	See below ⁶
¹ Analyze using methods set forth in Dawson et al. (1983); Appendix A			
² If liquid rotenone formulation is utilized, test for the following parameters: VOC (EPA method 8310) and semi-VOC (EPA method 502.2). Also test for any other inert ingredients listed on MSDS (i.e. the MSDS for Prentox [®] Prenfish [™] Toxicant lists naphthalene; 1,2,4-trimethylbenzene; and acetone).			
³ Only if neutralization of rotenone with potassium permanganate is required.			
⁴ Use the guidelines in Engstrom-Heg (1971) for measuring organic demand for KMnO ₄ .			
⁵ Lakes only. Zooplankton sampling protocols set forth on Page 4-5 of “Water Quality Assessments of Selected Lakes within Washington State - 1998” Department of Ecology, December 2000, Publication No. 00-03-039; Appendix B			
⁶ “Macroinvertebrate monitoring” includes gathering benthic invertebrate samples and summarizing the data using the benthic index of biotic integrity (B-IBI) and a ratio measure of the number of observed taxa divided by the number of expected taxa, the River Invertebrate Prediction and Classification System (RIVPACS).			
All bioassessment sampling and related habitat survey data, laboratory analysis, quality assurance, and data analysis shall follow the protocols in <i>Benthic Macroinvertebrate Biological Monitoring Protocols for Rivers and Streams: 2001 Revision</i> , Plotnikoff and Wiseman, August 2001 (http://www.ecy.wa.gov/biblio/0103028.html).			

C. Sampling and Analytical Procedures

Samples and measurements taken to meet the requirements of this permit shall be 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 effluent quality.

Sampling and analytical methods used to meet the monitoring requirements specified in this permit shall conform to the latest revision of the *Guidelines Establishing Test Procedures for the Analysis of Pollutants* contained in 40 CFR Part 136 or to the latest revision of *Standard Methods for the Examination of Water and Wastewater* (APHA), unless otherwise specified in this permit or approved in writing by the Department of Ecology (Department).

D. Laboratory Accreditation

All monitoring data required by the Department shall be prepared by a laboratory registered or accredited under the provisions of, *Accreditation of Environmental Laboratories*, Chapter 173-50 WAC. Flow, temperature, settleable solids, conductivity, pH, and internal process control parameters are exempt from this requirement. Conductivity and pH shall be accredited if the laboratory must otherwise be registered or accredited. The Department exempts crops, soils, and hazardous waste data from this requirement pending accreditation of laboratories for analysis of these media.

S3. REPORTING AND RECORDKEEPING REQUIREMENTS

The Permittee shall monitor and report in accordance with the following conditions. The falsification of information submitted to the Department shall constitute a violation of the terms and conditions of this permit.

A. Reporting

The first monitoring period begins on the effective date of the permit. Monitoring results shall be submitted annually. Monitoring data obtained during each monitoring period shall be summarized, reported, and submitted in an annual report form approved by the Department.

Post Treatment Discharge Monitoring Report forms shall be received no later than June 1, the year following each treatment. The report(s) shall be sent to Nancy C. Weller, Department of Ecology, Eastern Regional Office, N. 4601 Monroe, Spokane, WA 99205-1295.

Post Treatment Discharge Monitoring Reports shall contain the following information:

1. Name of lake or stream
2. County

3. Section, Township and Range
4. Date(s) of treatment
5. Purpose of treatment
6. Name of licensed applicator
7. Lake description: Surface acreage, number of acre-feet, maximum depth and average depth
8. Stream description: Width, length, flow rate of stream/outlet (cu. ft. per sec.); Volume and weight of water treated (gallons, pounds)
9. Name of fish toxicant product used
10. Description of treatment method(s)
11. Quantity of fish toxicant used (pounds and/or gallons)
12. Concentration of active rotenone in formulated rotenone product (%)
13. Concentration of active rotenone in water (ppm)
14. Water conditions/quality (temperature, pH, hardness, alkalinity – and any other additional data collected)
15. Detoxification of rotenone treated water (if required): Description of detoxification methods/equipment; potassium permanganate application rate (pounds per hour); flow rate of stream/outlet (cu. ft. per sec.); estimate of average concentration (ppm)
16. Description of lake inlet(s)/outlet(s) and any temporary water control measures (if required)
17. Period of toxicity (duration of water quality reduction)
18. Eradicated fish species
19. Results of pre- and post-treatment monitoring
20. Impact on non-targeted organisms
21. Brief description of treatment/detoxification and other comments
22. A copy of the amended FSEIS for the lakes/streams treated during the reporting period including all SEPA comments, results and decisions.
23. A list of the lakes/streams proposed for treatment during the upcoming year

B. Records Retention

The Permittee shall retain records of all monitoring information for a minimum of three (3) years. Such information shall 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. 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 the Director.

C. Recording of Results

For each measurement or sample taken, the Permittee shall record the following information: (1) the date, exact place, method, and time of sampling or measurement; (2) the individual who performed the sampling or measurement; (3) the dates the analyses were performed; (4) the individual who performed the analyses; (5) the analytical techniques or methods used; and (6) the results of all analyses.

D. Additional Monitoring by the Permittee

If the Permittee monitors any pollutant more frequently than required by this permit using test procedures specified by Condition S2. of this permit, then the results of this monitoring shall be included in the calculation and reporting of the data submitted in the Permittee's Post Treatment Discharge Monitoring Report.

E. Noncompliance Notification

In the event the Permittee is unable to comply with any of the terms and conditions of this permit due to any cause, the Permittee shall:

1. Immediately take action to stop, contain, and clean up unauthorized discharges or otherwise stop the noncompliance, correct the problem and, if applicable, repeat sampling and analysis of any noncompliance immediately and submit the results to the Department within thirty (30) days after becoming aware of the violation.
2. Immediately notify the Department of the failure to comply.
3. Submit a detailed written report to the Department within thirty (30) days, unless requested earlier by the Department. The report shall contain a description of the noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and the steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

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

S4. ANNUAL SEPA PROCESS

All lakes proposed for treatment are included in an addendum to the Final Supplemental Environmental Impact Statement (FSEIS). The FSEIS is subject to a 30 day public comment period. The annual SEPA process must be completed prior to conducting lake or stream rehabilitation activities.

S5. ANTIMYCIN SEPA REVIEW

On or before June 1, 2005, WDFW shall complete the SEPA review process regarding the use of Antimycin as a fish toxicant for certain fish management projects. Based upon the outcome of the SEPA process, Ecology may modify the permit to include the use of Antimycin.

S6. BEST MANAGEMENT PRACTICES

- A. In order to prevent unnecessary damage to the environment, the permittee shall follow the best management practices defined below on the day of application.
- B. The permittee shall comply with all product label instructions. When application requirements specified in this permit differ from those on the label, the more stringent of the two requirements must be complied with. However, no condition in this permit or any amended Order shall reduce or modify the label instruction. All applicable federal, state and local laws and ordinances shall be followed.
- C. Powdered rotenone formulations shall be applied in such a way that minimizes airborne dust, using the best available technology such as the method outlined in "Utah's Procedure for Mixing Powdered Rotenone into a Slurry" (Thompson et al. 2001).
- D. In order to prevent an exceedance of water quality standards outside the area intended for rehabilitation, rotenone treatment should only take place in lakes that are not discharging to downstream waters. This is accomplished by limiting treatments to lakes with closed basins or conducting treatments only during periods of low water, usually September or October.

In instances where treated waters may potentially discharge to downstream waters resulting in an exceedance of water quality standards outside the treatment area, such discharge shall be prevented by installing adequate temporary water control measures.

When it is necessary and unavoidable to discharge rotenone treated waters to downstream waters, the permittee shall conduct pretreatment water quality and biological monitoring, as specified in the monitoring plan.

Treated waters shall be effectively neutralized and detoxified using potassium permanganate so that water quality standards are not exceeded below the neutralization zone. For purposes of this section, neutralization zone is defined as the downstream waters where potassium permanganate has been applied but has not yet fully neutralized the rotenone, due to the lag time normally associated with detoxification. The neutralization zone is typically considered the distance that water can be expected to travel in 20 minutes. Since the neutralization zone may contain toxic levels of rotenone and potassium permanganate, some fish mortalities may occur in this zone.

Below the neutralization zone, rotenone must be totally neutralized and residual potassium permanganate levels maintained at a non-toxic level of 1 mg/L, not to exceed 2 mg/L. Live trout cars will be set up below the neutralization zone to monitor the effectiveness of detoxification measures.

Detoxification procedures must utilize calibrated equipment to achieve the minimum effective concentration of potassium permanganate to oxidize the rotenone within the neutralization zone. Potassium permanganate concentrations must be closely monitored using a field calibrated spectrophotometer to keep residual permanganate levels at a level that effectively neutralizes rotenone while preventing damage to aquatic life downstream of the treatment area and neutralization zone.

- F. In order to minimize the discharge of inert ingredients contained in liquid rotenone formulations, only powdered rotenone formulations shall be utilized, except in very limited cases when the WDFW finds it necessary to treat waters that are inaccessible by boat, such as weedy shorelines or marshy areas.

S7. SPILL PREVENTION AND RESPONSE

- A. Prior to the first rotenone treatment, WDFW shall submit a Spill Prevention and Response Plan to the Department of Ecology, Eastern Regional Office, N. 4601 Monroe, Spokane, WA 99205-1295. The spill plan should cover a plan for the prevention, containment, and control of spills or unplanned discharges from the application, storage and transportation of the pesticides. It should also include spills of oil and gasoline from application equipment including boats. According to the severity of the spill, it should tell when to report certain magnitudes of spills along with a list of names and telephone numbers of spill respondent teams at both WDFW and Ecology.

- B. Spills into state waters, spills onto land with a potential for entry into state waters, or other significant spills that may effect health, the environment, or property must immediately be reported to the following state and federal contacts:

National Response Center (Federal): 1-800-424-8802, and
Emergency Management Division (State): 1-800-258-5990, and
The appropriate Dept. of Ecology regional office:
Northwest Office, Bellevue: 1-425-649-7000
Southwest Office, Olympia: 1-360-407-6300
Central Office, Yakima: 1-509-575-2490
Eastern Office, Spokane: 1-509-456-2926

Within 5 days the event must be also be reported to Nancy C. Weller, Permit Manager, Department of Ecology, Eastern Regional Office, N. 4601 Monroe, Spokane, WA 99205-1295. It should be a written report that includes a description of the event, including exact date and time, and the actions taken to correct the problem

- C. In the event of a spill, containment and clean-up efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Clean-up shall include proper disposal of any spilled material and used clean-up material.

PUBLIC NOTICE PROCEDURES

P1. RESIDENTIAL AND BUSINESS NOTICE PROCEDURES

- A. Prior to the initiation of rotenone treatment, the WDFW shall notify all property owners located within one-quarter (1/4) mile of the shoreline or stream bank radius and five-hundred (500) feet upland of the waters affected by rotenone treatment, including waters treated with potassium permanganate to detoxify or neutralize rotenone treated waters.
- B. This notification may be done by mail, e-mail, or by handbills given directly to the residences or businesses. If hand bills are used, the applicator shall 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 watch dogs, the applicator 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.
- C. A copy of the notice and a list of names and addresses where they were sent shall be kept by the applicator for seven (7) years and be hand delivered or mailed to Ecology immediately upon request. Where notices were delivered by hand (hand bills), names are not required to be recorded; only the address where notification was made.
- D. Notification must take place at least 10 days, but not more than 21 days prior to initial treatment.
- E. Notification information must include:
 - 1. The lake or stream to be treated.
 - 2. The name of the pesticide (and oxidizer, when applicable) to be used.
 - 3. The internet address (URL) of the Material Safety Data Sheet (MSDS) for the chemical products used. For example, the URL for the MSDS for Prenfish™ Fish Toxicant Powder is http://www.prentiss.com/msds/pdf/655_691.pdf.
 - 4. The purpose of the treatment.
 - 5. Any public use or water use restrictions.
 - 6. The date(s) of treatment / restricted use.
 - 7. The names and phone numbers of designated contact people at WDFW and Department of Ecology so people can obtain additional information.

P2. LEGAL NOTIFICATION PROCEDURES

- A. The Department of Fish and Wildlife shall publish announcements in the legal section of the local newspaper of general circulation (or nearest regional paper if local paper does not exist) 10 to 21 days prior to initial treatment. The legal notice shall include:
 - 1. The lake or stream to be treated.
 - 2. The name of the pesticide (and oxidizer, when applicable) to be used.
 - 3. The purpose of the treatment.
 - 4. Any public use or water use restrictions.
 - 5. The posting procedures.

6. The date(s) of treatment / restricted use.
 7. The names and phone numbers of designated contact people at WDFW and Department of Ecology so people can obtain additional information.
- B. An original affidavit from the legal department of the newspaper shall be kept by the Department of Fish and Wildlife for seven years and be mailed to the Department of Ecology upon request.

P3. POSTING PROCEDURES

- A. The WDFW shall post signs prior to the application of any pesticide(s) no more than forty-eight (48) hours prior to application. The Department of Fish and Wildlife shall 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 30 days, whichever is longer. The Department of Fish and Wildlife shall be responsible for removal of all signs before the following treatment of the waterbody.
- B. 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, all posted signs shall explicitly state the restriction(s) or precaution(s).
- C. The WDFW shall construct and post signs as follows:

1. Public Property

Signs shall be a minimum of eight and one-half (8 ½) by eleven (11) inches in size and be made of durable weather-resistant material. Lettering shall be bold black type with the word “CAUTION” at least one (1) inch high and all other words at least one-quarter (1/4) inch high. The sign board shall be white, yellow, or orange. Signs shall be placed facing all points of normal public access to the shoreline or stream bank; or one every one-hundred (100) feet of public shoreline within ten (10) feet of the mean high water mark. Signs shall be posted so that they are secure from the normal effects of weather and water currents but cause no damage to private or public property. The applicator shall post all signs within 24 hours of initial treatment.

2. Boat Access Areas

Boat launches are defined as publicly designated and privately owned community access boat launches. Signs shall be posted at all boat launches on the waterbody to be treated. Signs shall be a minimum of two (2) feet by three (3) feet in size and be made of durable weather-resistant material. Lettering shall be bold black type with the word “CAUTION” at least two (2) inches high and all other words at least one-half (1/2) inch high. The colors used for the sign board shall be white, yellow, or orange.

Signs must be placed within twenty-five (25) feet of the shoreline, facing the entrance to the boat launch. Where the public access has a shoreline length greater than one hundred-fifty (150) feet, the applicator shall place signs so that they are clearly readable by all people using the access areas. Signs shall be posted so that they are secure from the normal effects of weather and water currents but cause no damage to private or public property.

GENERAL CONDITIONS

G1. SIGNATORY REQUIREMENTS

All applications, reports, or information submitted to the Department shall be signed and certified.

- A. All permit applications shall be signed by either a responsible corporate officer of at least the level of vice president of a corporation, a general partner of a partnership, or the proprietor of a sole proprietorship.
- B. All reports required by this permit and other information requested by the Department shall 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 a person described above and submitted to the Department.
 - 2. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility, such as the position of plant manager, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.)
- C. Changes to authorization. If an authorization under paragraph B.2 above is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of paragraph B.2 above must be submitted to the Department prior to or together with any reports, information, or applications to be signed by an authorized representative.
- C. Certification. Any person signing a document under this section shall 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 INSPECTION AND ENTRY

The Permittee shall allow an authorized representative of the Department, upon the presentation of credentials and such other documents as may be required by law:

- A. To enter upon the premises where a discharge is located or where any records must be kept under the terms and conditions of this permit.
- B. To have access to and copy - at reasonable times and at reasonable cost - any records required to be kept under the terms and conditions of this permit.
- C. To inspect - at reasonable times - any facilities, equipment (including monitoring and control equipment), practices, methods, or operations regulated or required under this permit.
- D. To sample or monitor - at reasonable times - any substances or parameters at any location for purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act.

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 the Department'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 this permit 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. The Department 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 pretreatment 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 the Department determines that modification or revocation and reissuance is appropriate.
2. The Department 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 (General Condition G8) but will not be revoked and reissued after the effective date of the transfer except upon the request of the new permittee.

G4. REPORTING A CAUSE FOR MODIFICATION

The Permittee shall submit a new application, or a supplement to the previous application, along with required engineering plans and reports whenever a material change to the facility or in the quantity or type of discharge is anticipated which is not specifically authorized by this permit. This application shall be submitted at least sixty (60) days prior to any proposed changes. The filing of a request by the Permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not relieve the Permittee of the duty to comply with the existing permit until it is modified or reissued.

G5. PLAN REVIEW REQUIRED

Prior to constructing or modifying any wastewater control facilities, an engineering report and detailed plans and specifications shall be submitted to the Department for approval in accordance with Chapter 173-240 WAC. Engineering reports, plans, and specifications shall 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 shall be constructed and operated in accordance with the approved plans.

G6. COMPLIANCE WITH OTHER LAWS AND STATUTES

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

G7. DUTY TO REAPPLY

The Permittee shall apply for permit renewal at least 180 days prior to the specified expiration date of this permit.

G8. TRANSFER OF THIS PERMIT

In the event of any change in control or ownership of facilities from which the authorized discharge emanate, the Permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Department.

A. Transfers by Modification

Except as provided in paragraph B below, this permit may be transferred by the Permittee to a new owner or operator only if this permit has been modified or revoked and reissued under 40 CFR 122.62(b)(2), or a minor modification made under 40 CFR 122.63(d), to identify the new Permittee and incorporate such other requirements as may be necessary under the Clean Water Act.

B. Automatic Transfers

This permit may be automatically transferred to a new Permittee if:

1. The Permittee notifies the Department at least 30 days in advance of the proposed transfer date.
2. The notice includes a written agreement between the existing and new Permittee's containing a specific date transfer of permit responsibility, coverage, and liability between them.
3. The Department does not notify the existing Permittee and the proposed new Permittee of its intent to modify or revoke and reissue this permit. A modification under the subparagraph may also be minor modification under 40 CFR 122.63. If this notice is not received, the transfer is effective on the date specified in the written agreement.

G9. REDUCED PRODUCTION FOR COMPLIANCE

The Permittee, in order to maintain compliance with its permit, shall 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.

G10. REMOVED SUBSTANCES

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

G11. DUTY TO PROVIDE INFORMATION

The Permittee shall submit to the Department, within a reasonable time, all information which the Department 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 shall also submit to the Department upon request, copies of records required to be kept by this permit [40 CFR 122.41(h)].

G12. OTHER REQUIREMENTS OF 40 CFR

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

G13. ADDITIONAL MONITORING

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

G14. PAYMENT OF FEES

The Permittee shall submit payment of fees associated with this permit as assessed by the Department.

G15. PENALTIES FOR VIOLATING PERMIT CONDITIONS

Any person who is found guilty of willfully violating the terms and conditions of this permit shall be deemed guilty of a crime, and upon conviction thereof shall 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 may be deemed a separate and additional violation.

Any person who violates the terms and conditions of a waste discharge permit shall incur, 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 shall be a separate and distinct offense, and in case of a continuing violation, every day's continuance shall be deemed to be a separate and distinct violation.

G16. UPSET

Definition – “Upset” means an exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations 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 limitations if the requirements of the following paragraph are met.

A Permittee who wishes to establish the affirmative defense of upset shall 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 S3.E; and 4) the Permittee complied with any remedial measures required under S5 of this permit.

In any enforcement proceeding the Permittee seeking to establish the occurrence of an upset has the burden of proof.

G17. PROPERTY RIGHTS

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

G18. DUTY TO COMPLY

The Permittee shall 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.

G19. TOXIC POLLUTANTS

The Permittee shall 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.

G20. 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 shall, 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 shall 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.

G21. REPORTING PLANNED CHANGES

The Permittee shall, as soon as possible, give notice to the Department of planned physical alterations or additions to the permitted facility, production increases, or process modification which will result in: 1) the permitted facility being determined to be a new source pursuant to 40 CFR 122.29(b); 2) a significant change in the nature or an increase in quantity of pollutants discharged; or 3) a significant change in the Permittee's sludge use or disposal practices. Following such notice, 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.

G22. REPORTING ANTICIPATED NON-COMPLIANCE

The Permittee shall give advance notice to the Department by submission of a new application or supplement thereto at least one hundred and eighty (180) 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 the Department.

G23. REPORTING OTHER INFORMATION

Where the Permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.

G24. REPORTING REQUIREMENTS APPLICABLE TO EXISTING MANUFACTURING, COMMERCIAL, MINING, AND SILVICULTURAL DISCHARGERS

The Permittee belonging to the categories of existing manufacturing, commercial, mining, or silviculture must notify the Department as soon as they know or have reason to believe:

- A. That any activity has occurred or will occur which would result in the discharge, on a routine or frequent basis, of any toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following “notification levels:”
1. One hundred micrograms per liter (100 µg/l).
 2. Two hundred micrograms per liter (200 µg/l) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/l) for 2,4-dinitrophenol and for 2-methyl-4,6-dinitrophenol; and one milligram per liter (1 mg/l) for antimony.
 3. Five (5) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).
 4. The level established by the Director in accordance with 40 CFR 122.44(f).
- B. That any activity has occurred or will occur which would result in any discharge, on a non-routine or infrequent basis, of a toxic pollutant which is not limited in this permit, if that discharge will exceed the highest of the following “notification levels:”
1. Five hundred micrograms per liter (500µg/L).
 2. One milligram per liter (1 mg/L) for antimony.
 3. Ten (10) times the maximum concentration value reported for that pollutant in the permit application in accordance with 40 CFR 122.21(g)(7).
 4. The level established by the Director in accordance with 40 CFR 122.44(f).

G25. 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 shall be submitted no later than fourteen (14) days following each schedule date.

APPENDIX A

**Rapid Method for Measuring
Rotenone in Water at Piscicidal Concentrations**

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Abstract

A high-performance liquid chromatography (HPLC) procedure that is rapid, specific, and sensitive (limit of detection <0.005 mg/liter) was developed for monitoring application and degradation rates of rotenone. For analysis, a water sample is buffered to pH 5 and injected through a Sep Pak ® C₁₈ disposable cartridge. The cartridge adsorbs and retains the rotenone which then can be eluted quantitatively from the cartridge with a small volume of methanol. This step effectively concentrates the sample and provides sample cleanup. The methanol extract is analyzed directly by HPLC on an MCH 10 reverse-phase column; methanol: water (75:25, volume: volume) is the mobile phase and flow rate is 1.5 ml/minute. The rotenone is detected by ultraviolet spectrophotometry at a wavelength of 295 nm.

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Rotenone, the active constituent of derris root, has been used widely as an insecticide and piscicide. Its use for removing undesired fish populations in the United States began in the 1930s (Schnick 1974). Several analytical procedures have been reported for the analysis of rotenone, including colorimetry (Gross and Smith 1934; Goodhue 1936), infrared spectrometry (Delfel 1976), thin-layer chromatography (Delfel and Tallent 1969), gas chromatography (Delfel 1973), and high-performance liquid chromatography (HPLC) (Bushway et al. 1975; Freudenthal and Emmerling 1977; Bowman et al. 1978; Kobayashi et al. 1980). These procedures are either costly, time-consuming, insensitive, or lack specificity for monitoring concentrations of rotenone in water during fish-eradication projects.

We describe a simple, rapid HPLC procedure with a sample-concentrating step that can be used to determine residues of rotenone in water at piscicidal concentrations.

Methods

Apparatus

1. HPLC—Varian 5000 equipped with varichrom ultraviolet-light detector and optional Model CDS-111L data system.¹ Operating conditions:

stationary phase—30 cm X 4 mm Varian micropak MCH- 10 reverse phase;

mobile phase—methanol: water (75:25, volume: volume);

flow rate—1.5 ml/minute; chart

speed—1 cm/minute;

wavelength—295 nm;

attenuation—0.04 absorbance full scale.

¹ Mention of commercial products does not imply endorsement by the United States Government.

2. Sep Pak® C₁₈ disposable cartridges from Waters Associates, Incorporated.
3. Vortex stirrer.
4. Disposable syringes (50 ml).
5. Test tubes (15 ml) with Teflon-lined screw caps.

Reagents

1. Methanol—HPLC grade.
2. Water—HPLC grade.
3. Rotenone—purified grade from Aldrich Chemical Company; 0.01 g/ 100 ml methanol (made fresh daily).
4. Acetic acid (glacial)—American Chemical Society (ACS) reagent grade, 0.2 M; 11.6 ml diluted to 1 liter with water.
5. Sodium acetate—ACS reagent grade, 0.2 M; 2.72 g of C₂H₃O₂Na · 3H₂O diluted to 100 ml with water.
6. Buffer reagent—0.1 M; 14.8 ml of 0.2 M acetic acid + 35.2 ml of 0.2 M sodium acetate diluted to 100 ml with water.

Procedure

1. Precondition Sep Paks with 2 ml methanol and 5 ml water according to instruction sheet supplied by manufacturer.
2. Add 1 ml buffer reagent for each 50 ml of water sample (if expected concentration is less than 0.02 mg/liter, more than 50 ml of sample may have to be extracted).
3. Attach preconditioned Sep Pak to 50-ml syringe with plunger removed.
4. Transfer sample to syringe, insert plunger, and force sample through Sep Pak at a rate of not more than 40 ml/minute. Discard water.
5. Remove Sep Pak, remove plunger, and replace Sep Pak on syringe.
6. Add 2 ml methanol, insert plunger, and slowly force methanol through Sep Pak into test tube.
7. Cap tube and mix on vortex stirrer.
8. Analyze by HPLC against 50 ml of a standard containing a known concentration of rotenone in water solution processed as above.

Results and Discussion

The ultraviolet spectrum of rotenone has an absorption maximum at 295 nm (Fig. 1). A monochromatic detector (254 nm) can be used, but a considerable loss of sensitivity and potential loss of specificity will occur. Performance of monochromatic detectors can be enhanced by the use of 313-nm filters, but a grating monochromator set at 295 nm provides optimal results.

As indicated in step 1 of the procedure, the Sep Paks must be prerinsed with methanol followed by water before they are used in the analyses. Previous tests (Dawson 1982) indicated that, for best results, this step should not be completed more than 2 hours before an analysis.

Rotenone recovery is influenced by the rate water samples flow through the Sep Paks during extraction and by the elution rate of methanol. The recovery was less than 70% at a flow of 100 ml/minute but exceeded 90% at flows of 40 ml/minute or less. Several volumes of methanol were evaluated for most efficient elution of adsorbed rotenone from Sep Paks. Small volumes of methanol provided more

concentrated samples, but recoveries were consistently better when 2 ml or more of methanol were used for elution.

Recoveries of rotenone were evaluated at various pH values to determine whether or not acidity of water samples affected the utility of the method. Water samples were fortified with 0.08 mg/liter of rotenone and buffered to pH 5, 7, and 9 before the Sep Pak extraction. Recoveries of rotenone from the buffered samples were 98, 94, and 73%, respectively, indicating that acidification is essential for optimal performance of the Sep Paks.

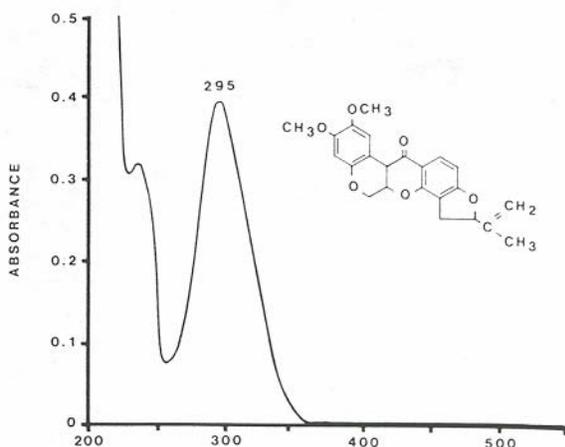


FIGURE 1.—Chemical structure and ultraviolet spectrum of rotenone (10 mg/liter) in methanol : water (75:25, volume : volume).

A water sample volume of 50 ml is sufficient for the analysis of rotenone concentrations of 0.02 mg/liter or greater. However, as much as 200 ml of sample may have to be extracted to achieve a sensitivity of 0.005 mg/liter. The limiting factors for greater sample concentration are the tedium of extracting large volumes of sample and possible interferences that may develop in samples as a result of the extraction and concentration of contaminants. Recently, J. T. Baker Chemical Company developed the Baker-10® extraction system, in which similar adsorption chromatography is used and the tedium of analysis is reduced by a vacuum manifold that extracts up to 10 samples simultaneously.

Samples extracted on Sep Paks are stable for only a few hours. However, if the sample is eluted from the Sep Pak and stored in the methanol eluate, the samples are stable for up to 2 days. For best results, samples should be kept cool and in the dark.

Retention time for rotenone from a sample of spiked pond water injected on the reverse-phase column was 5.7 minutes (Fig. 2). Unfortified pond water had no interfering peaks. The pen deflection at 2 minutes in Fig. 2 is the solvent injection peak.

Water samples from ponds treated with rotenone in summer and late fall were analyzed for residues of rotenone by this HPLC method (unpublished data). No interference problems were encountered and the measured concentration agreed closely with that calculated on the basis of the application rate.

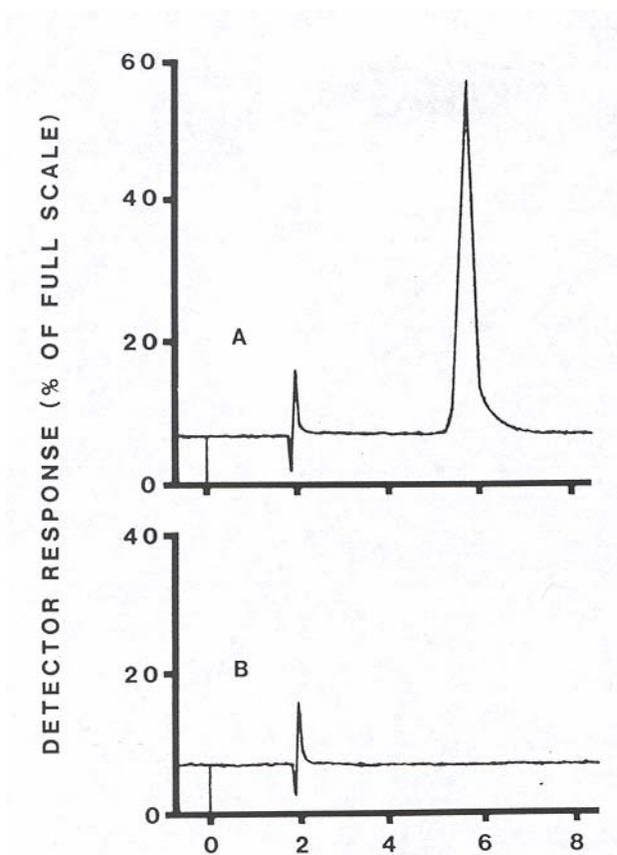


FIGURE 2.—Liquid chromatograms of (A) pond water sample fortified with rotenone (0.1 mg/liter) and (B) unfortified pond water; mobile phase—methanol:water (75:25, volume:volume); flow rate—1.5 ml/minute; wavelength—295 nm; attenuation—0.04 absorbance full scale. The water sample (50 ml) was concentrated 25 times on Sep Pak by elution with 2 ml methanol

Five replicate sample of pond water fortified with rotenone (0.1 mg/liter) were analyzed to evaluate the consistence of the method. The mean percentage of recovery and standard error were 97.6 ± 1.6 .

The use of a micro-processor data system, such as a Varian CDS-111L, greatly facilitates the analysis by integrating peak areas and converting values directly into concentration units.

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APPENDIX B

Sampling Protocols for Zooplankton

The new approach to measure uses on a given lake includes a need to evaluate the health of a fishery. A widely utilized tool on the east coast of the United States is the measuring of zooplankton as a cost effective surrogate to collecting and measuring fish. An index has been developed in order to determine the predator/prey balance in the fish communities within a given lake (Mills and Schavone, 1982). In a study of 18 natural lakes in upstate New York, Mills and Schavone (1982) demonstrated a strong correlation between mean length of cladocerans and planktivore weight ($r^2 = .70$; $P < 0.05$). In other words, the presence of large zooplankton indicate predator fish are keeping prey species in balance. Dominance of smaller zooplankton suggests an ineffective amount of predators to suppress planktivore density.

A standard approach to sampling zooplankton was followed in the field. Methods for collecting, storage, and enumeration are patterned after the "Zooplankton Workshop Reference Guide" prepared by BSA Environmental Services, Inc. (Beaver, 1997).

Sampling Period

Five vertical tows were pulled in June and five were pulled in August from the deep site of each selected lake. Tows were composited into one 125ml sample bottle. Five tows were not necessary if there were an abundance of zooplankton in the first few tows. Duplicate samples (again, five tows if necessary) were taken at duplicate TP sample sites.

Field Procedure

The Wisconsin net was pulled from a depth of one meter off the bottom or 20 meters, whichever was less. The depth was rounded to the most conservative meter to ensure bottom sediments weren't disturbed. Nets were retrieved at a rate of one meter per three seconds.

Upon retrieval of the sample, a squirt bottle filled with tap or distilled water was used to dislodge any zooplankton that may have been clinging to the mesh. Samples were discharged into a 125 mL amber, Lugol-treated sample container and preserved with approximately 15 mls of Lugol's solution.

Sample Analysis

Samples were analyzed for relative abundance of cladocerans and copepods and their mean length. Relative abundance was determined using a Sedgewick-Rafter counting chamber and a compound microscope. Subsamples were analyzed to estimate mean length of the zooplankton using a compound microscope and an ocular equipped with a reticle. Measurements were recorded to the nearest 0.2mm. Results were tabulated as the ratio of total cladocerans:total copepods.

Data Interpretation

Due to time constraints in 1998, it was not possible to fully analyze the collected samples of zooplankton but the following provides possibilities for future data interpretation. A subset of lakes sampled by Ecology in 1998 were also surveyed by the Washington State Department of Fish and Wildlife. Zooplankton mean length data should be compared to fish length-frequency distributions to evaluate whether there is a particular mean zooplankton length that could be used as a pivot indicator of a balanced predator/prey fish population in a given lake (e.g. 1.0 mm is used in some states). An index with a range of mean lengths within given categories may be the most effective use of the zooplankton data. For example, mean zooplankton lengths between 0.9 mm and 1.0 mm may be rated as “fair” for predator/prey populations and mean lengths between 1.0 mm and 1.1 mm may rate “good” and above 1.1 mm rated as “fair,” etc. A fair rating or worse could then be used to demonstrate impairment of a beneficial use.

Relative zooplankton abundance data may be correlated with nutrient and Secchi data. It is uncertain at this time whether or not zooplankton abundance is a good indicator of predator/prey balance. However, correlations with traditional water chemistry data and additional fish population data may demonstrate whether or not trophic cascade effects are present in Washington lakes (Brett and Goldman, 1996). Zooplankton data may also explain differences between total phosphorus concentrations and expected correlated values for chlorophyll *a*/Secchi measurements.

*Appendix B Sampling Protocols for Zooplankton was taken from pages 4-5 of *Water Quality Assessments of Selected Lakes Within Washington State 1998*, Washington State Department of Ecology. December 2000. Publication No. 00-03-039.