

PRE-REHABILITATION PLAN

Canal, Windmill, Heart, North Windmill, North North Windmill, June, North Teal, and Pit Lakes

I. PROPOSAL

A. Justification for Proposed Rehabilitation

The Canal, Heart, Windmill, North Windmill, North North Windmill, June, North Teal, and Pit chain of lakes lie southeast of O'Sullivan Dam and Potholes Reservoir. These waters have been popular trout fisheries since the 1950s, averaging 4-10 fish per angler when opening day-type seasons were in effect. The lakes are currently open to angling year-round, reducing the opening day crowds in favor of prolonged and steady angling pressure. Expanding populations of spiny-ray fishes are competing with trout fry and depressing trout survival. Anglers rarely pursue sunfish, and the other fisheries are little attended probably due to the diminutive size of the fish pursued. The present fishery is a shadow of the former rainbow fisheries that can occur there. The last treatment of these waters was 12 years ago.

Seven rehabilitations (1959, '68, '75, '82, '87, '90, and '97) have been done on Canal and Windmill, the largest and uppermost waters in this drainage. Heart Lake was most often isolated, although Canal Lake sometimes overflows into Heart Lake, and has only been treated four times (1959, '87, '90, and '97). An impassable barrier to upstream fish migration separates Canal from the smaller northern Windmills and June, which have also been treated fewer times (1975, '90, and '97). Pit Lake has been more problematic and has been treated eight times (1960, '63, '68, '72, '75, '80, '90, and '97). Two additional waters in the drainage, Virgin and Lois lakes, are separated by an impassable barrier and are too distant for illegal stocking to occur. These waters have never needed rehabilitation and are not further addressed in this proposal.

The earliest rehabilitations targeted illegally introduced crappie, although perch, sunfish, bullheads, and carp have also been targeted in the past. Crappie persisted, or were continually re-introduced, through four rehabilitation projects - including two with toxophene. They were not present after the 1987 rehabilitation. Pumpkinseed sunfish appeared in all these waters in the early 1980s and the last four rehabs have failed to eradicate them. Perch were also illegally introduced into Heart Lake in the 1980s and were present in Windmill and Canal during the last treatment. It is primarily the latter two species, sunfish and perch, that currently depress trout fry survival in Canal, Heart, Windmill, North Windmill, North North Windmill, and June lakes, although other species such as bass have probably also been introduced more recently.

Lake rehabilitation has provided 4-6 years of very good trout fishing after each treatment. Thereafter, trout survival begins to diminish and the fishery becomes less attractive over time. After 7-8 years, the trout fishery is almost non-existent. Since the last treatment, the proposed rehabilitation will entail superior techniques and equipment not available during previous rehabilitation attempts. Powdered rotenone will be slurried before application to the lake, providing a better distribution of the toxicant. Rehabilitation is desirable during the fall as the springs that feed these lakes will be at their lowest flow. This should reduce the amount of

sanctuary available to the target species during treatment. Fall treatment is also planned due to the early spawning of yellow perch. Sunfish spawning should be much diminished by fall. Submergent aquatic weed growth may present a problem during a fall rehabilitation.

Alternatives to rehabilitation are costly or impractical. Stocking catchable sized fish cost almost ten times the cost of a fry plant, and Region Two lacks the hatchery space and water to institute a catchable fish stocking program. Optimistic estimates of survival of 4-6 inch advanced fry in larger mixed species waters range from 10-20 percent. Spring fry survival in lakes free of competing species ranges from 50-80 percent. It has been 12 years since the last treatment of these lakes, and angling has virtually halted in these lakes. WDFW policy states that lake rehabilitation is an option for eliminating illegally planted fish to restore the intended management scheme.

B. Physical Description of Water Proposed for Rehabilitation

1. WATER: June Lake

2. LOCATION: Sec 21, 22 T17N R29E Grant Co.
3. SURFACE ACRES: 10.8 MAXIMUM DEPTH: 40 feet
4. VOLUME: 156.0 acre feet; 424,020,464 lbs H₂O
5. INLET STREAM: subterranean flow.
6. OUTLET STREAM: perennial, small creek (200 ft., 2-3 cfs) drains to N.N. Windmill Lake.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Public 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: North North Windmill Lake

2. LOCATION: Sec 22, T17N R29E Grant Co.
3. SURFACE ACRES: 3.8 MAXIMUM DEPTH: 30 feet
4. VOLUME: 44.4 acre feet; 120,685,594 lbs H₂O
5. INLET STREAM: perennial, small creek from June and perennial, small creek from Virgin.
6. OUTLET STREAM: perennial, small creek (600 ft., 2-3 cfs) drains to N. Windmill Lake.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Public 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: North Windmill Lake

2. LOCATION: Sec 27, T17N R29E Grant Co.
3. SURFACE ACRES: 20.2 MAXIMUM DEPTH: 50 feet
4. VOLUME: 341.6 acre feet; 928,517,990 lbs H₂O
5. INLET STREAM: perennial, small creek from N.N. Windmill.
6. OUTLET STREAM: perennial, small creek (50 ft., 2-3 cfs) drains to Windmill Lake; includes barrier (60⁰⁺ falls) to upstream fish migration.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: Private 100% Hampton Farms
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Windmill Lake

2. LOCATION: Sec 27, 28 T17N R29E Grant Co.
3. SURFACE ACRES: 37.4 MAXIMUM DEPTH: 60 feet
4. VOLUME: 1,073.7 acre feet; 2,918,471,213 lbs. H₂O
5. INLET STREAM: perennial, small creek from N. Windmill.
6. OUTLET STREAM: Permanent, open connection to Canal Lake. .
7. PUBLIC ACCESS: Entire Lake, w/ parking, launch, toilets, handicapped access.
8. LAND OWNERSHIP: PUBLIC 50% PRIVATE 50 % Hampton Farms
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Heart Lake

2. LOCATION: Sec 28 T17N R29E Grant Co.
3. SURFACE ACRES: 26.4 MAXIMUM DEPTH: 64 feet
4. VOLUME: 884.8 acre feet; 2,405,013,811 lbs. H₂O
5. INLET STREAM: None
6. OUTLET STREAM: None; occasional connection to Canal Lake during high water.
7. PUBLIC ACCESS: Entire Lake, w/ parking, launch, toilets, handicapped access.
8. LAND OWNERSHIP: PUBLIC 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Canal Lake

2. LOCATION: Sec 28, 33 T17N R29E Grant Co.
3. SURFACE ACRES: 92.2 MAXIMUM DEPTH: 130 feet
4. VOLUME: 1,960.2 acre feet; 5,328,105,869 lbs H₂O
5. INLET STREAM: Permanent, open connection to Windmill Lake.
6. OUTLET STREAM: Permanent, small stream (300 ft, 3-5 cfs) to Pit and N. Teal lakes; includes semi-barrier (45° falls) to upstream fish migration from N. Teal.
7. PUBLIC ACCESS: Entire Lake, w/ parking, launch, toilets, handicapped access.
8. LAND OWNERSHIP: PUBLIC 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: Pit Lake

2. LOCATION: Sec 33 T17N R29E Grant Co.
3. SURFACE ACRES: 22.8 MAXIMUM DEPTH: 30 feet
4. VOLUME: 186.5 acre feet; 506,933,856 lbs H₂O
5. INLET STREAM: Permanent, small stream (100 ft, 3-5 cfs) from Canal Lake.
6. OUTLET STREAM: Permanent, small stream (200 ft, 3-5 cfs) to N. Teal lakes; includes semi-barrier (45° falls) to upstream fish migration from N. Teal.
7. PUBLIC ACCESS: Entire Lake, walk in only, no facilities.
8. LAND OWNERSHIP: PUBLIC 100%
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

1. WATER: North Teal Lake

2. LOCATION: Sec 32, T17N R29E Grant Co.
3. SURFACE ACRES: 20.7 MAXIMUM DEPTH: 40 feet
4. VOLUME: 344.7 acre feet; 936,944,237 lbs H₂O

5. INLET STREAM: Permanent, small stream from Canal and Pit Lakes.
6. OUTLET STREAM: Permanent, small stream (300 ft, 3-5 cfs) to S. Teal lakes; includes semi-barrier (gabion) to upstream fish migration from S. Teal.
7. PUBLIC ACCESS: Entire Lake, parking, no facilities.
8. LAND OWNERSHIP: PUBLIC 100% Columbia National Wildlife Refuge
9. ESTABLISHED RESORTS: None on lake; a resort and state park near-by (Potholes Res.)

C. Proposed Management Actions

1. WATER: June Lake

2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 15-16 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 2,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 420 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~1-2

1. WATER: North North Windmill Lake

2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 15-16 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 1,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 120 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~1-2

1. WATER: North Windmill Lake

2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 16,18 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 921 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~1-2

1. WATER: **Windmill Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp (possible from N. Teal)
3. DATE LAST REHABED: 28,30 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 10,000 FRY: 15,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 5,788 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 4-6

1. WATER: **Canal Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp (possible from N. Teal)
3. DATE LAST REHABED: 28,30 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 20,000 FRY: 35,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 10,566 lbs., 10 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 4-6

1. WATER: **Heart Lake**
2. TARGET SPECIES: pumpkinseed sunfish
3. DATE LAST REHABED: 28,30 October, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 5,000 FRY: 6,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 1 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 2,385 lbs., 5 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~2-4

1. WATER: **Pit Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp (possible from N. Teal)
3. DATE LAST REHABED: 12-14 November, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): 1,005 lbs., 20 gal.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth Personnel ~ 2-4

1. WATER: **North Teal Lake**
2. TARGET SPECIES: pumpkinseed sunfish, carp
3. DATE LAST REHABED: 12-14 November, 1997
4. PROPOSED TREATMENT DATE: September-November, 2008
5. REPLANTING DATE: Spring 2009
6. SPECIES: rainbow trout
7. CATCHABLES: 0 FRY: 5,000
8. PROPOSED TOXICANT: Rotenone, powder and liquid CONCENTRATION: < 2 ppm
AMOUNT (ROTENONE AT 5% ACT. INGRED): none additional other than treated water from Canal and Pit lakes.
9. METHOD OF APPLICATION: pumper boat slurry and airboat/ATV spray
10. CREW DESCRIPTION: Leader(s) Jeff Korth

Note: Pit Lake may not be treated, depending on water level conditions and connectivity to Canal Lake. North Teal Lake will not be treated and is listed as a holding area for treated water from Canal and possibly Pit lakes.

Total Toxicant (ROTENONE AT 5% ACT. INGRED) = 21,205 lbs powder and 70 gallons of CFT Legumine.

II. PURPOSE:

The Washington Department of Fish and Wildlife (DFW) provides many types of fisheries in response to public desires. DFW manages both trout and warmwater recreational fisheries based on many different species of fish and levels of difficulty. Public demand for and participation in trout fisheries is very high. These fisheries are prized as opportunities for families to recreate together as well as providing an appropriate challenge for occasional or novice anglers. Year around season trout fisheries provide a relaxed recreational opportunity and are also integral to the state and many local economies.

June, North North Windmill, North Windmill, Windmill, Canal, and Heart lakes have a long history of being managed as trout fisheries. Management intends to return these lakes to trout fisheries, as per the Management Plans established over 20 years ago. Only the complete rehabilitation or the stocking of catchable-sized fish can restore the trout fishery in these waters now. Rehabilitation will eliminate or drastically reduce interspecific competition and allow the trout fisheries to flourish. The cost of annually stocking of catchable-sized trout and creating a mixed species fishery would be an order of magnitude greater for the larger trout necessary to attract anglers. Without a very significant capital investment, current resources are not available to provide catchable-sized trout on a regular basis without severely impacting hatchery production for many other fisheries. Managing these waters as warmwater fisheries will not create the same amount of recreation, as evidenced by the decline in participation as the trout fishery ebbs.

III. INTENDED OUTCOME/MEASURE OF SUCCESS:

DFW intends to restore June, North North Windmill, North Windmill, Windmill, Canal, and Heart lakes to popular, easily accessible trout fisheries based on fingerling-stocked trout. The

average catch rates should be at least two to three 10-12 inch trout per angler. Success will be apparent as angler participation increases and will be measured during random creel contacts and biological surveys. Given a reasonable chance of reducing the populations of undesirable species dramatically, the beneficial effects should last approximately 6 to 8 years under current management schemes. In addition to reasons listed under Resource, Recreational and Economic Impacts, to abandon these lakes as trout fisheries is to invite other incursions across the state.

IV. RESOURCE IMPACTS:

1. The populations of the target species, pumpkinseed sunfish and possibly others, will be severely and negatively impacted. All are exotic species.
2. Regional Lands, Habitat, Wildlife and Non-Game managers have been appraised of our rehabilitation plans. No unmitigated concerns have been expressed on the potential impacts to non-targeted species.
3. According to Bradbury (1986), the effects of rotenone on benthos are variable, depending on the concentrations and species. Crustaceans are most tolerant while the smaller insects are most affected. Immediate reduction of populations averages 25%, and survival doubles when access to bottom sediments exists. Benthic communities generally recover to at least pretreatment levels within two months. Zooplankton is more severely impacted, and communities generally take two to twelve months to fully recover. While relatively tolerant of even heavy doses of rotenone, amphibians (especially larval) are at risk, and herptiles are affected somewhat less so. Almost no chance of eliminating an entire population exists.
4. Loss of the following year's fishery will occur for June, North North Windmill, and North Windmill will probably occur due to lack of sufficient numbers of catchable-sized fish in the spring. Fingerlings will be stocked and the fishery will begin again one year after treatment. Hunting will be curtailed during the treatment (about 2-4 days). The lakes will be closed to angling, and other recreational uses such as boating, and swimming will be curtailed during the planned period of treatment. These waters are not a source of potable water for humans. A portion of the waters treated are sources of drinking water for livestock. Levels of rotenone used in the treatment will be too low to adversely affect the livestock.
5. Professional biologists and other naturalists have visited this site frequently over the past 40 years. To our knowledge, no endemic, rare, threatened or otherwise listed species will any be impacted by the rehabilitation.

V. MITIGATING FOR ADVERSE IMPACTS:

1. Provided catchable-sized fish are available the following spring, no loss of recreational fishing time will occur for Windmill, Canal, and Heart lakes. Trout fry survival and growth will be greatly enhanced, and future trout fisheries will attain their previous status. No removal of dead fish is planned as the nutrient base contained therein is best returned to the lake.

Livestock use of the waters to be treated will not be significantly affected. The concentration of rotenone used in the treatment will be far below that considered harmful to mammals. The landowners will be notified of the rehabilitation and consequent exposure of livestock to rotenone.

Fall rehabilitation will not interfere with waterfowl spring nesting. The eradication of spiny-ray fishes would also benefit waterfowl through increased production of invertebrates. Stocked populations of trout will not be anywhere near as numerous as the current spiny-ray population.

2. Downstream resources will not need to be protected as those waters are infested with carp and any secondary kill ensuing in that area would also be beneficial to waterfowl production.

Rehabilitation of these downstream waters will be proposed in the near future.

3. No endemic, rare, threatened or otherwise listed species are known to inhabit this area.

4. Protective wear for the eyes, face and hands will be available for all purveyors of rotenone.

5. Lakes will be posted according to Department of Ecology guidelines to notify the public of the treatment and discourage the public from possessing or consuming dead fish.

VI. RECREATIONAL IMPACT: ALSO SEE PROPOSAL IA, above.

Recreational opportunity will be increased. When free of competing species, these lakes are estimated to host a minimum of 20-30 angler trips per week during the usual angling season, accounting for at least 1,000 recreation-days per year. The lakes could conservatively sustain five times that amount of pressure at the anticipated levels of success.

Angler success should reach three to five fish per trip. Yearling trout should average about 11 inches. Carryovers should be expected to be about 10% of the catch and average 15 inches for 2-year-olds and 18 inches for 3-year-olds.

VII. ECONOMIC IMPACTS:

An estimated 1,000 trips made to these lakes as a result of the proposed management action would result in an increased economic impact totaling \$37,790 per year (1991 dollars; based WDW estimate of \$37.90 per trip). If used to its full potential, the annual value could be over \$200,000 to the state's economy. The fishery as it now exists generates maybe \$5,000 per year. Rehabilitation would bring back the fishery and associated economic activity.

The total annual cost to plant these lakes is less than \$3,500. The rehabilitation will cost the Department about \$45,000 (including costs of rotenone, time, travel). Even if rehabilitations occur once every five years (rather than the current 10 years), the cost of fry plants (5 yrs.) and the rehab totals \$62,800. The cost of stocking enough catchable-sized trout to create the same fishery, if this were possible (see IA), would be at least \$100,000 for this five year period. The

fishery produced during this five years is worth at least \$150,000 and as much as \$1,000,000 to the state's economy, depending on participation. Without action, the fishery is currently worth \$25,000 or less per five years.

Estimates for the cost of the enforcement action necessary to curtail the activity of the individuals responsible for illegal fish plants are not available. However, this cost might be looked upon as a statewide expenditure since some preventive benefit would certainly occur as perpetrators find out the Department takes illegal transport and planting of fish very seriously.

VIII. RELATED MANAGEMENT ACTION:

See I.C.6., above, for fish planting data.

Increased penalties and enforcement activities are desirable if WDFW is ever going to dissuade illegal stocking of state managed waters. Educating the public about the costs in Department dollars and time with emphasis on what WDFW might be able to accomplish with those resources would be a very worthwhile activity for O & E. This may result in stemming recruitment to this ill-advised group and turning local opinion against the offenders.

IX. PUBLIC CONTACT:

A public hearing will be held in July 2009 to explain Region Two 2009-10 rehabilitation proposals, assess public opinion, and address local concerns. The announcement will be provided to area papers and radio stations at least a week in advance of the meeting. With many of the lake's users living outside Grant County, actual percentages pro and con are difficult to obtain. Public support may be best judged by the number of participants in the fishery (vis a vis Recreational Impacts).

Initiated by: Region Two Fisheries Management