

## *Chapter 2: Community setting*

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Jefferson County was one of the first counties organized by the Washington Territorial Legislature in 1852. The county was named after President Thomas Jefferson. The county is located in the northwestern corner of the state bordered by the Pacific Ocean on the west and Puget Sound on the east. The county is 1,805 square miles in size or the 18th largest in the state.

### **2.1 Climate**

Washington State's climate is strongly influenced by moisture-laden air masses created in the Pacific Ocean. The air masses may move into the region any time of the year, but particularly during fall, winter and spring seasons. The flow of air from the Pacific Ocean is interrupted first by the Olympic Mountains and then significantly by the Cascade Mountains. As a result of the mountain ranges, the west or windward sides of the Cascades receive moderate to heavy precipitation, while the east or leeward side of the state in the "rain shadow" of the Cascades receives a light to moderate amount of precipitation.

The Cascades also affect temperature ranges in the state. The west or windward side is influenced by maritime air masses that are generally milder than those that sweep down from the Canadian Rocky Mountains on the east or leeward side of the state. Consequently, eastern Washington usually has colder winters and hotter summers, while western Washington is milder and more frost-free.

Jefferson County is located within the West Coast Marine Climatic Region with 5 distinct climatic zones that vary with elevation, topography, rainfall, and position with respect to bodies of water and wind patterns. The variations are significant ranging from 200 inches annually in the rain forest to 18 inches in Port Townsend in the "rain shadow"

In Port Townsend, mean temperatures vary from a high of 71 degrees in July to a low of 34 degrees Fahrenheit in January with extreme variations recorded at -3 to a high of 102 degrees Fahrenheit. Average annual precipitation is about 18 inches with a mean growing season with temperatures above 32 degrees Fahrenheit for about 170-190 days. Approximately 80% of the precipitation occurs from October through March with less than 6% falling from June through August.

## 2.2 Earth

Washington is divided into three principal physiographic divisions - the Pacific Mountain System, the Rocky Mountain System, and the Intermontane Plateaus.

- *Pacific Mountain System* - is defined by the Olympic Peninsula (the Pacific Border province) and the Cascade Mountain range and includes all counties that contain portions of the Cascade Mountains (the Cascade Mountain province).
- *Northern Rocky Mountain System* - is defined by the foothills of the Rocky Mountain ranges and includes all counties that are located north of the Columbia River and east of the Cascade Mountain system.
- *Intermontane Plateau* - is defined by the high plateaus created by the uplift between the Cascade and Rocky Mountain ranges and includes all counties that are located along the southern drainage basins of the Columbia River.

Jefferson County is located within the eastern edge of the Puget Trough section of the Cascade Mountain province of the Pacific Mountain System. The Olympic Mountains were created by an uplift of the underlying continental plates. The mountains were in turn subject to the action of periodic glacial intrusions - the most recent being the Pleistocene glacial period more than 15,000 years ago. The Pleistocene glacial intrusion gradually carved and flooded Puget Sound, the lowland areas, and other valleys alongside the Olympic and Cascade foothills.

Jefferson County consists of 3 distinct geographic areas – the “West End” on the Pacific Ocean, the Olympic Mountains in the central region, and the Puget Lowlands in the eastern section. The Olympic Mountains are the dominant landform occupying more than 75% of the total land area and located within Olympic National Forest and Olympic National Park.

Topography ranges from 0 to about 7,965 feet above Puget Sound on the top of Mount Olympus, the highest mountain in the Olympic Mountains. Because the Olympics were uplifted as a dome, rather than a ridge, the river systems radiate out in all directions from the center.

### **Soil regions**

Washington State soils were created by a combination of elements including the nature of the parent material or rock type, climate, and the characteristics of the local terrain. These combined processes created 11 principal soil regions in the state ranging from deposits with high concentrations of organic matter created by glacial and marine actions along Puget Sound to deposits with very low organic matter located in the eastern arid portions of the state.

- *Inceptisol-mollisol-spodosol* - Puget Sound is composed principally of gently to steeply sloping glacial plains, terraces, and foothills that were dominantly forested (inceptisol-mollisol-spodosol). These soils range from deposits with dark surface horizons and high organic contents (inceptisol) to deposits with dark, organically enriched surface horizons (mollisol) to deposits with high organic matter and lime with clay leached from the surface layers (spodosol).

Jefferson County includes soils with these characteristics. Within the higher elevations, receding glaciers left behind highly variable deposits ranging from porous sands and gravel to very impermeable glacial till. Between 5 and 100 feet

of glacial till covers most of the upper plateaus and plains. A surface layer of about 3 feet of looser weathered material forms the surface soils.

- *Inceptisol-mollisol-histosol* - significant portions of the soils described above were further eroded by the action of major tributary drainage systems, such as the Hoh, Clearwater, Queets, Elwha, Dungeness, Duckabush, Dosewallips, Big Quilcene, and Little Quilcene Rivers, and Snow, Salmon, Eagle, and Chimacum Creeks. The eroded soils are composed of nearly level to gently sloping alluvial lands.

The soils are located within river and creek valleys that were dominantly forested before being cultivated (inceptisol-mollisol-histosol). The soils range from deposits with dark surface horizons and highly organic content (inceptisol) to deposits with dark, organically enriched surface horizons (mollisol) to deposits with highly organic soils found in bogs (histosol).

Portions of Jefferson County, particularly portions of the river and creek valleys are located within soils with these characteristics. Historically, the floodwaters of the rivers and creeks, particularly the Chimacum, deposited rich sediments in the valleys that provided the basis for highly productive farmlands.

## **2.3 Water**

Jefferson County is drained by 9 major rivers and 4 major creeks that flow west into the Pacific Ocean, north into the Strait of Juan de Fuca, and east into Admiralty Inlet and Hood Canal.

### **Principal rivers**

- *Hoh River* - flows west into the Pacific Ocean.
- *Clearwater River* – flows west into the Pacific Ocean.
- *Queets River* – flows west into the Pacific Ocean.
- *Elwah River* – flows north through Clallam County into the Strait of Juan de Fuca.
- *Dungeness River* – flows north through Clallam County into the Strait of Juan de Fuca.
- *Duckabush River* – flows east into Hood Canal.
- *Dosewallips River* – flows east into Hood Canal.
- *Big Quilcene River* – flows east into Hood Canal.
- *Little Quilcene River* – flows east into Hood Canal.

### **Principal creeks**

- *Snow Creek* - flows north into Discovery Bay.
- *Salmon Creek* - flows north into Discovery Bay.
- *Eagle Creek* - flows north into Discovery Bay.
- *Chimacum Creek* - flows north into Admiralty Inlet.
- *Thorndyke Creek* – flows east into Hood Canal.
- *Fulton Creek* – flows east into Hood Canal.

### **Floodplains**

Floodplains and flooded areas include alluvial soils - which are former streambeds, tidal pools and retention ponds that fill during heavy rainfall, sometimes infrequently, often for extended periods during rainy seasons.

Floodplains are lands subject to high water inundation during high tides and/or heavy storms. Most of the county shoreline is subject to flooding during high tide

and cannot be built on without bulkhead and fill protection. All county rivers and creeks are potentially affected by the floodwaters possible during the worst storm in an average 100-year period. In both instances, floodwater depths would be shallow and not very extensive.

There are 7 major river systems that are subject to seasonal flooding in the county including:

- West end – the Hoh, Clearwater and Queets Rivers, and
- East end – the Duckabush, Dosewallips, Big Quilcene, and Little Quilcene Rivers.

### **Shorelines**

Jefferson County has over 200 miles of marine shoreline including 30 miles along the Pacific Ocean in the West End, and 170 miles along Discovery Bay, the Straits of Juan de Fuca, Admiralty Inlet, and Hood Canal in the eastern section.

The 30 miles of shoreline along the Pacific Ocean in the West End is predominantly located within the Olympic National Park managed by the National Park Service. Most of the remainder is located within the boundaries of the Quinault and Hoh Indian Nations.

The 170 miles of shoreline located in the eastern section of the county is primarily located under private ownership in a natural or undeveloped state. Approximately 15 miles are in public ownership accessible for public use at state and county sites in Fort Worden, Old Fort Townsend, Fort Flagler, Oak Bay, Indian Island, Bywater Bay, Termination Point, the Dosewallips River, and Pleasant Harbor.

### **Lakes**

Lakes are water bodies greater than 20 acres in size or more than 6 feet in depth. There are approximately 300 miles of river and lake freshwater shoreline in the county under the jurisdiction of the Shoreline Management Program. The inventory includes numerous lakes and ponds of varying sizes located in the eastern section of Jefferson County:

- Tibbals Lake – located in Port Townsend next to Fort Worden State Park off Jacob Miller Road. The shoreline has been preserved in an undeveloped state with trail access to Fort Worden State Park.
- Kah-Tai Lagoon – located in Port Townsend next to the Port of Port Townsend's Boat Haven off SR-20/Sims Road. The shoreline has been preserved in an undeveloped state within Kah-Tai Lagoon Park with trail access to the site and county.
- Anderson Lake - located near Chimacum in Anderson Lake State Park off Anderson Lake Road. The shoreline has been preserved and provided trails, boat access, and beachfront.
- Beausite Lake – located near Chimacum off Beausite Lake and West Valley Roads. The shoreline has been preserved within Beausite County Park and provided trails and beachfront.
- Gibbs Lake – located near Chimacum off Gibbs Lake and West Valley Roads. The shoreline has been preserved within Gibbs Lake County Park and provided trails, boat access, and beachfront.
- Crocker Lake – located at the intersection of SR-104 and US-101. The shoreline has been improved with a Washington State Department of Fish & Wildlife boat ramp.

- Tarboo Lake – located near SR-104 off Tarboo Lake Road. The shoreline has been improved with a Washington State Department of Fish & Wildlife boat ramp.
- Leland Lake – located on Leland Valley Road and US-101. The shoreline has been partially preserved within Leland Lake County Park and improved with a county and Washington State Department of Fish & Wildlife boat ramp.

Most of the other lakes in eastern Jefferson County are private property and/or are too small in size to support public access activities.

## **2.4 Wildlife habitats**

Habitat conservation areas are critical to the survival of the county's diverse plant and wildlife communities. Habitats encompass a variety of areas including large parcels of contiguous undeveloped land, special areas like streams or wetlands, and structural elements like rocky shorelines or standing dead trees.

The ecological value of an area depends on the quantity, quality, diversity, and the food, water, and cover that it provides wildlife species. A particular site's value also depends on proximity to other usable habitats, the presence of rare species, and the rarity of the habitat type.

The preservation and restoration of critical habitat areas is key to protecting the biological diversity of the county and region. Critical habitat can be lost or degraded due to urban and some rural land use activities. Critical habitat threats can be reduced with effective land use policies and regulations. In some instances, valuable habitat can also be restored or enhanced through preservation and conservation efforts.

For ease of discussion, wildlife habitats are generally classified as marine, estuarine, freshwater, and terrestrial categories. Many wildlife species rely upon most, even all, of these habitat categories for survival. Jefferson County has all four categories of wildlife habitat.

### **Marine habitat**

Marine habitats are deep water areas that extend outward from the upper limit of wave spray on land. In Jefferson County, the marine habitat zone extends the complete circumference of Jefferson County shoreline along the Pacific Ocean in the “West End”, the Strait of Juan de Fuca, Discovery Bay, Admiralty Inlet, Hood Canal, and Dabob Bay. Marine habitats provide critical plant, fish, and wildlife habitat that can be greatly affected by land and water based activities.

The waters of Puget Sound depend on the health of tideflats and the water column for primary production. Eelgrass, kelp, and phytoplankton provide the primary cornerstone for the grazing food chain, and shelter for both invertebrate and vertebrate animal species.

The deeper waters of the Strait of Juan de Fuca, Admiralty Inlet, and Hood Canal produce a unique marine environment rich in nutrients hosting a remarkable diversity of fish and animal life including octopus, ling cod, and wolf eels.

**Beach habitat** – near shore habitats, including eelgrass meadows and beaches, are the primary habitats for forage fish – small fish that play a very important role in the marine food chain.

- **Surf smelt** - spawn on county beaches containing a specific mixture of coarse and fine gravel in the upper tidal zone.
- **Sand lance** - spawn on county beaches containing sand and sandy-gravel in the upper tidal zone.
- **Pacific Herring** - attach their eggs to eelgrass and kelp, mostly in Discovery Bay, Admiralty Inlet, and Hood Canal.

These 3 species comprise over 50% of the diet of adult salmonids, including depleted chinook salmon. All 3 forage fish species have sharply declined in the past few decades.

Beaches provide refuge for juvenile salmonids at the edge of the tide where the water depth prevents passage of larger, predator species. Mobile, attached, and burrowing creatures make their homes on the sea floor from the top of the tidal influence to the deepest channels. In Jefferson County, these include native and introduced species such as littleneck and manila clams. Commercial and/or harvested species include crabs, clams, and kelp. Species that favor southern Puget Sound's gentler beaches and finer substrates, such as geoduck, tend to be abundant around in Discovery Bay, Hood Canal, and Dabob Bay.

**Offshore habitat** - the water column and surface provide habitat to marine mammals, fishes, and birds - some of which require special pelagic habitats for refuge, such as eelgrass meadows, kelp forests, and rocky reefs.

In 1997, 13 marine species were identified as being in steep decline and in need of attention to ensure successful protection or recovery. Those most likely to occur are Pacific herring, Harbor porpoise, and the group called unclassified marine invertebrates – which includes all invertebrate species currently not considered as food fish or shellfish by the WDFW.

The waters of Puget Sound depend on the health of tide flats and the water column for primary production. Eelgrass, kelp, and phytoplankton provide the primary cornerstone for the grazing food chain, and shelter for both invertebrate and vertebrate animal species.

The deeper waters and narrow channel of the Strait of Juan de Fuca, Admiralty Inlet, and Hood Canal produce a unique marine environment rich in nutrients hosting a remarkable diversity of fish and animal life including octopus, ling cod, and wolf eels.

**Species** - marine habitats support a variety of seaweed, various species of fish and marine invertebrates, birds, and mammals. The Strait of Juan de Fuca, Admiralty Inlet, and Hood Canal are components of a very complex and productive ecosystem. These waters are considered to be relatively clean and provide habitat for over 211 species of wildlife.

The open channels, rocky outcrops, islands, and large bays provide wintering and breeding habitat for a variety of marine birds including gulls, loons, grebes,

cormorants, and diving birds including auklets, guillemots, murrelets, puffins, and oyster catchers.

**Kelp and eelgrass beds** - provide habitat, feeding, and rearing ground for a large number of marine organisms including crabs, fish, and birds. Kelp are the large brown seaweeds typically found in rocky inter-tidal areas. Eelgrass is a vascular plant that grows commonly in inter-tidal and shallow sub-tidal areas.

Kelp beds provide a surface upon which other plants and animals grow. Kelp beds are used as resting areas by birds and mammals including gulls, herons, waterfowl, shorebirds, and otters. Kelp beds also protect environments for inter-tidal plants and animals by reducing current and wave actions, and inshore erosion on sand and gravel beaches. The beds provide a protected beach habitat and marine organisms that would not be present otherwise.

Eelgrass is a highly productive plant that provides trophic functions and nutrient infusions for the entire coastal zone. Eelgrass beds provide important stop over and wintering areas along the Pacific flyway for a variety of migratory birds. The eelgrass beds in Admiralty Inlet and Hood Canal Passage have been found to be 3 times greater in productivity to diving birds, for example, than non-vegetated near shore areas.

Kelp and eelgrass beds have declined in number and overall size in Puget Sound in recent years. The decline may be due to changes in water quality and turbidity resulting from urban development and forest cutting activities - or natural fluctuations due to storms, unusually hot weather, or an increase in the population of grazing species.

**Shellfish** - inhabit the mud, sands, and rocky substrata of Discovery Bay, Admiralty Inlet, Hood Canal, and Dabob Bay in tidelands and inter-tidal areas. Inter-tidal areas support hard shell clams including butter clams, native littleneck, manila clams, cockles, and horse clams. Geoducks typically burrow offshore in sub-tidal areas up to 2 to 3 feet into the mud or soft sand. Shrimp, crab, and oysters also inhabit the shoreline areas. Dungeness crab frequent eelgrass beds, and red rock crab inhabit rocky terrain with less silt content.

Commercial and recreational shellfish harvesting is restricted or otherwise controlled in Discovery and Dabob Bays.

**Herring and smelt spawn** - during the winter and early spring in eelgrass and seaweed in low inter-tidal areas and sometimes in gravelly areas along Hood Canal. Surf smelt spawn during the winter in sandy gravel beaches along Admiralty Inlet, Discovery, and Dabob Bays.

### ***Estuarine habitat***

Estuaries are semi-enclosed bodies of water that are freely connected with the open sea and within which saltwater mixes with freshwater drainage. Estuaries create transitions between marine, freshwater, and terrestrial environments that support a rich and diverse variety of wildlife species.

By definition, estuaries have a salt concentration from 0.5 parts per trillion up to 30 parts per thousand. Estuaries include sub-tidal and inter-tidal zones as well as lagoons, sloughs, and channels that meet this salinity definition. Estuaries are typically shallower with warmer water temperatures than marine habitat zones.

In Jefferson County, the estuarine zone may extend upland for some distance where the freshwater from the Hoh, Clearwater, Queets, Elwha, Dungeness, Duckabush, Dosewallips, Big Quilcene, and Little Quilcene Rivers, and Snow, Salmon, Eagle, and Chimacum Creeks mixes with the tidal currents. Salinity content may be affected by the amount of freshwater flow, the strength of the tides, and the resulting amount of fresh to saltwater mixing. Salinity is not constant within such a mixing and may vary with depth and area of flow. The animals and plants that may be established within the area are often better predictors of the estuary's influence than salinity content alone.

**Species** - the estuaries within the county may support over 40 types of marine algae including jellyfish, anemones, marine worms, marine snails, limpets, clams, cockles, oysters, mussels, barnacles, crabs, starfish, urchins, sea cucumbers, and sea squirts, among others.

The estuaries may also support over 50 types of fish including dogfish, herring, anchovy, salmon, sea-run trout, and smelt. Priority species that are supported by estuarine habitat include smelt, herring, and perch, as well as salmon and steelhead.

Prominent birds of the more than 100 types that are possible may include loons, grebes, cormorants, herons, egrets, swans, geese, brants, and a variety of ducks, sandpipers, gulls, murrelets, and puffins. State priority wildlife species that are associated with estuarine habitat include the bald eagle, heron, and osprey.

### ***Freshwater habitat***

Freshwater bodies include lakes, rivers, creeks, wetlands, riparian areas, and all other types of water bodies not included in estuaries or marine habitat that have a low ocean salt content. Freshwater habitat supports different wildlife than saltwater systems, particularly species that depend on wetland vegetation. However, 87% of all wildlife and fish species are estimated to depend on streams, wetlands, or other freshwater bodies during some part of their life cycle for drinking water, foraging, nesting, and migratory movements.

**Riparian areas** - are the wooded or vegetated corridors located along rivers, streams, and springs. Riparian corridors possess free flowing water or moist conditions that support high water tables, certain soil characteristics, and vegetation that are transitional between freshwater and terrestrial habitat zones. The transitional edges are usually defined by a change in plant composition, relative plant abundance, and the end of high soil moisture content.

Riparian corridors transport water, soil, plant seeds, and nutrients to downstream areas - and thereby serve as important migration routes for many wildlife species. Riparian areas, though small in overall size, are one of the most important sources of wildlife bio-diversity in the landscape.

Freshwater wetland habitats are water bodies less than 20 acres in size or less than 6 feet in depth and include marshes, swamps, bogs, seeps, wet meadows, shallow ponds, and lakes. Like riparian areas, wetlands support species in great diversities, densities, and productivity. The wooded areas that are located adjacent to wetlands provide nesting areas, forage, and other cover that is critical to wetland-dependent species, like most waterfowl or small mammals like beaver.

**Wetlands** - an inventory was accomplished of wetland plant communities throughout the eastern section of Jefferson County using a process combining aerial photography and on-site field visits. The inventory determined there were 4 principal wetland types:

- wet meadows - with standing water from late fall to early spring characterized by reed canary grass, spike rushes, bulrushes, and sedges,
- scrub/shrub wetlands - with seasonal flooding, characterized by hardhack, willow, red alder or redosier dogwood,
- forested wetlands - not usually flooded but with saturated soils characterized by large trees of black cottonwood, red alder, Oregon ash, and western red cedar with an under-story of vine maple, cascara, salmonberry, and devil's club, and
- shallow marsh - deep marsh, and open water wetlands.

There are no endangered, threatened or sensitive plant species within Jefferson County based on the results of the inventories. However, there are four threatened or endangered plants that could occur including:

- flowered sedge - found in and near sphagnum bogs,
- choriso bog orchid - found in wet meadows and bogs,
- frinshed pinesap - found in deep shady woods at moderate to low elevations especially in old forest, and
- golden Indian paintbrush - found in moist lowland meadows and prairies.

Riparian and wetland vegetation provides significant food and cover for wildlife habitat. Generally, riparian zones and wetlands provide substantially more important wildlife habitat than forested areas. Riparian zones are also passageways for wildlife migrating between or around developed areas. Riparian vegetation also helps maintain optimum fish spawning conditions by providing shade, bank stabilization, a breeding ground for insects, and a source of organic material for the stream.

Riparian zones are located within the river and creek valleys and adjacent to major lakes and ponds. These areas are covered with riparian vegetation and should be considered important wildlife corridors.

**Lakes** - are water bodies greater than 20 acres in size or more than 6 feet in depth. The deeper waters and larger surface of a lake support fish and wildlife species. However, most species prefer to nest and forage in the shallower ponds rather than lakes, and the wetlands that adjoin larger open water bodies.

The larger lakes in the eastern section of the county include Tibbals Lake, Anderson Lake, Beausite Lake, Gibbs Lake, Crocker Lake, Tarboo Lake, and Leland Lake. The Washington State Department of Fish & Wildlife (DFW) routinely stocks most of these lakes with game fish.

Most of the other lakes in Jefferson County Peninsula are private property and/or are too small in size to support public access activities. Nonetheless, the sites are important to the maintenance of freshwater habitat for region wildlife.

**Wildlife species** - freshwater zones support terrestrial and aquatic insects and resident and migratory fish species. Anadromous fish species include coho, chinook, and chum salmon, and steelhead. Naturally occurring or established species include largemouth bass, brown bullheads, bluegill, and black crappie.

Freshwater zones also support a variety of birds and mammals including salamanders, frogs, osprey, ducks, river otter, and beaver.

Riparian and wetland vegetation provides significant food and cover for wildlife habitat. Generally, riparian zones and wetlands provide substantially more important wildlife habitat than forested areas. Riparian zones are also passageways for wildlife migrating between or around developed areas. Riparian vegetation also helps maintain optimum fish spawning conditions by providing shade, bank stabilization, a breeding ground for insects, and a source of organic material for the stream.

Riparian zones are located within all county river and creek valleys and adjacent to all major lakes. These areas are covered with riparian vegetation and should be considered important wildlife corridors.

Conversely, there are wetlands within the county that have been invaded by exotic and invasive plant species. Invasive plant species do not have specific habitat requirements and can usually tolerate disturbed or degraded environments. In large populations, invasive plant species like reed canary grass and purple loosestrife can take over a site replacing the native vegetation and reducing bio-diversity and habitat value.

Urban and agricultural developments within the county have substantially reduced wildlife habitat through the years. However, valuable habitat qualities still remain in the undeveloped, large native vegetation tracts and around the remaining wetlands and riparian (streamside) forests along the rivers and creeks.

The wetlands and riparian zones probably support muskrat, mink, otter, beaver, raccoon, and weasel. Water bodies, wetlands, and adjacent agricultural fields also provide suitable nesting and feeding habitat for mallard ducks, American widgeons, green-wing teal, common coot, common merganser, blue-wing teals and great blue heron, and lesser and greater Canadian goose.

Portions of the county that overlook the Pacific Ocean, Strait of Juan de Fuca, Admiralty Inlet, Hood Canal, and Discovery and Dabob Bays also provide habitat for the bald eagle and osprey. The northern bald eagle is listed as a potentially threatened or endangered species on Washington State's endangered and threatened lists. No other endangered or threatened species are known to occur in Jefferson County.

**Fisheries** - county streams provide freshwater habitat for various species of anadromous fish, including salmon and sea-run trout, that live in saltwater but return to spawn in freshwater. These fish species have evolved over time to fit the specific characteristics of their stream of origin - and are uniquely imprinted compared with other members of the same species.

Anadromous fish require cool, uncontaminated water with healthy streambeds and insect populations. Vegetated riparian areas maintain stream habitats by stabilizing water temperature, producing an insect supply, controlling erosion, and providing woody debris.

Anadromous game fish that have been identified in the area include rainbow trout, cutthroat, dolly varden, eastern brook trout, whitefish, largemouth bass, perch, crappie, and catfish. These species spawn and rear in medium sized gravel beds that are provided medium velocity water flow along the creek channels, swamps, marshes, perennial and seasonal streams.

Chimacum Creek is a typical lowland-type stream that gradually meanders through a wide valley habitat offering suitable spawning and rearing areas.

A number of fish runs are considered endangered or threatened in Jefferson County including the chinook and the sea-run cutthroat trout. Factors that have caused the diminishment of the wild runs include:

- forest clear-cutting and land developments - that create sediment loads increasing water turbidity and silting in gravel spawning beds;
- clear-cutting tree stands in riparian areas – that remove natural shading increasing water temperatures; and
- water diversions – that restrict access from the upper reaches and spawning areas of stream and river runs.

The Washington Department of Fisheries & Wildlife and various Tribal Governments also supplement most of these species.

### ***Terrestrial habitat***

Terrestrial areas are the upland lands located above freshwater, estuarine, and marine water zones. The zones may extend from the level lowlands that border marsh or creek banks to the tops of the bluffs, hills, or foothills located around Jefferson County shoreline in the Strait of Juan de Fuca, Admiralty Inlet, Hood Canal, and Discovery and Dabob Bays.

Plants - natural plant communities are described in terms of broad vegetation patterns called vegetation zones. Washington plant communities are divided into 3 major vegetation groupings including:

- forests,
- grasslands and shrub/grass communities, and
- timberline and alpine areas.

Jefferson County includes 3 primary forested vegetation zones including the western hemlock, Pacific silver fir, and the mountain hemlock zone. The zones are defined by the different climates that are created by different elevations and the distinctive vegetation type that becomes dominant in a climax forest after the forest has progressed through successive stages of natural development. The dominant species defined by the zone usually reproduces to maintain dominance until some disturbance, such as fire, alters the zone's environment.

Most of the eastern section of the county is located within the western hemlock (*Tsuga heterophylla*) vegetation zone. The western hemlock zone is the most extensive vegetation zone in western Washington extending from the Pacific

coast to about 2,500 foot elevation on the slopes of the Olympic Mountains where the climate is mild and generally wet.

The western hemlock zone is the major source of commercial harvested coniferous trees including the western hemlock, Douglas fir (*Pseudotsuga menziesii*), and western red cedar (*Thuja plicata*). Grand fir, western white pine, and lodgepole pine also occur within this zone although on a sporadic basis.

Deciduous tree species such as red alder (*Alnus rubra*) or big leaf maple (*Acer macrophyllum*) or golden chinkapin are generally dominant on the lands that have been cleared for urban and agriculture uses within the county. Black cottonwood and Oregon ash, along with red alder and big-leaf maple tend to grow along major watercourses.

Vegetation inventories have recently been completed for portions of the state using a variety of aerial photos, landstat or infrared satellite photo imagery, and field reconnaissance. The inventories have distinguished a wide variety of vegetation types at a greater level of detail than the vegetation zones described above. Forest areas, for example, were further divided into lowland and mountain forests, deciduous and coniferous forests, and second growth and old growth forests.

The inventories determined portions of the county include several second growth lowland forested cover types including coniferous, deciduous, and mixed coniferous/deciduous forests. This forest type has marginal value as commercial timber or as unique vegetation. The majority of commercially important timber resources have been harvested, usually along with associated residential land development.

Under-story vegetation in the western hemlock zone varies substantially depending upon soils, wetness, and other environmental factors. Typical vegetation associations include:

- *Douglas-fir/creambush oceanspray association* - on the driest sites with a typical shrub layer including creambush oceanspray, California hazel, creeping snowberry, and salal;
- *western hemlock/Pacific rhododendron/Oregon grape association* - in climax stands with a typical shrub layer including vine maple, red huckleberry, trailing blackberry, and Pacific rhododendron, and
- *western hemlock/sword fern association* - on moist habitats with the under-story dominated by sword fern and many species of herbs.

Lowland areas within portions of all river and creek corridors are covered by grasses, agricultural crops, and riparian vegetation - the latter being especially prevalent along the creek floodplains and at the edge of wetlands or open bodies of water. Deciduous hardwood trees including red alder, cottonwood (*Populus trichocarpa*), Oregon Ash (*Fraxinus latifolia*), willow (*Salix sp.*), and associated under-story species are dominant within the wetland areas.

**Species** - terrestrial zones support a variety of insects, amphibians, reptiles, lowland and upland birds, large and small mammals. Some species, such as eagles, osprey, and murrelets, forage in other habitats but nest in upland locations in wooded areas in or near riparian zones.

Other species may forage in all of the zones, particularly during the winter months, but retreat for night and seasonal cover into the upland wooded areas. Examples include a variety of game species such as pigeon, grouse, rabbit, deer, bear, and cougar.

Mature forested areas provide thermal cover during winter months allowing larger game mammals to forage up to 3,000 feet in elevation during a normal season, or 2,000 feet during especially harsh winters.

***Animals*** - urban and agricultural developments within the county have substantially reduced wildlife habitat through the years. However, valuable habitat qualities still remain in the undeveloped, large native vegetation tracts and around the remaining wetlands and riparian (streamside) forests along all river and creek valleys.

The wooded areas support a wide variety of large and small mammals, birds, reptiles, and amphibians. The most common mammals within the wooded areas include chipmunks, rabbits, marmots, skunks, and raccoons. A small number of larger mammals including black-tailed deer and coyote occur at the edge of the plateaus where large contiguous forested areas remain.

Crows, jays, nuthatches, woodpeckers, sparrows, winter wrens, ruffed grouse, blue grouse, quality, band-tailed pigeon, Merriam's turkey, owls, hawks, Osprey, and eagles can find suitable habitat for feeding and nesting in the upland forested areas and stream valleys. Many of these species can tolerate adjacent urban developments so long as some habitat and connecting migration corridors remain undisturbed.

No other endangered or threatened species are known to occur in the county. Other species of special concern under Washington State's Department of Wildlife endangered, threatened, sensitive, candidate, and monitor species programs in Jefferson County may include the great blue heron, pileated woodpecker, purple martin, Vaux's swift, and western bluebird. Candidate and threatened mammals may include western gray squirrel along with the western pond turtle. Many of these remaining species can be found in close proximity to urbanized areas, although most need undisturbed vegetated areas large enough to maintain viable habitat.

Some remaining portions of the Chimacum Creek valley floor and other low-lying areas are now devoted to pastures and meadows with some agricultural crops, woody vegetation, grasses, and wild flowers. These materials provide food for migratory waterfowl and deer, habitat for rodents and other small animals, and prey for predators like garter snakes, barn owls, red-tailed hawk, and fox.

Large and rural contiguous parcels of mature forest land provide habitat for wildlife that compete successfully with other species in deeper cover, like birds and larger mammals like deer, bobcat, and possibly even bear at the outer edges of the urban areas.

Important terrestrial habitat elements for these species include tall trees along the shoreline, mature forests with snags and fallen trees, and undisturbed mature forest near or surrounding wetlands. These habitat elements are primarily important to bird species that nest and perch in the trees, and to small mammals like beaver and river otter that rely upon an interface between the undisturbed

terrestrial and aquatic areas. Some of these priority habitat characteristics have been mapped in the county except for caves, cliffs, urban natural open space, and snag-rich areas.

The bald eagle, blue heron, purple martin, and pileated woodpecker are the only threatened species that are known to still be located within the county.

**Other important habitats** - bobcat and black bear rely on large areas of continuous, undeveloped land that is relatively free of human activity and contact. A black bear's range, for example, may reach 10 miles in radius.

Migratory songbirds also rely on the habitat provided by large wooded areas. These species do not adapt well where clear-cutting forest practices or urban land developments fragment the forest habitat.

Smaller wooded tracts are suitable for many plant and animal communities and may provide temporary cover for some species for foraging or migratory movement. Large parks and open spaces can serve as wildlife refuges in urban areas. However, the number and diversity of species declines in direct relation to the size of the habitat and where the habitat has been isolated from other natural areas.

The size and extent of the terrestrial habitat can be improved where natural migration corridors connect small tracts and large reserves. The natural migratory corridors enable species to colonize new areas, forage for food, find mates, and exchange genes with neighboring populations. Ideally, according to studies conducted in King County, successful wildlife migratory corridors should be at least 100 feet wide along streams with additional buffers about severe slopes and along extensive wetland areas.

The county has not yet inventoried natural migration corridors or determined optimum width and sizes.

## **2.5 Unique and threatened species**

### **Unique species**

The Washington Department of Natural Resources has listed a number of sensitive species in danger of becoming extinct within the marine, estuarine, freshwater, and terrestrial habitats including:

#### **Marine and estuarine habitat**

- **Alaska alkaligrass** - that grows in salt marshes, mudflats, and gravelly areas near beaches and rock outcrops in sea spray, and
- **pink sandverbena** - that grows along sandy beaches near saltwater.

#### **Freshwater habitat**

- **bog clubmoss** - that grows in wetlands adjacent to low elevation lakes,
- **chain-fern** - that grows along stream banks and moist seep areas, mostly near saltwater,
- **bristly sedge** - that grows in marshes and wet meadows,
- **water lobelia (lobellia dortmania)** - that grows in emergent freshwater wetlands,
- **white meconella (meconella oregana)** - that grows on open ground where wet in the spring, and
- **woolgrass (scirpus cyperinus)** - that grows in wet low ground.

There are four threatened or endangered plants that could occur including:

- flowered sedge - found in and near sphagnum bogs,
- choriso bog orchid - found in wet meadows and bogs,
- frinshed pinesap - found in deep shady woods at moderate to low elevations especially in old forest, and
- golden Indian paintbrush - found in moist lowland meadows and prairies.

#### Freshwater and terrestrial habitat

- western yellow oxalis - that grows in moist coastal woods and dry open slopes.

#### Terrestrial habitat

- fringed pinesap – that grows in duff and humus of shaded, low-elevation coniferous forest,
- gnome plant - that grows in deep humus in coniferous forest,
- chick lupine (lupinus micipcarpus) - that grows in dry to moist soils, and
- great pole monium (pole monium corneum) - that grows in thickets, woodlands, and forest openings.

#### Priority habitat

The Washington Department of Fisheries & Wildlife has listed the following species as being species of concern, threatened, or endangered:

#### Marine, estuarine, freshwater, and terrestrial habitat

- bald eagle - a threatened species that depend on coniferous, uneven-aged forests near rivers, lakes, marine, and estuarine zones for nesting and foraging food,
- great blue heron - that depend on undisturbed stands of tall trees near fresh and saltwater wetlands, streams, and water bodies,
- osprey - a species of concern that depend on tall trees or dead snags near large bodies of water,
- river otter - a threatened species that depend on wooded streams and estuaries for food, forage, and cover.
- harlequin duck - that depend on trees and shrub streams, banks, boulder and gravel shorelines, and kelp beds,

#### Marine, estuarine, and freshwater habitat

- black brant - a threatened species that depend on eelgrass beds, and
- harbor seal - that depend on marine environments for food and shorelines for mating and rearing activities.

#### Estuarine, freshwater, and terrestrial habitat

- cavity nesting ducks - (Barrow's goldeneye, bufflehead, wood duck, hood mergansen) that depend on tree cavities adjacent to sloughs, lakes, beaver ponds, and other open water wetlands.

#### Freshwater and terrestrial habitat

- blue goose - that depend on open foothills created by fire or small clear-cuts with streams, springs, and other water features,
- band-tailed pigeon - that depend on coastal forests with diverse tree ages, and farmland, mineral springs, and streams with gravel deposits,

- sea-run and coastal cutthroat, and chinook salmon - that depend on wetlands and riparian corridors for spawning and rearing,
- steelhead - that depend on wetlands and riparian corridors for spawning and rearing,
- greenbacked heron - that depend on wooded ponds,
- beaver - that depend on wetlands and streams for food, forage, and cover, and

#### Terrestrial habitat

- purple martin - a species of concern that depend on tree cavities in low lying forests,
- pileated woodpecker - that depend on mature second growth coniferous forests with snags and fallen trees,
- Columbian black-tailed deer - that depend on deep forest for cover.

The department has mapped and listed a number of shoreline and estuaries as priority habitat areas.

## **2.6 Wildlife habitat concerns**

### Marine habitat

Oil spills constitute the greatest risk to the marine environment. Oil tankers and large craft with fuel and other petroleum byproducts regularly ply the marine routes along the Strait of Juan de Fuca and Admiralty Inlet.

There have been no major spills of consequence within Puget Sound to date although some spills have occurred in the Strait of Juan de Fuca and along the Pacific Ocean shoreline. The recorded spills did not result in major bird or animal kills nor were significant effects registered on long term marine conditions.

Urban development and forest cutting practices along the shoreline seriously impact the marine environment by increasing the amount of suspended solids, pollutants, or freshwater entering marine areas. Suspended solids that may be introduced into saltwater reduce light penetration, increase sediment deposition, increase water temperature, affect dissolved oxygen and pH balance, thereby affecting all forms of marine habitat.

An increase in turbidity as slight as 1% reduces light penetration and affects kelp and eelgrass beds. An increase in sedimentation levels smothers eelgrass beds in shallow areas, as can long term exposure to sewage effluent.

Sedimentation created by natural or urban erosion covers shellfish beds and fish spawning gravel. Shellfish beds can also be contaminated by chemical and bacterial discharge, and virus created by agriculture practices, animal defecation, failing septic drain fields, sewage out falls, and storm water runoff. Contaminants may not harm the shellfish, but adversely affect the bird populations that feed on the shellfish.

Toxic contaminants contained within urban storm water runoff or industrial discharge can poison the marine water column and sediments creating tumors and poisonous concentrations in fish and invertebrate species.

Bulkhead, dock, and other waterfront constructions reduce the natural shoreline and affect the rate of natural beach deposition resulting in loss of vegetation and the shoreline and inter-tidal habitat that supports herring, smelt, and other fish spawning areas.

Exotic, invasive species can also place marine habitats at risk.

- *Spartina alterniflora* - a cord grass that invades inter-tidal habitats in Puget Sound, has been removed from some locations around Jefferson County, but could return and needs to be closely monitored.
- *Sargassum muticum* - an algae that invades eelgrass meadows and kelp beds, is very prevalent in Admiralty Inlet and Hood Canal.
- *Zostera japonica* – an eelgrass that invades native eelgrass meadows and non-vegetated mudflats, has been identified in outer Discovery and Dabob Bays.

### **Estuarine habitat**

Some estuarine areas have been filled or drained in the past by grading activities - especially about the edge of the developed waterfront. The remaining free flow estuarine zones may be protected by the Shoreline Management Act - which virtually prohibits further alterations.

The greatest risks to estuarine zones are contaminants that may enter the saltwater from oil transportation hazards and recreational boating activities, and from freshwater by way of general storm water pollution from agriculture, septic failure, and other degradations. Water quality risks are dramatically increased where land development activities occur along the freshwater streams that feed the estuarine zones.

### **Freshwater habitat**

Some freshwater courses have been altered in the county by landfill or piped diversions. Past development actions adjacent to urban areas, particularly the shorelines and waterfronts, have filled valuable wetland habitat areas.

The greatest risks to freshwater zones are contaminants that may enter the storm water runoff from agriculture, septic failures, and other urban land uses. Water quality risks are also dramatically increased where land development or timber-clearing activities increase erosion and silt and/or clear vegetation within the riparian buffer along the freshwater corridor.

Development activities most adversely affect the quality of freshwater habitat by removing vegetation, increasing silt, organic debris, and other storm water contaminants that enter the natural drainage system. Generally, studies have determined that the hydrological balance of a stream begins to decline when 12% of the watershed becomes impervious.

### **Terrestrial habitat**

The clearing of lands for agriculture and urban land developments has permanently lost considerable terrestrial habitat. Commercial forest management practices have replanted timber clear cuts with single species, reducing wildlife diversity and isolating habitat and migration corridors, particularly along riparian areas.

Fire fighting practices, particularly of wildfires that would otherwise occur from natural forces, have reduced the amount and varying availability of meadowlands and other open areas necessary for foraging activities.

The greatest risk to the terrestrial habitat, however, is the continued pace of commercial logging and urban land conversions - particularly land development patterns that block or demolish migration corridors, log timbered areas, remove riparian cover, erode productive topsoil, and introduce urban activities - potentially including intense recreational uses - into wildlife areas. Careless logging practices have often led to serious soil erosion and the degradation of slopes.

As the most important habitats are isolated, the wildlife species decline in diversity and number. Urban tolerant species, like raccoons and crows, invade the remaining habitat from the urban edges, supplanting and driving out remaining native species.

## **2.7 Land use implications**

Marine, estuarine, freshwater, and terrestrial habitats contribute to the overall biological diversity of the region and provide a number of additional environmental functions and values of interest to island residents. Many species depend on the constant interaction of all four of these habitat systems for food, cover, nesting, and other survival requirements.

Some plant, fish, and wildlife habitat will irretrievably be lost as the peninsula population continues to grow. These impacts can be minimized, however, by sensitive land use patterns, innovative design concepts, and performance oriented development standards that:

- replant - native vegetation along the shoreline and tidal boundaries, within the estuarine zone, and along drainage corridors,
- remove - artificial shoreline constructions, barriers to the mixing of salt and freshwater, and freshwater impoundment or diversions,
- control - storm water runoff content and quality that enters the marine estuary system and within the fresh watershed in natural impoundment on-site where pollutants can be separated from natural drainage,
- cultivate - berry or fruit plants that support and retain native species, and
- cluster - roadways and other improvements to preserve natural shorelines and contiguous open spaces as common lands.

Portions of the most critical remaining habitat, like mature shoreline trees, snags, and downed logs, if retained, can sometimes allow wildlife species to coexist in urban areas.

The most effective preservation strategies, however, separate the most intense urban activities from the most sensitive habitats by creating beach, inter-tidal, estuary, and woodland conservancies, open space corridors, and other protected areas.

Where appropriate, the park, recreation, and open space plan should preserve and enhance the most critical and unique habitat areas by purchasing development rights or title for resource conservancy parks.

## **2.8 Historical development**

### **Indian settlements**

The arrival of Indian groups in the Pacific Northwest cannot be dated with great precision. However, archaeological investigations at the Manis mastodon site near Sequim on the Olympic Peninsula indicate man was in the area as early as 12,000 years ago.

There are more than 5,000 Indian sites on record in the state, a few of which have been professionally evaluated. Generally, sites are located at river conjunctions within valleys and along the shoreline of Puget Sound. Known sites have been grouped into three rather broad time periods:

- early sites - approximately 12,000-8,000 years old,
- middle-period sites - between 8,000-3,000 years old, and
- late period sites - about 3,000 years old.

A large number of different Indian tribes and bands inhabited the Pacific Northwest region with varied life-styles and different languages, dress, ceremonies, and adornments. Tribal characteristics are generally distinguished between the coastal tribes of western Washington and those of the interior. In general, the coastal tribes depended on the rivers and tidal waters for staple foods whereas the interior tribes relied more heavily upon plants and berries, as well as game and other animals.

Jefferson County was inhabited by several tribes of indigenous Salish-speaking people, and by 2 tribes of another (Chimakuan) linguistic family. The Quillayute and Quinault tribes occupied the West End, the Clallam, Chimacum, and Twanados tribes occupied the eastern section of the county.

The Quillayutes and Quinaults were expert whale and seal hunters, and traders. Warfare was frequent between the tribes of the coast ranging from the Columbia River to Vancouver Island. Warfare caused inter-tribal strife, particularly with the Makah, but did not prevent trade. Fishing and logging are still primary occupations of the Quinault and Quillayute tribes.

The Quillayutes and the Chimacum tribes were the only non-Salish-speaking peoples on the Olympic Peninsula. Legends identify the tribes as a single people who were separated by a great flood. The peoples that were separated located at Port Hadlock and became the Chimacum, who lived in the area until their extinction.

Chimacum tribal numbers were small, even in the late 18th century. The tribe fished and clamed along the coast and Chimacum Creek. The Chimacum were particularly warlike – although they were decimated by disease rather than by warfare. Their numbers diminished until the remaining members were virtually annihilated in a raid by the Clallam and Suquamish tribes in an encounter led by Chief Seattle of the Suquamish.

Members of the Clallam tribe, one of the most powerful and warlike of the Salish-speaking people along the Washington coast, occupied the eastern portion of the county formerly held by the Chimacums. Chief Chetzemoka of the Clallams acted as arbiter in the conflicts between the tribe and early settlers.

Indian encampments consisted of tribal groups that may have numbered more than 250 persons per group in densities of 4-10 persons per square mile. One of the most important sites was the village of Tsetsibus located in the Port Hadlock area at the site of present day Port Hadlock Marina and Inn, Skunk Island, and the adjacent waterfront. The site may have been occupied for up to 7,000 years, had permanent buildings, covered up to a square mile, and was referred to as the capital of the Puget Sound Clans. Old Patsy held the last great potlatch at the site in the 1890s.

The Organic Act of 1848 established Oregon Territory and also provided the first guarantee of Indian rights. The first comprehensive Indian agreement was negotiated by the Indian Treaty Act of 1850. The act authorized negotiations with the tribes located west of the Cascades and surveyed public lands for the Oregon Donation Act.

Isaac Stevens, territorial governor of Washington, and Joel Palmer, superintendent of Indian affairs in Oregon Territory, concluded treaties with the coastal tribes. The Quinault and Makah Reservations were located on the coast under the terms of the original 1854 Treaty.

### **Early expeditions**

The first exploration of Puget Sound was accomplished in 1792 by British explorer Captain George Vancouver – who named Port Townsend (Port Townshend). Vancouver sent several exploration parties out from Port Townsend, including one headed by the expedition botanist, Archibald Menzies, who named Mount Rainier.

The next major expedition of the Puget Sound region was the United States Exploring Expedition or Wilkes Expedition in 1838 under the direction of Lieutenant Charles Wilkes. The expedition's purpose was to chart more accurate and detailed maps and to determine if the United States should acquire the Oregon country.

In 1841, Wilkes sailed 2 ships for the Oregon Country entering the Strait of Juan de Fuca and anchoring in Port Discovery. The expedition explored the entire Puget Sound region.

### **Jefferson County settlers**

Jefferson County was settled for fishing, logging, and farming purposes beginning in the late 1800s. Early settlements were devoted to canneries, breweries, sawmills, and shipbuilding.

Ships from every nation moored in the harbors at Port Townsend, Port Ludlow, Port Hadlock, Irondale, and Discovery Bay. Speculative town sites were laid out in Port Townsend and Irondale in anticipation of industrial enterprises. Settlements were pushed further into the frontier founding communities at Brinnon, Quilcene, Chimacum, Nordland, Discovery Bay, and the Hoh River that survive today.

Early speculative developments ended in economic disaster when the transcontinental railroad stopped at Tacoma and Seattle. County population recovered with the development of Fort Worden and Fort Flagler during both World Wars, but declined with the withdrawal of military personnel thereafter.

### **Protection Island**

In 1914, the superintendent of the quarantine station at Diamond Point at the western entrance to Discovery Bay proposed to use the island as a leper colony. In the 1920s and 1930s, a private gun club raised and hunted pheasants on the island. In the 1950s promoters attempted to develop the island for residential use but failed due to lack of water.

The island was eventually designated a national wildlife refuge set aside for nesting rhinoceros auklets, pigeon guillemots, black oystercatchers, and glaucous-winged gulls. The island has reverted to the natural state and is off-limits to the public.

### **Discovery Bay**

In 1792 Captain George Vancouver dropped anchor and sent men ashore to cut a new spar for his flagship, the sloop Discovery. Vancouver noted that the shore provided the finest spars the world produces.

From 1852 to 1892 the SB Mastick Company of San Francisco operated a Discovery Bay sawmill that spawned a company town of 300 residents including a "Chinamen's Gulch" where Chinese workers lived. Mastick's sloop, the War Hawk, loaded lumber at the end of a long wharf and made regular voyages to sell the spars in San Francisco.

### **Port Townsend**

Homestead claims were filed on Port Townsend in 1851, 6 months before Seattle's pioneering Denny party landed at Alki Point. Alfred Plummer and Charles Bachelder came by canoe from Steilacoom to farm and supply salted salmon and timber for Captain Lafayette Balch, a trader. Francis Pettygrove and Loren Hastings families moved north from Portland a few months later.

In 1854 the US Customs office moved here from Olympia to avoid forcing sea captains to sail the length of Puget Sound before landing. Isaac Ebey was the appointed customs collector who campaigned to move the official port of entry to the site.

Port Townsend was originally a native settlement occupied by Chief Chetzemoka and the S'Kallam tribes following the annihilation of the Chimacums. Following the Point No Point Treaty in 1855, the tribe was relocated from the site to the Skokomish Reservation at the base of Hood Canal. The waterfront longhouses were burned to make way for the town's development.

Initially, Port Townsend's economy depended largely on San Francisco gold rush requirements for timber. The gold discoveries in 1858 and 1860 on the Fraser River and in the Cariboo District of British Columbia drew thousands of miners through the town and port.

In the 1880s, the town embarked on a speculative venture to develop a railroad line from the Columbia River to the city. Local boosters formed the Port Townsend & Southern Railroad and laid a mile of track hoping to promote the city as the western terminus of the Union Pacific's intercontinental railroad line. In 1889, the Oregon Improvement Company (a Union Pacific subsidiary) bought the token track, accepted land donations for a terminal, and promised to continue the line to Portland. Speculators embarked on a massive building spree constructing 6 banks, 3 hotels, and numerous commercial buildings.

Union Pacific employed 1,500 men, laid 20 miles of track and by 1890 shuttled trains back and forth between Port Townsend and Leland Lake. Nothing happened, however, on the Portland end of the proposed line. In 1895 the Oregon Improvement Company went bankrupt. Receivers of the company continued the tracks almost 5 miles to Quilcene then stopped. The city boom went bust preserving in the process over 70 individual Victorian commercial and residential buildings.

### **Irondale**

In 1879 Samuel Hadlock, platted the Hadlock townsite, then joined with other local businessmen to incorporate the Puget Sound Iron Company. The company planned to use bog iron from Chimacum, charcoal and limestone from Roche Harbor, and a 38-foot conical furnace built on Irondale beach near Chimacum Creek.

The company began major operations in 1881, building 20 kilns to create charcoal, and employing 400 men to mine and smelt the ore. The high-quality iron was successfully sold in San Francisco. The plant closed in 1889, however, due to management, machinery, and import duty problems.

The company reorganized 12 years later to successfully produce steel at the site. By 1910, Irondale had steam heat, electric lights, a newspaper, 6 stores, a contract for a hospital, and a signed agreement to import ore from China. The plant was producing nearly 700 tons of finished steel per week. In 1911, however, the east coast Carnegie Trust suspended operations and entered into bankruptcy. Irondale collapsed and except for a brief period during World War I, was eventually dismantled.

### **Hadlock**

The Washington Mill Company of San Francisco operated a sawmill across the bay from Port Hadlock when its huge Seabeck mill burned in 1886. The Port Hadlock wharf could accommodate the multiple schooners needed for the company's business operations.

In 1907, the company closed the mill due to a severe drop in lumber prices. Company president William J Adams (grandfather of Ansel Adams the photographer) decided to try a new method of turning softwood sawdust into alcohol. He bought patent rights, secured technical assistance from the parent firm in France (Classen Chemical Company) and began plans to operate the distillery at Hadlock. For a variety of reasons, the plant was never successful and closed in 1913 to remain derelict for 65 years until remodeled into the Hadlock Marina complex.

### **Chimacum**

In 1853, William Bishop and William Eldridge, with 5 other crewmen from a British man-of-war, jumped ship in Victoria and rowed to the Olympic Peninsula. The two men claimed land in Center Valley, started a series of business ventures, and raised large families, whose members intermarried.

In the 1920s, author Betty McDonald settled in Beaver Valley to raise chickens. Her memoir, *the Egg and I*, included the characters Ma and Pa Kettle.

### **Port Ludlow**

In 1853 San Francisco investors sent WF Sayward to Port Ludlow to build a small sawmill. In 1879 the Pope & Talbot Company bought the mill and rebuilt the complex into a major facility. Cyrus Walker, manager of the company's mill in Port Gamble, added the Port Ludlow operation to his responsibilities. Under Walker's guidance, the company gradually acquired significant forest landholdings.

In 1885, Walker married Emily Talbot and lived in the manager's house at Port Gamble until it burned. They moved to a new mansion (Admiralty Hall) in Port Ludlow where Walker oversaw all aspects of the operation from the front veranda and ground floor offices. Market fluctuations gradually diminished the importance of the Port Ludlow mill, and eventually all company operations were concentrated at Port Gamble. The Walkers moved to San Francisco, and the Hall, company buildings, and other improvements were gradually moved, dismantled, or burned until Pope & Talbot began development of the current resort complex at the site.

### **Quilcene**

In 1860 Hampden Cottle, a logger from Maine, settled in Quilcene cutting tree roots for ships knees. The city was the early terminus of the proposed Union Pacific Railroad line between Port Townsend and Portland – that ended in bankruptcy.

In 1902 the Tubal Cain Mine began operations in the upper Dungeness basin. Backers expected the mine to become a smelting center rivaling Tacoma. By 1905, the mine had a camp with 2 bunkhouses, a cookhouse, and a blacksmith shop at the east tunnel mine for manganese. A west tunnel for copper had a guesthouse, barn, sawmill, powder house, and a snow shed. Operations were discontinued in the 1920s with very little ore production.

### **Brinnon**

In 1860 Elwell P Brinnon took a donation of land at the Dosewallips River mouth and married the sister of Chetzemoka, the S'Kallam headman. Since the Dosewallips had various spellings, early settlers decided on the name Brinnon. In 1890, the prospect of a potential rail connection to Portland stimulated settlement and logging leading to the construction of a wagon road to Quilcene.

By 1907, Brinnon's population was 120 with a hotel, justice of the peace, a creamery, and shingle mill. Log drives on the Dosewallips and Duckabush Rivers moved timber to saltwater until the 1920s when rail logging took over.

### **Fort Worden and Fort Flagler**

Early military fortifications were built in response to the Indian Wars in 1856 and included forts at Seilacoom, Bellingham, and Port Townsend. When the Puget Sound Naval Shipyard was opened in Bremerton in 1896, the 50-year-old forts became wholly inadequate.

Secretary of War William C Endicott submitted a revolutionary plan for the construction of camouflaged forts of reinforced concrete armed with rifled cannons on disappearing carriages to provide coastal defense. Congress authorized the construction of 3 new forts for Puget Sound – Fort Worden, Fort Flagler, and Fort Casey on Whidbey Island. The 3 forts were an integral part of the Harbor Defenses of Puget Sound Defense housing the 248th and 14th Coast Artillery Regiments. All 3 installations included extensive grounds providing Victorian period officers quarters, dormitories, theaters, chapels, parade grounds, and other support buildings.

The 3 forts were fitted with state of the art equipment for World Wars I and II - but were never engaged. The grounds were used for training exercises during both wars, but eventually disbanded and sold to the state for state parks.

### **Olympic National Forest and Park**

Olympic National Forest was established in 1897 as a forest reserve, then 9 years later as Mount Olympus National Monument. The monument designation was intended to preserve elk, which were being hunted to the point of possible extermination for their teeth – popular as watch fobs. The elk's winter range was later removed from protection – restoring huge stands of cedar and spruce for possible logging.

Congress began considering designation of the site as a national park in 1936. Following a visit by President Franklin D Roosevelt, the bill was finally approved in 1938. The national park was expanded in 1956 to provide protection to an ocean corridor protecting the beaches and adjacent land along the Northern Coast of the Olympic Peninsula.

Olympic National Park and Olympic National Forest have been designated a UNESCO World Heritage Site (one of only 112 worldwide) and an International Biosphere Reserve.

### **The present**

Specialized recreational, retail, and small business centers have developed in Port Townsend, Chimacum, Port Hadlock, Quilcene, and Brinnon that provide services to local residents during the year. During the spring and summer seasons, the county, Port Townsend in particular, attracts a large number of recreation and tourist interests. The historical structures and scale of development within the older developed areas provide a major source of interest and value to present county residents and tourists alike.

## **2.9 Population and housing**

Jefferson County was established as a county in 1852. The resident population increased on a gradual basis with peak periods in 1910, 1950, and present day, and bust periods in 1920 and 1960 due to economic downturns.

Early residents were employed in fishing, agriculture, forestry, and some limited manufacturing activities. Current residents are increasingly employed by manufacturing, service, and related enterprises located in Port Townsend or elsewhere in Clallam or Kitsap Counties.

Between 1990 and 2000, the county population increased from 20,406 people in 1990 to 25,953 in the year 2000 at an annual average rate of 8.3%. The rate of population increase was higher than urban Puget Sound or Washington State for the same period.

Jefferson County population projections - according to the Washington State Office of Financial Management (OFM), Jefferson County will increase in population to 44,822 persons by the year 2020 or by 73% more people than existing. The annual average growth rate will gradually decline from 4.9% per year between 2000-2005 to 1.9% per year between 2015-2020. Even so, the annual average rate is expected to be higher in Jefferson County than in Washington State or urban Puget Sound.

The population of Port Townsend reflects the same boom and bust cycle as the county – since the city is the major economic enterprise in the area. Approximately 32% of all county residents resided in the city in the year 2000, compared to 34% in 1990.

The percent of all county residents that may reside within an incorporated urban area may increase in the future if the county expands the urban growth areas to include areas of rapid suburban development around Port Townsend, in Glen Cove, and the Chimacum areas.

Socioeconomic characteristics - the US Department of Census compiled demographic statistics for jurisdictional areas in 2000 including Washington State, Jefferson County, and Port Townsend.

According to the statistical findings, the population within Jefferson County had socioeconomic characteristics that were significantly different than the averages typical of the state. The statistics indicate residents of Jefferson County are likely to be older and living in childless households with recreational interests that coincide with these socioeconomic characteristics.

*Population projections by nation, state, region, county and city*

	United States	Washington State	Puget Sound (King/Kitsap/Pierce/Snohomish Counties)	Jefferson County (1852)	Port Townsend (1860)
1900	76,094,000	518,100	196,285	5,712	3,443
1910	92,407,000	1,142,000	492,306	8,337	4,181
1920	106,466,000	1,356,600	634,254	6,557	2,847
1930	123,077,000	1,563,400	736,996	8,346	3,970
1940	132,594,000	1,736,200	820,202	8,918	4,683
1950	152,271,000	2,379,000	1,196,172	11,618	6,888
1960	180,671,000	2,853,200	1,512,979	9,639	5,074
1970	204,879,000	3,413,300	1,938,899	10,661	5,241
1980	226,500,000	4,132,200	2,240,437	15,965	6,067
1990	250,410,000	4,866,692	2,748,895	20,406	7,001
2000	268,266,000	5,894,121	3,275,847	25,953	8,334
<b>Forecasts</b>					
2005	275,604,000	6,291,772	3,454,780	33,001	
2010	282,575,000	6,693,329	3,660,179	36,747	
2015	288,997,000	7,142,148	3,888,572	40,766	
2020	294,364,000	7,610,090	4,122,117	44,822	

**Annual average percent change by increment**

1900-1910	2.0%	8.2%	9.6%	3.9%	2.0%
1910-1920	1.4%	1.7%	2.6%	-2.4%	-3.8%
1920-1930	1.5%	1.4%	1.5%	2.4%	3.4%
1930-1940	0.7%	1.1%	1.1%	0.7%	1.7%
1940-1950	1.4%	3.2%	3.8%	2.7%	3.9%
1950-1960	1.7%	1.8%	2.4%	-1.9%	-3.0%
1960-1970	1.3%	1.8%	2.5%	1.0%	0.3%
1970-1980	1.0%	1.9%	1.5%	4.1%	1.5%
1980-1990	1.0%	1.6%	2.1%	2.5%	1.4%
1990-2000	0.7%	1.9%	1.8%	2.4%	1.8%
<b>Forecasts</b>					
2000-2005	0.5%	1.3%	1.1%	4.9%	
2005-2010	0.5%	1.2%	1.2%	2.2%	
2010-2015	0.5%	1.3%	1.2%	2.1%	
2015-2020	0.4%	1.3%	1.2%	1.9%	

Sources:

US Bureau of the Census, Current Population Reports, Series P-25, Number 1018, Mid Series 14: fertility=1.8 births/woman, mortality=81.2 years, 500,000 yearly net immigration.

Washington State, Office of Financial Management, Forecasting Division, OFM Forecast December 2001 for GMA Projections, Medium Review  
Washington State Data Book, Office of Financial Management