

FISHPOND MANAGEMENT – INVASIVE FISH CONTROL
DESIGN PROCEDURES (399 DP)

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BACKGROUND

Fishpond management requires that populations of aquatic species be kept in balance to provide for a healthy, productive aquatic ecosystem. It is not uncommon for certain fish species to increase to a level where they are having a negative impact on other aquatic organisms and their associated habitats. The most common example of this is the overpopulation of common carp (*Cyprinus carpio*) in open water wetlands and shallow lakes. Use of the chemical rotenone can be effective when applied under specific guidelines to eliminate the undesirable fish species and restore habitat quality. Invasive fish control for fishpond management shall be planned and implemented in accordance with the current [399 Fishpond Management Standard](#) and [Statement of Work](#). In all instances, this activity must be planned in coordination with appropriate staff with the Nebraska Game and Parks Commission. The design procedures detailed in this document are broken into two sections as follows:

- **Criteria for use of rotenone to control invasive species**
- **Planning considerations prior to implementation**

CRITERIA FOR USE OF ROTENONE TO CONTROL INVASIVE FISH SPECIES

The following criteria must be met to allow for rotenone to be used to control an invasive fish species resulting in enhanced aquatic habitat conditions:

- 1) Documentation that no endangered, threatened, or at-risk fish species (as identified by the Nebraska Natural Legacy Plan as 'Tier I' species) will be impacted by the proposed treatment. This includes species such as Topeka shiner, Northern redbelly dace, Plains topminnow and several others that would be directly susceptible to rotenone. An appropriate survey for these species must be conducted by a qualified biologist and a report of the findings included with the plan.
- 2) Analysis of the existing fish population must be made to determine that the population of undesirable species is excessive relative to any desirable species and that the imbalance is dramatic enough to warrant a rotenone treatment. A qualified biologist must conduct appropriate surveys for the existing fish species to quantify number, size, etc. and a report of these findings must be included with the plan.
- 3) A biologist must determine that the aquatic habitat proposed for treatment is impaired by an overabundance of the invasive fish species and that the elimination of that species will enhance the habitat conditions. For example, high populations of common carp in an open water wetland/shallow lake complex in the Nebraska Sandhills are causing excessive turbidity and uprooting wetland vegetation resulting in poor water clarity and reduced invertebrate populations needed by various wetland-dependent wildlife.
- 4) Opportunity for re-colonization of the aquatic habitat by the invasive fish species must be deemed very rare based on the absence of adjoining streams, wetlands, and other water bodies as well as consideration of topography and man-made structures. Frequency of overland flooding connecting infested water bodies with the proposed treatment area

should be less than once every ten years. Structures such as dikes may be used, as appropriate, to meet this item.

- 5) Authorization to implement the rotenone treatment must be obtained from the Nebraska Game and Parks Commission. In most instances, Game and Parks staff will coordinate and/or assist with the application of the chemical. The chemical may be difficult to obtain so it is important to plan accordingly.

PLANNING CONSIDERATIONS PRIOR TO IMPLEMENTATION

The criteria listed above need to be addressed prior to determining if the proposed treatment site is suitable for a rotenone application to remove an undesirable fish species. Once that has been accomplished, other elements of the plan can be developed with consideration of the items noted below:

- All streams, wetlands, and other water bodies that support fish which are or could easily become connected to the treatment area should be assessed and included in the plan for treatment. If these areas occur on adjacent lands under different ownership, permission to access these areas and treat them will be needed.
- Water levels on the treatment area should be lowered to the greatest extent possible by using water control structures, pumping, and other feasible means. Take advantage of low water levels during drought conditions. Late summer is often the most appropriate time for application due to low water levels.
- Springs and shallow water with emergent vegetation should be identified and targeted with specific chemical application methods to prevent these areas from becoming a refuge area for fish to survive the treatment.
- Water temperature should be 70 degrees F or warmer for best results.
- Application rates should be based on the aquatic conditions and the targeted fish species. For example, if high organic conditions are present and bullheads are the target species, a recommended application rate for liquid rotenone is one gallon (of 5% formulation) per acre-foot of water and powdered rotenone should be applied at 10 pounds (of 5% formulation) per acre-foot of water. Volume can be calculated by multiplying surface acres by average depth. The average depth can be estimated by multiplying the maximum depth by 0.4.
- Rotenone pesticide products used for fish management are restricted use pesticides. Applicators must be certified and licensed through the Nebraska Department of Agriculture as either a private applicator (i.e. a landowner treating their own property) or as a commercial/noncommercial applicator (i.e. a contractor for hire or employees making applications as part of normal duties on land their employer owns/operates). Applicators should read and follow all pesticide label restrictions, rates, and precautions.
- Rotenone kills fish by preventing the exchange of oxygen through the gills. It is not harmful to most warm-blooded species except swine, which should be excluded from the treatment area until it is detoxified. Rotenone is rapidly broken down in soil and water and nearly all toxicity is lost after a few days of sunlight.
- The decision to restock fish should be based primarily on resource objectives with consideration of the landowner's objectives. It may not be advantageous in some instances (i.e. wetlands) to restock the site with fish due to competition for resources or if the site cannot sustain a viable fishery. If fish are to be restocked, wait two to four weeks following the treatment. Test toxicity of the pond by leaving a bait bucket containing minnows in the pond overnight. Follow appropriate stocking guidelines for the site objectives.