

# NECHAKO ENVIRONMENT & WATER STEWARDSHIP SOCIETY

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NEEF Management Committee  
PO Box 2551  
Vanderhoof, BC  
V0J 3A0

March 20, 2012

Dear NEEF Management Committee Members:

On behalf of the Nechako Environment Water Stewardship Society (NEWSS) we would like to submit our proposal for funding under the Nechako Environment Enhancement Fund (NEEF).

We have attached a comprehensive report that covers our history and objectives, our accomplishments and partnerships while operating under the Murray Creek Stream Rehabilitation Project, along with supporting documentation. We understand the intent of the NEEF is to fund projects that provide environmental enhancement to the waterways of the Nechako River. Within this proposal we will demonstrate how NEWSS meets the objectives of the NEEF including:

- Options that address enhancement related to flow changes in the Nechako River.
- Options that seek to rehabilitate fish habitat and fish populations in the Nechako River.
- Options that promote education and stewardship of water in the Nechako watershed.

The vision of NEWSS is to act in an advisory capacity for both landowners and government, to serve as a vehicle for the delivery of incentives and investments into the Nechako watershed and to act as a trust that continually to inspires people, landowners and industry to demonstrate high quality land and water stewardship.

NEWSS will facilitate an ongoing conversation to exchange knowledge, share perspective and explore opportunities for cooperative learning with First Nations, community residents, landowners, industry leaders, grade schools, universities and appropriate government agencies. Within this conversation, we will continue to build partnerships and cooperatively identify a priority list of short and long-term objectives, projects and outcomes for NEWSS. At present, the founding objectives of NEWSS include:

1. Facilitating the rehabilitation of streams that flow through the Nechako Agricultural Belt into the Nechako River.
2. Facilitating watershed planning that provides a framework to protect, maintain and restore a healthy natural watershed.
3. Collaborate to improve the mapping of aquifers that lie beneath the Nechako Plateau and foster an improved understanding of the role healthy streams and riparian areas play in the dynamic interaction of surface and groundwater.
4. Assisting government to meet its stated vision for a cleaner and healthier environment.
5. Facilitating and participating in environmental stewardship and education opportunities for schools, universities and the community at large, including stream rehabilitation, water quality, Nechako white sturgeon and salmonids.

6. Developing a program to administrate a “Gold Label” certification standard for agricultural products produced in the Nechako Valley by identifying opportunity to recognize agriculture producers that have Farm Stewardship Plans in place and demonstrate land stewardship practices that operate in harmony with healthy streams.

NEWSS has the foundation, history and partnerships to successfully manage a program that looks at the Nechako watershed and its various components in a manner that will result in the development of a watershed management strategy and bring the importance of water stewardship practices to the forefront of the region. We believe that this information will help prepare us for future changes expected due to climate changes in the region.

We envision a collaborative approach that draws on our existing partnerships in the various government departments including Ministry of Forests, Lands & Natural Resources Operations (MFLNRO), Fisheries and Oceans (DFO), Fresh Water Fisheries Society of BC, the Regional District of Bulkley-Nechako, the area cattlemen and farmers, and the Universities and Schools within our region. We plan to develop a strategy that works toward creating a watershed within which lie healthy streams, productive industries and communities that flourish.

Of critical importance to our project is ensuring that we continue to hold true to the values that we demonstrated while moving the Murray Creek project ahead. These values include:

- building community support before proceeding,
- working and learning cooperatively,
- respectfully identifying improved land and water stewardship practices, and
- taking the time necessary to resolve differences in values and opinions while ensuring a return to healthy watersheds.

Our partnerships from within School District 91 and the University of Northern BC combined with our community's experiences in watershed restoration on Murray Creek, the WL McLeod Wetland and the new Nechako White Sturgeon recovery facility offer up a unique opportunity to partner and create education and employment opportunities for students that could share costs while benefitting the community. We also see an opportunity to benefit local students by providing educational bursaries and grants for students moving into post secondary studies in related fields. We believe there will also be opportunities to facilitate core funding for graduate studies that would support the work that NEWSS undertakes.

Based on the proposed scale and undertaking of this project NEWSS will support a small core of staff (one manager and two biologists) that will work with the various agencies and communities to move this project forward. Our proposal requests that a 20 million dollar legacy fund in that amount be set aside and we plan our operations around the interest that this would generate over the next decades.

We believe this is great project for the region, for government and for the environment. We look forward to further discussions as we move this project ahead.

Wayne Salewski  
Director - NEWSS

# NECHAKO ENVIRONMENT & WATER STEWARDSHIP SOCIETY

*A society for the betterment of  
water resources in the Nechako Valley.*

## Proposal and Supporting Documentation

*Submitted to the*  
**Nechako Environment Enhancement Fund  
Management Committee**

**March 2012**





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# Nechako Environment & Water Stewardship Society *NEWSS*

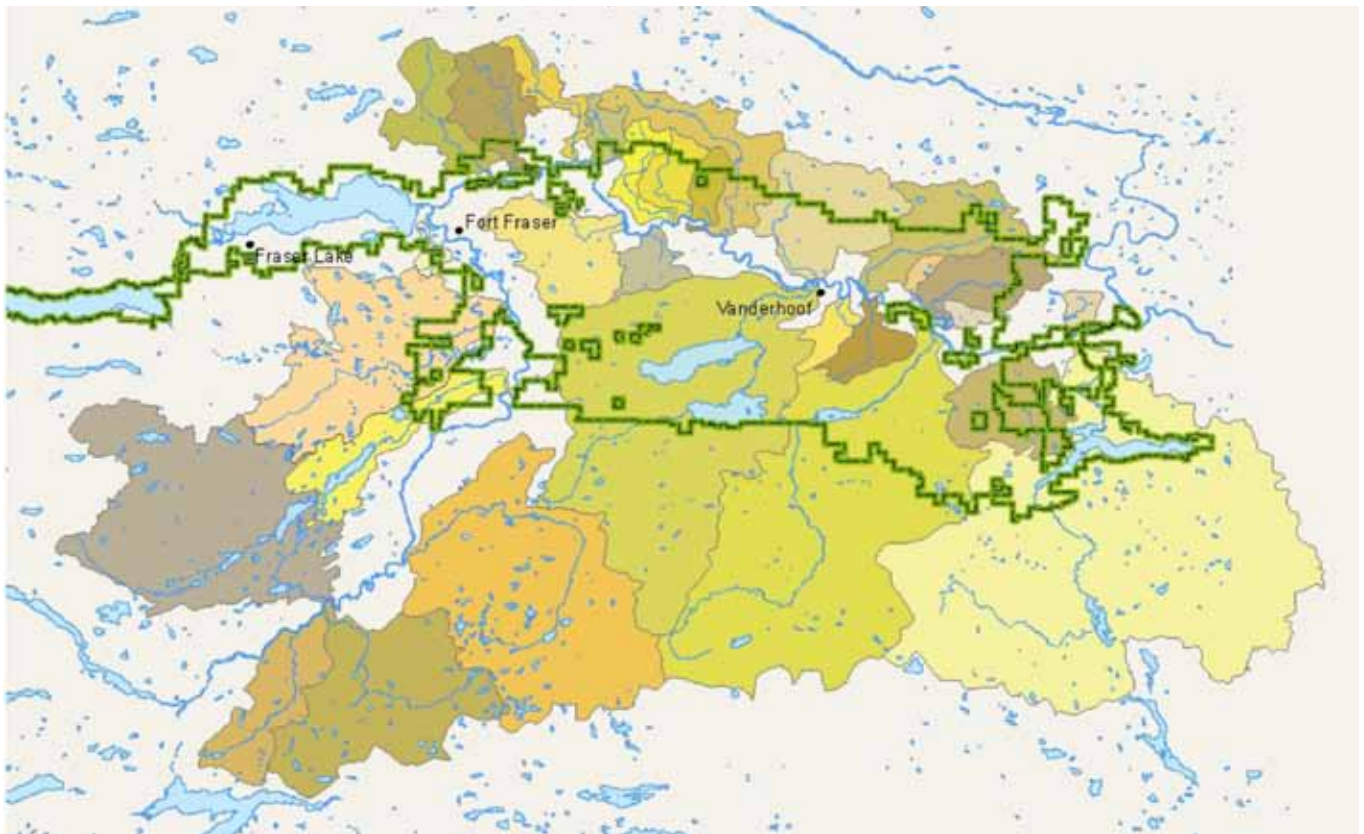


Figure 1: Thirty (the Nechako River watershed contains 30) small-medium sized individual stream watersheds have been initially identified as candidates for restoration. The green out-lined area indicates the Vanderhoof Crown Land Plan.



## NECHAKO ENVIRONMENT & WATER STEWARDSHIP SOCIETY - NEWSS

### SOCIETY

The Nechako Environment & Water Stewardship Society (NEWSS) is a registered society under the Society Act (No. S-0059345).

### BACKGROUND

The Nechako Environment and Water Stewardship Society was born from a recognition that environmental degradation in the Nechako Plateau had led to visible and obvious consequences in many of the streams in the region. Early agricultural clearing practices where it was considered acceptable to clear riparian areas and reshape stream channels without consideration to the stream ecosystem drove much of the degradation. Subsequent land practices in the flood plains of these streams and the changes in the upstream hydrology imposed by the Mountain Pine Beetle epidemic have accelerated stream bank erosion and made it increasingly difficult, if not impossible, for the riparian areas of many of these streams to restore themselves. The absence of a functioning riparian zone, in combination with incorrectly sized/placed culverts and various other land management decisions have led to decreased water quality and reduced high quality fish habitat in the small and medium sized streams across the agricultural region.

The initial priority of what was at the time the Vanderhoof Fish and Game club, focused on activities that restored riparian ecosystems, removed barriers to fish migration and attempted to remove or mitigate obvious contaminant sources (human septic, manure) to the Murray Creek watershed. The success of the Murray Creek Rehabilitation Project was rooted in the actions of volunteer members and a remarkable willingness of landowners, residents and industry to thoughtfully reverse the environmental degradation that has occurred in this one watershed. The Murray Creek group met with landowners, made plans, raised funds and took actions to restore this stream's ecosystem. More than just doing the work and walking away, this ongoing project includes people of all ages from all over, fosters learning together, and continually shares those lessons through presentations, conversations and countless watershed tours where people see, touch and/or participate in an initiative that is solely intended for the betterment of society and the environment. NEWSS began with the intent to again take another step forward and take the success of Murray Creek and extrapolate that onto the entire Nechako watershed.

The vision of NEWSS is to act in an advisory capacity for both landowners and government, to serve as a vehicle for the delivery of incentives and investments into the Nechako watershed and to act as a trust that continually to inspires people, landowners and industry to demonstrate high quality land and water stewardship (Figure 1).

### PROPOSED OPERATING AREA

The proposed initial focus area for NEWSS is made up of 30 small to medium sized watersheds in the Nechako Plateau (Table I). These watersheds include a combination of both crown and privately owned land. Most of the stream main-stems also flow through an area designated as the Vanderhoof Crown Land Plan, which includes land designated for agricultural, wildlife reserves and gravel pits (Figure 1). The operating area for the NEWSS is not predetermined and we would prefer to let the public conversation guide these decisions. The 30 watersheds identified in Figure 1 are proposed as a starting point for the discussion.



<b>NEWSS Proposed Operating Area</b>					
<b>Watershed Name</b>	<b>Area (ha)</b>	<b>Length of Stream Within ALR (m)</b>	<b>Length of Stream Outside ALR (m)</b>	<b>Area of Watershed With ALR (ha)</b>	<b>Area of Watershed Outside of ALR (ha)</b>
<i>Chilco Creek</i>	5,744	13,359	1,275	4,341	1,403
<i>Clarke Creek</i>	965	5,775	1,450	538	428
<i>Clear Creek</i>	8,679	8,387	16,727	2,129	6,550
<i>Cluculz Creek</i>	90,500	33,698	50,025	12,170	78,330
<i>Croft Creek</i>	2,771	3,829	0	2,771	0
<i>Cutoff Creek</i>	9,034	0	23,129	0	9,034
<i>Engen Creek</i>	9,938	11,858	0	9,938	0
<i>Greer Creek</i>	41,037		63,074	0	41,037
<i>Halsey Creek</i>	1,901	3,654	5,825	361	1,541
<i>Hullat Creek</i>	8,842	5,218	0	8,842	0
<i>Kluk Creek</i>	3,009	0	18,558	0	3,009
<i>Knight Creek</i>	10,065	20,056	8,254	5,324	4,741
<i>LeDuc Creek</i>	722	1,436	0	722	0
<i>Leona Creek</i>	1,055	2,122	0	969	86
<i>Martens Creek</i>	2,122	5,797	0	2,122	0
<i>Moss Creek</i>	2,024	2,526		1,510	515
<i>Murray Creek</i>	12,056	12,750	2,942	6,188	5,868
<i>Neuco Creek</i>	3,483	12,500	0	3,483	0
<i>Nine Mile Creek</i>	6,784	6,095	12,662	822	5,962
<i>Phillips Creek</i>	86	1,615	0	86	0
<i>Puttah Creek</i>	1,110	0	3,606	22	1,088
<i>Redmond Creek</i>	3,246	10,358	0	2,554	692
<i>Sinkut River</i>	60,727	21,644	53,692	15,863	44,864
<i>Smith Creek</i>	24,841	13,252	23,552	4,014	20,826
<i>Stoney Creek</i>	56,220	36,311	16,049	29,966	26,254
<i>Swanson Creek</i>	23,216	0	30,605	0	23,216
<i>Tahultzu Creek</i>	8,993	8,915	20,383	1,702	7,290
<i>Targe Creek</i>	36,977	0	48,809	0	36,977
<i>Tatsutnai Creek</i>	6,665	4,170	16,351	616	6,049
<i>Trankle Creek</i>	3,087	14,201	2,576	2,208	878
<b>Totals</b>	<b>445,900</b>	<b>259,527</b>	<b>419,542</b>	<b>119,260.8</b>	<b>326,639.5</b>
	<b>ha</b>	<b>m</b>	<b>m</b>	<b>ha</b>	<b>ha</b>

Table I: A listing of the 30 watersheds that make up the Nechako watershed. ALR = Agricultural Land Reserve, which represents the total agricultural land within the Vanderhoof Crown Land Plan.



## PURPOSE

*To corroboratively improve damaged stream ecosystems within the Nechako Watershed by restoring riparian function in the flood plain of streams, enhancing the regions collective awareness of surface and groundwater as a single resource and creating an atmosphere where the residents, land owners and various industries can voluntarily improve land and water stewardship practices. The intended outcome is improved water quality, resilient stream ecosystems and enhanced capacity of the region as a whole to understand and manage water security in the face of climate change and into the future.*

## OBJECTIVES

NEWSS will facilitate an ongoing conversation that will seek to be inclusive of not only existing stakeholders, community members and special interest groups but also those who emerge along the way. Within our conversation, we will seek to garner support and build partnerships to develop a common vision for land and water stewardship in the Nechako Watershed. Cooperatively, we will establish priorities and implement projects that build towards achieving these primary objectives of NEWSS:

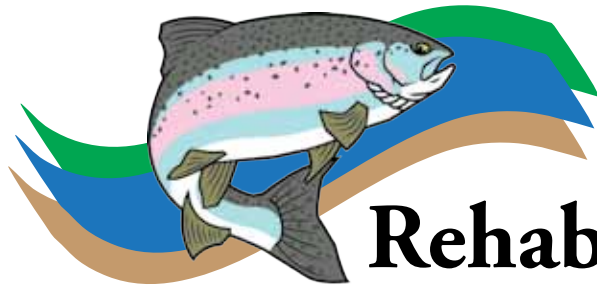
- Facilitating the rehabilitation of streams that flow through the Nechako Agricultural Belt.
- Facilitating watershed planning that provides a framework to protect, maintain and restore a healthy natural watershed.
- Collaborating to improve the mapping of aquifers that lie beneath the Nechako Plateau and foster an improved understanding of the role healthy streams and riparian areas play in the dynamic interaction of surface and groundwater.
- Assisting government to meet its stated vision for a cleaner and healthier environment.
- Facilitating and participating in environmental stewardship and education opportunities for schools, universities and the community at large, including stream rehabilitation, water quality, Nechako White sturgeon and salmonids.
- Developing a program to administrate a “Gold Label” certification standard for agricultural products produced in the Nechako Valley by identifying opportunity to recognize agriculture producers that have Farm Stewardship Plans in place and apply Best Management Practices on the land and streams with stewardship as an objective and to ensure the legacy of these values.



## DIRECTORS

The NEWSS Board of Directors are responsible for the successful completion of the NEWSS goals and objectives. The current Board of Directors has five directors:

- Wayne Salewski
- Brian Frenkel
- Richard Martens
- John Degagne
- Cam Hill



# **Murray Creek Rehabilitation Project**

## MURRAY CREEK STREAM REHABILITATION GROUP

### SOCIETY

The Vanderhoof Fish and Game Club (VFGC) is a member of NEWSS under the Nechako Valley Sporting Association (NVSA). The Vanderhoof Club has been operating for over 35 years and has been recognized provincially with several awards for its work on conservation over that time.

Numerous clubs operate under the umbrella organization that is NVSA including the Vanderhoof Fish and Game Club. NVSA shares a common executive, society, and facilities like the clubhouse and the grounds. The Murray Creek Rehabilitation Project is one of several club initiatives working on stewardship projects.

### BACKGROUND

The Murray Creek Stream Rehabilitation Project was formed in 2008, although it had been on the radar of club membership for over 30 years. The objective was to understand how to facilitate the restoration of a stream within the Nechako Valley by working with the landowners in a cooperative and conciliatory way that would benefit the landowner and provide an atmosphere that would result in water stewardship practices that created and restored a healthy ecosystem.

In the five years that we have been operating, the investment by private funders, landowners and agencies has been in excess of \$300,000.

The initial target was to get 70% of the landowners on side within the term of the project and we have exceeded this within the first five years time. Not all landowners will participate on this project but that we will have projects on the majority of private land within the life of this initiative. The farming and ranching community understands the need to adapt their programs to include Environmental Farm Planning (EFP) and to be wise users of the water resources. Our experiences on the Murray Creek Stream Rehabilitation Project have demonstrated how we can work together to meet these objectives.



### PURPOSE

*To enhance the habitat along Murray Creek for the benefit of all users, fish and wildlife.*

*To facilitate the process of the agricultural community voluntarily working towards water stewardship throughout the Nechako Watershed.*

### OBJECTIVE

To understand how to work corroboratively with the community along Murray Creek to facilitate the rehabilitation of the stream while ensuring that the majority of the funds required are raised from outside sources.

## DIRECTORS

- Wayne Salewski
- Brian Frenkel
- John Degagne
- Cam Hill
- Justus Benckhuysen
- Jerry Peterson – Regional District Bulkley Nechako
- Darren Carpenter – District of Vanderhoof
- Richard Martens – Regional Cattleman's Association.

## PARTNERSHIPS AND COLLABORATORS

As the Murray Creek Stream Rehabilitation Project has moved forward over the past few years we have developed tremendous support from many individuals, agencies and organizations throughout the province. Much of this support has been in the form of funding, while other support has been more collaborative in working on the larger outcomes of bringing water stewardship and education to the Nechako Valley.



### *School District 91 (SD91)*

Perhaps one of the more satisfying outcomes has been the development and working relationship that has come from the education sectors. We introduced students from within SD91 very early in our program development. No students had been involved in this type of outreach in the past, and we quickly ended up with weekly and annual field trips of elementary and high school students from across SD91. Additionally, two highschool students have completed independent studies for credit on Murray Creek. A particular point of pride is the inclusion of Murray Creek in Project Agriculture - a program throughout the School District - as part of their one week hands on teaching opportunity that brings the school classroom to the farm to experience life and opportunity on the farm as possible career opportunities in the future.



### *University of Northern British Columbia (UNBC)*

We developed a working relationship with UNBC three years ago that has resulted in Dr. Margot Parkes of UNBC bringing two funded projects to the Murray Creek Stream Rehabilitation Project. These projects have brought national and even international coverage to Vanderhoof. Dr. Parkes is a Canada Research Chair in Health, Ecosystems and Society at UNBC with a cross-appointment in the School of Health Sciences, and the Northern Medical Program, a co-founder of the Canadian Community of Practice in Ecosystem Approaches to Health, and President of the International Association for Ecology and Health. Dr. Parkes has developed a research focus on the impacts of ecosystem change on determinants of health especially in the context of watersheds, and in the design of education, research and governance options to address the converging objectives of health, social equity and ecosystem sustainability. This involvement has further translated into a working relationship and collaboration with the Northern Regional Drinking Water Team, which will be covered off under a separate heading. UNBC currently has two students doing graduate work on our project and a third student working in the Nechako Valley as a result of our watershed approach. We believe that we will foster more students in the upcoming year as we also expand into the larger forum.



### ***BC Cattlemen's Association – Farmland-Riparian Interface Stewardship Program (FRISP)***

FRISP is designed to help provincial agriculture producers to protect and enhance water quality, to protect and enhance riparian vegetation, and prevent and mitigate agricultural impacts on streams and lakes. This program was the first funder of the Murray Creek Stream Rehabilitation Project and a Provincial asset that gave us credence as a respected group with the Regional Cattlemen's Association. Lee Hesmith as the Program Manager for the BC Cattlemen's has facilitated a number of meetings on our behalf and has been a major supporter in moving our agenda forward successfully.



### ***Nechako Valley Regional Cattlemen's Association***

This Association represents the three area Cattlemen's Associations in the Nechako Valley. The Murray Creek Group first approached the Regional Association five years ago with the idea of cooperatively working towards water stewardship, and although we can still say that the producers are concerned as an industry about the cost of moving into a program as high profile as ours, they appointed a member to our Board. We have been well received by the area cattlemen with our approach and the trust that we will operate the same in the future.



### ***Fraser Basin Council (FCB)***

The FBC has supported the Murray Creek Rehabilitation Project from the start and has facilitated a number of introductions and set up meetings with key individuals within the Province of BC to help move our program forward.

In particular they have provided staffing help through a First Nations Youth Environmental Workshop that required the experience of working with an ENGO while working on the Murray Creek Rehabilitation Project. They have provided staff time and also facilitated First Nations youth employment.

The FBC also facilitated the original meeting with UNBC that brought First Nation's youth to our project. FBC also has a position at the table of the Northern Regional Drinking Water Team which has strong ties to our project.



### ***Fisheries and Oceans (DFO)***

We have forged a strong relationship with DFO both regionally and provincially. Although DFO was not at the table the first couple of years it was a decision of the Murray Creek Group based on a lack of understanding and faith on our part. We now have a working relationship that is the envy of many similar groups across the province and we work in concert to facilitate the role and goals of the Murray Creek Group. DFO has helped fund some important needs including a complete culvert assessment on both crown and private land. DFO has also provided us with annual funding for fencing materials and facilitating deals with private landowners that would have never have been made in previous times.

We have the support of DFO on this larger watershed strategy.





### ***Fraser River Action Plan (FRAP)***

Salmon Watershed Planning Profile recommendations made in 1997 by Fisheries and Oceans Canada, for the Nechako Watershed. The authors of the watershed planning profile for the Nechako identified agriculture development as having high impact on the Nechako from the Kenny Dam downstream. They also identified extensive riparian impacts and water withdrawal from agricultural development throughout the Nechako mainstem and its tributaries as a high level of concern.

The formalization and coordinated implementation of the NEWSS would lead to the implementation of some of the specific objectives identified in the FRAP salmon watershed planning profile for the Nechako including:

- Maintain the structural and functional integrity of riparian areas
- Maintain or improve water quality
- Protect stream channels and floodplains from influences of development activities
- Ensure the protection of headwater, ephemeral and intermittent channels; recognizing their influence on watershed stability, hydrology and water quality
- Ensure protection of critical aquatic habitats including: floodplain, off-channel sites, non-natal tributaries and other areas of biological significance
- Ensure the inventory, assessment and implementation of stream restoration and enhancement programs
- Support existing fisheries enhancement programs and activities
- Improve fish passage in the watershed<sup>1</sup>

In addition, NEWSS could contribute (and has already led) to the development and implementation of some of the specific strategies identified in the FRAP salmon watershed planning profile for the Nechako River, including:

- Develop a detailed riparian management plan from the outflow at Cheslatta Falls to Chilako River(Mud)Prince George identifying areas requiring site specific prescriptions (urban/agriculture)
- Develop a riparian management plan to protect and restore tributary stream habitat in cooperation with agricultural and ranching communities
- Implement a water drainage plan for sensitive soil, stream crossings or other areas specified in development plans
- Initiate a watershed restoration assessment and inventory for development of a Watershed Restoration Plan
- Initiate restoration, re-vegetation and stabilization measures on linear developments
- Review and document potential habitat improvement, habitat development and habitat restoration opportunities<sup>1</sup>

### ***Ministry of Environment (MOE)***

We have had the MOE at our BOD meetings since the Murray Creek Rehabilitation Project was formed. They have been helpful in focusing our efforts with the in stream work and have worked with us to ensure our focus has value for effort. We have also worked closely with the stewardship group from within the MOE and we have collaborated with them in designing our next steps of understanding our watershed and aquifer in conjunction with our stream rehabilitation goals for the Nechako Valley. They have contributed to creating the vision of healthy watershed, productive streams and in bringing water stewardship to the forefront over the next couple of decades.







### ***Nechako White Sturgeon Community Working Group (NWSCWG)***

During the last 60 years, the Nechako white sturgeon population has dropped from what scientists believe was a minimum of 5000 fish to less than 350 mature adults. The lack of younger fish means that sturgeon are either not reproducing successfully or that the young are not surviving to adulthood. As sturgeon do not begin spawning until they are 15 to 30 years old, the lack of young sturgeon in the Nechako River means that an entire generation is already missing.

In the mid to late 1990s, the Province of British Columbia coordinated an intensive study of the white sturgeon in the Nechako River. The study came to an unwelcome conclusion - the Nechako White sturgeon is in a critical state of decline. Unless something is done, and done soon, these great creatures will likely go extinct.

The Nechako White Sturgeon is now on the Species at Risk list as an endangered species.

With so many stakeholders involved along the entire length of the Nechako River, it was imperative all interested parties gather together to begin working as a team in the recovery planning efforts. This was the beginning of the Nechako White Sturgeon Recovery Initiative (NWSRI). The recovery initiative created two working groups, the Technical Working Group (TWG) comprised of biologists and government agencies and the Community Working Group (CWG) comprised of community members and other stakeholders. In short, the TWG created the Recovery Plan and is responsible for any research and habitat projects, while the CWG is responsible for community engagement and information sharing. The NWSRI is ultimately responsible for identifying the reasons why white sturgeon are no longer successfully spawning and surviving in the Nechako watershed, and for the design and implementation of habitat protection, restoration and management options.

Their habitat is crucial to their survival. In the colder winter months, the fish spend their time in deep river pools. In springtime, when water temperatures rise, mature adults travel many miles to gather together at spawning grounds. In the summer months, adults spend most of their time in large pools in the main channels, and in feeding areas such as slower backwater and below any rapids. Young sturgeons frequently move between the main channel and adjacent sloughs or back eddies. However, travel patterns of Nechako white sturgeon also suggest they follow the migration routes of one of their main sources of food, salmon.

For several years the NWSRI has implemented many research projects including a Pilot Hatchery, Brood stock capture and monitoring, White Sturgeon larvae release and monitoring, Nechako White Sturgeon Habitat Management Plan and the recent Spawning Habitat research project where 2 gravel beds (50 m by 150 m) were placed in the river at two strategic locations.

During the implementation of some of the early research projects, a



local group of individuals saw what was happening with the NWSRI and the positive response that were coming from the public and they created an organization that would work on stream restoration projects close to Vanderhoof. The creek that they decided to start with first was Murray creek which feeds into the spawning grounds of the Nechako White Sturgeon. The Murray Creek Restoration group took it upon themselves to approach landowners along Murray Creek and seek volunteers who wanted to create a better habitat along the creek and ultimately a better habitat for the Nechako White Sturgeon.

After 4 years of working on that watershed the group has now formed a society called the Nechako Environment and Water Stewardship Society (NEWSS). The NWSRI has been informed that this group will be working on 32 different watersheds that flow into the Nechako River from Cheslatta Falls to Finmore. While this endeavor is a major undertaking it our groups opinion that and improvement to water quality throughout the Nechako Valley will be a benefit to the Nechako White Sturgeon.

It is important to note that in recent meetings with both the Fort Fraser and the Lower Mud River Group, membership within both organizations talked about the juvenile sturgeon that they had seen using streams in the agricultural belt as rearing grounds. It would seem obvious that the rehabilitation of these streams will again provide valuable habitat for the Nechako White sturgeon.



#### ***Nechako Fisheries Conservation Program (NFCP)***

The Nechako Fisheries Conservation Program (NFCP) was formed to ensure the effective implementation of the 1987 Settlement Agreement between Rio Tinto Alcan, Fisheries and Oceans Canada and the BC Ministry of Environment. The objective of the NFCP is the conservation of salmon stocks in the Nechako River.

NEWSS feels strongly that this proposal will work in concert with the NFCP objective, through our objective of repairing the riparian zone of these systems that flow into the Nechako River that will ultimately increase in-stream habitat and lower the temperature. The Murray Creek Rehabilitation Project has shown that Chinook fry extensively use these small streams as rearing habitat and we believe we can not only increase survival by lowering the temperature but also ensure that outward migration can be increased by replacing poorly installed culverts that do not function properly during low flows.

## LAND USE IN THE NECHAKO VALLEY

### AGRICULTURE

The Vanderhoof area has seen farming and cattle ranching activity starting with the pioneers of the early 20th century. By the early 1930s there were scattered farms throughout the Nechako Valley and although the majority of them were subsistence homesteads, they were the forerunners of the development of the Agricultural Land Reserve (ALR) that was opened up by the provincial government in the early 1970s (as part of the Vanderhoof Crown Land Plan).

Many of the problems and challenges within the watershed and streams that flow through the Nechako Valley can be traced back to the policies of that era. The strategy put forward by the government of the day required landowners to cultivate 80% of the arable land over a 20 year period in order to receive title to the land. In most cases this resulted in land clearing that went up to and in some cases through the streams and wetlands that made up the parcels of land in the ALR.

Today, the Nechako Valley is the second largest contiguous agricultural belt in the province and is considered a future economic driver for the region. The long term sustainable existence of the agricultural industry within the Nechako watershed is dependent upon protecting the resource base (soil health, water quantity and quality) and general range ecosystem sustainability.

We believe that by bringing water stewardship practices to the forefront of the agricultural producers' agenda we create future opportunities to market our region as preferential and sustainable, both of which are important identifiers to the consumer of the future.

Figure 2 provides an overview of the gross production of the agricultural community as published in 2006 by the Regional District of Bulkley-Nechako (RDBN). These statistics cover the whole of the region as represented by the RDBN, but considering the Vanderhoof area is the largest contributor by area to these statistics we feel that the numbers accurately represent the area we are proposing to work in. The numbers speak for themselves and clearly demonstrate the value of the agricultural community to the region.

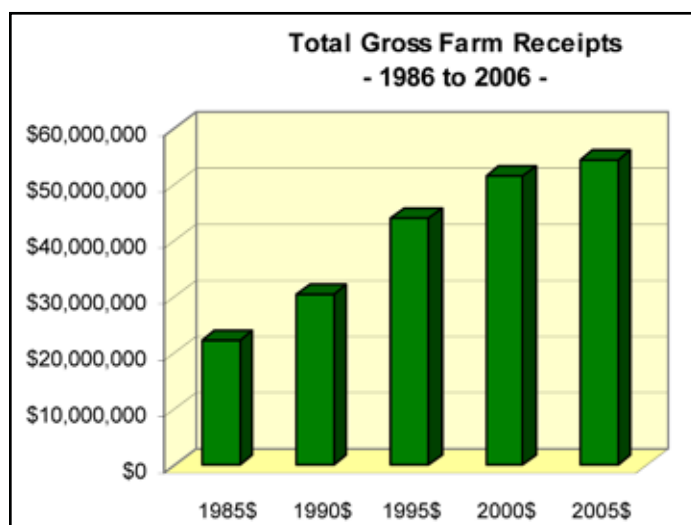


Figure 2 - Total Gross Farm Receipts from 1986-2006 in the Regional District of Bulkley-Nechako (taken from the Regional District of Bulkley-Nechako Agricultural Review 2008, page 14).



## **RIPARIAN ZONES - ECOLOGICAL SERVICES AND CARBON OFF SETS**

One of the many challenges to be undertaken by NEWSS will be the restoration of the riparian zone of streams within the Nechako watershed. Land clearing and development in the 1900s most often included clearing right to the stream bank, which over time has led to habitat degradation and poor water quality. To be able to restore riparian zones on private lands, landowners will have to 'give back' land currently used for farm production.

Our experiences with the Murray Creek Rehabilitation Project lead us to explore opportunities to compensate for the loss of productivity that farmers face when their land is dedicated solely to riparian restoration. The Murray Creek Rehabilitation Project already has one landowner that is working with individuals exploring how this could work. This is part of a provincial move to investigate Ecological Services as one of the options that may be a solution. There are many carbon off-set programs currently available, and the Murray Creek Rehabilitation Project had carbon hunters exploring opportunities. It appears that a program could be developed that provides added value and income to the agricultural community. This opportunity falls within part of our vision whereby we serve as a vehicle for the delivery of incentives and investments into the Nechako watershed. Refer to Appendix V.

## **STREAM CROSSINGS**

For early settlers and land developers, fording streams was a challenge. The early strategy of horse and wagon fording soon led to the need for bridges by the 1950. The first wooden bridges did not stand the test of time and were soon replaced with creosote structures. By the 1970s creosote bridges lost favor because of the leaching entering into the streams and waterways. Thus the majority of these bridges were replaced with metal and wooden culverts. At the time, and until very recently, the size, placement and type of culvert did not meet the fisheries or water flow needs of the individual stream, causing either barriers for fish passage, erosion of land and roads, and changes to the structure and shape of the stream. Many older culverts now are in disrepair and continue to cause risk to land and fisheries values. Current regulations for provincial roads require that culverts be installed to handle 100 year flow levels and allow fish passage.

Culverts on private land, on the other hand, are not regulated. There is a lot of evidence in the Nechako Valley of multiple attempts to secure crossings on private land that have failed and in some cases created larger problems.

As part of the Murray Creek Rehabilitation Project we conducted a culvert assessment within the Murray Creek watershed. Of the 21 culverts measured; 7 sites were ranked as high replacement priority and 7 as medium to high replacement priority, in total accounting for 66% of the crossings within the watershed. Extrapolating that figure to the entire Nechako watershed presents us with the potential situation that the majority of stream crossings on private land are at high risk, and therefore a great opportunity for NEWSS to facilitate crossings improvements through the development of watershed plans.



Figure 3: The 'before' image shows a stream crossing on Murray Creek that limited fish passage. The 'after' image is the same crossing after restoration was done and an adequately sized and properly placed culvert was installed. The new culvert allows fish to pass freely.

## GROUNDWATER & WATER SECURITY

Water security in the Nechako Valley is an important topic, and one NEWSS is actively involved in. Understanding groundwater and its value to water security is something that will need to be explored thoroughly to help improve watershed health within the Nechako watershed.

A round table discussion ensued in November of 2010 at the request of the NEWSS that centered on the theme “What would an Aquifer Study in the Nechako Plateau entail?” The meeting included representatives from NEWSS, hydrogeologists and hydrologists from the Northern Health Authority, UNBC, Simon Fraser University, the Province of British Columbia and industry representatives that operate in the Nechako Plateau. Figure 5 shows a mindmap created to capture and organize multitude of topics and information exchanged during this round table session. Some of the background knowledge presented on the area included these facts:

- The majority of people in the Nechako Plateau rely on water from wells for most uses (domestic, industrial, stock watering, etc).
- The District of Vanderhoof relies on water from an artesian groundwater source.
- There is only one provincial monitoring well in the region and it has an incomplete data record.
- Of the 4210 km<sup>2</sup> of watersheds identified as the initial priority of the NEWSS for restoration works, the underlying aquifers have been identified and mapped for approximately a quarter of that area, but the boundaries of many of the aquifers remain undetermined.
- The degree of interaction of groundwater and surface water is completely unknown.

The meeting highlighted that it is difficult to have an informed conversation about groundwater in the region because very little public information is being collected and even less has been done to understand groundwater outside of drilling water wells. What we acknowledge though, is that:

1. there is great value in understanding how groundwater flows through the region,
2. most of our infrastructure has been constructed to access water from aquifers,
3. activities on the surface have a direct impact on both the quality and quantity of water that flows through our region (above and below the surface), and
4. we do not know how sustainable current and future uses of water are, because we have assembled very little of the available information.

Although the round table discussion was only intended to be an initial discussion to explore an idea, the following “next steps” are a compilation of recommendations made at the meeting. These next steps were an outcome of a ‘mind mapping’ process shown on page 27:

- Conduct a water well survey across the area of interest. Within the survey, gain information about water chemistry and water quality, accurate location and elevation (meters above sea level) of the water level in the wells, well construction/protection information. Repeat certain aspects of the survey (specifically static water level) in subsequent years to evaluate change over time.
  - The water well survey is particularly beneficial because it provides an immediate result with benefits to stakeholders as well as providing a fundamental step to improved aquifer characterization and ground water modeling.





- Regular measurements of static water level across the region also add resolution to the trends seen from the provincial observation well network.
- Work with the Province to evaluate the Provincial Observation Well Network and identify where additional monitoring wells would be beneficial.
- Identify opportunities where existing wells (privately owned) that are no longer used may be instrumented and designated as provincial observation wells.
- Information from the observation well network is publicly available and provides real-time information to the public that is readily available via the internet.
- Determine the water budget for the region at different scales (i.e. 3rd order basins such as Murray Creek and one overall budget for the Nechako Plateau and surrounding area.)
- A water budget considers what is incoming and outgoing (precipitation, stream flow, groundwater flow), what water is lost to different processes (evaporation, transpiration, interception, ablation). It is essentially a balance sheet for the water that flows through the region. Figure 4 shows an example of a water budget from the State of Kansas in the United States (*Sophocleous, 1998, Kansas Geological Survey, University of Kansas, Lawrence, Kansas, Bulletin 239*).

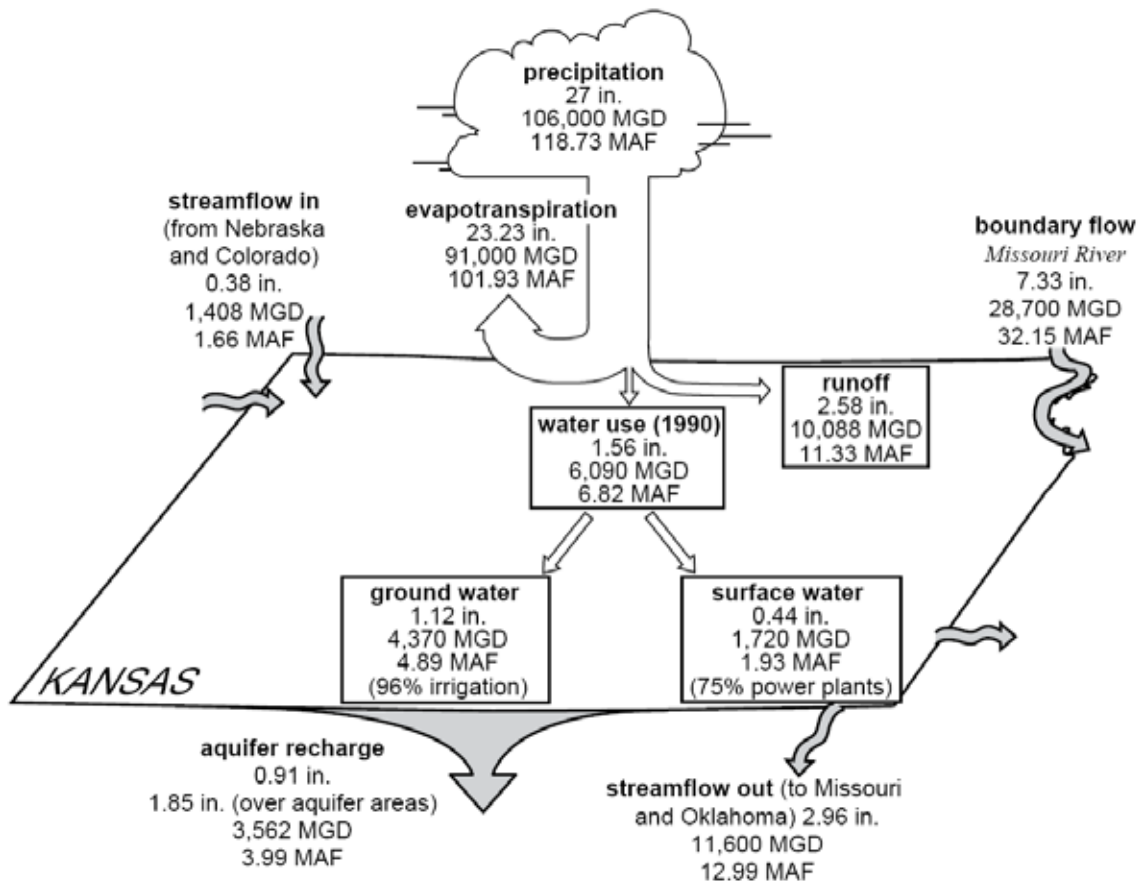


Figure 4: State of Kansas groundwater flow chart taken from *Sophocleous, 1998, Kansas Geological Survey, University of Kansas, Lawrence, Kansas, Bulletin 239*.



- Review existing climate information and identify if and where data is deficient. Although there is robust information collected for forecasting and forest fire protection, we anticipate that very little information exists that accounts for evaporation and snow ablation across vast areas of cleared land in the Nechako plateau.
- Ensure Cooperative learning— as projects and studies are underway, local people are participating and providing services. Results of projects become tangible and people start to see how their land and actions are part of a dynamic system of water flowing through the region.

This list of “next steps” were recommended at the Round Table discussion, and although technical in nature, the results of these “next steps” are the building blocks towards residents having the confidence to know how well their water supply is protected. Similarly the monitoring and information generated by these “next steps” gives people the knowledge to confidently re-shape management of the landscape if desired values are not being realized (i.e. declines in aquifer levels, excessive losses to seasonal run-off, missed opportunities to capture and store moisture within the soil, inadequate maintenance of base-flow and water quality in stream ecosystems, etc). There are explicit opportunities for partnering and leveraging of funds with government, universities, the health authority, non-governmental organizations and funding organizations for every recommendation identified.

Additional to the previous list of “next steps” NEWSS also feels that there is the need for a better understanding of the dynamics of groundwater discharge and recharge in stream-aquifer systems. As identified in the State of Kansas example, quantification of ground-water contributions to stream flow (base flow), definition of minimum stream flow requirements to maintain the capacity of streams to accept discharged contaminants, quantification of riparian vegetation impacts, maintenance of ecosystem functions, and satisfaction of water quality and quantity requirements are subjects of needed research. The relationship between recharge and stream-flow needs to be studied over a range of time scales and water levels to provide an information base for managing the combined resource (surface and ground water) on a long-term basis. High rates of flow and floods, as seen in most of the watersheds identified by NEWSS, has the effect of scouring out stream channels and gradually reducing the permeability of the channel thus altering connectivity of the stream and an aquifer. Effects can be seen in base flow (low flow) contribution, water quality, ability of streams to assimilate nutrients and contaminants as well as ecosystem function.

NEWSS wants to act on the knowledge that the areas surrounding streams have a substantial ground water component. These saturated zones of surface and ground water interaction are connected with the rest of the land base, which is less saturated but continues to have water moving through it at a much slower pace. The things we do to restore a floodplain, stabilize a creek, or remove pollution, directly affect water that is either becoming groundwater or has recently been groundwater and is now part of the aquatic ecosystem. As we unravel how these relationships affect the streams that flow across the Nechako Plateau, this knowledge will inevitably shape how our stream restoration efforts evolve into the future.

Actions taken for the purpose of improving surface water values can lead to rewards in dividends by improving connectivity of water to the rest of the system. By improving our knowledge of how water flows through the entire landbase (below the surface and above), we begin to understand the influence our actions can have, be it through something as simple as improved bank storage that promotes soil moisture for crops and mitigates localized flooding, to influencing upland decisions ranging from manure management, to rural development.



The role of NEWSS is to facilitate the discussion, connect the experts with the challenges and ensure the lessons are shared with everyone. The relationships that NEWSS has formed with the University of Northern British Columbia, Simon Fraser University, Province of British Columbia, Northern Health Authority, Fraser Basin Council and collectively through extension, broader watershed networks, is symbiotic. Universities are interested in studying and learning through experience, the province and health authorities are accountable for the health of the population and the land, the Fraser Basin Council and other watershed networks are interested in sharing knowledge and NEWSS is tasked with bringing this effort together and seeing that it makes a positive contribution to present and future residents of the Nechako region.

Water security, in the context of the Nechako Agriculture belt, is the capacity of the people to manage the resource and ultimately, manage themselves. How we manage the land and water directly influences the water security of the region. In a watershed, groundwater and surface water form a single interconnected and mutually dependent resource. Bringing this knowledge by example and through extension to the stakeholders, schools and individuals leads to capacity building.

### **SEDIMENT LOADING AND OPPORTUNITIES FOR NEWSS**

A 1997 article in the Canadian Journal of Fisheries and Aquatic Science has established that modified river flow and fine sediment load in the Nechako River has led to increased macrophyte (aquatic vegetation) abundance throughout the river bed of the Nechako River (French and Chambers, 1997). This vegetation changes the nutrient and hydraulic dynamics of the system in the sense that it slows the velocity of water that interfaces with the river bed causing fine sediment to settle out that would otherwise stay entrained in the water column. A more in-depth report commissioned by the Nechako Sturgeon Enhancement Society in 2005 examined the specific reach of the river between the hwy 27 bridge and the Stuart River junction (French 2005). This second report examined nutrient and contaminant levels from sources such as municipal sewage and storm run-off but continued to identify the entrainment of fine sediment as a causal link to the degradation of the Nechako River ecosystem and specifically, White Sturgeon spawning and rearing habitat. Both reports clearly show that modified river flows and a large sediment influx from the Cheslatta fan were the primary drivers of increased macrophyte production on the river bed, however, the second report was careful to include the following statement in the description of the study area:

“Diffuse sediment sources to the Nechako River likely include poorly-functioning road and rail crossings over the mainstem and tributaries, sparsely vegetated industrial and residential properties, and poorly-functioning riparian zones in agricultural sub-basins; however, such sediment sources have yet to be quantified.”

It is important for the NEWSS to understand and identify how stream restoration efforts can lead to incremental improvement throughout the Nechako watershed. The periodic hydraulic energy of water in many of the watersheds identified by the NEWSS is increased somewhat by clearing of forest vegetation (i.e. fields, industrial sites, homesteads, harvesting, etc.). Soil and stream bank erosion has been observed in several locations throughout the Murray Creek watershed and by extension, throughout the suite of watersheds initially identified by NEWSS. It is understood that erosion and sediment transport is a natural part of a healthy stream ecosystem. When the hydraulics are increased and riparian zones are diminished, however, sediment transport may be out of balance and this concern is shared by both the 2005 report and the NEWSS.

The questions remain,

1. how much sediment is being transported out of these smaller watersheds and deposited into the Nechako river,
2. to what extent is it out of balance with the natural system, and
3. if efforts are to be made to restore the sediment balance in these smaller watersheds, can understanding the dynamics of sediment transport and knowing the incremental benefits to the sturgeon recovery initiative assist us in establishing priorities throughout the greater watershed?

These questions and many others are intended to be key topics for the conversation that the NEWSS intends to facilitate over the coming years. We feel that this topic is one of many strategic discussions that exemplifies the collaborative spirit and leveraging potential of many initiatives underway in the Nechako watershed. It is also one more argument that reinforces the need for resilient and healthy watersheds and demonstrates the positive trickle-down effect of repairing and maintaining the quality of our source waters and the land from which they originate.





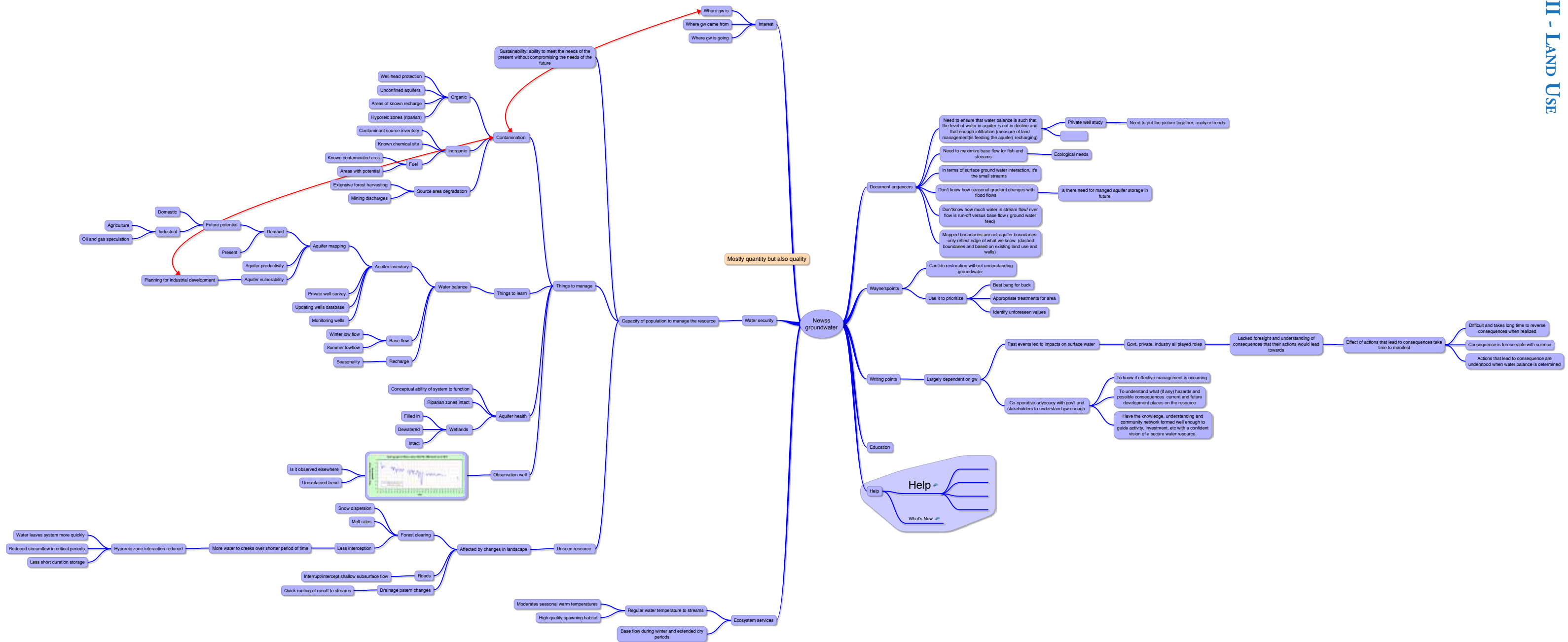


Figure 5: A mind map developed to organize the discussion and ideas that ensued during the 2010 roundtable discussion on groundwater in the Nechako watershed.





## EDUCATION AND OPPORTUNITIES

Our proposal to study the Nechako watershed creates tremendous opportunity to expand our role in facilitation of educational opportunities for regional schools, Universities and the ranching/farming community. We have developed strong working relationships with School District 91 and the University of Northern BC and Northern Health that are already providing education opportunities on the Murray Creek Rehabilitation Project.

### SCHOOLS

Currently we have had over 500 student's tour the Murray Creek Rehabilitation Project from the area elementary and high schools. This includes students from Vanderhoof, Burns Lake, Fraser Lake and Fort St James. It is important to recognize that prior to the Murray Creek Rehabilitation Project no students had ever been involved in a stream restoration project or received instruction on the assets and values of a water management strategy like Murray Creek. Included in these opportunities have been students from Project Agriculture touring the site. Project Agriculture is a 20 year old program that educates students from the region on agricultural opportunities as a future career. SD 91 has also had two high school students take on Murray Creek as an independent study for course credits.

We are currently meeting with SD 91 and the principals of the various schools in Vanderhoof to discuss curriculum opportunities for the upcoming years with our project. SD 91 is committed to working towards inclusion of NEWSS's proposal and is excited what this proposal means for students within the region.

### UNIVERSITIES

Our strong ties with the University of Northern BC (UNBC) has resulted in partnerships with research professionals and has garnered funding for projects like Dr. Margot Parkes "Knowledge to Action" (KTA) grant that is studying the relationships of healthy ecosystems to community health. In this case Dr. Parkes brings the Northern Regional Drinking Water Team, a collaborative group including Northern Health, Fraser Basin Council, Ministry of Environment, and UNBC together to address the ecosystem linkages to health.

We have also had conversations with UBC and Simon Fraser University on our project and feel that should we be successful in obtaining funding, these partnerships will then include the three principle Universities in what one Professor called a "world class proposal" that would bring research teams to look at the watershed, climate change and the agricultural land practices for the betterment of the region.

Dr. Parkes is currently scheduling a national water symposium in Vanderhoof as a result of our collaboration on Murray Creek. The importance of the presence of UNBC in our community cannot be over-emphasized. Dr. Parkes brings forward local politicians, medical authorities, First Nations and area leadership in examining the opportunities for water stewardship in the Nechako Valley that was built in BC and creates opportunities for solutions that recognize provincial legislation requirements.

We would further like to explore opportunities for bursaries and grants to deserving high school students moving forward on studies at the University.



## **NECHAKO WHITE STURGEON RECOVERY PROGRAM**

With the advent of the sturgeon recovery center around the corner, we feel that there are tremendous opportunities for the NEWSS team to partner with the NW sturgeon recovery center and share in the educational opportunities of this facility and the parallel work with the educational opportunities that our watershed initiative will provide. This could include not only core opportunities but involving the students in fine arts that document the history of these projects including educational documentation of the various components that will be moved forward under this program. We would like to participate in conversations that explored opportunities for the students of SD 91 including sharing of staff, facilities and objectives.

## **FARMS AND RANCHES**

There is very little water stewardship educational material available to the farming and ranching community here in BC. Most publications are imported from other Provinces and the northwest United States. Our organization recognizes this as an opportunity to provide field material build in BC that creates opportunities for solutions, recognizing provincial legislative requirements. Our experiences to date strongly indicate a support for NEWSS leadership on the issues of water stewardship and by providing local material we feel that we can accelerate partnerships within the region.

In summary we see the education component of this proposal to be pivotal to our success in bringing water stewardship principles and values to the region. To sustain the work we are doing today we must create an education piece that continues to demonstrate the value of a healthy watershed. In a resource based region where the majority of families are employed in some form of resource extraction, or the support of it, the benefits of having water stewardship principles in the forefront are immeasurable. We would further be very open to investigating how we can unify this thinking with the Nechako White Sturgeon Recovery Center and its mandate. We believe that this may be a very cost effective way of delivering education, tours and material.

## CLOSING REMARKS

The Nechako Environment & Water Stewardship Society (NEWSS) is committed to the concept of working together with industry, First Nations, government and the communities that live, work and recreate within the Nechako Watershed. We firmly believe we can better prepare ourselves to continue to derive the benefits of living off the land by having a better understanding of our watersheds, work towards improving the areas where we have made mistakes and prepare ourselves for the future.



## **APPENDICES**

### **APPENDIX I - INITIATIVES WORKING IN PARALLEL**

Initiatives Working in Parallel on Water Stewardship Issues in BC

### **APPENDIX II - MURRAY CREEK ANNUAL REPORTS**

Murray Creek 2011 Annual Report

Murray Creek 2010 Annual Report

Murray Creek 2009 Annual Report

### **APPENDIX III - MURRAY CREEK NEWSLETTERS**

2011 Murray Creek Newsletter

2010 Murray Creek Newsletter

### **APPENDIX IV - NEWSS LETTERS OF SUPPORT**

Fraser Basin Council Letter of Support

UNBC Letter of Support

SD #91 Letter of Support

### **APPENDIX V - RIPARIAN SETBACK ARTICLE**

Vancouver Sun Newspaper Article regarding Riparian Setbacks

## INITIATIVES WORKING IN PARALLEL ON WATER STEWARDSHIP ISSUES IN BC

The following is a list of programs and groups who's objectives and/or recommendations support the concept of NEWSS and the purpose and vision of this society. The projects and programs that will come from NEWSS will work in parallel to these programs and address key issues in watershed health for the Nechako River.

### BC CATTLEMAN'S FRISP PROGRAM

The BC Cattleman's Farmland Riparian Interface Stewardship Program (FRISP) is the key delivery partner for this proposal. Through their leadership many successful programs have been initiated throughout BC. FRISP is designed to help provincial agriculture producers to protect and enhance water quality, to protect and enhance riparian vegetation, and prevent and mitigate agricultural impacts on streams and lakes.

### LIVING WATER SMART

Living Water Smart (LWS) is a BC Government Initiative. NEWSS addresses the following LWS points.

- (2) By 2012, water laws will improve the protection of ecological values, provide for more community involvement, and provide incentives to be water efficient.
- (3) By 2012, water laws will improve the protection of ecological values, provide for more community involvement, and provide incentives to be water efficient.
- (4) Legislation will recognize water flow requirements for ecosystems and species.
- (5) Government will require all users to cut back their water use in times of drought or where stream health is threatened.
- (11) Government will require more efficient water use in the agriculture sector
- (13) Government will work with the private sector and support communities to conserve and restore stream function.
- (19) Community development strategies will be developed to recognize the importance of riparian zones in adapting to climate change.
- (20) Adapting to climate change and reducing our impact on the environment will be a condition for receiving provincial infrastructure funding
- (23) Wetland and waterway function will be protected and rehabilitated.
- (24) Government will provide incentives for restoration of streams or wetlands
- (35) By 2012, all students in B.C. will have completed at least one stream-health assessment
- (37) Government will provide summer jobs for youth between the ages of 16 to 22, to undertake twenty stream restoration projects across the province.

### RANCHING TASK FORCE

The BC Cattleman's released the Ranching Task Force report that supports and identifies the need for watershed management. This proposal will meet objective number two under the Environmental section, which is to 'develop regulations under the Water Act that facilitate off-stream livestock watering and help secure stream health.'

### AGRICULTURAL FLEXIBILITY FUND

This Federal fund is available to the agricultural sector that can meet any of the three key objectives of this program. NEWSS

meets the objective of 'investments to help reduce production costs or improve environmental sustainability for the sector.' One of their examples of this is to 'expand adoption of management practices and technologies that result in reduced environmental footprint (e.g. long-term improvements to environmental sustainability in the areas of soil, water and air quality)', which is an objective of NEWSS.

### FRESHWATER FISHERIES SOCIETY OF BC

The 2009 Freshwater BC annual report states that 270,000 anglers spent \$480 million on equipment, travel, accommodations and other items in 2005. This quickly shows the value to the BC economy in having productive and healthy watersheds, and supports the objectives of NEWSS.

### SOCKEYE SALMON FRASER RIVER COMMISSION

The status of many salmon stocks including the historically large sockeye salmon run that migrates through the Nechako River will benefit from a program that results in improved aquatic environment in the Nechako River.

### PACIFIC CARBON TRUST – BC FOREST OFFSET

Offset Projects 'a planned set of forestry or land use change activities designed to remove, reduce or prevent carbon dioxide emission in the atmosphere by conserving and or increasing forest carbon stocks.' Eligible Projects 'Afforestation: increasing the area of BC Forests by planting land that has not been forested since December 31, 1989.' Our objectives will be eligible under this definition.

### DUCKS UNLIMITED

Ducks Unlimited is a partner with the BC Cattleman's Association and recognized as 'their water partner.' They have developed a formal MOU that states this partnership and its objectives 'BC Cattlemen's Association (BCCA) and Ducks Unlimited Canada (DUC) have come together because we believe that working cooperatively is of mutual benefit to our organizations and to meeting our respective mandates within the province of British Columbia.'

The purpose of this MOU is to provide a framework for mutually beneficial activities for 'improving the sustainability of Beef Cattle Operations for the benefit of beef cattle producers, waterfowl, other wildlife, and British Columbia.' NEWSS will further support this purpose.

### FARM STEWARDSHIP CANADA – BRITISH COLUMBIA ENVIRONMENTAL FARM PLAN PROGRAM

This funding mechanism partners financially with producers that have a Farm Stewardship Plan in place. The current program runs through until 2013.

### NECHAKO WHITE STURGEON RECOVERY INITIATIVE

The Nechako White Sturgeon Recovery Initiative has identified that the only known spawning location for this endangered



species is at Vanderhoof. The accumulation of fines in the spawning location from point and non-point sources has been identified as a probable contributing factor to recruitment failure. Land and stream stewardship throughout the Nechako Valley will work towards recovery and enhancement of the habitat, the species and the facility.

#### **FRASER BASIN COUNCIL**

Fraser Basin Council supports the principles of this proposal in their Charter for Sustainability 'Living and managing activities in a way that balances social, economic, environmental and institutional considerations to meet our needs and those of future generations.'

#### **MINISTRY OF ENVIRONMENT – WILDLIFE PROGRAM PLAN**

This proposal will meet their Planning Framework and in particular meet their goals of clean and safe water, land & air; British Columbians understand they share responsibility for the Environment; and sustainable use of BC's environmental resource watershed stewardship.

#### **VANDERHOOF RURAL OFFICIAL COMMUNITY PLAN**

The recently adopted Rural Community Plan has identified healthy watersheds as an identified priority in rural planning. This is supported in section 4.2 Natural Environment:

*The natural environment is the foundation of the economic, ecological, and social viability of the Plan area. As such, careful management at local, regional and provincial levels is necessary. The Regional District recognizes the provincial government as having the primary responsibility in managing this resource and supports provincial efforts to manage the natural environment appropriately. Cluculz Lake, Tachick Lake, Nulki Lake, Sinkut Lake, and the Nechako River and their watersheds are the predominant natural features of the area. Their importance, along with other lakes and watercourses to the local communities, the entire region, and areas beyond cannot be over emphasized. These features play a role in many aspects of community life. They are the source of drinking water, an economic generator, and a recreational playground. Not only are the area's lakes and rivers an important amenity for the community and visitors, they are also the natural habitat for a wide variety of fish and aquatic life, waterfowl, and plant species.*

#### **DEPARTMENT FISHERIES AND OCEAN**

This program will help Fisheries and Oceans Canada ensure that the people who reside in the watersheds of the Nechako Watershed are aware of the need to protect and enhance fish habitat through public stewardship and outreach activities. In addition, the habitat conservation and restoration projects initiated within the Nechako Watershed will ensure that the Nechako Watershed provides the fresh water habitat required by salmon to carry out their life cycles. This partnership with the Murray Creek Rehabilitation Group and NEWSS recognizes that Fisheries and Oceans cannot protect and conserve salmon habitat on its own, and that mutual benefits can be achieved when people with like interests act in partnership.

#### **THE REGIONAL DISTRICT OF BULKLEY-NECHAKO**

The objectives of NEWSS would go a long way in helping the Region District of Bulkley-Nechako (RDBN) meet their objectives to lessen their carbon footprint with the rehabilitation of the streams within the Nechako Valley and its associated watersheds. In 2007 the Province established the following goals:

- By 2020, B.C. will reduce its greenhouse gas emissions by 33 per cent, compared to 2007 levels.
- By 2050, GHG emissions in the Province will be reduced by at least 80 per cent below 2007 levels.
- By 2010, the B.C. public sector will be carbon neutral. Section 877(3) of the Local Government Act states that Official Community Plans adopted after May 31, 2010 must include targets for the reduction of greenhouse gas (GHG) emissions in the area covered by the plan, and policies and actions of the local government proposed with respect to achieving those targets

In 2009 the RDBN signed the Climate Action Charter (CAC), which is an agreement between signatory local governments and the Province which outlines the commitments and responsibilities of the Province and local governments as they work together towards reduced greenhouse gas emissions.

Through the CAC the RDBN has agreed to develop strategies and take actions to achieve the following goals.

- Being carbon neutral in respect of their operations by 2012, recognizing that solid waste facilities regulated under the Environmental Management Act are not included in operations for the purposes of this Charter.
- Measuring and reporting on our community's GHG emissions profile.
- And, creating complete, compact, more energy efficient rural and urban communities (e.g. foster a built environment that supports a reduction in car dependency and energy use, establish policies and processes that support fast tracking of green development projects, adopt zoning practices that encourage land use patterns that increase density and reduce sprawl).

We feel we can develop and will have a strong partnership.

#### **NECHAKO FISHERIES CONSERVATION PROGRAM (NFCP)**

The objective of NFCP is the conservation of salmon stocks in the Nechako River. Among additional targets is the goal of keeping water temperatures within designate parameters. We believe that the work of NEWSS will greatly enhance success based on:

*Stream passage and habitat availability will be greatly increased and juvenile fry will be able to migrate out of these side streams and continue to migrate down the Nechako River. If the examples on Murray Creek are the trend across the watershed we should see substantial increased migration of juvenile fry back to the Nechako River.*



## Murray Creek Rehabilitation Project

# 2011 Annual Report



### Murray Creek 2011 Projects

**Project Number:** 11-01- Before

**UTM Coordinates:** 10U 429045 5991660

**Location:** Martens Bull Pasture - Northside Road

**General Description and issues:** Removal of two undersized and hanging closed bottom culverts and construction of cobble/gravel based crossing using geo-grid.

**Future needs:** Some fencing is required.

**Funder:** EDF

**Before:** One of two undersized and hanging culverts to be removed.



### Murray Creek 2011 Projects

**Project Number:** 11-01- after

**Location:** 10U 429045 5991660

**Outcomes:** Two undersized and hanging closed bottom culverts removed, and a cobble/gravel based crossing completed successfully. Approximately 300m of stream upstream of culvert is now accessible to fish.

**Investment:**

**Funders' investment:**

**Landowner investment:** NA

**Donations:**

**Total Investment:**

**After:** Two undersized and hanging culverts removed and a drain rock/cobble crossing constructed.



### Murray Creek 2011 Projects

**Project Number:** 11-02 - Before

**UTM Coordinates:** 10U 430439 5993790

**Location:** Dale Marten, Loop Road.

**General Description and issues:** Removal of one undersized closed bottom culvert and construction of streambed prior to installation of an 1828mm Span x 914mm Rise m open bottom culvert.

**Future needs:**

**Funder:**

**Before:** One undersized culvert to be removed





### Murray Creek 2011 Projects

**Project Number:** 11-02- After

**Location:** 10U 430439 5993790

**Outcomes:** Removal of an undersized closed bottom culvert and installation of an 1828mm Span x 914mm Rise m open bottom culvert. Approximately 800m of stream upstream of culvert is now accessible to fish.

**Investment:**

**Funders' investment:**

**Landowner investment:**

**Donations:** Arch Culvert

**Total Investment:**

**After:** Installation of an 1828mm Span x 914mm Rise m open bottom culvert.



### Murray Creek 2011 Projects

**Project Number:** 11-03- after

**Location:** Gaylon McKee, East of Loop Road

**Outcomes:** Approximately 110m of stream bank was armored and stabilized preventing further erosion and sediment deposition.

**Investment:**

**Funders' investment:**

**Landowner investment:** NA

**Donations:** NA

**Total Investment:**

**After:** Set back armoring riprap construction of stream banks in problem areas.



### Murray Creek 2011 Projects

**Project Number:** 11-03- Before

**UTM Coordinates:** 10U 430682 5988272

**Location:** Gaylon McKee, East of Loop Road.

**General Description and issues:** A combination of grazing activity, fine glacial-lacustrine bank material and the blowout of a beaver dam have contributed to lateral stream movement and erosion of the stream bank in several places. The prescription included strategically placing rock armoring on the stream bank for increased structural integrity, and the planting of native (willow) and grass species, to prevent further erosion and sediment distribution downstream.

**Future needs:** Stream should be fenced to keep cattle away from stream banks.

**Funder:**

**Before:** Undercutting of stream banks & extensive cattle use eroding stream banks.



### Murray Creek 2011 Projects

**Project Number:** 11-04 - Before

**UTM Coordinates:** 10U 434599 5992137

**Location:** Sylvia Price – McLeod Road

**General Description and issues:** Removal of three undersized closed bottom culverts and construction of streambed prior to installation of a 2438mm Span x 1219mm Rise Dur-A-Span Arch

**Future needs:** Fencing off of Murray Creek scheduled for December 2011. Additional deciduous cuttings and conifers will need to be planted.

**Funder:** EDF Fund

**Before:** Three culverts in various stages of erosion were removed



### Murray Creek 2011 Projects

**Project Number:** 11-04 - after

**Location:** Sylvia Price – McLeod Road

**Outcomes:** 3 undersized culverts removed, and installation of a 2438mm Span x 1219mm Rise Dur-A-Span Arch. Approximately 650m of stream upstream of culvert is now accessible to fish.

**Investment:**

**Funders' investment:**

**Landowner investment:** NA

**Donations:** Arch Culvert

**Total Investment:**

**After:** Arch culvert installed and erosions from cattle and banks were rocked to repair erosions above and below this new installation.



### Murray Creek 2011 Projects

**Project Number:** 11-05 - Before

**UTM Coordinates:** 10U 430346 5989240

**Location:** Kevin Bailey's property, approx. 5km from Vanderhoof, East off of Loop road

**General Description and issues:** An existing crossing was in poor condition. A prescription to upgrade and construct a cobble/gravel based crossing provided a hardened watering site for livestock to drink and cross at the stream, and will allowed for infrequent crossing of farm equipment.

**Future needs:**

**Funder:**

**Before:** The Murray Creek crossing on Kevin Bailey's property pre-work.



### Murray Creek 2011 Projects

**Project Number:** 11-05 - after

**Location:** Kevin Bailey's property, approx. 5km from Vanderhoof, East off of Loop road

**Outcomes:** Crossing upgrade completed successfully, permitting the reduction of erosion and sediment deposition from unfettered livestock access to the stream.

**Investment:**

**Funders' investment:**

**Landowner investment:** NA

**Donations:** NA

**Total Investment:**

**After:** The Murray Creek crossing on Kevin Bailey's property post-work.



### Murray Creek 2011 Projects

**Project Number:** 11-06- Before

**UTM Coordinates:** 10U 429988 5990082

**Location:** John Bailey's property, approx. 6km from Vanderhoof, East off of Loop road.

**General Description and issues:** An existing crossing was in poor condition. A prescription to upgrade and construct a cobble/gravel based crossing provided a hardened watering site for livestock to drink and cross at the stream.

**Future needs:** This section of stream should be fenced except at the crossing and more willow staking would help stabilize stream banks.

**Funder:**

**Before:** An existing crossing used by livestock that is contributing sediments into the stream.





### Murray Creek 2011 Projects

**Project Number:** 11-06 - after

**Location:** John Bailey's property, approx. 6km from Vanderhoof, East off of Loop road.

**Outcomes:** Crossing upgrade completed successfully, permitting the reduction of erosion and sediment deposition from unfettered livestock access to the stream.

**Investment:**

**Funders' investment:**

**Landowner investment:** NA

**Donations:**

**Total Investment:**

**After:** Hardened crossing of drain rock and cobble.



## 2010 Annual Report

### Murray Creek 2010 Projects

**Project Number:** FSWP – 10-1 - Before

**Location:** Alan Martens – Gravel Pit Rd off Larsen Rd

**General Description and issues:** Undersized culverts removed and replaced with arch culvert

**Future needs:** Continue riparian planting above and below installation

**Funder:** PSWP

**Before:** Road washed out for a mile in heavy snow years and then re-entered Murray Creek downstream. Chinook salmon fry found in plunge pool prior to removal and replacement



### Murray Creek 2010 Projects

**Project Number:** FSWP – 10-1- After

**Location:** Alan Martens – Gravel Pit Rd of Larsen Rd

**Outcomes:** Meets flow requirements and provided fish passage and increased stream availability  
Increased stream length: 800 meters plus.

**Investment:**

**Funders investment:**

**Landowner investment:** EFP - \$

**Donations:** Arch Culvert \$10,000

**Total Investment:**

**After:** Fry were moving through new culvert within minutes of completion



### Murray Creek 2010 Projects

Project Number: HCTF – 10-2 Demo Site - Before

Location: Alan Martens – Gravel Pit Rd off Larsen Rd

General Description and issues: Decades of heavy use created the situation

Future needs: Continue riparian planting

Funder: HCTF

Before: Heavily used pasture, no riparian zone, banks have lost structure



### Murray Creek 2010 Projects

Project Number: HCTF -10-2 Demo Site - After

Location: Alan Martens – Gravel Pit Rd off Larsen Rd

General Description: Stream started to channelize in the first spring after, area fenced off from cattle and cattle restricted to one site for watering

Future needs: Off channel waterier to be installed east of this site

Outcomes: Investment:

Funders investment:

Landowner investment:

Donations:

Total Investment:

After: Banks stabilized, willows and red osier planted



### Murray Creek 2010 Projects

Project Number: HCTF – 10-2 Demo Site

Location: Alan Martens – Gravel Pit Rd off Larsen Rd

General Description and issues: Decades of heavy use created the situation

Future needs: Continue riparian planting

Funder: HCTF

After: This site is used as a demonstration site to show what can be done to repair using Bio-engineering. The site is used by School District 91 for Project Agriculture, University of Northern BC for graduate studies and Northern Health as they collaborate with the Northern Regional Drinking Water Team to better understand the linkages between healthy watersheds and human health.



### Murray Creek 2010 Projects

Project Number: HCTF -10-2 Demo Site

Location: Alan Martens – Gravel Pit Rd off Larsen Rd

General Description: Stream started to channelize in the first spring after, area fenced off from cattle and cattle restricted to one site for watering

Future needs: Off channel waterier to be installed east of this site

Outcomes: Investment:

Funders investment:

Landowner investment:

Donations:

Total Investment:

After: Bottom portion of Demo site with banks stabilized, willows and red osier planted





### Murray Creek 2010 Projects

Project Number: FSWP 10-03 - Before

Location: Tom Silvers, 1 mile up from mouth of Murray Creek

General Description and issues: Narrowing of flood channel upstream increased velocity

Future needs: Monitoring

Funder: Fraser Salmon Watershed Program

Before: Unauthorized work upstream caused stream to start cutting a new channel, jeopardizing foundation of house. This was moving more silt downstream and also increasing stream velocity.



### Murray Creek 2010 Projects

Project Number: FSWP 10-03 - After

Location: Tom Silvers

General Description:

Future needs: Monitoring

Outcomes: Investment:

Funders investment:

Landowner investment: nil

Donations:

Total Investment:

After: Rock and log structure installed that allowed stream to meander and continued to utilize old channel.



### Murray Creek 2010 Projects

Project Number: FSWP 10-04 - Before

Location: Vern Reimer. End of Ericson Road

General Description and issues: Banks had lost their structural integrity along with the breakage if a beaver dam years earlier that moved the stream channel against the clay bank and eroded large section of bank downstream

Funder: Fraser Salmon Watershed Program

Before: 2009



### Murray Creek 2010 Projects

Project Number: FSWP 10-04 -after

Location: Vern Reimer

General Description:

Future needs: additional planting of willows, alders and conifers. Additional fencing in a couple of spots will happen

Outcomes: Investment:

Funders investment:

Landowner investment:

Donations:

Total Investment:

After: Rock and log structures installed along with deciduous cuttings that took well.





### Murray Creek 2010 Projects

Project Number: 10-05- after

Location: Striegler Pit Road

General Description: Silt was moved down the ditch line in heavy rains and was silting Murray Creek up. L&M Lumber had the ditch lined with cobble and installed an additional side culvert that moved this water into the forested land before entering the stream

Future needs: Monitoring

Funder: L&M Lumber Ltd.

Donations: \$2500.00

Total Investment: \$2500.00

After



### Murray Creek 2010 Projects

Project Number: 10-05-after

Location: Striegler Pit Rd

General Description and issues: Silt was washing down ditches of logging road and flowing into Murray CK.

Funder: L&M Lumber took this project on as soon as it was identified

After



### Murray Creek 2010 Projects

Project Number: 10-06 – Before and after

Location: McLeod Rd – “Grannies”

General Description: David Martens and Sons (DMS)- previous land owner had put the stream “where it belongs” and had farmed through the stream. DMS fenced off the main stream, hardened off four stream crossings for machinery and cattle watering and planted stream sides with willow

Future needs: addition planting of conifers and deciduous species

Funder:

Donations:

Total Investment:

After



### Murray Creek 2010 Projects

Project Number: 10-06

Location: McLeod RD -“Grannies”

General Description: DMS

Future needs: additional planting of willows, alders and conifers.

Outcomes:

Investment:

Funders investment:

Landowner investment:

Donations:

Total Investment:

After; hardened off stream crossing. One of four





# 2009 Annual Report

## Murray Creek 2009 Projects

**Project Number:** FRISP – 01-09

**UTM Coordinates:**

**Location:** Gaylon McKee

**General Description and issues:** Personal Bridge was continually having its foundations washed out and landowner had to go into the stream almost annually to reset foundation

**Future needs:** Monitor

**Funder:** BC Cattleman's FRISP program

**Before:**



## Murray Creek 2009 Projects

**Project Number:** FRISP – 01-09

**UTM Coordinates:**

**Location:** Gaylon McKee

**General Description and issues:** Personal Bridge was continually having its foundations washed out and landowner had to go into the stream almost annually to reset foundation

**Future needs:** Monitor

**Funder:** BC Cattleman's FRISP program

**After:**



## Murray Creek 2009 Projects

**Project Number:** FRISP -02 - 09

**UTM Coordinates:**

**Location:** Gaylon McKee

**General Description and issues:** Cattle watering had caused banks to erode

**Future needs:** Over planting with Conifers

**Funder:**

**Before:**



---

### Murray Creek 2009 Projects

---

**Project Number:** FRISP -02 - 09

**UTM Coordinates:**

**Location:** Gaylon McKee

**General Description and issues:** Cattle watering had caused banks to erode

**Future needs:** Over planting with Conifers

After: poor picture, but brow logs were anchored to rocks placed along the bank and willows planted



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### Murray Creek 2009 Projects

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## WHAT YOU CAN DO TO BE A STREAM STEWARD

- Maintain a **vegetated buffer** along riparian areas while cultivating, spreading manure and fertilizing.
- **Fence** off the stream from livestock.
- **Improve** road crossings and culverts.
- **Plant trees** within the riparian area.
- Make sure **livestock cannot access riparian areas** from confined areas such as pens or feedlots.
- **Avoid** working the soil and pasturing cattle near riparian areas when soils are wet.
- Provide **alternate water sources** for your livestock and fence off sensitive areas.
- **Avoid** manure build-up and do not spread manure on frozen ground.
- Place supplements and feed **away from riparian areas** (a minimum of 30 m, as stated under the Provincial Agriculture Waste Control Regulation).
- Distribute livestock evenly and exercise **good pasture management**.
- Complete an **Environmental Farm Plan**.
- **Attend** meetings and participate in stewardship projects.
- **Educate yourself** on stream health and stream rehabilitation.

*Contact us for assistance with fencing materials, off channel watering systems, and tree planting along the Murray Creek riparian corridor.*



## CONTACT & RESOURCES

If you are interested in rehabilitation work on Murray Creek contact us for more information, materials, and supplies.

Richard Marrons: 250-567-9402 • Wayne Salewski: 250-567-9542 • Brian Frenkel 250-567-6603

Get information on **Environmental Farm Planning** at:

<http://www.agf.gov.bc.ca/tesmgmt/EnviroFarmPlanning/index.htm>

Detailed information on **Best Management Practices** is available at:

<http://www.env.gov.bc.ca/wld/BMP/bmpintro.html>

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Rehabilitation Project 2011

2011 Newsletter

# Murray Creek Rehabilitation Project

2011 ANNUAL NEWSLETTER

## OUR GOALS:

- To enhance the habitat along Murray Creek for the benefit of all users, fish, & wildlife.
- To facilitate the process of the agricultural community voluntarily working towards water stewardship along Murray Creek.

Murray Creek flows into the Nechako River within Vanderhoof town limits. Salmonids, including trout and young Chinook salmon, live within the waters of Murray Creek. At the mouth of Murray Creek adult Chinook salmon and the endangered Nechako White Sturgeon spawn. Contaminants and sediment introduced into Murray Creek ultimately reach the Nechako River and impact fish species spawning and inhabiting waters downstream.

Stewardship measures taken by landowners, government, private industry, and citizens are improving Murray Creek and resulting in a healthier ecosystem, improved conditions for livestock, and protection of land assets.

## ABOUT THE MURRAY CREEK REHABILITATION PROJECT

The Murray Creek Rehabilitation Project brings together land owners, businesses, schools and environmental stewards that collaborate to rehabilitate Murray Creek. We hope to increase the number of salmonids that inhabit Murray Creek, as well as improve water quality to create a healthy ecosystem. This will in turn contribute to the health of the Nechako River and the salmon and white sturgeon that spawn at the mouth of Murray Creek.

The Murray Creek Rehabilitation Project has been well received by most of the land owners along the creek, as well as members of the community and governments.

## FUNDING & PROJECTS

To date the Murray Creek Rehabilitation Project has secured funding and in-kind contributions that have gone towards a number of in-stream works projects including fencing off the stream, off channel watering, bioengineering to stop erosion, replanting the riparian zone, and replacing inadequate culverts to be fish friendly. As well as educational field trips for elementary and secondary school students, public education, and research (UNBC Graduate study in Community & Watershed Health).

## PARTNERS & COLLABORATORS

The Murray Creek Rehabilitation Project partners are Murray Creek landowners, BC Cattlemen's Association, Farmland - Riparian Interface Stewardship Program (FRISP), Regional Cattlemen's Association, Regional District of Bulkley - Nechako, District of Vanderhoof, Rio Tinto Alcan, Habitat Conservation Trust Foundation, Fisheries and Oceans Canada, Fraser Salmon and Watershed Program, University of Northern British Columbia, Ministry of Environment - Environmental Stewardship Division, Avision Management Services, M4 Contracting, School District #91, and the Northern Regional Drinking Water Team which includes Fraser Basin Council, Northern Health and UNBC.

### 2011 FUNDERS : TOTAL \$72,000

Environmental Damages Fund: \$29,000  
Pacific Salmon & Watershed Program: \$35,000  
Department of Fisheries and Oceans: \$8,000  
Environmental Farm Planning will be well over \$30,000 once submitted.



Properly installed culverts allow for adequate volume and capacity of water to flow through, and fish passage. This culvert was replaced this summer at a washed out road crossing on private land. Rainbow trout fry were found at this crossing, and the properly installed culvert allowed for both fish passage and renewed road access to adjacent fields.

**FACT:** In 2011, DFO found juvenile Chinook salmon (fry) as far as 6 km upstream in Murray Creek from the Nechako River. These fish likely spawned in the Murray Creek and moved into habitat (a place to grow).



Bank stabilization, cattle crossing armouring, in-stream boulders and logs, and tree planting were some of the in-stream rehabilitation measures completed at the Demonstration Site on Murray Creek. These measures will slow down water flow, reduce bank erosion and siltation into the creek, and provide improved habitat for fish, and better water quality overall.

In 2010 over \$10,000 was invested into rehabilitation measures on Murray Creek.



Livestock are healthier and have greater weight gain when they have access to clean water. Providing off channel fresh water preserves water quality. You can view this waterer at the Demonstration Site.

## MAJOR PROJECTS IN 2011

### Projects that were completed this year included:

- Three undersized culverts were removed and replaced with arch culverts that were the appropriate size for the stream crossing. Additionally, one undersized culvert was removed and the crossing was reinforced to allow fording the stream with no damage.
- Stream bank restoration took place to restore bank integrity on two separate sites.
- Two new stream crossings were installed to tie into two new fencing projects that will control cattle movements.

### Project Highlights

- A **culvert assessment** was completed that examined all culverts, private and crown, that Murray Creek flows through within the entire watershed. This was a \$17,000 investment by DFO. What was found is that many culverts installed decades ago do not meet the water flow standards and requirements of today, nor do they allow fish passage. Culverts that impede water during spring freshet increase the risk of road failure and cause fields to be flooded for extended periods of time.
- The **Murray Creek Demonstration Project** was launched this past fall. The site, a section of Murray Creek that was rehabilitated in 2010, was established to demonstrate the regrowth of the riparian zone along Murray Creek, and various in-stream rehabilitation methods. The site doubles as an educational tool for students from area schools and UNBC, as well as the general public. A sign and brochure guide visitors through the site and explain the measures that were completed to improve stream habitat and the riparian zone. School District 91's Project Agriculture program included this as part of their 2011 curriculum.
- Dave Martens & Sons installed an **off channel watering system** designed by Henry Wiebe. Richard Martens was pleased as it removed cattle from the stream. It is gravity fed water and all excess water flows back into the stream. Richard feels it will water four hundred head daily with ease. If this system looks right for your operation, the Murray Creek Rehabilitation group is willing to cover the cost of installation.
- DFO provided \$8,000 for **fencing materials**. This allowed us to fence additional portions of Murray Creek. If you are a producer with an Environmental Farm Plan and a project that will fence cows out of the stream, we can help with posts and wire. Contact Richard Martens for more information (see reverse).
- Dr. Margot Parkes a UNBC Professor and Canada Research Chair in Health, Ecosystems, and Society – has obtained two grants that pertain to Murray Creek and adjoining watersheds in Northern BC. Dr. Parkes comes here to **examine the effect of changing ecosystems on the health and well-being of communities**, with a focus on water as a common resource for livelihoods, food security, culture and economies.
- One UNBC Graduate student has submitted a project proposal for **graduate studies examining ground water and its relationship to riparian health**.

Ecological Taxation – David Zehnder has been working with the BC Cattlemen's Association to define a study on Murray Creek that will examine an opportunity to provide **compensation to landowners that are protecting riparian zone** with an annual cheque for this exclusion of usage. This is one of many areas in the province that is being included in his study and could help to form policy and process to reward wise water stewardship producers.



# MURRAY CREEK

## Rehabilitation Project

Summer/Fall  
2010

### About Us...

We bring together land owners, businesses, schools and environmental stewards to collaborate to rehabilitate Murray Creek. We hope to increase rainbow trout and salmon stocks, as well as improve water quality.

### OUR GOAL:

To enhance the habitat along Murray Creek for the benefit of all users, fish, and wildlife.



Resetting bridge footing on Murray Creek. (WS)

*"It is important to save the creek from unnecessary erosion as it is a vital water, fish, recreation and wildlife resource. It is important to improve the fish habitat and to see agriculture protecting and properly using the creek."*

Gaylon McKee, Participating Farmer

### What Are Riparian Areas?

Riparian areas are the transition zones from water to stream bank. They include the ribbon of delicate grasses, shrubs, and vegetation along the stream edge and provide shelter and shade for numerous insects, fish, and wildlife.

### How Riparian Areas Work:

- Riparian areas improve water quality by filtering and trapping sediment from runoff.
- They reduce erosion by offering stability to the stream banks and shorelines.
- They reduce algae blooms, store nutrients, and trap contaminants such as pesticides.

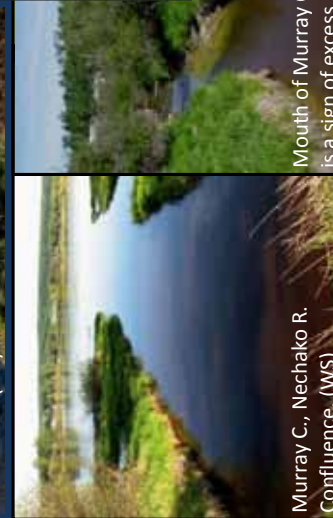
### Did You Know?

Riparian areas need deep rooted vegetation to properly function and to produce clean water.

can: clog and abrade fish gills, impair visual feeders (eg. Trout), suffocate eggs, lead to poor egg and fry development, and can clog sheltered areas where young fish find protection to survive.



A cow pasture under consideration for rehabilitation treatments. (WS)



Mouth of Murray C. Green algae is a sign of excess nutrients. (AK)

### Fish and Fish Habitat

Murray Creek flows into the Nechako River within Vanderhoof town limits, meters away from where sturgeon choose to spawn. Silt, sediment and contaminants that are not properly filtered enter the Nechako River and settle on the Sturgeon spawning grounds. Excess sediment in fish bearing water courses can: clog and abrade fish gills, impair visual feeders (eg. Trout), suffocate eggs, lead to poor egg and fry development, and can clog sheltered areas where young fish find protection to survive.

## Our Successes To Date:

- 15 km of streams assessed and mapped
- 12.5 km of fencing over 3 ranches
- 3000 seedlings planted
- 1 in stream rehabilitation project
- 1 bridge abutment reset
- Over \$84,000 raised for this year's Program
- Work done on drainage ditches above Striegler Pit by L&M Lumber to eliminate siltation into Murray Creek.

## Future Plans:

Work towards the development of a marketing strategy that brands the ranching community in a positive way for "water stewardship planning."

## Thanks to our Partners!

- Avison Management
- BC Cattlemen's Association- FRISP
- BC Forest Service- BC Timber Sales
- Bud Pye Contracting
- Department of Fisheries and Oceans
- Fraser Basin Council
- Fraser Salmon and Watershed Program
- Habitat Conservation Trust Fund
- Katimavik- Canada's Youth Volunteer Work Group
- Nechako Excavating Ltd
- Nechako Trading Company
- NVSS- Chris Mushamanski
- Classes
- Pacific Salmon Foundation
- Rio Tinto Alcan
- Stewardship of BC
- Village Inn Restaurant
- Yellowhead Road and Bridge



Fish friendly culvert- allowing for volume and capacity of fish and water to flow through. (AK)

## Did You Know?

Poorly maintained riparian areas do not filter sediments properly. Sediments can cover areas where fish feed, hide from predators and lay eggs.



Healthy riparian zone. (WS)

Creeks crossing open fields are subject to contamination, fertilizer and runoff. They also have less protection from the sun's rays and can heat up quickly. Increased water temperatures and excessive nutrients can lead to algae blooms which can lower water oxygen levels. Cool, clear, oxygenated water is vital to fish health and survival.

## Get Involved!

- Learn More? Contact **Wayne Salewski (Project Leader) 250-567-9542**
  - Making an Environmental Farm Plan? Contact **EFF Advisor Laura Grafton Ph. 250-967-4272 Fax: 250-967-4291 email: bark@explornet.com**
- (Photos for newsletter taken by Wayne Salewski and Alana Kulchar)

## What You Can Do...

- Maintain a **vegetated buffer** along riparian areas while cultivating, spreading manure and fertilizing.
- Make sure **livestock cannot access riparian areas** from confined areas such as pens or feedlots.
- **Avoid** working the soil and pasturing cattle near riparian areas when **soils are wet**.
- Provide **alternate water sources** for your livestock and fence off sensitive areas.
- **Avoid manure build-up** and do not spread manure on frozen ground.
- Place supplements and **feed away** from riparian areas. (A minimum of 30 meters, as stated under the Provincial Agriculture Waste Control Regulation).
- **Distribute livestock evenly** and exercise good pasture management.
- Complete an **Environmental Farm Plan**.

## Resources

- If you are interested in rehabilitation work on Murray Creek contact Richard Martens or Wayne Salewski for information, materials, and supplies.  
**Richard: 250-567-9402 Wayne: 250-567-9542**
- The Murray Creek rehabilitation group will plant seedlings along the M.C. riparian corridor at no cost to you. Call **Wayne: 250-567-9542**
- **The next Murray Creek Newsletter will be released Winter/Spring 2011 and will include more tips, updates and plans for the 2011 Summer.**

Undefined creek banks make navigation by fish and aquatic life difficult. Loss of native plant species and lack of biodiversity lowers ecosystem stability and health. (AK)

**Did You Know?**  
Livestock are healthier and have greater weight gains when they have access to clean water.







*Social well-being supported by a vibrant  
economy and sustained by a healthy environment*

January 10, 2012

Wayne Salewski  
PO Box 1983  
Vanderhoof, BC  
V0J 3A0

**Re: Support for Engaging the Nechako Agriculture Sector**

The Fraser Basin Council is pleased to support the Nechako Environment Stewardship Society (NEWSS) proposal designed to enhance riparian systems on private lands via partnerships with the agricultural sector.

Our involvement in the Murray Creek Rehabilitation Project has been very informative and we believe that there is a need to expand the current riparian enhancement activities in partnership with the agricultural sector. As you are aware, the Nechako Agriculture belt is an important piece of British Columbia's sustainable food solution and is a central component of the health and well-being of communities within the Fraser Basin.

We encourage NEWSS to continue to embrace a collaborative model and work with all orders of Government (Federal, Provincial, First Nations and Local) the private sector and non-government organizations in the development and implementation of its proposed activities.

Sincerely,

Terry Robert  
Regional Manager





Jan 6<sup>th</sup> 2012

To whom it may concern,

**Re: Murray Creek Rehabilitation Project and ongoing activities in Nechako Watershed**

I am very pleased to write this letter of support for the Murray Creek Rehabilitation Project informed by my involvement with their initiatives to date, and plans for ongoing engagement with new phases of activity associated within the wider Nechako Valley.

I have described my support here, in relation to (1) my own research in Northern BC and how this links with the Murray Creek Rehabilitation Project (MCRP); (2) existing collaborative research projects with MCRP; and (3) Future potential and planned activities leveraging off initial work by MCRP. The letter is written in the context of my role as Canada Research Chair in Health, Ecosystems and Society at the University of Northern British Columbia (UNBC) with a cross-appointment in the School of Health Sciences, and the Northern Medical Program, as well as roles as co-founder of the Canadian Community of Practice in Ecosystem Approaches to Health and as President of the International Association for Ecology and Health.

**1. Research in Northern BC and links with the Murray Creek Rehabilitation Project.**

From my background as a medical doctor and subsequent training in human ecology, public health and ecohealth I have developed a research focus on the impacts of ecosystem change on determinants of health especially in the context of watersheds, and in the design of education, research and governance options to address the converging objectives of health, social equity and ecosystem sustainability. Moving to Northern BC in 2009 has provided opportunities to work with a variety of groups interested in “fostering healthy people, living in healthy communities and in healthy environments”. This has involved establishing research connections with groups including Northern Health, local watershed groups, First Nations, local and provincial government, and interdisciplinary research colleagues at UNBC and beyond.

Since early 2010 I have been very fortunate to establish a productive and mutually beneficial working relationship with the **Murray Creek Rehabilitation Project** and the related groups in the community of Vanderhoof. The basis for this collaboration has been the work and leadership the Murray Creek Rehabilitation project in creating community-oriented land and water stewardship opportunities that have far-reaching implications for the health and wellbeing of the communities through their combined socio-economic and environmental impacts. My work with MCRP around Vanderhoof has provided timely insights about health as an important consideration in water and land governance in Northern BC, and of watersheds as settings for intersectoral action to improve health and wellbeing. These issues are especially important for important agricultural areas such as the Nechako Valley that will be highly influential as BC engages with the long term challenges of sustainability and security of food, land and water resources, and the implications these issues have for health and wellbeing.

**2. Existing collaborative projects with the Murray Creek Rehabilitation project**

Initial meetings with members of the MCRP team in February 2010 provided the foundations for an ongoing working relationship focused on the themes above. Since early 2010, I have worked with MCRP to develop a series of funded research collaborations – the most notable of which are described briefly here as background to specific upcoming collaborative initiatives.

**2a. “Linking Land Waterways and Health Living Project”,** funded by the BC Real Estate Foundation with in-kind support from the Fraser Basin Council, granted for 1 year in April 2010. The goal of this project was to enhance understanding of the pathways by which environmental stewardship activities offer practical, integrated opportunities to promote

**SCHOOL OF  
HEALTH SCIENCES**

College of Arts,  
Social & Health Sciences  
3333 University Way  
Prince George, BC  
V2N 4Z9  
Tel: (250) 960-6813  
Fax: (250) 960-5744

The initial project involved ongoing consultation with MCRP and liaison with local community advisors, review of literature regarding land/water stewardship and links with health and wellbeing; mapping and archiving for the Murray Creek Rehabilitation Project, and interviews and meetings with community organisations. Outcomes arising from this project include:

- Integration of themes, issues and project partners (MCRP, Vanderhoof District, FBC) as part of a UNBC-Northern Health (NH) 'knowledge to action' research partnership funded by CIHR entitled "Improving social and environmental determinants of health through integrated water governance" (see below);
- Participation by project partners (MCRP, Fraser Basin Council, UNBC) in inter-agency site-visits, meetings, and collaborative research planning, particularly with the Northern Regional Drinking Water Team;
- Collaboration for new round of BCREFPF funding in conjunction with UNBC 'integrated watershed-based science' researchers to leverage off the success of Murray Creek Rehabilitation Project (see 2b).
- Site visit to Murray Creek Rehabilitation Project as part of 2011 national Ecohealth summer school hosted at UNBC June 2011, with involvement of project participants (MCRP, FBC, NH, SD91, Rio Tinto Alcan)

**2b. "Working together to protect and enhance land, waterways and health in Northern BC: leveraging the potential of the Murray Creek Rehabilitation Project"**, is a 2<sup>nd</sup> phase of funding from the BC Real Estate Foundation, granted in April 2011. This builds directly from the first phase work to consolidate and develop initial relationships and research finding. The objectives are to further develop and refine approaches to integrate, share and exchange information about health, environment and social benefits of land and water stewardship - using in Murray Creek as a case-study for extension to other sites in the Nechako Valley; and to collaborate with government and research partners on a pilot study of water flow dynamics in riparian buffer zones on agricultural land to protect and enhance surface and ground water resources and habitats, using Murray Creek as a pilot study.

**2c. "Ecohealth & Watersheds in Northern BC" project**, funded in April 2011 for 2 years by the Canadian Institutes for Health Research, with a focus on "Improving Social and Environmental Determinants of Health through Integrated Water Governance". This 'knowledge to action' project is co-led by Dr. Margot Parkes (UNBC) and Dr. Ronald Chapman (Chief Medical Officer of Health, NH) and a steering committee with involvement from a range of 'knowledge-users'. Wayne Salewski represents the Murray Creek Rehabilitation Project as an important watershed partner on this Steering Committee.

### **3. Future potential and planned activities - leveraging off initial work with MCRP to develop**

Each of the initiatives above have contributed to an understanding of the role of the MCRP as an innovative, community-oriented initiative with diverse support and engagement, that crosses boundaries among community, academic, not-for-profit and government initiatives and with considerable potential to expand beyond its initial successes. For this reasons the following activities are already planned to profile MCRP as an exemplar of projects that promote converging community, socio-economic and environmental agendas.

- 3a.** March 19-21, Vanderhoof. Knowledge-to-Action workshop with national participants. This event will use MCRP as an exemplar and case-study to explore the challenges of integrating complex spatially referenced data for community oriented projects that are combine socio-economic, environmental and health objectives.
- 3b.** Further development of an intersectoral, interdisciplinary, inter-university project team to develop an integrated water budget (including surface and groundwater) for the Nechako watershed, and it's contribution to the Fraser River Basin. Conversations for this project have already begun with UNBC and SFU researchers, Regional Drinking Water Team and members of the MCRP.

I would be happy to provide more information about these existing collaboration with the MCRP and why I am in strong support of this valuable precedent of work being extended to offer long-term health, environment and socio-economic benefits to the wider Nechako Valley.

Sincerely,



Margot Parkes  
Canada Research Chair in Health, Ecosystems & Society, UNBC

***School District No. 91 (Nechako Lakes)****P.O. Box 129, Vanderhoof, B.C. V0J 3A0**Telephone: (250) 567-2284 Fax: (250) 567-4639*

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December 5, 2011

To Whom It May Concern:

**Re: Murray Creek Project**

This letter is written in support of the Murray Creek Project and their funding application. School District No. 91 (Nechako Lakes) supports hands-on educational opportunities that allow our students to interact with their environment and the local community. Students need opportunities to learn about their environment and the role they play in that stewardship.

Students in School District No. 91 (Nechako Lakes) have had the opportunity to work and learn on the Murray Creek Rehabilitation Project. To date, more than 500 hundred students have been involved in real life, hands-on projects at the creek and we look forward to increasing this number. Students have the opportunity to learn firsthand what it takes to maintain and restore a healthy ecosystem as they help take water samples, count "critters" in the water, count fish, and map progress. Learning excursions to the creek have included small groups and entire class fieldtrips. Even more exciting, we are now seeing students volunteer to undertake Independent Learning activities that allow them to work side-by-side with local community groups on water and fish related stewardship projects.

Additionally, School District No. 91 runs an agricultural career awareness project every year. Murray Creek runs through the farm where this event is held and we have been pleased to support Mr. Wayne Saléwski and the Murray Creek Project in setting up a creek station where students explore the impact of agriculture on the creek.

Mr. Wayne Saleweski and his organization are exemplary supporters of the education process and always strive to involve our students in their projects.

The Board supports initiatives that provide our students with the opportunity to do good things and grow and learn from projects such as this.

Sincerely,

Eugene Marks  
Director of Instruction

EM/ej

## PAYING FARMERS TO PROTECT HABITAT COULD SAVE ENVIRONMENT AND CASH

By Randy Shore, Post media News January 11, 2012  
Vancouver Sun

*Riparian setbacks designed to protect species at risk could mean farmers will have to stay 30 metres away from water.*

VANCOUVER — A research consortium is field-testing a revolutionary plan that would pay B.C. farmers and ranchers to produce cleaner air, water and wildlife habitat alongside their food crops.

By placing a monetary value on water purification through wetlands or preserved ecosystems on privately owned agricultural land, governments and conservation groups may be able to pursue their environmental goals by compensating farmers for changing their practices and protecting sensitive lands.

The new concept is being modelled on 13 demonstration farms, sheep and cattle ranches across the province by the Ecological Services Initiative, a collaboration of farmers, academics and conservationists.

The enhancements range from increasing the buffer zone between crops and waterways, livestock fencing around environmentally sensitive areas, replanting native plant species to encourage native wildlife and reforestation to capture carbon or shade salmon spawning streams.

“This is about enhancing normal (farming) practices to produce an ecological benefit,” said B.C. rancher Dave Zehnder, a consulting project co-ordinator for ESI.

The provincial and federal governments have invested in the project through the Investment Agriculture Foundation of B.C. The B.C. Agriculture Council and the B.C. Cattlemen’s Association have both endorsed the project.

Paying farmers to preserve the wetlands and wildlife habitat on their lands or improve sensitive areas around streams and rivers can have as big an impact as building public infrastructure or buying land for conservation at a fraction of the cost, Zehnder said.

Faced with building a water purification plant at a cost of up to \$8 billion and a further \$250 million a year in operating expenses, New York City instead invested \$1.5 billion to protect watersheds and pay farmers to remove sensitive lands from production, according to a report by the U.S. Environmental Protection Agency.

About 5,000 acres of land were targeted by the program to protect 165 “stream miles” in the Catskill/Delaware watershed to improve water quality to the point that the filtration plant was not required.

Compensation for the loss of productive land to a rancher could be as little as \$100 an acre, Zehnder said. Farmers in

the pilot project are being paid a stipend of up to \$2,000 based on the amount of land set aside and its agricultural productivity.

Governments and foundations spend billions of dollars on projects, infrastructure and operating costs to provide clean air, water and habitat for species at risk, work that can be done by nature.

Wetlands — sometimes drained for agricultural use — are an effective natural water filtration system and provide considerable value as a means of flood control.

Methane recovery from livestock manure produces meat and dairy with a lower carbon footprint, lowers greenhouse gas emissions and produces fuel.

“What we are hoping to do is put a dollar value on that ecological benefit,” Zehnder said.

Thousands of kilometres of streams and rivers flow through ranch and farmlands feeding B.C.’s Columbia and Fraser rivers, which get incrementally more contaminated along the way even if all the producers along the way are following environmental regulations and best farm practices, Zehnder said.

“Farmers or ranchers may already be doing a good job of maintaining their ecosystems, but this program focuses on giving them the assistance to do better, beyond what the law requires,” Zehnder said.

Something as simple as fencing livestock further away from riparian areas can make a difference to water quality downstream.

“Agriculture and the environment are not separate, you need a healthy ecosystem to produce food,” Zehnder said. “But a lot of the environmentally sensitive land in B.C. is in private hands, farmers and ranchers.”

Fish and wildlife habitat is protected under several pieces of legislation that prescribe agricultural practices and restrict certain kinds of land use without compensating farmers.

Farmers are loath to expand the protective buffers around sensitive areas, because once in place it would be against the law to remove them, Zehnder explained.

“We are looking at ways to compensate farmers that make sense from a producer’s point of view and from the funder’s point of view, be they governments or foundations,” he said.

The project is being funded by a variety of environmental, agriculture, government and conservation groups including Ducks Unlimited, University of Alberta’s Institute for Land Use Innovation and the Agriculture Environment & Wildlife Fund.



## **Nechako Environment & Water Stewardship Society**

For more information please contact one of our Directors:

Wayne Salewski

Brian Frenkel

Richard Martens

John Degagne

Cam Hill

