

## PART III

## Physical Description

Physical Regions of Washington

On the basis of surface features, Washington may be divided into eight general regions. Agricultural settlement is influenced by factors of topography, climate, soil, forest vegetation, and water resources distinctive to each of the physiographic regions. Each has become a different type of farming area as settlers have learned to adapt crops and livestock to the conditions, or have improved limitations through drainage or irrigation.

Coastal Plains

A narrow, sandy plain with shallow bays, tidal flats, stream deltas, and low headlands lies between the coastline and the Coast Range. It extends from the Columbia River mouth almost to Cape Flattery, being widest and lowest in the Grays Harbor and Willapa Bay districts. The climate is mild and damp with a long growing season, but it is too cool, cloudy, and wet for most crops. Originally this area was covered with heavy forests and much is now covered with woodlands. Lumbering and manufacture of wood products is the main industry. Farming is largely of the livestock and dairying type on low uplands and drained areas in the lower Chehalis River Valley. Cranberry growing is important and well-adapted to numerous, boggy areas in the Grays Harbor and Willapa Bay sections. The shallow bays are also used for oyster culture. Fishing is common in the rivers and coastal banks.

Coast Range

The Coast Range is an uplifted area of sedimentary and metamorphic rocks divided into the Olympic Mountains and the Willapa Hills. The Olympics tower to nearly 8,000 feet in a dome-like structure, carved deeply by rivers. These mountains have the heaviest precipitation in the state. Snowfields and heavy forest cover the mountains. Most of the wilderness area is within the Olympic National Forest and Olympic National Park, being managed for recreation, wildlife, and timber. Farm settlement is limited to some foothill river plains and coastal terraces such as the Dungeness and Port Angeles districts along the Strait of Juan De Fuca. Here in the lee of the mountains, rainfall is moderate and irrigation is practiced by some livestock farmers. The Willapa Hill country is wet, heavily forested, and carved into numerous narrow valleys. Logging is the main industry, combined with livestock farming in the upper Chehalis River Valley and along the banks of the Columbia River. Wet climate, hilly topography, and the difficulty of clearing stump land retards agriculture.

Willamette-Puget Sound Lowland

A broad lowland, described as a trough or valley, lies between the Coast Range and the Cascade Mountains. The northern part is the Puget Sound

Lowland which has been glaciated and occupied by the sea in the lowest sections. The continental glacier reached slightly south of Olympia. Under a warming climate it melted and geologists believe it receded about 25,000 years ago, leaving an infertile plain of moraines and outwash gravels, sands and clays known today as the Puget Glacial Drift Plain. Its rolling surface has numerous lakes and bogs. Most of the major cities--Seattle, Tacoma, Everett, Bellingham and Olympia--have been built on moraines bordering the Sound. Rivers such as the Nooksack, Skagit, Snoqualmie, White and Puyallup built up deltas and flood plains over the older gravelly plains. These narrow valleys are more fertile than the older glacial plains, and support numerous small dairy, vegetable and berry farms. Most of the gravelly areas are wooded with a second-growth forest and are used for pastures. In the southern part of the Willamette-Puget Sound Lowland, there are two large valleys--the Cowlitz and Chehalis. They drain a low, hilly area with several flat prairies and bottom lands.

Agriculture is handicapped by poor drainage and flooding of the river deltas and plains, by heavy winter rainfall, by cloudy but dry summers, by coarse, gravelly upland soils, and by densely wooded land which is costly to clear. Advantages are mild climate and a location close to major markets for farm products such as milk, poultry and vegetables.

### Cascade Mountains

The Cascades are a wide and high topographic and climatic barrier which separates western and eastern Washington. The range is made up of sedimentary, igneous and metamorphic rocks which have been carved by glaciers and streams. High isolated volcanic cones of lava such as Mt. Adams (12,307 feet), Mt. Rainier (14,408 feet), and Mt. Baker (10,791 feet), appear upon the older Cascade rocks. The Cascade crest varies between 10,000 and 3,000 feet and is higher and more rugged in northern Washington. Roads and railroads have been built across its lower passes in central and southern Washington. The Columbia River has cut a deep gorge and the lowest pass through the barrier. The western slope is wet and heavily forested with Douglas fir. The eastern slope is drier with a less-dense pine forest. Nearly all classified as forest land, most of the area is in Federal ownership in five national forests and Mount Rainier National Park. Tree fruit farming in the eastern slope valleys of Wenatchee, Chelan, Methow, Naches and the Columbia Gorge is most important. Sheep and cattle summer grazing on alpine grasslands is another use. Deep western slope valley bottoms such as the Skagit, Snoqualmie, Misqually, Cowlitz and Lewis also contain livestock farms. The area is vitally important as a source of water for irrigation and city drinking water and as a source of timber. Steep terrain, wet climate, short growing seasons and heavy forest vegetation are main handicaps for agriculture.

### Columbia Basin

A low plateau of old lava rocks covered with stream and wind-deposited soils extends in a series of plains, ridges, coulees and hills from the Cascades to the eastern Washington border. The area is basin-like in structure, being higher around its margins and sloping inward to low and level central plains. It has been sharply eroded by the Columbia River and

its interior tributaries, the Snake, Yakima, Palouse, and Spokane Rivers. The basin has sub-areas created by crustal movements and erosion.

The Yakima Folds are a series of hilly ridges extending from the Cascades eastward into the lower part of the basin. The Yakima and Columbia Rivers have cut gaps through the ridges, and built up plains in the troughs between them. The rich, alluvial plain of the Yakima River is an important irrigated valley.

The Waterville Plateau is a tableland of thin soils overlaying basaltic rock at an elevation of 2,500 to 3,000 feet. It has gorges cut by the Columbia River and ancient glacial outwash streams once flowing in Moses and Grand Coulees. It is too high for irrigation and is used for dryland grain and livestock farming. The high plain is often called the Big Bend country.

The Channelled Scablands is a belt of dry terrain carved by ice-age rivers into a series of coulees. Bare rock is exposed in the coulees. Small plateaus between the old river channels have thin soils used for dryland farming. The Grand Coulee of this region has been developed into a major irrigation reservoir.

The Palouse Hills consist of fertile deposits of wind-blown soil overlaying basaltic lava flows. After being deposited in large dunes, the formation was reshaped by streams into an intricate pattern of low, rounded hills which are tilled for wheat, barley, and legumes. The hills receive 16 to 25 inches of rainfall and have deep, porous and fertile soils. It is one of the richest farming areas of the Pacific Northwest.

The Central Plains are low and relatively level expanses of soil, deposited by old streams crossing the Channelled Scablands and later by the flooding of the Yakima, Columbia, Snake and Walla Walla Rivers. Climate is desert-like (6-12 inches of precipitation per year). The lower lands of the area, the Quincy and Pasco Basins and the Walla Walla Valley, are irrigated. Quincy Basin is a new irrigation area watered by Grand Coulee Dam.

Agricultural handicaps in Columbia Basin regions are mainly found in its dry, continental climate. Large irrigation systems built since 1900 have overcome much of the need for water on rich valley and basin soils. Dryland farming in higher areas is practiced widely, although occasional variations in rainfall, lack of snowfall, winter-kill, water and wind erosion inflict damage to field crops and to livestock ranges.

### Okanogan Highlands

A portion of the Rocky Mountains, consisting of well-eroded old granites, lavas and sedimentary rocks extends across north central Washington. These are the Okanogan Highlands, the state's richest mineral area. Summit levels reach 4,000 to 5,000 feet with peaks exceeding 7,000 feet. Prominent north-south valleys are occupied by irrigated tree fruit and livestock farms. These are the Okanogan, Sanpoil, Kettle and Colville Valleys. The Columbia River gorge through the Okanogan Highlands is occupied by the large man-made

lake behind Grand Coulee Dam--Roosevelt Lake. High and wetter portions are forested with pine and larch, and are managed for timber and for livestock ranges by the United States Forest Service and the Bureau of Indian Affairs. Cold winter temperatures, short growing seasons, dry valley climates and distance from markets are farming handicaps.

### Selkirk Mountains

The Selkirks, a range of the Rocky Mountain system, extend into the northeast corner of Washington. The rocks are old mineralized granites and metamorphics reaching elevations of over 7,000 feet. The Pend Oreille River Valley at the base of the Selkirks is an agricultural area of narrow bottom lands settled by livestock farmers. Nearly all of the uplands are in Kaniksu National Forest. While climate is cool and growing seasons are short, the Pend Oreille Valley has an advantage of being closely located to the Spokane metropolitan market area.

### Blue Mountains

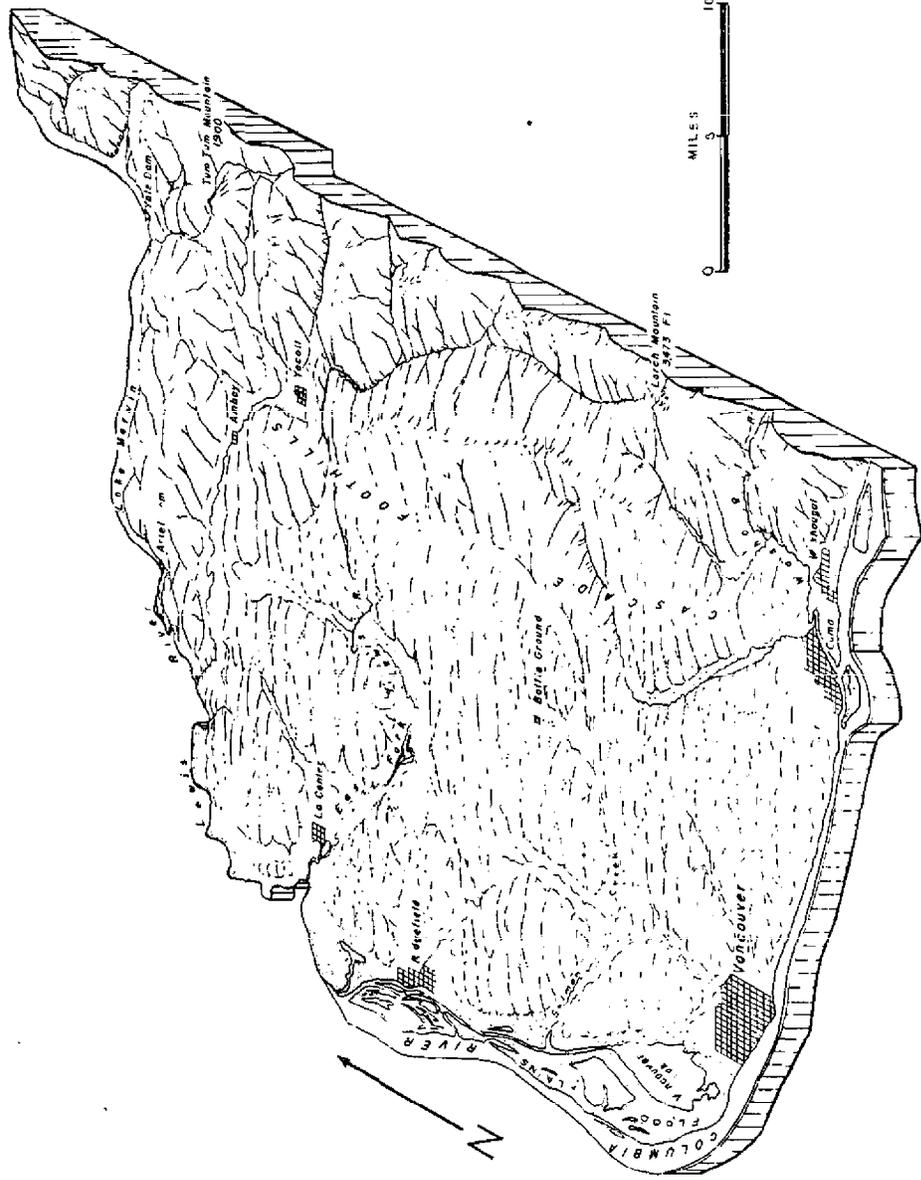
The Blue Mountains are an uplifted and eroded plateau extending into the southeastern corner of Washington. The strata are mainly ancient crystalline rocks which contain some minerals. The highest point of the mountains in the Washington section is Diamond Peak (6,401 feet), on the divide between the Grande Ronde, Tucannon and Touchet Rivers. These rivers, and the Walla Walla River, have cut valleys into the plateau. Extensive pine forest and grassland areas are in the highlands within Umatilla National Forest, where rainfall is 30 to 40 inches. The Snake River has cut a deep valley and gorge across the lower parts of the mountains. The area is well developed agriculturally around its northern foothills where wind-blown soils are deep and irrigation systems are used. The Walla Walla and Tucannon Valleys are rich grain, legume and livestock areas grown under irrigation and by dry farming. Grazing is an important use of the high lands by livestock ranchers in the upper valleys.

### Topography of Clark County

The topography of Clark County varies from Columbia River flood plain islands at sea level to Cascade Mountain elevations of over 3,000 feet. The highest point is Larch Mountain (3,473 feet), located on the southeastern county line, and the lowest land of 20 feet elevation is at the mouth of the Lewis River. Foothills of the Cascade Mountain physiographic province make up about two-thirds of the county's 405,120 acres. Primarily of old igneous rock (basalts) the foothills have been eroded into numerous ridges and narrow creek bottoms. From the air the county appears as a wide expanse of low hill country with ribbons of cleared farmlands in its valleys.

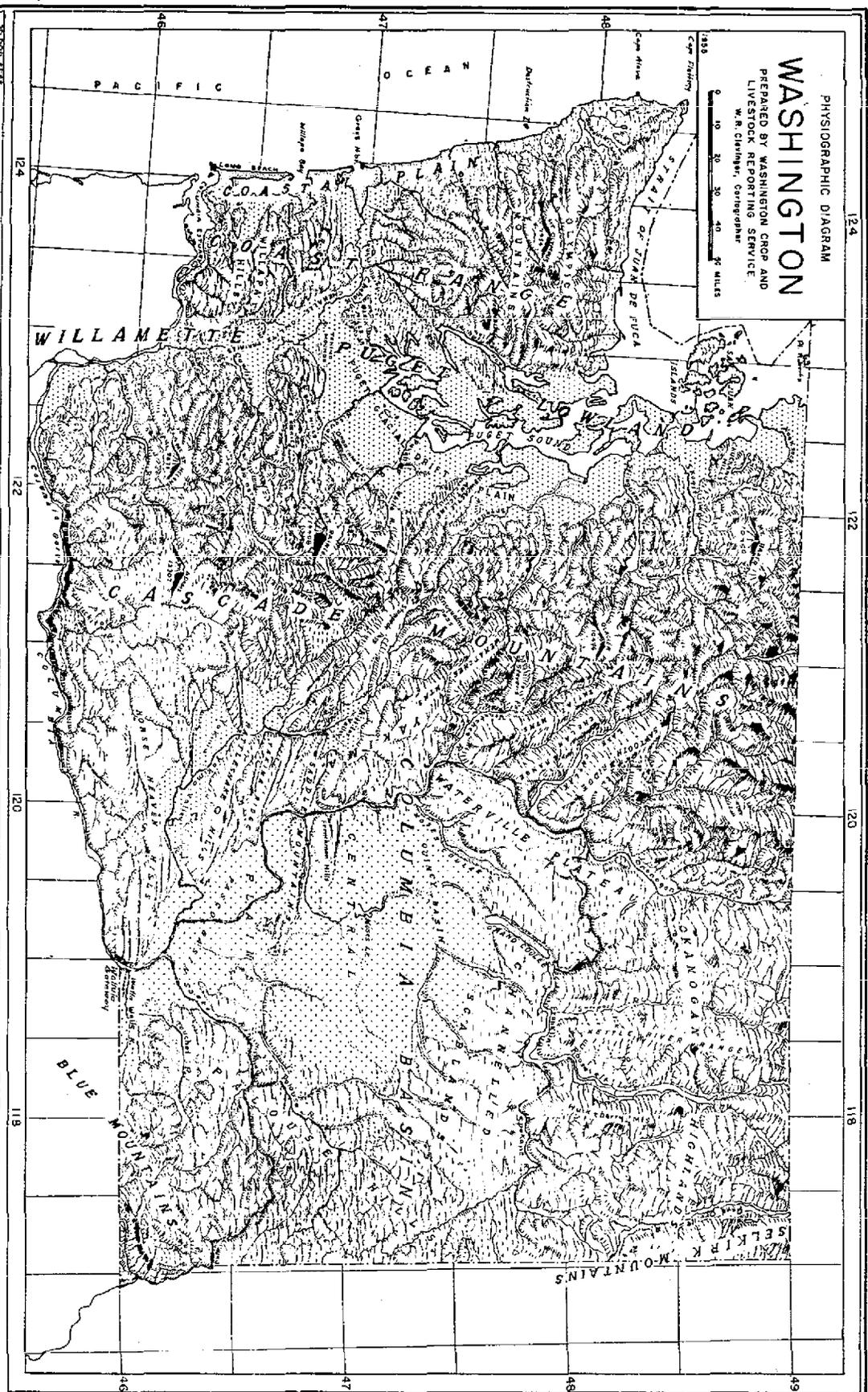
Most of the county's 219,000 acres in farms are located on the alluvial plains of the Columbia, Lewis and Washougal Rivers; the Salmon and La Camas Creeks and on the sloping terraces above these streams. Terrace and benchlands where the Columbia and other rivers meandered during early geological times are large in area. As the land has slowly risen the rivers have cut deeper, leaving these former river bottoms well above flood stage. Such areas include the La Camas Creek valley plain, the Fourth Plains northeast of Vancouver, Brush Prairie and the Ridgefield and Battle Ground prairies and plains. A high

TOPOGRAPHIC DIAGRAM  
CLARK COUNTY



# WASHINGTON

PHYSIOGRAPHIC DIAGRAM  
PREPARED BY WASHINGTON CROP AND  
LIVESTOCK REPORTING SERVICE  
W. R. CHAMBERLAIN, CHIEF GEOGRAPHER



GENERALIZED CROSS-SECTION ALONG 47° 30'

COAST RANGE      WILLAMETTE-PUGET LOWLAND      CASCADE MOUNTAINS      COLUMBIA BASIN

COASTAL PLAIN      OLYMPIC MOUNTAINS      PUGET GLACIAL DRIFT PLAIN      WATERVILLE PLATEAU      CHANNELLED SCABLANDS      MALOUSE HILLS

SEA LEVEL

VERTICAL SCALE EXAGGERATED 8 TIMES

1935

percentage of the farm land is of various degrees of slope and much hillside and hilltop land is utilized for pastures, orchards and woodlands. Low islands in the Columbia River channel are subject to flooding when flood stage is reached in the spring. With the exception of Lady Island at the mouth of the Washougal, they are uninhabited.

The principal interior stream, the Lewis River, drains the northern part of the county and forms the northern boundary. It is a source of hydroelectric power for western Washington and two power dams supply electricity to the Portland-Vancouver district. As a result of the dams two large reservoirs occupy its deep valley.

### Land Classification and Soils

The land of Clark County is divided into six broad classes of economic land use. <sup>1/</sup> Class I and II lands are of high and better-than-average productivity and support the farms with the highest income. This good farming land, however, is limited in area. It includes the silty loams of the Columbia River bank flood plains surrounding Vancouver Lake and the low terraces along the river north of Vancouver. Small areas also are found east of La Center and on the drained lake bed of Fargher Lake northeast of Yacolt. Class III and IV lands are about average in productivity and support farms of fair income when prices are good for farm products. This area covers most of the higher terraces and sloping land five to fifteen miles inland from the Columbia River, including the prairies and bottom lands of the Washougal, La Camas, Salmon Creek, East Fort and Cedar Creek Valleys.

Class V lands are submarginal and have farms of low productivity and income. These lands include steep foothills on the edge of the Cascade Range and some of the steep cliff and bank areas along the Columbia River and the narrow creek bottom valleys around Yacolt and the upper Washougal and Lewis Valleys. Class VI lands are not farmed and are considered uneconomic for farming. Best suited for forest growth, Class VI lands include the eastern one-third of the county which lies in the steeper and higher portions of the Cascades.

### Climate

Clark County is located in the West Coast Marine Climatic Region of North America which extends along the coast from southeastern Alaska to northern California. Climatologists and geographers describe this climate as one influenced by the mild, moist air flowing in from the oceans. Prevailing west winds of ocean air rising over the hills and mountains bring cool, cloudy and wet conditions for about nine months of the year. During the summer, the land is warm and the winds from off the ocean do not drop moisture as frequently as

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<sup>1/</sup> U.S. Dept. of Agric. and Washington Agric. Exp. Stations, Land Capability Methods for Conserving Washington Soils. Popular Bulletin No. 200, Inst. of Agric. Sciences, The State College of Washington. Pullman, Wash., Dec. 1950.

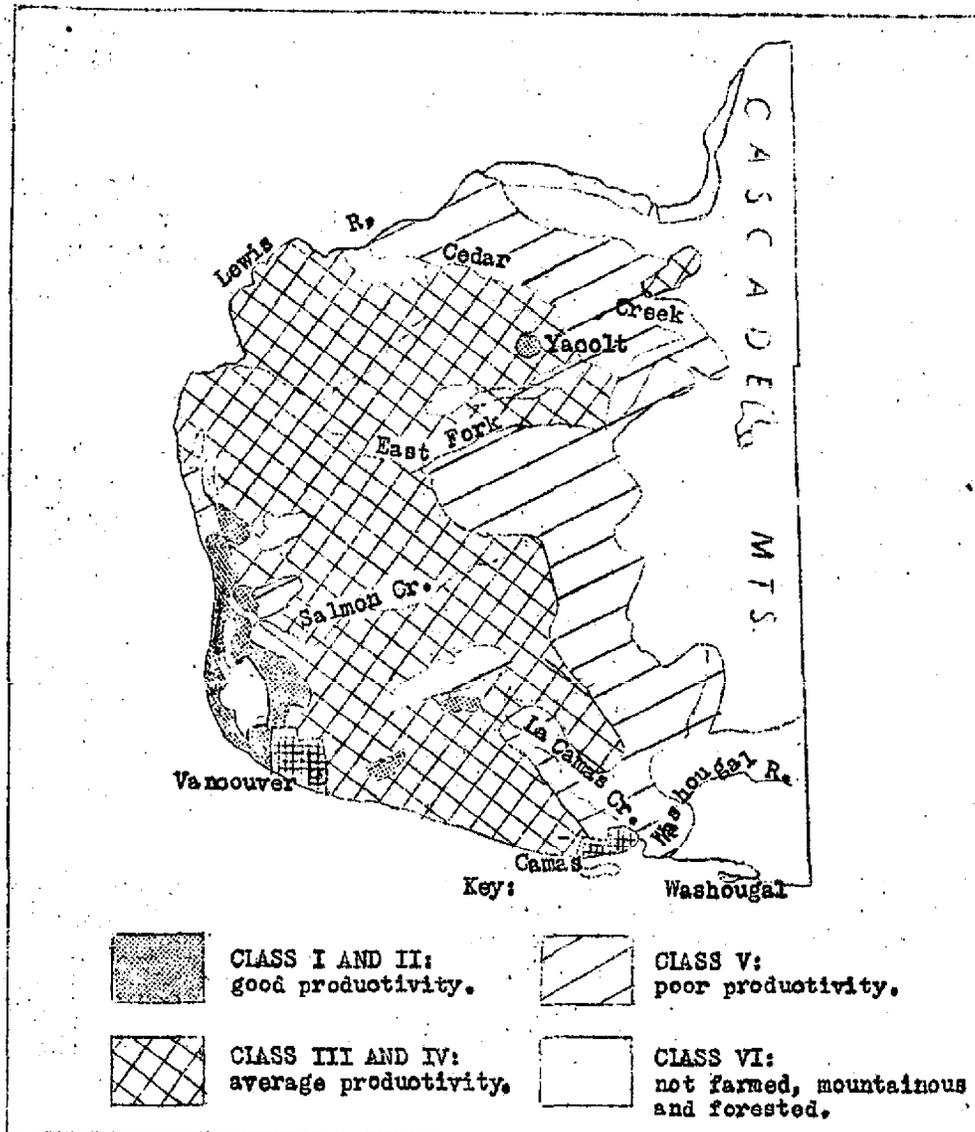


Figure 5.- General Quality of the Land in Clark County

Source: State College of Washington,  
Economic Land Use Class Map, Clark County, Washington, 1945.

in winter. Thus, there is generally a dry period during July and August with considerable sunshine to mature crops and provide good harvesting conditions for hay and grain.

The lowlands of Clark County have a climate similar to other parts of the world located on the west margins of continents in the belt of the prevailing westerly winds. These include England, northwestern France, Holland, Denmark and Norway in Europe. In the southern hemisphere the same mild, cloudy and wet climate is found in southern Chile and in southern New Zealand. In world regional and commercial geography, the countries and states located in the West Coast Marine Climatic Regions are noted for heavy forests which yield

lumber and pulp, and for livestock farms with green pastures which yield most of the world's dairy products.

Because of changes in elevation from the low riverside lands of the Columbia to the Cascade foothills and mountains, temperatures, frost conditions and rainfall vary considerably. Weather Bureau data are limited to three locations in Clark County, but they give a general pattern by which precipitation can be charted and temperature conditions estimated.

Table 6.- Temperatures For Selected Stations, By Months  
Clark County  
(Source: United States Weather Bureau)

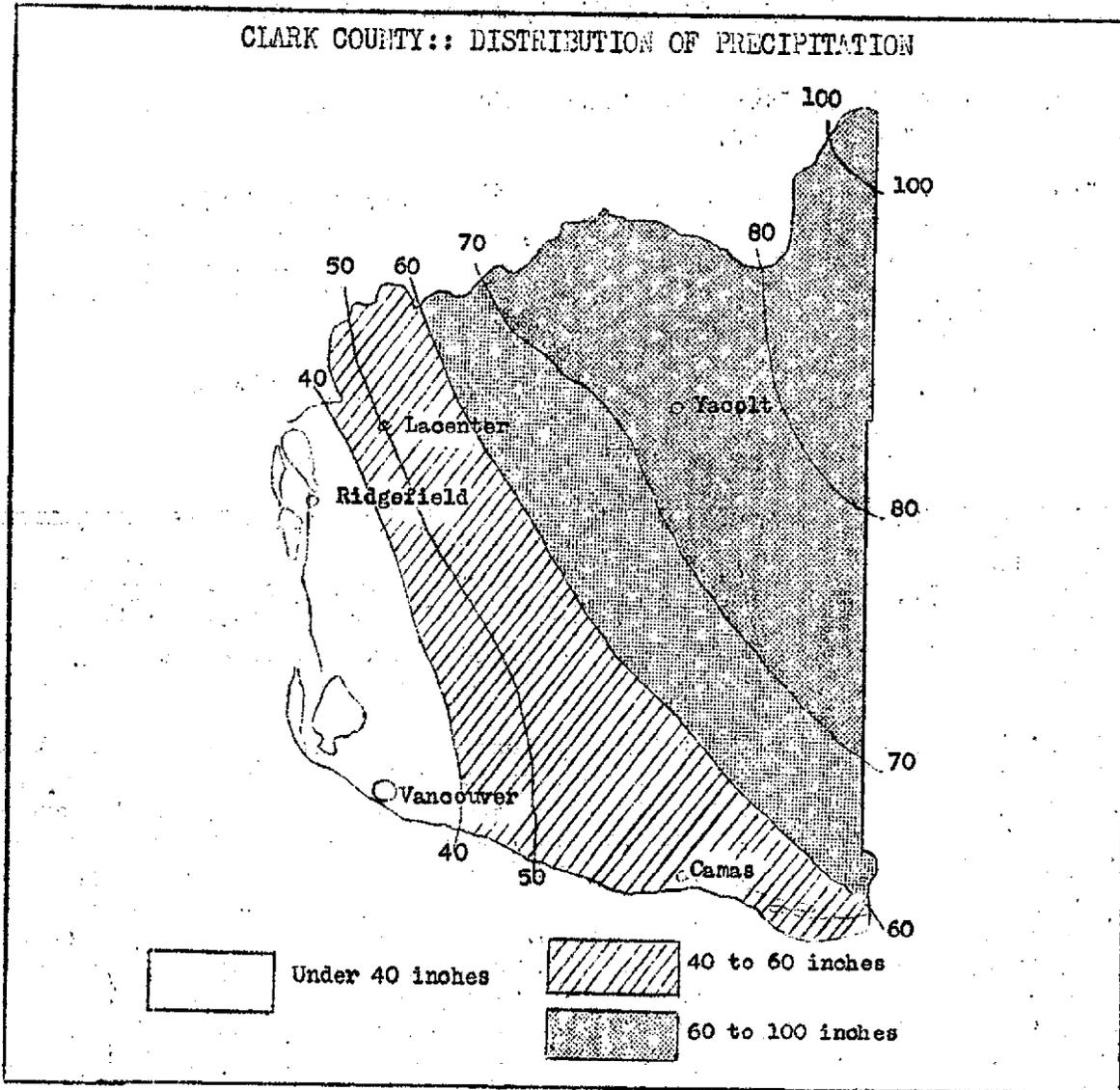
Station and Elevation in Feet	Average Temperatures (in degrees Fahrenheit)												Annual Average
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Vancouver (100)	38.4	38.4	47.0	52.0	57.0	62.0	66.8	66.9	61.4	54.3	45.5	40.4	52.5

Precipitation varies from about 37 inches per year on the Columbia River at Vancouver to an estimated 100 inches and over in the Cascade Mountains. The driest portion includes the river terrace lands extending from Vancouver to the mouth of the Lewis River. Precipitation is normally under 40 inches in this area. Foothills and mountains extending eastward from Camas and La Center are more humid, ranging from 60 to over 100 inches. In these uplands much of the precipitation is in the form of snow. Typified by the monthly amounts at Vancouver there is a wet season during November, December, January and February, moderately wet periods during the spring and fall, and a marked dry season during July and August. The summer dry season is often critical for pastures and growing crops and requires sprinkler irrigation for safety. It also creates a fire hazard in the forested upland country.

Temperature records of over 40 years time at Vancouver and La Center show that Clark County farming areas have an average of about 38 degrees in mid-winter and a summer average of about 65 degrees. Temperature extremes are not severe. Vancouver has an average growing season of 226 days normally free of killing frosts and freezing temperatures.

Freeze and frost conditions vary, however, from valley to valley in the upland prairies and bottom lands where growing seasons are shorter. Killing frosts can occur as late as May and as early as September. Clark County farmlands are exposed to one condition which is not common to the rest of western Washington. The Columbia River Gorge through the Cascades permits air to flow into the area from the interior of the continent. In the summer, hot, dry winds blow westward down the gorge on some occasions causing considerable damage to crops. The great Yacolt forest fire of 1902 was spread by such a dry east wind which blew westward through the gorge in early September of that year. In winter, cold air may pour down-river.

CLARK COUNTY:: DISTRIBUTION OF PRECIPITATION



Source: U.S. Dept. of Agriculture, Climate and Man 1941 Yearbook of Agriculture.

Table 7.- Temperature Extremes, Dates of Killing Frost  
Clark County

(Source: United States Weather Bureau)

Station	Temperature Extremes Recorded (degrees Fahrenheit)		Killing Frost Average Dates	
	Coldest	Hottest	Last in Spring	First in Fall
La Center	-13	107	April 24	Oct. 23
Vancouver	-10	103	March 30	Nov. 11
Yacolt	No data	No data	May 10	Sept. 23