

BEAVER MANAGEMENT GUIDELINES

**Prepared by
the**

**Ministry of Environment, Lands and Parks
Vancouver Island Region**

DRAFT

May 10, 2001

Version 1

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	REGULATORY FRAMEWORK	1
	Wildlife Act.....	1
	Water Act.....	1
	Municipal Act.....	2
3.0	BEAVER BIOLOGY.....	2
4.0	FISH AND WILDLIFE HABITAT INTERACTIONS.....	2
5.0	URBAN DRAINAGE.....	3
6.0	DAM AND DEBRIS MANAGEMENT	3
	6.1 Bridging	4
	Objective	4
	6.2 Culvert Screening Devices.....	4
	Objective	4
	Guidelines	4
	6.3 Other Structures	5
	6.4 Fencing Techniques.....	5
	Objective	5
	Guidelines	5
7.0	ANIMAL MANAGEMENT.....	7
	Objective	7
	Guidelines	7
8.0	DAM REMOVAL	7
	Objective	7
	Guidelines	7
	OTHER READING SOURCES:	8
	Figure 1. Example of “O” Shaped Fencing Layout	6
	Figure 2. Example of “U” Shaped Fencing Layout.....	6

1.0 INTRODUCTION

The following guidelines have been developed by the Ministry of Environment, Lands and Parks (MELP), Vancouver Island Region to assist local governments and other road managers towards more environmentally-sensitive management of beaver and beaver dams within their statutory right of ways or other locations. In order to prevent continual destruction and disruption of fish and beaver generated habitats, reduce costs and streamline agency referral procedures, it is vital that there be clear environmental direction for beaver dam maintenance processes that are performed by local government public works departments.

Our primary objective is to put forward a range of general environmental management and protection recommendations to agencies that are mandated to address local flooding concerns and to maintain free draining right of ways. This document provides a framework for local government staff to establish beaver dam inventories and develop clear strategies for more effective and sensitive management of beaver within their area of jurisdiction.

The following guidelines are intended to replace our old method of responding to site-specific, beaver dam removal requests. Consistent with the *Fish Protection Act* Streamside Directive it is recommended that these guidelines be adopted as part of a memorandum of understanding (MOU) with this ministry and implemented in a manner consistent with established environmental development permit areas (DPAs). We will continue to provide site-specific assistance from our Ministry, on a case-by-case basis where the guidelines do not “fit” the particular maintenance situation or where there is significant and immediate risk to the environment.

2.0 REGULATORY FRAMEWORK

Wildlife Act

Section 9 of the *Wildlife Act* makes it an offence to disturb, molest or destroy a beaver or muskrat house, den or dam, except where that person is a trapper, licensed under that Act, under “lawful authority” for the protection of property or where the action is authorized by regulation.

Water Act

Section 44(v) of the *Water Act* Section 9 Regulation provides for the lawful removal of a dam for drainage purposes with specific restrictions, as detailed in Section 42 of that Regulation. Subject to Section 37(4)(b), “if a person does not own the land, the approval of the landowner must be obtained whether the land is private or Crown land.” Where applicable MOU agreements have been signed with a local government or where appropriate beaver management strategies have been developed by public works departments, the Regional MELP office may be prepared to accept batch notifications

under the Section 9 Regulation. These batch notifications should be submitted no later than June 30 of any calendar year. This change in process should help to streamline dam removal requests from public works departments, while ensuring the protection of environmental resources.

It is important to remember that, although the guidelines have been established with joint agency input, their application will not necessarily exempt local government staff from liabilities associated with working within watercourses. All senior legislation will still apply with respect to protection of fish and fish habitat, prevention of flooding hazards and protection of licensed water user's rights.

Municipal Act

Implementation of the *Fish Protection Act* Streamside Directive will include a requirement for the establishment of development permit areas and MOUs to protect fish and fish habitat. As stated above, the intent is that the following guidelines would be adopted as part of an MOU and be consistent with the streamside directive.

3.0 BEAVER BIOLOGY

Beaver live in colonies of between three to nine individuals, typically including adults, yearlings and kits. The colony uses one or more lodges or burrows and will build one or more dams, in order to provide better access to the vegetation they require to sustain themselves over the winter.

Two-year-old juveniles will leave the colony in the early spring when they typically colonize new territory, often in adjacent watersheds. Females reach reproductive maturity at two years.

Active beaver systems are not permanent, as they typically run out of available food sources within easy access of the pond within two or three years.

Beaver prepare for winter by establishing winter food caches within the impoundment, although west coast populations likely continue to cut accessible vegetation all year.

4.0 FISH AND WILDLIFE HABITAT INTERACTIONS

The beaver's biology plays an important role in the nutrient cycling within the watershed, thus ensuring the health and productivity of the pond, the channel downstream and adjacent riparian areas.

Beaver impoundments are critical in supporting the ecological diversity and successional changes within our streams. Flooding and coppicing of riparian vegetation by the beaver, followed by the eventual collapse of the impoundment and

renewal of stream cover, all serve to provide rich organic soils that, in turn, support an even greater diversity of organisms.

Through their damming activities beaver supply up to 25% of the low summer water reserves required for viable fish habitat¹. In turn, they provide habitat for a broad range of plant and animal species that are dependent on these wetlands. When water is flowing over the dam, juvenile fish are able to migrate downstream, making use of small rivulets at either end of the dam. Adult migration is often accommodated during wet weather periods. Salmon and trout can often ascend the dams during these periods, although their access may be slowed or even halted during low water periods.

5.0 URBAN DRAINAGE

Beaver prefer slow moving low gradient watercourses (preferred <6%), including marshes, wetlands and lakes, with ample access to both herbaceous and woody materials that they use for food and dam building purposes. The impoundments that they create often cause flooding and drainage concerns on adjacent lands especially during winter and spring. This results in conflicts, particularly in settlement areas, at roadway stream crossings and on agricultural and forest resource lands.

6.0 DAM AND DEBRIS MANAGEMENT

Dam management options should be considered in urban areas where unacceptable flooding is affecting adjacent property or road surfaces. Dam removal as a tool, however, can be frustrating and is generally ineffective when not used in concert with other management techniques, as the beaver will usually repair the breach immediately. There are a number of design strategies that can address these circumstances and provide effective alternatives to repeated removal of these barriers. When monitored appropriately, these structures can reduce the frequency of intensive maintenance at a crossing, therefore, reducing operational and liability costs.

Other methods have been developed for the purpose of accommodating fish migration patterns, however, these may not be suitable for addressing flooding concerns. It is important to consider that not all beaver problems can or should be handled in the same way. The key is in the identification of the specific problem site and preparing an appropriate management strategy that can remain flexible over time.

The following are examples of replacement and isolation techniques that are recommended to avoid repeated maintenance activities or outright removal. Alternative structures are continually being developed and other equally effective

¹ Managing Beaver Habitat for Salmonids: Working with Beavers, Finnigan and Marshall, 1997

measures may already be available. The important feature of any replacement technique, however, is to reduce the dam building response of beaver to the sound of running water. Beaver do not normally exhibit dam building behavior when there is a constant water level in the system.

6.1 Bridging

Objective

Where fish habitat and adjacent land values require free flowing stream conditions, it is recommended that these crossings be prioritized for eventual replacement with clear span bridges wherever feasible.

Beaver prefer to construct their dams in low gradient locations, where there are natural constrictions in the streamflow and a ready source of food and building materials. This often means that road crossing culverts become prime targets for dam building activities.

Replacement of a culvert with a free span bridge requires submission of a notification and compliance with Section 9 of the *Water Act*.

6.2 Culvert Screening Devices

Objective

Culvert design conversions, including upstream screening methods, should be considered on small low gradient systems where frequent maintenance problems and protection of fish access is desirable.

Guidelines

- Where fish are present, the structure should be designed and installed to promote fish migration patterns.
- A long profile is necessary to determine critical bed elevations to allow back watering of the culvert and to set the culvert elevation.

So-called “Beaver baffler” structures typically include range of structures that are fixed to the inlet end of a culvert. At least one proprietary design is available known as “Beaver Stop”², includes a double walled wire cage assembly that is fastened to the upstream end of the culvert. Ordering information for a range of existing pipe shapes and sizes under this name is available in Appendix A.

² Beaver Stop, Distributed by DCP Consulting, Calgary Alberta

In order to ensure optimum efficacy of a baffler structure, it is recommended that the following design criteria be used in their design and construction:

- the culvert length should extend through the dam plus at least 1 m into the upstream pond with the cage fixed to its end;
- the cage should be sized to fit the appropriate culvert and protrude far enough from the end of the culvert, in order to remain submerged and to prevent the beaver from plugging the wire mesh;
- the cage should be constructed of a durable material that will provide service for a period of not less than that expected for the culvert;
- the cage should be suspended at least 0.5 m above the pond floor to deter anchoring of dam materials to the bed of the pond by the beaver;
- the wire mesh should have openings of about 15 cm, as this will allow fish passage but hinder attempts by the beaver to plug the gaps and should enclose the intake end (see attached drawing);
- the culvert and mesh assembly should be designed to withstand a 1:10 year storm event and sized to allow fish passage.

As noted above, while these structures reduce the frequency of maintenance visits typically needed to maintain these culverts and occasional cleaning will still be required.

6.3 Other Structures

Log or rock fish ladders adjacent to beaver dams can be workable alternatives, used to promote fish access over beaver dams however these structures may not adequately address flooding.

6.4 Fencing Techniques

Objective

Fencing should be designed to safely and effectively exclude beaver from accessing upland vegetation while maintaining unrestricted stream flows.

Guidelines

Safe foraging distances are thought to be as much as 800 m upstream of the dam site and 50 m upland of the stream or pond area. In order to ensure safe and effective beaver exclusion fencing, the following guidelines should be adhered to.

- the fencing mesh should have openings of no more than 15 cm, to prevent passage of beaver kits;
- fencing should be placed at or slightly above the winter high water mark of a watercourse;

- U-shaped fencing mesh should extend at least 40 m upstream of culvert opening (see drawing);
- O-shaped fencing only on upstream ponds, never on stream channels (see drawing);

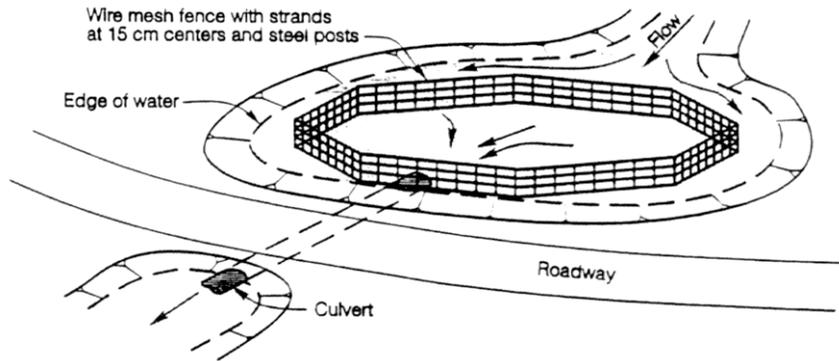


Figure 1. Example of “O” Shaped Fencing Layout
 (Drawing Courtesy of Finnigan and Marshall, 1997)

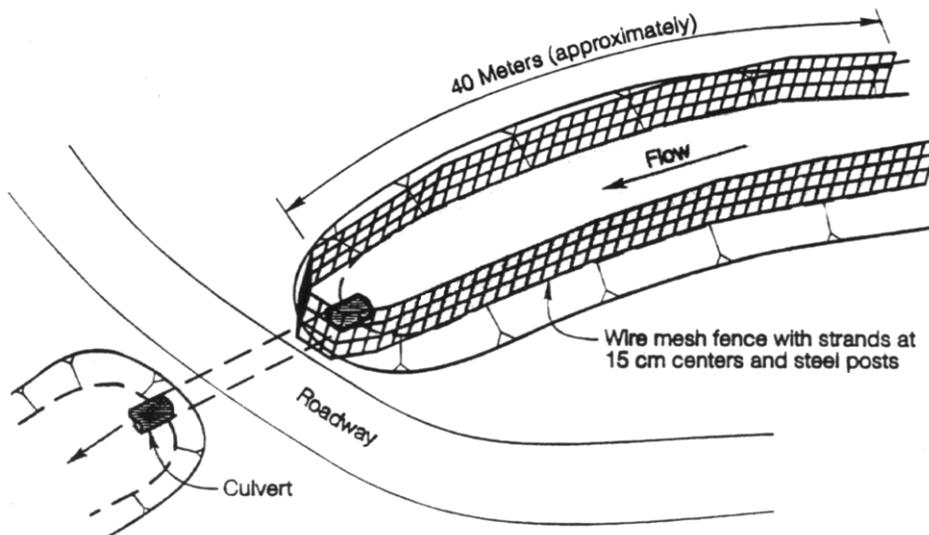


Figure 2. Example of “U” Shaped Fencing Layout
 (Drawing Courtesy of Finnigan and Marshall, 1997)

Note that all structures in and about a stream will require some level of maintenance.

7.0 ANIMAL MANAGEMENT

Objective

Due to the environmental benefits that these dams contribute to watershed health and biodiversity, wherever possible animal management techniques should allow the beaver colony to remain undisturbed.

Guidelines

Animal population control may be considered where consistent with the following guidelines:

- minor culls of animals may be considered where populations are known to be high;
- animal relocation is not considered a viable option due to the potential for creating new animal/human conflicts elsewhere;
- animal removal must only be undertaken by a licensed trapper during the open season between October 15 and April 30;
- detailed trapping information is included in Appendix B.

It is important to remember that trapping is often a temporary measure in that the beaver will quickly reoccupy the new territory from surrounding populations or from other watersheds. Further information concerning availability of licensed trappers is available from our ministry.

8.0 DAM REMOVAL

Objective

Complete beaver dam removal should only be considered after all other management tools have been exhausted, where an emergency situation has arisen and where measures can be taken to ensure no harmful alteration of fish habitat will occur. Expected negative impacts to instream habitat and channel stability include:

- a flush of silty water that can smother downstream fish spawning and rearing habitat;
- a rapid reduction of pond depth, that can result in stranding and mortality of fish, amphibians, bird species as well as aquatic and terrestrial plants;
- scouring and erosion of the downstream channel and banks, which often impacts private property and infrastructure;
- often rapid temperatures in the remaining pond, especially during summer months;
- flooding and erosion on downstream properties;
- potential contamination of downstream wells.

Guidelines

- Review and apply all the previously mentioned beaver management tools.

- Prepare a strategy for replacement or modification of the structure to address chronic maintenance concerns.
- Only undertake dam removal in compliance with federal *Fisheries Act* and the provincial *Water Act* Section 9 Regulations.
- Downstream water license holders must be notified prior to dam removal.
- Salvage fish in the area of disturbance, both downstream and in the pond. This is to be completed only under the terms and conditions of a fish collection permit issued by MELP staff [Contact Lew Carswell (250) 751-3225].
- Wherever possible, it is recommended that dam debris be removed by hand or light machinery.
- In order to control and prevent the release of silt to downstream fish habitat, appropriate silt fencing should be installed prior to any debris removal.
- In order to allow the pond head to gently discharge with minimal silt transfer and minor instream impacts, it is recommended that dam be removed in sections of roughly 6-12 inches staged every few hours.
- If machinery must be used, we recommend that it be positioned in a manner that will cause as little ground and vegetation disturbance to the stream bank as possible.
- It is recommended that all debris be removed from the site to prevent the beaver from reusing it in their repairs.

***Nothing in the above guidelines should be construed as authorization for harmful alteration destruction or disruption of fish habitat. It is the proponent's responsibility to obtain appropriate authorization for any instream works with potential for harmful alteration to fish habitat from Fisheries and Oceans Canada.**

OTHER READING SOURCES:

Nuisance Furbearer Damage Control in Urban and Suburban Areas, Maria H. De Almeida, Wildlife Branch, Ontario Ministry of Natural Resources, 1987.

Managing Beaver Habitat for Salmonids: Working With Beavers, Finnigan and Marshall, Watershed Restoration Technical Circular No.9, 1997.

The Return of the Beaver: Hye Yeong Kwon, Center for Watershed Protection, 1998.

Beaver Damage Control in Agricultural Areas of BC, BC Environment Stream Restoration Technical Bulletin QP#98358.

The Beaver Handbook: A Guide to Understanding and Coping with Beaver Activity, 1995.

BEAVER, Management Guidelines in British Columbia, Province of British Columbia, Wildlife Branch QP#92195.

Screening Units:

Beaver Stop, Packaged units or installations, DCP Consulting Ltd., 3219 Coleman Rd NW, Calgary, AB. T2L 1G6 (403) 282-2506 Fax (403) 220-9591.

APPENDIX A

“BEAVER STOP” - ORDERING INFORMATION



Packaged Units
or
INSTALLATIONS

Distributor:

DCP Consulting Ltd.
3219 Coleman Rd NW
Calgary AB T2L 1G6
Phone: (403) 282-2506
Fax: (403) 220-9591

TOLL FREE: 1-800-565-1152



**BEAVER STOP
PRICE LIST**

FOR PACKAGED UNITS

All Beaver Stops are 20 feet in length with 15 feet overlay and a Downstream Cap.

<u>CULVERT DIAMETER</u>		<u>PRICE</u>	<u>SHIPPING WEIGHT in lbs</u>
Up to 610 mm	24"	\$1,267.00	202
700 mm	27"	\$1,288.00	225
701 to 812 mm	32"	\$1,373.00	240
813 to 914 mm	36"	\$1,403.00	262
1000 mm	39"	\$1,565.00	290
1066 mm	42"	\$1,609.00	295
1067 to 1220 mm	48:	\$1,690.00	330
1221 to 1371 mm	54"	\$1,864.00	380
1600 mm	63"	\$2,147.00	445
1800 mm	72"	\$2,335.00	525

To inquire about special applications and availability call (403) 282-2506 or toll free at 1-800-565-1152.

Prices do not include PST, GST and shipping. Prices subject to change without notice.

There will be a 15% restocking charge on all returned Beaver Stops.

APPENDIX B

BEAVER MANAGEMENT GUIDELINES IN BRITISH COLUMBIA
PROVINCE OF BC MINISTRY OF ENVIRONMENT
WILDLIFE BRANCH

