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Land Utilization

THE LOOK OF OUR LAND

AN AIRPHOTO ATLAS OF THE RURAL UNITED STATES:

The Far West

U.S. DEPARTMENT OF AGRICULTURE ECONOMIC RESEARCH SERVICE AGRICULTURAL HANDBOOK NO. 372

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Studies in the series on The Look of Our Land—An Airphoto Atlas of the Rural United States include:

A. Northwestern Forest, Forage, and Specialty Crop Region
B. Northwestern Wheat and Range Region
C. California Subtropical Fruit, Truck, and Specialty Crop Region
D. Western Range and Irrigated Region
E. Rocky Mountain Range and Forest Region
F. Northern Great Plains Spring Wheat Region
G. Western Great Plains Range and Irrigated Region
H. Central Great Plains Winter Wheat and Range Regions
I. Southwestern Plateaus and Plains Range and Cotton Region
J. Southwestern Prairies Cotton and Forage Region
K. Northern Lake States Forest and Forage Region
L. Lake States Fruit, Truck, and Dairy Region
M. Central Feed Grains and Livestock Region
N. East and Central General Farming and Forest Region
O. Mississippi Delta Cotton and Feed Grains Region
P. South Atlantic and Gulf Slope Cash Crop, Forest, and Livestock Region
R. Northeastern Forage and Forest Region
S. Northern Atlantic Slope Truck, Fruit, and Poultry Region
T. Atlantic and Gulf Coast Lowlands Forest and Truck Crop Region
U. Florida Subtropical Fruit, Truck Crop, and Range Region

This bulletin, subtitled "The Far West," includes regions A, B, and C.

Washington, D.C. 20250 January 1970

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The Look of Our Land—An Airphoto Atlas of the Rural United States:

The Far West

Compiled by
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HENRY W. DILL, JR.[1]

BACKGROUND

The Economic Research Service has been conducting studies on present and potential uses of land in the United States. In connection with this activity, USDA Agriculture Handbook 153 "Land Use and Its Patterns in the United States," by F. J. Marschner, was published in 1959. This landmark publication contained a color map scaled at 1 : 5,000,000, entitled "Major Land Uses in the United States." An unusual feature of the Handbook was 168 aerial photographs showing land use patterns across the 48 contiguous States. The map, text, and photos together showed the ways that our land is used. This bulletin updates Agriculture Handbook 153, which is out of print and may be found only in major libraries.

In 1965, another landmark publication appeared: "Land Resource Regions and Major Land Resource Areas of the United States," USDA Agriculture Handbook 296, for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Morris E. Austin and many others in the Soil Conservation Service compiled this classification and systematic description of U.S. resource regions. Twenty land resource regions were delineated, which were further subdivided into 156 land resource areas, with information on land use, elevation and topography, climate, water, and soils for each.

This atlas, then, brings together text and photos that show land use and related information according to an established regional and area classification of U.S. land resources.

The ways we use our land are usually described verbally or quantitatively, or are depicted on maps. These presentations are informative but limited. There is no substitute for seeing, and an aerial view is unsurpassed for observing certain phenomena on the surface of the earth. Aerial photographs, used with maps and descriptions, provide a comprehensive idea of how land is used. Such richly detailed photos can be viewed stereoscopically for three-dimensional study of relationships between items on the earth's surface and man's activities.

The aerial photographs in this bulletin were selected to show characteristics and use of land in three areas in California, Oregon, Washington, and Idaho. Accompanying the photographs of each area is a brief description of land use, climate, soils, and topography for the area which the photos illustrate.

USE OF THE AIRPHOTO ATLAS

Two facing pages are devoted to each land resource area. A stereopair, usually at a scale of 1: 20,000, shares each right-hand page with a description of the area that is reproduced from Agriculture Handbook 296. To locate and orient the terrain shown in the stereopair, the reader should refer to the numbers on the photo index sheet (described below) on the left-hand page. He will note that the compass orientations of the stereopairs vary, but the index sheet clarifies the orientation.

The area shown on a stereopair overlaps two points on a flight line showing the same portion of the earth's surface. When viewed through a simple pocket stereoscope the scene appears three-dimensional. Any text on aerial photographic interpretation or photogrammetry describes how such photos are made and how to use the stereoscope.

Each left-hand page shows an aerial photographic index sheet that includes the area of the facing stereopair. Each index sheet was selected to match the land use description for the given area. An index sheet is an uncontrolled mosaic made up of many individual airphotos. The photos are assembled with their identification numbers showing, matched by eye, and mounted on a board. The group is rephotographed, reduced in scale, and printed for use as a reference for locating specific photographs. Most of the index sheets in this bulletin are reproduced at their original scale of 1: 63,360. A caution about using the index sheets: Since many individual photos were fitted together by eye, the fit is not always precise, so measurements of distance or area on index sheets are only approximate.

Each index sheet is oriented with north at the top. In some cases, flight lines of the individual photos were other than north-south, so the page must be rotated to read the number. To aid identification, the bottom label of each index sheet gives the following identification: Land resource area number, county, State, year and month of photography, index sheet number and scale, and agency for which the photography was flown. The letter "P" on the label indicates only partial coverage of the county.

Abbreviated sources shown on the photo index sheets are: ASCS, Agricultural Stabilization and Conservation Service; SCS, Soil Conservation Service; and USFS, Forest Service, of USDA.

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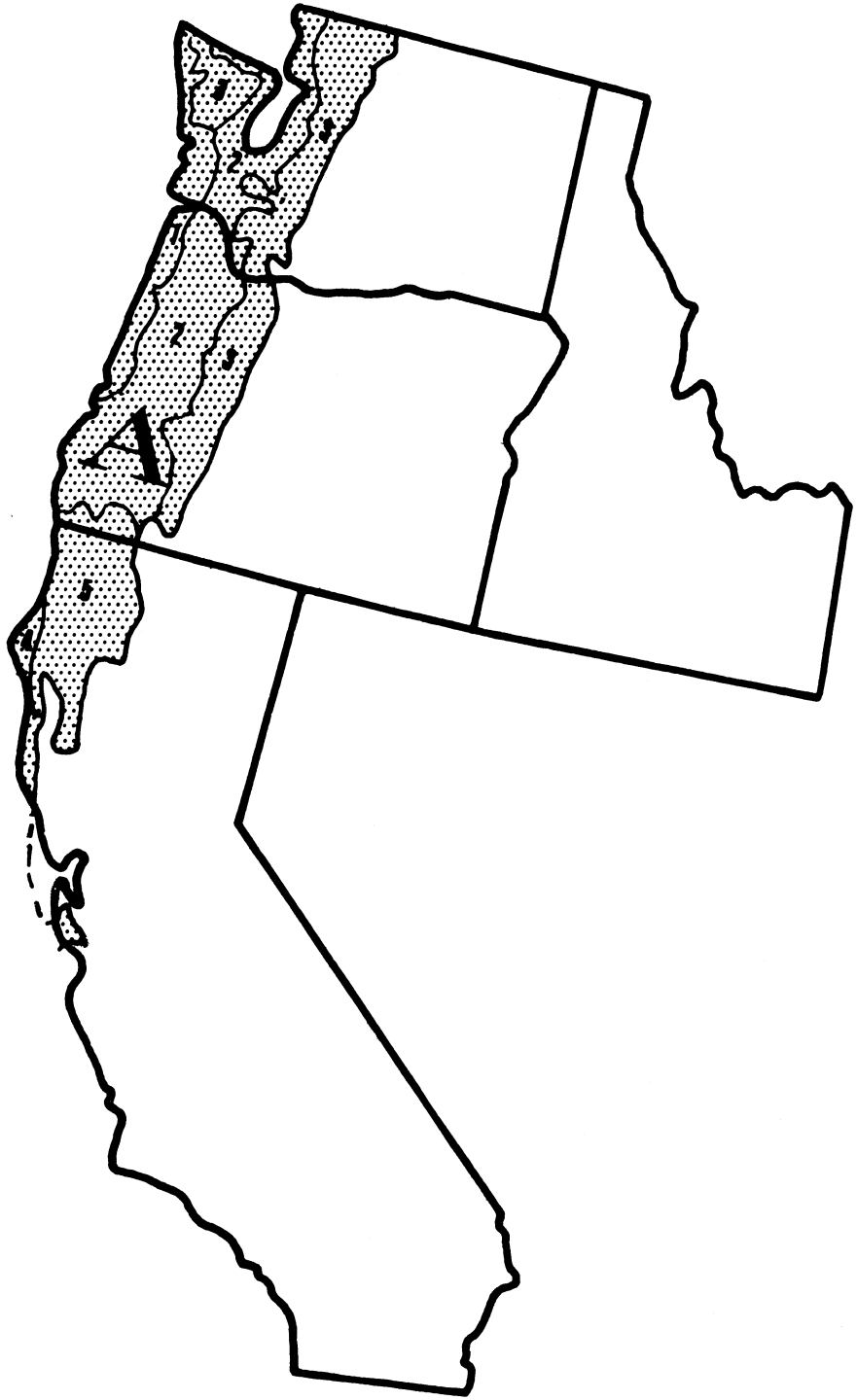
NORTHWESTERN FOREST, FORAGE, AND SPECIALTY CROP REGION

1 Northern Pacific Coast Range and Valleys
2 Willamette and Puget Sound Valleys
3 Olympic and Cascade Mountains (Western Slope)
4 California Coastal Redwood Belt
5 Siskiyou - Trinity Area



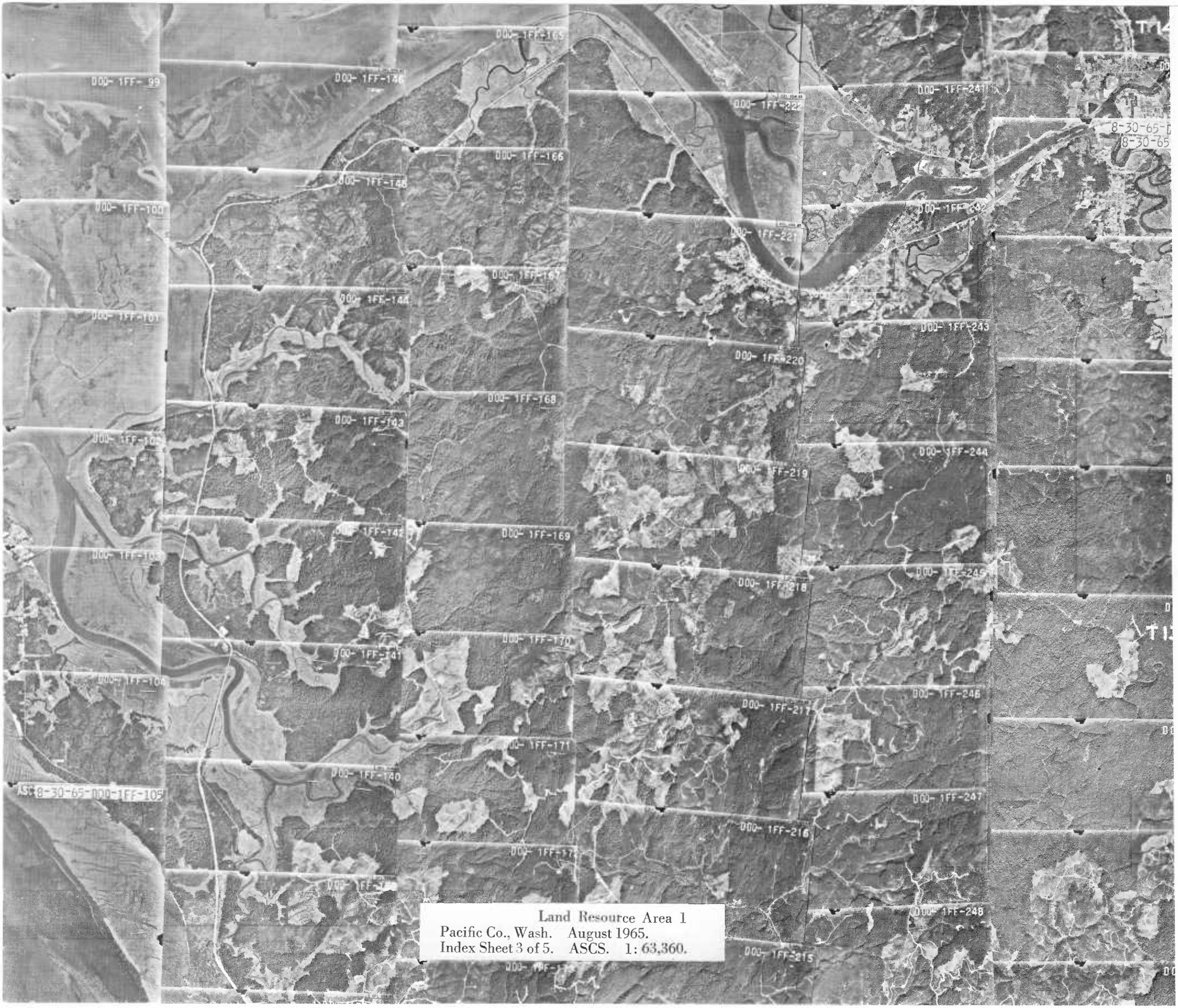
A—NORTHWESTERN FOREST, FORAGE, AND SPECIALTY CROP REGION

68,700 square miles

Steep mountains and narrow to broad, gently sloping valleys and plains characterize this region. The annual precipitation ranges from 40 to 70 inches over much of the region, but it is 15 inches or less in some valleys and as much as 200 inches in some of the higher mountains. All parts of the region have a pronounced dry season in summer. Average annual temperatures are 50° to 55° F. over most of the region but 35° F. or less in some of the mountains. The freeze-free season is more than 200 days in most valleys, as long as 300 days along the coast in the southern part, and only 115 days in the mountains.

Reddish-Brown Lateritic soils, Yellowish-Brown Lateritic soils, Brown Forest soils, Ando soils, Sols Bruns Acides, and Lithosols are the principal soil groups in the mountains and uplands. Alluvial soils, Brunizems, Brown Podzolic soils, and Humic Gley soils are extensive in the valleys.

The mountains are heavily forested, and lumbering is a major industry. Dairy farming is important in the valleys with higher rainfall; grain crops, grass and legume seeds, fruits, and horticultural specialities are grown extensively in the drier valleys.



Land Resource Area 1
Pacific Co., Wash. August 1965.
Index Sheet 3 of 5. ASCS. 1: 63,360.

1—Northern Pacific Coast Range and Valleys

Washington and Oregon
7,200 square miles

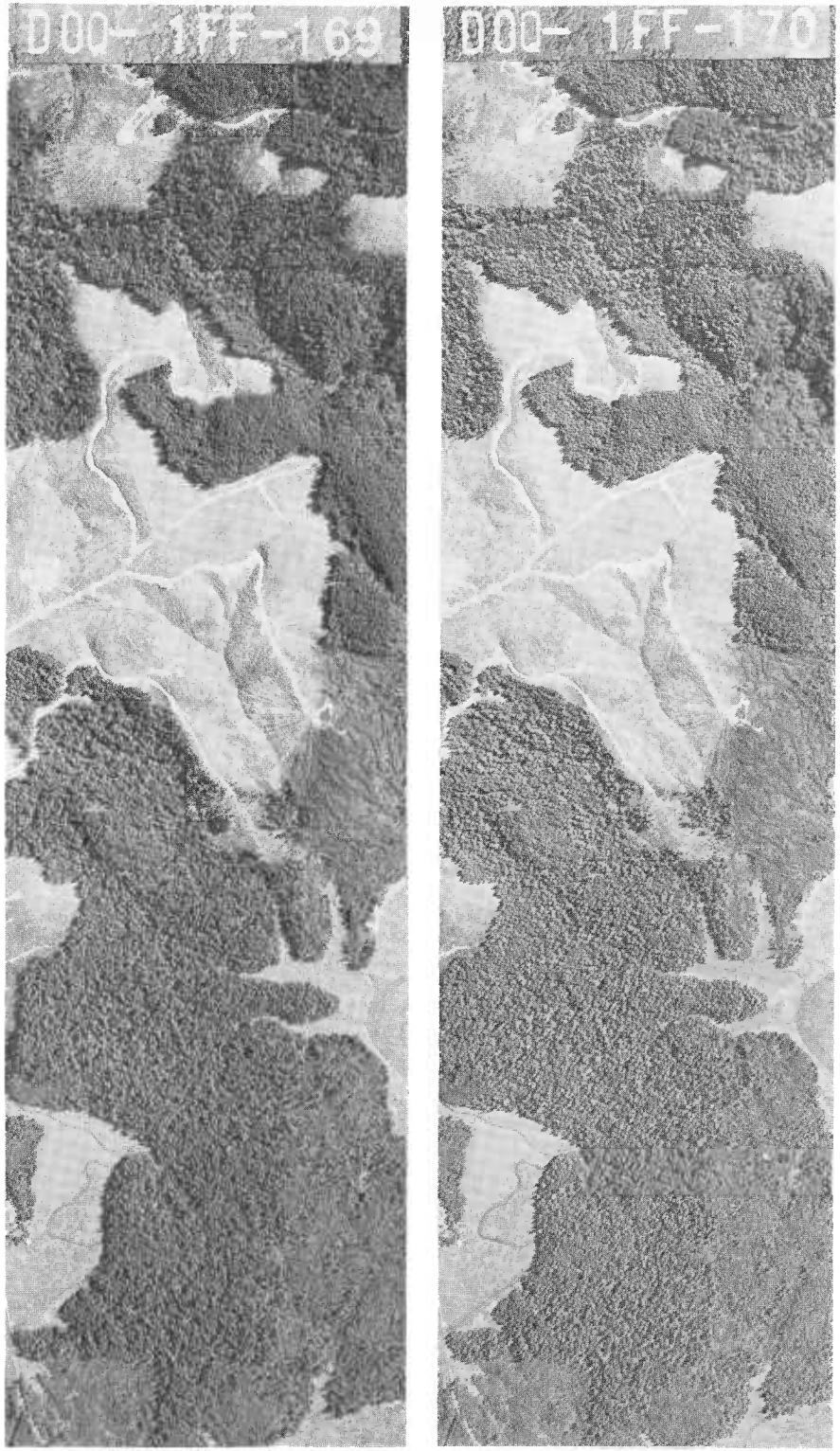
Land Use: Nearly all this area is in forest, mostly privately owned; about one-sixth of the land is owned by the Federal Government. Lumbering is the principal industry. Recreation and wildlife habitat are other important uses of the forested land. About 5 percent of the total area, in narrow valleys and on narrow coastal plains, is cleared. Hay for dairy cattle is the chief crop, and some grain and improved pasture are grown.

Elevation and Topography: Sea level to 3,000 feet, some mountain peaks nearly 7,000 feet. Gently to steeply sloping hills and low mountains occupy nearly all the area. Valleys are narrow and coastal plains are discontinuous and of small total extent.

Climate: *Average annual precipitation*—35 to 125 inches (50 to 100 inches in much of the area); evenly distributed through fall, winter, and spring; summers are dry. *Average annual temperature*—45° to 55° F. *Average freeze-free period*—140 to 225 days, decreasing with elevation.

Water: Abundant rainfall and many perennial streams provide enough water for all present needs within the area. The streams also provide water for irrigation and other purposes to adjoining lower drier valleys. Glacial and alluvial deposits in the valleys yield large quantities of ground water.

Soil: *Reddish-Brown Lateritic soils* (Olympic and Melbourne) and *Sols Bruns Acides* (Astoria) on consolidated rocks and *Ando soils* (Quillayute) in areas containing a large amount of volcanic ash are the major soils. Soils used for agriculture are *Sols Bruns Acides* (Nehalem and Chehalis) in alluvium-filled valleys and *Ando soils* (Quillayute and Spanaway) on terraces and coastal plains covered by volcanic ash.



Land Resource Area 2
Linn Co., Oreg. July 1960.
Index Sheet 1 of 1. P. ASCS. 1: 63,360.

2—Willamette and Puget Sound Valleys

Washington and Oregon
26,700 square miles

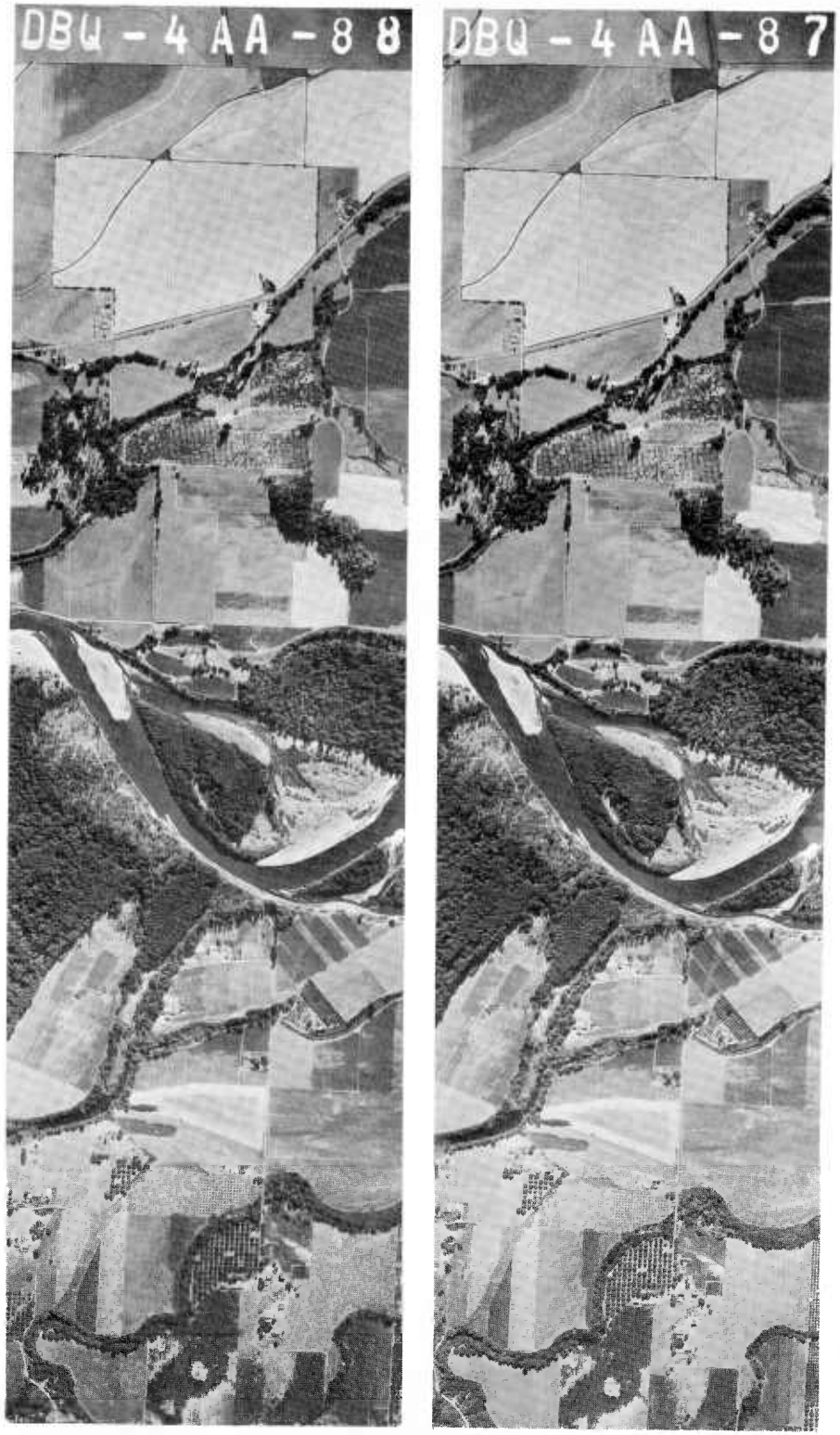
Land Use: Much of the land is privately owned; about one-sixth is owned by the Federal Government. Nearly three-fourths of the land in Puget Sound Valley is forested and lumbering is a major industry. In Willamette Valley the proportion of forested land is smaller—three-fifths or less of the area—and lumbering is not so important. Less than one-fifth of the total area is in crops or improved pasture, but agriculture is highly diversified. Deciduous fruits, berries, vegetables, seed crops, and grain grown under intensive management are the major crops; hay and grain for dairy and poultry feed also occupy large acreages. High-value crops are irrigated in some places, but most of the crops depend on rainfall for water.

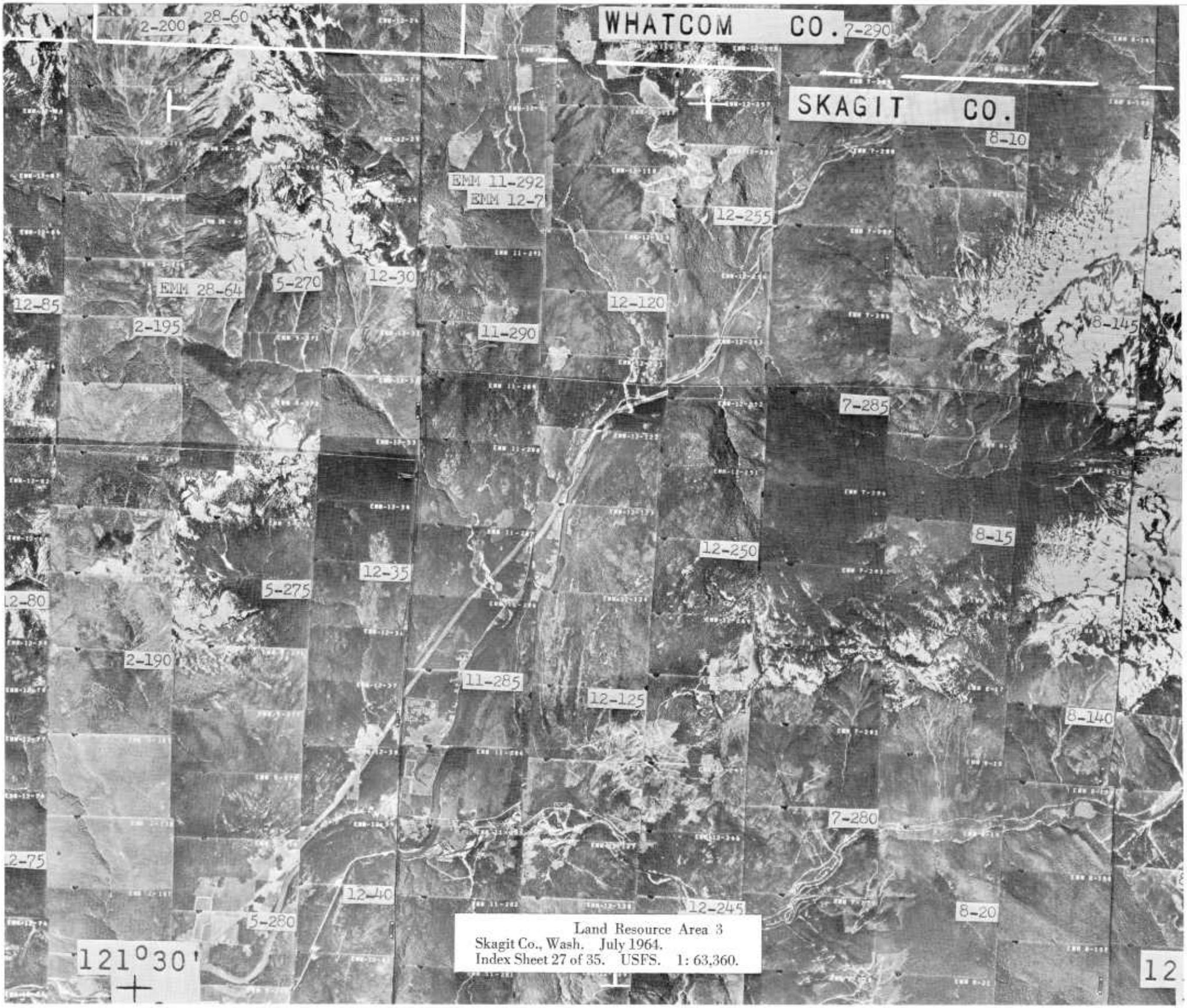
Elevation and Topography: Sea level to 1,500 feet. Willamette Valley consists of nearly level to gently sloping flood plains bordered by dissected higher terraces. Glacial till, glacial outwash, and lacustrine deposits cover Puget Sound Valley.

Climate: *Average annual precipitation*—15 to 60 inches (30 to 45 inches in much of the area); evenly distributed through fall, winter, and spring; summers are dry. *Average annual temperature*—48° to 55° F. *Average freeze-free period*—180 to 240 days.

Water: Moderate rainfall and abundant streamflow provide enough water for present needs. Additional supplies are available from adjoining mountain ranges if needed. Ground water is plentiful in glacial and alluvial deposits.

Soil: *Gray-Brown Podzolic soils* (Willamette), *Planosols* (Dayton), *Sols Bruns Acides* (Chehalis), *Alluvial soils* (Puyallup), *Humic Gley soils* (Coveland, Bellingham, and Wapato), *Reddish-Brown Lateritic soils* (Olympic), and *Yellowish-Brown Lateritic soils* (Salkum) are the principal groups. *Brown Podzolic soils* (Alderwood, Bow, and Everett) are extensive in Puget Sound Valley.





Land Resource Area 3
Skagit Co., Wash. July 1964.
Index Sheet 27 of 35. USFS. 1: 63,360.

3—Olympic and Cascade Mountains (Western Slope)

Washington and Oregon
18,400 square miles

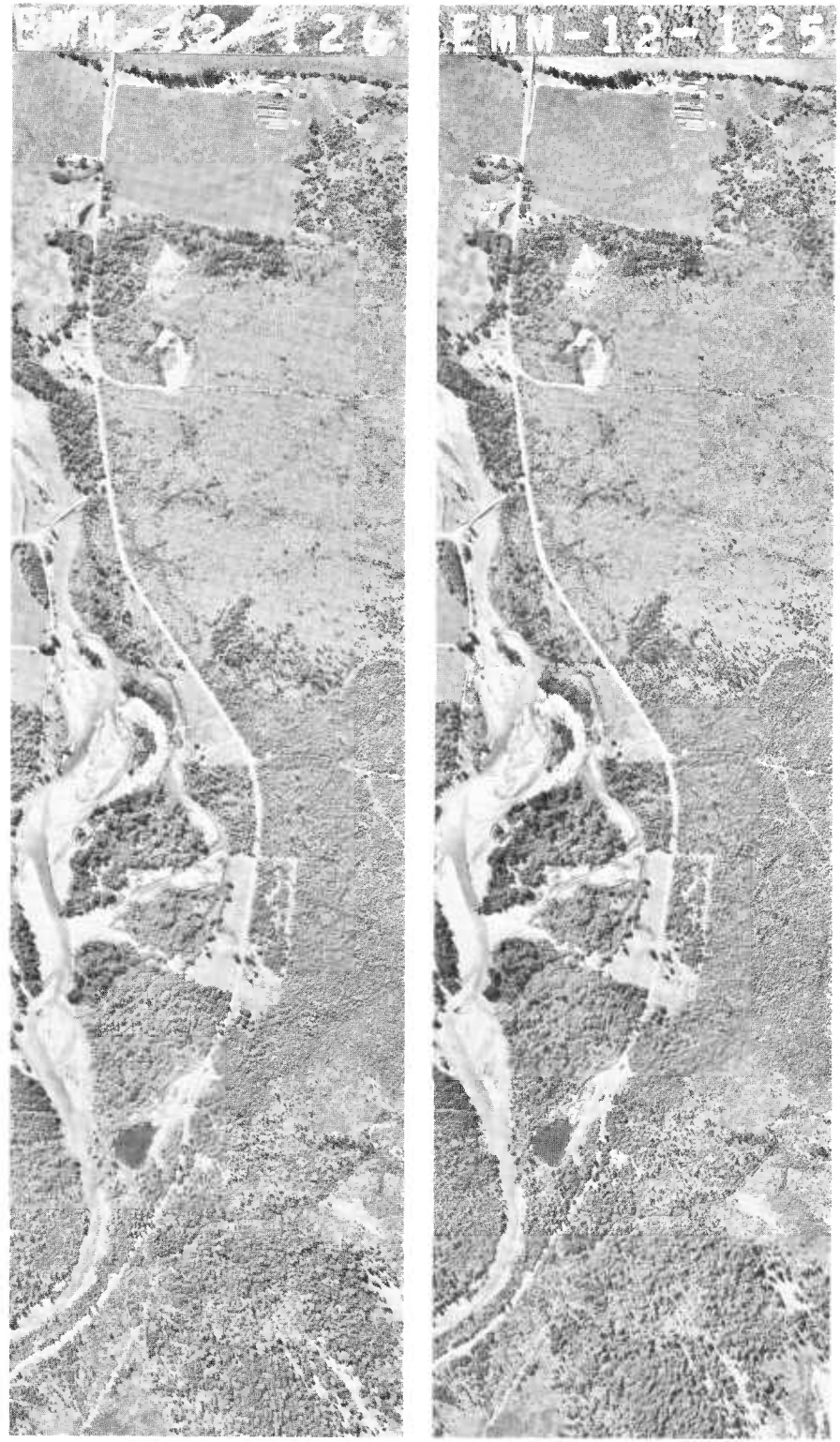
Land Use: More than three-fifths of the area is owned by Federal and State Governments. Most of the area is densely forested, and lumbering is the major industry. Mining is important in some places; recreation and wildlife habitat are other important uses. Some of the alpine meadows at the highest elevations provide summer range. About 5 percent of the area, mainly in the upper reaches of the major stream valleys, is cultivated. Forage and feed grains are the principal crops.

Elevation and Topography: 1,000 to 8,000 feet, some mountain peaks 14,000 feet. Steep to precipitous mountains, narrow valleys, and narrow divides are dominant. There are some small plateaus, and narrow bands of bottom land and terraces border some of the streams.

Climate: *Average annual precipitation*—50 to 90 inches in most of area, 30 inches in some valleys, and 200 inches on eastern slopes of mountains; increases with elevation and from south to north; falls mostly in fall, winter, and spring and much of it is snow. *Average annual temperature*—35° to 50° F., decreasing with elevation. *Average freeze-free period*—100 to 200 days, decreasing with elevation; frost every month of the year on some high mountain peaks.

Water: Rainfall and perennial streams provide abundant water for all present needs within the area. This area also supplies water to adjoining lower and drier areas.

Soil: Detailed information is lacking for most of the area. *Reddish-Brown Lateritic soils* (Olympic), *Brown Podzolic soils* (Cathcart and Oso), *Podzols* (Marblemount, Klaus, and Tokul), *Sols Bruns Acides*, *Alpine Meadow soils*, and *Lithosols* are the principal great soil groups. *Alluvial soils* (Puyallup, Pilchuck, and Wickersham) occur in small areas on flood plains of the larger streams.



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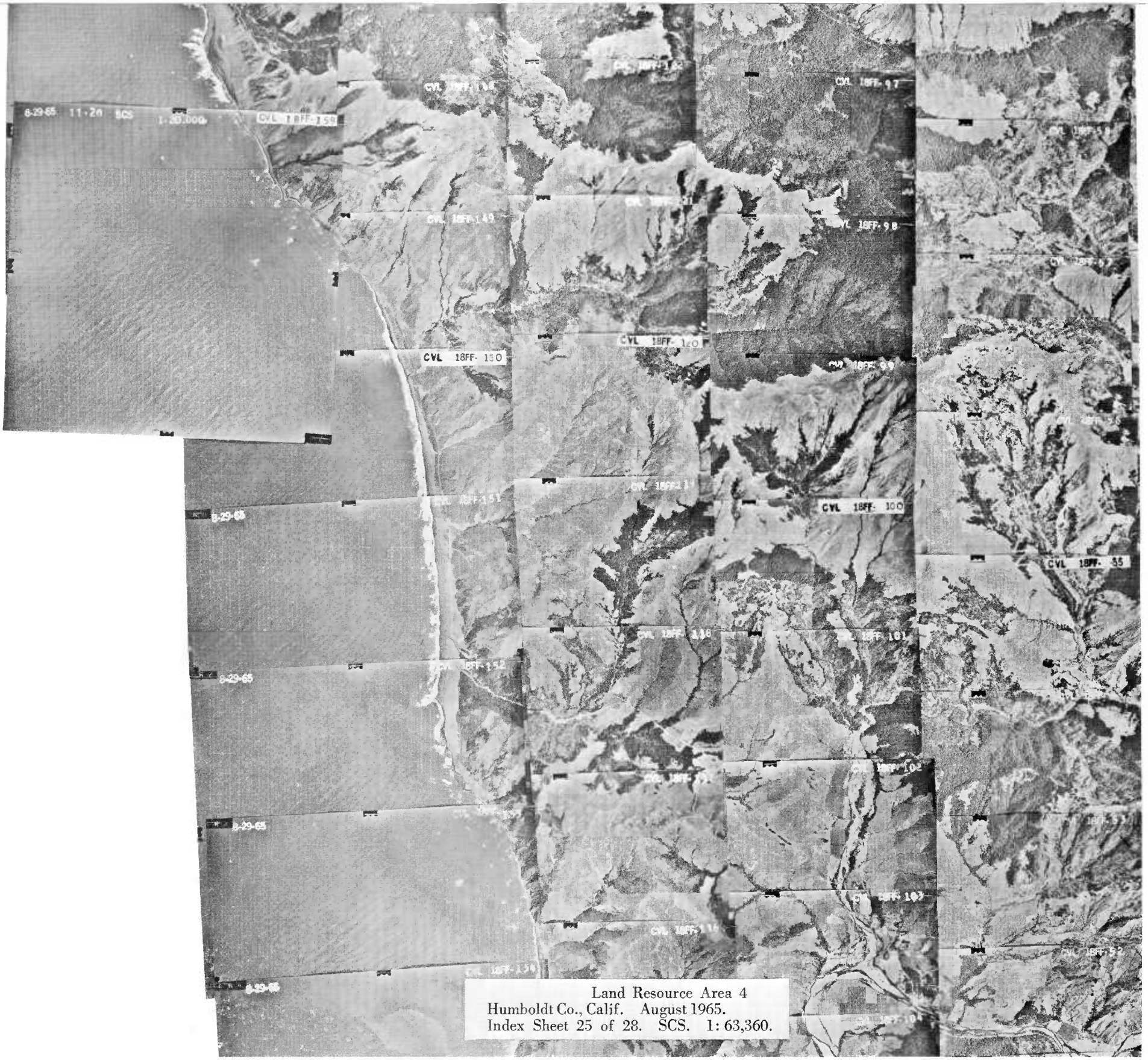


Land Resource Area 4
Humboldt Co., Calif. August 1965.
Index Sheet 25 of 28. SCS. 1: 63,360.

4—California Coastal Redwood Belt

California
4,200 square miles

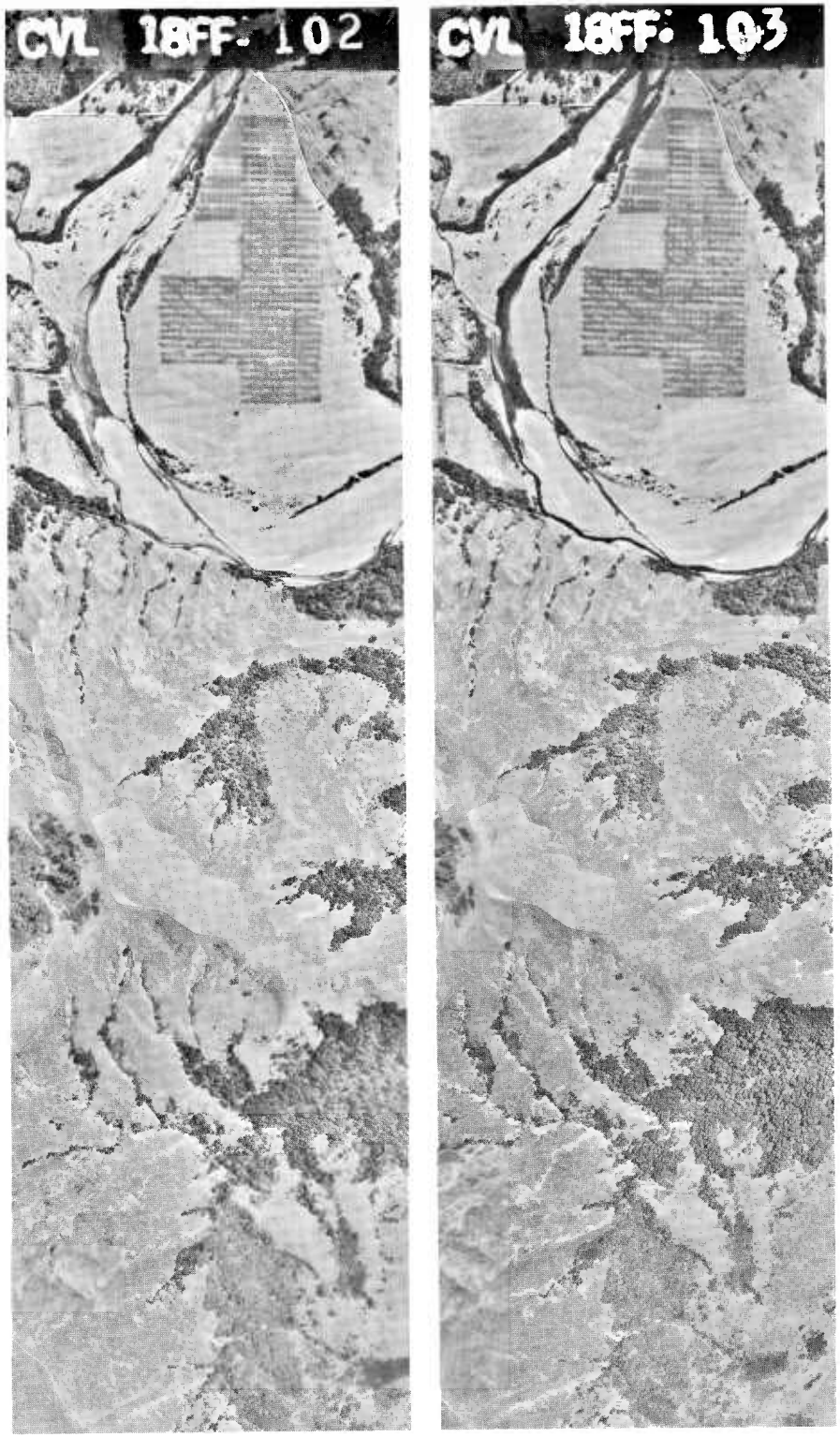
Land Use: Most of the land is in privately owned farms, ranches, or forest; about 10 percent is owned by the Federal Government. A large part of the area is densely forested with redwood, Douglas-fir, and associated species, and lumbering is the major industry. About 10 percent is grassland used for grazing. Cultivated land in valleys, less than 5 percent of the total area, is used mainly for forage and grain for dairy cattle; vegetables are grown where soils and climate are favorable.

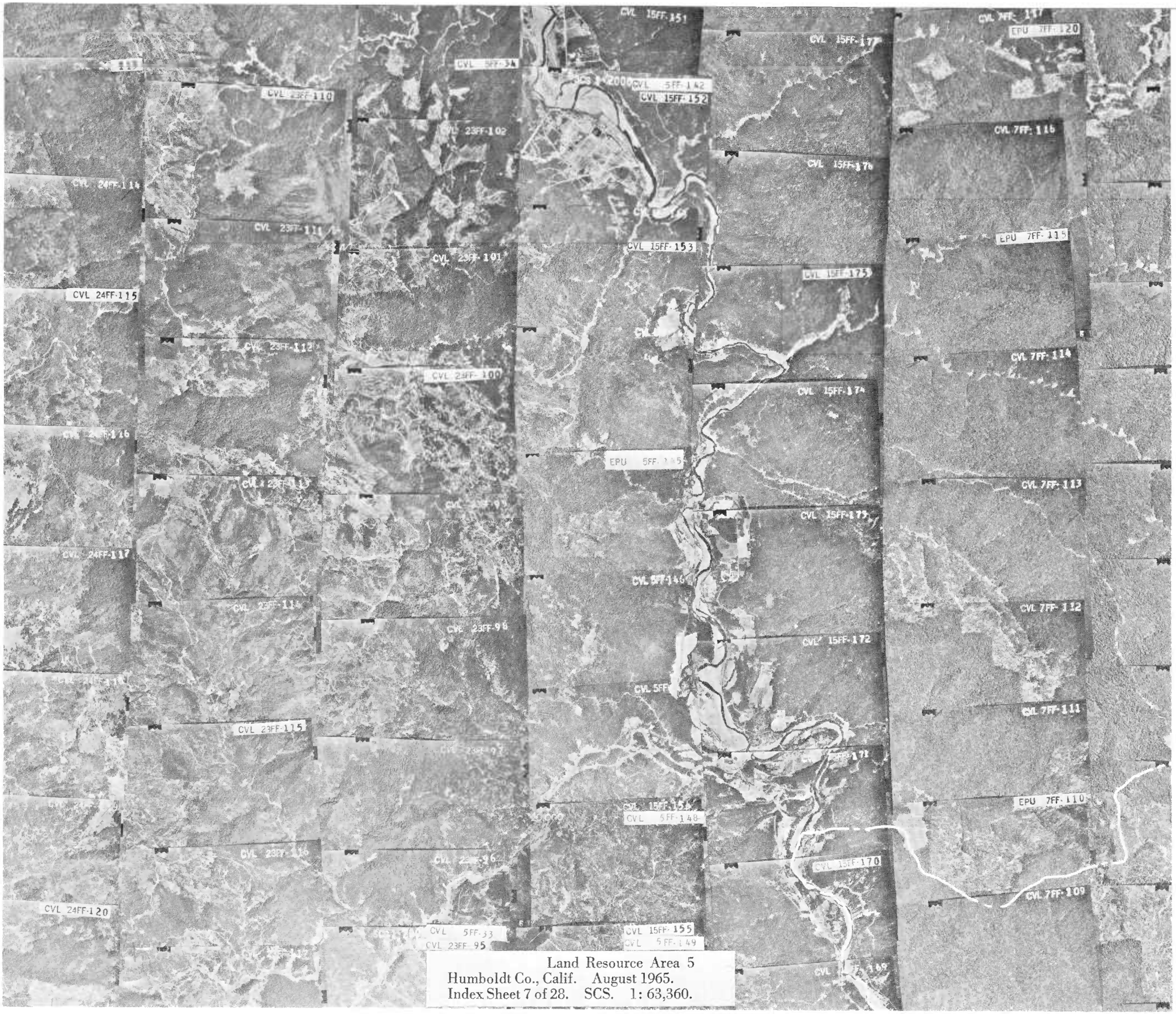
Elevation and Topography: Sea level to 2,500 feet, some peaks 4,000 feet. Low but steeply sloping mountains are dominant. Gently sloping marine terraces border the coast, and a few broad valleys extend inland through the mountains.

Climate: *Average annual precipitation*—32 to 80 inches; evenly distributed through fall, winter, and spring but very low in summer; heavy fogs are common along the coast in summer. *Average annual temperature*—50° to 55° F. *Average freeze-free period*—250 to 300 days.

Water: Abundant rainfall and many perennial streams provide enough water for most requirements. The drier valleys depend on streamflow from the mountains. Ground water is abundant in the deeper valley-fill deposits.

Soil: Detailed information is lacking. *Red-Yellow Podzolic soils, Reddish-Brown Lateritic soils,* and *Yellowish-Brown Lateritic soils* are dominant on forested mountain slopes and *Brunizems* on grassed areas at lower elevations.





Land Resource Area 5
Humboldt Co., Calif. August 1965.
Index Sheet 7 of 28. SCS. 1: 63,360.

5—Siskiyou-Trinity Area

Oregon and California
12,200 square miles

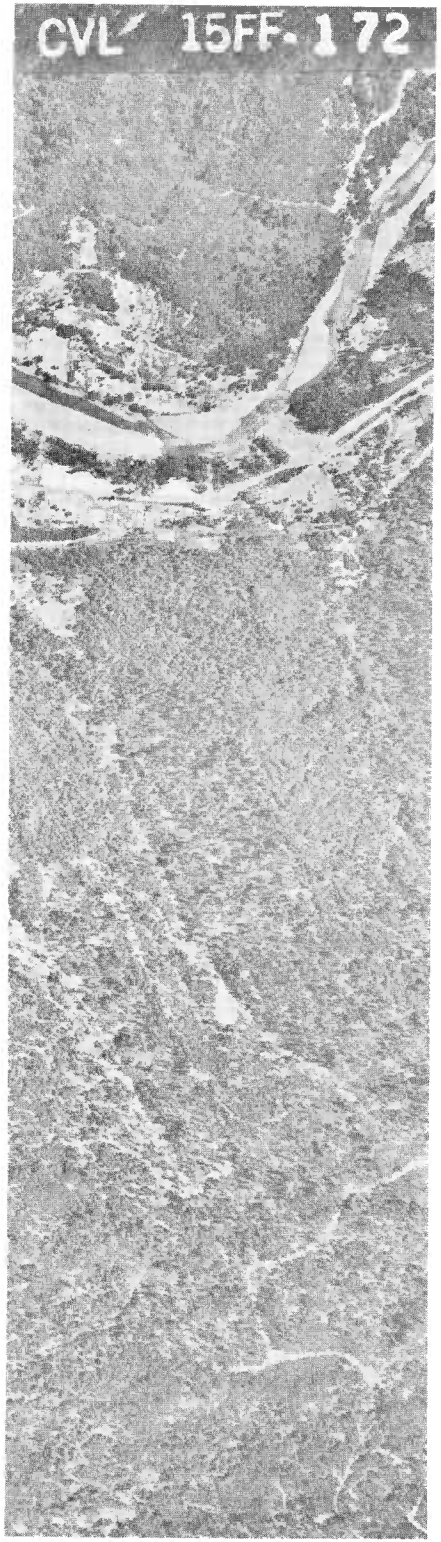
Land Use: Nearly half of the area is owned by the Federal Government. Most of the Federal land as well as the privately owned land is in forests of Douglas-fir, ponderosa pine, and sugar pine. Lumbering is important in these forests, which also provide wildlife habitat and recreation. About 5 percent of the area is grazed and a smaller amount is cropped. Truck crops are important in valleys that have enough water. On the more sloping parts of the valleys, small grains, hay, and pasture are grown to feed dairy cattle and other livestock.

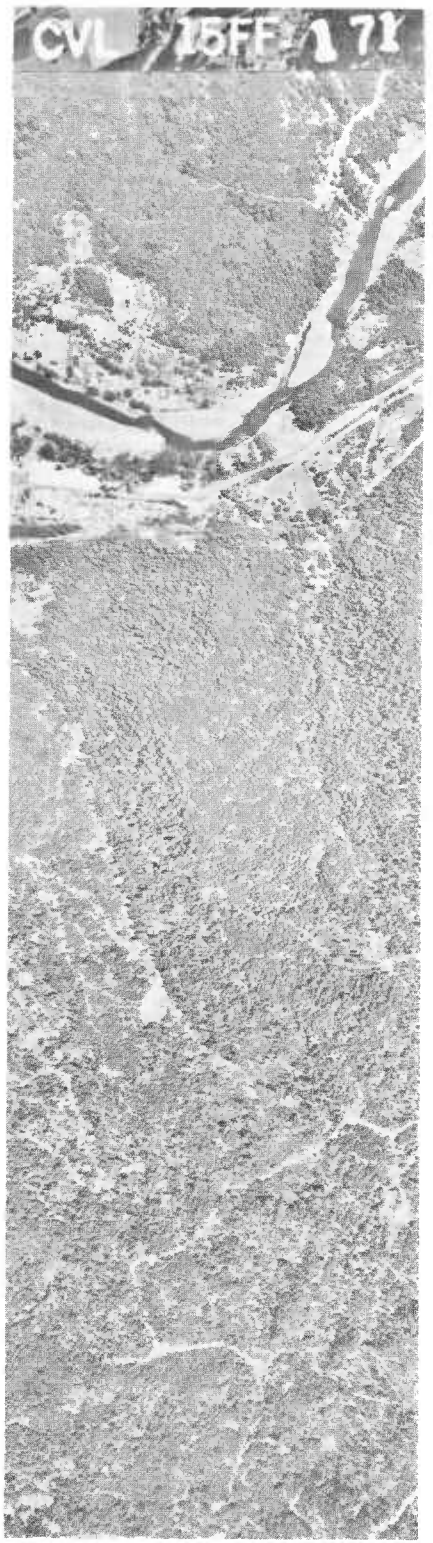
Elevation and Topography: 300 to 4,500 feet, some mountain peaks 7,000 feet. Rounded but steeply sloping mountains that are underlain mainly by sandstone and shale but in some places by granodiorite, gabbro, and other intrusive rocks are dominant. The narrow valleys have gently sloping flood plains and alluvial fans and are bordered by more strongly sloping foothills.

Climate: *Average annual precipitation*—18 inches in some valleys to 70 inches in the mountains; very low in summer and evenly distributed through rest of year. *Average annual temperature*—45° to 55° F. *Average freeze-free period*—115 to 250 days, decreasing with elevation.

Water: The moderate to high rainfall provides enough water in the mountains and higher valleys and, through streamflow, supplies irrigation water to the drier valleys. Ground water is abundant in alluvial deposits in most valleys.

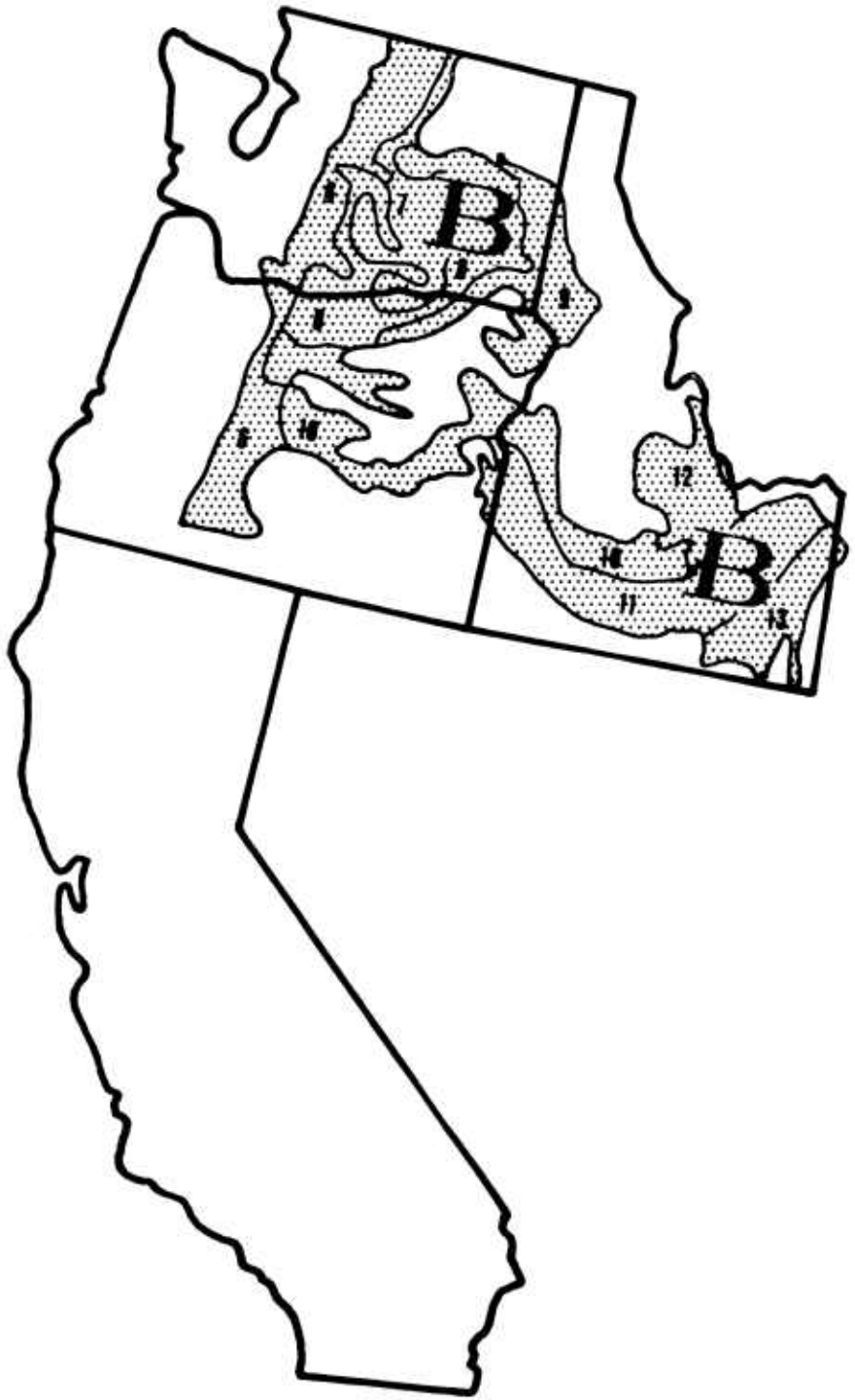
Soil: Detailed information is lacking for much of the area. *Reddish-Brown Lateritic soils* and *Yellowish-Brown Lateritic soils* (Masterson and Neuns) are the principal soils on the mountains and *Alluvial soils* (Cortina) on the lower alluvial fans and flood plains.





NORTHWESTERN WHEAT AND RANGE REGION

6 Cascade Mauntains (Eastern Slape)
7 Columbia Basin
8 Columbia Plateau
9 Palause and Nez Perce Prairies
10 Upper Snake River Lava Plains and Hills
11 Snake River Plains
12 Last River Valleys and Mauntains
13 Eastern Idaha Plateaus



B—NORTHWESTERN WHEAT AND RANGE REGION

97,600 square miles

A few mountain ranges are included in this region of smooth to deeply dissected plains and plateaus. The annual precipitation ranges from 10 to 23 inches over much of the area; in some valleys it is as low as 6 inches and in some mountains as much as 60 inches or more. Summers are dry. Average annual temperatures are 45° to 50° F. in most of the area but range from 38° to 55° F. The freeze-free season ranges from 120 to 200 days except in the mountains where it is shorter.

Brown soils, Chestnut soils, Sierozems, Chernozems, and Brunizems, all derived mainly from loess, are dominant over much of the region. Ando soils are conspicuous in places where the parent materials consist mostly of volcanic ash. Lithosols occur on the steep slopes underlain by basalt and lava. Alluvial soils on flood plains are important for agriculture.

Wheat grown by dryfarming methods is the major crop over most of the region, but oats and peas are important also. Fruit, mainly apples, is a major crop in the west. Potatoes, sugar beets, beans, and forage crops are grown on the irrigated land along Snake River in the eastern part of the region. Grazing is the major land use in the drier parts, especially in the west.

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Land Resource Area 6
Klamath Co., Oreg. August 1960.
Index Sheet 8 of 8. P. ASCS. 1: 63,360.

6—Cascade Mountains (Eastern Slope)

Oregon and Washington
17,200 square miles

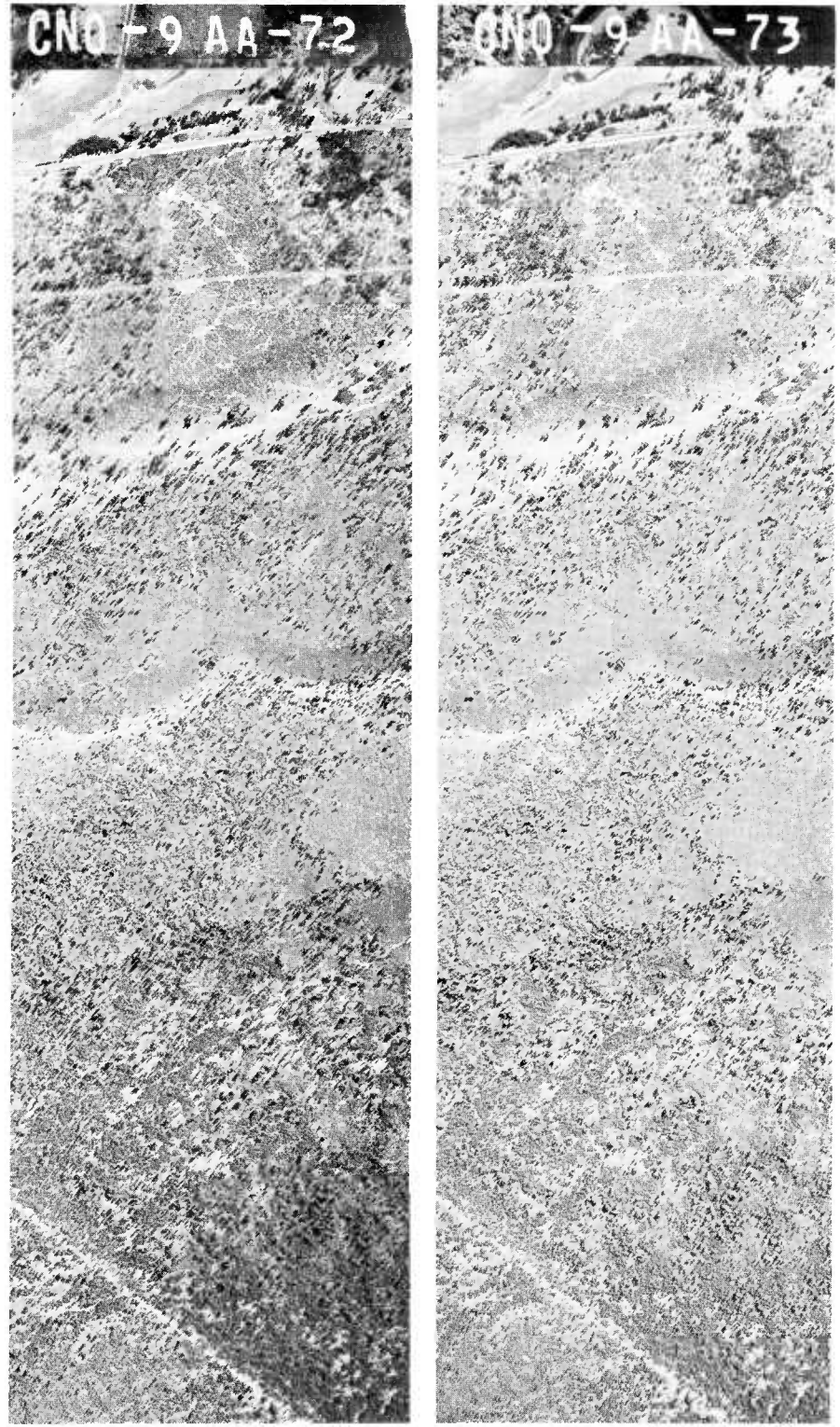
Land Use: About three-fifths of the area is owned by the Federal Government; most of the remainder is in farms, ranches, or privately owned woodlands. Much of the land, probably more than three-fourths, is in forest. Douglas-fir, larch, ponderosa pine, and lodgepole pine grow on the upper slopes where moisture is plentiful. Lumbering is important in these forests, which also serve as wildlife habitat and for recreation. Parklike woodlands at the lower elevations have an understory of grass, sagebrush, and bitterbrush and are used for grazing. About 5 percent of the area, mostly in valleys, is cropland, most of which is irrigated. Fruit, mainly pears, is a major crop along the Hood River; grain and forage crops are most extensive elsewhere. Small areas are dryfarmed to wheat.

Elevation and Topography: Mostly 1,000 to 4,500 feet, mountain crests in Washington 10,000 feet. Strongly sloping mountains that have some gently sloping crests and benches are dissected by many streams.

Climate: *Average annual precipitation*—12 to 30 inches in the lower valleys and foot slopes and 60 inches or more on the mountain crests; snowfall is heavy. *Average annual temperature*—45° to 52° F. *Average freeze-free period*—60 to 140 days, decreasing with elevation.

Water: The low to moderate rainfall and moderate streamflow are the principal sources of surface water. Ground-water supplies in the lavas that underlie most of the area are small and largely untapped.

Soil: Soils vary widely. *Podzols* (Pend Oreille, Methow, Cle Elum) and *Brown Podzolic soils* (Waits) are extensive at higher elevations where moisture is plentiful, *Lithosols* on most of the steeper mountain slopes,



366-564 O—70——3

Land Resource Area 7
Grant Co., Wash. July 1949.
Index Sheet 8 of 10. ASCS. 1: 63,360.

7—Columbia Basin

Washington and Oregon
9,200 square miles

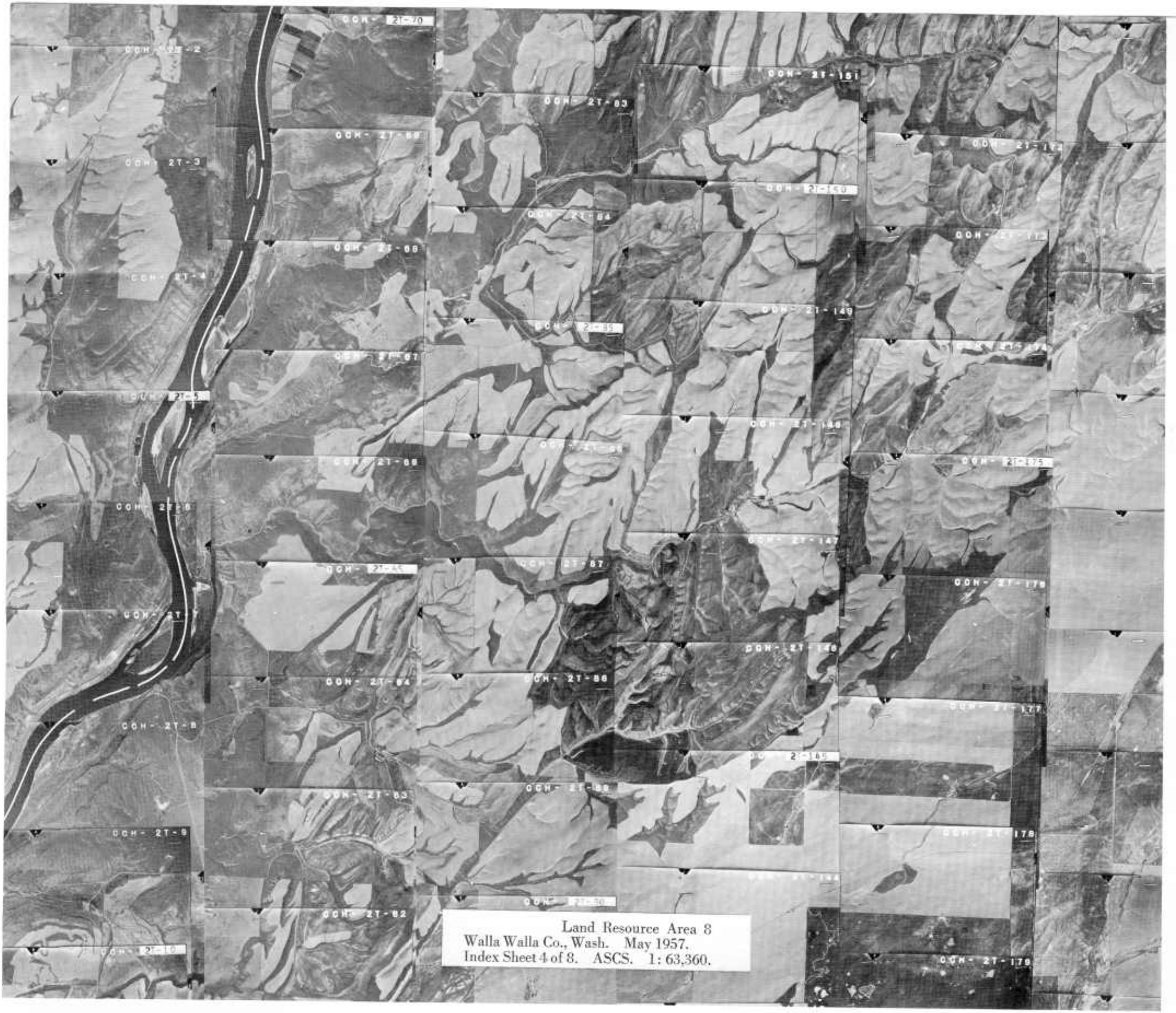
Land Use: Most of the area is in ranches, farms, and other private holdings; about one-fifth is owned by the Federal Government. About three-fifths of the area is in range of native grasses and shrubs and is grazed by cattle and sheep. About 10 percent of the area is irrigated and used for intensive production of fruits, vegetables, grain, hay, and pasture. An additional one-fourth of the area, the parts having deep silty soils but lacking water for irrigation, is dryfarmed; wheat is the principal crop.

Elevation and Topography: Mostly 1,000 to 1,500 feet, some deep canyons 350 feet, and some ridges 3,500 feet. The basin is a gently sloping to rolling plain broken by some steep ridges and steep-walled valleys.

Climate: *Average annual precipitation*—6 to 14 inches; highest in winter. *Average annual temperature*—47° to 55° F. *Average freeze-free period*—120 to 200 days.

Water: The Columbia, Yakima, and Snake Rivers supply large amounts of water for irrigation in their valleys but water is scarce elsewhere. Ground-water supplies in lavas underlying much of the area are small and largely untapped.

Soil: *Sierozems* (Ephrata, Warden, Sagemoor, and Timmerman) derived from glacial drift, loess, volcanic ash, or a mixture of these materials are the principal soils. Basalt rockland and rock outcrop occupy the steep ridges, scablands, and canyon walls. *Alluvial soils* (Esquatzel and Yakima) and *Humic Gley soils* (Kittitas) on flood plains and *Regosols* (Quincy) on sandy terraces are other important soils.



Land Resource Area 8
Walla Walla Co., Wash. May 1957.
Index Sheet 4 of 8. ASCS. 1: 63,360.

8—Columbia Plateau

Washington and Oregon
14,400 square miles

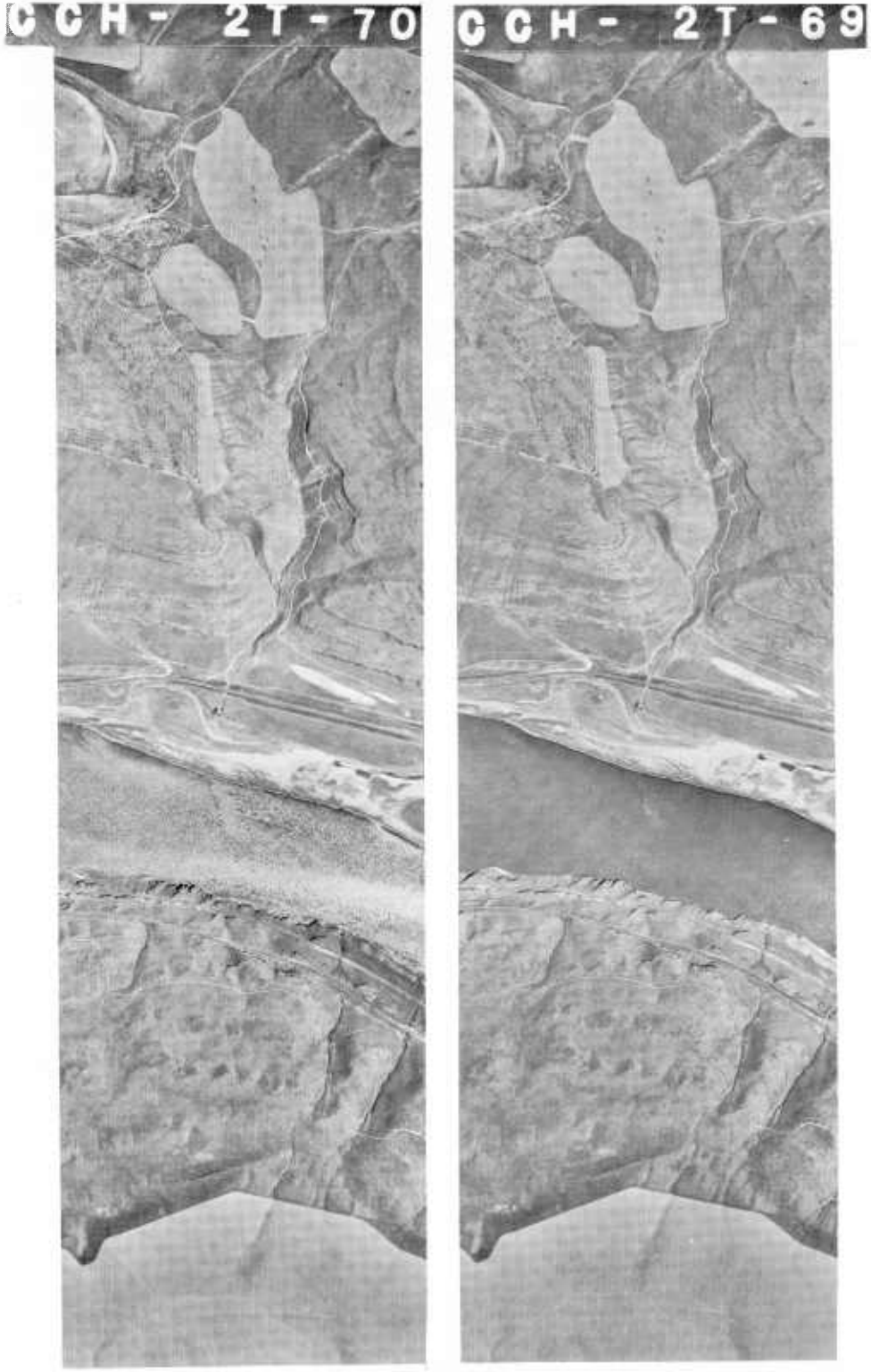
Land Use: More than 90 percent of the area is in farms or ranches, about 7 percent is owned by the Federal Government, and the remainder is urban. Nearly one-half of the land is cropland, most of which is dryfarmed. The main crops are wheat and peas, but a little land is in hay and improved pasture. Some small areas along the major streams are irrigated and used for growing vegetables, fruits (mainly apples), and hay. Nearly all the remaining land, about two-fifths of the total area, is in range but small areas are wooded.

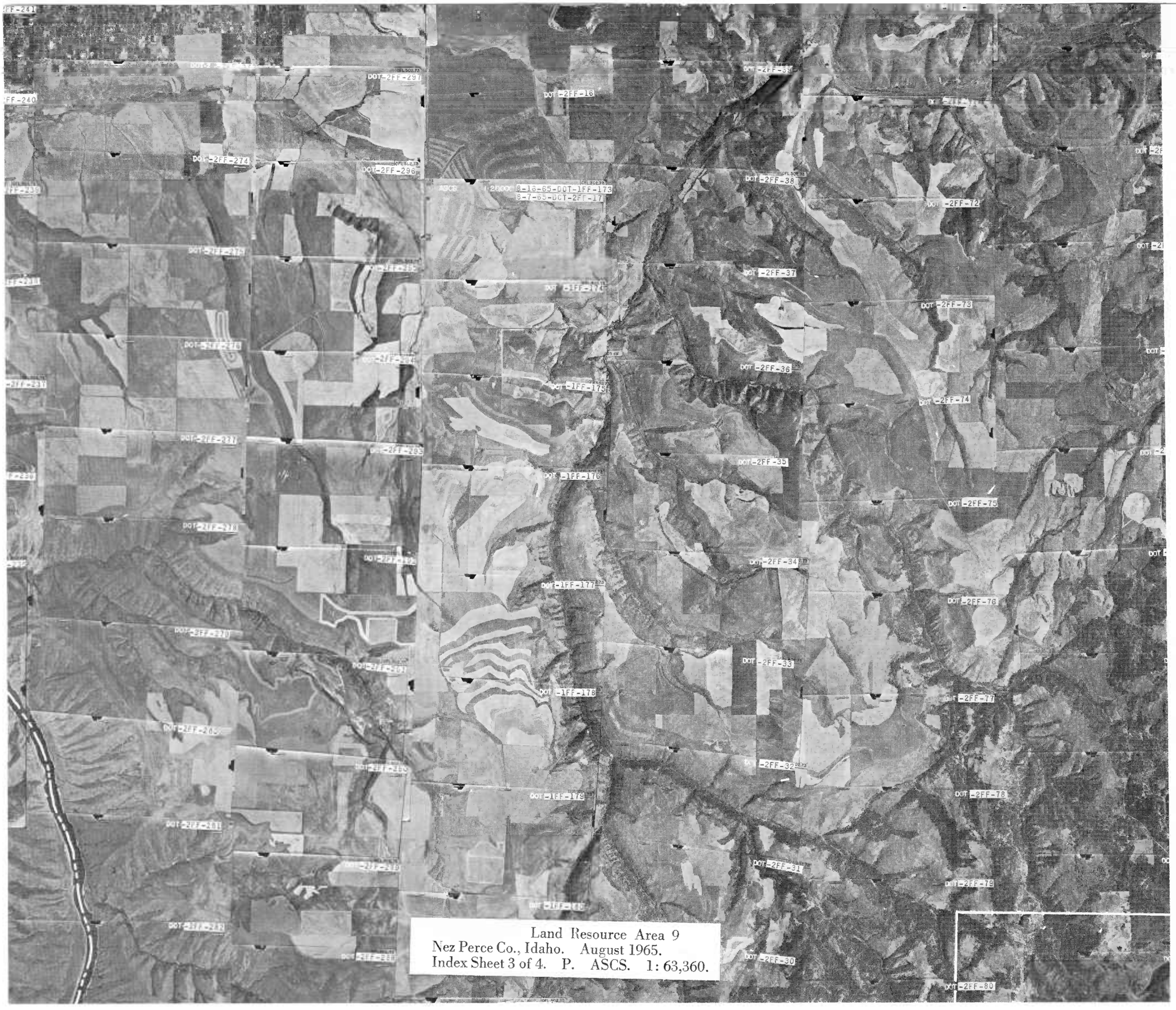
Elevation and Topography: 1,300 to 3,500 feet. These loess- and ash-mantled plateaus are nearly level to steeply sloping. Steep slopes are common along the walls of major valleys and in scablands.

Climate: *Average annual precipitation*—9 to 18 inches; highest in winter. *Average annual temperature*—45° to 55° F. *Average freeze-free period*—140 to 175 days.

Water: The low to moderate rainfall limits the choice of agricultural enterprise. The major rivers provide water for irrigation along their courses, but the few smaller streams provide little water. Ground-water supplies in the underlying basalts and lavas are small and mostly untapped.

Soil: Deep silty soils formed mostly in loess that contains small amounts of volcanic ash are dominant—*Chestnut soils* (Walla Walla and Condon) and *Brown soils* (Ritzville). *Alluvial soils* (Hermiston, Esquatzel, and Onyx) are important along the larger flood plains. *Lithosols*, shallow *Chestnut soils* (Kuhl), and shallow *Brown soils* (Bakeoven) occupy the steep slopes of scablands and canyons.

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Land Resource Area 9
Nez Perce Co., Idaho. August 1965.
Index Sheet 3 of 4. P. ASCS. 1: 63,360.

9—Palouse and Nez Perce Prairies

Washington, Oregon, and Idaho
9,200 square miles

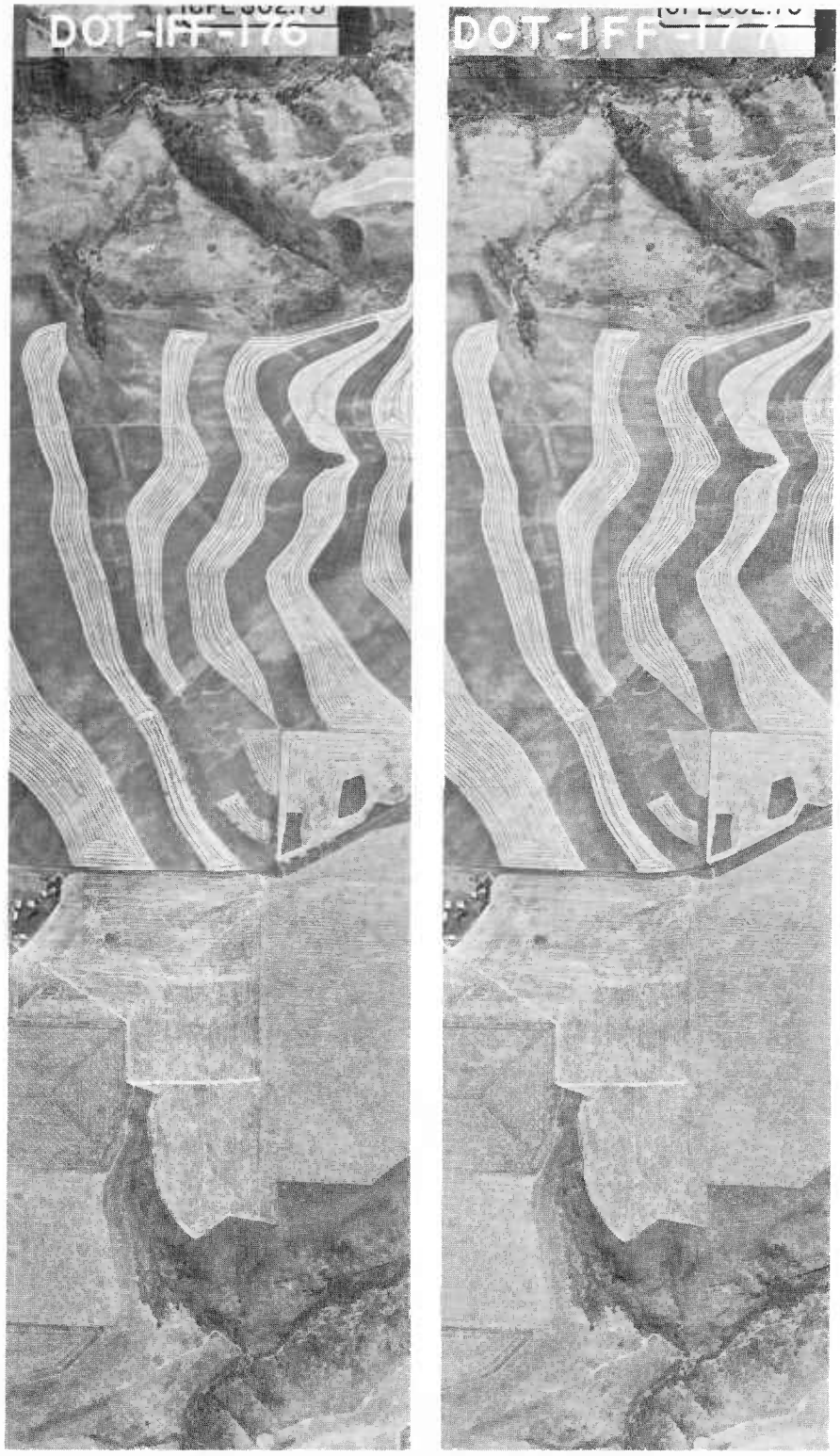
Land Use: About one-third of the area is owned by the Federal Government; nearly all the remainder is in farms and ranches. Much of the publicly owned land and about one-fourth of the land in ranches, consisting of the drier and more sloping uplands, is in range. About two-fifths of the area is cropland, nearly all dryfarmed to wheat and peas. Irrigated land, amounting to about 1 percent of the total area, is used to grow vegetables, seeds, and other specialty crops. Small wooded areas on steep slopes amount to about 10 percent of the area.

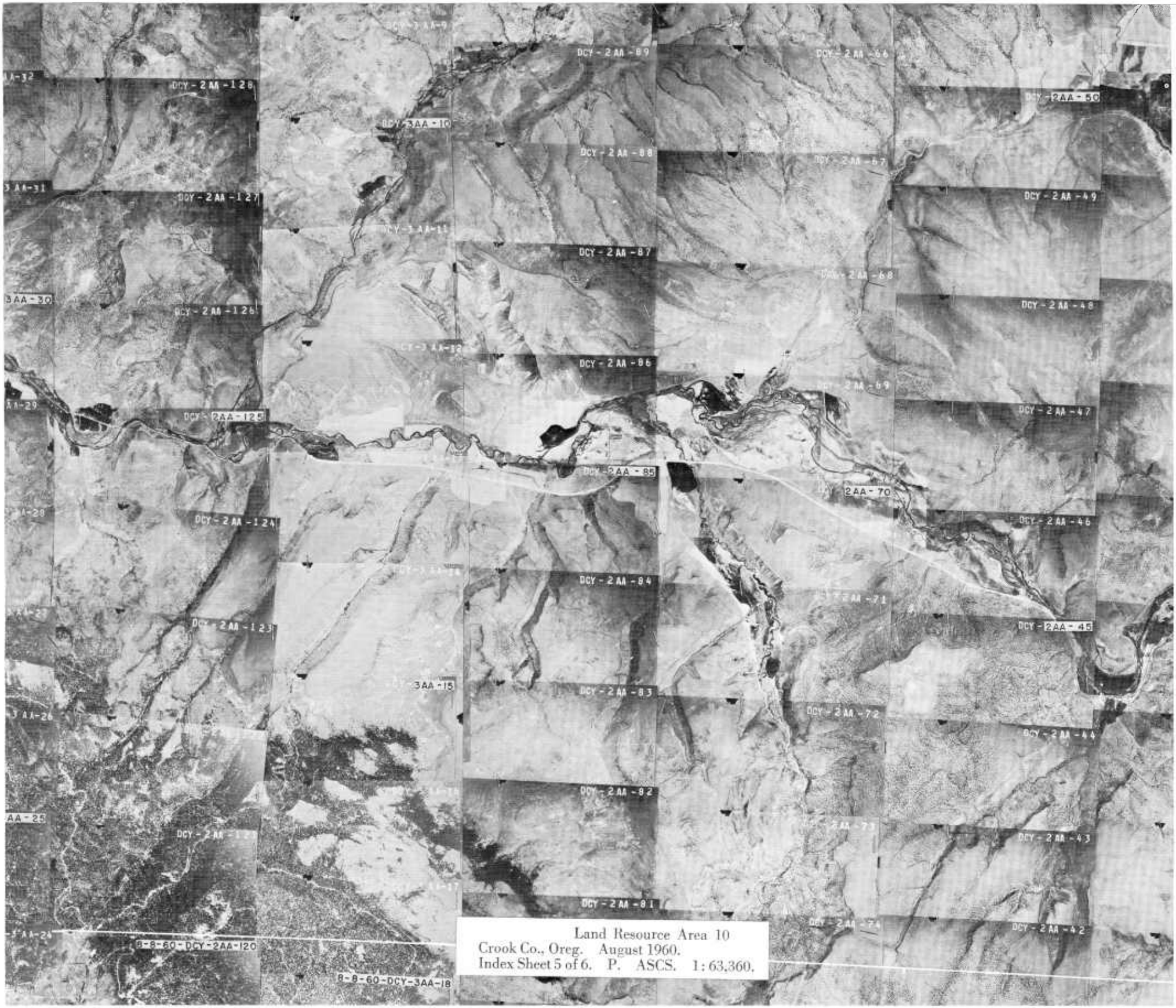
Elevation and Topography: 600 feet along the major streams and 2,000 to 4,000 feet over most of the plain. This loess-covered basalt plain is moderately to strongly dissected; slopes are mostly hilly and steep. The major streams have cut deep canyons.

Climate: *Average annual precipitation*—18 to 23 inches; evenly distributed through fall, winter, and spring but low in summer. *Average annual temperature*—45° to 55° F. *Average freeze-free period*—120 to 170 days.

Water: Rainfall is adequate for dryfarming in most of the area. Irrigation is limited mainly to areas adjacent to the large streams. Ground-water supplies are small and mostly untapped.

Soil: The better agricultural soils formed mainly in loess containing a small amount of volcanic ash. *Brunizems* (Palouse, Gwin, Waha, and Snow) and *Planosols* (Nez Perce) are dominant. *Chernozems* (Athena and Staley) are extensive in the drier areas, *Alluvial soils* and *Humic Gley soils* (Caldwell) in valleys, and scablands on lava flows.





Land Resource Area 10
Crook Co., Oreg. August 1960.
Index Sheet 5 of 6. P. ASCS. 1:63,360.

10—Upper Snake River Lava Plains and Hills

Idaho, Utah, and Oregon
17,700 square miles

Land Use: Nearly three-fifths of the area is owned by the Federal Government; most of the remainder is in farms or ranches. About three-fourths of the land is in grass and sagebrush used for range. The highest mountain slopes, about one-fifth of the area, are in forests of pine, spruce, and fir. Lumbering is important in these forests, which serve also as wildlife habitat and for recreation. About 5 percent of the total area, land bordering the large streams, is irrigated and used to grow potatoes and small grains and for pasture. Where rainfall is adequate, small areas of deep soils are dryfarmed.

Elevation and Topography: 1,300 to 6,500 feet, increasing from west to east, some mountain peaks 8,500 feet. The lava plains and hills are nearly level to steeply sloping. There are deep alluvial deposits in valleys and on fans adjacent to the mountains. The major streams are deeply entrenched, especially in the western part. Isolated mountain ranges occur throughout the area.

Climate: *Average annual precipitation*—10 to 20 inches; evenly distributed through fall, winter, and spring but low in summer. *Average annual temperature*—40° to 55° F. *Average freeze-free period*—60 to 165 days, decreasing from west to east and with elevation.

Water: The low to moderate rainfall is adequate for dryfarming on the smoother areas of deeper soils. Streams provide irrigation water for present needs along the major valleys. Ground-water supplies are small and at present mostly untapped.

Soil: *Chestnut soils* (Gem and Newell) and *Brown soils* (Lookout, Deschutes, and Madras) formed in alluvium, older unconsolidated deposits, and in some places thin loess are dominant. *Lithosols*, shallow *Brown soils* (Bakeoven and Ruckles) and *Regosols* are extensive on the steeper slopes, *Chernozems* and *Brunizems* on high mountain slopes, and soils transitional between *Brunizems* and *Gray-Brown Podzolic soils* on mountain tops and north-facing slopes.

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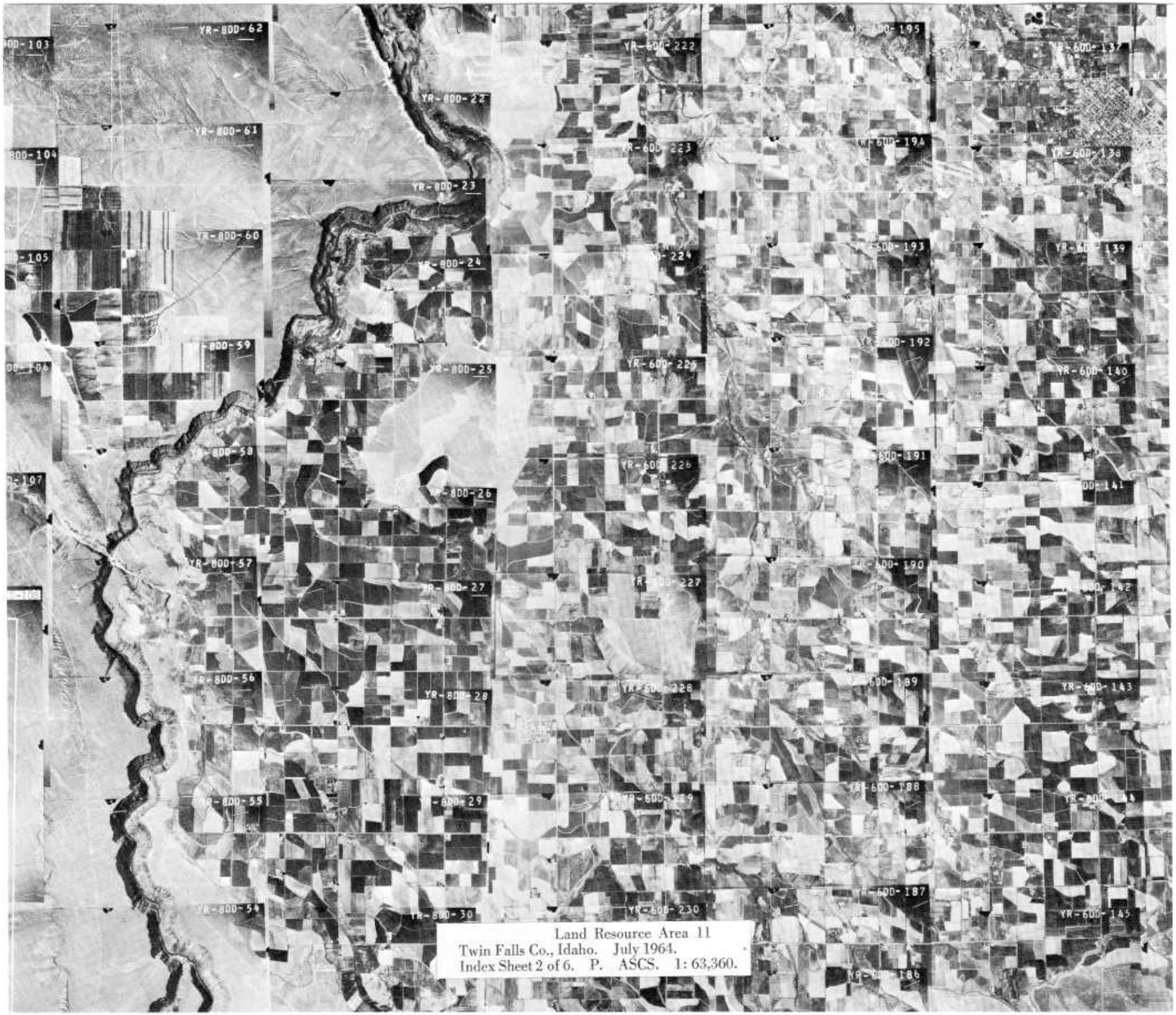
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Land Resource Area 11
Twin Falls Co., Idaho. July 1964.
Index Sheet 2 of 6. P. ASCS. 1: 63,360.

11—Snake River Plains

Idaho and Oregon
16,200 square miles

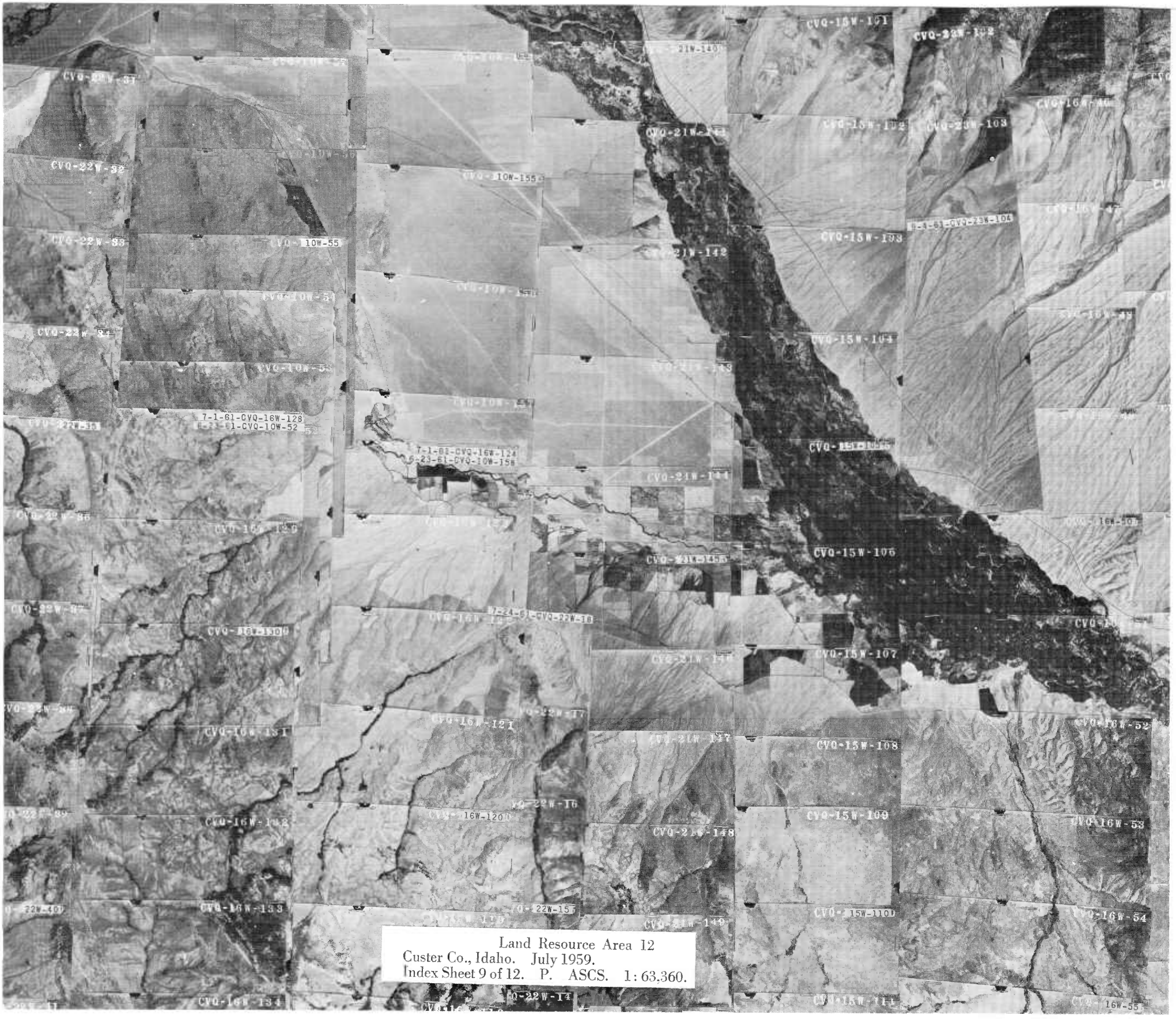
Land Use: Nearly one-half of the land is owned by the Federal Government; the remainder is in farms and ranches. Bare lava flows in the east include Craters of the Moon National Monument. About one-fourth of the area, the lower plains bordering Snake River, is irrigated. Potatoes, grain, sugar beets, beans, and hay are the principal crops, and there is some irrigated pasture. Other small areas that have favorable soils and moisture supplies are dryfarmed. Most of the Federally owned land and about one-fourth of the privately owned land is in range of sparse sagebrush and grass that has a low carrying capacity.

Elevation and Topography: 2,000 to 5,500 feet. These nearly level to steeply sloping lava plains have a thin to moderately thick cover of loess. Alluvial fans, terraces, and bottom lands are gently to moderately sloping.

Climate: *Average annual precipitation*—7 to 13 inches; little or none in summer. *Average annual temperature*—41° to 52° F. *Average freeze-free period*—90 to 170 days.

Water: A large amount of water is available for irrigation along Snake River and its larger tributaries. Ground water is plentiful in some of the deeper alluvial deposits throughout the area and in the lavas north of Snake River in eastern and central Idaho and has been used extensively for irrigation. In areas far from the major rivers, which depend on local rainfall, water is scarce.

Soil: *Calcisols* (Portneuf and Declo) and *Brown soils* (Paul) are dominant on the lower loess-capped lava plains and the alluvial fans and *Sierozems* with caliche (Minidoka) on the loess-capped older lava flows. *Alluvial soils* (Moulton) are important on the lower younger fans and flood plains. Recent lava flows and rockland are extensive in the east.



Land Resource Area 12
Custer Co., Idaho. July 1959.
Index Sheet 9 of 12. P. ASCS. 1: 63.360.

12—Lost River Valleys and Mountains

Idaho
7,200 square miles

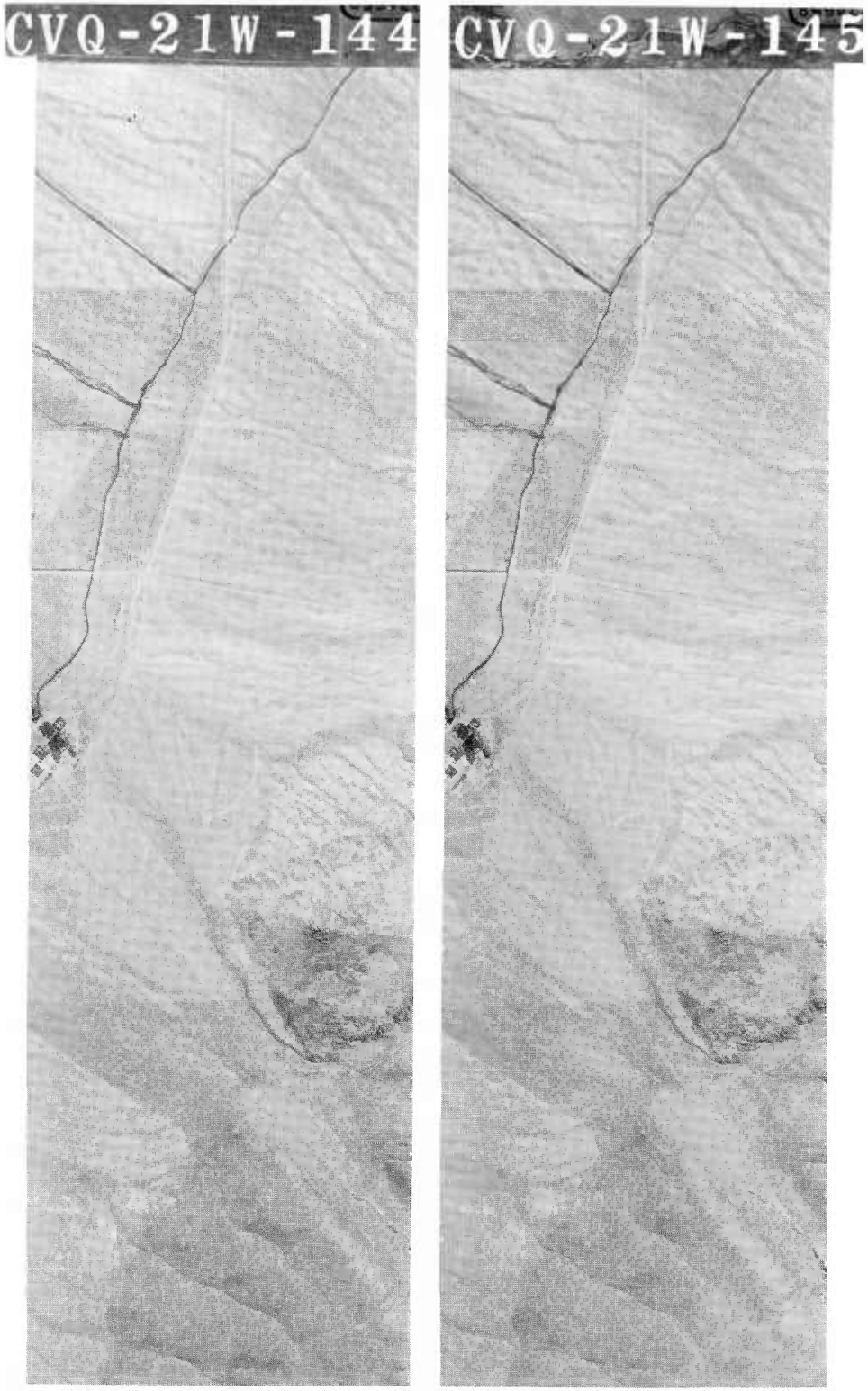
Land Use: Nearly all the area is owned by the Federal Government. The higher mountain slopes are forested and some lumber is produced. The lower grass- and shrub-covered slopes and valleys are grazed. Irrigated land in the valleys, amounting to about 1 percent of the area, is used mostly for hay and pasture, but potatoes and small grains are grown also.

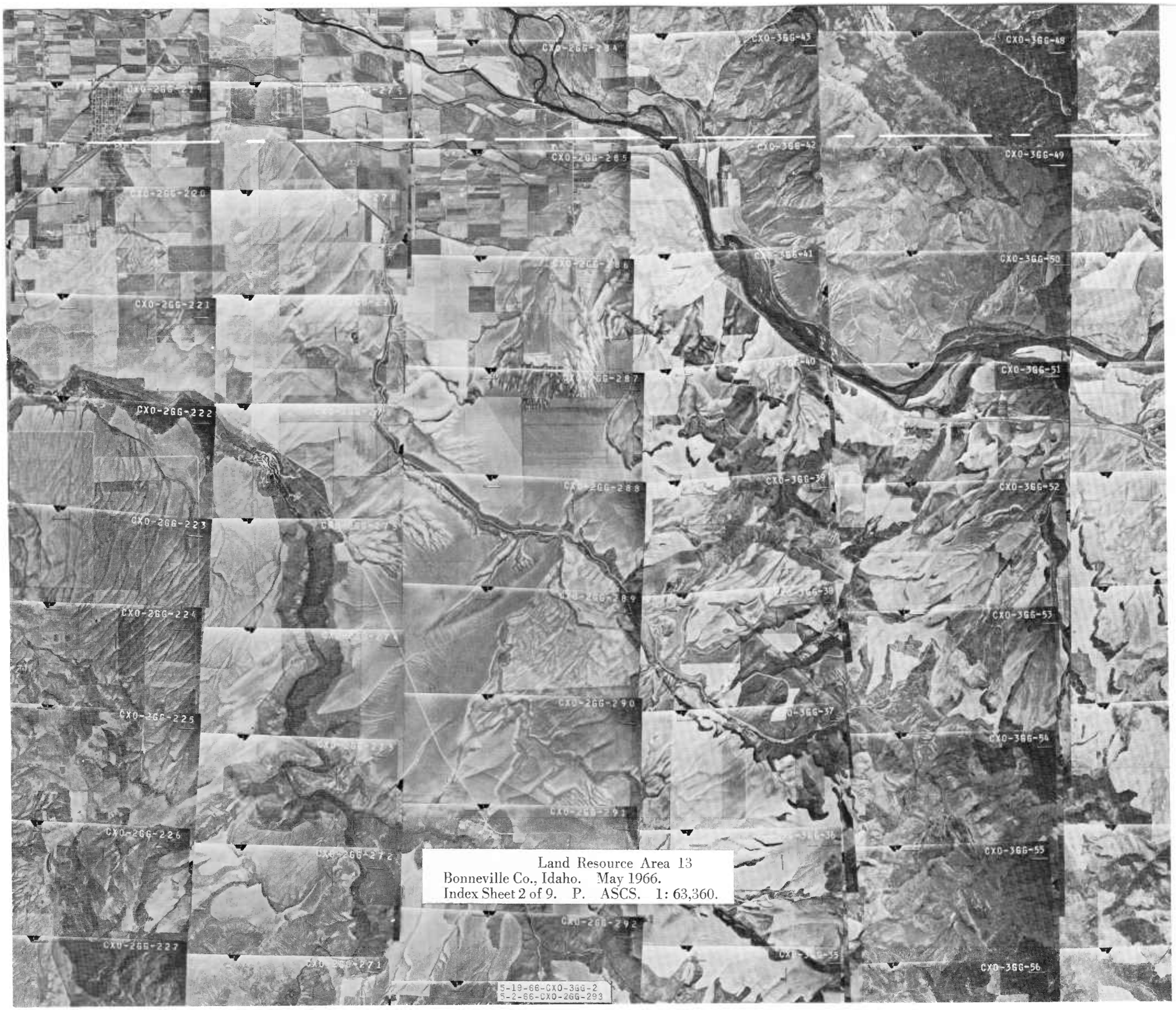
Elevation and Topography: 4,500 feet in the valleys to more than 10,000 feet at the highest mountain crests. Steep to very steep mountains underlain by mixed sedimentary rocks and volcanic rocks constitute more than 80 percent of the area. The large valleys deeply mantled by recent alluvium and some lacustrine deposits are level to moderately sloping.

Climate: *Average annual precipitation*—7 to 11 inches in valleys, increasing to 25 inches or more on mountain crests. *Average annual temperature*—38° to 45° F. in the valleys but much lower in the mountains. *Average freeze-free period*—80 to 110 days in the valleys; frosts occur every month of the year in the higher mountains.

Water: The moderate rainfall provides enough moisture for grass and shrubs to grow on mountain slopes, but valleys depend on streamflow from higher areas for water for livestock and irrigation. Springs and shallow wells in the valleys supply a small amount of ground water.

Soil: Detailed information is lacking for much of the area. *Lithosols* are the principal soils on mountain slopes. In valleys, *Desert soils*, *Brown soils*, *Sierozems*, *Calcisols*, and *Regosols* occupy the gently to strongly sloping fans and *Alluvial soils*, *Humic Gley soils*, and *Solonchak soils* the flood plains and lacustrine deposits. Some of the soils in valleys contain small to moderate amounts of alkali or salts.

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Land Resource Area 13
Bonneville Co., Idaho. May 1966.
Index Sheet 2 of 9. P. ASCS. 1: 63,360.
5-19-66-CXO-3GG-2
5-2-66-CXO-2GG-293

13—Eastern Idaho Plateaus

Idaho
6,500 square miles

Land Use: Nearly three-fourths of the land is in farms and ranches; the remainder is owned by the Federal Government. About one-fourth of the area is dry-farmed; wheat is the major crop. An additional 10 percent, land along some of the large streams, is irrigated and used largely for hay meadows and pasture, but some small grains and potatoes are grown. Much of the remaining land, amounting to about one-half of the area, is in range. About 10 percent, consisting of the higher mountain slopes, is in forests, which produce some timber and are grazed.

Elevation and Topography: 4,500 to 6,500 feet in plains and plateaus, mountain crests mostly 7,500 to 8,500 feet but some peaks more than 10,000 feet. The dissected plateaus and plains are underlain by sedimentary rocks that are mantled by loess on the gentle slopes. Lacustrine deposits and deep alluvium fill some level valleys and basins. The plains and plateaus are separated by many rugged but discontinuous mountain ranges and peaks.

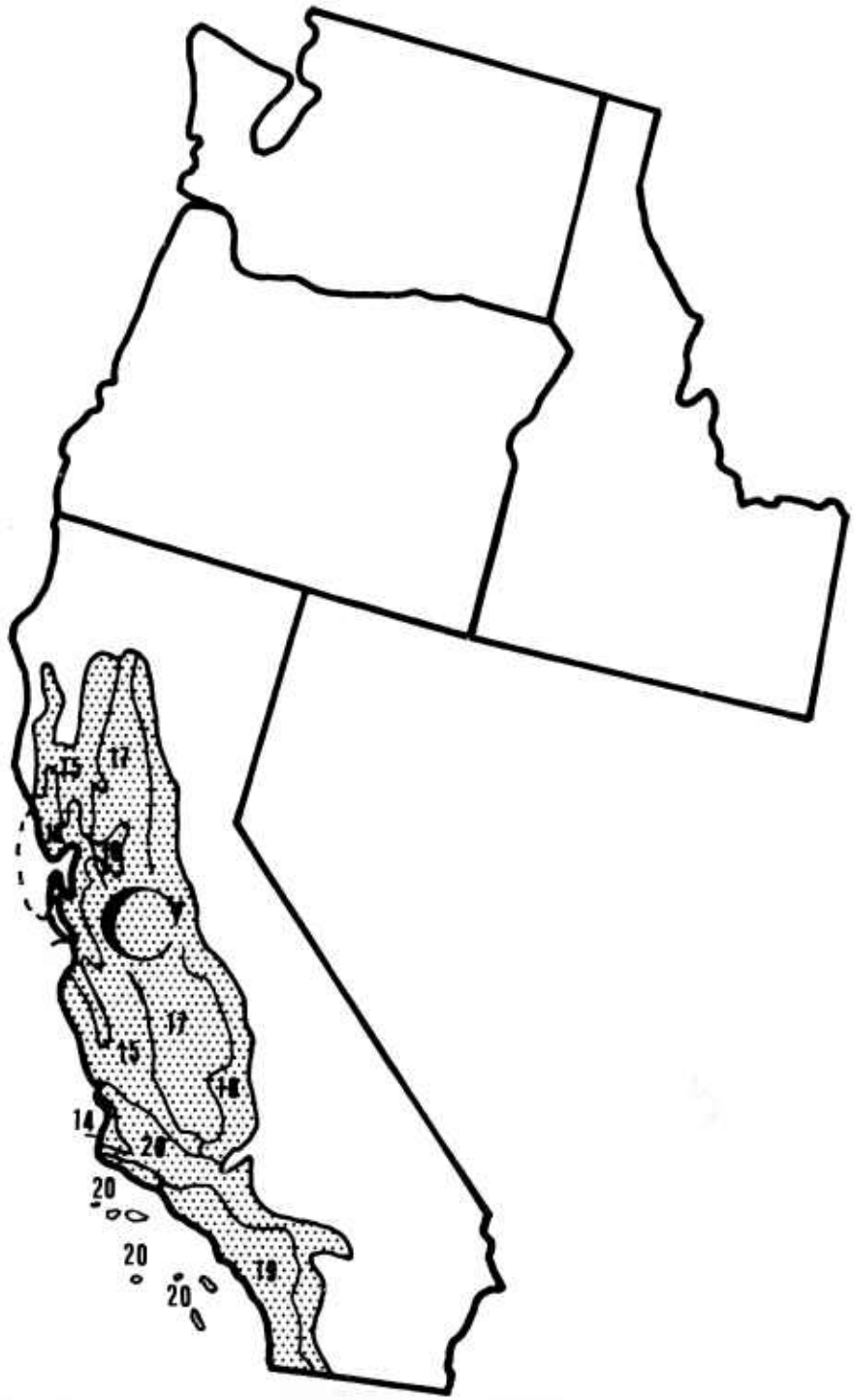
Climate: *Average annual precipitation*—12 to 20 inches; lowest from midsummer through autumn. *Average annual temperature*—40° to 45° F. but lower in mountains. *Average freeze-free period*—50 to 120 days; frosts occur every month of the year in the higher mountains.

Water: The scarcity of water imposes serious limits on agriculture. Rainfall provides water for dryfarming and grazing, but careful management is needed to make the best use of the limited amount. Perennial streams are few, and very little water is available for irrigation. Ground water is also scarce.

Soil: *Chestnut soils* from loess and residual materials are the principal soils in about two-thirds of the area. *Chernozems* (Lanark) on the higher slopes and in some of the moister loess-mantled areas and *Brown soils* in the drier areas are the principal soils in the remainder. *Lithosols* occupy the steeper slopes underlain by hard bedrock and *Regosols* the steep slopes of unconsolidated materials.

CALIFORNIA SUBTROPICAL FRUIT, TRUCK, AND SPECIALTY CROP REGION

14 Central California Valleys
15 Central California Coast Range
16 California Delta
17 Sacramento and San Joaquin Valleys
18 Sierra Nevada Foothills
19 Southern California Coastal Plain
20 Southern California Mountains



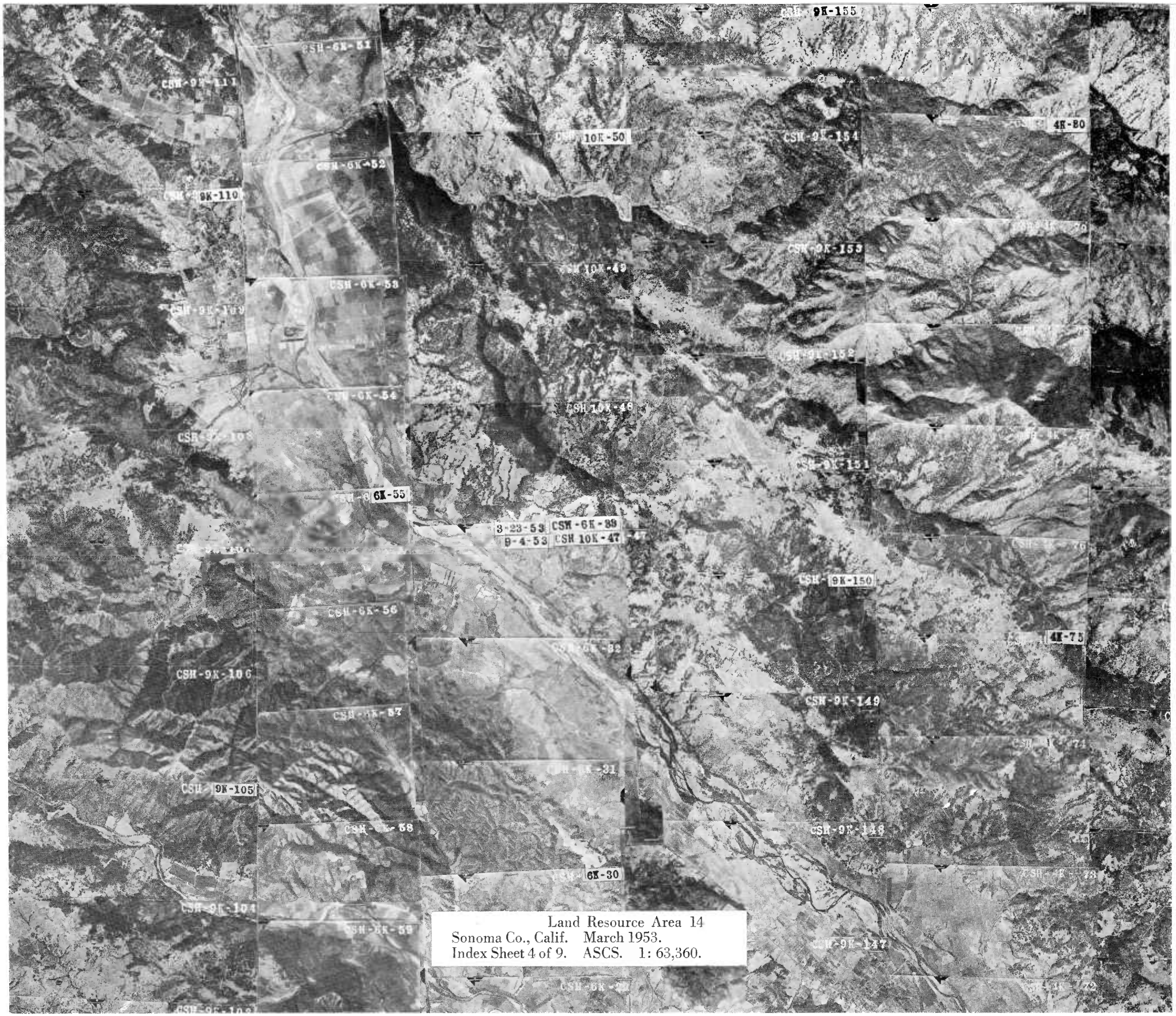
C—CALIFORNIA SUBTROPICAL FRUIT, TRUCK, AND SPECIALTY CROP REGION

66,100 square miles

This region of low mountains and broad valleys has a long warm growing season and low precipitation. The annual rainfall ranges from 40 inches to less than 10 inches; very little occurs from late April through October. Average annual temperatures are 60° to 65° F. over most of the region but are as low as 32° F. at some of the higher elevations. The average freeze-free season is 230 to 270 days in much of the region but is 125 days or less in some of the higher mountains and more than 350 days in the valleys of the south.

Noncalcic Brown soils, Grumusols, and Brunizems are extensive on the uplands and older terraces throughout the region, but Alluvial soils and Humic Gley soils on flood plains and alluvial fans are the most important soils for agriculture. Many of the soils on flood plains and low terraces are affected by salts and must be skillfully managed for satisfactory crop yields.

This region has a wide variety of crops and agricultural enterprises. Citrus fruits, other subtropical and tropical fruits, and nuts are major crops in the southern half. Many kinds of vegetables, grown mainly under irrigation, are produced throughout the region. Rice, sugar beets, cotton, grain crops, and hay are also important. Dairying is a major enterprise near the large cities. Beef-cattle production on feed lots and range is also important.



Land Resource Area 14
Sonoma Co., Calif. March 1953.
Index Sheet 4 of 9. ASCS. 1: 63,360.

14—Central California Valleys

California
5,200 square miles

Land Use: Most of the land is in farms and ranches; about 10 percent is urban and the amount in this use is increasing rapidly. The gently sloping land in the valleys is intensively farmed and many kinds of crops are grown. Truck crops, subtropical fruits, nuts, small grains, hay, and pasture are the principal crops on irrigated land and small grains on dryfarmed areas. Dairy and poultry farming are important near the large cities. The more sloping fans and foothills, amounting to one-fourth or more of the area, are in native range used for livestock grazing. A few small areas on the steep slopes along the coast remain in redwood forest.

Elevation and Topography: Sea level to 2,000 feet but less than 1,000 feet in most of the area. This area is a network of gently sloping valley floors bordered by higher and more sloping terraces and fans and by steep uplands.

Climate: *Average annual precipitation*—12 to 30 inches; very dry from midspring to midautumn. *Average annual temperature*—55° to 62° F. *Average freeze-free period*—250 to 365 days, longest along the coast.

Water: The low to moderate rainfall and local streamflow are inadequate for present water needs. Water from adjoining areas is brought in for both agriculture and the domestic and industrial requirements of the many large cities. The yield of ground water in the deeper alluvial deposits, especially in Santa Clara Valley, is declining, and the intrusion of sea water is reducing the quality.

Soil: *Noncalcic Brown soils* (Pleasanton, Chualar, and Zamora) on fans and terraces, *Grumusols* (Clear Lake) in fine-textured sediments and *Brunizems* (Elkhorn and Lockwood) in coarse-textured materials are extensive. *Humic Gley soils* (Alviso) and *Solonchak soils* occupy the wet parts of flood plains and *Alluvial soils* (Metz and Mocho) the better drained parts.

Land Resource Area 15
San Benito, Calif. June 1959.
Index Sheet 5 of 5. ASCS. 1: 63,360.

15—Central California Coast Range

California
15,900 square miles

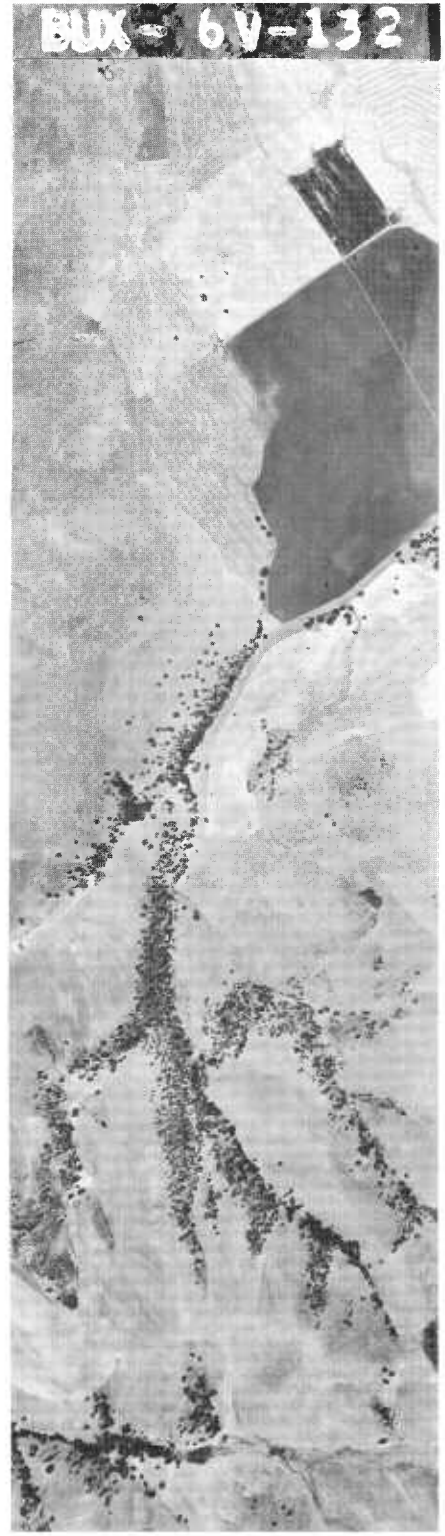
Land Use: More than four-fifths of the area is in farms and ranches; most of the remainder is owned by the Federal Government. About one-fifth of the area is dryfarmed to grain, and slightly more than one-fourth is in range of native grasses and brush. Open woodland, also used for grazing, covers nearly two-fifths of the area.

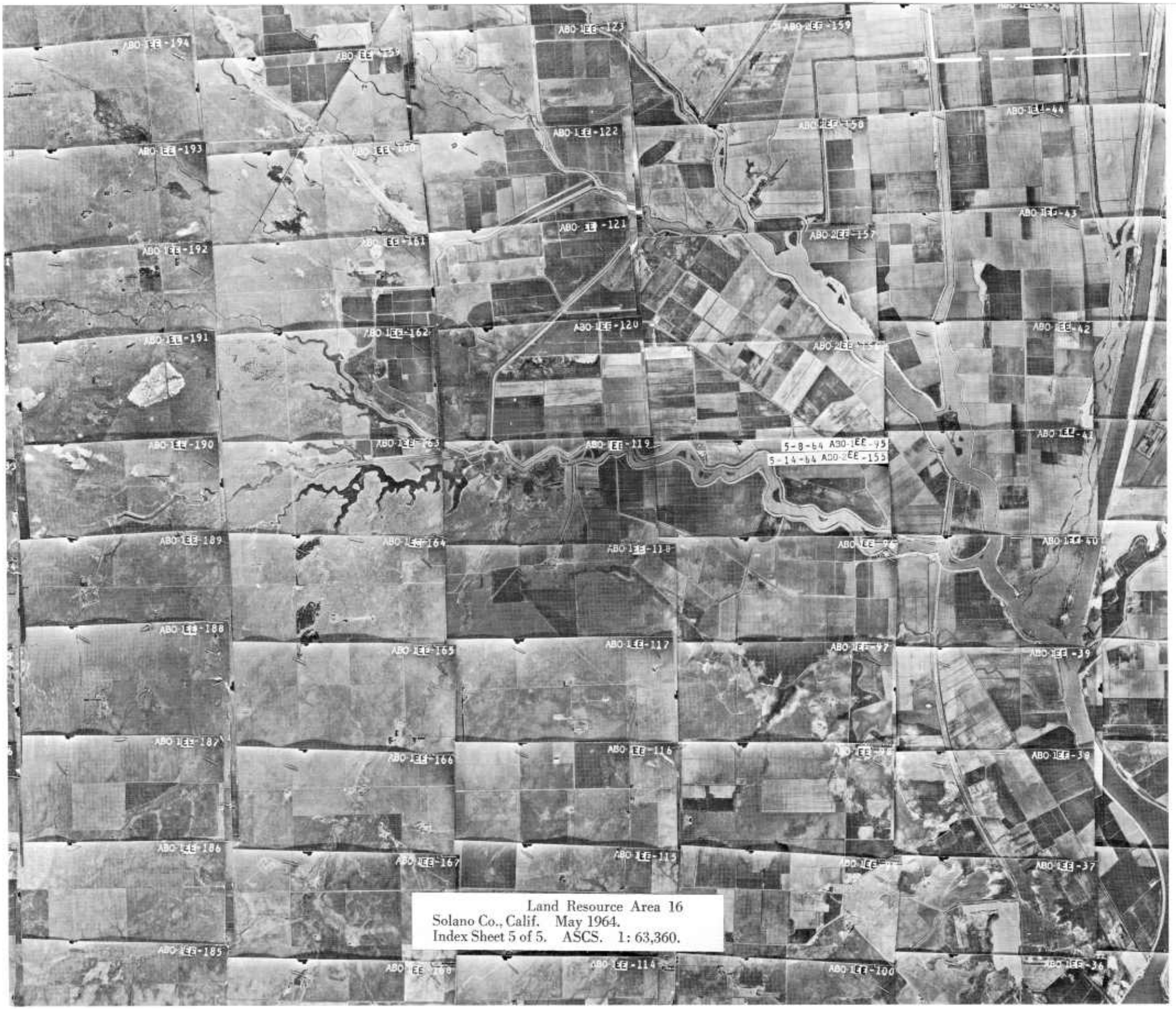
Elevation and Topography: Sea level to 2,500 feet in most of the area, some mountains 5,000 feet. Gently to steeply sloping low mountains that are underlain mostly by shale and sandstone and partly by igneous and volcanic rocks cover most of the area. Coastal plains are narrow and discontinuous, and stream valleys are narrow and widely separated.

Climate: *Average annual precipitation*—12 to 40 inches (15 to 30 inches in most of the area); evenly distributed through fall, winter, and spring and very low in summer; coastal areas receive some moisture from fog in summer. *Average annual temperature*—55° to 65° F. *Average freeze-free period*—200 to 270 days.

Water: The low to moderate rainfall and only moderate streamflow limit agriculture in most of the area to dryfarming. Ground-water supplies are small.

Soil: *Grumusols* (Altamont and Diablo) in clayey materials and *Noncalcic Brown soils* (Vallecitos, Newville, and Millsap) in coarser and more acid materials on the uplands are the major soils. Others are *Brunizems* (Los Osos and Santa Lucia) on some of the shale hills and *Alluvial soils* (Yolo) in coarse materials on flood plains of the narrow stream valleys.





Land Resource Area 16
Solano Co., Calif. May 1964.
Index Sheet 5 of 5. ASCS. 1: 63,360.

16—California Delta

California
700 square miles

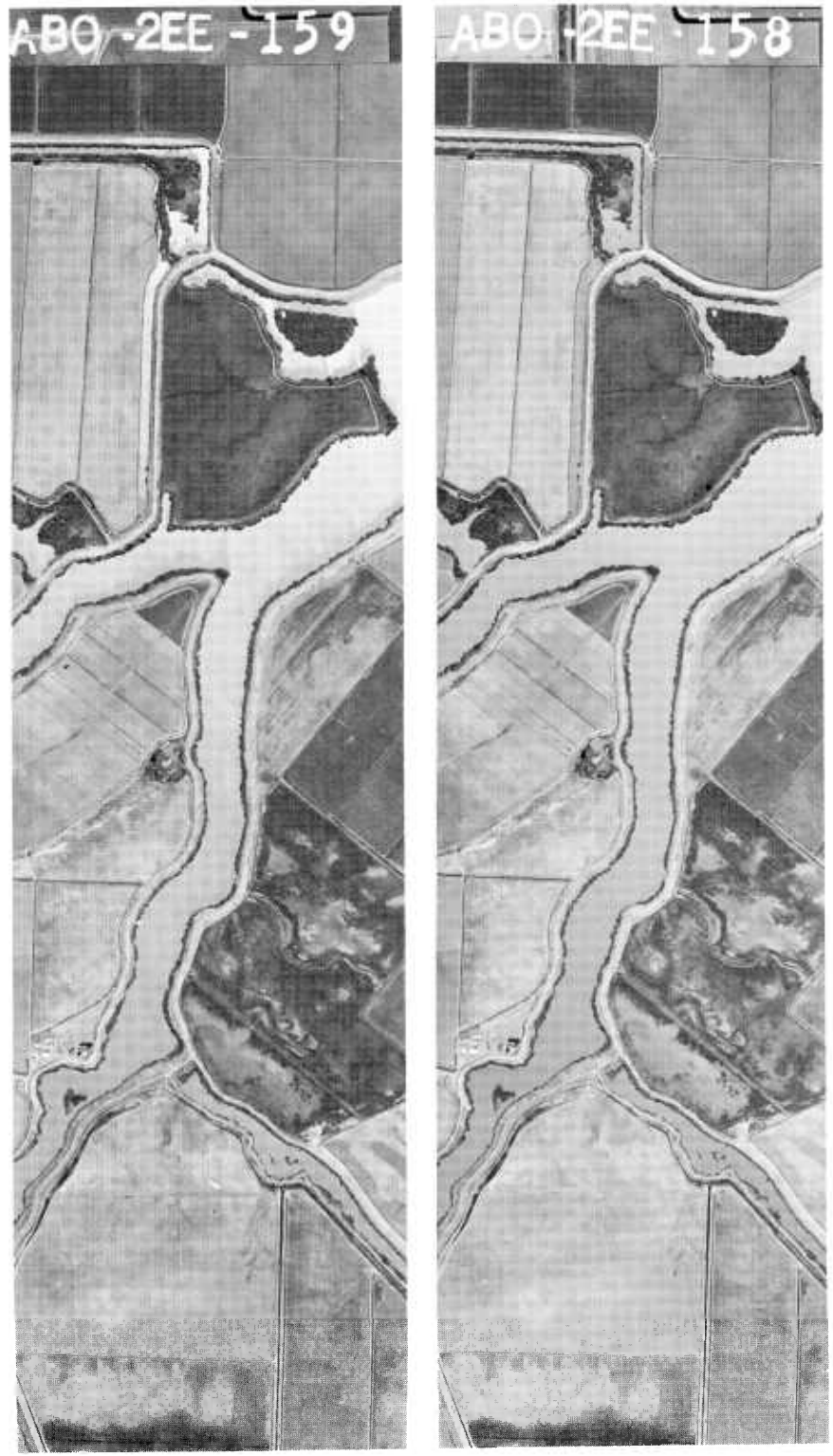
Land Use: Nearly all this area is farmed. Important crops are asparagus, sugar beets, potatoes, corn, and grain and hay grown under intensive management. Fruit trees, mainly pear, are grown on slopes of the protecting levee system.

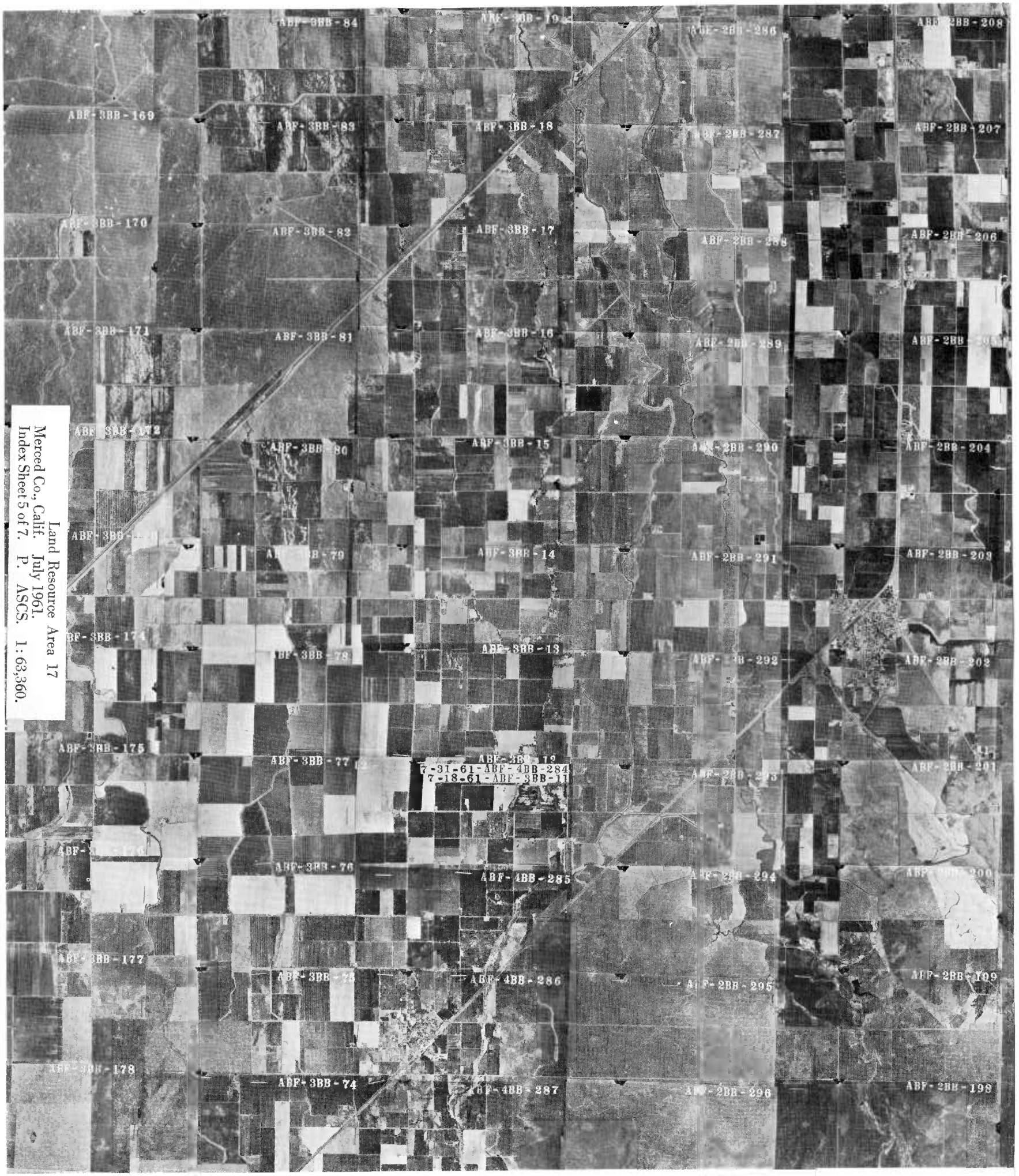
Elevation and Topography: 15 feet below sea level to 10 feet above. Many streams divide this nearly level delta into islands. Dikes are required to protect much of the area against flooding.

Climate: *Average annual precipitation*—13 to 15 inches; summers are dry. *Average annual temperature*—About 60° F. *Average freeze-free period*—About 275 days.

Water: Water for agriculture comes mostly from the many streams that cross the area. Salinity is a problem in water management.

Soils: The major soils are *Bog soils* (Staten, Venice, and Egbert) in peat and muck deposits and *Humic Gley soils* (Ryde) in wet alluvial deposits.





Land Resource Area 17
Merced Co., Calif. July 1961.
Index Sheet 5 of 7. P. ASCS. 1: 63,360.

17—Sacramento and San Joaquin Valleys

California
18,200 square miles

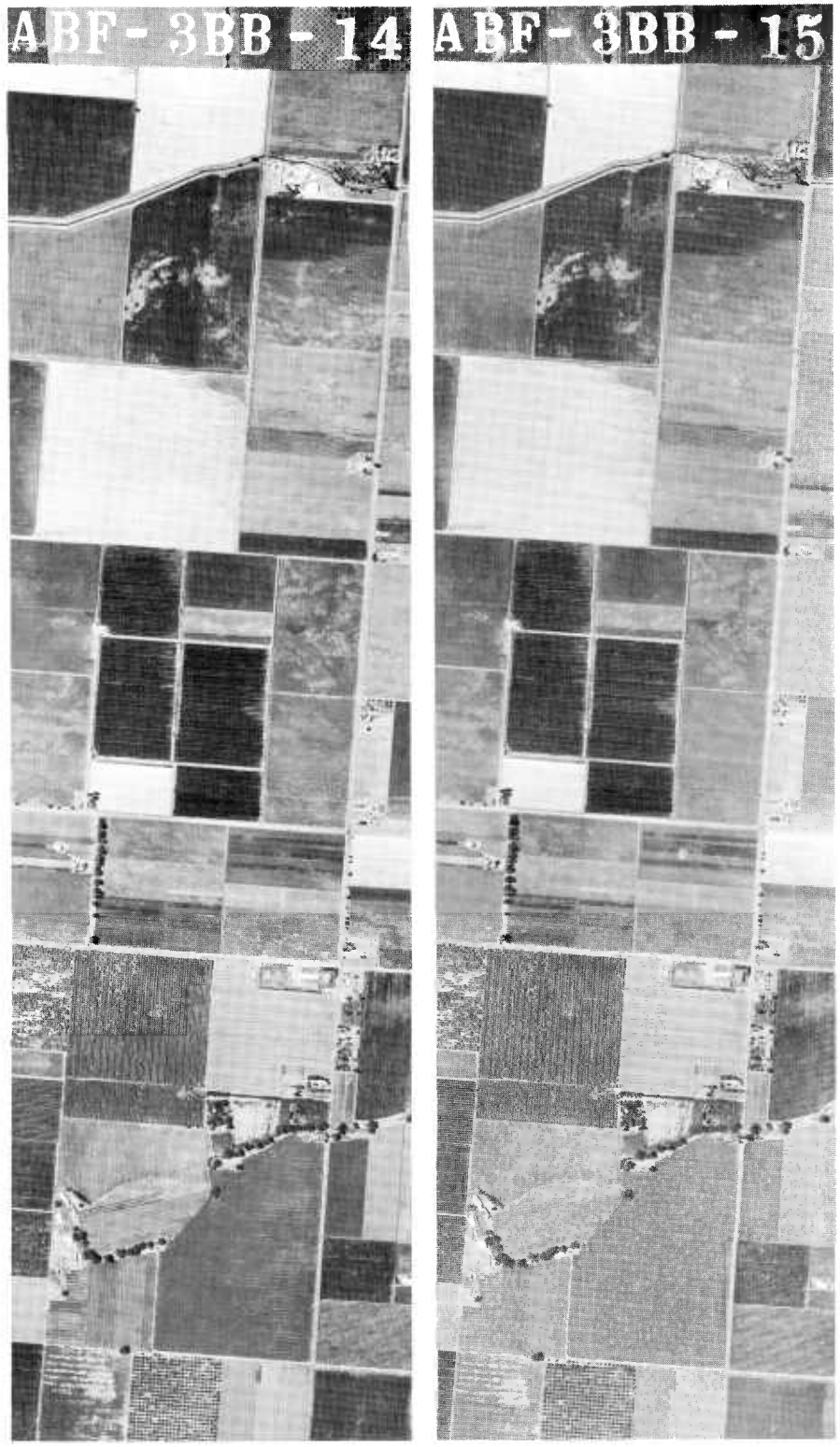
Land Use: More than 90 percent of the land is in farms and ranches. Much of the remainder is owned by the Federal Government, but 2 or 3 percent is urban and the amount of land in this use is increasing rapidly. Slightly more than half the area is cropland of which three-fourths or more is irrigated. Cotton, fruits, nuts, grapes, hay, grain, and pasture are grown on the irrigated land. The more sloping unirrigated cropland is dryfarmed to grain. About a third of the area is in native grasses, brush, and open woodland and is used mostly for range.

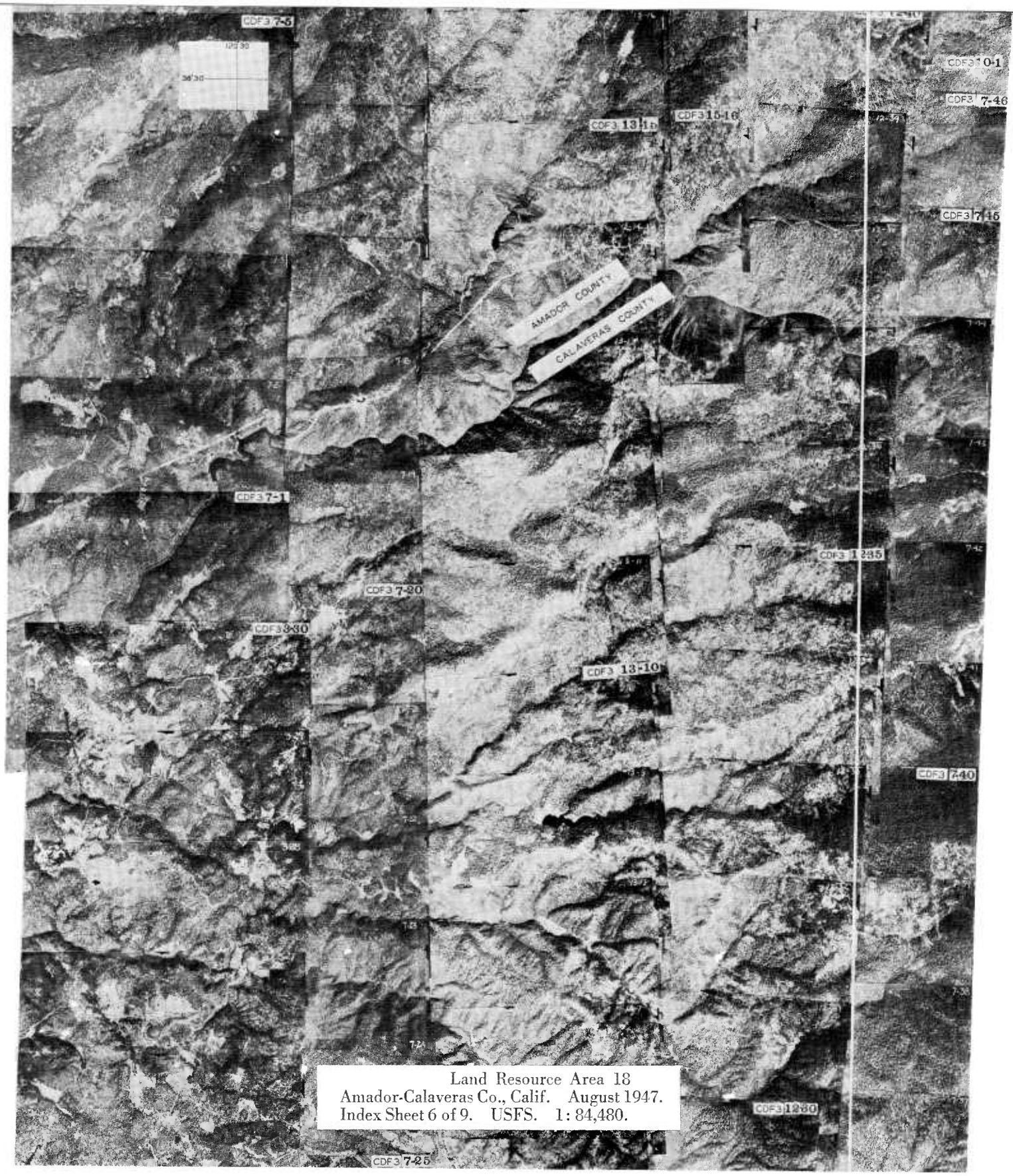
Elevation and Topography: Sea level to 500 feet. Broad smooth nearly level valleys are bordered by more sloping alluvial fans and slightly dissected terraces. There are large basins in the south.

Climate: *Average annual precipitation*—5 to 25 inches; long dry period in summer. *Average annual temperature*—60° to 67° F. in most of area but as low as 55° F. in the north. *Average freeze-free period*—230 to 350 days, increasing from north to south.

Water: The low rainfall and relatively small streamflow result in a scarcity of water in many parts of the area. The more intensively farmed irrigated areas depend on water from the adjoining mountains. In the south much of the irrigation water comes from wells, but supplies are diminishing because of the lowered water table.

Soil: *Noncalcic Brown soils* (San Joaquin, Madera, Arbuckle, and Redding) occupy large areas on alluvial fans and older terraces and *Solonetz soils* with hardpans (Fresno) similar positions in the drier parts of the area. *Alluvial soils* (Hanford, Panoche, and Yolo) and *Humic Glev soils* (Merced and Sacramento) are major soils on flood plains. *Regosols* (Delhi) are extensive in deep sands in some of the drier parts.





Land Resource Area 18
Amador-Calaveras Co., Calif. August 1947.
Index Sheet 6 of 9. USFS. 1: 84,480.

18—Sierra Nevada Foothills

California
9,200 square miles

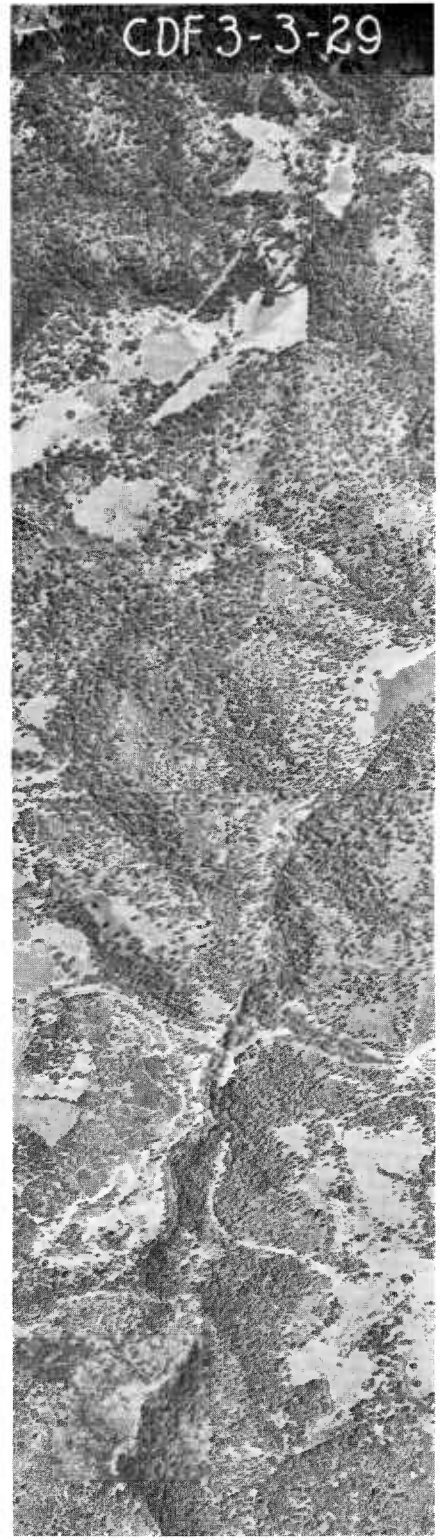
Land Use: About four-fifths of the area is in farms and ranches; most of the remainder is owned by the Federal Government. Much of the area is in native and tame grasses and a sparse to thick cover of shrubs, but there are some open forests at higher elevations. Production of livestock on range is the principal enterprise of the area. Irrigated cropland in the valleys used for growing fruits, nuts, and grain makes up between 5 and 10 percent of the area.

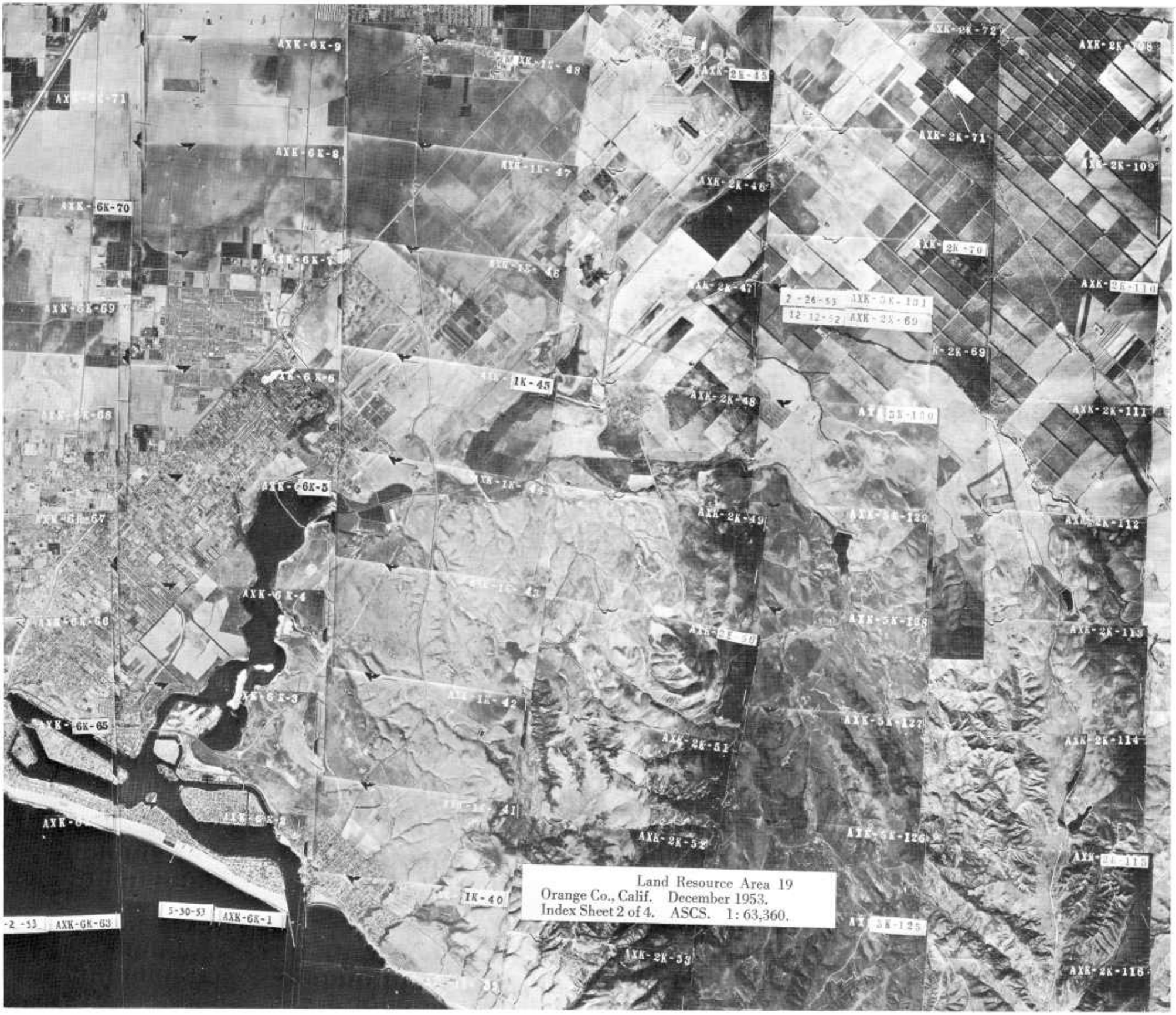
Elevation and Topography: 500 to 2,500 feet, some mountain peaks 4,000 feet. In this area of rolling to steep dissected hills and low mountains, the stream valleys are narrow and have fairly steep gradients.

Climate: *Average annual precipitation*—12 to 40 inches; summers are dry. *Average annual temperature*—55° to 65° F. *Average freeze-free period*—135 to 320 days.

Water: The moderate rainfall and intermittent streamflow are the major water sources. Groundwater supplies are small and mostly untapped.

Soil: *Noncalcic Brown soils* (Auburn and Sierra) are dominant. *Lithosols* (Exchequer and Toomes) are common on the more sloping areas.





Land Resource Area 19
Orange Co., Calif. December 1953.
Index Sheet 2 of 4. ASCS. 1: 63,360.

19—Southern California Coastal Plain

California
7,200 square miles

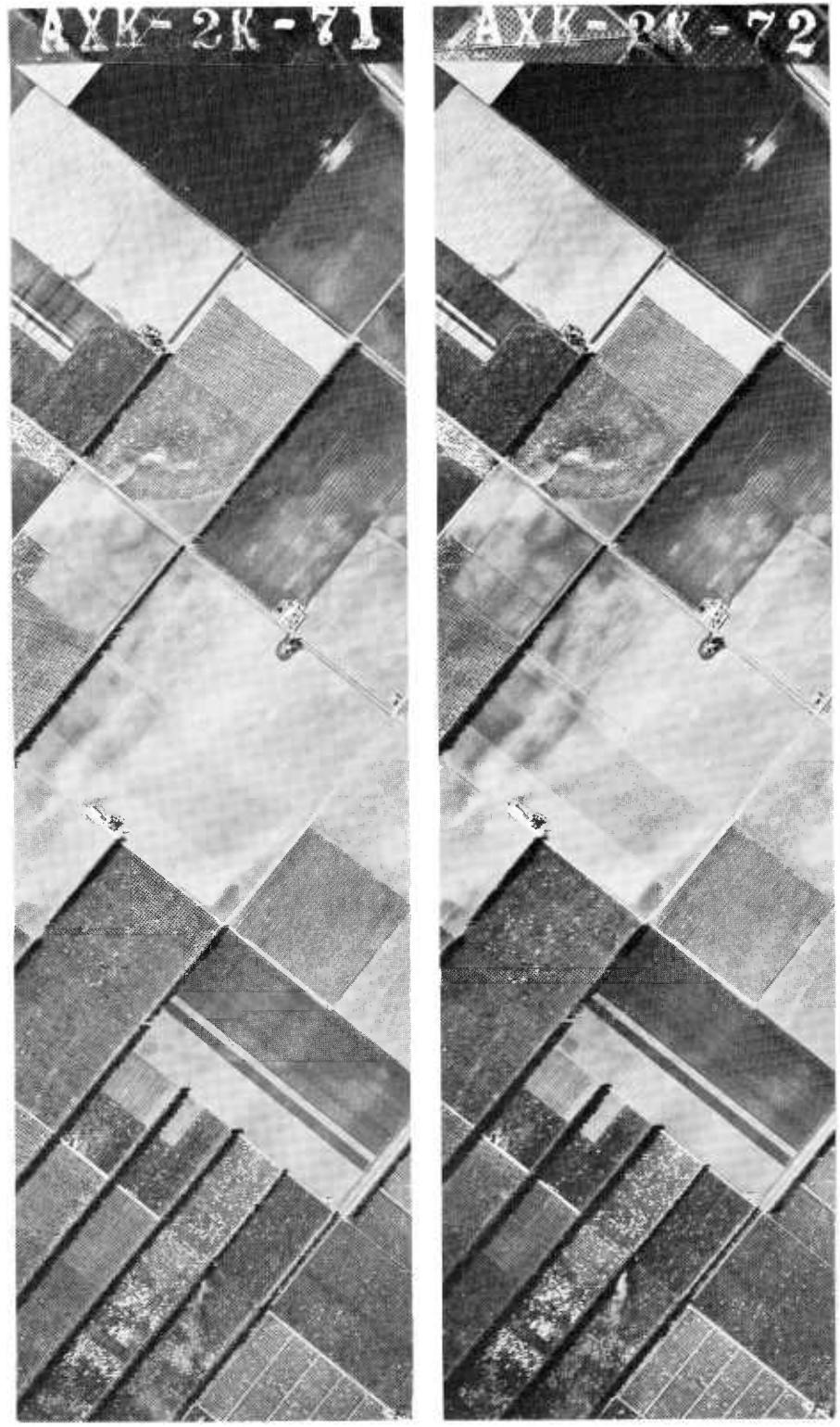
Land Use: More than one-fourth of the land is owned by the Federal Government; about one-fifth is urban or in built-up areas and additional land is being converted to this use very rapidly. One-third or more of the area is brushland that serves primarily as watershed protection. Fire prevention on this land is a major problem. Irrigated cropland, amounting to 10 to 20 percent of the area, is used to grow tropical fruits, deciduous fruits, grain, truck crops, grapes, hay, and pasture. Dairy farming and flower-seed production are other important enterprises. Some livestock are produced on range in areas far from the large cities.

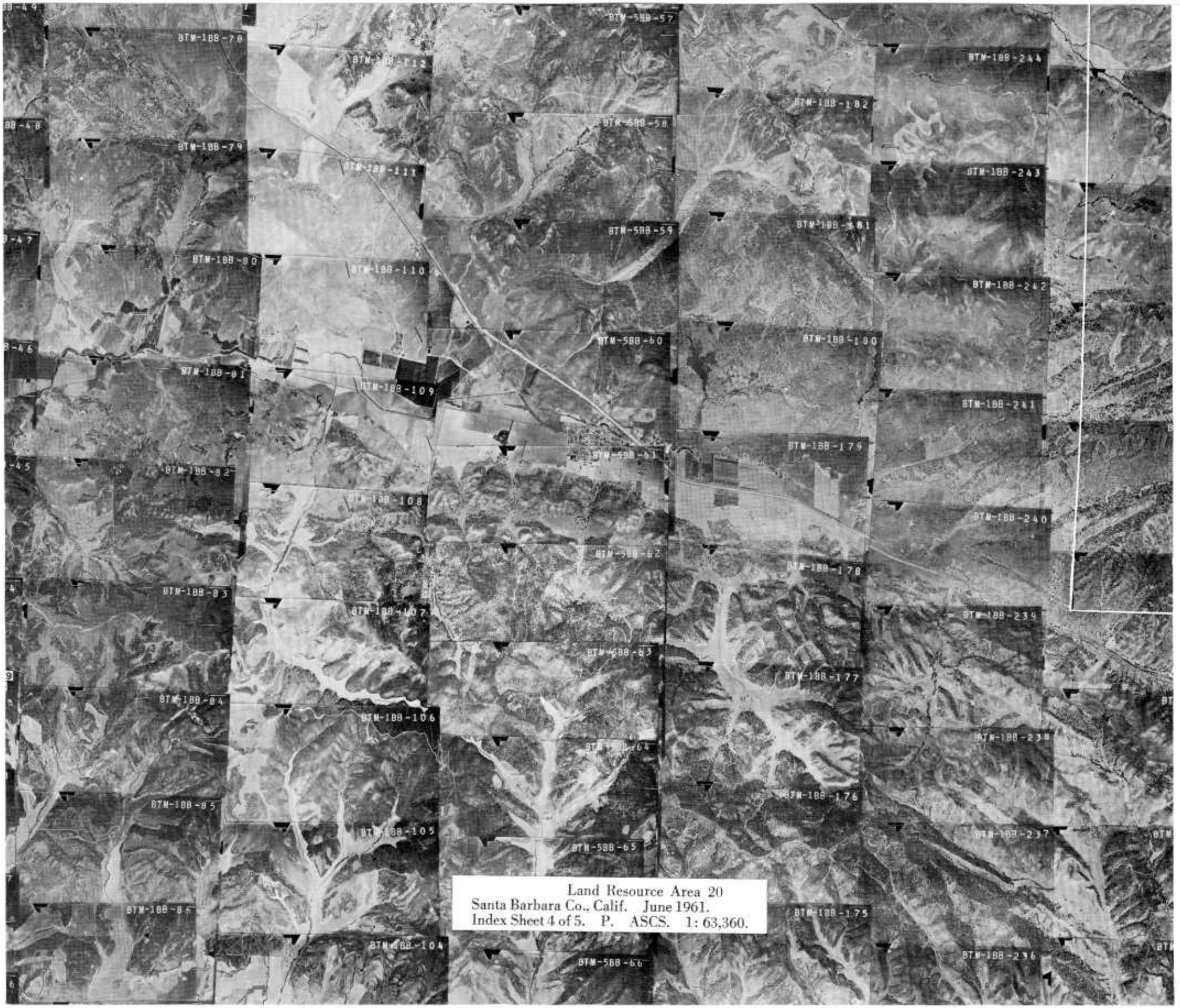
Elevation and Topography: Sea level to 2,000 feet. These gently to strongly sloping and dissected coastal plains are bordered by steeply sloping hills.

Climate: *Average annual precipitation*—10 to 25 inches; summers are dry although fogs provide some moisture along the coast. *Average annual temperature*—60° to 65° F. *Average freeze-free period*—365 days along the coast, decreasing to 250 days in the hills.

Water: The low rainfall and intermittent streamflow provide only small local supplies. Ground-water resources have been heavily exploited, and declining water tables and salt intrusion are reducing both quantity and quality. Much of the water for irrigation and nearly all the water for large urban areas is brought in from the Colorado River.

Soil: *Noncalcic Brown soils* (Ramona, Rincon, Fallbrook, and Vista) on terraces and on rolling hills underlain by granitic materials and *Grumusols* (Altamont) in fine-textured materials are the principal soils. *Noncalcic Brown soils* with claypans (Milpitas and Olivenhain) occupy the coastal terraces and *Alluvial soils* (Hanford) the flood plains.





Land Resource Area 20
Santa Barbara Co., Calif. June 1961.
Index Sheet 4 of 5. P. ASCS. 1: 63,360.

20—Southern California Mountains

California
9,700 square miles

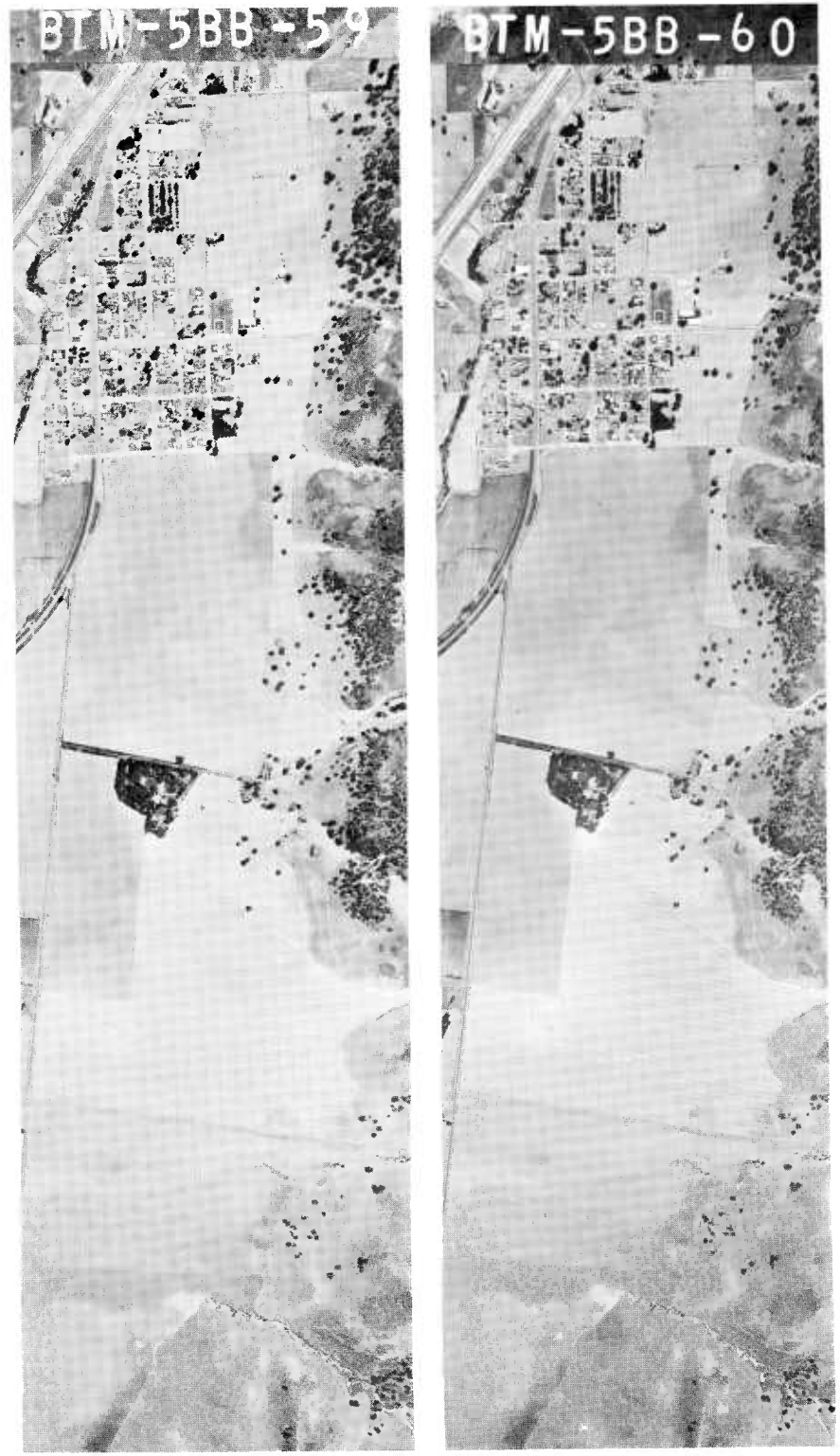
Land Use: More than two-fifths of the area is owned by the Federal Government, about 5 percent is urban, and the remainder is in farms, ranches, or other private holdings. About half the area has a brush cover that serves as watershed protection. Fire prevention is a serious problem in these areas. Open woodland and brushland having a grass understory and grazed amount to about one-fifth of the total area. Most of the larger valleys are dryfarmed to grain and hay, but locally fruits are grown under irrigation.

Elevation and Topography: 2,000 to 8,000 feet over most of the area, some peaks 12,000 feet, and a narrow strip along the western edge at sea level. These strongly sloping to precipitous mountains have unstable slopes and sharp crests; valleys are narrow.

Climate: *Average annual precipitation*—16 to 40 inches; summers are dry; a little snow falls in winter but does not last. *Average annual temperature*—32° to 60° F., decreasing with elevation. *Average freeze-free period*—100 to 200 days in most of the area, decreasing with elevation, and as long as 250 days along the western edge.

Water: The moderate rainfall provides water for brushland and range and also meets part of the water needs of adjacent lower areas. Deep sand and gravel deposits in the valleys yield water for livestock and domestic use and for some irrigation.

Soil: Most of the soils are shallow. *Reddish-Brown Lateritic soils* that have a dark surface layer (Holland) are extensive on crystalline rocks, *Brunizems* in areas of intermediate rainfall, and *Noncalcic Brown soils* (Las Posas and Vista) in the moderately dry areas.



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