

FACT SHEET FOR FISHERY RESOURCE MANAGEMENT NPDES PERMIT WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

SUMMARY

The State of Washington Department of Ecology (Department) has tentatively determined to issue an individual permit to the Washington Department of Fish and Wildlife (WDFW) for the application of rotenone, an aquatic pesticide used to manage fish populations in lakes and streams in the State of Washington. Any short term toxicity to aquatic organisms is allowed under the terms of the permit and the water quality modification provisions to accommodate the application of rotenone, an aquatic pesticide that is occasionally used by WDFW biologists to manage fish populations. The WDFW will conduct monitoring to determine the extent and duration of the short-term water quality reduction resulting from rotenone applications.

The proposed terms, limitations and conditions contained herein are tentative and may be subject to change, subsequent to public comments and testimony provided at public hearings. The WDFW will not be relieved of any responsibility or liability at any time during the life of the permit for: (1) violating or exceeding State water quality standards; or (2) violating any other local, State, or Federal regulation or standard as may pertain to the individual facility. Any application of pesticide to surface waters of the state requiring NPDES permit coverage found not covered under the individual permit will be considered to be operating without a discharge permit and subject to potential enforcement action.

On March 12, 2001, the Ninth Circuit Court of Appeals decided that the application of an herbicide in compliance with the labeling requirements of Federal Insecticide Fungicide Rodenticide Act (FIFRA) did not exempt an irrigation district from needing an NPDES permit (*Headwaters, Inc. v. Talent Irrigation District*). Ecology, as had many other states, had previously been issuing orders that were not NPDES permits that placed protective conditions on the use of pesticides in waters of the state. This individual permit will replace those short term modifications where pesticide applications are directed into surface waters of the state for the purpose of managing fish populations in lakes and streams.

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INTRODUCTION

This fact sheet is a companion document that provides the basis for issuance of the Fisheries Resource Management National Pollutant Discharge Elimination System (NPDES) Individual Permit. The Department of Ecology (the Department) is proposing to issue this permit, which will allow the Washington Department of Fish and Wildlife (WDFW) to discharge wastes from aquatic pesticide (rotenone) applications, used to manage fish populations in surface waters of the State of Washington, which are also waters of the United States, pursuant to the provisions of chapters 90.48, 90.52, and 90.54 Revised Code of Washington (RCW) and the Federal Water Pollution Control Act (FWPCA) as amended. This fact sheet explains the nature of the proposed discharges, the Department's decisions on limiting the pollutants in the wastewater, and the regulatory and technical basis for these decisions.

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has delegated responsibility to administer the NPDES permit program to the State of Washington on the basis of Chapter 90.48 RCW which defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-226 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see Appendix A--Public Involvement of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period closed, the Department summarized the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix E--Response to Comments.

GENERAL INFORMATION	
Applicant	Washington Department of Fish and Wildlife
Facility Name and Address	Lakes and streams in the State of Washington

BACKGROUND INFORMATION

LEGAL

The Federal Insecticide, Fungicide, and Rodenticide Act of 1979 (FIFRA), as administered by the United States Environmental Protection Agency (EPA), requires that all persons who apply pesticides classified as restricted use be certified according to the provisions of the act or that they work under the 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 will be accomplished by means of a "core" examination (*Pesticide Laws & Safety*). 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) are required to pass an additional exam (*Aquatic Pest Control*) to demonstrate competency as described in the code of federal regulations as follows:

Aquatic 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. Applicants in this category must demonstrate practical knowledge of the principles of limited area application (40 CFR 171.4).

A March 12, 2001 decision by the Ninth Circuit Court in *Headwaters, Inc. v. Talent Irrigation District* found that an applicator should have obtained coverage under a National Pollutant Discharge Elimination System (NPDES) permit prior to application of aquatic pesticides to an irrigation canal in Oregon. The canal discharged water into a creek where a fish kill occurred. The decision addressed residues and other products of aquatic pesticides.

Headwaters, Inc. and Oregon Natural Resources Council filed a Clean Water Act citizen suit against the Talent Irrigation District (TID) for applying aquatic herbicide into a system of irrigation canals. Reversing a district court's opinion, the Ninth Circuit held that application of the pesticide in compliance with the labeling requirements of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) did not exempt TID from having to obtain a NPDES permit, and that the irrigation ditches were "waters of the United States" under the Clean Water Act.

Ecology, as had many other states, had been issuing administrative orders (short term

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modifications), that were not NPDES permits, that placed protective conditions on the use of pesticides in waters of the state. Based upon the Ninth Circuit Court's decision, Ecology decided to write NPDES permits for all temporary water quality modifications for the application of aquatic pesticides under WAC 173-201A-110(1), including piscicides used in fisheries management. This individual permit replaces the short term modifications that were previously issued to the Washington Department of Fish and Wildlife for the application of pesticides into surface waters of the state for the purpose of managing fish populations in lakes and streams.

ROTENONE USE IN FISHERIES MANAGEMENT

Over the years, fisheries biologists have tried a number of techniques to eliminate nuisance fish from lakes: nets, traps, dynamite, electroshocking, predator stocking, and even complete drainage. But the use of fish poisons has been by far the most widespread; and of these poisons, rotenone is the most commonly used today. In most cases, the technique is relatively simple: all the fish in a lake are killed so that sportfish, usually trout, can then be stocked, free from predation or competition from other species (Bradbury 1986, cited in WDW 1992).

Rotenone itself is an alkaloid poison made from the roots of certain South American and Asian plants. Natives in those areas have for centuries killed fish for food 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 fish management, and it quickly became popular nationwide (Bradbury 1986, cited in WDW 1992). By 1949, 34 states and several Canadian provinces were using rotenone routinely for the management of fish populations (Finlayson et al. 2000). The number of states and provinces using rotenone has changed little since 1949, but the quantity of rotenone use has declined during a ten year survey period from 1988-1997 (McClay 2000).

A recent survey of rotenone use (1988-1997) indicates that the preferred formulation of rotenone appears to have changed. Agencies now appear to be placing a greater emphasis on the use of powdered rotenone, especially for treating standing waters. This trend is probably due to reduced costs and improved distribution techniques from the powdered formulation, as well as increased environmental and public health concerns for the inert ingredients contained in liquid formulations. Although liquid formulations have proven safe for use, according to EPA FIFRA evaluations, some agencies have found it more difficult to plan and execute treatments using these formulations because of the demands for environmental monitoring studies not normally required for projects that utilize the powder formulation (McClay 2000).

ROTENONE USE BY THE WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

This section 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.

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

To satisfy the annual demand for productive freshwater fishing, Washington Department of Fish and Wildlife stocks selected waters with trout from hatcheries and transplanted bass, crappie, walleye, and additional warmwater fish species from other waters. Many waters are managed for specific fisheries, such as trout-only or warmwater species. The management emphasis for state waters is decided according to habitat parameters, public desires, recreational demands, and previous management efforts. Occasionally, these waters become overpopulated with fish species outside this management emphasis. This often results in increased predation and/or competition, hence poor growth and survival, of targeted game fish. If carp overpopulate, fish survival decreases and nesting bird habitat is degraded due to siltation and uprooting of emergent vegetation. Infestations of these fish species occur through migration from other waters or through illegal transport and introductions. Three management options are available if this happens:

- 1) Take no action;
- 2) Change the management emphasis for the water;
- 3) Eliminate competing species and stock with desired gamefish species.

Option 1 will result in an increase in numbers of fish outside the management emphasis to a point where the water no longer supports a viable gamefish fishery.

Option 2 allows for a viable fishery, but is 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 a legal-sized trout (Washington Department of Fish and Wildlife, 1983). Even though fry survival is lower when compared to legals, they can still be more economical in some cases. Furthermore, legal-sized trout are considered a lower quality fish than naturally-reared fry-origin trout, and are usually smaller as well.

Option 3 is the preferred or most efficient alternative that allows the lake to continue to provide a viable fishery. Rotenone is the method currently used by WDFW to eliminate fish in lakes and is far more economical than either options 1 or 2 above. Washington Department of Fish and Wildlife (1984) 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 legal-sized trout stocking (no rotenone).

The cost of Option 3 was about one-fourth the cost of either Option 1 or 2. Also note that option 2 is not likely to be a viable alternative in many lakes for the reasons already discussed.

RESTORATION OF NATIVE FISH HABITAT

WDFW has successfully used rotenone treatment to eliminate illegally planted, non-native fish (e.g. northern pike) from lakes where they have been shown to negatively impact native fish populations (e.g. coho salmon) by competing for food and space, and in some cases actually using native fish as forage. Illegally planted fish populations could also serve as a source for additional illegal plants into other lakes.

EVALUATION OF AVAILABLE FISH CONTROL OPTIONS

The WDFW Supplemental Environmental Impact Statement – Lake and Stream Rehabilitations 1992 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 are evaluated in the FSEIS and are summarized as follows:

1. Fish Toxicants. Two fish toxicants (piscicides) are available, rotenone and Antimycin. Rotenone is regarded as safer and less persistent than Antimycin when used to rehabilitate lakes.
2. Predator stocking. The use of apex predators (e.g. tiger musky) as pest control is now being 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 effective option in “trout only” managed waters.
3. Mechanical means.
 - a. Water level drawdowns: Very few lakes have water level control facilities. Accordingly, this is not regarded as an effective option.
 - b. Lakewide netting and trapping: There are some accounts where this method has been shown to be effective. Most attempts using commercial fishing gear have failed because they are extremely labor intensive and therefore not cost effective.
 - c. Dams and barriers: This method prohibits the migration of undesirable spawning fish to their spawning grounds. This method has little practical value since most of the target species are lake spawners.
 - d. Electrofishing: This method has never been successful as a long term control measure for the same reasons that netting and trapping fail typically.
 - e. Removing congregations of spawning fish: There are several accounts of success with this method. Adult fish are allowed to congregate in spawning areas which are subsequently blocked off. The fish are then poisoned, electroshocked or netted. However, to actually effectively control an undesirable fish population, this technique must be repeated annually. 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.

In a letter to the Department, dated November 6, 2001, the WDFW Resident/Native Fish Program Manager provided a comparison of available fish control methods (Table 1).

Table 1: Comparison of fish control methods

Criteria	Fish Toxicants (rotenone)	Predator / Competitor	Mechanical
Impact on aquatic environment	Moderate – short term. Total detoxification through natural breakdown takes place normally within 5 weeks (Finlayson et al. 2000)	Moderate – long term	Moderate – short term
Ability to meet water quality standards	Excellent – Concentrations of rotenone for proposed work is not toxic to humans (Finlayson et al. 2000)	Good - immediate	Good - variable
Effectiveness for goal	Excellent – Good	Low	Low – moderate
Cost effectiveness	It has been estimated that for every dollar spent on rotenone and trout stocking, anglers gained between \$32 - \$105 worth of fishing	Moderate	High Cost – low return
Suitability for treatment sites	Suitable for most sites	Suitable for most sites	Suitable for very few sites
Protection for human health concerns	Human health concerns can be adequately addressed by following label restrictions and safety procedures	No human health concerns	No human health concerns
Response to emergency	Can be adequately addressed	No emergency response necessary	Human health concerns can be adequately addressed

Based upon previous criteria table, rotenone is WDFW’s preferred option to control undesirable fish species in managed waters (WDFW 2001).

WILDLIFE MANAGEMENT

Lakes are also rehabilitated by the WDFW to improve the quality of waterfowl habitat. The primary objective is to remove carp or other competitive species from potentially productive nesting and rearing duck habitat to increase the amount of food (aquatic invertebrates) and vegetative cover. Candidate waters are primarily one to three feet deep.

WDFW LAKE AND STREAM REHABILITATION PROCEDURES

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

“Schedule of Activities – Lake Rehabilitation Program” 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 D).

PRE-TREATMENT PROCEDURES

A lake or stream is selected for rotenone treatment when a viable fishery can only be provided with introductions of legal-sized fish. These determinations are made by the WDFW Area Fisheries Biologist directly charged with managing the lake's gamefish. Standard indicators of fishery performance are the average catch per hour on opening day, fish sizes and abundance from annual pre-season surveys. When poor performance is coupled with gillnet and/or electroshocking data showing an increase in species outside the management emphasis, the Area Biologist may recommend treatment of the water to his supervisor, the Regional Fisheries Program Manager.

A Pre-Rehabilitation Plan containing vital information on the proposed treatment must be completed by the Area Fish Biologist.

In calculating the dosage of rotenone needed, the biologist considers a variety of physical and biological factors, the most important being target species, water chemistry, past successes or failures in the lake and presence of weedy shorelines.

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, adjustments are required because the powder used by WDFW rarely contains only 5% active rotenone. To ensure correct application rates, each shipment is chemically assayed by the supplier for rotenone content. Powder formulations used in recent years has assayed between 7% and 8% active rotenone. This permit requires WDFW to follow all label requirements, including a maximum application rate of 0.25 parts per million (ppm) active rotenone for lake treatments. Information regarding specific treatments will be submitted to the Department in an annual report, including the quantity and concentration of rotenone applied to each body of water and the chemical assay performed by the supplier.

The Regional Fisheries Program Manager presents his list of proposed treatments along with justifications for each water body to the Fisheries Management Division of WDFW. Approval at this stage may depend not only on the validity of the biological justifications, but on other

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considerations such as the lake's public use and its importance as a recreational fishery, and finally the availability of rotenone. Statewide priorities are established, and a list of candidate lakes developed.

After developing a list of candidate lakes, the public is notified through a general news release, usually in early summer. Area Fish Biologists also solicit public opinion from lakeshore residents and other groups in the area. Public meetings are held in the vicinity of the waters proposed for treatment prior to a final decision. A final list of candidate lakes is issued for public review in the counties where the lakes are located as an addendum to the 1992 FSEIS to meet State Environmental Policy Act requirements.

The WDFW Director presented with the list of candidate lakes for agency approval. Even with the Director's approval, there is still a chance that a lake may not be treated if all the pre-treatment steps such as outlet detoxification 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, when possible, by emergency regulation to utilize fish in waters scheduled for rehabilitation. Warmwater game fish, usually mature bass, are collected (depending on need) prior to rehabilitation, to be utilized as broodstock for waters nearby which are managed for warmwater fisheries. On some lakes, bass that have floated to the surface have been netted by WDFW employees and bass club volunteers, revived by dipping the fish in potassium permanganate, and moved to mixed-species or spiny ray lakes to augment or start a population (Fletcher 1976, cited in WDW 1992). WDFW typically transplants 200-300 fish from a single lake during this type of procedure (WDW 1992).

TREATMENT PROCEDURES

In keeping with EPA's 1993 changes to the rotenone product label, WDFW has modified their rotenone application procedure to reduce applicator and public exposure to rotenone (WDFW 2002). The changes to reduce exposure are identified as the preferred alternative and are summarized in the FSEIS 2002 as follows:

The supervisor of the application project will be charged with ensuring that all label requirements are followed and all safety requirements are met. The application procedure for powdered rotenone product will be changed to a method pioneered by the Utah Division of Wildlife Resources, see below. Additionally, Powered Air Purifying Respirators (PAPR) will be adopted for use by the applicator crews and support staff. Procedures will also be adopted as they are developed by the Washington Department of Ecology in WDFW's pretreatment process to meet National Pollution Discharge Elimination System (NPDES) permit requirements, see below. NPDES permits are now required for all pesticide applications that are to or will affect state waters.

The new rotenone application method, pioneered by the Utah State Department of Natural Resources – Division of Wildlife Resources involves mixing powdered rotenone into slurry. The Utah application method involves using a pump and aspirator to vacuum rotenone powder from standard packaging to mix with lake water and apply the mixture. Standard packaging for

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powdered rotenone is a sealed, heavy gauge, removable plastic liner inside hermetically sealed, pressed fiber 50 kilogram drums. The powder and water are combined inside the aspirator chamber forming a slurry. The slurry is discharged directly on to the reservoir surface or delivered into barge tanks from the aspirator nozzle (Thompson et al. 2001). For a detailed description of the application procedure, refer to “Utah’s Procedure for Mixing Powdered Rotenone into a Slurry” by Thompson et al 2001, published by the American Fisheries Society.

ROTENONE SAFETY PROCEDURES

WDFW’s human health and safety procedures are summarized in a WDFW internal memo, dated February 3, 2001. This memo is included in WDFW’s 2002 FSEIS as Appendix C.

POST-TREATMENT PROCEDURES

In lakes with a stream outlet, runoff from the lake must be controlled or detoxified. In some cases, the runoff is small enough that it can be dammed off (using sandbags, for example) until the rotenone is naturally degraded. When this is not possible, and oxidizing agent – usually potassium permanganate – is dripped into the outlet stream to detoxify the rotenone before it can harm fish and invertebrates downstream. Between 1977 and 1984 such detoxification was necessary in only 16% of the lakes treated. Pfeifer (1985) provides a detailed account of outlet detoxification procedures, including dosage/detoxification curves and case histories in Martha and Silver Lakes, Snohomish County (WDW 1992).

Rotenone degrades naturally in a few days to eight weeks at the most in lowland lakes, and somewhat longer in sub-alpine or alpine lakes (WDFW 2002). At intervals following treatment, WDFW Area Biologists usually perform a simple bioassay to determine how long the lake remains toxic to fish: hatchery rainbow trout are commonly suspended in the water column in wire cages and when these fish survive 1-6 days in the lake, it is considered nontoxic (WDW 1992).

The biologist submits a Post-Rehabilitation Form for each treated water; it describes, among other things, the possibility of a complete kill, water conditions at the time of treatment, and any detoxification measures taken (WDW 1992).

Fish are restocked the following spring. During the post-treatment years, the Area Biologist continues to monitor fish survival and growth, as well as catch rates for the water (WDW 1992).

NUMBER AND SIZE OF WATERS TREATED

The first rotenone treatment in Washington State took place in September, 1940 on King Lake (Pend Oreille County). Since that time 503 state waters have been treated at least once. The chlorinated hydrocarbon insecticide toxaphene was occasionally used instead of rotenone; its use

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was discontinued in the late 1960's, and since then, rotenone has been the only fish poison applied in Washington State.

Almost all treatments have occurred in lakes and ponds, with only occasional stream or slough treatments. Waters treated since 1940 represent 6.1% of the total surface acreage of all lakes below 2,500 feet elevation in the state (WDFW 2002).

FREQUENCY OF ROTENONE TREATMENTS

Rotenone rarely if ever kills all the fish in a lake. Problem species often repopulate the lake 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, problem species are often reintroduced illegally by anglers or lakeside residents. These may be the same species that originally degraded the targeted fishery, or new ones. The net result of any of these cases is the same: trout production will eventually decline, and the lake may have to be rehabilitated again.

Of 503 Washington State lakes that have been treated, 283 (55%) have been treated more than once. The average length of time between treatments has been 7.74 years (WDFW 2002).

TARGET SPECIES

In the eastern half of the state pumpkinseed sunfish was most frequently targeted for elimination, in the western half of the state yellow perch was most frequently targeted. Other important target species statewide include carp, crappie, brown bullhead (catfish), and largemouth bass. All are introduced, non-native species.

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-rotenoned lakes changes over the years. This is often the case in "urban" lakes which are frequent targets for illegal fish introductions.

TIMING OF ROTENONE TREATMENTS

Seventy-eight percent of rotenone treatments in the state have taken place in the fall, mostly in September and October. Only 22% have been spring treatments, and these occurred mostly in March. All spring treatments were on eastern Washington lakes.

Rotenone is usually applied in the fall because water levels are low, aquatic vegetation is sparse, recreational use of the lake is reduced and since most lakes summer thermal stratification has ended (allowing rotenone to circulate throughout the water column). Fall treatments are also desirable when early Spring spawners are targeted (e.g. perch). Spring rotenone treatments are occasionally performed 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, early spring is the period of lowest water level and flow.

PERMIT STATUS

This is a previously unpermitted activity under the NPDES program. A permit application was submitted to the Department on April 5, 2002 and accepted by the Department on April 5, 2002.

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in a NPDES permit must be either technology- or water quality-based. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Sections 301, 302, 306, and 307 of the Federal Water Pollution Control Act (FWPCA) established discharge standards, prohibitions, and limits based on pollution control technologies. These technology-based limits are "best practical control technology" (BPT), "best available technology economically achievable" (BAT), and "best conventional pollutant control technology economically achievable" (BCT). Technology-based effluent limits may be taken from the federal effluent guidelines or developed on a case-by-case basis, otherwise known as

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Best Profession Judgement (BPJ). BPJ limits may be numerical limits or Best Management Practices (BMP's).

The State has similar technology-based requirement for pollutant control described as: "all known, available and reasonable methods of control, prevention, and treatment" (AKART) methods. AKART is referred to in State law under RCW 90.48.010, RCW 90.48.520, 90.52.040 and RCW 90.54.020. The Federal technology-based limits and AKART are similar but not equivalent. AKART may be more stringent than Federal regulations and may include requirements which are in state regulation.

The pesticide application industry has been regulated by EPA under the terms of the Federal Insecticide, Fungicide, and Rodenticide Act of 1979 (FIFRA), the Code of Federal Regulations (CFR) Titles 40 and 21, and other state and federal laws and rules. The product label use requirements were developed by EPA in accordance with FIFRA and CFR. EPA requires the pesticide manufacturer to register each pesticide and provide evidence that the pesticide will work as promised and that environmental harm will be minimized. The standards for environmental protection are different between the Clean Water Act (CWA) and FIFRA, however this permit specifies that the permittee must meet label requirements and applicable state and federal laws and rules regarding pesticide use.

Although WDFW has provided the Department with a list of several formulated rotenone products registered with the EPA, only two forms of powdered rotenone (Prentox[®] Prenfish[™] Fish Toxicant Powder and Peru Cube Powder[®]), and two forms of liquid rotenone (Prentox[®] Prenfish[™] Toxicant and Noxfish[®] Fish Toxicant) are currently registered by the Washington State Department of Agriculture (WSDA). If other rotenone piscicide products become registered with WSDA, they are also covered under this permit.

According to the Material Safety Data Sheets (MSDS) provided by WDFW, the liquid rotenone product Prentox[®] Prenfish[™] Toxicant contains 80% inert ingredients, including aromatic petroleum solvents (naphthalene, trimethylbenzene, and acetone). These chemicals are not found in powdered rotenone formulations.

The permit will restrict the use of liquid rotenone (e.g. Prentox[®] Prenfish[™] Toxicant) for the following reasons:

1. Human health concerns. 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).
2. Air quality concerns. VOCs contained in liquid formulations could cause air quality problems, especially in urban areas classified as non-attainment zones.
3. Alternative formulations exist. When compared to liquid rotenone, powdered rotenone applied using the Utah method, is effective in meeting fish control objectives.

The permit will require that the use of liquid rotenone products be limited to spot applications in areas that are not practicably accessible by boat, such as marshy areas. Open water areas on

lakes that are accessible by boat must be treated with powdered rotenone formulations, mixed with water, and applied using a 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 a slurry that is applied to the surface of the water.

DETOXIFICATION OF ROTENONE TREATED WATERS

WDFW typically only treats “closed basin” lakes that do not discharge. However, when rotenone treated waters may discharge and threaten aquatic life outside the area, rapid detoxification is required. Since 1992, such detoxification has been necessary in 3.6% of the lakes treated in Washington (WDFW 2002).

Potassium permanganate (KMnO₄) is the chemical most often used to quickly neutralize (oxidize) rotenone formulations (WDFW 2002; Finlayson, et al. 2000). The rotenone label also allows the use of chlorine for neutralization, but its use is not proposed by WDFW at this time. Rotenone degrades naturally within one to eight weeks depending on pH, alkalinity, temperature, and dilution with untreated water (Schnick 1974, cited in WDFW 2002). Rotenone toxicity can last longer in more sterile sub-alpine or alpine lakes. Potassium permanganate is seldom required for use by WDFW. Rotenone treatment timing is selected so that periods of very low or no flow are the case during the time that treated water remains toxic. Very low outlet flow is a requirement to insure that the outlet flow can be neutralized for the period that outflow would be toxic. Potassium permanganate can be applied by two methods. The crystals can be dissolved in water and the solution dripped or the crystalline chemical can be metered 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. The procedure to determine the amount of potassium permanganate required is found in the American Fisheries Society Rotenone Use in Fishery Management manual (Finlayson, et al. 2000) and in Archer (2001).

This permit requires that treated waters be effectively neutralized and detoxified using potassium permanganate so that water quality standards are not exceeded below the neutralization zone. For purposes of this permit, 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 would be expected to travel in 20 minutes (Finlayson et al. 2000; Horton 1997). Since the neutralization zone may contain toxic levels of rotenone and potassium permanganate, some fish mortalities may be expected within this zone.

Since potassium permanganate itself may be toxic to non-targeted organisms at 2 ppm (Marking and Bills 1975, cited in Archer 2001), detoxification procedures must utilize calibrated equipment to achieve the minimum effective concentration of potassium permanganate to oxidize the rotenone within the neutralization 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 (Finlayson et al, 2001). Detoxification is most effective

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against rotenone concentrations up to about 1 ppm of 5% formulation and detoxification is nearly impossible at rates greater than 3.2 ppm (Horton 1997). In situations where detoxification is required, rotenone applications should not exceed the minimum amount required to kill the target species.

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.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

WATER QUALITY BASED REQUIREMENTS

The use of rotenone to rehabilitate lakes and streams affects surface waters of the State. These waters are protected by chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington. The purpose of these standards is to establish the highest quality of State waters, through the reduction or elimination of contaminant discharges to the waters of the State, consistent with: public health; public enjoyment; the propagation and protection of fish, shellfish, and wildlife; and existing and future beneficial uses. This purpose is reached, in part, by compliance with the limitations, terms and conditions of this wastewater discharge permit.

The lake and stream rehabilitation activities which discharge, directly or indirectly, to surface waters shall be required to meet the State water quality standards for Class AA and Class A surface waters as given in chapter 173-201A WAC. The characteristic beneficial uses of Class AA and A surface waters include, but are not limited to, the following: domestic, industrial and agricultural water supply; stock watering; the spawning, rearing, migration and harvesting of fish; the spawning, rearing and harvesting of shellfish; wildlife habitat; recreation (primary contact, sport fishing, boating, and aesthetic enjoyment of nature); commerce and navigation.

RCW 90.48.035 authorizes establishment of water quality standards for waters of the State. The State has implemented water quality standards in chapter 173-201A WAC. All waste discharge permits issued pursuant to NPDES or State Wastewater Discharge (SWD) regulations are conditioned in such a manner that all authorized discharges shall meet State water quality

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standards. Standards include an "antidegradation" policy which states that beneficial uses shall be protected.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

The Department has determined that, when properly applied and handled in accordance with the terms and conditions of the individual permit, lake and stream rehabilitation activities will comply with State water quality standards, will maintain and protect the existing characteristic beneficial uses of the surface waters of the State, and will protect human health. New information regarding previously unknown environmental and human health risks may cause reopening of the individual permit.

No mixing or dilution zone shall be authorized to the Permittee for any discharge to surface waters under this individual permit. The short term water quality modification provisions of the permit will allow the discharges authorized by the individual permit to cause a temporary diminishment of some beneficial uses while the water body is altered to improve recreational fishing opportunities, public enjoyment and in some cases for native fish restoration. The short term modification will be short in that the actual impairment will be short lived, while the overall availability of authorization extends through the term of the permit.

The activities authorized by this individual permit do not have a reasonable potential to cause a violation of state water quality standards (WAC 173-201A) so long as the activities are carried out under the short term water quality modification. The water quality modification provides for an exception to meeting certain provisions of the state water quality standards such as meeting all beneficial uses all the time. Activities covered under this permit are allocated a temporary zone of impact on beneficial uses, but the impact must be transient, and must allow for full restoration of water quality and protection of beneficial uses upon project completion. The conditions of this permit constitute the requirements of a short term water quality modification.

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

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

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards.

SEPA COMPLIANCE

Rotenone use related to fish management activities has undergone environmental impact evaluations by WDFW in 1992 and 2002. The use of pesticides is conditioned to mitigate environmental impacts of concern noted in these evaluations. This individual permit will undergo SEPA. The conditions of this permit should satisfy any water quality related SEPA concerns.

For each lake proposed for rehabilitation, WDFW provides public announcements including local newspaper, internet / web site information, and news releases. WDFW also conducts local public meetings to solicit public input regarding each proposed treatment. All lakes proposed for treatment are included in an annual addendum to the Final Supplemental Environmental Impact Statement (FSEIS) - Lake and Stream Rehabilitations. 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

DESCRIPTION OF THE RECEIVING WATER

Although the permit is valid for lakes and streams throughout Washington, WDFW typically treats only lowland lakes with closed basins or no outlet stream. If an outlet stream is present it will be properly detoxified with potassium permanganate using approved methods.

ELIGIBILITY AND GEOGRAPHICAL AREA OF COVERAGE

For the purposes of the individual permit, the fish control activities for which the permit is valid includes surface waters of the entire State. All lakes proposed for treatment are included in an annual addendum to WDFW's Final Supplemental Environmental Impact Statement (FSEIS) on Lake and Stream Rehabilitation.

WASTEWATER CHARACTERIZATION

The proposed wastewater discharge is characterized for the following parameters:

Table 2: Wastewater Characterization – Powdered Rotenone Formulations

Product Name	Application Rate	Active Ingredient Concentration in Treated Waters
Prentox [®] Prenfish [™] Fish Toxicant Powder or Peru Cube Powder [®]	Application rates on label range from 0.10 - 5 ppm (based upon 5% active rotenone).	0.005 – 0.25 ppm
Potassium Permanganate (if neutralization 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 Neutralization Methods” by Archer (2001).	Variable concentration in the rotenone neutralization zone, based upon formulas in Archer (2001). Below, the neutralization zone, the concentration will not exceed 1 ppm.

Table 3: Wastewater Characterization – Liquid Rotenone Formulation

Product Name	Application Rate	Active Ingredient Concentration in Treated Waters
Prentox [®] Prenfish [™] Toxicant ¹	Application rates on label range from 0.10 - 5 ppm (based upon 5% active rotenone)	0.005 – 0.25 ppm active rotenone
Potassium Permanganate (if neutralization 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 Neutralization Methods” by Archer (2001).	Variable concentration in the rotenone neutralization zone, based upon formulas in Archer (2001). Below, the neutralization zone, the concentration will not exceed 1 ppm.

¹Inert 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)

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

GROUND WATER QUALITY LIMITATIONS

The ability of rotenone to move through soil is low to slight. Rotenone moves only 2 cm through most types of soils. An exception would be in sandy soils where the movement is about 8 cm. Rotenone is bound strongly to organic matter in soil so it is unlikely that rotenone would enter groundwater (Finlayson et al. 2000, Dawson et al. 1991).

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

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

Procedure for Obtaining Approval for the Discharge of Wastewater Containing Antimycin or Other Products Not Specified In the Current Permit

Antimycin-A, registered as Fintrol, is the only other piscicide that is registered with the EPA for general use in the United States (Finlayson et al. 2000). According to the PICOL database (Washington State University), Fintrol Concentrate - Antimycin A (EPA No. 39096-2) is presently registered for use as a fish toxicant in Washington. Antimycin, when used in proper concentration, is less harmful than the recommended killing concentration of rotenone to aquatic animals other than fish (U.S. Dept. of Interior 2000). Antimycin use is the only control method, other than dewatering, that is capable of complete eradication of fish populations. It also controls all post-embryonic life stages and can be selective by fish species (Finlayson et al. 2000). This permit requires WDFW to complete the SEPA process for Antimycin by June 1, 2005. Based upon the information gathered during the SEPA review, Ecology may modify the permit to authorize the use of Antimycin for certain types of management activities, such as native fish restoration in streams.

In addition, WDFW may propose the use of piscicide products other than rotenone, once the SEPA process is completed for the product. Based upon the outcome of the SEPA review process, Ecology will decide if the permit should be modified to allow use of the new product. If modified, Best Management Practices (BMPs) may be established to prevent or minimize environmental impacts associated with pesticide applications.

Other herbicides 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 (WSEUP). A WSEUP is required for all experiments involving pesticides that are not federally registered or uses not allowed on the federally registered pesticide label. Limited amounts of an experimental use pesticide may only be distributed or used for testing purposes after a written permit has been

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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).

In most situations only a state WSEUP is required for the use of an experimental pesticide. A federal EUP is required when a small-scale test will be conducted on a cumulative total of more than 10 acres of land per pest on terrestrial sites or on more than one surface acre of water per pest. When testing for more than one target pest at the same time and in the same locality, the 10-acre limitation shall encompass all of the target pests. Any person may apply to the EPA for a federal experimental use permit for pesticides, which are usually valid for only one year. Applicants holding a valid federal experimental use permit must also apply for and be granted a state experimental use permit before initiating any shipment or use of the pesticide in Washington. All other conditions of this permit apply as to appropriate monitoring and public notification procedures.

OTHER PERMIT CONDITIONS

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.

Monitoring of residual pesticides and or oxidizers (e.g. potassium permanganate) may be required to confirm assumptions of safety when applications are performed in compliance with the FIFRA label. The intent is to gather information to confirm the assumptions of persistence and toxicity relative to the rate of application. This information may better define the period of temporary diminishment of beneficial uses.

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. This assay is used by WDFW to adjust the application rate stated on the label, which contains a general guide that is based upon 5% product. The concentration of active rotenone in the formulation used must be reported to the Department in annual Post Treatment Reports.

REPORTING AND RECORDKEEPING

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-226-090).

LAB ACCREDITATION

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With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

GENERAL CONDITIONS

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose new or modified numerical limitations, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, SEPA review, or Department approved engineering reports.

The Department may also modify this permit as a result of new or amended state or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

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

REFERENCES FOR TEXT AND APPENDICES

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APPENDIX A--PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to issue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on July 18, 2001 and January 22, 2002 in the Washington State Register (WSR 01-15-082 and WSR 02-03110) to inform the public that an application had been submitted and to invite comment on the issuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on April 24, 2002 in the Aberdeen Daily World, the Bellingham World, the Kennewick Tri-City Herald, The Olympian, the Seattle Times, the Spokesman Review, and the Yakima Herald to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft 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 regional office listed below. Written comments should be mailed to:

Washington State Department of Ecology
Water Quality Program
Attention: Kathleen Emmett
PO Box 47600
Olympia, WA 98504-7600

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (360) 407-6127 or by writing to the address listed above.

This permit and fact sheet was written by Jeff Killelea, Water Quality Program, Department of Ecology.

APPENDIX B--GLOSSARY

Acute Toxicity--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

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

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

Average Monthly Discharge Limitation --The average of the measured values obtained over a calendar month's time.

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.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

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; USC 1251 et seq.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

Construction Activity--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

Continuous Monitoring --Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

FSEIS -- Final Supplemental Environmental Impact Statement

Grab Sample--A single sample or measurement taken at a specific time or over a short period of time as is feasible.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

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.

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).

Quantitation Level (QL)-- A calculated value five times the MDL (method detection level).

Responsible Corporate Officer-- 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 the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

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

Total Suspended Solids (TSS)--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

SEPA – State Environmental Policy Act

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State Waters--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.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Upset--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, lack of preventative maintenance, or careless or improper operation.

USEPA – United States Environmental Protection Agency

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 a receiving water.

APPENDIX C—WDFW POLICY C-3010

FISH AND WILDLIFE COMMISSION
POLICY DECISION

POLICY TITLE: Lake and Stream
Rehabilitations

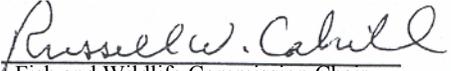
POLICY NUMBER: POL-C3010

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:

1. 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.

a. 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.

2. 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.

3. 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.

4. 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 D—SCHEDULE OF ACTIVITIES

**Schedule of Activities
Lake Rehabilitation Program**

April	Regions develop list of waters for rehabilitation in the fall of 2000 and spring of 2001 submit list of waters with amount of rotenone to Resident Native Fish Program Manager by May 1.
May 1-10	Resident Native Fish Program Manager places rotenone order based on rehabilitation plans and budget.
May	Regional approval of waters proposed for rehabilitation through Chemical Rehabilitation Approval Forms signed by Regional Director and Regional Program Managers (fish, wildlife, habitat and enforcement).
May 31	Regional Fish Program Managers and Resident Native Fish Program Manager prioritize rehabilitation list based on rotenone available.
June 1	Anadromous/Inland Statewide Manager approves rehabilitation list for public meetings.
June-July	Regions conduct public meetings.
July 15	Regional Fish Program staff complete public meetings, submit to Resident Native Fish Program Manager: <ul style="list-style-type: none">• Final List of Lakes for Rehabilitation, with amounts of rotenone.• Chemical Rehabilitation Approval Forms.• Pre-Rehabilitation Plan, updated to include Results of Public Meetings.• Waters Management Plans.• Waters General Information Summaries.
July 15-31	Resident Native Fish Program Manager completes addendum to FSEIS for approval by Anadromous/Inland Statewide Manager and forward to Habitat Program for review and sign off.
July 31	Public distribution of signed addendum to FSEIS from Habitat Program for 14 day review period. Copies to all Regional Fish Program Managers.
August 15-31	Anadromous/Inland Statewide Manager briefs Program AD for approval of rehabilitation package after completion of public FSEIS review.
September 1-5	List of waters approved by Program AD submitted to Director for agency approval. Resident Native Fish Program Manager requests emergency

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- regulations changes for season extensions, removal of minimum sizes and daily limits on waters approved for treatment.
- September 5 Approved rehabilitation package provided to Fish and Wildlife Commission – FYI only – unless they have some problems.
- September 5 Regional Fish Program Manager requests short term water quality variance permit from the Department of Ecology for waters approved by the Director.
- September-March Regions treat the approved waters.
- December-June Regions submit Post Rehabilitation Reports. December 1 deadline for fall rehabs and June 1 deadline for spring rehabs.

APPENDIX E—RESPONSE TO COMMENTS

Written comments were received by the following individuals:

1. Allen Moore, Department of Ecology
2. Nancy Weller, Department of Ecology
3. Janet Boyd and Tricia Shoblom, Department of Ecology

Written Comments

Commentor #1: [Ecology] should place a requirement in the permit for a spill prevention and response plan. 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 Fish & Wildlife and Ecology.

Submittal date of the spill plan could be later this summer, after the permit is effective but well before rotenone treatments are scheduled.

Response: Special Condition S.7. has been added to the permit that requires the submittal of a spill prevention and response plan prior to the first treatment.

Commentor #2: At the request of the regional Spills Response Program Manager and myself, would you please include the following statements (or similar statements) in the permit. Although all spills of pesticides are to be reported, putting the requirement into the permit would provide the when and how for reporting. This language was developed for the STM permits following spill incidents that were not properly reported or dealt with.

- A. SPILLS: Spills into state waters, spills onto land with a potential for entry into state waters, or other significant spills, shall be reported immediately to the Department of Ecology, ? Regional Office at (phone number).
- B. 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.

Response: The suggested language has been added to the permit in Special Condition S.7.

Commentor #3:

1. A spill plan should be included in the permit. It must address how they handle accidental over-use of permitted chemicals as well as petroleum spills from boat use or vehicular use.

Response: Special Condition S.7. has been added to the permit that requires the submittal of a spill prevention and response plan prior to the first treatment.

2. Before a treatment is considered, Fish and Wildlife should identify target and non-target species per individual waterbody.

Response: WDFW pre-treatment procedures are summarized on page 7 of the fact sheet. A Pre-Rehabilitation Plan is completed by the Area Fish Biologist which includes information about each individual lake or stream considered for treatment. The outline for preparing Pre-Treatment Plans is included in the Final Supplemental Environmental Impact Statement – Lake and Stream Rehabilitations 1992-1993 as Appendix A. Required information includes target species and potential impacts to non-targeted resources using survey data of individual waters.

3. Why does permit not allow for violations? The applicators could possibly spill or misuse the chemicals and in effect have a water quality violation imposed upon them.

Response: It is incorrect to state that the permit does not allow for violations. Special Condition S1.A. Water Quality Standards states that “All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit”. General Condition G18. Duty to Comply states that “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.” It is agreed that a spill or misuse of the authorized pesticides could result in a water quality violation.

4. The permit should include an annual operations plan which would include the proposed lakes for treatment, the target species for eradication, the location of the lake, the size of the lake, whether there are any species of concern (plants, animals, amphibians, macroinvertebrates, etc.), anticipates date of treatment, whether alternatives to the chemical treatment have been examined.

Response: It was determined that WDFW has adequate internal and public processes in place to address site-specific concerns; this permit does not require Ecology approval for each treatment. As such, the submittal of Annual Operations Reports is not necessary. The permit covers all waters of the state as long as WDFW completes the SEPA process for each waterbody prior to treatment and follows all label restrictions and permit conditions.

5. What is the purpose of the monitoring? Will Ecology be notified if detrimental impacts are identified/discovered during monitoring? Is the purpose for determining success rate of kill of target species? Whether the lake has returned to pre-spray water quality conditions? Is there a specific time limit for the chemical to remain above standards in each water body? Is this part of the monitoring plan?

Response:

A. The purpose of the monitoring is to determine the extent and duration of the short-term water quality reduction resulting from rotenone applications.

B. Yes, the permit requires the submittal of Post Treatment Discharge Monitoring Report forms which includes information on impacts to non-targeted organisms.

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C. No, the purpose of the monitoring is not to determine the success rate of kill of target species.

D. No, the purpose of the monitoring is not to determine if the lake has returned to pre-spray water quality conditions.

E. No, there is not a specific time limit for the chemical to remain toxic to aquatic life.

F. The monitoring plan does require the applicant to report the period of rotenone toxicity, i.e. the duration of water quality reduction.