



OKANAGAN
WETLANDS
REGENERATION
ALLIANCE

Ecology, Economy and Community in Lake Country

The Discovery of Wet Lands

We occupants of the Okanagan are dependent on an elaborate life-support system that maintains the air we breathe, regulates temperature, supplies reserves of food and water and shields us from deadly radiation. This system, provided by nature free of charge, offers a broad array of critical services: purifying the air and water, maintaining soil fertility, decomposing and detoxifying wastes, recycling essential nutrients, stabilizing the climate, protecting us from the sun's ultraviolet rays, mitigating floods and droughts, pollinating our crops and controlling agricultural pests.

The world's soggy realms, called wetlands – transitional zones between chronically wet and predominantly dry environments – are often considered worthless real estate, yet they filter and clean our water, mitigate the effects of floods, and offer a home to a variety of plants and animals that cannot thrive on dry ground. Although the services afforded by wetlands are generally taken for granted, every wetland acre is more valuable than any other in terms of ecosystem benefits.

Wetlands are biodiversity havens, providing breeding grounds and habitat for a wide variety of birds, fish and other wildlife. Wetlands enhance water quality by filtering out pollutants, sediments and nutrients that overflow a river's banks. They also limit flood damage by providing a buffer that can hold floodwater and delay its return to a river.

Wetlands cover about six percent of the Earth's land surface. They come in all shapes and sizes, and have identifiable characteristics, such as the presence of standing water, unique soils formed by the decomposition of plant matter, and vegetation adapted to chronically wet conditions. Simply put, they serve as intermediaries between aquatic and terrestrial realms, sharing some features of each.



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INTRODUCTION

The Okanagan Wetlands Regeneration Alliance was formed to apply the principals of ecological regeneration to the wetlands of the Okanagan Basin, which are the source and heart of the future of human habitation and economy of this area, and which are in continuous need of study, understanding and regeneration.

Partners in the Wetlands Alliance

- Okanagan Basin Water Board
- District of Lake Country: James Baker, Mayor
- Okanagan Greens: Angela Reid, President
- Okanagan Institute: Robert MacDonald, Director
- Okanagan College: Douglas MacLeod, Associate Dean, Science and Technology
- Community Futures of the Central Okanagan: Larry Widmer, Director
- Summerhill Organics and Wildcraft: Gabe Cipes, President
- Okanagan Nation: Chad Eneas, En'owkin Centre
- Okanagan Network for the Environment: Deb Thorneycroft, Coordinator
- Aspire Media Works: Geoff Millar, President

The Alliance welcomes participation from members of the public, as well as from companies, organizations and institutions of all kinds.

Please contact:

Robert MacDonald, Director
The Okanagan Institute
1473 Ethel Street, Kelowna BC V1Y2X9
TELEPHONE: 250.870.2690
EMAIL: info@okanaganinstitute.com

THE WORLD OF THE WETLAND

Marshes and bogs are the most common types of wetlands in the Okanagan. Marshes are filled with grasses and make up more than 90 percent of the total wetland area. Bogs are peat-accumulating wetlands that support the growth of mosses. Bogs dominated by Sphagnum moss store about one-third of the carbon locked up in the world's soils. Much is at stake, as these unheralded wetlands provide oases for dozens, if not hundreds, of plants and animals found nowhere else in the world.

Wetlands are sometimes called the "kidneys of the landscape." They serve as natural filters, removing pollution from waters flowing through them, while purifying and recharging aquifers below. Water is cleansed as wetland soils and vegetation trap sediments, heavy metals and pathogenic microbes. Wetlands also sift out nutrients such as nitrogen and phosphorus that cause eutrophication – the increased production of organic matter that can degrade water quality and threaten fisheries. It's hard to underestimate the economic value of this natural filtering is immense, reducing the need for costly water purification facilities.

Flood control is yet another important service provided by wetlands. They act like sponges, sopping up water from rain and overflowing rivers and storing it in temporary reservoirs, thereby retarding the flow of floodwaters. Since most flood damage is caused by peak flows, wetlands help by changing sharp runoff peaks into slower discharges. During dryer periods, wetlands perform the opposite role: they can mitigate droughts by storing water during the wettest times of the year and slowly releasing it during the driest times. Wetlands are unrivaled in their ability to regulate the flow of this precious liquid, insure its quality and make it available for a wide variety of uses.

Wetlands are "biological motherlodes" that help to sustain threatened and endangered species. These sodden zones provide essential habitats, breeding and feeding grounds, and resting areas for a variety of plants, fish, crustaceans, birds, mammals and insects. Birds, including more than half of migratory species, depend on wetlands for food or sanctuary. These regions are not just important for ducks, turtles and frogs, as humans benefit from them too – probably in more ways than can ever be calculated. Small wetlands of just a few acres or less may constitute the bulk of the wetland area. And for certain animals, such as frogs, toads and salamanders, small wetlands support a greater species diversity than large ones.

Wetlands occupy a small portion of the Western Interior Basin of BC due to the region's climate, soil, and topographic features. Nevertheless, they play a crucial ecological role particularly because wetlands in arid areas support more species than other ecosystems. Wetlands of the Okanagan support many species at risk. Most wetlands in this area are located in valley bottoms where development is also concentrated and wetland loss has been extensive since European settlement mainly due to conversion for agriculture and more recently for urban development. Between 1800 and 2005, specific wetland communities suffered different degrees of loss, including, 92% of shrubby water birch red-osier dogwood riparian wetlands, 63% of black cottonwood red osier dogwood riparian wetlands, and 41% of cattail marshes from the south Okanagan and lower Similkameen valleys. Wetlands continue to be lost and degraded by urbanization, intensive agriculture, and, in some areas, heavy recreational use. In addition, invasive species and climate change pose serious threats.



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THE PROPOSITION

- The ecological, economic and social value wetlands is tremendous.
- Many wetlands ecosystems have undergone significant degradation with negative impacts on biological diversity and peoples' livelihoods.
- Ecological regeneration provides enhanced biodiversity outcomes as well as improves human well-being in degraded landscapes.
- Ecological regeneration can revive the remarkable plumbing systems and biodiversity sanctuaries that nature once provided.
- The effectiveness of mitigation efforts should become an important part of community planning efforts and protecting existing wetlands should become a top priority.

THE VALUE OF WETLANDS

Wetlands are highly valuable to both the natural world and to society. They are one of the three most important life support systems on Earth, along with agricultural lands and forests. Yet wetlands have been converted to other uses at an astonishing rate. Approximately 50% of all the wetlands on earth have already been lost. In the Okanagan, we have lost two thirds or more of our original wetlands.

Because they are saturated with water, a substance essential to all living things, and because they form a transition zone between land and water, wetlands are among the most biologically diverse and productive places on earth. They filter pollutants and sediments out of the waters of our lakes, rivers and streams. They act as water purifiers for entire watersheds, filtering sediments and pollutants out of the water that goes into our streams and lakes. Wetlands trap nutrients and sediment in runoff, protecting downstream watercourses from algal blooms and fish-threatening sedimentation. They also can retain heavy metals and detoxify chemicals and pathogens. Wetlands are such effective water purifiers that they are now used in the tertiary treatment of industrial and municipal waste water.

Wetlands control flood damage and prevent soil erosion. Wetlands along watercourses and water bodies absorb and hold floodwaters, protecting banks and adjacent lands from serious damage. They also ease droughts. During wet seasons wetlands act like giant sponges, soaking up excess rain, snow and surface waters – then in drier seasons, wetlands provide wildlife with drinking holes, and slowly release their stored waters into aquifers and streams. Many community water supplies rely upon wetlands for water recharge. They also take in carbon dioxide and release oxygen. By absorbing carbon, wetlands form “carbon sinks” that are important in the control of global warming trends.

Wetlands also offer unsurpassed educational, scientific and recreational opportunities. Because of their abundant wildlife, wetlands have traditionally been heavily used for fishing, hunting, and trapping. Increasingly, wetlands are being used for non-consumptive recreation, such as bird watching, photography, canoeing and hiking. Wetlands near communities provide students with outdoor classrooms that teem with biological activity. The complex ecosystems found in wetlands provide scientists with the opportunity for research that will increase our understanding of hydrology and complex ecological processes.

In dollar terms alone, Environment Canada has estimated that the economic value of the functions performed by Canada's wetlands is almost \$10 billion annually – including \$2.7 billion for floodwater control, \$1.35 billion for water purification, and over \$4 billion for recreation, fishing and hunting. Cost-benefit studies have valued the functions of wetlands at \$100,000 per acre and more.

The problem is that modern markets fail to recognize and take into account the full value of wetlands. By failing to compensate a wetland owner for what the wetland produces, and simultaneously failing to charge the owner for the true cost of destroying a wetland, the market makes it attractive to turn wetlands into subdivisions and cropland. The subdivision or farm may have a far lower value to society than the original wetland – but the true comparative values have not been reflected in the marketplace. It is a classic case of “market failure”. Going forward, we must better reflect the full economic, social and environmental values of wetlands – and create economic incentives that encourage landowners to maintain them.



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WETLANDS AS A COMMONS

In recent years, some very important work has been done to create a renewed awareness of an ancient concept known as “the Commons.” The atmosphere and oceans, languages and culture, the stores of human knowledge and wisdom, the informal support systems of community, the peace and quiet we crave, the generic building blocks of life – these are all aspects of the Commons. In most traditional societies, it was assumed that what belonged to one belonged to all. Many indigenous societies to this day cannot conceive of denying a person or a family basic access to food, air, land, water and livelihood.

Noted Canadian environmentalist Richard Bocking states that the Commons are those things to which we have rights just by being a member of the human family. Many modern societies extended the same concept of universal access to the notion of a social Commons, creating education, health care and social security for all members of the community. Since adopting the Universal Declaration of Human Rights in 1948, governments are obliged to protect the human rights, cultural diversity and food security of their citizens. The Commons is the vast realm that lies outside of both the economic market and the institutional state, and that all of us typically use without toll or price.

The atmosphere and oceans, languages and culture, the stores of human knowledge and wisdom, the informal support systems of community, the peace and quiet we crave, the air we breathe, the freshwater we drink, the seas, forests, and mountains, the genetic heritage through which all life is transmitted, the diversity of life itself. – these are all aspects of the commons. Commons is synonymous with community, cooperation and respect for the rights and preferences of others. Some



Commons, such as the atmosphere, outer space and the oceans, may be thought of as global, while others, such as public spaces, common land, forests, the gene pool, and local medicines, are community Commons. The commons have the quality of always having been there. One generation after another, available to all.

As Maude Barlow of the Council of Canadians states, “To truly share water sources in an equitable and responsible way, we must recognize water as a shared common heritage to be fiercely protected, carefully managed, and equitably shared. Because it is a flow resource necessary for life and ecosystem health, and because there is no substitute for it, water must be regarded as a public Commons and a public good and preserved as such for all time in law and practice. Freshwater is central to our very existence and must be protected by public trust law for the common good, not for individual profit. Of course there is an economic dimension to water, but under the public trust, governments are obliged to protect water sources in order to sustain them for the long-term use of the entire population, not just the privileged few.”

As professor Richard Wagner of UBCO states, “In effect, whoever controls the ways in which water is commoditized and marketed has a much larger say in managing our future than the rest of Okanagan society. Corporate marketing of Okanagan water, as agricultural resource, as lakeview, as playground, perpetuates a settler culture committed to continued ecological degradation, not sustainability. The commons governance approach of the *Syilx*, the indigenous peoples of the Okanagan, was overwritten by colonial and provincial governments beginning in the late nine-



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WHERE ARE YOUR STORIES

From *If This Is Your Land, Where Are Your Stories?* by J. Edward Chamberlin

It happened at a meeting between an Indian community in northwest British Columbia and some government officials. The officials claimed the land for the government. The natives were astonished by the claim. They couldn't understand what these relative newcomers were talking about. Finally one of the elders put what was bothering them in the form of a question. "If this is your land," he asked, "where are your stories?" He spoke in English, but then he moved into Gitksan, the Tsimshian language of his people – and told a story.

All of a sudden everyone understood ... even though the government foresters didn't know a word of Gitksan, and neither did some of his Gitksan companions. But what they understood was more important: how stories give meaning and value to the places we call home; how they bring us close to the world we live in by taking us into a world of words; how they hold us together and at the same time keep us apart.

teenth century. But then, following a subsequent period of corporate irrigation management which ended during World War I, a new form of commons management was instituted – that of the farmer-operated 'irrigation district'. Many irrigation districts continue to operate in the Okanagan today though they generally provide more water now to non-agricultural, domestic customers than to agriculturists. Out of five water purveyors in the greater Kelowna area, for instance, three are irrigation districts. By contrast, in Penticton, Naramata and Summerland, the local irrigation districts have folded, handing their authority and water licenses over to either the local municipality or regional district. These handovers have been motivated mainly by concerns over water quality but they have been coerced, quite deliberately, by provincial government policy which prohibits the granting of water quality improvement grants to irrigation districts. The impetus today is towards a further, no less radical transformation of an agricultural society into a resort community with a valley wide population predicted to reach half a million by the middle of this century. The question I would like to pose to political leaders at all levels, as well as to local residents and water managers, is: whose interests are being served by this radical transformation? Is it perhaps time to rethink and dispense with policy developed during the colonial era and begin to develop policy to serve the interests of today?"

The market is like a runaway engine, with no governor to tell it when to stop depleting the Commons that sustains us all. What is needed is a "counter narrative" to the current narrative of individual ownership and control as the best way to manage resources. A new narrative, protected by a legal framework of its own, would allow us to manage our collective resources for the common good. This is not an esoteric concept. It is ever more clear that if we fail to create a new way of thinking about the planet and our role in it, we may not survive.

RETHINKING STEWARDSHIP | Historically, the Okanagan had an abundance of wetlands. Due to the impacts of land use changes and pressures such as urban development, increased population, resource development and extraction, there are currently fewer wetlands remaining. To conserve and protect those that remain, regular and careful monitoring and planning practices will be required.

For a vast array of wildlife species as well as for people, wetlands provide critical places that are fundamental in sustaining life and ecological services. Wetlands are typically the biological reservoirs in grassland, forested and other landscapes, hosting and sustaining many of the country's natural assets such as plants, birds, insects and mammals. Just as important, they sustain the mainstay physical resources, such as water and soils. Wetlands are also important shared resources across multi-lateral jurisdictions. Mexico, Argentina, United States and Russia rely on us to care for and manage our wetlands, largely because of migratory species.

Stewardship practices, at the farm gate through to international levels, help to ensure that highly migratory and other species of common concern have the critical places required in their lifecycles. Borders favour the territorial behaviour of people but not the inherent behaviour of wildlife species and ecosystems.

For urban developers, farmers, and road construction people in the Okanagan, as examples, wetlands often have been seen as obstacles that needed to be drained, filled-in or built-around, and in some cases destroyed. But fortunately attitudes about, and interests in, our wetlands are changing. We need to continue the process, to ensure a stable and substantial stewardship process going forward.



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ECOLOGICAL REGENERATION

The term regenerative describes processes that restore, renew or revitalize their own sources of energy and materials, creating sustainable systems that integrate the needs of society with the integrity of nature.

Regeneration is far more than simple renewal or restoration. It includes three key ideas: a radical change for the better; creation of a new spirit; returning energy to the source. The scale of change required over the next few decades requires profound changes in how we design, construct and inhabit our environments. The challenge is to design ecologically sustainable buildings, landscapes and communities as integrated wholes that reconnect us to a living and beautiful world and awaken an appreciation of what is life-giving. The science of living systems is revealing an understanding of nature as alive, self-organizing, intelligent, conscious or sentient and participatory at all levels.

In an intelligent and purposeful world, we ask not just how do we harvest wood sustainably, but how do we live with the forest in a way that enables the forest to evolve. Working from a living systems perspective shifts the focus of our attention from simply solving today's problems to working to realize the upper limits of creative potential a healthy system is capable of manifesting. This focus builds from an understanding of the unique nature of a community and of the inter-reliance of human and natural systems that create that uniqueness. It can awaken a deep and caring sense of place and thus become the source of a new community spirit that reconciles longstanding deep divisions as people work together to create an increasing vitality, viability and capacity for evolution of the whole.

Given that many people now depend on what have become degraded ecosystems to sustain their livelihoods, ecological regeneration needs to undertake four elements critical to successful ecosystem management: improve biodiversity conservation; improve human livelihoods; empower local people; and improve ecosystem productivity.

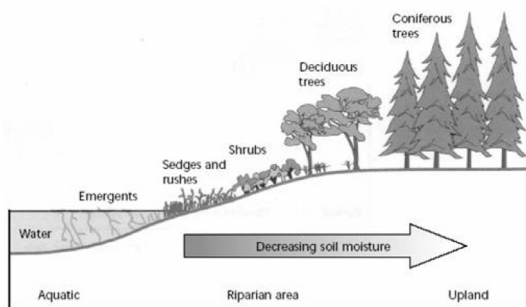
Ecological regeneration must be a primary component of conservation and sustainable development programmes. It is uniquely valuable in its inherent capacity to provide the opportunity not only to repair ecological damage, but also to improve the human condition, by renewing economic opportunities, rejuvenating traditional cultural practices and refocusing the aspirations of local communities.

By assisting the natural recovery process of an ecosystem that has been compromised, degraded or damaged, it is an intentional activity that initiates or accelerates an ecological pathway – or trajectory through time – towards what's called a reference state.

Ecological regeneration has as its goal an ecosystem that is resilient and self-sustaining with respect to structure, species composition and function, as well as being integrated into the larger landscape and supporting sustainable livelihoods. In this respect ecological regeneration supports conservation and sustainable development efforts.

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There are two major challenges involved when undertaking ecological regeneration. One is how to undertake regeneration across areas comprising a variety of land-uses. The second is how to equitably balance the trade-offs between improving biodiversity conservation and improvements in human wellbeing.





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REFERENCE STATE

A reference ecosystem is an actual ecosystem or its conceptual model that is used in setting goals and planning a regeneration project, and later in its evaluation. In its simplest form the reference ecosystem is an actual site, its written or oral description, or both. In other situations, the reference ecosystem is assembled from multiple sites and from other sources. In parts of the world where there is a lack of an actual reference ecosystem, or in situations where it is unclear which ecosystem over time would serve as an adequate reference, a more conceptual approach is required. It should be noted that the concept of the reference is a dynamic one, and that, typically, the reference represents a point of advanced development that lies somewhere along the intended ecological trajectory of the regenerated ecosystem (see Ecological Trajectory opposite).

PRINCIPLES OF REGENERATIVE PRACTICE

Ecological regeneration is a considered practice in biodiversity conservation and ecosystem management. Regeneration can be large-scale or small scale, it can be carried out by one or a few individuals or via government programmes involving thousands of participants. It can be well resourced or modestly funded, it can involve ecosystems that can be regenerated quickly or those that will require hundreds of years before ecological regeneration can be said to have occurred. In all cases ecological regeneration will improve the biological diversity on degraded landscapes, increase the populations and distribution of rare and threatened species, enhance landscape connectivity, increase the availability of environmental goods and services, and contribute to the improvement of human well-being. Principles of good ecological regeneration practice include:

Ecosystems

- Incorporating biological and environmental spatial variation into the design.
- Allowing for linkages within the larger landscape.
- Emphasizing process repair over structural replacement.
- Allowing sufficient time for self-generating processes to resume.
- Treating the causes rather than the symptoms of degradation.
- Include monitoring protocols to allow for adaptive management.

Human systems

- Ensuring all stakeholders are fully aware of the full range of possible alternatives, opportunities, costs and benefits offered by regeneration.
- Empowering all stakeholders, especially disenfranchised resource users.
- Engaging all relevant sectors of society and disciplines in planning, implementation and monitoring.
- Involving relevant stakeholders in the definition of boundaries for regeneration.
- Considering all forms of historical and current information, including scientific and indigenous and local knowledge, innovations and practices.
- Providing short-term benefits leading to the acceptance of longer-term objectives.
- Providing for the accrual of ecosystem goods and services.

A ecosystem can be considered to have been regenerated when it regains sufficient biotic and abiotic resources to sustain its structure, ecological processes and functions with minimal external assistance or subsidy. It will then demonstrate resilience to normal ranges of environmental stress and disturbance. It will interact with contiguous ecosystems in terms of biotic and abiotic flows and social and economic interactions. It will support, as appropriate, local social and economic activities. Such a state is often difficult to achieve. Nevertheless, significant environmental and social benefits can be realized even in the earliest stages of regeneration. Regeneration can take time before all the benefits are evident.

The attributes listed below provide a basis for assessing regeneration progress. Some are readily measured. Others must be assessed indirectly, including most ecosystem functions, through follow-up research. The full expression of all of these attributes is not essential to demonstrate that satisfactory progress is being achieved.



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ECOLOGICAL TRAJECTORY

Wherever possible, ecological regeneration attempts to return an ecosystem to its historic trajectory. Historic conditions are therefore the ideal starting point for regenerative design and planning. The regenerated ecosystem will not necessarily recover any of its specific former states, since contemporary constraints and conditions may render this impossible. Indeed, the historic trajectory of a severely impacted ecosystem may be difficult or impossible to determine with accuracy. Nevertheless, the general direction and boundaries of that trajectory can be established through a combination of knowledge of the damaged ecosystem's pre-existing structure, composition and functioning, studies on comparable intact ecosystems, information about regional environmental conditions, and analysis of other ecological, cultural and historical reference information. These combined sources allow the historic trajectory or other reference conditions to be charted from baseline ecological data and predictive models, and its emulation in the regenerative process should aid in piloting the ecosystem towards improved health and integrity.

Instead, it is only necessary for these indicators to demonstrate an appropriate trajectory towards the intended reference ecosystem condition.

Ecosystems

- The ecosystem contains a characteristic assemblage of the species that occurs in the reference ecosystem and that provide appropriate community structure.
- The ecosystem contains indigenous species to the greatest practicable extent.
- All functional groups necessary for the continued development and/or stability of the ecosystem are represented.
- The physical environment of the ecosystem is capable of sustaining reproducing populations of the species necessary for its continued stability or development along the desired trajectory.
- The ecosystem apparently functions normally for its ecological stage of development, and signs of dysfunction are absent.
- The ecosystem is suitably integrated into a larger ecological matrix or landscape, with which it interacts through abiotic and biotic flows and exchanges.
- Potential threats to the health and integrity of the ecosystem from the surrounding landscape have been eliminated or reduced as much as possible.
- The ecosystem is sufficiently resilient to endure the normal periodic stress events in the local environment that are an integral part of the dynamics of the ecosystem.
- The ecosystem is self-sustaining. It has the potential to persist indefinitely under existing environmental conditions. Aspects of its biodiversity, structure and functioning will change as part of normal ecosystem development, and may fluctuate in response to normal periodic stress and occasional disturbance events of greater consequence. As in any intact ecosystem, the species composition and other attributes of a restored ecosystem may evolve as environmental conditions change.

Human systems

- Balance exists between ecological processes and human activities such that human activities reinforce ecological health and vice versa.
- The people who are dependent on the ecosystem have a key role in setting priorities and implementation.
- Restoration activities are underpinned by economic mechanisms that equitably distribute the costs incurred and benefits arising at both a local and national level.
- The ecosystem serves as natural capital for environmental goods and services. Indicators may be more specific according to the nature of the restoration goals. For example, one goal may be that the regenerated ecosystem will provide habitat for rare species or will harbor a diverse gene-pool for selected species. Yet other goals of restoration may be to provide aesthetic amenities or to accommodate activities of social consequence, such as the strengthening of a community through the participation of individuals in a regeneration project.



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A PILOT PROJECT IN LAKE COUNTRY

The Lake Country Pilot Project of the Okanagan Wetlands Regeneration Alliance will provide a blueprint for conducting similar research projects in the other regions of the Okanagan basin watershed. When complete, it will ensure that decision-makers involved in economic and social development understand the framework for regenerative habitat, and that the general public appreciate the inter-connectiveness of the watershed in their lives.

By bringing regenerative practices into considerations about the present and future of the Okanagan Basin watershed, it is imperative that we understand the critical nature of wetlands and natural habitat to the environment. This project will present a framework for understanding and ensuring that awareness.

PROJECT GOALS

- To undertake a comprehensive botanical inventory of the wetlands areas of Lake Country and contiguous areas.
- To identify native and invasive plant species that contribute to and/or inhibit the natural waterflow environment. In the case of their contributory factors, determine how they can be maximized in their regenerative function. In the case of their inhibition factors, determine how they can be effectively removed and/or minimized.
- To determine a set of maintenance factors that ensure a regenerative watershed behavior going forward.
- To undertake a set of trial projects to determent those plants that have the most effective regenerative potential in the environment.
- To undertake a culling process to remove those plant species that inhibit waterflow and negate and/or limit regenerative processes.
- To produce information and learning materials, and conduct a series of public presentations, throughout the whole period of the project that reveal the findings and/or demonstrate the value of the project.
- To engage members of the public in the process of discovery and mediation, through volunteer activity and attendance at events.

PROJECT DELIVERABLES AND MEASURABLE OUTCOMES

- To understand and “know” the Lake Country watershed, for both proponents and volunteers, in a substantive and proactive manner.
- To contribute to the understanding of present and future watershed issues, and contributory factors, in a meaningful and proactive way, to all the stakeholders in the District.
- To contribute to the general public awareness of watershed issues.
- To provide a roadmap to the application of regenerative principles to the future of watershed maintenance, locally, regionally and globally.
- To provide materials that can be used by secondary and post-secondary faculty to engage their students.
- To provide materials that can be used by municipal leaders to promote the benefits of regenerative practices to their stakeholders.
- To determine the potential for regenerative non-timber forest product harvesting, processing and marketing in the area covered.



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METHODOLOGY

■ A volunteer supervisory committee has been formed, representing the Alliance partners, to provide governance and monitor the project.

■ A consultant team has been recruited to establish research and documentation guidelines, and supervise the chief investigator. Members of this team have expertise in aboriginal culture, wetlands ecology, biology research, environmental inventory analysis, permaculture, project documentation, and public awareness campaigns.

■ A chief investigator to spend the whole period of the project:

1. Mapping the watershed.
2. Conducting a habitat audit, and making recommendations to the committee on remediation activities.
3. Conducting habitat restoration on a priority basis.
4. Working with, and supervising, the activities of community volunteers and College and University faculty/students.
5. Preparing regular reports on field activities.

■ The project is being conducted in six stages over ten months, with some overlap between them:

Stage 1: Recruit and schedule principals, collaborators, interns and volunteers. Tasks and timeline established. Preliminary investigation.

Stage 2: Habitat Investigation and mapping.

Stage 3: Gathering information and producing a preliminary report for review by committee and team, and other stakeholder to determine tasks and timeline for next steps.

Stage 4: Based on results of habitat research, conduct remediation activities.

Stage 5: Publish a comprehensive report on the project, distribute press release, provide public website with project information.

Stage 6: Public awareness campaign: local and regional public presentations, school outreach, policy presentations.

TIMELINE

■ Project Start Date: 1 June 2011 Completion Date: 31 March 2012

Completion dates:

■ Stage 1: Recruit and schedule collaborators and volunteers. 31 August 2011

■ Stage 2: Habitat Investigation and mapping. 30 September 2011

■ Stage 3: Preliminary report documentation and report publishing. 15 October 2011

■ Stage 4: Habitat restoration and regeneration. 29 February 2012

■ Stage 5: Final report documentation and report publishing. 15 March 2012

■ Stage 6: Public awareness campaign. 31 March 2012



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WILD PRODUCTS IN THE WETLANDS

Wild products have had an important role in the livelihoods of both Aboriginal and non-Aboriginal peoples for as long as they have been present on the land. What is new, however, is the rapidity with which this sector is changing, including the volumes of species commercially traded, growth of interest in areas such as functional food markets and food security issues, and increasing attention to the sectors role in cultural maintenance and importance to wildlife. Population and development trends are also increasingly impacting the sector. There is no commonly agreed upon term for products collected in the wild, with wild collected products used interchangeably with wild crafted products, wild harvested products, and wild grown products.

Mushrooms, medicines, fruits, and florals come immediately to mind as the main focus of the wild products industry in British Columbia. These crops can provide for economic diversification in rural communities, can provide a sustaining or supplementary income for individuals and families, and can be culturally essential to First Nations, as well as providing important health and recreational benefits to rural and urban residents alike. Beyond these obvious resources lies an even greater value in the ecological services inherent in wetlands and the riparian zones adjacent to them: purification and supply of clean air and water, sequestration of atmospheric carbon, and productivity of soil. While initially looking at material products with a definable market and cash value, management of wild products invites us to consider the dynamics of the whole ecosystem as a diverse source of economically useful values and an essential part of the planet's life-support system.

It is necessary to incorporate local and traditional knowledge to define what quality means, how to assess this quality, and how to assess a particular site for accessibility. This has been initiated with a number of species in north central British Columbia, and we have begun this process in Lake Country. Quality ratings have been developed and are also available on the web. The incorporation of standardized quality ratings will increase our understanding of the site characteristics required for high quality sustainable abundance.

Effective management that involves multiple users and/or multiple uses will require novel institutional and governance arrangements. The majority of wild products remain unregulated throughout much of BC, however some community forests, woodlots, and private lands are exploring their options for management. Meaningful communication and inclusion of those who rely on these resources from the beginning of the planning process will help ensure efficient and effective solutions.

Understanding of the supply side of the market for wild products has been growing, and corresponding work is starting to be done on the demand side. What do consumers know about wild products and why do they buy them? A Shop the Wild survey asked 220 consumers a number of questions about their interaction with, and understanding of, the wild products sector. They asked consumers how frequently they had purchased wild, organic and local products during the last 12 months. 203 people surveyed said they had bought local products including those who gave no response, while 192 and 159 respondents said they had purchased organic and wild products, respectively, in the past year.





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THE EARTH'S BLANKET

**Nancy Turner from The Earth's Blanket,
Traditional Teaching for Sustainable Living**

Documenting botanical knowledge, including which species of plants are named and used by different cultures and groups, is a large part of my work. It has led me to understand that what might be just interesting, vague stories to outsiders have a much more profound meaning to people who have intimate knowledge of the places and the characters mentioned. Every story has its own context, its own situation. Not only do narratives and conversations convey essential cultural knowledge and information, they reveal lessons and ethical approaches to relationships with other people and to the environment.

Over the years I have become more and more aware of the important ties between ethnobotany and conservation, as well as the links between ethnobotany and ecological restoration – the art and science of recovering species and habitats that have been damaged by human activity.

What is fascinating is how often these types of “ethical” or sustainable products were purchased: 74% bought local products and 56% bought organic products every week. Wild products were purchased less regularly: 11% every week, 20% every month and 41% every 6 months. Research in sustainable consumption behaviour (in general) suggests that wild purchases may be less regular because of lack of access, high prices, concerns about quality/efficacy, or doubts about sustainability.

Far and away, supporting local producers was the most commonly chosen reason for buying wild products (by 100 respondents). Taste, sustainability, health benefits and encouraging biodiversity were the other reasons, with 50 “votes”.

The interesting overlap between wild products and local products identified in both the question on frequency of purchases and the reasons for purchasing wild products was also evident when we asked people to give their opinion on the statement “Products produced and harvested from the wilds of BC supports our economy and our communities”. Over half of all respondents strongly agree with this statement, with a further 93% believing that wild harvesting makes a positive contribution to local communities. Findings from our focus groups also confirm this overlap between wild and local. Consistently, participants saw the opportunity to build relationships with local producers, and to contribute to the creation of a thriving local economy, as primary motivators behind purchasing wild products.

Wild products are a rapidly expanding part of a wider ethical and sustainable products market. The evidence shows that consumers are less regularly engaged in the “wild” segment of that market than with local or organic products. At the same time, the impact that wild products have on the local economy is extremely important to their decisions to purchase wild products. There is a clear marketing advantage to linking wild products to small scale localized sustainable production.

Bringing wild products into the mainstream economy is a challenge. Many of the factors that affect harvesting, marketing, and maintenance of wild products are hidden in unrecorded traditional uses by First Nations, in the informal and underground economy of subsistence harvesters, in recreational pursuits, and in scientific obscurity. What evidence we have for the value to society of wild products is not yet enough to make a case for attention amid the clamour arising from traditional resource industries and agribusiness, but that is not a reason to ignore the great potential of treating our environment as a richly variegated resource that will benefit from an equally variegated approach to ecological management.

It is both possible and profitable to modify traditional approaches to landscape management in order to foster ecologically sound development of a new high-potential economic sector. Collaborative design, such as we are practicing with the Okanagan Wetlands Regeneration Alliance, is the key to managing ecological resources for the diverse interests in the wild products sector.

We have before us an opportunity to follow the emerging insights about wetlands and their potential for a wide range of natural products and services with practical demonstrations of co-design and co-management. The current circumstances of our forest and agricultural industries, the resulting need for economic diversification, and the global need to maintain the natural functions of the ecosystems demand that we rise to the challenge.

On the following pages we examine two of the plants that are part of the study group we have conducted in the wetlands landscape in Lake Country, and intend to further examine their potential as wild products.



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TYPHA: THE ECOLOGICAL POWERHOUSE Typha is often referred to as Cattail, and are perhaps the best known of the wetland plants. Yet very few people have a respect for their incredible ecological and wildlife value. Typhas has a vast number of uses both as food and as building materials. Euel Gibbons claims that for the number of different kinds of food it produces there is no plant, wild or domesticated, which tops the Typha. All parts of this plant are edible: the rhizomes, young shoots, young stalks and pollen. Sprouts are eaten raw or cooked lightly steamed and tossed in butter or pureed with cream as an excellent substitute for asparagus. The male flower, when just developing buds and emerging from the sheath, can be peeled and boiled. The buds are then nibbled from the stem and the stem discarded. Later, the pollen from male flower can be collected and mixed with flour for baking. The pollen adds nutrients as well as producing breads and pancakes with vibrant yellow hues. The rhizomes can be collected throughout the winter quite easily by reaching into the muddy ground of the shoreline and pulling them apart. They can be steamed or boiled or cut in sections and allowed to dry, the rhizomes can be ground into flour. This flour is very nutritious, with far more nutrients than corn, rice or wheat and the bonus of a high protein content. Gene Logsdon suggests growing Typha commercially because they are such aggressive growers, they are so nutritious and they yield a phenomenal amount of food. He argues that one acre of cattails can produce 30 dry tons of flour, leaving ample rhizomes for the next year's growth. In comparison, wheat offers an exceptional harvest at three tons per acre. First Nations people used Typha extensively.



BURDOCK: AN INVASIVE FRIEND AND FOE Burdock is a thistle plant native to the Old World, although several species have been widely introduced in temperate climates worldwide. It is often found in disturbed habitats, roadsides, vacant lots, and fields. It is a major wild food source and has long-stalked wedge-shaped, wavy edged, toothless leaves that looks much like Rhubarb. Burdock leaves are roughly two feet long

by one foot across and are white and fuzzy underneath. Folk herbalists consider dried burdock to be a diuretic, diaphoretic, and a blood purifying agent. The seeds are used in traditional Chinese medicine, under the name niupangzi. Burdock is a traditional medicinal herb that is used for many ailments. The invention of Velcro is attributed to Burdock's influence. There are two types of burdock in the Okanagan-Similkameen, both of which are European biennials. Common burdock (*Arctium minus*) is the most frequently occurring species, growing 1 to 3 metres in height. In the Okanagan, burdock is common in farmyards, along fence lines, roadsides, as well as riparian areas with moist, fertile soils and high nitrogen content. As with other non-native plants, burdock has an advantage over our native

plants because it lacks enemies, and therefore has a competitive edge. When the native plants are displaced, the animals that feed on them are forced to move elsewhere to find food, which diminishes their habitat. Effective control of burdock is highly dependent on stage of growth. During its first year of growth, the top 3 to 4 inches of the roots must be dug-out. The taproot functions to store nutrient and energy reserves. If plants have gone to seed, they should be carefully clipped and bagged, then taken to the landfill. Composting will not necessarily kill the seeds, so plant material should be buried.



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LEARNING THROUGH WETLANDS

Much wetland loss has resulted from actions by individuals, both consciously and through secondary outcomes. These actions occur daily on small properties as the result of personal decisions by people about how they will use their land to make a living, or for recreational or other uses. Some decisions may include draining wetland complexes, but they may also include smaller acts in rural, urban and recreational settings that can have damaging effects. Activities such as clearing vegetation to enhance a view, farming buffer zones with large machinery, carelessly maintaining vehicles near waterways, applying fertilizers and pesticides around wetlands, disposing toxic waste in drain systems, or discarding chemical containers, garbage and landfill in low lying areas are all potentially dangerous to wetland protection. Such behaviours may not be motivated by economic considerations so much as by a lack of ecological literacy – inappropriate understanding of environmental consequences and alternative choices.

Companies, resort holdings, municipalities, developers and some farms operating on larger land blocks make similar decisions with greater environmental consequences. These groups too are made up of individual decision makers whose decisions and actions affecting the environment occur within the context of policies, laws and regulations enacted to protect society. The majority of these people are unlikely to be fully ecologically literate.

People are both the problem and the solution relative to wetland conservation; human actions result in negative, neutral or positive consequences for wetlands.

Wetlands-focussed learning should develop the knowledge, experiences and skills needed to evaluate environmental issues, and make informed decisions, value choices and actions. Ecological literacy as the capacity to perceive and interpret the relative health of environmental systems and take appropriate actions to maintain, restore or improve the health of those systems.

Louis Aggassiz in the 1800s practised his dictum of “read nature not books”; i.e. experience nature first hand. Early environmental learning should centre on developing empathy for the natural world, slightly older children on exploration, and for those in early adolescence and beyond, on social action.

For action to be a logical outcome, learners must develop a bond or an emotional attachment so that they will have a predisposition and motivation for action. Such bonding is strongest when developed in preschool and elementary years. Ecological literacy often begins close to home, encouraging learners to understand and forge connections with their immediate surroundings.

Wetlands are numerous and can be found close to most places of learning, making them interesting and excellent sites for environmental learning.

In older youth, emphasis needs to be on action projects requiring the application of skills, knowledge and understanding to go beyond simple information acquisition and recitation. The premise is that if students are trained in action skills relative to the environment they care about, they will learn how to apply these skills in their daily lives and retain them as they grow older. Children involved in interesting, hands-on programs bring their learning home and share their experiences with their families; leading to a broader community impact.





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A SELECTIVE READING AND REFERENCE LIST

Among the many hundreds of resources consulted in this project, the following references are useful for information on wetlands and riparian zones, remediation and related aquatic and botanical determinants, as well as the educational and public outreach elements of the projects:

- Delesalle, Bruno in cooperation with Ducks Unlimited and Environment Canada. *Understanding Wetlands: A Wetland Handbook for British Columbia's Interior*. BC, Canada: Ducks Unlimited Canada, 1998.
- Gibbins, Euell with illustrations by M. Shroeder. *Stalking the Wild Asparagus*. New York: David McKay Company Inc., 1962.
- Kozloff, Eugene. *Plants and Animals of the Pacific Northwest: An Illustrated Guide to the Natural History of Western Oregon, Washington, and British Columbia*. Washington: The University of Washington Press, 1976.
- Pojar, Jim and MacKinnon, Andy. *Plants of Coastal British Columbia including Washington, Oregon and Alaska*. Vancouver, BC: Lone Pine Publishing, 1994.
- Turner, Nancy J. *Plant Technology of First Peoples in British Columbia*. Vancouver: University of British Columbia in collaboration with the Royal British Columbia Museum, 1998.
- Hammond, W.F. 1997. *Educating for action: a framework for thinking about the place of action in environmental education*. Green Teacher.
- Puk, T. 2002. *Ecological Literacy as the First Imperative. Principles For Achieving Ecological Literacy in the Next Ten Years: First Steps*. Department of Lifelong Learning. Lakehead University. Thunder Bay, Ontario.

Many resources and programs exist to further an ecological learning agenda. Information and ideas about wetlands are made available to classes and the public through Wetkit (www.wetkit.net). Such events as Wildlife Week and Earth Day have been successful catalysts for public involvement. However, World Wetlands Day falls in February and has drawn little attention. The International Year of Fresh Water is one model to capture the attention of Okanaganites around a variety of wetland themes under the banner Wonder of Water. A network of interpretive facilities across Canada provide wetland education programs but these are generally not coordinated. Youth groups like Scouts, Guides, 4-H, Junior Forest Wardens and others have programs in environmental action but enrollment is declining. Scouts Canada's Jumpstart Program for Cubs on the environment has a number of activities focusing on wetlands. These programs need to have greater emphasis on wetland conservation.

There are numerous guidebooks, resources and programs focusing on wetlands and water: *Wetland Keepers*, *Project Wet*, *Bog Ho*, *Digital Field Trip to the Wetlands*, *Wonder of Wetlands*, *Ducks Unlimited Canada's Wetland Ecosystem series*, *Read Aloud Wetlands*, *Digital Frog*, *Envirothon*, *Ecoscope*, *Living By Water*, *Adopt-A-Class*, *Marshmallow*, *Make Way for Wildlife*, *Adopt-A-Pond*, *Aquakit*, *Wade Into Wetlands*, *The Yellow Fish Road*, *Water Watchdog*, *Greenwing* and many more. A number of these have action-oriented components with mentoring, while others are investigative. Some of these materials are available only in hard copy, some are free through websites and others can only be acquired after going through training and accreditation. Only some of these show curriculum linkages to facilitate use by teachers. Several agency and government websites provide valuable background information on wetlands as well as links to other sites with resources.

Creating a wetlands learning centre in the Okanagan should not be viewed as something out of the realm of possibility. Partnerships are commonplace in public education today providing the extra dollars needed to enhance school programs, and the elements of environmental stewardship, education and youth that this approach combines are likely to be very well received in both the private and public sectors in the Okanagan. Also, any expertise required beyond what the centre itself can provide is present in most communities and a project like this often creates the spark that brings it into the schoolhouse. The keys to getting started and maintaining the momentum are strong leadership and a solid commitment to do so. Essential elements of the learning environment should include:

- Experiential learning should take place outdoors and often. However, there are lots of quality "hands-on" activities that can be adapted to lab and classroom setting.
- Empower learners to take on authentic tasks and do something with what they are learning. With minimum equipment, establish or plug into national/international monitoring programs that involve students in collecting, recording and analyzing data on a wide variety of wetland parameters.
- Teachers cannot do it all. Bring in the experts to teach special skills, provide insight into controversial issues, supply essential equipment and model future careers.
- Mentoring of students and having the learners do peer teaching are powerful ways to learn. When a group of learners get out in their wetland, what happens is magic.
- Wetlands are inclusive. There is something for everyone in wetlands. Enrichment should be available to learners of all ability groups, interests and ages.



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BRINGING THE WETLANDS HOME

Human behaviour is grounded in values, changes in societal behaviour will only occur as societal values change. The Wetlands pilot project in Lake Country has provided a large source of information from which we will draw inspiration as we proceed with our efforts over the coming months. In addition to supporting those efforts, we ask you to consider the following list of prospective initiatives and outcomes:

- Develop a public marketing/education strategy to target rural and urban audiences (e.g. landowners, business, youth, planners, teachers, politicians) about wetlands, based on their functions of providing clean water, flood protection, carbon sequestration, biodiversity and places to learn and enjoy, in order to capture attention about their importance, vulnerability and ways to get involved in conserving them.
- Develop a focussed agenda for wetland action in which the media, schools and the public can take part.
- Encourage the development of a wetlands festival with a focus on education and celebration. Organize this through watershed associations.
- Encourage family and youth-oriented activities around wetlands including heritage regeneration and wild foraging days.
- Develop and equip a network of high profile and well publicized wetland sites as foci for public and school education and tourism.
- Encourage new “centres of excellence” to foster partnerships, integration, cross-curricular programming, and experiential and inclusive programs.
- Link nonformal centres teaching wetland education to coordinate and improve programs and provide support services to teachers.
- Work to have wetlands become a highly visible component of the school curriculum at all levels; from this will come demand for teacher training, professional development and other support services.
- Develop new wetland programs and resource materials that enhance ecological literacy of participants and are based on excellence standards. Have an independent body review and rate existing materials and programs (including textbooks) so teachers can decide on their value and improvements can be made.
- Involve citizens, corporations and foundations in providing resources to help fund wetland education activities.
- Develop a variety of meaningful action-oriented wetland projects that students and the public can get involved in with community support. Have recognition associated with these to reward and celebrate excellence. Incorporate mentoring and peer teaching.

AN INVITATION

The Okanagan Wetlands Regeneration Alliance welcomes participation from members of the public, and from organizations and institutions of all kinds. We will be conducting a number of public information sessions over the next months and invite your attendance.

Please contact us at the coordinates given on the second page of this report.