

2003/2004 Program Fish & Wildlife *Project Handbook*

***A Guide For Projects And
Partners In The Columbia Basin***

Columbia Basin

FISH & WILDLIFE Compensation Program

CBFWCP is a joint initiative between BC Hydro and the Government of British Columbia (Ministry of Water, Land & Air Protection) to conserve and enhance fish and wildlife populations affected by BC Hydro dams. BC Hydro funds the Program \$3.2 million annually and MWLAP provides valuable technical expertise.

**Application deadline to submit
fish or wildlife projects
for funding is October 1**

www.cbfishwildlife.org



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 <p>Columbia Basin Fish & Wildlife COMPENSATION PROGRAM</p>	<p>Barry Bartlett, <i>Editor</i></p> <p>Published by Columbia Basin Fish and Wildlife Compensation Program</p> <p>103-333 Victoria St. Nelson, BC V1L 4K3</p> <p>email: barry.bartlett@bchydro.bc.ca</p> <p>phone (250) 352-6874 • fax (250) 352-6178</p> <p>www.cbfishwildlife.org</p>
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Dear Partner & Stakeholder:

The Columbia Basin Fish & Wildlife Compensation Program (CBFWCP) has reached a significant milestone of contributing a total of \$30 million since 1995 to conserve and enhance fish and wildlife populations in the region impacted by BC Hydro dams. The Program is delivering 47 projects this year with over 150 partners. To date, CBFWCP has delivered an estimated 536 projects with over 800 partners in the Columbia Basin and has partnered in the acquisition of nearly 7,700 ha of private land for wildlife.

CBFWCP is funded annually from a perpetual capital fund established by **BC Hydro** that generates \$3.2 million in 1994 dollars annually to satisfy the obligations regarding fish and wildlife attached to the various water licences in the region held by BC Hydro. As part of this agreement with the **Government of British Columbia** signed in 1993, all existing compensation programs relating to the Arrow, Duncan, Mica, Seven Mile and Revelstoke projects were merged into this overall Columbia Basin Program.

CBFWCP has also entered into agreements with other funding partners to deliver dam impact-related projects as part of their environmental initiatives. In this project year these partners include:

- **Columbia Basin Trust** is contributing \$72,000 to deliver four community-supported projects for CBT's Terrestrial Program. This partnership is negotiated on an annual basis.
- **Columbia Power Corporation** is funding \$191,000 (annual funding of \$175,000 in 1999 dollars) toward the Arrow Lakes Reservoir fertilization project as part of the corporation's environmental commitment to improve fish stocks in the Arrow Lakes impacted by Hugh Keenleyside Dam.
- **Kootenai Tribe of Idaho/U.S. Columbia Basin Fish & Wildlife Authority** is providing \$125,000 toward the Kootenay Lake and Arrow Lakes Reservoir fertilization projects. This funding is to mitigate for additional impacts caused by increased summer flows required for juvenile salmon conservation in the U.S and for increased flushing rates that will further reduce nutrient availability during the critical summer growing season. Additionally, plans to employ the associated "Arrow- Libby swap" flow management strategy, aimed at maintaining reservoir levels for recreation on the Kootenay (Libby) system, will further reduce productivity on Arrow Lakes Reservoir by moving even more water through that basin.

Aquila Networks Canada is also contributing \$500,000 to CBFWCP for projects to enhance regional fish, wildlife, and ecological values in the West Kootenay as part of Aquila's environmental commitment from the Kootenay 230kV System Development project. We are impressed that this funding, to be invested in projects over three years beginning in 2004-05, represents the single largest contribution to an environmental initiative in the company's 106-year history.

CBFWCP is currently working with parent agencies BC Hydro and the **Ministry of Water, Land & Air Protection**, and other related agencies to develop an extensive **Dam Impacts Assessment** for the 2004-05 project year. The purpose of this assessment will be to further quantify the footprint impact of BC Hydro dams on fish, wildlife and habitat productivity losses to better focus CBFWCP priorities and conservation/enhancement resources on species impacted by the dams.

One of our labours of love this year is working with our partners to develop and begin implementing a management plan for the recently acquired 4,037 ha **Hofert/Hoodoos** property in the Columbia Valley. This purchase of one of the largest and most important properties for critical wildlife habitat on private land available in the province was 10 years in the making. CBFWCP contributed one million dollars toward the \$1.5 million down payment and we are now supporting **The Nature Trust of BC** in helping raise the remaining two million dollars to complete the \$3.5 million purchase by 2006.

Groups and individuals interested in making a tax deductible contribution to the Hofert/Hoodoos purchase are encouraged to contact **Marian Adair** at 1-866-288-7878.

Did you know that CBFWCP has allocated funding for community-initiated fish or wildlife projects under \$10,000? Our **Small Works Program** is designed to provide opportunities for public involvement in meaningful projects to enhance fish and wildlife populations in the region. Groups are invited to apply for technical and small financial assistance in club-initiated projects anytime within CBFWCP's project year. The short and user-friendly Small Works Project application is in this handbook or can be downloaded from the home page of the CBFWCP website, **www.cbfishwildlife.org**.

I would like to introduce our two new members of the CBFWCP team. **Eva Schindler** is the Fertilization Limnologist for Arrow Lakes Reservoir and Kootenay Lake and **Amy Waterhouse** is our new Geographical Information System (GIS) coordinator. You can read more information on Eva and Amy in the Organization & Team Member Profiles section of this handbook.

We would also like to welcome **Fisheries & Oceans Canada** to the Program as new partners on the **CBFWCP Policy** and **Steering Committees**.

Sincerely



Maureen DeHaan
Program Manager



CO-CHAIRS REPORT

The Columbia Basin Fish & Wildlife Compensation Program (CBFWCP) delivered 47 fish and wildlife projects with over 200 partners worth a total value of \$3,181,032 during the 2002-03 project year. The significant increase in partners - compared to 30 partners in the Program's first full year of operations in 1996 - is a strong testament to CBFWCP's interest in involving public and stakeholder groups and demonstrates their belief that CBFWCP is an effective delivery agent for fish and wildlife projects.

It has been 10 years since the **Memorandum of Understanding (MOU)** that created CBFWCP was signed between **BC Hydro** and the **Government of British Columbia**. Under the terms of the agreement a review and assessment of the Program is required to determine CBFWCP's effectiveness in achieving its objectives. In preparation for that review, an assessment began in 2003-04 of the dam footprint impacts which will:

- Carry out a high level review of dam impacts that the Program is to be addressing;
- Review current criteria used to determine what and where improvement may be needed; and
- Review the criteria used in prioritizing and allocating funds (see Stage 2 – Ranking in the **Large Project Application** section of this handbook for an overview of the criteria.)

This assessment is to be completed by March 2005 and will be used as input to a 10-year Program review.

Fish Project Results

The upper Columbia white sturgeon hatchery was successfully relocated from Hill Creek to the **Kootenay Sturgeon Conservation Hatchery** with no loss of juvenile or adult sturgeon.

The Kootenay hatchery is a more modern and failsafe facility that can consistently meet the production goals set by the **Upper Columbia White Sturgeon Recovery Initiative** to increase the numbers and genetic diversity of juvenile sturgeon to prevent the species' extinction.

The **Arrow Lakes Reservoir** and **Kootenay Lake fertilization projects**, which also benefit sturgeon, continue to show impressive results. Kokanee populations in the Arrow system were sustained at the 20 million level as in 2001 while Kootenay Lake abundance increased from 21 million to near historic levels of 35 million in 2002. In total, over 65 million in-lake kokanee and two million spawning kokanee were counted in the Columbia Basin,

which reflects well on the health of aquatic ecosystems in the region.

We are pleased to be a partner in the **Sproule Creek Habitat Rehabilitation Project** with the **Nelson & District Rod & Gun Club** who received the **Dr. Louis Lemieux Conservation Award** from the **BC Wildlife Federation**. The annual award recognizes the BCWF club that best demonstrates the hands-on efforts of its members in improving fisheries and wildlife habitat. The Sproule Creek project is opening up 250 metres of important spawning and rearing habitat for rainbow trout by restoring fish passage from the Kootenay River as well as enhancing in-stream spawning and rearing habitat.

Wildlife Project Results

CBFWCP was a major partner in the acquisition of two important private properties: **Waldie Island** in the Columbia River at Castlegar and the 4,307 ha **Hofert/Hoodoo property** near Fairmont Hot Springs. The purchase and protection of these properties compensates for the loss of valley bottom and riparian habitat that resulted from the construction of BC Hydro dams.

CBFWCP involvement in species at risk recovery projects continued to reap benefits in 2002-03.

Rearing/reintroduction efforts in the **Northern Leopard Frog Recovery Project** were expanded based on the success of the 2001 pilot projects. Biologists reared and released 1,925 froglets and 1,320 tadpoles from egg masses located in the **Creston Valley Wildlife Management Area** to help save this last remaining BC population from extirpation.

Canada-U.S. transboundary co-operation rose to a new level in the region with the transplant of seven badgers from the Kalispell, Montana area as part of the **East Kootenay Badger Recovery Project**. This project also increased public education and stewardship to reduce human-caused mortalities in addition to protecting remaining badger habitat through land acquisitions such as the Hofert/Hoodoo property.

CBFWCP is also a partner in the **Columbia Basin Mountain Caribou Recovery Project** that began this year. This included a plan to transplant 20 caribou to augment the South Purcells herd, estimated at a critically low 19 caribou. The transplant is now tentatively scheduled for spring 2004.



2002/2003 ANNUAL REPORT

The **Steering Committee** is impressed with the high level of public support for and involvement in the **Columbia Basin Great Blue Heron Breeding Inventory and Habitat Assessment**. A total of 352 sightings from 185 different residents and an additional 30 days of volunteer time contributed to identifying 30 breeding sites. This will greatly assist resource management agencies with habitat protection and enhancement for this blue-listed species.

The Steering Committee is pleased with the positive impact that the Program has had on improving fish and wildlife values in the Columbia Basin to date and is looking forward to improvements that may result from the forthcoming dam footprint impact review.

CBFWCP Steering Committee Co-chairs:

Wayne Stetski, Ministry of Water, Land & Air Protection
Kevin Conlin, BC Hydro

2002 – 2003 FINANCIAL REPORT

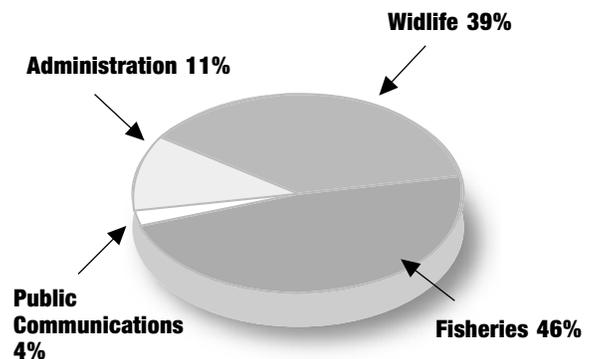
The Columbia Basin Fish & Wildlife Compensation Program began the 2002-03 project year with a fund deposit of \$3,833,369 and a carry over of \$154,627 from the previous year for a total budget of \$3,987,996. This is up \$293,848 from the previous year's total budget of \$3,694,148. The carryover represents savings from unspent land acquisition funds in 2001-02.

The Program is funded \$3.2 million annually by BC Hydro, which is indexed for inflation from 1995 dollars.

The combined budget for the four components of Fisheries, Wildlife, Public Communications and Administration was \$3,782,043, leaving a contingency of \$55,366.

Fisheries underspent by \$11,711 (1%) and Wildlife by \$59,664 (2%) as a result of reduced travel costs and project savings. Public Communications was over budget by \$10,161 (8%) due to unplanned joint advertising with BC Hydro and slightly higher than estimated project costs. Administration costs were over budget by \$30,721 (4%) due to increased vehicle costs and additional meetings for the CBFWCP Steering Committee.

Overall, the Program completed the 2002-03 year with total expenditures of \$3,754,528 and \$30,493 (1%) under budget, which is carried over to the 2003-04 fiscal year.



Item	Credit	Expenditure	Balance
Carry over from March 31			154,627
Fund Deposit	3,833,369		3,987,996
Fisheries		1,736,056	2,251,940
Wildlife		1,444,976	806,964
Public Communications		139,982	666,982
Administration		403,021	263,961
Total		\$3,724,035	

Fish and Habitat Enhancement Projects

Columbia Basin

FISH & WILDLIFE
Compensation
Program



www.cbfishwildlife.org



ARROW LAKES RESERVOIR

ARROW LAKES RESERVOIR FERTILIZATION & MONITORING

Project # **F-97-L-008**

Project Biologists: Harald Manson, Eva Schindler (Nelson)

Creel Survey Biologist: Steve Arndt (Nelson)

Contract Biologists: Don Miller (Balfour)

Contract Technicians: Glen Olsen (Nakusp); Allison Alder (Shelter Bay);
Heather Mackey (Castlegar); Brian Barney (Beaton)

The **Arrow Lakes Reservoir** and its fish populations have been strongly impacted by the construction of Hugh Keenleyside, Mica and Revelstoke dams. The dams blocked migrations of a number of fish species including blue-listed **bull trout**, rainbow trout, **kokanee** and critically-imperiled white sturgeon. The resulting reservoirs also flooded spawning and rearing habitat. Productivity at all trophic levels decreased as **nutrients** were impounded behind dams upstream of the reservoir. Kokanee populations experienced dramatic declines as their main food source, zooplankton, became less abundant due to the decreased productivity and competition from introduced **mysis** shrimp. The **fertilization** of the Arrow Lakes Reservoir began in 1999 following several years of research and based on the successful Kootenay Lake fertilization program. A blend of liquid **nitrogen** and **phosphorous** is added to the reservoir from late April to September—in a cost-effective manner from the Galena ferry—to compensate for loss of natural nutrient sources. Ongoing chemical and biological sampling has demonstrated that conditions in the reservoir have improved in response to the first four years of fertilization. Increased **phytoplankton** biomass is providing a stronger base for the entire food chain in the reservoir. Hydro-acoustic surveys documented an increase in numbers of kokanee in the Arrow Lakes Reservoir from 3-6 million in 1999 when fertilization began to 20 million in 2002. Annual aerial counts of spawning kokanee in tributary streams have documented an increase from 394,431 spawners in 1999 to 650,000 in 2002, providing further evidence that the kokanee population has benefited from the fertilization program.

Creel surveys are also being conducted to track the effectiveness of the fertilization project and potential benefits to the sport fishery.

Biologists collect **limnology** samples from the reservoir on a monthly basis to ensure that nutrient additions are maintained at optimum levels to effectively restore reservoir productivity. Following the initial five-year fertilization experiment, the project team will make a more detailed assessment of fertilization results to direct future compensation actions on the Arrow Lakes Reservoir.

Project Duration: Year 5 of 5

Partners: BC Hydro; Ministry of Water, Land & Air Protection; Ministry of Transportation; Columbia Power Corporation/Columbia Basin Trust; University of British Columbia; Kootenai Tribe of Idaho

Related reports available @ www.cbfishwildlife.org:

Arrow Lakes Reservoir Fertilization Experiment: Year 1 (1999-2000) Report, 2000

Arrow Lakes Reservoir Limnology and Trophic Status: Year 2 (1998-99) Report, 1999

Arrow Lakes Reservoir Creel Survey & Contribution of Hatchery Production in 1998 and 1999, June 2002

Bold and italic text – see Glossary for more information

HILL CREEK SPAWNING CHANNEL OPERATIONS AND MONITORING

Project # **F-95-L-010**

Project Biologist: Harald Manson (Nelson)

Contract Technicians: Grant Thorp (Nakusp)

Completion of **Hugh Keenleyside Dam** in 1969 flooded an estimated 30% of natural tributary spawning habitat for kokanee salmon. Arrow Lakes Reservoir (ALR) kokanee were further impacted in 1984 when **Revelstoke Dam** was completed, blocking upstream passage of up to 500,000 spawners annually. The Hill Creek **Spawning Channel** on the Upper Arrow Lakes Reservoir was constructed to compensate for some of these losses. The 3.2 km long channel provides quality spawning habitat for more than 150,000 adult kokanee. Monitoring the number of kokanee returning to the channel each year provides an index of the health of kokanee populations in the ALR and a basis for evaluating the success of the fertilization program. Kokanee spawner escapement has more than doubled since fertilization began, from 90,000 in 1999 to 195,000 in 2002 and has exceeded the original target for the spawning channel. Biologists also count numbers of kokanee fry entering the reservoir from the channel to measure egg-to-fry survival. In natural tributaries the survival rate of eggs to fry is about 5-10% while in the Hill Creek Spawning Channel it has been estimated to be as high as 36%. As many as 8 million fry may be produced in the spawning channel each year. The channel requires ongoing maintenance to ensure optimum spawning and rearing conditions for kokanee.

Project Duration: Ongoing

Partner: **Ministry of Water, Land & Air Protection**

Related reports available @ www.cbfishwildlife.org: Kokanee Fry Enumeration Summary, July 2003

NATURAL BULL TROUT PRODUCTION IN ARROW LAKES RESERVOIR

Project # **F-03-NS-024**

Project Biologists: Steve Arndt (Nelson)

Karen Bray (Revelstoke)

Bull trout populations in the Arrow Lakes Reservoir appear to be stable based on creel survey data, but little is known about natural sources of recruitment. Biologists at the ALR Bull Trout Workshop last year identified several research and monitoring priorities to better understand bull trout production in the reservoir. Catch estimates will be refined by modifying data collection and analysis methods. Aerial boat counts will coincide with ground-based creel surveys to quantify angler activity, and an appropriate expansion factor will be applied to harvest data. Existing hydro-acoustic data collected for kokanee will be reanalyzed to count numbers of larger fish in the ALR as a potential index to bull trout relative abundance. Another component of this project is to develop methods for monitoring spawner numbers in selected tributaries as an additional index to relative abundance. This year's data will serve as a baseline to detect trends in future surveys. Biologists will estimate juvenile densities in each of these tributaries to determine relative importance of tributary versus reservoir production to the population. Long-term monitoring of these parameters will allow biologists to detect overall trends, make comparisons with other systems and help monitor the success of the fertilization program. Factors limiting population growth in the reservoir will be examined and opportunities for habitat enhancement on bull trout spawning tributaries will be identified through this project.

Project Duration: Year 1 of 1

Partner: BC Hydro

Related reports available @ www.cbfishwildlife.org:

Arrow Lakes Reservoir Creel Survey & Contribution of Hatchery Production in 1998 – 99, June 2002

ARROW LAKES RESERVOIR FISHERIES MANAGEMENT PLAN

Project # **F-03-NM-021**

Project Biologist: Colin Spence (MWLAP, Nelson)

The fisheries of the Arrow Lakes Reservoir have received much research and management consideration from CBFWCP, government agencies and other researchers. Biologists have identified the need for these groups to collaborate on an overall management plan for the system. The ALR Bull Trout Workshop hosted by CBFWCP in 2002 presented an opportunity to share information and coordinate research and management actions among all groups. The first year of this project involves compiling existing data on fish species occurring in the reservoir, including abundance and life history information. Current management plans and other relevant documents will

Bold and italic text – see Glossary for more information

be gathered. Researchers, biologists and resource managers will begin to develop management and monitoring objectives to be incorporated into the plan and to identify roles and responsibilities of each partner in plan implementation. The ALR Fisheries Management Plan will be completed in Year 2 of the project.

Project Duration: Year 1 of 2

Partners: **Ministry of Water, Land & Air Protection**

ARROW LAKES RESERVOIR BURBOT STOCK STATUS

Project # **F-03-NM-022**

Project Biologists: Steve Arndt (Nelson)
Colin Spence (MWLAP Nelson)
James Baxter (BC Hydro Castlegar)

Burbot numbers have decreased in some portions of the Columbia Basin leading to its designation as a **red-listed** species in Kootenay Lake and the lower Kootenay River system. Reasons for the burbot's decline are poorly understood but may include impacts of dam construction on the Columbia and Kootenay rivers. Little is known about the status of burbot occurring in the Arrow Lakes Reservoir (ALR). Creel data for this species is limited because few anglers target burbot in the reservoir. This project is aimed at acquiring preliminary data on ALR burbot numbers. Methods of assessment will include cod-trapping and possibly underwater video. This information will be used to interpret existing creel data, compare relative abundance with other systems and measure burbot response to fertilization. The assessment of burbot in the ALR will contribute to developing effective management and conservation strategies for the species in the Columbia Basin.

Project Duration: Year 1 of 2

Partners: BC Hydro; Ministry of Water, Land & Air Protection

*Related reports available @ www.cbfishwildlife.org: **Arrow Lakes Reservoir Creel Survey & Contribution of Hatchery Production in 1998 and 1999, June 2002***

UPPER KOOTENAY

UPPER COLUMBIA STURGEON CULTURE AT KOOTENAY STURGEON HATCHERY Project # **F-02-L-009**

Project Manager: Laird Siemens, Kootenay Hatchery Manager (Cranbrook)

Project Technicians: Ron Ek, Fish Culturist (Kootenay Trout Hatchery)

The white sturgeon population in the Canadian portion of the Columbia River is experiencing extremely low reproduction rates, apparently from the effects of dams on habitat, flow stability and water clarity. Recent estimates estimate the upper Columbia sturgeon population to be 1,400 adults. Although spawning has been observed, young sturgeon are seldom found, indicating these fish are not reproducing successfully. This suggests post-spawning survival is minimal or absent in most years. In 2000, the Upper Columbia White Sturgeon Recovery Initiative (UCWS-RI) was established to prevent the extinction of white sturgeon in the Columbia River before the population becomes unrecoverable. As an important component of the recovery process, this project will address the lack of juveniles in the population by culturing sturgeon eggs in a controlled environment and rearing young to yearling stage.

CBFWCP is funding the hatchery component of the UCWSRI, which was transferred last year from the Hill Creek Hatchery to the more modern and reliable Kootenay Sturgeon Conservation Hatchery in Wardner near Cranbrook. Hatchery targets are to raise 12,000 juvenile sturgeon annually to be released into the upper Columbia above the US border near Trail. In the first two years, a total of 20,469 juveniles were tagged and released and are being monitored on an ongoing basis.

Project Duration: Ongoing

Partners: **Ministry of Water, Land & Air Protection; BC Hydro; Upper Columbia River White Sturgeon Recovery Initiative; Freshwater Fisheries Society of BC**

*Related reports available @ www.cbfishwildlife.org: **Upper Columbia River White Sturgeon Broodstock Collection: 2002 Data Summary Report, March 2003***

Bold and italic text – see Glossary for more information

LOWER KOOTENAY

KOOTENAY LAKE FERTILIZATION & ADAPTIVE MANAGEMENT

Project # **F-95-L-012**

Project Biologists: Harald Manson, Eva Schindler (Nelson)

Contract Biologist: Don Miller (Balfour)

Contract Technician: George Veale (Balfour)

The completion of **Duncan Dam** in 1967 and Libby Dam in 1973 blocked the natural flow of nutrients into Kootenay Lake causing productivity to become depressed. Numbers and size of kokanee and Gerrard rainbow trout declined as a result of reduced productivity. Another stress on the kokanee population is the presence of introduced mysid shrimp, which compete with kokanee for the same plankton food source. Fertilization of Kootenay Lake with liquid nitrogen and phosphorous began in 1992 to attempt to reverse the declines in fish populations. Biological monitoring of the effects of fertilization in the lake indicates that biomass of phytoplankton, zooplankton and kokanee increased with fertilization. Phytoplankton and kokanee abundance is closely related to fertilizer loading as was demonstrated in 1997-2000 when biomass decreased in response to a temporary reduction in the amount of fertilizer added to the system. Experimentally varying fertilizer amounts and measuring biological response allowed biologists to determine that dispensing 30 to 47 metric tonnes annually is the optimal range for maintaining kokanee numbers. Fish population targets established for Kootenay Lake include 35 million kokanee in-lake and 750,000 spawners to Meadow Creek and Lardeau River. In 2002, the target of 35 million kokanee in-lake was met. Spawner numbers were down slightly from 595,000 in 2001 to 464,000 in 2002, but are expected to rise as the increased number of in-lake kokanee mature to spawning age.

Project Duration: Ongoing

Partners: **University of BC; Ministry of Water, Land & Air Protection; BC Hydro; Kootenai Tribe of Idaho**

Related reports available @ www.cbfishwildlife.org:

Kootenay Lake Fertilization Experiment Year 8 (1999-2000) Report, July 2002

MEADOW CREEK SPAWNING CHANNEL OPERATIONS

Project # **F-95-L-011**

Project Biologist: John Bell, (Nelson)

Fisheries Technician: Murray Pearson (Meadow Creek)

Contract Technician: Stan Baker (Meadow Creek)

Completion of the Duncan Dam in 1967 flooded spawning habitat for an estimated 2.8 million kokanee. Meadow Creek was the most important tributary for kokanee on the lower Duncan River prior to inundation, supporting approximately 700,000 spawners annually. In 1967, BC Hydro constructed Meadow Creek Spawning Channel (MCSC) to help compensate for habitat losses. The 2.9 km long channel can accommodate more than 350,000 adult kokanee to help support kokanee escapement in the adjacent Meadow Creek. Ongoing maintenance and improvements ensure that quality habitat conditions are maintained in the channel. Each fall, project staff count numbers of kokanee entering the channel and in the spring they measure the number of fry produced. This information is used to help track trends in kokanee populations and evaluate the effectiveness of compensation projects including the Kootenay Lake fertilization. The number of kokanee spawning at Meadow Creek in 2002 was estimated at 354,000, down from 431,000 in 2001, but still above the original annual escapement target of 350,000.

Project Duration: Ongoing

Partner: **Ministry of Water, Land & Air Protection**

Bold and italic text – see Glossary for more information

LOWER KOOTENAY

SALMO RIVER RAINBOW TROUT HABITAT USE & POPULATION ASSESSMENT Project # F-00-M-013

Project Biologist: Steve Arndt (Nelson)

The rainbow trout population in the Salmo River Watershed was impacted by Seven Mile Dam which flooded the lower Salmo River and prevented the movement of fish from the Columbia River into the Pend d'Oreille River. Little was known of the population size, habitat use or life history of Salmo River rainbow trout prior to the initiation of this project in 2001. Biologists are assessing habitat use by **tagging** trout and tracking their movements with radio telemetry. Project results to date include: habitat used by staging trout in summer and for overwintering were characterized by wood or boulder cover and by relatively deep water; radio-tagged fish spawned primarily in the mainstem rather than in tributaries; and the channelized section of the river from the Village of Salmo to Hellroaring Creek was not used by tagged fish, likely due to lack of cover and pools. Biologists conducted summer snorkel surveys to augment habitat use information derived from radio telemetry and to estimate trout abundance in the river. Results from 2001 and 2002 suggest that there may be fewer than 200 fish over 40 cm length in the usable portion of the river, which excludes potential deep water habitat in the canyon in the lower five km section. Plans for 2003/04 include continuing with radio telemetry and snorkel counts to refine population estimate techniques and conducting a fish count in the canyon reach to better assess population status of rainbow trout in the entire Salmo River. Future enhancement opportunities may include creating additional deep water habitat and providing wood and boulder cover.

Project Duration: Year 3 of 3

Partners: **BC Hydro; Ministry of Water, Land & Air Protection**

REVELSTOKE

REVELSTOKE RESERVOIR BULL TROUT RADIO TELEMETRY

Project # F-00-M-014

Project Biologist: Karen Bray, Fisheries Biologist (Revelstoke)

Contract Biologist: Karla Robison (Revelstoke)

Revelstoke Reservoir was created with the completion of the **Revelstoke Dam** in 1984. This 130-km long reservoir supports populations of **blue-listed** bull trout. The life history of bull trout in the reservoir is poorly understood, and appropriate management requires identifying critical spawning habitat and timing of spawning runs. The most effective means of obtaining this information is by tagging individuals and following their movements through radio telemetry. This project is part of a basin-wide bull trout telemetry study that began in 1995 and has included the Duncan River, Arrow Lakes Reservoir, **Kinbasket Reservoir** and the upper Kootenay River systems. Since 2001, 39 bull trout from the Revelstoke Reservoir have been tagged and followed with ground and aerial tracking. Timing of spawning migrations and locations of spawning fish have been determined in eight watersheds. Radio **telemetry** will continue for two more years to assess year-to-year variation, confirm findings to date and to account for fish that spawn in alternate years. Identification of key spawning, **rearing** and staging areas is essential for habitat protection and enhancement efforts for LRR bull trout.

Project Duration: Year 3 of 4

Partners: **Local anglers**

Related reports available @ www.cbfishwildlife.org:

Lake Revelstoke Reservoir Bull Trout Radio Telemetry Progress Report, December 2001

Lake Revelstoke Reservoir Bull Trout Radio Telemetry Progress Report 2002-2003, January 2003

Lake Revelstoke Winter Creel Survey Progress Report, January 2001

Lake Revelstoke Creel & Visitor Use Survey, January 2001

Bull Trout Spawning Migrations in the Duncan River: Insights from Telemetry & DNA, April 2001

Bold and italic text – see Glossary for more information

**REDUCING RESERVOIR OLIGOTROPHY BY EXPERIMENTAL SMALL SCALE
NUTRIENT ADDITION TO EMBAYMENTS (PHASE I – ASSESSMENT)**

Project # **F-02-NM-018**

Project Biologist: Karen Bray (Revelstoke)

Revelstoke Reservoir supports an increasing population of kokanee, as well as unknown numbers of bull trout, rainbow trout, mountain whitefish, burbot and possibly white sturgeon. The **limnology** of the reservoir has not been well studied since its impoundment, but **productivity** in reservoirs is known to decline over time. Experimental large-scale fertilization of Arrow Lakes Reservoir and Kootenay Lake has demonstrated that supplementing for the nutrients lost as a result of impoundment behind dams benefits most fish populations by increasing their food base. Whole-lake fertilization is costly, but Revelstoke Reservoir may be a good candidate for fertilization on a smaller scale. This project involves characterizing the productivity status of the reservoir through water quality sampling in the main basin and in selected embayments. In addition, the physical characteristics of embayments will be examined to better plan for possible **nutrient** addition. Preliminary data collection is essential for providing a baseline with which to evaluate the effectiveness of future restoration or enhancement projects in the reservoir.

Project Duration: Year 1 of 4

BASIN-WIDE

KOKANEE SPAWNING SURVEYS

Project # **F-96-L-016**

Project Biologists: Bill Westover, Fisheries Biologist (Cranbrook)
Karen Bray, Fisheries Biologist (Revelstoke)

Numbers of **kokanee** salmon in Columbia Basin reservoirs reflect the overall health of the fish populations in those systems. Kokanee are an important element of the sport fishery in many areas and a significant food source for larger species including adult rainbow trout and bull trout. Aerial spawner surveys for kokanee are conducted each year on tributary streams to Koocanusa, Revelstoke, Arrow Lakes and Kinbasket reservoirs. Results from kokanee spawner surveys on reservoir tributaries allow biologists to track kokanee abundance trends over time and provide an important index to system productivity. Spawner surveys are also used to identify which streams are most important to spawning kokanee. Although numbers of spawning kokanee were down in some systems in 2002 compared to 2001, results indicate that populations remained at healthy levels. For example, an estimated 265,000 spawners were counted in upper Columbia River and Kinbasket Reservoir tributaries, down from 400,000 in 2001. For upper Kootenay River and Koocanusa Reservoir tributaries, nearly 500,000 spawners were estimated for 2002 compared to 385,000 in 2001. In 2003-04, surveys will be conducted on over 30 streams in the upper Kootenay and upper Columbia river systems and on Kinbasket and Revelstoke reservoirs.

Project Duration: Ongoing

Partners: BC Hydro; Ministry of Water, Land & Air Protection

Related reports available @ www.cbfishwildlife.org:

Kinbasket Lake Kokanee Enumeration, 2002

Koocanusa Kokanee Enumeration, December 2001

Camp Creek Kokanee Spawner Survey, March 2001

FISHERIES PROGRAM DELIVERY – Small Works Projects

Project Biologist: Harald Manson, Senior Fisheries Biologist (Nelson)

Well-planned and coordinated projects using a combination of biologist expertise, volunteer time and limited funds can stretch resources to successfully deliver many small, yet important, fisheries enhancement activities. This project will identify and develop small works projects, collect background information, identify appropriate partners and evaluate completed enhancement projects on an ongoing basis.

To encourage local community involvement and to provide project opportunities for motivated conservation groups, CBFWCP set aside \$50,000 this year for fish projects up to \$10,000 per project for which local groups can submit proposals anytime during the Program year.

Bold and italic text – see Glossary for more information

The Small Works projects give CBFWCP some flexibility in working with local groups to deliver less costly works that arise during the program year. A by-product of working with community groups is increasing the public's understanding and active support of fish and their habitat requirements.

Project Duration: Ongoing

Partners: **Various community groups**

Small fish projects for this year include:

LOWER COLUMBIA & KOOTENAY DRAINAGE

LOWER COLUMBIA RIVER TRIBUTARY RAINBOW TROUT MONITORING

Project Biologist: Steve Arndt (Nelson)

Blueberry, China and Murphy creeks are tributaries of the Columbia River below Hugh Keenleyside Dam. These streams contain spawning habitat for migratory rainbow trout, but have been impacted by dam and highway construction. Recent enhancement work at Blueberry and China creeks has included modifying artificial barriers to improve fish passage. Sections of the side channel at Murphy Creek were upgraded to improve quality of spawning habitat and ensure adequate water flows. All three streams will be closely monitored using spawner counts, fish jump counts and water level measurements to evaluate the effectiveness of previous **restoration** measures and to identify the potential for future improvements.

Project Duration: 1 Year

Partners: **Trail Wildlife Association; Columbia-Kootenay Fisheries Renewal Partnership; Columbia Power Corporation; Peter Kiewit Sons Ltd.; Ministry of Transportation; JL Crowe Secondary School; Blueberry Creek Irrigation District; Local volunteers; Ministry of Water, Land & Air Protection; BC Hydro**

Related reports available @ www.cbfishwildlife.org:

Blueberry Creek Remediation, January 2001

Assessment of Rainbow Trout Passage at Three Man-made Obstructions on Blueberry Creek, October 2001

Effect of an Artificial Side Channel on Fry Production and Rearing Densities of Rainbow Trout in Murphy Creek, October 2001

SPROULE CREEK RAINBOW TROUT PASSAGE MONITORING

Project Biologist: Steve Arndt (Nelson)

Volunteer Technician: Stewart Pederson (Nelson)

Sproule Creek near Nelson provides spawning and **rearing** habitat for rainbow trout from the Kootenay River. However, for many years fish passage into the creek was restricted due to combined effects of the highway culvert and water level fluctuations. In addition, the straightening of the creek to accommodate the highway and the removal of natural woody debris and boulders had further degraded trout habitat. In 2001, CBFWCP and Nelson District Rod & Gun Club volunteers raised the water in the plunge pool to allow easier passage for fish through the culvert. Rock weirs, boulder clusters and spawning gravel were added to the straightened portion of the creek to enhance habitat. Biologists confirmed in 2002 that rainbow trout from Kootenay River successfully moved through the culvert, and the number of juvenile trout in the creek increased over previous years.

In 2003, biologists are using a live trap to monitor and estimate the number of fish emigrating out of the creek. Ongoing monitoring of the numbers of spawners, fry and juveniles in Sproule Creek will evaluate the long-term effectiveness of **rehabilitation** efforts.

Project Duration: 1 Year

Partner: **Nelson District Rod and Gun Club**

Related reports available @ www.cbfishwildlife.org:

Sproule Creek Habitat Rehabilitation Assessment, 2002

Bold and italic text – see Glossary for more information

SLOCAN RIVER TEMPERATURE MONITORING

Project Biologist: Steve Arndt (Nelson)

Up to the 1960's, the Slocan River supported an excellent recreational fishery for large rainbow trout. The fishery declined dramatically in the mid-1970s and trout numbers have remained low despite experimental stocking and angling closures. CBFWCP biologists have monitored summer temperatures in the Slocan drainage since 1997 to investigate temperature as a factor limiting trout abundance in the system. Results show that the Slocan River is warmer than most other rivers in the region, and mainstem temperatures in summer are well above optimum rearing conditions for rainbow trout juveniles. In this project, biologists are locating cool water refuges in the river relative to the distribution of available rearing habitat to identify enhancement opportunities to benefit juvenile trout.

Project Duration: 1 Year

Related reports available @ www.cbfishwildlife.org:

Slocan River Summer Temperatures: Implications for Rainbow Trout Distribution & Production, September 1999

DEER CREEK KOKANEE SPAWNER COUNTS AND RESTORED HABITAT EVALUATION

Project Biologist: Steve Arndt (Nelson)

Deer Creek, which supports resident and migratory rainbow trout populations as well as a significant spawning kokanee run, was identified in a 1996 fisheries assessment as one of 10 tributaries in the **Arrow Lakes Reservoir** system requiring habitat enhancement. An old government water survey weir prevented upstream passage of kokanee to approximately 1,000 m of quality spawning habitat in the creek. For several years, local residents spear-headed relief efforts to give spawning kokanee a helping hand over the impassable weir. In 2001, a new water monitoring station was installed further up Deer Creek above an impassable falls and the old weir removed to allow spawning fish access to upstream habitat previously unavailable. Kokanee spawners increased from a low of 1,660 in 1997 to 25,500 in 2002.

Biologists will continue to monitor kokanee spawning runs to assess the benefits of the weir removal as well as identify additional enhancement opportunities.

Duration: 1 Year

Partners: *Deer Creek Residents John Erikson & Ken Carter; Kalesnikoff Lumber; Forest Renewal BC; Water Survey of Canada; Ministry of Water, Land & Air Protection*

COTTONWOOD CREEK RESTORATION PROGRAM

Project Biologist: Steve Arndt (Nelson)

Cottonwood Creek, a tributary that flows through Nelson to the Kootenay River, once supported populations of kokanee as well as introduced brook trout. Fish passage and habitat quality have been impacted by a variety of human impacts including road construction, channelization and sedimentation. CBFWCP biologists are providing technical advice to the Cottonwood Creek Restoration Committee to improve fish habitat. The committee plans to first survey and map the natural features and human impacts along the creek, then develop and implement a restoration strategy for the system. Education regarding human influences on aquatic ecosystems is also an important component of the project.

Project Duration: 1 Year

Partners: *Kootenay Lake Freshwater Resources Society; Columbia Kootenay Fisheries Renewal Partnership; Nelson District Rod & Gun Club; B.C. Wildlife Federation; Ministry of Water, Land & Air Protection; Wetlands Institute; Ducks Unlimited Canada; Selkirk College*

Bold and italic text – see Glossary for more information

BEAR LAKE RESTORATION

Project Biologist: Steve Arndt (Nelson)

Bear Lake in the Champion Lakes Provincial Park below Trail supports a popular year-round rainbow trout fishery. However, an abandoned beaver dam at the outlet of the stocked lake has deteriorated which has caused the water levels to drop 1.5 m lower than when the dam was intact. The low water levels makes Bear Lake more susceptible to freezing to the bottom resulting in regular winter-kills of rainbow trout and reducing the viability of fish populations. CBFWCP is providing technical expertise for this community-initiated project which is examining the feasibility of returning the lake to former levels to maintain numbers of rainbow trout and other species year-round.

Project Duration: 1 Year

Partners: **Trail Wildlife Association; BC Hydro; BC Parks**

LOWER COLUMBIA RAINBOW TROUT LIFE HISTORY

Project Biologist: Steve Arndt (Nelson)

The Columbia River below Hugh Keenleyside Dam supports a population of rainbow trout that provides a quality fishery for recreation and consumption. Although it is known that these trout use both the river and its tributaries for spawning and rearing, the relative importance of tributaries as ***rearing*** habitat is unknown. The objective of this project is to determine whether differences in growth rate between mainstem and tributary-reared fish are sufficient to be detected by examining scale growth rings. Detectable and consistent differences in growth patterns would allow biologists to separate fish reared in the mainstem from those reared in tributaries. This will lead to a better understanding of life history variations in Columbia River rainbow trout.

Project Duration: 1 Year

Related reports available @ www.cbfishwildlife.org:

Elemental Signature of Columbia River Rainbow Trout, April 2001

UPPER KOOTENAY

IMPACT OF SMALL DAMS ON NUTRIENT DYNAMICS

Project Biologist: Harald Manson (Nelson)

Reduced **nutrient** availability is a well-documented consequence of impounding large river systems, but recent research has shown that small dams on streams may also have significant effects on downstream nutrient dynamics. This project will investigate the availability of phosphorous and nitrogen above and below dams on the Bull, Elk and Spillimacheen rivers in the East Kootenay. Existing water samples will be tested if available, or biologists will collect samples this year for analysis.

Project Duration: 1 Year

LIZARD CREEK TRIBUTARY HABITAT RESTORATION

Project Biologist: Steve Arndt (Nelson)

Westslope cutthroat trout are a ***blue-listed*** subspecies of rainbow trout occurring only in the East Kootenay and adjacent waters. An unnamed tributary of Lizard Creek, near Mount Fernie Provincial Park, is a productive nursery stream for westslope cutthroats. However, bank erosion and sedimentation have degraded habitat along the stream. Biologists are encouraging landowner involvement in a stewardship agreement to help prevent further damage and develop a prescription for bank stabilization and other habitat restoration measures.

Project Duration: 1 Year

Partners: **Local landowners**

Bold and italic text – see Glossary for more information

ARROW LAKES RESERVOIR

INCOMMAPLEUX RIVER GORGE BULL TROUT PASSAGE

Project Biologist: Karen Bray (Revelstoke)

Radio **telemetry** data from **Arrow Lakes Reservoir** studies revealed that **bull trout** traveled up the Incommapleux River as far as the gorge, which is approximately 5 km upstream from the reservoir. **Tagged** fish did not move beyond the gorge but other large bull trout have been observed in several upstream tributaries during spawning migrations. This year, eight fish will be implanted with 24-hour tags to allow biologists to follow their movements from Beaton Arm in the Arrow Lakes Reservoir and up the Incommapleux River to help confirm that bull trout spawn above the gorge.

Project Duration: 1 Year

MACKENZIE CREEK ASSESSMENT

Project Biologist: Karen Bray (Revelstoke)

Bull trout from the Arrow Lakes Reservoir were known to move into MacKenzie Creek during spawning migrations in the 1970s. In the 1980's, water from the creek was diverted to Hill Creek Hatchery to support hatchery operations. However, the effects of dewatering on fish population in MacKenzie Creek were not studied. In addition, a highway culvert on the creek may be affecting fish passage. This project will assess fish populations and habitat conditions on MacKenzie Creek and identify opportunities for habitat enhancement to benefit migratory bull trout.

Project Duration: 1 Year

JORDAN RIVER SIDE CHANNEL REHABILITATION

Project Biologist: Karen Bray (Revelstoke)

The Jordan River provides spawning habitat for migratory bull trout from the Arrow Lakes Reservoir. A natural side channel in the lower section of the river supports juvenile bull trout as well as rainbow trout and prickly and slimy sculpin. In some years, kokanee enter the lower channel to spawn. However, as water levels drop in mid-summer, flow between pools is drastically reduced, making fish vulnerable to stranding. Rehabilitation work in 2003/04 will focus on restoring constant flows to the lower portion of the Jordan River side channel.

Project Duration: 1 Year

Partners: **BC Hydro**

UPPER COLUMBIA

CAMP CREEK YELLOWFIN RAINBOW TROUT SURVEY

Project Biologist: Karen Bray (Revelstoke)

When Mica Dam was completed in 1973, Kinbasket Reservoir flooded most of the low-gradient streams tributary to Canoe River that were used by spawning salmonids. Camp Creek is one of a few streams in the area that still provides significant spawning and rearing habitat for migratory fish. Prior to impoundment by Mica Dam, Camp Creek was believed to support migrating **yellow fin rainbow trout** from Arrow Lakes Reservoir. This project involves surveying the creek during the historical spawning period to determine whether yellow fin rainbows are still using Camp Creek. Local residents will also be canvassed for their observations of large trout in the system.

Project Duration: 1 Year

Partners: **Local Residents**

Bold and italic text – see Glossary for more information

FISH DERBY MONITORING

Project Biologist: Karen Bray (Revelstoke)

CBFWCP biologists attend fish derbies on the Arrow Lakes, Revelstoke and Kinbasket reservoirs on an annual basis to collect age and growth measurements from captured rainbow and bull trout. Data recorded for each fish includes length, weight, sex and stomach contents. Scales and otoliths (fish ear bones) are collected for aging the fish and a piece of the caudal fin preserved for DNA analysis. This information is used to detect trends in harvested fish populations, such as changes in length frequencies, growth patterns, sex ratios or food habits. Over the long term, the data can be used to determine species response to management actions such as lake fertilization. For example, biologists have observed that the physical condition of Arrow Lakes Reservoir **bull trout** has improved since 1999 when fertilization began, a trend not evident in bull trout harvested from the other two reservoirs that are not fertilized. Biologists will continue to participate in these derbies on an ongoing basis and collect this readily available source of information to measure fish population health over the long term.

Project Duration: Ongoing

Partners: **Revelstoke Rotary Club; Nakusp Conservation Association; Local Anglers; Mica Creek Volunteer Fire Department; Mica Creek Community Club; BC Hydro**

Related reports available @ www.cbfishwildlife.org:

Fish Derby Summary, March 2002

COLUMBIA LAKE BURBOT SPAWNER COUNTS

Project Biologist: Steve Arndt (Nelson)

CBFWCP biologists have been studying **burbot** life history and population trends in Columbia Lake since 1996. For six years, project staff operated a counting fence in the main spawning tributary at the south end of the lake to enumerate number of spawners and monitor spawner behaviour. During last winter's spawning period, biologists conducted periodic streamside counts at the tributary to test a method used to count salmon returns called 'Area Under the Curve' to estimate spawner numbers at a fraction of the cost of operating the counting fence. Although results generated from the counting fence are more accurate, statistics can be applied to the streamside counts to obtain a reasonable estimate of the spawning population in the tributary. This method has been widely used in other areas to estimate salmon returns and will allow researchers to track trends in spawning numbers and detect fluctuations in the Columbia Lake burbot population. Based on counts made in 2003, an estimated 650 fish spawned at the south end site.

Project Duration: 1 Year

Partners: **Ministry of Water, Land and Air Protection**

Related reports available @ www.cbfishwildlife.org:

Columbia Lake Burbot Population Estimate Program at Canal Flats, June 2002

Movements of Burbot in Columbia Lake, British Columbia, for 18 Months After Spawning as Determined by Radio Telemetry, March 2001

Data Summary for the 2000 Upper Columbia Burbot Study, March 2000

Summary of 1995-2001 Winter Creel Surveys for Columbia & Windermere Lakes, October 2001

The Early Life History and Ecology of Columbia Lake Burbot, May 2002

Columbia Lake Burbot 2001 Data Summary, June 2002

Juvenile Burbot Sampling in Columbia and Windermere Lakes, October 2002

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Wildlife and Habitat Enhancement Projects

Columbia Basin

**FISH & WILDLIFE
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ARROW LAKES VALLEY

WEST KOOTENAY UNGULATE ENHANCEMENT PROJECT

Project # **W00-NL-017**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
John Gwilliam, Wildlife Biologist (Nelson)
Ross Clarke, Wildlife Biologist (Nelson)

Wildlife Technicians: Thomas Hill, Aaron Reid (Nelson)
Nicole Thomas, Tim Van Wijk (Pend d'Oreille)

Low elevation, south-facing slopes provide critical winter range for deer, elk and other wildlife in the West Kootenay. Prime valley-bottom habitat was flooded following construction of dams on the Columbia-Kootenay systems in the past 40 years. Maintaining the extent and quality of remaining low-elevation habitat is a high priority for *ungulate* management in the region. Historically, periodic forest fires returned large areas of forest back to open, shrub-dominated habitats characteristic of the early-succession communities preferred by wintering deer and elk. Now, controlled burning and slashing treatments are required to recreate the positive effects that natural fires had on the landscape. Burning and slashing result in regrowth of high quality browse for ungulates and reduce the height of shrubs that have grown out of their reach. Project activities include evaluating potential treatment sites, planning and implementing treatments and monitoring the effectiveness of enhancement operations. To date, CBFWCP and various partners have *enhanced* more than 3,500 ha of ungulate habitat in the West Kootenay. Proposed project activities for 2003/04 are comprised of three components:

I Project Identification/Definition

- Investigate slashing/burning opportunities in the Slocan Valley from Lemon Creek to Winlaw Creek
- Investigate slashing/burning opportunities along the Salmo River from Clearwater Creek to Sheep Creek
- Investigate slashing/burning opportunities at Waneta Bluffs near Trail and Blizzard Mountain in the Pend d'Oreille Valley
- Investigate burning opportunities at Burton Creek and Dog Creek south of Nakusp
- Investigate slashing opportunities on MacKenzie Mountain near Revelstoke
- Investigate slashing/burning prescription at Sanca Creek

II Project Implementation

A) Arrow Lakes

- Conduct slashing treatment and timber harvest on Deer Creek property (up to 9 ha)
- Conduct slashing treatment on Hamlin Creek property near Nakusp (2-3 ha)
- Conduct slashing treatment at Carpenter Creek near New Denver (5 ha)
- Slash conifer ingrowth and decadent shrubs at Winlaw Creek
- Conduct prescribed burn at Blueberry Creek
- Identify fueling site for prescribed burn at Johnson Creek

B) Pend d'Oreille/South Salmo River

- Conduct prescribed burns at Neptune Creek (50 ha), Hall Creek (20 ha), East Bombi (20 ha), Grouse Creek (20 ha) and Rorick Face (40 ha)
- Slash 10 ha deciduous growth on the South Salmo River near Silica Mine
- Slash 5 ha deciduous growth at Grouse Creek
- Slash up to 4 ha deciduous growth in the Pend d'Oreille Valley with Selkirk College students

C) Kootenay Lake

- Slash up to 3 ha deciduous growth at Grohman Creek
- Slash 7 ha of deciduous growth at Glacier Creek

Bold and italic text – see Glossary for more information

D) Revelstoke/Big Bend

- Slash 5 ha deciduous growth at Beaton

E) Creston

- Conduct prescribed burn at Corn/Buckworth (40 ha)

III Project Monitoring

- Continue vegetation monitoring at Deer Creek, Neptune Creek and Rosebud Lake
- Monitor spotted knapweed at Marsden, Eldorado Creek, Kitchener Mountain and Matthill Field
- Establish pre-treatment plots at Blueberry Creek
- Map boundaries of habitat enhancement sites
- Summarize vegetation monitoring data

Rejuvenated vegetation communities will help maintain healthy populations of moose, elk, deer and other species and improve wildlife viewing and hunting opportunities.

Project Duration: Ongoing

Partners: **Habitat Conservation Trust Fund; Ministry of Water, Land & Air Protection; Ministry of Forests; Selkirk College; Creston Rod & Gun Club; New Denver Friends for Wildlife; Duncan-Lardeau Advisory Committee; North Arm Wildlife Club; Trail Wildlife Association; BC Hydro; Kalesnikoff Lumber**

Related reports available @ www.cbfishwildlife.org:

West Kootenay Prescribed Burns Evaluation, February 2002

West Kootenay Mule Deer Progress Report, October 1999

FORT SHEPHERD BATS ECOLOGY & INVENTORY

Project # **W03-NM-002**

Project Biologists: John Gwilliam, Wildlife Biologists (Nelson)

Contract Biologist: Mike Sarell

Wildlife Technicians: Thomas Hill; Aaron Reid; Nicole Thomas

The 2002 wildlife inventory at Fort Shepherd near Trail confirmed the presence of 86 species including five species of bat. Further investigations may reveal additional bats in the area, as nine species have been found in the adjacent Pend d'Oreille Valley. Discovery of a cave containing 20 female ***Townsend's big-eared bats*** was particularly significant, because this ***blue-listed*** species has a limited distribution in the Columbia Basin. Biologists determined that while the cave does not host a maternity colony of Townsend's big-eared bats, it may be used as a staging area prior to moving to a maternity roost. This project will confirm the use of the cave as a regular staging site and track female Townsend's big-eared bats to identify their maternity roost. The cave will be further examined to locate potential hibernacula. Biologists will complete the bat inventory at Fort Shepherd to identify other important sites used by bats and to verify the presence of additional species.

Project Duration: Year 1 of 2

Partners: **Trail Wildlife Association; Teck Cominco; Ministry of Water, Land & Air Protection**

Related reports available @ www.cbfishwildlife.org:

Biodiversity Inventory within the ICHxw at Fort Shepherd, December 2002

A Summary of Bat Research in the Pend d'Oreille Valley in Southern British Columbia, December 2000

Bold and italic text – see Glossary for more information

KOOTENAY LAKE

NORTHERN LEOPARD FROG RECOVERY PROJECT

Project # **W00-NM-010**

Project Biologist: Doug Adama, Wildlife Biologist (Golden)

Field Biologist: Marc-Andre Beaucher (Creston)

Husbandry Technicians: Kate Lansley, Sarah Herring, Justin Lang (CVWMA)

Amphibians are extremely sensitive to habitat change and degradation because they depend on both aquatic and terrestrial environments during their life cycles. Populations of many frog species are declining. The range of the **northern leopard frog** in British Columbia has been drastically reduced and this species is listed as provincially and federally endangered. Once found in numerous locations in the Okanagan, Kootenay and Columbia valleys, its only known locations in BC are two sites within the protected Creston Valley Wildlife Management Area (CVWMA). CBFWCP has supported inventories and research of this remnant population since 1996. Biologists used radio telemetry to study movements of frogs and to determine habitat use and distribution within CVWMA wetlands. Methods of counting frogs included spring calling surveys, observations along census routes and mark-recapture techniques.

This population estimated at only 1,200 adults breeds at three areas within a 400-hectare wetland compartment in the CVWMA and overwinters in an adjacent side channel. Limiting factors to population growth may include disease, high predation rates and changes in water quality and habitat availability due to hydroelectric operations and other human activities. In addition, biologists have found a number of adult leopard frogs dead or dying due to chytrid fungus. This fungus is an emerging wildlife infectious disease now thought to be associated with amphibian population crashes around the world. CBFWCP and partners are addressing threats to frogs and their habitats. A provincial recovery team was established to plan and co-ordinate recovery efforts. An experimental rearing program was initiated at CVWMA in 2001. Eggs are collected and raised through hatching to the froglet stage. Numbers released included approximately 500 leopard frogs in 2001 and 2,500 in 2002. Captive rearing is continuing in 2003-04 with reintroductions planned for another compartment in the CVWMA and the Bumpers Flats Conservation Area in the East Kootenay. To date, the program has successfully reared and released more than 6,500 juvenile frogs and several thousand tadpoles in the CVWMA and Bumpers Flats. Biologists are identifying habitat enhancement opportunities as well as monitoring the current population to track trends and evaluate the success of frog releases and habitat restoration.

Project Duration: Year 4 of 5

Partners: Creston Valley Wildlife Management Area; Ministry of Water, Land & Air Protection; World Wildlife Fund; Environment Canada; Adama Wildlife Consulting; Additional funding by Columbia Basin Trust

Related reports available @ www.cbfishwildlife.org:

Northern Leopard Frog 2000-01 Progress Report, March 2001

Northern Leopard Frog Recovery - CVWMA Fish Inventory, March 2001

Northern Leopard Frog (*Rana pipiens*) Husbandry Manual, December 2002

Bold and italic text – see Glossary for more information

UPPER KOOTENAY

EAST KOOTENAY ENHANCEMENT

Project # **W00-NL-018**

Project Biologists: Larry Ingham, Wildlife Biologist (Invermere)
Doug Adama, Wildlife Biologist (Invermere)
John Krebs, Senior Wildlife Biologist (Nelson)

Grasslands in the East Kootenay are important habitat for many species including elk, deer, and **red-listed** East Kootenay badger. These areas formerly supported populations of Columbian sharp-tailed grouse. The loss of valley bottom habitat from hydroelectric development in the Columbia River system has increased the importance of maintaining the productivity of remaining low-elevation grasslands. However, other human activities including agricultural uses, housing development and forest encroachment as a result of fire suppression continue to degrade remaining habitat. Forest in-growth causes an estimated loss of 3,000 ha of grasslands and open forests in the East Kootenay Trench each year. As habitat becomes more limited, wildlife and livestock are concentrated into smaller areas and habitat quality is reduced because of over-grazing. CBFWCP is working with other resource agencies to reclaim grasslands in the East Kootenay Trench. Grassland and open forest habitat can be restored through controlled slashing and burning. Partners estimate that 4,500 ha per year must be treated to restore grassland and open forest habitat to historic levels. CBFWCP has identified their role for 2003/04 to include the following activities:

I Project Identification

- Participate on East Kootenay Trench Restoration Committee
- Participate on Radium Bighorn Sheep Working Group
- Develop Stand Management Prescriptions and Burn Plans for priority sites (approximately 1,500 ha) as identified by the Trench Restoration Committee

II Project Implementation

A) Invermere Forest District

- Burn piles at Reed Pasture (40 ha)
- Slash 209 ha at Gina Lake

B) Cranbrook Forest District

- Conduct prescribed burns at Munson West (300 ha) and Wigwam (150 ha)
- Slash 170 ha at Munson East and 300 ha at Newgate (Rocks Pasture and Ashfire/Sharptail Pasture)

III Project Monitoring and Reporting

- Continue vegetation monitoring on Fontaine Pasture
- Establish pre-treatment plots on Newgate Units and Stoddart Creek
- Map boundaries of enhancement sites
- Prepare annual report

Project Duration: Ongoing

Partners: **Rocky Mountain Elk Foundation; Rocky Mountain Natural Resource Society; Ministry of Forests; Habitat Conservation Trust Fund; East Kootenay Wildlife Association; Ministry of Water, Land & Air Protection; Sparwood Fish & Wildlife Association; Tembec Industries; Additional funding by Columbia Basin Trust**

Related reports available @ www.cbfishwildlife.org:

Monitoring Ecosystem Restoration Treatments in the Rocky Mountain Trench, January 2003

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ST. MARY'S RESERVE ECOSYSTEM RESTORATION

Project # **W03-NM-003**

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Project Co-ordinator: Brent Lucas

The St. Mary's Band of the Ktunaxa Kinbasket Tribal Council resides on the 7,500 ha St. Mary's Indian Reserve in the East Kootenay Trench. Fire suppression over the past 60 years has caused forest encroachment, which is reducing grassland and open forest habitat and decreasing wildlife diversity on the reserve. The St. Mary's Band has prepared an Integrated Resource Management Plan to address habitat degradation by applying standard silvicultural practices and prescribed burns on selected sites and by improving range management practices. This project complements CBFWCP's involvement in other grassland restoration initiatives in the East Kootenay Trench, and will potentially benefit **Lewis's woodpecker**, long-billed curlew, badger, and other species at risk.

Project Duration: 1 Year

Partners: **Ktunaxa Kinbasket Development Corporation; First Nations Forestry Program; St. Mary's Indian Band; Funding by Columbia Basin Trust**

ECOSYSTEM RESTORATION IN THE CRANBROOK COMMUNITY FOREST

Exclusion of fires from natural ecosystem processes has resulted in extensive ingrowth and encroachment of forest into historical grassland and savannah ecosystems. This project is designed to imitate the natural role of fire to restore an estimated 20 ha of forest ingrowth to improve tree health, promote grass, forb and shrub species for wildlife habitat enhancement, and reduce ladder fuels and fire hazard in this urban interface zone. The restoration will also improve the recreational value and aesthetic quality of the area.

Project Duration: 1 Year

Partners: **Cranbrook Community Forest Society; Funding by Columbia Basin Trust**

COLUMBIA VALLEY

CONSERVATION OF BADGERS IN THE EAST KOOTENAY

Project # **W01-NM-008**

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Contract Biologist: Nancy Newhouse, Sylvan Consulting (Invermere)

Conservation of the **badger** population in the East Kootenay presents many challenges. Badgers prefer valley-bottom grassland habitat which is heavily impacted by human development and forest ingrowth. In addition to habitat loss and degradation, badgers are subject to mortality from vehicle collisions, shooting, trapping, and ingestion of poisoned ground squirrels. Over the past 20 years, the number of badgers in the East Kootenay has been declining to a point where the remaining estimated 60 breeding adults may be too low for the population to recover naturally. As a result of their vulnerability, badgers in British Columbia have been provincially and federally designated as endangered.

Following a five-year study to better understand the biology, habitat requirements and current status of the East Kootenay badger, biologists initiated a recovery action plan to conserve this local population. This included radiotagging and monitoring 31 resident badgers and seven badgers translocated from the Kalispell area in Montana to the upper Columbia zone of the study area.

Further augmentation of the population is occurring this year and project staff will closely monitor the success of these recovery actions by documenting reproduction and survivorship of resident and translocated badgers. Another major component of this year's program is public education and stewardship to help reduce human-caused mortality. This includes recording badger sightings and responding to "problem badger" calls from landowners.

Researchers will continue to monitor population dynamics in the East Kootenay Trench and initiate a study of the badger's principal prey, Columbian ground squirrels. Properly managing prey populations may benefit badgers. The objective of the badger conservation project is to increase the viability of badgers in the East Kootenay by reducing mortality, improving reproductive success and increasing numbers with translocations.

Bold and italic text – see Glossary for more information

Project Duration: Year 3 of 5

Partners: Ministry of Water, Land & Air Protection; Montana Department of Fish, Wildlife & Parks; Jeffersonii Badger Recovery Team; Canada Parks Service; Invermere Veterinary Hospital; East Kootenay Environmental Society; TEMBEC Forest Industries; Forest Renewal BC; Kimberley Golf Course; Copperpoint Golf Course; Habitat Conservation Trust Fund; Private landowners; Local public

Related reports available @ www.cbfishwildlife.org:

Habitat Associations of American Badgers in Southeast British Columbia, January 2001

The Ecology of Badgers in Southeastern BC, March 2000

REVELSTOKE/BIG BEND

FEMALE WOLVERINE REPRODUCTION AND SURVIVAL REPORT

Project # **W00-NM-015**

Project Biologist: John Krebs, Senior Wildlife Biologist (Nelson)

Wildlife Technician: Dave Lewis, Wildlife Technician (Invermere)

CBFWCP biologists have been studying **wolverines** in the Northern Columbia Mountains since 1995 in order to better manage this vulnerable population. Hydroelectric development reduced available habitat, affected prey species and restricted wolverine movements. Early research was aimed at describing the wolverine's ecology and habitat use in the area. The current project focuses on gathering information on reproduction, females, including age at first breeding, number of kits and den site characteristics, as well as survival rates of females and their young. Female wolverines were radio-tagged to facilitate collecting data and locating dens. In 2003/04, biologists are continuing to monitor the two remaining radio-tagged wolverines. In this final year of the project, staff is summarizing data into reports and scientific articles for other scientists and resource managers studying the wolverine and for incorporation into government management plans.

Project Duration: Year 4 of 4

Partners: Canada Parks Service; Habitat Conservation Trust Fund; BC Forest Service;

Canadian Mountain Holidays

Related reports available @ www.cbfishwildlife.org:

Wolverine Ecology and Habitat Use in the North Columbia Mountains: Progress Report, February 1999

BASIN-WIDE

NON-GAME SPECIES HABITAT ENHANCEMENT

Project # **W00-NL-019**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)

John Gwilliam, Wildlife Biologist (Nelson)

Larry Ingham, Wildlife Biologist (Invermere)

Doug Adama, Wildlife Biologist (Invermere)

Ross Clarke, Wildlife Biologist (Nelson)

Contract Biologist: Mitch Firman (Calgary)

Wildlife Technicians: Thomas Hill, Aaron Reid (Nelson); Andrea Davidson (Invermere)

CBFWCP's non-game enhancement program focuses conservation and enhancement activities on species that may otherwise receive little management or conservation attention. These include bats, snakes, turtles, waterfowl and wetland-dependent wildlife, some of which are species at risk. In 2003/04 biologists plan to conduct the following activities:

- Monitor and maintain **nestboxes** for cavity-nesting ducks in the Columbia Valley and Meadow Creek area;
- Control vegetation and monitor use of alternate nest sites created for the blue-listed Western **painted turtle** near Argenta, Revelstoke and Cranbrook;
- Monitor and maintain maternity roosts of the **blue-listed** Townsend's big-eared bat near Cranbrook, including liaison with First Nations and resort developers at the St Eugene Mission;
- Identify abandoned mine works used by bats adjacent to Kootenay Lake and recommend appropriate conservation measures;

Bold and italic text – see Glossary for more information

- Identify and implement wetland enhancement opportunities in the West Kootenay;
- Conduct an inventory of the blue-listed racer snake in the Pend d'Oreille;
- Resurvey bat roost trees in the Pend d'Oreille;
- Survey historical leks (breeding grounds) for blue-listed **sharp-tailed grouse** in the East Kootenay.

Objectives for the non-game species enhancement program this year include conserving vulnerable wildlife species, improving wildlife viewing opportunities and reversing the loss of ecologically important **wetlands**.

Project Duration: Ongoing

Partners: **Ktunaxa Kinbasket Tribal Council; Delta Hotels; Rocky Mountain Naturalists; Golden & District Rod & Gun Club; Windermere Rod & Gun Club; City of Cranbrook; City of Revelstoke; Ministry of Transportation; Revelstoke Arrow Heights Elementary School; North Arm Wildlife Club; Nelson Naturalists; VSA Highways Maintenance; BC Hydro**

Related reports available @ www.cbfishwildlife.org:

Summary Report: Painted Turtle Nest Site Enhancement and Monitoring at Elizabeth Lake, Cranbrook BC, October 2001

Summary Report: Painted Turtle Nest Site Enhancement and Monitoring at Red Devil Hill, October 2000

A Summary of Bat Research in the Pend d'Oreille Valley in Southern British Columbia, December 2000

Identifying Critical Habitats for a Vulnerable Snake Species, the Rubber Boa, July 1999

Habitat use and movement patterns of Northern Alligator Lizards and Western Skinks in Southeastern British Columbia, January 2001

Distribution and Status of herpetofauna in the Columbia Basin, April 1996

CBFWCP LAND MANAGEMENT OPERATIONS

Project # **W95-L-009**

Project Biologists: John Gwilliam, Wildlife Biologist (Nelson)
 Larry Ingham, Wildlife Biologist (Invermere)
 Ross Clarke, Wildlife Biologist (Nelson)

Wildlife Technicians: Nicole Thomas, Tim Van Wijk (Pend d'Oreille)

CBFWCP manages approximately 7,700 ha of wildlife habitat in the Columbia Basin and co-manages additional wildlife properties with other resource agencies and conservation organizations. Detailed management plans are prepared for each site to direct habitat enhancement activities for wildlife. Land management operations also include maintenance activities and response to incidents ranging from insect outbreaks to illegal occupation and use on managed properties. Specific tasks for 2003/04 include controlling spotted **knapweed** in the Pend d'Oreille Valley and on Coleman Ranch, haying and thistle mowing at Meadow Creek and maintaining roads, fences and signs on properties as necessary. Biologists will evaluate management needs on recently acquired lands including East Columbia Lake, Waldie Island and the Rankin property, and refine or implement management recommendations at Meadow Creek and the Big Ranch/Musil properties. The Land Management Operations program ensures that biologists have the necessary resources to effectively manage habitat for wildlife and respond to land management issues on acquired lands.

Project Duration: Ongoing

Partners: **Habitat Conservation Trust Fund; Ministry of Water, Land & Air Protection; The Nature Trust of BC/East Kootenay Conservation Youth Team; Elkford Rod & Gun Club; Fernie & District Rod & Gun Club; Sparwood Fish & Wildlife Association; Duncan-Lardeau Public Advisory Committee; North Arm Wildlife Club**

Related reports available @ www.cbfishwildlife.org:

Archaeological Impact Assessment - Deer Park and Broadwater Wildlife Properties on Lower Arrow Lake, October 2002

Bold and italic text – see Glossary for more information

CBFWCP LAND ACQUISITION AND STEWARDSHIP

Project # **W95-L-021**

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
Larry Ingham, Wildlife Biologist (Invermere)
John Gwilliam, Wildlife Biologist (Nelson)

Habitat loss is one of the leading causes of declining wildlife populations. Land acquisition is an effective means to ensure that key parcels of wildlife habitat are protected from non-compatible uses. The CBFWCP Land Acquisitions Strategy provides direction to prioritize potential purchases based on their value to fish and wildlife resources. Ranking criteria include: relative scarcity of habitat type; significance to species at risk; winter range capability; potential for enhancement; proximity to other land reserves or to land affected by hydroelectric development; potential for partnership with other land protection agencies; and projected cost of future habitat management and enhancement activities on the site. Purchase recommendations depend on a property's availability, priority ranking and purchase price. CBFWCP consults with MWLAP Land Management staff to ensure co-ordination with other regional land acquisition programs. Once purchased, management plans are developed for each property to guide restoration activities. To date, CBFWCP and partners have acquired and are managing nearly 7,700 ha of significant habitat throughout the basin. Goals for this project include securing one of the ten highest-ranking priority properties for wildlife in the Columbia Basin.

Another method of protecting wildlife habitat is through stewardship agreements, which avoids high purchase costs. Landowners retain their properties, but agree to provide access for habitat restoration activities and to avoid uses that compromise the land's value for wildlife. CBFWCP is pursuing formal partnerships with land protection groups to begin using stewardship agreements as an additional means of securing high quality wildlife habitat.

Project Duration: Ongoing

Partners: **Columbia Basin Trust; The Land Conservancy; Rocky Mountain Elk Foundation; BC Conservation Foundation; The Nature Trust of BC; Ministry of Water, Land & Air Protection; Elk Valley Clubs; East Kootenay Conservation Program; Ducks Unlimited; West Kootenay Naturalists**

LARGE MAMMAL MONITORING

Project # **W95-L-012**

Project Biologists: Larry Ingham, Wildlife Biologist (Invermere)
John Gwilliam, Wildlife Biologist (Nelson)

The Large Mammal Monitoring Program (LMMP) was developed in 1998 to address the need for regional population data for all species of *ungulates* in the Columbia Basin: **mule deer**, white-tailed deer, **mountain caribou**, moose, **Rocky Mountain bighorn sheep**, elk and mountain goat. CBFWCP monitors these animals using aerial surveys as well as through counts conducted in conjunction with other wildlife projects. In 2003/04, aerial survey efforts will include moose and mountain goat counts in the Robson Valley. Mule deer will also be inventoried in selected areas in the West Kootenay. Aerial surveys for bighorn sheep will be conducted in the East Kootenay and in the Robson/Broadwater area of the Arrow Lakes Reservoir. Carry over counts for deer will continue in the East Kootenay with assistance from local rod and gun clubs and previously identified transects are counted each spring. Spotlight counts for deer will be conducted in the Pend d'Oreille Valley. CBFWCP is seeking new partnerships with forest companies and other organizations to expand survey coverage.

Results from the LMMP assist in tracking trends in ungulate populations over time, and evaluating wildlife response to habitat enhancement and protection efforts. This information is incorporated into habitat restoration and species management plans for wildlife populations in the Columbia Basin.

Project Duration: Ongoing

Partners: **East Kootenay Wildlife Association; Canal Flats Wilderness Club; Kimberley Wildlife & Wilderness Club; Fernie Rod & Gun Club; Lake Windermere Rod & Gun Club; Traditional Bow Hunters of BC; Sparwood Fish & Wildlife Association; Ministry of Water, Land & Air Protection; Ministry of Forests**

Related reports available @ www.cbfishwildlife.org:

2002 Southern East Kootenay Mountain Goat Aerial Survey, January 2001

Winter Habitat Selection by White-tailed Deer in the Pend d'Oreille Valley, September 2000

Cougar Predation and Population Growth of Sympatric Mule Deer and White-tailed Deer, April 2002

Movements, Survival and Mortality of White-tailed Deer in the Pend d'Oreille River Valley, December 2002

Bold and italic text – see Glossary for more information

COLUMBIA BASIN BIODIVERSITY ATLAS

Project # **W00-NM-011**

Project Co-ordinators: John Krebs, Senior Wildlife Biologist (Nelson)

Ian Parfitt/Amy Waterhouse, GIS Co-ordinators (Nelson)

The Columbia Basin supports a wide diversity of habitats and wildlife. Ongoing research by CBFWCP staff and other biologists is constantly increasing our understanding of the region's ecosystems. These studies have resulted in an accumulation of data with tremendous potential for species and habitat conservation as well as for education.

The **Biodiversity** Atlas was initiated to provide a means of visually presenting information on wildlife and their habitats in the Columbia Basin through a combination of maps, photos and text. The goal is to summarize large amounts of data in a visual manner that would be useful for resource managers, policy makers, educators and the public. The atlas should illustrate the variety of ways in which data can be applied to conservation and management issues. In addition, the atlas should help identify gaps in knowledge of the region's wildlife and ecosystems. Last year, project staff launched an internet-based pilot atlas to demonstrate the project's capabilities. This preliminary atlas focused on East Kootenay components, including the grassland restoration project and badger conservation. This year, atlas coordinators are refining partner roles and data sharing agreements and expanding the on-line atlas to encompass all of the Columbia Basin. New themes to be incorporated include the large mammal monitoring program, non-game enhancement projects and additional species profiles, such as caribou and wolverine. Links with other databases will be established to provide the user with additional search options. Increased public awareness of the needs of wildlife and the ecosystems that support them should lead to a better understanding of the importance of wisely managing the natural resources of the region.

Project Duration: *Year 3 of 3*

Partners: **University of British Columbia; Ministry of Sustainable Resource Management; Ministry of Water, Land & Air Protection; Selkirk College**

Related reports available @ www.cbfishwildlife.org:

Columbia Basin Biodiversity Atlas: Phase One, June 2001

MOUNTAIN CARIBOU RECOVERY

Project # **W02-NM-016**

Project Manager: Bob Forbes, WLAP Section Head (Cranbrook)

Project Biologists: Guy Woods; John Krebs, Wildlife Biologists (Nelson)

Contract Biologist: Trevor Kinley, Sylvan Consulting (Invermere)

The **mountain caribou** population in the Columbia Basin are **red-listed** because of its vulnerability to habitat loss and fragmentation from human settlement, hydro dams, timber harvest and to disturbance from recreation. These factors may work together to cause caribou to be more susceptible to cougar and wolf predation. Results from inventories conducted in 2002 suggested that the Central Selkirk, Revelstoke and Monashee herds have declined significantly in recent years and that numbers of animals in the South Selkirk, South Purcell and Monashee herds are dangerously low. For example, the South Purcells herd has only 19 caribou. Herds this size are particularly vulnerable to extirpation from severe weather conditions, decreased food availability and increased predation or disturbance.

CBFWCP biologists are participating in Recovery Action Groups established to co-ordinate recovery efforts and develop management plans for endangered herds. CBFWCP is playing a key role in caribou transplants proposed for southern herds in 2003/04 and 2004/05. The goal is to transplant up to 20 adult caribou to the South Purcell herd from the Itcha-Ilgachuz Woodland caribou herd of 2,900 animals in the Williams Lake area in 2003/04. These animals will be radio-collared and tracked to follow their movements, investigate mortality factors and monitor success of recovery efforts. Data gathered this year will be incorporated into recovery action plans and will help direct future transplant events.

Project Duration: *Year 2 of 6*

Partners: **Ministry of Water, Land & Air Protection, Kootenay Region; Habitat Conservation Trust Fund; Aquila Networks Canada; South Kootenay Recovery Action Group; Additional funding by Columbia Basin Trust**

Related reports available @ www.cbfishwildlife.org:

LaForme Creek Lichen Enhancement Project: Preliminary Results to Date, February 2001

2002 Population Survey for the South Purcell Subpopulation of Mountain Caribou, April 2002

Characteristics of a Hunted Population of Cougar in the South Selkirk Mountains of British Columbia, 2003

Bold and italic text – see Glossary for more information

GREAT BLUE HERON BREEDING INVENTORY & HABITAT ASSESSMENT

Project # **W02-NS-202**

Project Biologist: John Krebs, Senior Wildlife Biologist (Nelson)

Contract Biologist: Marlene Machmer, Pandion Ecological Research (Nelson)

The great blue heron is provincially **blue-listed** due to its sensitivity to habitat loss and disturbance associated with land development and other human activities. In the Columbia Basin, herons often use low-elevation shoreline and wetland habitat for breeding and foraging. In addition, many sites suitable for herons have been lost to flooding of reservoirs or are affected by unnatural water level fluctuations.

The purpose of the heron inventory is to gather up-to-date information on the status of this species in the Columbia Basin, and to describe habitat characteristics at breeding colonies and important feeding sites. Identifying key sites will assist in reducing human threats and lead to more effective conservation efforts of the species in the region.

Public participation in this project is essential. In 2002, 185 individuals documented 352 sightings of herons in the Columbia Basin. These observations assisted biologists in identifying locations of breeding sites and prioritizing areas for ground-based and aerial field surveys. A total of 259 active heron nests were located at 17 breeding sites across the region in 2002. In addition, 13 historical breeding sites were visited to check for nesting activity. Project components for 2003/04 include locating additional breeding sites by continuing to gather sightings from the public; following up on observations received this year and late last year; and conducting field surveys in poorly covered areas. Breeding activity and productivity at active sites will be closely monitored to identify potential factors affecting breeding success or failure. For example, disturbance by humans and by predators such as bald eagles is suspected to be an important cause of colony abandonment.

Increased public awareness of threats to herons and their habitat should contribute to reducing disturbance and loss. Knowledge of the status and distribution of nesting sites will contribute to improved land management decisions and conservation of the great blue heron population in the Columbia Basin.

Project Duration: Year 2 of 2

Partners: **West Kootenay Naturalists; Local Public; Additional Funding by Columbia Basin Trust**

Related reports available @ www.cbfishwildlife.org:

Great Blue Heron Breeding Inventory and Habitat Assessment in the Columbia Basin, March 2003

SHORT-EARED OWL AND AMERICAN BITTERN BREEDING INVENTORY & HABITAT ASSESSMENT

Project # **W03-NS-004**

Project Biologist: John Krebs, Senior Wildlife Biologist (Nelson)

Contract Biologists: John Cooper, Suzanne Beauchesne

Short-eared owls and American bitterns are **blue-listed** species requiring meadows and marshes for feeding and breeding. Populations of both species are declining in B.C. and in many other parts of their ranges due to habitat loss and fragmentation from human settlement and to habitat degradation from cattle grazing. Over the past 70 years, most suitable habitat for these birds was flooded when reservoirs were created as a result of dam construction on the Columbia and Kootenay rivers in the Columbia Basin. Little is known about the current status of short-eared owls or American bitterns in the region. Short-eared owls have been confirmed nesting only at Creston. American bitterns nest in Creston and on the Lower Arrow Lakes Reservoir, and are suspected to breed in the East Kootenay Trench. This project will inventory areas with remaining available habitat to identify additional breeding sites for each species. Naturalist clubs and the general public will be requested to submit sightings to further define the regional distributions of owls and bitterns. Biologists will prepare conservation recommendations for key sites based on the information gathered.

Project Duration: 1 Year

Partners: **Columbia Basin Naturalists Groups; Parks Canada; Local Public**

Bold and italic text – see Glossary for more information

MOUNTAIN GOAT MINERAL LICK MONITORING

Project # **W03-NM-005**

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Mountain goats occur throughout many high-elevation mountain ranges in the Columbia Basin, but their numbers have declined over the last 10 years. Ongoing population research is required to ensure that goat numbers do not continue to drop. Aerial surveys using helicopters were used to determine distribution and relative abundance of mountain goat herds and to identify mineral licks in the region. The goat mineral lick monitoring project involves testing the use of motion-detection cameras at selected licks as a potentially cost-effective alternative to aerial surveys. Biologists have identified two licks in the East Kootenay and two in Robson Valley to install the cameras. In addition to determining relative abundance and sex ratios among herds, biologists hope to document timing of lick use by goats and compare use by males and females. Comparison of data collected by cameras with population estimates derived from previous aerial surveys will be used to examine the feasibility of using this method for population monitoring. An additional component of the project will compare DNA samples collected from goat hair or feces at licks with DNA from harvested animals to identify which herds are using the licks. Information gathered through this project will serve as a baseline to evaluate harvest regulation changes and other management actions including habitat treatments.

Project Duration: Year 1 of 3

Related reports available @ www.cbfishwildlife.org:

Southern East Kootenay Goat Aerial Survey, January 2001

Small Wildlife Projects

Project # **W95-L-013**

Project Biologist: John Krebs, Senior Wildlife Biologist (Nelson)

Providing opportunities for public involvement in meaningful projects to enhance wildlife populations in the Columbia Basin is a key component of the Compensation Program. This task addresses the need for increased club and community participation with the Compensation Program. Clubs are invited to approach the Program for technical and small financial assistance in club-initiated projects anytime within CBFWCP's project year. The funding available for each community-initiated wildlife project in this Small Works Project is up to \$10,000 per project.

Recent small works projects include **restoring** McGinty Lake **wetland** habitat by raising the water levels using a pump system to deliver water from Cherry Creek in partnership with the Kimberley Wildlife & Wilderness Club; and **enhancing** mule deer habitat in the New Denver/Silverton area in partnership with the New Denver Friends for Wildlife.

This project enables clubs to play an active role in the enhancement of wildlife habitat, provides volunteers with technical expertise and the necessary funds for equipment and material, and increases public awareness of CBFWCP.

Project Duration: Ongoing

Partners: Local Community Groups

Related reports available @ www.cbfishwildlife.org:

Small Works Project Application

McGinty Lake Enhancement Report, June 2002

Bold and italic text – see Glossary for more information

Small wildlife projects for 2003-04 include:

REVELSTOKE CARIBOU/SNOWMOBILE MANAGEMENT

Project Biologists: John Krebs, Senior Wildlife Biologist (Nelson)
Bob Brade, MWLAP Habitat Biologist (Revelstoke)

Project Technician: Dave Lewis (Invermere)

Volunteer Co-ordinators: Tom Dickson; Ron Laroy (Revelstoke)

The installation of information signs and markers in the Revelstoke Reservoir/Frisbee Ridge area with the assistance of the Revelstoke Snowmobile Club will help clarify open and closed areas for snowmobilers to avoid interactions with mountain caribou on the identified slopes. This area is home to an estimated 245 endangered **mountain caribou**. This population has been impacted by habitat loss caused by hydroelectric development, forest harvest and human settlement combined with increased recreation pressure in these areas. Disturbance by motorized vehicles may increase caribou vulnerability to starvation, predation and avalanches and may be a contributing factor to the population's decline.

Project Duration: 1 Year

Partners: **Revelstoke Snowmobile Club; Ministry of Water, Land & Air Protection; Ministry of Sustainable Resource Management; Funding by Columbia Basin Trust**

EAST KOOTENAY YOUTH CREW WILDLIFE HABITAT PROTECTION

Project Biologist: Larry Ingham, Wildlife Biologist (Invermere)

Contract Biologist: Ian Radridge

Project Co-ordinators: Gary Tipper; Jim Hope

CBFWCP and other partners are providing funding for a team of young people to perform habitat protection and management tasks on wildlife properties in the East Kootenay. Activities include controlling noxious weeds, repairing perimeter fences and posting signs to restrict illegal access to the lands. This work will enhance habitat quality and availability for a variety of wildlife including deer, elk and nesting birds.

Project Duration: 1 Year

Partners: **The Nature Trust of BC; Ministry of Water, Land & Air Protection; Funding by Columbia Basin Trust; Habitat Conservation Trust Fund**

Related reports available @ www.cbfishwildlife.org:

East Kootenay Youth Crew, November 2002

Bold and italic text – see Glossary for more information



EVOLUTION OF CBFWCP



Evolution of Columbia Basin Fish & Wildlife Compensation Program

Hydroelectric development by BC Hydro in the Columbia Basin occurred between 1960 and 1985. Some of the potential dam impacts were immediately evident, such as the Seven Mile Dam development flooding prime white-tailed deer habitat in the Pend d'Oreille Valley. Other impacts, such as decline in lake productivity, were gradual and took up to a 20 – 25 year period before becoming evident.

The Columbia Basin Fish & Wildlife Compensation Program is a joint initiative separate from—but not independent of—BC Hydro and the Government of British Columbia (Ministry of Water, Land & Air Protection, partners). CBFWCP was created in 1994, evolving from existing Mica, Revelstoke and Pend d'Oreille compensation programs as well as related activities in the Arrow and Duncan reservoir areas. The new Compensation Program formed a more comprehensive and integrated program for the BC portion of the Columbia River Basin.

CBFWCP's mandate is to deliver projects that conserve and enhance fish and wildlife populations affected by BC Hydro dam-related activities throughout the Columbia Basin. CBFWCP receives \$3.2 million a year from a perpetual fund established by BC Hydro as part of the crown corporation's water licence agreement. The annual allocation of these funds for fish and wildlife projects is established through a three-tiered process:

- project applications are submitted by organizations and community groups;
- Program biologists and respective Fish or Wildlife Technical Committees evaluate proposed projects based on established Acceptability and Ranking Criteria; and
- the technically-approved projects are reviewed and receive financial approval from the CBFWCP Steering Committee.

The Steering Committee, which also approves CBFWCP's Annual Operating Plan, is comprised of representatives from BC Hydro, WLAP, Fisheries and Oceans Canada, First Nations as well as public representatives for each of three areas (southeast Kootenays, southwest Kootenays, northern Kootenays).

Between 1995 and 2003, CBFWCP has delivered approximately 536 fish and wildlife projects, at a cost of over \$30 million, in conjunction with an estimated 800 partners. More than 175 of these projects directly involved species at risk.

A key component of CBFWCP's mandate is Public Consultation and Communications to build support and involvement in the Program among residents, community groups and other key stakeholders including First Nations, local governments, resource users, government agencies and the media.

The Program utilizes a variety of integrated programs and activities to achieve its communication objectives including: semi-annual Update Newsletter, annual Fish & Wildlife Project Handbook, news releases, website, public presentations, displays at key stakeholder and community events; fish and wildlife project interpretative signs, public opinion surveys and reader response cards.

Bold and italic text – see Glossary for more information



▲ FISH PROGRAM

Map# Project

Arrow Lakes Reservoir

1. Hill Creek Spawning Channel
2. Arrow Lakes Fertilization & Monitoring
3. Arrow Lakes Reservoir Bull Trout Production
4. Arrow Lakes Reservoir Management Plan
5. Arrow Lakes Reservoir Burbot Stock Status

Upper Kootenay

6. Upper Columbia White Sturgeon Hatchery

Lower Kootenay

7. Kootenay Lake Fertilization & Adaptive Management
8. Meadow Creek Spawning Channel

Lower Columbia

9. Salmo River Rainbow Trout Habitat Use & Population Assessment

Revelstoke

10. Revelstoke Reservoir Bull Trout Radio Telemetry
11. Reducing Reservoir Oligotrophy by Experimental Small Scale Nutrient Addition to Embayments (Phase I - Assessment)

SMALL WORKS PROJECTS – FISHERIES

Lower Columbia/Kootenay Drainage

12. Lower Columbia River Tributary Rainbow Trout Monitoring
13. Sproule Creek Rainbow Trout Passage Monitoring
14. Slocan River Temperature Monitoring
15. Deer Creek Kokanee Spawner Counts & Restored Habitat Evaluation
17. Cottonwood Creek Restoration
19. Bear Lake Restoration
20. Lower Columbia Rainbow Trout Life History

Upper Kootenay

21. Columbia Lake Burbot Spawner Counts
22. Impact of Small Dams on Nutrient Dynamics
23. Lizard Creek Tributary Habitat Restoration

Arrow/Revelstoke/Upper Columbia

24. Incomappleux River Gorge Passage
25. MacKenzie Creek Assessment
26. Camp Creek Yellowfin Survey
27. Fish Derby Monitoring
28. Jordan River Side Channel Rehabilitation

Basin-wide

29. Kokanee Spawner Surveys
30. Small Works Program

● WILDLIFE PROGRAM

Map# Project

Arrow Lakes Valley

1. West Kootenay Enhancement
2. Fort Shepherd Bats Ecology & Inventory

Kootenay Lake

3. Northern Leopard Frog Recovery

Revelstoke/Big Bend

4. Female Wolverine Reproduction & Survival

Upper Kootenay

5. East Kootenay Enhancement
6. St. Mary's Band Ecosystem Restoration
7. Mountain Goat Lick Monitoring
8. Cranbrook Community Forest Enhancement

Columbia Valley

10. Conservation of Badgers in the East Kootenay

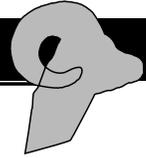
SMALL WORKS PROJECTS – WILDLIFE

9. East Kootenay Youth Crew Wildlife Habitat Protection
20. Revelstoke Cariboo/Snowmobile Management

Basin-wide

11. Non-game Species Habitat Enhancement
12. Large Mammal Monitoring
13. Great Blue Heron Inventory
14. CBFWCP Land Acquisition
15. CBFWCP Land Management Operations
16. Columbia Basin Biodiversity Atlas
17. Mountain Caribou Recovery
18. Short-eared Owl & American Bittern
19. Small Works Program

FISH & WILDLIFE PROJECT MAP



Approved Projects 2003-4

Columbia Basin Fish and Wildlife Compensation Program

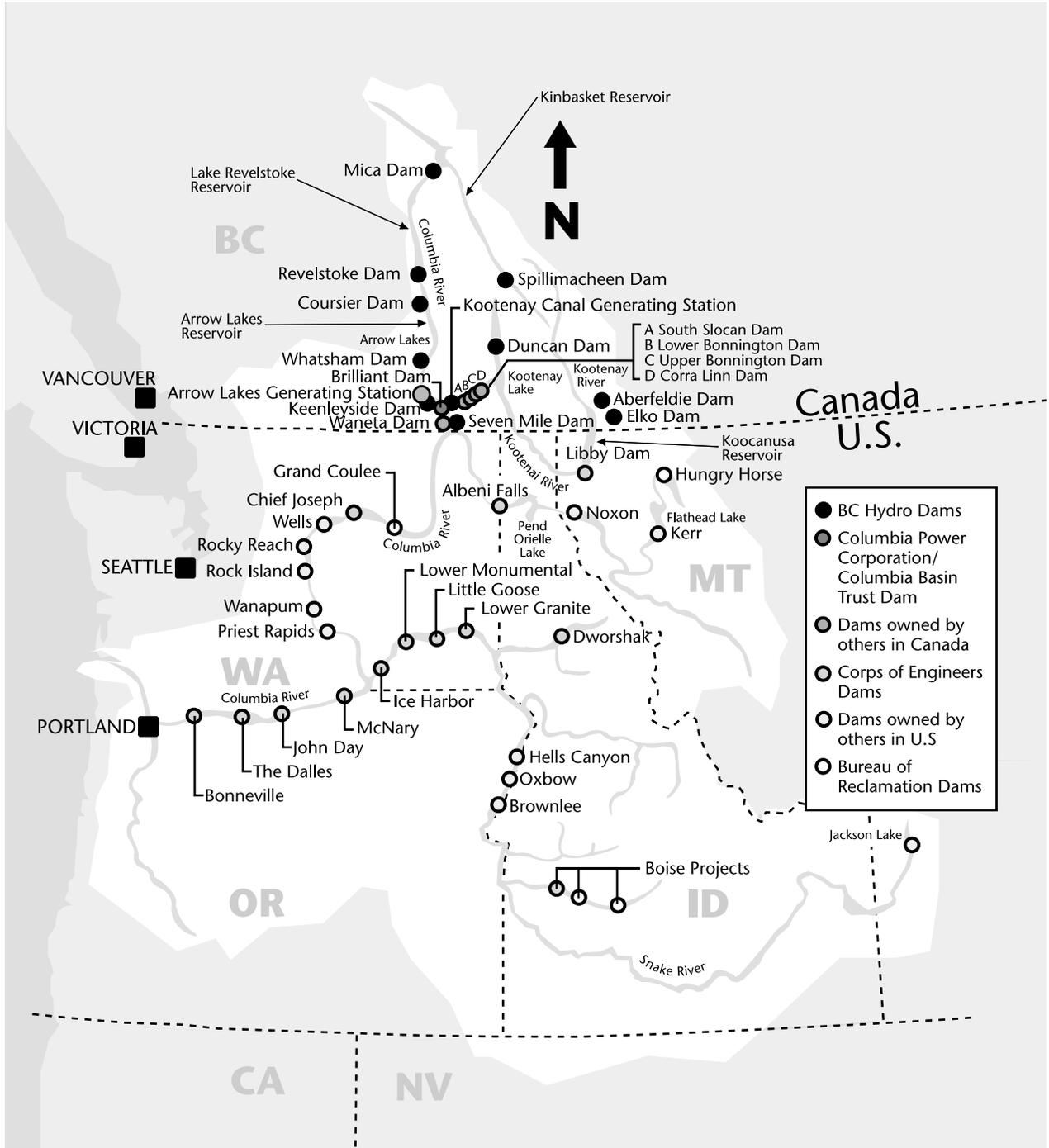


- Program Area
- Wildlife Area Extension
- Program Area Boundary
- Dam
- Wildlife Project
- Fish Project

COLUMBIA RIVER DRAINAGE SYSTEM



Canadian Columbia Basin 87,250 km² (8.7% of BC)



KEY FACTS & EVENTS



- 1934** Grand Coulee Dam is constructed in Washington State to control floods and produce electricity. Stops anadromous runs of sockeye and chinook salmon and steelhead trout in the Columbia River Basin.
- 1948** Spring floods devastate communities and businesses along the Columbia River in Canada and the US claiming 41 lives, leaving 38,000 people homeless. A Canada/US International Joint Commission study identifies sites on the Columbia River in Canada for flood control storage projects.
- 1949** Mysid shrimp are introduced in Kootenay Lake as a food source for intermediate-sized rainbow trout.
- 1953** Cominco phosphate fertilizer plant on St. Mary River, a tributary to the Kootenay River is operational and causes a significant decline in water quality and an increase in nutrient levels in Kootenay Lake.
- 1961** Canadian and US governments sign Columbia River Treaty, requiring Canada to build large dams and storage reservoirs now called: Mica, Keenleyside and Duncan. Canadian government transfers the Canadian portion of the treaty to BC government. US is allowed to build Libby Dam in Montana and flood land upstream in Canada (Koocanusa Reservoir).
- 1962** The Government of British Columbia creates BC Hydro as the “Columbia River Treaty Entity” responsible for building and operating dams and reservoirs for flood control and power production.
- 1964** Columbia River Treaty is ratified with the Government of British Columbia allowed to sell a 50% share of down stream benefits for 30 years to build Columbia River Treaty dams and reservoirs.
- 1967** Duncan Dam is constructed above Kootenay Lake and creates a 7,150 hectare Duncan Lake Reservoir.
- 1968** Fisheries managers introduce Mysid shrimp into Arrow Lakes Reservoir as a food source for young fish-eating trout.
- 1969** Keenleyside Dam is constructed, flooding the Upper and Lower Arrow Lakes to create one 51,600 ha reservoir of water 190 km long and eliminating an estimated 30% of spawning/rearing habitat.
- 1972** Libby Dam is constructed, affecting both fish and wildlife habitat. Nutrient retention in the 45,187 ha (107 km) Kootenay Lake (phosphorus loading) declines to one-third of historical levels following pollution control measures at Cominco’s fertilizer plant.
- 1975** Cominco fertilizer plant upgrade on St. Mary River significantly reduces discharge into Kootenay Lake.
- 1976** Mica Dam is constructed and creates the 42,500 ha Kinbasket Reservoir. Seven Mile Dam is constructed on the Pend d'Oreille River creating a 410 ha reservoir. Mica and Pend d'Oreille Compensation Programs are formed by BC Hydro to address the impacts of the two dams on fish and wildlife populations.
- 1977** Number of spawning kokanee returning to spawn in North Arm of Kootenay Lake is estimated at 1.4 million.
- 1980** Hill Creek Spawning Channel is completed by BC Hydro to compensate for the impact of Keenleyside Dam on fish populations. The channel is 3.2 km long, 6.1 km wide with 56 settling-basin holding areas for spawners and a capacity for 150,000 kokanee salmon.
- 1982** Hill Creek Hatchery is completed by BC Hydro to replace anticipated loss of Arrow Lakes fish spawning capacity as a result of Revelstoke Dam.
- 1984** Revelstoke Dam is constructed, flooding 150 km of mainstem Columbia River and 200 km of tributaries, and significantly impacting fish stocks and habitat over an 11,530 ha area. Cumulative impact of dams was the estimated loss of 66% of the bull trout population.
- 1987** Hill Creek Hatchery size is doubled to produce Arrow Lakes fish lost as a result of the Keenleyside Dam. Capacity is 100,000 fingerling bull trout, 20,000 yearling rainbow trout, 60,000 yearling Gerrard rainbow trout and up to 2 million kokanee eggs per year. Cominco fertilizer plant on St. Mary River ceases operation permanently.

- 1990** Kootenay Lake South Arm kokanee stocks are virtually extinct. WLAP, Kootenay Region Fisheries holds public meetings to explore restoration options.
- 1991** Kootenay Lake North Arm spawning kokanee escapement declines to 237,000.
- 1992** WLAP and BC Hydro begins 5-year experimental fertilization project in the North Arm of Kootenay Lake.
- 1994/1995** CBFWCP is created, consolidating all previous compensation programs, to deliver projects to sustain and enhance fish and wildlife populations affected by BC Hydro dam-related activities in the Columbia Basin. Funding is \$3.2 million in perpetuity from BC Hydro as a part of the crown corporation's water licence agreement.
- 1996** CBFWCP begins accelerated projects to measure the effect of the dams on nutrient levels and fish populations in the Arrow Lakes Reservoir.
- 1996** Water levels similar to 1948 occur along the Columbia River, but flood control from dams reduces natural flows
- 1997** 40% and minimizes impact. No lives or dwellings are lost.
- 1997** Kootenay Lake North Arm kokanee spawning escapement increases to 1.45 million. Fertilizer levels (agricultural-grade nitrogen & phosphorus mix) are reduced after ongoing monitoring indicates the lake is being over-fertilized.
- 1998** North Arm spawning escapement increases to 2.15 million; total kokanee population in Kootenay Lake reaches 25 – 30 million; kokanee-feeding bull trout and rainbow trout caught by anglers nearing 13.6 kg (30 lb). Kootenay Lake Experimental Fertilization Project results and proposed restoration plan for Arrow Lakes Reservoir are presented a 2-day Public Conference in Nelson.
- 1999** Upper Arrow Lakes Reservoir fertilization from the Galena-Shelter Bay ferry begins in late April.
- 2000** Arrow Lakes Reservoir Fertilization Project results after first year indicate algae production has increased 2^{1/2} times.
- 2001** Kokanee abundance in the Upper Arrow Lakes Reservoir tripled to over seven million with an estimated 10 million in the Arrow system. Kokanee spawning escapement at Hill Creek Spawning Channel jumps to 142,103 compared to 47,000 spawners in 1996. Kootenay Lake kokanee abundance is an estimated 17 million fish with kokanee escapement of 560,000 spawners at the Meadow Creek Spawning Channel and nearby Lardeau River. The fertilizer level was raised to previous levels to increase and maintain a kokanee abundance of 25-35 million fish.
- 2002** Hydro-acoustic (sonar) surveys estimate 21 million kokanee in Kootenay Lake, up from 12 million in 2000. Kokanee abundance in the Arrow Lakes Reservoir reaches 20 million, a 228% increase over 1999. CBFWCP is participating in three red-listed species recovery initiatives for upper Columbia white sturgeon, East Kootenay badger and northern leopard frog. A summary of wildlife habitat enhancement results to date shows CBFWCP has contributed to the restoration of 17,890 ha of grassland in the East Kootenay and enhancement of 3,500 ha in the West Kootenay to benefit ungulate populations.
- 2003** Kootenay Lake kokanee abundance achieves a near historic level of 35 million while Arrow Lakes Reservoir abundance is maintained at 20 million. CBFWCP is involved in the mountain caribou recovery project. The Program partners in three private land purchases of 4,100 ha for a total of 7,600 ha acquired for wildlife to date.

CBFWCP Fish & Wildlife Projects 1995 – 2003

ACCOMPLISHMENTS TO DATE

(not including 2003/2004 fish and wildlife projects)

Columbia Basin

FISH & WILDLIFE Compensation Program

www.cbfishwildlife.org



FISH AND WILDLIFE PROJECTS 1995 – 2003

Project	Status	Project	Status
REVELSTOKE/BIG BEND			
Wildlife			
Wolverine Ecology & Habitat Use	1995 - 2000	Pend d'Oreille Deer/Predator Relationships	1995 - 96
Grizzly & Black Bear Monitoring	1994 - 99	Amphibian & Reptile Inventory	1995 - 96
Willowbank Mountain Enhancement	1995 - 2000	Salmo River Harlequin Duck Inventory	1999 - 2001
Northern Long-Eared Bat	1995 - 98	Fort Sheppard Bioterrain Ecosystem	1997 - 98
Cummins Bio-Terrain Ecosystem Mapping	1996 - 99	Mapping	
Columbia Mountain Caribou Research	1995 - 99	West Kootenay Mule Deer Study	1996 - 2002
Northern Long-Eared Bat Species Status	1995 - 96	Arrow Lakes Land Management	1995 - 96
Crawford Creek/Arrowhead Enhancements	1996 - 99	Bat Survey Species & Habitat Inventory	1994 - 95
Williamson Lake Painted Turtle	Ongoing	Arrow Lakes Enhancement	1995 - 2000
Crossing Assessment		Small Wetlands Enhancement	1996 - 97
Crawford/Alkololex Enhancement	1996 - 98	West Kootenay Mule Deer	1996 - 97
Small Wetland Enhancement	1996 - 98	Pend d'Oreille California Bats Study	1997 - 98
Revelstoke Wetland Project Development	1996 - 97	Ceanothus Planting	1998 - 99
Columbia Mountain Institute	1996 - 98	Waneta Winter Range Restoration	2002-03
of Applied Ecology		Skattebo Slashing	2002-03
Arrow/Revelstoke Raptor Survey	1996 - 97		
Illecillewaet Greenbelt Nature Park	1997 - 98	ARROW LAKES RESERVOIR	
Wetland Rehabilitation Survey		Fish Projects	
La Forme Creek Girdling	1997 - 98	Arrow Lakes Reservoir Kokanee Stock Assessment	1997 - 99
Bear-Human Conflict Education	1996 - 99	Arrow Lakes Reservoir Paleolimnology	1997 - 98
Location of Suspected Bat Hibernicum	1998 - 99	Arrow Lakes Reservoir Bull Trout Life History	1997 - 2000
Revelstoke Area		Arrow Lakes Reservoir Bull Trout Genetics/Stock	1997 - 2000
Wildlife Tree Creation & Enhancement	1998 - 99	Identification	
Revelstoke Caribou/Snowmobile Management	2002 - 03	Arrow Lakes Reservoir Rainbow Trout Hatchery	1995 - 96
		Arrow/Kinbasket Rainbow Trout Stock	1998 - 2001
		ID/Distribution	
		Lower Arrow Lakes Reservoir Tributary Inventory	1996 - 97
		Arrow Lakes Reservoir Water/Nutrient Exchange	1998 - 99
		Arrow Lakes Reservoir Nutrient Recycling	1998 - 99
		Arrow Lakes Reservoir Productivity Study	1998 - 99
		Arrow Lakes Reservoir Fish Summary	1997 - 99
		Tonkawatla River Rainbow Trout Habitat	Ongoing
		Enhancement	
		Fissure Creek Diversion Feasibility Study	1998 - 99
		Arrow Lakes Reservoir Rainbow Trout Stock	1998 - 99
		Identification & Distribution	
		Illecillewaet River Assessment	1998 - 99
		Arrow Lakes Reservoir Trout Radio Telemetry	1997 - 2002
		Burton Creek Fish Habitat Assessment	1998 - 2000
		Birch Creek Plunge Pool Repair	1998 - 99
		Arrow Lakes Reservoir	Ongoing
		Fertilization and Monitoring	
		Hill Creek Hatchery Operations	1982 - 98
		Hill Creek White Sturgeon Operations	2000 - 02
		Hill Creek Spawning Channel Operations	Ongoing
ROBSON VALLEY			
Wildlife			
Deer Habitat Utilization	1995 - 96		
Mountain Caribou in Robson Valley	1996 - 99		
Deer Habitat Use Monitoring	1995 - 99		
McBride Peak Enhancement	1995 - 96		
Raush Valley Enhancement	1995 - 96		
Holmes River Enhancement	1996 - 97		
Nevin Creek Enhancement	1996 - 97		
Tete Jaune Bioterrain & Ecosystem Mapping	1996 - 97		
Fisher Population Status	1996 - 97		
Robson Valley Land Stewardship	Ongoing		
Robson Valley Rare Bird Survey	2001 - 2002		
ARROW LAKES VALLEY			
Wildlife			
Pend d'Oreille/South Salmo Enhancement	1995 - 2000		
Skattebo Habitat Enhancement	1999 - 2000		
Wilson/Stagleap Biophysical Mapping	1995 - 96		
Pend d'Oreille Bat Survey	1995 - 96		
Arrow Lakes Land Management	1995 - 2000		
Forest Interior Conditions-	1995 - 96		
McCormick Creek			
Arrow Lakes Large Mammal Monitoring	Ongoing		
(Arrow Lakes Compensation Program)			
Pend d'Oreille Large Mammal Monitoring	1995 - 2000		
Nakusp Caribou	1995 - 99		
Arrow Lakes Reservoir Forage Enhancement	1995 - 2000		
Pend d'Oreille Valley Habitat Enhancement	1995 - 96		
Arrow Lakes Enhancement Area Identification	1995 - 96		

Project	Status	Project	Status
KOOTENAY LAKE		BASIN WIDE	
Fish Projects		Wildlife Projects	
Kootenay Lake Experimental Fertilization	1992 - 97	Land Management	Ongoing
Kootenay Lake Fertilization & Adaptive Management	Ongoing	Duck Nestbox Monitoring	Ongoing
Duncan River Bull Trout Radio Telemetry	1996 - 99	CBFWCP Land Acquisition	Ongoing
Meadow Creek Spawning Channel Operations	Ongoing	Enhancement Project Identification & Development	Ongoing
Kootenay Lake Fertilization Angling Evaluation	1998 - 99	Large Mammal Monitoring Plan	Ongoing
UPPER KOOTENAY		Site Enhancement Monitoring	Ongoing
Wildlife Projects		Columbia Basin Biodiversity Atlas	Ongoing
Townsend's Big-eared Bat Roost	2000	Wildlife Strategic Plan	1995 - 98
Hibernaculum Conservation		Avalanche Path Habitat Study	1995 - 2000
East Kootenay Lynx Ecology & Habitat Suitability	1996 - 2001	Tailed Frog in the Columbia Basin	2001 - 2002
Upper Elk Valley Winter Range Enhancement	2000	Small Wildlife Projects	Ongoing
Bull Mountain Prescribed Burn Enhancement	Ongoing	Small Red-Listed Mammals Status Study	1995 - 2000
Sharptail Grouse Transplant Feasibility	1996 - 97	Biophysical Map Digitizing	1996 - 97
Saddle Pasture Prescribed Burn	1997 - 98	Geographic Information System (GIS) Support	Ongoing
Townsend's Big-Eared Bat Roost Monitoring	Ongoing	Great Blue heron Breeding Inventory & Habitat Enhancement	2002 - 03
Elk Valley Riparian Assessment	1996 - 97		
Upper Kootenay Bats	1996 - 97	BASIN WIDE	
Pickering Hills Enhancement	1997 - 2000	Fish Projects	
East Kootenay Trench Grasslands Restoration	Ongoing	Solar Aerator Testing	1995 - 96
Upper Elk Valley Range Enhancement	Ongoing	White Sturgeon Conservation in Reservoirs	1995 - 99
MacDonald Marsh Wetland Enhancement	1998 - 99	Public Interaction - Project Identification	Ongoing
Sheep Mountain Prescribed Burn	1998 - 99	Angler Log Book Program	1995 - 96
Tobacco Plains Wildlife Habitat Restoration	1998 - 99	CBFWCP Fisheries Strategic Plan	Ongoing
Deer Lake Ungulate Winter Range Enhancement	1998 - 99	Small Works Program	Ongoing
Bighorn Pasture Ungulate Winter Range Enhancement	1998 - 99		
Kimberley Airport Slough	2000 - 2001		
McGinty Lake Enhancement	2001 - 2002		
UPPER KOOTENAY			
Fish Projects			
Cooperative Montana Studies	1997 - 98		
Koocanusa Creel	1996 - 97		
Kootenay Lake South Arm Burbot	1996 - 98		
Aberfeldie & Elko Aquatic Inventory	1996		
Koocanusa Kokanee Survey	1996 - 2001		
Koocanusa Reservoir Kokanee Spawner Counts	1996 - 2000		
Upper Kootenay River Bull Trout Radio Telemetry	1998 - 2002		
Status of Columbia Basin Chiselmouth	1998 - 99		
Columbia Lake Burbot Population Estimate & Juvenile Densities	2002 - 03		

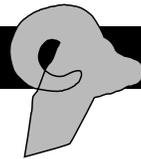
Glossary

Columbia Basin

**FISH & WILDLIFE
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Apthona nigriscutis

One of several insects approved for release in North America in 1989 and widely used in Western Canada, lays its eggs on leafy spurge. The larva feeds on the spurge's roots and kills the weed.

Arrow Lakes Reservoir

Created in 1968, the Arrow Lakes Reservoir was formed from two natural lakes—Upper Arrow and Lower Arrow—and has a surface area of 51,600 ha with water storage capabilities of 8.8 trillion m³. Water levels are maintained between 420 – 440 m. The water flow is regulated between the Revelstoke Dam and Hugh Keenleyside Dam.

Badger, American (East Kootenay)

A predominantly nocturnal, secretive animal that spends daylight hours underground, the badger is poorly understood because of the inherent difficulty in collecting information on the species. *Taridea taxus jeffersonii* is one of four subspecies of the North American badger and its BC range is limited strictly to the Southern Interior and the southern part of the Cariboo region.

The badger's body and other physical characteristics have moulded uniquely to its fossorial (adapted to digging) existence: a stout, compact animal, built low to the ground; very muscular forelegs and long curved claws up to five cm long; toes partially webbed to remove loose soil; and a body nearly as wide as it is long allowing greater maneuverability underground.

The badger breeds May – August but implantation is delayed until January or February. The female gives birth to an average of two young in March/April after an eight-week gestation period. The delayed implantation, a unique characteristic of only several mammals including the black bear, helps synchronize birth with maximum food availability to enhance their survival rate. Females breed very early, occasionally having young before they are two years old.

Badger populations are composed of two kinds of individuals: adults with established home ranges that shrink and expand seasonally; and juveniles without permanent homes that sometimes travel long distances as they disperse from their natal area. Home ranges of East Kootenay badgers overlap, averaging in size of 475 km² for males and 46 km² for females. Their preferred habitat is treeless areas such as grasslands, cultivated fields, cutblocks and open forests. They use a series of dens throughout their home range, usually moving to a different den daily. About 70% of the dens used were previously dug.

The badger is an efficient predator of fossorial prey, such as ground squirrels, which make up most of their diet. They are opportunistic feeders and supplement their diets with a wide range of mammals, birds, eggs, reptiles, amphibians and invertebrates. This allows them to adjust to seasonal availability. As well, badgers are physiologically and behaviorally adapted to

deal with food shortages and cold temperatures. They can reduce heat loss and limit energy expenditure by remaining inactive within the den during the coldest periods. While badgers have few natural enemies, their populations are particularly sensitive to human-caused mortality. Roadkills, human intolerance and accidental capture in traps set for coyotes can account for 90% of badger deaths in some populations.

Bio-agent

An insect (or microorganism) introduced in a controlled setting to help manage or eliminate a specific species (e.g. Leafy Spurge or Purple Loosestrife) where other control mechanisms such as herbicides are ineffective or environmentally unsafe.

Biodiversity

The variety, distribution and abundance of different plants, animals and microorganisms relative to the ecological functions they perform within a specific area or region.

Bioterrain Map

A map of the physical/geographical characteristics of a region combined with data that is relevant to wildlife habitat, including soil moisture conditions and vegetation.

Black Bear

The American Black Bear currently occupies about 85% of its historical range and has been eliminated from most of the more southerly regions of all provinces, primarily through human encroachment. *Ursus americanus* requires a mixed forest habitat with a variety of tree and shrub species of varying ages. While mainly vegetarians, they are also scavengers and attracted to carrion which they can scent up to a mile away. Black bears have the lowest reproductive rates of any land mammal in North America—with the possible exception of the muskox. They have several remarkable characteristics: while they mate in midsummer, the fertilized eggs remain unattached to the female's uterus until fall and their minimum body weight in preparation for hibernation is attained. The cubs are born late December to early February which the mother nurtures without having consumed any food for up to five months.

Blue-Listed Species

A vulnerable fish or animal that is particularly sensitive to human activities or natural events, and:

- a) populations have recovered or increased to a point where extinction is unlikely as long as currently available habitat is preserved or managed;
- b) populations have experienced no evidence of a decrease for the last three-to-five years;

- c) populations are so low that the species is uncommon within its range or confined to a small geographic area;
- d) the species' habitat requires protection and other activities in the area are regulated.

Brood Stock Collection

The capture of adult fish to obtain eggs and milt, primarily used in hatcheries to increase fish production.

Bull Trout

Bull trout (*Salvelinus confluentus*) are members of the char family and have recently been classified as a separate species from Dolly Varden. Found in lakes and streams throughout the upper and lower Columbia and Kootenay systems, bull trout are identified by a dusky-coloured dorsal fin without bold black marks and the spots on the trout's sides are not surrounded by light haloes. The fish is a sub-surface feeder with kokanee as its primary food source. Bull trout mature slowly and often reach five-seven years of age before beginning to spawn. They can live for more than 20 years and can reach a size of 13.5 kg.

Burbot

Lota lota is a member of the codfish family and recognized by its long body, elongated dorsal and anal fins, and a single barbel on the tip of the chin. Burbot, which grow up to 100 cm, are found in large lakes and rivers throughout the Columbia River Basin. The primary food sources for larger burbot include kokanee and other small fish, as well as aquatic insect larvae and mysis shrimp. The burbot, also known as ling cod, spawns in February at nighttime under the ice in shallow bays or in streams. A number of burbot will mill together to form a large ball which may stay together for several minutes. A sport fish, the burbot's liver contains oil comparable to salt-water cod in vitamin richness.

Canopy

A layer of foliage in a forest stand, most often referring to the uppermost layer of foliage, but the term can be used to describe lower layers in a multi-storied stand. It includes above ground leaves, branches and vegetation that provide shade and cover for fish and wildlife.

Conserve

To manage human use of living (animals, plants) and non-living (e.g. soils, nutrients) resources within an ecosystem in an attempt to restore, enhance, protect and sustain the quality and quantity of a desired mix of species and ecosystem conditions for present and future generations.

Creel Survey

The collection of data specific to the number of fish caught by sport fishers on a particular stream or in a particular area such as the Arrow Lakes Reservoir.

Drawdown

The controlled limited drainage of a body of water such as a marsh to improve wildlife habitat and food values. Drawdowns are also used as a method of flood control in reservoirs.

Duncan Dam

Built in 1967 and the first of three BC Hydro Columbia River Treaty dams, Duncan Dam is located 42 km north of Kaslo. The 40-meter high structure created a 45 km long reservoir with a surface area of 7,150 ha that holds 1.7 trillion m³ of water.

Duncan/Lardeau Property

A 200 ha parcel of property in the Meadow Creek area purchased by CBFWCP in 1998 to be enhanced for its wildlife values. The property is adjacent to eight similar and inter-connected properties in the area which together form corridors for traveling wildlife.

Enhance

To heighten specific environmental values of a habitat or ecosystem by management intervention to reduce the severity of undesirable impacts.

Escapement

The number of adult fish that return to their spawning grounds in a given period of time.

Extirpation

The elimination or disappearance of a species or subspecies from a particular area, but not from its entire range.

Fauna

All of the animal life found in a specific region, e.g. Columbia Basin.

Fertilization

Adding nutrients, usually phosphorus and nitrogen, to a body of water that are essential to the growth and well being of its living organisms.

Fish Technical Committee

Comprised of four members, two each from Water Land and Air Protection and BC Hydro, this committee is responsible for the review, evaluation and recommendation of fisheries-related projects submitted to CBFWCP.

Fry

The second developmental stage of young salmon and trout. During this stage, the fry is usually less than one year old, has absorbed its yolk sac and is rearing in the stream. The main stages of development are: egg, fry, juvenile and adult, which is when sexual maturity has been reached.

Gerrard Rainbow Trout

A strain of rainbow trout (*Oncorhynchus mykiss*) native to the Columbia Basin system, the adult Gerrard are primarily lake dwellers and not normally found in rivers or streams, except during spawning. A slow growing fish, the Gerrard matures later than most rainbow strains and can live for up to 20 years. It feeds

mainly on kokanee salmon which helps account for the size of up to 16 kg that this popular sport fish can achieve. Gerrard trout over 4.5 kg consume around 200 kokanee per year. A lake with 3000 Gerrard rainbow trout would eat about 600,000 kokanee annually. The Gerrard rainbow trout spawn only in the Lardeau River system.

Girdling

A wildlife enhancement technique used for: creating food for browsing ungulates by stimulating suckering (creation of new growth) of favourable browse from shrubs; and creating habitat in trees for cavity-nesting birds and small mammals.

Grizzly Bear

The Grizzly Bear is a subspecies of the Brown Bear which also includes the Kodiak Bear. *Ursus arctos horribilis* are slow-growing, long-living (20 – 25 years) with low reproductive rates averaging 2 cubs per litter every 3 – 6 years. Females can grow up to 280 kg (640 lb) while males can achieve sizes of 500 kg (1150 lb) depending on the food supply within their range. Grizzlies have only six months to obtain sufficient food to last a full year. Pregnant females have less time because they den earlier and exit later. The species have relatively short stomachs. Consumed food passes rapidly through their systems resulting in a high rate of food consumption. In fact, starting around mid July, grizzlies feed 20 hours a day and consume more than 20,000 kcal (1 kcal = 1,000 calories) a day in preparation for hibernation. Grizzlies compete directly—and often aggressively—with humans for food and space which greatly affects their nutritional levels and survival.

While population densities vary based on abundance and distribution of food, Glacier National Park has a density of 1:28 km², which is considered average. Contrary to popular belief, grizzlies have good eyesight. As well, their hearing is excellent and their sense of smell is superb. Grizzlies are omnivores and their movement patterns within their range is determined by the quality of their food supply at different times of the year. For example, moose and caribou are a main source of their diet, but primarily in the spring when yearlings and winter-starved ungulates are most vulnerable. While they adapt slowly to changes in their environment, grizzlies can, if given time, adapt behaviorally to altered habitat.

Habitat Complexing

The application of logs, rocks and/or vegetation to enhance stream habitat for fish. For example, boulders that change the water-flow patterns and offer fish shelter are said to add complexity. Primarily, this allows for better spawning and rearing habitat as well as providing cover for fish.

Hibernaculum

The hibernating habitat for bats, typically found in abandoned mines, abandoned buildings and similar enclosures.

Home Range

The area that an animal traverses in the scope of normal activities, such as feeding. For example, the home range of a male badger in the East Kootenay area can be 500 km², typically much larger than the home range of badgers studied in the US.

Hugh Keenleyside Dam

Hugh Keenleyside Dam, located eight km east of Castlegar, controls a drainage area of 22,560 km² in the Arrow Lakes Reservoir extending 232 km north to Revelstoke. The dam, 52 m high and 853 m long, includes a navigation lock providing passage for river traffic.

Hybridization

The process of interbreeding between two different species, such as yellowfin rainbow trout with other rainbow trout species, either in the wild or under artificial conditions.

Kinbasket Reservoir

Created as a result of the Mica Dam and generating station, this 216 km long water storage reservoir can see its water level decrease/increase by up to 24 m; with a surface area of 42,500 ha from 754 m in late summer to 730 m in April.

Knapweed

Introduced from Eurasia in the early 1900's and with no natural enemies or parasites, Knapweed spread rapidly across BC and became well established in this area over the past three decades. Both types of the weed, Diffuse and Spotted, are present in the Columbia Basin. **Diffuse Knapweed** is recognizable by its white (sometimes pink or purple) urn-shaped flower surrounded by yellowish green bracts with narrow stiff spines. **Spotted Knapweed** has pink to purple flowers with a black-tipped fringe, giving the flowerhead a spotted appearance. Both types contain volatile oils which have an extremely bitter, non-poisonous taste.

Both species invade grassland sites and outcompete all native vegetation. As well as severely reducing the grasses and herbs which are the food supply of domestic animals, knapweed encroachment can also destroy wildlife forage resulting in significant declines in deer and elk populations. Over 40,000 hectares (100,000 acres) in BC are currently infested, potentially reducing forage by up to 90% in some areas.

Successful long-term control requires a combination of proper grazing management, judicious herbicide use, bio-agent control and a high level of public awareness and responsibility. While these plants are highly resistant to most herbicides, several insects have proven effective including seed-reducing flies and moths, and a root-feeding beetle.

Kokanee

Sockeye salmon that became landlocked in BC lakes after the last ice age and adapted to their freshwater habitat, kokanee (*Oncorhynchus nerka*) occupy open waters at intermediate depths. While their primary food source is zooplankton and

phytoplankton, kokanee will also eat insects and mysid shrimp. Kokanee have retained many of the biological and instinctive characteristics of their sockeye ancestors. After four to five years in the lake, red-flanked adult salmon will return to their spawning stream in the fall, lay and fertilize their eggs, and then die. The kokanee, which can grow to 4.5 kg, is a popular sport fish but serves a more important function as the main food source for other fish species including adult bull trout, Gerrard Rainbow Trout and white sturgeon.

Koocanusa Reservoir

Formed by the Libby Dam in Montana as part of the Canada/US Columbia River Treaty, this reservoir is 145 km long, with the upper 68 km located in BC. Water levels are controlled by the Libby Dam at Libby, Montana, 77 km south of the BC border. The dam, constructed and operated by the US Army Corps of Engineers, is owned by the US government.

Leafy Spurge

A perennial, hardy weed that spreads by seeds as well as buds on persistent, creeping roots, leafy spurge is an aggressive competitor with no natural enemies. The weed grows quickly in clumps, forming dense and extensive stands. A nonindigenous plant, leafy spurge has spread from Pacific northwest states into the grasslands and open forests of the southern BC interior, including the East Kootenay and Boundary regions. All parts of the plant contain a milky-coloured latex juice that can poison livestock and cause skin irritations on humans. Herbicides are ineffective in controlling leafy spurge. The best control methods involve using approved Euroasian bio-agents, specifically several subspecies of flea-beetles and moths.

Lewis's Woodpecker

While the Lewis's woodpecker ranges throughout Southern BC, Bull Mountain is one of the only known local wintering habitat sites in Western Canada. *Melanerpes lewis*, which can grow to 29 cm from beak to tail, is identifiable by the extensive pinkish red belly (the only North America woodpecker with this colour) and wide black wings. The preferred habitat of the Lewis's woodpecker is open ponderosa pine forest, scattered or logged forests and river groves.

Limnology

The study of aquatic ecology or interactions between aquatic organisms and their physical and chemical environments.

Mica Dam

The largest of the three Columbia River Treaty hydroelectric developments, Mica rises 200 m above the riverbed and is an earthfill structure made up of 33 million m³ of gravel, sand, rock and glacial till. The dam, in operation since 1973, impounds the Kinbasket Reservoir as well as regulates water flow into Revelstoke Reservoir.

Mitigate

To reduce the severity of impacts on fish or wildlife habitat.

Moose

Alces alces is the largest member of the deer family and one of the largest land mammals in North America. Males can weigh up to 595 kg and females 418 kg. The life cycle of the moose begins with rutting season from early September to late November. After a gestation period of eight months, females typically give birth to one calf, although two is not uncommon, in late May or June. The pregnant female seeks seclusion as birth time approaches and will aggressively drive away her young from the previous year to devote her attention to the new calf. The newborn calf is licked copiously and regularly, establishing a strong cow-calf bond. Moose calves receive a substantial proportion of their food from their mother's milk until fall.

There are four subspecies of moose including the Columbia Basin's Shira's moose (*Alces alces shirasi*). They are solitary animals and keep to a small home range of 5 – 10 km². While moose are not territorial, cows are very aggressive to one another during the rut, in contrast to other antlered species.

Moose are a very hardy and adaptable species, evident in that they winter successfully in some of the coldest regions of the world. They will adapt to a variety of available forage, but their preference are early succession plants found in new growth areas after fires and logging, willow, forbs and aquatic plants.

The primary limiting factor of moose populations is good habitat. Their winter mortality is related to snow depth, density, hardness and the duration of these factors. As well as restricting forage, deep snow leaves moose snowbound and vulnerable to wolf predation. Other mortality causes include: bear predation on calves in spring; competition for forage with deer, elk and livestock; and collisions with vehicles and trains.

Mountain Caribou

Rangifer tarandus caribou is a member of the deer family. Caribou are unique in that both the male and females have antlers. Nonpregnant females shed their antlers in March or April, while pregnant females will shed their antlers at the time of calving. Breeding occurs during a one-week period between mid to late October and, after a gestation of 228 days, 90% of the females will give birth to a single calf within a 10-day period.

Caribou's reproduction rate is low while the mortality rate is high. While calves are able to follow their mothers around within one hour after birth, they are highly vulnerable to predation. Calf mortality can exceed 90% where there are high densities of wolves and/or grizzlies. As well as predation, calves are susceptible to wind chill and starvation.

Caribou are highly adapted to their environment and adaptable to a changing environment. They eat a wider variety of plants than other deer species, but prefer green vascular plants, mushrooms, grasses, sedges and cottongrass. In winter when the snow crust will support their weight, caribou will shift from open habitats to forest

cover seeking arboreal lichens growing on coniferous trees. As well, they can smell food buried under snow up to 18 cm. Ideal winter feeding conditions include: irregular terrain with variable snow depths; habitat with three vegetation strata—ground, shrubs and well-spaced trees; and shallow, hard snow.

Mule Deer

The populations of Rocky Mountain Mule Deer (*Odocoileus hemionus hemionus*) is larger than all 11 mule deer subspecies in North America combined. Remarkably adaptable, this mule deer is migratory and will travel 80 km or more from summer to winter ranges. They breed in November-December and will typically bear two fawns in June which minimizes fawn exposure to late spring or early fall snowstorms.

Mule deer capitalize on abundant and nutritious forage in summer and fall for growth and weight gain, and minimize intake and expenditure in winter when energy costs are high and forage is poor. They store fat rapidly from April to October, but deplete most of it by December and reach a low weight in March. Females gain and lose weight more slowly and reach their low weight in May. The survival of mule deer is a matter of enduring very long periods of inadequate forage, an environment they have evolved in and adapted to in North America. Intermediate feeders rather than browsers, mule deer consume a wide range of forage types in a wide range of climatic conditions. Major causes of population declines are: human encroachment in deer habitat; predation, forest fire suppression, forest encroachment, excessive hunting, and collision with vehicles.

Mysids Shrimp

An exotic shrimp introduced into Kootenay Lake from Upper Waterton Lake (Alberta) in 1949 as a supplementary food source for intermediate-sized rainbow trout and in Arrow Lakes Reservoir in 1968 for young fish-eating trout. Instead, *Mysis relicta* became an efficient competitor with kokanee for zooplankton. However, mysids are an important food source for white sturgeon and burbot.

Nestbox

Constructed with 25.4 mm cedar, these new custom-built homes for tree cavity-nesting ducks are placed in cottonwood and aspen trees seven to ten metres off the ground. Six species of cavity-nesting ducks use these nestboxes. While there are good stands of cottonwood and aspen trees—the ducks' preferred nesting sites—in their wetland habitat, there are not enough natural tree cavities to support the total populations' needs.

Nitrogen

A colourless, tasteless, odourless gaseous element which makes up 78% of earth's atmosphere, nitrogen is an essential component of proteins and nucleic acids required by all living organisms. In the aquatic food chain, nitrogen enters lakes through

the air as nitrates where it is converted to complex organic compounds by bacterial action and absorbed by drifting microscopic plants called phytoplankton. Phytoplankton is consumed by zooplankton which, in turn is eaten by mysid shrimp and kokanee salmon. These salmon are the main food source of bull trout and Gerrard Rainbow Trout. When aquatic living organisms die and decay, the complex organic compounds are reduced to nitrates again to complete the nitrogen cycle.

If lakes don't have adequate water flows and circulation, the nitrates settle on the bottom where they are locked in and effectively removed from the nitrogen cycle and the food chain. This reduces the abundance of phytoplankton and the domino effect can contribute to declines in kokanee populations and sizes.

Northern Leopard Frog

Once a very common species in southern BC and northwestern US, and a favourite specimen in high school biology experiments, their populations have been decimated by several causes including: diseases believed to be related to environmental stress, habitat loss, and increase in ultraviolet light exposure resulting from a thinning ozone layer. The preferred habitat of *Rana pipiens* is marshes, wet meadows, river banks and moist, open woods.

Northern Long-Eared Bat

One of the rarest bats in BC, two of only three known locations are in the Revelstoke area. It's diverse diet includes caddisflies, moths, beetles, flies and leafhoppers. *Myotis septentrionalis* hibernate alone in caves and abandoned mine tunnels. They has small maternity colonies of up to 30 individuals and females produce a single young in late June to early July.

Nutrient Levels

The amount of nutrients, particularly phosphorus and nitrogen, found in water bodies that contribute to the overall health of these ecosystems.

Oligotrophic

Waters that are poor in dissolved nutrients, have low photosynthetic productivity, and are rich in dissolved oxygen at all depths.

Painted Turtle

The only fresh water turtle native to BC, *Chrysemys picta* is found in southern parts of Canada and is blue-listed in many parts of the Columbia Basin. Its name comes from the bright red and yellow markings on a black or greenish brown flat shell and distinctive yellow stripes on the head and neck. Painted turtles are small: only 6 to 25 cm with the female growing larger than the male.

The painted turtle breathes by forcing air in and out of its lungs by alternately contracting the flank and shoulder muscles. It can't expand its chest to breathe because the ribs are fused to the shell. The turtle prefers quiet, shallow, thickly-planted freshwater with a muddy bottom. It's main diet includes worms, minnows and aquatic insects.

Painted turtles mate in the spring. In June to early July the females travel from the water to their nesting areas where they lay 5 to 15 oval, soft-shelled eggs in a flask-shaped hole they dig with their hind legs. The eggs hatch in about 10 weeks. Lacking sex chromosomes, the sex of painted turtles is determined by temperature during incubation. Low temperatures make males and high temperatures produce females. Hatchlings face heavy predation from ravens, gulls and Great Blue Herons from the time they leave the nest. Quick movements, a good sense of smell and colour vision are their defenses against predators.

To rid themselves of parasitic leeches, the turtles bask in the sun on rocks, stumps or trees partially submerged in water, often in large groups. Under stressful conditions in captivity they can produce Salmonella.

Paleolimnology

The study of the physical properties of freshwater lakes in prehistoric times, specifically Upper Arrow Lakes Reservoir geochemistry (nitrogen, carbon and phosphorus) conditions, algae evolution and fossil zooplankton.

Partnering

The synergistic affect from pooling of resources to work together toward a common goal. This reduces duplication of effort, helps ensure that the appropriate level of resources are available. The savings in time, money and expertise can then be reinvested into other projects.

Phytoplankton

A microscopic plant life that are an important source of food for zooplankton, which are, in turn, food for kokanee and mysid shrimp. Fertilization projects underway in Kootenay Lake and the Arrow Lakes Reservoir are adding nitrogen and phosphorus to these water systems to produce healthy levels of phytoplankton to stimulate the food chain.

Phosphorus

An allotropic (element that can exist in two or more forms, e.g. diamonds and graphite are allotropes of carbon) nonmetallic element in phosphates, phosphorus is a nutrient required by all living organisms. Phosphates occur naturally in the different strata of rocks throughout the earth including under bodies of water such as lakes. In the aquatic food chain, phosphates are leached into the water where it is converted by bacteria into the complex organic compound phosphorus and absorbed by phytoplankton (drifting microscopic plants).

Phytoplankton is consumed by zooplankton which, in turn is eaten by mysid shrimp and kokanee salmon. These salmon are the main food source of bull trout and Gerrard rainbow trout. When aquatic living organisms die and decay, the complex organic compounds are reduced to phosphates again to complete the cycle.

Some phosphates settle on the bottom where they are locked in and effectively removed from the food chain. This reduces the abundance of phytoplankton and the domino effect can contribute to declines in kokanee populations and sizes.

Prescribed Burn

The planned use of carefully controlled fire for habitat enhancement. Prescribed burns are commonly used to prepare a site for planting, create a better quality browse for wildlife, manage a fire hazard and reduce pest problems. The timing of the burn is determined by a combination of conditions including weather, fuel moisture, soil moisture and relative humidity to ensure the fire is confined to the planned area. For example, the Saddle Pasture prescribed burn took nearly two years to implement because of unacceptable weather conditions.

Productivity

The gain in weight which the total number of a species in a specified area (e.g. kokanee in Kootenay Lake), or the total number of all living organisms in a specified area, accumulates in a given period of time.

Protect

To manage the conservation of ecosystems, habitat or species by management intervention.

Protection Projects

Improvements to habitats to ensure the preservation of resident fish and wildlife populations.

Public Involvement Process

An important focus of the Program where residents and interested groups are encouraged to submit specific projects in which they will participate and that will protect or enhance fish, wildlife or their habitats in the Columbia Basin.

Purple Loosestrife

Accidentally introduced to North America from Europe in the 1800's, purple loosestrife has made a slow relentless invasion of wetlands across Canada. While the weed prefers wetlands, it is as devastatingly effective in dryland habitats. Each plant can produce up to 2.7 million seeds a year. Growing up to 2 m high with square woody stocks, a colony of purple loosestrife forces wildlife to consume native vegetation around the weed, creating more space for new loosestrife to grow. Pulling and digging the plants by hand, a labour-intensive exercise, is still one of the most effective ways of dealing with the infestation problem.

Rearing Habitat

Areas in rivers or streams where juvenile salmon and trout find food and shelter to live and grow.

Red-Listed Species

An endangered or threatened fish or animal facing imminent extinction or extirpation (no longer live in the wild in BC but do live elsewhere) if certain factors are not reversed. These factors include: very few native populations exist; and remaining populations are declining drastically due to habitat loss, excessive harvest, natural catastrophes, environmental stresses or other factors caused by human activities such as pollutants. The criteria include:

- a) the number of offspring that survive to an age where they can reproduce is only marginally higher or lower than the number of offspring that die during the same time period;
- b) habitat essential to the species' survival is adequately protected for the foreseeable future through management and preservation;
- c) the population is stable or increasing but their numbers are still very small;
- d) captive or cultivated stock may have to be used if the remaining population isn't large enough to reproduce sufficient numbers of offspring; and
- e) the factors causing the species' decline are still evident.

Rehabilitate

To restore the functions and processes of a degraded ecosystem or habitat to an effective state rather than an original state.

Restore

To return ecosystems or habitats to their original structure and species composition.

Revelstoke Dam

Located about five km north of Revelstoke, the dam created a reservoir 130 km long extending back to Mica Dam and has a surface area of 11,534 hectares. The dam is a 175 m high concrete gravity structure with a 122 m high earthfill dam.

Riparian zone

The area of land from the shoreline of a river or lake to roughly 30 – 60 m inland. This habitat supports a wide variety of species dependent on water systems including raptors.

Although riparian areas make up only a small fraction of land, they are among the most productive and valuable of all landscapes. These areas act as a buffer and filter to maintain water quality and provide forage, shelter and habitat to both wildlife and livestock.

Rocky Mountain Bighorn Sheep

One of three types of mountain sheep in North America, the Rocky Mountain bighorn sheep is the largest with the ram weighing up to 143 kg and the ewe 91 kg. Few animals are as well adapted to extremes of elevation and temperature. Their preferred range is rocky escape terrain in close proximity to open stands of their preferred food: grasses, sedges and shrubs. Browse vegetation are important foods during fall and winter. The sheep is also attracted to natural and artificial salt licks,

particularly during spring and early summer, to correct a sodium imbalance caused by high intakes of potassium and water from new spring forage.

R.M. bighorn sheep are highly social animals that are separated into two groups: nursery bands of ewes, lambs and subadults that stay on smaller nursery ranges; and ram bands comprised of males three years old and older that forage away from the nursery range and travel great distances to known feeding ranges. These two groups come together to rut in November/December and again in the spring as sprouting vegetation appears.

The total population of all R.M. bighorn sheep in North America numbers less than 25,000, with over 1,400 in BC. Competition with livestock for food and parasites/diseases contracted from livestock are major causes for this sheep's decline. Pneumonia caused by Lungworm, one of 51 strains of parasites and diseases they contract from livestock, have been known to decimate herds particularly in overprotected and overcrowded ranges.

Sharp-tailed Grouse

While still fairly common inland in the northwestern US and Western Canada, the columbia subspecies of the sharp-tail grouse has been on the decline and is blue-listed in the Columbia Basin. A pale and speckled brown grouse, *Tympamuchus phasianellus columbianus* can be recognized by its short pointed tail which shows white at the sides when in flight. The displaying male inflates purplish neck sacs. The preferred habitat of sharp-tail grouse includes prairie, clearings, open burns in coniferous forests, forest edges and bushy groves.

Silviculture

The science and practice of controlling the establishment, growth, composition, health and diversity of forests and woodlands. Silviculture entails the manipulation of forest and woodland vegetation in stands and on landscapes.

Spawning Channel

A man-made 'tributary' that simulates habitat conditions fish need to spawn naturally. This includes streamside vegetation and gravel beds at a uniform width and depth with pockets of deeper pools. A channel is constructed according to the species' requirements and their projected numbers. For example, the Hill Creek spawning channel is 3.2 km long and designed to accommodate 100,000 kokanee requiring .5 m² of space for each fish.

The survival rate of fry and eggs are substantially higher in man-made channels than natural tributaries. Kokanee have a five percent survival rate in natural spawning tributaries, but 30% – 60% survival in the spawning channel.

Species

A biologically distinct population of animal, plant or organism, other than bacteria or virus, that is wild to nature and is native to BC or has extended its range into BC without human intervention and has been present here for at least 50 years.

Stand Management Prescription

A site-specific operational plan describing the nature and extent of silviculture activities planned for a free-growing stand of trees for specified social, economic and environmental results.

Sustain

To maintain desired levels of ecological processes and functions, biological diversity and productivity of an ecosystem over the long term.

Tagging

CBFWCP biologists use a variety of radio-tagging methods to gather information in fish and wildlife projects. These include radio telemetry collars on wolverines, implants in bull trout and “fanny packs” on Northern leopard frogs. Tagging is used to study the movement, migration, habitat requirements and other behavioral characteristics of a species very accurately and cost effectively.

Telemetry

The tracking of subjects using radio transmitters and receivers, often by plane or satellite. The radio transmitters can be in the form of collars (on animals) or implants (in fish).

Townsend's Big-eared Bat

The maternal colony in the Saint Eugene Mission on the St. Mary's Band Reserve represents 25% of all known Townsend's Big-eared bats in Canada. Unlike many bat species which travel great distances to hibernate, *Plecotus townsendii* travel only about 40 km between maternity roosts and hibernacula (hibernating roost). Also known as the Lump-nosed bat and Western big-eared bat, they are identified by enormous ears almost one-half its body length. These bats feed primarily on small moths and grows to only 12 grams—little more than the weight of a loonie. A single pup is born in July and is flying within three weeks.

Ungulates

Hoofed, grazing mammals, which have antlers and four-chamber stomachs. In the Columbia Basin, these include deer, elk, bighorn sheep, moose, mountain goat and caribou.

Wetlands

Areas of land inundated by surface water and groundwater supporting vegetative or aquatic life that require saturated or seasonally saturated soil conditions for growth and reproduction. There are five wetland classes: bogs, fens, marshes, swamps and shallow open waters.

Wildlife Technical Committee

Comprised of five members, three from the Ministry of Water, Land & Air Protection and two from BC Hydro, this committee is responsible for the review, evaluation and recommendation of wildlife-related projects submitted to CBFWCP.

Wolverine

Solitary, secretive animals that live primarily in boreal forests and tundra areas, wolverines typically occupy back country or wilderness areas that have little human activity or development. *Gulo gulo* have few natural enemies and are very well suited for the environment in which they live. They have exceptional stamina and can cover great distances in a relatively short time period. Wolverine can withstand severe cold, exhibit keen senses of hearing and smell, have a caching instinct and can defend a food source from larger predators. Their extremely strong teeth and jaws can crush bones of an adult moose. While wolverines have poor eyesight, their acute sense of smell can locate carrion buried under 200 cm of snow. Their average weight is 10 – 17 kg for males and 7 – 14 kg for females.

Wolverines breed during early summer and carry the dormant unimplanted embryo until the following December or January when implantation occurs. Litters are 2 – 3 kits with each weighing an average of 84 g when born. At one per 150 – 200 km², wolverine population densities are low compared to other carnivores. Their home range sizes are large, averaging one every 535 km². Like many carnivores, their density and home range is related to the abundance and availability of food. An opportunistic feeder, wolverines are capable predators and efficient scavengers. Carrion is a major food source, particularly moose, elk, caribou and deer. They are also successful predators of small animals including grouse, ptarmigan, voles, mice and squirrels. Primarily nocturnal animals, wolverines are active year round and don't migrate from their home range.

Yellow Fin Rainbow Trout

The Arrow Lakes traditionally supported a trophy rainbow trout fishery for the piscivorous (fish-eating) yellow fin rainbow trout. These fish were large (up to 14 kg) with a yellow-orange colour on their bellies and pectoral, pelvic and anal fins. The flooding of the lakes almost completely eradicated this stock and few of these fish were caught between the mid-seventies and early eighties. Earlier attempts to preserve and enhance this population by collecting brood stock had some success. However, this method was very labour-intensive and insufficient numbers of adults were found and collected to help the yellow fin make a comeback.

Yellow-Listed Species

Any indigenous species or subspecies in BC that are not at risk, but may be vulnerable during times of seasonal concentration.

Zooplankton

Drifting or floating microscopic animals found at various depths in lakes, rivers and seas. Zooplankton is the primary food source for kokanee and mysid shrimp.

Project Application Information

The deadline for Large Project Applications (\$10,000 or more) is October 1.

Small Project Applications (less than \$10,000) can be submitted anytime during the project year.

Applicants are encouraged to involve CBFWCP biologists or the appropriate representative in preparing their project applications for submission.

Columbia Basin

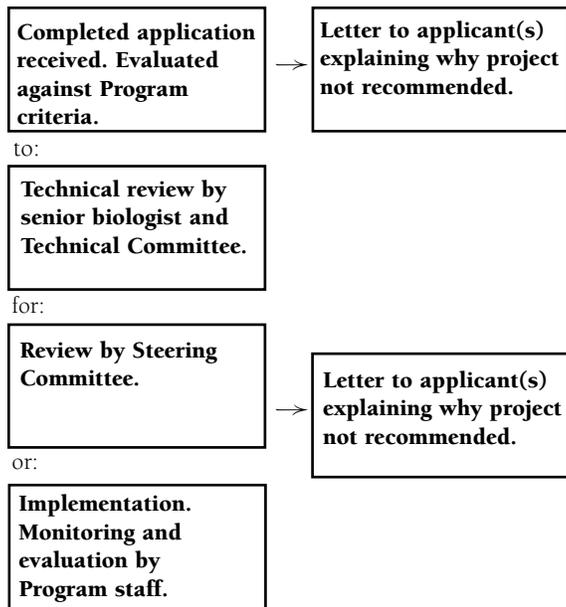
FISH & WILDLIFE Compensation Program

www.cbfishwildlife.org

PROJECT INFORMATION

HOW ARE PROJECTS SELECTED?

Project applications are reviewed by various individuals and committees to ensure that they are cost effective, achievable, biologically appropriate and socially desirable. The following flow-chart illustrates the process.



The final project review and selection is made by the Steering Committee, which is also responsible for the overall direction of the Program. Members of the Steering Committee are:

Government of British Columbia

Wayne Stetski – Co-chair, MWLAP (Cranbrook)
 Jamie Alley, MWLAP (Victoria)

BC Hydro

Kevin Conlin – Co-chair (Burnaby)

Public Representatives*

Southwest Kootenays – Richard Spilker (Nelson)
 Ph.(250) 352-2660 Email: spilkr@direct.ca

Southeast Kootenays – Greg Mustard (Windermere)
 Ph./Fax (250) 342-3114 Email: mustard@rockies.net

First Nations Representative*

Ktunaxa-Kinbasket Tribal Council – Joe Nicholas (Windermere)
 Ph.(250) 342-6301 Email: akisqnuk@rockies.net

*You are encouraged to contact the nearest appropriate representative or Program biologist to discuss your project idea before submitting your application.

WHAT KINDS OF PROJECTS WILL NOT MEET CRITERIA?

The Compensation Program will support activities that complement and do not duplicate the work of other agencies and organizations, and will seek partnerships with other groups whenever possible.

The following activities are examples of unacceptable projects. Please ensure your project proposal does not include:

- construction of boat launches, recreational access and recreation sites
- debris clean-up on reservoirs
- ongoing administrative costs for interest groups or organizations
- compensation for individual losses resulting from hydroelectric development
- promotion of business opportunities

In addition, projects must conform with current resources management objectives and with established practices, legislation and policies (e.g. Wild Fish Policy).

Project evaluation is a three stage process involving a non-ranked set of required criteria, a ranked set of criteria applied by the Technical Committees and a non-ranked set of considerations applied by the Steering Committee. Members of the Technical Committees are:

Fish Technical Committee

Jeff Burrows – Chair, MWLAP (Nelson)
 Ken Ashley, BC Fisheries (Vancouver)
 David Wilson, BC Hydro (Burnaby)
 Gary Birch, BC Hydro (Castlegar)

Wildlife Technical Committee

Guy Woods – Chair, MWLAP (Nelson)
 Bob Forbes, MWLAP (Cranbrook)
 Glen Watts, MWLAP (Prince George)
 Ed Hill, BC Hydro (Burnaby)
 Alan Chan-McLeod, BC Hydro (Burnaby)

Communications Committee

Barry Bartlett, CBFWCP (Nelson)
 Bob Gammer, BC Hydro (Castlegar)
 Wayne Stetski, MWLAP (Cranbrook)

1. Introduction to the Program

The Program is a joint partnership of BC Hydro (BCH) and the Government of British Columbia. It was created to deliver and fund a variety of activities that help conserve and enhance fish and wildlife populations in the Canadian portion of the Columbia River system. Other activities will evolve from new proposals submitted by members of the public, the two partner agencies or other organizations. All ongoing and new projects are funded from the annual budget of approximately \$3.2 million (indexed for inflation).

The specific objectives of the Program are to:

- Enhance existing fish and wildlife habitat in areas affected by BC Hydro's hydroelectric developments in the Columbia River Basin. For example a project to improve spawning areas at the mouth of a fish-bearing stream that feeds into a reservoir.
- Enhance wildlife habitat in other areas of the Columbia Basin where the opportunity for on-site enhancement has been significantly reduced or eliminated by reservoir development. For example, a project to improve deer winter range similar to habitat lost due to flooding.

Projects will be considered for funding under this Program if they support one of the above objectives.

2. Small vs. Large Projects

There are two application processes for funding requests. A simplified process is available for small projects of \$10,000 or less (Small Project Application), and a more detailed application for over \$10,000. If you are unsure which application process is more suitable for your project idea, consult the local Program office (see addresses on last two pages in this handbook).

3. Submission Deadline and Format

There is only one intake of large project applications each year. All applications must be received by the deadline of **4:30 pm on October 1**. If October 1 is on a weekend, the deadline will move to the following Monday. Applicants should mail, courier, fax, e-mail or hand deliver one copy of the completed application package to the Nelson Program office.

As explained below, the application consists of two parts: a Project Summary & Budget form and a Project Outline (see #8 under Application Format). Both must be typed. Note that proposals that are incomplete, late or hand-written will not be considered.

4. Eligible Proponents and Projects

Project proponents may be individuals or organizations. The Program will support projects that complement and do not duplicate the work of other agencies and organizations, and that involve partnerships with other groups whenever possible.

In meeting the two broad objectives of the Program (see #1 above), projects may directly address habitat enhancement or they may indirectly address habitat and population issues. Four types of activities will be considered for funding by the Program:

- **inventory** and **assessment**, to describe the current situation. For example, conducting a population count of deer in a particular area and assessing their habitat.
- **design** and **planning**, to define how the current situation can be improved. For example, researching the habitat needs of deer, comparing these requirements with the results of a habitat assessment, and developing a plan to achieve improved habitat.
- **enhancement** or **restoration** activities.
- follow-up **evaluation** and **monitoring** to ensure goals are met.

5. Review Process

Applications are reviewed by Program staff and committees to ensure they are cost-effective, achievable, biologically appropriate and socially desirable. There are three steps to the review process:

- 1) Stage 1 – Acceptability
- 2) Stage 2 – Ranking
- 3) Stage 3 – Project Considerations

1. STAGE 1 – ACCEPTABILITY

Any project submitted to the Program must meet the following criteria before receiving further consideration:

- Consistent with Program objectives (as stated above)
- Consistent with BC government/BCH mandates and policies, and with regional fish and wildlife management goals
- Compatible with other resource management objectives
- Based on sound biological principles
- Located within the Program area. This includes most of the Columbia River Basin in Canada, extending from the Valemount area in the north to Grasmere in the southeast and Rossland in the southwest. Note that the Flathead, Kettle and Okanagan river drainages are not included in the Program area at this time. Refer to the map in this handbook for Program boundaries.

If a project is not recommended following Stage 1 review, a letter will be sent to the applicant explaining why.

2. STAGE 2 – RANKING

Proposals that meet the Stage 1 acceptability criteria are forwarded to the appropriate Technical Committee (fish or wildlife) for ranking based on the following criteria:

Contributes to conservation of indigenous species and wild stocks. This criterion is a major priority under the WLAP mandate and follows provincial policy. Secondary importance can be given to augmented or introduced stocks which satisfy angler demand, provided task actions do not impact wild stocks significantly and meet local WLAP management goals.

Protects or augments sensitive or valuable habitats.

This criterion provides support for those habitats which serve to protect wild stocks of both sport and nonsport species. It also provides secondary support for introduced or augmented, but valuable, angled and/or harvested stocks and their related habitats.

Improves or maintains local or regional species diversity.

This criterion serves to protect existing biodiversity, but also allows for non-wild stock enhancement in presently barren or depopulated habitats, particularly those which are isolated.

Includes ongoing/existing work requiring continuity.

Projects resulting in defensible habitat actions usually require a plan including background and design studies, construction plans and evaluation studies. This criterion recognizes the importance of this planning approach. It also recognizes that some projects may be staged in their planning and implementation while others must be continuous and going from planning to implementation in order to complete the project.

Involves restoration, rehabilitation or enhancement of habitat. Conservation, rehabilitation or enhancement which will protect or augment indigenous biodiversity receives the highest score. Secondary importance is given to habitat work which will contribute to the strength of sport fish stocks, including both wild and introduced species provided these projects meet local management goals.

Addresses a direct impact as a result of dam construction and inundation. This criterion recognizes that addressing water license requirements is a Program mandate and an objective of BC Hydro. Importance can, however, be given to off-site tasks (those outside the direct impact zone, but still within the Program area), especially where on-site opportunities are restricted. Such support is derived from the basin-wide mandate of the Program as dictated by the Steering Committee.

Adequate/logical background and planning has been completed. As task development nears completion within the Program, additional support should be provided to assure final construction and/or evaluation. In addition, tasks may come forward for which the necessary background work has been partially or fully completed outside the Program. Provided such tasks meet Stage 1 Acceptability Criteria (i.e. regarding transfer of liability) such tasks should be considered for priority approval.

Addresses an urgent requirement or threat to population maintenance and/or habitat protection. This criterion is included to provide extra support for those species or habitats which are undergoing unforeseen or unresolved dramatic alienation or decline in abundance, respectively. It is directed to both designated endangered species, as well as important sport species.

Cost effectiveness (benefit to cost or risk ratio) and value-added aspects. Higher scores are given to those tasks which show evidence of getting the most benefits for the budget provided.

Encourages a coordinated basin-wide approach either in terms of methodology, applicability of study results or the enhancement of habitat productivity. Tasks which only benefit isolated local needs receive less support, while those which benefit a wider geographic area or ecosystems within the Program area receive higher scores.

Ease of implementation. Project is easy to implement, and requiring a low staff commitment versus requiring significant staff commitment and coordination to implement.

Encourages innovation Project is innovative, incorporating/developing new techniques.

3. STAGE 3 – PROJECT CONSIDERATIONS

After the Technical Committees complete the Stage 2 ranking, recommended project applications are reviewed by the Program's Steering Committee (which includes representatives from the BC government and BCH, as well as public representatives). The following considerations are used by the Steering Committee to capture socio-economic and geographic values:

Consistency with the Program Strategic Plan. In order to ensure the Program fulfills its mandate and maintains the direction it sets for itself, projects must be consistent with the strategic plan directions and objectives.

Financial impact of the project on the total Program budget. The Program operates within the limits of a defined annual budget that funds four components of the Program, namely fish, wildlife, public communications and administration. Each project should be reviewed with an eye to how it affects the budget allocation within the individual components and between the components.

Timeline impact on the Program's ability to meet its mandate and/or public expectations. Delivery of projects may span one fiscal year, several fiscal years or be an ongoing requirement to meet project evaluation needs. Commitments to a multi-year or ongoing project need to be reviewed for their impact on the Program's ability to deliver other project work in future years, the contribution that project makes towards fulfilling the Program mandate and how it may impact public expectations of the Program.

Encourage the involvement of First Nations, community based groups and interested individuals. Does the project have direct involvement or potential for direct involvement? Are there volunteer and/or in-kind contributions from First Nations, community based groups or interested individuals? The level of direct involvement or in-kind contributions and the impact on project delivery and benefit to the resource is considered.

Other partners are involved in the project. While the Program encourages project partnerships, it is important that those partnerships are compatible with the goals of the Program. Projects should not divest agency or industry responsibilities to the Program. They should ensure that the commitment of those partnerships are clearly defined and do not impact on the ability of the Program to deliver projects in the future. This is of particular concern where multi-year project partnerships are proposed.

Opportunities provided to raise public awareness of and active support for the Program. Projects can provide varying degrees of opportunities to raise public awareness of both the Program and its partners. Such recognition can be dependent on project location, number and type of partnerships, scope of public exposure, timeliness, local versus international significance, etc.

Geographic distribution of projects throughout the Basin. The Program does strive to take a basin wide approach to project allocation and provide a balance of projects throughout the basin. It is recognized that distribution of projects also has to be weighed against priorities and benefits to the resource but it is expected that a wide distribution of projects across the basin occurs.

Meeting community and public values. Projects may meet a variety of community and public values in a direct or indirect way. Depending on the type of project, previously identified community priorities, public feedback received and level of community partnership involvement, public values may be taken into account.

Likelihood of the project moving from study to action. Does the initial study proposal indicate "next steps". Have there been previous studies done on the same project and did they lead to action?

A summary of previously approved projects for both fisheries and wildlife is available from any of the Program offices or on the Program website www.cbfishwildlife.org

6. Important Program Information

Proponents are encouraged to contact the nearest public representative and/or Program biologist to discuss project ideas prior to submitting an application. Refer to the last two pages of this handbook for contact information.

7. The Applicant's Responsibility

In addition to the work that the applicant proposes and agrees to do, there are two other important responsibilities applicants must be aware of and willing to undertake:

- once a project is accepted, adequate accident insurance and WCB coverage must be arranged for all people and activities involved for the duration of the project. This will be arranged in conjunction with the Program.
- to receive project funding, invoices accompanied by supporting documents, such as receipts, must be submitted to the Program office in Nelson. Note that funds not utilized by the project are retained by the Program.

8. Application Format

The application consists of two parts:

A. Project Summary and Budget (see form attached). This form is the cover sheet for the more detailed project outline described below.

B. Project Outline. The outline must include the following information. Please use the format and sequence outlined below.

1. Project Location

Indicate the location on a 1:50,000 map and provide a detailed, written description of the location including distances and directions from well-known features such as the nearest town, highway, body of water, etc.

2. Project Description and Rationale

Issue(s): describe why this project is necessary, what need or gap it fills, or what problem it addresses.

Describe the urgency/priority of this issue on a regional or provincial scale.

Objective(s): briefly describe the project's objectives, i.e. what is to be accomplished to address the problem/meet the purpose of the project. For example, explain how habitat will be enhanced and for what species, or how information from this project will be used to restore habitat/populations in question. Include a statement on social benefits.

Description of work: briefly describe the work to be done, include background information, enhancement activities, research techniques or educational initiatives. Mention any research used to develop the project. Describe the timelines for the project activities.

Measures of success: describe the measurable outcome of each activity, i.e. how the success of the project in meeting its objectives can be measured. E.g., number of hectares slashed, number of km of stream enhanced. These measures of success will be used to evaluate the overall success of the project.

Proposed future work: if it is anticipated that work on this project will extend beyond the fiscal year, outline the additional proposed phases including costs for each year. For example, ongoing maintenance costs.

3. Public Participation/Partners

The Program encourages the involvement of the public and the development of partnerships in funded projects. Describe how other partners (e.g., businesses, clubs, the general public, government agencies) are involved in the project and what resources they are contributing.

4. Credentials and Letters of Support

Provide information on the credentials of consulting companies that will be involved in the project. Letters of support may also be submitted, as well as confirmation of other contributors.

Reminder

**APPLICATION DEADLINE
OCTOBER 1st**

Columbia Basin

Fish & Wildlife Compensation Program

103 – 333 Victoria Street, Nelson, British Columbia V1L 4K3

Phone: (250) 352-6874 Fax: (250) 352-6178



LARGE PROJECT APPLICATION

Project Summary and Budget

Project Name _____

(Include a geographic name and a description of the nature of the project. E.g., Frenchman's Ridge Enhancement)

Project Description _____

(Provide a brief summary of project activities)

Project Sponsor (group or individual)

Name _____

Mailing address _____

Town _____

Postal Code _____

Phone _____ Fax _____ E-mail _____

Contact Person (if sponsor is group)

Name _____

Mailing address _____

Town _____

Postal Code _____

Phone _____ Fax _____ E-mail _____

Funding requested from the Program \$ _____

Project Budget

Project Name _____

Prepare a budget for the upcoming fiscal year. If the project involves more than one site, complete a budget for each site.

A. Expenditures

Services	No. Days/Hours	Daily/hourly rate	Total
Professional _____			
Administration _____			
Technical _____			
Unskilled _____			
			Total services \$ _____

Materials & Supplies

Office expenses..... \$ _____

Equipment rental..... \$ _____

Vehicle/boat rental..... \$ _____

Educational material (signs, brochures, etc.)..... \$ _____

Total materials & supplies \$ _____

A. Total Expenditures \$ _____

B. Project Funding (cash)

Other (not Program) cash contributions **confirmed** from:

_____ \$ _____

_____ \$ _____

_____ \$ _____

Total other cash contributions: \$ _____

Funding requested from the Program \$ _____

(Total expenditures minus total other cash contributions)

B. Total (other + Program) Cash Contributions \$ _____

C. Applicant's Contributions (in kind)

Volunteer labour (@min. wage/hour) \$ _____

Donated equipment (@prevailing rate/hour) \$ _____

Other (specify) _____

C. Total In Kind Contributions \$ _____

Total value of project (B + C) \$ _____

ALL APPLICANTS MUST READ, SIGN AND DATE THE STATEMENT BELOW:

I/we _____ of _____
hereby make application for financial assistance under the terms and conditions of the CBFWCP in the amount of
\$ _____. I/we acknowledge that the Government of British Columbia and BC Hydro are not
liable for any personal injury or destruction of property as a result of this project. All submissions received by the
CBFWCP become the property of the CBFWCP.

Project sponsor: _____

Date _____

The completed Application Form must be received at the Nelson Program office by **4:30 p.m., October 1**.
Applications may be submitted by mail, hand delivery, courier, fax or e-mail.

SMALL PROJECT APPLICATION



Working with the CBFWCP to conserve and enhance fish and wildlife.

First Things First

The Columbia Basin Fish and Wildlife Compensation Program is a partnership of BC Hydro and BC Government created to deliver and coordinate activities that enhance fish and wildlife habitat in the Columbia Basin. Some of these activities are ongoing (e.g., fish spawning channel operations) or research oriented (e.g., a study of lynx habitat and ecology). Other very valuable activities come forward as small project proposals from members of the public.

Where's the Columbia Basin?

To be funded, projects must lie within the Program area, which is most of the area drained by the Columbia River in Canada. It extends from Valemount in the north to Grasmere in the southeast and Rossland in the southwest. The Flathead, Kettle and Okanagan river drainages are not in the Program area. Refer to the map in this handbook for Program boundaries.

The Small Project Fund

Each year the Program sets aside money to support small projects (under \$10,000 each). Most of this money will be allocated to projects submitted by the public, whether individuals or organizations (such as a rod and gun club or conservation group). While October 1 of each year is the deadline to submit a project application, projects submitted during the project year will be considered, dependent on available funding.

The fund is designed to support projects such as:

- cleaning debris from a creek
- removing windfall from a deer grazing area
- a deer count in a particular area
- habitat enhancement of a small area

The following types of activities will not be funded:

- construction of boat launches or recreation sites
- debris clean-up on reservoirs
- ongoing administration costs of organizations
- individual compensation for losses resulting from hydroelectric development
- promotion of business opportunities or training

Who Decides on Projects and How?

Project applications are reviewed by Program staff and Technical Committees and approved by the Steering Committee, which includes technical and public representatives. The reviews will consider whether the project is:

- **Cost effective.** Compared to the benefits to be achieved, is the cost of the project reasonable?
- **Supported by partners.** Does the project have partners who are contributing resources to the project? Will the applicant contribute volunteer labour, cash or in-kind donations?
- **Achievable.** Is the project do-able, given the time, resources, etc. proposed in the application?
- **Biologically appropriate.** Does the project make sense biologically and is it achieving a positive biological outcome?
- **Socially desirable.** Does the project increase public awareness of fish and wildlife issues?
- **Lawful.** Does the project adhere to legislation and policies? (e.g., the provincial wild fish policy that prohibits introduction of exotic fish into streams with wild fish.)

Help is Available

Individuals or organizations who are considering making an application are encouraged to contact the nearest Program office (in Nelson, Invermere and Revelstoke) to discuss their idea. Staff biologists will assist you to develop your project idea and complete the application.

Applicant's Responsibilities

First of all, your responsibility is to complete the work as outlined in your application. The Program does anticipate a contribution of volunteer labour to projects that it funds. As project sponsor, you must be prepared to coordinate the volunteer labour part of the project.

In addition, you must be willing to:

- ensure adequate accident insurance and WCB coverage is arranged for all participants in the project, through the Program.
- provide invoices, with supporting documents such as receipts, to the Program office to receive the project funding.

For Further Information, contact:

HEAD OFFICE, NELSON

CBFWCP
103-333 Victoria Street
Nelson, BC V1L 4K3
Phone: 250-352-6874
Fax: 250-352-6178
E-mail: beth.woodbridge@bchydro.bc.ca

Public representative: Richard Spilker, Castlegar

Phone 250-365-2183
E-mail: spilk@direct.ca

EAST KOOTENAY OFFICE

CBFWCP
Box 14, D3
Unit 2 - 108 Industrial Road #2
Athlmer, BC V0A 1A0
Phone: 250-342-3941
Fax: 250-342-3986
E-mail: larry.ingham@bchydro.bc.ca

Public representative: Greg Mustard

Phone/Fax 250-342-3114
E-mail: mustard@rockies.net

First Nations representative: Joe Nicholas

Phone: 250-342-6301
E-mail: akisqnuk@rockies.net

REVELSTOKE OFFICE

CBFWCP
Box 500
1200 Powerhouse Road
Revelstoke, BC V0E 2S0
Phone: 250-837-2538
Fax: 250-837-9600
E-mail: karen.bray@bchydro.bc.ca

CBFWCP WEBSITE

www.cbfishwildlife.org

Application for Small Project Funding

Project Name _____
(Include a geographic name and a description of the type of activity e.g. Frenchman's Ridge Enhancement)

Project Sponsor (group or individual) Name _____

Mailing address _____

Town _____ Postal Code _____

Phone _____ Fax _____ E-mail _____

Contact Person (if sponsor is group) Name _____

Mailing address _____

Town _____ Postal Code _____

Phone _____ Fax _____ E-mail _____

Project Location and Description

Describe where the project will take place and provide a reference to a well-known feature such as the nearest town, highway, etc. (e.g., Arrow Creek valley, 8 km east of Creston, north of Hwy 3)

Mark the general location on the attached map or provide a more detailed map if available.

Describe the goal(s) of the project.

Describe the activities to be undertaken. _____

Describe the benefits to fish/wildlife and the community of this project. _____

Describe any future maintenance costs or additional project costs that are anticipated for future years.

Project Budget

A. Expenditures

Contracted services _____
(e.g., professional consultant)

Materials & supplies _____
(e.g., flagging tape, notebooks, shovels, postage)

Equipment rental _____

Other (specify) _____

(e.g. mileage) _____

A. Total expenditures \$ _____

B. Project Funding (cash)

Other (not Program) cash contributions **confirmed** from:

_____ \$ _____

_____ \$ _____

Total other cash contributions \$ _____

Funding requested from the Program \$ _____

(Total expenditures minus total other cash contributions)

B. Total (other + Program) cash contributions \$ _____

C. Applicant's Contributions (in kind)

Volunteer labour (@min. wage/hour) \$ _____

Donated equipment (@prevailing rate/hour) \$ _____

Other (specify) _____

C. Total in kind contributions \$ _____

Total value of project (B + C) \$ _____

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hereby make application for financial assistance under the terms and conditions of the CBFWCP in the amount of
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liable for any personal injury or destruction of property as a result of this project. All submissions received by the
CBFWCP become the property of the CBFWCP.

Project sponsor: _____

Date _____

The completed Application Form may submitted by mail, hand delivery, courier, fax or e-mail to
any of the Program offices.

CBFWCP Organization, Team Member Profiles & Contact Information

Columbia Basin

FISH & WILDLIFE
Compensation
Program

www.cbfishwildlife.org



Columbia Basin Fish and Wildlife Compensation Program

103-333 Victoria St.

Nelson, BC V1L 4K3

Phone: (250) 352-6874

Fax: (250) 352-6178

Email: beth.woodbridge@bchydro.bc.ca

Administration - Beth Woodbridge

NELSON HEAD OFFICE

Public Representative: Richard Spilker Ph. (250) 352-2660 spilk@direct.ca

Born and raised in the West Kootenays and nominated by the West Kootenay Outdoorsmen, Richard is an active member in Duck's Unlimited and the Nelson District Rod & Gun Club. He is familiar with public needs regarding the management of fish and wildlife resources and is a strong advocate for conserving biological diversity and wisely managing habitats. Richard is also a lawyer with the skills to communicate effectively and help facilitate consensus decision-making.

Maureen DeHaan, *Program Manager*

Maureen holds a Bachelor of Science Honours Degree in Environmental Science from Murdoch University in Perth, Australia as well as a Diploma in Forest Technology from the British Columbia Institute of Technology (BCIT). Before joining the Compensation Program in 1994, she was Planning & Assessment Manager with BC Environment and an Environmental Forester with an environmental management firm in BC's interior.

Maureen is a Registered Professional Biologist and Professional Forester.

Beth Woodbridge, *Administrative Assistant*

Beth joined CBFWCP in 1995 and has over 20 years of administration experience with BC Hydro. She applies a broad range of administrative and public interaction experience to what she considers "the perfect job". As the front line person—the first voice you hear when you call the Nelson office—Beth views her role as: "I'm here to help people who are interested in the Program in what ever way I can".

John Krebs, *Senior Wildlife Biologist*

John has extensive experience in both wildlife management and technical forestry, particularly in the Columbia Basin region. A biology graduate from Simon Fraser University, he earned his Masters in Science Zoology from the University of Alberta as well as a Diploma in Fish, Wildlife & Recreation from BCIT. An active member of the Western Forest Carnivore Committee and the North Columbia Mountain Ecological Research Group, John has published over 15 reports on his research work. He has been with compensation programs in the Columbia Basin since 1992. John is a Registered Professional Biologist.

John Gwilliam, *Wildlife Biologist*

A wildlife biologist with compensation programs in the Columbia Basin since 1980, John has a broad range of hands-on wildlife management, habitat enhancement and public involvement experience throughout the area. He was involved in the Pend d'Oreille Wildlife Management Plan as well as developing timber harvesting plans and prescribed burn programs as habitat enhancement techniques. A graduate of the University of Victoria in Biology, John has published a series of reports on his research and programs in the Columbia Basin.

Harald Manson, *Senior Fisheries Biologist*

A graduate of the University of British Columbia with a Bachelor of Science in Zoology, Harald spent 27 years with the Ontario Ministry of Natural Resources before joining CBFWCP in 1996. His last position at the Ministry was Operations Supervisor, overseeing the delivery of aquatic research and assessment programs on Lake Erie and Lake St. Clair.

Steve Arndt, *Fisheries Biologist*

Steve has been involved in fisheries-related work in Ontario and New Brunswick since 1982. A Masters of Science graduate from the University of New Brunswick, he is the author of a number of reports on salmonid growth and field assessment. Steve's main interests are fish population dynamics and fisheries management.

John Bell, *Fisheries Technician*

John is a graduate from Lethbridge Community College's Renewable Resource Management Program with a Fisheries Technician diploma. He worked with the Provincial Fisheries Branch in Williams Lake, Cranbrook and Prince George prior to relocating to Nelson in the late 1980's.

Eva Schindler, *Fertilization Limnologist*

Eva became the Limnologist responsible for the Arrow Lakes Reservoir and Kootenay Lake fertilization projects in 2003 after 15 years with the Dept. of Fisheries & Oceans. She held several positions with DFO including Freshwater Chemist and Phytoplankton Photosynthesis Biologist at the Freshwater Institute in Winnipeg and, more recently, Habitat Steward with Ocean & Community Stewardship in conjunction with the Bella Coola Watershed Conservation Society. Eva is a graduate from the University of Winnipeg with a Bachelor of Science in Biology.

Amy Waterhouse, *GIS Co-ordinator*

As the Geographic Information Systems (GIS) Co-ordinator, Amy provides mapping services including spatial analysis to support the delivery of fish and wildlife projects. Amy is a native of Kimberley with a Bachelor of Science in Geography from the University of Lethbridge. She brings six years of relevant experience in resource management from the Ministries of Sustainable Resource Management and Water, Land & Air Protection, BC Assets and Land Corporation, Federal Dept. of Indian and Northern Affairs and private environmental consultants.

Ross Clarke, *Contract Wildlife Biologist*

Ross has a broad range of experience in both wildlife enhancement and forestry in British Columbia and Alberta. A graduate of the University of Alberta with a Bachelor of Science in Forestry, he has spent over 15 years as a consultant for both government and private industry. Ross has worked with the Compensation Program since 1995. His main interests are in habitat enhancement/restoration and wildlife management.

Barry Bartlett, *Contract Public Communications Coordinator*

Barry is a photojournalism graduate from Vancouver's Langara College with several years experience in BC community newspapers and 13 years in communications in the energy, manufacturing and forestry sectors prior to joining CBFWCP in 1997. He has received professional recognition for his work including best newsletter in Canada and, as part of a team, best corporate communications program internationally.

EAST KOOTENAY OFFICE

#2, 108 Industrial Rd. #2

Athalmer, BC V0A 1K5

Phone: (250) 342-3941

Fax: (250) 342-3986

Email: larry.ingham@bchydro.bc.ca

Public Representative: *Greg Mustard*, Windermere

Ph./Fax: (250) 342-3114 E-mail: mustard@rockies.net

Greg represents the southeast Kootenays that includes south of Golden to the U.S. Border and east of Creston to the Alberta border. A Windermere resident and avid outdoor enthusiast, Greg was nominated by a number of EK groups including the East Kootenay Wildlife Association, Traditional Bowhunters of BC and Elkford, Fernie, Lake Windermere and Golden rod and gun clubs. Greg has participated in a variety of fish and wildlife projects and environmental initiatives with the Lake Windermere District Rod & Gun Club, BC Wildlife Federation, East Kootenay Environmental Society, Back Country Coalition, Jumbo Creek Conservation Society, EKWA and TBBC.

First Nations Representative: *Joe Nicholas*, Windermere

Ph. (250) 342-6301 (Columbia Lake Band office); (250) 342-6301 (home) E-mail: akisqnuk@rockies.net

Joe was appointed by the Ktunaxa/Kinbasket Tribal Council, which includes the Columbia Lake, Lower Kootenay, St. Mary's, Shuswap and Tobacco Plains bands. A chief of the Columbia Lake Band for 15 years and currently a band councilor, Nicholas was a member of the Columbia Basin Trust Committee and serves on the Canadian Columbia River Inter Tribal Fisheries Commission. Nicholas has had a lifetime interest in wildlife and wants to help address conservation issues resulting from the dams and growing economic development of the region.

Larry Ingham, *Wildlife Biologist*

Larry has been involved in wildlife compensation programs in the Columbia Basin since 1992. As well, he has extensive experience in the region as a wildlife biologist for BC Environment, BC Conservation Foundation and the Kootenay Wildlife Heritage Fund. Larry is a Simon Fraser University graduate in Biology and a BC Institute of Technology graduate of the Fish, Wildlife and Recreation Program. His habitat enhancement proposals have been recognized with two awards of excellence from the Habitat Conservation Trust Fund. Larry is a Registered Professional Biologist.

Bill Westover, *Regional Fisheries Biologist*

Bill has worked as a fisheries biologist for the MWLAP for three decades and is responsible for fisheries management in the East Kootenays. Bill has a Bachelor of Science in Biology from the University of Victoria and is a Registered Professional Biologist. Much of his recent work has focused on bull trout in the upper Kootenay drainage including the Wigwam River and Skookumchuck Creek.

Doug Adama, *Contract Wildlife Biologist*

Doug is a lifetime resident of the Columbia Valley and chair of the Northern Leopard Frog Recovery Initiative. He holds a Bachelor of Science in Biology from the University of Victoria. Doug has worked extensively on habitat enhancement and grassland ecosystem restoration projects throughout the Columbia Basin.

Dave Lewis, *Contract Wildlife Technician*

Dave, a graduate of Lakeland College's Environmental Science Program with majors in fish and wildlife, worked with the Mica Compensation Program before joining CBFWCP in 1995. A certified trapper and immobilization/animal handler, Dave works on a range of predator and large mammal projects as well as conducts many of the monitoring and surveying activities relating to Program wildlife projects in the southeast and northern Kootenay regions.

REVELSTOKE OFFICE

BC Hydro Bldg.
PO Box 500
1200 Powerhouse Rd. Revelstoke, BC V0E 2S0
Ph. (250) 837-2538
Fax (250) 837-9600
Email karen.bray@bchydro.bc.ca

Karen Bray, *Fisheries Biologist*

Karen has a Masters of Science in Watershed Ecosystems from Trent University in Ontario and a solid background in the theories, principles and practices of aquatic sciences and habitat rehabilitation. She also has extensive training and experience in methods of assessing and managing habitat, fish populations and environmental impacts. Karen is the author of numerous publications and presentations on aquatic habitat conservation and restoration. Karen is a Registered Professional Biologist.

