



## Background

Historical infrastructure management experience has demonstrated that under certain circumstances it is necessary to deploy the use of explosives in the removal of beaver dams that are obstructing normal water flow and/or water travel paths. It is recognized that beaver activity in the northern boreal region is a dynamic management challenge driven by widespread populations that continually see new generations of beavers dispersing to seek out new habitat to establish territorial bases. Fundamentally, the solution to addressing risks to infrastructure (roads, bridges, unobstructed access routes) is one of a sequence of controls:

1. Regular monitoring of access investments to detect potential new beaver activities early before obstructions occur or dams grow to problematic size, and identifying an action plan to treat anticipated problems early.
2. Preventative engineered solutions such as beaver-proofing culverts and advance involvement of trap line stakeholders in control of populations adjacent to roads, culverts, or bridge infrastructures (existing infrastructure or future access).
3. Manual or mechanical removal of beaver-obstructions, wherever readily accessible. (i.e. adjacent to all-weather access)
4. Controlled, supervised use of explosives within well-established regulatory guidelines and authorizations as a last resort and for locations not readily accessible for mechanical removal.

The nature of projects deploying explosives around watercourses and wildlife is highly regulated from a number of legislation sources, with multiple layers of regulations at both the federal and provincial level:

- Occupational Health and Safety (provincial) –contract worker safety regarding water, explosives, etc
- Regulations governing sale, storage, transportation and use of explosive materials (public & worker safety)
- Wildlife damage regulations (permissions to destroy public wildlife –Alberta Fish and Wildlife)
- Fisheries and fisheries habitat regulations
- Water resource regulations

Consequently, this type of project work represents one of the higher regulated and potentially more hazardous forms of work task that the company manages. It is critical that staff involved in determining the necessity of this treatment and in supervising its use, employ due diligence in procedure, field practices and documentation of individual projects. This document provides a quick-reference guideline to assisting due diligence.

## Prohibitions

- Except in emergency circumstances that are defined and specifically authorized by the appropriate provincial and federal regulators, removal of obstructions by explosives is normally not permitted:
  - During frozen conditions once watercourses have an ice-cover and beavers are confined to habitat below-ice,
  - Within Class A streams anytime (Alberta Water Act -Code of Practice classification).
- Loose dry or liquid explosives that are hand-mixed (i.e. ammonium nitrate: fuel/oil mixtures) are prohibited by federal fisheries legislation.
- Explosives will not be directly used to kill beavers or to destroy active ‘beaver-houses’, nor are charges to be deployed adjacent to where aquatic mammals (beavers, otters) are observed actively swimming.
- Explosives must not alter the original channel flow path, or impact upon the channel bed or banks.

## Project Locations (Justifiable Circumstances)

Federal fisheries regulations permit the use of explosives only for specified circumstances. For each particular project location, DMI staff will determine and document the specific information as a record of justifiable circumstances for the use of explosives as a prescribed treatment. Federal and/or provincial regulatory agencies may audit the company at any point for





such information. This information will be completed on a prescribed form for review with the contractor, attachment to his contract and filing for future reference:

- LOC, road name, and/or DMI Operating Area name,
- Access road type (winter, all-weather, dry-weather) -regulators may request justification that the access supports year-round ground-crew planning work, seasonal logging (timber or chip haul projects), reforestation works and public access,
- Specific location (legal, or GPS) of the beaver dam(s) and number of dams to be treated,
- Rationale for a treatment prescription using explosives, specifically noting whether the subject beaver dam activity is directly affecting; company investment in road-grade structure, access road-grade stability (vehicle safety), investment in bridge abutments/structure, temporary bridge crossing site (crossing-width impacts), other (i.e. culvert function),
- Vehicular accessibility issues -Often, accessibility to the beaver dam site(s) is precluded by wetland areas or dry-weather roads that will not support transport of heavy equipment, rendering the access unfeasible to mechanical treatment alternatives. Beaver obstructions may also simply be out of reach for heavy equipment that is required to operate strictly from the edge outside of water channel. Where access to the problem site with heavy equipment (i.e. backhoe) for alternative treatment methods is unfeasible, 'explosives' use is permissible. Access might be readily possible under frozen conditions, however provincial and federal wildlife/fisheries regulators discourage any impacts to beaver dams and watercourses upon the onset of winter conditions.

Explosives must only be used where identified as the most feasible intervention to provide a solution to restoring natural drainage (width, flow) and correcting beaver flooding-associated impacts to property, vehicle safety and/or crossing channel-width.

## Treatment Objectives

The desired treatment is a package-approach that addresses both the physical 'obstruction(s)' and the beavers as the source point of the damming. The goal is to provide a complete, long-term solution to restoring natural drainage (width, flow), correcting beaver flooding-associated impacts (property, vehicle safety and/or crossing channel-width), as well as discouraging future beaver activity at the site. Consequently, three related objectives will form the prescription:

1. Destroy resident beavers within a desired treatment area (i.e. 100- Meters) by standard humane practices.
2. Alter / breach all identified dams to release containment of accumulated water and to restore natural 'flow'.
3. Restore & maintain consistent natural channel 'width' (original channel).

The desired effect on the obstruction will be effective notching of the center of each dam portion only (NOT the entire dam width or depth to creek bed, nor 'total dam removal'). An effective notch will permit water back-up release, yet prevent bank and bed damage as much as reasonably possible.

## Contractor Resources

DMI will only employ contractors who hold the required federal and provincial authorizations (permits, licences), can provide compliant explosives storage equipment and transport equipment, as well as who are specifically competent for deployment of explosives in beaver-dam treatments.

## Environmental Authorizations

The federal government (Department of Fisheries and Oceans) has provided an efficient mechanism for allowing explosives treatments to occur without advance approval, as long as they are limited to defined site circumstances and conducted under





specific field practices. (See “Alberta Operational Statement” –Beaver Dam Removal). DMI staff must complete and submit the required advance “Notification Form” to DFO in advance, along with a description of location(s) where explosives will be used. \*\*Any intended use of explosives ‘outside’ those circumstances or not able to meet their required site practices, will require a separate process of submission and approval by DFO.

Under provincial wildlife legislation, beavers may be destroyed through one of two available avenues:

1. Requested voluntary assistance of the registered trap line holder under his legal authority, or,
2. Project-specific provincial authorization to destroy beavers by firearms (Damage Control Permit). Alberta Fish and Wildlife is the source-point for obtaining time-limited “Damage Control Permits” and any related instructions or conditions from regional Fish & Wildlife staff.

## Other Authorizations

Selected contractors will be competently qualified, experienced, and authorized under provincial and/or federal legislation to purchase, store, transport, and handle explosives. Relevant authorizations the contractor will hold include:

- Provincial dangerous goods authority (transportation),
- Explosives purchase & magazine storage licence (Federal, Natural Resources Canada, Explosives Act)
- Blasters certificate (Provincial, OHS Act).

## Prescription and Required Environmental Practices

### Federal:

The Department of Fisheries and Oceans (DFO) has defined very specific circumstances where explosives are/are not permissible adjacent or within watercourses, as well as some thresholds for their use. Within those guidelines<sup>1</sup>, DMI has determined that its application of explosives method will be of “confined” classification, in that the charges will be detonated within the center of each dam-structure (saturated soils, vegetation debris, and wood debris).

The target of DMI use of explosives is NOT the substrate adjacent to or under the watercourse, but rather the alteration of an obstacle to natural stream flow and natural channel width. DFO-defined minimum “setback distances” from water for explosive charges (to avoid exceeding the 100kpa/14.5psi overpressure and 13mm.s-1 peak particle velocity guideline criteria) will not be feasible since detonation will occur at a mid-point in an obstruction within the center of the channel width. Consequently, the above pressure & velocity thresholds will not be achievable, and mortality of any aquatic life forms present near the detonation shock points is certain to occur. The DFO recognizes this, but prescribes specific practices be followed, as defined within its “Alberta Operational Statement” on Beaver Dam Removal in order to reduce the collective impacts of detonation shock, water release scouring, sedimentation, etc.

DMI staff supervising such a project should be familiar with the most current version of the DFO Alberta Operational Statement that describes these prescribed measures. The company’s contract document will include a summary of the salient practices to be followed. The size, pattern, and number of individual detonations will be determined dam-to-dam at the discretion and experience of the blaster and within the described regulatory limits.

<sup>1</sup> 1998, Canadian Technical Report of Fisheries and Aquatic Sciences 2107., “Guidelines for the use of explosives in or near Canadian fisheries waters”, Fisheries and Oceans Canada





**Provincial:**

If time and interest of trapper permits, the desired approach is through the trap line stakeholder and the defined practices they operate under. If the beavers are to be destroyed by firearms under the provincial Damage Control Permit, the conditions and instructions associated with that permit apply.

**DMI Staff Roles**

The supervising DMI staff member holds some specific roles, not including any handling of explosive charges:

- Submitting the “Notification Form” and sites list to DFO office.
- Obtaining (or by instruction to contractor to do so) the Damage Control Permit.
- Obtaining ‘current’ explosives licence number and certificate number (& expiry dates) from the contractor.
- Verifying that insurance coverage and WCB coverage is active and within that specified on DMI contract.
- Completing the project contract-form (site description and justification rationale)
- Reviewing the project specifications and particular circumstances with the contractor.

Field roles include:

- Accompanying the contractor on date of deployment.
- Ensuring that the project occurs within prescribed federal/provincial guidelines (including safe transportation, handling and environmental practices) and the terms of the Damage Control Permit
- Providing determination of completion to objectives within safety limitations.

**REVISION HISTORY:**

Original issued:	July 28, 2009	Author:	J. WITIW
Revision 1.1	August 17, 2009	Author:	EMS Coordinator

**APPROVAL:**

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