

# Where the River Meets the Sound



## Welcome Educator!

Thank you for choosing to bring your students to Nisqually National Wildlife Refuge! We are happy that you are using the Refuge's resources to enhance the learning experience for your students.

With the help of this guide, we hope that field trips to the Refuge delight the senses and nurture an ongoing process of discovery. The guide includes information about the Refuge's habitats and wildlife, as well as the environmental education program: field trip planning, pre-field trip and post-field trip activities, and hands-on field trip activities.

Our approach to learning is comprehensive, integrated and hands-on. Field trip activities are designed to compliment in-class learning, teacher's objectives, and meet state requirements for environmental education. We believe that our role as educators is to awaken in students the following:

- Awe and delight in nature with respect for all life forms
- A foundation of practical ecological knowledge
- A sense of belonging to a special human niche within the natural world
- A feeling of accountability for human impacts upon the environment
- Sensitivity towards diverse interests and cultural perspectives
- The skills to identify and resolve environmental problems

Together as educators, we have an opportunity to increase environmental awareness throughout our communities. We look forward to working with you!

# US Fish & Wildlife Service

The Fish and Wildlife Service (FWS), within the U.S. Department of the Interior, is the principal agency through which the United States government carries out its responsibilities to care for the country's wildlife and their habitats. Migratory birds, endangered species, certain marine mammals, and freshwater and anadromous fish are all wildlife resources managed by the FWS. Some of the natural resource programs within the agency include:



## ***Endangered Species***

The FWS leads the Federal effort to protect and restore animals and plants that are in danger of extinction both in the United States and worldwide. Using the best scientific evidence available, FWS biologists identify species that appear to be endangered or threatened. After review, species may be placed on the Interior Department's official "List of Endangered and Threatened Wildlife and Plants." FWS biologists, along with other partners, then develop recovery plans for the species that include research, habitat preservation and management, and other recovery activities.

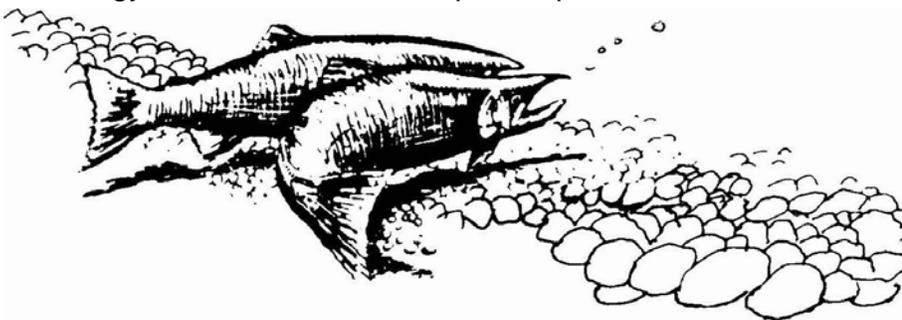
## ***Migratory Birds***

Because many bird species fly thousands of miles in their annual migrations, conservation by any single state or nation alone is not possible; cooperative efforts by each are required. The United States government is responsible for coordinating migratory bird conservation under several laws and international treaties with Canada, Mexico, Japan and Russia. The FWS is responsible for the conservation of more than 800 species of migratory birds; it regulates hunting, studies bird populations, and acquires and manages many national wildlife refuges to provide secure habitat for migratory birds.



## ***Fisheries***

Restoring nationally significant fisheries that have been depleted by overfishing, pollution or habitat damage is a major effort of the FWS. Research laboratories study fish health, genetics, ecology, nutrition and other topics to provide the information needed to raise fish in hatcheries and restore wild fish populations. As part of this program, nearly 80 national fish hatcheries produce some 50 species of fish. The FWS stocks more than 160 million fish annually.



## **Federal Aid**

Through a system of excise taxes on fishing and hunting equipment, more than \$50 million per year is distributed to states for fish and wildlife management. Grants to states fund the purchase and development of critical habitat and research on endangered species.

## **Law Enforcement**

The FWS enforces Federal laws that protect endangered species, migratory birds, marine mammals, and fisheries. The FWS carries out U.S. enforcement obligations under international agreements. Special agents work to prevent exploitation of game and nongame species, such as the interstate transportation of illegally taken wildlife. Wildlife inspector stations at major ports of entry check the legality of documents and permits and inspect shipments of live animals and wildlife products to ensure that protected species are not imported or exported illegally.

## **National Wildlife Refuge System**

The National Wildlife Refuge System is the world's largest and most diverse collection of lands and waterways set aside specifically for wildlife. Over 552 refuges stretch across the continent and over to the Pacific Islands. They range in size from Minnesota's tiny Mille Lacs (less than 1 acre) to Alaska's sprawling Yukon Delta (approximately 20 million acres). Many early refuges were created for herons, egrets and other water birds; others were set aside for large mammals like elk and bison, but most have been created to protect migratory waterfowl.

Today, national wildlife refuges play a vital role in preserving endangered and threatened species. They provide secure habitat for native plants and many species of resident mammals, fish, insects, amphibians and reptiles. National wildlife refuges offer a wide variety of recreational opportunities, and many refuges have visitor centers, wildlife trails and environmental education programs. Small or large, each refuge provides vital habitat for at least a portion of America's wildlife populations.

### **The Blue Goose:**

#### **The Symbol of the National Wildlife Refuge System**

"Whenever you meet this sign, respect it. It means that the land behind the sign has been dedicated by the American people to preserving, for themselves and their children, as much of our native wildlife as can be retained along with modern civilization." – Rachel Carson

#### **Why a Blue Goose?**

The Blue Goose has been used on refuge boundary signs markers, entrance signs, brochures, and exhibits since 1936. It was designed by Pulitzer Prize-winning editorial cartoonist J.N. "Ding" Darling, while he was chief of the U.S. Biological Survey in 1934-1935. There are over 548 national wildlife refuges in all 50 states protecting over 150 million acres of land and water. Each national wildlife refuge is identified by a posted sign with the emblem of a "blue goose". The Blue Goose was adopted as the official symbol of the National Wildlife Refuge System in 2003.



Look for  
**The Blue Goose**  
while you're  
visiting  
Nisqually National  
Wildlife Refuge!

# Nisqually National Wildlife Refuge

Nisqually National Wildlife Refuge (NWR) is located 8 miles northeast of Olympia, Washington on the biologically rich Nisqually River Delta. Here, the freshwater of the Nisqually River combines with the saltwater of Puget Sound to form an estuary rich in nutrients and detritus. These nutrients support a web of sea life – the benefits of which extend throughout Puget Sound and beyond.

Together with McAllister and Red Salmon Creeks, the Nisqually River forms one of the largest remaining relatively undisturbed estuaries in Washington. Although most major estuaries in Washington have been filled, dredged or developed, the estuary of the Nisqually River has been set aside especially for wildlife. In 1974, Nisqually NWR was established to protect the delta and its diversity of fish and wildlife habitats. These diverse habitat types include salt marsh and mud flats, freshwater marshes, estuary, mixed forests, and riparian forests.



As surrounding wildlife habitat is lost to development, Nisqually NWR becomes an increasingly important place for wildlife, especially migratory birds. For some birds, the Refuge is a place to feed and rest before continuing on, while for others it is the end of their season's journey.

Over 300 species of birds, mammals, fish, reptiles and amphibians inhabit Nisqually NWR, making it an excellent place to observe and study wildlife. The Refuge provides abundant

opportunities for wildlife-dependent recreation. Hiking, wildlife observation, wildlife photography, fishing and environmental education all allow visitors to learn more about the natural world and the importance of places rich in beauty and biological diversity. National Wildlife Refuges are set aside specifically to provide and protect habitat for wildlife. Refuge managers take care to ensure the activities of refuge visitors do not conflict with the needs of the wildlife using the refuge.

# A History of the Nisqually Delta

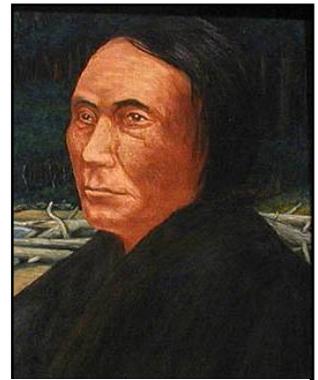
The first people to inhabit the place that is now the Nisqually National Wildlife Refuge were the ancestors of the Nisqually Tribe, the Squally-Absch, people of the river, people of the grass country. For thousands of years, they fished the Nisqually River, building seasonal villages along its banks. The Nisqually also used the estuary and mudflats to harvest shellfish.



Nisqually Tribal member harvesting cattails.

**1830's and 40's** — Hudson's Bay Company established Fort Nisqually and began farming in the area.

**1846** — The McAllister and Shazer families began farming the Nisqually delta. The McAllister family lived for a year in the trunks of a few cedar trees while building their log cabin.



Chief Leschi signed the Medicine Creek Treaty.

**1854** — Medicine Creek Treaty signed at the Treaty Tree just north of I-5. This treaty was signed on the banks of present-day McAllister Creek by representatives of all Native American tribes in the South Puget Sound area as well as representatives of the U.S. government, including Governor Stevens and the President of the United States. The treaty sought to end wars and establish fishing, hunting and reservation rights.

**1904** — The delta area was sold to Alson Brown, who constructed a 5-mile earthen dike to create more farmable land. The farm had a dairy, chickens, hogs, an orchard and honey bees, and produced hay for feed. The farm operated successfully for about 15 years under Brown's direction and was sold to several successive owners who continued to farm it sporadically for the next 50 years.



Workers outside the living quarters on the Brown Farm.

**1967** — Washington Department of Fish & Wildlife (then Department of Game) purchased 616 acres of Delta tidelands and salt marshes.

**1968** — The Brown farm was up for sale again. Farming on the delta wanes. The Port of Tacoma proposes to build a deep water port facility near the mouth of the Nisqually River. Margaret McKenny organized opposition to the proposal and catalyzed support for protection of the delta from resource degradation.



Harvesting hay on the farm.

**1974** — An extensive lobbying effort by local citizens, the Nisqually River Task Force, and the US Secretary of the Interior resulted in the purchase of Brown Farm and transfer to the US Fish & Wildlife Service for management as a National Wildlife Refuge. This also protected the delta from another plan to develop a landfill for Pierce and King Counties' garbage.

**1995-96** — Major flooding on the Nisqually River caused significant damage to the Brown Farm Dike, Refuge trails and other infrastructure. Money was appropriated from Congress to repair trails and buildings as well as implement habitat restoration.

**1999** — The Refuge completed the construction of a new Visitor Center, administrative offices, and the Twin Barns Loop Trail boardwalk.

**2001** — The Twin Barns Education Center closed following the Nisqually Earthquake.

**2004** — A 15-year management plan is adopted which describes major changes to the habitats, trails, public use, and environmental education.

**2009** — After two years of work, 762 acres of diked habitat is reconnected to the tides of Puget Sound. A portion of the Nisqually Estuary Trail is opened. A new Environmental Education Center is completed.

**2010** — The Nature Explore Area, an integrated outdoor exploration area, is completed. Another portion of the Nisqually Estuary Trail Boardwalk is completed.

**2011** — The Nisqually Estuary Trail Boardwalk is completed including an Observation Tower, Blind, two Viewing Platforms and meets ADA standards.



The Epicenter of the Nisqually earthquake was 2 miles from the Twin Barns.



Removing the Brown Farm Dike.



The Nature Explore Area (Music and Movement Space) with Environmental Education Center in background.

# Refuge Management

## ***Purpose***

All national wildlife refuges have purpose for which they were established. Refuge managers must consider this purpose first and foremost when making decisions about how to manage the Refuge. Nisqually NWR was established in 1974 “...for use as an inviolate sanctuary, or for any other purpose, for migratory birds.”

## ***Refuge Goals***

- To conserve, manage, restore and enhance native habitats and associated plant and wildlife species representative of the Puget Sound lowlands.
- To support recovery and protection efforts for Federal and State threatened and endangered species, species of concern, and their habitats.
- To provide quality environmental education opportunities focusing on the fish, wildlife and habitats of the Nisqually River delta and watershed.
- To provide quality wildlife-dependent recreation, interpretation and outreach opportunities to enhance public appreciation, understanding and enjoyment of fish, wildlife, habitats and cultural resources of the Nisqually River Delta and watershed.

## ***Refuge Resources***

- Migratory Birds
- Significant Wildlife Habitat
- Endangered and Threatened Species

## ***Why is it necessary to manage the resources?***

- Loss of habitat due to development
- Pollution from urban runoff, industrial and agricultural activities
- Introduction of nonnative plants and animals
- Trash such as styrofoam and fishing line

## ***How does the Refuge staff manage these resources?***

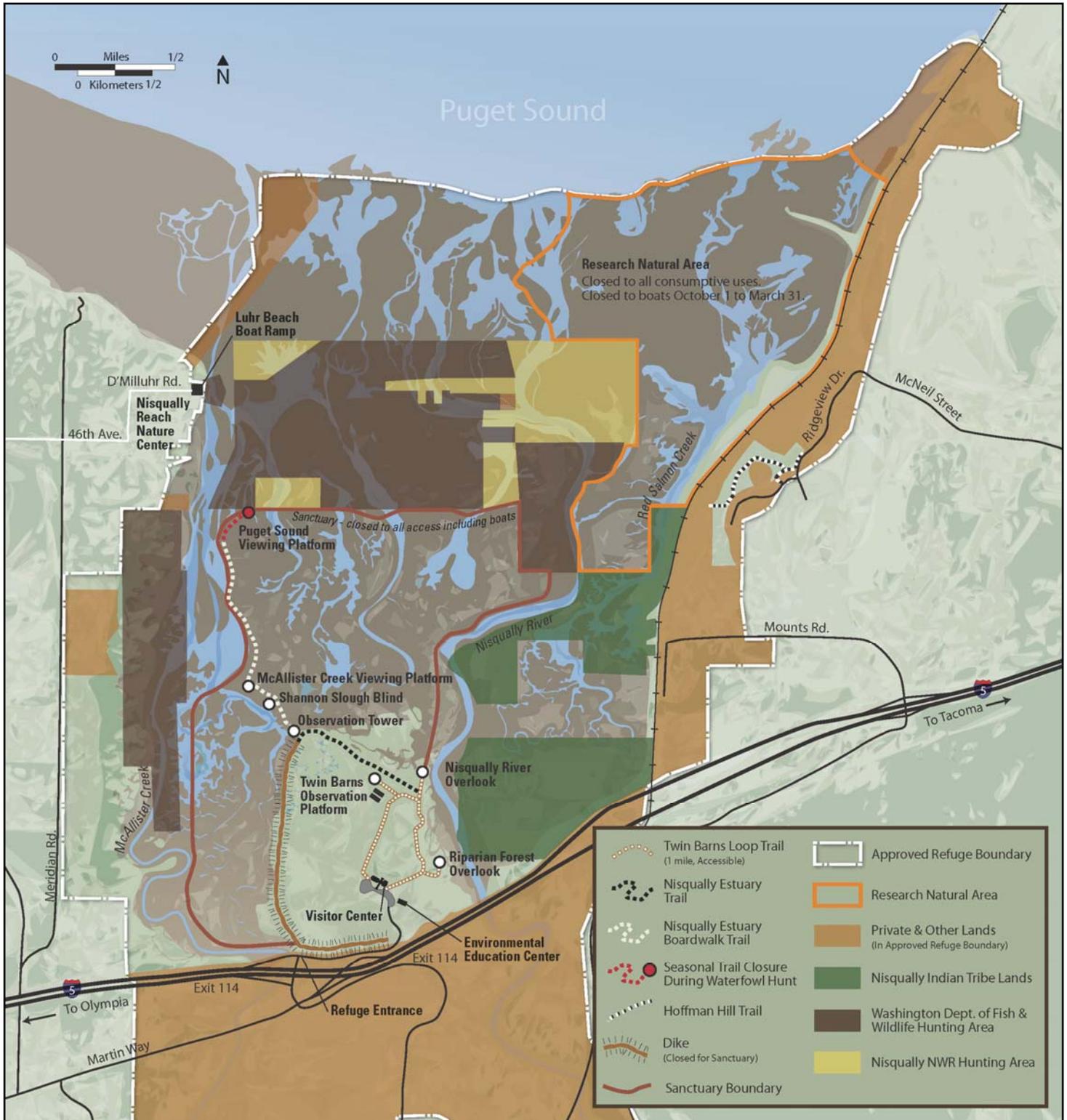
- Designs, develops and implements restoration plans to improve wildlife habitat
- Monitors the populations of endangered species and migratory birds
- Conducts programs to educate people about the value of the resources
- Acquires additional land to protect and restore
- Controls nonnative plants and animals and re-plants native species
- Controls water levels

## ***How can students help the Refuge?***

- Learn about habitats, endangered species and migratory birds, and teach others
- Never dump anything down storm drains and label storm drains with warnings
- Protect wildlife from pets by following regulations
- Teach others, including parents, about the Refuge
- Reduce, Reuse and Recycle • Write letters to legislators

# Map of Nisqually National Wildlife Refuge

To print off a color version of this map, go to [www.fws.gov/nisqually/education](http://www.fws.gov/nisqually/education)



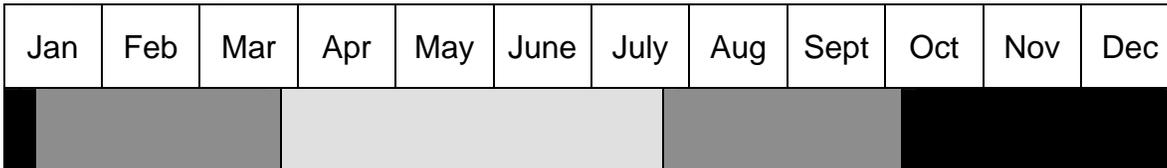
# Seasons of the Refuge

Nisqually National Wildlife Refuge means different things to different creatures. For some it's a place where they raise their young or a stopover during migration. For others, it's a place to spend the winter or a year-round home. Visit Nisqually at different times of the year to enjoy an ever-changing panorama of wildlife. **The darker the graphs, the more birds there are!**

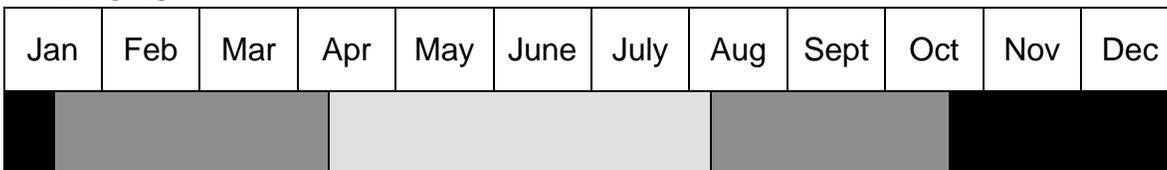
## WATERFOWL



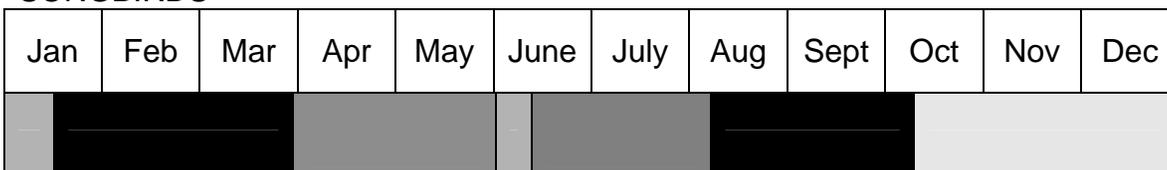
## SHOREBIRDS



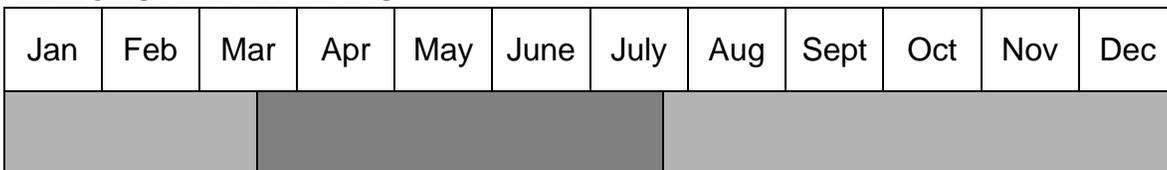
## RAPTORS



## SONGBIRDS



## HERONS AND BITTERNS



# Seasonal Scheduling

When are the best times to visit? What types of wildlife can be seen? Nisqually NWR is a good place to visit at all times of the year. The wildlife you see will depend on the season.

## ***Spring (March-May)***

The refuge receives most of its visits by school groups during the late spring (May through early June). Visits at this time of the year usually provide good weather. Migrating songbirds move through the Refuge during the spring. Spring migrants include goldfinches, red-winged blackbirds and swallows. Watch for nesting Canada geese, red-tailed hawks, great blue herons, bald eagles and great horned owls.

## ***Summer (June-August)***

The best summer wildlife viewing is in the early morning or evening. Birds nesting on the Refuge in the spring can also be seen during the summer.

## ***Fall (September-November)***

By scheduling field trips in the fall, educators will find fewer conflicts with other school groups than they would experience in May and June. Although many songbirds leave the Refuge for the winter, fall announces the arrival of Canada and cackling geese, many species of waterfowl, and raptors.

## ***Winter (December-February)***

Winter field trips can be a wonderful experience for groups, allowing them to combine environmental education activities with the opportunity to see large numbers of Canada geese and a variety of ducks. Bald eagles are also more abundant during this time. Groups need to be prepared for cold weather and/or rain during the winter.

# Trail Distances and Times

Distances and approximate hiking times are from the visitor parking lot. Times indicated are for steady walking. ***Add time to account for wildlife and habitat observation and activities.***

<b>Trail</b>	<b>Distance</b>	<b>Time Walking</b>	<b>Time with activities</b>
Twin Barns Loop Trail	1 mile loop	30 minutes	1½ - 2 hours
To Riparian Forest Overlook	¼ mile one way	10 minutes	20 minutes
To Nisqually River Overlook	½ mile one way	20 minutes	30 minutes
To Twin Barns	½ mile one way	20 minutes	30 minutes
Nisqually Estuary Trail	2 miles round trip	1 hour	2 hours
Nisqually Estuary Boardwalk Trail	4 miles round trip	2 hours	3 hours

# Hiking Trail Descriptions

The Refuge has approximately 5 miles of trails, including a 1 mile loop trail. Trails provide views of a variety of wildlife habitats. Please stay on the observation decks and trails.

## ***Twin Barns Loop Trail***

This level, mile-long boardwalk passes through a riparian forest, seasonal and freshwater wetlands, past the Twin Barns and an observation platform. There are three spur trails off the main trail, the Riparian Forest Overlook, the Nisqually River Overlook, and the Twin Barns Observation Platform.

## ***To Riparian Forest Overlook***

A short trail to an observation deck branches off the east side of the Twin Barns Loop Trail. It curves through a surge plain, where tidal changes cause the Nisqually River to spill into a wooded habitat.

## ***To Nisqually River Overlook***

A little under ½ mile around the east side of the Twin Barns Loop Trail, the boardwalk extends for another 150 yards to the river. Here there is an observation deck with a mounted spotting scope for wildlife viewing along the Nisqually River.

## ***The Twin Barns Observation Platform***

About ½ mile around the west side of the Twin Barns Loop Trail, the boardwalk spur to the left goes to the Twin Barns Observation Platform. This elevated platform provides excellent views of the freshwater wetlands and the tidal estuary outside the dike. Mounted spotting scopes can assist with viewing wildlife.

## ***The Nisqually Estuary Trail and Boardwalk***

This trail starts just prior to the Nisqually River Overlook and is on top of an earthen dike. The salt water tidal estuary is to the north of the trail and freshwater wetlands are to the south. The first ½ mile is on top of an earthen dike, the rest is a boardwalk. The trail is flat and easy walking. NOTE: The last 700 feet of the boardwalk is closed from early October through late January during waterfowl hunting season.



# Habitats of the Refuge

## Riparian Forest – Tidally Influenced (Stop 1, Habitat Comparison Walk)

The Riparian Forest Overlook Spur off the Twin Barns Loop Trail winds through alder and black cottonwood groves. The plants and animals of this forest must be able to survive tidal influences on the Nisqually River. This forest is one of the rare, naturally-occurring, deciduous riparian forests found in Western Washington. Drought or flooding, erosion or choking silt – all are common and the habitat can change rapidly. Tidal changes in the river and sloughs bring a twice daily wash of mixed salt and fresh waters, as well as rich life-giving organic matter called detritus. In order to cope in this habitat, animals may move to higher ground or employ evolutionary adaptations which allow them to swim in water; plants adapt in various way to survive periodic flooding while retaining moisture when the waters recede.

### *Birds, Animals and Plants of the Riparian Forest*

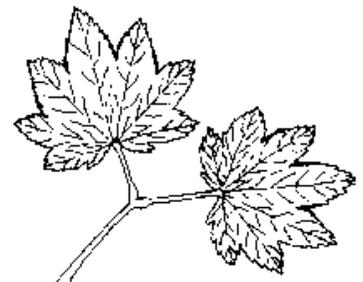
Birds	Animals	Plants
Great Horned Owl	Beaver	Black Cottonwood
Hooded Merganser	Millipede	Red Alder
Wood Duck	Mosquito	Big Leaf Maple
Mallard	Red-legged Frog	Skunk Cabbage
Swainson's Thrush	Pacific Tree Frog	Scouring Rush
Yellow-rumped Warbler	River Otter	Moss
Woodpeckers	Sow Bug	Lady Fern
	Satyr Anglewing	Licorice Fern
	Rough Skinned Newt	Stinging Nettle
	Caterpillars	Snowberry
		Oregon Ash
		Willow
		Salmon Berry



Great Horned Owl



River Otter



Salmon Berry

# Habitats of the Refuge

## Riparian Forest

(Stop 2, Habitat Comparison Walk)

Along the east side of the Twin Barns Loop Trail is a Riparian Forest that is not tidally influenced because it is behind a dike. This area was once similar to the tidally-influenced riparian forest, but was logged, diked and farmed. Second growth trees now form a forest that includes native species such as red alder, black cottonwood and big leaf maple. Some snags (dead, standing trees) still remain in the forest and provide nesting habitat for swallows and forage for woodpeckers.

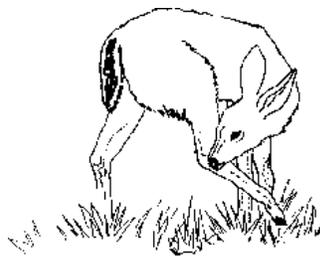
Many of the understory plants are a mix of nonnative plants like the Himalayan blackberry and English ivy. This area is undergoing restoration work by Refuge managers, including cleaning, contouring and replanting with more native plants.

### *Birds, Animals and Plants of the Woodland Habitat*

Birds	Animals	Plants
Great Horned Owl	Black-tailed Deer	Black Cottonwood
Hooded Merganser	Red-legged Frog	Red Alder
Bufflehead	Pacific Tree Frog	Big Leaf Maple
Black-Capped Chickadee	Mink	Himalayan Blackberry (non-native)
Peregrine Falcon	Long-tailed Weasel	Stinging Nettle
Swainson's Thrush		Snowberry
Sparrows		Oregon Ash
Swallows		Willow
Woodpeckers		



Downy Woodpecker



Black-tailed Deer



Stinging Nettle

# Habitats of the Refuge

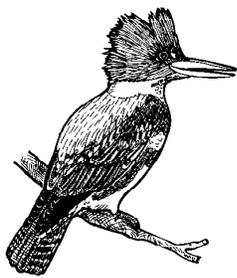
## River

### (Stop 4, Habitat Comparison Walk)

The Nisqually River's source is the Nisqually Glacier on Mount Rainier. The river gathers water from other tributary streams and slows and widens as it reaches the delta. The delta has been formed by the river carrying and dropping sediment as it slows to meet the Puget Sound. The Nisqually River is a critical habitat for endangered and threatened salmon runs.

The River Overlook provides a great view of the river, including an area influenced by salt water from the Puget Sound. During fishing season, Nisqually Tribal fishing floats are visible in the water.

Birds	Animals	Fish
Common Mergansers	River Otter	Chum Salmon
Double-crested Cormorant	Harbor Seal	Chinook Salmon
Great Blue Heron	Beaver	Coho Salmon
Belted Kingfisher	Black-tailed Deer	Pink Salmon
Mallard		Steelhead



Belted Kingfisher



Beaver



Salmon

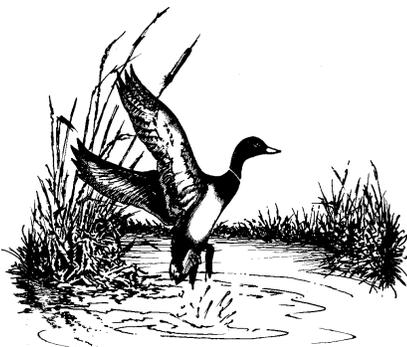
# Habitats of the Refuge

## Seasonal Freshwater Wetlands (Stop 4, Habitat Comparison Walk)

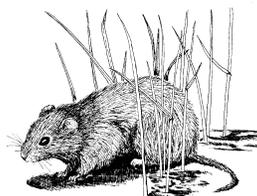
Depending on the time of year, you may not think that habitats inside the dike are wetlands, but not all wetlands are wet year-round! Seasonal freshwater wetlands like the ones around the Twin Barns, fill with water in the fall and winter, and then gradually dry out over the spring. The Refuge manages seasonal freshwater wetlands by pumping water into them in the fall. With winter rainfall, these areas remain wet until the late spring when warm weather dries them out. In the fall and winter these seasonal wetlands are a great place to watch waterfowl; Northern shoveler, American wigeon, green-winged teal, gadwall, Northern pintail and Canada geese feed here. Migrating shorebirds find food in the drying- out ponds as early spring hatches of invertebrates provide birds with a boost of fat and protein they need to migrate. A cacophony of calls signifies the beginning of the breeding season for the Pacific tree frog. During the summer, songbirds nest in the wetlands vegetation.

Animals use the seasonal freshwater wetlands for hunting. In particular, red-tailed hawks, great blue herons, and Northern harriers hunt for mice and voles. Vegetation around the edges of the wetlands including meadow foxtail, tall fescue, and a mix of pasture grasses, provide year-round shelter for sparrows, towhees, and juncos.

Birds	Animals	Plants
Red-tailed Hawk	Deer Mice	Black Medic
Northern Harrier	Townsend's Vole	Creeping Bentgrass
Bald Eagle	Red-legged Frog	Reed Canarygrass
Canada Goose	Pacific Tree Frog	Velvet Grass
Mallard	Garter Snake	Canada Thistle
American Wigeon		



Mallard



Townsend Vole



Nootka Rose

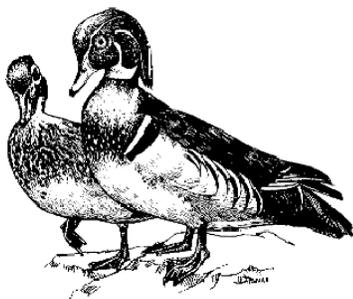
# Habitats of the Refuge

## Permanent Freshwater Wetlands (Stop 5, Habitat Comparison Walk)

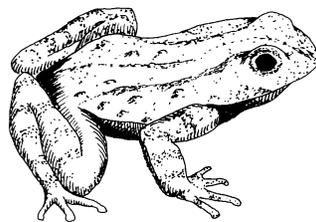
The permanent freshwater wetland around the Visitor Center and visitor parking lot was first created in 1970 by manipulating the flow of water from artesian wells inside the Brown Farm dike. The plants and animals in the permanent freshwater wetland are adapted to constant contact with freshwater in the form of shallow and deep pools and ponds. Refuge staff continues to restore this wetland by planting native species and removing invasive plants.

Over 75% of freshwater wetlands in the Puget Sound have been dredged, filled or diked. The Refuge’s freshwater wetlands provide important habitat to replace that which has been lost elsewhere.

Birds	Animals	Plants
Mallard	Mink	Cattail
Marsh Wren	Beaver	Reed Canarygrass
American Bittern	Black-tailed Deer	Duckweed
Wood Duck	Red-legged Frog	Pacific Willow
Ring-necked Duck	Pacific Tree Frog	Bittersweet Nightshade
Red-winged Blackbird	Bullfrog	Stinging Nettle
Hooded Merganser		Red Elderberry



Male and Female Wood Ducks



Tree Frog



Red Elderberry

# Habitats of the Refuge

## Coniferous Forest

Tall Douglas firs and big leaf maples grow on the western bluffs overlooking the delta. This area used to contain an old growth forest which was logged many years ago. Bald Eagles use the tall firs as lookouts. One pair nests here every spring.

## The Estuary

Where the freshwater of the Nisqually River meets the salt water of the Puget Sound, a rich habitat called an estuary is created. Estuaries provide rich nutrients and sediment for plants, animals and invertebrates. Twice each day, the high tide floods the estuary with water and twice each day the low tide drains the area of water. The Refuge has restored 762 acres of the Nisqually estuary by removing dikes and introducing tidal waters after an absence of more than 100 years. In the estuary there are several distinct habitat types that are described below.

### Salt Marsh, Sloughs, and Channels of the Estuary

The Nisqually estuary has both high and low salt marsh. Salt marshes are areas of slightly higher elevation and covered with water only during high tides. The low salt marsh (lower elevation) will be covered with water most of the time during high tides. The high salt marsh (higher elevation) will only be covered during very higher tides.

Plants and animals that live in the salt marsh must adapt to handle salt water. Some examples are the Puget Sound gumweed and pickleweed, which sweat out salt through evaporating pores in their leaves. This process deposits a salt film or dusting on the leaves.

Sloughs and channels on the estuary provide habitat and food for salmon fry before they head out to the Sound, as well as adults returning to spawn. These fish provide food for birds such as great blue heron, hooded merganser and grebes.

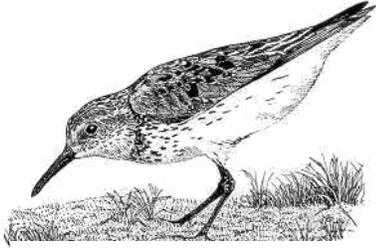
### Mudflats on the Estuary

The Nisqually River and McAllister Creek continually drop sediment on some 1,000 acres the mudflats. This area is rich in invertebrates, including worms, clams and crustaceans (crabs). *One square yard of mudflats can contain 100 clams, 2,000 worms and 30,000 amphipods!* During spring and fall migrations shorebirds gather to feed on this wealth of invertebrates.

## ***Birds, Animals, Fish, and Plants of the Estuary***

<b>Birds</b>	<b>Animals/Fish</b>	<b>Plants</b>
Grebes (various species)	Clams	Puget Sound Gumweed
Great Blue Heron	Crab	Lyndbys Sedge
Common Merganser	Amphipod	Tufted Hairgrass
Caspian Tern	Salmon (see river species)	Pickleweed
Glaucous-winged Gull	Steelhead	
Bufflehead	Lugworm	

## ***Mudflat Birds, Animals and Plants***

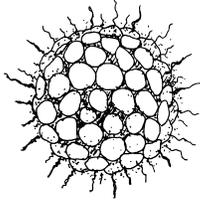
<b>Birds</b>	<b>Animals/Fish</b>	<b>Plants</b>
Western Sandpiper	Amphipod	Sea Lettuce
Dunlin	Threadworm	Phytoplankton
American Wigeon	Midge Larvae	
Greater Yellowlegs	Fly Larvae	
	Clam	
	Snail	
	Sculpin	

Western Sandpiper

## **Open Salt Water**

The Nisqually NWR boundaries include the deep waters of the Nisqually Reach and Puget Sound. Here, the marine environment takes over. Harbor seals hunt for flounder and Dungeness crab. Scaup and surf scoters feed on clams, while American wigeon rest and feed on sea lettuce (algae).

## ***Birds, Animals and Plants of the Marine Habitat***

<b>Birds</b>	<b>Animals/Fish</b>	<b>Plants</b>
Scaup	Harbor Seal	Sea Lettuce (Algae)
Surf Scoter	Flounder	Phytoplankton
American Wigeon	Clam	
Glaucous-winged Gull	Dungeness Crab	
	Salmon	
	Steelhead	



American Wigeon

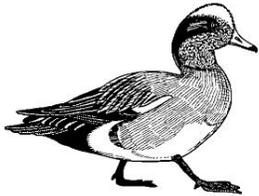
Phytoplankton

# Birds of the Refuge

The following list, although not complete, describes some of the birds most commonly seen on the Refuge. Drawings are not to scale. For a complete list see the enclosed Bird Checklist. The checklist is also available online at <http://www.fws.gov/nisqually>

## **American Goldfinch (*Carduelis tristis*)**

This is a bright-yellow bird with a black cap and wings. It is common in flocks in weedy fields, bushes and roadsides, and in seed-bearing trees.



## **American Wigeon (*Anas americana*)**

The wigeon is a surface feeding duck that eats mostly aquatic plants. In flight, wigeons are mostly brown with a white wing patch. The males have green and white on top of their heads.

## **Bald Eagle (*Haliaeetus leucocephalus*)**

Adult bald eagles are readily identified by a white head and tail and huge yellow bill. Immature bald eagles are mostly dark brown; it takes four or five years for bald eagles to reach full adult plumage. It feeds mainly on fish. The bald eagle was an endangered species, but thanks to intense recovery programs populations are increasing.

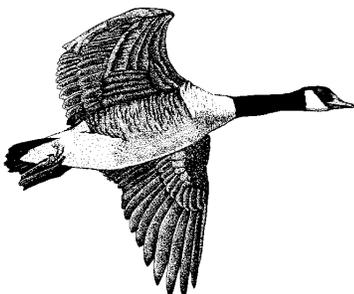


## **Barn Swallow (*Hirundo rustica*)**

This swallow has an iridescent blue back, with a cinnamon-colored belly and throat. Most distinctive is its long, deeply forked tail. It makes open cup-shaped mud nests. If it can't find any mud, it makes its own by walking in water and then soil. It eats insects while flying.

## **Belted Kingfisher (*Ceryle alcyon*)**

The kingfisher dives from the air, head first into the water to catch fish with its long beak. They nest in tunnels dug into the banks of rivers and lakes. It is gray on its head and back with a gray band across its white breast. The female also has a rusty colored band. Belted kingfishers can also be found along the Nisqually River.

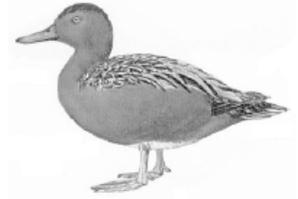


## **Canada Goose (*Branta canadensis*)**

The Canada goose is the most common and best-known goose. It is identified by the black head and neck and broad white cheek. It can be seen in large flocks, grazing in open fields within commuting distance of water. The Refuge is inhabited by two species which differ greatly in size and slightly in color, the western and cackling. The characteristic honking of the western is well-known.

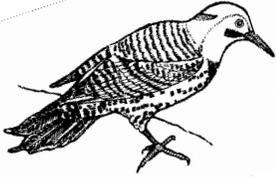
### **Cinnamon Teal (*Anas cyanoptera*)**

Male cinnamon teal have cinnamon heads, neck and underparts. The female is brown. Males older than 8 weeks have red-orange eyes, yellowish legs and bright blue on their wings. They are common in marshes, ponds and lakes.



### **Common Flicker (*Colaptes auratus*)**

Flickers are jay-sized woodpeckers with brown back, no white on wings, and a black breast crescent. In flight, note the white rump, and salmon color under wings and tail. Often seen on the ground eating ants. It is common in open country near large trees. The call is a loud repeated *flick* or *flicker*.



### **Common Yellowthroat (*Geothlypis trichas*)**

The male common yellowthroat has a broad black mask and a bright yellow throat and breast. The female lacks the black mask and is more olive color. They can be found in grassy fields, shrubs and marshes; it nests on the ground. It often holds its tail cocked like a wren. Its song is a loud, rolling *wichity wichity wichity wick*.

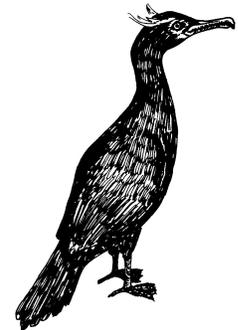


### **Dark-eyed Junco (*Junco hyemalis*)**

Juncos are rather tame sparrows with light pink bills, gray or black hoods and white outer tail feathers that can be seen when they fly. Often seen in flocks, they hop on the ground and pick up small seeds. In winter, juncos are easily attracted to feeding stations.

### **Double-crested Cormorant (*Phalacrocorax auritus*)**

Large, rounded throat pouch is orange year round. Double crests are seldom visible. Its body is black throughout. Kinked neck is distinctive in flight, flies with rapid wing beat. The cormorant is a resident along coast, lakes and estuaries.

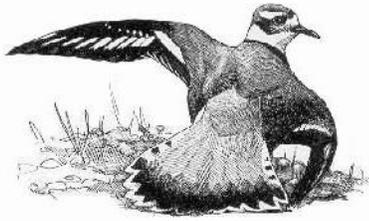


### **Great Blue Heron (*Ardea herodias*)**

One of the larger wading birds, the great blue heron stands 4 feet tall. It is slate blue with a white head, a black stripe extending above the eyes, and a white fore neck streaked with black. The great blue is graceful and majestic, as are all herons. They eat fish, frogs and mice (spears fish and flips them upwards, catching them in midair), and are residents of freshwater marshes. They can also be found along the Nisqually River.

### Great Horned Owl (*Bubo virginianus*)

This large nocturnal owl is distinguished by its large ear tufts (feathers, actually, not ears!). The great horned owl will take prey as large as skunks and often preys on baby barn owls. Look for great horned owls near the Twin Barns.



### Killdeer (*Charadrius vociferus*)

Killdeer have two black stripes on a white breast. They are common in fields and pastures as well as on shores and riverbanks. The killdeer eats insects, worms and grubs, and is a skilled actor, feigning injury near its nest to distract intruders.

### Mallard (*Anas platyrhynchos*)

The male is identified by his metallic green head and neck, yellow bill, narrow white collar, and chestnut breast. Black tail feathers curl up. A “puddle duck” that feeds with its tail in the air and head underwater. The mallard can be observed in a variety of wetland habitats.



### Marsh Wren (*Cistothorus palustris*)

This little bird has a brown crown, bold white eye line, black triangle on upper back streaked with white, and underparts that are mostly white. The marsh wren’s call sounds like a lawn sprinkler *whish, whish*. It is found in reedy freshwater marshes.

### Northern Harrier (*Circus cyaneus*)

Both sexes of the harrier have a distinct white area between the lower back and tail called a “white rump patch.” Females are brown above and white below with dark streaks. Males are gray above and white underneath. They fly close to the ground searching for mice, rats, frogs, rabbits, small birds and other small prey.



### Northern Pintail (*Anas acuta*)

When feeding, this dabbling duck “tips over” for its meal (plant matter) showing off its long tail feathers. The male has a chocolate brown head and white neck with a dark strip down the back. Black central tail feathers extend to form a “pintail.”

### Northern Shoveler (*Anas clypeata*)

The shoveler has a large, spatula-like bill that is longer than its head. The male has a green head, white breast, and brown sides; females have a grayish bill tinged with orange. It is found in ponds, marshes and bays.



**Pied-billed Grebe (*Podilymbus podiceps*)**

The pied-billed grebe is a small, stocky brown bird with a black ring around its stout whitish bill, a black chin and throat, and pale belly. It nests around marshy ponds and sloughs and tends to hide from intruders by sinking like a submarine until only its head shows. Grebes spit up pellets of indigestible materials, such as bones, like owls do.



**Peregrine Falcon (*Falco peregrinus*)**

Large and stocky with pointed wings and short tail. The peregrine has a dark head, uniformly patterned underwing, and gray or dark barring on belly. The fastest diving bird, the peregrine dives on smaller birds at speeds of up to 200 miles per hour. Although no longer listed as an endangered species, the peregrine falcon is now considered threatened.

**Pileated Woodpecker (*Dryocopus pileatus*)**

Prominent red crest, black with white under wings. The pileated woodpeckers eat insects from the trees in which they drill their nests. Once abandoned, their nests are then used by squirrels, swallows and wood ducks.

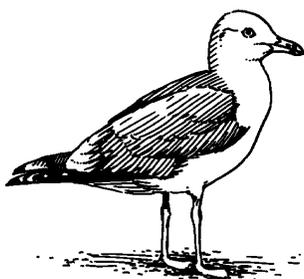


**Red-winged Blackbird (*Agelaius phoeniceus*)**

In the spring, the red-winged blackbirds are commonly found nesting in the freshwater marsh. The males have a black body with red patch on the wings, while females are typically a browner, striped tone. Both have a relatively stocky body with rounded wings and a fairly short tail.

**Red-breasted Nuthatch (*Sitta canadensis*)**

A small acrobatic bird that climbs up, around or down a trunk head first. Its white face, solid black cap and black eye stripe are distinctive. Both males and females have a pale orange underbelly. Call is a weak, nasal *yenk*. Common in deciduous woodlands.

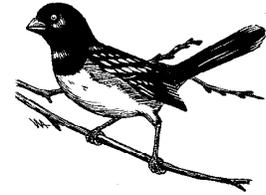


**Ring-billed Gull (*Larus delawarensis*)**

Adults have black ring around yellow bill, greenish-yellow legs, pale-grey mantle, white head and underparts, and black primary feathers tipped with white spots. Their heads are streaked with brown in winter. These gulls mature in 3 years and acquire new and different plumage in each of their first three winters.

**Rufous-sided Towhee (*Pipilo erythrophthalmus*)**

This large, ground-feeding sparrow has rufous sides, a white belly, and a long rounded tail with large white spots. Its back is spotted with white. Towhees are commonly seen in brush, heavy undergrowth and wood margins. They hop with both feet together, and usually fly close to the ground.



**Song Sparrow (*Melospiza melodia*)**

Long, rounded tail, pumped in flight. Broad, grayish eyebrow and broad, dark stripe bordering whitish throat. Upper parts usually streaked. Breast also is heavily streaked, with lines converging at a central spot. Legs and feet are pinkish. Found in dense, brushy areas.

**Wood Duck (*Aix sponsa*)**

The large head, the short neck, and the long square tail are good field marks. No other duck has the long slicked-back crest. They feed on plant materials, from duckweed to acorns, and some insects. Nesting is in natural tree cavities or nest boxes. Fairly common in open woodlands near ponds or rivers.



**Mammals and Amphibians of the Refuge**

*The following list, although not complete, describes some of the animals most commonly seen on the refuge.*

**Beaver (*Castor canadensis*)**

A mammal with long incisors, webbed feet and long flat tail. Beavers construct dams for homes in lakes and streams by chewing down trees with their large teeth. Usually very shy and active at night, they can be difficult to see.



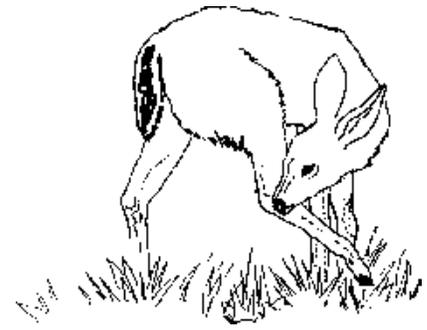
**Coyote (*Canis latrans*)**

Coyotes have large pointed ears and a fluffy tail. About the size of a large domesticated dog, their tracks can be mistaken for those of domesticated dogs. Coyotes eat small rodents, hares, Canada geese and sometimes larger animals such as newborn fawns.



**Black-tailed Deer (*Odocoileus hemionus columbianus*)**

Black-tailed deer usually stay within the area where they are born. Males grow branching antlers. Both males and females have dark brown or black flattened tails with white underneath. Like all deer, black-tailed deer browse exclusively on vegetation such as salal, huckleberry, blackberry, bitterbush and snowbrush.



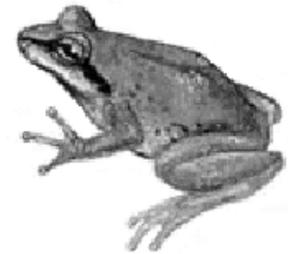
**Northern Red-legged Frog (*Rana aurora aurora*)**

Adults are up to 10 cm in length. Upper surface and sides are usually reddish brown, with a few dark spots or blotches, while underside of belly and inner legs are a pinkish red. Lives in or near marshes, streams and ponds, and is usually voiceless.



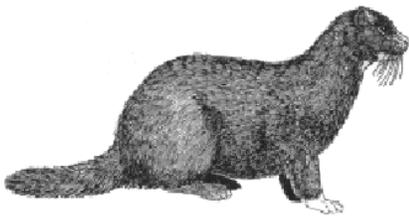
**Pacific Treefrog (*Hyla regilla*)**

Adults are about 4 cm long and can range in color from green to brown to gray. Typically have dark blotches on legs and are characterized by a white-bordered dark streak running through each eye. Their call sounds something like *wreck-it*. Pacific treefrogs, like most treefrogs, have sticky finger pads that allow them to grip onto the tree.



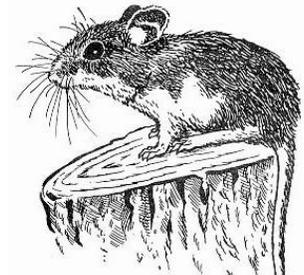
**Mink (*Mustela vison*)**

Mammals up to the size of a small house cat, minks have a long slender body, short legs, slender tail and dark brown fur. They can be found around freshwater marshes, streams and lakes. Mink eat muskrats, voles, fish, shorebirds, young ducks and amphibians. Main predators of mink are humans (for their fur), hawks and owls.



**Deer Mice (*Peromyscus maniculatus*)**

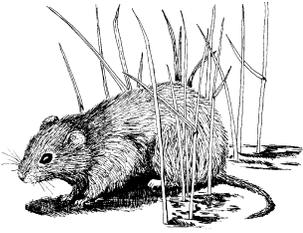
A small mouse with large membranous ears. Deer mice primarily eat seeds and fruit and can be found in grassland, shrub and woodland habitats. They are preyed upon by raptors and owls.



**River Otter (*Lutra canadensis*)**

Fur-bearing mammal with large canine teeth, long slender body, short legs, four webbed feet and a long tail covered with dense fur. Live in streams, large lakes, rivers and sea coasts. River otters eat a variety of fish, frogs, and occasionally small diving birds and small mammals. They can dive 60 feet below water surface and stay underwater for up to 4 minutes.





### **Townsend's Vole (*Microtus townsendi*)**

Small mouse-like mammal with rounded nose, short bi-colored tail, and long front teeth for gnawing. Voles are most commonly found in the grassland and woodland areas and eat seeds, roots, berries and mushrooms. They are important to many plants because they help scatter seeds and spores, and the tunnels voles create in the soil aides water absorption.

## **Plants of the Refuge**

*The following, although not complete, describes some of the most commonly seen plants in each of the Refuge habitats. Poisonous plants such as stinging nettles, bittersweet nightshade and poison hemlock are described in the next section under medical considerations.*

### **Riparian Forest**

#### **Black Cottonwood (*Populus balsamifera trichocarpa*)**

Often found near rivers and in wet forest habitats, the deciduous black cottonwood has a heart-shaped leaf.



#### **Red Alder (*Alnus rubra*)**

The red alder is a common native deciduous tree with serrations along its leaf edges.



#### **Big Leaf Maple (*Acer macrophyllum*)**

A common Northwest deciduous tree, the big leaf maple can be identified by its leaf with its five distinct fingers.



#### **Scouring Rush (*Equisetum hyemale affine*)**

Related to the horsetail, the scouring rush is a plant often found in wetlands. The plant grows tall, green spikes composed of segments.



#### **Skunk Cabbage (*Lysichiton americanum*)**

Another common wetland plant, the skunk cabbage is so named for its skunky, musky odor. It has broad green leaves and blooms a bright yellow flower in spring (riparian forest only).



**Snowberry/Waxberry (*Symphoricarpos albus*)**

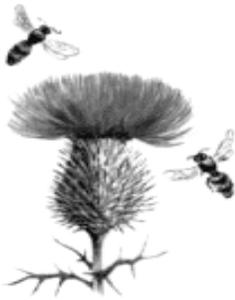
This shrub grows in the both the riparian forest and woodland areas. It can be easily identified by its small white berries.

**Seasonal Freshwater Wetlands Habitat**

The seasonal freshwater wetlands contain mostly non-native grasses, which are often difficult to identify.

**Black Medick (*Medicago lupulina*)**

Low-growing plants that flower in the spring with violet flowers. Related to clover and often referred to as hop clover.



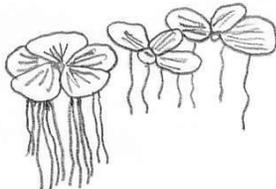
**Canada Thistle (*Cirsium arvense*)**

Spine-tipped leaves, spines less than 1 mm in length, with flowers that appear spiny and usually purple or reddish. Thistles have deep-seated, creeping roots that allow them to take hold easily.

**Permanent Freshwater Wetlands Habitat**

**Pacific Willow (*Salix lasiandra*)**

The Pacific willow tree can grow up to 20 meters tall. The bark of the trunk is dark gray to dark brown. The leaves are narrow and long tapering to a slender tip. The tree also produces male and female catkins which appear yellow and hairy.



**Duckweed (*Callitriche heterophylla*)**

Forms continuous mats (each leaf less than 1 cm wide) in shallow water. The mats appear free-floating, but are rooted in the mud.

### **Cattail (*Typha latifolia*)**

Leaves grow around base of the main stems. The top of these stems form the characteristic “cattail,” which is made up of male and female flowers. Cattails are found primarily in permanent wetlands growing in standing water and can reach a height of 3 meters.



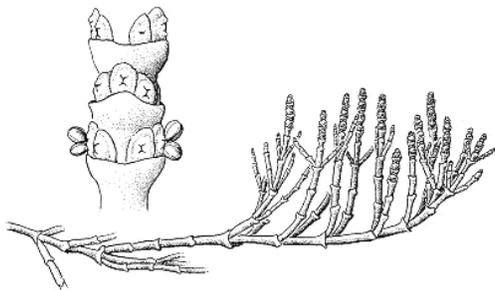
### **Reed Canarygrass (*Phalaris arundinacea*)**

One of the most invasive grass species in the Pacific Northwest, reed canarygrass grows as a dense thicket in wetlands. The plant’s stems are usually 1 cm wide and can be up to 2 meters tall. The leaves are blue-green when fresh, straw-colored when dry.

## **Salt Marsh Habitat**

### **Lyngby Sedge (*Carex lyngbyei*)**

A common coastal, estuarine (salt water) plant species. It has tall, round stems with a purplish brown base. Has both male and female flower spikes (see close up) which bloom April through July.



### **Pickleweed (*Salicornia pacifica*)**

Common in salt marshes throughout the Puget Sound. The stems of pickleweed are composed of short interlocking segments. The flowering stems are green with a reddish or purple cast and the flowers are tiny yellow clusters at the tips of the stems.

### **Puget Sound Gumweed (*Grindelia integrifolia macrophylla*)**

A sticky succulent that emits a strong, musky-odor. The stems are stout and soft-hairy or nearly hairless. Blooms with sunflower-like flower heads. The Puget Sound gumweed is sticky with a white gummy sap.

