

**BOWEN ISLAND
FISH & WILDLIFE CLUB**



**CARTER POND
Sediment Removal Project**

Bowen Island 2014



INTRODUCTION

Carter Pond was created when a concrete dam was built many years ago by the Union Steamship Company as a water reservoir. Today it is on Bowen Island Municipality land and serves as the primary water source for the Terminal Creek Salmon Hatchery in Crippen Park. The hatchery is owned by Metro Vancouver Parks and operated by volunteers of the Bowen Island Fish & Wildlife Club (BIFWC) under the supervision of the Department of Fisheries & Oceans Canada (DFO).

Over time sediment from Terminal Creek accumulates in Carter Pond. Approximately every 10 – 12 years the sediment reaches a high level and heavy rain events between November and March cause muddy sediment and twigs to be washed into the water supply pipe at Carter Pond and into the hatchery incubation trays and water troughs. The sediment starves salmon eggs and fry of oxygen. During the winter of 2013-14 the BIFWC lost 50,000 of the 100,000 pink salmon eggs incubating in the hatchery, and 60,000 of the 200,000 chum eggs. Thus, removing sediment from Carter Pond during low water in the summer of 2014 became a priority for DFO and the BIFWC.

Funds to complete the project were provided by the Pacific Salmon Foundation (PSF) and J&E Backhoe Ltd. was awarded the contract to complete the work. PSF funds must be matched by volunteer in-kind contributions. The total value of this Carter Pond Sediment Removal Project is about \$12,500.

This booklet is structured to show photos and descriptions as per the order of events from the beginning to the end of the project. Because Carter Pond will likely have to be dredged every 10 – 12 years, this booklet will be a useful reference in the future.

SEDIMENT REMOVAL PROCESS

Before the Labour Day weekend, 2014, J&E Backhoe moved their large excavator with a 1 yard bucket down the steep hill behind the pond onto the site. The BIFWC had received a work permit from Bowen Island Municipality (BIM); the cost of the permit was \$100 plus a \$500 refundable deposit was given to BIM. The excavator gently removes ferns and shrubs and prepares the sediment disposal area in the forest far enough away from Carter Pond that sediment will not be washed back into the pond during heavy rain events. Ferns and shrubs will be replanted after the project is completed.

BIFWC volunteers placed a fish net on Terminal Creek upstream of Carter Pond then trapped fish over several days, rescuing mainly cutthroat trout by trapping and relocating them above the fish net. When as many fish as possible had been trapped, BIFWC volunteers removed the three stop logs on the dam one-at-a-time using ropes with hooks to gradually raise the stop logs so that sudden surges of water didn't wash downstream. On the Friday afternoon before the long weekend the J&E Backhoe excavator created a pool where Terminal Creek enters Carter Pond and the J&E crew ran a 6" PVC sectional plastic pipe from the pool over the dam where the stop logs had been. Therefore, clear water from Terminal Creek was gravity fed over the dam to keep Terminal at full-flow downstream.





Fish net is secured across Terminal Creek upstream of Carter Pond. Fish, mainly cutthroat trout, are trapped and moved above the fish net.



After fish are rescued from Carter Pond, the excavator digs a hole to create a pool where Terminal Creek enters Carter Pond. The 3 stop logs on the dam are removed one-at-a-time using ropes with hooks which attach to the hooks on the stop logs. For safety reasons, BIFWC volunteers are careful not to create sudden heavy surges of water over the dam into Terminal Creek downstream. A 6" PVC sectional pipe gravity feeds clear water from the pool over the dam where the stop logs used to be located. Note that only 1 stop log remains (soon to be removed completely) and it has been lifted slightly to allow the water to drain slowly; the same procedure was followed with the top 2 stop logs.



A backup diesel water pump is located beside the pool with the output hose draped over the dam. The water pump will be used to maintain full flow over the dam when the PVC pipe is temporarily removed to allow the excavator to remove sediment from that area.





Carter Pond was allowed to drain over the Labour Day long weekend. The sediment lies on top of bedrock.



On Tuesday the extent of sediment build-up in Carter Pond is evident. In addition to sediment, trees and logs must be removed.



Tim Pardee and Jim Bydak, BIFWC volunteers, standing on sediment in Carter Pond. Because water drained over the weekend, it was easier for the excavator to enter the pond area.



Ed Weismiller and Julian Stevenson of J&E Backhoe remove the PVC pipe temporarily so that sediment can be removed. Note that the pump hose is now directing clear water from Terminal Creek over the dam.



The excavator removes sediment from the area where the PVC pipe was previously located while the water is pumped from Terminal Creek over the dam.





Jamie Weismiller, the J&E excavator operator, can move a lot of material with the 1 yard bucket.



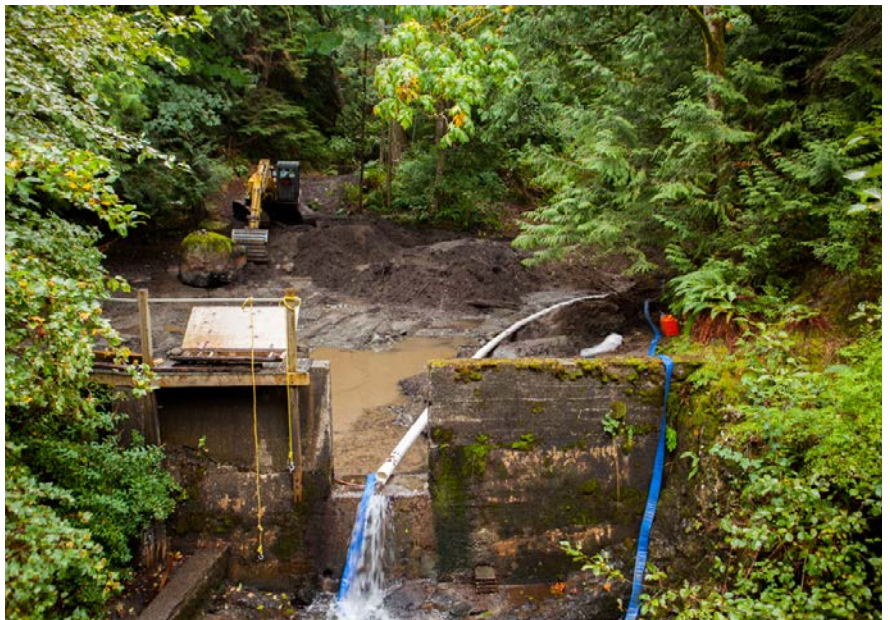
While the excavator removes sediment, BIFWC volunteers remove and clean the 8 heavy hatchery water intake filter grates. Note all the sediment build-up on the grates and that about 3 feet of mud and silt has accumulated at the bottom of the water intake structure right in front of the water intake pipe opening.



After removing and cleaning the grates on the street and shoveling the mud and silt away from the water intake, the grates are replaced. In the future, BIFWC volunteers should clean the grates and remove mud and silt built up in front of the hatchery water intake pipe every year during low water in August or September. This involves carefully removing the stop logs one-by-one to lower the water level in Carter Pond, removing and cleaning the grates, and wearing hip waders to enter the pond and shovel mud and silt from the bottom of the water intake structure.



Meanwhile, the excavator has removed all sediment from the side of Carter Pond, the PVC pipe has been re-installed to again allow the gravity feed of water from Terminal Creek over the dam, and the water pump has been turned off.



While the rest of the sediment is being removed, clean water continues to flow from Terminal Creek over the dam through the 6" PVC pipe.



As you can see, the bottom of Carter Pond is bedrock.



This view from the point where Terminal Creek enters Carter Pond, looking toward the dam, shows that the huge volume of sediment and trees have been removed.





When all sediment has been removed, the pool at the entrance to Carter Pond is released and the PVC pipe removed. The pond refills and water soon flows over the dam.



Dirt clouds the water at first but it soon clears. Within hours the water flow and turbidity in Terminal Creek downstream of Carter Dam is back to normal.



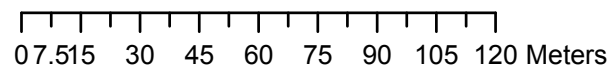
The relocated sediment, very organic material, is moved well back into the forest and leveled. Natural ferns and shrubs have been replanted and mitigation measures taken to assure sediment is not washed back into Carter Pond during heavy rainfall.



Ed Weismiller, Owner of J&E Backhoe Ltd., and Tim Pardee, President of the Bowen Island Fish & Wildlife Club, smile after all the sediment has been removed from Carter Pond. Another salmon rehabilitation project well-done.







**Carter Pond Sediment Removal,
Bowen Island.**

Prepared by Whitehead Environmental Consultants Ltd.
26 Jan. 2015

Base map courtesy of the Bowen Island Municipality and Bowen Island Conservancy.
Topography based on LIDAR survey, 1 m intervals. All feature locations are approximate.

LEGEND	
Stream, fish present:	
	yes
	no
	unknown
	Properties





CONTRIBUTING TO SALMON HABITAT REHABILITATION

This project would not have been possible without the energy and dedication of Bowen Island Fish and Wildlife Club volunteers. In the case of the Carter Pond Sediment Removal Project special thanks go to Mike von Zuben, Alan Whitehead, Roger Milsted, Bill Keller, Jim Bydak, Charles Perrin, Craig MacDonald, Anne de Ferriere, and Andre Chollat.

BIFWC Volunteers at the Terminal Creek Salmon Hatchery

Without funding from the Pacific Salmon Foundation it would not be possible to do the rehabilitation work we do. Rob Bell-Irving, DFO's Community Advisor, provided invaluable technical expertise. Rob is now more confident that the Terminal Creek Salmon Hatchery water supply is more reliable, and that sediment and woody debris will not be washed into the hatchery water intake at Carter Dam. The work now completed protects salmon eggs and fry in the hatchery.

Bowen Island Municipality (BIM) owns Carter Dam and we wish to thank BIM, in particular Kathy LaLonde and Bob Robinson, for their approval and support of this project. Ed Weismiller, Jamie Weismiller, and Julian Stevenson of J&E Backhoe Ltd. completed their work on time and on budget. Working with Ed and his team is a learning experience and pleasure.



From L to R: Jlonka Bally Brown, Martin Clarke, Mike von Zuben, Anne de Ferriere, Rob Bell-Irving (DFO), Tim Pardee, Roger Milsted, Andre Chollat

(Photo credit: Debra Stringfellow)



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