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 heavyforests 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 Hills 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 section. 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 (12,397 feet), Mt. Rainier (14,408 feet) and Mt. Baker (10,791 feet) appear upon the older Cascade rocks. The Cascade crest varies between 3,000 and 10,000 feet and is higher 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, Nisqually, Cowlitz and Lewis also contain livestock farms. The area is vitally important 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 build 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 Asotin County

Asotin County is primarily a mountainous and hilly region with three narrow, valley lowland belts. With the exception of Snake River benchlands and river bars and the valleys of the Grande Ronde River and Asotin Creek, the area is comprised of ridges, plateaus and slopes of the Blue Mountains physiographic region.

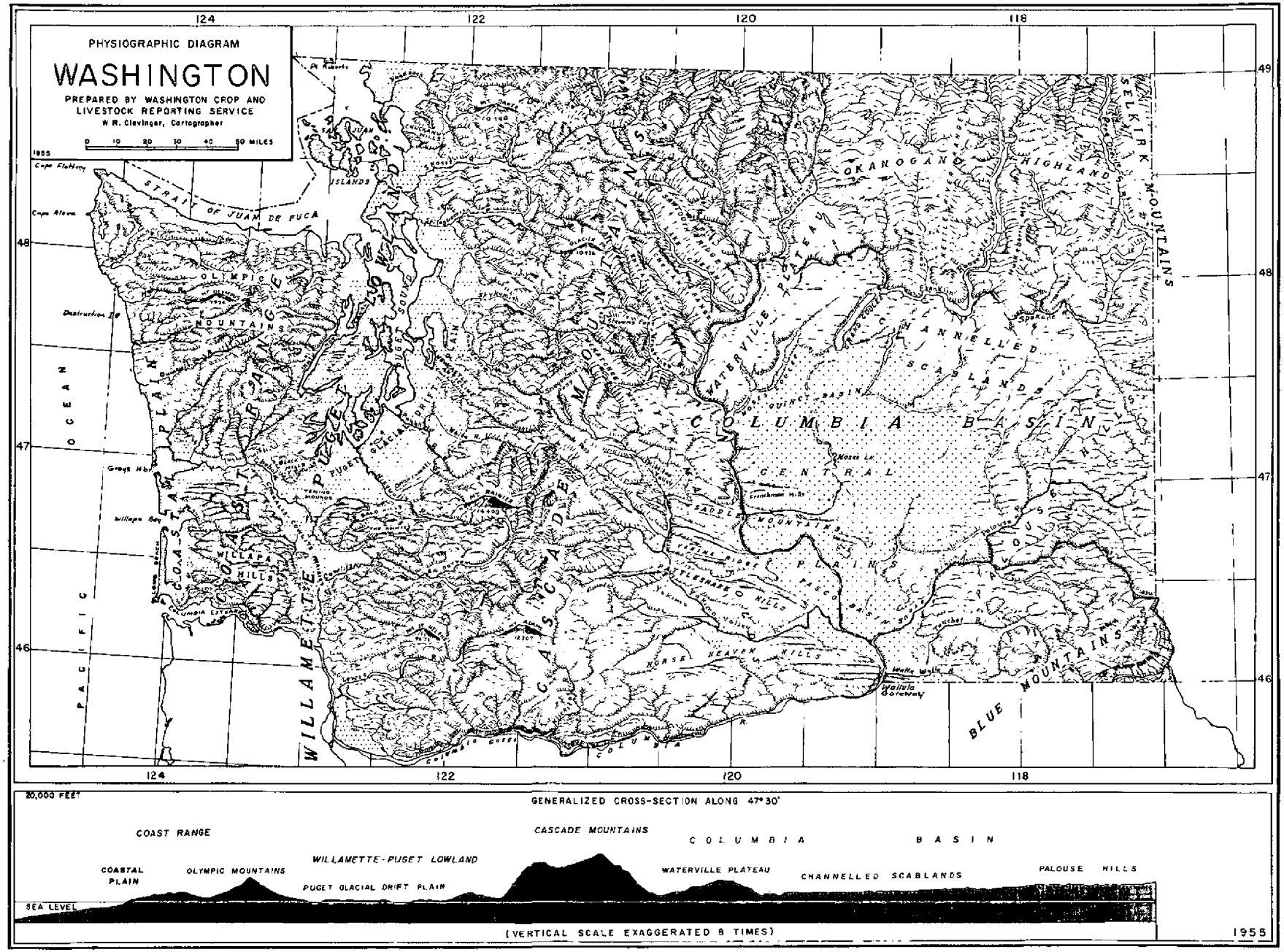
Lowest elevations are along the Snake River which has cut a deep valley through the Blue Mountain plateau. Townsites and farm lands along the Snake River range from about 700 feet above sea level at Clarkston to 760 feet at Asotin. Asotin Creek and Grande Ronde River slope upward toward the summit of the Blue Mountains and their valleys of alluvial soil range from 750 feet to 1,500 feet in elevation.

Central Asotin County surrounding Anatone, Cloverland and Clarkston Heights is an elevated plateau of rolling plains. At Cloverland the plateau is 3,000 feet in elevation and slopes downward toward the Snake River.

Most of western Asotin County is rough Blue Mountain terrain. Tributary streams, such as Pow Wah Kee Gulch, Charley Creek and Lick Creek, have cut deep V-shaped valleys into the plateau. Ridges in between the stream systems range from 2,300 to 3,000 feet. Highest elevations are in the southwest corner, being about 4,200 feet on the divide between Grande Ronde and Tucannon Rivers.

Land Classification and Soils

Asotin County land is broadly divided into seven general classes. Less than 25 percent of the county area is classified class I, II and III land which is fair to good land suited for grain, hay and fruit crops. Class II land--the wind deposited Palouse soil series--is localized in several bands on the


PHYSIOGRAPHIC DIAGRAM
WASHINGTON
PREPARED BY WASHINGTON CROP AND LIVESTOCK REPORTING SERVICE
W. R. Clevinger, Cartographer
0 10 20 30 40 50 MILES
1955
124
122
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PACIFIC OCEAN
STRAIT OF JUAN DE FUCA
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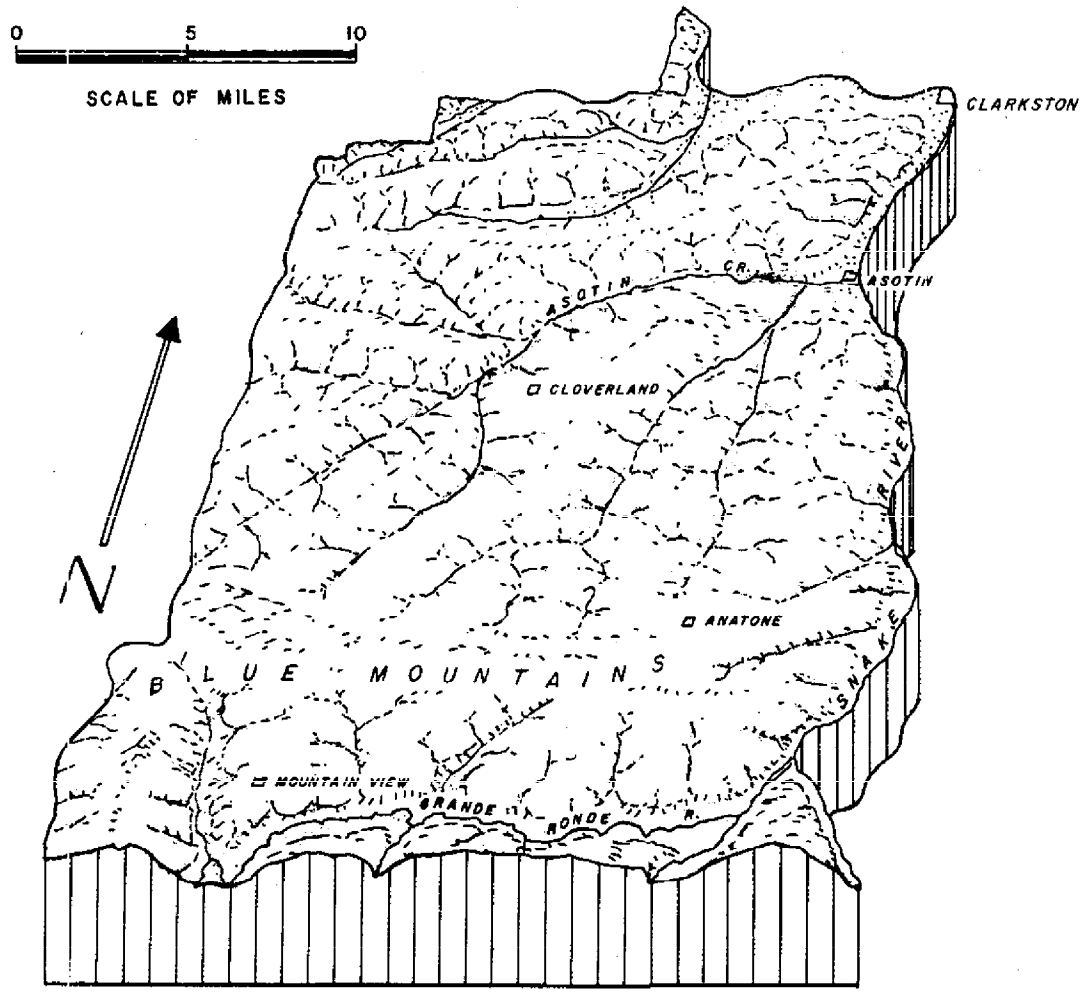
OLYMPIC MOUNTAINS
COASTAL PLAIN
PUGET LOWLAND
PUGET GLACIAL DRIFT PLAIN
WILLAMETTE LOWLAND
WILLAMETTE HILLS
COAST RANGE
CASCADE MOUNTAINS
OKANOGAN HIGHLAND
SELKIRK MOUNTAINS
WATERVILLE PLATEAU
CHANNELLED SCABLANDS
COLUMBIA BASIN
CENTRAL PLAINS
PALOUSE HILLS
BLUE MOUNTAINS
Wallula Gateway
COLUMBIA R.
GENERALIZED CROSS-SECTION ALONG 47° 30'
20,000 FEET
SEA LEVEL
COAST RANGE
COASTAL PLAIN
OLYMPIC MOUNTAINS
WILLAMETTE-PUGET LOWLAND
PUGET GLACIAL DRIFT PLAIN
CASCADE MOUNTAINS
COLUMBIA BASIN
WATERVILLE PLATEAU
CHANNELLED SCABLANDS
PALOUSE HILLS
(VERTICAL SCALE EXAGGERATED 8 TIMES)
1955

TOPOGRAPHIC DIAGRAM

ASOTIN COUNTY



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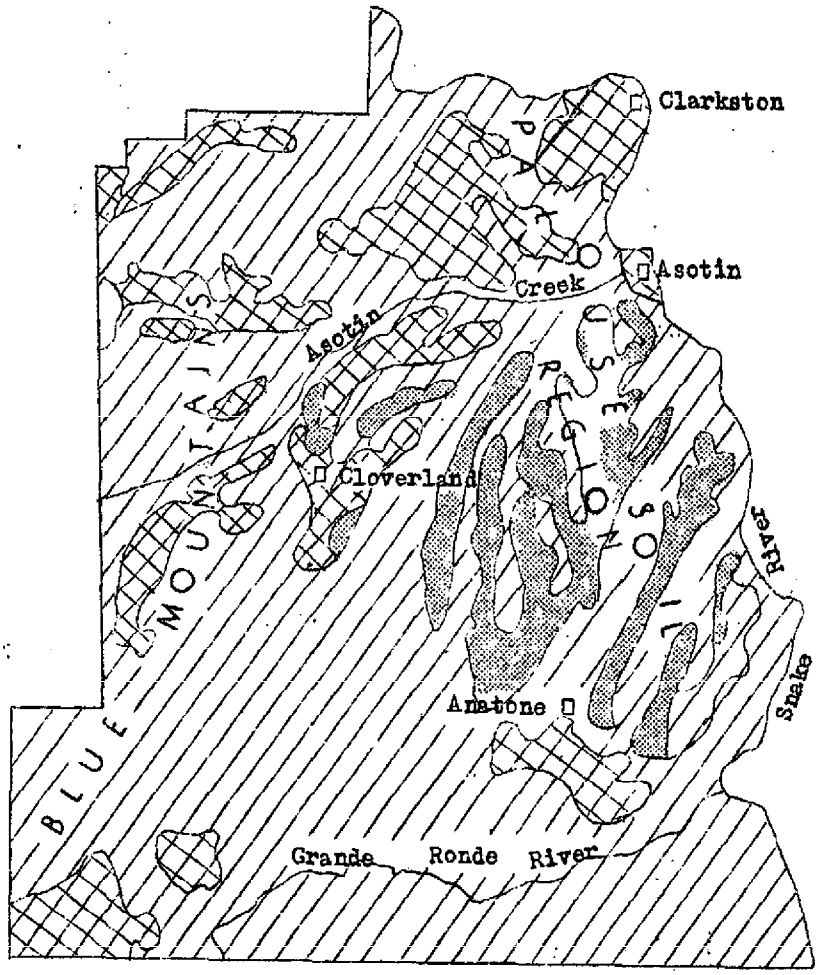
plateau between Asotin and Anatone and westward to Cloverland. The Palouse soil is in rolling plains accessible to machinery. It is a fine-textured soil that retains moisture well and one which is important for winter and spring wheat and barley. Thinner Palouse soil districts in northeastern Asotin County such as Clarkston Heights are Class III land. River benchland soils at Asotin and Clarkston are of Class III type. Wind and stream deposited soils where cultivatable and irrigable are fertile and rich in essential minerals for crops.



Class I and II Land: Soil of good and above-average productivity.

Class III and IV Land: Soil and terrain of fair quality for farming.

Class V, VI and VII Land: Hilly and mountainous terrain with poor soils, suited for grazing and forest growth only.

Source: Generalized from map, Washington Generalized Classification of Land According to its Capability For Use. Published by U. S. Soil Conservation Service and Washington State Agricultural Experiment Stations, cooperating. 1949.

Figure 6.- General Quality of Land in Asotin County

About 75 percent of Asotin County is classified as Class IV (submarginal land for crops) and as Class V, VI and VII lands suited only for livestock grazing and forestry. Some of this mountainous land is within Umatilla National Forest, but most of it is privately owned or leased by livestockmen and timber companies. Most of the Grande Ronde basin is ClassVI and VII land of limited use for crops and is a range livestock region. The Snake River Valley with its steep, sloping sides is also a grazing region with small benchlands and river bar pockets suited for orchards and hay.

Climate

Climatic conditions vary from west to east with changes in elevation. With the exception of the wet zone of the Blue Mountain area in its western half, Asotin County has the dry, continental climate which extends from the Cascades eastward to the ranges of the Rocky Mountain cordillera. This climate is characterized by cold winters and hot, dry summers. In Asotin, temperature averages are warmer and growing seasons slightly longer than in the counties north of the Snake River. Grain and fruit crops mature earlier than in regions to the north. The climate is of two general geographic types: the moderately humid Blue Mountains-Palouse Hills type and the dry, intermontane basin-type typical of the Snake River Valley lowlands. Asotin County climate is mainly influenced by the Blue Mountains.

Temperatures vary considerably because of variations in elevations. The Blue Mountain foothill plateaus surrounding Anatone and Cloverland, which range from 1,500 to 3,500 feet in elevation, are colder than the Snake River lowlands and lower Asotin Valley. Records at Anatone, 3,500 feet, show that mid-winter months average below freezing and mid-summers are cool, averaging about 65 degrees. This cool plateau area also has a shorter growing season and more extreme temperatures. A low of 30 degrees below zero has been recorded at Anatone. Plateau conditions are suited for hardy grains, grasses and livestock.

On the lower valley floors and benchlands at Clarkston and Asotin, conditions are warmer. Clarkston area temperatures average above freezing in mid-winter and become hot in mid-summer. January monthly averages are 34 degrees while July averages 73 degrees. Air drainage and temperatures are suitable for fruit and field crops. Westerly winds flowing down the eastern slopes of the Blue Mountains become warm Chinook winds favoring fruit orchards on the slopes near the Snake River.

Table 6.- Temperature Extremes, Dates of Killing Frost
Asotin County

Station and Elevation in Feet	Temperature Extremes Recorded (degrees Fahrenheit)		Killing Frost Average Dates	
	Coldest	Hottest	Last in Spring	First in Fall
Anatone (3,570)	-30	104	May 15	September 1
Clarkston Hts. (1,186)	-30	101	May 1	September 15

Source: U,S. Weather Bureau, Climatological Data Washington

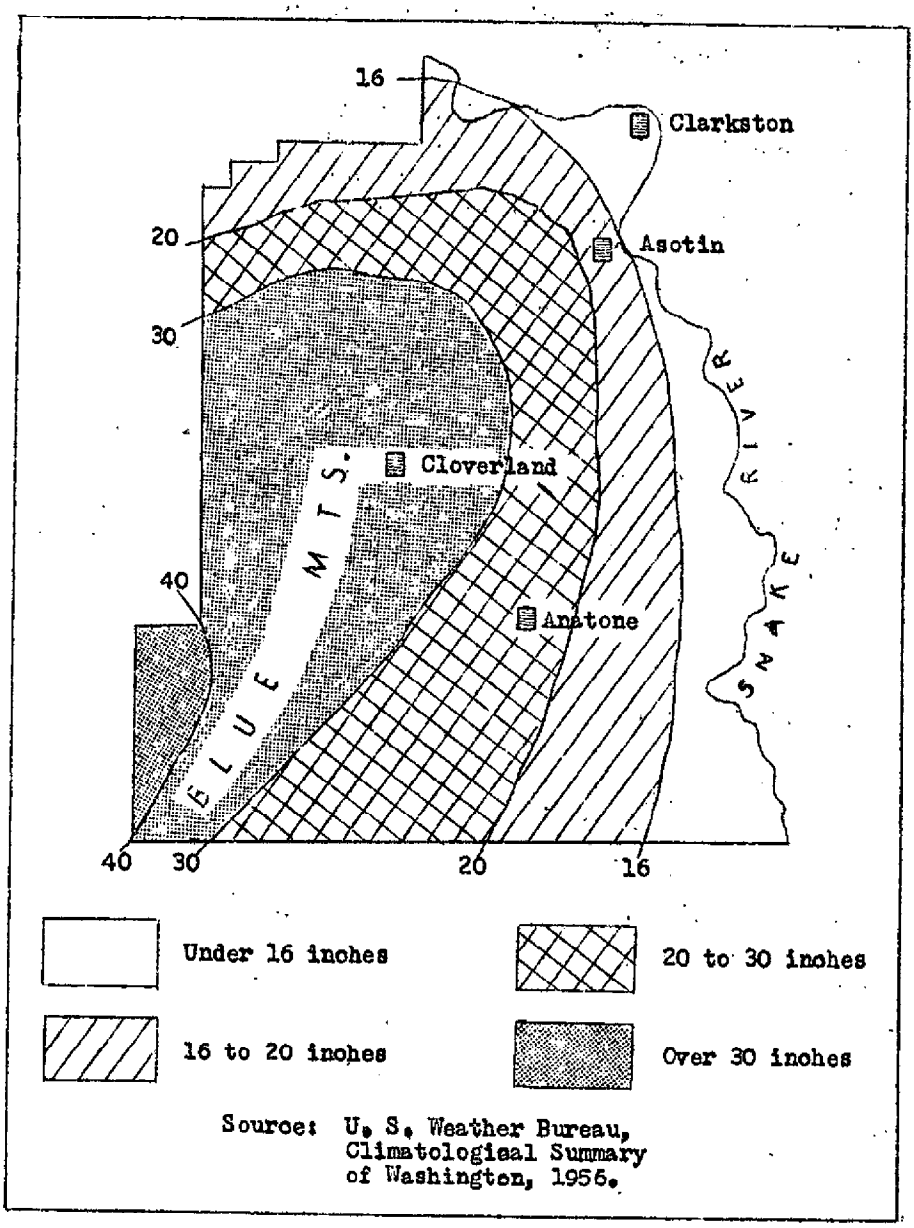


Figure 7.- Distribution of Precipitation
Asotin County

There are three general precipitation zones. The western area in the Blue Mountains is moderately humid, receiving 30 to over 40 inches of precipitation per year. Most of the precipitation falls as snow during the winter when westerlies from the Pacific ascend the Blue Mountains. Circling the Blue Mountains is a belt of precipitation receiving 16 to 30 inches. It conforms with the eastern and northern foothills plateau where air is descending after passing over the mountain front. This is an open forested and grassland area and portions of it are suited for spring wheat and hay.

A dry zone corresponding with the Snake River Valley makes up eastern Asotin County. Rainfall and snowfall there amounts to 16 inches or less of moisture per year, being about 13 inches at Clarkston. This is an area of

dryland wheat farming using the summer fallow system. Alfalfa and fruit are grown using small irrigation systems. All three precipitation zones have a seasonal pattern of a short, dry summer in July and August and a longer winter season with a more humid phase. Summer season electrical storms with heavy showers occur in some localities, but in none with regularity. Very dry years have resulted in low wheat yields.

The growing season averages only 108 days at Anatone, where the elevation is 3,570 feet above sea level. At Clarkston Heights, more than 2,000 feet lower, the season averages about one month longer. Along the river bottoms the growing season is even longer than at Clarkston Heights.

Table 7.- Temperatures For Selected Stations, By Months
Asotin County

Station and Elevation in Feet	Average Temperatures (in degrees Fahrenheit)												Annual Average
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Anatone (3,570)	25.9	29.5	36.2	43.4	50.6	57.9	65.2	64.2	1/	47.0	44.4	31.8	1/
Clarkston Hts. (1,186)	34	38.4	44.2	52.1	59	64.6	73.2	70.6	60.6	50.8	39.4	35.6	49

1/ No data recorded.

Source: U.S. Weather Bureau, Climatological Data, Washington, Annual Summary, 1956

Table 8.- Precipitation For Selected Stations By Months
Asotin County

Station and Elevation in Feet	Average Monthly Precipitation (in inches)												Annual Total (inches)
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Anatone (3,570)	3.0	2.31	2.17	1.84	1.65	2.14	.56	.71	1.23	1.84	1.38	2.82	21.55
Clarkston Hts. (1,186)	.93	1.06	.97	1.30	1.55	1.61	.43	.31	1.38	1.29	1.21	2.36	12.38

Source: U.S. Weather Bureau, Climatological Data, Washington, Annual Summary, 1956

Forests and Other Land Resources

Southeastern Asotin County is located in the Blue Mountains pine forest and about one-eighth of the county area is within Umatilla National Forest. Important commercial timber species are Ponderosa pine, making up about 75 percent, while Douglas fir, western larch, lodgepole pine and Engelmann spruce make up the remainder. Most of this resource is managed by the U. S. Forest Service.

The mountain land is valuable for multiple uses such as watersheds for irrigation, wildlife management, grazing, selective logging and recreation for campers and hunters. Annual log harvest in Asotin County has been over seven million board feet in recent years. In a recent hunting season, the upper Asotin Creek elk herd yielded over 300 head and 1,500 deer were taken. Upland bird hunters harvested 1,500 pheasants from grain and other cropland districts. Flats and grain fields near the Snake River are hunted for ducks and geese.