

DATES TO REMEMBER

❑ **Until May 26: Course evaluation period.**

Check your Hunter e-mail for instructions.

Smartphone: www.hunter.cuny.edu/mobile Computer: www.hunter.cuny.edu/te

✓ **TODAY May 12: REQUIRED ROADTRIP EXERCISE** DUE; late penalty assessed starting May 13.

❑ **May 16:** Last class lecture and **last day for pre-approved extra credit** (paper or other project).

❑ **May 23: Exam III: The Final Exam**

- From 9 to 11 AM << note different time from class
- Same format as exams I and II.
- **Last day** to hand in Exam III extra credit exercise and "Landscape Analysis" extra credit option.

Regional Landscape Studies

- ✓ NORTHLANDS
- ✓ NORTHEAST COAST
- ✓ MEGALOPOLIS
- ✓ CANADA'S NATIONAL CORE
- ✓ AMERICA'S HEARTLAND
- ✓ APPALACHIA and the OZARKS
- ✓ THE SOUTH
- ✓ GREAT PLAINS and PRAIRES
- ✓ MOUNTAINS, PLATEAUS and BASINS: The Empty Interior
- ✓ DESERT SOUTHWEST
- **NORTH PACIFIC COAST**
- ❑ HAWAII

<<<For each region:

1. Know its physical geography.
2. Identify its unique characteristics.
3. Be able to explain the human imprint.
4. Discuss its sequence occupancy and economic development.

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Regional Landscapes of the United States and Canada North Pacific Coast

Prof. Anthony Grande

©APG 2017

North Pacific Coast

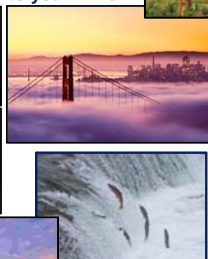
Review Ch 1, 2, 8, in Text; Sec. 4 in Atlas

- ❖ **Elongated, isolated coastal area of western N. America (34°N to 63°N)**
- **Over 4,000 miles long but less than 150 mi wide** (most of it is <100 mi wide).
- 1. Runs north from the **Los Angeles Basin**.
- 2. Past **San Francisco Bay**.
- 3. Along coastal **Pacific Northwest** and **British Columbia** (with Vancouver Is), **Inland Passage** and **Alaska Panhandle**.
- 4. Turns W at **Gulf of Alaska Coastal Plain**.
- 5. Follows the **Alaska Peninsula** and the **Aleutian Islands** for over 1,200 miles.
- 6. Ends at **Attu Island** near the International Date Line in Pacific Ocean.



North Pacific Coast

When you think about this region, what images come into your mind?



Cloudy days
Volcanoes
Dense forests
Hydroelectricity
Rugged coastlines
Seattle/Vancouver
Cruise ships/Fjords
Totem poles
Salmon

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OVERVIEW: Physical Geog.

- ✓ **Composed of three distinct sub-regions.**
- ✓ **Marine subtropical climate dominates**
 - Wettest area of North America; ice free harbors.
- ✓ **Tall parallel N-S trending coastal mountain ranges**
 - Intercept westerly winds from Pacific Ocean
 - Irregular, rocky coastline with little or no coastal plain.
 - Warmer but drier (rain shadow) fertile lowlands between them.
- ✓ **Geologically active area.**
 - Shaped by: volcanism, earthquakes, mass movements.
 - North: glacier-carved valleys flooded by the sea – fjords.
 - South: large fast flowing rivers fed by rainfall and snowmelt.
 - Tsunami danger: from undersea tectonic activity.
- ✓ **Heavily forested.**

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OVERVIEW: Human Geog.

- ✓ **Isolated from the rest of N. Amer. by site and situation** (difficult transportation between areas).
- ✓ **Over 150 distinct Native American ethnic groups** each located in small coastal valleys (isolated from each other).
- ✓ **Explored by Spanish, Russians, British, Americans.** Historic British and American claims on the "Oregon Country."
- ✓ **Low population density** with few large cities.
- ✓ **Aleutians had a strategic location in WWII and Cold War**
- ✓ **Diversifying economy** but still dominated by primary activities: lumbering, fishing, agriculture.
- ✓ **Fastest growing area is SW British Columbia.**

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Subtropical "C" Climate Predominates

- Major climate controls are:
- ✓ Westerly winds
 - ✓ Ocean current temperature
 - ✓ Tall north-south mountains with vertical zonation (H).

Variations due to latitude, elevation and situation. Coast of Alaska gets **less rain and snow** than areas further south. Pacific storms do not make it that far north.

Cfb/Cfc: Marine West Coast (cool summers/precipitation every month is **unique to this area of North America** (coastal OR/WA/BC/AK))

Csb: Mediterranean (cool dry summer) found along California coast north of Santa Barbara.

Csa: Mediterranean (hot dry summer) found in the Central Valley.

Dfc: Humid continental (cold and damp) found on the Aleutian Is.

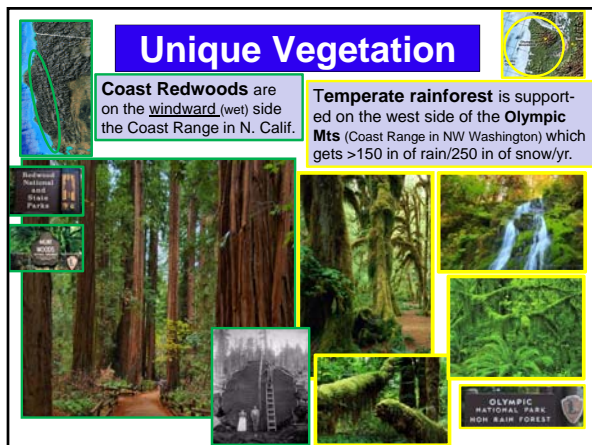
H: Highland (vertical zonation) found in the mountains.

- **Warm ocean current** prevents harbors from freezing during winter even at 60°N.
- **Cold ocean current** creates California's coastal fog as warm air blows over cold water.

Unique Vegetation

Coast Redwoods are on the **windward (wet)** side the Coast Range in N. Calif.

Temperate rainforest is supported on the west side of the **Olympic Mts** (Coast Range in NW Washington) which gets >150 in of rain/250 in of snow/yr.



Unique Vegetation: Sequoia

Giant Sequoias are found on the windward side of the Sierra Nevada Mts.



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Subregion 1: California Coast

California Coast subregion extends westward from the foothills of the Sierra Nevada and north of the Los Angeles Basin.

Includes:

Central Valley of California
San Francisco Bay Estuary
Coast Ranges



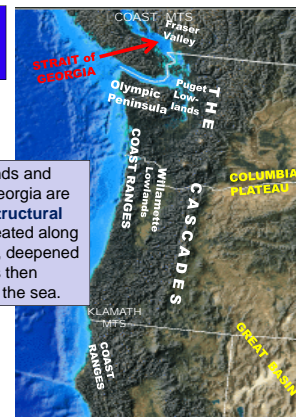
Subregion 2: Pacific Northwest

Pacific Northwest subregion

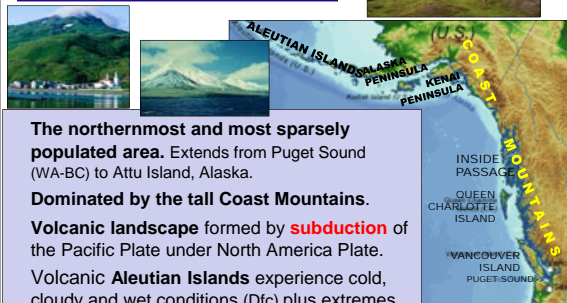
includes NW California, W Oregon, W Washington and SW British Columbia.

- Klamath Mts.
- Coast Ranges
- Cascades
- Coast Mts
- Puget Lowlands
- Fraser Valley (lowland)
- Willamette Lowlands
- Strait of Georgia

The lowlands and Strait of Georgia are part of a **structural trough** created along a fault line, deepened by glaciers then flooded by the sea.



Subregion 3: Coastal BC and Southern Alaska



The northernmost and most sparsely populated area. Extends from Puget Sound (WA-BC) to Attu Island, Alaska.

Dominated by the tall Coast Mountains.

Volcanic landscape formed by **subduction** of the Pacific Plate under North America Plate.

Volcanic **Aleutian Islands** experience cold, cloudy and wet conditions (Dfc) plus extremes of daylight hours (high latitude location).

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Earthquakes and Volcanoes

Entire Pacific Northwest Coast region exists on the NE margin of the Pacific "**Ring of Fire**," a geologic zone of earthquakes and volcanism.

Dots show epicenters of major earthquakes.



The magnitude 9.2 Great Alaska Earthquake (aka Good Friday Earthquake) that struck south-central Alaska on **March 27, 1964**, is the **largest recorded earthquake in U.S. history** and the second-largest earthquake recorded with modern instruments. **The earthquake generated a tsunami which devastated Anchorage.**



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Alaska-Aleutian Convergent Zone

The Alaska Peninsula and Aleutian Islands experience volcanism because they are located along the boundary where the Pacific Plate goes under the North American Plate.

<http://www.avo.alaska.edu/map/index.php?map=volcanoes&other=volcanoes>



Southern Alaska's Volcanic Zone

Alaska has over 130 volcanoes. About 90 are classified as "active" and 50+ have had recent activity. **This region has over 70 of Alaska's volcanoes.**



Augustine eruption, 2006

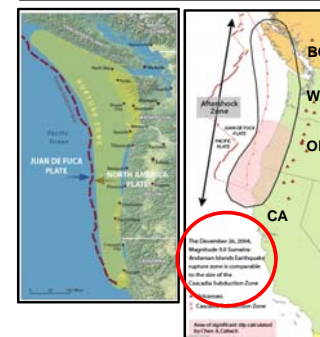


<https://www.avo.alaska.edu/volcanoes/about.php>
https://www.avo.alaska.edu/volcanoes/alaska_peninsula.php

Valley of 10,000 Smokes Katmai National Park



Undersea Cascadia Rupture Zone



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Tsunami Prone Coast

Coastal areas are in danger of destruction from tsunami waves esp. when the shape of the embayment and the configuration of the shoreline funnel water upward. Anchorage and Crescent City (CA) have been severely damaged by tsunamis.

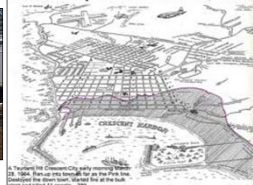
Houses built at the edge of cliffs "for the ocean view" can be undermined and may collapse.



8 ft waves from 2011 Japanese tsunami hitting Crescent City, CA marina.

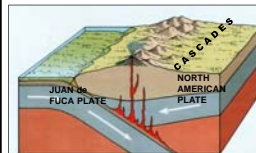


Crescent City Tsunami March 28, 1964



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Volcanism caused by Subduction



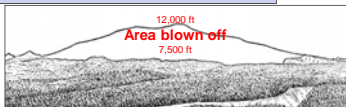
The Juan de Fuca Plate is being overridden by N. America Plate. As molten rock moves to the surface through fracture zones in the crumbled North America Plate, volcanoes are created.



Crater Lake, Oregon



FORMATION OF CRATER LAKE
About 7500 years ago, Mt. Mazama erupted with such force that 4,500 ft of its summit was blown off, creating a caldera that has since filled with water.



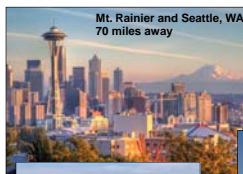
Eruption of Mt. St. Helens (1980)



<http://news.yahoo.com/magma-rising-washington-states-mount-st-helens-erupts-16242253.html?type=t>

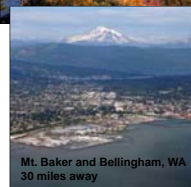
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Volcano Skylines

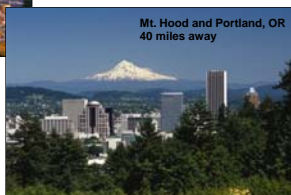


Mt. Rainier and Seattle, WA
70 miles away

Urban areas, on the coastal lowlands, have grown in the shadow of the Cascades and can be affected by an eruption



Mt. Baker and Bellingham, WA
30 miles away



Mt. Hood and Portland, OR
40 miles away

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Lahar

❖ **LAHAR:** volcano eruption-triggered massive fast-moving mudflow (ash, debris and water from melted snow). Greatest danger is at the end of winter when snowpack is thickest.

The creation of lahars is the chief concern of any volcanic eruption in the Cascades.

Evidence of historic lahars are found throughout the region including the suburbs of Seattle <70 mi from Mt. Rainier. Evacuation route maps are posted around the area.

Mt. St. Helens (1982 eruption)



A Lahar from the 1980 Mount St. Helens' Eruption



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Landslides and Mudflows

Landslides usually occur during and after an earthquake.



Mudflows occur towards the end of the winter rainy season, during a period of snowmelt and especially in areas that had brush fires at the end of the dry season.



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Landslides along Big Sur



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Coast Ranges

❖ **Linear folded mountain ranges** (3,000-5,000 ft high in CA; to 7900 ft in WA) rising from the sea and paralleling the coast from LA Basin to Seattle.

- The only **gap** is the Golden Gate.

❖ Coastline is characterized by **stacks** created by headland wave erosion.



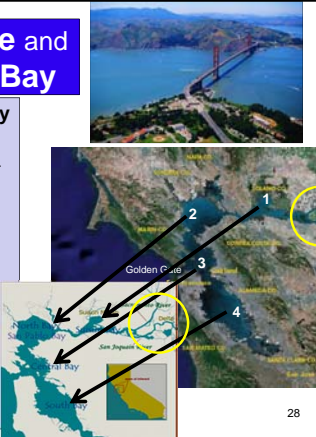
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The Golden Gate and San Francisco Bay

▪ **SF Bay is a tidal estuary** reached via a gap in the Coast Range (Golden Gate).

- Divided into four bays.
- Fed by Sacramento and San Joaquin rivers which create the Delta Region.
- Has water quality issues from both urban and agricultural pollution.

➤ **Six major fault zones** pass through it, giving the area its NW-SE alignment, and subjecting it to earthquakes.



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Central Valley of California

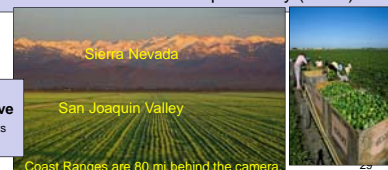


400 mi long and 90 mi wide, located between the Coast Ranges and Sierra Nevada.

Former inland sea; filled with sediment from rivers originating in the Sierra Nevada. Extremely flat and fertile.

Two sections: Sacramento Valley (north)
San Joaquin Valley (south)

Rain shadow area needs irrigation. Most productive general farming area (fruits and vegetables) of the US

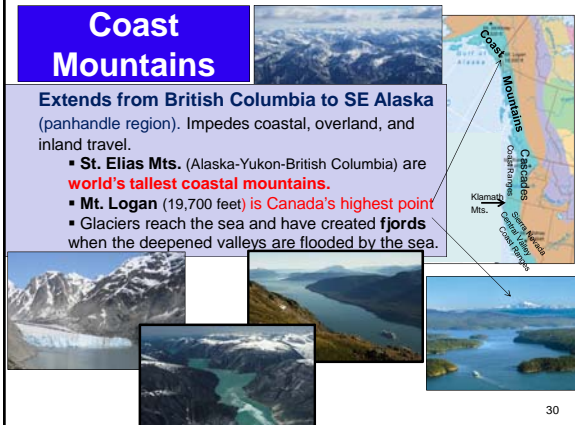


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Coast Mountains

Extends from British Columbia to SE Alaska (panhandle region). Impedes coastal, overland, and inland travel.

- **St. Elias Mts.** (Alaska-Yukon-British Columbia) are **world's tallest coastal mountains**.
- **Mt. Logan** (19,700 feet) is **Canada's highest point**
- **Glaciers reach the sea and have created fjords** when the deepened valleys are flooded by the sea.



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Alaska Panhandle/Coastal BC

❖ **Inside Passage** is a maze of deep, scenic navigable waterways between the islands.

Area was flooded by the sea at the end of the Ice Age. The islands are mountain tops.

Topography limits interaction with the mainland.

Travel is by boat, ferry and small airplane.

Overland travel along the length of the coast is difficult or impossible.



Strait of Georgia
Near Mt. Baker, WA



Juneau, Alaska

Native American Settlement

• **Native American population** was relatively large because of the **moderate climate** and abundant **year-round food supply**.

• **Culturally:**

- **100+ distinct ethnic groups**, each located in a small coastal valley.
- Had a close relationship with nature. Believe the natural world (fauna/flora) interact with a supernatural world. Existed by hunting, fishing, gathering.
- Built large, impressive plank houses and dugout canoes.
- **Totem Pole:** carved record on a log of person's life.



Tillamook Village



Haida Village



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Plank Houses of the Northwest

Plank houses are structures used by tribes of the Northwest Coast (California to Alaska). The houses are made of long, flat planks of cedar wood that are lashed to a wooden frame. There are no windows. A hole in the roof vents smoke from the fire pit.



Totem poles are placed outside the structure to protect inhabitants from evil spirits. The carvings tell a story about the family or the place.



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European Arrival

❖ **Last area of N.Am. to be explored by Europeans** (because of the distance)

- **Juan de Fuca** (1592) for Spain
- **Vitus Bering** (1740) for Russia
- **James Cook** (1778) for Britain
- **Lewis and Clark** (1804) for USA

1792 George Vancouver expedition in Queen Charlotte Sound. HMS Discovery on the rocks



❖ **Russian Settlement**

- **First settlements late 1700s.**
 - Fur-trading posts from SE Alaska to N California.
 - Never self-sufficient in food; expensive to maintain.
 - Conflict with the British and Americans over Oregon.
- **Russia sold Alaska to the U.S. in 1867** for \$7.2 mil fearing Britain would seize it.
- Evidence of Russian settlement remain in places names, building design and Russian Orthodox churches.



Fort Ross St. Hil. Site, Sonoma, CA

British Settlement in the Northwest

• **Hudson's Bay Company**

- Controlled fur-trading in Columbia Basin (Rupert's Land)
- Dominant force in the area (Oregon to British Columbia) until the 1830s.

▪ **Victoria** (1843) is at southern tip of **Vancouver Island**; strategic overlook on the Strait of Juan de Fuca.

▪ **Vancouver** (1867) is on the mainland.

- Established as a sawmill site; logs were floated down river from mountain-side lumber camps into the harbor.
- Protected harbor made it a seaport.
- **Terminus of the transcontinental Canadian Pacific Railway** (1886).



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American Expansion

See maps in Historical Atlas pp. 23, 32, 33, 34, 36, 42, 46, 47



- Explored by **Lewis and Clarke** in 1804-07.
- **John Jacob Astor** established fur trade company (1810); Fort Astoria (now Astoria, OR) at the mouth of Columbia River is the first US settlement (1811) in Pacific Northwest.
- **Treaty of 1818** extended the US-Canada border along **49°N latitude to the Rocky Mts.**, not to the coast.
- US and Great Britain jointly administer **Oregon Country** (Rocky Mts. to Pacific Ocean) from 1818-46.
- **American settlers arrive** via the **Oregon Trail** to Oregon's Willamette Valley (1840s).
- By late-1840s Americans in **Oregon Territory** were pushing for statehood.

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Contested Northwest

- **Pacific Northwest was contested in the early 1800s:** Russia (Alaska), Great Britain (Canada), USA (Oregon) and Spain (Mexico).
- **Explored by Lewis and Clark** (1804-07).
- **John Jacob Astor** established a fur-trading post at mouth of Columbia River (1811).
- **Spain withdrew claims** after Mexican independence (1824).
- **Mexico ignored** the area N of California
- **US and Great Britain jointly administer "Oregon Country"** (1818-46).
- **American settlers arrive** via the Oregon Trail (1840s); push for statehood.



See maps in Historical Atlas pp. 23, 32, 33, 34, 36, 42, 46, 47

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Oregon Country

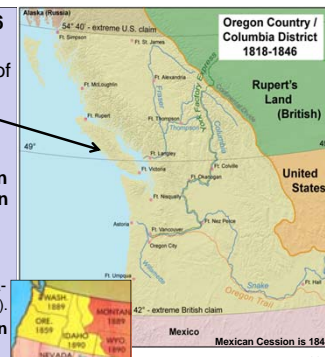
The **Oregon Treaty of 1846** set the boundary at 49°N latitude with the exception of Vancouver Is.

While politically acceptable, it disrupted N-S movement in Puget Sound and on the Columbia River.

Becomes **Oregon Territory** in 1848 and the **State of Oregon** in 1859.

Washington Territory (WA/ID) was created by Congress (1853) at the urging of a growing population around Puget Sound (Seattle).

Washington becomes a state in 1889 and **Idaho** in 1890.



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Regional Economy

Characteristics:

- Production of **staple products**: wood, fish, agriculture (primary sector).
- **Distance from major markets** of US&C increases costs.
- **Cheap electricity is a asset.**
- **Tourist industry is growing.**



Willamette Valley, OR



Forestry

❖ Chief economic activity

- ✓ BC: 54% of Canada's timber.
- ✓ WA, OR, CA: 50% of U.S. total.

▪ Large-scale logging activity

- ✓ **Clear-cut harvesting method**: forest is cut down without regard to size and species of tree; area is replanted.
- ✓ **Mills are located within the forest** to sort and cut logs to proper lengths.

▪ Tree species vary with region

- ✓ **Douglas fir** major lumber tree.
- ✓ Trees are large; produce much square footage.

▪ Markets

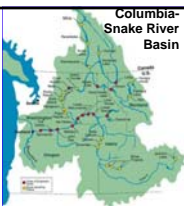
- ✓ Products are shipped great distances: all parts of US&C and Asia.



Hydroelectric Power and Dams

❖ Region's hydroelectric potential unmatched in North America

- Rugged topography and deep canyons (WA/OR have 40% of U.S. potential)
- Abundant precip with no dry season.
- Columbia River dams regulate water flow (flood control and navigation), impound water for irrigation and produce electricity and allows ocean-going ships to reach interior British Columbia.



Fishing

❖ Area of cold water species that once were the lifeline of the region, especially for Native Americans.

- Whale and salmon populations have been greatly reduced by overfishing and human interference.

▪ Dams on the rivers of the Pacific NW interfere with salmon migration to upstream spawning areas.

- **Fish ladders (steps)** are an attempt to help migrating fish move around dams.



<https://www.youtube.com/watch?v=naR1HvrdJENY>



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Shellfishing



Alaskan Red King Crab



Dungeness Crabs



Location of Razor Clam Beaches



Snow crabs





3

Present Population Distribution

- **Faster growth than national averages** in both the U.S. and Canada (population and economy).
- **British Columbia** is the fastest growing area.
- Home to **3% of U.S. population** and **10% of Canada's population**.
- Most people live within the **interior lowlands** from the Fraser River to Willamette Valley.
- **Few large cities:**

San Francisco	Metro: San Francisco, Oakland, San Jose
Fresno, CA	Sacramento, CA
Seattle, WA	Portland, OR
Vancouver, BC	Victoria, BC
	Bakersfield, CA
	Anchorage, AK

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Anchorage

- **Alaska's largest city** with about 300,000 people and 40% of its population.
- Established (1914) as a port for the construction of the Alaska Railroad.
- Grew as a **transportation hub** and military base because of its harbor and connections to the interior.
- Today is a shipping center.
- Devastated by 1964 earthquake and tsunami




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Vancouver

- Canada's **3rd largest** and **fastest growing** city (605,000 people).
- Metro area of more than 2.3 million people.
- **Western HQ for Canadian businesses.**
- Gateway to the Canadian Rockies (hosted the 2010 Winter Olympics) and interior Canada.
- **Tourist hub** for the Inside Passage.
- **Canada's busiest seaport:** Wood products; wheat.



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Seattle

- ❖ **Largest U.S. city of the Pacific Northwest** since late 1800s; has over 600,000 in city/3.5 mil metro area
- **Founded as a logging center**, became dominant with coming of RRs (1883) and as an **outfitting point to Alaska**, esp. after gold was discovered (1890s) in the Klondike;
- **Second largest container port in U.S.**
- Since WWI, the **home of Boeing Aircraft.**
- **Diversification:** Computer technology (Microsoft); research & development, medical biotechnology, forest products, banking and finance.




Portland

- Has a pop. of over 590,000 people with a metro area of over 1 million.
- Ranks high among livable cities
- More diversified economy than Seattle's with better access to interior via Columbia River.
 - Shipment of grain from eastern Washington.
 - Large, deep port with easy access to the Pacific.
 - Iron and steel, clothing, food processing, computer technology





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