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Sea Lamprey Control Centre
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Canada

TECHNICAL OPERATING PROCEDURE

PROCEDURE TITLE:

Protocol for investigations of, and responses to unexplained mortality of non-target fish

APPLICABILITY:

Protocol applies to all unexplained non-target fish mortality that coincides with lampricide applications and cannot be initially attributed to the treatment. The extent that the procedures are followed is at the discretion of the Treatment Supervisor.

PRINCIPLE:

To provide a framework for investigations of, and responses to unexplained non-target fish mortality that coincides with the use of lampricides.

POTENTIAL INTERFERENCES:

Not applicable

EQUIPMENT REQUIRED:

Data forms (see attachments)
Clip board and pens
Hand tally/counters
Labels and permanent markers
Waders/boots
Scap nets
Handheld GPS

Collection buckets
Press and seal bags
Trash bags
Sample bottles
Fish ID book(s)

DISPOSAL:

Minor fish kill

Disposal of dead fish (<100) can be done by burying fish in a pit away from human or animal activity after permission is granted from property owner. All fish can be disposed in a landfill after they have been double bagged.

Moderate or major fish kill

All fish should be disposed in a landfill after they have been double bagged. Contact the local landfill near the body of water where the fish kill occurred.

REAGENTS:

Not applicable

DEFINITIONS:

I. Typical Survey Effort

Biological surveys are routinely conducted during a treatment and after the lampricide block has passed in order to assess treatment effectiveness, verify sea lamprey distribution and age class structure where assessments are questionable, or document non-target mortality. Typically, staff walk a stream and collect organisms using scap nets (Fyke nets are not recommended). Non-target organisms are identified to species and sea lampreys are counted and measured. Survey types and detailed procedures are contained in TOP:029.x.

II. Fish Kill

The American Public Health Association (APHA) et al. (1985) definitions for levels of impact on fish are used for all fish except lampreys.

A. Minor kill is defined as <100 fish/1.6 km (1.0 mi.)

B. Moderate kill is defined as 100 - 1000 fish/1.6 km (1.0 mi.)

C. Major kill is defined as >1000 fish/1.6 km (1.0 mi.)

III. Environmental Protection Agency (EPA) Threshold for Non-target Mortality of Fish Species:

Involves any incident caused by a pesticide in Formal Review for ecological concerns.

A. Fish: Affected 1,000 or more individuals of a schooling species or 50 or more individuals of a non-schooling species (AOP:007.x).

B. Involves adverse effects caused by a pesticide, to federally Listed endangered or threatened species.

PROCEDURES:

The Flowchart for Response to Fish Mortality Concurrent with Lampricide Treatment (Appendix W) outlines the following procedures in graphical form.

Non-target fish mortality may be discovered by Sea Lamprey Control Program (SLCP) field personnel or by personnel external to the program, including the general public. When the SLCP is notified of fish mortality by a public source the incident must be confirmed. If notification occurs after the field crew has

left the area, the treatment supervisor may choose to contact another natural resources agency located in the vicinity of the treatment and ask that they confirm the report. If there is positive confirmation, the treatment supervisor will determine the appropriate amount of resources required to respond.

I. Evaluation

- A. Field crew estimates severity and range of the fish kill and determines whether kill is minor, moderate, or major based on typical chemical treatment survey effort (See DEFINITIONS).
- B. Field crew identifies species involved.
- C. Field crew notifies treatment supervisor that a fish kill has occurred.
- D. Evaluate potential impacts
 - 1. Risk to human health
 - a. Exposure to disease carrying animals
 - b. Exposure to large amounts of decomposing organisms
 - c. Non-target fish kill large enough to affect public activities
 - 2. Fish population
 - 1) Spawning stock versus pre-recruited stock
 - 2) Species type
 - 1) Game or non-game species
 - 2) Schooling or non-schooling (AOP:007.x)
 - 3) Listed species (AOP:007.x)
 - 3) Species sensitive to lampricides
- E. Evaluate immediate response/consider options
 - 1. Treatment Supervisor determines whether to deploy additional personnel and resources to assist in non-target investigation
 - 2. Treatment Supervisor notifies Unit Supervisor of non-target fish kill

II. Notification

- A. Unit Supervisor decides which agencies or individuals need to be notified based on consideration of the following:
 - 1. Severity/ scope of the fish kill
 - 2. Species impacted
 - 3. Potential for public concern
- B. Agencies, organizations, and individuals that may require notification

1. Canada

- a. Federal agencies
 - 1) DFO
 - 2) Health Canada
- b. Provincial agencies
 - 1) Ministry of Natural Resources
 - 2) Ministry of Environment
- c. Local agencies
 - 1) Conservation authorities
 - 2) Municipalities
 - 3) First Nations
- d. Great Lakes Fishery Commission
 - 1) Sea Lamprey Program Director
 - 2) Communications Director

2. United States

- a. Federal agencies
 - 1) EPA
 - 2) National Park Service
 - 3) USFWS (Region 3)
 - (a) Sea Lamprey Control Field Supervisor
 - (b) Ecological Services
 - (c) National Wildlife Refuge System
- b. State agencies
 - 1) Department of Natural Resources (or equivalent)
 - 2) Department of Environment, Great Lakes, and Energy (or equivalent)
- c. Local agencies
 - 1) Municipalities
 - 2) County Health Department
 - 3) Native American Tribes
- d. Great Lakes Fishery Commission
 - 1) Sea Lamprey Program Director
 - 2) Communications Director

III. Investigation

A. Minor fish kill; follow routine procedures (see TOP:029.x)

1. Fill out collection form (Appendix K)

- a. U.S. records mortality data on the Chem Treat/Non-Target form.
- b. DFO records mortality data on the Secondary Application Data Form

2. Treatment Supervisor will determine if a 6(a)(2) report is required (AOP:007.x/US or AOP:007.x/CAN)

B. Moderate and major fish kill; investigation warranted

In addition to actions taken under minor fish kill, conduct the following:

1. Quantify numbers of dead non-target organisms. This task is accomplished immediately by field personnel using at least one of the following methods:
 - a. Absolute counting method
 - 1) Sample entire area and count all non-target fish killed
 - 2) Measure area affected
 - 3) Estimate collection efficiency
 - b. Empirical method of providing estimate based on severity and range of fish kill (See Attachment 3– Fish Counting Procedures)
 - 1) Subsample area and count non-target fish killed
 - 2) Estimated area affected
 - 3) Estimate collection efficiency
2. Collect water samples for toxicant analysis (Attachment 4 - Sample Collection and Preservation)
 - a. Inside the treatment area
 - b. In a control area outside of the treatment area
3. Collect entire fish sample (Attachment 4 - Sample Collection and Preservation)
4. Define the stream reach or lentic area in which the fish kill occurred
 - a. GPS coordinates
 - b. Zone/Station codes
 - c. Branch/Lentic
5. Complete the Investigations Field Form (Attachment 1) which would include but is not limited to:
 - a. List the species involved
 - b. List of contacts
 - 1) Employees involved in the treatment
 - 2) Observers (General public witnesses)
 - c. Possible outside contributing factors
 - 1) Commercial/recreational fishing
 - 2) Fire
 - 3) Toxic algal blooms
 - 4) Lightning
 - 5) Electrofishing (State, Tribal, Federal, Universities)
 - 6) Ammonia and pesticides from farming activities kill
 - d. Take photographs of anything suspected of contributing to the fish kill
 - 1) Area treated
 - 2) Fish killed
 - 3) Shoreline

- 4) Agriculture
- 5) Industry
- 6) Other boats in the area

6. Compile water chemistry data collected prior to and during treatment which may include:

- a. Temperature
- b. pH
- c. Alkalinity
- d. Dissolved oxygen
- e. Ammonia

7. Compile lampricide application and concentration data collected during treatment

- a. Lampricide application forms
- b. Lampricide analysis forms
- c. Secondary application forms

REFERENCES:

American Public Health Association, American Water Works Association, and Water Pollution Control Federation. 1985. Standard methods for the examination of water and wastewater. 16th edition. American Public Health Association, Washington, D.C. 1268 pp.

Field Manual for the Investigation of Fish Kills. 1990. United States Department of the Interior, Fish and Wildlife Service/ Resource Publication 177.119 pp.

Queensland Department of Environment and Heritage. 1998. Fish Kill Reporting and Investigation Manual. QDEH, Brisbane.

Rhode Island Fish Kill Form: http://www.dem.ri.gov/topics/erp/6_4_7.pdf

Southwick, R. I., and A. J. Loftus, editors. 2003. Investigation and Monetary Values of Fish and Freshwater Mussel Kills. American Fisheries Society, Special Publication 30, Bethesda, Maryland.

United States Environmental Protection Agency. Reporting Requirements for Risk/Benefit Information. Federal Register: September 19, 1997 (Vol. 62, No.182.) <http://www.epa.gov/fedrgstr/EPA-PEST/1997/September/Day-19/p24937.htm>

This procedure has been reviewed and approved by the undersigned representatives of the U.S. Fish and Wildlife Service and Fisheries and Oceans Canada.

REVIEWED/APPROVED _____ DATE _____
Field Supervisor (U.S.)

REVIEWED/APPROVED _____ DATE _____
Program Manager (Canada)

Revision No.	Date	Person(s) Responsible	Description
91	2/1/2021	Benson Solomon, Jenna Tews, Alan Rowlinson, Jesse Haavisto	Added required equipment list