

HRSEP

Habitat Restoration and Salmon Enhancement Program

2000/2001 Summary Report



Fisheries and Oceans
Canada

Pêches et Océans
Canada

Canada 

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EXECUTIVE SUMMARY

The Habitat Restoration and Salmon Enhancement Program (HRSEP) was established in 1996-97 to complement the Pacific Salmon Revitalization Strategy. The main objective of the federally funded HRSEP is to revitalize salmon populations in British Columbia through habitat restoration, stock rebuilding, and resource and watershed stewardship. Other important goals are to develop and strengthen partnerships at the community level and (where feasible) train and/or employ displaced fishery workers. The projects are run by a variety of community groups and agencies.

The 2000-01 fiscal year was the fifth consecutive year of the HRSEP, with over \$6 million invested in over 140 projects



throughout British Columbia and the Yukon Territory. Program results included over 21 million adult and juvenile salmon enumerated, nearly 68,000 sq. kilometres of habitat mapped or inventoried, over 1,000,000 sq. metres of channel, lake and estuarine habitat created/restored, over 300,000 sq. metres of riparian area replanted, approximately 81 km of stream access made available to fish, and approximately 34 km of streamside fencing constructed. As well, numerous media releases and public presentations were made, and thousands of landowners were contacted to ensure extensive public involvement. This report summarizes the 2000-01 program results and highlights several projects.

DESCRIPTION OF HRSEP

The Habitat Restoration and Salmon Enhancement Program was first established in 1996 as part of the Pacific Salmon Revitalization Strategy in response to concerns over declining Pacific salmon populations, particularly coho. Declines are attributed to habitat loss, changes in climate and marine conditions and past overfishing practices. HRSEP aims to help restore the health of Pacific salmon populations by engaging the efforts of many different groups throughout British Columbia. In the past three years since its inception, this federally funded program has injected \$25 million into community conservation projects involving hundreds of groups and agencies. Activities focused on habitat restoration, stock rebuilding, and resource and watershed stewardship.

The second phase of the HRSEP commenced in 1999 with the allocation of an additional \$20 million to continue the program for a further three fiscal years under the federal government's \$100 million Resource Rebuilding program. The latter is a major element of the five-year, \$400 million Pacific Fisheries Adjustment and Restructuring Program launched in 1998 to assist individuals and communities in rebuilding Pacific salmon. This report summarizes the 2000-01 HRSEP program results.

HRSEP FOCUS

The primary focus of HRSEP is to revitalize salmon populations in the Pacific Region through habitat restoration, stock rebuilding, and resource and watershed stewardship. The projects fall into three major categories:

A. Habitat Restoration

Habitat restoration activities focus on improving or creating fish habitat in local streams, rivers lakes and estuaries to improve salmon survival and increase their production. Project activities include:

- Building side-channels, adding spawning gravel, and placing large woody debris (LWD) and boulders into streams to create and enhance spawning and rearing habitat,



- Planting riparian vegetation, adding rip-rap and constructing log-crib walls to stabilize eroding banks,
- Installing fencing to restrict livestock access to salmon streams and protect riparian stability,
- Modifying barriers to fish passage to improve or extend fish access to suitable habitat, and
- Constructing water-storage dams in upper watersheds to improve water flows.

B. Salmon Stock Rebuilding

Salmon rebuilding activities focus on strengthening weak salmon populations through intensive enhancement projects that include hatchery operations, juvenile marking studies to assess survival, adult and juvenile enumeration and bio-sampling.

C. Resource and Watershed Stewardship

Watershed stewardship involves community-based initiatives that lead to sustainable salmon populations. Projects include stream inventories, habitat mapping, adult and juvenile fish monitoring, protection of habitat through watershed planning, and development of educational community programs (presentations, workshops, brochures, public signage, field trips, etc).

HRSEP PARTICIPANTS

Numerous individuals, local communities, stewardship groups, corporations, First Nations, fishing interests, and all levels of government (municipal, provincial, federal) participated in the 2000-01 program. Many projects employed and trained displaced fishery workers including First Nations members. All these groups worked in partnership with Fisheries and Oceans Canada (DFO) which provided technical assistance for many projects.

LOCATION OF HRSEP PROJECTS

The 2000-01 HRSEP projects encompassed seven major regions of British Columbia and the Yukon – Upper, Middle and Lower Fraser areas; North, Central and South Coast areas; and the Yukon Territory. The individual projects are listed below by geographical area (see maps & lists pages 11-19).

EVALUATION OF PROPOSALS

Community groups, stakeholders and technical staff from agencies including Fisheries and Oceans Canada submitted proposals to the HRSEP for 2000-01 fiscal year. Project proposals

were reviewed in early 2000, and final projects were selected by technical committees that consisted of Fisheries and Oceans Canada personnel, First Nations members, representatives of provincial agencies such as Fisheries Renewal BC, and delegates from local community stewardship groups. Of the approximately 400 proposals valued at \$19 million submitted for evaluation, over 140 were approved for a total of \$6.2 million.

The selected projects addressed a combination of HRSEP priorities, including:

- Focusing on stocks at risk, and targeting those areas with high priority for stock conservation and/or habitat restoration issues,
- Involving, developing and strengthening partnerships with local communities and other agencies,
- Demonstrating appropriate support, permits and approvals (where required), and garnering additional funding from other partners, and
- Showing a high likelihood of project success, and meeting all objectives within the proposed budget by the end of March 2001.

Projects that best met the above priorities, were recommended for funding.



HRSEP FUNDING

The federal contribution of \$6 million to the 2000-01 HRSEP was in addition to the \$33 million that Fisheries and Oceans Canada spends annually on fish habitat management and salmon enhancement in the Pacific Region. The proponents of HRSEP also received funds and in-kind support from other partners.

Fisheries and Oceans Canada provides funding to proponents through a contractual agreement that covers project description, budget and payment schedule. The document also provides legal direction including right to credit, property ownership, equipment purchase and termination rights. As well, all proponents are required to submit a final report in a standardized format.



HRSEP ADMINISTRATION

Fisheries and Oceans administers the HRSEP projects within a well-defined monitoring and reporting structure. The final mandatory report for each project covers the following topics:

1. Proponent information,
2. Project location, title and rationale,
3. Project activity type and objectives,
4. Personnel and partnerships involved,
5. Results and quantifiable measures (area mapped, numbers of salmon enumerated, habitat area restored or created, media releases issued, etc.),
6. General project description (methods, techniques),
7. Recommended follow-up monitoring, and
8. Supporting documentation and financial summary.

Part of the information collected is entered into the Fisheries Project Registry – a joint provincial/federal database that summarizes all fishery projects in British Columbia by watershed. This internet-based information registry is operational and allows easy access to all interested groups.



QUICK FACTS

SPECIES AND HABITAT ADDRESSED

Species Addressed	# Projects
Coho	116
Chum	61
Sockeye	37
Pink	44
Chinook	65
Steelhead	51
Other	81
Total projects with that information*	138

*Many projects addressed several or all species in target streams.

Habitat Addressed	# Projects
In-Channel (mainstem)	59
Off-Channel	37
Riparian	37
Lake	3
Estuarine-Marine	5
Other	3
Total projects with that information*	90

*Many projects addressed several habitat types.

PERSONNEL INVOLVED AND WORK ACCOMPLISHED

Persons Involved	Total
Persons Trained	2,292
Persons Employed	1,024
Person-days of Employment Created	85,236
Volunteers Involved	2,320
Volunteer-hours	40,242

Stewardship & Community Planning	Total
Public Presentations/Media Releases	332
Landowners Contacted	4,439

Stock Rebuilding	Total
Adult Salmon Enumerated	839,520
Juvenile Salmon Enumerated	20,630,060
Salmon Marked, Tagged or Released	1,069,255

Mapping/Inventory & Habitat Restoration	Total
Mapping/Inventory (linear m)	382,327
Mapping/Inventory (km ²)	67,867
Fencing (m protected)	34,145
Fencing (m ² protected)	418,364
Riparian Replanting (# plants, trees)	108,911
Riparian Replanting (m ² area)	302,929
In-Channel Habitat (m ² area restored)	638,253
Off-Channel Habitat (m ² area created/restored)	180,287
Estuarine Habitat (m ² area created/restored)	6,220
Lake Habitat (m ² area created/restored)	238,000
Fish Access (m habitat made available)	80,984

PROGRAM RESULTS

Funding by Geographic Area

Funding allocation for the 2000-01 program is shown by geographic area in Figure A. Of the \$6.2 million spent, approximately \$0.3 million, \$0.8 million and \$1.3 million were allocated to each of the Upper, Middle and Lower Fraser areas; \$1.0 million, \$0.5 million and \$2.1 million to each of the North, Central and South Coast areas; and \$0.2 million to the Yukon Territory.

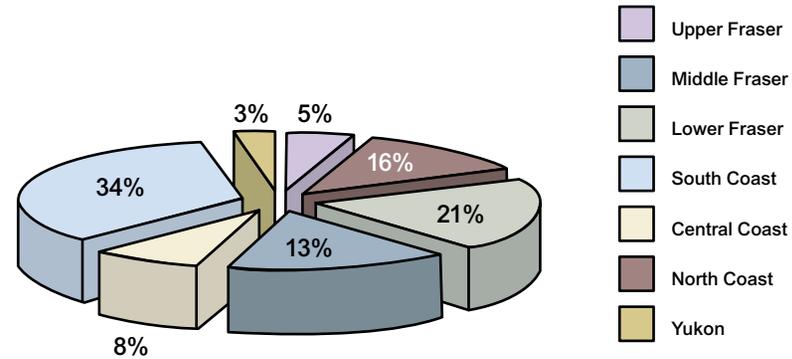


Figure A: Funding by Geographic Area

Funding by Project Category

Funding allocation by project category is shown in Figure B. Habitat restoration projects received 42% of the total funding, followed by the stock rebuilding projects (33% of total funds) and resource and watershed stewardship projects (15% of funds). The remaining funds were spent on items associated with program operation (i.e., administration, technical support and travel expenses involved with program audit).

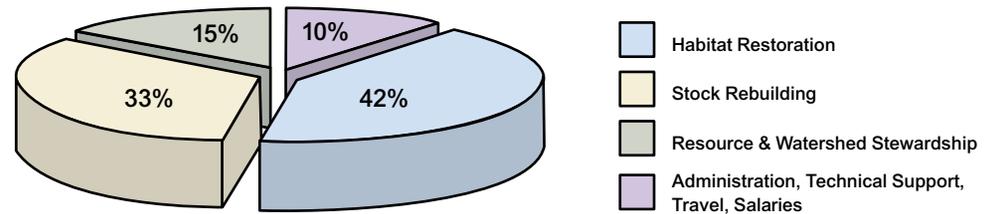


Figure B: Funding by Project Category

PERSONNEL INVOLVED & WORK ACCOMPLISHED

Project results are summarized in Quick Facts (page 7). The available data show that a vast scope of work was accomplished during the 2000-01 HRSEP including:

- over 21 million adult and juvenile salmon enumerated,
- nearly 68,000 sq. kilometres of habitat mapped or inventoried,
- over 1,000,000 sq. metres of channel, lake and estuarine habitat created/restored,
- over 300,000 sq. metres of riparian area replanted,
- approximately 81 km of stream habitat made available through improved fish access, and
- approximately 34 km of streamside fencing constructed.

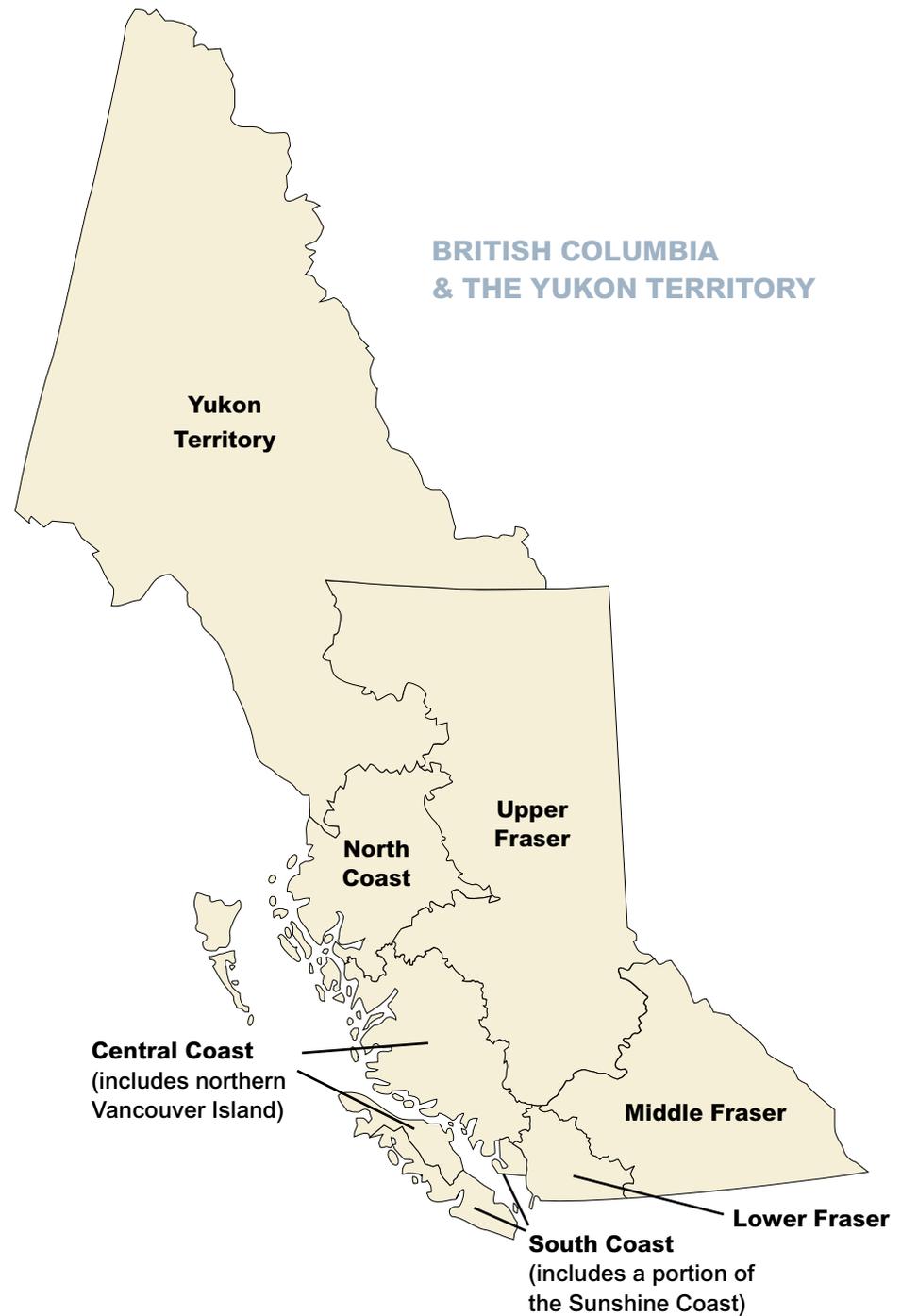


Numerous media releases and public presentations were also made (see Quick Facts, page 7), and thousands of landowners were contacted, ensuring a broad educational base and extensive public involvement. As well, HRSEP provided funds for the employment and training of hundreds of displaced fishery workers, including those from First Nations groups.

SPECIES & HABITAT ADDRESSED

The HRSEP projects addressed all species of Pacific salmon (coho, chinook, chum, sockeye, pink, steelhead). Likewise, all habitat types (in-channel, off-channel, riparian, lake, estuarine-marine) were addressed. The greatest effort was directed toward coho salmon and their freshwater habitat which is critical to rearing coho juveniles (see Quick Facts, page 7).

LOCATION OF HRSEP PROJECTS



LOWER FRASER

Map # Project Title

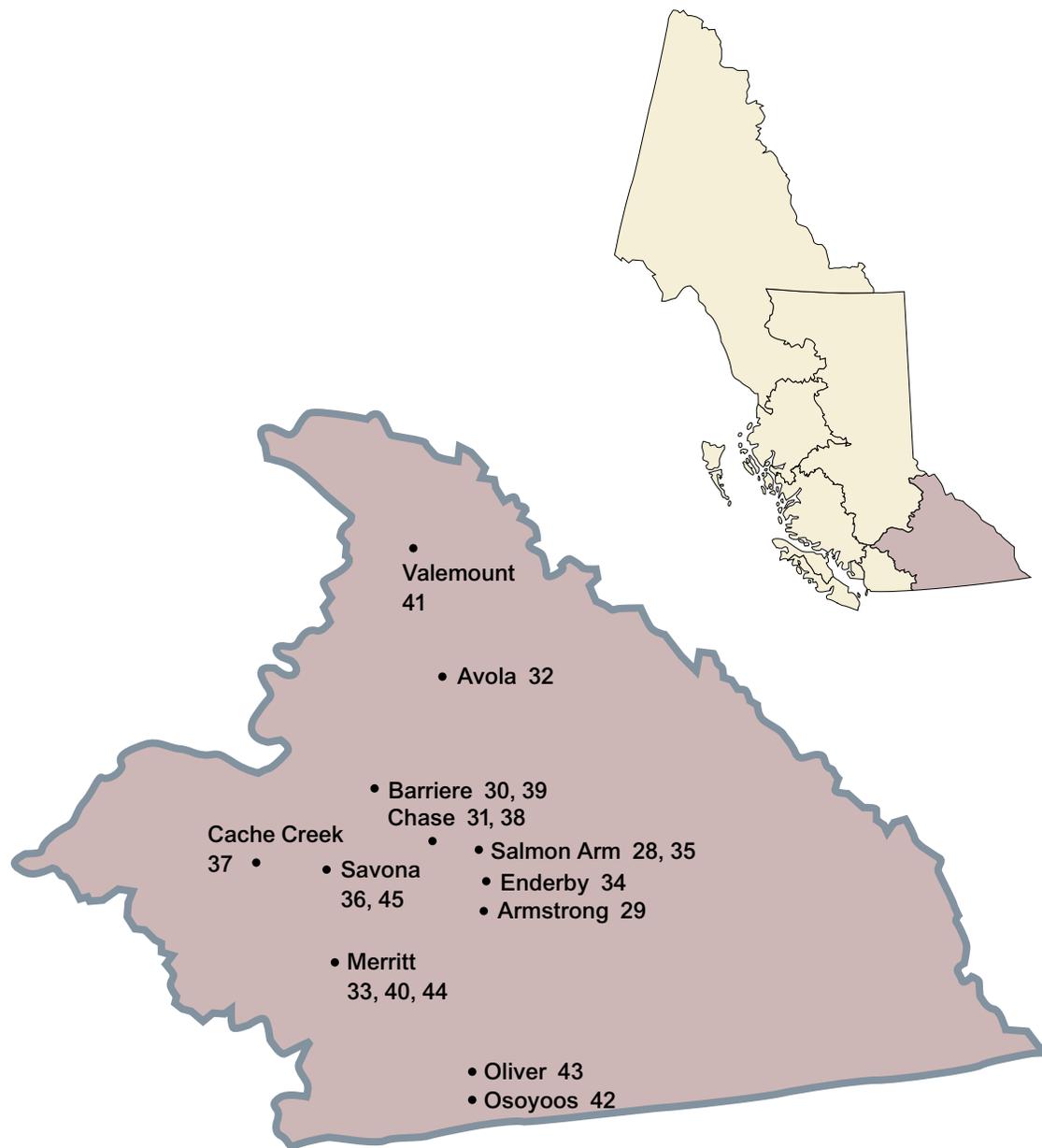
- 1 Vedder River Flood Plain Agricultural Restoration
- 2 Upper Chilliwack River (Restitution Creek) Restoration Project
- 3 Hyde Creek Restoration
- 4 Lower Mainland Small Streams 2000-01
- 5 Upper Lillooet River Off-Channel Rehabilitation
- 6 Squamish River Estuary Restoration
- 7 Maria Slough Chinook Spawning Habitat
- 8 Seymour River Off-channel Habitat Project
- 9 Beecher Creek Habitat Restoration
Lougheed Highway Culvert
- 10 Silverdale Creek Falls Fish Access
- 11 Terminal Creek Gravel Placement
- 12 Coquitlam/Alouette & Como Salmon Habitat Restoration
- 13 Langley Watershed Restoration Projects
- 14 Loggers Lane Creek Enhancement
- 15 Stoney Creek Off-channel Fish Habitat Enhancement
- 16 Kanaka Watershed Stewardship
- 17 Watercourse Mapping Project: Phase 3
- 18 SHaRP: Salmon Habitat & Restoration Program
- 19 Alouette Watershed Stewardship
- 20 Agassiz Debris Trap
- 21 Hoy Scott Creek Hatchery Enhancement
- 22 Coho Outmigration and Distribution Study
- 23 Yale Fishwheel and Coho Tagging Program
- 24 Salmon River (Langley) Wild Coho Assessment
- 25 Upper Pitt River Wild Coho Assessment
- 26 Salmon River (Langley) Wild Coho Assessment:
Non-funded Project Cost Increases
- 27 Hope Slough Salmonid/Water Assessment
and Community Awareness



MIDDLE FRASER

Map # Project Title

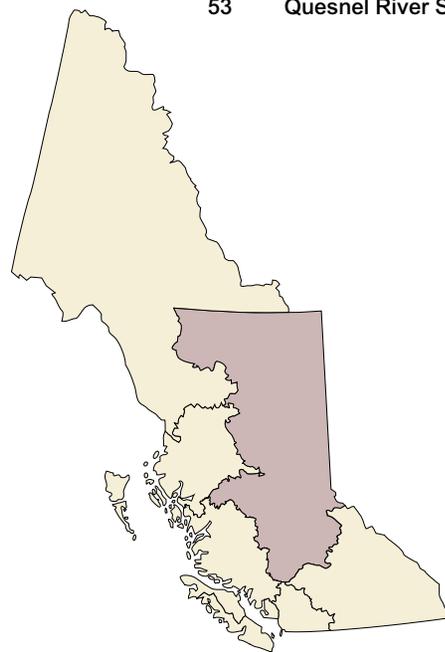
- 28 Salmon River Watershed Project
- 29 Fortune Creek Restoration Project
- 30 Louis Creek Stream Restoration
- 31 Sinmax Creek Mixed Stock Planting and Riparian Fencing
- 32 Avola Creek: Phase 3
- 33 Middle Nicola Riparian Restoration
- 34 Wap Creek Instream Salmonid Habitat Improvement Program
- 35 Palmer Creek Fish Passage Improvements
- 36 Deadman River Restoration
- 37 Bonaparte River Stream Restoration - Antoine Property
- 38 Juvenile Utilization Assessment of Habitat Restoration Structures
- 39 Louis Creek Riparian Restoration and Grazing Plan
- 40 Guichon Irrigation Ditch Deactivation
- 41 Robson Valley Digital Mapping Development
- 42 Comparative Surveys of Mysis Relicta & Juvenile Sockeye/Kokanee in Osoyoos & Skaha Lakes
- 43 Okanagan Sockeye Stock Assessment
- 44 Coldwater River Coho Counting Fence
- 45 Deadman River Electronic Fish Counting Fence Video Validation



UPPER FRASER

Map # Project Title

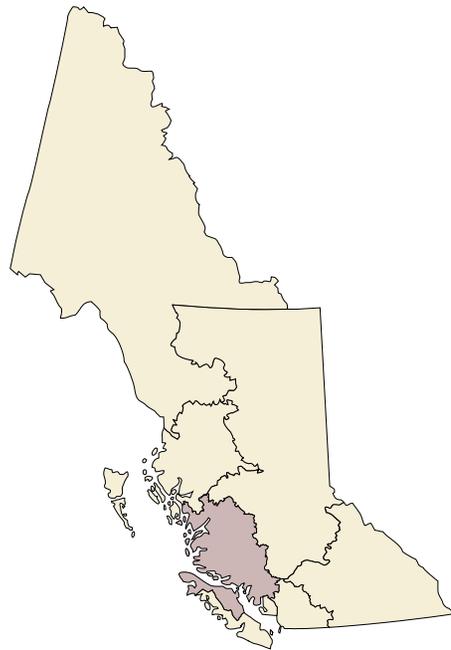
- 46 Blackwater River/Trout Lake Watershed Protection Project
- 47 Replacement of Defective Finnegan Fish Screens (Chilcotin)
- 48 Off-channel Rearing Habitat Restoration on Naver Creek
- 49 Narcosli Creek Survey and Restoration
- 50 Chilako River Watershed Fluvial Geomorphology Study
- 51 Digital Mapping of Riparian Areas Around Prince George
- 52 Development of Native Plant Stock for Riparian Restoration
- 53 Quesnel River Salmon Hatchery and Landscape Ecology Center



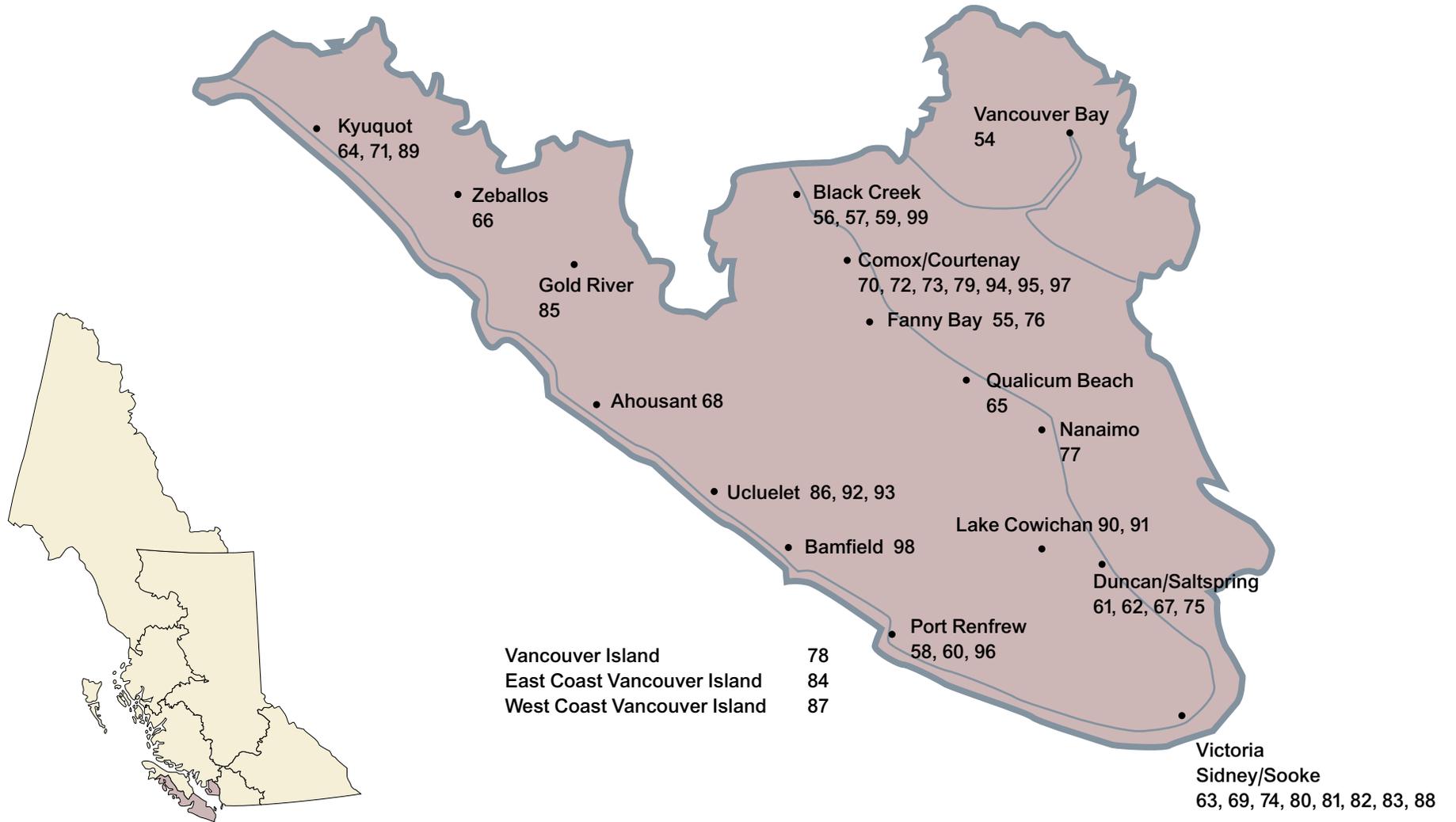
CENTRAL COAST

Map # Project Title

- 84 Vancouver Island Salmon Recovery Plan
- 100 Bella Coola Valley Restoration Program
- 101 Algard (Clear Creek) Side-Channel: Phase 1
- 102 Woss River Airport Side-Channel
- 103 Haig-Brown's Kingfisher Creek Habitat Improvements
- 104 Woss Lake Sockeye Assessment and Enrichment Project
- 105 Survival and Exploitation of Keogh River Coho
- 106 Salmon Escapement Enumeration on the Keogh
- 107 Willow and Simms Creek Fry Distribution and Stream Flow Study
- 108 Woss Community Hatchery Upgrade and Public Awareness
- 109 Enhancement and Assessment of Coho, Chum, and Sockeye



SOUTH COAST



SOUTH COAST

Map # Project Title

54	Van Bay Sidechannel: Phase 2	78	Streamkeeper Coordinator Position
55	Coal Creek Groundwater/Side Channel Assessment	79	Headquarters Creek Monitoring Station
56	Raven Channel Extension	80	South Island Pollution Prevention & Watershed Renewal
57	South Oxbow Side-Channel (Oyster River)	81	Project Emerald
58	Lens Creek Side-Channel	85	Gold River Chinook Project
59	Swamp 101 - Miller Creek Water Storage Project	86	Kennedy Lake Drainage Stock Assessment
60	San Juan River/ Harris Creek Fertilization	87	WCVI Salmon Escapement Assessment to "Wild" Rivers
61	Lower Bings Creek Habitat Restoration	88	Kirby Creek Coho Stock Assessment
62	Spiers Creek Culvert Replacement	89	Jansen Lake Habitat Restoration Project: Phase II
63	Lower Reay Creek Restoration Project	90	Cowichan Floating Lake Trap, River Auger Trap (Juvenile Coho Assessment)
64	Malksope River Beaver Dam Restoration and Coho Fry Enumeration	91	Oliver Creek Assessment Program, Smolt & Adult Fence Trap
65	Grandon Creek Culvert Barrier Removal	92	Life History and Stock Structure - Kennedy Lake Sockeye, Chinook, and Coho Salmon
66	Zeballos Side-Channel	93	Kennedy Lake Expanded Sockeye Incubation Study: Phase 3
67	Salt Spring Island Small Stream Restoration	94	High Temperature Study at Puntledge River
68	Cypre River Groundwater Channel, Site 15	95	Distribution and Abundance of Juvenile Salmon in Courtenay River Estuary/Baynes Sound
69	Noble Creek Dam Removal and Riparian Zone Restoration	96	Continued Partnership for Stock Assessment SWCVI
70	Stream Channel Redefinition and Habitat Restoration	97	Hatchery/Wild Fry Assessment
71	Easy Creek Fish Habitat Restoration Project	98	Henderson Lake Sockeye and Chinook Rebuilding Program
72	Prescriptions for Coho Habitat Restoration and Enhancement	99	Assessment of Coho Smolt Production in Man-Made Channels in the Mainstem of Oyster River
73	Salmonid Habitat Restoration and Enhancement Reach 4, Piercy Creek Mainstem		
74	Demamiel Creek Restoration Strategy: Phase 1		
75	Four Side Channels Restoration Project: Phase 2		
76	Rosewall Creek Instream Habitat Complexing and Bank Stabilization		
77	Nanaimo River Land Acquisition		

Map # Project Title

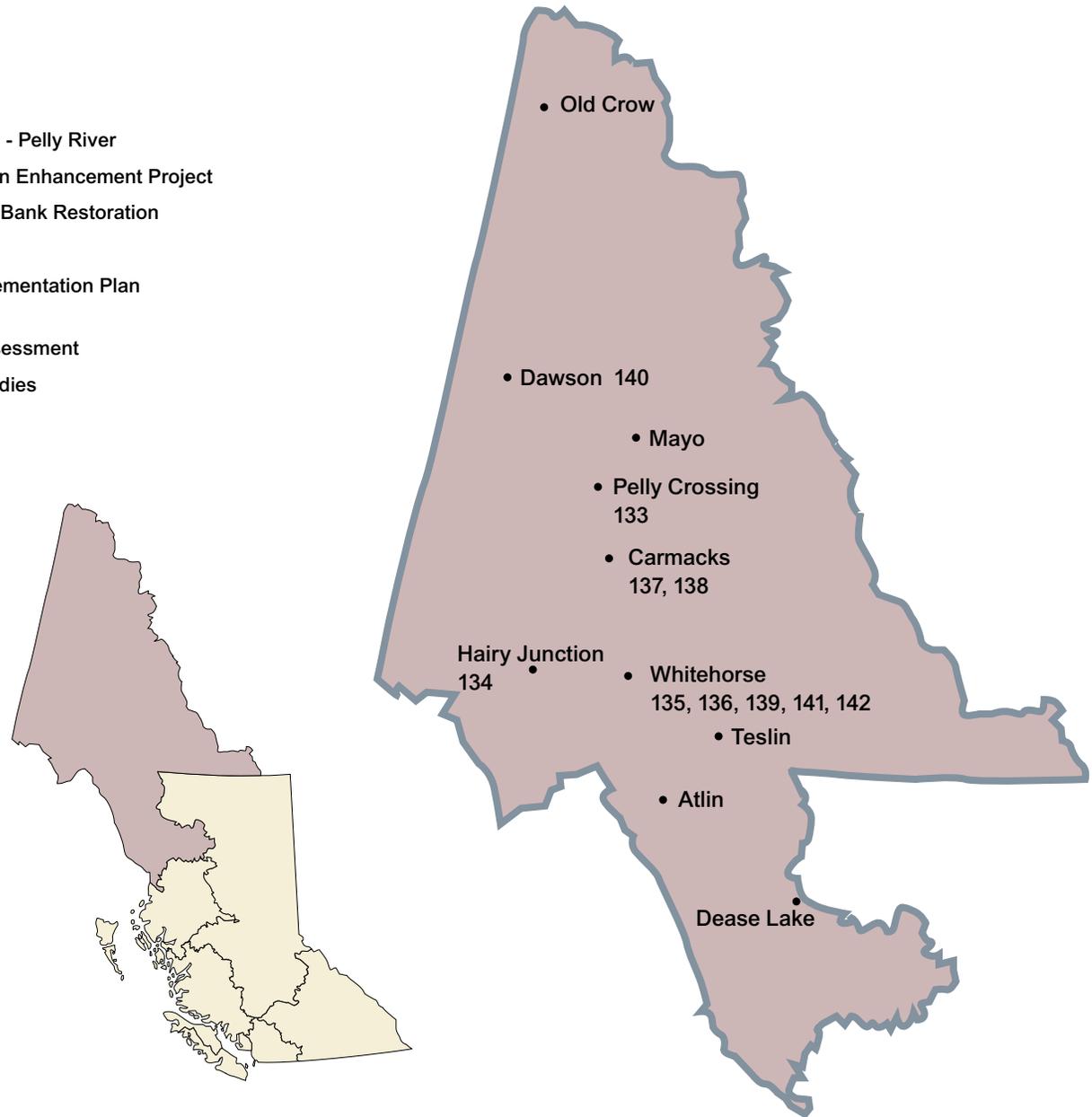
- 110 Rigging Chainsaw Winch Systems for Stream Restoration Projects
- 111 Spring Creek Restoration Project
- 112 Rennell Sound and Peel Inlet Fish Habitat and Inventory Project
- 113 Skidegate Inlet, W, Skidegate Channel & Rennell Sound Streams Fish Habitat Restoration
- 114 Kofoed Creek Habitat Restoration
- 115 Chown Brook Habitat Survey
- 116 Transportation Corridor Stream Crossing Inventory Database and Fish Habitat Signage Program
- 117 Juvenile Salmon Distribution in the Intertidal Foreshores of Prince Rupert and Port Edward
- 118 Stream Channel Stability Assessment of Clear Creek in the Kitsumkalum Watershed
- 119 Habitat Rehabilitation, Fisheries Inventory & Public Stewardship for Bear River Tributaries
- 120 Kids in Creeks (KIC)
- 121 Salmon Habitat Sensitivity Mapping
- 122 Moricetown Coho Conservation and Tagging Program
- 123 Coho Escapement Counts on Bulkley Watershed Streams
- 124 Kitwanga Coho Salmon Enhancement Program
- 125 Upper Skeena Coho and Sockeye Stock Assessment
- 126 Naden Guardian Adult Spawner Enumeration
- 127 North Coast Stream Inventory Program
- 128 ORRA/Metlakatla 2000 Watershed Restoration and Stock Enhancement Project
- 129 2000 Adult Coho Enumeration Program
- 130 Modifications and Operation of the Tlell River Adult Salmon Counting Fence
- 131 Kitwanga Sockeye Enhancement Program
- 132 Aliford Bay Hatchery Manager Funding



YUKON

Map # Project Title

- 133 Salmonid Habitat Restoration and Monitoring - Pelly River
- 134 Little Klukshu Habitat Restoration and Salmon Enhancement Project
- 135 Wolf Creek Snowmobile Trail Relocation and Bank Restoration
- 136 Michie Creek Beaver Management
- 137 Salmon Restoration, Development, and Implementation Plan for the Upper Nordenskiöld River
- 138 Klusha Creek Chinook Spawning Habitat Assessment
- 139 Yukon Schools Fry Releases and Habitat Studies
- 140 Chandindu River Salmon Enumeration Weir
- 141 McIntyre Creek Salmon Incubation Facility
- 142 Wolf Creek Enhancement Project



EXAMPLES OF COMPLETED HRSEP PROJECTS

The following examples of completed HRSEP projects illustrate the scope of work in the 2000-01 program.

UPPER FRASER

Horsefly River and tributaries

The Quesnel River Watershed Alliance received \$24,300 to grow native riparian shrubs to meet ongoing requirements for streamside planting at habitat restoration sites in the Horsefly River watershed. Plants were salvaged from areas slated for clearing, and seeds and cuttings were collected and propagated for next year's stock. The project provided employment and plant-nursery training to local youth.

Chilcotin River (Alexis Creek)

The Chilcotin Livestock Association received \$21,400 to replace, in cooperation with Fisheries and Oceans Canada and rancher Tony Bayliff, the existing non-functioning fish screens to decrease the mortality of chinook, coho and rainbow fry in their natal stream. The project promoted community awareness of salmon and fostered a land stewardship ethic by demonstrating how fish and ranchers can co-exist.



MIDDLE FRASER

Coldwater River (Merritt)

The Nicola Watershed Stewardship and Fisheries Authority received \$86,300 to operate a counting fence and conduct a mark-recapture study to accurately estimate the Coldwater River coho population. Information on salmon life history and biological characteristics was also collected, including the numbers of enhanced fish returning to their natal stream.

Upper Fraser watershed (McBride and Valemont)

The Regional District of Fraser-Fort George received \$24,700 to produce integrated digital maps for fish-bearing streams within the Upper Fraser River and its direct tributaries within the Robson Valley. These maps – depicting water features, property boundary data and environmentally sensitive areas – will be used as a tool for land-use planning, and will assist in the management of riparian areas.

LOWER FRASER

Seymour River (North Vancouver)

The Seymour Salmonid Society received \$36,000 to enlarge the Homestead Channel (constructed in 1999) with a third over-wintering pond to provide critical low-gradient, off-channel habitat to coho salmon. As well, Intake Creek was surveyed and a design completed to develop additional habitat adjacent to the Seymour River.

Squamish River estuary

The Squamish River Watershed Society received \$78,000 to reclaim marshland and restore vegetation in the Squamish River estuary. As well, fish access was restored to the estuary and numerous tributaries by placing culverts under the road to West Barr Log Sort.

Upper Pitt River and tributaries (Pitt Meadows)

The Fraser River Fishermen Society received \$24,300 to carry out a mark-recapture program to provide scientifically defensible stock assessment data on wild coho populations in the lower Fraser to assist with fisheries management. The project provided jobs to students, First Nations people and under-employed fishers.

NORTH COAST

North Coast streams and Oona and Metlakatla rivers (Kitkatla)

The Oona River Resources Association received \$51,900 to carry out strategic stock enhancement and watershed restoration work on North Coast streams using the new hatchery facilities and newly acquired stock and habitat information. Also, a new fish ladder was built, and beaver dams and debris jams were altered to provide additional improved habitat for coho and pink salmon.

North Coast streams (Prince Rupert)

The North Coast Fisheries Renewal Council received \$137,000 to complete a third year of training for displaced fishery workers from seven North Coast communities. The group worked with DFO to develop mapping procedures, map physical characteristics of streams, and document abundance of juvenile and adult coho salmon.

Tlell River (Queen Charlotte Islands)

The Tlell Watershed Society received \$15,700 to conduct a six-day summer camp to teach children how to conduct stream inventories, identify stream restoration opportunities, and improve fish habitat in a local coho-bearing creek. As well, a report of activities was compiled that included recommendations for future youth stewardship projects.

CENTRAL COAST

Charter, Snooka and Ann creeks (Bella Coola)

The Bella Coola Watershed Restoration Partnership received \$30,000 to map and restore coho salmon habitat in order to increase the habitat quantity and quality, and improve watershed planning & stewardship. In addition, information was collected for a proposed resource centre.

Keogh River (Port Hardy)

The Northern Vancouver Island Salmonid Enhancement Association received \$10,000 to mark 30,000 coho juveniles in Keogh River with coded-wire tags to estimate ocean survival and exploitation. The data will be valuable for stock assessment, fisheries management and enhancement planning.



SOUTH COAST

Grandon Creek (Qualicum Beach)

The Qualicum Beach Streamkeepers received \$15,000 to create three kilometres of fish habitat accessible to coho, chum and other species by installing a new "fish-friendly" culvert system. This labour-intensive project provided employment to several displaced fishers. Educational signage was also installed at this site which is highly visible to the general public at Qualicum Beach.

Duck Creek (Ganges)

The Island Stream and Salmon Enhancement Association received \$30,000 to increase and restore coho salmon habitat by constructing new rearing ponds, installing woody debris and boulders, placing gravel and planting streamside vegetation. These activities provided jobs and training to unemployed fishers and youth, and will increase juvenile coho survival.

Oliver Creek (Lake Cowichan)

The Cowichan Lake Salmonid Enhancement Society received \$16,400 to assess wild juvenile coho production in Oliver Creek. Spawner residency time was also determined by counting and tagging coho adults, and releasing them back into the creek for recovery. Escapement records, maintained since the 1940s, were also collected.

YUKON TERRITORY

Pelly River Watershed (Pelly Crossing)

The Selkirk First Nation received \$20,000 to eliminate barriers to fish by breaching beaver dams and log jams on Mica Creek, and Needle-rock and Willow systems. Members of the Selkirk First Nation received training in fisheries and habitat monitoring during the program.

Wolf Creek (Whitehorse)

The Yukon Fish and Game Association received \$1,750 and employed students to collect salmon escapement data for Wolf Creek. Students and volunteers also flagged and counted the number of salmon redds, and sampled carcasses for coded-wire tags for analysis by DFO.



DETAILS ON SELECTED PROJECTS

Several projects were selected randomly to represent the three project categories in different geographic areas within the 2000-01 HRSEP fiscal year.

Project 1

Development of Native Plant Stock for Riparian Restoration
Area: Upper Fraser
Category: Resource & Watershed Stewardship

Project 2

Vedder River Flood Plain Agricultural Restoration
Area: Lower Fraser
Category: Habitat Restoration

Project 3

Wild Coho Assessment in Salmon and Upper Pitt Rivers **
Area: Lower Fraser
Category: Stock Rebuilding

Project 4

Kitwanga Coho and Sockeye Enhancement Programs **
Area: North Coast
Category: Stock Rebuilding

Project 5

North Coast Stream Inventory Program
Area: North Coast
Category: Stock Rebuilding

Project 6

Malksope Beaver Dam Restoration and Coho Fry Enumeration
Area: South Coast
Category: Habitat Restoration

Project 7

McIntyre Creek Salmon Incubation Project
Area: Yukon Territory
Category: Stock Rebuilding

** This represents two separate HRSEP projects.



PROJECT 1: DEVELOPMENT OF NATIVE PLANT STOCK FOR RIPARIAN RESTORATION \$24,300

Category & Area

Resource & Watershed Stewardship –
Upper Fraser

Partners

Quesnel River Watershed Alliance (QRWA); Kroener family; Baker Creek Enhancement Society; BC Real Estate Foundation; BC Environment Youth Team; Ministry of Environment; Lands and Parks (MELP); Fisheries and Oceans Canada.

Employed/Trained

95 person-days, 124 volunteer-hours;
QRWA members and volunteers.

INTRODUCTION

The primary objectives of this project were to:

1. Provide planting stock for restoring riparian areas in the Horsefly River watershed,
2. Complete the restoration projects started in 1999 and carry out new plantings in areas previously identified in DFO assessments,
3. Train local people in seed collection/propagation and transplanting techniques, and
4. Continue the community stewardship program that began in 1998, by working with ranchers and local residents to develop optimal management practices for the Horsefly River watershed.

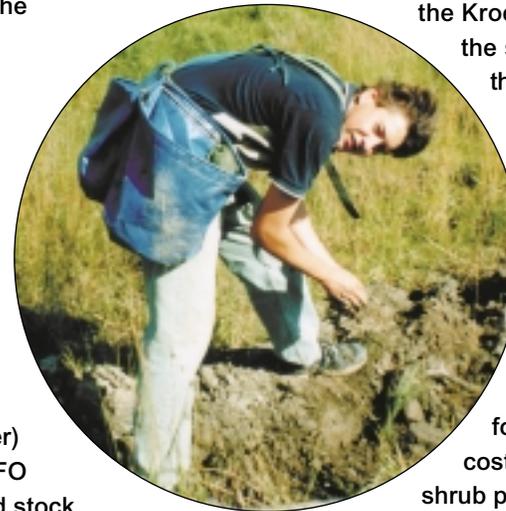
METHODS

The Kroener family donated the land along the Horsefly River tributaries for protection and planting, and provided time and equipment for fencing work and tilling. The volunteers donated all the required tools, as well as space and utilities (hydro, water) for the QRWA plant nursery. DFO provided a portion of the potted stock,

as well as technical advice and monitoring. A propagation workshop conducted in the fall of 2000, provided the volunteers with skills on seed collection and native plant propagation.

RESULTS

All major objectives were met. Over 4,000 seeds from seven different species were collected, and cuttings were gathered, propagated and planted. Altogether, over 3,300 plantings of hawthorn, willow, spruce, cottonwood, birch, alder, dogwood, rose and black twinberry were used to replant an area of 10,935 sq. metres along the creeks and back-channel ponds on the Kroener property. At several sites, the sod was turned over to expose the soil to reduce competition with planted stock. Dead tree branches were hauled in to protect the young shrubs, and 1,000 metres of stream length were protected with fencing. The Quesnel River Watershed Alliance Moffat Creek plant nursery was also upgraded to increase its output and allow for experimentation to develop cost-effective methods for riparian shrub propagation.



Community involvement consisted of organizing the Horsefly River Celebration Day in July 2000. This event included watershed information displays, a fish-habitat river race, a variety of crafts, a canoe-tour of the Horsefly River Riparian Conservation Area, a potluck meal and the viewing of the "Eyes of the River" video. As well, a slide presentation demonstrated some of the restoration work involving ranchers – this educational tool will be used at future workshops.

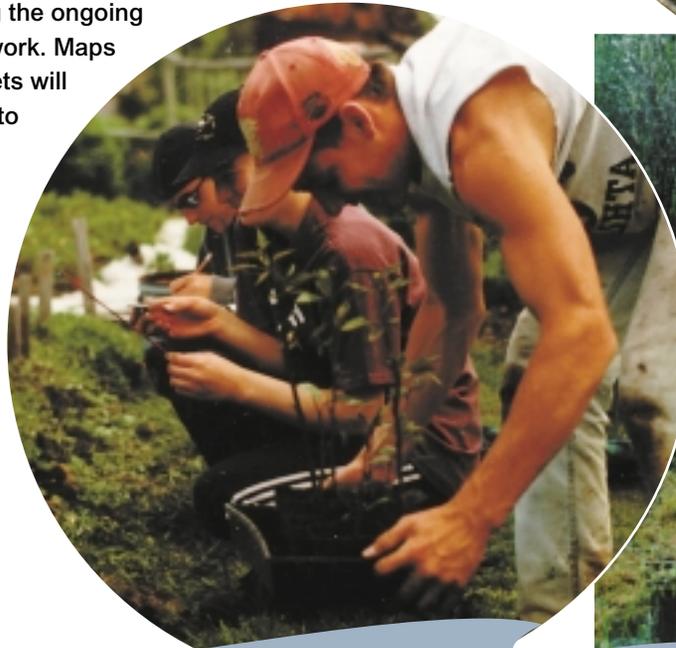
As a result of the above community-based QRWA activities and articles in local papers, this organization has highlighted the ongoing stream restoration work, giving concrete examples to ranchers on how to improve the riparian habitat. Ranchers are now actively coming forward to seek help with their riparian habitat and join the QRWA program for future restoration work. As well, new volunteers are coming out to cut willows and the community is planning another river celebration event.

FUTURE EFFORTS

Future plans include the continued development of planting stock using the most effective technology for the area. The goal is to work with several local nurseries to develop a consistent nearby source of native plants for restoration

work. Only Phase I of the work prescribed for the Kroener property was completed by fall 2000, and funds are being sought to complete the project. Phase II of the project will focus on completing the fencing, excavating connector channels, replacing culverts, planting along exposed stream banks, protecting the planted stock, and addressing cattle watering needs (e.g., well-distributed watering sites, selected stream access sites, dugouts at springs, and the use of geo-grid and gravel hardened ramps).

The QRWA also plans to work with the Horsefly Community Development Centre to erect an information kiosk in the village of Horsefly explaining fish habitat requirements and detailing the ongoing restoration work. Maps and pamphlets will be provided to encourage visitors to view the sites.



PROJECT 2: VEDDER RIVER FLOOD PLAIN AGRICULTURAL RESTORATION \$60,300

Category & Area

Habitat Restoration – Lower Fraser

Partners

Chilliwack / Vedder Watershed Restoration Society; River Watch Program; private landowners; City of Chilliwack; T. Buck Suzuki Nursery; Fraser Valley Regional Watershed Coalition; Fisheries Renewal BC; Chilliwack River Hatchery; Fisheries and Oceans Canada.

Employed/Trained

115 person-days, 18 volunteer-hours; River Watch Program, Chilliwack / Vedder Watershed Restoration Society, HRDC Summer Youth Program, Chilliwack Restorative Justice Youth.

INTRODUCTION

The lowland tributaries of the Vedder River flow through extensive flood plains. Agricultural, residential and commercial use of these lands has compromised fish habitat. Furthermore, set-back dykes and pumping stations have greatly altered water flows. The primary objectives of this project were to:

1. Restore coho and steelhead habitat in the tributaries, and provide additional habitat for salmonids and other species,
2. Establish a working model for habitat restoration in agricultural areas, and
3. Develop watershed stewardship by involving all land users.



METHODS

The field work followed established DFO and MELP habitat complexing designs for the construction of over-wintering ponds, spawning beds, bypass channels and beaver boxes. The on-site presence of DFO and MELP personnel (biologists, engineers) ensured correct placement in streams of large woody debris (LWD), spawning gravel and riprap. Native riparian planting and fencing were also carried out in accordance with the prescribed guidelines.

RESULTS

All target activities outlined for Phase I of the project were completed, and water flow and habitat issues were successfully addressed. Altogether, 1,000 metres of stream length were protected with fencing, resulting in 10,000 sq. metres of protected stream area; 15,000 sq. metres of riparian area were planted with 2,500 cuttings; 6,000 sq. metres of channel habitat were created/restored; and an additional 1,500 metres of stream length were made accessible to fish. Other work included the construction of 12 over-wintering ponds, one bypass channel and three beaver bypass structures, as well as the strategic placement of LWD. Approximately 13,000 juvenile salmon and 900 adult salmon were enumerated during bio-assessments.

Community involvement and stewardship activities included consultation with landowners regarding implementation of complexing designs. As well, private and public sectors (local landowners, City of Chilliwack, Department of National Defence, Crown Land) were contacted to obtain approval for land use. The working model for habitat restoration encompassed the placement of signs in Habitat Sensitive Areas, the development of a video that focused on various restoration activities, and ongoing biological assessments. The latter showed a substantial increase in coho and steelhead populations since the start of the program.

FUTURE EFFORTS

During the fall of 2000, an inventory survey was conducted on Atchelitz Creek, a tributary to the lower Fraser River, to identify critical areas of salmon rearing habitat. Salmon using this watercourse must pass through the flood pump facility before entering the Fraser River. The major impacts to fish habitat include restricted watercourse access, constricted water flows, reduction of groundwater recharge, lack of spawning gravel and riparian cover and/or diversity, active bank erosion, heavy siltation and pollution from land use area.

As a result of this assessment, further restoration work of fish habitat was identified for this watershed, with the priority action for salmon enhancement being the modification of the pump station on Atchelitz Creek. The Phase II activities will include construction of a new river intake, the development of additional spawning beds and over-wintering ponds, complexing of streams, as well as native riparian planting and fencing of stream banks.



PROJECT 3: WILD COHO ASSESSMENT IN SALMON & UPPER PITT RIVERS \$110,503

Category & Area

Salmon Stock Rebuilding – Lower Fraser

Partners

Fraser River Fishermen Society (FRFS);
Garnet Farms Ltd.; Upper Pitt River
Hatchery / Fisheries and Oceans Canada.

Employed/Trained

146 person-days, 150 volunteer-hours;
FRFS members, displaced fishery
workers, volunteers.

INTRODUCTION

Wild coho stocks have been the foundation of the commercial and recreational fisheries in the Strait of Georgia. These stocks are declining and rebuilding them is a regional priority. During 2000-01, Fisheries and Oceans Canada and the Fraser River Fishermen Society worked jointly on two coho assessment projects – one on the Salmon River (Langley) and one on the Upper Pitt River. These rivers represent the only two wild coho indicator stocks in the lower Fraser watershed. The population statistics on these stocks have been collected annually by DFO since 1986 (Salmon River) and 1993 (Upper Pitt). These data are considered vital to the management and stock rebuilding strategies for Fraser River coho. The primary objectives of these projects were to:

1. Estimate coho escapements to the Salmon and Upper Pitt rivers,
2. Enumerate coho smolts in the Salmon River to estimate their production, and apply coded-wire tags to juveniles to assess marine survival, harvest distribution and rate of exploitation,
3. Provide employment and training opportunities to displaced fishery workers, and involve the local community in order to promote awareness of fishery management issues, and

4. Assist in the development of Salmon River community plans (water, agricultural and development concerns) and of Upper Pitt River watershed plans (water use, forestry, gravel mining) by providing important stock assessment information.

METHODS

In the Salmon River juvenile (spring) program, coho smolts were trapped, marked with a combination of fin-clip and/or coloured "pan-jet" mark, and released for recapture at a downstream fence. Recaptured coho were counted by mark type, coded-wire tagged and released downstream. The Salmon River adult (fall) program consisted of fence trapping, enumeration and tagging; carcass recovery via foot surveys; and mark-recapture and bio-sampling (fecundity, scales, length).

In the Upper Pitt River program, over twenty five tributaries were surveyed. Coho adults were captured in beach seines and tags were applied throughout the system. The Upper Pitt carcass recovery continued into February 2001. Snowmobiles and ATVs had to be used during the winter period.

RESULTS

Both programs were highly successful due in part to favourable weather conditions (moderate flows and water levels) during trapping and recovery. The results are summarized below.

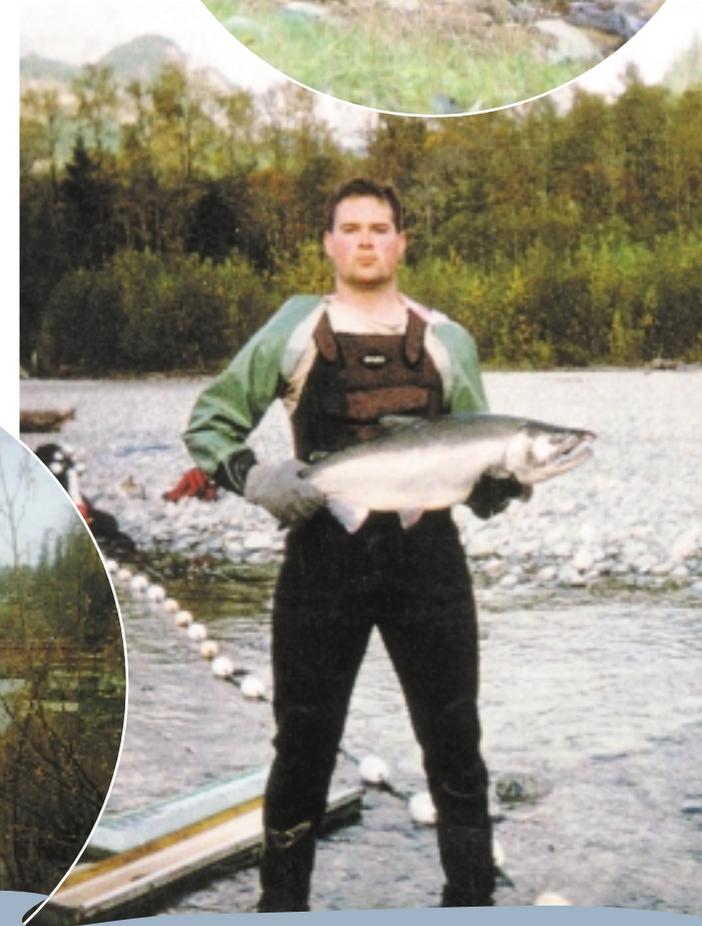
1. Juvenile production in Salmon River was estimated at 83,400 coho smolts; coded-wire tags were applied to 25,163 smolts.
2. Coho adult escapement was estimated at 4,900 for Salmon River and 12,800 for Upper Pitt River (preliminary data).
3. The unusually high December counts of adult coho in the Salmon River (over 40% of total escapement) were attributed in part to the integrity of the fence, fish behavior and a possible shift in this year's adult migration timing.
4. Reconnaissance trips to the Upper Valley near Garibaldi Park resulted in two new coho bearing creeks being added to the Upper Pitt survey list for next year.
5. The FRFS interacted with various community sectors (DFO, Salmon River Enhancement Society, BCIT, and local high schools and elementary schools). Close cooperation with DFO personnel resulted in shared technology

and experience among the participants. As well, information on stock assessment techniques and fisheries management practices was disseminated to the general public.

6. The Salmon River data were forwarded to the Salmon River Enhancement Society for use in their community planning; the Upper Pitt River data were made available to DFO's Resource Restoration Division.

FUTURE EFFORTS

The HRSEP funding assistance over the last three years has led to greatly improved data collection for both the Salmon and Upper Pitt rivers. Additional funding is being sought to continue assisting DFO in these projects as they are vital to the management of Fraser River coho populations.



PROJECT 4: KITWANGA COHO AND SOCKEYE ENHANCEMENT PROGRAMS \$88,720

Category & Area

Salmon Stock Rebuilding – North Coast

Partners

Gitanyow Fisheries Authority (GFA);
Gitskan Watershed Authority; Gitanyow
Hereditary Chiefs; Fisheries and Oceans
Canada.

Employed/Trained

700 person-days, 32 volunteer-hours;
GFA personnel, unemployed fishers and
Gitanyow community residents, other
local community members.

INTRODUCTION

These two HRSEP projects were spearheaded due to concerns over declining coho stocks and sockeye stocks at risk in the Kitwanga River – a system in the Skeena basin and historically an important salmon producer for the Gitksan People. The primary objectives were to:

1. Conduct salvage operations on coho juveniles throughout the Kitwanga system,
2. Monitor juvenile coho densities at selected index sites,
3. Collect reliable sockeye escapement data for the year 2000,
4. Determine if two distinct sockeye spawning populations (lake and river) use the system,
5. Improve spawner access to upstream areas by breaching beaver dams,
6. Determine if Kitwancool Lake water is suitable for successful sockeye rearing, and
7. Provide employment and training opportunities to residents of Kitwanga and nearby areas.



METHODS

During salvaging operations, coho fry and smolts stranded in shallow isolated pools were Gee-trapped and relocated to deeper waters linked to the mainstem. Juvenile density surveys were conducted at 17 index sites and involved Gee-trapping, bio-sampling (length, weight, scales), caudal fin-clipping, and release for later recapture and Petersen population estimation. Beaver dams were located using aerial photos from a helicopter survey, and notched with axes, shovels and shears to provide upstream passage for salmon adults without destroying the valuable juvenile over-wintering habitat created by the dams.

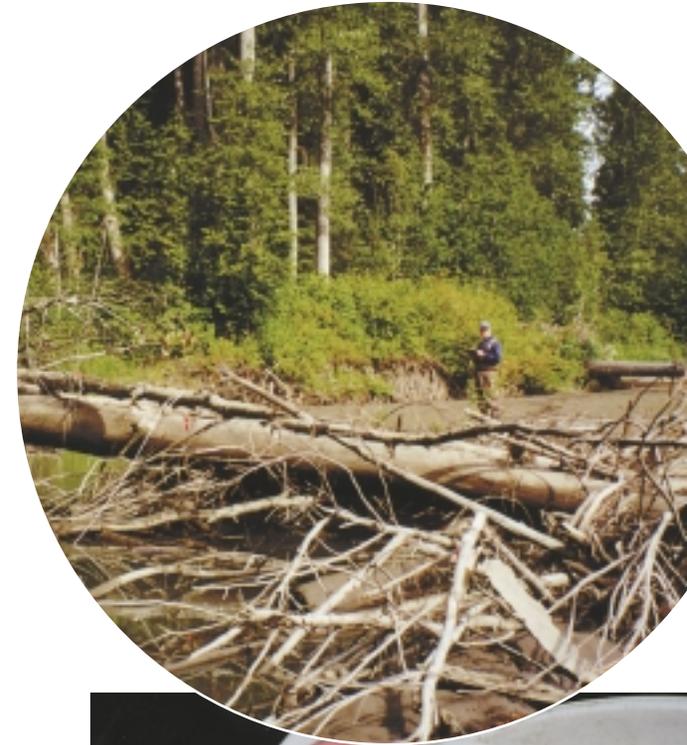
Sockeye adults were enumerated at a temporary fence. Daily records included fish species, numbers, fish length, spaghetti tag I.D. (for possible mark/recapture), and some scale and DNA sampling. All trapped fish were released upstream. The Kitwancool lakeshore was patrolled weekly in a zodiac to check for lake spawners. Lake temperatures and dissolved oxygen levels were monitored weekly at four sites during the summer months to determine if the water quality was suitable for juvenile sockeye rearing.

RESULTS

1. Over 4,600 stranded juveniles (40% of which were coho) were salvaged.
2. Juvenile coho densities at the 17 surveyed sites ranged from 0.02 to 5.7 fish/sq. metre.
3. A total of 1,542 salmon adults of all species were enumerated at the fence, and sockeye escapement was finalized at 260 adults.
4. No lake or river-spawning sockeye adults were observed, suggesting deep water spawning.
5. Temperature and oxygen levels in Kitwancool Lake were found to be suitable for juvenile sockeye rearing, with temperatures never exceeding 18°C.
6. A total of 830,000,000 sq. metres of the watershed were surveyed and 15 beaver dams were breached, increasing the upstream spawner access by 9,600 metres (96,000 sq. metres of habitat).
7. A total of 12 individuals were hired from the Gitanyow community to assist with the programs. Training included fish identification, enumeration, proper handling and electro-fishing, as well as water quality sampling, boat safety and handling, and first aid.

FUTURE EFFORTS

- Continue with annual coho density surveys to provide baseline data for future program evaluation and management.
- Continue with beaver dam mitigation activities as these appear to be very effective in expanding the upstream spawner access.
- Seek funding to obtain reliable fence counts of sockeye escapement over a four-year period (one cycle); these data will assist in developing and monitoring stock rebuilding efforts.
- Attempt radio-telemetry tagging to track sockeye adults to clarify the occurrence of lake or river spawning. Ultimately, conduct egg-to-fry survival studies to determine if sockeye production is limited by poor spawning and/or incubation conditions.
- Continue with limnological studies for at least three more years to establish conclusively if the lake water quality is suitable for juvenile sockeye rearing.



PROJECT 5: NORTH COAST STREAM INVENTORY PROGRAM \$137,000

Category & Area

Salmon Stock Rebuilding – North Coast

Partners

North Coast Fisheries Renewal Council / Community Fisheries Development Centre; Hartley Bay Band; Kitkatla Band; Lax Kw' Alaams Band; Kincolith Band; Metlakatla Band; Oona River Resources Association; Fisheries Renewal BC; Fisheries and Oceans Canada.

Employed/Trained

1,150 person-days, 200 volunteer-hours; displaced fishers and members from various North Coast communities.

INTRODUCTION

This North Coast Stream Inventory Program (NCSIP) is part of an ongoing four-year program started in 1998 aimed at collecting information on juvenile coho and their habitat in selected streams in Areas 3 to 6. The geographical stream referencing system based on aerial photo-referencing and stream information, will allow resource managers to correlate fish statistics with fish habitat data. The completed database will be used to identify coho indicator streams for use in fishery management and for forecasting future run sizes of coho salmon in the area.

The primary objectives of this project were to:

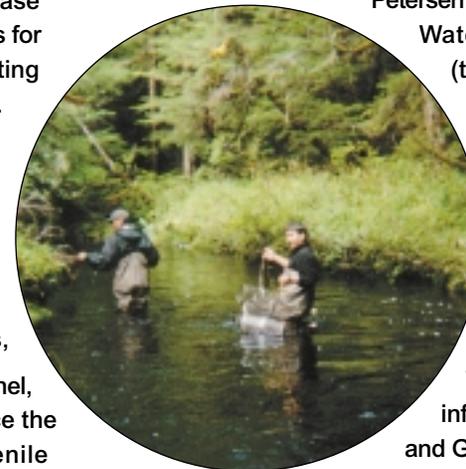
1. Continue with the third year of the program, focusing on coho density and habitat surveys in selected streams,
2. Refine, in cooperation with DFO personnel, the mapping procedures to geo-reference the different watersheds, and attach juvenile density data and related stream information into an ARCINFO GIS format,
3. Continue the stream-by-stream analysis of the collected information, and
4. Promote watershed stewardship among the North Coast communities.

METHODS

During the field program, the same sites and streams were surveyed. Similar methods were used as in the previous two years in order to maintain data continuity within each system. Juvenile coho were Gee-trapped, marked with a partial caudal fin-clip, bio-sampled (length, weight, scales) and released for later mark-recapture to provide density estimates and Petersen population estimates.

Water quality samples (temperature, oxygen, pH, conductivity) and site measurements (stream length, width, depth, percent canopy, substrate composition, etc.) were also collected.

This year, the stream information was expanded and GPS equipment was used for geo-referencing the sampling sites within a given system. The three area managers assigned to the different survey regions have streamlined the operation by facilitating field work and data transfer, ensuring data integrity, and relaying any concerns from the project manager and data collector to the field crews.

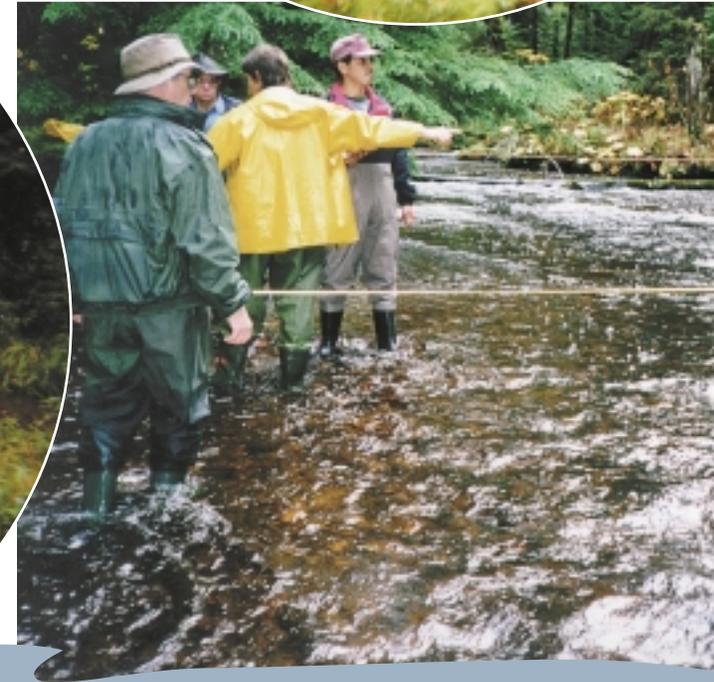


RESULTS

1. A total of 59 streams were surveyed for juvenile coho densities, with 11,174 juveniles marked and nearly 20,000 trapped or recaptured.
2. The collected coho statistics and habitat information continue to be coded and entered into specialized databases, and analyzed with the assistance from DFO and MELP personnel. The analysis will help identify major data gaps that will be addressed in the final year of the program.
3. To date, the analysis indicates inter-relationships within and among different streams regarding fish parameters such as length frequency distribution, fish condition factor, length/weight regression, juvenile coho density, estimated population size and catch per unit effort.
4. The project has provided employment and training opportunities to North Coast community members, and has promoted watershed stewardship through direct community involvement, continued training of personnel, information sessions, and input from the stream steward coordinator.

FUTURE EFFORTS

Funding will be sought for the fourth and final year of the program to provide a time-series database spanning one coho life-cycle for the targeted systems. This database will allow the selection of key components that will be used, in conjunction with DFO personnel, to identify the coho indicator streams. An integrated productivity model will also be developed to compute coho carrying capacity and survival rates by life stage for a given stream.



PROJECT 6: MALKSOPE BEAVER DAM RESTORATION AND COHO FRY ENUMERATION \$22,770

Category & Area

Habitat Restoration – South Coast

Partners

Interfor & Kyuquot Management Board where the KMB consists of Kyuquot / Checleset First Nations; Nuu-chah-nulth Tribal Council; Regional Aquatic Management Society (RAMS); Komori Wong Environmental; Fisheries and Oceans Canada and other partners.

Employed/Trained

45 person-days, 30 volunteer-hours; First Nations crew, Kyuquot Fisheries Program personnel.

INTRODUCTION

The Malksope River, located on the northwest coast of Vancouver Island, has shown a decline in coho, chum and chinook escapements since the late 1970s. Historical logging operations have severely degraded the salmon spawning habitat in the Malksope mainstem, while floodplain logging has further decreased the availability of good-quality, off-channel rearing habitat essential for over-wintering juvenile coho. A 1996 bio-assessment study has confirmed that stable off-channel rearing habitat was a limiting factor to coho production in the Malksope system.

Historically, the off-channel habitat in the Malksope has been naturally enhanced by the presence of beaver dams at the outlet of small groundwater-fed tributaries. These dams have led to the formation of backwatered ponds that provided stable summer and winter habitat for rearing juveniles. There have been no signs of beaver activity in the Malksope watershed for many years, and many of the pond complexes are being dewatered due to dam deterioration. One such beaver dam, located in the lower part of a large backwater pond-complex, failed during the winter of 1998, resulting in the draining and

loss of 1,000 sq. metres of valuable off-channel habitat. This failed dam was the reconstruction site for the present HRSEP project.

The primary objectives of this project were to:

1. Reconstruct the failed beaver dam in order to provide stable over-wintering habitat for juvenile coho and thereby increase coho smolt production in the Malksope system, and
2. Evaluate the use of the newly restored pond by over-wintering coho juveniles.



METHODS

The beaver dam was reconstructed during a low flow period in August 2000. The site was first isolated with stop nets, and 30 coho fry salvaged using electrofishing and minnow trapping methods. Due to the sensitivity of the work site, all materials were carried in on foot and all gravel was transported in wheelbarrows. The completed dam measured 10 metres in length and was designed to have a 25-year life-span with minimum maintenance. The construction materials included cedar timbers, rebar anchors, geotextile cloth to minimize

seepage, and a combination of sand, gravel and cobble to stabilize the structure. Specially designed access boxes and a series of notches in the dam allowed passage for adults and juveniles.

In March 2001, a study was conducted on the abundance of over-wintering juveniles in the restored backwater pond in order to evaluate the use by over-wintering coho. Juveniles were captured in minnow traps and by electrofishing, sampled for length, marked with a partial adipose fin-clip, and released for mark-recapture the following day.

RESULTS

The reconstructed dam resulted in backwatering a 500 sq. metre pond during low summer flows (and 750 sq. metres during high winter flows). During the March bio-assessment study, a total of 119 coho fry and smolts were captured and marked. Recapture the following day also yielded 119 coho, of which 25 were marked. Based on these data, it was estimated that at least 500-600 juvenile coho were over-wintering in the recently backwatered pond. This is similar to an estimated increase in the annual coho smolt production based on existing bio-standards for similar restored habitats.

FUTURE EFFORTS

Recommendations for future work on the pond complex include:

- Improvement of upstream migration access by juveniles through the existing wood weir,
- Ongoing monitoring of the physical and biological performance of the restoration structures,
- Assessment of the feasibility for extension of the existing pond area by excavating a relic logging road, and
- Assessment of the feasibility for restoration of other remnant beaver dams in order to re-water additional historical rearing habitat.



PROJECT 7: MCINTYRE CREEK SALMON INCUBATION PROJECT

\$18,215

Category & Area

Salmon Stock Rebuilding – Yukon Territory

Partners

Whitehorse Correctional Centre (WCC);
Yukon Schools; Streamkeepers North
Society; Fisheries and Oceans Canada.

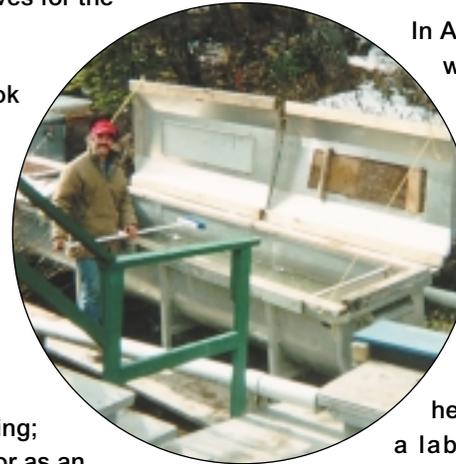
Employed/Trained

10 person-days, 2,000 volunteer-hours;
WCC personnel and inmates, Wood Street
School students, volunteers.

INTRODUCTION

The McIntyre Creek Hatchery is located in Whitehorse and since 1996 has been operated by the Whitehorse Correctional Centre (WCC). The work focuses on the development and field-testing of equipment and methods for use in small-scale salmon restoration projects. These may become crucial, given the record-low numbers of salmon returning to the Yukon River in the recent past. Specific objectives for the 2000-01 season were to:

1. Tag and release juvenile chinook from the 1999 brood year, then sub-sample the released fry to assess their condition,
2. Monitor returning chinook adults to obtain information on their interception and survival,
3. Collect chinook broodstock for egg-takes, incubation and rearing; and test a Heath stack incubator as an alternative method of incubation, and
4. Provide a training program for the WCC inmates, and foster stewardship of the salmon resource by using the hatchery as an educational site for schools and the general public.



METHODS

Fry from the 1999 brood year were moved into rearing troughs in April 2000 and reared until their release in late June 2000. Rearing troughs were cleaned daily, and automatic feeders filled and reset. Prior to their release, fry were marked with coded wire tags. In July 2000, fry were Gee-trapped at one of the release sites and measured for length and weight.

In August 2000, chinook broodstock were captured for egg-takes using gill nets and/or an adult fence, depending on the site. Collected eggs and milt were transported separately to the hatchery for fertilization and incubation. Adults were also enumerated and checked for marks during foot and floating surveys, and during broodstock collection; heads from tagged fish were sent to a laboratory for tag recovery and decoding. During the winter of 2000-01, the WCC crew regularly monitored the hatchery operation to ensure adequate temperatures and flow regimes, sorted the eggs to remove dead and unfertilized embryos, oversaw egg hatching in December 2001, and moved the fry into rearing troughs in early April 2001.

RESULTS

1. A total of 66,000 chinook fry were released into the Tatchun Creek and Takhini system in June 2000. Fry trapping in July showed that all juveniles were in good condition.
2. An estimated 27,700 chinook eggs were taken in August 2000 from Tatchun Creek and also from Takhini River. Adult surveys and egg-takes were hampered by low spawner numbers and high water levels.
3. Egg survival to hatch was about 84% for Takhini eggs and about 58% for Tatchun eggs. The Heath stack incubator showed similar water temperatures and egg survivals as the deep-matrix incubator, while allowing easier egg picking and viewing.
4. The WCC personnel and inmates participated in all phases of the McIntyre project including monitoring, maintenance, fry release and trapping. The WCC personnel provided information to visiting students and public, and assisted with school field trips. Eyed chinook eggs were supplied to 21 Yukon schools for use in classroom projects. On June 24, 2000, the WCC and DFO hosted a public fry release at the Takhini River. The event included display posters, a quiz, prizes and refreshments.

FUTURE EFFORTS

Future plans include the continued development and monitoring of an effective small-scale incubation system for salmon at the McIntyre site. Data analysis of marked Yukon chinook adults and possible latex marking of released fry are also being considered. As well, further modifications are planned to improve the operational design of the McIntyre Hatchery.



PROGRAM SUMMARY

The 2000-01 Habitat Restoration and Salmon Enhancement Program has demonstrated for the fifth successive year that the committed and joint efforts of local communities, corporate groups, First Nations, fishing interests, government agencies and non-government organizations can make a significant difference in the overall health of salmon populations and their habitat.

With appropriate agency assistance, funding and well-defined parameters, this program has resulted in major improvements in the quality and quantity of salmon habitat, and assisted in salmon stock rebuilding. The program has also generated valuable information for managing the salmon resource in BC and the Yukon, fostered a cooperative approach to watershed management, provided training and employment to displaced fishery workers, strengthened local economies, and promoted a healthy future for our salmon resource.

ACKNOWLEDGEMENTS

The HRSEP coordinators wish to thank all proponents for their project submissions, and all the groups and individuals involved in the 2000-01 HRSEP (list of partnerships is provided below). The enthusiasm, commitment and many hours of labour, provided by employed workers and volunteers alike, made this program a great success. We hope to encourage further cooperative efforts and provide more funding for future activities dedicated to the restoration of the salmon resource in British Columbia.

FOR FURTHER INFORMATION

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HRSEP PARTNERSHIPS

Fisheries and Oceans Canada would like to thank all HRSEP partners for their contribution to the program.

Federal Government Agencies

Canadian Wildlife Service (CWS), Environment Canada
Community Futures Development Corporation (CFDC)
Department of National Defence (DND)
Environment Canada / EcoAction
Fisheries and Oceans Canada (DFO), Institute of Ocean Sciences (IOS), Pacific Biological Station (PBS) and federal hatcheries
Fraser River Estuary Management Program
Heritage Canada
Human Resources Development Canada (HRDC)
Indian and Northern Affairs Canada (INAC)
Pacific Salmon Commission (PSC)
Transport Canada
Western Economic Diversification Canada

Provincial and Territorial Government Agencies

BC Crown Assets and Lands
BC First Job in Science and Technology
BC Parks
Crown Land Registry Service (CLRS)
Fisheries Renewal BC (FsRBC)
Forest Renewal BC (FRBC) / WRP
Geographic Data BC - TRIM (GDBC - TRIM)
Habitat Conservation Trust Fund (HCTF) (MOF)
Min. Agriculture, Food & Fisheries (MAFF)
Min. Environment, Lands & Parks (MELP)
Min. of Forests (MOF) Skimkin Nursery
Min. of Transportation & Highways (MOTH)

Min. Small Business, Tourism & Culture
Urban Salmon Habitat Program (USHP), MELP
Youth Options BC Program
Yukon Territorial Government (YTG)

Municipal Government Agencies

Bowen Island Municipal Council
Bulkley Lakes District Maintenance
Capital Regional District (CRD) / CRD Parks
Central Coast Regional District
City of Burnaby / Engineering / Parks
City of Chilliwack & Chilliwack Restorative Justice
City of Coquitlam
City of Courtenay
City of Merritt
City of Prince Rupert
City of Surrey
City of Terrace
Columbia-Shuswap Regional District (CSRD)
Community of Avola
District of Campbell River
District of Highlands
District of Langford
District of Maple Ridge
District of Metchosin
District of Mission
District of North Saanich
District of Pitt Meadows



District of Saanich / Saanich Parks
 District of Sooke
 District of Squamish
 District of Stewart
 District of West Vancouver Parks
 Fortune Creek Drainage & Dyking District (FCDDD)
 Fraser Valley Regional District
 Greater Vancouver Regional District (GVRD) / GVRD Parks
 Municipality of Lake Cowichan
 Municipality of Sooke
 Regional District of Comox-Strathcona
 Regional District of Fraser-Fort George
 Regional District of Nanaimo
 Salmon Arm District Office
 Salt Spring Island Parks & Recreation Commission
 Squamish-Lillooet Regional District
 Thompson-Nicola Regional District
 Town of Qualicum Beach
 Town of Sidney
 Town of Smithers
 Township of Esquimalt
 Township of Langley
 Village of Gold River

First Nations / Bands / Organizations

Adams Lake Band
 Ahousaht First Nation
 Bonaparte Indian Band

Canadian Columbia River Inter-Tribal Fisheries Commission (CCRITFC)
 Cape Mudge Indian Band
 Cariboo Chilcotin Aboriginal Training Education Centre (CCATEC)
 Champagne and Aishihik First Nations (CAFN)
 Cheam Indian Band
 Cowichan Tribes
 Ditidaht First Nation Fisheries
 Gitanyow Fisheries Authority (GFA)
 Gitskan First Nation / Watershed Authority
 Gitskan and Wet'suwet'en Watershed Authority
 Gwa'nii Hatchery
 Haida Fisheries Program
 Haida Gwaii Marine Resource Group Association (HGMRGA)
 Hartley Bay Band
 Heiltsuk Tribal Council
 Homalco First Nation
 Huu-ay-aht First Nation
 Kincolith Band
 Kitkatla Band
 Kitsumkalum Indian Band / Council
 Kluane First Nation
 Kwanlin Dun First Nation (KDFN)
 Kyuquot/Checleset First Nations (KCFN)/ Fisheries Program
 Kyuquot Management Board (KMB)
 Lax Kw' Alaams Band



Little Salmon / Carmacks First Nation
 Little Shuswap Indian Band
 Metlakatla Band
 Mowachat / Muchalate First Nations
 Nazko Indian Band
 Neskonlith Band
 Nicola Tribal Association
 Nimpkish Resource Management Board (NRMB)
 Nisga'a First Nation
 North Thompson Indian Band (NTIB)
 Nuuchahnulth Tribal Council (NTC)
 Nuxalk Nation
 Okanagan Nation Alliance
 Okanagan Nation Fisheries Commission (ONFC)
 Pacheedaht First Nation Fisheries
 Seabird Island Indian Band
 Sechelt Indian Band (SIB)
 Selkirk First Nation
 Shuswap Nation Fisheries Commission (SNFC)
 Siska First Nation
 Skeetchestn Indian Band
 Skwah Indian Band
 Skway Indian Band Council
 Songhees First Nation
 Spallumcheen First Nation
 Squamish Nation
 Sto:lo Nation / Development Corporation
 T'sou-ke First Nation

Tla-o-qui-aht First Nation (TFN)
 Tr'ondëk Hwech'in (TH) First Nation
 Tseycum First Nation
 Uchucklesaht Tribe
 Wet'suwet'en First Nation / Wet'suwet'en Fisheries Program
 WSIKEM and TENTEN Creeks Stewardship Group
 Yale First Nation (YFN)

Non-Government Organizations

Alouette River Management Society (ARMS)
 Baker Creek Enhancement Society (BCES)
 Bamfield Marine Station (BMS)
 Bamfield Streamkeepers (BSK)
 BC Cattleman's Association
 BC Conservation Foundation (BCCF)
 BC Environment Youth Team
 BC Salmon Farmers' Association
 BC Shorekeepers & Reefkeepers Association
 BC Wildlife Federation
 Bear River Salmonid Enhancement Society (BRSES)
 Bella Coola Watershed Restoration Partnership
 Bertrand Creek Enhancement Society (BCES)
 Black Creek Board
 Bonaparte River Watershed Ad Hoc Committee



Bowen Island Fish & Wildlife Club
 British Columbia Institute of Technology (BCIT)
 Burnaby District Scouts
 Campbell River Community Fisheries Committee
 Campbell River Lodge
 Canada Trust - Friends of the Environment
 Canada World Youth
 Canadian Mental Health Association (CMHA)
 Carihi Secondary High School
 Casino Fund

Central Coast Fisherman's Protective Association (CCFPA)
 Chilliwack River Action Committee
 Chilliwack / Vedder Watershed Restoration Society
 Chown Brook Salmon Enhancement Group
 Clayoquot Biosphere
 Coastal Community Action Fund
 Coastal Enterprise and Resource Cooperative Association (CERCA)
 Colquitz Stewardship Education Project
 Commercial Fisherman's Adjustment Centres
 Community Fisheries Development Centre
 Como Watershed Group



Comox Valley Flyfishers
 Comox Valley Land Trust Society
 Comox Valley Naturalists Society
 Comox Valley Project Watershed Society
 Council of Marine Carriers
 Courtenay Fish & Game Association
 Courtland-Hastings Agricultural Preservation Society
 Cowichan Estuary Preservation Society
 Cowichan Lake Salmonid Enhancement Society (CLSES)
 Cowichan Regional Fisheries COOP
 CV Environmental Council
 Discovery Coast Greenways Land Trust
 Douglas College
 Ducks Unlimited Canada
 Fanny Bay Salmonid Enhancement Society
 Federated Cooperatives Ltd.
 FishAmerica Foundation – USA
 Fraser Basin Council Society
 Fraser River Estuary Management Program (FREMP)
 Fraser River Fishermen Society (FRFS)
 Fraser Valley Regional Watershed Coalition
 Friends of the Marble River
 Friends of Tod Creek
 Ganges Fishermen's Association
 Garnet Farms Ltd.
 Georgia Strait Alliance

GitCorp
 Gold River Chinook Project Society
 Gold River Rod & Gun Club
 Gold River Secondary School
 Goldstream Volunteer Salmonid Enhancement Association (GVSEA)
 Gorge Waterway Action Society
 Grazing Enhancement Fund
 Greater Vancouver Volunteer Centre
 Habitat Conservation Trust Fund (HCTF)
 Hagen / Kennes Creek Project / Stewardship Society
 Haig-Brown Kingfisher Creek Society
 Hecate Strait Streamkeepers (HSS)
 Horticulture Centre of the Pacific
 Hoy Scott Creek Streamkeepers
 Hyde Creek Streamkeepers
 Island Stream and Salmon Enhancement Association
 Kanaka Creek Elementary
 Kanaka Education & Environmental Partnership Society (KEEPS)
 Kiwanis Club of Courtenay
 Klondike Snowmobile Association (KSA)
 Kluane Lake School
 Kroener Family
 Lakelse Community Association



Langley Environmental Partners Society (LEPS)
 Little Campbell Watershed Society (LCWS)
 Lord Tweedsmuir School New West
 Malaspina College
 Millard / Piercy Watershed Stewards
 Mountain Equipment Coop
 Nanaimo & Area Land Trust
 Natural Sciences and Engineering Research Council (NSERC)
 Nature Trust of BC
 Nicola Watershed Stewardship & Fisheries Authority (NWSFA)
 North Coast Fisheries Renewal Council
 North Fraser Salmon Assistance Project (NFSAP)
 North Graham Island Streamkeepers (NGIS) Society
 North Island College (NIC)
 North Vancouver Island Salmonid Enhancement Association (NWISEA)
 Northwest Community College (NWCC)
 Northwest Ecosystem Institute
 Northwest Watershed Enhancement Society
 Oona River Community Association (ORCA)
 Oona River Resources Association (ORRA)
 Outdoors School – Bowen Island
 Oyster River Enhancement Society (ORES)
 Oyster River Watershed Management Committee (ORWMC)
 Pacific Salmon Foundation (PSF)
 Pacific Streamkeepers Federation (PSKF)
 Pemberton Sportsmen's Wildlife Association (PSWA)

Pinetree Secondary Environmental Club
 Puntledge River Restoration Committee
 Quadra Island Salmon Enhancement Society (QISES)
 Quadra Seniors
 Qualicum Beach Streamkeepers
 Quesnel River Enhancement Society (QRES)
 Quesnel River Watershed Alliance (QRWA)
 Real Estate Foundation of BC
 Regional Aquatic Management Society (RAMS)
 River Watch Program
 Rock Solid Foundation
 Royal Roads University
 Saanich Inlet Protection Society
 Salmon River Enhancement Society (SRES)
 Salmon River Watershed Management Partnership (SRWMP)
 Salmon River Watershed Society (SRWS)
 Salt Spring Centre
 Salt Spring Foundation
 San Juan Enhancement Society / San Juan Fund
 San Juan Watershed Steering Committee
 SeaChange Marine Conservation Society
 Sequoia Springs West Development
 Seymour Salmonid Society
 Shuswap Community Living Association (SCLA)
 Shuswap Junior High School
 Sidney Anglers' Association
 Sierra Club of Canada
 Skidegate Inlet Sportfishing Association (SISA)

Somenos Marsh Wildlife Society (SMWS)
 Sooke Salmon Enhancement Society
 Sooke Watershed Society
 South Coast Elementary and Secondary Schools
 South Islands Aquatic Stewardship Society (SIASS)
 South Salt Spring Property Owners' Association
 Sports Fishery Advisory Board
 Squamish Estuary Conservation Society
 Squamish Estuary Environmental Assessment Committee
 Squamish River Watershed Society
 Squamish Streamkeepers
 Squamish Trails Society
 Stave Valley Salmonid Enhancement Society (SVSES)
 Steelhead Society of BC
 Stelly's High School
 Stoney Creek Environmental Committee (SCEC)
 Streamkeepers North Society
 Surrey School District
 Terrace Salmonid Enhancement Society
 Thomas Haney Secondary
 Thompson Basin Fisheries Council (TBFC)
 Thornton Creek Enhancement Society
 TLC The Land Conservancy of BC
 Tlell Watershed Society (TWS)
 Toboggan Creek Enhancement Society
 Tofino Creek Hatchery / Enhancement Society
 Trans Canada Trail Foundation



Trout Unlimited Canada (TUC)
 Tsolum River Task Force
 University College of Cariboo
 University of British Columbia (UBC) – Forestry, Oceanography
 University of Northern BC (UNBC)
 University of Victoria (UVic), Society for Conservation Biology
 Upper Bulkley River Roundtable (UBRR)
 Veins of Life Watershed Society (VOLWS)
 Victoria Foundation
 Victoria Natural History Society
 Victoria Wooden Boat Association
 Whitehorse Correctional Centre (WCC) / WCC Inmate Fund
 Whitehorse Rapids Fish Hatchery
 Wildlife Together – USA
 Williams Lake Sportsmen's Association
 Willow Creek Watershed Society
 World Fisheries Trust (WFT)
 Woss Community Hatchery
 York University
 Yorkson Watershed Stewardship Committee (YWSC)
 Youth Community Action
 Yukon Conservation Society (YCS)
 Yukon Fish and Game Association
 Yukon Panel – R&E Fund
 Yukon River Commercial Fishing Association (YRCFA)
 Yukon Salmon Committee (YSC)

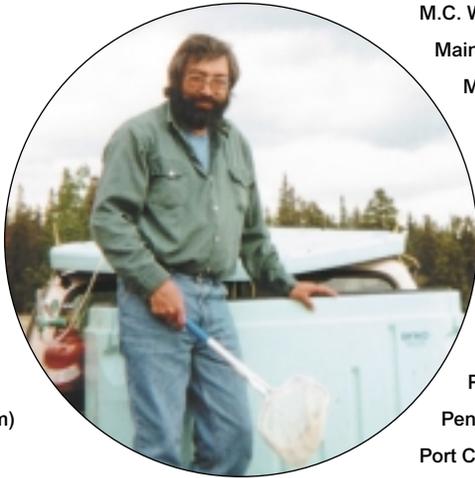


Yukon Schools – Wood Street School
 Yukon Youth Conservation Corps (Y2C2)

Corporate Groups

Ainsworth Lumber Co.
 Anderson Engineering
 Aquaterra Environmental Services
 Arbutus Grove Nursery
 Axy's Consulting
 BC Bridge Coastal
 BC Ferry Corporation
 BC Hydro
 BC Rail Corporation / BC Rail Properties
 Belcher Accounting
 Bigfoot's Consulting Services
 Blackburns Equipment
 Border Times
 Bowater Inc.
 Bowman & Associates
 Brentwood Bay Marina
 Butler Brothers
 Canadian Forest Products Ltd. (CFP)
 Canfor Ltd.
 Catherwood Towing
 Chamber of Commerce
 Charles Howard & Associates
 Chin-Ho Aqua Ltd.
 Clark Hydrometric Services

CN Rail
 Coast Valley Contracting Ltd.
 Coastal Forest Industry
 Cowichan Hydraulics Ltd.
 D.R. Clough Consulting
 Discovery Foods
 Discovery Passage
 DNA Enterprises
 Elk Falls Pulp Mill
 Environmental Dynamics
 Finning (Canada)
 Fir Shelter Farm
 Fraser Port Authority
 Gold River Smolt Company
 Hansen B. (X'mas Tree Farm)
 Holskog Ltd.
 Husby Forest Products
 International Forest Products Ltd. (Interfor)
 Island Truss Ltd.
 J&E Backhoe
 J.A. Taylor & Associates
 J.S. Jones Logging Ltd.
 J.S. Jones Timber
 John Hunter Co. Ltd.
 Ken Grieve Excavating Ltd.
 Komori Wong Environmental



LaPointe Consulting
 LGL Consultants Ltd.
 Ludwig Dairies
 M.C. Wright & Associates
 Mainroad Contracting
 MCC Ecoworks
 MTE Inc. Consultants
 N.A.R. Developments
 Nechako Northcoast Construction Services
 Newbury Hydraulics
 North Fraser Port Authority
 Northey Lake Farms Ltd.
 Nub's Holdings
 Partridge Scaling
 Pendray Farms Ltd.
 Port Corporation of Prince Rupert
 Precision Identification Consultants
 PRT Nurseries
 Queen Charlotte Lodge
 R. Irwin Consulting
 Raven Forest Products Ltd.
 Redden Net Ltd.
 Riverside Forest Products Ltd.
 Shell Environmental Fund
 Skeena Cellulose Inc.
 Scott Resource Services



Spring Creek Aggregates Ltd.
 Stellar Survey Corp.
 Summit Environmental Consultants
 T-Buck Suzuki Nursery
 Texada Land Development Corp.
 TFL Forest Ltd.
 TimberWest Forest Products
 Times Colonist
 Tolko Industries
 Trans Mountain Pipeline
 Translink
 Triton Environmental Consultants Ltd.
 VanCity Enviro Fund
 Vancouver City Community Credit Union
 Vancouver Island Helicopter
 Victoria Airport Authority (VAA)
 Volnet
 West-Barr Contracting
 Western Forest Products (WFP) Ltd.
 Westland TV
 Weyerhaeuser Ltd.
 Woodmere Nursery Ltd.
 Wright Focus
 Yukon Energy Corporation