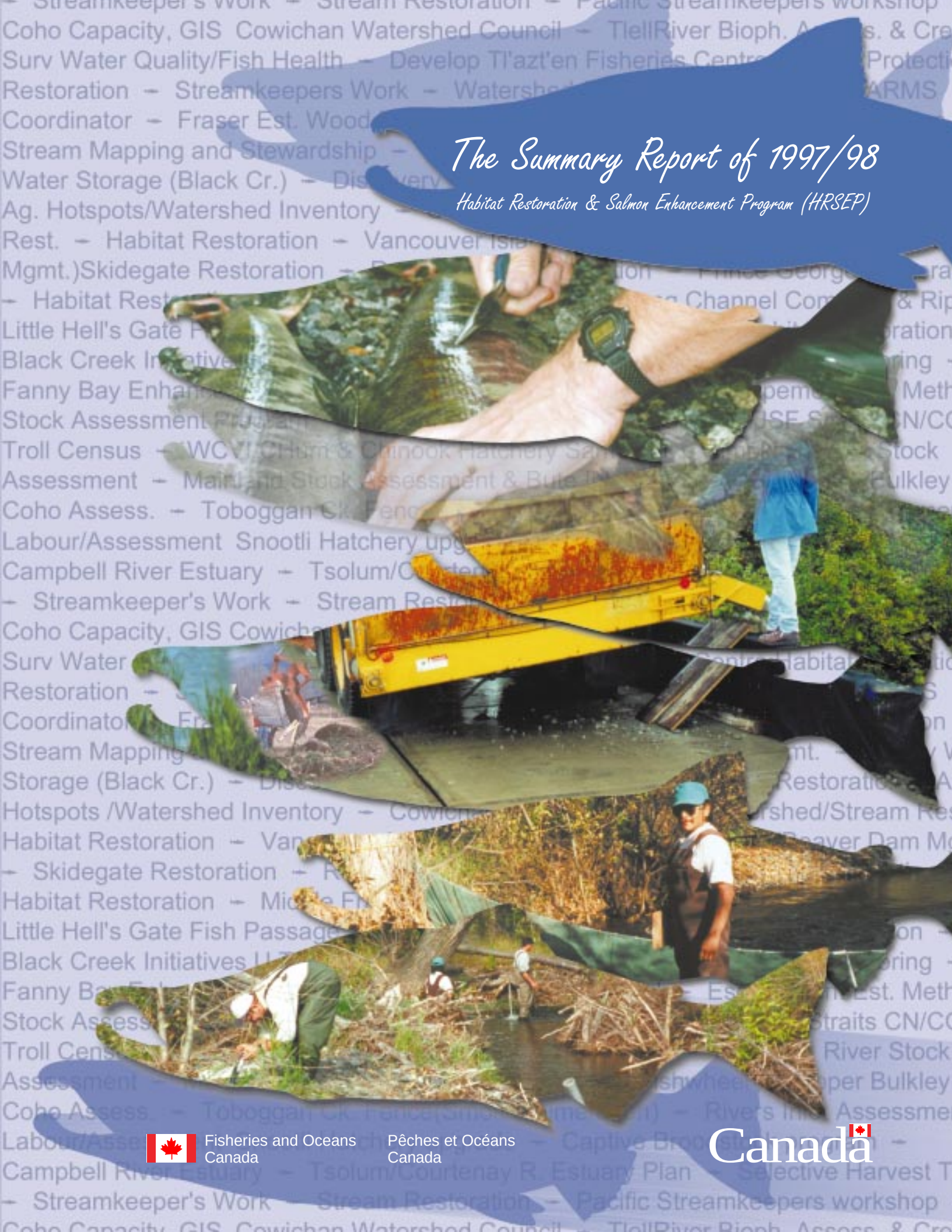
The Summary Report of 1997/98

Habitat Restoration & Salmon Enhancement Program (HRSEP)



Fisheries and Oceans Canada
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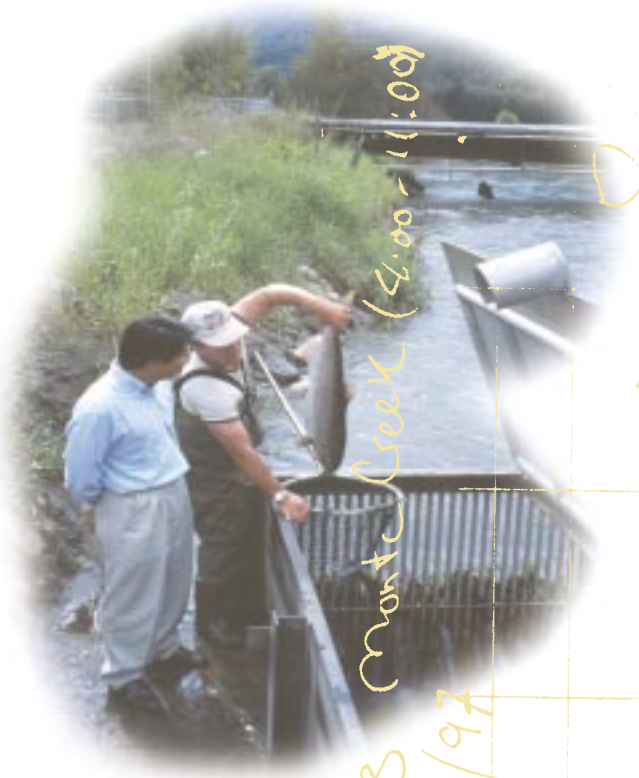


Stream	No. of Sites	Burbot	Chinook	Coho	Cottid	E. Brook Trout	Kokonee [1]	Longnose Sucker	Mountain Whitefish	Peamouth Chub	Rainbow Trout	Red Sided Shiner	TOTAL
Ashton Ck	1		3		2						4		25
Blurton Ck	2		21		1						12		54
Bonaparte R.	1	1	9						1	6	27		13
Canoe Ck	1		6		5						1		30
Cooke Ck	3		3								14		16
Crazy Ck	1										6		9
Creighton Ck	1			11	11	6	1		2		9		47
Danforth Ck	2			11	15					5	33		82
Eagle River	3									1	41		93
Hat Ck	3										38		39
Huihill Ck	3										32	4	14
Johnson Ck	2									37	10		9
Kingfisher Ck	1			6					3		6		35
Loon Ck	1			10			6				28		22
Monte Ck	3					1				1	3		31
Scottie Ck	1										24		83
Sinimax Ck	3			15	2						71		35
Trinity Ck	3			1							8		73
	96	1	96	28	15	7	1	0	6		70		713
		1.0	100.0	29.2	15.6	7.3	1.0	0.0	6.3		437	4	4,100.0
									0.8		61.3	0.6	

Fisheries and Oceans Canada

Habitat Restoration and Salmon Enhancement Program (HRSEP)

1997/98 Summary Report

Introduction:

The HRSEP was established in January 1997 to complement the Pacific Salmon Revitalization Strategy. The main objective of the three-year, $15 million program is: to increase the quality and quantity of salmon habitat in conjunction with conserving and rebuilding of weak salmon stocks.

Program objectives encompassed three major categories in the on-going effort to ensure healthy salmon stocks — **Resource and Watershed Stewardship, Habitat Restoration and Salmon Stock Rebuilding**. Activities in each category are designed to encourage community-based stewardship, increase the quality or quantity of in-stream and riparian habitat and rebuild stocks through intensive assessment and enhancement techniques. A closer examination of the projects detailed within this report provides an overview of how the challenge was approached by the many committed individuals, communities and corporations who received funding. To this end, $7.25 million was allocated to 73 projects within the 1997/98 fiscal year spanning April 1/97 to March 31/98.

A newly created contractual agreement was used by DFO to provide funding to proponents. The agreement covers payment schedule, location, duration, project description, budget and in-kind contributions. In addition, the document provides legal direction including right to credit, intellectual property ownership, equipment purchase and termination rights.

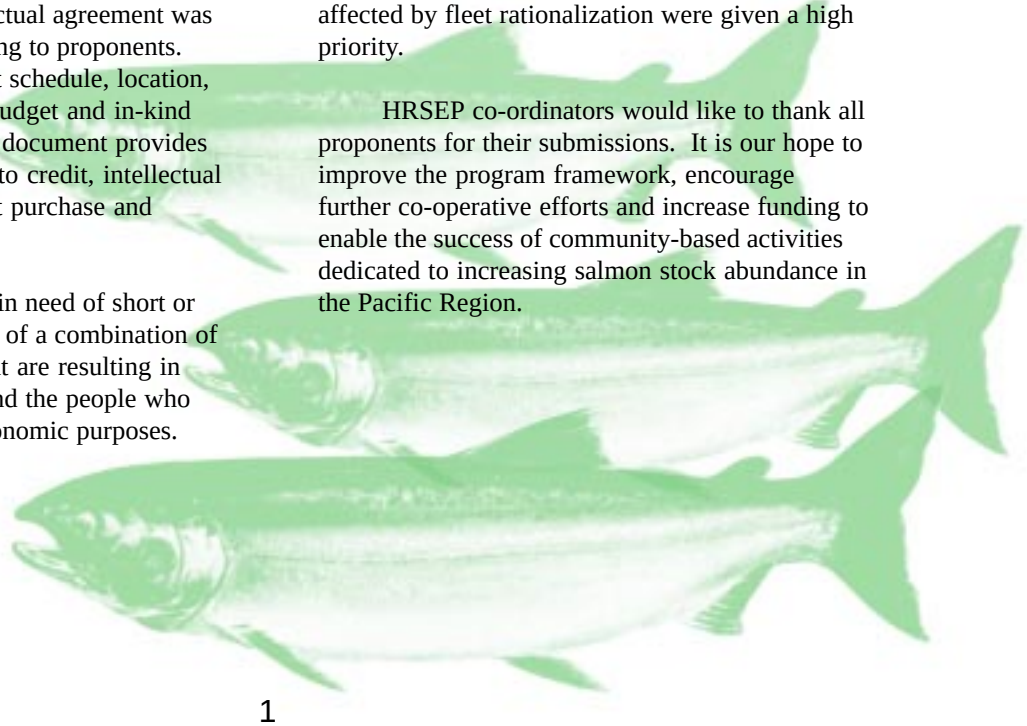
Many salmon stocks are in need of short or long-term intervention because of a combination of human and climatic factors that are resulting in negative impacts on salmon, and the people who rely on them for cultural or economic purposes.

Funding from this program has assisted a diverse group of participants to build partnerships aimed at grassroots or highly technical solutions to problems that may be hindering the long-term health of many salmon populations.

From First Nations to biological consultants, fishermen to volunteers and industry to government, the projects funded this past year are focusing energies towards restoring salmon stocks.

Various community groups, stakeholders and technical staff from the Department of Fisheries and Oceans (DFO) submitted proposals valued at over $20 million to HRSEP in the 97/98 fiscal year. Proposal reviews were conducted by DFO with input from various B.C. ministry staff, resulting in the approval of 73 projects. Successful projects exhibited a combination of HRSEP priorities within the program categories of resource and watershed stewardship, habitat restoration and stock rebuilding via assessment or enhancement techniques. Projects meeting these criteria and employing displaced fishermen in communities affected by fleet rationalization were given a high priority.

HRSEP co-ordinators would like to thank all proponents for their submissions. It is our hope to improve the program framework, encourage further co-operative efforts and increase funding to enable the success of community-based activities dedicated to increasing salmon stock abundance in the Pacific Region.



Program Administration:

The HRSEP administrative framework has established three main geographic areas within the province of B.C.: North and Central Coast, the Fraser River Basin and Vancouver Island & South Coast (see pie chart on right).

Funded projects have been further grouped into three main project categories: **Resource & Watershed Stewardship, Habitat Restoration, Stock Rebuilding (Assessment & Enhancement)**. The fourth category of *Pilot Selective Fisheries* encompassed a single project in the Vancouver Island & South Coast area to investigate the potential for a "mark-only" fishery on selected coho stocks originating from the south coast hatchery program.

The fifth funding category is DFO Technical Support which represents the province-wide cost to assist implementation of HRSEP projects in the field. This encompasses engineering and biological support, including assessment, survey, design, drafting and field supervision.

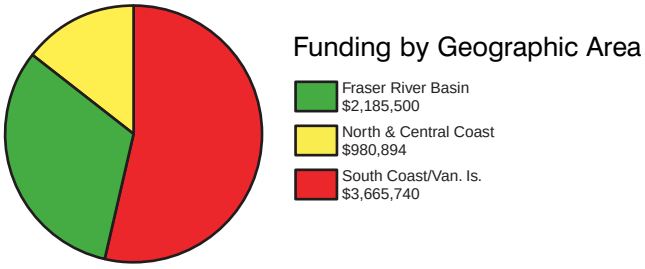
The Schedule on page 3 is summarized by geographic area and project category. All projects within each grouping are rolled up to show summarized project durations and costs.

Summary of Project Results:

In creating this summary report, 12 data categories have been chosen to represent HRSEP objectives (see Overview of Project Results on p.7-8 for details on these categories). Project reports ranged greatly in the level of detail in which data was submitted.

** In some cases the final reports contained a qualitative rather than quantitative description of results. For this reason, the values appearing in the table on the right are conservative as not all project proponents were able to supply exact numbers.*

** * LWD (large woody debris)*



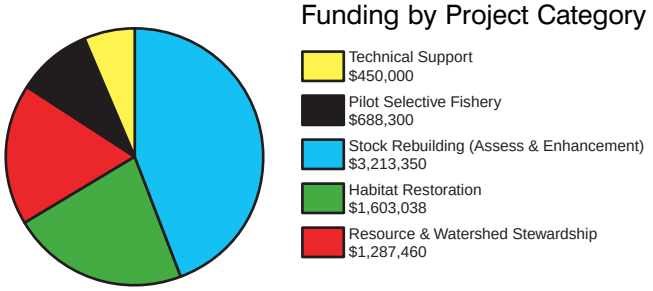


Table of Total Results*

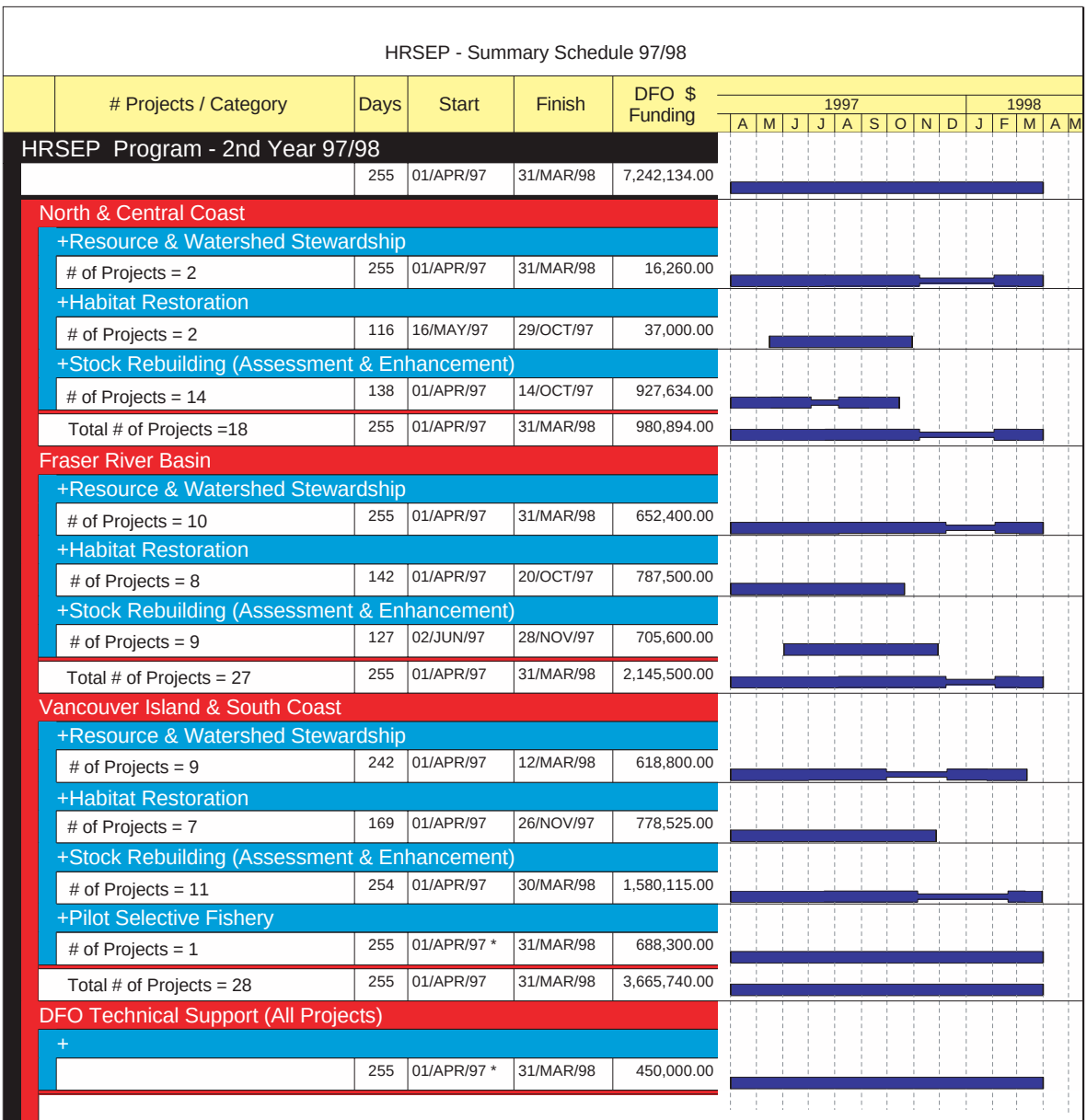
(73 projects from 97/98 HRSEP year)

Data Category	Totals
A. Person days employment (fishermen only)	7,345
B. Person days training (fishermen only)	2,227
C. Habitat – Stream & Riparian (sq.m.)	220,728
D. Habitat – LWD** & Complexing (sq.m.)	4,600
E. Habitat - Access Upstream (sq.m.)	11,307,400
F. Riparian Replanting (# of native plants)	65,587
G. Fencing Installed (linear m.)	16,750
H. Mapping – Sensitive Areas (linear m.)	443,247
I. Public Presentations & Media Releases	41
J. Adult Salmon Enumerated	179,160
K. Juvenile Salmon Enumerated	57,276
L. Salmon Marked, Tagged or Released	6,872,286
Number of Projects	73

Executive Summary

HRSEP - Summary Schedule 97/98

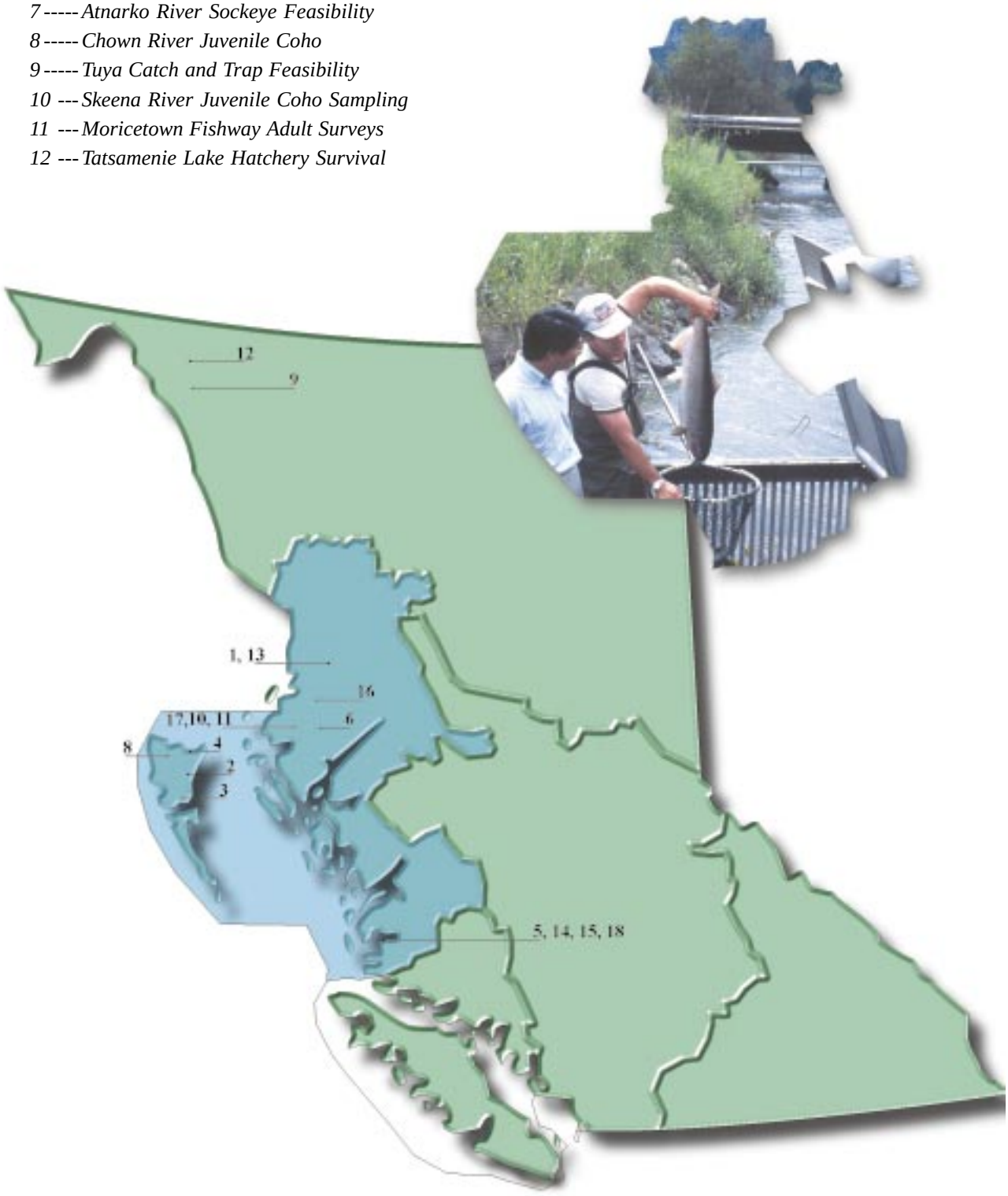
# Projects / Category	Days	Start	Finish	DFO $ Funding
HRSEP Program - 2nd Year 97/98				
	255	01/APR/97	31/MAR/98	7,242,134.00
North & Central Coast				
+Resource & Watershed Stewardship				
# of Projects = 2	255	01/APR/97	31/MAR/98	16,260.00
+Habitat Restoration				
# of Projects = 2	116	16/MAY/97	29/OCT/97	37,000.00
+Stock Rebuilding (Assessment & Enhancement)				
# of Projects = 14	138	01/APR/97	14/OCT/97	927,634.00
Total # of Projects =18	255	01/APR/97	31/MAR/98	980,894.00
Fraser River Basin				
+Resource & Watershed Stewardship				
# of Projects = 10	255	01/APR/97	31/MAR/98	652,400.00
+Habitat Restoration				
# of Projects = 8	142	01/APR/97	20/OCT/97	787,500.00
+Stock Rebuilding (Assessment & Enhancement)				
# of Projects = 9	127	02/JUN/97	28/NOV/97	705,600.00
Total # of Projects = 27	255	01/APR/97	31/MAR/98	2,145,500.00
Vancouver Island & South Coast				
+Resource & Watershed Stewardship				
# of Projects = 9	242	01/APR/97	12/MAR/98	618,800.00
+Habitat Restoration				
# of Projects = 7	169	01/APR/97	26/NOV/97	778,525.00
+Stock Rebuilding (Assessment & Enhancement)				
# of Projects = 11	254	01/APR/97	30/MAR/98	1,580,115.00
+Pilot Selective Fishery				
# of Projects = 1	255	01/APR/97 *	31/MAR/98	688,300.00
Total # of Projects = 28	255	01/APR/97	31/MAR/98	3,665,740.00
DFO Technical Support (All Projects)				
+				
	255	01/APR/97 *	31/MAR/98	450,000.00



Company name	Fisheries & Oceans Canada
Start date	01/APR/97
Finish date	31/MAR/98

North & Central Coast: Geographic Area and Project Locations

1 ----- Water Quality/Fish Health - Bulkley River
2 ----- Tlell River Assessment & Creel Survey
3 ----- Skidegate Restoration
4 ----- Fish Access (Beaver Dam Mgmt.) - Masset
5 ----- Captive Broodstock - Rivers Inlet
6 ----- Toboggan Ck. Fence (Smolt Enumeration)
7 ----- Atnarko River Sockeye Feasibility
8 ----- Chown River Juvenile Coho
9 ----- Tuya Catch and Trap Feasibility
10 --- Skeena River Juvenile Coho Sampling
11 --- Moricetown Fishway Adult Surveys
12 --- Tatsamenie Lake Hatchery Survival
13 --- Upper Bulkley R. Coho Assessment
14 --- Rivers Inlet Assessment
15 --- Labour/Assessment - Rivers Inlet
16 --- Babine River Fence Extension
17 --- Upper Skeena Adult Coho Surveys
18 --- Snootli Hatchery Upgrade - Rivers Inlet



Fraser River Basin

19 --- Alouette River Mgmt. Society - Coordinator
20 --- Streamkeepers Work - S. Mainland B.C.
21 --- Watershed Stewardship
22 --- Stream Mapping & Stewardship - Squamish
23 --- Fraser Basin Council
24 --- FREMP – Fraser River Estuary Mgmt.
25 --- Habitat Protection & Rest. - Salmon River
26 --- Tl'azt'en Fisheries Centre - Tachie River
27 --- Mapping Data Compilation & Coordination - Vancouver
28 --- Fraser River Estuary Wood Removal
29 --- Little Hell's Gate Fish Passage - Thompson R.
30 --- Prince George Restoration
31 --- Lower Mainland Restoration
32 --- Habitat Restoration - Bonaparte River
33 --- Middle Fraser Restoration
34 --- Lang Channel Complexing & Rip Rap
35 --- Sechelt Restoration/Enumeration
36 --- Langley Environmental Partners (LEPS)
37 --- Adams Lake Fertilization
38 --- Okanagan Sockeye
39 --- Calibration of Helicopter Escapement Estimates
40 --- Squamish Coho Assessment
41 --- Thompson R. Coho Stock Recovery
42 --- Upper Pitt River - Coho Assessment
43 --- Sockeye Reproductive Potential - Stuart R./Takla R.
44 --- N. Thompson River Enhancement
45 --- Salmon River Restoration

Geographic Area and Project Locations

Vancouver Island & South Coast

46 --- Pacific Streamkeeper's Workshops
47 --- Pacific Streamkeeper's Field Work
48 --- Coho Capacity, GIS
49 --- Campbell River Estuary
50 --- T'souke Selective Harvest Trap
51 --- Educational Hatchery - Kitsuksis Creek
52 --- South Island Streams Restoration
53 --- Tsolum R./Courtenay R. Estuary Plan
54 --- Cowichan Watershed Council
55 --- Vancouver Island Restoration
56 --- Tsolum River Restoration
57 --- Agricultural Hot Spots/Watershed Inventory
58 --- Discovery Coast Wetland Restoration
59 --- Keddy Water Storage (Black Cr.)
60 --- Cowichan River - Stoltz's Slide
61 --- Saltspring Island Stream Restoration
62 --- Black Cr. Initiatives: Juvenile & Habitat Inventory
63 --- Tsolum River Seal Predation
64 --- Nimpkish River Stock Assessment
65 --- Coho By-Catch Monitoring
66 --- Marble River Rearing Channel - Port Hardy
67 --- Mainland Inlet Stock Assessment & Bute Inlet Fishwheel
68 --- Fanny Bay Enhancement
69 --- Georgia & Juan De Fuca Straits Troll Census
70 --- W. Coast Vancouver Is. Chinook Surveys
71 --- W. Coast Vancouver Is. Chum & Chinook Hatchery Sampling
72 --- Escapement Estimation - Keogh River
73 --- Georgia Strait Coho Initiative

Reporting Requirements

As required by the contractual funding agreements, all proponents were asked to submit interim and/or final reports in a format that covers the points below.

1. Project Details
2. Results - General Discussion
3. Results – Quantifiable Measures
4. Follow-up, Monitoring & Future Plans
5. Financial Statement

Overall, the data and effort from this program have produced valuable results, training and employment aimed at rebuilding salmon stocks and the habitat on which they rely. Many of the projects dealt with conservation of steelhead and coho salmon.

Results & Data Categories

Project activities included enumeration of coho stocks (both adult and juvenile), DNA sampling, habitat mapping and restoration. In addition, some of the projects tested selective fishing techniques as a means of continuing the harvest of stronger salmon stocks while reducing fishing of weaker stocks, particularly coho, during mixed stock fisheries.

Results listed below were extracted from reports submitted for each project. In some cases, the data submitted did not contain quantifiable values in all the categories of work. Therefore, the values contained in the following table are not comprehensive. In other cases, the data submitted was too detailed to cover in this summary report of the HRSEP 1997/98 year. Project results have been condensed into 12 data categories that reflect program objectives.

A.) Person days employment (fishermen only): The number of person days of employment for coastal community fishermen displaced by fleet rationalization.

B.) Person days training (fishermen only): The number of person days of training received by coastal community fishermen displaced by fleet rationalization. Training programs are underway to standardize the methods and techniques used by personnel conducting field work.

C.) Habitat – Stream & Riparian (sq.m.): This category combines in-stream (rearing & spawning habitat) with riparian (streamside) habitat. Desired results are recorded in square metres of habitat created.

D.) Habitat – Large Woody Debris & Complexing (sq.m.): Types of in-stream fish habitat include structures used by juvenile salmon seeking shelter from predators and high water flows. Large woody debris (LWD) and complexing structures such as boulders are typically used by juveniles. Some projects involved the placement of LWD and complexing structures. Desired results are recorded in square metres of habitat created.

E.) Habitat - Access Upstream (sq.m.): In some stream or river systems, the access to upstream habitat for spawning and rearing salmon has been hampered by human or natural factors. Some of the projects improved upstream access to spawning and rearing habitat. Desired results are recorded in square metres of accessible habitat.

F.) Riparian Replanting (# of native plants): Riparian zones are made up of vegetated corridors along streambanks. These corridors provide valuable shade and stream cover, which maintains cooler water temperatures needed by rearing juvenile salmon and provides nutrients to promote invertebrate production. Numerous projects were involved with replanting indigenous plants to improve streamside riparian zones. Results show number of plants introduced.

G.) Fencing Installed (linear m.): Agricultural impacts to in-stream and riparian habitat can be significant because of uncontrolled livestock access to streams. Many of the projects involved working with farmers to provide and install fencing along streambanks to reduce livestock impacts. Fencing installed was measured in linear metres.

H.) Mapping – Sensitive Areas (linear m.): Extensive database information from mapping will be incorporated into federal, provincial and municipal government archives, and will assist local land-use planning. Sensitive stream areas mapped were measured in linear metres.

I.) Public Presentations & Media Releases: Many of the HRSEP projects involved public awareness and education through workshops, presentations and media releases.

J.) Adult Salmon Enumerated: Escapement of all species of salmon was measured on various river systems. Considerable effort was dedicated to coho enumeration. Results are in fish enumerated, all species combined. Data will assist fisheries and habitat management.

K.) Juvenile Salmon Enumerated: As above.

L.) Salmon Marked, Tagged or Released: Includes total number of all adults and juveniles marked, tagged or released from enhancement projects.

Table of Results by Project Category & Total

(73 projects from 97/98 HRSEP year)

Project Category vs. Results	Totals	Resource & Watershed Stewardship	Habitat Restoration	Stock Rebuilding (Assessment & Enhancement)	Pilot Selective Fishery
A. Person days employ (fishermen only)	7,345	2,100	1,825	3,420	
B. Person days train (fishermen only)	2,227	2,095	132		
C. Habitat – Stream & Riparian (sq.m.)	220,728	132,865	87,863		
D. Habitat – LWD & Complexing (sq.m.)	4,600	100	4,500		
E. Habitat - Access Upstream (sq.m.)	11,307,400	2,000	11,305,400		
F. Riparian Replanting (# of native plants)	65,587	65,587			
G. Fencing Installed (linear m.)	16,750	2,000	14,750		
H. Mapping – Sensitive Areas (linear m.)	443,247	295,177		148,070	
I. Public Presentations & Media Releases	41	41			
J. Adult Salmon Enumerated	179,160	43,866		135,294	
K. Juvenile Salmon Enumerated	57,276	40,000		17,276	
L. Salmon Marked, Tagged or Released	6,872,286	40,142		19,913	6,800,000
Number of Projects	73	21	17	34	1

Five projects were randomly chosen as representative of the three geographic areas and three main project categories within the Habitat Restoration & Salmon Enhancement Program. They encompass a diverse cross-section of activities:

- Public Education
- Community Participation
- Employment & Training Opportunities
- Inter-Governmental Participation & Cooperation
- Development Guidelines & Practices
- Stakeholder Participation & Cooperation
- Selective Fishing / Enumeration Techniques
- Hydrological Engineering
- Fisheries Biology: Sampling & Statistical Modelling
- Protecting & Restoring Habitat: Forest Practices, Agriculture, Urban Development, Mining, Transportation, Pollution

List of 5 Projects

#6 Toboggan Creek Coho Smolt Enumeration
#58 Discovery Coast Wetlands Restoration
#57 Agricultural Hot Spots & Watershed Inventory
#19 Alouette River Management Society
#41 Thompson River Coho Stock Recovery

Project #6: Toboggan Creek Coho Smolt Enumeration - $19,294
Area/Type: North & Central Coast / Stock Rebuilding (Assessment & Enhancement)
Partners: Toboggan Creek Enhancement Society (Smithers), SKR Consultants, DFO
Employ/Train: Consultants & Volunteers

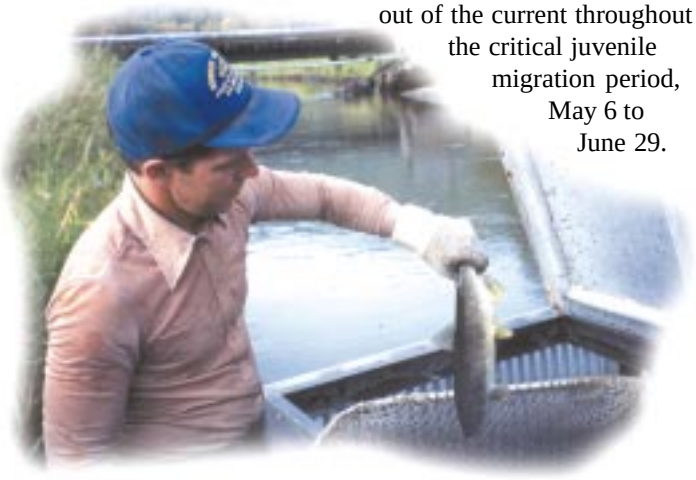
Introduction:

Toboggan Creek is a glacial tributary of the Bulkley River within the Skeena River watershed. The creek provides good coho spawning habitat. Rearing habitat for juveniles is found within the low gradient side channels of Toboggan Creek and downstream into Toboggan Lake. Fish include coho, chinook, steelhead and other freshwater species. Toboggan Creek is unique within the Skeena River watershed for its hatchery that has augmented coho stocks since 1988. Smolts released from the hatchery are marked with coded wire tags and adipose fin clips. A counting fence on Toboggan Creek has enumerated adult coho since 1989 and steelhead since 1993.

The primary focus of this project was to capture, count, and release a representative sample of all juvenile coho in the system. Estimates of wild coho abundance could then be extrapolated from the data. Collection of data revealing condition, migration timing and age of the wild coho will assist with fisheries management and coho conservation.

Methods:

Juvenile coho were sampled using a fyke trap. A new trap, similar to the one used for the last three years, was mounted on an aluminium frame. Deflection bars were used upstream to prevent debris from entering the trap. The trap was anchored to trees on shore, employing a cable and pulley to move the trap in and out of the current throughout the critical juvenile migration period, May 6 to June 29.



Sampling was conducted two or three times per week depending upon abundance and water flow. As fish were dip-netted from the live box they were counted and inspected for adipose fin clips, then returned to the river. Factors such as weight, fork length, and scale samples for age determination were taken for up to 200 fish of each wild species. Water and weather parameters were recorded for each sampling period.

Results:

The peak migration of coho smolts occurred at night between May 28 and June 24. A total of 1,628 wild and 1,276 hatchery coho were caught in the fyke trap during the critical juvenile migration period. In addition, 133 steelhead, 3 dolly varden, 7 chinook, 3 cutthroat trout and 21 lamprey were captured. Increased water levels resulting from high rainfall and snowmelt, combined with changes to trap design, appeared to increase mortality over previous sampling years. As a result, the sampling intensity was lower towards the end of the study. The total number of captured wild and hatchery coho was lower than in previous years, due probably to reduced trapping intensity and to the number of adults returning to spawn upstream of the fence location. Peak flows did not result in peak captures, possibly because of lower trap performance. A predominance of coho fry compared to smolts was observed towards the end of the sampling period. As is common with coho, some fry stay an additional year in freshwater, heading to the ocean as smolts in their second year.

Future Efforts:

Toboggan Creek could be used as an index site when monitoring fluctuations in freshwater productivity, juvenile survival, and smolt-to-adult survival of coho in the Bulkley River watershed. Improvements to enumeration techniques in 1998 involved the use of a rotary screw trap at new locations further downstream to enumerate juveniles from wild fish spawning below the adult counting fence.

Toboggan Creek Coho Smolt Enumeration, North / Central Coast Region

Project #58: Discovery Coast Wetland Restoration - $239,750
Area/Category: Vancouver Island & South Coast / Habitat Restoration
Partners: Community Groups, Discovery Coast Greenways Land Trust, North Island Fisheries Initiative (NIFI), MELP, Dist. of Campbell River, DFO
Employ/Train: Management personnel, NIFI members (fishermen), many volunteers

Introduction:

An unprecedented alliance between local stewardship groups, commercial and sports fishermen, federal, municipal and provincial governments, this project involves a series of wetland and watershed restoration initiatives for the Campbell River area. It is meant to encompass environmentally sensitive area planning and development guidelines for the District of Campbell River, a region that stretches from Stories Creek in the south, to Menzies Creek in the north, including the Village Bay Lakes system on Quadra Island. The project includes assessment, mapping and restoration work on key streams, including wetlands and estuaries. As part of ongoing efforts to ensure the retention of key environmentally sensitive habitat a Greenways Strategic Plan has been created. Adoption of this plan as a template for future development and growth within the District of Campbell River will be an essential component of the Discovery Coast Wetlands Restoration project.

DFO's commitment to this project enabled community groups and volunteers to assist with the restoration and enhancement of salmon stocks and to the habitat that supports them.

Methods:

Work varied from the highly technical to educational events such as B.C. Rivers Day. Technical endeavours included the design of protective structures for creek mouths and estuaries, and detailed mapping using a differential global positioning system (GPS) and geographic information system (GIS). Computer mapping programs (Arc View) were used to record the data. This data will direct the Greenways Strategy which will drive the future management guidelines for land development by the District of Campbell River.

Other work included enumeration of juvenile and adult salmon as well as the mark-and-release of coho smolts, which had been given a jump-start through net pen rearing by a local sport fishing club.

Results:

The District of Campbell River administers the finances and accounts for this project. They follow the processes that govern the financial operation of a local government. A coordinating committee was formed to review work plans and to monitor progress and results:

- *Design of Simms Creek estuary structure (rock groyne)*
- *Adult salmon enumerated on Simms & Willow Creeks*
- *Fry enumerated – Quinsam River*
- *Strategic Plan for Campbell River*
- *Land Management & Development Regulations – Greenways Plan*
- *20,000 coho smolts marked & released following marine net pen rearing*
- *Public education – B.C. Rivers Day & landowner education kits*

Future Efforts:

Activity will continue in all areas of this project. Commendations from the B.C. Outdoor Recreation Council sum up the future of this endeavour: "Of all the communities in B.C., Campbell River evoked the greatest spirit of celebration. By taking the cooperative approach, you have proven that interest groups working together make a greater impact. With 11 different event sites and a variety of activities for the whole family, you managed to attract more people to your celebration than any other community in the province. The Council commends you for your dedication to making a real difference to the issues involving our local waterways. Thank you for making B.C. Rivers Day 1997 a real success".

Discovery Coast Wetland Restoration, Vancouver Island & South Coast

Project #57: Agricultural Hot Spots & Watershed Inventory - $66,775
Area/Category: Vancouver Island & South Coast / Habitat Restoration
Partners: Comox Valley Project Watershed, Comox-Strathcona Regional District, Farmers and Landowners, Health Services Society, Farmers Inst. Advisory Committee, HRDC, MELP, MAFF, DFO
Employ/Train: 3 people for 670 days, many volunteers

Introduction:

This project was coordinated by the Comox Valley Project Watershed Society whose mission is to promote community stewardship of watersheds from Oyster River to Deep Bay Creek. Operating from the premise that improperly managed livestock farms threaten water quality, salmon habitat, shellfish farms and public health, the project presents positive environmental options to non-commercial hobby farms in the Comox Valley. The Watershed Inventory component provides mapping information on which to base management decisions in an area undergoing rapid population growth. Recently, a new tool has been developed to help in the land-use planning process — an Environmentally Sensitive Areas (ESA) Atlas. Regular updates will provide baseline fisheries information on small streams under pressure from urban development and agricultural impacts. This is expected to promote environmentally sensitive planning and contribute to careful management of our watersheds and protection of salmon stocks and their habitat.

Methods:

The Agricultural Hot Spots objectives were achieved by contacting landowners, surveying riparian areas on farms, and farm site remediation such as livestock fencing along impacted stream banks. Riparian corridors on farms were revegetated. Ditching and containment ponds were established around manure piles, from which runoff had been impacting salmon-bearing streams. Promoting program goals through public presentations and press releases provided valuable public education. Watershed inventory objectives were threefold: field work, production work and community development. Field work involved ground truthing watercourses on farms and determining fish presence. Production work meant digitizing field information, then designing and managing a GIS computer program. Community development involved arranging partnerships, campaigning for awareness, and developing a "community mapping network" via training workshops. The Youth E-Team, Streamkeepers, Fish Harvesters Employment Transition Centre, Women in Technology Training and interested individuals participated in this worthwhile project.

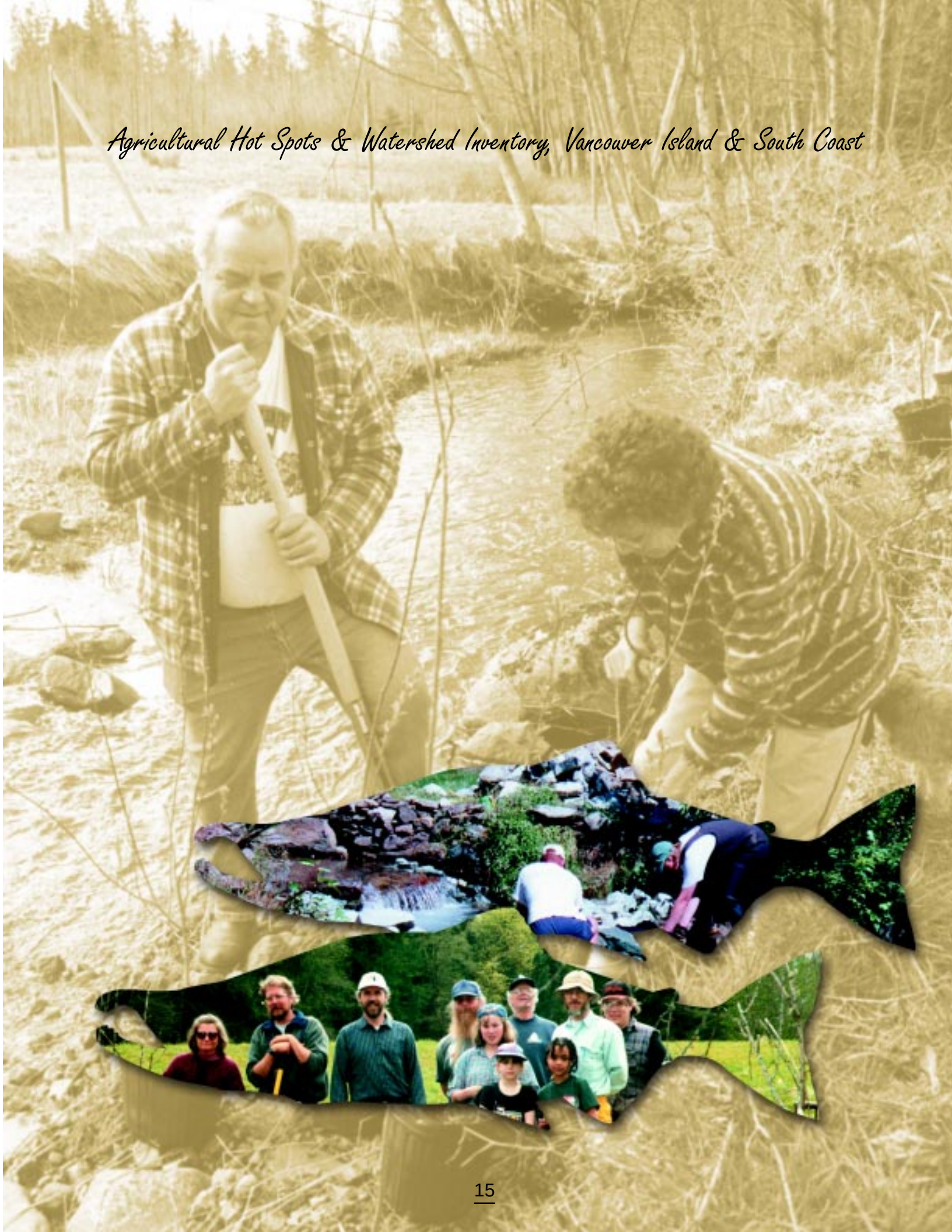
Results:

- *132 rural properties surveyed*
- *Ground truthed watercourses on 116 farms*
- *Remediation actions on 20 farms*
- *Fencing erected along 2,050 m. of farm streams*
- *Riparian revegetation - 2,312 native plants*
- *Created & distributed Agricultural Hot Spots brochure*
- *23 public presentations, 10 media releases*
- *ESA atlas updated*
- *Agreement letter between Comox Valley Project Watershed & Comox Strathacona Regional District*

Future Efforts:

This program was successful in promoting improved land management activities. However, many streams, wetlands and sensitive ecosystems are not yet accurately mapped, and the ESA atlas lacks effective updates because of fiscal restraints. Through partnerships and clear terms of reference, however, Project Watershed is moving ahead to involve more landowners, expand its databases with layers pertaining to fish habitat, greenways and water quality, in order to complete the GIS atlas.

Agricultural Hot Spots & Watershed Inventory, Vancouver Island & South Coast



Project #19: Alouette River Management Society - $50,000
Area/Type: Fraser River Basin / Resource & Watershed Stewardship
Partners: ARMS, CFDC, Landowners, Dist. Maple Ridge, UBC, Alouette River Correctional Centre, B.C. Hydro, FRBC, MELP, DFO
Employ/Train: 31 fishermen trained, 98 volunteers, for 1,650 hrs.

Introduction:

The Alouette River Management Society (ARMS) (est. 1993) is a broad-base organization committed to the protection, restoration and enhancement of the Alouette watershed and adjoining waterways. They conducted hands-on work and brought ARMS concerns to the Alouette River Management Council (ARMC). This council has representation from all levels of government and acts as a problem-solving advocacy board.

The Alouette watershed is home to many habitat types and land uses. The headwaters upstream of the Alouette River Correctional Centre are protected by Golden Ears Park and are pristine. The central reaches are rural or suburban residential with small hobby farms, while the lower section down to the Pitt River confluence is mostly agricultural. The main areas of concern for ARMS are:

- *Effects of land use (storm runoff, improper development)*
- *Potential effects of future land use*
- *On-going effects of past activities (channelization, riparian strip removal)*
- *Management of Alouette Dam operations (B.C. Hydro)*

Methods:

Riparian restoration — willow, cottonwood, alder, and coniferous species donated by Interfor — were planted by personnel (under-employed fishermen) from the Community Fisheries Development Centre. Habitat restoration included placing in-stream large woody debris, improving access to upstream channels and creating streambank habitat. Salmon enumeration involved spring fry trapping in newly opened channels and counting adult chum salmon returning in the fall. Public education is a priority with ARMS, as they believe that an educated and empowered public will protect their riparian corridors.

Results:

Short-term impacts were realized through education and dedicated community action. Long-term benefits included increased cover, lower summer water temperatures, increased food production for rearing salmon and recruitment of woody debris as cover for the juveniles. Identifiable accomplishments:

- *10,000 trees planted on 100,000 sq.m. of riparian habitat*
- *100 sq.m. of large woody debris (LWD) habitat created*
- *1,200 sq.m. in-stream habitat created*
- *Opened access to 2,000 sq.m. of upstream habitat*
- *Mapped 6,250 sq.m. of Alouette River including water quality*
- *Enumerated 40,000 adult chum salmon*
- *Interfaced with public via newsletters, mail-outs*
- *Facilitated education & sediment control workshop*

Future Efforts:

ARMS intends to increase the amount of riparian cover in other areas. They will continue to convince developers that the *Fisheries Act* is not contrary to their interests. Networking with other municipalities that have implemented stream classification systems, and promoting educational tools like the Land Owner Activity Kit are key objectives for the future.

Alouette River Management Society, Fraser Basin Region

Project #41: Thompson River Coho Stock Recovery - $165,200
Area/Type: Fraser River Basin / Stock Rebuilding (Assessment & Enhancement)
Partners: Shuswap Nation Fisheries Commission (SNFC), Triton Environmental
Employ/Train: 350 person days: Band Technicians & Consultants

Introduction:

Historical information on coho escapements is unreliable because most of the data is based on visual counts. The status of over half the coho stocks in B.C. is, therefore, virtually unknown (Slaney et al., 1996). The status of wild coho production from unenhanced streams in the Thompson Basin is not well documented. To begin the process of Thompson River coho stock recovery, the Shuswap Nation Fisheries Commission (SNFC) and member Bands conducted a multi-faceted coho study program with the DFO. This project had two phases, first a juvenile survey and second, adult coho escapement monitoring.

Methods:

Juvenile enumeration was done using removal-depletion density estimates derived from electro-shocking and pole seining sampling at random locations. A minimum of three sites from each stream were targeted for sampling. Fork lengths were measured for all fish sampled and scales were taken from selected fish. Genetic samples via caudal fin clips were also taken from juvenile coho and rainbow trout. Adult enumeration was done using Alaskan style fences at five fence sites. The Bonaparte Fishway used a live trap incorporated into the fishway structure.

Information collected at each site included habitat types, wetted area, water quality, substrata and cover pattern. Finally, all sites were marked in the field and on 1:50,000 topographic maps, supplemented with UTM co-ordinates and watershed codes.

Results:

Yearling coho were captured at only four sites in three of the sampled streams. In total, 713 fish were sampled, of which 28 were coho. Fence counts of adult coho in four enhanced streams totalled 1,255, whereas counts in four wild streams totalled 161 coho. Comparing these adult escapements with brood year (1993) the data shows a reduction of 66% for wild stocks and a 50% reduction for enhanced stocks in 1997.

Future Efforts:

Juvenile densities can be used to rank streams for their coho productivity, while mean fork length can reveal trends in escapement. This survey is meant to help develop a cost-effective system for monitoring stream productivity and coho escapements via assessment of yearling (0^{+}) coho. Adult escapement data from otherwise unmonitored streams will help determine if new harvest management strategies are working. Future data will have far-reaching implications for addressing the abundance of coho in streams now devoid of fish. This new information will assist with management of habitat in the future.

Thompson River Coho Stock Recovery, Fraser River Basin

HRSEP - Partnerships *

Federal Government

Fisheries and Oceans Canada (DFO)
Environment Canada
Human Resources Development Canada
National Research Council
Parks Canada

Provincial Government

Forest Renewal B.C.
Min. Agriculture, Food & Fisheries
Min. Environment, Lands & Parks
Min. of Forests
Min. of Transportation & Highways

Municipal Government:

City of Kelowna
City of Port Alberni
District of Campbell River
District of Maple Ridge
Greater Vancouver Regional District (GVRD)
Township of Langley

Non-Government Organizations:

Alberni Valley Enhancement Association
Alouette River Management Society (ARMS)
Bertrand Creek Enhancement Committee
Canadian Centre for Fisheries Innovation
Canadian Columbia River Inter-Tribal Fisheries Commission
Carrier Sekani Tribal Council Fisheries Program
Coastal Community Conservation Society
Community Fisheries Development Centre (CFDC)
Comox Valley Project Watershed Society
Cowichan Watershed Council
Cows, Fish & Forests Roundtables
Ducks Unlimited
Fanny Bay Enhancement Society
Fraser River Fisherman Society
Friends of the Marble River
Gwaii Trust Society
Haida First Nation
Homalco First Nation
Island Stream & Salmon Enhancement Assoc.
Keogh River Watershed Restoration Project
Kwakiutl Territorial Fisheries Commission
Land for Nature Initative
Langley Environmental Partners Society
McLean Mill Historical Society
Namgis First Nation
Nicomekl Enhancement Society
Nimkish Resource Management Board
Nooksack Salmon Enhancement Society
North Island Fisheries Initiative (NIFI)
Okanagan Nation Fisheries Commission
Okanagan Training & Development Council
Pacific Salmon Foundation
Pete Taggares (Othelo, WA. – U.S.A.)
Port Alberni Museum Advisory Board
Port Alberni Salmon Festival
Quatsino Sound Salmon Enhancement Society
Quesnel Watershed Alliance
Rivers Inlet Restoration Society
Salmon River Enhancement Society
Salmon River Roundtable
Shuswap Nation Fisheries Commission
South Island Streams
Sports Fishing Institute
Steelhead Society
Streamkeepers Federation
T'sou-ke First Nation
Tahltan First Nation
Tl'azt'en First Nation
Tlell Watershed Society
Toboggan Creek Enhancement Society
Tsolum River Task Force
UBC Fisheries Centre
UFAWU/Native Brotherhood
Watershed Foundation
West Coast Fishing Club
Wet'suwet'en First Nation
World Fisheries Trust
Many Volunteers
(community groups, schools, individuals)

Corporate:

Aines & Tyler Electric
Al McGill & Associates
BC Hydro
BHP Island Copper
Canadian Forest Products Ltd.
CLN Machining & Fabricating
Coast Tractor & Equipment
Dolans Concrete
Easton Transport
GLM Falling
H. Leighton Contracting
Herb Saunders Contracting
Horsefly Cattlemen's Association
International Forest Products Ltd.
John Foster Trucking
Jones Seaboard & Co. Law Offices
Lignum Forest Products Ltd.
McLean & Higgins Plumbing
R.J. Hay & Consulting
Stan Zwicker Contracting
Terminal Forest Products Ltd.
Terratech Equipment
Weldwood of Canada
West Coast Energy
West Coast Helicopters
Western Forest Products Ltd.

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

Introduction:

In many cases the fieldwork on fisheries projects has critical timing constraints imposed by migration of salmon or climatic conditions. The planning stage is crucial because the mobilization of field crews and equipment must be synchronized with the varied behavioural patterns of local fish populations, water flow or visibility and terrestrial conditions. Missing critical events such as run timing, emergence or out-migration of fry or smolts may have significant impacts on the project success. Climatic and aquatic conditions at the desired site should be considered as this may affect the efficiency of proposed field work.

Effective project management and cash flow are crucial to the successful completion of any project. The commitment of all proponents to work within a standardized framework, from training and safety through to collection of field data will ensure cost effective results for all project categories within HRSEP.

Projects have been grouped by geographic area and category codes. They are sequenced within each grouping based on the project start date.

1. Detailed Project Schedule (p. 22-26):

The following six pages list the 73 projects funded in the Habitat Restoration & Salmon Enhancement Program for the 1997/98 fiscal year. Details such as timing, duration, project funding (HRSEP only) and coding (by area & category) have been given for each project. Detailed planning and scheduling assist to emphasize the need for timing of critical activities throughout the year based on climatic conditions or salmon behaviour.

- Geographic Area Codes (3)
- Project Category Codes (4)
- Timing & Duration (in days based on 5d/wk.)
- Project Funding (HRSEP contributions only)

Each page of the schedule is comprised of information on the left and a bar chart on the right. The first line summarizes duration, timing, and funding for all projects in the 1997/98 fiscal year. Geographic areas show similar sub-totals at the bottom for all projects within the North & Central Coast, Vancouver Island & South Coast and the Fraser River Basin.

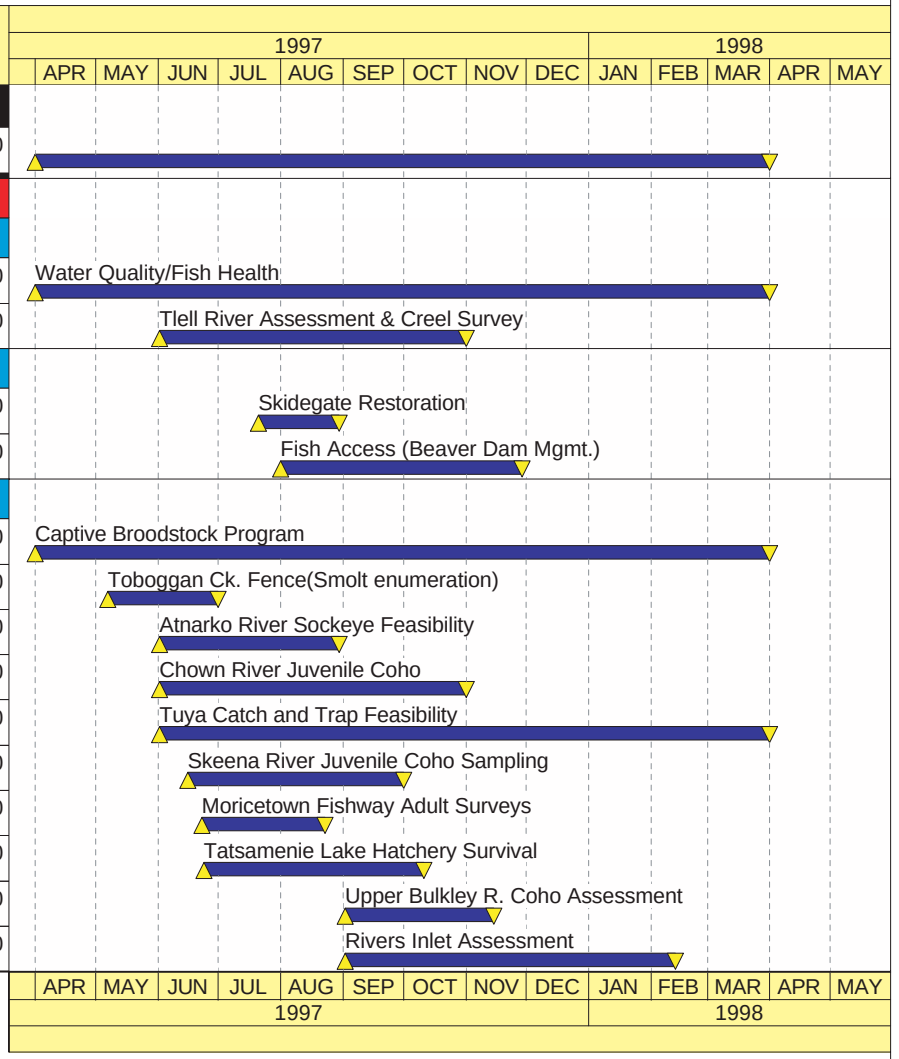
2. Cost Profile (p. 27):

The cost profile shows HRSEP expenditures over the timeframe of April 1, 1997 to March, 31, 1998. Expenditures are coded by Project Category as follows:

- Habitat Restoration
- Resource & Watershed Stewardship
- Stock Rebuilding (Assessment & Enhancement)
- Pilot Selective Fishery (Georgia Strait)
- DFO Technical & Administration Costs

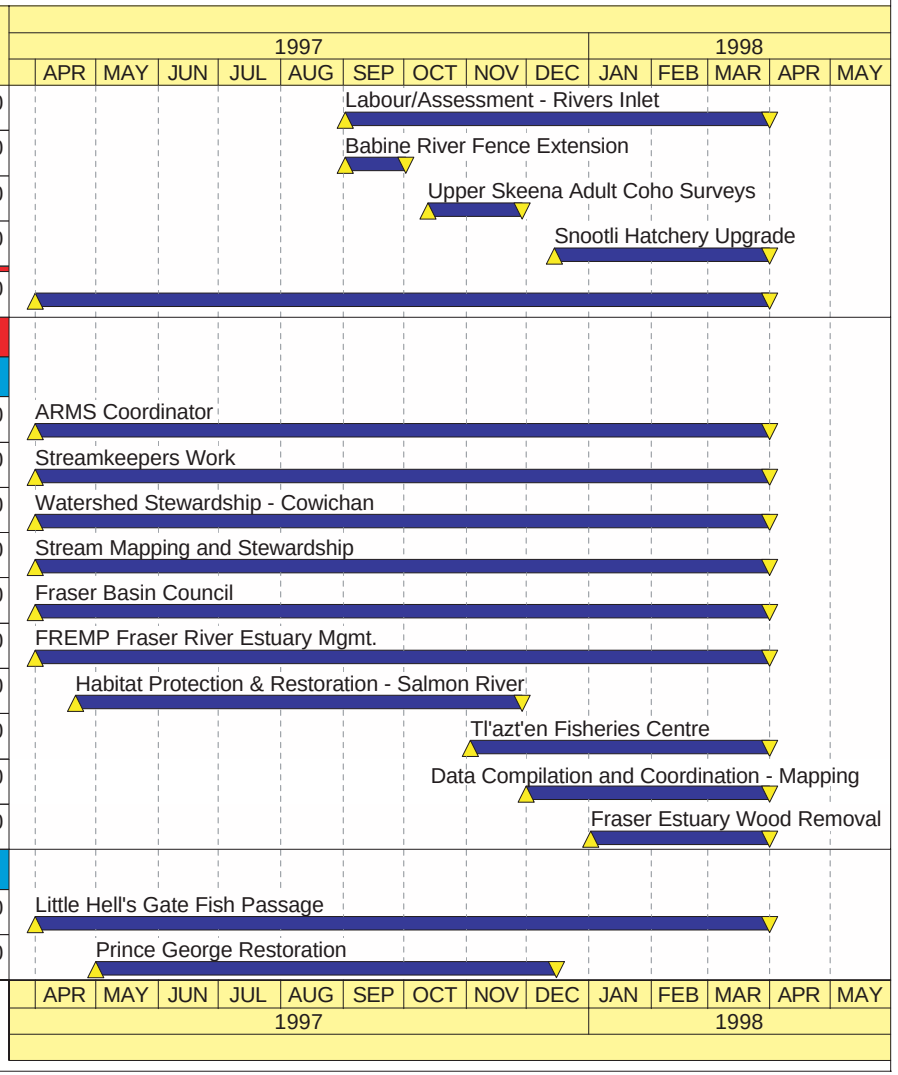
HRSEP Project Schedule 97/98 Year

	Proj #	Project Name	Days	DFO Funding $
HRSEP Program - 2nd Year 97/98				
			255	7,242,134.00
North & Central Coast				
Resource & Watershed Stewardship				
	1	Water Quality/Fish Health	255	6,260.00
	2	Tlell River Assessment & Creel Survey	108	10,000.00
Habitat Restoration				
	3	Skidegate Restoration	30	27,000.00
	4	Fish Access (Beaver Dam Mgmt.)	84	10,000.00
Stock Rebuilding (Assessment & Enhancement)				
	5	Captive Broodstock Program	255	80,000.00
	6	Toboggan Ck. Fence(Smolt enumeration)	38	19,294.00
	7	Atnarko River Sockeye Feasibility	64	27,400.00
	8	Chown River Juvenile Coho	108	11,000.00
	9	Tuya Catch and Trap Feasibility	212	73,000.00
	10	Skeena River Juvenile Coho Sampling	75	64,500.00
	11	Moricetown Fishway Adult Surveys	44	45,500.00
	12	Tatsamenie Lake Hatchery Survival	77	100,000.00
	13	Upper Bulkley R. Coho Assessment	54	15,000.00
	14	Rivers Inlet Assessment	115	150,000.00



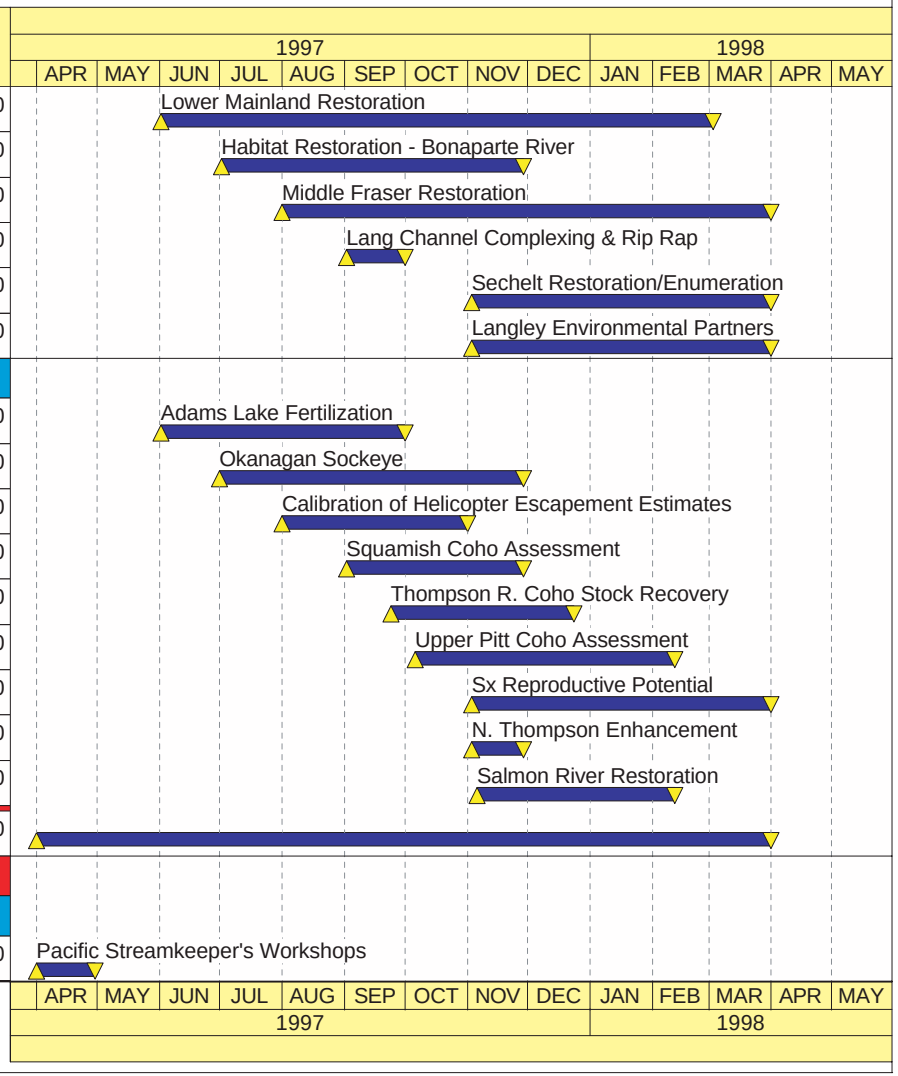
HRSEP Project Schedule 97/98 Year

Proj #	Project Name	Days	DFO Funding $
15	Labour/Assessment - Rivers Inlet	148	140,000.00
16	Babine River Fence Extension	22	36,600.00
17	Upper Skeena Adult Coho Surveys	34	22,000.00
18	Snootli Hatchery Upgrade	75	143,340.00
	North & Central Coast subtotal	255	980,894.00
	Fraser River Basin		
	Resource & Watershed Stewardship		
19	ARMS Coordinator	255	50,000.00
20	Streamkeepers Work	255	40,500.00
21	Watershed Stewardship - Cowichan	255	25,000.00
22	Stream Mapping and Stewardship	255	21,900.00
23	Fraser Basin Council	255	50,000.00
24	FREMP Fraser River Estuary Mgmt.	255	150,000.00
25	Habitat Protection & Restoration - Salmon River	156	100,000.00
26	Tl'azt'en Fisheries Centre	104	50,000.00
27	Data Compilation and Coordination - Mapping	85	115,000.00
28	Fraser Estuary Wood Removal	63	50,000.00
	Habitat Restoration		
29	Little Hell's Gate Fish Passage	255	60,000.00
30	Prince George Restoration	159	165,000.00



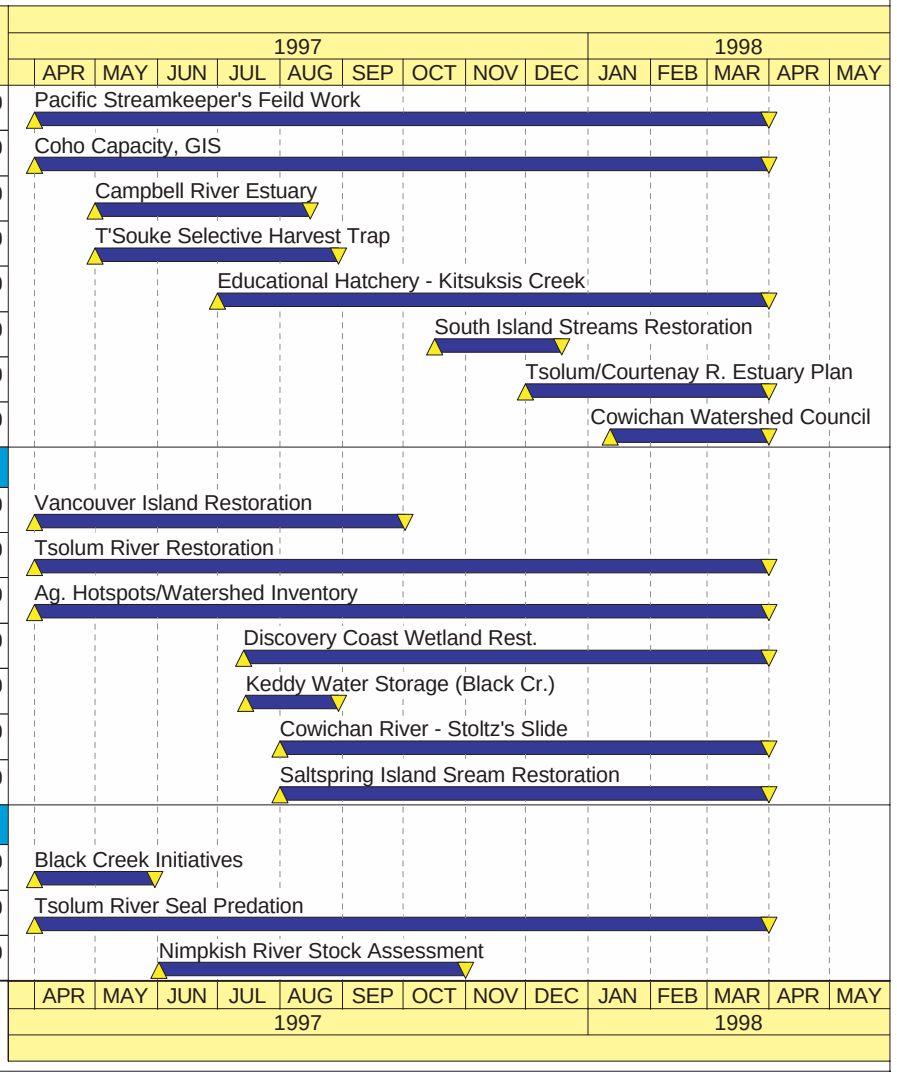
HRSEP Project Schedule 97/98 Year

Proj #	Project Name	Days	DFO Funding $
31	Lower Mainland Restoration	191	70,000.00
32	Habitat Restoration - Bonaparte River	105	100,000.00
33	Middle Fraser Restoration	169	200,000.00
34	Lang Channel Complexing & Rip Rap	21	100,000.00
35	Sechelt Restoration/Enumeration	104	42,500.00
36	Langley Environmental Partners	104	50,000.00
	Stock Rebuilding (Assessment & Enhancement)		
37	Adams Lake Fertilization	85	140,000.00
38	Okanagan Sockeye	106	40,000.00
39	Calibration of Helicopter Escapement Estimates	65	40,000.00
40	Squamish Coho Assessment	63	56,500.00
41	Thompson R. Coho Stock Recovery	64	165,200.00
42	Upper Pitt Coho Assessment	90	68,800.00
43	Sx Reproductive Potential	104	60,000.00
44	N. Thompson Enhancement	19	45,000.00
45	Salmon River Restoration	67	90,100.00
	Fraser River Basin subtotal	255	2,145,500.00
	Vancouver Island & South Coast		
	Resource & Watershed Stewardship		
46	Pacific Streamkeeper's Workshops	21	1,200.00



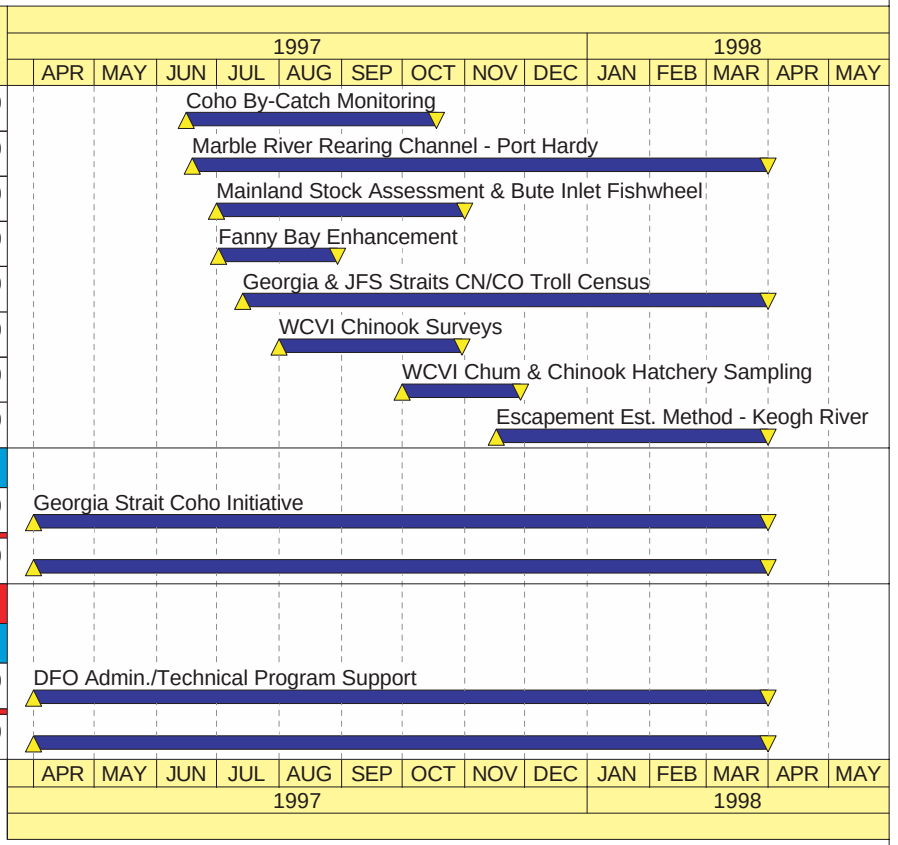
HRSEP Project Schedule 97/98 Year

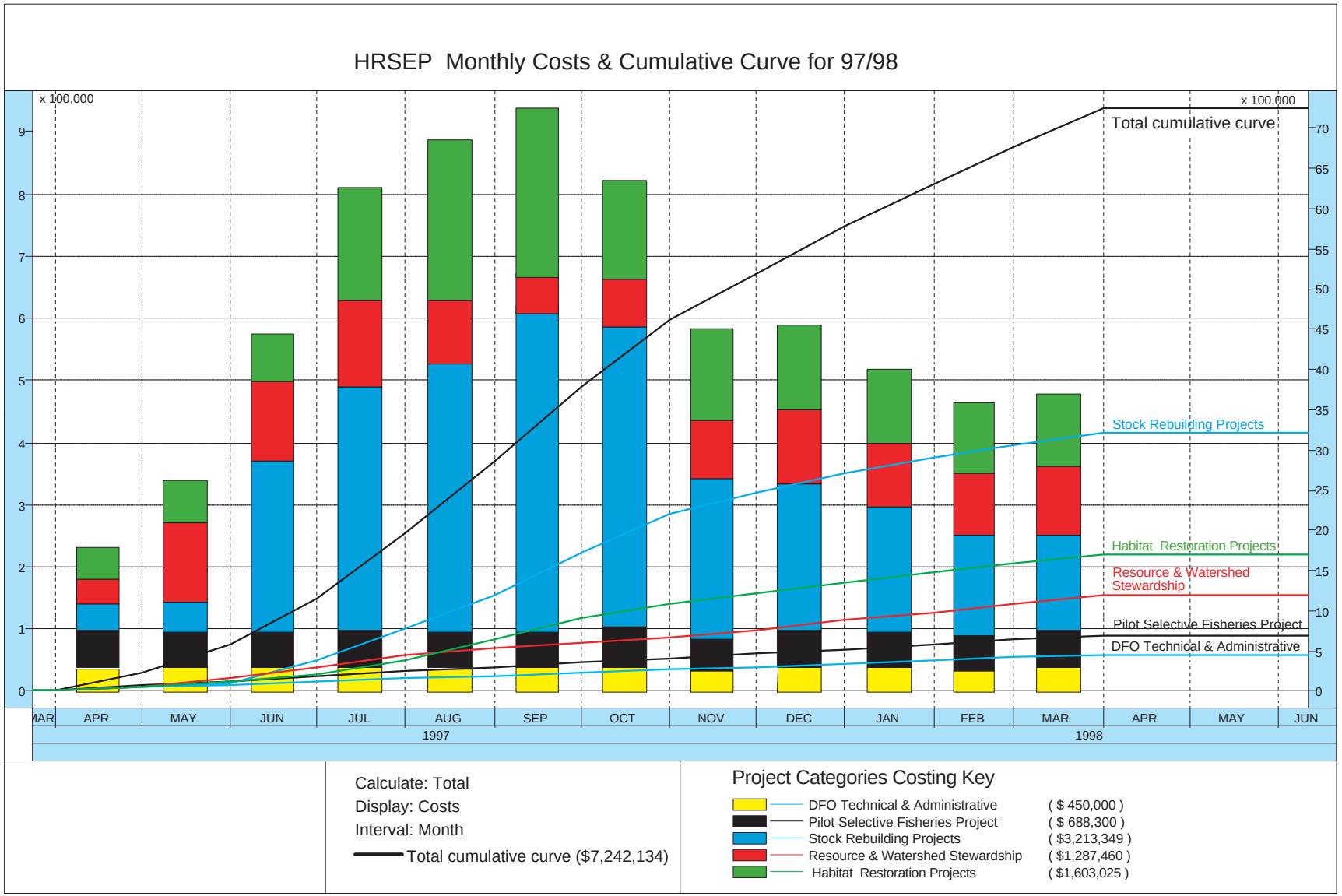
Proj #	Project Name	Days	DFO Funding $
47	Pacific Streamkeeper's Feild Work	255	25,100.00
48	Coho Capacity, GIS	255	15,000.00
49	Campbell River Estuary	75	210,000.00
50	T'Souke Selective Harvest Trap	85	100,000.00
51	Educational Hatchery - Kitsuksis Creek	191	100,000.00
52	South Island Streams Restoration	44	100,000.00
53	Tsolum/Courtenay R. Estuary Plan	85	50,000.00
54	Cowichan Watershed Council	57	17,500.00
Habitat Restoration			
55	Vancouver Island Restoration	129	165,000.00
56	Tsolum River Restoration	255	133,700.00
57	Ag. Hotspots/Watershed Inventory	255	66,775.00
58	Discovery Coast Wetland Rest.	183	239,750.00
59	Keddy Water Storage (Black Cr.)	34	110,000.00
60	Cowichan River - Stoltz's Slide	169	15,000.00
61	Saltspring Island Sream Restoration	169	48,300.00
Stock Rebuilding (Assessment & Enhancement)			
62	Black Creek Initiatives	43	25,000.00
63	Tsolum River Seal Predation	255	273,000.00
64	Nimpkish River Stock Assessment	108	191,000.00



HRSEP Project Schedule 97/98 Year

Proj #	Project Name	Days	DFO Funding $
65	Coho By-Catch Monitoring	88	400,000.00
66	Marble River Rearing Channel - Port Hardy	199	73,232.00
67	Mainland Stock Assessment & Bute Inlet	87	255,000.00
68	Fanny Bay Enhancement	42	8,000.00
69	Georgia & JFS Straits CN/CO Troll Census	183	215,000.00
70	WCVI Chinook Surveys	64	68,000.00
71	WCVI Chum & Chinook Hatchery Sampling	42	14,000.00
72	Escapement Est. Method - Keogh River	94	57,883.00
	Pilot Selective Fishery		
73	Georgia Strait Coho Initiative	255	688,300.00
	Vancouver Island & South Coast subtotal	255	3,665,740.00
	DFO Technical Support (All Projects)		
00	DFO Admin./Technical Program Support	255	450,000.00
		255	450,000.00




HRSEP Monthly Costs & Cumulative Curve for 97/98
Monthly $
Cumulative $
x 100,000
x 100,000
Total cumulative curve
Stock Rebuilding Projects
Habitat Restoration Projects
Resource & Watershed Stewardship
Pilot Selective Fisheries Project
DFO Technical & Administrative
MAR APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN
1997
1998
Calculate: Total
Display: Costs
Interval: Month
Total cumulative curve ($7,242,134)
Project Categories Costing Key
DFO Technical & Administrative ($ 450,000)
Pilot Selective Fisheries Project ($ 688,300)
Stock Rebuilding Projects ($3,213,349)
Resource & Watershed Stewardship ($1,287,460)
Habitat Restoration Projects ($1,603,025)

Fisheries and Oceans Canada has demonstrated its continued commitment to the conservation of Pacific salmon through programs such as the Habitat Restoration and Salmon Enhancement Program. Funding was provided to address habitat rehabilitation, stock rebuilding, improved land-use planning and watershed stewardship. Collectively these efforts are designed to improve the health of salmon stocks.

Funding for the second year of the program provided an opportunity for communities to address their conservation needs. The desire for community "ownership" has been expressed with the large number of well-developed proposals. The projects demonstrated that communities are willing and capable of implementing technical programs that can contribute to the sustainability of the salmonid resource in B.C.. With appropriate agency assistance, funding and well-defined parameters, the result should be an increase in habitat quality and quantity along with increased stock abundance.

In future years, the program will be improved with a well-defined monitoring and reporting structure. Better cooperation between funding agencies would improve the efficiency of projects and foster cohesive working relationships within communities.

For further information, contact:

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