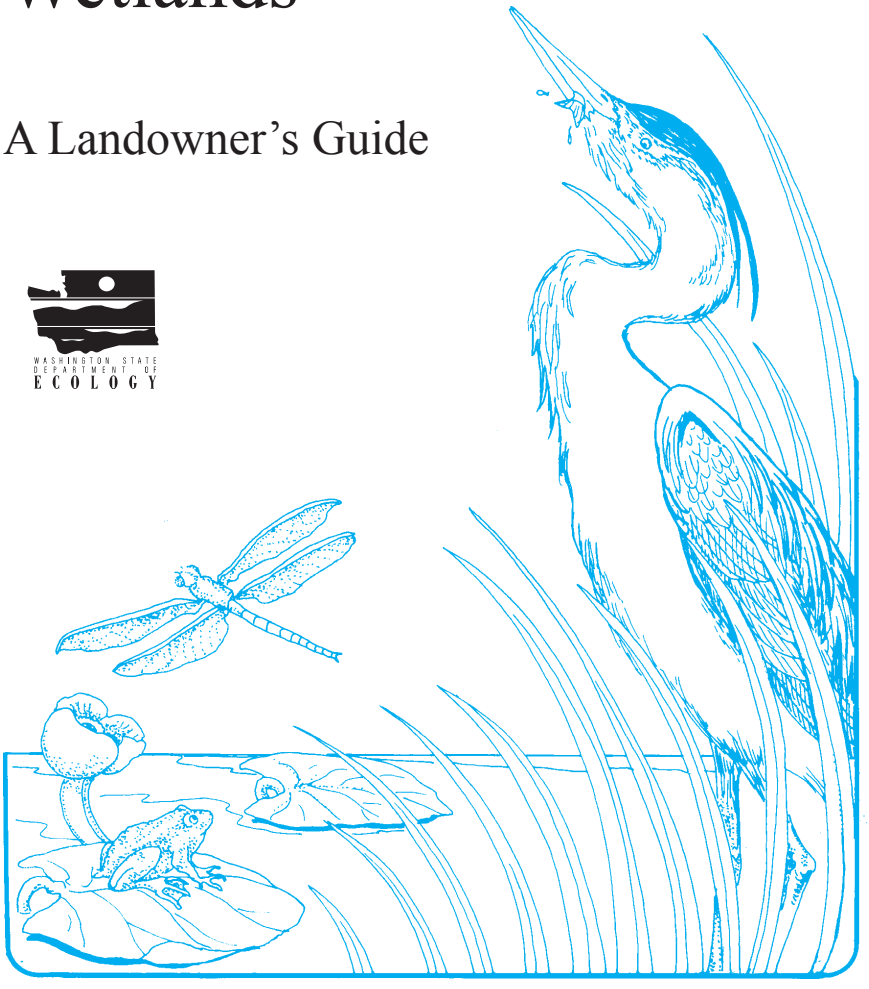
At Home with Wetlands

A Landowner's Guide

WASHINGTON STATE DEPARTMENT OF ECOLOGY



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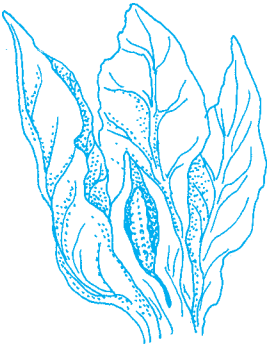

At Home with Wetlands

A Landowner's Guide

2nd Edition

by Joy P. Michaud

for the Washington State Department of Ecology

Illustrated by Sandra Noel

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A special thanks goes to Bob Wiltermood, who took the author on a wetland tour that provided both ideas and inspiration.

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Chapter Six of this second edition incorporates information from Ecology's out-of-print *Wetlands Preservation: An Information and Action Guide*, written by Jane Rubey.
Tim Gates did desktop publishing for this edition.

Contents

Preface

Throughout our history, wetlands have suffered at the hands of humans. Whether through indifference, exploitation, or misguided views, we have damaged or destroyed most of Washington's wetlands. And even now — in spite of our new understanding of the ecological importance of wetlands — the degradation continues, and we are still losing hundreds of acres of wetlands a year. As the owner of a wetland, you have an opportunity to join in the protection of this important and threatened resource.

This guidebook describes how wetlands function, explains their significance in your local watershed and in the hydrologic cycle, and shows how human activities have come to threaten wetlands. This book offers protection, enhancement, and preservation options — things you can do for your wetland. It also explains the importance of your role as a wetland steward.

Stewardship is a traditional American idea. The word "stewardship" means "the individual's responsibility to manage his life and property with proper regard to the rights of others." Farmers have practiced land stewardship in part because their livelihoods depend on sustaining the land resource that supports them.

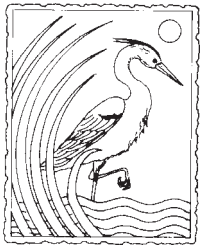
In the farming context, the "others" include not just neighbors and the farmer's community, but also future generations. The responsibility comes from the recognition that we do not live in isolation, that what we do affects others (sometimes in ways we are unaware of), and that our children deserve the same opportunities we had.

When we consider the ecological contributions of wetlands, along with the significant loss of wetlands throughout our history and the continuing threats to our wetland resources, we can see how important it is that wetland owners embrace the idea of stewardship.

The stewardship responsibility, you may be happy to learn, does not oblige you to a life of wetland maintenance and supervision. This guidebook offers a wide range of stewardship activities and explains how good stewardship is often a matter of what you do not do.

Wetland stewardship can be as much an opportunity as a responsibility — if you are looking for a way you can make a difference for the environment, you could hardly do better than protect your wetland.

CHAPTER ONE

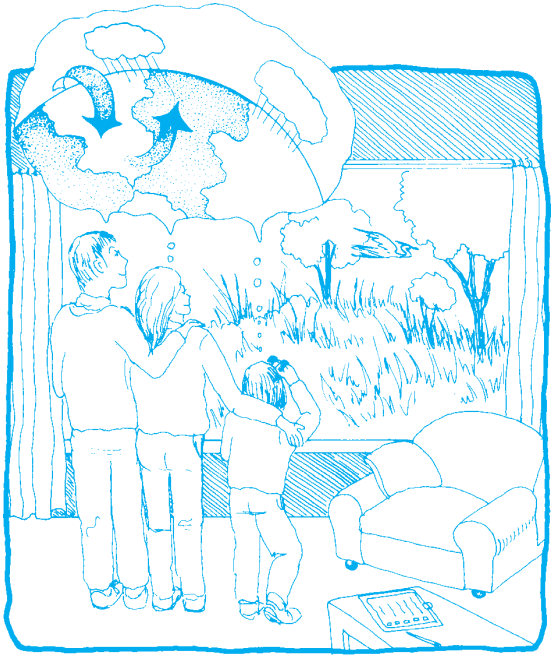


The Big Picture

Except for the small quantities of water carried from the biosphere by astronauts and disposed of in space, nearly every molecule of water present when the seas formed on earth is still present on the planet. Moving from gas to liquid to solid ice, these molecules constitute a dynamic hydrologic cycle that bathes and supports life. A hypothetical example is often used to illustrate ...: in the moisture that bathes your eye there may be a molecule of water from Cleopatra's bathwater, from water drunk by Moses, or from the moist tissue of an octopus that lived in ancient seas.
— The Cousteau Alliance

If you are having trouble figuring out whether or not a certain area of your property is actually a wetland, you are in good company. Many people have the same question, and even the experts can disagree. In recent years, however, ecologists have expanded our knowledge of wetlands significantly, and have developed ways for defining and classifying wetlands.

Scientists define wetlands as transitional areas between land and water; these areas are saturated with water or covered by shallow water at least part of each year, or part of most years. These wet conditions determine the type of soil and plants found there. When determining whether an area is a wetland or not, wetland specialists look for the presence of those soils associated with wet conditions (hydric soils) and for plants that can tolerate saturated soil (hydrophytes).

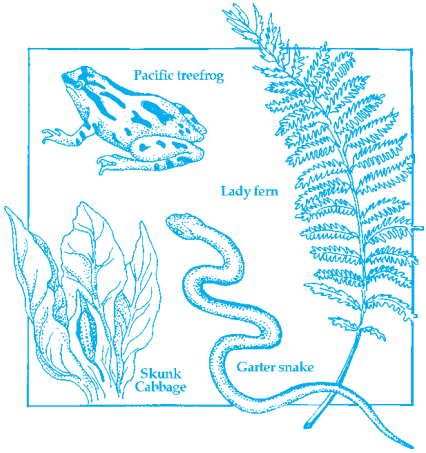


Wetland Types

The most commonly used wetland classification system is "Cowardin," named for the scientist who developed it. It was officially adopted by the U.S. Fish and Wildlife Service in the 1970s. Cowardin divides wetlands into five major categories based on the type of aquatic environment to which they are connected. *(See box on page 12 for details.)* Cowardin further divides wetlands by soil type, vegetation, persistence of wet conditions, and other characteristics.

By combining all the different categories and wetland characteristics in Cowardin, scientists can identify hundreds of specific wetland types.

As a wetland owner you do not need to know the exact classification of your wetland to use this guidebook. You might be able to impress your friends by telling them that you own a "littoral nonpersistent emergent wetland in the lacustrine system," but you don't really need to know all that to be a good wetland steward. You

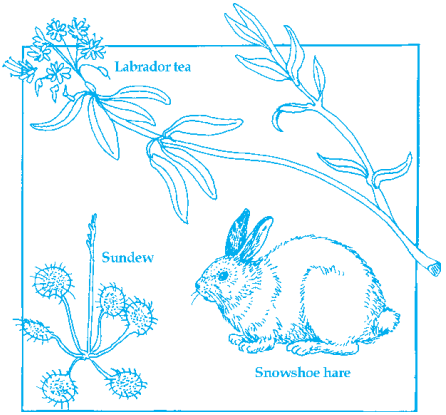


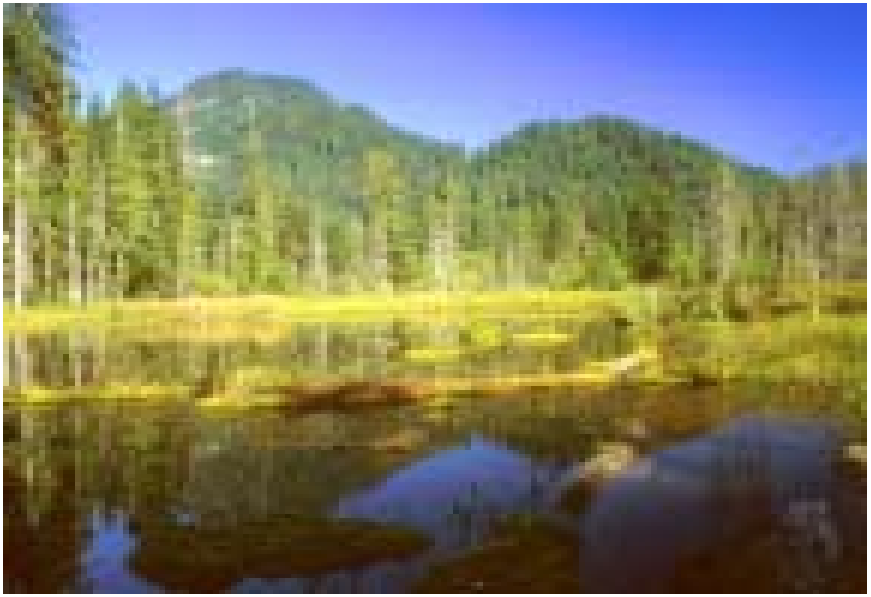
Freshwater Swamp

may be more familiar with the common terms "swamp," "bog," and "marsh," which refer to specific kinds of wetlands, each distinguished by its plants, soils, and water chemistry.

Swamps (or forested wetlands) usually occur along river courses. Their vegetation is dominated by trees and shrubs — cedars, spruce, cottonwood, dogwood, spirea, and willows, among others. Swamps have dense understories — the vegetation growing beneath the trees — and, with their abundance of food and cover, provide diverse wildlife habitat.

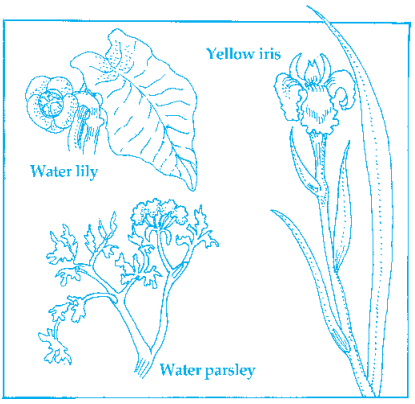
Bogs occur in cool, wet areas where the drainage is poor. Bogs often have floating mats of vegetation and very dark colored water. The dominant plants are sedges and mosses, especially sphagnum. As the plant material decays, it forms layers of peat. Many of Washington's bogs were destroyed when they were mined for their peat. In an era when things change at an astonishing rate, it is comforting and amazing to consider that most of the bogs in our state are 10,000 years old.





Bog.

Marshes can be either saltwater or freshwater wetlands. Freshwater marshes occur both alone and in association with other bodies of water. Saltwater marshes are located near estuaries and marine water. Marsh vegetation consists primarily of grasses and herbs — plants that have fleshy rather than woody stems.



Freshwater Marsh

The Five Basic Types of Wetlands

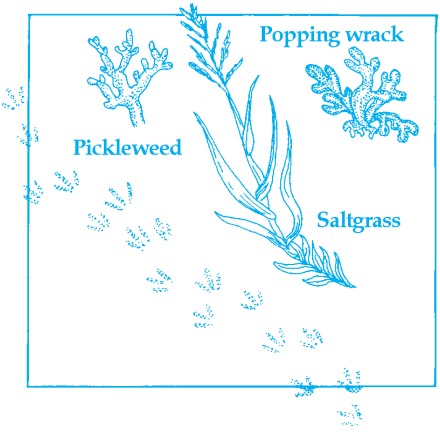
Marine: seawater wetlands undiluted by freshwater.

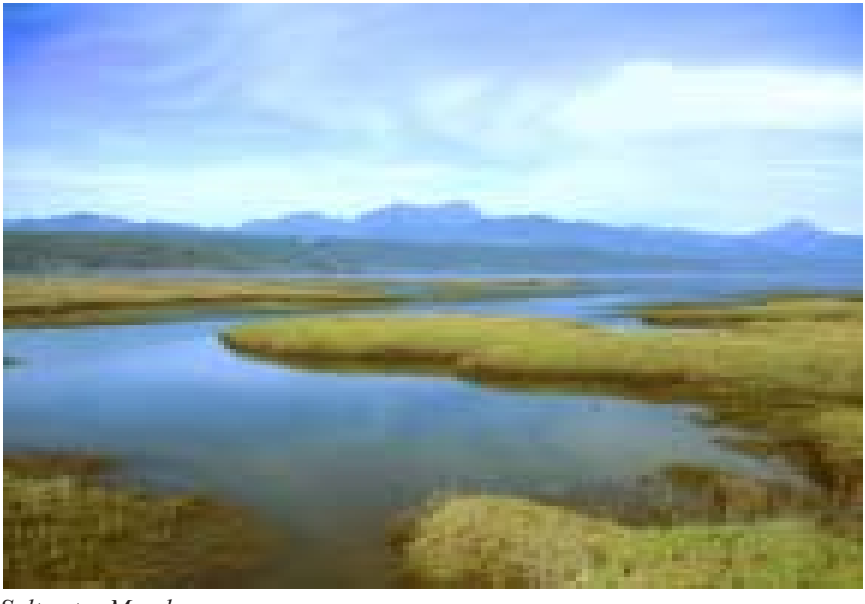
Estuarine: (ESS-choo-a-reen) wetlands in estuaries — areas where saltwater and freshwater mix.

Riverine: (RIV-er-een) freshwater wetlands associated with rivers or streams.

Lacustrine: (la-KUSS-tren) freshwater wetlands associated with lakes.

Palustrine: (pa-LUSS-tren) all other freshwater wetlands (swamps, marshes, bogs, etc.)





Saltwater Marsh

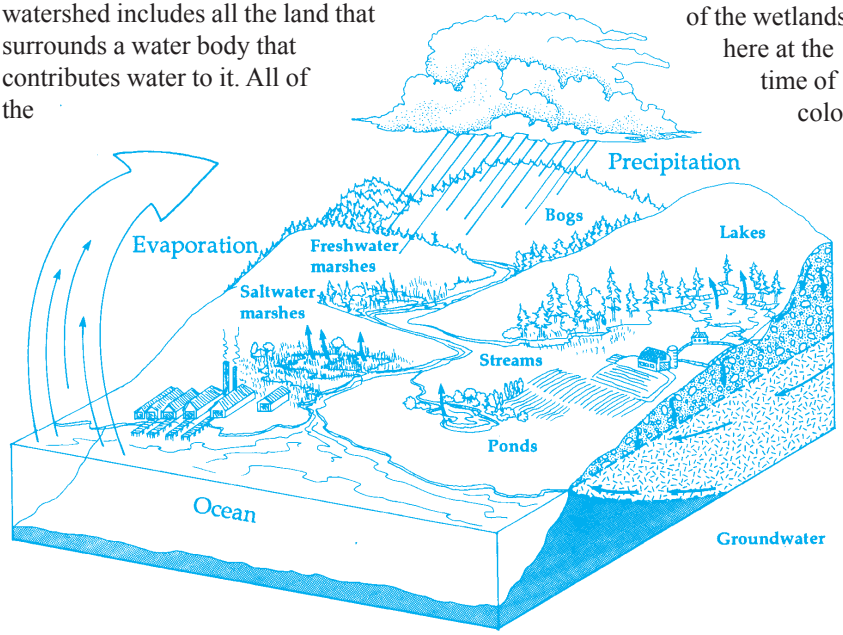
Your Wetland and the Watershed

The hydrologic cycle is the circuit of water movement from the atmosphere to the earth and back to the atmosphere again. Evaporation and precipitation are two key processes in this cycle. Transpiration (when plants give off water into the air), infiltration and percolation (the downward movement of water into the soil), and condensation (when water vapor turns liquid — the opposite of evaporation), are less familiar processes. The groundwater that supplies our wells and the surface waters that form our lakes, rivers, and oceans are where water is stored between these processes.

Your local branch of the global hydrologic cycle is your watershed. A watershed includes all the land that surrounds a water body that contributes water to it. All of the processes of the hydrologic cycle occur within a watershed. A watershed can be as vast as the area drained by the Columbia River or as small as the area around your wetland.

Wetlands help regulate the quantity of water moving through a watershed by retaining water during wet periods and releasing it during dry periods. A watershed may have a few large wetlands, many smaller ones, or any combination that provides the necessary storage capacity. All wetlands, small or large, are essential to the proper functioning of a watershed. Your wetland, however small, is valuable both for its own intrinsic merits and for its contributions to your watershed.

When you consider that Washington State has already lost between one-third and one-half of the wetlands here at the time of colo-



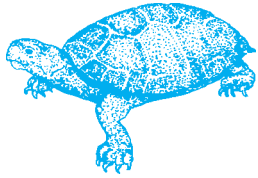
nization, you can get the idea that we ought to protect and preserve those remaining, regardless of size. By providing the proper stewardship for your wetland, you put into practice the popular slogan, "Think globally, act locally," and you can take satisfaction in the knowledge that your personal contribution is significant.

Do You Have a Wetland?

The first step in determining whether you have a wetland on your property is to consult the available wetlands maps. The National Wetlands Inventory (NWI), compiled by the U.S. Fish and Wildlife Service, covers all of Washington State and identifies wetlands by using aerial photography. Local governments use the NWI as a starting point for their own inventories, and take the additional step of conducting field reviews of wetlands in their areas.

Your local planning department can tell you whether they have NWI or their own wetlands maps, and can help you determine whether your property has an identified wetland. You should recognize, however, that even if the maps do not show a wetland on your property, you may still have one. The maps are limited, often missing small or forested wetlands. And the wetland boundaries, which may change over time with natural cycles, are only approximations.

The next step you can take to determine whether you have a wetland, or to define its boundaries, is to get some professional assistance. Your local planning office may have a wetlands specialist who can help you, or you may want to retain the services of a wetlands consultant. Many environmental consulting firms have staff members who can confirm the presence of a wetland and can conduct a wetland "delineation," a process of defining the boundaries of a wetland. You may want a delineation for your own information, or to ensure that you keep a proper buffer zone between your wetland and other activities on your property. Chapter Five describes buffers and provides advice on how to select a consultant.



Questions About Your Wetland

While you do not need to determine the exact classification of your wetland to use this guidebook, it will help to have given some thought to its distinguishing characteristics. The following questions will help you get acquainted with your wetland, allow you to compare it to other wetlands, and enable you to describe some of its important characteristics to local planners or community action groups interested in protecting it, or to a wetlands specialist you may approach for advice.

Where is the wetland located? At the mouth or delta of a river? Along a riverbank or within a river's flood-plain? Along the shore of a lake? Is the wetland influenced by tides? Is its water source present for only part of the year? Or is the wetland isolated from any surface water body source?

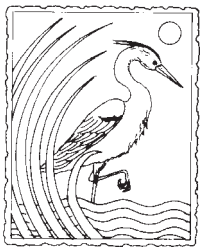
How wet is your wetland? Does it have standing water? How deep is the water? If there is no standing water, are the soils saturated (do your shoes become soaked when you walk there) or are the soils just very damp? If there is standing water, how much of the wetland does it take up? How much of the wetland consists of saturated soils? How much is relatively dry?

What kinds of plants grow in your wetland? Are there submerged (underwater) plants? Are there emergent plants — those that poke up through the water's surface? Are the plants growing on floating mats of vegetation? Is it primarily small shrubs and grasses? Is it mosses and shrubs? Trees and shrubs? Reeds or cattails? How does the vegetation change as you move from wetter to drier conditions?

How does your wetland change with time? Is it wet only part of the year, like during the wet season or during the irrigation season? Does it have a permanent pool of water, or a pool sometimes and wet soil the rest of the time? Is it affected by tides or changing lake levels? What do you think causes these changes in your wetland?

The answer to many of the questions above will change with the season. Explore your wetland during both the wettest and driest portions of the year and note how much the vegetation and character of the area changes.

CHAPTER TWO



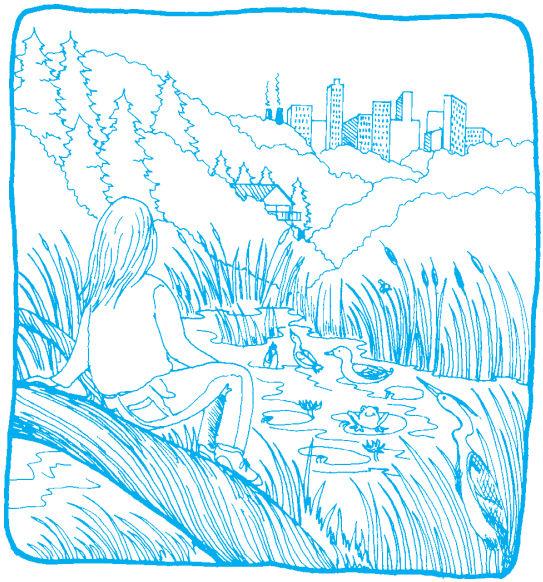
The Functions and Values of Wetlands

The marsh would have been more valuable as a marsh than in its subsequent desecrated form.
— John and Mildred Teal

Wetland Functions

Wetlands perform a dazzling array of ecological functions that we have only recently begun to appreciate. A century ago the president of the American Health Association promoted the idea of a national campaign to eliminate wetlands. Today scientists recognize the environmental benefits that wetlands provide, and they are now alerting us to the importance of preserving rather than eliminating our wetland resources. Your wetland is likely performing vital ecological functions that were barely recognized a few short years ago.

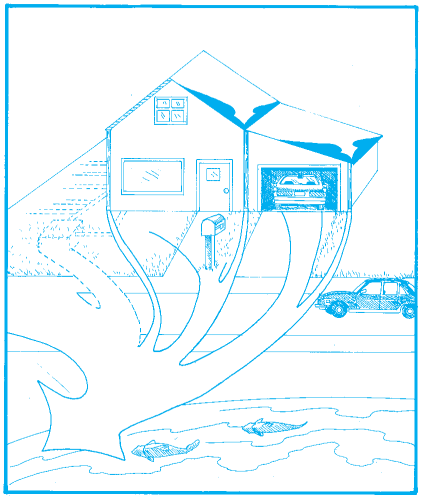
Even now our understanding of the complexities of wetland ecosystems is still developing, and it seems the more we learn, the more valuable wetlands become. Wetland ecologists have already documented the following environmental benefits of wetlands: water purification, flood protection, shoreline stabilization, groundwater recharge, and streamflow maintenance. Wetlands also provide habitat for fish and wildlife species, including endangered species. Not all wetlands provide all of these benefits, and how your particular wetland works depends on its location and its type. What follows is a simple summary of how wetlands perform their complicated functions, along



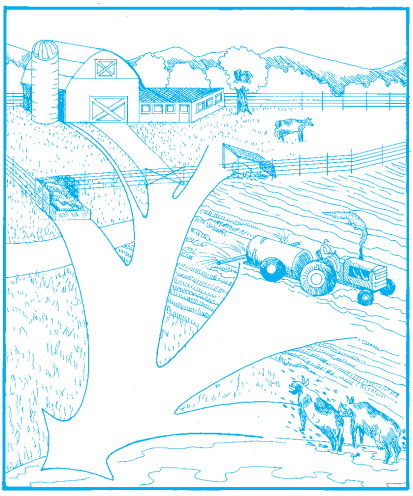
with a brief explanation of how these functions support humans and other species.

Water Purification

Wetlands protect water quality by trapping sediments and retaining excess nutrients and other pollutants such as heavy metals. These functions are especially important when a wetland is connected to groundwater or surface water sources (such as rivers and lakes) that are in turn used by humans for drinking, swimming, fishing, or other activities. These same functions are also critical to the fish and other wildlife that inhabit these waters.



In urban areas runoff may carry fertilizers and pesticides from lawns and gardens; moss killers from roofs; and motor oils, antifreeze, brake fluids, and other pollutants from houses, streets, and driveways.



Runoff from rural areas may carry fertilizers and pesticides from fields; animal waste; and sediments from exposed soils and trampled stream banks.

Sediments, nutrients, and toxic chemicals enter wetlands primarily by way of "runoff," a term used to describe the rain and stormwater that travels over land surfaces on its way to receiving waters. In urban areas, runoff washes over buildings and streets in industrial, commercial, and residential areas where it picks up pollutants and carries them to receiving waters. In rural areas, agricultural and forest practices can affect runoff. Where the runoff drains a freshly-plowed field or clear-cut area, it may carry too much sediment. Runoff may carry pesticides and fertilizers if these have been applied to the land.

Sediments, which are particles of soil, settle into the gravel of streambeds and disrupt or prevent fish from

spawning, and can smother fish eggs. Other pollutants — notably heavy metals — are often attached to sediments and present the potential for further water contamination. Wetlands remove these pollutants by trapping the sediments and holding them. The slow velocity of water in wetlands allows the sediments to settle to the bottom where wetland plants hold the accumulated sediments in place.

Runoff waters often carry nutrients that can cause water quality problems. An example of such an occurrence is an "algae bloom." Besides the aesthetic problems associated with algae blooms (a green, smelly slime) they result in low levels of oxygen in the water. This oxygen depletion can result in the death of fish and other aquatic life. Some algae release toxins that can kill pets and livestock when bloom conditions occur. Wetlands protect surface waters from the problems of nutrient overload by removing the excess nutrients, some of which are taken up and used by wetland plants, and some of which are converted to less harmful chemical forms in the soil.

Toxic chemicals reach surface waters in the same way as nutrients, and can cause disease, death, or other problems upon exposure to plants and animals (including humans). In a function similar to nutrient removal, wetlands trap and bury these chemicals or may even convert some of them to less harmful forms. Scientists are continuing to study what happens to toxic chemical when they enter wetlands, and they warn us that even if the toxins are buried, they are still potentially dangerous. Disruptions of the wetland soils could release the toxins back into the aquatic environment.

Flood Protection

Almost any wetland can provide some measure of flood protection by holding the excess runoff after a storm, and then releasing it slowly. The size, shape, location, and soil type of a wetland determine its capacity to reduce local and downstream flooding. While wetlands cannot prevent flooding, they do lower flood peaks by temporarily holding water and by slowing the water's velocity. Wetland soil acts as a sponge, holding much more water than other soil types. Even isolated wetlands can reduce local flooding — if the wetlands were not there to hold stormwater runoff, backyards and basements might end up under water.

Shoreline Stabilization

Wetlands that occur along the shoreline of lakes or along the banks of rivers and streams help protect the shoreline soils from the erosive forces of waves and currents. The wetland plants act as a buffer zone by dissipating the water's energy and providing stability by binding the soils with their extensive root systems.

Groundwater Recharge and Streamflow Maintenance

Aquifers and groundwater are "recharged," that is, replenished with water by precipitation that seeps into the ground and by surface waters. Those wetlands that are connected to groundwater systems or aquifers are important areas for groundwater exchange. They retain water and so provide time for infiltration to occur. Groundwater, in turn, provides water for drinking, irrigation, and maintenance of streamflow and lake and reservoir levels. During periods of low streamflow (or low lake water levels), the slow discharge of groundwater often helps maintain minimum water levels. In addition, wetlands located along streams, lakes, and reservoirs may release stored water directly into these systems, thus also contributing to their maintenance.

Wetlands' many intricate connections with groundwater, streamflow, and lake and reservoir water levels make them essential in the proper functioning of the hydrologic cycle.

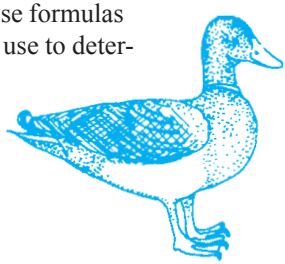
Fish and Wildlife Habitat

Many species of birds, fish, mammals, reptiles, and amphibians rely on wetland habitat for breeding, foraging, and cover. The special wetland conditions provide unique habitat for species that cannot survive elsewhere. Many endangered and threatened animal species, such as salmon, require wetlands during part of their life cycle. The incredibly high rate of wetlands loss has contributed to their demise.

Wetland plants and small animals — especially insects — are essential links at the lowest levels of the food chain. A wetlands environment supports these plants and animals, which in turn support the larger animals that feed on them. While an otter or a trout may be a more attractive species to protect than some anonymous insect or plant, the latter are no less important in the overall scheme. If we diminish the lowest levels of the food chain, the higher levels will suffer as well.

Economic Benefits

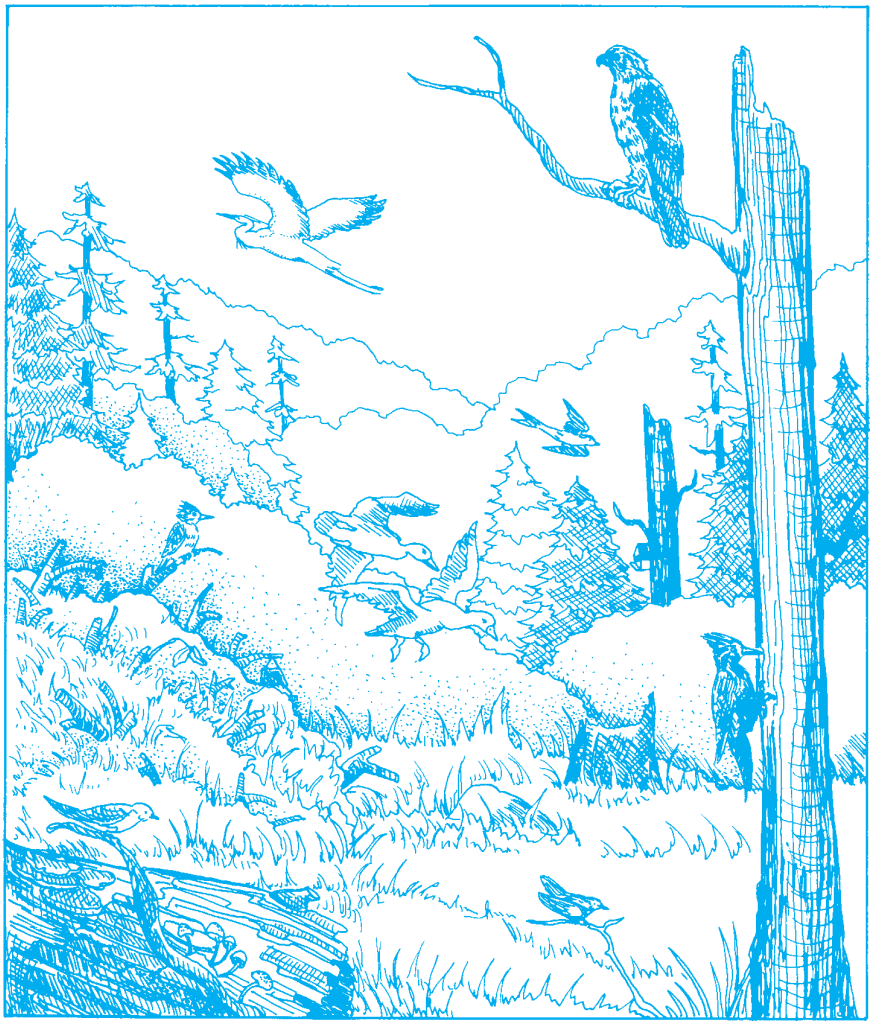
The economic benefits associated with these environmental values of wetlands also can be substantial. If, for example, a community had to build flood control or water treatment systems to replace those functions provided by wetlands, the costs could far outweigh the land purchase price of preserving the natural wetland systems. Similarly, when wetlands lose their value as fish habitat, this value is difficult to replace, and the consequent losses to the recreational and commercial fishing industries can be significant. There are as yet no precise formulas that we can use to determine the accurate dollar



value per acre of wetland, but the more we learn about wetlands, the higher that value becomes.

Other Benefits

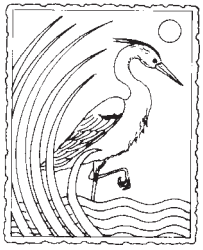
Some of the values associated with your wetland will be yours and yours alone. No one else can really say what the open space means to you and your family. How your wetland affects your quality of life, and how you value it for its aesthetic contributions are personal matters. You or members of your family may also get personal recreation benefits from your wetland — nature photography or birding or simply quiet time in a peaceful place.



The Limits of Wetlands

As amazing as wetlands are, and for all their ecological contributions, they do have their limits. A partially filled or otherwise damaged wetland is one that only partially meets its potential for flood control, shoreline stabilization, or groundwater recharge. A badly degraded wetland can lose its capacity to remove excess sediments, nutrients, and other pollutants, and can lose its habitat value for fish and wildlife. Wetlands may have tremendous capacities to provide environmental benefits, but they are not indestructible. If we want wetlands to continue to perform their ecological functions, then we have to do our part to protect them.

CHAPTER THREE



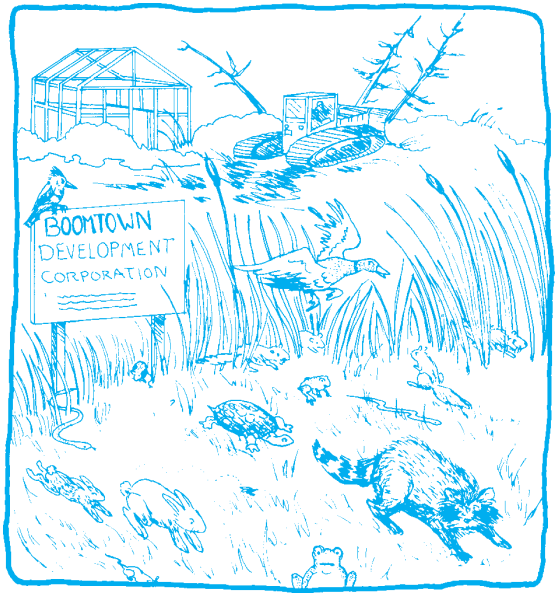
Wetlands and Humans

Don't it always seem to go that you don't know what you've got 'til it's gone?
— Joni Mitchell

People vs. Wetlands

Up until the 1970s, federal policy actually encouraged the draining and filling of wetlands to accommodate agriculture, forestry, mining, and other economic development. These policies have since changed, but not before we lost many wetlands along with their ecological benefits. Today scattered wetland regulations offer some protection, but many wetlands — especially smaller ones — remain vulnerable to draining and filling.

Urban growth and development also account for significant historical losses of wetlands. Washington's coastal urban areas have already lost 90 to 98 percent of their estuarine wetlands, and the Puget Sound basin has lost 70 percent of its wetlands to port development and other activities. Some communities have enacted local wetlands protection laws in an attempt to save their remaining wetlands, but most communities do not have such laws, and even those laws that are in place cannot protect all wetlands from all threats.



Degradation of wetlands in less obvious than outright loss, and can occur as a direct or indirect consequence of many human activities. Urban growth, for example, can result in wetlands degradation by increasing the volume of runoff and the amount of pollutants that the runoff carries. Other activities that can damage wetlands

include agriculture and forestry practices, and the clearing of vegetation. Hydrologic disruptions, such as the diversion of surface water or the withdrawal of groundwater, are major causes of wetlands degradation in urban areas.

When we degrade a wetland, we diminish or lose some or all of its functions. The value of a wetland as fish and wildlife habitat, for example, is often the first function to suffer. The relationship is simple: as we disturb or disrupt a wetland more and more, fish and wildlife can use it less and less.

Losing Ground

The sad irony in all this is that our human activities would create the environmental need for more wetland resources even if they did not damage or destroy our existing wetlands. Our roads, houses, commercial buildings, parking lots — essentially all of our development — cause some disruption in the functioning of our watersheds. The hard surfaces prevent water from infiltrating into the soil, and one result is more and faster runoff. If there were more rather than fewer wetlands to handle these consequences of our development, we might be able to maintain the original hydrologic balance. As it is, we not only create the need for more of the environmental functions of wetlands, we also destroy or damage the resources that provide those functions.

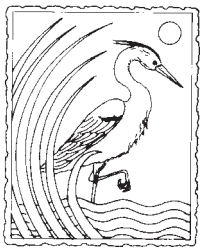
We have responded to these environmental needs or our own making by designing and building expensive stormwater control and water purification devices. Our engineering, however, is not nearly as elegant or successful as the natural design. Scientists and engineers have long recognized the limitations of their structures, and are now attempting to return to a naturally functioning system by re-introducing wetlands into the landscape where they once existed.

Wetland Stewardship

In light of our current knowledge, it makes much more sense to preserve and protect our remaining wetlands than to try to replace them after we damage or destroy them. Current regulations and governmental policies, which are largely based on our improved understanding of wetland functions, have greatly increased the protection of wetlands. But policies can only reach so far. At some point we have to rely on responsible and informed citizens.

In short, we have to rely on the good stewardship of wetland owners. You may not be able to alter the course of urban growth, but there are many other ways you can act to protect your wetland. Chapter Four discusses a number of practices and activities over which you do have some measure of control, and suggests how you can act as a good steward of your wetland.

CHAPTER FOUR



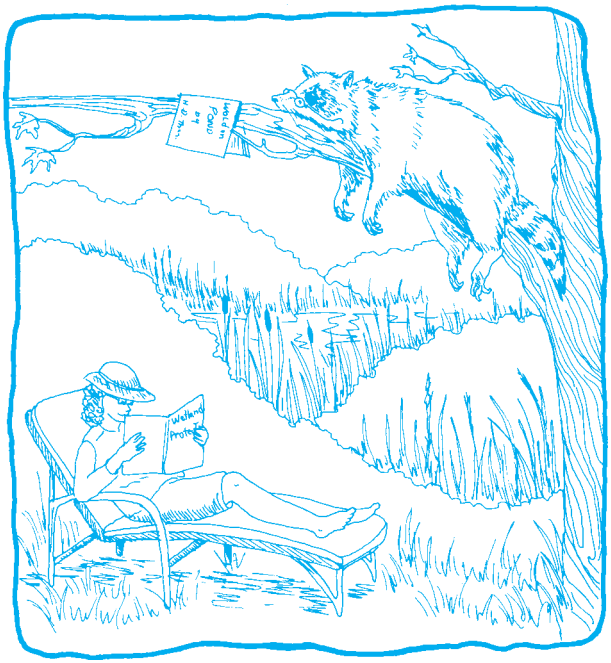
Protecting Your Wetland

Only within the moment of time represented by the present century has one species — man — acquired significant power to alter the nature of his world.
— Rachel Carson

Protecting a wetland doesn't necessarily require additional effort on our part; often it is what you don't do that is important. If your wetland is not already degraded, your most effective protection strategy may be as simple as guarding it from activities that will damage it. This means maintaining a buffer around the wetland, and protecting the hydrology and plants within the wetland.

The Importance of Buffers to Wetlands Protection

Buffers, the natural, undeveloped area surrounding a wetland, are a crucial part of the wetland system and must be protected along with the wetland. Buffers provide the initial filtering of sediments and other pollutants from runoff water. Buffers also slow and direct runoff water and so are important to wetland hydrology. In addition, they serve as a "habitat connector," providing a protective pathway for wildlife species moving from the

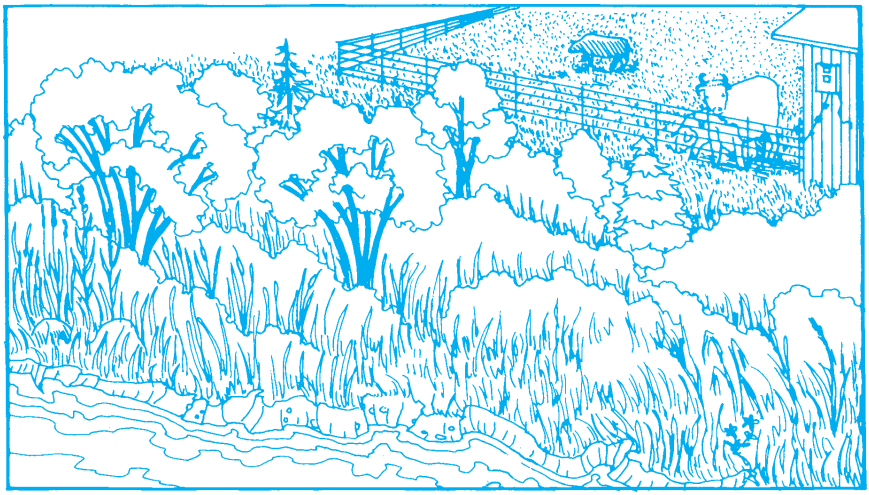


wetland to other upland habitat areas. They are vital to the livelihood of many species that rely on upland areas near wetlands to complete their habitat needs. And buffers provide a visual and noise barrier between the inner core of the wetland and adjacent activities.

The recommended minimum buffer width for a healthy wetland ranges from 50 to 300 feet or more. The width requirement is based on the size of your wetland, the functions it provides, the health of existing vegetation, the wildlife you may want to protect, and adjacent land use. Your Conservation District, county Cooperative Extension office, local planning office or the Department of Ecology can advise you on the minimum requirement for your particular wetland.

Activities That Affect Wetlands Hydrology

Maintaining the natural hydrology of a wetland is the key to protecting it. Even small changes in the flow pattern can cause large changes in the way a wetland functions: how much flood protection a wetland affords, how much sediment and pollutants it can remove, the amount of water available for stream and groundwater recharge, and the type of plants and wildlife habitat found there. Channelizing, dredging, diking, impounding, and draining are the most common activities that disrupt or destroy the hydrologic balance of wetland systems. The result often is increased flooding, filling, and pollutant levels. Ironically, these activities are often done as a means of alleviating these problems.

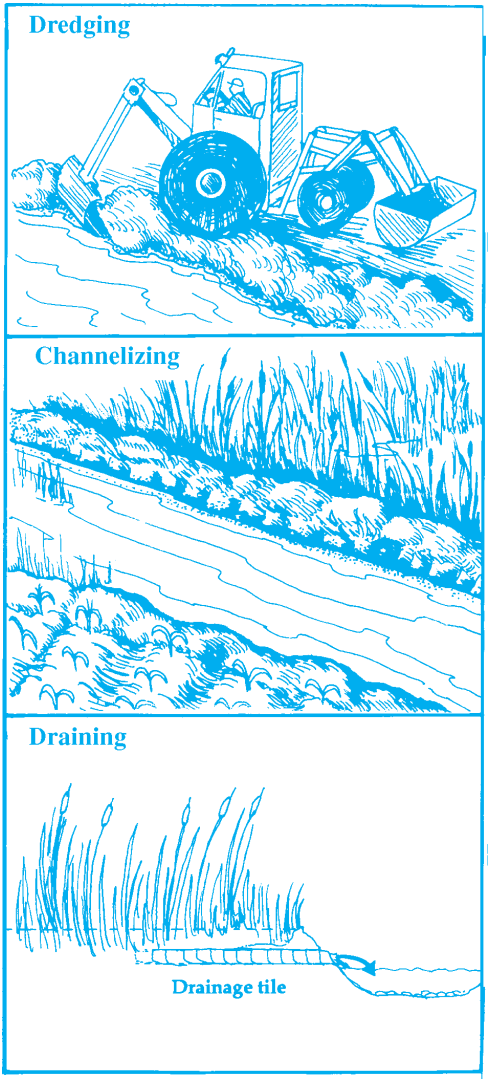


Creating Ponds in Wetlands

Creating ponds or open water in an otherwise pondless wetland is commonly done with the intent of improving or "enhancing" wetlands. Ponds are typically created for aesthetic reasons — often to attract waterfowl. Although a shallow pond is a type of wetland, it does not follow that all wetlands should have ponds, or that a pond is always an enhancement.

In creating a pond in a wetland you may lose other functions. Pondless wetlands may provide different types of wildlife habitat, filter pollutants more efficiently, or even provide for greater groundwater recharge. Your wetland formed in response to the conditions of the watershed. Therefore, the greatest environmental benefit is attained by leaving your wetland in its natural state.

In a few cases, where wetlands have already been degraded, a pond may be a valuable addition to a wetland. A good example of this is a wetland that has been taken over by the invasive exotic plant called reed canary grass. Excavating a pond may be the best alternative for controlling the grass. A wetland specialist can help you make that determination.



Dredging: Earth-moving activities usually designed to deepen or widen streams and wetlands or to change the direction of water flow.
Channelizing: Directing or guiding water along a desired course, usually in straight, trench-like channels.
Draining: Drawing all or some of the water off, or away from, a stream or wetland.

Providing Water for Livestock

Since wetlands provide a potential water supply for livestock, many wetlands are lost or severely degraded by alterations related to this use. Dredging, channelizing, impounding, or draining are often undertaken to improve the water supply. As described previously, these activities all represent major changes to a wetland's hydrology, and will likely result in future problems.

In addition, watering livestock usually implies pasturing them nearby. When livestock are kept near streams and wetlands the trampled banksides, damaged vegetation, and direct addition of animals waste result in increases in erosion, sedimentation, and pollution. Your local Conservation District can give you advice on the best way to water livestock on your property with minimum environmental damage. Depending upon your particular Conservation District, federal cost-sharing money may be available to help pay the costs of providing alternative livestock watering facilities.

Building Bulkheads

Small wetlands often form at the shoreline of lakes, streams, and estuaries. These are especially important nursery habitat for the early life stages of fish and other aquatic life. They also play an important role as the final pollutant filtering area before runoff enters surface water. Unfortunately, an increasingly large proportion of these essential wetlands are lost by bulkhead construction. Wetlands may be lost directly because of bulkhead placement, or indirectly through the impact of the bulkhead on wave activity and water flow patterns on adjacent and nearby shorelines.

Typically bulkheads are built to prevent shoreline erosion, but there are alternatives. Placing buoys in front of your property to keep passing boats at a maximum distance from your shoreline will help control erosive wave action. Thicker vegetation at your shoreline, and in the water itself, will bind the soil and provide increased protection against erosion. You may want to do some planting to improve your shoreline's stability and attract fish for spawning and rearing. If you do, be sure to plant native species. A discussion of the impacts of non-native plant species is included on page 29.

Beaver Dam Destruction

Beaver dams are one of nature's ways of creating a wetland. Although they change the existing hydrology, they

usually result in creation of more wetland in addition to increased pool size. It is illegal to destroy a beaver dam without a permit from the State Department of Wildlife. Be forewarned that when beaver dams are destroyed, the once wet area is often replaced by stands of reed canary grass. This grass habitually forms a thick, choking mass that obstructs water flow, causes rapid filling of streams and wetlands, and eventually leads to costly and repeated dredging.

Activities That Affect Wetland Plant Communities

Protecting wetlands vegetation, including the plants in the adjacent buffer area, is important to the overall functioning of your wetland. The plants in and around a wetland trap and filter out sediments and chemical pollutants and aid in groundwater recharge by retaining runoff waters. Furthermore, many of the plants listed on Washington State's rare and endangered plant species list are plants associated with wetland areas. By protecting your wetland's vegetation you may be preserving one of these important species.

Clearing, Grazing, and Haying

Clearing, grazing, and haying commonly occur within the buffer area and sometimes directly in wetlands. These activities adversely affect the soil structure, the type of plants that grow in the area, and the density and overall health of the vegetation. These changes in turn affect wetlands' filtering capacity, flood control capabilities, water recharge, and wildlife habitat.

Even clearing a small swath through the buffer to allow better visibility or access to the wetland creates problems. Many wildlife species need a complete noise and visual barrier from civilization. Even one swath will cause disruption, especially if the wetland is located near homes or development. (Imagine living near a busy street with only a thick hedge protecting you from the noise and disruption. Removing just a small portion of the hedge would allow much greater penetration of noise and loss of privacy.)

Non-Native Species Invasion

Introduction of non-native (exotic) plants has damaged or ruined ecosystems around the world. Exotic plants choke out native vegetation and alter the way wetlands function. This can affect sedimentation, nutrient use, habitat value, and more. These changes in turn affect the benefits your wetland provides. Exotic plants are introduced to wetlands either directly, as decorative additions, or indirectly through natural seeding from exotics placed in nearby lawns and gardens.

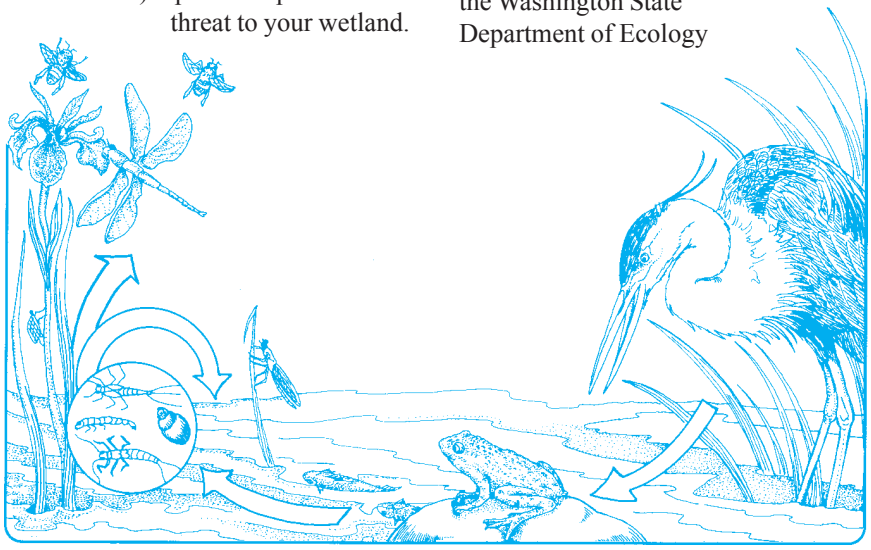
An example of an exotic plant introduced to northwest wetlands is purple loosestrife. This plant is so hardy that it is choking out native species. Attempts to control it are underway but success is still uncertain. People have resorted to herbicides to kill the plant, but have found that all the vegetation dies off, and the loosestrife reappears stronger than before. Despite this problem, purple loosestrife seeds continue to be found in many wildflower seed packages.

Other invasive exotic plants include reed canary grass, eurasian milfoil, soft rush, and creeping buttercup. For information on exotic species in your area and how to control them, contact your county Noxious Weed Control Board (see Appendix Two), or the State Noxious Weed Control Board at (360) 902-2053.

Using Chemicals

Fertilizers and pesticides (plant and insect killers) represent a potential threat to your wetland. If they are used on adjacent or upstream lawns or farmland it is likely they will eventually enter local waterways and your wetland. These chemicals alter the ecological balance of wetlands and can indirectly create many problems for you. For example, certain pesticides will eliminate important bugs and insects that work in the wetland. You might not notice the loss of these "pests," but perhaps an algae bloom will take over the pond because the insects and microscopic life that may normally have controlled the algae bloom are no longer there. There may also be a decrease in the bird population because their food source (the bugs and insects) is gone. Likewise, additional nutrients from fertilizers will cause extensive plant growth. These plants will eventually decay, cause oxygen depletion, and again result in a stagnant wetland.

There are safe alternatives to using fertilizers and pesticides. Call the Washington State Department of Ecology



at 1-800-RECYCLE for recommend alternatives to using these products.

If you do use fertilizers or pesticides, follow manufacturers' directions carefully. Do not apply more than is recommended. Apply them only during periods of dry weather when you can be assured they will not wash away with the next rainfall. (Note: Dry weather in this context means a few days without rain. Most fertilizers should not be applied during periods of prolonged dry weather because they may harm vegetation under very dry conditions.)

To protect your wetland it is best to establish a chemical-free zone that surrounds your entire wetland and any streams, lakes, or other surface water. The chemical-free zone should include an especially wide buffer strip to provide extra filtering capacity to keep these chemicals from the wetland.

General Protection Considerations

Fencing

Fencing is one of the simplest means of protecting your wetland. Even if you can't fence all of your wetland, you can often fence off overused trails, livestock pasturing areas, and the banks of streams or the buffer strip around the wetland in places where extra protection is necessary. Federal cost-sharing money may be available to help with the costs of fencing. Check with your local Conservation District to see if you are eligible for this assistance.

Dumping and Filling

Since wetlands have traditionally been viewed as wasted land they are often used as garbage dumps; old refrigerators and stoves, tires, bikes, and every other imaginable refuse can be found in wetlands. Refuse should be removed from wetlands, and neighbors and other likely "dumpers" should be educated about wetland protection. A great way to educate people is to invite them to help remove the garbage as a neighborhood cleanup project.

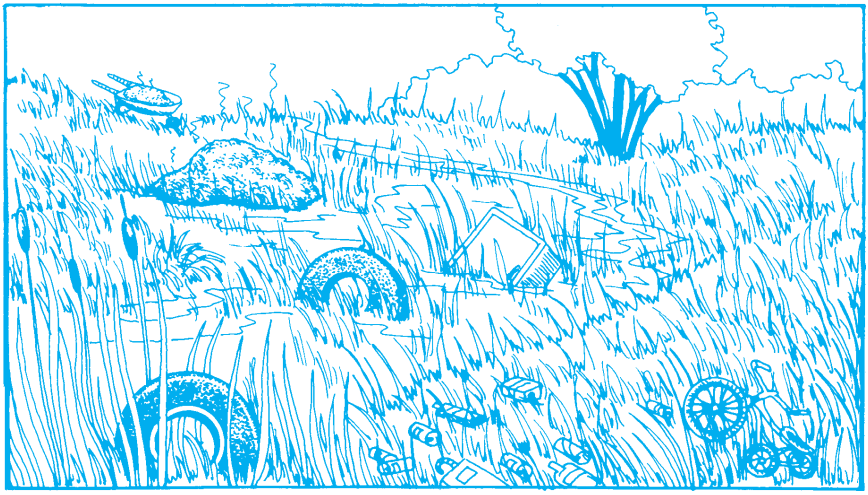
Another common dumping practice is to throw fill dirt, lawn clippings, wood chips, and other yard waste into wetlands. This is often done with the intent of filling the wetland, perhaps to extend lawn or garden area. Any kind of filling results in direct loss of the wetland's capacity to control flooding and may cause an increased rate of "natural" filling in the area, which will further disrupt flood control potential.

Additionally, dumping yard waste will cause changes in a wetland's chemical balance. Although yard waste is composed of natural materials that will eventually decompose, they can damage a wetland in the process. As they decompose they release nutrients and use up oxygen that is necessary for aquatic life. The result is likely to be a stagnant, smelly wetland. The best thing to do with yard waste is to compost it. (Compost piles should be located far enough from your wetland or other surface water to ensure the nutrient-laden runoff water that drains the compost will not reach them.)

Urban Stormwater Runoff

Stormwater supplies much of the water necessary to maintain wetlands, especially in urban areas. Chances are if you live near a lake, stream, or wetland the stormwater from your property drains directly into it. In fact, even if you don't live close to one of these and your stormwater enters concrete pipes and is "taken away," it likely goes only as far as the nearest body of water. Therefore, it is important to take special care to keep your stormwater clean. A good rule of thumb is "don't throw anything down a storm drain you wouldn't want to swim in."

A common source of pollutants to stormwater is the area around the garage and driveway, where petroleum products and other chemicals are used for household and car maintenance projects. If you let these products drain onto the drive, they will eventually wash into local waterways. There are recommended methods for disposal of these products. Call the Washington State Household Hazardous Waste Hotline (1-800-633-7585) for more information.



Septic Systems

Septic systems also are a source of pollutants to wetlands. Be sure your septic system is operating properly. If you notice the area over your drainfield is particularly green or if you can smell sewage during rainy periods, then your system is not working properly. Seepage from your system may be polluting nearby areas, including your wetland. To avoid this problem, have your septic system pumped and inspected every three to five years.

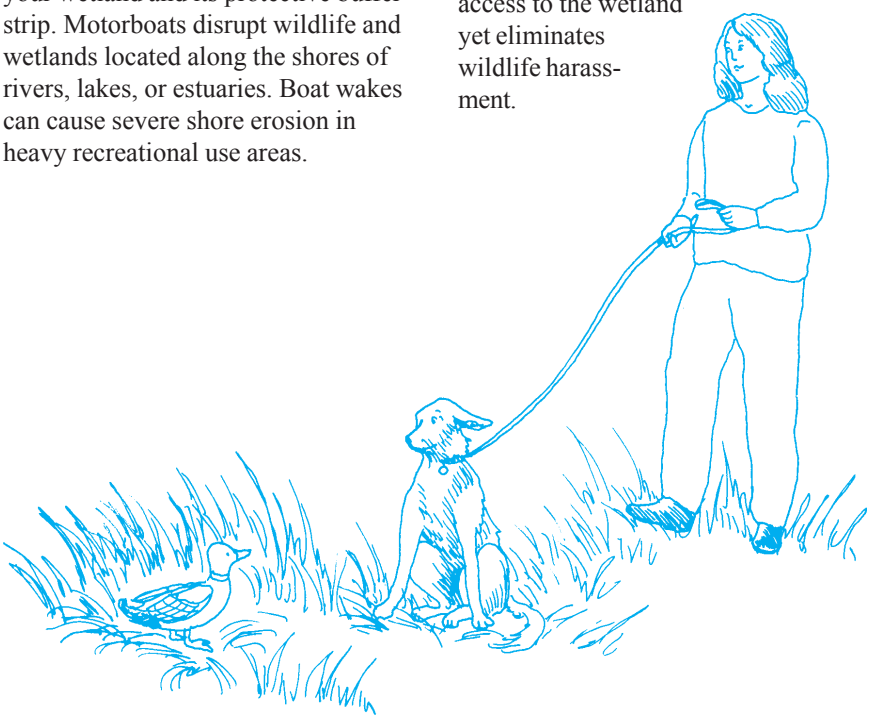
Recreation Overuse

Off road vehicles (ORVs) — dirt bikes, all-terrain vehicles, and mountain bikes — destroy soils, vegetation, and wildlife habitat within your wetland and its protective buffer strip. Motorboats disrupt wildlife and wetlands located along the shores of rivers, lakes, or estuaries. Boat wakes can cause severe shore erosion in heavy recreational use areas.

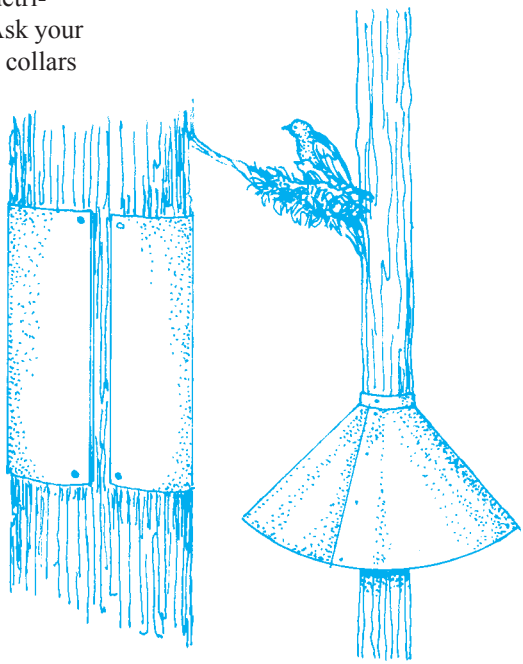
Passive recreational activities such as hiking, canoeing, and bird watching are compatible with wetland protection as long as wildlife and their habitat are not disturbed. Not disturbing them may require closing the wetland to all or certain uses during breeding or nesting seasons.

Pet Control

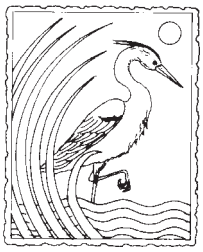
Dogs and cats represent a problem for wetland owners. They can wreak havoc on the wildlife populations you may be trying to protect. The best option for wildlife protection is to exclude dogs and cats from the wetland entirely. Restricting dogs from the wetland during early spring and summer and requiring leashes throughout the year is a less limiting measure. This allows access to the wetland yet eliminates wildlife harassment.



Cats can be highly efficient predators and in some areas the sheer number of domestic and feral cats (domesticated cats that have gone wild) is a detriment to wildlife populations. Ask your neighbors to place bells on the collars of their cats. (Note: Some cats apparently have learned to stalk prey without ringing a collar bell, so the more bells the better.) You also might request that neighbors keep their cats indoors during early morning and dusk when wildlife is most active. You can protect individual nesting trees from preying cats by nailing a wide piece of sheet metal around their trunks.



CHAPTER FIVE

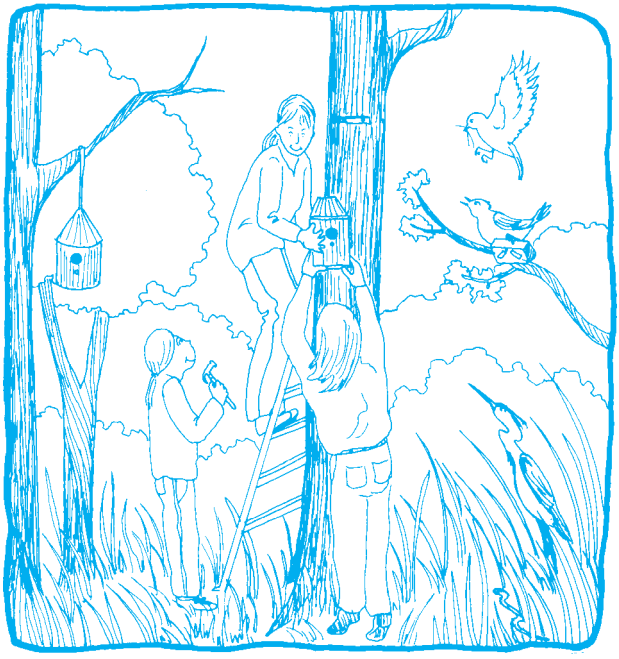


Wetland Enhancement Techniques

Harmony of land is like harmony with a friend; you cannot cherish his right hand and chop off his left.
— Aldo Leopold

The term "wetlands enhancement" implies some benefit to the wetlands, but in fact, most wetland enhancement projects meet the desires of people, rather than the needs of wetlands. Enhancement projects typically result in wetlands that are different, but not necessarily better. There is always a trade-off between benefits wetlands can provide before and after enhancement projects. It is an unfortunate human characteristic that makes us want to "improve" upon natural things. By creating something we personally prefer we are essentially destroying the natural rhythm of the system and replacing it with something that may always be out of sync with nature.

The most appropriate time to undertake a major enhancement or restoration project is when the wetland is degraded beyond its ability to recover on its own. If that is the case, it is best to seek the advice of professionals. Beware the neighbor who volunteers the use of his backhoe. Wetlands are complex ecosystems. Even trained teams of scientists and engineers have failed in restoration efforts. Letting your neighbor with a backhoe into your wetland is akin to having your wisdom teeth pulled by your neighborhood handyman.



This chapter describes small-scale enhancement projects you can do on your own. These projects are designed to help protect your wetland and provide better wildlife habitat. Wetland restoration and creation, though sometimes considered types of wetland enhancement, are complex projects that are beyond the scope of this guide. A section at the end of this chapter provides advice on the best strategy for beginning a large or complicated wetland project.

Wetland Enhancement: Improving one or more of the functions of a wetland.

Wetland Restoration: Returning a historic wetland site from its present altered condition to its previously existing natural condition.

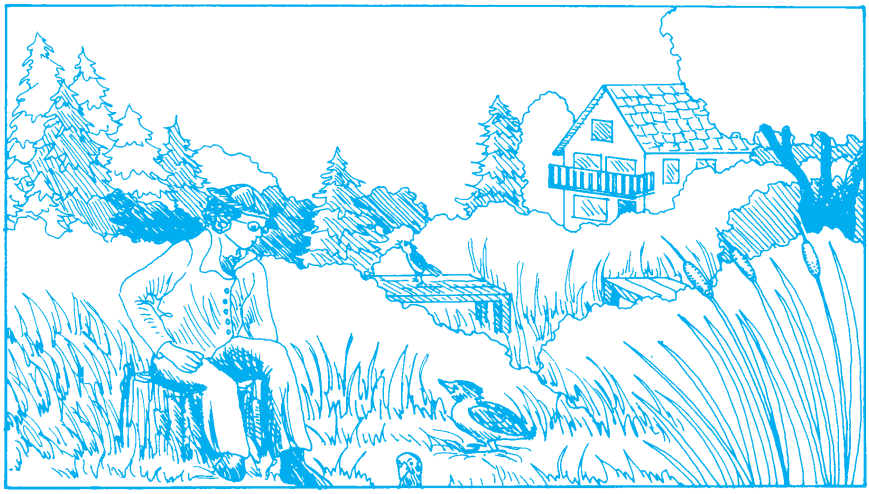
Wetland Creation: Establishing a wetland where one had not existed in the past.

Small-Scale Enhancement Projects

Planting Vegetation

Planting vegetation along stream corridors and around degraded wetlands is a simple, effective way to protect and enhance your wetland. Vegetation helps retain water, stabilize soils, and provides a place for sediments to accumulate. It also provides food and shelter for wildlife.

Many nurseries now carry or even specialize in wetland plants. They should be able to help you select plants that will thrive in your particular wetland. Always select plants that are native to your area. Although exotic plants may appear more attractive to you, native plants are best suited to the environment, and natural wildlife populations are more likely to use them.



Use caution when planting near or in open water sections of a wetland. Too many plants, or the wrong type of plant, can "choke" a small pond. (Note: If your wetland is not degraded and has a healthy variety and density of vegetation it is best to leave it be. Introducing even native plants to a natural area can cause problems.)

Removal of exotic or "noxious" plants also is an important enhancement measure. Contact your county Noxious Weeds Control Board or the Cooperative Extension for information on noxious weed species and methods of removal. Be aware that some counties may recommend the use of pesticides. This is not a safe alternative near wetlands or any surface water source.

Widening Buffers

The amount of buffer required for adequate protection depends upon the wetland. For maximum protection you will want to allow as much protective buffer as possible. Increasing the size of the buffer is always a good choice. For example, if your lawn grows to the edge of the wetland (or to the edge of the buffer) you may consider converting it to a natural yard and thus increasing the amount of protective buffer. Replacing cultivated lawns with native shrubs, grasses, and ground cover will result in a low-maintenance yard that requires no poisonous fertilizers or pesticides and is much more attractive to wildlife. A good garden supply store should have information on native plants that are attractive to wildlife. There are also many books available on this subject. Some are listed in the appendix.

Creating Human Access

Trails can be an important part of wetland enhancement projects. By allowing easy access, trails promote enjoyment and appreciation of the wetland. Trails also protect the wetland by keeping human disturbance within a designated area. Be careful about creating too many trails; it is important to limit disturbance and provide wildlife with an unbroken expanse of habitat.

Most trails can be left as natural paths, but if you find you have a heavily used trail that is showing signs of wear, you may want to cover and protect it. The best (though most costly) alternative for trails is to create boardwalks. These minimize disruption of soils, vegetation, and water flow. Beauty bark, gravel, or wood chips also are commonly used on trails. If you choose to use beauty bark, make sure that the bark hasn't been treated with pesticides or herbicides before placing any near your home or wetland. If you are considering gravel, be aware that it can be noisy, disturbing both you and wildlife you hope to see.

For an extra measure of protection for wildlife it may be wise to close certain trails in early spring and summer during the breeding and nesting period. This will provide a sanctuary for species that are sensitive to human disturbance.

You may want to include some resting areas along the trail. Place a few old benches or comfortable logs in select places where you have a good view of the wetland and can relax and enjoy your efforts. You may consider constructing a viewing blind up in a tree or camouflaging one in some tall grass or shrubs. There you can disappear into the surroundings and observe wildlife undetected.

Attracting Wildlife

Wetlands naturally attract many bird species. You can attract even more by placing birdhouses throughout the wetland. Birdhouses can be designed to attract specific species. Your local Audubon Society and the Washington State Department of Fish and Wildlife are good sources for information on birdhouse construction.

Large snags or dead trees are valuable wildlife habitat. The snags allow perching sites for many species. If a snag is tall enough it may even attract elusive raptors such as hawks and osprey. Snags may naturally develop over time around the perimeter of your wetland. If a large enhancement project is already planned for the wetland, then adding artificial snags — downed trees you have collected in a nearby woods — is a great idea. Wetland ecologists recommend as many as three large snags per acre of wetland.

Wildlife habitat also can be provided by materials that otherwise may be considered waste. Large stumps or logs in the water provide cover for fish. On the land they provide

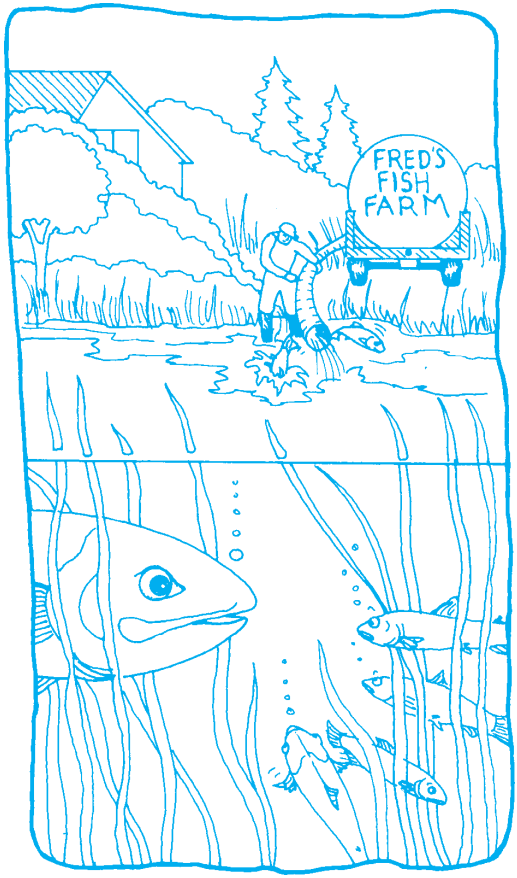
perching spots for birds and cover for small animals. Likewise, a brush pile located on the edge of a wetland may be a great asset to wildlife. Be cautious in your use of these materials. If over-used they no longer enhance a wetland and constitute a form of dumping or filling. The Washington State Department of Fish and Wildlife can offer advice on the optimum number to include per acre of wetland.

Fish Stocking

Although fish stocking is considered an enhancement technique by some, it is a good example of a project designed for people's satisfaction, not the health of the wetland. In fact, stocking can cause severe ecological problems. There are numerous issues to consider before stocking a pond or stream with fish. You will want to consult many professionals before making a decision. A few of the questions to answer first include: Can

the pond or stream sustain fish, or sustain the type of fish you wish to stock? How much will the introduced species put natural wildlife populations out of balance? Will the fish contribute to water quality problems in your pond or stream? The answer to each of these questions changes considerably with each situation.

Contact the Washington State Department of Fish and Wildlife for information on fish stocking. Never stock non-native fish or fish not found in adjacent waterways if there is any chance of their getting into nearby waterways. In assessing this chance remember that although your pond may not be connected to a local lake or stream, it may overflow into them during periods of flooding.



Landscaping with Wetlands

As people learn to appreciate the beauty of wetlands they are finding more ways to preserve them and keep them as an integral and important part of their landscaping plans. Natural wetlands make a great focal point for any lawn or garden. However, landscaping activities should be restricted to those that enhance the area surrounding the wetland and its buffer. Landscaping activities should not be done directly within a wetland unless it is a degraded wetland you are trying to restore. And remember, exotic plants are often introduced to wetlands through planned landscaping in adjacent areas. Be sure the plants you use in your landscaping are native to your area.

If you are planning a landscaping project as part of a wetland restoration the best approach is to get the advice of a professional landscaper. Be sure you use a landscaper who specializes in wetlands. The same questions that apply to selecting an environmental consultant apply to selecting a landscaper.

Getting Started on Large Wetland Projects

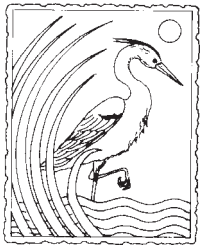
If your wetland is seriously degraded, you may decide major enhancement or restoration is in order. Begin the project by doing some research. The first step is to find out if the activity you are considering is legal, and determine if there are any requirements in the way of paperwork or permits. Chapter Seven describes some of the regulations affecting wetlands and the agencies responsible for their enforcement.

The second step is to get various opinions from agencies and wetland specialists about the pros, cons, potential problems, and possible alternatives to the activity you are considering. Likely sources of information are the Natural Resources Conservation Service, and your county Cooperative Extension. The more opinions and information you get the more qualified you will feel to make a decision. If it is a large, complex project, your third step should be to consider hiring a consultant to assist you. The more research you have done before approaching a consultant, the better prepared you will be to work with that person and be assured of a satisfactory outcome.

Selecting a Consultant

Before asking prospective consultants to visit your site check to be sure they are experienced with wetlands projects. Ask them how long they have been doing wetland restoration work and how many wetland specialists they have on staff. Request a reference list from other jobs they have done that are similar to yours. Be sure the people who did these jobs are still part of their staff. Call each of the references on the list and visit their wetlands if you can. Find out who they worked with from the consulting firm and how they liked working with them. Ask whether there were any problems that occurred during or after construction, how the consultant handled those problems, and the total cost of the project.

CHAPTER SIX



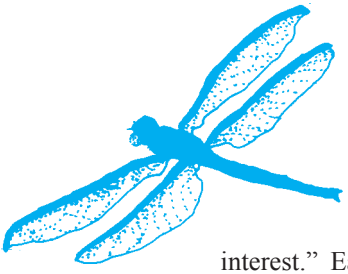
Wetland Preservation

What would the world be, once bereft
Of wet and of wilderness? Let them be left,
O let them be left, wildness and wet;
Long live the weeds and the wilderness yet.
— Gerard Manley Hopkins

It is increasingly rare to find natural places that are preserved intact, especially near where we live. As the owner of a small wetland, you have the rare opportunity to preserve a natural place that can be an ecological gem for generations to come. Whether you want to preserve it for the short term, or indefinitely, there are several options available. The right preservation choice for you depends on the characteristics of your property and on your own financial and personal consideration.

Making Preservation Decisions

Property ownership includes a variety of rights such as the right to build structures, extract minerals, use resources, or exclude others from the property. Ownership of all property rights is described as a "fee simple



interest." Each of these rights constitutes a less-than-fee interest in the property. The rights can be separated out individually and leased, sold, restricted, or donated to other parties.

Before seeking to protect your land, by restricting any of these rights, you should clearly define your objectives. What are your financial constraints? Do you wish to continue owning and managing the property? What are the features on the land you want to preserve? What property rights will you restrict and how will you do it? The answers to these questions will help you determine the best preservation option.

Here are some steps to help you get started. You do not need to follow these steps in this sequence, but you should complete each before making a final decision.

Step 1: Identify what resources are present on the land.
Your land may contain wetlands, habitat for endangered species, archeological features, or other important characteristics that you

should know about. Begin by conducting a resource inventory. Ask you local land use planning office whether they have information about any unique features on your land.

For a thorough inventory, hire a resource consultant to examine your land personally or contact a land trust in your area to get some help. They may be able to help you identify land features or put you in touch with someone in your community who can, such as retirees, professionals, or skilled amateurs who are versed in ecology, botany, zoology, etc.

Step 2: Seek advice from several specialists.
Before making decisions about the future of your land you should contact several specialists including:

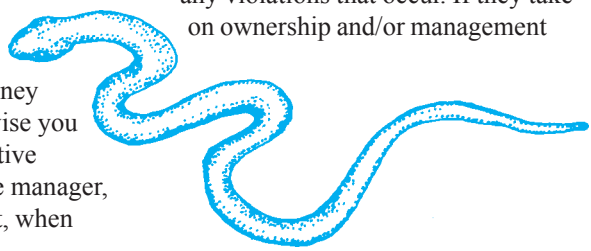
- a land trust representative,
- tax attorney or accountant,
- appraiser, and
- resource managers (e.g., botanists, hydrologists, wildlife biologists, soil scientists).

Each of these specialists will offer you valuable information in their area of expertise. However, it is important to recognize that each specialist individually may not understand the total picture as it pertains to you and what is best for your property as a whole.

For example, a tax consultant will be able to give you very good advice on how to save money but will not be able to advise you on how to manage a sensitive resource. Even a resource manager, such as a forest consultant, when advised on forest harvesting, may not recognize the effect on other resources such as wetlands or scenic views. So, seek their advice, but understand their limits. Accumulate information from several specialists, weigh it carefully, and you will have a firm foundation for making your decision.

Step 3: Identify who you wish to do business with and who, likewise, is interested in the attributes of your property.
According to tax law, deductions for charitable contributions of property for conservation purposes are only permissible when the contribution is received by a government agency or non-profit organization. In this context, a local, state, or other government agency or a local land trust is termed a "qualified" party. This means they not only can accept land for conservation purposes under tax law, but also are essentially qualified to own and manage the property for retaining its natural features in perpetuity.

Accepting lands carries a heavy responsibility for assuring that the natural features of the land are preserved. Preservation in perpetuity means the "holder" or "grantee," as the qualified party is termed, must monitor the land forever and enforce any violations that occur. If they take on ownership and/or management



responsibility, they must also care for the land and pay for management in perpetuity as well.

Because of these long-term responsibilities, the grantee may request a cash endowment be provided with the land, by the present owner or some other party, to help cover the expenses of monitoring, enforcement, and management.

If your wetland has some unique qualities, there may be a federal or state agency interested in protecting it under one of their special programs. Ecology's publication *Exploring Wetlands Stewardship (#96-120)* has a complete directory of federal and state agency preservation programs, as well as detailed descriptions of preservation options and other parties to work with on preservation and restoration.

At the local level, you could approach your local governments to inquire if they are interested. Most local governments have open space or park and recreation plans that address lands of interest to the community at large. If your community supports a land trust, you might consult them regarding their interest in your land. Keep in mind that identifying the right grantee will depend on both 1) their preservation interests and 2) your preferred options for preserving your land.

Also keep in mind that identifying a grantee is not always necessary should you be pursuing a preservation option that does not require one, or a charitable deduction is not needed.

Step 4: Pick a preservation option. You need to know what your choices are and what the consequences will be. The chart "Narrowing the Choices" on page 44 should help direct you to the preservation options of interest to you.

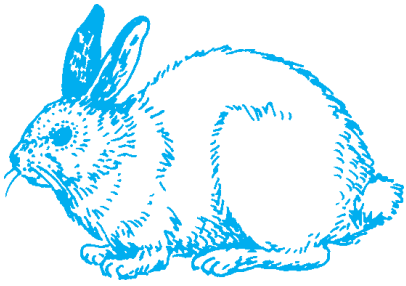
These options are briefly described on the following pages of this chapter. Descriptions are alphabetized under three headings:

- permanent approaches (donation, sale, transfer with conditions),
- less-than-permanent approaches, and
- limited approaches.

You may want to use these descriptions as a staring point from which to research your preferred choices further.

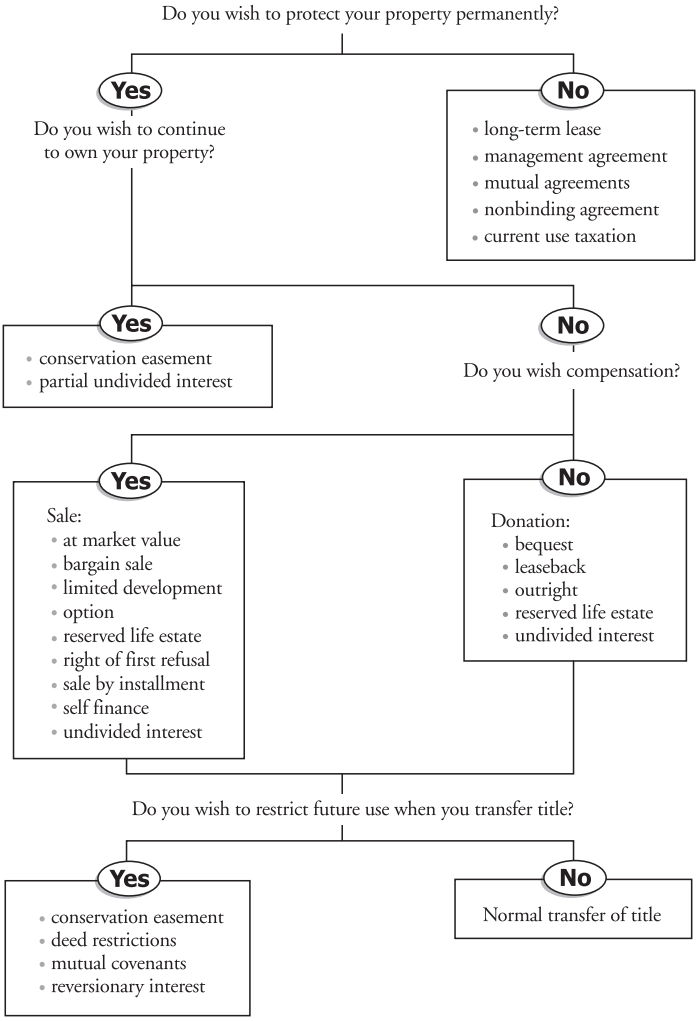
For more information about preservation options, parties to work with on preservation, and a complete directory of federal and state agency preservation programs, see Ecology's *Exploring Wetlands Stewardship (Pub.#96-120)*.

The book is posted on the World Wide Web at www.wa.gov/ecology/biblio/96-120.html.



Narrowing the Choices

Questions to ask when deciding how to protect your property



Information from Virginia's Heritage, A Property Owner's Guide to Resource Protection, 1988, Dept. of Conservation and Historic Resources

Permanent Approaches

Donations

Bequest - A donation at the time of death provided for in a will. The advantages are: the landowner retains full use of the land until death and may revoke the bequest at any time should circumstances change, and estate taxes will be reduced if the land is donated to a qualified party. The disadvantage is the landowner would not benefit from income tax deductions for the gift and would pay real estate taxes on the land until death.

Leaseback - Property is donated to an agency or non-profit organization but the original owner leases back the use of land for a specified period of time. One thing to remember here is that making the right to leased the property a condition of the gift may preclude taking a tax deduction for the donation of the property.

Outright - All rights to the land in fee simple are given to a government agency or non-profit organization. The benefits to the landowner include an income tax deduction equal to the appraised value of the land, reduction of estate taxes, and elimination of further property taxes. A less-than-fee donation could also be made, where only one of the property rights is given away.

Reserved Life Estate or Remainder Interest - The landowner donates the land to a recipient but reserves the

right to use the property until death through a provision in the deed. Thus lifetime use of the land is assured to the owner(s) or other specified individuals. The advantage is the donor only pays real estate taxes on the portion of the land retained for personal use and may be able to claim an income tax deduction on the value of what is actually given up prior to death. The disadvantage is the donation may not be revoked if circumstances change within the owner's lifetime.

Sales

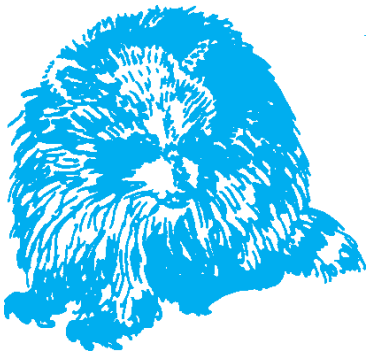
At Fair Market Value - A sale at fair market value is when the owner gets the full market price for their property. The only drawback to this approach is the difficulty agencies and nonprofit organizations may have in raising sufficient funds to purchase the land.

Bargain - In a bargain sale the property is sold for less than its market value. Selling at a bargain price makes it easier for an agency or non-profit organization to purchase the land. It also lowers capital gains tax for the seller. In addition, the seller can claim an income tax

deduction for the difference between the price received and the fair market value. This can help compensate for the lower income from the sale.

Installment - There are two types of installment sales. In one, a price is agreed on, title to the entire property is transferred, and payment is received in installments. In the other, a price for the entire property is agreed on, but the property is physically divided to transfer title in stages with payment. Installment sales are advantageous to the seller because the income from the sale is spread over a number of years, thus minimizing the amount of capital gains tax that must be paid. They also help the buyer by allowing them more time to raise funds and reducing the initial outlay of capital.

Option - This is a contract between the owner and a potential buyer that states the buyer may purchase the property at an agreed upon price within a certain period of time, often ninety days to a year. The buyer makes a payment for this option that if not exercised, is forfeited. Options are frequently used to afford the organization time to raise money for the purchase.



Reserved Life Estate - With a reserved life estate, the landowner sells property to an agency or organization with the agreement that the owner, and/or specified heirs, may continue to use the land during their lifetimes. This is handled similar to a donation with reserved life estate.

Right of First Refusal - The right of first refusal is a legally binding agreement which takes effect once the property is placed on the market. It specifies that a particular agency or non-profit organization is given the right to match any bona fide offer made on the property within a given period of time. This is a useful agreement should you wish to allow the agency or organization the option of purchasing the land in the event of your death. Also, if granted in perpetuity, it may qualify as a charitable contribution for federal income, estate, and gift taxes.

Self Finance - If you wish to assist the non-profit organization in making the purchase, and are in a position to do so, you may finance all or part of the purchase yourself. Contact your bank for information on two approaches: a balloon note or interest only financing. Both of these approaches buy time for the organization to raise funds to protect the property.

Transfers with Conditions

Conservation Easements – A conservation easement is the most prevalent and popular preservation approach. It is a legal agreement that allows property owners to divide up the set of rights that their ownership entails, restricting certain uses of the land. The restricted rights may include the right to construct buildings, to harvest timber, and to restrict access, among others. The easement is recorded on the property deed and therefore "runs with the land." You retain private ownership of the property, but the easement legally binds all present and future owners of the land to the specified restrictions, thus providing permanent or long-term protection.

Conservation easements can be tailored to protect specific attributes of all or part of a piece of property. Depending on which particular activities are restricted, easements can range from keeping the land in a wild, natural state to allowing limited farming, timber harvesting or building. Also an easement may be dedicated in perpetuity or for a specified period of time. Essentially, easement restrictions are tailored to the attributes of the property, the desires of the landowner, and the requirements of the grantee.

To set up a conservation easement a "holder" or "grantee" must be named as the willing recipient responsible for oversight of the terms. This would be a government agency or a private nonprofit land trust that is interested in preserving the natural values of the land. It is their responsibility to ensure that present and subsequent owners of the property abide by the terms of the easement. They monitor the property and enforce the easement restrictions in court if necessary. For this service they usually require that a cash endowment accompany the easement grant to defer these long-term costs.

In addition to the satisfaction gained by protecting valuable land, the landowner gains a financial incentive for entering into an easement. A conservation easement affects the market value of the land to the extent that it limits development and potential use. A reduction in the market value will reduce the lands assessed value, and the estate tax due upon the owner's death. In addition, the landowner would be able to claim any loss in value as a charitable contribution for income tax purposes.

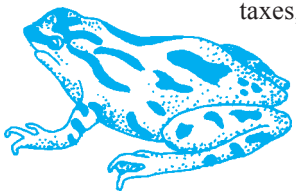
Deed Restrictions - In the case where a recipient of a conservation easement is not available, a deed restriction can be applied. Deed restrictions are similar to conservation easements, in that they are recorded on the deed and runs with the land. However, they have disadvantages.

First, enforcement of the restrictions must be carried out by the landowner. Therefore, maintaining the restrictions

beyond the original landowner's lifetime may be a problem should subsequent owners not agree with them. Also, the landowner cannot claim any reduction in value caused by the deed restrictions as a charitable deduction, although property tax deductions should apply.

Mutual Covenants - A group of landowners can limit the future use of their land through the imposition of a mutual covenant. This tool is often used when no agency or non-profit organization can be found to accept a conservation easement. Neighboring landowners with a common conservation interest may sign and record an agreement containing restrictions similar to an easement. The agreement, like an easement, would then bind subsequent owners. These covenants can be enforced by any of the landowners entering into the agreement or by any future owners of the land.

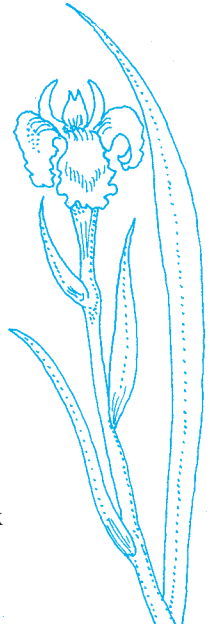
There are some drawbacks to mutual covenants. They may not be as lasting as easements because legally they would be subject to the "doctrine of changed conditions;" where a court could refuse to enforce the covenants if it felt that it was no longer possible to achieve the benefits sought when the covenants were imposed. Mutual covenants do receive the same treatment as easements in regards to property, estate, and gift taxes, but the landowner is not allowed to claim a loss in market value as a charitable deduction on income tax returns.



Reversionary Interest - An owner can control future use of the land by including a reversionary interest clause in the deed stating that title will transfer to a certain named party if deed restrictions are violated. This provides more strength to the deed stipulations because breaking the conditions would result in a loss of title.

Undivided Interest

An undivided interest is a percentage of ownership in an entire property. (e.g., three children sharing ownership in the inherited family farm). Each owner shares a percentage of the property costs such as taxes, and a percentage of the property income in proportion to their share of the total. Granting an undivided interest to a non-profit organization gives them a voice in management of the land. Donation, sale, or transfer of an undivided interest to a non-profit may be tax deductible if done within the owner's lifetime, and may lower the estate tax liability for heirs.



Less Than Permanent Approaches

Open Space Current Use Taxation (CUT) Classification

"Open space" property classification is an exceptional opportunity for landowners with wetlands, or other natural features, on their property to steward their land in its natural state - while receiving property tax reductions too. Current use taxation programs are available in every county in Washington, although enrollment criteria may vary somewhat from one jurisdiction to another. Generally, most landowners with wetlands are eligible to apply for CUT classification. Local elected officials review the application and make a determination regarding the properties eligibility and acceptance in the program.

If approved, the landowner receives a property tax reduction in their assessed market value of the land for retaining the natural features in their current undeveloped use. The landowner signs an agreement with the assessor's office committing to the natural condition, and must remain in the program for a minimum of 10 years. Generally, properties remain enrolled in the program until the landowner seeks withdrawal, but upon doing so, he/she must pay 7 years of back taxes plus interest. Landowners interested in CUT classification can obtain information from their local assessors office.

Long Term Lease

For some unique situations a landowner may have the option of granting a lease to a land management agency or non-profit organization. Most commonly agencies would lease private in-holdings in parks, forests, or wildlife refuges as an alternative to purchasing the land. Rental payments are negotiated between parties. No tax benefits accrue to the landowner unless the lease affects the value of the land at the time of the landowner's death.

Nonbinding Agreements

This is an agreement between the landowner and an agency or nonprofit organization that each will do certain things in regards to the property. The agreement may take the form of a handshake, a letter, or a contract that allows each party to cancel as specified. Generally, both parties sign a document that states the objectives and obligations of each party. The owner may agree to notify the organization of plans for any change in the property, while the organization may provide technical advice on property management.

Management Agreements

This is a more formal, but still temporary, enlistment of help from an agency or organization for property protection. First, a stewardship plan is drawn up and agreed to by both parties. The organization then provides professional management assistance and monitors compliance with the plan. These agreements can usually be cancelled with 30 days notice and are renewed on an annual basis.

Mutual Agreements

Mutual agreements are usually made between neighbors who may share a common resource and management interest. They enter into an informal agreement to manage their lands cooperatively, but no binding commitments are made.

Limited Approaches

Land Exchange

Land exchange can be used if the landowner is willing to accept another property of "like-kind" from the party interested in the special features on their current parcel. The interested party may be a government agency or conservation organization. The exchange may be for equal values, or values may be equalized by a cash payment. This approach enables the landowner to defer capital gains.

The major limitation to this approach is that the interested party must consider the property of high enough priority to swap other lands for it, and they must have other lands available for trade.

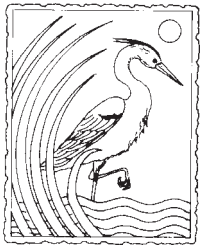
Limited Development

Limited development is sometimes the only feasible way to preserve a piece of property in an area with high land values or where the owner finds all other options unaffordable. In limited development, part of the property that is less sensitive is developed to provide the owner with the funds needed to preserve the sensitive area. To permanently preserve the remaining sensitive features from further activity a conservation easement is the preferred option.

This approach can be used by an individual landowner whose primary interest is preservation, or by a developer concerned about maintaining existing community values. Profits forgone by not developing all the land are often offset by the increased marketability of a development that contains desirable amenities.

This approach is best used on large parcels where conditions allow for development, without endangering the sensitive features. A sufficient buffer around features is also critical in preventing the impacts of development. Certain types of development near sensitive features are incompatible with preservation.

CHAPTER SEVEN



Wetland Regulations

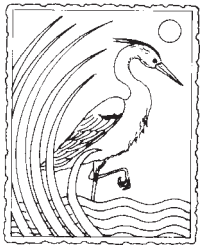
Wetland owners should be aware of their responsibilities under existing laws, but the complete set of regulations regarding the protection of wetlands is anything but simple. There is no single, comprehensive law that governs wetlands, nor any single agency that regulates all wetland matters. Rather, there are a number of laws each of which pertains, at least in part, to wetlands issues. These laws are administered by several different agencies, each with specific responsibilities and jurisdiction. Furthermore, these multiple authorities exist at all three levels of government — federal, state, and local. Federal and state regulations currently in force do not cover all wetlands or all activities associated with wetlands. Local laws, which may be more restrictive or more comprehensive in their coverage, vary widely from place to place.

Wetland owners who are considering a change in their wetland should check with their county or city planning department to find out what permits they may need. You should be prepared for the possibility that the planning department will refer you to other departments or agencies, and that you may have to make several calls to get all the information you need. The following table provides an overview of the major regulations pertaining to wetlands. For more information see Ecology's *Wetland Regulations Guidebook* (Pub. No. 88-05).

Overview of the major regulations pertaining to wetlands

Regulation	Description	Agency
Federal Clean Water Act Section 404	Requires a permit for placement of all dredge and fill materials, and covers all the waters of the United States, including most wetlands.	U.S. Army Corps of Engineers/EPA
Federal Clean Water Act Section 401	Requires certification from the state that any materials discharged into a wetland under a federal permit meet state water quality standards.	Department of Ecology
Federal River and Harbor Act Section 10	Requires a permit for all construction activities in navigable waters, including wetlands within those waters.	U.S. Army Corps of Engineers
State Shoreline Management Act	Requires a permit to ensure that proposed activity complies with local shoreline master plan; includes all land within 200 feet of ordinary high water mark of a state shoreline, and may be extended to include an entire associated wetland.	Local jurisdiction, Department of Ecology
State Hydraulic Code	Requires a permit for all work that occurs below the ordinary high water mark of state waters, including portions of wetlands.	State Department of Fish and Wildlife
State Environmental Policy Act (SEPA)	Requires full disclosure of the potential adverse environmental effects of any proposed actions; applies to all federal, state, and local actions and all wetlands.	Usually a local agency
National Environmental Policy Act (NEPA)	Requires full disclosure of the potential effects of proposed federal action; applies to all wetlands.	Usually federal agency issuing permit.
Federal Coastal Zone Management Act	Requires a notice of consistency with the state coastal zone management plan as a condition of federal support of local activities; covers Washington's 15 coastal counties and the wetlands within them.	Department of Ecology
Flood Plain Management Program	Regulates construction and other activities that might increase flood flow; covers wetlands incidentally.	Local jurisdictions and Department of Ecology
Local Regulations	May identify specific wetlands or performance standards. May vary widely from jurisdiction to jurisdiction.	Local jurisdiction

CHAPTER EIGHT



Exploring Your Wetland

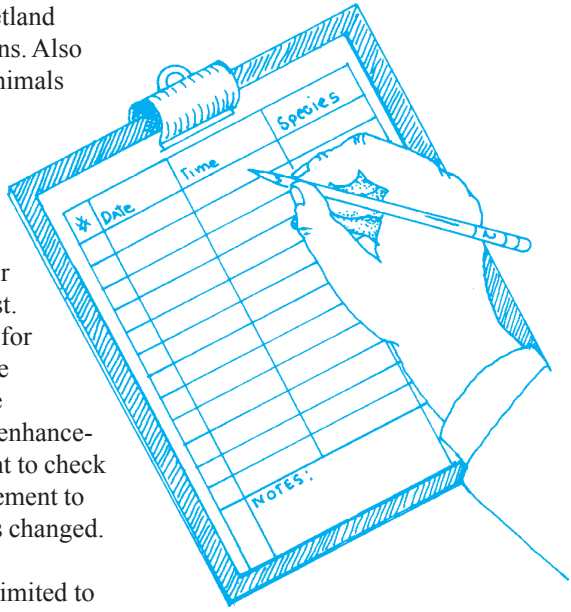
After seeking pleasure in vain amongst the works of art, we are forced to come back to the point from whence we set out, and find our enjoyment in the lovely simplicity of nature.
— Frances Brooke

Your wetland provides many opportunities for recreational use and enjoyment. This chapter describes activities you and your family can do to learn more about how your wetland functions. These activities are designed to help you get acquainted with your wetland — its hydrology, how it fits into your watershed, and the plants and animals that live there. Use caution when doing these activities to limit your disturbance of the area and the wildlife. If your activity and use of your wetland becomes too intense, wildlife use will decline.

Making a Wildlife List

The diversity of habitat types found within wetlands makes them attractive to more species of wildlife than any other ecosystem type. It is easy and fun to compile a list of the wildlife that uses your wetland. The whole family can create a list together, or each member can create his or her own and you can compete to see who sees the most. The list should include the date and time of day the animal was seen and the number of individuals observed. You should find that

different animals use the wetland more during different seasons. Also include notes on what the animals may have been doing at the time. Were they building nests, foraging for food, or being still? Don't forget to include frogs, butterflies, and other smaller creatures in your wildlife list. Keep the wildlife list going for at least a year to see how the populations change with the season. If you are planning enhancement projects, you may want to check your list again after enhancement to see whether wildlife use has changed.



The list doesn't need to be limited to wildlife you see. Keep lists of signs of wildlife as well. Animals tracks, bird nests, feathers or hair, and scat (droppings) also should be included in the list since it may be difficult to view many of the wildlife species that use your wetland. You may consider putting in a viewing blind where you can sit quietly and wait for wildlife to appear. Many wildlife species are most active at dawn and dusk. You may want to make a special effort to visit your wetland during these hours.

Another method of determining what wildlife may use your wetland is to create a tracking pit. Pick a spot along a trail that is well used by wildlife. Loosen and rake the top two inches of the soil to form a soft, smooth surface. You may want to put bait near the pit to attract more wildlife to the area. (Note: Leaving bait or any food in your wetland should be done on an infrequent and irregular basis. It is unhealthy for wildlife to become accustomed to regular feeding.) Check the tracking pit every day and try to identify tracks left by the animals. Chapter Five describes enhancement projects you can use to attract wildlife to your wetland. The appendix contains a reference list for books on identifying and attracting wildlife.

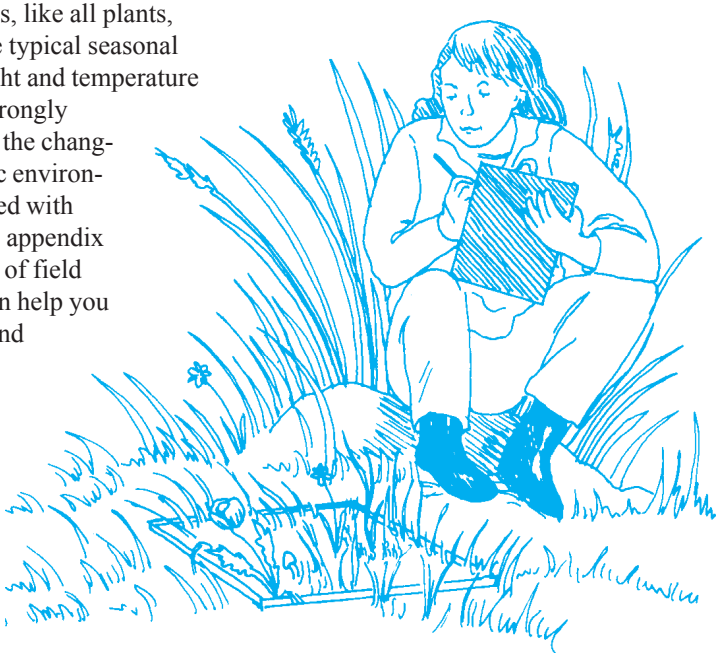
Listening to the Birds

Find a spot to sit comfortably and quietly, close your eyes, and listen. Keep track of the many different bird sounds you hear. Can you identify the different birds? You may want to included the number of bird sounds you hear with the rest of your wildlife list. You can use this method to teach yourself how to identify birds by their call. There are also instruction tapes available to teach bird calls. Contact your local Audubon Society for information on these tapes.

Making a Plant List

One reason so many different wildlife species prefer or use wetlands is because many different plants grow there. Making a plant list is one way to demonstrate this. Simply list all of the plants you see as you visit your wetland. If you can't identify a specific plant, note some of its characteristics so you can include it in the list and identify it later. Some identifying characteristics include height, leaf shape, color, and whether it is woody or not. You may want to divide the list according to where you found the plants. Was the entire plant under the water (submerged)? Was part of the plant in standing water while some or most of it was above the water? Was it located in soggy ground, or was it in an upland part of the wetland where the ground is fairly dry? You may want to note what time of the year each plant was seen. Wetland plants, like all plants, respond to the typical seasonal changes of light and temperature but also are strongly influenced by the changing hydrologic environment associated with wetlands. The appendix contains a list of field guides that can help you identify wetland plants.

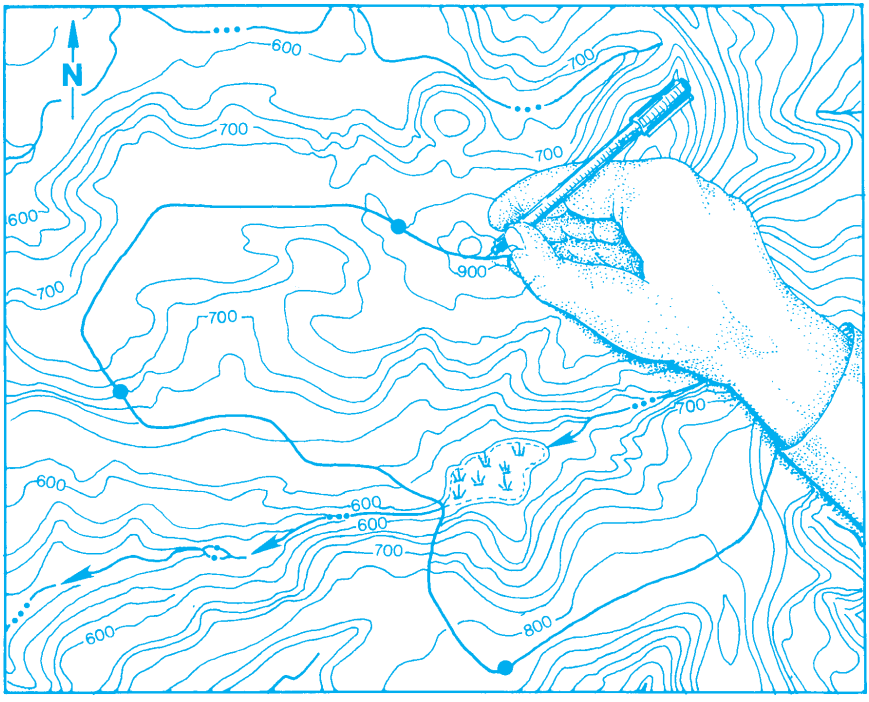
One way to compare the diversity of plant life in a wetland to other areas is to do a simple comparison of the number of species found. Build yourself a wooden or stock frame. The size is not important, something about two feet square should be about right. (Your old hulahoop would work if you can find it.) Take this, and toss it or place it anywhere in your wetland, and count the number of different plants you find there. It is not necessary to identify the plants, just note the number of different species. Do this in three or more locations throughout the wetland. Calculate the average number of different plants found within the frame. Take the same frame and do the same tests in other natural surroundings. Most of the time you should find there is much more variety in the wetland, proof again of the versatility and diversity of these ecosystems.



Determining Your Wetland's Watershed

A good way to examine your wetland's importance to watershed drainage is to determine what land drains to the wetland. A good topographic map (a map showing all surface features and relief of the land) and your own knowledge of the watershed is all it takes. (Topographic maps can be obtained from the Washington Department of Natural Resources, map stores, and stores specializing in outdoor recreation equipment.)

First, mark the approximate location of your wetland on the map. In most cases the wetland will be at a low elevation and the land surrounding it will rise (the numbers on the lines of the topographic map will increase). Start at the north end of your wetland and, moving northerly, follow the rising topography lines until you reach the spot where the land elevation starts to decrease. The highest elevation point marks the edge of the wetland's watershed. The water that falls on land north of this spot will flow away from your wetland; that which falls south of it will flow toward your wetland. Use this same exercise to mark the southern, eastern, and western boundaries of the watershed. Then connect the dots by a line between them that follows the land's topography. This is the boundary of your watershed. If you have trouble drawing in the line, imagine dropping a ball in the area and think again about which direction it would

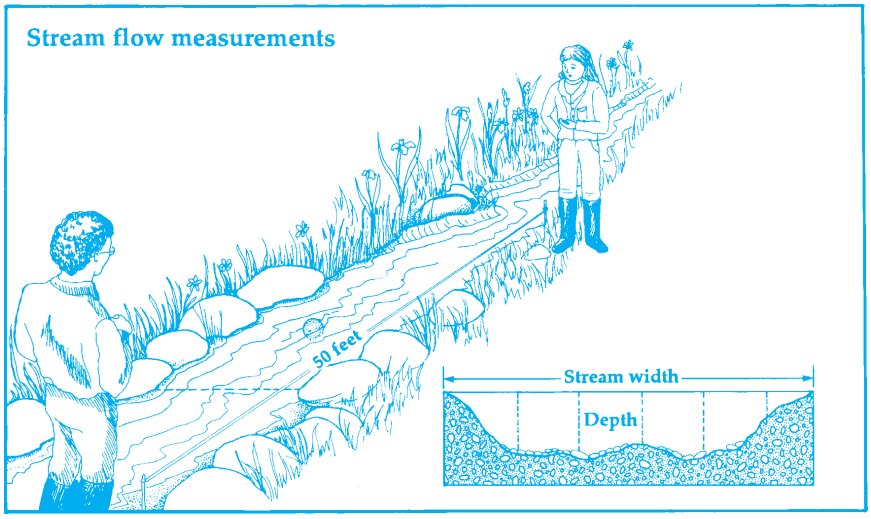


roll. If it would roll toward your wetland, then the area is within your wetland's watershed.

Once you have determined what land drains to your wetland, it will be easier for you to recognize what or who else may be affecting your wetland. You may want to continue working with your map, labeling or marking where different activities are occurring and thinking about the likely effects on your wetland. For example, is there a new subdivision or a plan for one in the watershed? How about shopping malls? What fields are irrigated nearby? Where are animals pastured close to the creek? Where are manure, fertilizers, or pesticides being spread or sprayed? Where have you seen dredging activity near a stream? If you are lucky you will find that your wetland only drains land owned by you or your neighbors. This makes your protection job much easier.

Taking Stream Flow Measurements

If you have a stream entering or leaving your wetland, you may be able to estimate the amount of water your wetland is handling. All it takes is a tape measure or a 50-foot rope length, an orange, and a stopwatch. Pick a section of stream that is flowing freely — not backed up by a dam or debris. Measure out 50 feet along the stream bank, drop the orange into the middle of the stream, and record the number of seconds it takes the orange to go the 50 feet. Do this three times and calculate the average time it takes the orange to travel the distance. Divide the time by the distance (50 feet) and you will know the approximate speed the water is moving in feet per second (fps). (Note: If the stream is moving very fast you may need to use a 75- or 100-foot length to get a good estimate.)

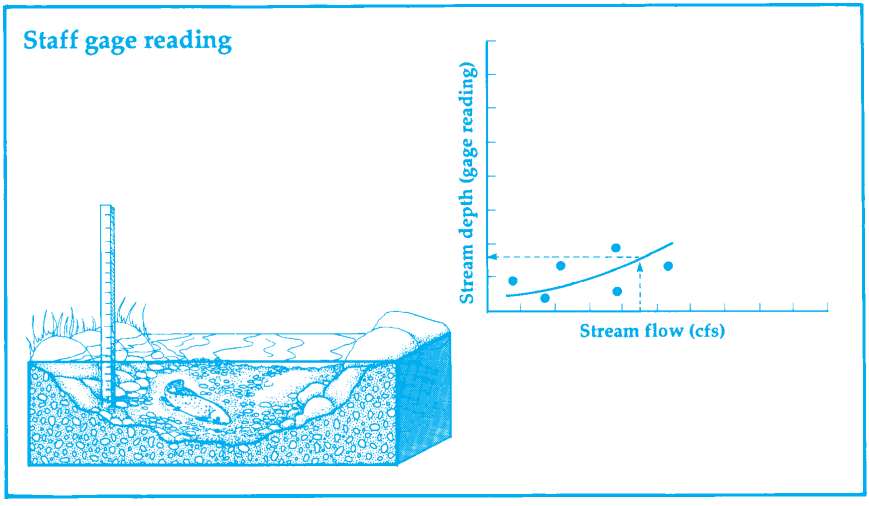


You also may want to know how much water is moving at that speed. Is it just a small rivulet or a rushing river? Use your yardstick or a strong pole marked off in tenths of inches to measure the depth of the stream at one- to two-foot intervals across the stream. Also measure the total stream width. The average depth multiplied by the width gives a rough estimate of the cross-sectional area of the stream, or the volume of water (in cubic feet) in that spot in the stream. This number multiplied by the water speed (from the floating orange test) gives an estimate of total water flow in cubic feet per second (cfs).

If you have a stream coming in and going out of your wetland, try to do this in both streams and compare the difference. If the difference is very large you may assume your wetland is either storing water or releasing water. Try this during different times of the year to test whether there are changes with wet or dry conditions.

Another simple method of monitoring changes in stream flow is to set up a staff gauge. A staff gauge is nothing more than a ruler you place upright in your stream and leave there. Be sure you place the staff gauge in a free-flowing portion of the stream. If you notice that sediments begin to build up around the base of your gauge, move it and begin the experiment over. (You can make your own staff gauge by marking any sturdy pole in tenths of inches and hammering it into the stream bottom. Stainless steel, plastic, PVC pie, or a straight sturdy stick will do. Just be sure it is tall and strong enough to withstand high stream flows and that the markings are vivid enough to be seen even through accumulated dirt and algae. You may have to wipe the gauge periodically to allow better readings.)

To use the gauge, simply read the water depth off the gauge on a regular basis — once a week or once every two weeks. Keep notes on how much

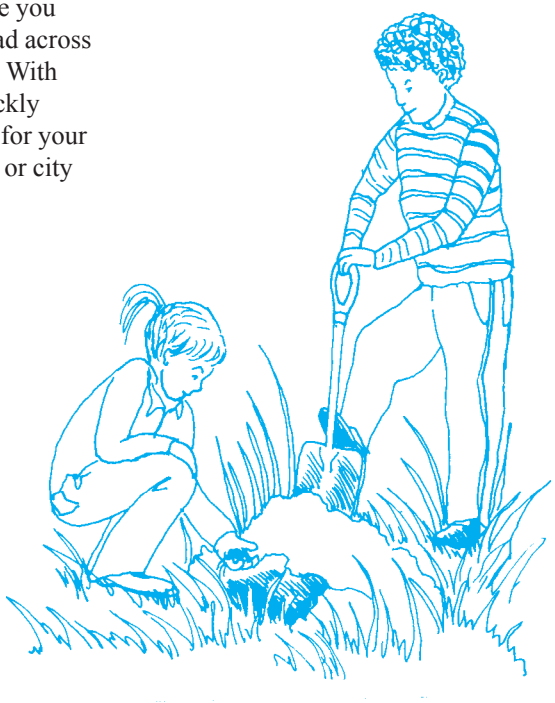


rain has fallen between readings to learn how your stream or wetland responds to rainfall.

If you put in a staff gauge and take flow measurements every time you take a gauge reading, you will soon be able to estimate flow without bothering with the floating orange test. Once you have five or more flow estimates and gauge readings for the low flow period (June through October), and/or five or more readings for high flow periods (November through May) you can begin to predict flows from your staff gauge readings. Simply create a graph with the staff gauge reading on one axis and the flow on the other. Each time you get one of each, put a point on the graph showing where they intersect. When you have at least five points, draw a smooth curved line between them. Then each time you take a staff gauge reading, read across the line to the estimated flow. With this information you may quickly become the local hydrologist for your stream. Let your local county or city government or conservation district know what you're doing. If you are serious about good record keeping, they may find your information useful and may even offer to train you to take more accurate measurements.

Digging a Soil Pit

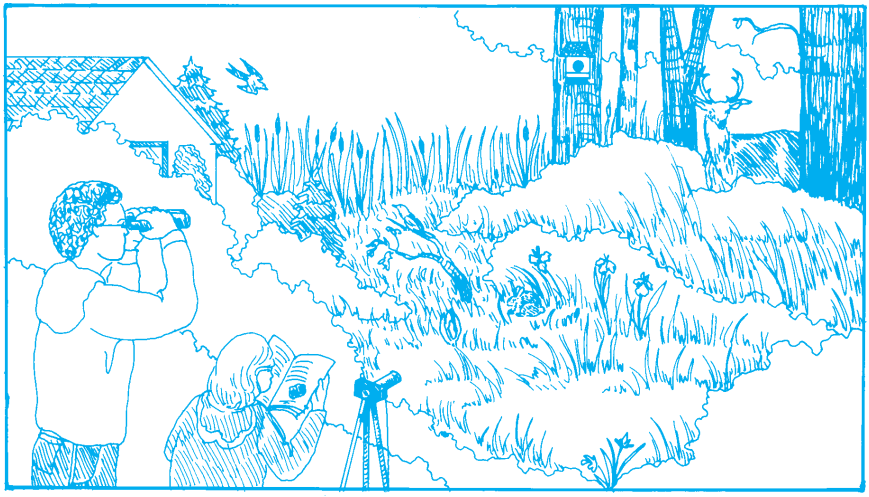
Soil type is one of the "clues" used to determine whether an area should be considered a wetland or not. This is because the soils that form under saturated or wet conditions are distinctly different from other soils. You can prove this to yourself by digging a hole (soil pit) in your wetland in saturated ground, or ground you know is wet much of the year. You should find most wetland soils to be dark — sometimes almost black — and you may be able to make out bits and pieces of grass, wood, and other organic material. The soil may have a strong odor similar to rotten eggs, or just a very musty, earthy smell. Compare these soil characteristics to a soil pit you dig on dry upland ground. Note differences in color, depth of organic material (grass, wood, etc.), texture, smell, and wetness. Can you imagine yourself as a microscopic creature? Which soil type do you think you would prefer?



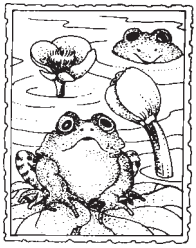
Photographing Your Wetland

With all the wonderful wildlife and plant species available, wetlands are a great place to practice your nature photography. Photographs also can be used to document the changes that take place in your wetland as the seasons pass. Select a few different spots within your wetland that represent different habitat types and take pictures at each spot. Return to these same spots through the year and take pictures again. In this way you will have documented the seasonal progression of your wetland.

A wetland naturally changes in character as the years go by. If you make a point to take these same pictures, say every five years, you eventually may be able to see the subtle changes that are occurring in your wetland as it ages. (Note: Change should occur gradually over a long period of time. A yearly difference in major vegetation borders, in the extent of a pool, or newly eroded banks, indicates the wetland is being affected by poor land-use practices, and suggests strong protection measures are needed.)



APPENDIX ONE



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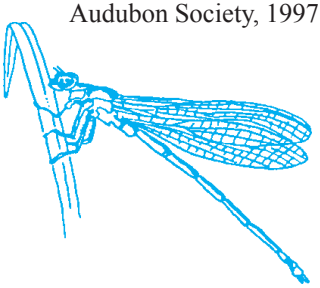

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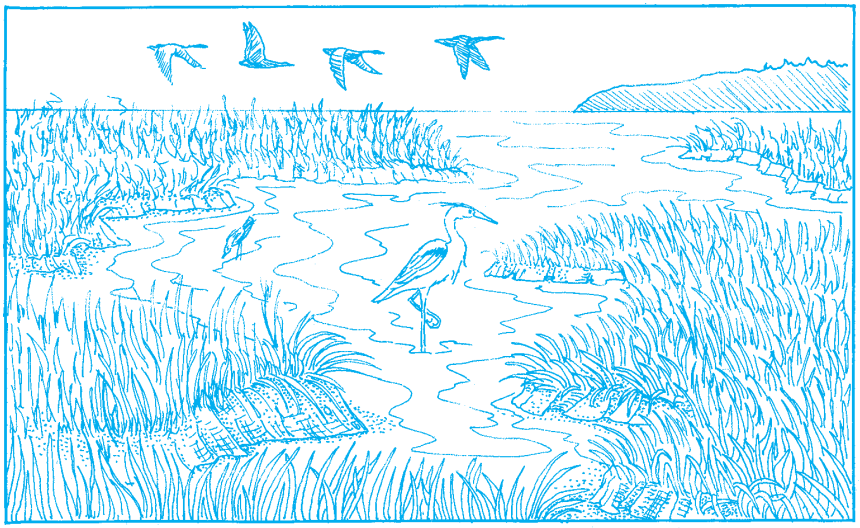

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[1] **NOTE:** Publications by the Department of Ecology are posted on the World Wide Web at www.ecy.wa.gov/ under "Publications."

APPENDIX TWO

Wetland Contacts

This list is organized by county. If the number listed here no longer works, please consult your local phone directory.

Adams County

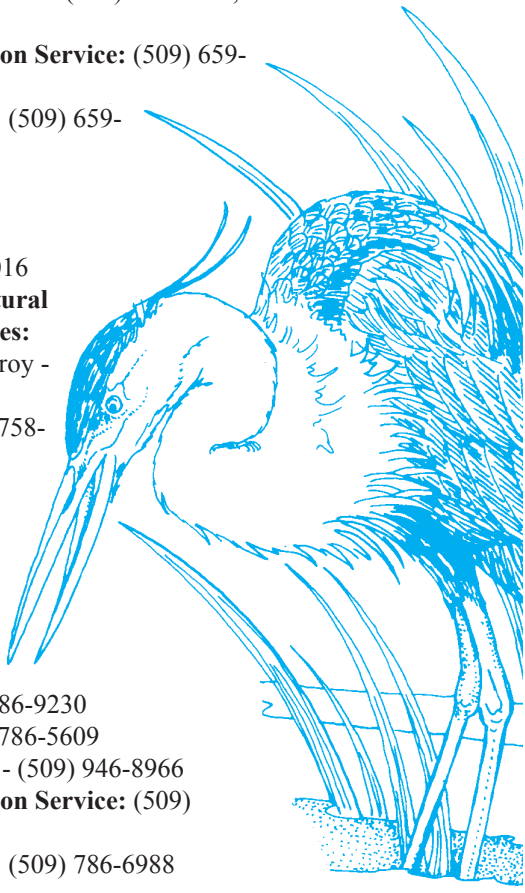
County Assessor: (509) 659-3203
Conservation Districts: Othello - (509) 488-2802; Adams - (509) 659-1553
Cooperative Extension: (509) 659-3209
Land Trust: Inland NW Land Trust - (509) 328-2939; Palouse Land Trust (208) 882-5248
Natural Resources Conservation Service: (509) 659-0254
Noxious Weed Control Board: (509) 659-1806

Asotin County

County Assessor: (509) 243-2016
Conservation District and Natural Resource Conservation Services: Asotin - (509) 758-8012; Pomeroy - (509) 843-1998
Cooperative Extension: (509) 758-5147
Noxious Weed Control Board: (509) 243-2098

Benton County

County Assessor: (509) 786-2046
Conservation District: (509) 786-9230
Cooperative Extension: (509) 786-5609
Land Trust: Tapteal Greenway - (509) 946-8966
Natural Resources Conservation Service: (509) 786-1923
Noxious Weed Control Board: (509) 786-6988



Chelan County

County Assessor: (509) 664-5365
Conservation District: (509) 664-0265
Cooperative Extension: (509) 664-5540
Land Trust: Chelan-Douglas Land Trust - (509) 667-9708
Natural Resources Conservation Service: (509) 664-0265
Noxious Weed Control Board: (509) 664-5561

Clallam County

County Assessor: (360) 417-2204
Conservation District: (360) 452-1912
Cooperative Extension: (360) 417-2279
Land Trusts: N. Olympic Land Trust - (360) 417-1623
Natural Resources Conservation Service: (360) 457-5091
Noxious Weed Control Board: (360) 417-2414

Clark County

County Assessor: (360) 699-2391
Conservation District: (360) 883-1987
Cooperative Extension: (360) 254-8436
Land Trust: Columbia Land Trust - (360) 696-0131
Natural Resources Conservation Service: (360) 883-1987
Noxious Weed Control Board: (360) 260-6161

Columbia County

County Assessor: (509) 382-2131
Conservation District: (509) 382-4773
Cooperative Extension: (509) 382-4741
Land Trust: Palouse Land Trust - (208) 882-5248
Natural Resources Conservation Service: (509) 382-4773
Noxious Weed Control Board: (509) 382-9760

Cowlitz County

County Assessor: (360) 577-3010
Conservation District: (360) 425-1880
Cooperative Extension: (360) 577-3014
Land Trust: Columbia Land Trust - (360) 696-0131
Natural Resources Conservation Service: (360) 425-1880
Noxious Weed Control Board: (360) 577-3020

Douglas County

County Assessor: (509) 745-8521 x 440
Conservation Districts: Foster Creek (509) 745-8362; South Douglas (509) 745-9160
Cooperative Extension: (509) 745-8531
Land Trust: Chelan-Douglas County Land Trust - (509) 667-9708
Natural Resources Conservation Service: (509) 745-8362

Ferry County

County Assessor: (509) 775-5205
Conservation District: (509) 775-3473
Cooperative Extension: (509) 775-5235
Natural Resources Conservation Service: (509) 775-3473
Noxious Weed Control Board: (509) 775-5210

Franklin County

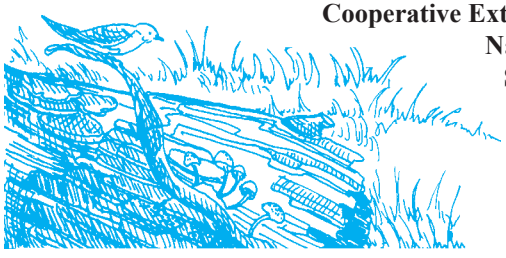
County Assessor: (509) 545-3506
Conservation District: (509) 545-8546
Cooperative Extension: (509) 545-3511
Land Trust: Palouse Land Trust - (208) 882-5248
Natural Resources Conservation Service: (509) 545-8546
Noxious Weed Control Board: (509) 545-3847

Garfield County

County Assessor: (509) 843-3631
Cooperative Extension: (509) 843-3701
Land Trust: Palouse Land Trust - (208) 882-5248
Natural Resources Conservation Service: (509) 843-1998
Noxious Weed Control Board: (509) 843-1913

Grant County

County Assessor: (509) 754-2011 ext. 310
Conservation Districts: Moses Lake - (509) 765-5333; Upper Grant Co.- (509) 754-0195; Warden - (509) 349-7539
Cooperative Extension: (509) 754-2011 ext. 412
Natural Resources Conservation Service: (509) 754-2463; Othello (509) 488-2802
Noxious Weed Control Board: (509) 754-4445



Grays Harbor County

County Assessor: (360) 249-4121
Conservation District: (360) 249-5980
Cooperative Extension: (360) 249-4332
Land Trust: Chehalis River Basin Land Trust - (360) 495-3950
Natural Resources Conservation Service: (360) 249-5944
Noxious Weed Control Board: (360) 482-2265

Island County

County Assessor: (360) 679-7303
Conservation District: Whidbey Island - (360) 678-4708
Cooperative Extension: (360) 679-7327
Land Trust: Whidbey-Camano Island Land Trust - (360) 678-5705
Natural Resources Conservation Service: (360) 428-7684
Noxious Weed Control Board: (360) 321-5111, ext. 211

Jefferson County

County Assessor: (360) 385-9105
Conservation District: (360) 385-4105
Cooperative Extension: (360) 379-5610
Land Trusts: N. Olympic Land Trust - (360) 417-1623; Jefferson Land Trust - (360) 385-7976
Natural Resources Conservation Service: (360) 457-5091
Noxious Weed Control Board: (360) 379-5610, ext. 205

King County

County Assessor: (206) 296-5195
Conservation District: (206) 764-3410
Cooperative Extension: (206) 296-3900
Land Trusts: Evergreen Land Trust - (360) 592-5222; Land Conservancy of King-Snohomish Co.- (206) 292-5907; Vashon-Maury Island Land Trust - (206) 463-2644
Natural Resources Conservation Service: (206) 764-3325
Noxious Weed Control Board: (360) 296-0290

Kitsap County

County Assessor: (360) 337-7160
Conservation District: (360) 337-7171
Cooperative Extension: (360) 337-7157
Land Trusts: Bainbridge Island Land Trust - (206) 842-1216; Indianola Land Trust - (360) 297-1602; Kitsap Land Trust - (360) 377-7691
Natural Resources Conservation Service: (360) 895-3733

Kittitas County

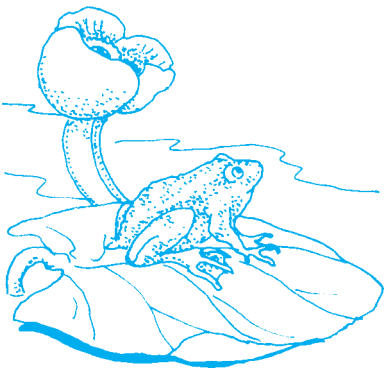
County Assessor: (509) 962-7501
Conservation District: (509) 925-8585
Cooperative Extension: (509) 962-7507
Natural Resources Conservation Service: (509) 925-8580
Noxious Weed Control Board: (509) 962-7007

Klickitat County

County Assessor: (509) 773-3715
Conservation Districts: Underwood (509) 493-1936; Central (509) 773-5823; Eastern (509) 773-5823
Cooperative Extension: (509) 773-5817
Land Trust: Sacred Earth Trust - (509) 773-4536
Natural Resources Conservation Service: (509) 773-5823
Noxious Weed Control Board: (509) 773-5810

Lewis County

County Assessor: (360) 740-1392
Conservation District: (360) 748-0083
Cooperative Extension: (360) 740-1212
Land Trust: Chehalis River Basin Land Trust - (360) 495-3950
Natural Resources Conservation Service: (360) 748-0083
Noxious Weed Control Board: (360) 740-1215



Lincoln County

County Assessor: (509) 725-7011
Conservation District: (509) 725-4181
Cooperative Extension: (509) 725-4171
Land Trust: Inland Northwest Land Trust - (509) 328-2939
Natural Resources Conservation Service: (509) 725-4181
Noxious Weed Control Board: (509) 725-3646

Mason County

County Assessor: (360) 427-9670 ext. 490
Conservation District: (360) 427-9436
Cooperative Extension: (360) 427-9670
Land Trust: Hood Canal Land Trust - (360) 275-3925
Natural Resources Conservation Service: (360) 337-4433

Okanogan County

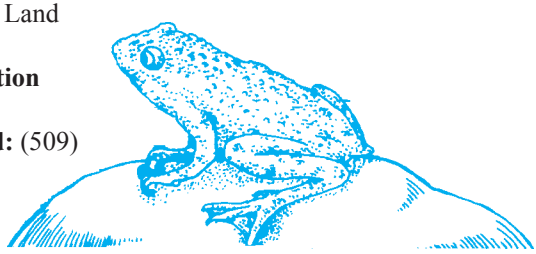
County Assessor: (509) 422-7190
Conservation District: (509) 422-0855
Cooperative Extension: (509) 422-7245
Land Trust: Methow Conservancy - (509) 996-2870
Natural Resources Conservation Service: (509) 422-2750
Noxious Weed Control Board: (509) 422-7165

Pacific County

County Assessor: (360) 875-9301 ext 208
Conservation District: (360) 875-9424
Cooperative Extension: (360) 875-9331
Natural Resources Conservation Service: (360) 249-5944
Noxious Weed Control Board: (360) 875-9425

Pend O'Reille County

County Assessor: (509) 447-4312
Conservation District: (509) 447-5370
Cooperative Extension: (509) 447-2401
Land Trust: Inland Northwest Land Trust - (509) 328-2939
Natural Resources Conservation Service: (509) 447-4217
Noxious Weed Control Board: (509) 447-2401

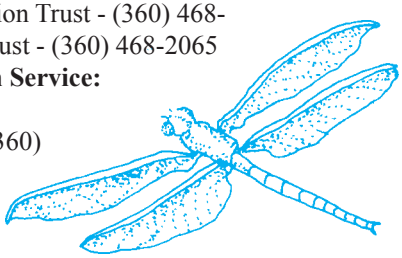


Pierce County

County Assessor: (253) 798-3711
Conservation District: (253) 845-9770
Cooperative Extension: (253) 798-7180
Land Trusts: Hood Canal Land Trust - (360) 275-3925; Cascade Land Conservancy - (253) 582-6601 or (206) 293-5907; Nisqually River Basin Land Trust - (253) 761-1652; Peninsula Heritage Land Trust - (253) 851-5616
Natural Resources Conservation Service: (253) 845-9272
Noxious Weed Control Board: (253) 798-7263

San Juan County

County Assessor: (360) 378-2172
Conservation District: (360) 376-6621
Cooperative Extension: (360) 378-4414
Land Trusts: San Juan Preservation Trust - (360) 468-3202; Lopez Community Land Trust - (360) 468-2065
Natural Resources Conservation Service: (360) 428-7684
Noxious Weed Control Board: (360) 376-4095



Skagit County

County Assessor: (360) 336-9370
Conservation District: (360) 428-4313
Cooperative Extension: (360) 428-4270
Land Trusts: Evergreen Land Trust - (360) 592-5222; Walker Creek Community - (360) 422-8915; Skagitonians to Preserve Farmland - (360) 336-3974; Skagit Land Trust - (360) 293-4153
Natural Resources Conservation Service: (360) 428-7684
Noxious Weed Control Board: (360) 336-9430

Skamania County

County Assessor: (509) 427-9400
Cooperative Extension: (509) 427-9427
Land Trust: Columbia Land Trust - (360) 696-0131
Natural Resources Conservation Service: (509) 493-1936
Noxious Weed Control Board: (509) 427-9416

Snohomish County

County Assessor: (425) 388-3446
Conservation District: (425) 335-5634
Cooperative Extension: (425) 338-2400
Land Trusts: Evergreen Land Trust - (425) 592-5222; Cascade Land Conservancy - (253) 582-6601 or (206) 293-5907
Natural Resources Conservation Service: (425) 334-2828
Noxious Weed Control Board: (360) 422-6083

Spokane County

County Assessor: (509) 477-3696
Conservation Districts: (509) 535-7274
Cooperative Extension: (509) 477-2048
Land Trust: Inland Northwest Land Trust - (509) 328-2939
Natural Resources Conservation Service: (509) 924-7350
Noxious Weed Control Board: (509) 477-5777

Stevens County

County Assessor: (509) 684-6161
Conservation Districts: (509) 685-0937
Cooperative Extension: (509) 684-2588
Land Trust: Inland Northwest Land Trust - (509) 328-2939
Natural Resources Conservation Service: (509) 685-0937
Noxious Weed Control Board: (509) 684-7590

Thurston County

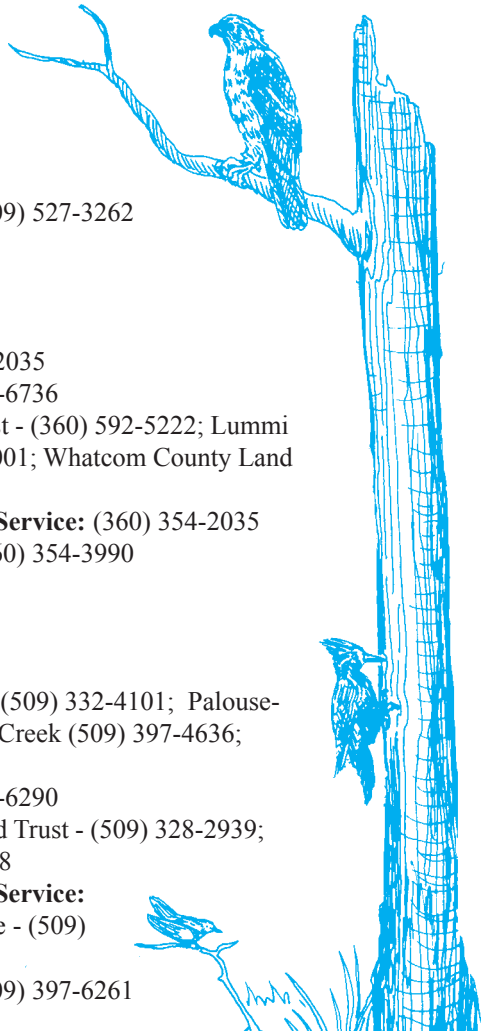
County Assessor: (360) 786-5410
Conservation District: (360) 754-3588
Cooperative Extension: (360) 704-7777
Land Trusts: Capitol Land Trust (360) 753-8414; Chehalis River Basin Land Trust: (360) 495-3950; Nisqually River Basin Land Trust - (360) 761-1652
Natural Resources Conservation Service: (360) 704-7740
Noxious Weed Control Board: (360) 786-5576

Wahkiakum County

County Assessor: (360) 795-3791
Conservation District: (360) 795-8240
Cooperative Extension: (360) 795-3278
Natural Resources Conservation Service: (360) 425-1880
Noxious Weed Control Board: (360) 795-3852

Walla Walla County

County Assessor: (509) 527-3216
Conservation District: (509) 522-6340
Cooperative Extension: (509) 527-3260
Land Trusts: Palouse Land Trust - (208) 882-5248
Natural Resources Conservation Service: (509) 522-6340
Noxious Weed Control Board: (509) 527-3262



Whatcom County

County Assessor: (360) 676-6790
Conservation District: (360) 354-2035
Cooperative Extension: (360) 676-6736
Land Trusts: Evergreen Land Trust - (360) 592-5222; Lummi Island Heritage Trust - (360) 758-7001; Whatcom County Land Trust - (360) 650-9470
Natural Resources Conservation Service: (360) 354-2035
Noxious Weed Control Board: (360) 354-3990

Whitman County

County Assessor: (509) 397-6220
Conservation Districts: Palouse - (509) 332-4101; Palouse-Rock Lake - (509) 648-3680; Pine Creek (509) 397-4636; Whitman (509) 397-4636
Cooperative Extension: (509) 397-6290
Land Trust: Inland Northwest Land Trust - (509) 328-2939; Palouse Land Trust - (208) 882-5248
Natural Resources Conservation Service: (509) 397-4636; Palouse-Rock Lake - (509) 648-3680
Noxious Weed Control Board: (509) 397-6261

Yakima County

County Assessor: (509) 574-1100
Conservation Districts: North Yakima - (509) 454-5736; South Yakima - (509) 837-7911
Cooperative Extension: (509) 575-1600
Land Trust: Cowiche Canyon Conservancy - (509) 453-7937; Tapteal Greenway - (509) 946-8966; Yakima Greenery Foundation - (509) 453-8280
Natural Resources Conservation Service: North Yakima - (509) 454-5736; South Yakima - (509) 829-3003
Noxious Weed Control Board: (509) 574-2180