Protecting British Columbia's Wetlands: A Citizen's Guide

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West Coast Environmental Law
Research Foundation
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Preface

This book is ‘tool-kit’ to use to protect wetlands in British Columbia. It includes background information on the formation and function of wetlands. It also includes a review of legislation, and information on how to use existing laws to protect wetlands in the province.

The ‘tools’ are described so that they can be put to use by the average citizen who has no background in wetland science or law. This guide has been prepared for environmental and conservation groups, elected officials at any level of government, and our municipal staff, who so often have the fate of our wetlands in their hands.

Contents

Introduction

Over the past century many of British Columbia's wetlands have been drained, filled, farmed, polluted and "developed." The wetlands that remain provide vitally important habitat for our fish, birds, amphibians, insects, and the billions of invertebrates and micro-organisms that form the basis of the global food chain. In addition, our wetlands provide naturalists, boaters, hunters, and weekend walkers with a connection to nature.

Wetlands are so important that it is almost possible to say "No wetlands, no life!", and yet we continue to allow the destruction of our wetlands at an extraordinary rate. This book provides some of the background information you will need to protect our remaining wetlands. It is a call for better wetland legislation and a plea for British Columbians to get wetlands onto this province's public agenda — in the media, in our schools, at our municipal councils, and into the public life of our communities.

Over the past twenty years British Columbians have become highly sensitized to the environmental calamities occurring in our forests and to our fish populations. Meanwhile, wetlands have been pushed to the background, not only in the media, but in terms of protective legislation.

Wetlands have been historically undervalued in our society. They have been drained, filled, and paved over. The ecological benefits that wetlands provide have been lost. But policy makers and government decision-makers have started to listen to advice from ecologists, scientists and conservationists. They are beginning to protect wetlands in a variety of ways: by di-

rectly acquiring them for habitat for fish and waterfowl; by restricting development in or around a wetland and by using various other legal tools to ensure that wetlands are protected.

British Columbia does not have a clear and complete set of wetland laws. The legislation that does exist is inadequate, and often not enforced. Monitoring wetland use and health is a huge undertaking, especially when we consider the number of wetlands on private land. The fact that existing laws and policies are routinely ignored by individuals, government agencies, and businesses is a clear indication that we are all part of the problem.

To overcome our wetland protection/preservation problems we need to educate ourselves and our elected officials, demand protection for wetlands in law, participate in land use planning, monitor land use in our local areas, organize community groups to restore damaged or destroyed wetlands, and insist on wetland education in our schools.

This Guide is divided into four chapters. The first chapter introduces wetland science. It answers the question: "What is a wetland?" and describes the ecological functions and benefits of wetlands. The second chapter discusses wetlands in B.C. and provides estimates of wetland loss. The third chapter describes the major laws that are used to protect wetlands. Finally, the last chapter proposes changes to the current legal framework for wetland protection. It discusses effective legal tools used in other jurisdictions, tools that we wish we had in B.C. Wetlands will only be protected once people understand their value, and have the legal tools to translate their concerns into lasting protection. We hope that this Guide will help to develop a better wetland stewardship ethic in our province.

What is a wetland?

Wetlands come in many different forms. For instance, the shores of many ponds, lakes, rivers and oceans are wetlands. Any land depression where water accumulates in or just above the soil for much of the year is a wetland. Even an oasis in a desert is a wetland. With the exception of deserts, mountain tops, and the extreme polar regions, it is possible to say that "wetlands are everywhere."

Wetlands are defined in at least four ways: scientifically, legally, politically, and personally. These definitions are interrelated. Your personal definition, although the most valuable to you, will count the least when you try to tackle governments or developers over wetland protection. If you care about wetlands, you need a definition that attains the "highest common denominator" (the most protection). This view says that any place that is even occasionally wet is a wetland and therefore deserves special treatment and protection. If you do not believe in the value of wetlands you aim for the "lowest common denominator" (the least protection). This view says that wetlands are a waste of potentially valuable "land" that can be put to "better" use.

As Zoltai observed in *Wetlands of Canada* (p. 9), "A universally accepted definition of wetlands has not emerged because of the diversity of users and the regional variations of wetlands." The definitions with which we must live, of which there are more than fifty around the world (Dugan, p. 12), are somewhere in the middle. Here are some examples:

"A wetland is simply any area of land that is covered with water for a part of the day or a part of the year. There are two classes of wetlands: freshwater and saltwater." (From *Wetlands,* a Canadian Wildlife Service pamphlet.)

"**They (wetlands) are neither firm "lands" in the conventional sense nor bodies of open water; hence they occupy a transitional position between land and water. The ecosystems that develop on such lands are dominated by the persistent presence of excess water. Wetland is defined as "land that has the water table at, near, or above the land surface or which is saturated for a long enough period to promote wetland or aquatic processes as indicated by hydric soils, hydrophytic vegetation, and various kinds of biological activity that are adapted to the wet environment**." (Tarnocai in *Wetlands of Canada,* p. 3.)

"Wetlands are areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six metres." (International definition adopted at the 1971 Ramsar Convention on Wetlands.)

We can think of wetlands as places where the world can re-create and re-invent itself. Life on earth may have begun in the ocean, but it really began to diversify and become interesting once it extended to the amphibious realm, the wetland realm. Wetlands are places that are rich in possibilities, dense with different habitat niches, and sufficiently complex that they offer a model of the kind of diversity that scientists know is needed to sustain stability and genetic health in the global ecosystem. Looking at it this way, you could say that wetlands are the earth's way of providing places where life as we know it could have evolved and will continue to flourish.

What are the Different Types of Wetlands?

The distinctions between and among wetlands are based on such characteristics as water levels, whether floods occur, the acidity of the water, the type of soil, the types of plants, and the amount of woody plant material. It is important to remember that **all wetlands are worth preserving.** Some, however, will be assessed as more valuable than others because they are a rare type of wetland, provide a vital link in a "greenways" scheme, or because they contain rare or endangered species

There are many ways to approach the classification of wetlands. The broadest categories of wetland are called **classes.** There are two classes of wetland: freshwater and saltwater. These are broken down into the following basic **types**:

Freshwater: Shallow ponds and potholes, marshes, peatbogs, swamps, fens, wet meadows, swamp forests, floodplains, and most shorelines (the exception being those shorelines that are extremely steep).

Saltwater: tidal flats, saltwater marshes, eelgrass beds, estuaries, and deltas.

Another method of classifying wetlands is based on five types of wetland **systems** (from Niering, p. 21):

1. **Marine** — non-estuary saltwater wetlands
2. **Estuarine** — wetlands around the mouth of a river
3. **Lacustrine** -wetlands connected lakes
4. **Riverine** — wetlands connected to rivers
5. **Palustrine** — marshy wetlands

This breakdown is useful but has its limitations. Note that it forces peatlands, for instance, into the marshy wetland category, which is not an accurate description.

The Canadian Wetland Classification System, produced by the Canadian Wildlife Service, uses 5 types of wetlands: is this same as above?

And a comparison between Puget Sound and the Strait of Georgia of losses and gains of marine aquatic habitat used nine classifications: sand, mud, marsh,riparian vegetation, unvegetated subtidal, eelgrass, intertidal algae, kelp beds and rock gravel. (Levings and Thom, 1994). This study was produced for a scientific symposium as background for the B.C./Washington Marine Science Panel report. One of its key recommendations was to advise the provincial and state governments to develop a common classification system to assist in assessing the degree of marine habitat loss. The Marine Science Panel rated prevention of habitat destruction as the highest marine environmental priority because its impacts are irreversible, the potential harm to the environment is great and habitat losses are highly preventable while the cost and effort needed to restore the amount of functional habitat are very high. (B.C./Washington Marine Science Panel, 1994). Although this report concerned wetlands located beside the ocean, the findings and recommendations are equally applicable to freshwater wetland areas.

Wetland Characteristics

The attempts to describe the characteristics of wetlands are at the core of why wetlands often remain a "disputed territory." The disputes, to date in the U.S. than in Canada, often rage around the distinctions between what is a wetland and what is not. The status of a wetland may depend entirely on which "characteristics" one accepts as legitimate. Legitimizing wetlands as wetlands constitutes the "proof" that a particular wet place is worth protecting.

Here are the general characteristics of wetlands:

1. **Water**. Wetlands are characterized by the presence of either surface water, sub-surface water, or both.
2. **Vegetation**. Wetlands support plants that are indicative of wet sites. This sounds circular, and it is, but it is worth noting that the presence of certain plants is proof that a place is in fact a wetland. These plants, called **hydrophytes or hydrophitic plants**, are only found in wetlands.
3. **Soil**. Wetland soil is called **hydric soil**. Hydric soils have physical and chemical properties that are characteristic of waterlogged conditions that lead to an almost complete lack of oxygen.

It might be possible to add "wetland animals" to this list, but animals are too mobile to be properly included in any classification scheme.

Why are Wetlands Important?

Wetlands offer an extraordinary variety and number of habitats for creatures seeking a home. Wetlands are important for the inhabitants of wetlands as well as for the inhabitants of nearby ecosystems of other types. A wetland in one locale is important for migrating birds that are thousands of miles away.

An understanding of food chains, animal habitat provided by plants, and the provision of water in dry seasons will come easily to anyone familiar with basic ecology. Each of these is a key aspect of what is valuable about wetlands. Differences in point of view regarding the value of wetlands often stem from differences in understandings about the basics of ecosystems, and their importance.

Many writers have called wetlands the "kidneys" of the earth because they filter and clean the water that flows through them. But they are also the "bladders" of the earth by virtue of their water storage ability. For their role in transforming nutrients,

wetlands are also the earth's digestive tract, and for their ability to filter toxins, they are the liver as well.

One answer to the question of why wetlands are important is the same as the answer to the question of What good is a kidney? By filtering the body's fluids the kidneys help support the biological functions around them. Wetlands, through their role in providing habitat and supporting biodiversity, do just the same — they support life, including filtering the fluids that pass through them.

The value of our remaining wetlands has increased dramatically over the past few decades because so many wetlands have been destroyed. The days are gone when one could assume that there would always be another wetland habitat to take the place of one that was filled or drained. Seventy percent of the wetlands near many Canadian cities and towns have been destroyed, mainly in conversions to agricultural uses. (See *Wetlands in Canada: A Valuable Resource)* At some time in the past there may have been "other places to go" for wetland creatures, but that option has been lost as a result of one hundred years of wetland destruction.

The richness of wetland habitat is exploited when wetlands are converted to agricultural uses. Many centuries worth of organic material has built up, and it can then become productive farm land, but only at the expense of the food chains (or food webs) that once functioned at that site. That this richness is so prized by farmers is an indication of just how important these wetlands are in the global ecosystem.

Every wetland provides many different types of habitat; part of the richness of wetlands is to be found in the fact that they have many different habitat niches. Each niche is like a universe unto itself that is preyed upon and utilized by creatures in the adjacent universes. The sheer number of niches, and their variety, is a function of the transitional nature of wetlands; they are neither water nor land, but every imaginable combination of

the two crammed into a finite area. Everything that wetlands **cannot** do for humans directly is exactly what they **can** do for other lifeforms — wetlands provide shelter and food; they are the factories and nurseries of our landscape.

The Links Between Mapping and Definitions

All wetlands have some features in common and these commonalities are the keys to defining wetlands. Figuring out where a wetland ends and the next ecosystem begins is the key to visualizing where a wetland exists on a map, as well as where it exists on the earth. The process of defining wetlands, either on paper or in the field, is called **mapping.** (In the United States it's called **delineation.**) Wetland mapping is dependent on having clear wetland definitions because boundaries can only be established in relation to an agreed-upon set of wetland characteristics.

Wetland protection will be incomplete unless there are laws about how close to the edge of a wetland development activities can occur. How far from the edge of a wetland do you have to be before your activities no longer affect the wetland ecology? To function as healthy ecosystems wetlands need buffer zones around them. Wetland animals use the adjacent ecosystems, so from the point of view of plants and animals, those non-wet places are an extension of the wetland. Thus, the answer to the question What is a wetland? is directly linked to the answer to the question: Where does the wetland begin and end?

Mapping and defining wetlands are interrelated. When the definitions of wetlands are questioned, people often want to change the mapping/delineation of wetlands so that fewer wetland areas meet the definition. Conversely, if our definitions are more inclusive, then more land can be classified as wetlands — to the benefit of entire communities.

Why are Wetlands Misunderstood ?

Only recently have people perceived and comprehended the value of the indirect benefits of wetlands. While the benefits are clear for their biological inhabitants, for humans it takes an understanding, for instance, that without wetlands BC's salmon population would disappear. Therefore, unless we have some knowledge of these indirect benefits, we won't know they even exist.

The gap between direct benefits and indirect benefits can be filled only by education and understanding. Two initiatives would go a long way toward filling this gap — a comprehensive wetlands education syllabus for the public school system and a compulsory wetlands module for all students of town and regional planning. Other important tools are: strong wetland protection laws and continued media coverage of wetland issues.

Many commentators on wetlands, including Bill Nye on the *Science Guy* show on PBS, have wondered if our misunderstanding of wetlands can be traced to the tensions that exist between humans and insects. Maybe so, but in any event we need to counter this attitude by convincing people that wetlands are important. Confronted by an unsympathetic elected official, you could try saying, "I am bothered by mosquitoes and blackflies as much as the next person, but I think of these insects as food for dragonflies and birds, and I imagine that had we not destroyed so much of Canada's wetland habitat there would be enough birds to clear the air somewhat." The point being that the solution to excess numbers of insects is not the draining of more wetlands, but the restoration of our lost wetland habitat.

Wetland Formation

All that is needed to have a wetland is a place where standing or slow-moving water can accumulate. Why is the earth's wa-

ter where it is? There are two reasons, one topographical, the other climatological.

Our earth is full of pockets that are like nests for water, and those pockets often become wetlands. Many places that are now lakes and rivers will gradually be filled in with sediment and become wetlands. A flat earth (i.e. an earth with no hills or mountains) would probably be one big wetland.

Human activity continues to play a major role in the formation of wetlands. Excavations, logging, and flooding, due to dam building, sewage lagoon construction or diking, are all capable of creating wetlands. Maltby (p. 29) gives the example of logging in Great Britain which triggered soil changes that led to changes in vegetation and hydrology and set up the conditions for bog formation. The erosion resulting from logging created wetlands by modifying the height of the water table.

Wetland conditions do exist in places where there may be little standing water. On BC's Pacific coast, wetland conditions are created on mountain slopes as a result of precipitation. Hydric soils and hydrophitic vegetation are found on mountain slopes that rarely have a chance to dry out. (See *Wetlands of Canada*, pp. 307 to 345.)

In short, wetlands are the natural outcome of the earth's geological formation, its meteorological cycles, and its climate. In true Darwinian style, it could be no other way — unless, that is, the "artificial selection" of draining and filling is allowed to overtake the "natural selection" of leaving our wetlands undisturbed but evolving.

Wetland Processes

Descriptions of wetland processes are somewhat complicated by the sheer variety of wetland types — each wetland type has processes that differ from other types in some basic way.

In battles over wetland protection, therefore, we must be clear about exactly what it is that we are protecting. It may be that one's favourite wetland is in fact an algae-filled, oxygen-starved, nutrient-poor pond that may eventually evolve into a meadow. It is nevertheless an important habitat, with vital roles to play in the ecosystem. We must know our wetlands for what they are and not defend them on the basis of what they are not.

In many ways, the form of a wetland, and its processes, are directly related to its **hydroperiod**. This term sums up in one word all the different seasonal or daily variations in water input that form a wetland. In tidal wetlands this inundation may be twice daily, once monthly, or permanently flooded, as in subtidal eelgrass beds. In non-tidal wetlands, the hydroperiod ranges from seasonally predictable to randomly timed flooding. The form, organization, and hence the type of wetland, all rely on these patterns of water input.

Any given wetland may have characteristics of more than one wetland type. As conditions change, especially water input, the bio-profile of the wetland may change. This is important, not only because it is ecologically fascinating, but in any studies of the status of a given wetland it is best to think of it as being multifaceted. For instance, one would not want to file a court challenge in winter to protect a wet meadow and have it come to court after a drought in late summer when it had dried out and had as many grassland indicators as wetland indicators.

So, the organization of a wetland — its metabolic processes, as measured through various functions that are analogous to digestion, blood circulation, and waste removal — will be a function of its topographic setting, its substrate (the underlying geological structures), and the particular rhythm with which water enters and leaves the wetland — its hydroperiod.

Wetland Hydrology and Soil

Hydrology is what wetlands are all about — water in contact with land. Wetland hydrology is the study of, and the description of, the ways water moves in and out of a wetland. The balance between the inflows and outflows of wetland water is called the **water budget.** The water budget will affect everything about a wetland, from its general type to its nutrient make-up, from its species profile to its value as a tourist destination.

Water enters a wetland via tidal flows, periodic flooding (from either surface or groundwater sources) or precipitation. Water exits a wetland by gravity, which forces it downstream, through evaporation, or through transpiration from plants. One or another of these processes, or a combination of them, will be dominant in any particular wetland — which will give the wetland what is called its **hydrological signature.**

In wetlands water is one of the "boats" that move nutrients around. Water is the container for much that is mobile within a wetland ecosystem. Wetland soil, whether it be bottom sediments or shoreline banks, is a zone of relative stability. Some wetland soils, though, are actually mobile, such as river sandbars.

Wetland soil is characterized by the absence of oxygen and is called "hydric soil" rather than "mud" by wetland scientists. Wetland soil is a storage vault for the chemicals required by plants. It is also a site for the various chemical metamorphoses that occur in the wetland — the breaking down and building up of new compounds from those available in the "wetland soup." Hydric soil is described as soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (i.e., oxygen-free) conditions in the layer closest to the water.

These definitions are important to know when you are claiming that a given site is a wetland. But note that assessing soil as hydric (or not) will often require either sophisticated instruments or the advice of a wetland scientist, or both.

Plants, Animals, and Habitat

A visit to the Reifel Bird Sanctuary in Ladner (25 minutes south of Vancouver by car) shows that wetlands are popular tourist destinations because they are teeming with wildlife.

Wetlands are wonderfully well equipped to provide wildlife with a place to live. Given a certain richness and diversity of nutrients in a wetland, there will eventually appear a richness and diversity of wildlife. Micro-organisms love wetlands, as do those who eat the micro-organisms, and so on up the food chain to the duck hunters and crayfish farmers. Wetlands are usually downstream from other ecosystems and, as a result, they are net importers of the nutrients, biomass, and energy that gravity washes downhill. When all this material gets to the wetland, it slows down or even stops moving completely, and becomes part of the wetland's metabolism.

Wetlands are among the most productive of all ecosystems on earth. (However, it is important to note that while this is true of most wetlands, it is not the case with every wetland type.) This massive productivity is measured not only by the amount of life the wetland can create but also by the amount it can sustain. One result of this huge productivity is biological diversity. It is now an irrefutable truth of biological science that diversity is crucial to the well-being of life on this planet, and that wetlands are a magnificent source of biodiversity.

Diversity provides stability because any large-scale losses or gains in species or populations are off-set by other species or other populations. Biodiversity is nature's best defence against the negative effects of species monoculture and the decline in genetic health that attends excess inbreeding. Wetlands are the

opposite of monoculture — the problems that continually beset the monocultures of agri-business are never problems for wetlands. You'll rarely see too many pests, dustbowl soil, or rampaging floodwaters in a natural wetland. That's because wetlands have what monoculture, by definition, lacks — complexity, diversity, and, as a result, the ability to deal with environmental change.

This diversity in wetlands applies equally to animal life, plant life, and micro-organisms. Not only are wetland habitats diverse, they are often the most secure of all animal habitats, and it is for this reason that wetlands are described as a "refuge" — a place where non-wetland predators can't get. The relations between wetland creatures and their habitat can sometimes be paradoxical. For example, some wetland predators are responsible for sustaining the populations of their prey. Maltby (p. 78) gives the example of a species of fish in the Amazon that died out when its main enemies, two species of crocodiles, were removed — apparently the crocodiles' excreta were a key element in the food chain that supported the fish.

Shoreline Wetlands — Riparian Zones

Riparian zones are shorelines. They are found at the edges of most bodies of water and form the wetland component of oceans, rivers, harbours, and lakes. Riparian zones include riparian forested wetlands — these are all those treed shorelines that are occasionally flooded but remain dry during the growing season. (Mitsch and Gosselink, p. 41)

Riparian zones are extremely important to the life of any wetland, but they are especially important here in BC because of the supportive role they play in maintaining the salmon population. Riparian zones are a transition area where the life of the **upland slope** (the watershed above the wetland) meets the wetland.

Riparian zones are wetland areas with a difference. The difference is that they are usually in direct contact with, and are therefore directly influenced by, a large body of water such as a river or a lake. A riparian zone along a river is essentially a linear wetland — if the river is 200 kilometres long, then the riparian zone will cover most of the 400 kilometres of shoreline. Sometimes the two opposing shorelines are very close, other times they are so far apart as to be part of two separate habitats.

Marine riparian zones have their own names, such as "tidal flat", "the shore of the estuary", or "the edge of the salt marsh", These riparian zones will all be, at most points in their geography, shoreline wetlands.

The importance of riparian areas is in part due to their abundance. For example, riparian forested wetlands (and their associated deepwater swamps) are the most "extensive class of wetlands in the U.S., covering 22.3 million hectares." (Mitsch and Gosselink, p. 40)

Upland Slopes — The Watershed Above the Wetland

Wetlands are as ecologically connected to the land that surrounds them as a child in the womb is to its mother. A riparian zone at the shoreline is not unlike the membrane through which metabolic exchanges take place between mother and child. Two important questions arise from this: firstly, where does the wetland end? and secondly, how much of the upland slope has to be protected in order to protect the wetland?

A wetland ends at the point where the three basic characteristics of wetlands are no longer present. (See page _____ for basic characteristics.)

In British Columbia, upland slopes, especially in suburban areas, are being destroyed at a breakneck pace. The nutrients

that once flowed down hillsides are now locked underneath pavement, homes, and lawns. The natural cycle of the watershed, which gradually transfers both water and nutrients to the wetlands below, is disrupted. This leads to nutrient starvation and droughts. (Because pavement prevents water from seeping into the earth.) Culverts and other surface-water control systems also divert water away from its natural destination — our wetlands.

Upland slopes need to be protected if the wetlands below them are going to remain healthy and alive. But these higher zones are most often selected for new development. How do we get around this? The answer lies in environmentally sensitive development. In other words, development that does not have as its primary goal the placement of the maximum number of lots on a site, or the largest houses on the smallest lots. The retention of forested greenways through a site will preserve some of the functions of the watershed.

Municipal councils and planning departments are sometimes unaware that there are sensible methods of developing that do not destroy the local ecology. This is true not only for upland slopes but for wetlands as well. See *BCWETNET NEWS* #1 for a story about a successful housing development in a wetland on Bowen Island. Because the lots in this development were in a preserved natural environment, they were more valuable than they would have otherwise been. The developer lost no money even though the wetland was preserved in its entirety, and even enlarged from its original state.

Wetland Succession — How Wetlands Change Over Time

Wetlands are not static entities. They are alive — as alive as any organism — and like an organism, they exhibit a day-to-day, moment-to-moment transfer of energy from one realm to another, one place to another, and as with any metabolizing or-

ganism, they also change naturally over time. This evolution is called **succession**, which is a polite term for "aging." A maturing deciduous forest evolving into a coniferous one is said to be undergoing forest succession. A maturing wetland, however, can evolve in any number of ways.

In a sense, a wetland's greatest natural enemy is itself. The ongoing creation of biomass, which accumulates as detritus, combined with the useful ability to absorb inflowing sediments, leaves many shallow wetlands doomed to evolve — first into meadows and eventually into forest floor. As a wetland shrinks, more and more non-wetland plant species take hold at the receding shoreline. And this in itself can accelerate the succession process. But because the water from the original wetland has to go somewhere, it is probable that a new wetland area will form nearby.

Succession occurs in coastal waters as well. River sediments alone can build up and extend a shoreline, leaving one-time estuaries far inland. Dugan (p. 18) gives the example of the ancient port city of Palenburg on the North coast of Sumatra, which was visited by Marco Polo in 1292 and is today 50 kilometers inland.

Human activity can play a significant role in succession: "Altered drainage has the most widespread effects. A lowering of the water table allows shore pine, western hemlock, and paper birch to expand at the expense of Sphagnum and other bog species in basin and domed bogs." (*Wetlands of Canada,* p. 342) Peat mining brings about the possibility of flooding, and the succession from bog to marsh.

Why does wetland succession matter? Succession matters because habitat matters — after all it's all we have. Succession is not so much habitat loss as it is habitat change. It is a benign process because it is a slow process — not as slow as the pace of geological events, but relatively slow in the scale of biologi-

cal time. It is this gradualness that distinguishes wetland succession from wetland destruction by humans.

Should we interfere in this process? We shouldn't interfere, but there are many reasons for doing so, given the amount of wetland destruction that has taken place. Some intervention would be required just in order to maintain our current inventory of wetlands. Preserving habitat can never be a bad thing, but whether humans should intervene in this process is tricky and fraught with peril. (See "Restoration" on page _____.) Meanwhile, it is important to be clear about the distinction between slow, gradual succession and the destructive rapidity of "development." Developers should emulate nature — developing 1000 hectares at a rate of ten hectares a year over 100 years would have much to recommend it!

Ponds evolving into marshes, marshes into fens, and fens into bogs, are all part of the ecological process called succession**.** They are all natural, gradual, and benign facets of the life of our wetlands.

Wetlands and Flood Control

One of the greatest virtues of wetlands is their ability to control floods by absorbing water. Approximately 100,000 cubic kilometers of water falls on the earth every year as precipitation, and about 25 percent of that flows over the land surface as runoff. Perhaps the best way to imagine how wetlands work to slow down this cascade and mitigate the damaging effects of floods, is to picture 25,000 cubic kilometres of water falling on a paved surface — which, for the purposes of this discussion, is the opposite of a wetland.

In the United States, some 520,000 square kilometres of land — an area approximately the size of France — have severe flooding problems. In 1995 and 1996 there was severe flooding in the Pacific Northwest, which many suspect was partially

the result of wetland loss and destruction. If thousands of hectares of wetlands had not been destroyed, these catastrophes might not have occurred, or at least would have been minimized.

How do wetlands perform these protective functions? Even though a wetland is already wet it will always have room for more water. Wetlands give incoming waters "cause for pause", and they do it without damage to themselves. Patterns of water-flow concern humans greatly during storms and droughts. During storms, our wetlands help protect us from floods by absorbing and holding water before releasing it. In dry periods, a wetland is a valuable source of water. This is the sponge-like function of a wetland — gradually releasing valued water while absorbing more if it comes along.

Think of wetlands as devices for seizing water, using it, cleaning it, and then gradually letting it go on to serve other uses.

Getting the message to your town council about the sponge-like function of wetlands can be an important step in getting town/district officials on-side for future wetlands debates. Describing the flood-control function of wetlands to elected officials will be rewarding if it helps them understand why wetlands need special protection.

Filtration — How Wetlands Clean Water

Regardless of our point of view, we must accept that wetlands are the great purifiers of the waters of the earth. Wetlands are a natural answer to the question of **water quality**. "Wetlands, once regarded as a source of disease, can actually help maintain water quality, promote the rapid growth of plants, absorb toxic metals and chemicals, clean up polluted water, and even act as natural sewage treatment plants." (Maltby p. 63)

This becomes clear when we consider sediments, such as the fine sand found in turbid, fast-moving rivers. This sand is in

the water until the water slows down — when it slows down the sediments drop and you get either a wetland or a delta that will soon be a wetland.

Wetland plants absorb and retain compounds that are toxic to other forms of life. According to Maltby, "These imperfectly understood processes can immobilize, transform and fix contaminants, preventing a high proportion of them from flowing out or entering groundwater or the food chain. The efficiency of heavy metal removal varies from twenty to one hundred percent." (p. 64)

The filtration capabilities of wetlands are such that it is possible to "use" wetlands for sewage treatment. (See *BCWETNET NEWS* #5.) Wetlands can "fix and render harmless viruses, coliform bacteria and suspended solids normally left after secondary sewage treatment." (Maltby, p. 64)

The filtration function of wetlands is not limited to sediments and toxic compounds. For example, it is our wetlands that have saved us from an environmental catastrophe caused by all the excess nitrogen in fertilizers that have been dumped on the earth since around 1920. Not only is some of the excess nitrogen converted into wetland plant life but wetlands contain bacteria that can reduce the oxygen in nitrates, and convert the nitrogen back into the atmosphere as a gas. Without this ability, which is called denitriphication, our environment would have long ago choked on an overdose of nitrates. For a summary of wetland filtration see Laura Jamieson's article in *BCWETNET NEWS* #4.

Wetland Restoration and Creation

One of the most surprising things about wetlands is that an artificially created wetland can be just about as good as a natural one. Wetland restoration involves making a healthy wetland where there used to be one. This may involve nothing more

than restoring the natural hydrological conditions and letting nature take its course. Wetland creation involves making a wetland where none has been in recent memory.

There are some questions to be asked about the soundness of creating or restoring a wetland. The answer is relatively easy for restoration — it should always be desirable to restore a wetland to a place where there once was one. Creating a wetland is more complicated. What habitat is being lost to create the wetland? Which of these habitats is more important, especially given the costs of wetland creation? Government agencies with "no net loss" policies (i.e., that any wetland loss will be mitigated by creation of new wetlands of equal size.) have to deal with these complexities. Often community groups, those with a desire to experience the joys of having a local wetland, will be the initiators of restoration/creation projects.

The reasons for restoration and creation are the same as the functions of wetlands: habitat creation, flood control, water quality improvement, recreation, nature study, and shoreline erosion control. In addition, created wetlands are commonly made for wastewater treatment. (See Martin Keeley's article on the Dawson Creek lagoons in *BC WETNET NEWS* #5.)

Kentula's book *Wetlands: An Approach to Improving Decision Making in Wetland Creation and Restoration*, explains just how complicated the process can get. When the project is on public land and requires taxpayers' money, the need for expert advice is ecologically and politically compulsory. What one wants to achieve during the proposal/planning stage of a restoration/creation project is "a framework for the development of ecologically defensible management strategies for restoration and creation that are tailored to local and regional needs." (Kentula, p. 3)

So, unless you just want to experiment with a patch of land on your own back forty, the restoration and creation of wetlands will need expert advice and consulting. A critical review of the

proposal will be a key element in the success of the project. Costs of maintaining the site must be assessed, and the problem of long-term monitoring of the new wetland's health must be addressed early on. Will this be done by volunteers? Who will train them? Kentula's book, in addition to having an extensive bibliography related to this topic, has an entire chapter on the use of volunteer monitors.

If you're in the Lower Mainland and wish to see some created wetlands, visit the pond site at Jericho Park on the west side of Vancouver, or Trout Lake on the east side. The Fraser River Foreshore Park, Ladner Lagoon, Iona Island Park, and Sea Island Park are also well worth a visit. (These sites are listed in *The Discoverer's Guide to the Fraser River Delta* by Don Watmough.)

If you have a possible wetland restoration project in your area, there is expert help available through government agencies. Call the federal Department of Fisheries and Oceans if the wetland is a potential salmon habitat. The Canadian Wildlife Service can offer advice, as can Ducks Unlimited. Also, university departments of biological science or geography will more often than not have several wetland experts on faculty.

Wetlands in B.C.

British Columbia's Wetlands — Two Types?

British Columbia is said to have two percent of Canada's wetlands, and these 3,120,000 hectares constitute three percent of British Columbia's total land area. In the 1980s it was estimated that wetlands covered about 14 percent of Canada, but

the original, historic wetland coverage would have been substantially higher. About 50 percent of the original wetlands (i.e., before European settlement) in the Greater Vancouver and Greater Victoria areas have been converted to agricultural uses. An additional 25 percent have been converted to "urban activities", which is to say that they have been paved over and built upon. Approximately 25 percent of our original natural wetlands remain. (Bill - source?) In some areas, wetland loss is much more extensive. About 96% of the wetlands in the North Arm of the Fraser estuary have been lost since the turn of the century. (Levings and Thom, 1994)

Much of Canada's wetlands are frozen for at least six months of the year, during which time they virtually shut down as theatres of biological operations. The exception to this half-year-long frigidity is the Pacific coast — the Fraser Valley up as far as Hope, and the low-level wetlands all the way up and down the coast, north and south of Vancouver. The mild climate in these areas makes them valuable to migrating and resident waterfowl on a year-round basis. Their micro-biological activities are chugging away straight through the winter, and their nutrient flows and food chain functions operate year-round.

From a bird's point of view, one could say that in the dead of winter there are two kinds of wetlands in B.C.— the frozen and the almost frozen. This is not to say that our coastal wetlands are more valuable than other wetlands, just that they do have somewhat special status within the overall context of Canadian wetlands, and because of that the remaining coastal wetlands must be cherished and protected.

A Wetland Ecology Ethic — The Tragedy of the Commons

The tragedy of the commons is an old story. At its core is the "I don't care about the people downstream" view of the world which has repeatedly been the cause of our environmental ca-

tastrophes. It is also the title of a beautiful essay published in 1968 by Garrett Hardin which provides a paradigm for the development of a wetland ethic. The story goes like this:

In England in the 1600s great prosperity grew out of the trade in wool and woolens. Markets were expanding at a pace greater than the ability of sheep-owning farmers to provide wool. One 'solution" to the 'shortage" of this basic commodity was to allow more and more sheep to graze on common pasture land. It stood to reason that if the market demanded more wool, the producers were obliged to increase their flock sizes in an effort to meet the demand.

Placing excess demands on the environment led to the destruction of the grazing lands, the collapse of many farming operations, and the shift from community-based common grazing lands to privately owned "enclosed" land. Their tragedy was rooted in demanding more of the environment than it could sustain. Our wetlands have been subject to the same pressures as old England's grazing lands were. In a effort to "create wealth" we have radically diminished the environmental benefits that we all derive from wetlands.

We've done this at our own peril, to say nothing of the certain death that was faced by all the organisms that depended on those wetlands. In the Lower Mainland, for example, over 70 percent of the area's original wetlands have been lost to either urban and industrial development or farming. Near Chilliwack in the 1920s all 2,600 hectares of Sumas Lake were drained to create farmland. That alone was a loss of 26 square kilometers of wetland habitat. (*Bill - source?)*

In the tragedy of the commons, the actions of individuals had a cumulative impactaffect that eventually led to a loss of opportunity not only for the individual farmers, but the entire society as well. We need to develop a wetland ethic that will protect BC's wetlands for the indefinite future, or face the prospect of

making the kinds of mistakes that can lead to tragedies of our common wetlands.

Protecting wetlands is simple when people agree on the same degree of protection for distant wetlands as they would seek for wetlands near their home. This can only be accomplished through legislation and education. Caring for wetlands can be accomplished through an application of the "golden rule" (do unto others ...), but in the absence of laws, education, and care, wetland protection in BC will require hard lobbying efforts.

The first step in developing a wetland ethic is the acceptance of the fact that we have already destroyed as many wetlands as we can afford to destroy without bringing a tragedy of the commons upon ourselves.

With a wetland ethic it would be clear that the losses outweigh the gains and that we cannot afford to sacrifice more wetland habitat. The existence of wetlands in close proximity to human society is a sign of true civilization. A human society that is founded on wetland destruction will eventually reap the curse that monoculture has to offer. In the absence of the biodiversity that wetlands support, we can expect the worst: from food chain breakdowns to floods and droughts; as well as generations of children who are deprived of places to experience the joys of nature, and a society that "knows the price of everything and the value of nothing."

One of the ironies of wetland loss is that the decision-makers who do nothing to save wetlands are often the same people who are deeply appreciative of what wetlands have to offer. They feel for the losses, but are caught up in a complicated system. Our job is to remind them that BC's wetlands are underprotected, and that we have to work together to change this. Living in harmony with wetlands is a sign of civilization. A destroyed wetland means little to someone who is insensitive to the ecological and communal need for wetlands — so it is our

job to provide a "wetland education" for as many British Columbians as possible.

The confrontations and sit-ins that have characterized the debate over logging practices have not yet become common in the wetland world. Will this state of relative peace continue in the absence of better protection for wetlands? The friends of wetlands in BC are a mixed group — ranging from kids who love ducks to the 100,000 or so senior citizens who take part in nature clubs and ad-hoc nature walks. This group has a lot of brains, a lot of money, and a lot of votes. There is a lot of pent-up anger and frustration over the ease with which so many wetlands have been filled and paved over — the question of when this frustration will be transformed into a broad-based call for better protection of wetlands remains unanswered.

The Fate of BC's Wetlands

If one were keeping a scorecard, it would appear that humans are enormously hostile toward wetlands. It is as if a deep and terrible wrong against humans had been committed by wetlands in the past, and our history over the past 500 years has been a kind of "ecological cleansing" in revenge for the now long-forgotten offence. Far-fetched though this scenario seems, one can imagine anthropologists from another planet drawing that conclusion after studying what we"ve done to the earth.

British Columbia has been a full participant in the demise of North America's wetlands. The fate of our wetlands from here on depends on which of two viewpoints gets its way. One view is unsympathetic to wetlands, and says that we must use wetlands for such and such a development. The net result of this view getting its way is not only habitat loss, but the loss of wetland functions such as flood control and the retention of water for use during dry periods.

The other viewpoint is sympathetic to wetlands and the need for their preservation. It argues that we can work **with** the wetland habitats of the world. Humans can live in and with wetlands — in what Dugan (p. 45) has termed "aquatic civilization." In British Columbia the example of Finn Slough in Richmond is a reminder of how harmonious relations between humans and wetlands can be. Dugan (pp. 44-45) gives Vientiane in Laos as an example of a stilt-house city in which people are "working with the hydrological system rather than trying to control it with dikes and dams." There is even a substantial wetland community of several hundred stilt houses in New York City!

But just having knowledge of the ways that humans and wetlands could work in harmony is not enough to prevent further losses. The challenge is to get the principles of ecosystem management into every level of government decision making, and then into private land stewardship as well. Starting at the local level you could work towards getting your municipality to request that the Union of BC Municipalities adopts a "wetlands-friendly" position and that it lobbies the provincial government on behalf of wetlands.

BC could easily become a model of wetland preservation. We have been fortunate because so much of our land is owned by the crown. Large areas of wetland have been sold to private interests, though, and it is in this domain that protective legislation is sorely lacking. Many individual efforts are already working toward the goal of protecting wetlands, including projects by Ducks Unlimited, Wetlands Keepers, and the Fraser River Action Plan. Land acquisition programs are underway, such as the Pacific Coast Joint Venture which has secured million hectares of wetlands in the province in the past --- years. Collaborations with farmers such as the Delta Farm and Wildlife Trust are also a positive sign of increased concern for wetlands. Today there is not a single valid reason for destroying more wetlands. We now have the knowledge required to

work **with** our wetlands rather than against them. The fate of BC's wetlands is in our hands and the time is right for us to take responsibility for our wetland habitat.

Legal Tools for Protecting Wetlands

This chapter is about the wide range of laws that have the potential to be used to protect wetlands. British Columbia does not have a law or policy devoted specifically to wetlands. Instead, there are different laws at the federal, provincial and municipal levels which may play a role in wetland protection. Each case of wetland protection may involve one or more levels of government, and one or more laws and policies. Often, the best way to protect a wetland will involve participation in local land use planning processes. In addition, there are legal tools which may be used to protect privately owned land, especially conservation covenants held by non-governmental organizations.

The chapter is divided into four sections. First, the report discusses how to gather information about a wetland. Second, it describes the different levels of government and their different jurisdictional powers over wetlands. This section includes a summary of the major laws at all levels of government that apply to wetlands protection, and a brief description of some intergovernmental programs. Third, legal options to protect privately owned wetlands are discussed. Finally, a section on wetland stewardship in BC contains proposals for reform of wetlands law and policy in the province.

GATHERING INFORMATION ABOUT WETLANDS

> *Citizens can and should take the initiative in wetland protection. You and your neighbourhood organization can begin a prevention program by monitoring and documenting the unique features of your wetland. You can also track land use planning and development activities in your area and in the watershed. Should development be proposed, you should be prepared to get involved in the early stages...This will help to avoid emergencies that occur due to lack of citizen input. Your objective should always be to promote a win/win solution.*
>
> *- Wetland Protection Guide, Seattle Audubon Society, 1995*

Who Owns the Wetland?

The very first step that must be taken if you are interested in protecting a wetland is to determine whether the wetland is privately or publicly owned. There will be different restrictions on what you can do based on the ownership of the land. In general, your options are more restricted if you are not the owner of the wetland, and if the owner is not interested in legal protection. Your opportunities to increase the legal protection of a wetland are increased if you are dealing with a cooperative landowner. If the wetland is publicly owned, you have a range of options to increase legal protection. Which option you choose to use will depend on a number of factors:

- zoning of the wetland and the opportunity to change the zoning;
- whether the wetland contains fish habitat;
- the presence or absence of wildlife on the wetland;

- whether any human activities such as filling, logging or polluting are threatening the wetland.

In British Columbia, most land is publicly owned, including wetlands. Of the 6% of the province that is characterized as wetlands, "a significant but as yet undetermined portion of that is located on private lands."[1]

One survey that analyzed the ownership of the wetlands in the Fraser lowlands area found 13.3% of the total were privately owned. Different levels of government in this area owned the remaining 86.7%, divided as follows:

- 76.9% owned by the Provincial Crown
- 4.6% owned by municipal or regional governments
- 2.6% owned by the federal Crown
- 2.6% located on First Nations reserve land. [2]

To determine the ownership ofr a wetland that you are concerned about, you should contact your local Land Title Office. The Land Title Office is the centralized daily registry of changes in the title to individual pieces of property. There are offices around the province. The Land Title system is based on the *Land Title Act*, a BC statute. The Land Title Office maintains a record, by property, of all the estates and charges on the title of that piece of property. By searching the title of a piece of property at the Land Title Office, you can determine who the owner is of that land, as well as what restrictions are registered on the title of that particular piece of land. These restrictions could take the form of an easement, a restrictive covenant or a lease, for example[3].

Government Involvement with the Wetland

Other relevant provincial government departments that may provide valuable information about wetlands in BC include:

- the Crown Land Office, a department of the BC Ministry of Environment, Lands & Parks
- the Ministry of Municipal Affairs,
- the Ministry of Transportation and Highways,
- the Ministry of Agriculture, Fisheries and Food, and
- the Ministry of Health.

Federal agencies with important responsibilities for wetland protection include:

- the Department of Fisheries and Oceans (DFO)
- Environment Canada and
- the Canadian Wildlife Service.

Also, your local government can provide valuable information about land ownership and zoning restrictions. Potential offices to approach include :

- the Planning Department,
- the Engineering and Public Works Department,
- the Parks and Recreation Department,
- the Environment Department, and
- the Building Department.[4]

Biological Information About the Wetland

You may be interested in learning more about the biology of your wetland. For information about conducting an initial wetland assessment, a survey of wetland plants, and a wetland bird survey, consult the publication *The Wetlandkeepers Handbook-A Practical Guide to Wetland Care*, B.C. Wildlife Federation, 1996.

Privately Owned Wetlands

No matter who owns the wetland, the most common way to influence whether or not it is protected is through the land use planning process conducted by your local municipal planning office. This may involve influencing the zoning, trying to have the wetland designated as an environmentally sensitive area, attempting to have the wetland designated as a park, or imposing restrictions on a developer's ability to proceed with development if the municipal council does allow a subdivision to occur.

It is also important to remember that landowners' rights are restricted on their property. There are a number of legal limitations on a landowners' right to do whatever he or she wants with a parcel of land. Private landowners must follow laws that apply to them. For example, the federal *Fisheries Act* applies to all fish habitat and prevents destruction of or damage to fish habitat. If you suspect that damage to fish habitat is occurring on a privately owned wetland, you may wish to contact the local DFO office to investigate this breach of law. There are a number of similar laws which a private landowner must obey. See the next section for more details on federal, provincial and municipal laws related to wetlands.

Nonetheless, a member of the public has more limited rights in relation to a wetland that is privately owned than on one that is publicly owned.

Trespass

The most important restriction is that no one may trespass on privately owned land. Trespass means the unauthorized entry on to someone else's land. In BC, under the *Trespass Act*, if land is fenced or posted with signs prohibiting trespassing at the access points to the property, a person coming on to the land is deemed to be a trespasser unless that person can show that he or she had the consent of the owner, lessee or occupier.[5]

So, in order to visit a particular wetland, or do anything in relation to that wetland, if you have determined that the land is privately owned, you must obtain the consent of the landowner before entering onto the property.

Additional Rights Available to Neighbours — Nuisance

If you own land next to a privately owned wetland, you may have additional legal rights. Landowners are not entitled to use their land in ways detrimental to their neighbours' use of their own land. An owner of land may be able to sue for nuisance against someone who does something that adversely affects the landowners land. Nuisance can sometimes provide a legal avenue for the environmental protection of private land, for example, if the land is being polluted by a neighbouring owner. Nuisance law covers a wide range of activities, such as noise, vibrations, noxious odours, and interference with riparian rights. To succeed in an action for nuisance, the occupier of the land must show that he or she has suffered actual and substantial harm. A lawyer's advice may be necessary to determine whether a particular use of land is a nuisance, and ultimately it will be up to a Court to determine if it is.[6]

Publicly Owned Wetlands

If you determine that the wetland you are interested in is publicly owned, you may freely visit the area, subject to any restrictions imposed by any government agency. For example, a wetland in a park may only be open to the public during certain hours.

As with privately owned land, you can try to affect the uses of the publicly owned wetland through changes in zoning, having input into an official community plan, or lobbying to have legislation passed which will limit the permissible uses of the land to avoid, prevent or minimize damage to the land. Or you may choose to lobby the government to acquire the land itself for protection purposes.[7]

If you want to use the law to protect public wetlands, you should first determine what laws are applicable in a particular case by reading the sections in this book that follow on federal, provincial and municipal law. Then, you should investigate whether the laws are being followed. If you suspect that the laws are being violated, you should ask for help from government enforcement agencies. There are a number of laws that may be applicable to any particular situation. You may want to consult a lawyer to determine what legal options are available.[8]

Government Jurisdiction Over Wetlands

Many laws have the potential to protect wetlands, by controlling certain activities such as land development or pollution emissions, or by restricting the use of land or water, for example, by way of a water licence or designation as a protected area.

Different levels of government have different powers to make laws which have an impact on wetlands.[9] The three levels of government (federal, provincial and municipal) have the power to enact laws over different subject areas.

The federal government has the authority to make laws regarding fisheries. The federal *Fisheries Act* is an important tool for protecting wetlands. Other federal constitutional powers relate to land reserved for Indians; peace, order and good government; criminal law; federal undertakings and federal public land.[10] The federal government also plays a role in wetlands protection through its own policy on wetland conservation which applies to federal lands[11] and through activities such as cosponsoring publications with the North American Wetlands Conservation Council for public education.

Most environmental laws are provincial. The provincial government has jurisdiction to make environmental laws based on their authority to control natural resources; property in the province; sale and management of public lands; and all matters of a local nature.[12] The *Waste Management Act*, *Water Act*, and *Environmental Assessment Act* are examples of provincial environmental laws. There is no specific provincial wetlands protection law, although the province is preparing a written policy to guide government decision makers on wetland issues. Currently, the province has an informal policy of "no net loss" of wetlands. This policy is not enforceable in a court. It is little known and rarely applied. Even if the policy was systematically applied, it has problems. The policy means that if a develop-

ment destroys part or all of a wetland, the developer must compensate for this loss by rehabilitating a damaged wetland elsewhere or creating a new wetland. There are many problems with compensation. A preferable approach is to avoid destruction of existing wetlands in the first place.

Municipal governments also have wide powers to regulate wetlands through land use and zoning decisions; and bylaws about a number of subjects. Municipalities and other forms of local or regional government have no direct constitutional powers. They have only the powers that are delegated to them by other levels of government. The *Municipal Act* is the law which regulates what municipalities can do in BC. Wetland protection can be, and has been achieved in several municipal jurisdictions. For example, the District of North Vancouver has an *Environmental Protection Bylaw* which is used to protect wetlands and riparian areas. The following is an overview of federal, provincial and municipal laws that could apply to a wetlands protection case.

Legal Tools for Protecting Wetlands

Federal Laws Related to Wetlands

FEDERAL POLICY ON WETLANDS CONSERVATION

The most explicit statement of the federal government's position on wetlands is the *Federal Policy on Wetlands Conservation.* This policy, issued in 1991, recognizes that wetlands are among Canada's most threatened ecosystems and commits the government to "no net loss" of wetlands. Since this is a policy, rather than a law, it is not legally enforceable in a court. How-

ever, the policy may be used as evidence in a court or administrative tribunal case. In the case of *Re Kelly*, the Ontario Municipal Board refused to allow a landowner to sever a piece of his land for development because it would harm the wetland. The federal policy was cited by the planning board as proof of the government's concern over protecting wetlands.[13]

FISHERIES ACT

The federal *Fisheries Act* contains several provisions which protect wetland fish habitat:

- Section 35(1) prohibits the harmful alteration, disruption or destruction of fish habitat,
- Section 36(3) prohibits the deposit of a deleterious substance in any water frequented by fish, (deleterious generally has been interpreted to mean harmful or toxic) and
- Section 37 which gives the Ministry of Fisheries and Oceans the power to require plans and specifications to assess a project that results or is likely to result in either of the interferences with fish or fish habitat contained in Sections 35 and 36. If a plan and/or specification is required, the Minister may require modifications to the plans or restrict or close the work or undertaking.

The first provision, relating to habitat protection, allows the Department of Fisheries and Oceans (DFO) to authorize certain projects to go ahead even if they may damage fish habitat. In this case, DFO provides an authorization for a project to proceed, and requires habitat compensation to achieve the government's policy goal of "no net loss of fish habitat."

The second provision is a general anti-pollution section. Even though provincial law also contains many anti-pollution provisions, it is often the federal *Fisheries Act* which is used to prosecute offences of polluting rivers or streams where the discharge is deleterious to fish.

The importance of the *Fisheries Act* is obvious when considering the number of authorizations required, the number of investigations underway and the number of charges laid in the last two years (1994-95) in the province – approximately 92. Most charges are related to stream or river protection.

Enforcement of the Fisheries Act

Where a violation of the *Fisheries Act* has occurred or has the potential to occur that will present irreparable harm, a Court injunction may be requested under Section 41(4) to stop the work or undertaking. This is an important procedure which can be used to prevent imminent damage or destruction of a wetland.

If damage has occurred, a prosecution for violating the *Act* may be started. The DFO will provide technical evidence to the Department of Justice, the federal government department responsible for prosecution. Where a conviction results, possible penalties are fines, imprisonment or orders for restorative action. The largest fine ever levied against a Canadian company for breach of an environmental statute was the result of a *Fisheries Act* prosecution against Tioxide Co. for depositing deleterious substances in water frequented by fish. A judge of the Cour de Quebec ordered the company to pay $4 million: $1 million in fines, and $3 million for projects to protect fish and fish habitat.

There have been many court cases involving destruction of fish habitat in BC. The *Fisheries Act* is a powerful tool for wetlands protection when properly enforced.

Limitations of the Fisheries Act

But the *Fisheries Act* is not the legal answer for protecting wetlands in B.C., despite its power to protect fish, and the wetland habitat they depend on. It is limited to protecting fish habitat, so does not apply in the case of a wetland without fish. There are other limitations as well.

Who gets charged?

Enforcement of the *Act* is limited by lack of resources, and also by political concerns. As Dovetail Consulting has noted: "Prosecutions are generally pursued where there have been approvals granted, where warnings have occurred, and/or cases where the proponent should be familiar with requirements and the proponent still commits an offence."[14] DFO must consider the financial and practical aspects of prosecutions.

Private prosecutions

Private citizens may initiate prosecutions under the *Fisheries Act*. However, the province has the authority to intervene in the prosecution to either take it over, or to stay or cancel the proceedings. This is an obvious constraint on NGO involvement. The Georgia Strait Alliance has been frustrated in its attempts to prosecute the GVRD for violations of the *Fisheries Act* and the provincial *Waste Management Act*.

Reactive Law

Another limitation of the *Fisheries Act* is that prosecutions usually occur after damage has occurred. It is rare for the Minister of Fisheries and Oceans to issue a stop work order prohibiting any damage from occurring, even though that provision is available (s. 37 (2) (b)). Though everyone agrees that 'an ounce of prevention is worth a pound of cure' and that restoration work is expensive, complicated and time consuming, it is still rare to have the department intervene before there is proof of damage.

WHAT YOU CAN DO

If you suspect that wetland fish habitat is being altered or destroyed, contact the Department of Fisheries and Oceans and ask them to investigate.

Private citizens can also initiate prosecutions under the *Act*, and will receive one half of any fine that is imposed if a conviction is obtained. However, the provincial Crown will intervene to either take over the prosecution or to stay (end) the case. For more information about private prosecutions, contact the West Coast Environmental law Association or Sierra Legal Defence Fund in Vancouver.

WHO TO CONTACT

Destruction of fish habitat

Observe, Record and Report – DFO (Department of Fisheries & Oceans) 24 hour line Vancouver 1-800-465-4336

MELP Hotline, Victoria (freshwater species) 1-800-663-9453

Department of Environment (federal) 24 hour line, North Vancouver 666-6100.

CANADIAN ENVIRONMENTAL ASSESSMENT ACT

This law provides for the environmental effects of a project to be assessed, as far as possible, before the project has been granted approval. Depending on the outcome of an environmental assessment, a project may not be approved, or may be modified to minimize any environmental impacts. There are both federal and provincial environmental assessment laws.

The federal law will generally apply whenever federal departments and agencies propose a project, provide funding or land

for a project or exercise a regulatory duty (such as issuing a licence, permit or approval) that allows a project to go ahead.

Wetlands are specifically mentioned in regulations made under the *Act*. A wetland is defined as " a swamp, marsh, bog, fen or other land that is covered by water during at least three consecutive months of the year." The term "water body" includes "wetland." There are a number of references to projects or activities which may have an impact on water bodies in the regulations, and which may therefore require a federal environmental assessment. For example, if a *Fisheries Act* authorization is required for a project or activity that will harm fish habitat by draining or altering the water levels of a water body, then a federal environmental assessment must be conducted.

If the *Canadian Environmental Assessment Act* does apply, then the relevant government agency proceeds with an assessment of the likely environmental effects of the project. For example, the environmental assessment of a project with fisheries impacts will be conducted by the Department of Fisheries and Oceans. Certain types of projects with significant environmental impacts require independent environmental assessments and will be conducted by an independent panel or mediator.

Different projects will require different types of assessment. The possibilities are:

- a *screening,* the least detailed form of assessment, is "a systematic approach to documenting the environmental effects of a project and determining the need to eliminate or minimize or mitigate the effects, to modify the project plan or to recommend further assessment through mediation or a panel review."
- a *class screening*, applicable to an entire class of activities, such as dredging, is designed to avoid duplication of assessments for relatively routine activities.

- a *comprehensive study*, with more detail, will be done for a project which will likely have a major impact on the environment, such as a large energy project, or new pulp mill or a project in a national park.
- a *mediation* or a *panel review*, the most intensive environmental assessments are conducted independently of the government. A panel review may be ordered only by the Minister of the Environment.

FIRST NATIONS LAND

The *Canadian Environmental Assessment Act* also applies to First Nation Lands. Section 10 of the *Act* requires a Band Council to conduct an environmental assessment before receiving financial assistance from the federal government to enable a project to be carried out in whole or in part on a reserve. The assessment is to be done in accordance with regulations. These regulations have not yet been finalized.

CROWN CORPORATIONS

The *Act* does not currently apply to Crown Corporations. For example, the Vancouver Port Corporation is not subject to the *Act*, and follows only its own internal environmental assessment procedures when embarking on a new project, such as expansion of the container facility at Roberts Bank. Regulations about the applicability of CEAA to Crown Corporations are being developed.

INTERNATIONAL ADVERSE ENVIRONMENTAL EFFECTS

The *Canadian Environmental Assessment Act* allows the Minister of the Environment to refer a project to a public process in order to determine the nature of the environmental effects outside the jurisdiction in which the project is carried out. The Minister may make this decision on the basis of advice supplied to him by his own government or the government of a

foreign state that claims significant adverse environmental effects under their jurisdiction. A regulation is under development that would apply the *Act* to certain projects or activities that occur outside Canada if they involve federal funding or have some other federal component.

DISCRETION OF GOVERNMENT

The Minister of the Environment has the discretion to decide whether or not a project will be referred to a public hearing in many cases. There is no appeal from a discretionary decision of this nature. Public involvement is a key objective of the environmental assessment process established by the *Act*, and the federal authority responsible for each project has been directed to make an effort to understand the range of public concerns. It is therefore crucial in order to influence discretionary decisions that may be made by the Minister of the Environment to provide informed public input on the likely adverse environmental effects of a project at the earliest opportunity. The greater the degree of public concern, the better the likelihood that a public and independent environmental assessment hearing will be ordered.

WHAT YOU CAN DO

1. If a proposed project, such as construction of a building on federal land, has the potential to harm wetlands, and CEAA applies, you may decide to become involved in the environmental assessment process. There are a number of opportunities for public participation.

2. The *Act* requires information and documents relating to an environmental assessment to be made public through a Public Registry, available in libraries, the local office of an environmental assessment panel, and the Canadian Environmental Assessment Agency headquarters. The Index is also available

in electronic form, and can be accessed through the West Coast Environmental Law Association's *Environmental Legal Information Base (ELIB).*

3. For more information on federal environmental assessment, see *A Citizen's Guide to the Canadian Environmental Assessment Process*, Canadian Environmental Assessment Agency, 1994, available at the local public library, and at the library of West Coast Environmental Law Association.

WHO TO CONTACT

Federal Environmental Reviews

Large projects

Canadian Environmental Assessment Agency, Vancouver, 666-2431;

Small projects

DOE, Environmental Assessment, North Vancouver, 666-0048.

OTHER FEDERAL LAWS

The *Canada Wildlife Act* gives the federal government the power to create and administer National Wildlife Areas such as the Alaksen NWA in the Fraser Estuary. This NWA is also designated as the only Ramsar site in BC pursuant to the Convention on the Conservation of Wetlands of International Importance. NWAs are established for research, conservation, and interpretation in respect of migrating birds and other wildlife. Similarly, pursuant to the *Migratory Birds Convention Act*, the government may establish Migratory Bird Sanctuaries.

The proposed new federal *Oceans Act* calls for the development of a national strategy for "management of estuarine coastal and marine ecosystems in waters that form part of Can-

ada" as well as the preparation of integrated management plans for marine and estuarine areas.

Provincial Laws Related to Wetlands

We now turn to the provincial laws which apply to protection of wetlands. No single provincial law protects wetlands. The most important provincial laws for wetlands protection are the *Water Act*, the *Waste Management Act*, the *Wildlife Act and the Environmental Assessment Act*. A description of each of these *Acts* follows. The *Municipal Act* is another crucial provincial law since it controls what municipalities can do with their land, and also sets out the environmental protection powers available to municipalities. The *Municipal Act* will be discussed in the section on municipal law below.

WATER ACT

The *Water Act* regulates activities or uses which impact water that flows in and out of a wetland. The Water Management Branch provides approvals which authorize all changes to natural watercourses, and licences for the diversion, storage and use of water. The provincial Crown owns the water, subject to licences or permits issued or approvals given under the *Act*.

IS A LICENCE, PERMIT OR APPROVAL UNDER THE ACT INVOLVED?

Different procedures apply, and there are different requirements under the *Water Act* depending whether a licence, permit or approval is required.

A **licence** allows a holder to divert and use a specified quantity of water for a specified time; store water; construct works for the diversion of water; alter or improve a stream or channel; and construct fences, screens or guards across streams for the purpose of conserving fish or wildlife. A licence may be acquired by certain types of people, including landowners and municipalities. A licence is issued by the Comptroller of Water

Rights or a regional water manager. It is the current policy of the Ministry of Environment, Lands and Parks to consider fish and habitat requirements before issuing new water licences. The Ministry can refuse to issue, or put conditions on, a new water licence if issuing the licence would significantly impact on uses of water. For example, a "fish clause" may be included in the water licence to protect fish and fish habitat.

A **permit** is required for flooding Crown land or for the construction, maintenance, or operation on the land of works authorized by a licence or approval.

Approvals are given for "changes in and about a stream" which includes any modification to the nature of a stream, including the land, vegetation, natural environment, or flow of water within a stream or any activity or construction within the stream channel that has or may have an impact on the stream.[15] The Comptroller of Water Rights, Regional Water Manager (or an engineer, in the case of changes in and about a stream) may place conditions on the approvals. Generally, standard conditions on approvals will reflect the concerns of the Water Management Branch for water quality implications, downstream flooding, and potential effects on the works of downstream licensees, and habitat and ecosystem concerns from provincial and federal fisheries and wildlife agencies.[16]

New regulations under this section of the *Act* further define the standards for protection of water quality and habitat that apply to changes in and about a stream.[17] The regulations define "habitat" and require people who are making changes in and about a stream to follow any terms and conditions that a habitat officer of the Ministry of Environment, Lands and Parks may impose to protect habitat. These may include restrictions on the times of year that changes may be made, minimum instream flow requirements, restoration requirements and directions to obtain approvals from DFO.

The regulations also extend the reach of the *Water Act* in a section on protection of water quality which place limits on sediment deposition, disturbance of natural materials, and prohibit exceeding ambient (background) water quality standards set by the provincial Ministry of Environment, Lands and Parks. This is an important development since the *Water Act* has not historically been used to regulate water quality. Since it is an offence to not comply with any term or condition of a licence, an approval or the regulations, these additional standards should ensure greater legal protection of wetlands. The penalties for committing an offence under the Act are a maximum penalty of $200,000 or $200,000 for each day that the violation continues or imprisonment for up to 12 months.[18]

However, as the following case study of the East Kootenay Environmental Society's intervention in a wetland threatening development in Lake Windermere demonstrates, the deficiencies in the *Water Act*, and the procedural flaws in the Environmental Appeal Board powers do not always provide adequate legal protection for wetlands.

Case Study — The *Water Act* and Wetlands Protection:

> The East Kootenay Environmental Society and Lake Windermere Resorts Ltd.
>
> Windermere Lake lies in eastern British Columbia near the town of Invermere. In 1990, a parcel of land bordering the Lake was sold by the Province to a development company, Lake Windermere Resorts Ltd. ("the developer"). Environmentalists were concerned that if the company's proposal to construct a four-season lakefront resort was approved, it could potentially damage to the ecologically sensitive wetland. When the company began filling some of its land without a permit, a local environmental group, the East Kootenay Environmental Society ("EKES" or "the Society") attempted to intervene and protect the land. The difficulties the group had in achieving its goals illustrate some problems with the current law. After a series of appeals to officials in the Water Management Branch, the Environmental Ap-

peal Board, and the courts, EKES was denied permission to even make its arguments about why the wetland should not be filled.

Background

The importance of the Windermere wetlands had long been recognized. Before the Province sold it to the developer, it had been part of a Wetlands Reserve. The area's ecological sensitivity was also recognized by the District of Invermere, who placed restrictive covenants on the land title record of the wetlands, limiting the types of development that would be allowed. These restrictions required development plans to be prepared before any activities could be undertaken to improve the lands, and contained provisions preventing development immediately adjacent to the natural boundaries of the Lake and nearby river in recognition of the potential for flooding.

The case began when the developer started to fill in the wetlands, ostensibly for surveying and preparatory purposes. The Company had not developed a plan or obtained a permit under the *Water Act* before it started filling. EKES asked the Regional Water Manager to intervene, due to their concern that the filling would have negative environmental impacts. Apart from changing the very character of the lands, filling also had the potential to cause other harmful environmental effects such as producing methane gas from the decay of covered organic materials.

Initial Attempts to Stop Filling

EKES first tried to get the Regional Water Manager to exercise his authority under the *Water Act* to require the developer to obtain a permit before proceeding with filling.

The Water Management Branch initially refused to take action because it said the lands in question were not regulated by the *Water Act.* A permit, however, was eventually issued after pressure from EKES. The decision of the Regional Water Manager to issue the permit was made without public notice, without any opportunity for public participation and without any environmental assessment. EKES attempted to appeal this decision to grant approval, but the Comptroller of Water Rights refused to consider the matter until the issue of whether the group had the right to bring an appeal (the issue of standing) was resolved.

This brought the issue of standing to the forefront.

Standing

Not everyone has a right to bring a legal action. An individual (or group) may seem to have a legitimate interest in a particular matter, but may still be denied the right to take part in legal proceedings because they lack standing. Normally a party will have standing only if a legally recognized right or interest may be directly affected by a decision. (Often in environmental issues this boils down to property rights, but not always.) An interest simply to see that the law be observed is not truly a legal interest.

Currently public interest standing may be granted only when certain conditions must be met. First, there must be a serious issue in question and the issue must be one that can be resolved by a court. Second, the party wishing standing must be able to demonstrate that they have a genuine interest in the matter and that they will fully argue the matter. Finally, there must be no other reasonable and effective means by which the issue can be brought before the court.

Environmental Appeal Board Hearings

Because the Comptroller insisted on hearing arguments relating to standing, EKES went directly to the Environmental Appeal Board (EAB) to appeal the Comptroller's decision. EKES asked the EAB to issue a stay of the Manager's approval (which would stop the developer from filling until the matter was resolved).

The stay was granted but the developer continued filling the land in preparation for construction. The developer chose to ignore the stay because it had decided to challenge the authority of the EAB to issue such an order. EKES then sought an injunction in B.C. Supreme Court against the developer, trying to halt the filling but the court dismissed the injunction application on the basis that it lacked jurisdiction.

EKES then asked the Board if it would enforce its own order. The EAB Chair was uncertain if the Board had this power, since under the *Water Act* and the *Environment Management Act* there were no provisions granting enforcement powers to the Board. The Board initiated another court proceeding, and was granted an interim injunction to enforce the stay pending a hearing of the matter.

Eventually a hearing was held by the Board. The Water Management Branch argued that EKES lacked standing to bring an action and that the EAB lacked the authority to issue a stay. The

EAB found that the wetland had already been filled so the subject matter of the environmental group's concern had largely disappeared. The decision did however affirm the jurisdiction of the Board to issue stays and also found that EKES did have standing.

The developer then applied for judicial review of the Board's decision. This application was dismissed by the Court which said the matter had become academic since the EAB had vacated (taken away) its order to stop the filling. A charge of contempt of court against the developer for disobeying the EAB's stay order was dismissed at the same time, for the same reasons.

The Decision of the Comptroller and Court Actions

After this series of EAB hearings and court actions EKES went back to the Water Management Branch, to try once again to appeal the initial approval of the developer's application for a permit to fill the wetland. In December, 1995, the Comptroller's office released its decision regarding the Regional Water Manager's approval allowing Lake Windermere Resort Ltd. to fill in the wetlands, an approval which had been granted more than a year before.

The Comptroller's decision covered two general issues: first, whether EKES had standing to appeal under the Water Act; and, second, whether the Water Manager was right in deciding to grant approval to fill the lands in question.

On the first point, the Comptroller found that the Society lacked any statutory or common law right to appeal the Water Manager's decision. This is a disappointing decision, given the time, effort and energy expended by EKES to protect the wetland. The interpretation of the appeal rights in the Water Act seems unduly narrow. The common law rules related to public interest standing were also given little consideration. And the Comptroller paid scant attention to the EAB's previous decision on standing.

The second part of the Comptroller's decision regarding the substantive issues found that the Water Manager was right in deciding to grant approval to fill the wetlands.

This case demonstrates the inadequacy of the current law. Not only was the East Kootenay Environmental Society unable to prevent or reverse the filling of the wetlands, but the Comptroller's decision may well make it more difficult for other environmental groups to challenge approvals made under the Water Act.

If the Water Act was amended to more closely resemble other environmental legislation which explicitly states that any affected person can appeal, some of the problems experienced by the East Kootenay Environmental Society could be avoided in the future.

WHAT YOU CAN DO

To find out whether the *Water Act* can be used to protect the wetland you are concerned with, take these steps:

1. Find out if a licence, permit or approval is needed for any activity taking place on the wetland. You can ask the local representative of the Water Branch of the Ministry of Environment, Lands & Parks, and/or the landowner. You may also want to consult a lawyer to see if one of these documents is required.

2. If any of these documents is required, ask if it has been obtained. If it has been issued, get a copy. It may be possible to appeal the document. If it has not yet been issued, you may have an opportunity to participate in the application process, and prevent the permit from being issued or have terms and conditions imposed which better protect the wetland.

3. If you do not agree with a decision made by the Regional Water Manager or Comptroller of Water Rights, you may be able to appeal the decision. Your appeal rights are limited. The relevant provisions of the *Water Act* differ from other environmental laws in granting only certain narrow classes of people the right to appeal. Only riparian owners, licensees and applicants for a licence are allowed to object to applications for licences. Section 38 of the *Act* which addresses rights of appeal does not specify who may appeal but refers only to a "person." This is in contrast to the pro-

visions, for example, of the *Pesticide Control Act* which allow "any interested person" to appeal an Order.

The *Water Act* provides for appeal of an order of a Regional Water Manager to be made to the Water Branch Comptroller, then to the Environmental Appeal Board, and finally to the Lieutenant Governor in Council (Cabinet). The appeal must be started within 30 days of the order.

4. Where a permit has existed for more than 30 days, there may be the possibility of suspension or cancellation of rights or permits. Section 18 of the *Water Act* requires the permit holder to use reasonable care to avoid damaging land, works, trees or other property. Where this requirement has not been met the permit may be canceled and compensation of damages may be required.

WHO TO CONTACT

Water Quality

Permitted discharge MELP Environmental Protection, Surrey 1-800-665-7027; 582-5274

Pollution

DOE Environmental protection (24 hr line), North Vancouver 666-6100

Salmon/marine fish habitat

DFO Habitat and Enhancement, New Westminster 666-6479

WILDLIFE ACT

This *Act* offers some legal protection for wildlife species that may reside in a wetland.

Section 3 of the *Wildlife Act* gives the MOELP the power to

(a) acquire and administer land, improvements on land and timber, timber rights and other rights on private land, and

(b) enter into and carry out an agreement with a person, association or other body for the purposes of management or protection of wildlife. [19]

Each year, MOELP purchases land for wildlife protection, often with other agencies, such as the Canadian Wildlife Service, a municipality, or a nongovernmental organization such as the Nature Conservancy of Canada or Ducks Unlimited.

The *Wildlife Act* gives the Minister the authority to designate land under his or her control as a Wildlife Management Area (WMA).The province currently has designated 12 WMAs, but these amount to only 0.021% of the province's area.[20] Most WMAs have a land use management plan. Wildlife Management Areas are protected from any use that contravenes the *Wildlife Act*, without a permit. Permits can be obtained by applying to the Regional Fish and Wildlife Manager. Permits will be granted where the proposed land use is compatible with the values being protected in the management plans. Where there is no management plan, the permit must still be compatible with the land values of the area protected.

These powers have been used to protect wildlife residing in wetlands, primarily migratory birds. For example, the South Arm Marshes WMA will protect several small islands in the mouth of the Fraser Estuary which are valuable habitat for Canada's largest assemblage of migratory birds.[21]

Wetlands are also acquired by the province through the Habitat Conservation Fund. The HCF is funded primarily through surcharges on angling, hunting, trapping and guiding licences as well as through donations and bequests. Over 1,200 projects across B.C. have been funded by the HCF since 1981 at a cost of approximately $21 million. An example of a wetland area acquired partially with funds from the HCF is the Delkatla Wildlife Sanctuary in Masset, Haida Gwaii. The sanctuary provides important migratory habitat for sandhill cranes, dusky

Canada geese, white fronted geese and tundra swans as well as wintering habitat for trumpeter swans, American widgeon, mallard and northern pintail. The purpose of the project was to restore tidal flows to Delkatla Inlet by replacing a 33 metre section of causeway with a bridge to allow the natural tidal flow to return to the mud flats. The causeway had blocked the tidal flow and the marsh was becoming freshwater. The project cost of approximately $1 million was shared between the federal and provincial governments, the village of Masset, the community, and non-profit organizations such as Ducks Unlimited.

Non-profit organizations provide critical support as well as fund raising efforts to preserve wetlands. Another example involving the Habitat Conservation Fund and a non-profit organization is the acquisition of a critical salt marsh on Pender Island. The Pender Island Conservancy Association raised $250,000 to purchase the Medicine Beach wetlands which contain many rare and unusual plants.

PROTECTION FOR ENDANGERED SPECIES

Under the current BC *Wildlife Act*, endangered species receive very limited legal protection.

The definition of wildlife under the *Act* is limited to "raptors, threatened species (a species of animal which is designated as a threatened species), endangered species (a species of animal which is designated as an endangered species), game or other species of vertebrates prescribed as wildlife." This means that some species which have been scientifically identified as threatened are not eligible for any of the possible protection measures provided by the *Act*. For example, though plants are not counted as species under the definition used in the BC *Wildlife Act*, they are included on the Red and Blue Lists of endangered and threatened species prepared by the Conservation Data Cntre, a branch of MoELP.[22] Currently 634 plants are designated as rare in BC of which 124 are considered threatened or endangered.[23]

The *Act* is also discretionary, rather than mandatory. Section 6 of the *Wildlife Act* says the Lieutenant Governor in Council *may* designate a species as endangered or threatened and section 7 also uses the discretionary word *may* to refer to the power to designate land as habitat for endangered or threatened species.

The current provincial law has rarely been used to designate species. Since 1980, only four species have been designated: the Vancouver Island marmot, the sea otter, the burrowing owl, and the American white pelican. These species were all designated in 1980 and remain the only species to have received legal designation in the province.

The situation with respect to the use of the current law's *habitat* protection powers is even worse. The power to designate land as a critical wildlife area (habitat for a threatened or endangered species) has only been used once, for the Vancouver Island marmot.The infrequency with which the law is used to designate species and protect their habitat is one of the most troubling aspects of species protection in the province. Habitat loss is the single most important factor affecting species loss in BC[24]

Case Study - Boundary Bay Wildlife Management Area

> Boundary Bay is a vital international link for more than a million shorebirds and waterfowl on the Pacific Flyway and also provides an overwintering site for thousands of ducks. Canada's highest concentration and diversity of over-wintering raptors is found in the rich alluvial farmland adjacent to Boundary Bay. The area has been threatened by many different types of development.
>
> In January 1991, a BC Supreme Court judge quashed municipal approval of a controversial golf course project on prime wildlife habitat in Delta, BC. The court quoted the BC Ministry of Environment:
>
> "The site of the proposed golf course involves one of the more important habitat areas for raptors [hawks, eagles and owls] in Boundary Bay and the Lower Mainland region. Accordingly, the

Ministry of Environment considers the site to be critically important to sustaining a viable population of raptors in the Boundary Bay area. Such habitats have become exceedingly scarce over recent years."

The court accepted arguments by the Boundary Bay Conservation Committee that Delta Council's approval of Boundary Shores Golf Course Ltd.'s 72nd Street proposal was invalid because Council considered pertinent information supporting the proposal after the conclusion of legally-required public hearings -- and didn't give opponents of the development a chance to respond to the information. The court held that the municipality's obligation to hold a public hearing under the *Municipal Act* was breached by its receipt of "powerfully persuasive materials" following the conclusion of a public hearing without giving opponents of the rezoning an opportunity to respond.

The decision was the climax of a long struggle by the Committee against what the court referred to as "an unprecedented number of golf course development proposals" faced by the city of Delta. These proposals were among the 130 golf courses proposed following the BC government's 1988 decision to allow construction of golf courses without the approval of the Agricultural Land Commission on agricultural land protected under the *Agricultural Land Commission Act*.

After the 72nd Street proposal had been approved by Delta Council, Delta voters in November, 1990, elected a new Council which imposed a moratorium on new golf course proposals.

The Boundary Bay Conservation Committee finally was successful in having Boundary Bay designated as a WMA after years of effort. In October 1994, a Public Advisory Committee (PAC) was established to represent some 28 public interest groups and municipalities from around the Bay. The Committee has met monthly since that time, even though the Wildlife Management Area was not officially declared until June 1995. A final plan for the WMA has still not been established, with much of the time being spent in polarised arguments between hunters and representatives of environmental groups. Perhaps the major concern has been the lack of dedicated staff time on the part of MOELP to follow up on decisions made by the PAC. For example, a major issue involves the use of certain parts of the foreshore for helicopters – mostly for hovering just a few metres above the ground. It took more than a year for MOELP to begin to take action on

this issue, and it has still not been resolved. However, some restrictions, even though not part of an integrated WMA plan, have been imposed. These include the use of the area by any wheeled vehicles such as motorcycles and dune buggies. Enforcement of restrictions is also a concern because of a lack of MOELP or DFO enforcement 'cops.'

WHAT YOU CAN DO

1. Find out what species inhabit the area concerned, by contacting your local government, the Ministry of the Environment Lands and Parks, and naturalist and environmental groups in the area. If the wetland is important habitat, you may want to contact Ducks Unlimited, the Nature Trust of BC, the Nature Conservancy of Canada, or the Federation of BC Naturalists to see if they can assist with efforts to protect the wetland.

2. If the wetland concerned is in a wildlife management area, check the management plan and try to find out whether all the activities in the area are authorized by the plan.

3. If the wetland is not in a wildlife management area, ask MOELP to establish a wildlife management area, and/or use the MOELP powers to acquire the land.

4. If endangered species reside in the wetland, ask for the species to be designated under the *Act* and also ask for protection of the species' critical habitat.

WHO TO CONTACT

Wildlife and Endangered Species protection

MELP Environmental Protection 1-800-665-7027

Canadian Wildlife Service (for migratory birds or wildlife on federal lands) 666-0143

Pollution affecting salmon marine species and migratory birds

DOE Wildlife Enforcement, Delta, 946-8643, 666-0143

WASTE MANAGEMENT ACT

The *Waste Management Act* is the central anti-pollution law in the province. It contains a general prohibition against introducing waste into the environment, subject to a number of exceptions for activities done under a permit. A permit or other authorization may contain requirements for environmental protection such as giving security to repair any environmental damage that occurs or monitoring the waste to ensure that pollution does not exceed certain parameters. The Act also requires local governments to prepare municipal waste management plans.

The *Waste Management Act* may be important for wetlands protection, since pollution may be entering a wetland either pursuant to a *Waste Management Act* authorization, or without an authorization. It is important to know the requirements of the *Act* to ensure that the law is being followed.

"Waste" under the *Waste Management Act* includes air contaminants, litter, effluent, refuse, biomedical waste and special waste (a toxic substance designated by Cabinet). Effluent is broadly defined.

There are sections of the *Waste Management Act* which create automatic offences for certain waste introduced into the environment. For example s.6 makes it an automatic offense to throw down, drop or deposit litter, and s.7 makes it an automatic offense to discharge waste from a recreational vehicle.

An important provision in the *Act* allows a Manager to make an Order to abate pollution. Section 22 provides that "where a Manager is satisfied on reasonable grounds that a substance is causing pollution, he may order a number of persons, including

(1) the person with possession, charge or control of the substance, (2) the person who caused or authorized the pollution, or (3) the person who owns or occupies the land on which the substance is or was located, to do a number of things directed at abating pollution."

The MOELP has the power to suspend or cancel permits or approvals. Section 23 contains a long list of situations in which this power may be exercised. The list includes suspension or cancellation where the permit or approval is not in the public interest, where the permit or approval conflicts with or is replaced by an approved waste management plan, or where the permit holder fails to comply with requirements in the permit, or the *Act*.

Section 26 provides for appeals of decisions of the manager by anyone aggrieved by a decision.

Finally, s.34 sets out the offences and penalties involved in not complying with a permit or approval. Any non-compliance with permits should be brought to the attention of the manager, who should notify the proper authorities to initiate prosecutions. This may act as further deterrent to destroying the wetland.

Other parts of the *Act* that may be relevant for wetlands protection include requirements to immediately report the spill or escape of polluting substances. The *Act* gives wide enforcement powers to environmental protection officers who can enter onto land and investigate works or activities that may be causing or capable of causing pollution or producing waste or that are used for storage, handing, treatment, destruction or disposal of waste.

WHAT YOU CAN DO

1. Find out if waste is entering the wetland. Then determine whether the waste is being emitted under a permit. Permit applicants must fulfill certain requirements when apply for a permit or approval. The public notification regulation sets out the requirements for public notice.
2. If you have reason to believe that pollution is harming a wetland, you may ask the Ministry of the Environment to issue a pollution abatement order or a pollution prevention order. Pollution prevention Orders are particularly important since they can address potential pollution before any damage is caused.
3. If you are not satisfied with the decision made by the Ministry about a specific permit, you may appeal the decision to issue the permit or amend the permit to the Environmental Appeal Board (EAB). Any person who is aggrieved by a decision has the right to bring an appeal to the EAB. The office of the EAB is in Victoria. For more information, you can contact them directly at 1-604-387-3464. You may also want to contact West Coast Environmental Law Association for more information about how to bring an EAB appeal.
4. You may also want to become involved in the development of your local waste management plan. Before the MOELP approves a waste management plan, public consultation respecting all aspects of the development, amendment and final content of a waste management plan is required. Once approved, permits or approvals granted must not conflict with the waste management

WHO TO CONTACT

Emergency — Hazardous materials

DOE (24 hr. line), North Vancouver 666-6100

Provincial Emergency program (24 hr. line), Victoria 1-800-663-3456

Observe, Record, report ORR-DFO Hotline 1-800-465-4336

Non-emergency

Dirty water, minor erosion and sedimentation, garbage dumped in or near water

Municipal engineering department - see Blue Pages

ORR — DFO hotline, 1-800-465-4336

Permitted discharge or contaminated site -

MELP Environmental Protection, Surrey – 665-7027 or 582-5274.

ENVIRONMENTAL ASSESSMENT ACT (BC)

The BC *Environmental Assessment Act* came into force on June 30, 1995. This new piece of legislation consolidated the fragmented approach to environmental impact assessment that previously existed in BC through separate provisions for impact assessment of energy projects, major projects, and mine developments. The *Act* applies to major project proposals in the following categories: industrial, mining, waste, transportation, energy, water, fin-fish aquaculture/food processing and tourism. The new *Act* is also designed to ensure meaningful public participation in the environmental assessment and review process.

The *Act* provides for public input at a number of key stages:

- when an application is received by the environmental assessment office;
- when draft project report specifications are being prepared;

- when the project report is filed at the environmental assessment office;
- when the draft terms of reference for a public hearing are being prepared; and
- during a public hearing, if one is held.

One of the innovative features of the new *Act* is a project registry that will provide notice and information to the public throughout the review process. The Project Registry will contain a wealth of important information, including:

- a list of all reviewable projects currently under review;
- an index listing the records filed at the Project Registry for each reviewable project; and
- all important documents and decisions produced during the assessment process.

In addition, it offers an equitable and orderly transition for projects currently being reviewed under existing processes to the new environmental assessment process. Each project will be placed in the new process at a point which gives credit for progress already achieved in existing review processes. Section 3 of the new *Act* allows regulations to be made prescribing what constitutes a reviewable project for the purposes of the *Act*. Section 4 allows the Minister, by Order, to designate a project to be a reviewable project, even though it does not fall within the regulations if the Minister is satisfied that the project has or may have a significant adverse effect in that the designation is in the public interest.

Although biodiversity is not explicitly mentioned in the *Act*, examining the environmental impacts of a proposed project will necessarily include the effects on the biodiversity of a particular area. The list of reviewable projects set by regulation is extensive, and this new *Act* should lead to greater protection of biodiversity in British Columbia.

The type of project that is subject to an environmental assessment by the provincial government are listed in the Environmental Assessment Reviewable Projects Regulation. These projects include:

- industrial projects, such as chemical plants, forest product industry, sawmill plants, fibre production and contract textile dying plants and leather tanneries among others;
- mine projects;
- energy projects including electric transmission lines and energy storage facilities and power plants;
- water management containment and diversion projects such as dams, dikes and groundwater extraction and shoreline modification projects;
- waste disposal projects such as special waste facilities;
- food processing projects such as meat packing and poultry and fish processing plants;
- transportation projects such as public highways, railways, ferry terminals and airports; and
- tourism and recreational projects such as destination resorts.

All of these projects will be subject to an environmental assessment review if they meet the thresholds listed in the regulations. Even if a project does not fall within the thresholds established by the reviewable projects regulation, the Minister of the Environment has the power to designate a project to be subject to an environmental assessment if the Minister is satisfied that the project has or may have a significant adverse effect and that the designation is in the public interest. This power is contained in s. 4 of the BC *Environmental Assessment Act*.

Certain types of projects will not be subject to environmental assessment since they are not listed in the Reviewable Projects Regulation. These include residential subdivisions and forest practices. However, in special cases, the Minister may exercise his or her discretion under s. 4 of the *Act* and order a project to be reviewed. This is what has been done with the Bamberton project on Vancouver Island, a large residential development in an ecologically sensitive area.

WHO TO CONTACT

Environmental Assessment

Large projects

BC Environmental Assessment Office, Victoria
1-604-952-0575

Small projects and regional referrals coordinated by MELP

MELP Planning and Assessment, Surrey,
1-800-665-7027; 582-5235.

FOREST PRACTICES CODE

The area logged now in Canada is twice what it was in 1960. The impact of logging on wetland health can be substantial, but wetlands can be protected by the retention of adequate "green strips" around their edges. An important legal tool which provides this protection is the new *Forest Practices Code of British Columbia Act* which includes wetland and riparian setbacks. The area of land along the edge of a wetland or other defined water body that must be free from logging varies, according to the class of stream or wetland involved. The *Code* establishes Riparian Management Areas (RMA's) which include both a reserve zone and a management zone. Timber harvesting is prohibited in reserve zones except in special circumstances, with the approval of MoELP. The Operational Planning Regulations, Part 10, made pursuant to the *Forest*

Practices Code of B.C. Act contain the water body classifications and setback restrictions for RMAs. The following table illustrates the setbacks which will apply in wetland RMAs.

The reserve zones are established on the larger categories of fish streams or streams in community watersheds but not on the narrower fish streams or on non-fish-bearing streams, areas where there is a need for biodiversity protection. The reserve zones are likely too narrow for effective biodiversity conservation and do not protect small wetland areas such as bogs, ferns and marshes[25].

Other restrictions in RMAs include:

- road construction is generally prohibited;
- wildlife trees must be retained to the greatest possible extent;
- an approved Range Use Plan is required for any livestock use in the area.

A series of Guidebooks is also part of the *Forest Practices Code*. The recommendations in the Guidebooks are not man-

datory. Once a recommended practice is included in a plan, prescription or contract, it becomes legally enforceable. The Guidebooks are intended to provide assistance to those preparing operational plans.

The three Guidebooks of most relevance for biodiversity protection on forest land in B.C. are: *Biodiversity Guidebook* September 1995; *Riparian Management Area Guidebook* December 1995 and *Managing Identified Wildlife Guidebook,* not yet released. Together, these three Guidebooks are intended to address the majority of biodiversity concerns on forested land in the province.

The objectives for riparian management areas set out in the *Riparian Management Area Guidebook* include the following:

1. to minimize or prevent impacts of forest and range uses on stream channel dynamics, aquatic ecosystems, and water quality of all streams, lakes and wetlands
2. to minimize or prevent impacts of forest and range uses on the diversity, productivity of wildlife and sustainability of wildlife habitat and vegetation adjacent to streams, lakes, and wetlands with reserve zones, or where high wildlife values are present.

The *Code* also creates the Forest Practices Board, which has the power to receive public complaints about enforcement of the *Code*, carry out audit and inspection functions to determine compliance with planning and operational requirements and take part in appeals to the Forest Appeals Commission.[26]

WHAT YOU CAN DO

1. Contact the local Ministry of Environment, Lands and Parks or Ministry of Forests office to ask for help with wetlands in forested areas under Crown control.

2. If you are not satisfied with the response from these Ministries, you may wish to request an investigation or lodge a complaint with the Forest Practices Board. The headquarters of the Board are in Victoria.

WHO TO CONTACT

Wetlands in Forests

Local MELP or MOF office- See blue pages in phone book.

Forest Practices Board

Toll free 1 -800-994-5899

PARK ACT AND OTHER PROTECTED AREAS

If you are interested in wetland protection, you should find out whether the wetland has been recommended for protection as a park, ecological reserve or other protected area. The province has embarked on an ambitious protected areas strategy (PAS), with the goal of doubling BC's protected area space to 12% of the province's land mass by 2001. Regional protected area teams (RPATs) have been working to identify candidate areas for inclusion as protected areas. In the Lower Mainland, the RPAT recently recommended a number of wetlands for protection.

Legislation under which protected areas can be created include:

- *Park Act*
- *Regional Park Act*
- *Ecological Reserve Act*
- *Heritage Conservation Act*
- *Islands Trust Act*
- *Municipal Act*.

WHAT YOU CAN DO

You may want to lobby government to preserve the wetland you are concerned with as a park. You should contact the parks employees at the provincial and municipal levels in your area to find out the procedures for creating a new park.

WHO TO CONTACT

Protected Areas

Local B.C. Parks or MELP office- See blue pages in phone book.

Municipal Parks - See blue pages in local phone book.

ENVIRONMENT MANAGEMENT ACT

Under this Act, the Minister of Environment, Lands and Parks is given broad powers, including the power to prepare environmental management plans for specific areas of the province which may include measures with respect to the following:

- flood control;
- drainage;
- soil conservation;
- water resource management;
- fisheries and aquatic life management;
- wildlife management;
- waste management; and,
- air management.

Management plans made under Section 2 are binding only when the Minister has made a declaration under Section 4 of the Act, the Lieutenant Governor in Council has requested

preparation of a management plan and has accepted or modified the plan. One example of how an environmental management plan made pursuant to this *Act* can be used to protect wetlands is the Cowichan Estuary Plan which was approved by Order in Council. No licence, permit or power under an enactment can be issued or exercised in the Cowichan Estuary without the written approval of the Minister of Environment, Lands and Parks "to the effect that the issuance or exercise will have no detrimental environmental impact ... and is in conformity with the plan." More information on the Cowichan Estuary Plan can be obtained from the Nanaimo regional office of the Ministry of Environment, Lands and Parks.

Municipal Laws Related to Wetlands

Although environmental protection is usually thought of as the responsibility of the federal and provincial governments, municipalities also play a very important role in protecting environmental values, including wetlands, because they control land use and development. It is at the local level that most wetlands protection decisions are made. Decisions about planning, zoning, park and land acquisition, bylaws, and environmentally sensitive areas all have a major impact on wetland protection.

The *Municipal Act* contains many tools that could be used to protect urban streams. Other laws enforced at the municipal level include the *Local Services Act* and its *Subdivision Regulation*, which sets minimum standards for on-site sewage servicing; the septic standards set by the *Health Act* and the goals for growth management set out in the *Growth Strategies Act*. If a municipality has environmental protection as a priority, there is no lack of tools at its disposal.

The available municipal legal tools have been extensively canvassed in recent publications, such as *Environmental Stewardship in the Municipal Act - A Synopsis of Local Governments' Powers* (DFO, 1996) and the forthcoming Dovetail Consulting

publication prepared for DFO titled *Assessment of Mechanisms for Protecting Riparian and Aquatic Resources in Urban Areas*. The *Guide to Stewardship Bylaws*, part of DFO's Stewardship series, is also available as a working draft and will be published by the end of the summer.

MUNICIPAL ACT

The *Municipal Act* gives municipalities a number of different powers which can be used to achieve environmental objectives, such as protecting wetlands. Some examples are:

- the Official Community Plan (OCP) may use designations such as Conservation and Open Space to protect wetlands.
- the OCP may include comprehensive development areas or density bonus areas with provisions for urban design to preserve wetlands and bonuses for developers who protect sensitive habitat or other environmentally significant areas.
- the municipality may use its zoning powers to regulate buffer zones around wetlands, and regulate permitted uses near wetlands and other environmentally sensitive areas.
- a municipality may use the Development Permit Area provisions of the *Act* to place additional controls on development.
- a municipality may make bylaws regulating tree cutting, flood prevention, drainage, watercourses and soil removal.

Other municipal environmental protection powers that may be relevant for wetland protection include park and other land acquisition, sewage works and waste removal, and heritage conservation.

The Vancouver Charter gives the City of Vancouver similar powers as those set out in the *Municipal Act*. The City of Vancouver is not subject to the *Municipal Act*.

OFFICIAL COMMUNITY PLANS

The *Municipal Act*[27] s.945 states,

> (1) A community plan is a general statement of the broad objectives and policies of the local government respecting the form and character of existing and proposed land use and servicing requirements in the area covered by the plan.

The *Act* requires all bylaws enacted or works undertaken by a council or board to be consistent with the OCP.

An OCP can include goals and policies for protecting local ecosystems such as Density Bonus Zones, Comprehensive Development Areas and Development Permit Areas.

- Density Bonus Zones allow developers to increase density on all or part of the site in exchange for provision of an amenity.
- Comprehensive Development Areas enable local governments to negotiate complex multi-use sites and to develop customized zoning regulations.
- Development Permit Areas may be designated in areas for protection of the natural environment.

OCPs are periodically revised and may be amended by the local government. There are opportunities for public involvement in the preparation and amendment of the plans.

Zoning

Local government may by by-law create zones. Zoning regulates the development of property in a city, town or rural area. The zones are usually set out in both the OCP (if there is one) and a zoning bylaw The zones divide part or all of the municipality or regional district. Under the *Municipal Act* the zoning by-laws can regulate within a zone, the density, siting, size and use of land buildings and structure; and the location of uses on the land and within buildings.

Section 963(3) of the *Municipal Act* sets out how regulations may vary between and within the zones, for locations in the zones and on standards for works and services. Section 963(4) gives the power to prohibit any use or uses of land in a zone.

Environmentally Sensitive Areas and Development Permit Areas

To adequately protect wetlands, they must first be identified. Section 945(4) of the *Municipal Act* allows a municipality to designate areas in its community plan to protect the natural environment. A number of municipalities have designated ESAs in their community plans. In the Lower Fraser Valley, ESAs have been identified in community plans by the municipalities of Anmore, Burnaby, Chilliwack, Delta, Langley Township, Maple Ridge, Mission, North Vancouver District, Port Coquitlam, Port Moody, Richmond, Surrey, West Vancouver. Of the 25 municipalities in the Lower Fraser Valley, these 14 had identified or designated environmental sensitive areas such as wetlands in a manner that would allow them to establish comprehensive regulations to manage and protect these areas. Most of the other municipalities have also partially identified this type of habitat or have started the process.[28]

Identification of ESAs such as wetlands should be followed by the development of regulations or policies to protect these areas. A number of methods have been adopted by local governments. One of the most common ways to regulate development in ESAs is to require a development permit, which may be the most important planning tool that local governments have for environmental protection. Section 976(d) of the *Municipal Act* says that if an OCP identifies an ESA, a development permit must be obtained before land in that area can be altered in any way. A municipality retains flexibility over whether or not to require development permits - the community plan may specify conditions under which a development permit would not be required for designated land. Although this tool is

powerful, it would be even more useful for wetland protection if the *Act* specifically said development permits could be used for wetlands as well as for protection of the natural environment and protection of development from hazardous conditions.

The municipalities in the Lower Fraser Valley surveyed in 1995 scored a lot lower on actual protection of wetlands – less than half of the governments had established objectives for protecting riparian and aquatic habitat which were backed up by regulatory guidelines and measures that could be implemented.

BYLAWS

Bylaws can be used to protect wetlands. Municipalities have the power to make bylaws on many subjects, including:

- stream, creek, waterway or watercourse protection, s.587;
- tree cutting and protection, s. 929.01,929.03;
- soil removal and deposition, s. 930.1;
- zoning, s.963;
- flood plain control, s. 969;
- subdivision approvals, Part 29, Division 7;
- heritage conservation, Part 30; and,
- monitoring and enforcement.

There has been increasing interest in municipal environmental protection powers in recent years. One pioneer municipality is the District of North Vancouver which adopted a comprehensive *Environmental Protection and Preservation Bylaw* in 1990. The bylaw incorporates *the Land Development Guidelines* discussed below, which gives the municipality a powerful tool to ensure developers protect streams and wetlands during the construction process. The bylaw is divided into four sections: soils, trees, aquatic areas and sloping terrain. The bylaw

requires developers to obtain an environment permit which incorporates the *Land Development Guidelines* (see section below). The permit requirement is important since it both educates developers about the need for the *Land Development Guidelines* and makes enforcement of the bylaw easier since violating the permit is an automatic infraction.

Model Bylaws

The surge of interest in municipal environmental protection powers has prompted many municipalities to consider adopting more comprehensive bylaws for that purpose. A new publication from the federal and provincial governments illustrates how the land use regulation powers available to local governments can be used as part of a stewardship implementation strategy. This publication provides sample wording and detailed information for those involved directly in local government bylaw drafting and in the land management process. The publication (*A Guide to Stewardship Bylaws*) provides sample wording for general clauses enabling legislation, general definitions and references, tree management bylaws, soil removal and deposition bylaws, water course protection bylaws, zoning bylaws, development permits and subdivision and servicing standards bylaws. Since local conditions vary, it is important for a municipal government to draft a bylaw that accounts for the degree of development already present; the natural features and ecological sensitivity of the area; the specific activities that are affecting the stream; and the resources required to enforce the bylaw.

LAND DEVELOPMENT GUIDELINES FOR PROTECTION OF AQUATIC HABITAT

The *Land Development Guidelines for the Protection of Aquatic Habitat* were produced in May 1992 by the Habitat Management Division of the Department of Fisheries and Oceans and the Integrated Management Branch of the Ministry of En-

vironment, Lands and Parks. The *Guidelines* apply to development in or adjacent to waters containing fish or fish habitat.

The *Guidelines* apply primarily to salmon, trout and char, but are applicable to all fish species that may be affected by developments in or adjacent to their waters. Out-of-stream habitat features such as wetlands are included. The goal of the *Guidelines* is to "ensure that the quantity and quality of fish habitat are preserved and maintained at the productive level that existed prior to land development activities. Thus, land development projects are subject to the following guideline objectives:

- leave strip protection and provision;
- erosion and sediment control and site development practice;
- storm water management;
- instream work controls;
- fish passage and culverts maintenance; and,
- prevention of deleterious substance discharges.

While the *Land Development Guidelines* have no legal force, (unless they are incorporated directly into a bylaw) they may be of use in deciding whether there has been a breach of the standard of care required of developers in a prosecution for alteration or destruction of fish habitat under the *Fisheries Act*. The *Guidelines* also help the Minister of Fisheries and Oceans to decide whether development should be allowed, if there is the possibility of a net loss of wetlands that the federal government has an interest in.

Some municipalities in BC have incorporated these guidelines directly into their bylaws. This is an important tool for wetlands protection, as it limits what type of development can occur near riparian and aquatic habitat. An approving officer for

the municipality may refuse to give planning permission for a new development if the Guidelines have not been followed.

CASE STUDY — MUNICIPAL ACTION: *NORMAN VS. THE CITY OF PORT MOODY*

A recent case involved the victory of a private citizen concerned that his municipality had not adequately protected some wetlands in Port Moody. He successfully represented himself in a judicial review application in the BC Supreme Court to have the bylaw that purported to regulate the wetland quashed.

The municipal council of Port Moody prepared a bylaw for a land use policy for a 381 acre area on the north shore of Burrard Inlet. While preparing this plan, the city had commissioned an environmental assessment of the area which included two different wetlands, both noted as "high sensitivity areas." One of the wetlands was about 6.7 acres and the other was 1.6 acres. The assessment also said that there were "potential risks associated with developing in and adjacent to the wetlands." The planning staff in Port Moody decided that only the larger of the two wetlands was to be protected from development. In the bylaw that the city prepared, the larger wetland is noted on the land use plan for the area, but the smaller wetland was excluded.

David Norman petitioned the City of Port Moody, BC to set aside the Port Moody municipal bylaw which concerned a land use policy for a 381 acre area on the north shore of the Burrard Inlet. He argued that the city had not followed the requirements of the *Municipal Act*. Specifically, they had failed to properly designate all the wetland area on the map attached as a schedule to the bylaw. The *Municipal Act* requires that a community plan shall include statements and map designations for the area covered by the plan respecting restrictions on the use of land that is subject to hazardous conditions or that is environmentally sensitive to development. (s. 945 (2) (d)). The Court rejected this argument, finding that the city was only required to identify on the plan all *restrictions* on the environmentally sensitive land.

However, the Court granted the judicial review application and ordered the bylaw to be set aside. The judge agreed with Mr. Norman's second argument that the city had not fully disclosed all the information it had about the wetlands. The Court found that the City had a duty to ensure that all citizens of Port Moody

could inform themselves of the basic questions at issue in the debate over the bylaw, but that the City had failed this duty. It had not disclosed all its information regarding the wetlands included in the land use policy set by the bylaw. The Court found that the City's disclosure of information left a mistaken impression that it was protecting all of the wetlands area, when in fact this was not the case.

This decision is an important victory for wetlands protection. It is also important for its comments on the importance of environmental protection and allowing public participation in those issues. The judge stated:

> *it is specious to contend that while Courts should concern themselves with private property rights, they must ignore citizens' legitimate concerns about property that is collectively owned by a community. Public hearings that involve a reflection on environmental issues involve special procedural considerations. Given that a land use decision with a significant impact on the environment affects all the members of the community, it is incumbent upon an elected Council to attempt to disclose as much information as possible to allow citizens to voice their opinions. It is a first step to commission an environmental assessment. Council must also ensure that the vital information in the assessment is properly disseminated at the public meeting.*

After the court case, the city held additional public meetings. Many members of the citizens' group opposed to development of the wetland attended these meetings. Considerable media attention was also devoted to the issue. The city decided to appeal the court decision and not to proceed with the bylaw, pending the appeal.

HABITAT ACQUISITION AND MANAGEMENT

Directly acquiring a wetland may be the best way to protect it. Land can be acquired by a municipality in a variety of ways - for example, by purchase, expropriation, or dedication of certain areas. Part 12 of the *Municipal Act* concerns acquisition and disposal of property. Section 533 of the Act gives a mu-

nicipal the power by bylaw to dedicate for public purpose real property owned by the municipality.

Some of the greatest opportunities to acquire land occur during the process of subdivision. Where land is being subdivided, section 992 of the *Municipal Act* requires the landowner to provide without compensation park land of an amount and in a location acceptable to the local government or pay to the local government an amount equaling the market value of the land that may be required for park land purposes. Section 993(4) sets the 5% requirement. Not more than 5% of the land being proposed for subdivision will be required to be dedicated as parkland. Some local governments have made great use of the 5% parkland dedication. Other governments have asked for cash in lieu of the 5% land requirement. There are other methods a local government can use to acquire wetlands, and proposals have been made for changes to the Municipal Act to expand the possibilities for park or wetland acquisition even further.[29]

GROWTH MANAGEMENT

The *Growth Strategies Statutes Amendment Act,* part of the *Municipal Act,* became law in 1995. It provides Regional Districts with the authority to adopt regional growth strategies and provides mechanisms for coordination between municipalities and Regional Districts on issues that cross municipal boundaries.

The purpose of a regional growth strategy is: "to promote settlement that is socially, economically and environmentally healthy and that makes sufficient use of public facilities and services, land and other resources." A strategy is to "work towards" objectives such as protecting environmentally sensitive areas and protecting the quality and quantity of ground and surface water. [30] Official community plans and rural land use bylaws are also directed to "work towards" these and other objectives.

This *Act* is considerably weaker than similar legislation in Washington state, which has been used extensively by environmental advocates to protect wetlands. In Washington, counties must identify sensitive areas and protect them by ordinance. The B.C. legislation is almost entirely voluntary - the provincial Cabinet may require an area to prepare a regional growth strategy, but otherwise a regional district is free to decide whether or not it wants to adopt such a strategy.

WHAT YOU CAN DO

1. The planning department of your local government office has a wealth of information which will be useful for wetland protection. There, you can review the Official Community Plans (OCP) and zoning by-laws to determine the zoning for the wetland you are concerned about. You may want to see if your local government has identified and/or protected all the environmentally sensitive areas under its jurisdiction.

2. You can check to see whether there are any environmental protection bylaws, and if not, you may want to ask your municipal council to consider adopting this type of bylaw.

3. If you are interested in the development of a particular piece of property , you could check to see if all necessary permits have been obtained. For example, in Vancouver, these are some of the permits that are required before starting any new development:

- development permit
- building permit
- excavation permit
- temporary crossing permit
- sewer connection permit

- access approvals.

4. You can find out whether your local government is involved in preparing a regional growth strategy, and ask what avenues are available for public involvement in the development of the strategy

5. If you have reason to believe that a bylaw is being violated, you should contact the local government employees responsible for enforcement.

WHO TO CONTACT

Municipal planning departments

For more information about what measures your local government may have taken to protect wetlands and other aquatic habitat, and more information about Environmentally Sensitive Areas and Development Permit Areas, a good starting point is the municipal office. See phone numbers in Blue Pages of phone book.

Consult the publications :

A Guide to Stewardship Bylaws

Land Protection Guidelines for the Protection of Aquatic Habitat

Stream Stewardship.

If you live in the Lower Mainland area, you may also want to review a recent publication from the Department of Fisheries and Oceans that summarizes this information for municipalities in the Lower Fraser Valley: *Protection of Aquatic and Riparian Habitat by Local Governments – An Inventory of Measures Adopted in the Lower Fraser Valley*, 1995.

Intergovernmental programs

PACIFIC COAST JOINT VENTURE

The Pacific Coast Joint Venture (PCJV) is the implementation arm of the North American Waterfowl Management Plan, an effort by the American, Canadian and Mexican governments to restore declining populations of waterfowl through habitat identification and acquisition. The Pacific Coast Joint Venture encompasses wetlands and other habitats on the Pacific Coast, and includes many government agencies as well as non-governmental organizations. As of 1995, the PCJV had secured over 1,000 hectares of important waterfowl habitat at a cost of $130 million. An example of an important Joint Venture is the Englishman River Estuary established near Parksville in 1992 and now designated by the provincial government as a Wildlife Management Area.

Estuary Programs

FRASER RIVER ESTUARY MANAGEMENT PROGRAM (FREMP)

This program is a cooperative effort between federal, provincial and municipal governments. It aims to coordinate planning and decision-making in the Fraser Estuary. The main office of FREMP is in New Westminster, BC. FREMP was authorized by a provincial Order in Council, which requires an environmental impact assessment among other things for any development or improvement of land in designated areas, or approval of a subdivision. Since FREMP has no enforcement powers, it is still up to the other levels of government to enforce any terms or conditions imposed by the Project Review Process. Any project that has the potential to affect the environment in the FREMP area will be reviewed by the Environment review Committee. FREMP has also prepared Area Designations to assist with decisionmaking. Shorelines have been colour coded

red, yellow, or green (or stop, pause, go)). In red coded shoreline areas, development may occur provided that mitigation is applied to avoid impacts on habitat features of the area. FREMP recognizes that dyking, dredging, draining and filling have resulted in an estimated 70% loss of tidal wetlands in the estuary. The Area Designations and Project Review Process were designed to halt these losses.

There are two other estuary management plans in the province. The Squamish Estuary Management Plan has no formal legal basis. The Cowichan Estuary Management Plan was established under the *Environment Management Act.* No licence, permit or power under an enactment can be issued or exercised in the Cowichan Estuary without the written approval of the Minister of the Environment.

WHAT YOU CAN DO

1. Public participation is encouraged in FREMP. Information about projects is avilable from the FREMP office. The public can provide written comments on projects, and can also request a review of any recommendations made by the FREMP Environment Review Committee.

WHO TO CONTACT

Fraser River Estuary Management Program

Phone 775-5756

Cowichan River Estuary Management Program

Phone

Squamish River Estuary Management Program

Phone

FRASER BASIN MANAGEMENT PROGRAM

The Fraser Basin Management Program was established in 1992 to advance the environmental, economic and social sustainability of the Fraser River Basin. The program has a 19 member Board with representatives from government, First Nations, business, labour, NGOs and other groups throughout the Basin. It produces an annual report card on the state of the Fraser. Its 1995 report, *Assessing Progress Towards Sustainability in the Fraser Basin*, noted the disappearance of wetlands in the section on containment of urban growth and sprawl.

PACIFIC ESTUARY CONSERVATION PROGRAM (PECP)

The headquarters of this program is in West Vancouver, BC. The project acquires, reserves and enhances wetland habitat on the BC Coast. The groups involved in this program are Wildlife Habitat Canada, the BC Ministry of Environment, Lands and Parks, the Nature Trust of BC, Ducks Unlimited, the federal Department of Fisheries and Oceans, and the Canadian Wildlife Service. The PECP was instrumental in negotiating the park acquisition of Widgeon Marsh Regional Park Preserve, near Pitt Lake, for example.

INTERIOR WETLANDS PROGRAM

This is part of the Fraser River Action Plan and was a federal Green Plan initiative established in 1992. It is a partnership between Environment Canada and the province of British Columbia. The programs goal is to encourage landowners and resource managers to incorporate wildlife habitat concerns, land use practices and management plans. The program picks demonstration projects to improve and conserve water and wildlife resources. Examples are modified watering facilities to provide water and salt away from a wetland or riparian area or wildlife which will reduce stress on the wetland area. Other

examples are fencing for livestock management, planned grazing systems, herd management, hay production planning.

Options for Protecting Privately Owned Wetlands

Many wetlands, especially in the rapidly expanding urban areas of the province, are privately owned. Governments are unable to purchase all of these ecologically valuable lands, both because of the steep prices of land in urban areas and the limited amount of funds available for this, as well as many other, purposes. To secure lasting protection for these areas, another set of legal tools, in addition to the statutes discussed above, may be applicable.

There are many different legal tools available to protect privately owned land , which are extensively canvassed in a series of recent publications from West Coast Environmental Law Research Foundation. [31]

Some of the legal tools are well known. For example, one of the most common ways to protect private land is to transfer title to the land from one owner to another party who wants to protect it. Other legal tools are less common, but can also be useful in certain situations.

The *Land Title Act* is an important tool for protecting urban streams, as it is the chief statute controlling land disposition in the province. Since the problem of legal protection for urban streams has both a water and land component, it is important to look at land laws like the *Land Title Act* as well as laws that focus more on water. To protect streams the law must address both the water quality in terms of what enters the water and what is taken out of the water (including the water itself) as well as the physical space or land around the water, which can

be in the form of culverts, or pavement, or erosion of the banks of a stream.

The *Land Title Act* contains provisions for a legal tool called a "conservation covenant", created in 1978 under s. 215 of the *Land Title Act*. This type of covenant is an agreement between a private landowner and the Crown or Crown corporation or agency, municipality or regional district or a local trust committee under the *Islands Trust Act*. Municipal governments have used s. 215 covenants to specifically protect fish habitat on privately owned land. Many covenants of this type have been signed between a landowner and the Ministry of Environment, Lands and Parks in which the landowner agrees not to alter the riparian portion of his or her property covered by the covenant.

The *Land Title Act* was recently amended to allow conservation organizations to be the holders of conservation covenants. As this is a relatively new legal tool, it is difficult at this point to assess the effectiveness of this new type of covenant to protect urban streams.

However, a study done by DFO and the City of Surrey, titled *Protection of Aquatic and Riparian Habitat on Private Land – Evaluating the Effectiveness of Covenants in the City of Surrey 1995,* did look at the use of s.215 covenants in a study area. Of the 261 lots that were the subject of the survey, 185 or 71% had covenants. The frequency of encroachment into these covenanted areas was 75%. This means that the covenants were not being followed. Landowners had either intentionally or unintentionally affected the riparian setback area in a negative way.

The study also concluded that s.215 covenants alone were not effective in protecting fish habitat in the Municipality of Surrey under the current management regime. Suggested reasons for this failure included lack of enforcement and lack of resident knowledge of the conditions attached to the covenant. The study found a big gap between those landowners who said they

knew the conditions of the covenant and those who actually understood it. More public education about the terms of such covenants was recommended.

Also, lack of enforcement is a problem. The Ministry of Environment and DFO are reluctant to increase enforcement because it would entail lengthy, costly and risky civil action suits. The study notes: "If violators know there are penalties for their inappropriate actions, they may make more of an effort to educate themselves about their responsibilities respecting covenants."

An owner may want to restrict the use of land in some way, such as by prohibiting logging or preventing construction of buildings within a certain distance from a pond. It may be possible and, indeed, desirable in many cases to bind the land with a common law restrictive covenant drawn in favour of a neighbour's property together with a section 215 covenant (under the *Land Title Act*) drawn in favour of the Crown, both containing the same restrictions on land use.

However, property law was not designed with the conservation of land in mind. So the legal tools sometimes have serious deficiencies when they come to be considered in a conservation context. These deficiencies are discussed in the WCELRF publications referred to above.

One of the best new tools for protecting private land is a conservation covenant.

What Is A Conservation Covenant?

A conservation covenant is an agreement between a landowner and another party — a government body, conservation organization or adjacent land owner — that is designed to conserve land or a particular aspect or feature of the land. The agreement is registered against title to the affected land; the burden of the covenant runs with title to the land and therefore binds

the successors in title to it. British Columbia's *Land Title Act*[1] has recently been amended to allow such conservation covenants to be granted to qualified conservation organizations and government bodies, to protect private land in British Columbia.

Conservation covenants are voluntary agreements. They are used to protect private land where the owner has willingly granted the covenant on terms acceptable to the owner. An owner may be motivated to grant the covenant by concern for preserving the land, by payment for it, and/or by receiving other benefits such as a reduction in real property tax.

As it now stands, s. 215 of the *Land Title Act* offers great flexibility for parties to fashion an instrument appropriate to the needs of the situation at hand. A covenant under s. 215 may include any one or more of the following provisions:

- Provisions in respect of the use of land, or the use of a building that exists on the land or that is to be built on the land.
- Provisions stipulating that the land is not to be built upon, or that it is to built on only in accordance with the covenant.
- Provisions regarding subdivision of the land, including a prohibition on subdivision or provisions regulating the manner of subdivision.
- Provisions stipulating that parcels of land identified in the covenant, and registered under more than one indefeasible title, are not to be sold or otherwise transferred separately.

In addition to these provisions, s. 215(1.3) permits a conservation covenant to include provisions:

> ... that land or a specified amenity in relation to it be protected, preserved, conserved, maintained, enhanced, restored or kept in its natural or existing state in accordance

> with the covenant and to the extent provided in the covenant.

The word "amenity" is defined in s. 215(1.4) as *including*:

> ... any natural, historical, heritage, cultural, scientific, architectural, environmental, wildlife or plant life value relating to the land that is subject to the covenant.

Moreover, by virtue of s. 215(2), a covenant may include "as an integral part" an indemnity in favour of the covenantee "against any matter agreed to by the covenantor and covenantee." The indemnity may provide for "the just and equitable apportionment of the obligations under the covenant as between the owners of the land affected." Last, performance of the covenant can be secured by way of a rent charge, charging the land and payable by the covenantor and the successors in title to the covenantor.

Uses of Conservation Covenants

Conservation covenants held by conservation organizations are useful in a wide variety of situations:

- protecting ecologically valuable features of the land,
- providing a buffer zone adjoining a park or other protected area,
- requiring agricultural land to be used for farming without damaging important waterfowl habitat,
- limiting private forest land to ecologically sustainable forestry,
- requiring specific management or development practices that protect a variety of values relating to the land, including natural, historical, heritage, cultural, scientific, architectural, environmental, wildlife or plant life values,

- providing a buffer zone to protect riparian habitat from logging on private land, and
- protecting a rails-to-trails or other linear conservation project. (from LLL, p.-3)

However, like any law or legal tool, a conservation covenant has limitations. It may be difficult to enforce. It has the potential to add to a landowner's risk of liability, if members of the conservation organization or the public are injured while on the land for purposes allowed by the covenant. The proposed covenant holder must invest substantial time and energy to effectively monitor and enforce the covenant. A landowner must obtain legal and tax advice before entering into a covenant, which can be expensive. Nonetheless conservation covenants are a valuable tool for wetland protection in B.C., and their potential will be more fully realized once landowners and conservation groups have more experience with their use.

Wetland Stewardship in BC

Proposals for Reform of Wetland Policy

Unlike other jurisdictions, such as the federal government and the provinces of Ontario and Alberta, BC has no official written policy on wetlands protection.

Wetlands in BC have little statutory legal protection. The province has an informal, unpublished policy on wetlands, and only the federal *Fisheries Act* contains an explicit "no net loss of wetland functions" policy for wetlands under federal fisheries jurisdiction.[32]

A number of changes to law and policy are required to give wetlands a level of protection similar to other ecologically valuable areas. The most important change would be a comprehensive wetland policy. A written policy statement, confirming the government's commitment to protect wetlands, and containing policy goals, would fulfill these key functions:

- require land use decisionmakers to give priority to wetland preservation;
- raise public awareness of the ecological value of wetlands, both within and outside government;
- authorize programs and policies designed to enhance and restore wetlands.

When developing a wetland policy, B.C. has the advantage of learning from other jurisdictions, which have had more experience with wetland protection regulation. It can look at the experience DFO has had, for example, when formulating the

provincial goals. A common goal is "no net loss" of wetlands, but there are problems with this policy goal. Both Washington State and the federal government have documented continuing losses of wetlands when the "no net loss" goal has been in effect. [33]

For this reason, the policy should be based on the goals "no loss of *provincially significant* wetlands" and "no net loss" of other wetlands.

Other legal reforms are also required to adequately protect wetlands. Some of these changes are addressed below.

WATER ACT

The *Water Act* is seriously in need of revision. An improved Water Act could be an important tool for wetlands protection.

The *Water Act* sets up a system of water rights which are acquired through the issuance of licences. The rights are allocated on a 'first come first served' basis. So, a licence obtained before another licence of a later date will prevail. This model of water rights legislation which had historical advantages has obvious defects today. First, there is the problem of over allocation. Once all the rights have been distributed to licensees, there is no provision for granting water rights to new users. Secondly, the law does not adequately deal with the need to maintain instream flows for conservation purposes, rather than dividing up rights to the water amongst residential, agricultural and industrial users. Thirdly, neither the BC *Water Act* nor regulations made under the *Act* deal with the problem of low flow periods, when not enough water is entering the stream or river to satisfy all the users, let alone for conservation purposes. Although the *Act* does make provision for cancellation of water licences, in fact these provisions are rarely if ever used.

The appeal rights in the *Water Act* should also be amended to more closely resemble other environmental legislation which explicitly states that any affected person can appeal

FOREST PRACTICES CODE

The current Riparian Management Area setbacks, in which logging is prohibited or restricted, apply only to areas that are under the jurisdiction of the *Code*. Some have argued that the *Forest Practices Code* should also be applied to private forest land.

PROVINCIAL RIPARIAN SETBACKS

Wetland setbacks similar to those in the Forest Practices Code should be required for all wetlands in B.C. Crucial wetland and other riparian habitat should be protected not only from logging but from residential and industrial and other urban development. The province is looking at the idea of a provincial riparian law, which would apply to urban areas and which would codify the existing *Stream Stewardship Guidelines* and *Land Development Guidelines for the Protection of Aquatic Habitat* prepared by the Department of Fisheries and Oceans.

MUNICIPAL ACT

Selected Wetland Glossary

Anaerobic: having no molecular oxygen. Reduced amounts of oxygen are common to many wetlands

Buffer zone (reserve zone): Regarding wetland protection, a buffer zone is the area beyond the wetland itself that is deemed to vital to the health of the wetland and therefore deserving of protection. Buffer zones have legal standing in many places, including Washington State. In BC the buffer zone concept is enshrined in the Forest Practices Code, where it is called a reserve area.

Conservation: Perhaps once meant leaving things in their natural state. The word 'preservation' is now used to describe this. *Wetlands in Canada* defines conservation as "that aspect of renewable resources management which ensures that utilization is sustainable and which safeguards ecological processes and genetic diversity for the maintenance of the resources concerned."

Ditch: Any channel that has been specifically dug to facilitate drainage

Dredging: The excavation of the bottom soil of a wetland. Common practice in estuary areas, especially where sediments fill in shipping lanes in larger rivers, in which case dredging may be a tool in wetland restoration. A practical tool in creating artificial wetlands as well.

Ecosystem: A term coined in 1935 by the Oxford-based ecologist A.G. Tansley as a substitute for terms such as "community," which he thought were excessively "anthropomorphic or vegetative." An ecosystem is the sum of the interactions and energy transfers between a given set of organisms and their environment. A geographical unit in which a somewhat defined set of energy transfers occur.

Ecotone: A transition area between two different ecosystems or communities. A small shrub area between a wetland and a forested upland slope would constitute an ecotone.

Estuary: An inlet of the sea reaching a river valley as far as the upper limit of tidal rise where fresh and saline waters mix.

Eutrophic (eutrophication): The process of excessively fast growth of plants (especially algae) resulting from an overabundance of nutrients in the water, especially nitrogen and phosphorous. The large quantities of biomass created lead to ecosystem succession as a result of the filling in of the water with plant material.

Floodplain: Any area near a body of water that is, or was, occasionally or periodically flooded by the nearby river, lake or ocean.

Forest Practices Code: BC legislation that sets environmental standards for the logging industry. Wetlands are granted some protection under the Code, but many feel that the provisions for buffer zones are insufficient.

Groundwater: Water that is passing through or standing in the soil and underlying strata.

Habitat: Home. The place where any given organism lives and works.

Hummock: A lump in a wetland. In the Arctic it will have an ice core. In Southern environments it will have a core of gravel or dense vegetation.

Hydric soils: Any soil that is sufficiently wet, or wet for a long enough portion of the year to encourage the existence of an anaerobic environment. The presence of hydric soils is a key indicator of wetland habitat.

Hydrologic cycle: The ongoing movement (recycling) of water between the atmosphere, the land, freshwater systems and the

oceans. The process varies, but typically might follow the path of: condensation, precipitation, runoff, soil absorption, evaporation, evapo-transpiration from plants, and releases through combustion and animal respiration. One could look at wetlands as being devices to slow the hydrologic cycle, thereby making water available to life-forms that would have otherwise missed out as water sped along to the ocean.

Marshes: These come in many forms, but basically marshes may be thought of as treeless wetlands fed by any of the three main types of shallow water: fresh, brackish or saline. Under the Canadian wetland definition system (in *Wetlands of Canada*) a marsh is "a mineral wetland or peatland that is periodically inundated by standing or slowly moving water ... The waters are rich in nutrients ... characteristically showing zonal or mosaic surface patterns composed of pools or channels interspersed with clumps of emergent sedges, grasses, rushes, reeds..."

Mire: An English wetland term. Covers all kinds of peatlands.

Mitigation: A term more commonly used in the U.S. It describes the effort to reduce the negative impact of any human activity on wetlands. It takes the form of avoiding, minimizing, or compensating for the perceived negative effects of a development or activity.

Monitoring: Keeping an eye on wetlands. Everything from poaching to dumping; from going to council meetings to tracking natural change and evolution. Land use decisions by councils and the actual land use by people may both be monitored.

Nutrients: Any material, whether organic or not, that may be used by plants and animals to sustain their various metabolic processes. Nutrients range from free-floating chemical compounds to the proteins and carbohydrates digested when an organism eats another organism. Wetlands are generally nutrient-rich, and therefore life-sustaining, ecosystems.

Paludal: Of a marsh; marshy, marsh-like.

Paludification: A useful term describing the process by which a bog or a marsh expands in size due to a rise in the water table. Paludification is a natural process that often results from the wetland's drainage being impeded by the vegetation that the wetland has produced. This process is somewhat at odds with succession.

Peatlands: A generic term including all types of peat-covered terrain. Many peatlands are a complex of swamps, bogs, and fens.

Ponds: A body of water mid-way in its life-cycle between a lake and a wetland. Its shoreline will be wetland. Its water content may be seasonal or permanent. Pond succession, resulting from eutrophication, usually indicates that pond-sites will soon be wetland sites.

Salinity: The amount of soluble salt in water.

Salt marsh: A marsh subject to daily or seasonal inflows of brackish or saline water.

Sedimentation: Small solid material dropping out water. The stuff that settles to the bottom as a result of gravity operating on it. This process happens more readily when water ceases to move quickly, as is almost always the case in wetlands. (The main exception being some river shorelines.)

Succession: The gradual replacement of one kind of ecosystem by another one. i.e., lake becomes pond; pond becomes wetland; wetland becomes scrub forest, etc. Not to be confused with the replacement of wetlands by subdivisions, which has another name.

Upland, upland slope: Uphill from the wetland. By definition it must have good drainage because if doesn't it will part of the wetland rather than a drier watershed slope above it. Also, by

definition, it has to be sloped, because if it isn't water will usually pool, and a wetland will form. (see **watershed**)

Water table: The upper level of the groundwater or the level below which the soil is saturated with water. So in a wetland the water table may be at or near the surface even if you don't see any pools of water.

Watershed: Any area of land that surrounds and drains precipitation into a common body of water: whether it be a stream, river, lake, or ocean. (see **upland**)

Wetland Types: Some of the Names Used in North America to Describe Wet Places

See *Wetlands of Canada* (pp. 416-424) for descriptions of most of these; others will be described in Mitsch & Gosselink. Note that 'classes' of wetlands are mixed in this list, so that a given category below, 'Shallow open water' for instance, will contain within it many of the other types listed here. The purpose of this list is only to demonstrate the extraordinary range of wetland types.

Backswamp
Basin fen
Basin Swamp
Blanket bog
Bog
Boreal forest
Bottomland hardwood forest
Deepwater swamp
Braided channel
Cedar swamp
Channel fen
Channel water
Collapse scar bog/fen
Cypress dome
Cypress swamp
Cypress-tupelo swamp
Depositional zone
Domed bog
Dune fields (freshwater marsh)
Estuarine wetlands
Estuaries
Estuarine high (or low) marsh
Excentric bog
Farm ponds
Farmed wetlands
Feather fen
Fen
Flat swamp
Floating fen/marsh/bog
Floodplain
Floodplain marsh
Floodplain swamp
Freshwater marsh
Freshwater swamp (Southern deepwater swamp)
Gravel bar
High marsh
Inactive delta marsh
Inland freshwater marsh
Kettle marsh
Ladder fen
Lake-edge swamp
Lowland polygon bog/fen
Mangrove swamp
Marsh
Meadow
Mesotrophic bog
Mire
Moor

Mound bog
Muskeg
Net fen
Northern peatland
Palsa bog/fen
Patterned fen
Peat mound bog
Peat margin swamp
Peatland
Playa
Polygonal peat plateau bog
Ponds
Potholes (prairie potholes)
Quaking bog
Raised bog
Reedswamp
Root-zone wetland
Salt marsh
Scrub-shrub wetland
Sedge shore fen
Sedge shore marsh
Seep wetland
Seepage track marsh
Sere
Shallow basin marsh
Shallow open water
Shore bog
Shrub shore fen
Slope bog
Slough
Sphagnum bog
Spring swamp
Stream swamp
String bog
Swamps
Tall shrub slope bog
Terminal basin marsh
Tidal creeks
Tidal freshwater marsh
Tidal salt marsh
Veneer bog
Vernal pools
Wastewater wetland
Wet meadows
Wet prairie

Quick and Basic Wetland Bibliography

Government pamphlets

Wetlands in Canada: *a Valuable Resource*: this is a pamphlet available from Environment Canada. It is Fact Sheet 86-4 from their Lands Directorate in Ottawa, K1A 0E7 From the same source you might want to ask for Working Paper 26, *Land Use Change on Wetlands in Southern Canada*, or Working Paper 34, *Land Use Change on Wetlands in the Southwestern Fraser Lowland*.

The Canadian Wildlife Service has produced a good pamphlet on wetlands. It is called *Wetlands*, and if you can't obtain it from a local office of C.W.S. or Environment Canada, you could write the C.W.S. Distribution Section in Ottawa, K1A 0E7.

Videotapes

Two reasonable videos are available locally. The Friends of Boundary Bay have produced a 23 minute video called *Wondrous Wetlands*. This tape is designed for classroom use, and raises many questions which are left unanswered in an effort to stimulate discussion. It can be ordered by sending $16.00 to F.O.B.B. at P.O. Box 1441 Stn. 'A' Delta, BC V4M 3Y8

Another tape is available from the Washington State Department of Ecology in Olympia. It has three separate wetland videos compiled onto one tape, including *Bill Nye the Science Guy on Wetlands*. This is a good resource for community groups or

schools. Address: P.O. Box 47600, Olympia, Washington, 98504-7600.

Books

Patrick Dugan's *Wetlands in Danger, A world Conservation Atlas,* is a coffee table book with good photographs and a global focus. Published by Oxford University Press, New York, 1993.

Edward Maltby's *Waterlogged Wealth* (1986) is a great introduction to wetlands. Published by Earthscan, 1717 Massachusetts Avenue, Washington, DC 20036.

Mitsch and Gosselink's *Wetlands* came out in a new edition in 1993. This is a standard wetlands text. Six hundred pages with fifty pages of bibliography. Recommended, but note that it focuses on U.S. wetlands, assumes some science background, and that it costs around $80.00. Published by Van Nostrand Reinhold.

The Audubon Society Nature Guide on Wetlands by William Niering and a team of associates. The emphasis here is on species and identification in U.S. wetlands. Prefaced by a brief introduction to wetlands. At $25.00 it is valuable if identification of species is what you want.

Wetlands of Canada was published by the federal Minister of Supply and Services in 1988. Authored by the National Wetlands Working Group, it is the main source for information about Canadian wetlands, but note that only twenty pages out of four hundred are devoted to wetlands generally: the rest of the book is broken up geographically. BC's Pacific Coast wetlands are given a chapter, but aside from boreal wetlands, the rest of BC, which is more than half the province, is not discussed specifically.

A book that is similar to the one you are holding, but focusing on Washington State: called *Wetland Protection Guide*: is dis-

tributed by the Washington Wetlands Network at 8050: 35th Avenue N.E. Seattle, WA. 98115. Call or fax them to check on cost: tel: 206-524-4570 or fax: 206-528-7779.

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Land in British Columbia, West Coast Environmental Law Research Foundation, Vancouver, Canada, January 1994, at page 33-34. A detailed discussion of land law is beyond the scope of this publication. *Here Today* provides an excellent overview of the subject of land law. It also provides a detailed discussion of legal tools available to protect privately owned land, including wetlands. This publication will be referred to repeatedly throughout the section on protection of privately owned wetlands, with the permission of the authors of *Here Today*.

[4] More information about the different roles of these government departments and agencies can be found in *Stream Stewardship: A Guide for Planners and Developers*, Government of Canada, Province of British Columbia at pages 45-47.

[5] *Here Today, Here Tomorrow*, page 49.

[6] *Here Today, Here Tomorrow*, page 48-49.

[7] *Here Today, Here Tomorrow*, page 16.

[8] The West Coast Environmental Law Association provides free legal advice to environmental groups and individuals in BC on environmental legal issues. The Lawyer Referral Service at 687-3221 in Vancouver can also put you in touch with an environmental law specialist for a small initial fee.

[9] For a more detailed explanation of constitutional division of authority over the environment see Chris Rolfe and Linda Nowlan. *Economic Instruments and the Environment: Selected Legal Issues.* Vancouver, British Columbia: West Coast Environmental Law Research Foundation, 1993, Chapter 1, The Constitutional Context.

[10] The Constitutional division of powers is found in the *Constitution Act*, 1867 (U.K.) 30 and 31 Vict. C.3, section 91 and 92 of the Act concern division of powers. For the powers listed above, authority is found in respectively: Fisheries 91(12); Land Reserved for Indians 91(24); Criminal Law

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[11] Environment Canada, *The Federal Policy on Wetland Conservation*, (Ottawa: the Ministry, 1991).

[12] Sections 92(13) and (16) of the *Constitution Act*.

[13] This decision is reported at (1993) 2 Digest of Environmental Law and Environmental Assessment 48 (O.M.B.). It is a decision of the Ontario Municipal Board.

[14] Dovetail Consulting, *Assessment of Mechanisms for Protecting Aquatic and Riparian Habitat in Urban Areas*, DFO, Draft, 1996.

[15] S. 7.1, Act.

[16] Stewardship of the Water, Volume 3.

[17] Water Act regulation, s. 41 and 42.

[18] Act, s. 41(2).

[19] s.3, Act, S.B.C c.57, 1982.

[20] Kenneth Morrison and Anthony Turner, "Protected Areas in British Columbia: Maintaining Natural Diversity" in *Biodiversity in British Columbia*, 1993, at 360.

[21] Pacific Estuary Conservation Program, July 1995 at 24-27. For more information on this program, see the section on Estuaries.

[22] The province prepares Red and Blue Lists of terrestrial vertebrates to help decide on priorities for conservation. The Blue List is for species that are vulnerable or "at risk" and contained 87 taxa as of April 1993. The Red List species are endangered or threatened, or, are under consideration for that status. As of April 1993, the Wildlife Branch had listed 64 taxa on the Red List.

[23] Hans Roemer, "Rare and Endangered Vascular Plants in British Columbia" in *Biodiversity in British Columbia*, Ministry of the Environment, 1993, at 98. Some plants are controlled through the Dogwood, Rhododendron and Trillium Protection Act, R.S.BC 1979, c. 96, which restricts harvesting these plants.

[24] *State of the Environment Report for British Columbia*, at 55.

[25] Personal Communication, Dr. G.G.E. Scudder, Department of Zoology, U.B.C., April 3, 1996

[26] *Forest Practices Code Act*, part 8, s.176

[27] R.S.B.C 1979, c.290.

[28] Department of Fisheries and Oceans, Fraser River Action Plan, Protection of Aquatic and Riparian Habitat by Local Governments, A-6, 1995, Quadra Consultants.

[29] Calvin Sandborn, *Green Space and Growth: Conserving Natural Areas in B.C.*, CORE et al. : March 1996, at 71 - 82.

[30] *Municipal Act*, Section 942.11 (2) (d) and (j).

[31] The publications are:

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- *Here Today, Here Tomorrow — Legal Tools for the Voluntary Protection of Private Land in BC — 1993, barbara findlay and Ann Hillyer*
- *Using Conservation Covenants to Protect Privately Owned Land in B.C., 1992, David Loukidelis*

- The reports are all available from West Coast Environmental Law Research Foundation. This section is based on these reports.

[32] The federal *Fisheries Act* prohibits the destruction of fish habitat, but federal fisheries policy allows such destruction if mitigation is such that there is "no net loss" of habitat.

[33] See, Michael Ryklo et al., U.S. Environmental Protection Agency, "How Much Wetland Mitigation Are We Requiring? Or Is No Net Loss A Reality?", and Otto Langer, Canadian Department of Fisheries and Oceans, "Evaluating an Application of the Concept of No Net Loss to Fraser River Estuary Wetlands" in *Wetlands, A Trans-Boundary Agenda Conference Proceedings*, Fraser for Life Communications Society & Washington Wetlands Network, 1993, at 99-105 and 23-29 .