Scout Lake Restoration Project: Environmental Assessment

Alaska Department of Fish and Game

Division of Sport Fish

43961 K-Beach Road, Suite B

Soldotna, AK 99669

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LETTER TO THE U.S. FISH AND WILDLIFE SERVICE

Date: 8/20/2009

TO: United State Fish and Wildlife Service (USFWS)

Scout Lake is an 85 surface-acre natural lake. It is located south of the Sterling Highway approximately five and a half miles east of the Soldotna City limits. The Alaska Department of Fish and Game has developed an Environmental Assessment (EA) that proposes eradicating illegally introduced northern pike population in Scout Lake using the piscicide rotenone. The northern pike population has caused the cessation of stocking in Scout Lake for this once popular stocked coho salmon and rainbow trout fishery. In addition, the proximity of these northern pike to critical wild salmon and trout fisheries exposes these fisheries to an increased risk from further introductions. The objectives of this treatment are to completely remove the northern pike population and restock Scout Lake with coho salmon and/or rainbow trout. This will restore a popular angling opportunity for the public, help protect critical wild fisheries and refine technical treatment skills applicable to more complex treatments elsewhere in the future. This EA has been available to the public online at: http://www.sf.adfg.state.ak.us/region2/pike/ and a 30-day commenting period was announced via a public news release on June, 29, 2009.

Please contact Rob Massengill at (907) 262-9368 if you have questions.

Attention: Rob Massengill
Scout Lake Restoration Project: Environmental Assessment
Alaska Department of Fish and Game
43961 K-Beach Road, Suite B
Soldotna, AK 99669
or email at: robert.massengill@alaska.gov

Sincerely,
Rob Massengill - Fisheries Biologist

ALASKA DEPARTMENT OF FISH AND GAME

DIVISION OF SPORT FISH

Environmental Assessment of the proposed rotenone treatment of Scout Lake for the purpose of eradicating an invasive northern pike population and restoring a stocked recreational fishery

PART I: PROPOSED ACTION DESCRIPTION

A. Type of Proposed Action: Remove the illegally introduced northern pike population that has decimated the stocked coho salmon and rainbow trout fishery in Scout Lake so that this popular recreational fishery can be restored. Eradicating the northern pike population will also reduce the threat that they could be introduced into nearby wild salmon and trout habitats.

B. Agency Authority for the Proposed Action: By consent of the Alaska Board of Fisheries, the Alaska Department of Fish and Game is authorized to perform such acts per Alaska Statue (AS 16.35.200).

C. Estimated Commencement Date: Late September or early October 2009

D. Name and Location of the Project: Scout Lake Restoration Project - removal of an invasive northern pike population through the application of rotenone, a naturally occurring botanical piscicide. Scout Lake is located in T05N R09W Sec. 10 (Seward Meridian, Kenai Peninsula) and is about five and a half miles east of the Soldotna city limits and south of Sterling Highway (Figure 1 and 2). Scout Lake is a natural lake. The land surrounding roughly two-thirds of the lake is publicly owned (Kenai Peninsula Borough and State of Alaska Department of Natural Resources (ADNR)). The remainder consists of private lands located along the western portion of the lake (Figure 3).

E. Project Size (acres affected)

1. Developed/residential - 0 acres
2. Industrial - 0 acres
3. Open space/Woodlands/Recreation - 0 acres
4. Wetlands/Riparian - Scout Lake covers 85 surface acres, has a maximum depth of ~21 feet, and a volume of 835 acre-feet. There is no surface outlet from this lake (Figure 4).
5. Floodplain - 0 acres
6. Irrigated Cropland - 0 acres
7. Dry Cropland - 0 acres
8. Forestry- 0 acres
9. Rangeland - 0 acres

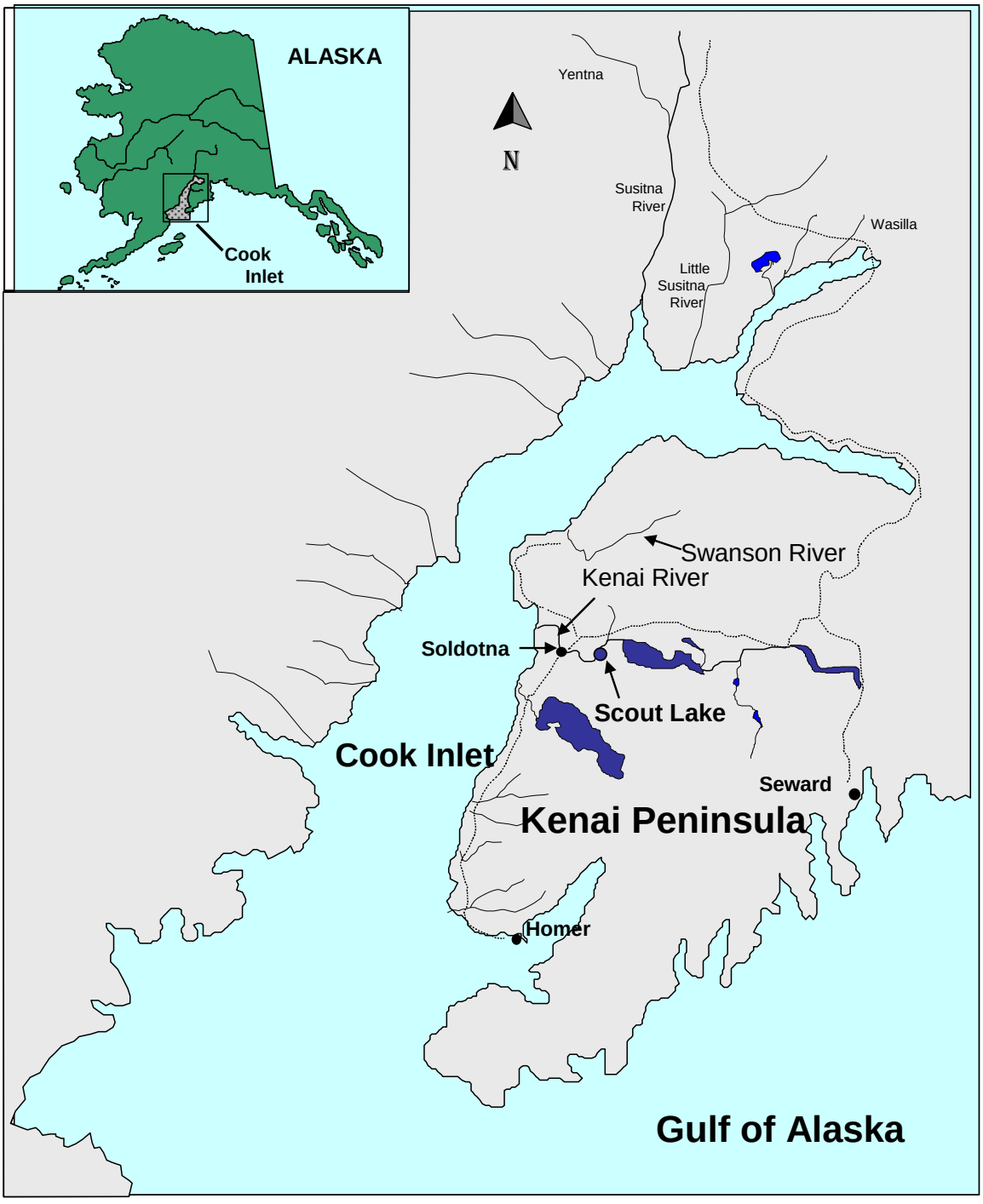


Figure 1. Map of the Kenai Peninsula.

Figure 2. Google Earth™ image of Scout Lake and surrounding area.

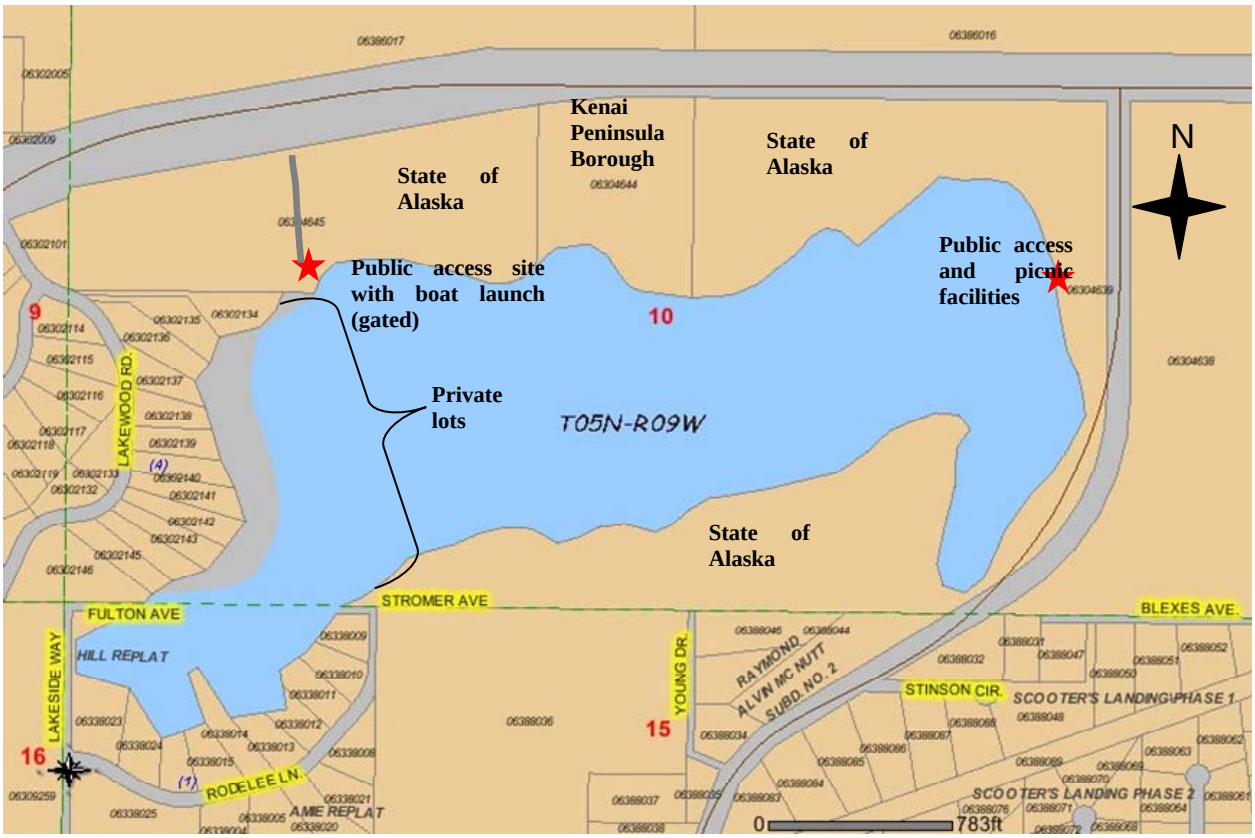
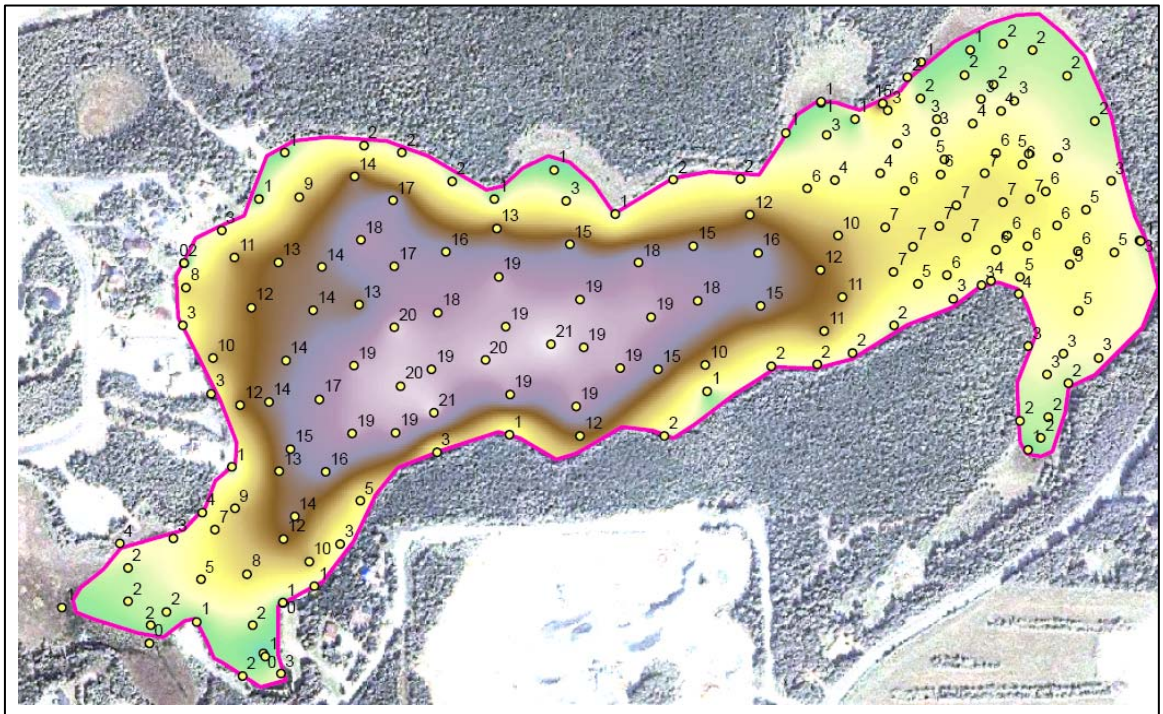


Figure 3. Kenai Peninsula Borough image depicting land ownership surrounding Scout Lake.



Scout Lake bathymetric map
Maximum depth = 21feet
Mean depth = 13 feet
Surface Area = 85 acres
Volume = 835 acre-feet
Elevation = 245 feet

Figure 4. Bathymetric map of Scout Lake.

F. Summary and Purpose of the Proposed Action

Background

The only fish native to Scout Lake is the threespine stickleback (Gasterosteus aculeatus) (ADF&G, Soldotna Office, Scout Lake file).Available information suggests Scout Lake was first stocked with rainbow trout in 1957. Twice, in 1968 and 1975, ADF&G treated Scout Lake with rotenone in an attempt to eradicate the stickleback population which was believed competitive with stocked rainbow trout; neither treatment succeeded in stickleback eradication.

Since stocking began, Scout Lake has provided a quality recreational angling opportunity for rainbow trout (*Oncorhynchus mykiss*), coho salmon (*Oncorhynchus kisutch*), and Chinook salmon (*Oncorhynchus tshawytscha*). Scout Lake was stocked exclusively with coho salmon and rainbow trout in recent years until northern pike (*Esox lucius*) were discovered there in the fall of 2005, and stocking was discontinued. Scout Lake has no surface outlets and is located just over one mile from the Kenai River, which contains world-class wild salmon and rainbow trout fisheries. Scout Lake is only two and a half miles from the Moose River which is important salmon rearing habitat known to support approximately 30% of the Kenai River drainage coho salmon smolt population (Massengill In Prep a). The invasive northern pike population in Scout Lake could serve as a source of fish to be illegally transported elsewhere in the Kenai watershed, where impacts to wild salmon and trout populations could be devastating.

Purpose

The proposed action is to remove all fish in Scout Lake using the piscicides CFT Legumine™ (5% liquid rotenone product) and Prentox® Prenfish™ Fish Toxicant Powder (7.4% powdered rotenone product). Upon project completion, the lake will be restocked with hatchery produced coho salmon and/or rainbow trout.

Proposed Activities

Rotenone is a naturally occurring substance derived from the roots of tropical plants in the bean family including jewel vine (Derris spp.) and lacepod (Lonchocarpus spp.) that are found in Australia, Oceania, southern Asia, and South America (Ling 2003) (Appendix 1). Native people have utilized rotenone for centuries to capture fish for food in areas where these plants are naturally found (Quigley 1956, Bearez 1998, Robertson and Smith-Vaniz 2008). It has been used in fisheries management in North America since the 1930s (Finlayson et al. 2000).

Rotenone acts by inhibiting oxygen transfer at the cellular level. The biochemical process affected by rotenone takes place within the cell mitochondria and involves blocking electron transport by inhibiting NADH-ubiquinone reductase, resulting in the uncoupling of the metabolic pathway oxidative phosphorylation (Singer and Ramsay 1994, USEPA 2007). Fish die from tissue anoxia due to cardiac and neurological failure (Ling 2003). It is effective at low concentrations with fish because it is readily absorbed into the bloodstream through the thin cell layer of the gills. Mammals and other non-gill breathing animals do not have this rapid absorption route into the bloodstream and can tolerate exposure to concentrations much higher than those used to kill fish. Therefore, non-target organisms that do not have gills are typically not negatively affected at the concentrations necessary to kill fish (Finlayson et al 2000, Ling 2003, NPS 2006, USEPA 2007, MFW&P 2008).

The boundary for this treatment is Scout Lake itself. The lake would be treated primarily with CFT Legumine™ (Appendix 2 and 3) which is a liquid product containing 5% rotenone. A second product called Prentox® Prenfish™ Fish Toxicant Powder (Appendix 4 and 5), which contains 7.4% rotenone, would be used in conjunction with the CFT Legumine™; all products would be contained within the lake boundaries. The target concentration for the treatment would likely be within the product label recommended range for "normal pond use". Pre-treatment bioassays using caged juvenile coho salmon will be used to “fine-tune” the exact concentration needed within product label guidelines, which is estimated to be about ~1.0 ppm (or 0.05 ppm of the active ingredient rotenone).

The preferred timing of the treatment would be fall 2009, just prior to freeze-up. Freeze-up typically occurs in mid-October. Rotenone naturally degrades with light and temperature (USEPA 2007). Therefore, a coldwater application would enhance the active life of the rotenone and ensure a longer exposure to the northern pike. The persistence of rotenone in the lake will likely last through most of the winter months depending on water temperatures, sunlight penetration, alkalinity and organic load. Although there is no domestic use of water directly from Scout Lake, signs would be posted to advise people that Scout Lake was treated with rotenone and to not eat fish or drink water from the lake until the rotenone detoxifies, likely by spring 2010.

Materials and equipment required to complete the project would be transported to the site by truck. The rotenone would be dispersed in the lake with two outboard powered motorboats equipped with pumping systems that would mix lake water with the rotenone product (liquid or powdered product) and then discharge the mixture to the surface waters and into the propeller wash behind the boat. Over deep water (>10 feet) a weighted hose may be used to discharge the rotenone mix below the surface waters to more uniformly treat the lake. Caged coho salmon would be used to measure the toxicity of the treated water. Caged live fish will be used to evaluate when the waters have naturally detoxified. The rotenone label specifies that once fish can survive 24 hours in treated water, it is considered detoxified and is safe for restocking.

All dead fish that surface will be collected by ADF&G staff and disposed of at the Soldotna landfill. The Washington Department of Fish and Wildlife has examined various studies that documented the percentage of dead fish that float after rotenone treatment. They estimated that approximately 70% of rotenone-killed fish sink to the bottom in water temperatures varying from 44° to 81° F and that most carcasses that surface will do so within 24 hours after treatment (Bradbury 1986). Unrecoverable dead fish should help stimulate plankton growth and aid in the recovery of zooplankton and aquatic insect populations (UDWR 2007).

Gillnet sampling will be conducted at least twice after the treatment to evaluate the success of the rotenone application. To ensure compliance with the Migratory Bird Treaty Act, gillnets will be monitored frequently (several times a day), or set under the ice to eliminate the potential for the unauthorized "take" of loons and other birds that might become entangled in the gillnets. The first gillnetting effort will occur after the treatment as soon as the ice on the lake is safe to walk on. The second effort will occur after ice-out the following spring (2010). In open water, owl decoys will be positioned near the set gillnets to discourage other birds from using the area, particularly waterfowl.

Each gillnetting effort would include deploying 12 gill nets, each 120 ft long, 6 ft deep, with 6 panels of mesh (one each of 1/2 in, 5/8 in, ¾ in, 1 in, 11/2 in, and 2 in). Each gillnetting effort would last for at least four days, in open water. Netting in open water would occur only during daylight hours so bird activity can be monitored.

If live northern pike are detected after the treatment, a second treatment would be planned for the following fall (2010). In the unlikely event that live northern pike are detected after a second treatment, a third treatment would be conducted in fall 2011.

Monitoring is a major component of this type of management activity. Pre-treatment baseline data collection will include water quality (i.e., temperature, dissolved oxygen, pH, specific conductance and alkalinity), water and sediment sampling (to determine if any background rotenone-based compounds are present), and sampling for predominant macroinvertebrate taxa. Water quality and macroinvertebrates will be sampled after the treatment to document biological recovery and maintenance of water quality. ADF&G will collect lake water and sediment samples and submit the samples to a qualified laboratory for rotenone concentration analysis. These samples will be taken immediately before and periodically after the treatment until background levels are realized.

The degradation of rotenone applied during fall treatments in Alaska has been documented; based on this information, it is anticipated the rotenone will remain toxic to fish throughout most of the winter, possibly until spring break-up (McHenry 1978 Chlupach 1976; Massengill In Prep. (b); Dunker, In Prep.). Interestingly, a small unnamed Kenai Peninsula lake was treated with rotenone by ADF&G during late September 2000 to eradicate illegally introduced yellow perch (*Perca flavescens*). Immediately following the treatment, water samples were tested indicating the rotenone concentration had attained 0.15 ppm, after 1 week rotenone concentrations dropped to 0.05 ppm, and after 2 weeks rotenone was not detectable. No rotenone was detected from any sediment samples including those taken immediately after treatment (ADF&G Unpublished).

If the Scout Lake treatment successfully eradicates the northern pike population (as determined by post treatment gillnet sampling) and when water quality and macroinvertebrate populations are deemed adequate, the lake will be restocked with coho salmon and/or rainbow trout in the summer 2010 or 2011. Signage will be posted at both Scout Lake public accesses that describe the northern pike eradication efforts including any required pesticide warnings. This signage will be in place both prior to and after the treatment and will remain at least until the restoration is complete.

Funding

The proposed action will be funded through both the U.S. Fish and Wildlife Service Aquatic Nuisance Species Program and through ADF&G Sport Fish Division Federal Aid funding that combines State sport fishing license revenue with a three-fold Federal match (Dingell-Johnson Act). ADF&G Region II personnel will provide all manpower required to complete the project.

PART II. ENVIRONMENTAL REVIEW AND COMMENTS

A. NATURAL ENVIRONMENT

1. Land Resources Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Soil instability or changes in geologic substructure?		X			
b. Disruption, displacement, erosion, compaction, moisture loss, or over-covering of soil which would reduce productivity or fertility?		X			
c. Destruction, covering or modification of any and unique geologic or physical features?		X			
d Changes in siltation, deposition or erosion patterns that my modify the channel of a river or stream or the bed or shore of a lake?		X			
e. Exposure of people of property to earthquakes, landslides, ground failure, or other natural hazard?		X			

2. Water Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Discharge into surface or any alteration any alteration of surface water quality including but not limited to temperature, dissolved oxygen or turbidity			**X**		**2a**
b. Changes in drainage patterns or rate and amount of surface runoff?		**X**			
c. Alteration of the course or magnitude of flood water or other flows?		**X**			
d. Changes in the amount of surface water in any water body or creation of a new water body?		**X**			
e. Exposure of people or property to water related hazards such as flooding?		**X**			
f. Changes in the quality of groundwater?		**X**			**2f**
g. Changes in the quantity of groundwater?		**X**			
h. Increase in risk of contamination of surface or groundwater?			**X**		**see 2a,f**
i. Effects on any existing water right or reservation?		**X**			
j. Effects on other water users as a result of any alteration in surface or groundwater quality?		**X**			**see 2f,j**
k. Will the project affect a designated floodplain?		**X**			
l. Will the project result in any discharge that will affect federal or state water quality regulations? (Also see 2a)			**X**		**2l**

Comment 2a. This project would intentionally introduce a pisicide to surface waters to kill invasive fish. It is anticipated the impacts would be short-term. CFT Legumine™ (5% rotenone) and Prentox® Prenfish™ Fish Toxicant powder (~7.4% rotenone) are registered by both the Environmental Protection Agency EPA and the Alaska Department of Environmental Conservation and are deemed safe to use to eradicate invasive fish when applied according to label instructions. The proposed treatment using either one product or a combination of two products is ~1.0 ppm (or .05 ppm active ingredient (rotenone)), but this may be adjusted within the label's allowed limits based upon the results of on-site assays.

There are three ways in which rotenone can be detoxified once applied. The first detoxification method involves basic dilution by fresh water. This may be accomplished by fresh groundwater or surface water flowing into the lake. The second method of detoxification involves the application of an oxidizing agent such as potassium permanganate. This dry crystalline substance is mixed with lake water to produce a concentration of liquid sufficient to detoxify the concentration of rotenone applied. Detoxification is typically accomplished after about 15-30 minutes of mixing between the two compounds.

The third and most common method is to allow the rotenone to naturally breakdown. Rotenone is a compound that is susceptible to natural detoxification through a variety of mechanisms such as water chemistry, water

temperature, organic load, and exposure to oxygen and sunlight (Ware 2002; ODFW 2008; Loeb and Engstrom-Heg 1970; Engstrom-Heg 1972; Gilderhus et a1. 1986). Rotenone persistence studies have found that in cold water (32°- 46° F), the half-life of rotenone ranges from 3.5 to 20 days (Gilderhus et al. 1986; Dawson et al. 1991, USEPA 2007).

The degradation of rotenone applied during fall treatments in Alaska has been studied; based on these studies, it is anticipated the rotenone will remain toxic to fish throughout most of the winter, possibly until spring break-up (McHenry 1978 Chlupach 1976; Massengill In Prep. (b); Dunker, In Prep.). Delayed rotenone degradation would result in a longer exposure time and increase the likelihood the treatment will kill all of the northern pike in Scout Lake. Interestingly, a small unnamed Kenai Peninsula lake was treated with rotenone by ADF&G during late September 2000 to eradicate illegally introduced yellow perch (*Perca flavescens*). Immediately following the treatment, water samples were tested indicating the rotenone concentration had attained 0.15 ppm, after 1 week rotenone concentrations dropped to 0.05 ppm, and after two weeks rotenone was not detectable. No rotenone was detected from any sediment samples including those taken immediately after treatment (ADF&G Unpublished). This demonstrates the variability in rotenone detoxification between lakes.

Because Scout Lake has no obvious surface water inlet to detoxify the lake water and groundwater recharge rates are unknown, and exposing invasive northern pike to toxic levels of rotenone over a long period is desired, the preferred detoxification method would be to allow the rotenone to degrade naturally over time.

The degradation of rotenone results in at least 20 different degradation products of which only one is toxic (rotenolone) (Cheng et al. 1972). Rotenolone is approximately one order of magnitude less toxic than rotenone (Finlayson 2000). The ultimate breakdown products of rotenone are carbon dioxide and water (more information is available online at: http://www.prentiss.com/Products/fishman.htm).

There are several formulations of rotenone available as a piscicide, including liquid and powder formulations. CFT Legumine™ is a liquid rotenone mixture and its other ingredients facilitate the emulsification and dispersion of rotenone in water. The CFT Legumine™ formulation was analyzed for the California Fish and Game Department in 2007 (Fisher 2007). This analysis showed that the primary ingredients (carrier compounds) are soluble organic compounds (SOCs) such as diethylene glycol ethyl ether (DGEE) (61.1%), Fennedefo 99™ (17.1%), N-methyl pyrrolidone (9.8%), rotenone (5.12%) and rotenolone (0.72%).

Diethylene glycol ethyl ether (DGEE) is the majority ingredient of CFT Legumine™. With respect to the environmental fate of this compound, volatilization, photolysis, and hydrolysis are all processes that are not expected to occur to a significant degree in surface waters (SPECTRUM, Chemical Fact Sheet, 2008). Biodegradation is the most likely removal mechanism for the compound and 48-87% degradation would be expected in 20 days; DEGEE was observed to degrade greater than 90% after 28 days (information found online at: http://toxnet.nlm.nih.gov/. Because DGEE is water soluble, it will not bind to sediments and it is believed its ability to bioconcentrate in aquatic organisms is low (http://toxnet.nlm.nih.gov/). When tested on rats, the oral LD50 (oral dose that kills 50% of test animals) was 5.54g/kg (Bingham et al. 2001).

In a lake treated with 1 mg/L of CFT Legumine™, it would be expected that the concentration of DGEE would be at a concentration of 0.61 mg/L or 0.00061 ml/L. The estimated lethal dose (LD) of the chemical to humans is ~1ml/kg of body weight or about 70ml (or 70g) for a 70kg person. A 70 kg person drinking two liters of water from the lake (normal daily water intake) would only consume 0.00122 mL/L of the compound, which is 1/57,000th of a fatal dose. The oral LD50 for dogs is around 3.0 g/kg, while for rats and mice the LD50 is 5.5-8.7 g/kg. A 10 kg (22 lb) dog drinking one liter of treated lake water would only ingest 1/49,000th of the LD50. To put this simply, unless humans or other mammals (represented here by dogs, rats and mice) drink about 195 gallons of treated water for every pound of their body weight, they will not be at risk.

Fennedefo 99™ is primarily a fatty acid ester mixture that contains polyethylene glycol (PEGs) and alcohol and is used with rotenone as an emulsifying agent. The fatty acid ester mixture is likely derived from "tall oil". Tall oil fatty acids are a byproduct of wood pulp (for more information visit http://www.harting.cl/talloil.html). PEGs are common ingredients in a variety of consumer products, including soft-drink syrups (as an antioxidant), lotions and antifreeze (Fisher 2007). PEGs are highly soluble, have low volatility and rapidly degrade within days. The fatty acids in the fatty acid ester mixture do not exhibit volatility, are virtually insoluble, and are readily biodegraded, although over a slightly longer period of time than the PEGs (Fisher 2007).

N-Methyl pyrrolidone is increasing in use as a solvent because of its low toxicity. It is used as a solvent for pharmaceuticals for oral ingestion (Ott 2008). This compound is expected to behave similarly to DGEE in an aquatic environment. Biodegradation is the pathway most likely to effect its removal from the environment, rather than volatilization, hydrolysis or photolysis (for more information visit http://toxnet.nlm.nih.gov/). The persistence of this compound in water has not been reported, but it has been found to have a half-life of 4.0, 8.7 and 11.5 days in clay, loam or sand, respectively. N-methyl pyrrolidone has been classified as readily biodegradable under aerobic conditions (Concise International Chemical Assessment document available at: http://www.inchem.org/. When rats and mice were tested, the oral LD50 reported values ranged from 3.9-7.7 g/kg. The LD50 of methyl pyrrolidone is similar to DGEE, but its concentration following lake treatment is expected to be only 1/6th that of DGEE, and acute toxic conditions should not arise for mammals drinking the water following treatment.

Other trace compounds in the formulation include an array of volatile organic compounds (VOCs), but all at very low concentrations. All compounds, with the exception of polyethylene glycols (PEG), would be below the reporting limits of California. At the diluted treatment concentration expected in Scout Lake, PEG levels would be far below the California reporting limits.

Regarding exposure to trace constituents in liquid rotenone including CFT Legumine™, trichloroethylene and naphthalene are known carcinogens. Both have been detected in CFT Legumine™, but trichloroethylene was absent from most product lots recently analyzed (Fisher 2007) and the estimated concentration of trichloroethylene and naphthalene at treatment concentration is ~0.0000073 mg/L and 0.000255 mg/L respectively which is far below the Human Based Screening Level (HBSL) for exposure to surface waters for a child (CDFG 2007).

In summary, CFT Legumine™ contains a mixture of rotenone, VOCs and SOCs and more water soluble chemicals, methyl pyrrolidone and DEGEE. The VOCs and SOCs in the formulation are expected to reach undetectable levels within a week to several weeks. However, N-methyl pyrrolidone and DEGEE would be expected to dissipate more slowly because they are water soluble and will not readily dissipate through volatilization, but both chemicals are biodegradable, for more information visit: http://www.cdph.ca.gov/HealthInfo/environhealth/water/Pages/LakeDavis.aspx).

Following rotenone treatment, there may be a substantial quantity of dead pike carcasses. Bradbury (1986) reported that approximately 70% of rotenone-killed fish in Washington lakes immediately sink. Parker (1970) reported that at water temperatures of 40° F and cooler, dead fish required 20-41 days to surface. The most important factors inhibiting fish from surfacing are cooler water (<50 °F) and deep water (> 15 feet). Scout Lake has a maximum depth of 15 feet and the desired treatment period (Oct-April) would likely result in water that is 32-45 °F (Massengill *In prep*. c) and would potentially result in few recoverable fish. Bradbury (1986) also reported that 9 of 11 water bodies in Washington treated with rotenone experienced an algae bloom shortly after treatment. This occurred from the input of phosphorus to the water as fish decayed. Bradbury further noted that approximately 70% of the phosphorus content in the dead fish would be released into the

lake through bacterial decay. This stimulates phytoplankton production which in turn increases zooplankton production, providing prey for macroinvertebrates and fish. This change in water chemistry is viewed as a benefit to stimulate plankton growth (UDWR 2007). Any changes or impacts to water quality resulting from decaying fish would be short-term and minor. Nonetheless, ADF&G personnel will recover and dispose of all surfacing dead fish at regular intervals until ice-up, and then again after ice-out until no dead fish are observed.

Comment 2f: No contamination of groundwater is anticipated to result from this rotenone treatment. Because Scout Lake has no surface flow outlet, water must transfer from the lake through its bed or via evaporation. Rotenone binds readily to sediments and is broken down in soil and water (Skaar 2001; Engstrom-Heg 1971, 1976; Ware 2002). Rotenone penetrates approximately 1 inch in most soil types; the only exception is sandy soil where movement is about 3 inches (Hisata 2002). The primary soil types in the Scout Lake area consists decaying organics (0-4 inches from the surface) overlaying a silt and loam mixture (4-29 inches from the surface) and (very gravelly sand/fine sandy loam 29-60 inches from the surface) with most soils classified as moderately to highly permeable (Van Patten 2005). Therefore it is expected that rotenone would only penetrate soil about three inches in the Scout Lake area.

Studies indicate that the other compounds in liquid rotenone formulations have not been detected at harmful levels in groundwater associated with rotenone application (Finlayson et al. 2000; Ridley et al. 2006; Fisher 2007) and case studies in Montana have concluded that rotenone movement through groundwater does not occur (MFWP 2008). Subsurface water rights in the immediate area (within one quarter mile) of Scout Lake can be found in Appendix 6 and online at: http://magellan.dnr.state.ak.us/dnrwater/default.cfm. No surface water rights were found in the immediate area of Scout Lake. Nearby private well locations (for properties adjacent to the lake) will be recorded with onsite surveys. Because water leaving Scout Lake must travel through lake sediments, soil, and gravel, and rotenone is known to bind readily with these substances, no contamination of ground water is anticipated.

Comment 2j: The existing sport fishery in Scout Lake is primarily for northern pike, and perhaps, for remnant rainbow trout and silver salmon. Anecdotal observations suggest fishing effort is very light, yet there may be sport fishers who prefer northern pike that will experience lost opportunity. The estimated number of angler days spent on Scout Lake in 2006 was seventy days with no harvest of any species estimated (Jennings In Prep.). The loss of northern pike fishing opportunity would be minimal because there are seven lakes within six miles of Scout Lake that provide northern pike fishing, some of which provide a high quality fishing experience in terms of fishing success.

Comment 2l: The treatment will be confined to Scout Lake and no discharge is expected to occur outside of the lake. As required by state regulation, ADF&G will submit a pesticide permit application to the Alaska Department of Environmental Conservation (ADEC) which must be approved prior to treating Scout Lake with rotenone.

3. Air Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Emission of air pollutants or deterioration of ambient air quality? (Also see 13 c)			**X**		**3a**
b. Creation of objectionable odors?			**X**		**3b**
c. Alteration of air movement, moisture, or temperature patterns or any change in climate, either locally or regionally?		**X**			
d. Adverse effects on vegetation, including crops, due to increase emissions of pollutants?		**X**			
e. Will the project result in any discharge which will conflict with federal or state air quality regulations.		**X**			

Comment 3a: Emissions from four-stroke outboard motors would be produced, but are expected to dissipate rapidly.

A study of airborne drift associated with two rotenone products (a liquid and a powdered formulation) was conducted in California (CARB, 1997) and results showed that the rotenone levels adjacent to a treatment area immediately following a treatment, were, at the highest, 1,000 fold lower than the estimated no observed effect level (NOEL) of 0.43 mg. of rotenone per cubic meter collected over a 24-hour period.

Prentox® Prenfish™ Fish Toxicant Powder poses the greatest airborne risk, mostly to the applicators, because they are in direct contact with undiluted product and product particulates can become airborne. To reduce exposure risk, the product will be premixed with lake water to form a slurry just prior to discharge from the boat, and applicators will adhere to the safety protocol suggested by Finlayson (2000). This safety protocol, in addition to the use of PPE, utilizes a plastic or Plexiglas shield to cover the opened product containers. The shield has a small opening that allows a vacuum nozzle to siphon the product out of the container and into a closed-system pumping apparatus. Prentox® Prenfish™ Fish Toxicant Powder containers will only be opened in the boat and away from individuals not wearing PPE.

CFT Leguimine® is a liquid, and the product Material Safety Data Sheet (MSDS) states “do not breathe spray mist” and identifies appropriate respirators for use by product handlers/applicators. Although volatile and semi-volatile organic compounds and ethylene glycol-based compounds have been identified in the CFT Legumine™ formulation, when compared to Health Based Screening Levels (HBSL) values, no compound in CFT Legumine™ exceeded the HBSLs. This indicates there are no significant inhalation risks from the vapors of this product. (CDFG, 2007).

Comment 3b: CFT Legumine™ contains some solvents that make it soluble in water. The odor from these solvents can last from several hours to several days, depending on air conditions. The product manufacturer advertises that the newest CFT Legumine™ formulation is virtually odor free since reducing or eliminating a number of solvents. Nonetheless, relatively "heavy" organic solvent compounds tend to sink or remain close to the ground and move downwind. The California Department of Pesticide Regulation (CDPR 1998, cited in Finlayson et al. 2000) found no health effects from odors from rotenone formulations that consisted of greater solvent concentrations than that found in CFT Legumine™. Applicators will have the greatest potential contact with odors. However, as the product label recommends, they will wear respirators for protection. Any impacts caused by objectionable odors would be short-term and minor.

Prentox® Prenfish™ Fish Toxicant Powder is pure ground root product and contains no additives; the product label states it has an odor similar to wet chalk or dirt.

The northern pike carcasses resulting from this project may cause objectionable odors. Collecting and removing visible carcasses coupled with the likelihood most carcasses will sink (Bradbury 1986) should help mitigate odor concerns, making any effects from these odors short-term and minor.

4. Vegetation Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Changes in the diversity, productivity or abundance of plant species (including trees, shrubs, grass, crops and aquatic plants)?			**X**		**4a**
b. Alteration of a plant community?		**X**			
c. Adverse effects on any unique, rare, threatened, or endangered species?		**X**			
d. Reduction in acreage or productivity of any agricultural land?		**X**			
e. Establishment of spread of noxious weeds?		**X**			
f. Will the project affect wetlands, or prime and unique farmland?		**X**			

Comment 4a: Scout Lake has one unimproved boat launch/access that can be used for this project. There is also a small dirt parking area near the lake that will be used. Thus, there should be little trampling of vegetation around the lake. No direct, immediate, or long-term impacts to vegetation are anticipated from the treatment itself because rotenone does not negatively affect plants at concentrations necessary to kill fish.

5. Fish and Wildlife Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Deterioration of critical fish or wildlife habitat?		**X**			
b. Changes in the diversity or abundance of game animals or bird species?			**X**		**5b**
c. Changes in diversity or abundance of nongame species?			**X**		**5c**
d. Introduction of new species into an area?		**X**			
e. Creation of a barrier to the migration or movement of animals?		**X**			
f. Adverse effects on any unique, rare, threatened, or endangered species?		**X**			
g. Increase in conditions that stress wildlife populations or limit abundance (including harassment, legal or illegal harvest or other human activity)?			**X**		**See 5b,c**
h. Will the project be performed in any area in which T & E species are present, and will the project affect any T & E species on their habitat? (Also 5f)		**X**			
i. Will the project introduce or export any species not presently or historically occurring in the receiving location? (Also see 5d)		**X**			

Comment 5b: <u>Fish:</u> This project is designed to kill non-indigenous invasive fish. It is not believed any native fish species, other than threespine sticklebacks, occupy the lake based on ADF&G test netting results during the summer of 2007 and historic lake survey information available in the Soldotna ADF&G office. Scout Lake was treated with rotenone in 1968 and 1975 to eradicate sticklebacks that were believed competitive with ADF&G stocked rainbow trout and salmon (Soldotna ADF&G lake file memo), neither treatment succeeded in that goal. Sticklebacks tolerant of low dissolved oxygen tolerance (Hemming 1988) and have demonstrated some tolerance to rotenone. Both Scout Lake treatments strived to treat the lake at 1.1 parts per million of powdered rotenone product which is slightly above the anticipated target concentration for this project. Research in some Nova Scotia lakes showed at least some sticklebacks survived rotenone treatments when target product concentrations were 0.25 ppm (Smith 1940). Fisheries managers were successful at eradicating sticklebacks at 1.6 ppm product target concentration in a lake near Seward, Alaska (McHenry 1978). It is feasible that at least some sticklebacks could survive the proposed treatment at Scout Lake. It is possible that threespine sticklebacks could be reintroduced to Scout Lake if the proposed treatment eradicates the existing population.

It is currently unknown if coho salmon and rainbow trout populations have survived in Scout Lake as stocking was discontinued after 2005 upon discovery of invasive pike in the lake. ADF&G test gillnetting and light trap sampling in the summer of 2009 caught 87 northern pike over a three day period and no other fish species were caught although sticklebacks were observed in great abundance.

Game Mammals: Grizzly bears, black bears and wolves (rarely) are found in the area but are not dependent on the lake or fish from the lake for food. The infrequent occurrence of bears/wolves in this area, human activity related to the project implementation, and the removal of dead fish resulting from this project would reduce the potential for these species to consume rotenone-killed fish. Even if rotenone-killed fish were consumed by bears, there would be no adverse effects because the rotenone would be degraded by enzymes in the animals' digestive tracts (Finlayson et al. 2000; USEPA 2007). Because this project is planned for autumn, freeze-up conditions would further limit bear scavenging behavior at the lake. Following rotenone treatment, frequent monitoring of the lake to collect dead fish should limit fish carcasses from becoming an attractant to bears. The project itself would have no impact on bears.

Ingestion of treated waters by terrestrial wildlife should also have no adverse effects because of the low rotenone concentrations and enzymatic action in the animal's digestive tracts. Also, the gastrointestinal absorption of rotenone is inefficient (Finlayson et al. 2000).

Rotenone has a low acute toxicity via the dermal route of exposure and receives a toxicity category IV rating; in rabbits, the LD50 is >5000mg/kg (USEPA 2007). Risk of inhalation exposure to rotenone from the liquid CFT Legumine™ to wildlife is almost nonexistent. Only individuals working with the concentrated product could be at risk and they would be protected with appropriate protective respirators suggested by the product manufacturer.

There is a year-round distribution of moose and seasonal presence (spring-fall) of caribou in the area. It is possible these species may ingest water from the lake during the treatment period. EPA-approved bioassays indicate that, at the proposed concentrations, rotenone would have no effect on mammals that drink the treated water (Schnick 1974a, 1974b; Herr et al. 1967).

Migratory waterfowl: During the proposed treatment period, most waterfowl will have already migrated from the area. The remaining waterfowl that could be present during the proposed treatment may be temporarily displaced from the Scout Lake area, but the availability of other waters in close proximity to the project area should minimize any impacts. It is possible that these birds may feed on rotenone-killed fish carcasses shortly after treatment. However, research has indicated it is not physiologically possible for birds to consume sufficient quantity of rotenone-killed fish to result in a lethal dose (Finlayson 2000: USEPA 2007).

Rotenone residues in dead fish are generally very low (<0.1.0 ppm), unstable, and not readily absorbed through the gut of the animal eating the fish (Finlayson et al. 2000). A bird weighing ¼ pound would have to consume 100 quarts of treated water or more than 40 pounds of fish and invertebrates within 24 hours to receive a lethal dose. This same bird would normally consume 0.2 ounces of water and 0.32 ounces of food daily, thus a safety factor of 1,000 to 10,000 fold exists under normal conditions for birds and mammals. The LD50 values for mallard ducks and ring-necked pheasants, based on formulated product (34.5% a.i. rotenone), were 2200 mg/kg and1680 mg/kg, respectively (Turner et al. 2007). No latent or continuing toxicity to birds is expected because the lake is expected to freeze with days or weeks after treatment thus eliminating exposure to treated waters. Human activity associated with the application of rotenone in Scout Lake and subsequent monitoring and fish carcass collection should further temporarily reduce utilization of Scout Lake by waterfowl.

Other Birds: Dead fish will result from this project. Birds common to the area that could potentially consume dead fish include bald eagles, herring gull, Bonaparte's gull, parasitic jaeger, common loon, horned grebe, red-necked grebe, crow, raven, magpie, stellar jay, gray jay and osprey. It is possible that some of these birds will

be present and consume rotenone-killed fish. There are high concentrations of bald eagles and gulls in the area. There are also high numbers of these birds along the nearby Kenai River feeding on salmon during the summer and fall. Efforts to remove rotenone-killed fish that surface following treatment would minimize risks to these birds; thus, impacts would be negligible. Long-term impacts from removing Scout Lake's northern pike population would not have significant impact on birds. In addition, because northern pike are known to opportunistically prey on waterbirds, the eradication of these fish from the lake may actually benefit avian populations in the area.

Comment 5c: Non-game species that might be present during this project include zooplankton, aquatic insects, wood frogs, some birds, and some small mammals such as red squirrels, shrews and voles.

Invertebrates: In general, most studies report that aquatic invertebrates, except zooplankton, are much less sensitive to rotenone treatment than fish (Schnick 1974b). Anderson (1970) reported that comparisons between samples of zooplankton taken before and after a rotenone treatment did not change substantially. Houf and Campbell (1977) reported that no long-term significant reduction in aquatic invertebrates was observed due to the effects of rotenone, which was applied at concentrations twice as high as those proposed for the Scout lake project. In most cases, the reduction of aquatic invertebrates was temporary, and most treatments used a higher concentration of rotenone than proposed here (Schnick 1974b). In a study on the relative tolerance of different types of aquatic invertebrates to rotenone, Engstrom-Heg et al. (1978) reported that the long-term impacts of rotenone are mitigated because those insects that were most sensitive to rotenone also tended to have the highest rate of re-colonization. A study in Southcentral Alaska comparing rotenone treated waters to untreated waters indicates that treated lakes require between one and two years to reestablish zooplankton production and three years to attain a production level of previous dominance and abundance; and it was apparent that none of the abundant species of zooplankton were eliminated from lakes after rotenone treatment (Chlupach 1977). Chandler and Marking (1982) found that clams and snails were between 50 and 150 times more tolerant than fish to rotenone.

Because of their short life cycles (Anderson and Wallace 1984), good dispersal ability (Pennack 1989) and generally high reproductive potential (Anderson and Wallace 1984), aquatic invertebrates are capable of rapid recovery from disturbance (Jacobi and Deegan 1977; Boulton et al. 1992; Matthaei et al. 1996). Recolonization will include aerial dispersal of adult invertebrates from adjacent areas of the project area (e.g., mayflies and caddisflies).

Amphibians: Wood frogs are the only amphibians on the Kenai Peninsula and presumed to be common to the area and probably inhabit the area of Scout Lake. Wood frogs mate in the spring and their offspring quickly develop from egg to tadpole to frog. This northern adaptation helps ensure complete metamorphosis before fall freeze-up (ADF&G Wildlife Notebook Series: Frogs and Toads). Adult frogs are generally more resistant to the effects of rotenone than fish. Grisak et al. (2007) conducted laboratory studies on long-toed salamanders, Rocky Mountain tailed frogs, and Columbia spotted frogs and concluded that the adult life stages of these species would not suffer an acute response to rotenone, but larval and tadpole stages could be affected by rotenone at fish killing concentrations. These authors recommended rotenone treatments at times when the larva were not present, such as in the early spring or later in the fall, which aligns well with the timing of the proposed fall Scout Lake treatment.

Nongame mammals: Mammals varying in size from coyotes to shrews could be present and scavenge on rotenone killed fish or drink treated lake water. The effects of rotenone on non-target organisms have been studied extensively. Mammals, in general, are not affected because they neutralize rotenone by enzymatic action in their stomach and intestines (Finlayson 2000: AFS 2002; USEPA 2007). Interestingly, pigs appear to be much more sensitive to rotenone than other livestock and their exposure to rotenone should be avoided: http://www.inchem.org/documents/hsg/hsg/hsg073.htm

Laboratory tests have been conducted in which rats and dogs have been fed forms of rotenone as part of their diet for periods of six months to two years (Marking 1988). Observed effects included diarrhea, decreased food consumption, and weight loss. Researchers reported that despite the unusually high treatment concentrations of rotenone fed to rats and dogs, the chemical did not cause tumors or reproductive problems in these mammals. CDFG (1994) studies on potential risks to terrestrial animals found that a 22-pound dog would have to drink 7,915 gallons of lake water within 24 hours or eat 660,000 pounds of rotenone-killed fish to receive a lethal dose. The State of Washington reported that a half-pound mammal would need to consume 12.5 mg of pure rotenone to receive a lethal dose (Bradbury 1986). In this project we are using a 5% rotenone solution. Assuming the primary way an animal may consume the compound under field conditions is by drinking lake water, a half-pound animal would need to drink an unlikely 66 gallons of Scout Lake water treated at the planned 1.0 ppm concentration.

It is important to note that nearly all of these examples involved subjecting laboratory specimens to unusually high concentrations of rotenone or conducting tests on animals that would not be exposed to rotenone during normal use in fisheries management. Based on this information we expect the impacts to non-target organisms to range from non-existent to short-term.

B. HUMAN ENVIRONMENT

6. Noise/Electrical Effects Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Increase in existing noise levels?			**X**		**6a**
b. Exposure of people to severe or nuisance noise levels?		**X**			
c. Creation of electrostatic or electromagnetic effects that could be detrimental to human health or property		**X**			
d. Interference with radio or television reception and operation?		**X**			

Comment 6a: The noise generated from this project would result from the use of an outboard motor during application of the rotenone, collection of dead fish afterwards, and from monitoring activities. The noise generated from these activities would be short-term and minor.

7. Land Use Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Alteration or interference with the productivity or profitability of the existing land use area?		**X**			
b. Conflicted with a designated natural area or area of unusual scientific or educational importance?		**X**			
c. Conflict with any existing land use whose presence would constrain or potentially prohibit the proposed action?		**X**			
d. Adverse effects on the relocation of residences?		**X**			

8. Risk/Health Hazards Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Risk of an explosion or release of hazardous substances (including, but not limited to oil, pesticides, chemicals, or radiation) in the event of an accident or other forms of disruption?			**X**		**8a**
b. Affect an existing emergency response or emergency evacuation plan or create a need for a new plan?			**X**		**8b**
c. Creation of any human health hazard or potential hazard?			**X**		**see 8a,c**
d. Will any chemical toxicants be used?			**X**		**see 8a**

Comment 8a: The principal risk of human exposure to hazardous materials from this project would be limited to the rotenone applicators. All applicators would wear all necessary safety equipment such as a fitted respirator, goggles, rubber boots, Tyvek overalls, and nitrile gloves. At least one applicator will have been trained on the safe handling and application of the piscicide at a formal course taught at the U.S. Fish and Wildlife Service Natural Conservation Training Center in Shepherdstown, West Virginia. At least two, and probably several Alaska Department of Environmental Conservation certified pesticide applicators will be onsite to supervise or help administer the project. Rotenone would be transported, handled, applied and stored according to the label specifications to reduce the probability of human exposure or spill. Accidental spillage is a concern and appropriate spill response plans are found in Appendix 7.

Comment 8b: ADF&G has prepared a draft rotenone treatment plan that will be made available online at: http://www.sf.adfg.state.ak.us/region2/pike/, this document addresses nearly all aspects of safety. Elements of the plan include establishing a clear chain of command, applicator training, delegation and assignment of responsibility, clear lines of communication between members, spill contingency, first aid, emergency responder information, personal protective equipment, monitoring and quality control, and other details. Implementing this project should have no impact on existing emergency plans. Because of ADF&G's treatment plan, the risk of emergency response would be minimal and any affects to potential emergency responders would be short-term and minor.

Comment 8c: Although pesticides are widely used to control unwanted species, legitimate public concerns have been raised regarding health and human safety. As with any pesticide, direct exposure or consumption of piscicides at full strength can have harmful or sometimes fatal effects on humans. Rotenone is an EPA-registered pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (USEPA 2007).

Although Alaska does not have established water quality criteria for rotenone, the EPAs recent re-registration eligibility decision for rotenone (USEPA 2007) provides human health risk conclusions. An EPA assessment of acute dietary risk was based on the maximum solubility of rotenone in water of 200 ppb. Any additional rotenone in water would not further increase the concentration available for exposure. The EPA concluded that acute dietary exposure estimates for drinking and eating fish from rotenone treated waters was below the Agency's level of concern.

The EPAs chronic dietary exposure assessment of rotenone was performed for only drinking water because rotenone degrades rapidly and has a low propensity to bioaccumulate in fish (potential food). The EPA estimated the drinking water level of concern (DWLOC) to be 40 ppb (rotenone) for the most sensitive subgroup (infants and children). Therefore, at the anticipated rotenone concentration planned for Scout Lake (~50 ppb), the DWLOC would be exceeded by 20% for a relatively short time (probably several days to several weeks) until the rotenone degraded naturally below the DWLOC level. However, the DWLOC (40ppb) is for chronic long-term dietary exposure and is a scenario not likely to occur with the Scout Lake project because there are no public or private surface water intakes, only groundwater wells. The treatment application would be late fall just prior to freeze-up conditions, so easy access to the lake water would be for a relatively short period. Also, signs and public notices will be posted to warn the public not to drink Scout Lake water until monitoring ensures the rotenone has completely degraded.

As an example of rotenone toxicity, a 160-pound adult would have to drink 23,000 gallons and a 22 pound child would need to drink over 1,400 gallons of rotenone-treated water at one sitting to receive a lethal dose at pisicidal concentrations (Gleason et al. 1969).

There have been previous concerns that rotenone exposure could be linked to Parkinson's disease, but this linkage has since been refuted. In a study in which rats were injected with rotenone for several weeks, researchers reported finding lesions characteristic of Parkinson's disease (Betarbet et al. 2000). However, these results have been challenged on the basis of methodology: (1) that the continuous intravenous injection method used leads to "continuously high levels of the compound in the blood," and (2), that dimethyl sulfoxide (DMSO) was used to enhance tissue penetration whereas normal routes of exposure actually slow introduction of chemicals into the bloodstream. Finally, injecting rotenone into the body is not a normal way of assimilating the compound. Marking (1988) found no Parkinson-like results in a similar study. Extensive research has demonstrated that rotenone does not cause birth defects (HRI 1982), gene mutations (Van Geothem et al. 1981; BRL 1982) or cancer (Marking 1988). Spencer and Sing (1982) reported that rats fed diets laced with 10 to 1,000 ppm rotenone over a 10-day period did not suffer any reproductive dysfunction. Rotenone was found to have no direct role in fetal development of rats that were fed exceedingly high concentrations of rotenone. Typical concentrations of actual rotenone used in fishery management range from 0.025 to 0.50 ppm and are far below those administered during most toxicology studies.

Public health issues surrounding the use of rotenone have been studied extensively (USEPA 2007). In general, the EPA through the FIFRA certification process has concluded that use of rotenone for fish control does not present unreasonable risks. Finlayson et al. (2000) reported that the EPA "has concluded that the use of rotenone for fish control does not present a risk of unreasonable adverse effects to humans and the environment." In relation to air quality, they further note that "No public health effects from rotenone use as a piscicide have been reported." No waiting period is specified for swimming in rotenone-treated water. Aside from the rotenone itself, liquid formulations also consist of petroleum emulsifiers. Finlayson et al. (2000) wrote regarding the health risks of these constituent elements:

"...the EPA has concluded that the use of rotenone for fish control does not present a risk of unreasonable adverse effects to humans and the environment. The California Environmental Protection Agency found that adverse impacts from properly conducted, legal uses of liquid rotenone formulations in prescribed fish management projects were nonexistent or within acceptable levels (memorandum from J. Wells, California Department of Pesticide Regulation, to Finlayson, 3 August 1993). CFT Legumine™ does contain trace amounts of various aromatic compounds that are expected to degrade rapidly through photolytic and biological degradation mechanisms. Other substances found in low concentrations in CFT Legumine™ include the solvent hexanol, polyethylene glycols (PEGs) and fatty acids, all of which are readily biodegradable. None of these constituents identified in the liquid rotenone formulation appear to be at concentrations that suggest human health risks through water, or ingestion exposure scenarios and no relevant regulatory criteria are exceeded in estimated exposure concentrations (Fisher 2007)."

The product labels states:

"…do not use dead fish for food or feed, do not use water treated with rotenone to irrigate crops or release within ½ mile upstream of a potable water or irrigation water intake in a standing body of water such as a lake, pond, or reservoir. . . . do not allow swimming in rotenone treated water until the application has been completed and all pesticide has been thoroughly mixed into the water according to the labeling instructions. This product is flammable and should be kept away from heat and open flame ..."

The major risks to human health from rotenone come from accidental exposure during application. This is the only time when humans are exposed to concentrations that are greater than those needed to eradicate fish and when inhalation or dermal exposure risk is greatest. To prevent accidental exposure to rotenone the Alaska Department of Environmental Conservation requires applicators to be:

- Working under the direct supervision of a trained and certified pesticide applicator
- Equipped with the proper safety gear, which, in this case, includes fitted respirator, eye protection, rubberized gloves, and a hazardous material suit
- In possession of product labels during use
- Storing materials only in approved containers that are properly labeled
- Adhering to the product label requirements for storage, handling, and application"

Any threats to human health during application will be greatly reduced with proper use of safety equipment. People recreating in the area would likely not be exposed to the treatments because a temporary lake access closure would preclude them from being in the area. Public notification through news releases, signs, and ADF&G personnel in the project area should be adequate to keep unintended recreationists from being exposed to any treated waters. Dead fish that surface in the lake would be collected and removed from the site on a daily basis until dead fish are no longer present.

9. Community Impact Will the proposed action result in:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Alteration of the location, distribution, density, or growth rate of the human population of the area?		**X**			
b. Alteration of the social structure of a community?		**X**			
c. Alteration of the level of distribution of employment or community or personal income?		**X**			
d. Changes in the industrial or commercial activity?		**X**			
e. Increased traffic hazards or effects on existing transportation facilities or patterns of movement of people and goods?		**X**			

10. Public Services/Taxes/Utilities	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Will the proposed action have an effect upon or result in the need for new or altered governmental services in any of the following areas: fire or police protection, schools, parks/recreational facilities, roads or other public maintenance, water supply, sewer or septic systems, solid water disposal, health, or other governmental services? If any, specify:			**X**		**10a**
b. Will the proposed action have an effect upon the local or state tax base and revenues?		**X**			
c. Will the proposed action result in need for new facilities or substantial alterations of any of the following utilities: electric power, natural gas, other fuel supply or distribution systems, or communications?		**X**			
d. Will the proposed action result in increase use of any energy source?		**X**			
e. Define projected revenue sources		**X**			
f. Define projected maintenance costs		**X**			

Comment 10a: The Alaska Department of Natural Resources Division of Parks and Recreation administers the land containing the public accesses to Scout Lake and the Division will be asked to collaborate with ADF&G to temporarily close the Scout Lake access areas to public use for the day of the treatment through the use of signage and public announcements.

11. Aesthetics/Recreation	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Alteration of any scenic vista or creation of an aesthetically offensive site or effect that is open to public view?			**X**		**11a**
b. Alteration of the aesthetic character of a community or neighborhood?		**X**			
c. Alteration of the quality or quantity of recreational/tourism opportunities and settings?			**X**		**11 a,c**
d. Will any designated or proposed wild and scenic rivers, trails or wilderness areas be impacted? (Also see 11a, 11c)		**X**			

Comment 11a: Public access to Scout Lake is on land owned by the Alaska Department of Natural Resources Division of Parks and Recreation. Public access will be discouraged at Scout Lake immediately before, during, and immediately after treatment using appropriate signage and public notices. It is also possible that offending odors could arise from decomposing fish shortly after treatment or from the rotenone products. The odors would be expected to dissipate within a few days after treatment. Also, planned routine removal of fish carcasses post-treatment would be expected to minimize offensive odors.

Comment 11c: Some primary objectives for this project would be: (1) reduce the threat of northern pike being illegally introduced into critical fishery habitat including the nearby Kenai River drainage, (2) improve angling quality at Scout Lake - which would result in increased use by recreationists. The benefits of eradicating this invasive pike population would outweigh any short-term social impacts associated with the actual rotenone treatment. Any aesthetic impacts would be short-term and minor and would be directly associated with the actual rotenone treatment and immediate aftermath, including dead fish in the project area.

The current sport fishery in Scout Lake has virtually collapsed since the illegal introduction of northern pike. Anecdotal evidence suggests fishing effort for northern pike or remnant coho salmon and rainbow trout is very light, and no harvest was reported in the ADF&G angler mail survey in 2006 (Jennings In prep.). However, there may be sport fishers who prefer the northern pike fishery and will experience lost opportunity. To help mitigate the loss of northern pike fishing opportunity there are six lakes within six miles of Scout Lake that currently provide northern pike fishing.

12. Cultural/Historical Resources	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Destruction or alteration of any site, structure or object of prehistoric, or paleontological importance?		**X**			
b. Physical change that would affect unique cultural views?		**X**			
c. Effects on existing religious or sacred uses of a site or area?		**X**			
d. Will the project affect historic or cultural resources?		**X**			

13. Summary Evaluation of Significance Will the proposed action, considered as a whole:	Impact Unknown	None	Minor	Potentially significant	Can impact be mitigated
a. Have impacts that are individually limited, but cumulatively considerable? (A project or program may result in impacts on two or more separate resources which creates a significant effect when considered together or in total).		**X**			
b. Involve potential risks or adverse effects which are uncertain but extremely hazardous if they were to occur?		**X**			
c. Potentially conflict with the substantive requirements of any local, state, or federal law, regulation, standard or formal plan?		**X**			
d. Establish a precedent or likelihood that future actions with significant environmental impacts will be proposed?		**X**			
e. Generate substantial debate or controversy about the nature of the impacts that would be created?	**X**			yes	**13e**
f. Is the project expected to have organized opposition or generate substantial public controversy?	**X**			yes	**13f**
g. List any federal or state permits required.					**13g**

Comment 13e and 13f: In general**,** the use of pesticides can generate controversy. Outreach efforts by the Department would help to educate the public on the safe and effective use of rotenone. It is not known if this project would have organized opposition. One reason that ADF&G is considering this course of action is that invasive northern pike have already affected fisheries in the Soldotna Creek drainage and have resulted in lost fishing opportunity in three lakes that were previously stocked with rainbow trout or salmon.

In part, this project was initiated over concerns for diversity in the area's fisheries. Scout Lake is easily accessible and provided a quality stocked salmon fishery before northern pike were illegally introduced.

Comment 13g: The following permits and approvals will need to be obtained prior to the proposed treatment:

ADEC (Alaska Department of Environmental Conservation): Pesticide Use Permit (Appendix 8).

Alaska Board of Fisheries: Written consent of approval to use rotenone by the Alaska Board of Fisheries (Appendix 9).

ADNR (Alaska Department of Natural Resources): submission of an ADNR Coastal Project Questionnaire and Certification Statement to determine whether an Alaska Coastal Management Program (ACMP) Consistency Review is required (Appendix 10).

PART III. ALTERNATIVES

Alternative 1 - No Action

The no action alternative would allow the status quo to continue which would maintain or reduce angling opportunity. As long as invasive northern pike remain in Scout Lake, ADF&G would not have the ability to restore the fisheries there and angling opportunities for the local public would continue to be limited. Further, there would be continued risk that northern pike could be transported from Scout Lake to nearby wild fisheries.

Alternative 2 - Rotenone treatment and rainbow trout or salmon stocking (Proposed Action)

The Proposed Action involves removing northern pike from Scout Lake using CFT Legumine™ and Prentox® Prenfish™ Fish Toxicant Powder. Following treatment and natural detoxification, the lake would be restocked with coho salmon and/or rainbow trout.

This alternative offers the highest probability of achieving the goals of improving the recreational fishery in Scout Lake and reducing the threat of invasive northern pike being transported illegally to other areas.

Alternative 3 - Mechanical Removal

This alternative would involve using gill nets and/or trap nets to selectively remove northern pike. Once all northern pike were removed, Scout Lake would be restocked with rainbow trout or salmon.

Under specific conditions, gillnets have been successfully used to remove unwanted fish from lakes. Bighorn Lake, a 5.2-acre lake located in Banff National Park in Alberta, Canada, was gillnetted from 1997 to 2000 to remove an invasive population of brook trout (Parker et al. 2001). Over 10,000 net nights (1 net night = 1 net set overnight for at least 12 hours) were conducted over a four-year period to remove the population that totaled 261 fish. The researchers concluded that the removal of nonnative trout using gillnets was impractical for larger lakes (> 5 acres). In clear lakes, fish have the ability to acclimate to the presence of gillnets and avoid them. These researchers reported observing brook trout avoiding gillnets within 2 hours of being set.

Knapp and Matthews (1998) reported that Maul Lake, a 3.9-acre lake in the Inyo National Forest in California, was gillnetted from 1992 to 1994 to remove a brook trout population. The population consisted of 97 fish that were removed after 108 net days of effort. Following the removal of brook trout Maul Lake was mistakenly restocked with rainbow trout. Efforts to remove them using gillnets were implemented immediately. From 1994 through 1997, 4,562 net days were required to remove 477 rainbow trout from the lake. Knapp and Matthews (1998) reported that gillnets could be used as an alternative to chemical treatment, but they acknowledged that the small size and shallow depth of Maul Lake leant itself to a successful fish eradication using gillnets. Their criteria for successful fish removal using gillnets included lakes less than 3.9 surface acres, were less than 19 feet deep, and had little or no inflow or outflow to perpetuate reinvasion, and no natural reproduction of the fish population.

Information could not be obtained about the probability of success in using gillnets or trap nets to completely remove northern pike from Scout Lake. In any event, Scout Lake exceeds surface area criteria described by other researchers. Deploying gillnets and traps require frequent on-site inspections to check and reset nets. This method of fish removal at Scout Lake would require an unreasonable commitment of time and manpower. Gillnetting, the more efficient of the two mechanical methods listed, could expose birds and aquatic mammals to the risk of net entanglement in water.

PART IV. ENVIRONMENTAL ASSESSMENT CONCLUSION SECTION

A) Is an EIS required?

After reviewing the information provided by the applicant, the assessment of environmental impact contained in Part II of this document, and the responses received during the public review process, the U.S. Fish and Wildlife Service has accepted the EA and has prepared and signed a FONSI for the project as described above

B) Public Involvement.

This EA is posted on the ADF&G internet site found at: http://www.sf.adfg.state.ak.us/statewide/invasivespecies/index.cfm/FA/rotenone.projects and can be mailed directly to persons who request it. Any interested citizen will be encouraged to contact the preparer of this EA to discuss the proposal.

Public scoping/notifications:

1) The local ADF&G advisory committees (Kenai/Soldotna, Cooper Landing, and Central Peninsula) and other identified stakeholders were notified of the Scout Lake restoration proposal during winter of 2009 by the Soldotna ADF&G Sport Fish Area Management Biologist.

2) A public meeting targeting property owners near Scout Lake to share the Scout Lake restoration proposal was held on April 30, 2009 in Sterling, Alaska..

3) Public notices for the Scout Lake restoration pesticide use permit application will be printed in the Peninsula Clarion on two consecutive days (June 29 and 30, 2009) as required by ADEC for the pesticide use permitting process (Appendix 11).

4) ADF&G news release issued was issued on June 30, 2009 announcing that the Scout Lake and Sand Lake (Anchorage) public commenting periods will be open for the pesticide use applications and environmental assessments (Appendix 12)

5) A synopsis (Appendix 13) describing the project will be distributed to identified stakeholders and interested persons. These flyers will also list project contact information.

C) Duration of the comment period

The comment period began on June 30, 2009 and concluded July 30, 2009.

D. Summary of public comments received and Department responses.

(Appendix 14).

E. Contact Person Responsible for Preparing the EA Document

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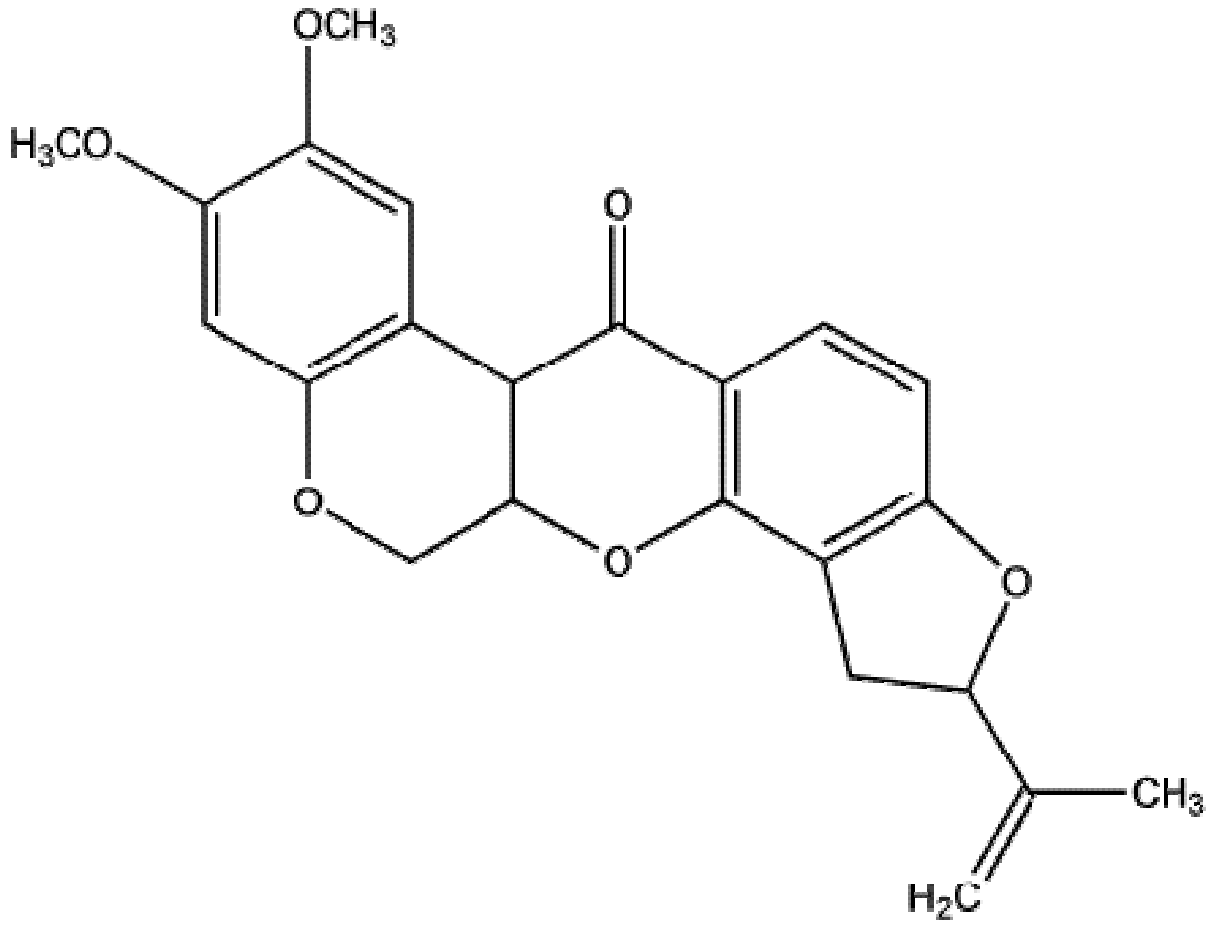
APPENDIX

Appendix 1. Molecular structure of rotenone.



Appendix 2.CFT Legumine™ product label.

RESTRICTED USE PESTICIDE
Due to aquatic toxicity
For retail sale to, and use only by, Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.

CFT Legumine™

Fish Toxicant

For Control of Fish in Lakes, Ponds, Reservoirs, and Streams

ACTIVE INGREDIENTS:

Rotenone	5.0%	w/w
Other Associated Resins	5.0%	
OTHER INGREDIENTS[1]	90.0%	
Total	100.0%	

[1] Contains Petroleum Distillates

CFT Legumine is a trademark of CWE Properties Ltd., LLC

KEEP OUT OF REACH OF CHILDREN
WARNING

FIRST AID Have product container or label with you when obtaining treatment advice.	
If swallowed	• Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice. • Do not give any liquid to the person. · Do not anything to an unconscious person • Do not induce vomiting unless told to do so by the poison control center or doctor.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice.
If inhaled	• Move person to fresh air. • If person is not breathing, call an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice.
Note to Physician: Contains Petroleum Distillates. Vomiting may cause aspiration pneumonia. For information on this pesticide product (including health concerns, medical emergencies, or pesticide incidents), call the National Pesticide Information Center at 1-800-858-7378.	

EPA Reg. No. 75338-2 EPA Est. No. 655-GA-1

Manufactured for CWE Properties Ltd., LLC, P.O. Box 336277, Greeley CO 80633

SPECIMEN

1

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
WARNING

May be fatal if inhaled or swallowed. Causes moderate eye irritation. Harmful if absorbed through skin. Do not breathe spray mist. Do not get in eyes, on skin, or on clothing. Wear goggles or safety glasses.

When handling undiluted product, wear either a respirator with an organic-vapor-removing cartridge with a prefilter approved for pesticides (MSHA/NIOSH approval number prefix TC-23C), or a canister approved for pesticides (MSHA/NIOSH approval number prefix 14G), or a NIOSH approved respirator with an organic vapor (OV) cartridge or canister with any R, P, or HE prefilter.

Wash thoroughly with soap and water after handling and before eating, drinking, or using tobacco. Remove contaminated clothing and wash before reuse. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals.

ENVIRONMENTAL HAZARDS

This pesticide is extremely toxic to fish. Fish kills are expected at recommended rates. Consult your State Fish and Game Agency before applying this product to public waters to determine if a permit is needed for such an application. Do not contaminate untreated water when disposing of equipment washwaters.

CHEMICAL AND PHYSICAL HAZARDS

FLAMMABLE: KEEP AWAY FROM HEAT AND OPEN FLAME. FLASH POINT MINIMUM 45°F (7°C).

For information on this pesticide product (including health concerns, medical emergencies, or pesticide incidents), call the National Pesticide Information Center at 1-800-858-7378.

STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.

STORAGE: Store only in original containers, in a dry place inaccessible to children and pets. This product will not solidify nor show any separation at temperatures down to 40°F and is stable for a minimum of one year when stored in sealed drums at 70°F.

PESTICIDE DISPOSAL: Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your state pesticide or Environmental Control Agency, or the Hazardous Waste representative at the nearest EPA Regional Office for guidance.

CONTAINER DISPOSAL: Triple rinse or equivalent. Then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or by other procedures approved by state and local authorities.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

CFT Legumine is registered for use by or under permit from, and after consultation with State and Federal Fish and Wildlife Agencies.

GENERAL INFORMATION

This product is a specially formulated product containing rotenone to be used in fisheries management for the eradication of fish from lakes, ponds, reservoirs and streams.

SPECIMEN

Since such factors as pH, temperature, depth and turbidity will change effectiveness, use this product only at locations, rates, and times authorized and approved by appropriate State and Federal Fish and Wildlife Agencies. Rates must be within the range specified on the label.
Properly dispose of unused product. Do not use dead fish for food or feed.
Do not use water treated with rotenone to irrigate crops or release within ½ mile upstream of a potable water or irrigation water intake in a standing body of water such as a lake, pond or reservoir.
Re-entry Statement: Do not allow swimming in rotenone-treated water until the application has been completed and all pesticide has been thoroughly mixed into the water according to labeling instructions.
FOR USE IN PONDS, LAKES, AND RESERVOIRS
The actual application rates and concentrations of rotenone needed to control fish will vary widely, depending on the type of use (e.g., selective treatment, normal pond use, etc.) and the factors listed above. The table below is a general guide for the proper rates and concentrations.
This product disperses readily in water both laterally and vertically, and will penetrate below the thermocline in thermally stratified bodies of water.
Computation of Acre-Feet: An acre-foot is a unit of volume of a body of water having the area of one acre and the depth of one foot. To determine acre-feet in a given body of water, make a series of transects across the body of water taking depths with a measured pole or weighted line. Add the soundings and divide by the number made to determine the average depth. Multiply this average depth by the total surface area in order to determine the acre-feet to be treated. If number of surface acres is unknown, contact your local Soil Conservation Service, which can determine this from aerial photographs.
Amount of CFT Legumine Needed for Specific Uses: To determine the approximate number of gallons needed, find your "Type of Use" in the first column of the table below and then divide the corresponding numbers in the fourth column, "Number of Acre-Feet Covered by One Gallon" into the number of acre-feet in your body of water.

Type of Use	Parts per Million		Number of Acre-Feet Covered by One Gallon
	CFT Legumine	Active Rotenone	
Selective Treatment	0.10 to 0.13	0.005 to 0.007	30 to 24
Normal Pond Use	0.5 to 1.0	0.025 to 0.050	6.0 to 3.0
Remove Bullheads or Carp	1.0 to 2.0	0.050 to 0.100	3.0 to 1.5
Remove Bullheads or Carp in Rich Organic Ponds	2.0 to 4.0	0.100	1.5 to 0.75
Preimpoundment Treatment Above Dam	3.0 to 5.0	0.150 to 0.250	1.0 to 0.60

*Adapted from Kinney, Edward. 1965. Rotenone in Fish Pond Management. USDI Washington, DC Leaflet FL-576

Pre-Mixing and Method of Application: Pre-mix with water at a rate of one gallon of CFT Legumine to 10 gallons of water. Uniformly apply over water surface or bubble through underwater lines.

SPECIMEN

Detoxification: Water treated with this product will detoxify under natural conditions within one week to one month depending upon temperatures, alkalinity, etc. Rapid detoxification can be accomplished by adding chlorine or potassium permanganate to the water at the same rate as CFT Legumine in parts per million, plus enough additional to meet the chlorine demand of the untreated water.

Removal of Taste and Odor: Waters treated with this product do not retain a detectable taste or odor for more than a few days to a maximum of one month. Taste and odor can be removed immediately by treatment with activated charcoal at a rate of 30 ppm for each 1 ppm of CFT Legumine remaining. (Note: As this product detoxifies, less charcoal is required.)

Restocking After Treatment: Wait 2 to 4 weeks after treatment. Place a sample of fish to be stocked in wire cages in the coolest part of the treated waters. If the fish are not killed within 24 hours, the water may be restocked.

USE IN STREAMS IMMEDIATELY ABOVE LAKES, PONDS, AND RESERVOIRS

The purpose of treating streams immediately above lakes, ponds and reservoirs is to improve the effectiveness of lake, pond and reservoir treatments by preventing target fish from moving into the stream corridors, and not to control fish in streams per se. The term "immediately" means the first available site above the lake, pond or reservoir where treatment is practical, while still creating a sufficient barrier to prevent migration of target fish into the stream corridor.

In order to completely clear a fresh water aquatic habitat of target fish, the entire system above or between fish barriers must be treated. See the use directions for streams and rivers on this label for proper application instructions.

In order to treat a stream immediately above a lake, pond or reservoir you must: (a) Select the concentration of active rotenone, (b) Compute the flow rate of the stream, (c) Calculate the application rate, (d) Select an exposure time, (e) Estimate the amount of product needed, (f) Follow the method of application.

To prevent movement of fish from the pond, lake, or reservoir, the stream treatment should begin before and continue throughout treatment of the pond, lake or reservoir until mixing has occurred.

1. Concentration of Active Rotenone

Select the concentration of active rotenone based on the type of use from those listed on the table. Example: If you select "normal pond use" you could select a concentration of 0.025 parts per million.

2. Computation of Flow Rate for Stream

Select a cross section of the stream where the banks and bottom are relatively smooth and free of obstacles. Divide the surface width into 3 equal sections and determine the water depth and surface velocity at the center of each section. In slowly moving streams, determine the velocity by dropping a float attached to 5 feet of loose monofilament fishing line. Measure the time required for the float to move 5 feet. For fast-moving streams, use a longer distance. Take at least three readings at each point. To calculate the flow rate from the information obtained above, use the following formula:

$$\frac{F = Ws \times D \times L \times C}{T}$$

Where F = flow rate (cubic feet/second), Ws = surface width (feet), D = mean depth (feet), L = mean distance traveled by float (feet), C = constant (0.8 for rough bottoms and 0.9 for smooth bottoms), T = mean time for float (sec.).

SPECIMEN

3. Calculation of Application Rate

In order to calculate the application rate (expressed as gallons/second), convert the rate in the table (expressed as gallons/acre-feet) to gallons per cubic feet and multiply by the flow rate (expressed as cubic feet/second). Depending on the size of the stream and the type of equipment, the rate could be expressed in other units, such as ounces/hour, or cc/minute.

The application rate for the stream is calculated as follows:

$$R_s = R_p \times C \times F$$

Where R_s = application rate for stream (gallons/second), R_p = application rate for pond (gallons/acre-feet), C = 1 acre-foot/43560 cubic feet and F = flow rate of the stream (cubic feet/second).

4. Exposure Time

The exposure time would be the period of time (expressed in hours or minutes) during which CFT Legumine is applied to the stream in order to prevent target fish from escaping from the pond into the stream corridor.

5. Amount of Product

Calculate the amount of product for a stream by multiplying the application rate for streams by the exposure time.

$$A = R_s \times H$$

Where A = the amount of product for the stream application, R_s = application rate for stream (gallons/second) and H = the exposure time expressed in seconds.

FOR USE IN STREAMS AND RIVERS

Only state or Federal Fish and Wildlife personnel or professional fisheries biologists under the authorization of state or Federal Fish and Wildlife agencies are permitted to make applications of CFT Legumine for control of fish in streams and rivers. Informal consultation with Fish and Wildlife personnel regarding the potential occurrence of endangered species in areas to be treated should take place. Applicators must reference the Stream and River use Monograph before making any application to streams or rivers.

CFT LEGUMINE STREAM AND RIVER USE MONOGRAPH

USE IN STREAMS AND RIVERS

The following use directions are to provide guidance on how to make applications of CFT Legumine to streams and rivers. The unique nature of every application site could require minor adjustments to the method and rate of application. Should these unique conditions require major deviation from the use directions, a Special Local Need 24(c) registration should be obtained from the state.

Before applications of CFT Legumine can be made to streams and rivers, authorization must be obtained from state or federal Fish and Wildlife agencies. Since local environmental conditions will vary, consult with the state Fish and Wildlife agency to ensure the method and rate of application are appropriate for that site.

Contact the local water department to determine if any water intakes are within one mile downstream of the section of stream, river, or canal to be treated. If so, coordinate the application with the water department to make sure the intakes are closed during treatment and detoxification.

Application Rates and Concentration of Rotenone

Slow Moving Rivers: In slow moving rivers and streams with little or no water exchange, use instructions for ponds, lakes and reservoirs.

Flowing Streams and Rivers: Apply rotenone as a drip for 4 to 8 hours to the flowing portion of the stream. Multiple application sites are used along the length of the treated stream, spaced

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approximately ½ to 2 miles apart depending on the water flow travel time between sites. Multiple sites are used because rotenone is diluted and detoxified with distance. Application sites are spaced at no more than 2 hours or at no less than 1-hour travel time intervals. This assures that the treated stream remains lethal to fish for a minimum of 2 hours. A non-toxic dye such as Rhodamine-WTR or fluorescein can be used to determine travel times. Cages containing live fish placed immediately upstream of the downstream application sites can be used as sentinels to assure that lethal conditions exist between sites.

Apply rotenone at each application site at a concentration of 0.25 to 1.0 part per million of CFT Legumine. The amount of CFT Legumine needed at each site is dependent on stream flow (see Computation of Flow Rate for Stream).

Application of Undiluted Material

CFT Legumine can drain directly into the center of the stream at a rate 0.85 to 3.4 cc per minute for each cubic foot per second of stream flow. Flow of undiluted CFT Legumine into the stream should be checked at least hourly. This is equivalent to from 0.5 to 2.0 ppm of this product, or from 0.025 to 0.100 ppm rotenone. Backwater, stagnant, and spring areas of streams should be sprayed by hand with a 10% v/v solution of CFT Legumine in water to assure a complete coverage.

Calculation of Application Rate:

$$X = F\ (1.699\ B)$$

X = cc per minute of CFT Legumine applied to the stream, F = the flow rate (cu.ft/sec.) see Computation of Flow Rate for Stream section of the label, B = parts per million desired concentration of CFT Legumine

Total Amount of Product Needed for Treatment: Streams should be treated for 4 to 8 hours in order to clear the treated section of stream of fish. To determine the total amount of CFT Legumine required, use the following equation:

$$Y = X\ (0.0158\ C)$$

Y = gallons of CFT Legumine required for the stream treatment, X = cc per minute of CFT Legumine applied to the stream, C = time in hours of the stream treatment.

Application of Diluted Material

Alternatively, for stream flows up to 25 cubic feet per second, continuous drip of diluted CFT Legumine at 80 cc per minute can be used. Flow of diluted CFT Legumine into the stream should be checked at least hourly. Use a 5 gallon reservoir over a 4 hour period, a 7.5 gallon reservoir over a 6 hour period, or a 10 gallon reservoir over an 8 hour period. The volume of the reservoir can be determined from the equation:

$$R = H \times 1.25$$

Where R = the volume of the reservoir in gallons, H = the duration of the application in hours.

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The volume of CFT Legumine diluted with water in the reservoir is determined from the equation:

$$X = Y(102\ F)H$$

Where X = the cc of CFT Legumine diluted in the reservoir, Y = parts per million desired concentration of CFT Legumine, F = the flow rate (cubic feet/second), H = the duration of the application (hours).

For flows over 25 cubic feet per second, additional reservoirs can be used concurrently. Back-water, stagnant and spring areas of streams should be sprayed by hand with a 10% v/v solution of CFT Legumine in water to assure a complete coverage.

Detoxification

To limit effects downstream, detoxification with potassium permanganate can be used at the downstream limit of the tre ated area. Within ½ to 2 miles of the furthest downstream CFT Legumine application site, the rotenone can be detoxified with a potassium permanganate solution at a resultant stream concentration of 2 to 4 parts per million, depending on rotenone concentration and permanganate demand of the water. A 2.5% (10 pounds potassium permanganate to 50 gallons of water) permanganate solution is dripped in at a continuous rate using the equation:

$$X = Y(70\ F)$$

Where X = cc of 2.5% permanganate solution per minute, Y = ppm of desired permanganate concentration, F = cubic feet per second of stream flow.

Flow of permanganate should be checked at least hourly. Live fish in cages placed immediately above the permanganate application site will show signs of stress signaling the need for beginning detoxification. Detoxification can be terminated when replenished fish survive and show no signs of stress for at least four hours.

Detoxification of rotenone by permanganate requires between 15 to 30 minutes contact time (travel time). Cages containing live fish can be placed at these downstream intervals to judge the effectiveness of detoxification. At water temperatures less than 50°F detoxification may be retarded, requiring a longer contact time.

WARRANTY STATEMENT

Our recommendations for the use of this product are based upon tests believed to be reliable. The use of this product being beyond the control of the manufacturer, no guarantee, expressed or implied, is made as to the effects of such or the results to be obtained if not used in accordance with directions or established safe practice. To the extent consistent with applicable law, the buyer must assume all responsibility, including injury or damage, resulting from its misuse as such, or in combination with other materials.

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Appendix 3. CFT Legumine™ Material Safety Data Sheet

CWE Properties Ltd., LLC – P.O. Box 336277 – Greeley, CO 80633

CFT Legumine™ EPA Reg. No. 75338-2

Material Safety Data Sheet

SECTION 1: CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT/CHEMICAL NAME: CFT Legumine™

Emergency Contact: 1-800-858-7378 (National Pesticide Information Center)

Transportation Emergency Contact: 1-800-858-7378 (National Pesticide Information Center

Manufactured for: CWE Properties Ltd., LLC
P.O. Box 336277
Greeley, CO 80633

SECTION 2: HAZARDS IDENTIFICATION SUMMARY

KEEP OUT OF REACH OF CHILDREN –WARNING – May be fatal if inhaled. May be fatal if swallowed. Causes substantial, but temporary, eye injury. Causes skin irritation. Do not breathe spray mist. Do not get in eyes, on skin, or on clothing. Wear goggles or safety glasses. This product is an orange, viscous liquid with slight petroleum odor.

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Ingredients:	Percentage By Weight	CAS No.	TLV (Units)
Rotenone	5.00	83-79-4	5 mg/m3
Other Associated Resins	5.00		
Inert Ingredients, Including N-Methylpyrrolidone	90.00	872-50-4	not listed

SECTION 4: FIRST AID MEASURES

IF SWALLOWED: Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-900-858-7378 immediately for treatment advice. Do not induce vomiting unless told to do so by the Poison Control Center or physician. Do not give any liquid to the person. Do not give anything by mouth to an unconscious or convulsing person.

IF INHALED: Remove victim to fresh air. If not breathing, give artificial respiration, preferably by mouth-to-mouth. Call a physician, Poison Control Center, or the National Pesticide Information

Center at 1-800-858-7378 immediately for treatment advice.

IF IN EYES: Hold eyelids open and rinse slowly and gently with water for 15-20 minutes. Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice.

IF ON SKIN OR CLOTHING: Take off contaminated clothing. Rinse skin with plenty of water for 15-20 minutes. Call a physician, Poison Control Center, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice.

Note: Have the product container or label with you when obtaining treatment advice.

SECTION 5: FIRE FIGHTING MEASURES

Flash Point (Method Used): 192°F (89°C) (Closed Cup)

Flammable Limits: LFL: Not established
UFL: Not established

Extinguishing Media: CO_2, foam, dry chemical water spray.

Special Fire Fighting Procedures: Use self-contained breathing apparatus and full protective equipment. Fight fire from upwind from a safe distance and keep non-essential personnel out of area.

SECTION 6: ACCIDENTAL RELEASE MEASURES

SPILL/LEAK PROCEDURES: Wear protective clothing as described in Section 8 (Exposure Controls / Personal Protection) of this MSDS. Absorb liquid with material such as clay, sand, sawdust, or dirt. Sweep up and place in a suitable container for disposal and label the contents. Area can be washed down with a suitable solution of bleach or soda ash and an appropriate alcohol (methanol, ethanol, or isopropanol). Follow this by washing with a strong soap and water solution. Absorb any excess liquid as indicated above, and add to the disposal container. This product is extremely toxic to fish. Fish kills are expected at recommended use rates. Keep spills and cleaning runoff out of municipal sewers and open bodies of water.

Emergency Telephone Number: 1-800-858-7378

Revision Date: July 12, 2007

SECTION 7: HANDLING AND STORAGE

HANDLING: Avoid inhalation of vapors. Harmful if swallowed, inhaled or absorbed through skin. Avoid contact with skin. Wear clean protective clothing. Wash hands before eating, drinking, chewing gum, using tobacco or using the toilet. Remove clothing immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing. Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

STORAGE: Store in original containers only. Store in a dry place away from children and domestic animals. Do not store at temperatures below 40 F/4.4^{O}C. This product is stable for a minimum of 1 year when stored in sealed drums at 70^{O}F/21.1 $_{o}$C. Do not contaminate water, food or feed by storage or disposal.

SECTION 8: EXPOSURE CONTROLS / PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide general or local exhaust ventilation systems to maintain airborne concentrations below OSHS PELs (see section 3).
RESPIRATORY PROTECTION: When working with an undiluted product in a confined space, use a non-powered air purifying respirator equipped with an N–, R-, or P-series filter. For emergency or non-routine operations (cleaning reactor vessels or storage tanks), wear an SCBA"

Warning! Air-purifying respirators do not protect workers in oxygen-deficient atmospheres. If respirators are used, OSHA requires a written respiratory protection program that includes at least: medical certification, training, fit testing, periodic environmental monitoring, maintenance, inspection, cleaning, and convenient, sanitary storage areas. **PROTECTIVE CLOTHING/EQUIPMENT:** Wear chemical-resistant gloves, boots, and aprons to prevent prolonged or repeated skin contact. Wear protective eyeglasses or chemical safety goggles, per OSHA eye- and face-protection regulations (29 CFR 1910.133).

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Viscous liquid
Appearance and Odor: Orange liquid with slight solvent odor.
Specific Gravity: 1.019 g/ml
Bulk Density: 8.506 lbs./gal.

Emergency Telephone Number: 1-800-858-7378
Revision Date: July 12, 2007

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: None known.
Incompatibility: Strong acids and strong oxidizers,
Hazardous Decomposition Products: Oxides of carbon.
Hazardous Polymerization: Will not occur.

SECTION 11: TOXICOLOGICAL INFORMATION

Acute Oral LD_{50} (rat): 55.3 – 264 mg/kg
Acute Dermal LD_{50} (rabbit): >2020 mg/kg
Inhalation LC_{50} (rat): 0.048 mg/L (4 HR)
Eye Irritation (rabbit): Moderately irritating
Skin Irritation (rabbit): Moderately irritating
Skin Sensitization (guinea pig): Not a sensitizer
Carcinogenic Potential: Not listed by IARC, NTP, or OSHA. ACGIH lists Rotenone as TLV A4: Not classifiable as to human carcinogenicity.

SECTION 12: ECOLOGICAL INFORMATION

This product is extremely toxic to fish. Fish kills are expected at recommended usage rates. Consult local Fish and Game agencies before applying this product to public waters to determine if a permit is needed for such an application.

SECTION 13: DISPOSAL CONSIDERATIONS

Do not reuse empty containers. **Plastic:** Triple rinse (or equivalent), then offer for recycling, or puncture and dispose of in a sanitary landfill, or incineration, or, if allowed by state and local authorities, by burning. If burned, stay out of smoke. **Metal:** Triple rinse (or equivalent), then offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill or by other procedures approved by state and local authorities. Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture or rinsate is a violation of Federal law and may contaminate groundwater. Do not contaminate water, food or feed by storage or disposal.

SECTION 14: TRANSPORT INFORMATION

U.S DOT Shipping Description: Pesticide, Liquid, Toxic, N.O.S. (Rotenone), 6.1, UN2902, III, Marine Pollutant, ERG Guide 151Emergency Telephone Number: 1-800-858-7378

SECTION 15: REGULATORY INFORMATION

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) HAZARD RATINGS:

Category	Rating	0: Least
Health	4	1: Slight
Flammability	2	2: Moderate
Instability	0	3: High
		4: Severe

SARA Hazard Notification/Reporting:

SARA Title III Hazard Category:
Immediate: Yes – Fire: No – Delayed: No – Reactive: No
Reportable Quantity (RQ) U.S. CERCLA: Not listed
SARA Title III, Section 313: N-methylpyrrolidone (CAS: 872-50-4) 10.0%
RCRA Waste Code: Not listed
California Proposition 65: WARNING: This product contains chemicals known to the State of California to cause cancer or birth defects or other reproductive harm.

SECTION 16: OTHER INFORMATION

Prepared by: ERR
Issue Date: July 12, 2007
Revision Notes: July 12, 2007
NOTE: *CFT Legumine is a Restricted Use Pesticide due to Aquatic Toxicity*

NOTICE: The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, expressed or implied, is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state, and local laws and regulations.

Appendix 4. Prentox® Prenfish™ Fish Toxicant Powder product label.

RESTRICTED USE PESTICIDE
DUE TO AQUATIC, ACUTE ORAL AND INHALATION TOXICITY
For retail sale to, and use by, Certified Applicators or persons under their direct supervision and only for those uses covered by the Certified Applicator's certification.

ROTENONE FISH TOXICANT POWDER

ACTIVE INGREDIENTS:

Rotenone- Minimum Guaranteed	7.4% w/w
Other Associated Resins	11.1%
OTHER INGREDIENTS:	81.5%
TOTAL:	100.0% w/w

ROTENONE ASSAY _____% ROTENONE

PRENTOX® - Registered Trademark of Prentiss Incorporated

KEEP OUT OF REACH OF CHILDREN

DANGER
POISON

FIRST AID
Have the product container or label with you when calling a poison control center or physician, or going for treatment.

If swallowed	• Call a Poison Control Center, physician, or the National Pesticide Information Center at 1-800-858-7378 immediately for treatment advice. • Have person sip a glass of water if able to swallow. • Do not induce vomiting unless told to do so by the Poison Control Center or physician. • Do not give anything by mouth to an unconscious or convulsing person.
If on skin or clothing	• Take off contaminated clothing. • Rinse skin immediately with plenty of water for 15-20 minutes. • Call a Poison Control Center, physician, or the National Pesticide Information Center at 1-800-858-7378 for treatment advice.
If in eyes	• Hold eye open and rinse slowly and gently with water for 15-20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a Poison Control Center, physician, or the National Pesticide Information Center at 1-800-858-7378 for treatment advice.
If inhaled	• Move person to fresh air. • If person is not breathing, call 911 or an ambulance, then give artificial respiration, preferably mouth-to-mouth, if possible. • Call a Poison Control Center, physician, or the National Pesticide Information Center at 1-800-858-7378 for treatment advice.

For information on this pesticide product (including health concerns, medical emergencies, or pesticide incidents), call the National Pesticide Information Center at 1-800-858-7378.

SEE INSIDE LEAFLET FOR ADDITIONAL PRECAUTIONARY STATEMENTS AND DIRECTIONS FOR USE

Manufactured by: 5/02 **E.P.A. REG. NO. 655-691**
E.P.A. EST. NO. 655-GA-1

PRENTISS INCORPORATED
Plant: Kaolin Road, Sandersville, GA 31082
Office: C.B. 2000, Floral Park, NY 11002-2000

PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS
DANGER

Fatal if inhaled or swallowed. Harmful if absorbed through the skin. Causes moderate eye irritation. Prolonged or frequently repeated skin contact may cause allergic reactions in some individuals. Do not breathe dust. Use a dust/mist filtering respirator (MSHA/NIOSH approval number prefix TC-21C), or a NIOSH approved respirator with any N, R, P or HE filter. Avoid contact with skin, eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco. Remove contaminated clothing and wash clothing before reuse.

ENVIRONMENTAL HAZARDS

This pesticide is extremely toxic to fish. Fish kills are expected at recommended rates. Consult your State Fish and Game Agency before applying this product to public waters to determine if a permit is needed for such an application. Do not contaminate untreated water when disposing of equipment washwaters.

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STORAGE AND DISPOSAL

Do not contaminate water, food or feed by storage or disposal.
STORAGE: Store only in original container, in a dry place inaccessible to children and pets. If spilled, sweep up and dispose of as below.
PESTICIDE DISPOSAL: Wastes resulting from the use of this product may be disposed of on site or at an approved waste disposal facility.
CONTAINER DISPOSAL: Completely empty bag into application equipment. Then dispose of bag in a sanitary landfill or by incineration, or if allowed by State and local authorities by burning. If burned, stay out of smoke.

DIRECTIONS FOR USE
It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

USE RESTRICTIONS:
Use against fish in lakes, ponds, and streams (immediately above lakes and ponds).

Since such factors as pH, temperature, depth, and turbidity will change effectiveness, use this product only at locations, rates, and times authorized and approved by appropriate state and Federal fish and wildlife agencies. Rates must be within the range specified in the labeling.

Properly dispose of dead fish and unused product. Do not use dead fish as food or feed.

Do not use water treated with rotenone to irrigate crops or release within ½mile upstream of a potable water or irrigation water intake in a standing body of water such as a lake, pond or reservoir.

Note to User: Adjust pounds of Rotenone according to the actual Rotenone Assay as noted under the Ingredient Statement on this label. For example, if the required amount of 5% rotenone is 21 pounds, and the Rotenone Assay is 7%, use $^{5}/_{7}$ of 21 pounds or 15 pounds of this product to yield the proper amount of active rotenone.

APPLICATION DIRECTIONS:

Treatment of Lakes and Ponds

1. **Application Rates and Concentrations of Rotenone**
The actual application rates and concentrations of rotenone needed to control fish will vary widely, depending on the type of use (e.g. selective treatment, normal pond treatment, etc.) and the factors listed above. The table below is a general guide for the proper rates and concentrations.

2. **Total Amount of Product Needed for Treatment**
To determine the total number of pounds needed for treatment, divide the number of acre-feet covered by one pound for a specific type of use (e.g., selective treatment, etc.), as indicated in the table below, into the number of acre-feet in the body of water.

General Guide to the Application Rates and Concentrations of Rotenone Needed to Control Fish in Lakes and Ponds[1]

Type of Use	No. of Acre-Feet Covered by One Pound	Parts Per Million	
		Active Rotenone	5% Product
Selective Treatment	3.7 to 2.8	0.005 - 0.007	0.10 - 1.3
Normal Pond Use	0.74 to 0.37	0.025 - 0.050	0.5 - 1.0
Remove Bullheads or Carp	0.37 to 0.185	0.050 - 0.100	1.02 - 2.0
Remove Bullheads or Carp in Rich Organic Ponds	0.185 to 0.093	0.100 - 0.200	2.0 - 4.0
Pre-impoundment Treatment above Dam	0.123 to 0.074	0.150 - 0.250	3.0 - 5.0

5. **Restocking**
Waters treated with this product detoxify within 2 to 4 weeks after treatment, depending on pH, temperature, water hardness, and depth. To determine if detoxification has occurred, place live boxes containing samples of fish to be stocked in treated waters. More rapid detoxification can be accomplished by adding Potassium Permanganate or chlorine at a 1:1 ratio with the concentration of rotenone applied, plus sufficient additional compound to satisfy the chemical oxidation demand caused by organic matter that may be present in the treated water.

Treatment of Streams Immediately Above Lakes and Ponds
The purpose of treating streams immediately above lakes and ponds is to improve the effectiveness of lake and pond treatments and not to control fish in streams per se. The term "immediately" means the first available site above the lake or pond where treatment is practical.

In order to treat a stream immediately above a lake or pond, you must select a concentration of active rotenone, compute the flow rate of a stream, calculate the application rate, select an exposure time, estimate the amount of product needed, and follow the method of application.

1. **Concentration of Active Rotenone**
Select the "Concentration of Active Rotenone" based on the type of use from those on the table. For example, if you select "Normal Pond Use" you could select a concentration of "0.025 Parts per Million".

2. **Computation of Flow Rate for Stream**
Select a cross section of the stream where the banks and bottom are relatively smooth and free of obstacles. Divide the surface width into 3 equal sections and determine the water depth and surface velocity at the center of each section. In slowly moving streams, determine the velocity by dropping a float attached to 5 feet of loose, monofilament fishing line. Measure the time required for the float to move 5 feet. For fast-moving streams, use a longer distance. Take at least three readings at each point. To calculate the flow rate from the information obtained above, use the following formula:

$$F = \frac{Ws \times D \times L \times C}{T}$$

where F = flow rate (cu. ft./sec.), Ws = surface width (ft.), D = mean depth (ft.), L = mean distance traveled by float (ft.), C = constant (0.8 for rough bottoms and 0.9 for smooth bottoms), and T = mean time for float (sec.).

For example, after using the above formula, you might have computed the stream's flow rate to be "10 cu. ft. per sec."

3. **Calculation of Application Rate**
In order to calculate the application rate (expressed as "pound per sec"), you convert the rate in the table (expressed as "pound per acre-feet"), to "pound per cu. feet" and multiply by the flow rate (expressed as "cu. ft. per sec."). Depending on the size of the stream and the type of equipment, the rate could be expressed in other units, such as "ounces per hr."

The application rate for the stream above is calculated as follows:

$$R_s = R_p \times C \times F$$

where R_s = Application Rate for Stream (lb/sec), R_p = Application Rate for Pond (lb/acre feet), C = 1 acre foot/43560 cu. ft., and F = Flow Rate (cu. ft/sec).

In the example, the Application Rate for Stream would be:
R_s = 1 lb/0.74 acre-foot x 1 acre-foot/43560 cu. ft. x 10 cu. ft./sec.
R_s = .00031 lb/sec or 17.9 oz./hr.

4. **Exposure Time**
The "Exposure Time" would be the period of time (expressed in hours or seconds) during which target fish should **not** enter the lake or pond under treatment. In the example, this period of time could be 4 hours.

5. **Amount of Product**
Calculate the "Amount of Product" for a stream by multiplying the "Application Rate for Stream" by the "Exposure Time". In the example, the "Amount of Product" would be 71.6 oz. (17.9 oz./hr. x 4 hr.) or 4.5 lb.

RE-ENTRY STATEMENT
Do not allow swimming in rotenone-treated water until the application has been completed and all pesticide has been thoroughly mixed into the water according to labeling instructions.

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[1]Adapted from Kinney, Edward, 1965 Rotenone in Fish Pond Management. USDI Washington, D.C. Leaflet FL-576.

Computation of acre-feet for lake or pond: An acre-foot is a unit of water volume having a surface area of one acre and a depth of one foot. Make a series of transects across the surface, taking depths with a measured pole or weighted line. Add the measurements and divide by the number made to determine the average depth. To compute **total acre-feet**, multiply this average depth by the number of surface acres, which can be determined from an aerial photograph or plat drawn to scale.

3. **Pre-Mixing Method of Application**

Pre-mix one pound of Rotenone with 3 to 10 gallons of water. Uniformly apply over water surface or bubble through underwater lines.

Alternately place undiluted powder in burlap sack and trail behind boat. When treating deep water (20 to 25 feet) weight bag and tow at desired depth.

4. **Removal of Taste and Odor**

Rotenone treated waters do not retain a detectable taste or odor for more than a few days to a maximum of one month. Taste and odor can be removed immediately by treatment with activated charcoal at a rate of 30 ppm. for each 1 ppm. Rotenone remaining (Note: As Rotenone detoxifies, less charcoal is required).

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Appendix 5. Prentox® Prenfish™ Fish Toxicant Powder material safety data sheet.

Product: 655-691 Prentox® Prenfish™ Fish Toxicant Powder

Material Safety Data Sheet
U.S. Department of Labor (OSHA 29 CFR 1910.1200)

Section 1: Product and Company Identification

Product: 655-691 Prentox® Prenfish™ Fish Toxicant Powder

Manufacturer's Name: **Prentiss Incorporated**
C. B. 2000
Floral Park, NY 11001
Telephone Number: **(516) 326-1919**

Section II: Composition/Information on Ingredients

Ingredient Name:	OSHA PEL	ACGIH TLV	%
Rotenone (CAS # 83-79-4)	(TWA) 5 mg/M³	(TWA) 5 mg/M³	7.4
Other Cube Resins	None	None	11.1
Other Ingredients	None	None	81.5

Section 3: Hazards Identification:

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Emergency Overview:

A tan powder with a wet chalk or dirt-like odor.

- Fatal if inhaled or swallowed
- Harmful if absorbed through skin
- Causes moderate eye irritation
- May cause allergic skin reactions in some individuals
- This pesticide is extremely toxic to fish

Potential Health Effects:

Primary Route(s) of Entry:
Ingestion, inhalation, and skin contact

Eyes:
Causes moderate eye irritation

Skin:
Harmful if absorbed through the skin. Prolonged or frequently repeated skin contact may cause allergic skin reactions in some individuals.

Ingestion:
Fatal if swallowed

Inhalation:
Fatal if inhaled

Signs and symptoms of acute overexposure:
May cause irritation of the eyes, nose and throat in addition to temporary numbness. Prolonged or repeated exposure can cause nausea, vomiting, abdominal cramps, muscle tremors, poor muscle coordination, seizures, shallow breathing, skin rashes and eye, nose and mouth lesions.

Section 4: First Aid Measures:

Eyes:
Flush eyes with plenty of water for 15 minutes. Get medical attention if irritation persists

Skin:
Wash with plenty of soap and water. Get medical attention if irritation persists

Ingestion:
Call a physician or Poison Control Center. Drink 1 or 2 glasses of water and induce vomiting by touching back of throat with finger. Do not induce vomiting or give anything by mouth to an unconscious person.

Inhalation:
Remove person to fresh air. If not breathing, give artificial respiration, preferably mouth to mouth. Get medical attention

Note to Physician:
If a small amount is ingested (or if treatment is delayed), oral administration of large amounts of activated charcoal and a cathartic is probably sufficient therapy.
Do not administer milk, cream or other substances containing vegetable or animal fats, which enhance the absorption of lipophilic substances.

Section 5: Fire Fighting Measures:

Extinguishing Media:
Carbon dioxide, dry chemical, foam or water

Fire Fighting Instructions:
As in any fire, wear self-contained breathing apparatus, pressure demand, MSHA/NIOSH approved (or equivalent), and full protective gear. Keep upwind. Isolate hazard area. Avoid inhalation of smoke and fumes. Use water or foam to reduce fumes. Do not touch spilled material. If possible, move containers from area. Extinguish only if flow can be stopped. Use flooding amounts of water as a fog. Cool containers with flooding amounts of water from as far a distance as possible. Avoid breathing vapors.

Flammability Classification/Rating:
NFPA/OSHA Class: IIIB
NFPA Rating (Fire): 1

Section 6: Accidental Release Measures:

General and Disposal: Use proper protective equipment to minimize personal exposure (see Section 8). Take all necessary action to prevent and to remedy the adverse effect of the spill. Ensure that the disposal is in compliance with all Federal, State/Provincial, and local regulations (see Section 13 for applicable RCRA number). Refer to Section 15 for applicable Reportable Quantity (RQ) and other regulatory requirements.

Land Spill: Sweep or shovel spilled material into a tightly sealed container. Dispose of with chemical waste.

Section 7: Handling and Storage:

Handling Precautions:
Do not breathe dust. Avoid contact with eyes, skin or clothing.

Storage Precautions:
Do not contaminate water, food or feed by storage. Store in a dry place, away from excessive temperature extremes.

Work/Hygienic Practices:
Wash thoroughly with soap and water after handling and before eating, drinking or using tobacco. Remove contaminated clothing and wash before reuse.

Section 8: Exposure Controls/Personal Protection:

Manufacturing, formulation and other Non-Agricultural uses.

Engineering controls:
Control airborne concentrations below the appropriate exposure guideline (see Section 2 for applicable OSHA/ACGIH Exposure Limits). Local exhaust ventilation may be necessary.

Eye/Face Protection:
Wear safety glasses, splash goggles or face shield.

Skin Protection:
Wear chemical resistant gloves (Neoprene, Nitrile rubber or PVC) and other protective clothing to avoid skin contact.

Respiratory Protection:
Ensure good ventilation. If not adequate, use a chemical cartridge type respirator approved by the National Institute of Occupational Health and Safety.

General Protection:
Eye wash facility and safety shower should be available. Wear a protective apron, long sleeves and pants to prevent skin contact.

Section 9: Physical and Chemical Properties:

Appearance:
Tan powder

Odor:
Wet chalk or dirt-like odor.

Basic Physical Properties:

Physical State: Solid

Solubility (H_2O): Insoluble

Bulk Density: Fluffed – 0.24 gm/cm^3 (14.7 lb./cu. Ft.). Packed – 0.45 gm/cm^3 (28.1 lb./cu. Ft.)

Section 10: Stability and Reactivity:

Stability: Stable.

Conditions to Avoid (Stability): High temperatures and constant exposure to sunlight

Incompatible Materials: Avoid strong oxidizers and reducing agents

Hazardous Polymerization: Will not occur

Section 11: Toxicological Information:

The following data were developed with rotenone dust containing 5% rotenone.

Eye Effects:

Irritation (Rabbit): Slightly irritating.

Skin Effects:

Irritation (Rabbit): Non-irritating.

Absorption (Rabbit): LD_{50} > 2,020 mg/kg (Slightly Toxic).

Sensitization (Guinea Pig): Sensitizing

Acute Oral Effects:

LD_{50} (Rat, male): 874 mg/kg (Slightly Toxic).

(Rat, female): 99.2 mg/kg (Moderately Toxic).

Acute Inhalation Effects:

4 hour LC_{50} (Rat, Male): 0.087 mg/L (Moderately Toxic).

4 hour LC_{50} (Rat, Female): 0.045 mg/L (Highly Toxic).

4 hour LC_{50} (Rat): 0.056 mg/L (Moderately Toxic).

Note: the severity classifications listed above are those of Prentiss Incorporated, and, particularly for eye irritation, may not always coincide with EPA-mandated Precautionary Statements.

The following data were developed with rotenone, the active ingredient in this product.

Chronic (Cancer) Information:

Rotenone was not carcinogenic when tested in rats and mice.

Carcinogenicity: **NTP:** No **IARC:** No **OSHA:** No

Teratogenicity (Birth Defects):

Rotenone was not teratogenic or fetotoxic when tested in rats and mice.

Reproductive Effects:

Rotenone had no adverse effects on reproduction when tested over two successive generations in rats.

Mutagenicity (Genetic Effects):

Rotenone was not mutagenic nor clastogenic when tested in the Ames test, Yeast test, Mouse Lymphoma test, Mouse Micronucleus test, Chromosome Aberration test and the Mitotic Recombination test in Yeast.

Section 12: Ecological Information:

Other Environmental Information:

This pesticide is extremely toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters, unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA

Section 13: Disposal Considerations:

Do not contaminate water, food or feed by disposal.

Pesticide Disposal:

Pesticide wastes are acutely hazardous. Improper disposal of excess pesticide, spray mixture, or rinsate is a violation of Federal law. If these wastes cannot be disposed of by use according to label instructions, contact your State Pesticide or Environmental Control Agency or the Hazardous Waste Representative at the nearest EPA Regional Office for guidance.

Container Disposal:

Completely empty liner by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into application equipment. Then dispose of liner in a sanitary landfill or by incineration if allowed by State and local authorities. If drum is contaminated and cannot be reused, dispose of in the same manner.

RCRA Information:

RCRA Hazardous Waste Ingredients: None.

Section 14: Transport Information:

Proper Shipping Name: Pesticide, Solid, Toxic, n.o.s. (Rotenone)
Hazard Class: 6.1, PG I
DOT Identification Number: UN2588
DOT Shipping Label: POISON

Additional Shipping Paper Description: Marine Pollutant

Note: For transport purposes (49 CFR Part 173.132), the calculated 1 hour LC_{50} (Rat) is: 0.224 mg/L (dust)

Section 15: Regulatory Information:

U.S. Federal Regulatory Information:

EPA Reg. No.: 655-691
TSCA Inventory: Registered pesticide, exempt from TSCA.
SARA Title III Notification and Information:

Section 302 (EHS) ingredients: None.
Section 304 (CERCLA & EHS) ingredients (RQ): None.
Section 313 ingredients: None.

SARA Title III Notifications and Information:

SARA Title III Hazard Classes:

Acute Health Hazard: Yes
Chronic Health Hazard: No
Fire Hazard: No
Sudden Release of Pressure Hazard: No
Reactivity Hazard: No

Regulated Ingredients:
Ingredient: Rotenone
CAS Number: 83-79-4
Percent by Weight: 7.4
Regulations:
Illinois Toxic Substance
Massachusetts Hazardous Substance
New Jersey Special Health Hazardous Substance
New Jersey Workplace Hazardous Substance
Pennsylvania Workplace Hazardous Substance

U.S. State Regulatory Information:
California (Proposition 65): This product does not contain any chemical which is known to the State of California to cause cancer or birth defects, or other reproductive harm.

Canadian Regulatory Information:
CPC Number: None
WHMIS Classification for Control Product Regulations (CPR): Registered pesticide under US FIFRA regulations; exempt from CPR classification.
The MSDS contains all CPR required hazard-related information.
WHMIS Hazard Rating: See HMIS rating (Section 16).

Section 16: Other Information:

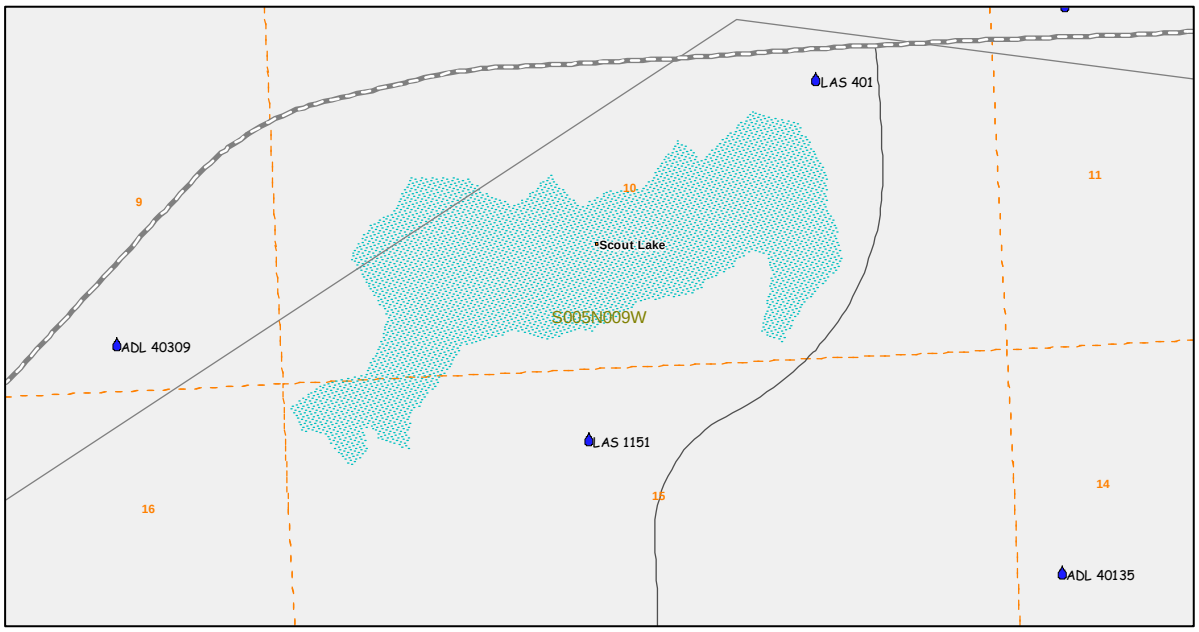
NFPA Hazard Rating:
Health: 2 – Moderate
Fire: 1 – Slight
Reactivity: 0 – Negligible
Special:

HMIS Hazard Rating:
Health: 2 – Moderate
Fire: 1 – Slight
Reactivity: 0 – Negligible
Protection: J

Date Prepared: August 14, 2000
Supersedes: November 3, 1997
Reason: Revision of sections 3, 5, 6, 7, 8, 9, 11, 13, 14, 15

The information and recommendations contained herein are based upon data believed to be correct. However, no guarantee or warranty of any kind, expressed or implied, is made with respect to the information contained herein.

Appendix 6. ADNR map depicting locations (blue teardrop symbol) of subsurface water rights nearest Scout Lake.



Appendix 7. Spill Contingency Plan

Any accidental spill of a rotenone product will be immediately reported to the ADEC hazardous spill number (1-907-269-3063) and the local ADEC Office (1-907-262-5210), in the event of a significant spill (>20 gallons of product) or one that could enter surface waters outside the treatment area, it will immediately be reported to Kenai Peninsula Borough Emergency Services (1-907-262-4792) and the Kenai Borough Emergency Management Office (1-907-262-4910).

To reduce the possibility of an accidental spill during transport, all product containers will be tethered securely into the transporting vehicle. To move the rotenone product containers to and from vehicles or boats, loading ramps will be used to roll the containers so manual lifting can be avoided. If a spill occurs, a spill response kit will be available at the treatment site; this kit will also accompany the transport of any rotenone product. The spill response kit will contain shovels to remove contaminated soil, a large plastic container to hold contaminated material/soil (50 gallon volume), absorbent pads, activated charcoal (minimum of 5 gallons), dry sand (10 gallons), plastic garbage bags, and personnel protective equipment.

Any contaminated soil will be treated as if it were the pure rotenone pesticide, and all required pesticide application safety gear will be worn. If there is a spill outside of the treatment area and there is a chance it could enter surface waters out of the project area, then the disposal of the contaminated soil to an approved landfill may be required. For any spillage onto soil surrounding Scout Lake, the contaminated soil will be removed and treated as if it were the pure pesticide and applied to Scout Lake. Activated charcoal will be mixed into the soil of the spill area to deactivate any remaining rotenone at a rate of 100 to 1 (charcoal to active ingredient) as suggested online at www.buyactivatedcharcoal.com. Washing of equipment contaminated from a spill or equipment leaks can be accomplished by washing with a solution of bleach (1:10 ratio bleach to water) followed by washing with a strong soap and water solution as suggested by the Material Safety Data Sheets for CFT Legumine™ and Prentox® Prenfish™ Fish Toxicant Powder.

Appendix 8. Copy of the ADEC Pesticide Use Permit for the Scout Lake Restoration Project.

STATE OF ALASKA

SEAN PARNELL, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL HEALTH
PESTICIDES PROGRAM

555 Cordova Street
Anchorage, Alaska 99501
PHONE: (907) 269-7690
FAX: (907) 269-7600
http://www.dec.state.ak.us/

Certified Mail # 7007 2560 0001 6559 4591
Return Receipt Requested

August 3, 2009

Robert Massengill
Alaska Department of Fish and Game
43961 Kalifornsky Beach Road, Suite B
Soldotna, Alaska 99669

Subject: Permit to Apply Pesticides, **# 09-AQU-01**

Dear Mr. Massengill:

The Department of Environmental Conservation (DEC) has completed its evaluation of your request for a permit for the application of the pesticide **CFT Legumine Fish Toxicant**, EPA Registration Number **75338-2** and **Prentox Rotenone Fish Toxicant Powder**, EPA Registration Number **655-691** to waters of the state to eradicate invasive Northern Pike in Scout Lake, 5½ miles east of Soldotna, Alaska. DEC is issuing the enclosed permit in accordance with Alaska Statute 46.03.330 and Title 18, Chapter 90.525 of the Alaska Administrative Code (18 AAC 90.525) for a period not to exceed two years.

Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 - 18 AAC 15.340, or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director, Alaska Department of Environmental Conservation, 555 Cordova Street, Anchorage, AK 99501 within 15 days of the permit decision. Adjudicatory hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation, 410 Willoughby Avenue, Suite 303, Juneau, Alaska 99801, within 30 days of the permit decision. In addition, please send a copy of the request to ADEC Pesticide Program, 1700 E. Bogard Road, Building B Suite 103, Wasilla, AK 99654. If a hearing is not requested within 30 days, the right to appeal is waived.

Sincerely,

Robert J. Blankenburg, P.E.
Solid Waste & Pesticides Program Manager

Enclosure

STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
555 CORDOVA STREET
ANCHORAGE, ALASKA 99501

PERMIT TO APPLY PESTICIDES

Permit No.: 09-AQU-01
Date Issued: August 3, 2009
Date Effective: September 12, 2009
Date Expires: December 31, 2010

The Alaska Department of Environmental Conservation (ADEC), under authority of Alaska Statute 46.03.330 and Title 18, Chapter 90.525 of the Alaska Administrative Code (18 AAC 90.525), hereby grants a Permit to Apply Pesticides to:

Robert Massengill
Alaska Department of Fish and Game
43961 Kalifornsky Beach Road, Suite B
Soldotna, Alaska 99669

for the purpose of applying the pesticide **CFT Legumine Fish Toxicant**, EPA Registration Number **75338-2** and **Prentox Rotenone Fish Toxicant Powder**, EPA Registration Number **655-691** to waters of the state to eradicate invasive Northern Pike in Scout Lake, 5½ miles east of Soldotna, Alaska.

The permit holder shall manage and apply the pesticide in accordance with 18 AAC 90 and the permit application materials submitted June 8, 2009. In addition, the following permit conditions and stipulations are required:

1. Apply pesticides prior to freeze up or ice formation on the lake.

2. Use pesticides only in the manner specified by the label instructions. Adhere to all the requirements specified by the pesticide product label.

3. Ensure that pesticides are applied only by a person properly certified by DEC to apply such pesticides, or a person under the direct supervision of a person so certified.

4. Apply pesticides using properly calibrated equipment, and in strict compliance with safety precautions.

5. Public notification signs must be posted prior to pesticide application at each point of access to the lake, as specified in 18 AAC 90.630(a). Signs shall remain posted at the treatment site until application is complete.

6. Notify the DEC Pesticide Program immediately if rotenone-treated water is discharged from the lake.

7. Maintain the following records for each pesticide used. Records must be available to DEC upon request:
   - Product name
   - EPA registration number
   - Target pest
   - Date and time of application
   - Method of application
   - Weather conditions during application
   - Amount of pesticide used
   - Location and size of treatment area
   - Names of applicators
   - Purchase, storage, and disposal information

8. Dispose of empty pesticide containers in accordance with label directions and 18 AAC 90.615(a). Any burning of pesticide containers must be done in compliance with 18 AAC 50.

9. Immediately report any spill or accident, alleged accident, or complaint to the DEC Pesticide Program at 1-800-478-2577.

10. Ensure that decontamination, safety, and spill clean up supplies are available at the treatment site at all times during application.

11. Store all pesticide containers securely, as required by 18 AAC 90.615(d). Post a warning notice on the outside of each storage area in compliance with 18 AAC 90.615(e)-(h).

12. No later than **March 31, 2011**, submit a written Summary of Treatment Results in accordance with 18 AAC 90.535. This summary must include the following information for **each** pesticide used:
   - Product name
   - EPA registration number
   - Target pest
   - Dates and times of application
   - Method of application
   - Weather conditions during applications
   - Total amount of pesticide used
   - Location and size of treatment area
   - Names of applicators
   - Purchase, storage, and disposal information
   - Assessment of success or failure of the treatments
   - Any observed effect on human health, safety or welfare, animals, or the environment

In addition to the above stipulations, the ADEC Pesticide Program may monitor treatments to ensure compliance with 18 AAC 90 and the Permit Conditions and Stipulations.

This permit expires on **December 31, 2010**, or upon completion of the above described project, whichever comes first, and may be revoked in accordance with 18 AAC 90.540.

Robert J. Blankenburg, P.E.
Solid Waste & Pesticides Program Manager

Appendix 9. Copy of the letter of consent to treat Scout Lake with rotenone provided by the ADF&G Board of Fisheries.[a]

STATE OF ALASKA

SEAN PARNELL, GOVERNOR

DEPARTMENT OF FISH AND GAME
BOARD OF FISHERIES

ADF&G
P.O. BOX 115526
JUNEAU, AK 998011-5526
PHONE: (907) 465-4110
FAX: (907) 465-6094

Charles O. Swanton
Division Director
ADF&G, Sport Fish
PO Box 115526
Juneau, AK 99811-5526

August 18, 2009

Dear Charles,

The Board of Fisheries received your August 11, 2009 letter asking for consent to use Rotenone to eradicate a non-indigenous Northern Pike population from Sand Lake in Anchorage and Scout Lake near Sterling as per Alaska Statute 16.35.200. The Board of Fisheries supports its use in this project. The board members were polled and there was no opposition.

Please contact Jim Marcotte, the board's Executive Director (465-6095) if you have any questions on this.

Regards,

John E. Jensen

John Jensen
Chairman, Alaska Board of Fisheries

cc: Board of Fisheries members
Kristine Dunker, ADF&G
Rob Massengill, ADF&G
James Hasbrouck, ADF&G
Rob Bentz, ADF&G

a) On 8/12/09, Charlie Swanton (ADF&G Director of Sport Fish Division) gave his approval via an email for the Scout Lake restoration project after receiving this approval from the Alaska Board of Fisheries.

Appendix 10. Copy of the ADEC determination that a Project Coastal Management Program Review is not required for the Scout lake Restoration Project.

STATE OF ALASKA / SARAH PALIN, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION
DIVISION OF ENVIRONMENTAL HEALTH
PESTICIDES PROGRAM

1700 E. Bogard Rd. Bldg B. Ste 103
Wasilla, Alaska 99654
PHONE: (907) 376-1856
FAX: (907) 376-2382
http://www.dec.state.ak.us/

July 10, 2009

Robert Massengill
Fisheries Biologist
Alaska Department of Fish and Game
43961 Kalifornsky Beach Road, Suite B
Soldotna, Alaska 99669

Subject: Scout Lake Pesticide Permit Application

Dear Mr. Massengill:

The Department of Environmental Conservation (DEC) has determined that an Alaska Coastal Management Program (ACMP) consistency review of your project is not required. This determination is based on the Kenai Peninsula Borough coastal district's response that this project does not include activities that are subject to a district enforceable policy.

DEC will continue processing your application under DEC authorities and procedures. The affected coastal districts will have an opportunity to provide comments as part of the permitting process.

If you have any questions, please contact me at (907) 376-1856 or e-mail Karin.Hendrickson@alaska.gov.

Sincerely,

Karin Hendrickson
Environmental Program Specialist
Pesticides Permitting

cc: Gary Williams, KPB Coastal District Coordinator
Randy Bates, DNR, DCOM
Dan Easton, DEC, Deputy Commissioner

Appendix 11. ADF&G public announcement printed in the Peninsula Clarion notifying public of commenting periods for the Scout Lake ADEC Pesticide Use Application.

NOTICE OF APPLICATION FOR PERMIT

TO APPLY PESTICIDES

The Alaska Department of Fish and Game (ADFG) has applied to the Alaska Department of Environmental Conservation (ADEC) for a permit to apply pesticide during October of 2009 to the waters of Scout Lake located approximately five and a half miles east of the Soldotna city limits and just south of the Sterling Highway.

The following project is proposed and is being reviewed by the appropriate regulatory agencies. ADEC requests comments from the public regarding the permit application. To be considered, written comments must be submitted to ADEC at the following address:

Kim Jordan, Administrative Assistant ADEC – Pesticide Program

555 Cordova Street

Anchorage, Alaska 99501

Phone: (907) 269-7581

Fax (907) 269-7600

Email: kim.jordan@alasks.gov

Written comments must be received on or before **July 30, 2009 (5:00pm).**

PROJECT NAME: Scout Lake Restoration Project.

PROJECT SUMMARY AND LOCATION: ADF&G proposes to apply a pesticide to the waters of Scout Lake during fall 2009 to eradicate an illegally introduced northern pike (*Esox lucius*) population. Northern pike are an invasive species in southcentral Alaska and the population in Scout Lake eliminated the stocked rainbow trout and coho salmon fisheries there. Scout Lake covers approximately eighty-five surface acres, contains approximately 835 acre-feet of water, and has no surface water inlets or outlets.

The pesticide products selected to treat Scout Lake are called CFT Legumine™ (EPA Registration No. 75338-2) and Prentox® Prenfish™ Fish Toxicant Powder (EPA Registration No. 655-691), both of which contain a naturally occurring plant derivative called rotenone that is toxic to fish. Rotenone has been used extensively across the country for fisheries work and naturally degrades with sunlight and warm temperatures. Pending bioassay results, it is

anticipated the treatment concentration in the lake would be 1 to 1.3 parts per million of combined pesticide products. Application of the pesticide during late fall just prior to freeze-up would be expected to prolong the active life of the pesticide and increase the likelihood of successfully eradicating northern pike while limiting impacts to many other organisms. There is no known human health risks from waters treated with rotenone at the recommended treatment concentrations. Environmental impacts from this treatment are expected to be minimal.

PROJECT NEED: The presence of invasive northern pike in Scout Lake has eliminated a stocked lake fishing opportunity and provides a source of northern pike for illegal transplants elsewhere. Restoring Scout Lake by eradicating its northern pike population using a pesticide provides an opportunity for ADF&G to develop technical treatment knowledge useful for planning future restoration efforts of larger and more complex waterbodies with similar invasive northern pike populations.

PERMIT APPLICANT: Alaska Department of Fish and Game

APPLICANT ADDRESS: 43961 Kalifornsky Beach Road, Suite B, Soldotna, AK 99669

A copy of the application is available upon request. ADEC will hold a public hearing on the application if 50 or more residents in an affected area, or the governing body of an affected municipality, make a request within 30 days after first publication of this notice (June 29, 2009) to the ADEC office noted below.

Individuals with disabilities who may need auxiliary aids, services, or special modifications to participate in this review may contact the number above.

FOR SPECIFIC INFORMATION REGARDING THE APPLICATION CONTACT:

Department of Environmental Conservation
Pesticide Program,
1700 E. Bogard Rd. Suite 103B
Wasilla, AK 99654

Contact: Karin Hendrickson
Phone: (907) 376-1856
Fax: (907) 376-2383
Email: Karin.Hendrickson@alaska.gov

Appendix 12. ADF&G news release issued on June 30, 2009 announcing the Scout Lake and Sand Lake (Anchorage) public commenting periods will be open for the ADEC Pesticide Use Applications and Environmental Assessments.

Region 2-Southcentral News Release

(Released: **June 30, 2009**)

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Back to Previous Page

NEWS RELEASE

ALASKA DEPARTMENT OF FISH AND GAME
Denby S. Lloyd, Commissioner

DIVISION OF SPORT FISH
Charles O. Swanton, Director

Contact:
Dan Bosch
Area Management Biologist
Phone: (907) 267-2153

June 30, 2009

PUBLIC INPUT SOUGHT FOR PLAN TO USE ROTENONE TO REMOVE INVASIVE NORTHERN PIKE

The Alaska Department of Fish and Game plans to use a naturally occurring pesticide to eradicate northern pike in two Southcentral lakes and is seeking public comment. ADF&G has prepared environmental assessment documents and applied for pesticide application permits for both lakes through the Alaska Department of Environmental Conservation. The public participation processes are now beginning for these projects. The environmental assessments can be viewed online at:

http://www.sf.adfg.state.ak.us/Static/invasive_species/PDFs/SandLakeEA.pdf
http://www.sf.adfg.state.ak.us/Static/invasive_species/PDFs/ScoutLakeEA.pdf

Written public comments on these projects will be accepted through July 30, 2009.

Northern pike are native to most of Alaska, but were illegally introduced to waters in Southcentral, south of the Alaska Range. Where northern pike are native, they are valuable sport and subsistence fish. Outside their native range, northern pike can cause tremendous ecological and economic damage. Pike deplete populations of salmon and trout in shallow, vegetated water bodies, and have severely affected local fisheries.

Sand Lake in Anchorage and Scout Lake near Sterling both contain populations of illegally-introduced northern pike. The pike are damaging fisheries in both lakes and have the potential to spread to other local waters where they could threaten other wild and stocked fisheries. ADF&G is currently proposing to treat Sand and Scout lakes with rotenone to remove pike from those lakes.

In recent years, ADF&G has addressed the pike issue in Southcentral Alaska by liberalizing bag limits and methods for harvesting pike, and in some instances, setting gill nets to reduce pike populations. These efforts will not permanently removed significant numbers of pike. In 2008, rotenone was used to eradicate illegally-introduced populations of invasive northern pike in Cheney Lake in Anchorage and Arc Lake in Soldotna. Both treatments were successful.

Rotenone is a naturally-occurring substance derived from the roots of tropical plants. Historically, it has been used by indigenous peoples in the tropics to catch fish for food and by
fisheries managers in the United States to remove unwanted or invasive fish. Rotenone interrupts a biochemical process that allows fish to use oxygen in their blood, resulting in fish mortality. In the concentrations necessary to kill fish, rotenone is not dangerous for birds or mammals. No public health effects from the use of rotenone in fish management have been reported, although consuming fish following treatment is not recommended.

The rotenone treatments are being planned for the fall of 2009. If the lakes are treated according to these plans, their waters will be monitored throughout winter and spring to assure that pike have been eradicated. Once all pike have been removed and the rotenone is gone from the lake, rainbow trout, Arctic char, and/or landlocked coho salmon can be re-stocked.

For more information on these projects, please contact ADF&G biologists Dan Bosch (Anchorage) at 267-2153, or Robert Begich (Soldotna) at 262-9368 or see http://www.sf.adfg.state.ak.us/Statewide/InvasiveSpecies/index.cfm/FA/rotenone.about

- END -

State of Alaska | ADF&G | Sport Fish | Wildlife | Commercial Fish | Habitat | Subsistence | Boards | Admin
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Appendix 13. Synopsis of Scout Lake project proposal.

Scout Lake Restoration Project Synopsis

Alaska Department of Fish and Game

Sport Fish Division

Soldotna, Alaska

Contact: Robert Begich– Area Management Biologist (Sport Fish)

Ph (907) 262-9368

Northern pike *Esox lucius* do not naturally occur in Southcentral Alaska. Populations of invasive northern pike on the Kenai Peninsula resulted from illegal introductions that were first confirmed in the Soldotna Creek drainage during the 1970's, and they have since spread to other Kenai Peninsula waters. Although native to much of Alaska, northern pike can severely alter aquatic ecosystems and fish assemblages that evolved in their absence. Invasive northern pike have been shown to severely impact native fish populations in southcentral Alaska and there is much to lose if pike become established elsewhere on the Kenai Peninsula. Currently, sixteen Kenai Peninsula lakes have been confirmed with northern pike and three of those lakes were formerly stocked by the Alaska Department of Fish and Game (ADF&G).

Typically, invasive northern pike in Southcentral Alaska dominate the fish community within a lake and reduce or eliminate the native fish species, particularly in shallow lakes where prey have difficulty avoiding predation. Of particular local concern are the vulnerable salmon and trout-rich Kenai and Swanson River drainages. Northern pike could pioneer or be illegally introduced to new areas and damage valuable fisheries beyond that already sustained in the Soldotna Creek drainage, Stormy Lake and some local stocked lakes.

Education, netting, barriers and liberalized fishing regulations have all been used by ADF&G to help control northern pike populations on the Kenai Peninsula but these tools will not eliminate their threat. A promising option is to treat an invaded waterbody with a pisicide (rotenone), a naturally occurring plant derivative of the bean family that prevents a fish from using the oxygen absorbed in their blood, hence killing them. Rotenone targets gill-breathing organisms and naturally degrades with sunlight and warm temperatures. Rotenone does not travel through groundwater more than a few inches. No public health effects from rotenone being used as a piscicide have been reported. In 2008, Arc Lake near Soldotna was treated with rotenone to remove an invasive pike population and initial findings suggest the treatment was successful.

Scout Lake is located five and a half miles east of the Soldotna city limits and just south of the Sterling Highway and was a popular stocked-lake fishery for many years. Northern pike were discovered in Scout Lake in 2004 by ADF&G and all stocking was discontinued. Scout Lake covers 95 acres and the surrounding lands are a mix of public (Alaska State Parks and Kenai Peninsula Borough) and private lots. A successful restoration effort at Scout Lake will serve as a positive transition to the long-term goal of

eradicating northern pike and restoring other Kenai Peninsula waters. Removing invasive pike from Scout Lake would restore a popular stocked fishery and lessen the possibility that the pike population expands through illegal introduction elsewhere like the nearby Moose River. Interestingly, Scout Lake was treated with rotenone twice before and was initiated by a once common fishery management practice of reducing stickleback abundance prior to stocking with trout and salmon; those treatments occurred in 1968 and 1975.

ADF&G will be submitting an Environmental Assessment for the Scout Lake restoration plan to the U.S. Fish and Wildlife Service and applying for a Pesticide Use Permit from the Alaska Department of Environmental Conservation to use a liquid rotenone product (CFT Legumine®) and a powdered rotenone product (Prentox® Prenfish™ Fish Toxicant Powder) to treat Scout Lake. Expect this summer to be able to view and comment on the Environmental Assessment at: www.sf.adfg.state.ak.us/region2/pike/ and to view details for the ADEC Pesticide Use Permit at: http://www.dec.state.ak.us/eh/pest/publicnotice.htm. The rotenone treatment is planned for fall 2009. If treated, Scout Lake will be monitored afterwards to determine if the effort was successful and to verify water quality parameters. Scout Lake could be re-stocked with salmon or rainbow trout in 2010 or 2011.

Appendix 14. Comments received during the Scout Lake Restoration Project Environmental Assessment public commenting period.

There were no formal comments submitted for the Scout Lake Restoration Project Environmental Assessment during the 30-day public commenting period. Some informal discussion about possible consequences to the Scout Lake threespine stickleback population from the proposed rotenone treatment is summarized below:

During the public commenting period, ADF&G partook in an email discussion amongst several university professors who share research and conservation interests in threespine sticklebacks in Southcentral Alaska. The discussion led to a consensus amongst the researches that the proposed Scout Lake Restoration Project was worthy, but that the native population of threespine sticklebacks might be eradicated along with the northern pike population. In the event that the stickleback population is eradicated, an agreement was reached amongst the researchers that introducing anadromous threespine stickleback from Rabbit Creek Slough (Anchorage) would be the preferred restorative action (in addition to the planned stocking of hatchery-raised coho salmon and rainbow trout). A similar introduction of anadromous sticklebacks was conducted in 2008 in Cheney Lake (Anchorage) after a rotenone treatment eradicated the land-locked stickleback population. The researchers felt there would be value in studying the evolutionary changes of anadromous sticklebacks introduced into another land-locked lake such as Scout Lake. ADF&G agreed that reintroducing sticklebacks was a feasible idea and could help facilitate the required permitting if necessary.

Appendix 15. "Finding of No Significant Impact" from the U.S. Fish and Wildlife Service.

U.S. Department of the Interior
Fish and Wildlife Service
Region 7, Alaska

FINDING OF NO SIGNIFICANT IMPACT

Proposed Removal of Invasive Northern Pike *Esox lucius* from Scout Lake
Scout Lake, near Soldotna, Alaska

The Alaska Department of Fish and Game (ADF&G), Sport Fish Division, proposes the removal of an illegally introduced northern pike population using the piscicide rotenone in Scout Lake, five and a half miles east of the Soldotna, Alaska city limits. Planned activities include the complete eradication of northern pike from the lake and subsequent restocking with hatchery produced coho salmon and/or rainbow trout. It is anticipated the removal of northern pike from Scout Lake will lessen the risk that the population will expand through illegal introduction into nearby critically important systems like the Kenai River. The proposed actions will also restore a quality angling opportunity for the public in the area. The proposed project will be funded through the U.S. Fish and Wildlife Service under the Aquatic Nuisance Species Program, Wildlife and Sportfish Restoration Program and ADF&G. The Alaska Board of Fisheries supports the use of rotenone to eradicate non-indigenous northern pike in Scout Lake.

Alternatives Considered

Three alternatives were evaluated, including the use of gill nets and/or trap nets to selectively remove northern pike. However, the mechanical removal alternative was dismissed from further consideration as Scout Lake exceeds the surface area criteria necessary for success and due to the potential for exposing bald eagles, migratory birds, and aquatic mammals to the risk of net entanglement in the water. The "no action" alternative was also rejected since there would be continued risk that northern pike could be transported from Scout Lake to nearby wild fisheries.

Public Review

Three local ADF&G advisory committees on the Kenai Peninsula and other known stakeholders were notified in the winter of 2009. A public meeting, targeting property owners near Scout Lake, was held on April 30, 2009 in Sterling, Alaska, to share the Scout Lake restoration proposal. In addition, on June 30, 2009, ADF&G issued a press release announcing 30-day public comment periods for 1) the Environmental Assessment (EA) prepared by ADF&G, and 2) a proposed Alaska Department of Environmental Conservation (ADEC) Pesticide Use Permit for this project.

Public notices for the Scout Lake pesticide use permit application were printed in the Peninsula Clarion newspaper on two consecutive dates in June 2009, as part of the ADEC permitting process. A synopsis of the proposed project was also distributed to all landowners having

property adjacent to Scout Lake during May, 2009. The EA was posted on the ADF&G internet site and copies were mailed to individuals upon request.

There were no formal comments submitted for the Scout Lake Restoration Project EA during the 30-day public comment period. However, during the public review process, and based on discussions with several university professors who share research and conservation interests in threespine sticklebacks in Southcentral Alaska, a question arose as to the potential effects to the Scout Lake threespine stickleback population from the proposed rotenone treatment.

ADF&G participated in discussions with several university professors who share research and conservation interests in threespine sticklebacks in Southcentral Alaska. As a result of the concerns raised about the potential for the native threespine stickleback population being eradicated along with the northern pike population, it was agreed that introducing anadromous threespine stickleback from Rabbit Creek Slough (Anchorage) would be a feasible restorative action. ADF&G and the researchers concur that there will be value in studying the evolutionary changes of anadromous sticklebacks introduced into another land-locked lake such as Scout Lake.

Conclusions

Study of the ecologic and socio-economic effects of the proposal has shown them not to represent a negative impact on the quality of the human environment. Further, no wetlands or other sensitive habitat will be affected by the work as proposed. Accordingly, I find that all reasonable alternatives were considered in the evaluation of this project. I also find that this project complies with the meaning of Executive Order 11990 and 11988. Therefore, based on a review and evaluation of the enclosed, environmental assessment, I have determined the proposed removal of invasive northern pike as described in the project entitled, "Scout Lake Restoration Project" is not a major federal action which would significantly affect the quality of the human environment within the meaning of Section 102 (2) (c) of the National Environmental Policy Act of 1969.

The Environmental Assessment, prepared by the Alaska Department of Fish and Game has been adopted by the U.S. Fish and Wildlife Service according to rules contained in 40 CFR 1506.3. Accordingly, preparation of an environmental impact statement on the proposed action is not required.

for Geoffrey L. Haskett
Regional Director

28 Sept 09
Date