Bulletin No. 698

# Soil Survey of the University of Idaho Agricultural Experiment Station and Campus, Moscow, Idaho




**R. E. McDole and P. N. Peterson**



*Agricultural Experiment Station*

University of Idaho

*College of Agriculture*

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**About the Authors**

R. E. McDole is an Extension soil specialist and chair of the Soil Science Division of the University of Idaho Department of Plant, Soil and Entomological Sciences, Moscow. P. N. Peterson is a soil scientist, USDA Soil Conservation Service, now headquartered in Boise, formerly in Moscow.


The authors acknowledge the work of Keri Gibbs, cartographic technician, USDA Soil Conservation Service, Boise, for her preparation of maps that appear in this publication.

**Published and distributed by the**
**Idaho Agricultural Experiment Station**
**Gary A. Lee, Director**

**University of Idaho College of Agriculture**
**Moscow, Idaho 83843**





750, August 1989

$5.00 per copy

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## Location

The University of Idaho Agricultural Experiment Station and campus are located in northern Idaho near Moscow. The University of Idaho is a Land-Grant institution and the only institution of higher education in Idaho offering a 4-year degree in agriculture. The location of the University of Idaho is fortuitous, only 8 miles from another Land-Grant institution — Washington State University, located at Pullman, Washington. This close proximity allows unique, close working relationships among faculty members and joint listing of many classes at the two universities.

The University of Idaho campus is located on the west side of the city of Moscow (Fig. 1). The campus includes approximately 290 acres with another 220 acres in an 18-hole golf course and arboretum (Fig. 2).

The University of Idaho Agricultural Experiment Station lands are in two separate parcels. The Animal Science Farm contains approximately 720 acres and the Plant Science Farm contains about 170 acres (Table 1).

The Animal Science Farm adjoins the campus on the west and extends to the Idaho-Washington border (Fig. 3). The Moscow-Pullman Highway (Highway 270) runs through the Animal Science Farm. The University Beef operations are located in the portion south of the highway, and the dairy and sheep operations are on the north.

**Fig. 1. Aerial view of the University of Idaho campus (about 1932) looking northeast toward the town of Moscow. The timber at the upper left is the base of Moscow Mountain. East of the football stadium is Memorial Gymnasium, and east of the baseball field is the Administration Building. Morrill Hall is among a cluster of buildings up and to the left of Memorial Gymnasium. (#1-3-43, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)**

Fig. 2. The University of Idaho ASUI Golf Course (1982) is located to the south of the Shattuck Arboretum (below). The arboretum expansion is to the east (left) of the golf course.

Fig. 3. Aerial view looking north of the campus and Animal Science Farm (1982). The Moscow-Pullman Highway runs through the middle of the property. To the north are the dairy and sheep operations. Beef operations are located to the south of the highway.

The elevation of this property ranges from 2,520 to 2,750 feet above mean sea level. Paradise Creek flows through the property along the south side of the Pullman Highway. The Burlington Northern and Union Pacific Railways both traverse the property, also following along the south side of Pullman Highway.

A narrow strip of University property along the north side of Pullman Highway, approximately 90 acres, has been developed into a shopping mall. This mall — the Palouse Empire Mall — was leased by the University to a developer in 1979 after the University realized that commercial development was the best use for this prime commercial property. The shopping center includes seven large stores, numerous small shops, a motel and convention center and 4-plex theatre.

**Table 1. Legal descriptions and approximate acreages of University of Idaho Agricultural Experiment Station, campus and other facilities at Moscow.**

| **Animal Science Farm and Campus** | **Acres** |
|---|---|
| Section 6 Township 39N Range 5WBM | |
| W½ SW¼ | 80 |
| S½ SW¼ SE¼ SW¼ | 5 |
| SW½ SE¼ SE¼ SW¼ | 3 |
| Section 7 Township 39N Range 5WBM | |
| S½ SW¼ (portion south of Pullman Highway) | 62 |
| N½ NW¼ | 80 |
| SW¼ NW¼ | 40 |
| Section 18 Township 39N Range 5WBM | |
| NW¼ | 160 |
| W½ NE¼ | 80 |
| W½ SW¼ | 80 |
| W½ W½ SE¼ SW¼ | 10 |
| W½ NE¼ SW¼ | 20 |
| Section 1 Township 39N Range 6WBM | |
| E½ SE¼ | 80 |
| Section 12 Township 39N Range 6WBM | |
| S½ SE¼ SW¼ (that portion in Idaho) | 30 |
| NE¼ | 160 |
| SE¼ (except highway r-o-w and city sewer plant) | 138 |
| Section 13 | |
| N2 (that portion in Idaho) | 102 |
| **Plant Science Farm** | |
| NW¼ Section 15 Township 39N Range 5WBM | 155 |
| E½ SE¼ NE¼ Section 16 Township 39N Range 5WBM | 15 |

The Plant Science Farm (Fig. 4) is located approximately 2 miles east of Moscow (Table 1). It is bordered on the south by the Troy Highway (Highway 8) and on the east by a county road that separates the farm from the Elks Club Golf Course. A county road also borders the property on the north. The South Fork Palouse River flows through the northeast corner of the farm. The elevation of the property ranges from 2,590 feet where the South Fork Palouse River leaves the farm to a maximum of 2,750 feet.

## History

On Jan. 29, 1889, a bill passed both houses of the Idaho Territorial Legislature to establish a University in the territory. It was signed by Governor Stevenson the next day. The bill created the Board of Regents and specified the location of the University at Moscow.

On July 1, 1890, a bill to admit Idaho to statehood passed the U.S. Congress with President Benjamin Harrison signing it into law on July 3, 1890.

The first president of the University of Idaho, Franklin B. Gault, met the first class on campus on Oct. 3, 1892. At that time the campus consisted of 20 acres of land which had been a wheat field. It had been purchased from James Deakin for a sum of $4,000 in May 1889. It was described by the May 24, 1889, issue of the *Moscow Mirror:*

> "Probably a more sightly location could not be found in Idaho, nor one that can be more successfully ornamented with trees and shrubbery. The location is level, except the slope necessary for drainage, and although by no means a piece of

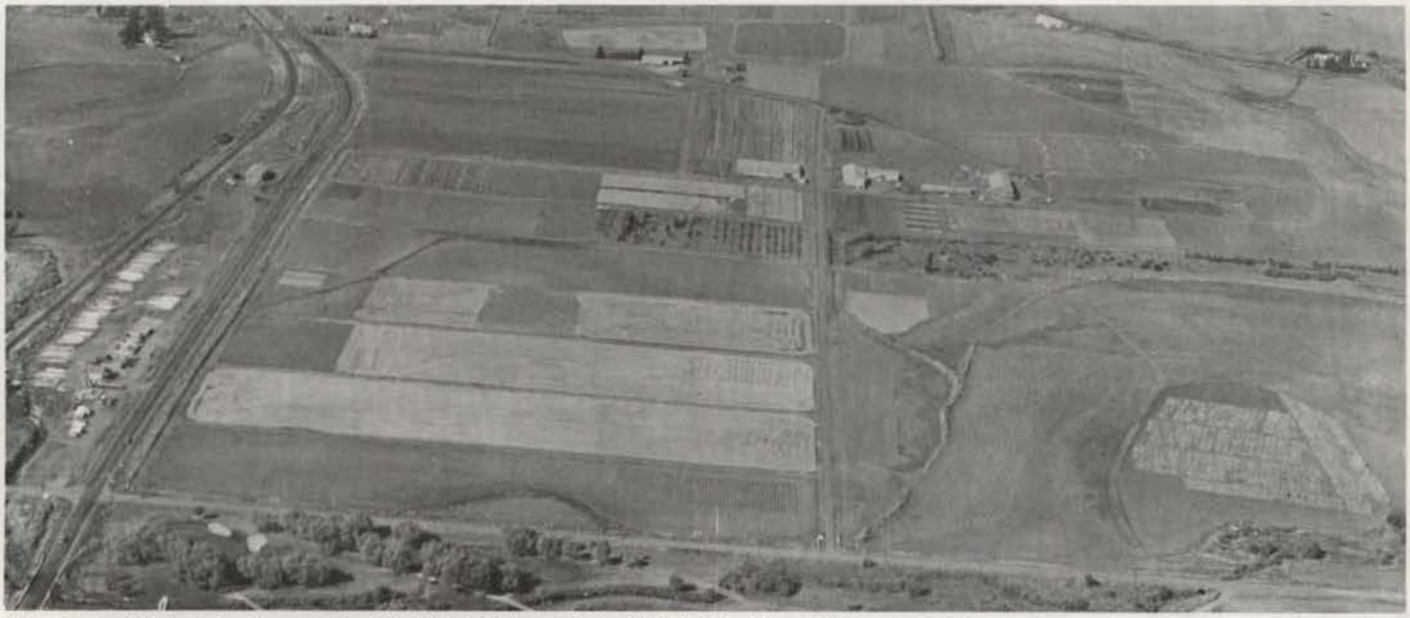

**Fig. 4. Aerial view, looking west, of the Plant Science Farm (1982). The Troy Highway at left forms the southern boundary, and a county road below separates the farm from the Elks Golf Course.**

high ground, is sufficiently elevated to command a perfect view of Paradise Valley and the spur of the mountains beyond. . ."

The origin of the Agricultural Experiment Station and the Land-Grant status for certain universities began when President Abraham Lincoln signed a bill, the Morrill Act, on July 2, 1862. This bill, named for Representative Justin Smith Morrill from New Hampshire, who fostered the bill and fought for its passage, revolutionized higher education.

The act endowed certain colleges throughout the United States with land. In return these colleges were to emphasize agriculture and the mechanical arts as well as provide military training programs for young men who attended the institutions.

Proponents of the Morrill Act felt that the classic colleges of that day were for the fortunate few, while the Land-Grant colleges were for the many. Morrill envisioned at least one college in each state with a sure and continuous foundation of support. He felt that this law would leave the states considerable latitude in carrying out their programs. He saw agriculture as the then-existing foundation as well as the future prosperity for our nation.

In 1887, Congress passed another bill that broadened programs under the Morrill Act. The Hatch Act, named for Representative William H. Hatch of Missouri, provided for the establishment of an agriculture experiment station at each Land-Grant institution. Funds were made available for each agricultural experiment station to promote scientific investigation and experimentation on principles and applications of agricultural science.

At an Idaho Board of Regents meeting on Feb. 26, 1892, the Idaho Agricultural Experiment Station was organized, with the home station established at Moscow. Thus the Idaho Agricultural Experiment Station was in operation before the University, and because it was in operation, $15,000 of Federal funds was allocated, which provided a "nest egg" for both agriculture and academics. In 1893, 5 acres of land immediately west of the campus were made available for crop tests. In 1899, the Agricultural Experiment Station started the first experiments with peas. On Dec. 31, 1899, the *Spokesman Review* newspaper of Spokane carried a photograph of the frame horticulture building surrounded by vegetables on what is now the main campus lawn (Fig. 5).

In 1896, about 94 acres of land were made available ½ mile west of campus. Citizens of Moscow and faculty members made contributions toward purchase of the land. Two barns and a farmhouse were built in 1899. Previous

**Fig. 5. The original University of Idaho Administration Building (1892-1906) in 1900 with garden trials in what is now the main campus lawn. (#0-51-7, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)**

to that time a small stable was used, located west of the old Administration Building. A 60×70-foot stock barn was constructed in 1900.

In 1902, the Agricultural Experiment Station began to thrive. Several barns and buildings and a small dairy were in place (Fig. 6). The third University president, James A. MacLean, appointed Prof. Hiram T. French as the first director of the Station. His first act as director was to appoint Pren Moore as farm foreman. Moore, who later became state poultry specialist, retired on June 30, 1949, after serving the state for more than 47 years.

Additional new land was purchased in 1904 and, in 1905, a 63-acre parcel located between the recently purchased tract and the original farm, was leased and later purchased. A sheep and hog barn was built in 1916.

A fire destroyed the University's Administration Building on March 30, 1906. Money available from insurance was only about half enough for the new Administration Building envisioned by President MacLean. The president decided to use the available money to build the University's first Agriculture Building. This was done in response to critics who were claiming that not enough was being done in agriculture. It also would serve to provide needed classroom space until a new Administration Building could be built. The new building became the University's first Agriculture Building — Morrill Hall (Figs. 7 and 8). In later years, it served as the Forestry Building, but in 1972, when the new Forestry, Wildlife and Range Sciences Building was completed, it once again became Morrill Hall.

The first dean of the College of Agriculture was appointed in 1908. Dean Edwin Ebenezer Elliot was a pioneer member of the faculty of Washington Agriculture College at Pullman. He served as Dean of Agriculture until 1910, when he was replaced by William L. Carlyle. Earlier in 1910, Carlyle had come to Idaho as director of the Agricultural Experiment Station.

Another feature of the campus is the Shattuck Arboretum (Figs. 1, 8 and 9). In 1908, Professor Charles H. Shattuck joined the University of Idaho faculty in the new Department of Forestry. Before coming to Idaho, he had been at other colleges in the East and South where he had taught a wide range of subjects and served as an administrator. His first love was forestry and soon after he arrived on campus he began to eye a weed-covered north slope just south of the Administration Building. He suggested to the Board of Regents that it could be put to use to grow a wide variety of trees to test their adaptability to the area. The Board of Regents quickly agreed as they had been trying to decide for some time what to do with the unsightly area.

Shattuck collected more than 300 different varieties of trees that were planted in the 20-acre area designated by the Board of Regents. Today the Shattuck Arboretum has more than 150 surviving varieties of trees. It includes a campfire/barbecue pit and picnic shelter and is used as an outdoor classroom for groups ranging from Cub Scouts to college students.

In 1975, an effort was initiated to develop a new arboretum in a 63-acre area between the ASUI (Associated Students University of Idaho) Golf Course and a housing development to the east (Fig. 10). In 1977 a consultant was selected to develop a master plan. The master plan report was completed in 1980. Work on the new arboretum and botanical garden began shortly after and will continue for several more years.

When Melvin A. Brannon became the fourth president of the University of Idaho in 1914, the campus had 65 acres devoted to its 14 buildings, gardens, shady drives and athletic grounds. The University then had a total of 317 acres, much of which was used by the College of Agriculture and the Experiment Station.

The Plant Science Farm, also referred to as the Parker Farm, was purchased in August 1956. This property consisted of approximately 250 acres purchased from Joseph C. and Willamette M. Parker. All field research in soils, agronomy and horticulture, plant pathology and plant breeding was moved to this location. Approximately 80 acres of the property (N½ NE¼ Section 15) was sold to the Elks Club of Moscow in about 1960 for a planned expansion of the Elks Golf Course.


**Fig. 6. Several barns and buildings were constructed in the early 1900's as the Agricultural Experiment Station began to grow. This picture shows a panoramic view of the structures in 1933. (#1-1-9, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)**

Fig. 7. Morrill Hall was the first Agriculture Building, constructed in about 1907. (#1-66-1, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)

Fig. 8. Aerial view (about 1933) looking south across the central campus. Some of the main buildings include the Administration Building at center top, with the Shattuck Arboretum extending to the right just slightly above; Memorial Gym at far right; Dairy or Agronomy Building below and to left of Memorial Gym; Morrill Hall near center; and Science Building to the left between Morrill and Administration. (#1-3-16, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)

An orchard was established in the portion of the farm in Section 16 in 1957. It was pulled out in 1975 and reestablished in 1982. Work on this orchard was limited to the study of fungal and viral diseases of fruit trees.

The southwest corner of the farm (approximately 20 acres) was used by the College of Forestry until 1982 as a tree nursery. Bare root tree stock was produced for use by farmers in planting windbreaks. The use of coarse granitic sand to cover the soil surface at seeding each year may have slightly altered the surface soil texture in this area. At present, the College of Forestry still maintains a greenhouse and about 4 acres of land for production of tree stock and seedlings.

A Dairy Building (Fig. 11) was constructed in 1917. In 1942 a new Dairy Building was constructed adjacent to the west end of Morrill Hall, with the old building becoming the Agronomy Building. In about 1971, when the new wing of Agricultural Science Building was completed, the Agronomy Building became available for other uses. It is presently the Communication Building. The Dairy Processing Lab in the new Dairy Building was discontinued in 1970, and the building became the Food Science Building.

The Science Building (Fig. 12) was built in 1926. In addition to chemistry, physics, botany, zoology and other basic sciences, it housed agricultural biochemistry which included soil chemistry.

In 1949, the State Legislature appropriated funds for a new Agricultural Science Building (Fig. 13). The building was completed for dedication ceremonies preceding the Father's Weekend football game on Nov. 4, 1950. A new wing was added and dedicated on April 6, 1974, to give the building its present appearance (Fig. 14). The building was named the E. J. Iddings Agricultural Science

**Fig. 9. An aerial view of University of Idaho campus (about 1951) looking northwest toward the Animal Science Farm. The golf course, Neale Stadium and Shattuck Aboretum are in the left and upper left of the photograph. The Idaho-Washington state line is near the top of the photograph. The Music Building is under construction in the center portion of the photo. (#1-3-29, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)**

Building in honor of Edward John Iddings, Dean of Agriculture from 1910 to 1946.

In 1936 the Regents floated a bond that was used to construct a stadium and a 9-hole golf course (Fig. 1). The stadium was named Neale Stadium after president Mervin Neale, the eighth president of the University. A fire in about 1968 destroyed the stands on the south side of the stadium. They were rebuilt and, in 1976, a cover was completed over the stadium and it was named the ASUI-Kibbie Dome.

The 9-hole golf course, which occupied about 80 acres on the southwest side of the campus (Fig. 2), was designed by Francis L. (Frank) James. James had designed the Elks Golf Course just east of Moscow in 1926. The University Golf Course was expanded to 18 holes in about 1975.

In 1961 the U.S. Forest Service constructed a Forest Research Laboratory on the southeastern corner of the campus. This facility is called the Intermountain Forest Experiment Station.

## Geology

The dominant surface geologic material, in the area in which the University of Idaho campus and Experiment Station are located, is a wind-deposited silt called loess. The loess deposits are in excess of 100 feet deep in some places. The dune-like topography (Fig. 15) is strongly rolling with slopes ranging to more than 50 percent. The steepest slopes are found on the north to northeast facing aspects due to the deposition action of the southwesterly winds. The area is dissected by nearly level, narrow stream valleys.

The area lies on the eastern edge of the Columbia River Plateau near the foothills of the western slope of the Rocky Mountains. The underlying geologic material of the plateau is primarily basaltic lava flows, which were believed to have been extruded, during the Miocene, from fissures within the earth's crust. Hundreds of separate flows, ranging from 10 feet to more than 200 feet thick, were extruded intermittently during this time. Some of these flows covered hundreds of square miles.

The lava was extruded on an essentially flat plain, which became increasingly rough as the flows approached the mountains in what is now northern Idaho.

**Fig. 11. Built originally as the Dairy Science Building (1918-45), then later the Agronomy Building, this is now the home of Communications. (#1-108-1, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)**

**Fig. 10. Aerial view looking north of the proposed expansion area of the Shattuck Arboretum to the south of the University of Idaho campus in 1982. The large building to the right of center is the ASUI-Kibbie Dome.**

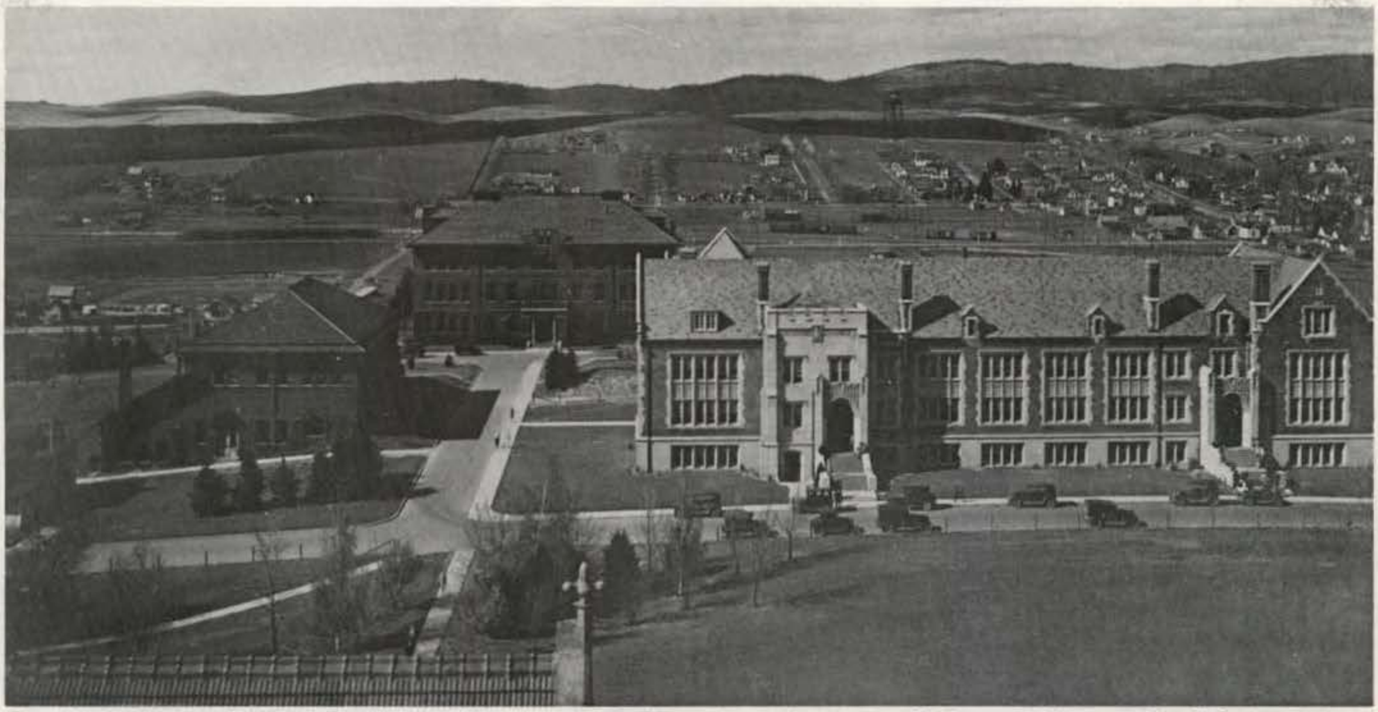

Fig. 12. Looking north from the roof of the Administration Building, the newly completed Science Building and Morrill Hall set in front of some of the Moscow residential district and Palouse hills (about 1926). (#1-2-32, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)

Fig. 13. The Agricultural Science Building in about 1952. (#1-111-7, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)

The earliest rocks in the area were a thick sequence of sedimentary rocks of the Precambian age. These rocks are referred to as the Belt Supergroup. Deformation of the terrain and intrusive granitic rocks of the Idaho Batholith formed east-west trending mountains and ridges. The intrusive batholith rocks also caused extensive metamorphism in the Belt rocks.

The remnants of these Precambian and granitic rocks form Moscow Mountain, or the Palouse Range, to the north and northeast of Moscow (Fig. 1) and Tomer Butte and Paradise Ridge to the south and southeast of Moscow. They protrude 1,000 to 1,900 feet above the basin floor.

The silty loess parent material was carried in from southeastern Washington. Uplifts in the earth's crust and ice dams formed numerous lakes which collected fine sediments. During other periods, rapidly receding glaciers in northern Idaho, north of Lake Coeur d'Alene, produced heavy runoff and flooding that also resulted in deposition of fine materials in the Columbia Basin area. Then as the season warmed, the sediments dried and were picked up by winds and redeposited over extensive areas of what is now eastern Washington and northern Idaho. Old buried soils (paleosols) with strongly developed horizons are found in the deep loess deposits. These represent extensive periods of soil formation, when no deposition was occurring.

Another major event that impacted the soils of the area was the eruption of Mount Mazama in southcentral Oregon. This eruption, which resulted in the formation of Crater Lake, deposited a thick layer of volcanic ash over much of the Northwest. This ash is interbedded with loess and mixed with stream and talus deposits. Many other, smaller depositions of volcanic ash occurred but none as heavy as the Mazama ash from about 6,700 years ago. The most recent deposit of volcanic ash occurred in May 1980 when Mount St. Helens erupted. This deposit approached ½ inch in thickness in the Moscow area.

The present landscape (Fig. 15), known as the "Palouse," is a complex function of the geologic events that shaped the area along with recent mass-wasting and erosional processes. Much of the recent processes have been the result of man's management.

## Mineralogy

The clay mineralogy of soils typical of the Experiment Station at Moscow shows a predominance of illite and vermiculite with persistent but lesser amounts of koalinite (Hipple 1981). Smectite occurs in the lower depths of many of the soils, especially in higher clay containing Bt and Btb horizons. Since all the soils are predominately formed in loess parent material, including even the alluvial bottom soils that are formed from reworking the loessial material from higher slopes, drastic differences in clay mineralogy are not expected.

The soils in the area contain a certain amount of volcanic ash. The most recent ash deposition came from the Mount St. Helens eruption in May 1980. This eruption deposited approximately 0.3 inch of silt-sized dry ash

**Fig. 14. The Agricultural Science Building as seen today (1989), now called Iddings Building, with the new wing completed in 1974.**

material over the entire area (Fosberg et al. 1982). With wetting and settling, the depth was reduced by about 50 percent, which resulted in an 0.15-inch layer of ash. In areas that have not been cultivated since that eruption, a discrete ash layer still exists at the soil surface. With cultivation, the layer of ash has been mixed into the tillage layer and has no significant effect on the soils. Prior eruptions from various mountains in the Cascade range in Washington and Oregon, including the massive deposition from Mount Mazama (now Crater Lake), have contributed to the soils of the area, but again the effect is not significant. The Mount St. Helens ash of 1980 had 15 to 20 percent feldspars and a high silt content (70 to 80 percent), not unlike the loess soil materials.

## Climate

The climate of the region includes relatively dry, warm summers and moist, cold winters. Storms, which develop over the Pacific Ocean, move in from the west. The storms lose much of their moisture as they pass over the Cascade Mountains, which are located approximately 200 miles to the west of the University of Idaho campus. As the storms move east from the Cascade Mountains they lower in elevation and thus release less of their moisture load. This creates a broad area of desert that extends toward northern Idaho. As the storms move to the east, the air is forced up as the elevation of the land increases, and the air mass increases its tendency to form precipitation. In fact, for every 10 miles of movement to the east from the Columbia Basin area of central Washington, the average annual precipitation increases about 1 inch.

Long-term weather records show November, December and January to be the highest precipitation months (Table 2), each with about 3 inches of precipitation, slightly less than half of which comes in the form of snow. The months of October and February through June each have about 2 inches of precipitation. The months of July and August are the driest with less than 1 inch of precipitation.

Long-term (88 years) average annual precipitation (23.0 inches) is lower than the average annual precipitation over the 1965 to 1988 period, which had an average of 26.4 inches. The monthly distribution pattern over the recent 24-year period is quite similar to the long-term pattern.

One of the unique features of the climate is the fact that the early settlers never experienced a crop failure caused by drought. This has pretty well stood up, although the 1976-77 crop year came close to breaking this record. That year was close to disastrous, as the period November 1976 through June 1977 had less than half normal average precipitation. Many areas had near crop failures that year.

The average daily minimum air temperatures (Table 3) are lowest in December and January. Sub-zero temperatures are not uncommon in winter months, but usually do not occur for any extended period. Many winters pass with

**Fig. 15. The University of Idaho campus in the mid-1950's looking northwest showing the rolling, dune-like topography of the Palouse area. (#1-3-13, Historical Photograph Collection, University of Idaho Library, Moscow, Idaho.)**

**Table 2. Average precipitation by month at University of Idaho Plant Science Farm Weather Station.**

| | Precipitation (inches) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
| 1965 | 3.48 | 1.10 | 0,80 | 2.80 | 1.08 | 2.24 | 0.47 | 1.43 | 0.36 | 0.35 | 1.64 | 0.89 | 16.6 |
| 1966 | 3.33 | 1.32 | 2.33 | 0.46 | 0.72 | 1.00 | 0.68 | 0.41 | 0.06 | 1.31 | 3.58 | 3.74 | 18.9 |
| 1967 | 3.46 | 0.35 | 1.57 | 2.75 | 1.94 | 2.06 | 0.04 | 0.00 | 0.53 | 3.28 | 0.76 | 3.48 | 20.3 |
| 1968 | 0.96 | 4.34 | 1.82 | 0.87 | 1.57 | 1.45 | 0.65 | 1.75 | 2.89 | 3.31 | 4.05 | 3.57 | 27.2 |
| 1969 | 4.83 | 0.67 | 0.83 | 3.89 | 1.56 | 1.05 | 0.06 | 0.00 | 1.41 | 1.29 | 0.72 | 3.70 | 20.1 |
| 1970 | 7.67 | 2.71 | 2.54 | 1.52 | 1.51 | 2.58 | 1.89 | 0.16 | 1.83 | 2.51 | 3.52 | 2.32 | 30.8 |
| 1971 | 2.89 | 1.99 | 2.95 | 2.07 | 2.45 | 4.81 | 0.96 | 1.60 | 1.87 | 2.22 | 3.40 | 3.09 | 30.3 |
| 1972 | 4.28 | 3.88 | 4.39 | 2.02 | 3.20 | 0.99 | 0.59 | 0.91 | 1.21 | 1.62 | 1.87 | 5.86 | 30.8 |
| 1973 | 2.57 | 0.95 | 2.06 | 0.50 | 2.60 | 0.84 | 0.02 | 0.13 | 2.03 | 1.60 | 7.32 | 6.92 | 27.6 |
| 1974 | 6.70 | 2.92 | 3.15 | 2.19 | 1.66 | 2.30 | 1.18 | 0.06 | 0.25 | 0.05 | 2.48 | 2.98 | 26.0 |
| 1975 | 4.96 | 2.93 | 2.34 | 2.97 | 1.85 | 1.76 | 2.65 | 2.82 | 0.00 | 3.84 | 3.25 | 3.70 | 32.9 |
| 1976 | 1.86 | 2.73 | 2.47 | 2.87 | 2.90 | 1.54 | 0.84 | 2.63 | 0.06 | 2.31 | 0.93 | 1.21 | 22.4 |
| 1977 | 0.77 | 0.76 | 1.67 | 0.47 | 2.86 | 0.59 | 0.67 | 2.86 | 2.51 | 1.09 | 3.90 | 4.71 | 22.8 |
| 1978 | 3.04 | 2.30 | 1.63 | 4.74 | 2.24 | 0.93 | 1.05 | 2.29 | 1.55 | 3.19 | 1.92 | 2.52 | 24.3 |
| 1979 | 1.07 | 4.12 | 2.06 | 3.30 | 2.82 | 1.01 | 0.49 | 0.99 | 0.41 | 0.75 | 2.85 | 3.03 | 25.3 |
| 1980 | 3.65 | 1.71 | 2.67 | 1.51 | 4.80 | 1.99 | 1.12 | 1.00 | 1.09 | 2.81 | 3.90 | 3.88 | 27.8 |
| 1981 | 1.84 | 3.39 | 2.81 | 3.01 | 2.09 | 3.43 | 1.00 | 0.01 | 1.03 | 2.89 | 2.80 | 4.63 | 28.8 |
| 1982 | 3.75 | 3.19 | 2.70 | 2.38 | 1.52 | 0.67 | 1.98 | 1.20 | 2.38 | 1.73 | 2.29 | 2.72 | 28.6 |
| 1983 | 2.81 | 3.62 | 4.07 | 1.83 | 2.23 | 2.96 | 1.91 | 0.77 | 1.20 | 2.36 | 5.95 | 2.82 | 30.5 |
| 1984 | 2.16 | 1.38 | 2.64 | 2.05 | 2.48 | 3.51 | 0.66 | 0.94 | 1.04 | 1.96 | 5.02 | 2.12 | 26.4 |
| 1985 | 0.45 | 1.68 | 1.49 | 1.12 | 1.76 | 2.04 | 0.11 | 1.41 | 3.75 | 1.96 | 2.18 | 0.54 | 18.5 |
| 1986 | 4.40 | 4.26 | 2.28 | 2.05 | 2.80 | 0.53 | 1.31 | 1.81 | 3.43 | 1.07 | 4.45 | 0.71 | 29.1 |
| 1987 | 1.80 | 1.92 | 2.51 | 1.75 | 2.42 | 2.15 | 2.90 | 0.07 | 0.00 | 0.00 | 1.09 | 3.42 | 20.0 |
| 1988 | 2.17 | 1.39 | 3.82 | 2.80 | 2.22 | 2.10 | 1.62 | 0.00 | 1.28 | 0.72 | 4.84 | 1.28 | 24.2 |
| Mean (24 years) | 3.09 | 2.51 | 2.52 | 2.19 | 2.36 | 1.87 | 1.13 | 1.11 | 1.49 | 1.87 | 3.27 | 3.12 | 26.4 |
| Long-term mean* | 2.92 | 2.21 | 2.20 | 1.77 | 1.88 | 1.65 | 0.70 | 0.74 | 1.25 | 1.79 | 2.92 | 2.97 | 23.0 |

*Long-term mean (1900 through 1988).

**Table 3. Average daily minimum air temperature by month at Moscow.**

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1965 | 24.9 | 28.2 | 26.3 | 37.7 | 37.4 | 42.0 | 50.4 | 51.9 | 39.7 | 41.0 | 34.3 | 26.7 |
| 1966 | 25.4 | 24.8 | 31.4 | 33.1 | 39.7 | 42.2 | 44.9 | 47.8 | 46.7 | 35.2 | 32.2 | 31.0 |
| 1967 | 29.2 | 30.5 | 29.5 | 31.4 | 38.2 | 48.2 | 47.1 | 50.6 | 47.6 | 39.0 | 29.8 | 22.8 |
| 1968 | 22.8 | 32.9 | 35.9 | 32.5 | 39.3 | 46.0 | 48.3 | 47.4 | 45.9 | 36.3 | 31.7 | 19.2 |
| 1969 | 12.9 | 22.7 | 28.0 | 35.9 | 42.1 | 48.7 | 46.8 | 45.3 | 45.6 | 33.8 | 30.5 | 26.8 |
| 1970 | 24.3 | 31.4 | 28.7 | 30.5 | 40.9 | 49.0 | 51.8 | 48.7 | 39.6 | 35.8 | 30.8 | 21.6 |
| 1971 | 25.8 | 26.7 | 27.1 | 33.0 | 41.0 | 44.2 | 47.9 | 51.8 | 39.3 | 33.2 | 31.3 | 20.3 |
| 1972 | 18.3 | 25.3 | 32.6 | 31.1 | 42.9 | 46.1 | 48.2 | 50.6 | 40.0 | 34.8 | 32.6 | 17.1 |
| 1973 | 20.2 | 27.4 | 30.7 | 30.7 | 39.3 | 43.5 | 45.6 | 46.3 | 45.1 | 36.4 | 27.0 | 30.0 |
| 1974 | 17.0 | 30.3 | 30.9 | 36.8 | 36.1 | 45.4 | 47.5 | 46.5 | 41.0 | 34.5 | 31.8 | 26.3 |
| 1975 | 20.7 | 20.4 | 28.6 | 31.5 | 39.7 | 43.2 | 53.4 | 45.8 | 40.3 | 36.4 | 26.2 | 26.4 |
| 1976 | 24.3 | 24.0 | 24.6 | 34.5 | 39.3 | 42.2 | 46.8 | 49.1 | 45.6 | 34.8 | 31.5 | 25.5 |
| 1977 | 18.5 | 28.8 | 30.2 | 36.0 | 37.7 | 47.7 | 49.3 | 51.2 | 43.1 | 35.5 | 27.7 | 25.7 |
| 1978 | 26.7 | 30.4 | 32.2 | 34.3 | 38.3 | 43.2 | 49.2 | 49.6 | 45.0 | 33.6 | 23.9 | 14.0 |
| 1979 | 5.8 | 24.4 | 32.0 | 35.9 | 41.0 | 44.8 | 47.1 | 48.6 | 45.0 | 37.9 | 25.8 | 30.2 |
| 1980 | 16.0 | 30.5 | 30.5 | 38.7 | 42.1 | 44.2 | 48.0 | 42.9 | 43.5 | 36.7 | 33.3 | 30.3 |
| 1981 | 31.0 | 29.1 | 31.8 | 36.1 | 40.5 | 44.7 | 47.3 | 49.6 | 42.3 | 35.2 | 34.7 | 26.9 |
| 1982 | 21.1 | 24.1 | 32.1 | 32.7 | 38.8 | 48.5 | 48.4 | 49.6 | 44.1 | 36.9 | 27.5 | 23.5 |
| 1983 | 30.2 | 32.0 | 34.5 | 33.4 | 39.8 | 44.6 | 49.9 | 52.0 | 39.8 | 37.0 | 32.5 | 15.9 |
| 1984 | 24.9 | 28.7 | 33.2 | 33.1 | 39.2 | 43.5 | 47.7 | 49.5 | 41.9 | 33.4 | 31.2 | 18.9 |
| 1985 | 16.1 | 17.0 | 25.8 | 36.5 | 41.4 | 44.9 | 49.4 | 48.9 | 41.2 | 35.0 | 16.5 | 10.8 |
| 1986 | 28.4 | 27.2 | 36.0 | 34.5 | 41.8 | 49.6 | 46.6 | 52.0 | 42.9 | 36.4 | 29.0 | 23.9 |
| 1987 | 21.4 | 29.4 | 32.8 | 39.5 | 43.5 | 46.5 | 51.8 | 47.5 | 43.7 | 34.1 | 31.9 | 23.0 |
| 1988 | 21.2 | 28.6 | 30.2 | 38.1 | 40.8 | 45.4 | 46.3 | 46.1 | 42.2 | 41.5 | 31.4 | 23.5 |
| Mean (24 years) | 22.0 | 27.3 | 30.7 | 34.5 | 40.1 | 45.4 | 48.3 | 48.7 | 43.0 | 36.0 | 29.8 | 23.3 |

**Table 4. Average daily maximum air temperature by month at Moscow.**

| Year | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1965 | 36.6 | 41.5 | 46.4 | 58.5 | 64.6 | 73.5 | 82.9 | 81.6 | 67.1 | 66.8 | 47.6 | 38.3 |
| 1966 | 36.8 | 39.1 | 48.8 | 58.3 | 71.7 | 71.3 | 81.5 | 83.8 | 80.5 | 60.2 | 46.4 | 39.4 |
| 1967 | 39.9 | 44.1 | 45.0 | 51.2 | 63.4 | 75.3 | 86.0 | 91.8 | 82.6 | 59.0 | 46.8 | 34.2 |
| 1968 | 36.4 | 45.8 | 52.3 | 54.7 | 66.0 | 73.5 | 86.3 | 77.8 | 71.9 | 56.6 | 42.9 | 33.0 |
| 1969 | 27.9 | 36.2 | 46.4 | 58.3 | 69.0 | 76.8 | 82.4 | 82.0 | 72.5 | 55.0 | 47.5 | 35.7 |
| 1970 | 35.0 | 46.2 | 45.2 | 50.1 | 66.5 | 77.6 | 86.0 | 87.5 | 67.5 | 57.0 | 45.1 | 33.9 |
| 1971 | 37.6 | 41.3 | 41.9 | 55.8 | 67.8 | 67.5 | 83.9 | 90.2 | 68.3 | 56.6 | 41.9 | 33.5 |
| 1972 | 32.3 | 39.2 | 50.5 | 52.0 | 67.7 | 74.0 | 81.9 | 87.1 | 68.2 | 60.5 | 44.1 | 31.5 |
| 1973 | 34.1 | 43.8 | 48.7 | 57.0 | 68.9 | 74.6 | 87.2 | 84.8 | 74.4 | 58.8 | 39.0 | 39.4 |
| 1974 | 31.1 | 42.1 | 46.8 | 56.2 | 60.5 | 76.1 | 81.6 | 83.1 | 79.1 | 66.2 | 45.5 | 38.1 |
| 1975 | 34.4 | 35.9 | 42.8 | 50.2 | 64.6 | 69.4 | 84.2 | 77.2 | 77.4 | 56.0 | 42.5 | 39.1 |
| 1976 | 37.4 | 39.5 | 42.4 | 55.2 | 67.8 | 68.5 | 81.8 | 77.4 | 79.2 | 61.8 | 47.4 | 38.1 |
| 1977 | 32.0 | 46.0 | 45.0 | 64.5 | 61.8 | 80.6 | 82.3 | 86.0 | 66.1 | 59.1 | 42.5 | 36.7 |
| 1978 | 36.9 | 41.8 | 53.3 | 55.4 | 60.9 | 75.4 | 82.1 | 78.5 | 70.3 | 64.0 | 38.9 | 28.9 |
| 1979 | 23.6 | 37.0 | 50.2 | 55.1 | 66.4 | 77.0 | 86.1 | 85.0 | 79.9 | 62.3 | 41.8 | 41.4 |
| 1980 | 30.8 | 41.7 | 44.7 | 61.0 | 64.3 | 67.6 | 80.6 | 78.5 | 73.6 | 63.3 | 45.9 | 42.1 |
| 1981 | 41.5 | 42.3 | 51.8 | 55.6 | 61.0 | 66.5 | 78.1 | 86.7 | 74.8 | 54.9 | 46.7 | 37.6 |
| 1982 | 31.1 | 35.0 | 44.4 | 50.3 | 61.8 | 72.4 | 77.7 | 80.2 | 69.8 | 54.3 | 36.9 | 33.8 |
| 1983 | 40.5 | 43.9 | 50.8 | 56.1 | 66.8 | 70.0 | 76.4 | 85.2 | 68.7 | 59.3 | 43.2 | 25.5 |
| 1984 | 34.8 | 39.8 | 47.0 | 51.1 | 59.2 | 64.6 | 83.3 | 84.0 | 68.0 | 52.7 | 41.1 | 30.3 |
| 1985 | 29.5 | 32.8 | 43.9 | 57.8 | 67.9 | 74.4 | 90.7 | 80.3 | 65.4 | 56.3 | 29.8 | 27.1 |
| 1986 | 38.5 | 40.4 | 53.5 | 56.7 | 67.7 | 80.0 | 78.6 | 89.1 | 65.6 | 64.1 | 41.5 | 35.2 |
| 1987 | 34.1 | 44.1 | 50.5 | 64.9 | 70.0 | 77.7 | 81.1 | 81.6 | 81.7 | 68.5 | 47.0 | 35.2 |
| 1988 | 34.3 | 46.4 | 49.0 | 60.3 | 66.8 | 73.4 | 81.8 | 85.0 | 75.2 | 70.0 | 45.0 | 36.0 |
| Mean (24 years) | 34.4 | 41.1 | 47.5 | 56.1 | 65.6 | 73.4 | 82.7 | 83.5 | 72.8 | 60.1 | 43.2 | 35.1 |

**Table 5. Growing degree days by month for Moscow using 40º and 50ºF bases.**[1]

| Base | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct |
|---|---|---|---|---|---|---|---|---|
| 40ºF | 125 | 275 | 449 | 574 | 720 | 699 | 547 | 341 |
| 50ºF | 34 | 123 | 257 | 361 | 531 | 508 | 357 | 169 |

[1]Everson et al. 1976.

**Table 6. Length of growing season at Moscow for four temperature thresholds at 50 percent probability or average occurrence of these temperatures in the spring and fall.**[1]

| | Temperature | | | |
|---|---|---|---|---|
| | 20ºF | 24ºF | 28ºF | 32ºF |
| Days | 256 | 226 | 176 | 135 |

[1]Everson et al. 1978.

**Table 7. Probability of spring and fall freezing thresholds at Moscow.**[1]

| | Percent probability of indicated or lower temperature occurring on or after date in spring | | | | | Percent probability of indicated or lower temperature occurring on or after date in fall | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Temp. | 90% | 75% | 50% | 25% | 10% | 10% | 25% | 50% | 75% | 90% |
| 20ºF | Jan 30 | Feb 15 | Mar 4 | Mar 23 | Apr 9 | Oct 17 | Oct 31 | Nov 16 | Dec 2 | Dec 16 |
| 24ºF | Feb 16 | Mar 1 | Mar 19 | Apr 5 | Apr 20 | Oct 3 | Oct 16 | Oct 31 | Nov 15 | Nov 29 |
| 28ºF | Mar 21 | Apr 3 | Apr 18 | May 3 | May 16 | Sep 17 | Sep 29 | Oct 12 | Oct 24 | Nov 5 |
| 32ºF | Apr 21 | May 2 | May 13 | May 25 | Jun 4 | Sep 4 | Sep 14 | Sep 25 | Oct 6 | Oct 17 |

[1]Everson et al. 1978.

**Table 8. Extreme occurrences of freezing temperature thresholds at Moscow.**[1]

| | Spring | | Fall | |
|---|---|---|---|---|
| Temperature | Earliest | Latest | Earliest | Latest |
| 28ºF | March 11, 1940 | June 10, 1973 | September 8, 1962 | November 29, 1937 |
| 32ºF | April 6, 1936 | July 3, 1962 | August 16, 1935 | November 3, 1940 |

[1]Everson et al. 1978.

no sub-zero temperatures. Even in July and August, the warmest months, the nights are relatively cool as evidenced by average daily minimum air temperatures.

The average daily maximum air temperature (Table 4) is highest in July and August. Most years do not have any maximum daily temperatures above 100°F, although every year will see several days near 100°F. Successive days of temperatures near or above 100°F are usually limited.

Measurement of growing degree days (Table 5) is a method of relating expected plant growth to environmental air temperature. More favorable areas for plant growth, such as Lewiston and Caldwell, Idaho, have growing degree day values 20 to 30 percent higher than those shown for Moscow. This difference is demonstrated by the fact that such crops as tomatoes and field corn are not as productive in the Moscow area as they are in the Lewiston and Caldwell areas.

Average length of growing season is shown in Table 6, using 4 different temperature levels. The probability of various freezing thresholds in spring and fall are given in Table 7, and the extreme occurrences of freezing temperature thresholds are given in Table 8.

## Native Vegetation

The native vegetation on most of the upland soils was primarily Idaho fescue (*Festuca idahoensis*), bluebunch wheatgrass (*Agropyron spicatum*), Sandberg bluegrass (*Poa sandbergii*), arrowleaf balsamroot (*Balsamorhiza sagittata*) and common snowberry (*Symphoricarpos albus*). Due to the microclimate effect, soils occupying the steep north slopes grew additional species such as Woods rose (*Rosa woodsii*), baldhip rose (*Rosa gymnocarpa*), mallow ninebark (*Physocarpus malvaceus*) and ponderosa pine (*Pinus ponderosa*). The wetter and usually cooler bottomland areas had native vegetation consisting of black hawthorne (*Crataegus douglasii*), common chokecherry (*Prunus virginiana*), ponderosa pine (*Pinus ponderosa*) and various perennial forbs and grasses. If the bottomland areas were very wet, they also had some sedges (*Carex* spp.) and rushes (*Juncus* spp.).

## Crop Production

Most of the Experiment Station land is well adapted to the common crops grown in the area. These include wheat, dry peas, barley, lentils, grass/legume hay and pasture, with good yields. Yields of the major crops under a high level of management are given in Appendix II, Table A1. Some acreage of alfalfa, grass seed and rapeseed is grown in the area, but these are minor crops. Because of the relatively high precipitation and deep soils, the area is well adapted to annual cropping. Winter wheat has been the major cash crop. Spring cereal crops produce lower yields than winter crops primarily because the wet springs greatly delay planting.

Soil erosion can be severe when the soils are not well protected over winter. The worst problem with erosion occurs when warm rains fall on frozen soils. The warm rain and warm air masses thaw the surface of the soil, and the super-saturated surface soil actually flows down the hillside or is washed away by small running streams of water that form rills or gulleys.

Another serious problem in erosion is tillage erosion. Tillage erosion is caused by downhill movement of the soil in plowing. All the erosion processes tend to expose the less fertile subsoil materials which are usually higher in clay than the topsoil. These exposed subsoil areas continue to increase in size as the tillage and water erosion processes continue.

## Soil Fertility

Since the soils were developed primarily under grass vegetation, they have a relatively high natural fertility. The volcanic nature of the parent materials of these soils also assures a minerology high in many of the essential plant nutrients. This, along with high organic matter content and moderately high clay content, assures a high natural fertility and high nutrient-holding capacity. The high rainfall does, however, tend to deplete the mobile nutrients, nitrogen (N), sulfur (S) and boron (B). These three nutrients are the most commonly used fertilizer nutrients.

Besides soil erosion, one of the biggest impacts that man has had on the soils of the area is to increase acidity of the soils by using ammonium fertilizers. The native soils generally had a pH of 6.3 to 6.5. With the heavy use of ammonium fertilizer over the past 30 to 35 years, the soil pH of the plow layer has been decreased until now it is often 5.0 to 5.6. This reduced pH (increased acidity) adversely affects phosphorus (P) availability. Thus some of the areas also need P fertilization.

# SOILS

The soils of the University of Idaho Agriculture Experimental Station and campus at Moscow include nine soil series (Table 9). A soil series is a group of soils that have horizons that are similar in composition, thickness and arrangement. The taxonomic classification of each series is also given in Table 9.

The Experiment Station and campus area includes 38 identified mapping units (Table 10). Mapping units, which are the areas delineated on the soils maps, are made up predominately of a single soil series or combination of soil series. Mapping units vary in steepness of slope, soil erosion or other characteristics that influence use and management of the units. Many of the mapping units are similar to those found in the Latah County Soil Survey Report (Barker 1981). Since this is a more detailed survey than the Latah report, some differences are found between this report and the Latah report.

Mapping units are the smallest grouping of soils designed for management. One mapping unit, for example At3 (Athena silt loam, 7 to 12 percent slopes) may appear several times in the property, but at each location the soils present should be similar and management needs should be the same.

In the following section each soil series is described (Soil Survey Staff, 1981), the mapping units for each soil series are listed and described, and use and management characteristics are outlined. Further information is given in the appendices on special terms used in describing soils (Appendix I), tables interpreting uses, problems and suitability of each mapping unit (Appendix II) and tables of physical and chemical characteristics of the soils (Appendix III).

**Table 9. Classification of soils of the University of Idaho Agricultural Experiment Station and campus at Moscow.[1]**

| Soil series name | Classification |
|---|---|
| Athena | Fine-silty, mixed, mesic Pachic Haploxerolls |
| Cald | Fine-silty, mixed, mesic Cumulic Ultic Haploxerolls |
| Garfield | Fine, mixed, mesic Mollic Haploxeralfs |
| Latah | Fine, mixed, mesic Xeric Argialbolls |
| Latahco | Fine-silty, mixed, frigid Argiaquic Xeric Argialbolls |
| Naff | Fine-silty, mixed, mesic Ultic Argixerolls |
| Palouse | Fine-silty, mixed, mesic Pachic Ultic Haploxerolls |
| Staley | Coarse-silty, mixed, mesic Calcic Haploxerolls |
| Thatuna | Fine-silty, mixed, mesic Xeric Argialbolls |

[1]From Barker 1981.

**Table 10. Mapping unit legend for the University of Idaho Agricultural Experiment Station and campus at Moscow.**

| Map symbol | Mapping unit name |
|---|---|
| At1 | Athena silt loam, 4 to 7 percent slopes |
| At2 | Athena silt loam, 4 to 7 percent slopes, eroded |
| At3 | Athena silt loam 7 to 12 percent slopes |
| Cd1 | Cald silt loam, 0 to 3 percent slopes |
| Cd2 | Cald silt loam, 3 to 5 percent slopes |
| Ga1 | Garfield silt loam, 4 to 7 percent slopes |
| Ga2 | Garfield silt loam, 7 to 12 percent slopes |
| Ga3 | Garfield silty clay loam, 7 to 12 percent slopes, eroded |
| Ga4 | Garfield silt loam, 12 to 25 percent slopes |
| Ga5 | Garfield silt loam, 25 to 35 percent slopes |
| Lt1 | Latah silt loam, 0 to 3 percent slopes |
| Lt2 | Latah silt loam, 3 to 5 percent slopes |
| Lt3 | Latah silt loam-Cald silt loam soils undifferentiated, 0 to 3 percent slopes |
| Lt4 | Latah silt loam-Cald silt loam soils undifferentiated, 3 to 5 percent slopes |
| Lo1 | Latahco silt loam, 0 to 3 percent slopes |
| Lo2 | Latahco silt loam, 3 to 5 percent slopes |
| Nf1 | Naff silt loam, 3 to 7 percent slopes |
| Nf2 | Naff silt loam, 7 to 12 percent slopes |
| Nf3 | Naff silt loam, 12 to 25 percent slopes |
| Nf4 | Naff silt loam, 25 to 35 percent slopes |
| Nf5 | Naff silt loam, 35 to 45 percent slopes |
| Pe1 | Palouse silt loam, 0 to 3 percent slopes |
| Pe2 | Palouse silt loam, 3 to 7 percent slopes |
| Pe3 | Palouse silt loam, 7 to 12 percent slopes |
| Pe4 | Palouse silt loam, 7 to 12 percent slopes, eroded |
| Pe5 | Palouse silt loam, 12 to 25 percent slopes |
| Pe6 | Palouse silt loam, 12 to 25 percent slopes, eroded |
| Pe7 | Palouse silt loam, 25 to 35 percent slopes |
| Pe8 | Palouse silt loam, 25 to 35 percent slopes, eroded |
| Sy1 | Staley silt loam, 3 to 7 percent slopes |
| Sy2 | Staley silt loam, 7 to 12 percent slopes |
| Sy3 | Staley silt loam, 7 to 12 percent slopes, eroded |
| Sy4 | Staley silt loam, 12 to 25 percent slopes |
| Sy5 | Staley silt loam, 12 to 25 percent slopes, eroded |
| Ta1 | Thatuna silt loam, 7 to 12 percent slopes |
| Ta2 | Thatuna silt loam, 12 to 25 percent slopes |
| Ta3 | Thatuna silt loam, 25 to 35 percent slopes |
| Ta4 | Thatuna silt loam, 35 to 45 percent slopes |

# Athena Series

The Athena series consists of very deep, well-drained soils on upland positions. They formed in deep loess. Slopes range from 4 to 12 percent. The average annual soil temperature is about 50°F, and the average annual precipitation is lower than the general area because of south slope aspects. The growing season is slightly longer than the average for the area because of the south slope aspects and good water and air drainage.

**Taxonomic Class**: Fine-silty, mixed, mesic, Pachic Haploxerolls.

**Typical Pedon**: Athena silt loam (59 Ida 2915) on a nearly level slope under cultivation; described by Ray Barker and Jack Chugg on Oct. 6, 1959.

**Type Location**: Latah County, Idaho; NE¼ NW¼ Sec. 13, T. 39 N., R. 6 W. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 9 inches. Grayish brown (10YR 5/2) silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky parting to moderate fine granular structure; soft, friable, sticky and slightly plastic; abundant bleached material giving a gray cast when dry; many fine roots; abundant fine tubular pores; abrupt smooth boundary.

**AB** — 9 to 25 inches. Brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak very coarse prismatic parting to weak medium subangular blocky structure; soft, friable, sticky and slightly plastic; many fine roots; many coarse tubular pores; dark brown (10YR 3/3) coatings on ped faces; many 5- to 7-mm old vertical root channels that continue throughout the profile, lined with darker soil material; fine roots are concentrated in these channels; gradual wavy boundary.

**Bw1** — 25 to 43 inches. Pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium prismatic parting to weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; coatings on vertical ped surfaces slightly darker than ped interior; many fine roots, mostly in old channels; many coarse tubular pores; many 5- to 7-mm diameter old vertical root channels lined with A material (continue throughout profile); gradual wavy boundary.

**Bw2** — 43 to 55 inches. Pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; very weak medium subangular blocky structure; very hard, friable, sticky and slightly plastic; many fine roots, mostly in old root channels; many coarse tubular pores; old root channels as in above horizon; abrupt wavy boundary.

**Bk1** — 55 to 80 inches. Brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky parting to moderate fine subangular blocky structure; very hard, firm, sticky; violently effervescent; lime in old root channels and on surfaces of peds; many fine manganese concretions; few fine roots, mostly in old root channels; many coarse tubular pores; gradual wavy boundary.

**Bk2** — 80 to 100 inches. Brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; very hard, firm, sticky; violently effervescent; few fine roots, mostly in old root channels; many coarse tubular pores; gradual wavy boundary.

**C** — 100 to 130 inches. Brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; massive; very hard, friable, sticky and slightly plastic; some lime in splotches; few fine roots, mostly in old root channels; many coarse tubular pores.

**Note**: No pH's were taken for this profile.

**Permeability**: moderate (0.6 to 2.0 inches/hr).

**Available Water-holding Capacity**: high (9 to 11 inches).

**Effective Rooting Depth**: 60 inches or more.

## Mapping Unit Descriptions

The three Athena mapping units within the property differ from each other in percent slope and/or amount of erosion. The eroded unit is mostly on narrow ridgetops. The Athena mapping units are mostly in the western portion of the property. Included in this mapping are small areas of Palouse silt loam on toeslope positions and Staley silt loam on narrow ridgetops. (Runoff and erosion potentials are based on bare or disturbed soil conditions.)

**At1** — Athena silt loam, 4 to 7 percent slopes. Runoff is medium and hazard of water erosion is moderate.

Most areas of this unit are used for cropland. A few areas are used for hay and pastureland. This unit is in capability subclass IIe.

For crop production, this unit is limited mainly by a moderate hazard of erosion. Erosion can be controlled and fertility maintained by using a suitable cropping system, crop residue management, minimum tillage and proper fertilization.

This unit is well suited for production of hay and pasture. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

This unit is well suited to recreational development. It is limited mainly by the dusty surface layer.

**At2** — Athena silt loam, 4 to 7 percent slopes, eroded. Runoff is moderate and hazard of water erosion is moderate to high.

This unit is similar to At1 differing only in that a portion of the surface layer has been removed because of erosion.

Use and management of this unit is similar to At1. This unit is in capability subclass IIIe. Because of the loss of surface soil, returning the crop residue to the soil is important to improve fertility and tilth.

**At3** — Athena silt loam, 7 to 12 percent slopes. Runoff is medium to rapid and hazard of erosion is moderate to high.

Most areas of this unit are used for cropland. A few areas are used for hay and pastureland. This map unit is in capability subclass IIIe.

For crop production, this unit is limited mainly by the moderate to high hazard of erosion. Erosion can be controlled and fertility maintained by using a suitable cropping system, crop residue management, minimum tillage and proper fertilization. In the steeper areas, cross-slope farming may be needed.

This unit is well suited to production of hay and pasture. The main limitations are slope and the hazard of water erosion. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

This unit is suited to recreational development. It is limited mainly by a dusty surface layer and steepness of slope.

# Cald Series

The Cald series consists of very deep, somewhat poorly drained soils in bottomlands and drainageways. They formed in silty alluvium from loess. Slopes range from 0 to 5 percent. The average annual soil temperature is about 48°F. The low bottomland position, which collects runoff from adjacent areas, and the cold, wet soil conditions and poor air and water drainage create a higher average annual precipitation and shorter growing season than typical for the area.

**Taxonomic Class**: Fine-silty, mixed, mesic Cumulic Ultic Haploxerolls.

**Typical Pedon**: Cald silt loam (77 Ida 2975) on a 4 percent slope under cultivation; described by Karl Hipple on June 7, 1977 (Hipple 1981).

**Type Location**: Latah County, Idaho; approximately 600 feet east and 300 feet north of SW corner of the SW¼, SE¼, Sec. 23, T. 38N., R. 5W. This profile is not on University of Idaho property. No description of Cald has been made on the Experiment Station. This description was made near the UI land and does represent the Cald series as found on the UI property. Cald series is an included soil in Latah mapping units in the Latah County Soil Survey Report. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; moderately acid (pH 5.9); abrupt smooth boundary.

**A1** — 7 to 10 inches. Dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate medium platy structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; moderately acid (pH 5.7); abrupt smooth boundary.

**A2** — 10 to 18 inches. Dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many fine tubular pores; moderately acid (pH 5.9); abrupt wavy boundary.

**A3** — 18 to 25 inches. Dark grayish brown (10YR 4/2) silt loam, black (10YR 2/1) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; moderately acid (pH 5.7); clear wavy boundary.

**BA** — 25 to 33 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots, many fine tubular pores; moderately acid (pH 6.0); clear wavy boundary.

**Cg1** — 33 to 39 inches. Gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few fine roots; many fine tubular pores; common fine distinct mottles; moderately acid (pH 5.7); clear wavy boundary.

**Cg2** — 39 to 46 inches. Gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; very few fine roots; many fine tubular pores; common fine distinct mottles; moderately acid (pH 5.9); clear wavy boundary.

**Cg3** — 46 to 59 inches. Gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; very few fine roots; many fine tubular pores; common fine distinct mottles; moderately acid (pH 6.0); gradual wavy boundary.

**C** — 59 to 65 inches. Very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; very few fine roots; many fine tubular pores; very few thin clay films in pores; slightly acid (pH 6.1).

**Permeability**: moderately slow (0.2 to 0.6 inches/hr).

**Available Water-holding Capacity**: high (9 to 12 inches).

**Effective Rooting Depth**: 60 inches or more.

**Water Table**: A seasonal high water table exists at a depth of 6 to 18 inches in late winter and spring months. This soil is subject to frequent, brief periods of flooding in winter and early spring months from stream overflow and surface runoff from adjacent slopes.

## Mapping Unit Descriptions

The property includes two mapping units of the Cald series. The two Cald mapping units differ in steepness of slope. They occur throughout the Agricultural Experiment Station and are located in the broad valley floors near stream channels. Included in mapping are small areas of the Latah series occurring on small convex areas. Cald soils also occur in two mapping units with the Latah series (page 21). (Runoff and erosion potentials are based on bare soil conditions.)

**Cd1** — Cald silt loam, 0 to 3 percent slopes. Runoff is slow, and hazard of water erosion is slight.

**Cd2** — Cald silt loam, 3 to 5 percent slopes. Runoff is slow to medium, and hazard of water erosion is slight to moderate. This unit is in the more narrow drainageways and on some toeslopes.

Most areas of these units are used for crop and hay production and pastureland. These map units are in capability subclass IIIw.

For crop production, these units are limited mainly by a water table. Artificial drainage is necessary for maximum production. A suitable cropping system, crop residue management and proper fertilization help to maintain soil fertility and tilth.

These units are well suited to production of hay and pasture. The main limitation is wetness. Wetness limits the choice of plants and the period of cutting or grazing, and increases the risk of winterkill.

These units are poorly suited to recreational development. They are limited mainly by the water table and the hazard of flooding.

# Garfield Series

The Garfield series consists of very deep, well-drained soils on primary and secondary ridgetops, knobs or knolls. They formed in deep loess. Slopes range from 4 to 35 percent. The average annual soil temperature is about 50ºF.

**Taxonomic Class**: Fine, mixed, mesic Mollic Haploxeralfs.

**Typical Pedon**: Garfield silt loam on a 10 percent southwest-facing slope on a secondary knob; described by Elbert Moore and Harley Noe on Oct. 19, 1967.

**Type Location**: Latah County, Idaho; about 1,020 feet south and 780 feet east of the NW corner of Sec. 8, T. 37N., R. 4W. This profile is not located on University of Idaho property. It is the typical profile for the Garfield series found in the Latah County Soil Survey Report and represents the Garfield soils as mapped on the Experiment Station. There are no available profile descriptions on UI property. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 8 inches. Brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many fine interstitial pores; few medium and coarse pieces of B material; neutral (pH 6.8); abrupt smooth boundary.

**Bt1** — 8 to 15 inches. Brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 4/4) moist; moderate medium and coarse angular blocky structure; very hard, firm, sticky and plastic; few fine and very fine roots; few fine and very fine tubular pores; common moderately thick clay films on faces of peds and in pores; neutral (pH 7.0); clear wavy boundary.

**Bt2** — 15 to 22 inches. Brown (7.5YR 5/4) silty clay loam, dark brown (7.5 YR 4/4) moist; weak medium and coarse angular blocky structure; very hard, very firm, sticky and plastic; few fine and very fine roots; common fine and very fine tubular pores; common moderately thick clay films on faces of peds and in pores; neutral (pH 6.6); gradual wavy boundary.

**BC1** — 22 to 53 inches. Light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, very firm, slightly sticky and slightly plastic; no roots; common fine and very fine tubular pores; few thin clay films on faces of peds; few lime veins; mildly alkaline (pH 7.4); clear smooth boundary.

**BC2** — 53 to 60 inches. Light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, very firm, slightly sticky and slightly plastic; no roots; few fine and very fine tubular pores; few thin clay films on faces of peds; mildly alkaline (pH 7.4).

**Permeability**: slow (0.06 to 0.20 inches/hr).

**Available Water-holding Capacity**: high (9 to 12 inches).

**Effective Rooting Depth**: 60 inches or more except that roots are somewhat restricted in the clayey subsoil.

## Mapping Unit Descriptions

The property has five mapping units of the Garfield series. They differ in percent slope and/or amount of erosion. The eroded mapping unit occurs on narrow, secondary ridgetops. The Garfield mapping units are predominantly on the west side of the Agricultural Experiment Station. The soils are most often on knolls and secondary ridgetops and some primary ridgetops. Included in mapping are small areas on primary ridgetops of a soil that is similar to Garfield but has less than 35 percent clay in the subsoil. (Runoff and erosion potentials are based on bare or disturbed soil conditions.)

**Ga1** — Garfield silt loam, 4 to 7 percent slopes. Runoff is rapid and hazard of water erosion is high.

**Ga2** — Garfield silt loam, 7 to 12 percent slopes. Runoff is rapid and hazard of water erosion is high.

**Ga3** — Garfield silty clay loam, 7 to 12 percent slopes, eroded. Runoff is medium to rapid and hazard of water erosion is moderate to high. Much of the surface layer of this soil has been removed due to erosion which has exposed the silty clay loam subsoil in many areas.

**Ga4** — Garfield silt loam, 12 to 25 percent slopes. Runoff is rapid and hazard of water erosion is high.

Most areas of these units are used for cropland. A few areas are used for hay and pastureland. These map units are in capability subclass IVe.

For crop production, these units are limited mainly by a high hazard of erosion, poor tilth and low fertility. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes or grass-legume mixtures are needed to improve fertility and tilth. Minimum tillage, cross-slope farming, divided slope farming or stripcropping and proper fertilization are also needed. Steep areas (over 25%) may need to be seeded to permanent cover.

These units are suited to production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep pasture in good condition and to protect the soil from erosion.

The map units of the Garfield soil are poorly suited to recreational development because of slope and high hazard of water erosion and, where eroded, because of the thin surface layer.

**Ga5** — Garfield silt loam, 25 to 35 percent slopes. Runoff is very rapid and hazard of water erosion is very high. This unit is very poorly suited to use as cropland because of the very high hazard of erosion. It should be maintained in permanent plant cover. This map unit is in capability subclass VIe.

This unit is well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion. The addition of nitrogen and sulfur is essential, and phosphorus is also needed if legumes are grown.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should follow the contour.

# Latah Series

The Latah series consists of very deep, somewhat poorly drained soils on valley floors and drainageways. They formed in silty alluvium from loess. Slopes range from 0 to 5 percent. The average annual soil temperature is about 49°F. The low bottomland position, which collects runoff from adjacent areas, and the cold, wet soil conditions and poor air and water drainage create a higher average annual precipitation and shorter growing season than typical for the area.

**Taxonomic Class**: Fine, mixed, mesic Xeric Argialbolls.

**Typical Pedon**: Latah silt loam on a 1 percent slope under cultivation; described by Steve Base, Ray Barker and Elbert Moore on Nov. 1, 1967.

**Type Location**: Latah County, Idaho; about 2,290 feet east and 100 feet south of the NW corner Sec. 10, T. 38N., R. 5W. This profile is not located on University of Idaho property. It is the typical profile for the Latah series in the Latah County Soil Survey Report and represents the Latah soils as mapped on the UI Agricultural Experimental Farm. No adequate soil descriptions exist for the Latah series on UI property. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium and coarse granular structure; hard, very friable, slightly sticky and slightly plastic; many very fine roots; many fine interstitial pores; neutral (pH 7.3); clear wavy boundary.

**A1** — 7 to 19 inches. Dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium and coarse subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; many very fine roots; many fine tubular pores; neutral (pH 7.0); gradual wavy boundary.

**A2** — 19 to 23 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; common very fine roots; many fine tubular pores; neutral (pH 7.3); clear wavy boundary.

**E1** — 23 to 27 inches. Pale brown (10YR 6/3) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common fine roots; many fine tubular and vesicular pores; neutral (pH 7.3); gradual wavy boundary.

**E2** — 27 to 32 inches. Light gray (10YR 6/1) silt loam, dark gray (10YR 4/1) moist; massive; hard, very friable, slightly sticky and slightly plastic; common fine roots; many fine tubular and vesicular pores; many fine iron and manganese concretions less than 3 mm in diameter; neutral (pH 7.1); abrupt wavy boundary.

**Bt1** — 32 to 42 inches. Dark gray (10YR 4/1) silty clay, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic parting to moderate medium angular blocky structure; very hard, firm, very sticky and very plastic; common fine roots; many fine tubular pores; continuous moderately thick clay films on faces of peds and in pores; common fine iron and manganese concretions less than 2 mm in diameter; neutral (pH 7.3); gradual wavy boundary.

**Bt2** — 42 to 60 inches. Light brownish gray (2.5Y 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; brown (7.5YR 4/4) mottles; moderate medium prismatic parting to moderate medium angular blocky structure; very hard, friable, sticky and plastic; few fine flattened roots; few fine tubular pores; continuous moderately thick clay films on faces of peds; dark gray (10YR 3/1) organic coatings; neutral (pH 7.0).

**Permeability**: very slow (less than 0.06 inches/hr).

**Available Water-holding Capacity**: high (9 to 12 inches).

**Effective Rooting Depth**: 60 inches or more.

**Water Table**: A perched water table exists above the clayey subsoil early in the spring. This soil is often subject to occasional, brief periods of flooding from stream overflow and/or runoff from adjacent slopes during winter and early spring.

### Mapping Unit Descriptions

The area includes four mapping units of the Latah series. Two of the units are undifferentiated mapping units with Cald series (page 19). The mapping units differ in slope. These mapping units are found in bottomland, valley floors and drainageways throughout the Agricultural Experiment Station. Included in mapping are areas of Latahco silt loam and a soil similar to Latah but with a thinner A horizon. (Runoff and erosion potentials based on bare soil conditions.)

**Lt1** — Latah silt loam, 0 to 3 percent slopes. Runoff is slow, and the hazard of water erosion is slight.

**Lt2** — Latah silt loam, 3 to 5 percent slopes. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. This unit is in the narrow, more sloping drainageways.

**Lt3** — Latah silt loam-Cald silt loam soils undifferentiated, 0 to 3 percent slopes. Runoff is slow, and hazard of water erosion is slight. The two soils are so intermingled throughout the map unit that it was not practical to map them out separately. However, the Cald soils are usually closer to the stream channels.

**Lt4** — Latah silt loam-Cald silt loam soils undifferentiated, 3 to 5 percent slopes. Runoff is slow to medium, and hazard of water erosion is slight to moderate. This unit is on the more sloping toeslope positions. The two soils are so intermingled that it was not practical to map them out separately. However, the Cald soils are usually closer to the stream channels.

Most areas of these units are used for cropland. A few areas are used for hay and pastureland. These mapping units are all in the capability subclass IIIw.

For crop production, these units are limited mainly by the seasonal high water table. Artificial drainage is necessary for maximum production. A suitable cropping system, crop residue management and proper fertilization help to maintain soil fertility and tilth.

These units are well suited to the production of hay and pasture. The main limitation is wetness. Wetness limits the choice of plants and the period of cutting or grazing and results in a high risk of winterkill.

These units are poorly suited to recreational development. They are limited mainly by the seasonal high water table and the hazard of flooding.

## Latahco Series

The Latahco series consists of very deep, somewhat poorly drained soils on valley floors. They formed in silty alluvium from loess. Slopes range from 0 to 5 percent. The average annual soil temperature is about 46°F. The low bottomland position, which collects runoff from adjacent areas, and the cold, wet soil conditions and poor air and water drainage create a higher average annual precipitation and shorter growing season than typical for the area.

**Taxonomic Class**: Fine-silty, mixed, frigid Argiaquic Xeric Argialbolls.

**Typical Pedon**: Latahco silt loam (77 Ida 2978) on a 2 percent slope under cultivation; described by Karl Hipple on June 27, 1977.

**Type Location**: Latah County, Idaho; approximately 350 feet east and 250 feet south of the NW corner of SW¼, NW¼, Sec. 15, T. 39N., R. 5W. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 8 inches. Dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; weak thin platy parting to weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many fine interstitial pores; moderately acid (pH 6.0); abrupt smooth boundary.

**AB** — 8 to 14 inches. Dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; slightly acid (pH 6.2); clear smooth boundary.

**Bw** — 14 to 20 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic parting to weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many fine tubular pores; slightly acid (pH 6.2); clear smooth boundary.

**Ec1** — 20 to 24 inches. Light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic parting to weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; common fine rounded black concretions; slightly acid (pH 6.4); clear smooth boundary.

**Ec2** — 24 to 28 inches. Light gray (10YR 7/2) silt, grayish brown (10YR 5/2) moist; massive; soft, very friable; few fine roots; many fine tubular pores; many fine rounded black concretions, slightly acid (pH 6.5); abrupt smooth boundary.

**Btcb1** — 28 to 36 inches. Light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic parting to moderate medium angular blocky structure; very hard, firm, sticky and plastic; few fine roots; many fine tubular pores; many fine rounded black concretions; peds capped with bleached silt grains; common moderately thick dark gray (7.5YR 4/0) clay films in pores and on faces of peds; slightly acid (pH 6.3); gradual wavy boundary.

**Btcb2** — 36 to 46 inches. Light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic parting to moderate medium and coarse angular blocky structure; very hard, very firm, sticky and plastic; few fine roots; many fine tubular pores; few fine rounded black concretions; common moderately thick dark gray (7.5YR 4/0) clay films in pores and on faces of peds; slightly acid (pH 6.4); gradual wavy boundary.

**Btcb3** — 46 to 70 inches. Gray (7.5YR 6/0) silty clay loam, dark gray (7.5YR 4/0) moist; moderate coarse prismatic parting to moderate medium and coarse angular blocky structure; very hard, firm, sticky and plastic; very few fine roots; many fine tubular pores; few fine rounded black concretions; common moderately thick dark gray (7.5YR 4/0) clay films in pores and on faces of peds; slightly acid (pH 6.3).

**Permeability:** moderately slow (0.2 to 0.6 inches/hr).

**Available Water-holding Capacity:** high (9 to 12 inches).

**Effective Rooting Depth:** 60 inches or more.

**Water Table:** A water table is perched above the Bt horizons early in the spring. This soil is also subject to occasional, brief periods of flooding due to either stream overflow or surface runoff from slopes.

### Mapping Unit Descriptions

The property has two mapping units of the Latahco series. They differ in steepness of slope. These mapping units are in the valley floors and broad drainageways. Latahco mapping units are mostly on the Plant Science Farm. However, some Latahco soils occur in the narrow drainageways in the northwestern portion of the property. (Runoff and erosion potentials based on bare soil conditions.)

**Lo1** — Latahco silt loam, 0 to 3 percent slopes. Runoff is slow, and hazard of water erosion is slight.

**Lo2** — Latahco silt loam, 3 to 5 percent slopes. Runoff is slow to medium, and the hazard of water erosion is slight to moderate. This unit is in the narrower drainageways and/or toeslope positions.

Most areas of these units are used for crops, hay and pastureland. These mapping units are in capability subclass IIIw.

For crop production, these units are limited mainly by the seasonal perched water table. Artificial drainage is necessary for maximum production. A suitable cropping system, crop residue management and proper fertilization can help to maintain soil fertility and tilth.

This unit is well suited to the production of hay and pasture. The main limitation is wetness. Wetness limits the choice of plants and the period of cutting or grazing and increases the risk of winterkill.

These units are poorly suited to recreational development. They are limited mainly by a seasonal perched water table and the hazard of flooding.

## Naff Series

The Naff series consists of very deep, well-drained soils on upland positions. They formed in deep loess. Slopes range from 3 to 45 percent. The average annual soil temperature is about 49°F.

**Taxonomic Class:** Fine-silty, mixed, mesic Ultic Argixerolls.

**Typical Pedon:** Naff silt loam (77 Ida 2977) on a 14 percent southwest facing slope under cultivation; described by Karl Hipple on June 9, 1977.

**Type Location:** Latah County, Idaho; approximately 800 feet east and 250 feet north of the SW corner of Sec. 5, T. 39N., R. 5W. This profile is not on University of Idaho land. However, no profile of Naff has been described on UI property. This description was taken just north of Moscow and represents the typical Naff series as mapped on the Agricultural Experiment Station. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 5 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak thin platy parting to weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine, few coarse roots; many very fine and fine interstitial pores; slightly acid (pH 6.3); clear smooth boundary.

**A** — 5 to 9 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; moderately acid (pH 6.0); abrupt smooth boundary.

**Bt1** — 9 to 13 inches. Brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; moderate medium prismatic parting to moderate medium angular blocky structure; hard, firm, sticky and plastic; many very fine and fine roots; many very fine and fine tubular pores; many moderately thick yellowish red (5YR 5/6) clay films in pores and on faces of peds; moderately acid (pH 6.0); clear wavy boundary.

**Bt2** — 13 to 19 inches. Pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium prismatic parting to moderate fine and medium angular blocky structure; hard, firm, sticky and plastic; many very fine and fine tubular pores; many moderately thick yellowish red (5YR 5/6) clay films in pores and on faces of peds; moderately acid (pH 6.0); gradual wavy boundary.

**Bt3** — 19 to 26 inches. Pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate coarse prismatic parting to moderate medium and coarse angular blocky structure; hard, firm, sticky and plastic; many fine roots; many very fine and fine tubular pores; many thick yellowish red (5YR 5/6) clay films in pores and on faces of peds; slightly acid (pH 6.1); gradual wavy boundary.

**Bt4** — 26 to 40 inches. Pale brown (10YR 6/3) silty clay loam, brown (10YR 5/3) moist; moderate medium prismatic parting to moderate fine and medium angular blocky structure; hard, firm, sticky and plastic; many fine roots; many very fine and fine tubular pores; many thick yellowish red (5YR 5/6) clay films in pores and on faces of peds; slightly acid (pH 6.2); gradual wavy boundary.

**Bt5** — 40 to 50 inches. Light yellowish brown (10YR 6/4) silty clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse angular blocky structure; hard, firm, sticky and plastic; many fine roots; many very fine and fine tubular pores; many thick reddish brown (5YR 5/4) clay films in pores and on faces of peds; slightly acid (pH 6.3); gradual wavy boundary.

**Bt6** — 50 to 60 inches. Light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; very few fine roots; many fine tubular pores; few thin reddish brown (5YR 5/4) clay films in pores and on faces of peds; slightly acid (pH 6.2).

**Permeability:** moderately slow (0.2 to 0.6 inches/hr).

**Available Water-holding Capacity:** high (9 to 12 inches).

**Effective Rooting Depth:** 60 inches or more.

## Mapping Unit Descriptions

The property has five mapping units of the Naff series. They differ in steepness of slope. Naff soils are generally on convex positions. The Naff soils are found throughout the Agricultural Experiment Station area. Included in mapping are small areas of Garfield soils on narrow ridgetops and Thatuna soils in concave, northerly facing slopes. (Runoff and erosion potentials based on bare or disturbed soil conditions.)

**Nf1** — Naff silt loam, 3 to 7 percent slopes. Runoff is medium, and the hazard of water erosion is moderate.

This unit is used mostly for cropland. A few areas are used for hay and pastureland. This map unit is in capability subclass IIe.

For crop production, this unit is limited mainly by the moderate hazard of erosion. Erosion can be controlled and fertility and tilth maintained by using a suitable cropping system, crop residue management, minimum tillage and proper fertilization.

This unit is well suited to the production of hay and pasture. It has few limitations. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

This unit is suited to recreational development. It is limited mainly by a dusty surface layer.

**Nf2** — Naff silt loam, 7 to 12 percent slopes. Runoff is medium to rapid, and hazard of water erosion is moderate to high.

**Nf3** — Naff silt loam, 12 to 25 percent slopes. Runoff is rapid, and hazard of water erosion is high.

Most areas of these units are used for cropland. A few areas are used for hay and pastureland. These map units are in capability subclass IIIe.

For crop production, these units are limited mainly by the high hazard of erosion. Erosion can be controlled and fertility and tilth maintained by using a suitable cropping system, crop residue management, minimum tillage, cross-slope farming, divided-slope farming or stripcropping and proper fertilization.

These units are well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

These units are poorly suited to recreational development. They are limited mainly by slope.

**Nf4** — Naff silt loam, 25 to 35 percent slopes. Runoff is very rapid, and hazard of water erosion is very high.

Most areas of these units are used for cropland. A few areas are used for hay and pastureland. This map unit is in capability subclass IVe.

For crop production, this unit is limited mainly by the high hazard of erosion. Erosion can be controlled and fertility and tilth maintained by using a suitable cropping system, crop residue management, minimum tillage, cross-slope farming, divided-slope farming or stripcropping and proper fertilization.

This unit is well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should be laid out across the slope.

**Nf5** — Naff silt loam, 35 to 45 percent slopes. Runoff is very rapid, and hazard of water erosion is very high. This map unit is in capability subclass VIe.

Most areas of this unit are used to produce crops, hay and pasture. A few areas are used for woodland.

This unit is very poorly suited to use as cropland because of the very high hazard of erosion. It should be maintained in permanent plant cover.

This unit is well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should be laid out across the slope.

# Palouse Series

The Palouse series consists of very deep, well-drained soils on upland positions. They formed in deep loess. Slopes range from 0 to 35 percent. The average annual soil temperature is about 50°F.

**Taxonomic Class:** Fine-silty, mixed, mesic Pachic Ultic Haploxerolls.

**Typical Pedon:** Palouse silt loam (77 Ida 2979) on a 9 percent southeast facing slope under cultivation; described by Karl Hipple on June 21, 1977.

**Type Location:** Latah County, Idaho; approximately 200 feet south and 50 feet east of NW corner of SW¼, NW¼ of Sec. 15, T. 39N., R. 5W. (Colors are for dry soil unless otherwise noted.)

**Ap1** — 0 to 7 inches. Dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; moderately acid (pH 5.6); abrupt smooth boundary.

**Ap2** — 7 to 9 inches. Dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; moderately acid (pH 5.7); abrupt smooth boundary.

**A** — 9 to 15 inches. Dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; moderately acid (pH 5.9); clear smooth boundary.

**AB** — 15 to 25 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic parting to weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very few medium roots; many very fine and fine tubular pores; krotovina approximately 5 inches in diameter at 18 inches filled with granular A material; moderately acid (pH 6.0); gradual wavy boundary.

**Bw1** — 25 to 33 inches. Pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; approximately 20 percent of this horizon contains old vertical worm channels partially filled with dark A material; moderately acid (pH 6.0); clear wavy boundary.

**Bw2** — 33 to 43 inches. Pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium prismatic parting to moderate fine and medium subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine and fine roots; many very fine and fine tubular pores; approximately 20 percent of this horizon contains old vertical worm channels partially filled with dark A material; slightly acid (pH 6.3); gradual wavy boundary.

**Bt** — 43 to 52 inches. Pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate coarse prismatic parting to moderate medium and coarse angular blocky structure; hard, firm, slightly sticky and slightly plastic; many fine roots; many very fine and fine tubular pores; approximately 10 percent of this horizon contains old vertical worm channels partially filled with dark A material; few thin reddish brown (5YR 5/3) clay films in pores and on faces of peds; slightly acid (pH 6.2); clear wavy boundary.

**Btb** — 52 to 62 inches. Brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 3/4) moist; moderate coarse prismatic parting to moderate fine and medium angular blocky structure; hard, very firm, sticky and plastic; few fine roots; many very fine and fine tubular pores; many moderately thick reddish brown (5YR 5/3) clay films in pores and on faces of peds slightly acid (pH 6.1).

**Permeability:** moderate (0.6 to 2.0 inches/hr).

**Available Water-holding Capacity:** high (9 to 11 inches).

**Effective Rooting Depth:** 60 inches or more.

## Mapping Unit Descriptions

The campus and Experiment Station have eight mapping units of the Palouse series. They differ in steepness of slope and/or amount of erosion. The Palouse soil is usually in concave and long smooth south and west slope positions. Palouse soils are found throughout the Agricultural Experimental Station area. Included in these mapping units are small areas of Naff soils on convex areas and Athena soils in small, concave areas. (Runoff and erosion potentials based on bare or disturbed soil conditions.)

**Pe1** — Palouse silt loam, 0 to 3 percent slopes. Runoff is slow, hazard of water erosion is slight. This unit is on the broader, gentle ridge top positions.

**Pe2** — Palouse silt loam, 3 to 7 percent slopes. Runoff is slow to medium, and the hazard of erosion is slight to moderate. This unit is often on toeslopes.

These units are used mostly for cropland. A few areas are used for hay and pastureland. These map units are in capability subclass IIe.

For crop production, these units are limited mainly by the moderate hazard of erosion. Erosion can be controlled and fertility maintained by using a suitable cropping system, crop residue management, minimum tillage and proper fertilization.

These units are well suited to hay and pasture production. They have few limitations. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

These units are suited to recreational development. They are limited mainly by a dusty surface layer.

**Pe3** — Palouse silt loam, 7 to 12 percent slopes. Runoff is medium, and the hazard of water erosion is moderate. This unit is often on toeslope positions.

**Pe4** — Palouse silt loam, 7 to 12 percent slopes, eroded. Runoff is medium, and hazard of water erosion is moderate to high. Part of the surface soil has been removed by erosion.

**Pe5** — Palouse silt loam, 12 to 25 percent slopes. Runoff is rapid and the hazard of water erosion is high.

These units are used for cropland, hayland and pastureland. These mapping units are in capability subclass IIIe.

For crop production, these units are limited mainly by the moderate to high hazard of erosion. Erosion can be controlled and fertility maintained by using a suitable cropping system, crop residue management, minimum tillage, cross-slope farming, divided-slope farming or stripcropping and proper fertilization.

These units are well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

These units are poorly suited to recreational development. They are limited mainly by slope.

**Pe6** — Palouse silt loam, 12 to 25 percent slopes, eroded. Runoff is rapid and hazard of water erosion is high to very high. Part of the surface soil has been removed by erosion.

**Pe7** — Palouse silt loam, 25 to 35 percent slope. Runoff is very rapid, and hazard of water erosion is very high.

These units are used mainly for cropland. They are also used for hay, pasture and wildlife habitat. These mapping units are in capability subclass IVe.

For crop production, these units are limited mainly by the very high hazard of erosion and a hazard of soil slippage. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes or grass-legume mixtures help to maintain fertility and tilth. Minimum tillage, cross-slope farming, divided slope farming or stripcropping and proper fertilization are also needed. The steeper areas may need to be seeded to permanent cover.

These units are well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

These units are poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should contour across the slope.

**Pe8** — Palouse silt loam, 25 to 35 percent slopes, eroded. Runoff is very rapid, and hazard of water erosion is very high. Part of the surface soil has been removed by erosion.

Most areas of this unit are used for hay and pastureland. This map unit is in capability subclass VIe.

This unit is poorly suited to use as cropland because of the very high hazard of erosion. It should be maintained in permanent plant cover.

This unit is well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should be laid out across the slope.

# Staley Series

The Staley series consists of very deep, well-drained soils on narrow ridgetops. They formed in loess. Slopes range from 0 to 25 percent. The average annual soil temperature is about 50°F.

**Taxonomic Class:** Coarse-silty, mixed, mesic Calcic Haploxerolls.

**Typical Pedon:** Staley silt loam (60 Ida 2918) on a 1 percent slope under cultivation; described by Jack Chugg, survey E. Doner and David Kunkel on May 24, 1961.

**Type Location:** Latah County, Idaho; north end of UI farm, north of Pullman highway at top of ridge above north facing slope, NW¼ NE¼, Sec. 12, T. 39N., R. 6W. Staley series is an included soil in Athena mapping units in the Latah County Survey Report. No soil pH's were taken for this pedon. (Colors are for dry soil unless otherwise noted.)

**Ap** — 0 to 8 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine platy parting to moderate fine granular structure; very hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many medium and fine tubular pores; abrupt smooth boundary.

**A** — 8 to 12 inches. Grayish brown (10YR 5/2) silt, very dark gray (10YR 3/1) moist; weak very fine platy parting to moderate fine granular structure; hard, friable, slightly sticky and slightly plastic; common fine roots; many fine tubular pores, 5 to 7 mm diameter root channels extending to 48 inches lined with organic matter and A material; abrupt wavy boundary.

**Bt** — 12 to 16 inches. Brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium prismatic parting to weak platy structure; hard, friable, sticky and plastic; few fine roots; many fine tubular pores; few thick clay films lining faces of peds; matrix has abundant fine subangular blocks of hard material which is slightly darker in color; clear wavy boundary.

**Bk1** — 16 to 27 inches. Brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic parting to moderate fine subangular blocky structure; hard, friable, sticky and plastic; few fine roots; many fine tubular pores; few clay films lining faces of peds; lime is concentrated in pores which are violently effervescent; matrix has hard subangular blocks; clear wavy boundary.

**Bk2** — 27 to 48 inches. Pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; hard, friable, slightly sticky; many fine tubular pores; strongly effervescent; abrupt wavy boundary.

**C** — 48 to 72 inches. White (10YR 8/2) moist; silt loam; lime throughout matrix.

**Permeability:** moderate (0.6 to 2.0 inches/hr).

**Available Water-holding Capacity:** high (9 to 12 inches).

**Effective Rooting Depth:** 60 inches or more (however, some rooting restrictions may result from a lime layer at 40 to 60 inches).

## Mapping Unit Descriptions

The property has five mapping units of the Staley series. They differ in steepness of slope and/or amount of erosion. The Staley soils are usually located on narrow ridgetops or knolls. They are primarily on the western part of the Agricultural Experiment Station. Included in mapping units are small areas of Athena silt loam in concave positions. (Runoff and erosion potentials are based on bare soil conditions.)

**Sy1** — Staley silt loam, 3 to 7 percent slopes. Runoff is slow to medium and hazard of water erosion is slight to moderate.

Most areas of this unit are used for cropland. A few areas are used for hay and pastureland. This mapping unit is in capability subclass IIe.

For crop production, this unit is limited mainly by the moderate hazard of erosion. Erosion can be controlled and fertility maintained by using a suitable cropping system, crop residue management, minimum tillage and proper fertilization.

This unit is well suited to production of hay and pasture. It has few limitations. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition.

**Sy2** — Staley silt loam, 7 to 12 percent slopes. Runoff is medium, and hazard of water erosion is moderate.

**Sy3** — Staley silt loam, 7 to 12 percent slopes, eroded. Runoff is medium, and hazard of water erosion is moderate to high. Part of the surface soil has been removed by erosion. Some places have lime exposed at the surface.

**Sy4** — Staley silt loam, 12 to 25 percent slopes. Runoff is rapid and hazard of water erosion is high.

Most areas of these units are used for cropland. A few areas are used for hay and pastureland. These mapping units are in capability subclass IIIe.

For crop production, these units are limited mainly by the high hazard of erosion. Erosion can be controlled and fertility and tilth maintained by using a suitable cropping system, crop residue management, minimum tillage, cross-slope farming, divided-slope farming or stripcropping and proper fertilization.

These units are well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

These units are poorly suited to recreational development. They are limited mainly by slope.

**Sy5** — Staley silt loam 12 to 25 pecent slopes, eroded. Runoff is rapid, and hazard of water erosion is very high. Part of the surface layer has been removed by erosion. Many areas of this unit have lime exposed at the surface.

This unit is used mainly for cropland. It is also used for hay and pastureland. This mapping unit is in capability subclass IVe.

For crop production, this unit is limited mainly by the very high hazard of erosion. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes or grass-legume mixtures help to maintain fertility and tilth. Minimum tillage, cross-slope farming, divided slope farming or stripcropping and proper fertilization are also needed. The steeper areas may need to be seeded to permanent cover.

This unit is well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit to a few paths and trails, which should contour across the slope.

# Thatuna Series

The Thatuna series consists of very deep, moderately well-drained soils on upland positions. They formed in deep loess. The slopes range from 7 to 45 percent, usually occurring on a north or east aspect. The average annual soil temperature is about 49ºF. The north and east aspects usually result in higher average annual precipitation than is typical for the area and also result in a somewhat shorter growing season.

**Taxonomic Class:** Fine-silty, mixed, mesic Xeric Argialbolls.

**Typical Pedon:** Thatuna silt loam (65 Ida 2924) on a 9 percent north slope under cultivation; described by M. A. Fosberg on June 14, 1965.

**Type Location:** 230 feet south and 290 feet east of fence corner NW¼ NW¼, Sec. 15, T. 39N, R. 5W. (Colors for dry soil unless otherwise noted.)

**Ap** — 0 to 8 inches. Dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium and fine subangular blocky parting to moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine interstitial pores; slightly acid (pH 6.4); abrupt smooth boundary.

**A1** — 8 to 17 inches. Dark grayish brown (10YR 4/2) silty clay loam, black (10YR 2/1) moist; weak medium and fine subangular blocky parting to moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; neutral (pH 6.7); clear smooth boundary.

**A2** — 17 to 24 inches. Grayish brown (10YR 5/2) silt loam, very dark brown (10YR 2/2) moist; weak medium prismatic parting to weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine, few coarse tubular pores; neutral (pH 6.8); clear smooth boundary.

**A3** — 24 to 29 inches. Grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium prismatic parting to weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine, few coarse tubular pores; neutral (pH 6.7); clear smooth boundary.

**E1** — 29 to 33 inches. Light brownish gray (10YR 6/2) silt, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular and vesicular pores; neutral (pH 6.7); abrupt smooth boundary.

**E2** — 33 to 34 inches. Light gray (10YR 7/2) silt, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky; few very fine roots; common very fine tubular pores; neutral (pH 6.7); abrupt smooth boundary.

**Btb1** — 34 to 38 inches. Light brownish gray (10YR 6/2) silt loam, dark brown (10YR 4/3) moist; weak medium prismatic parting to moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and plastic; few very fine roots; common very fine tubular pores; many thick clay films on faces of peds; light gray (10YR 7/2) silt coatings on faces of peds; neutral (pH 6.9); clear smooth boundary.

**Btb2** — 38 to 51 inches. Pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; weak medium prismatic parting to moderate medium and fine angular blocky structure; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; many thick clay films on faces of peds; neutral (pH 6.8); clear smooth boundary.

**Btb3** — 51 to 61 inches. Pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; weak medium prismatic parting to moderate medium and fine angular blocky structure; hard, firm, sticky and plastic; few very fine tubular pores; many thick clay films on faces of peds; light gray (10YR 7/2) bleached silt coatings on faces of peds; neutral (pH 7.0); clear smooth boundary.

**Permeability:** slow (0.06 to 0.20 inches/hr).

**Available Water-holding Capacity:** high (9 to 12 inches).

**Effective Rooting Depth:** 60 inches or more.

**Water Table:** A water table is perched above the Btb horizons in the early spring. This water moves laterally down slope in these soils and contributes to mass slumping and soil slippage.

## Mapping Unit Descriptions

The property has four mapping units of the Thatuna series. They differ in steepness of slope. The Thatuna soils are generally on north- and east-facing slopes and on toeslope positions. They are found throughout the Agricultural Experiment Station. Included in mapping are small areas of Naff on convex positions and an unnamed soil similar to Thatuna with greater than 35 percent clay in the subsoil. (Runoff and erosion potentials based on bare or disturbed soil conditions.)

**Ta1** — Thatuna silt loam, 7 to 12 percent slopes. Runoff is medium, and hazard of water erosion is moderate.

**Ta2** — Thatuna silt loam, 12 to 25 percent slopes. Runoff is rapid, and hazard of water erosion is high.

Most areas of these units are used for cropland. A few areas are used for hay and pastureland. These mapping units are in capability subclass IIIe.

For crop production, these units are limited mainly by the high hazard of erosion and the seasonal perched water table. Erosion can be controlled and fertility and tilth maintained by using a suitable cropping system, crop residue management, minimum tillage, cross-slope farming, divided-slope farming or stripcropping and proper fertilization.

These units are well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion.

These units are poorly suited to recreational development. They are limited mainly by slope and perched water table.

**Ta3** — Thatuna silt loam, 25 to 35 percent slopes. Runoff is very rapid and hazard of water erosion is very high.

This unit is used mainly for cropland. It is also used for hay and pastureland and wildlife habitat. This mapping unit is in capability subclass IVe.

For crop production, this unit is limited mainly by the very high hazard of erosion and a hazard of soil slippage. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes or grass-legume mixtures help to maintain fertility and tilth. Minimum tillage, cross-slope farming, divided-slope farming or stripcropping and proper fertilization are also needed. The steeper areas may need to be seeded to permanent cover.

The hazard of soil slippage can be reduced by avoiding undercutting on toeslopes with tillage and by properly placing windbreaks to reduce snow drifting on the steeper slopes.

This unit is well suited to the production of hay and pasture. The main limitations are steepness of slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion. The addition of nitrogen and sulfur is essential, and phosphorus is also needed if legumes are grown.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should contour across the slope.

**Ta4** — Thatuna silt loam, 35 to 45 percent slopes. Runoff is very rapid, and hazard of water erosion is very high.

Most areas of this unit are used for hay and pastureland. This mapping unit is in capability subclass VIe.

This unit is very poorly suited to use as cropland because of the very high hazard of erosion. It should be maintained in permanent plant cover.

This unit is well suited to the production of hay and pasture. The main limitations are slope and the hazard of water erosion. Seedbed preparation should be on the contour or across the slope where practical. Proper stocking rates, pasture rotation and restricted grazing during wet periods help to keep the pasture in good condition and to protect the soil from erosion. The addition of nitrogen and sulfur is essential, and phosphorus is also needed if legumes are grown.

This unit is poorly suited to recreational development. Slope limits the use of areas of this unit mainly to a few paths and trails, which should be laid out across the slope.

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# Appendix I — Glossary of Terms

Many special terms are used in describing soils and explaining soil characteristics. In this section these special terms are defined to help the non-soil scientist better understand the information in this soil survey report.

**Alluvium:** Soil material, such as sand, silt or clay, that has been carried and deposited by moving water in streams.

**Available Water-holding Capacity:** The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. The capacity, in inches, in a 60-inch profile or to a limiting layer, is expressed as:

| Class | Inches water in profile |
|---|---|
| Very low | 0 to 3 |
| Low | 3 to 6 |
| Moderate | 6 to 9 |
| High | 9 to 12 |
| Very high | 12 or more |

**Drainage:** Soil drainage refers to the wetness condition that existed during the development of the soil and relates to the tendency for a soil to have a water table or other condition that will affect crop growth and production.

***Very poorly drained*** — Water is removed so slowly that the soil remains wet most of the time, water ponds on the surface frequently and the water table is at the surface most of the time.

***Poorly drained*** — Water is removed so slowly that the soil remains wet a large part of the time, and the water table is at or near the surface during a considerable part of the year.

***Somewhat poorly drained*** — Water is removed from the soil slowly enough to keep it wet for significant periods but not all the time.

***Moderately well-drained*** — Water is removed from the soil somewhat slowly, so that the soil is wet for a small but significant part of the time.

***Well-drained*** — Water is removed from the soil readily but not rapidly.

**Effective Rooting Depth:** The depth of soil favorable for plant growth and water retention. It represents the distance down to bedrock, hardpan or other restricting layer which limits the satisfactory extension of roots and movement of moisture.

**Erosion Hazard:** An estimate of the hazard for soil loss caused by runoff from soils when not protected by cover. The significance of soil loss is much greater on a shallow soil than on a deep soil.

| Erosion hazard class | Approximate soil loss per acre per year |
|---|---|
| None to slight . . . | Less than 2 tons from a shallow soil, less than 5 tons from a very deep soil. |
| Moderate . . . . . . . | From 2 to 8 tons from a shallow soil, 5 to 20 tons from a very deep soil. |
| High . . . . . . . . . . | From 8 to 20 tons from a shallow soil, 20 to 50 tons from a very deep soil. |
| Very high . . . . . . | More than 20 tons from a shallow soil or more than 50 tons from a very deep soil. |

**Horizon:** A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. The major soil horizons are:

***A Horizon*** — The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with mineral material. It is also a plowed surface horizon which had once been a B, C or E soil horizon.

***B Horizon*** — The mineral horizon that formed below an A, E or O horizon. It has (1) accumulated clay, iron, aluminum, humus, carbonates, gypsum or silica; (2) evidence of removal of carbonates; (3) redder or browner colors from coatings of oxides than overlying or underlying horizons; (4) granular, blocky or prismatic structure or (5) any combinations of these.

***C Horizon*** — Horizon or layer, excluding hard bedrock, that is little effected by soil-forming processes described in A, B or E horizons.

***E Horizon*** — A mineral horizon which has lost a significant amount of clay, iron or aluminum, leaving a concentration of sand and silt particles, mainly quartz.

Arabic numbers preceding the major horizons, starting with the number 2, indicate a significant change in particle-size distribution or mineralogy such as a difference in parent material. Where a soil has formed entirely in one kind of material, a prefix is omitted from the symbol; the whole profile is material 1.

Arabic numbers following the letters indicate a subdivision of a horizon.

Lower case letters are used as suffixes to designate specific kinds of master horizons or layers. The symbols are briefly described as follows:

b — buried genetic horizon

c — concretions or hard nonconcretionary nodules

g — strong gleying indicating either that iron has been reduced and removed during soil formation or that saturation with stagnant water has preserved a reduced state

k — accumulation of carbonates

m — cementation or induration

p — plowing or other disturbance

q — accumulation of silica

t — accumulation of clay

w — development of color or structure

x — fragipan character

**Loess:** Silty soil material that has been carried by the wind and deposited over the landscape.

**Pedon:** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet, depending on the variability of the soil.

**Permeability:** That quality of the soil that enables it to transmit water or air.

**Permeability ratings:**

| Class | Inches per hour |
|---|---|
| Very slow | less than 0.06 |
| Slow | 0.06 to 0.2 |
| Moderately slow | 0.2 to 0.6 |
| Moderate | 0.6 to 2.0 |

**Pores:** Portion of the soil occupied by air and water, determined largely by arrangement of solid particles. The shape of pores is described by three primary types:

***Vesicular*** — The pores are approximately spherical or elliptical in shape. Pores of this type are not continuous.

***Irregular (interstitial)*** — The pores are irregular in shape and are bounded by curved or angular surfaces of mineral grains or peds, or both.

***Tubular*** — The pores are more or less cylindrical in shape, roughly circular in cross section, and greatly elongated vertically.

**Runoff:** Water that is lost from the land where it falls without entering the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow. Estimates of runoff are based on surfaces without cover.

***Ponded*** — None of the water added to the soil as precipitation or by flow from surrounding higher land escapes as runoff.

***Very slow*** — Surface water flows away so slowly that free water lies on the surface for long periods or enters immediately into the soil.

***Slow*** — Surface water flows away so slowly that free water covers the soil for significant periods or enters the soil rapidly.

***Medium*** — Surface water flows away at such a rate that a moderate proportion of the water enters the soil and free water lies on the surface for only a short time.

***Rapid*** — A large proportion of water moves rapidly over the surface of the soil and a small amount goes through the soil.

***Very rapid*** — Most of the water moves rapidly over the surface of the soil and a very small amount goes through the soil.

**Slope:** The inclination of the land surface from the horizontal. Percent slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

**Soil Color:** Color can be accurately described by measuring its three principal properties — hue, value and chroma. Hue refers to the dominant color (red, yellow, blue, green, etc.). Value, sometimes called brilliance, refers to the total quantity of dark (black) to light (white) colors. Chroma is the relative purity of the color.

The Munsell notation of color is a systematic numerical and letter designation of each of the three variable properties of color. The three properties are always given in the order hue, value and chroma. For example, in the Munsell notation 10YR 6/4, 10YR is the hue, 6 is the value, and 4 is the chroma.

**Soil Texture:** The relative proportions of sand, silt and clay particles in a soil. The textural classes occurring in this soil survey, in order of increasing proportion of fine particles, are: **Loam**, **Silt Loam**, **Clay Loam**, **Silty Clay Loam** and **Silty Clay.**

**Soil Structure:** The combination or arrangement of primary soil particles into secondary particles, units or peds. These secondary units may be, but usually are not, arranged in the profile in such a manner as to give a distinctive characteristic pattern. The secondary units are characterized and classified on the basis of size, shape and degree of distinctness into classes, types and grades, respectively.

# Appendix II — Tables of Interpretations

The following section contains tables of interpretations giving ratings for each mapping unit. The tables list mapping units and soils and give interpretations for different uses. Limitations for uses of mapping units do not prevent specified uses, but serve to flag possible problems that will have to be overcome. Following the tables is a listing of criteria and definitions of terms used in the tables.

**Table A1. Yields of crops commonly produced in the area. Yields given are produced under a high level of management.[1]**

| Soil name and Map unit symbol | Wheat (bu) | Barley (bu) | Dry peas (lb) | Dry lentils (lb) | Grass-legume hay (ton) | Pasture (AUM) |
|---|---|---|---|---|---|---|
| **Athena** | | | | | | |
| At1, At2, At3 | 70 | 65 | 1,600 | - | 2 | 5 |
| **Cald** | | | | | | |
| Cd1, Cd2 | 80 | 75 | - | - | 3.5 | 8 |
| **Garfield** | | | | | | |
| Ga1, Ga2, Ga4, Ga5 | 40 | 30 | 500 | 250 | 1 | 3 |
| Ga3 | 35 | 25 | 450 | 200 | 1 | 2 |
| **Latah** | | | | | | |
| Lt1, Lt2 | 60 | 45 | 1,500 | 1,000 | 1.5 | 4 |
| **Latah-Cald** | | | | | | |
| Lt3, Lt4 | 60-80 | 45-75 | 1,500 | 1,000 | 1.5-3.5 | 4-8 |
| **Latahco** | | | | | | |
| Lo1, Lo2 | 70 | 50 | - | - | 2.5 | 6.0 |
| **Naff** | | | | | | |
| Nf1, Nf2, Nf3 | 65 | 50 | 1,440 | 840 | 1 | 4 |
| Nf4, Nf5 | 50 | 45 | 1,200 | 735 | 1 | 4 |
| **Palouse** | | | | | | |
| Pe1, Pe2, Pe3, Pe4, Pe5 | 70 | 65 | 1,800 | 1,200 | 2 | 5 |
| Pe6, Pe7, Pe8 | 60 | 55 | 1,400 | 800 | 1 | 3 |
| **Staley** | | | | | | |
| Sy1, Sy2, Sy3, Sy4 | 55 | 50 | - | - | 2 | 4 |
| Sy5 | 50 | 45 | - | - | 1.5 | 3 |
| **Thatuna** | | | | | | |
| Ta1, Ta2 | 80 | 60 | 1,800 | 1,300 | 2.5 | 6 |
| Ta3 | 50 | 45 | 1,200 | 735 | 1 | 5 |
| Ta4 | 35 | 25 | 800 | 500 | 1 | 3 |

[1]From Barker 1981.

**Table A2. Soil physical properties and features.**

| Soil name and Map symbol | Depth | Erosion factors: K-Factor | Erosion factors: T-Factor[1] | Available water capacity | Permeability | Potential frost[1] action | Risk of corrosion[1]: Uncoated steel | Risk of corrosion[1]: Concrete | Shrink-swell potential |
|---|---|---|---|---|---|---|---|---|---|
| | (inches) | | (ton/acre) | (inch/inch) | (inch/hr) | | | | |
| **Athena** | | | | | | | | | |
| At1, At3 | 0-55 | 0.32 | 5 | 0.19-0.21 | 0.6-2.0 | High | Moderate | Low | Low |
| | 55-80 | 0.49 | | 0.19-0.21 | 0.6-2.0 | | | | Low |
| | 80-130 | 0.55 | | 0.19-0.21 | 0.6-2.0 | | | | Low |
| At2 | 0-45 | 0.32 | 5 | 0.19-0.21 | 0.6-2.0 | | | | Low |
| | 45-80 | 0.49 | | 0.19-0.21 | 0.6-2.0 | | | | Low |
| | 80-130 | 0.55 | | 0.19-0.21 | 0.6-2.0 | | | | Low |
| **Cald** | | | | | | | | | |
| Cd1, Cd2 | 0-33 | 0.37 | 5 | 0.19-0.21 | 0.6-2.0 | High | High | Low | Low |
| | 33-65 | 0.32 | | 0.19-0.21 | 0.2-0.6 | | | | Moderate |
| **Garfield** | | | | | | | | | |
| Ga1, Ga2, Ga4, Ga5 | 0-8 | 0.32 | 5 | 0.17-0.20 | 0.2-0.6 | High | Moderate | Low | Low |
| | 8-22 | 0.43 | | 0.14-0.16 | 0.06-0.2 | | | | High |
| | 22-60 | 0.43 | | 0.18-0.21 | 0.2-0.6 | | | | Moderate |
| Ga3 | 0-14 | 0.43 | 5 | 0.14-0.16 | 0.06-0.2 | | | | High |
| | 14-60 | 0.43 | | 0.18-0.21 | 0.2-0.6 | | | | Moderate |
| **Latah** | | | | | | | | | |
| Lt1, Lt2 | 0-32 | 0.37 | 5 | 0.19-0.21 | 0.6-2.0 | High | Moderate | Low | Low |
| | 32-60 | 0.32 | | 0.14-0.16 | $<0.06$ | | | | High |
| **Latah-Cald** | | | | | | | | | |
| Lt3, Lt4 | | | | | | | | | |
| Latah | 0-32 | 0.37 | 5 | 0.19-0.21 | 0.6-2.0 | High | Moderate | Low | Low |
| | 32-60 | 0.32 | | 0.14-0.16 | $<0.06$ | | | | High |
| Cald | 0-33 | 0.37 | | 0.19-0.21 | 0.6-2.0 | High | High | Low | Low |
| | 33-65 | 0.32 | | 0.19-0.21 | 0.2-0.6 | | | | Moderate |
| **Latahco** | | | | | | | | | |
| Lo1, Lo2 | 0-28 | 0.32 | 5 | 0.19-0.21 | 0.6-2.0 | High | High | Low | Low |
| | 28-60 | 0.43 | | 0.19-0.21 | 0.2-0.6 | | | | Moderate |
| **Naff** | | | | | | | | | |
| Nf1, Nf2, Nf3, Nf4, Nf5 | 0-9 | 0.37 | 5 | 0.19-0.21 | 0.6-2.0 | | | | Moderate |
| | 9-60 | 0.32 | | 0.17-0.20 | 0.2-0.6 | High | Moderate | Low | Moderate |
| **Palouse** | | | | | | | | | |
| Pe1, Pe2, Pe3, Pe5, Pe7 | 0-15 | 0.32 | 5 | 0.19-0.21 | 0.6-2.0 | High | Moderate | Low | Low |
| | 15-60 | 0.43 | | 0.19-0.21 | 0.6-2.0 | | | | Moderate |
| Pe4, Pe6, Pe8 | 0-8 | 0.32 | 5 | 0.19-0.21 | 0.6-2.0 | | | | Low |
| | 8-60 | 0.43 | | 0.19-0.21 | 0.6-2.0 | High | Moderate | Low | Moderate |
| **Staley** | | | | | | | | | |
| Sy1, Sy2, Sy4 | 0-16 | 0.43 | 5 | 0.19-0.21 | 0.6-2.0 | High | High | Low | Low |
| | 16-72 | 0.43 | | 0.14-0.17 | 0.6-2.0 | | | | Low |
| Sy3, Sy5 | 0-10 | 0.43 | 5 | 0.14-0.17 | 0.6-2.0 | | | | Low |
| | 10-72 | 0.43 | | 0.14-0.17 | 0.6-2.0 | | | | Low |
| **Thatuna** | 0-29 | 0.32 | 5 | 0.19-0.21 | 0.6-2.0 | | | | Low |
| Ta1, Ta2, Ta3, Ta4 | 29-34 | 0.43 | | 0.19-0.21 | 0.6-2.0 | High | Moderate | Low | Low |
| | 34-68 | 0.55 | | 0.19-0.21 | 0.06-0.2 | | | | Moderate |

[1]Based on entire profile.

**Table A3. Engineering index properties.**

| Soil name and Map symbol | Depth (inches) | USDA texture | Classification | | Percentage passing sieve number — | | | Liquid limit | Plastic index |
|---|---|---|---|---|---|---|---|---|---|
| | | | Unified | AASHTO | 10 | 40 | 200 | | |
| **Athena** | | | | | | | | | |
| At1, At3 | 0-55 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-40 | NP-5 |
| | 55-80 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-40 | NP-10 |
| | 80-130 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-40 | NP-10 |
| At2 | 0-45 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-40 | NP-5 |
| | 45-80 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-40 | NP-10 |
| | 80-130 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-40 | NP-10 |
| **Cald** | | | | | | | | | |
| Cd1, Cd2 | 0-33 | silt loam | CL-ML | A-4 | 100 | 90-100 | 85-100 | 20-30 | 5-10 |
| | 33-85 | silt loam, silty clay loam | CL | A-6 | 100 | 90-100 | 85-100 | 30-40 | 10-15 |
| **Garfield** | | | | | | | | | |
| Ga1, Ga2, Ga4, Ga5 | 0-8 | silt loam | CL-ML,ML | A-4 | 100 | 95-100 | 90-100 | 25-35 | 5-10 |
| | 8-22 | silty clay loam, silty clay | CL,CH | A-7 | 100 | 95-100 | 90-100 | 40-55 | 20-30 |
| | 22-60 | silty clay loam, silt loam | ML | A-6 | 100 | 95-100 | 90-100 | 35-40 | 10-15 |
| Ga3 | 0-14 | silty clay loam, silty clay | CL,CH | A-7 | 100 | 95-100 | 90-100 | 40-55 | 20-30 |
| | 14-60 | silty clay loam, silt loam | ML | A-6 | 100 | 95-100 | 90-100 | 35-40 | 10-15 |
| **Latah** | | | | | | | | | |
| Lt1, Lt2 | 0-32 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-35 | NP-10 |
| | 32-60 | silty clay, silty clay loam, clay | CL,CH | A-7 | 100 | 95-100 | 90-100 | 45-55 | 20-30 |
| **Latah-Cald** | | | | | | | | | |
| Lt3, Lt4 | See Cald and Latah above | | | | | | | | |
| **Latahco** | | | | | | | | | |
| Lo1, Lo2 | 0-28 | silt loam | CL-ML,ML | A-4 | 100 | 95-100 | 90-100 | 20-30 | NP-10 |
| | 28-60 | silty clay loam, silt loam | CL,ML | A-6, A-7 | 100 | 95-100 | 90-100 | 35-45 | 10-20 |
| **Naff** | | | | | | | | | |
| Nf1, Nf2, Nf3, Nf4, Nf5 | 0-9 | silt loam | ML | A-4, A-6 | 100 | 95-100 | 90-100 | 25-40 | NP-15 |
| | 9-60 | silty clay loam, silt loam, silty clay | CL | A-6, A-7 | 100 | 95-100 | 90-100 | 20-50 | 15-35 |
| **Palouse** | | | | | | | | | |
| Pe1, Pe2, Pe3, Pe5, Pe7 | 0-15 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 30-40 | 5-10 |
| | 15-60 | silt loam, silty clay loam | ML | A-4, A-6 | 100 | 95-100 | 90-100 | 30-40 | 5-15 |
| Pe4, Pe6, Pe8 | 0-8 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 30-40 | 5-10 |
| | 8-60 | silt loam, silty clay loam | ML | A-4, A-6 | 100 | 95-100 | 90-100 | 30-40 | 5-15 |
| **Staley** | | | | | | | | | |
| Sy1, Sy2, Sy4 | 0-16 | silt loam | ML | A-4 | 100 | 90-100 | 80-90 | 20-40 | NP-10 |
| | 16-72 | silt loam | ML | A-4 | 100 | 90-100 | 80-90 | 20-40 | NP-15 |
| | 0-10 | silt loam | ML | A-4 | 100 | 90-100 | 80-90 | 20-40 | NP-10 |
| Sy3, Sy5 | 10-72 | silt loam | ML | A-4 | 100 | 90-100 | 80-90 | 20-40 | NP-15 |
| **Thatuna** | | | | | | | | | |
| Ta1, Ta2, Ta3, Ta4 | 0-29 | silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 25-35 | NP-5 |
| | 29-34 | silt, silt loam | ML | A-4 | 100 | 95-100 | 90-100 | 20-35 | NP-10 |
| | 34-66 | silty clay loam, silt loam | CL | A-6, A-7 | 100 | 95-100 | 90-100 | 35-45 | 15-20 |

**Table A4. Soil and water features.**

| Soil name | Flooding | | | High water table | | | Hydrologic group |
|---|---|---|---|---|---|---|---|
| | Frequency | Duration | Months | Depth | Type | Months | |
| | | | | (feet) | | | |
| Athena | None | - | - | >6.0 | - | - | B |
| Cald | Frequent | Brief | Dec-May | 0.5-1.5 | Apparent | Feb-Jun | C |
| Garfield | None | - | - | >6.0 | - | - | C |
| Latah | Occasional | Brief | Dec-Apr | 0.5-2.5 | Perched | Dec-Jun | C |
| Latahco | Occasional | Brief | Feb-Apr | 0.5-2.5 | Perched | Apr-May | C |
| Naff | None | - | - | >6.0 | - | - | B |
| Palouse | None | - | - | >6.0 | - | - | B |
| Staley | None | - | - | >6.0 | - | - | B |
| Thatuna | None | - | - | 3.0-4.0 | Perched | Feb-Apr | C |

Table A5. Soil use ratings for various agricultural and recreational uses.

| Soil name and Map symbol | Features affecting: Terraces and diversions | Features affecting: Grassed waterway | Features affecting: Drainage | Limitations for: Embankments, dikes and levees | Limitations for: Picnic areas | Limitations for: Playgrounds | Limitations for: Paths and trails | Limitations for: Local roads and streets |
|---|---|---|---|---|---|---|---|---|
| **Athena** | | | | | | | | |
| At1, At2 | erodes easily | erodes easily | deep to water, frost action | severe-piping | moderate-slope, dusty | moderate-dusty, slope | moderate-dusty dusty | severe-frost action |
| At3 | slope, erodes easily | slope, erodes easily | deep to water, slope, frost action | severe-piping | moderate-slope, dusty | moderate-dusty, slope | moderate dusty | severe-frost action |
| **Cald** | | | | | | | | |
| Cd1, Cd2 | wetness | wetness | floods, frost action | severe-piping, wetness | severe-wetness | severe-wetness, floods | severe-wetness | severe-wetness, floods |
| **Garfield** | | | | | | | | |
| Ga1, Ga2, Ga3, Ga4, Ga5 | slope, percs slowly | slope, percs slowly | deep to water, frost action, slope | moderate-hard to pack | severe-slope | severe-slope | moderate-slope, dusty, severe-slope (>25%) | severe-frost action, shrink-swell low strength |
| **Latah** | | | | | | | | |
| Lt1, Lt2 | erodes easily, wetness, percs slowly | wetness, erodes easily, percs slowly | percs slowly, floods, frost action | severe-wetness | severe-wetness | severe-wetness | severe-wetness, erodes easily | severe-wetness, floods, frost action |
| **Latah-Cald** | | | | | | | | |
| Lt3, Lt4 | | | | | | | | |
| Latah | erodes easily, percs slowly | wetness, erodes easily, percs slowly | percs slowly, floods, frost action | severe-wetness | severe-wetness | severe-wetness | severe-wetness, erodes easily | severe-wetness, floods, frost action |
| Cald | wetness | wetness | deep to water, frost action, slopes | severe-piping, wetness | severe-wetness | severe-wetness, floods | severe-wetness | severe-wetness, floods |
| **Latahco** | | | | | | | | |
| Lo1, Lo2 | wetness | wetness | floods, frost action | severe-thin layer, wetness | severe-wetness | severe-wetness | severe-wetness | severe-low strength, wetness floods |
| **Naff** | | | | | | | | |
| Nf1, Nf2, Nf3, Nf4, Nf5 | slope, erodes easily | slope, erodes easily | deep to water, frost action | slight | severe-slope | severe-slope | severe-erodes easily, slope (>25%) | severe-low strength, slope >15%), frost action |

Table A5. (cont'd)

| Soil name and Map symbol | Features affecting: Terraces and diversions | Grassed waterway | Drainage | Limitations for: Embankments, dikes and levees | Picnic areas | Playgrounds | Paths and trails | Local roads and streets |
|---|---|---|---|---|---|---|---|---|
| **Palouse** | | | | | | | | |
| Pe1, Pe2 | erodes easily | erodes easily | deep to water, frost action | severe-piping | moderate-dusty | moderate-slope, dusty | moderate-dusty | severe-low strength, frost action |
| Pe3, Pe4, Pe5, Pe6, Pe7, Pe8 | slope, erodes easily | slope, erodes easily | deep to water, slope, frost action | severe-piping | severe-slope | severe-slope | moderate-slope dusty, severe-slope (>25%) | severe-slope (>15%), low strength, frost action |
| **Staley** | | | | | | | | |
| Sy1 | erodes easily | erodes easily | deep to water, slope, frost action | severe-piping | moderate-dusty | moderate-dusty | moderate-dusty, slope | severe-frost action |
| Sy2, Sy3, Sy4, Sy5 | slope, erodes easily | slope, erodes easily | slope, deep to water, frost action | severe-piping | severe-slope | severe-slope | severe-slope (>25%) | severe-slope(>15%) frost action |
| **Thatuna** | | | | | | | | |
| Ta1, Ta2, Ta3, Ta4 | slope, erodes easily | slope, erodes easily | percs slowly, frost action, slope | moderate-piping | moderate-slope, dusty severe-slope (>25%) | severe-slope | moderate-slope, dusty severe-slope (>25%) | severe-slope (>15%), frost action erodes easily |

**Table A6. Wildlife habitat suitability.**

| Soil names and Map symbol | Grain and seed | Grass and legume | Herb | Wild shrubs | Wetland plants | Shallow water areas | Potential habitat for: Openland wildlife | Wetland wildlife | Rangeland wildlife |
|---|---|---|---|---|---|---|---|---|---|
| **Athena** | | | | | | | | | |
| At1, At2 | Good | Good | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| At3 | Fair | Good | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| **Cald** | | | | | | | | | |
| Cd1, Cd2 | Poor | Fair | Good | Good | Good | Good | Fair | Good | Good |
| **Garfield** | | | | | | | | | |
| Ga1, Ga2, Ga3, Ga4 | Fair | Good | Fair | Fair | Very poor | Very poor | Fair | Very poor | Fair |
| Ga5 | Poor | Fair | Fair | Fair | Very poor | Very poor | Fair | Very poor | Fair |
| **Latah** | | | | | | | | | |
| Lt1, Lt2 | Fair | Good | Good | Good | Good | Good | Good | Good | Good |
| **Latah-Cald** | | | | | | | | | |
| Lt3, Lt4 | | | | | | | | | |
| Latah | Fair | Good | Good | Good | Good | Good | Good | Good | Good |
| Cald | Poor | Fair | Good | Good | Good | Good | Fair | Good | Good |
| **Latahco** | | | | | | | | | |
| Lo1, Lo2 | Fair | Fair | Good | Good | Good | Good | Fair | Good | Good |
| **Naff** | | | | | | | | | |
| Nf1 | Good | Good | Good | Good | Poor | Very poor | Good | Very poor | Good |
| Nf2, Nf3, Nf4, Nf5 | Fair | Good | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| **Palouse** | | | | | | | | | |
| Pe1, Pe2 | Good | Good | Good | Good | Poor | Very poor | Good | Very poor | Good |
| Pe3, Pe4, Pe5, Pe6 | Fair | Good | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| Pe7 | Poor | Fair | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| Pe8 | Poor | Fair | Good | Good | Very poor | Very poor | Fair | Very poor | Good |
| **Staley** | | | | | | | | | |
| Sy1, Sy2, Sy3, Sy4, Sy5 | Fair | Good | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| **Thatuna** | | | | | | | | | |
| Ta1, Ta2 | Fair | Good | Good | Good | Very poor | Very poor | Good | Very poor | Good |
| Ta3 | Fair | Fair | Good | Good | Very poor | Very poor | Fair | Very poor | Good |
| Ta4 | Poor | Fair | Good | Good | Very poor | Very poor | Fair | Very poor | Good |

# Criteria and Definitions for Interpretative Tables

## Definitions of Ratings

**Slight or Good:** These ratings are given to soils having properties favorable for the specified use. The degree of limitation is minor and can easily be overcome.

**Moderate or Fair:** These ratings are given to soils having limitations for the specified use. The degree of limitation can be overcome or modified by special planning, design or maintenance. During some part of the year these mapping units have more limitations than those rated slight or good. Some units given these ratings may require artificial drainage, runoff control, extended sewage absorption fields, extra excavation or other modifications. Structural modification may be needed such as special foundations, extra reinforcement, etc.

**Severe or Poor:** These ratings are given to soils having properties unfavorable for given use. Limitations include steep slopes, high shrink-swell potential, a seasonal high water table or low bearing strength. Generally require soil reclamation, special design or intensive maintenance. Some uses can be adapted by reducing or removing the soil feature that limits the use, but in most situations, overcoming or compensating for the limitations is difficult and costly.

## Definition of Physical Properties and Features

**Erosion K Factor:** This factor (Table A2) indicates the susceptibility of a soil to sheet and rill erosion by water. The K factor is one of six components used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss (tons/acre/year) by sheet and rill erosion. The estimates are based primarily on percentage of silt, sand and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69, but for soils in this survey area they range from 0.32 to 0.55. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

| **Hazard** | **K value** |
|---|---|
| Low | less than 0.22 |
| Medium | 0.22 to 0.40 |
| High | more than 0.40 |

**T Factor:** The T factor is the soil loss tolerance. This is the maximum rate of soil erosion that will indefinitely permit a sustained, economic and high level of crop productivity. Permissible loss values for the soils of this area are 5 tons per acre.

**Potential Frost Action:** These ratings (Table A2) evaluate the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, permeability, content of organic matter and depth to the water table are the most important factors considered in evaluating the potential for frost action. The evaluations assume that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured clayey soils that have a high water table in winter are most susceptible to frost action. Frost heave and low soil strength during thawing cause damage mainly to pavements and other rigid structures.

**Risk of Corrosion:** These ratings (Table A2) evaluate the potential soil-induced electrochemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, soil texture, acidity and electrical conductivity of the soil. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer. Risk of corrosion for uncoated steel is evaluated as **Low**, **Moderate** or **High**.

The rate of corrosion of concrete is based mainly on the soil's sulfate and sodium content, soil texture, soil moisture content and soil acidity. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. Risk of corrosion for concrete is also evaluated as **Low**, **Moderate** or **High.**

**Shrink-Swell Potential:** These ratings (Table A2) evaluate the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling in undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to high, shrinking and swelling can cause damage to buildings, roads and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are: **Low**, a change of less than 3 percent; **Moderate**, a 3 to 6 percent change; and **High**, more than 6 percent.

## Definitions of Terms Of Soil Properties

**Available Water-holding Capacity:** The capacity of soils to hold water in a form available to plants. It is the amount of water held in the soil between field capacity and the wilting point of plants. Also termed available moisture capacity. Field capacity is the moisture content of a soil after the gravitational or free water has been allowed to drain away after irrigation or a long, soaking rain. The wilting point is the moisture content of the soil at which plants wilt as they cannot obtain needed water.

Available water-holding capacity rating (Table A2) is the available water held by a soil. The data in the table is given as the amount of available water per inch of soil. To calculate the available water in a profile, multiply by the depth (in inches) of the soil profile to a maximum of 60 inches or to a limiting layer. The categories used in soil descriptions are expressed as:

| **Category** | **Inches water in profile** |
|---|---|
| Very low | less than 3 inches |
| Low | 3 to 6 inches |
| Moderate | 6 to 9 inches |
| High | more than 9 inches |

**Engineering Classification:** Engineering classes of soils (Table A3) are determined according to the Unified Soil Classification System and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (Barker 1981). The USCS classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit and organic matter content. Silty and clayey soils are identified as ML, CL, OL, MH, CH and OH. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit and plasticity index.

## Definitions of Hydrologic Groups

**Hydrologic Groups:** These groups (Table A4) are used to estimate runoff from precipitation. Ratings are assigned to one of two groups which are based on unprotected soil surfaces. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms. The four hydrological groups are:

***Group B*** — Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well-drained or well-drained soils that have moderately fine to moderately coarse texture. These soils have a moderate rate of water transmission.

***Group C*** — Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine or fine texture. These soils have a slow rate of water transmission.

## Definitions of Soil Limitations

Soil uses (Table A5) are limited by various soil characteristics. The severity of the limitations depends on the soil characteristic and intended use.

**Deep to Water:** Deep to permanent water during dry season.

**Dusty:** Soil particles detach easily and cause dust.

**Erodes Easily:** Water erodes soil easily.

**Floods:** Soil flooded by moving water from stream overflow or runoff.

**Frost Action:** Freezing and thawing may damage structures.

**Low Strength:** The soil has inadequate strength to support loads. It also refers to the effect of water on the consistency of soil material. For example, as the moisture content of a clayey soil increases from a dry state, the material changes from a semisolid to a plastic state. As the moisture content further increases, the material changes from plastic to liquid. The point at which the soil material liquifies with increased wetting is influenced by weight of structures placed on it.

**Percs Slowly:** Water percolates or moves through the soil slowly, affecting the specified use.

**Piping:** The soil is susceptible to the formation of tunnels or pipe-like cavities formed by moving water.

**Shrink-Swell:** The soil expands on wetting and shrinks on drying, which may cause damage to roads, dams, building foundations or other structures.

**Slope:** Slope too great. Soils as they occur on the land have varying slopes. Some soils are nearly level; some have moderate slopes; others are mostly very steep. Since the degree of slope commonly has a large influence on the management of the soils, many soils are divided into several slope groups for convenience when being interpreted for their many uses. Other slope characteristics, such as shape, length and pattern, are important considerations but onsite investigations are necessary to assess fully the effects of these characteristics. Soil slope is normally measured with a hand level and expressed in terms of percentage — the difference in elevation in feet for each 100 feet horizontal. Thus, a soil slope of 45 degrees is 100 percent since the difference in elevation of two points 100 feet apart horizontally is 100 feet.

**Wetness:** Soil wet during period of use. This may also be the result of perched water tables.

# Appendix III —
# Tables of Physical and Chemical Analyses

Physical and chemical laboratory analyses of soil profiles are provided in the following tables to give a better understanding of the different soils. Some of the profiles were taken from the University of Idaho Agricultural Experiment Station lands, but similar profiles from sites adjacent to Moscow were used in some cases since not every soil was sampled on the University land.

**Table A7. Particle size distribution of Athena series (59 Ida 2915).**

| Horizon | Depth | Very coarse sand | Coarse sand | Medium sand | Fine sand | Very fine sand | Total sand | Total silt | Total clay | Textural class |
|---|---|---|---|---|---|---|---|---|---|---|
| | | (mm) | | | | | | | | |
| | | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (inches) | (%) | | | | | | | | |
| Ap | 0 to 9 | 0.12 | 0.3 | 0.4 | 1.3 | 7.2 | 9.3 | 71 | 20.1 | Silt loam |
| AB | 9 to 25 | 0.04 | 0.1 | 0.1 | 0.9 | 6.0 | 7.1 | 69 | 23.9 | Silt loam |
| Bw1 | 25 to 43 | 0.04 | 0.1 | 0.1 | 0.6 | 4.5 | 5.4 | 78 | 16.8 | Silt loam |
| Bw2 | 43 to 55 | 0.05 | 0.7 | 0.6 | 1.6 | 8.9 | 11.7 | 84 | 4.3 | Silt loam |
| Bk1 | 55 to 80 | 0.22 | 2.3 | 2.4 | 2.4 | 5.8 | 13.2 | 79 | 7.9 | Silt loam |
| Bk2 | 80 to 100 | 0.11 | 0.1 | 0.6 | 2.0 | 8.6 | 11.4 | 83 | 5.3 | Silt |
| C | 100 to 130 | 0.06 | 0.1 | 0.6 | 0.4 | 0.6 | 5.3 | 74 | 20.6 | Silt loam |

**Table A8a. Chemical properties of Cald series (77 Ida 2975).**

| Horizon | Depth | pH paste | ECX10³ | PW at saturation |
|---|---|---|---|---|
| | (inches) | | (mmhos/cm) | (%) |
| Ap | 0 to 7 | 5.9 | 0.4 | 49 |
| A1 | 7 to 10 | 5.7 | 0.4 | 49 |
| A2 | 10 to 18 | 5.9 | 0.4 | 50 |
| A3 | 18 to 25 | 5.7 | 0.3 | 49 |
| BA | 25 to 33 | 6.0 | 0.2 | 45 |
| Cg1 | 33 to 39 | 5.7 | 0.3 | 44 |
| Cg2 | 39 to 46 | 5.9 | 0.2 | 44 |
| Cg3 | 46 to 59 | 6.0 | 0.2 | 44 |
| C | 59 to 65 | 6.1 | 0.4 | 43 |

**Table A8b. Chemical properties of Cald Series (77 Ida 2975).**

| Horizon | Exchangeable ions | | | | Ext. acidity | | Base saturation | OM | C | N | C:N ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ca | Mg | Na | K | H | CEC | | | | | |
| | (meq/100 gms) | | | | | | (%) | | | | |
| Ap | 8.5 | 2.0 | 0.2 | 2.1 | 10.5 | 22.9 | 54.8 | 4.9 | 2.8 | 0.25 | 11.3 |
| A1 | 8.0 | 1.5 | 0.2 | 1.8 | 11.2 | 24.6 | 50.7 | 4.3 | 2.5 | 0.22 | 10.6 |
| A2 | 9.3 | 2.0 | 0.3 | 2.0 | 7.5 | 24.3 | 64.1 | 4.5 | 2.6 | 0.20 | 12.6 |
| A3 | 8.0 | 1.8 | 0.3 | 0.5 | 8.3 | 22.8 | 57.3 | 2.6 | 1.5 | 0.15 | 10.0 |
| BA | 7.5 | 2.3 | 0.2 | 0.9 | 6.5 | 19.5 | 62.6 | 1.6 | 0.9 | 0.11 | 8.4 |
| Cg1 | 6.5 | 2.3 | 0.3 | 0.8 | 6.3 | 18.6 | 61.1 | 1.4 | 0.8 | 0.09 | 9.1 |
| Cg2 | 6.0 | 2.3 | 0.3 | 0.6 | 5.3 | 16.1 | 63.0 | 0.7 | 0.4 | 0.06 | 6.9 |
| Cg3 | 7.0 | 3.0 | 0.3 | 0.5 | 4.9 | 19.6 | 68.8 | 0.5 | 0.3 | 0.05 | 6.0 |
| C | 8.8 | 4.5 | 0.3 | 0.5 | 4.2 | 21.6 | 77.0 | 0.3 | 0.2 | 0.03 | 5.8 |

Table A9. Physical properties of Cald series (77 Ida 2975).

| Horizon | Very coarse sand | Coarse sand | Medium sand | Fine sand | Very fine sand | Total sand | Total silt | Total clay | Textural class |
|---|---|---|---|---|---|---|---|---|---|
| | (mm) | | | | | | | | |
| | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (%) | | | | | | | | |
| Ap | 0.10 | 0.2 | 0.2 | 1.0 | 4.5 | 5.8 | 71 | 23.1 | silt loam |
| A1 | 0.08 | 0.2 | 0.1 | 0.7 | 3.1 | 4.2 | 70 | 25.9 | silt loam |
| A2 | 0.06 | 0.2 | 0.1 | 0.7 | 4.8 | 5.9 | 68 | 25.8 | silt loam |
| A3 | 0.10 | 0.1 | 0.1 | 0.7 | 5.3 | 6.4 | 68 | 25.8 | silt loam |
| BA | 0.09 | 0.3 | 0.1 | 0.8 | 4.9 | 6.2 | 70 | 24.2 | silt loam |
| Cg1 | 0.08 | 0.2 | 0.1 | 0.7 | 5.5 | 6.3 | 68 | 23.2 | silt loam |
| Cg2 | 0.10 | 0.3 | 0.2 | 0.8 | 5.2 | 6.5 | 73 | 20.5 | silt loam |
| Cg3 | 0.20 | 0.3 | 0.1 | 0.5 | 4.5 | 5.6 | 71 | 23.3 | silt loam |
| C | 0.23 | 0.4 | 0.2 | 0.5 | 4.3 | 5.5 | 70 | 24.2 | silt loam |

| Horizon | Bulk density | Water content ⅓ bar | 1 bar | 5 bar | 15 bar | Liquid limit | Plastic limit | Plastic index |
|---|---|---|---|---|---|---|---|---|
| | (g/cc) | (%) | | | | | | |
| Ap | 1.27 | 32 | 23 | 15.5 | 15.1 | 35.1 | 29.9 | 5 |
| A1 | 1.48 | 35 | 26 | 17.9 | 17.0 | 35.8 | 27.7 | 8 |
| A2 | 1.34 | 35 | 25 | 17.2 | 16.9 | 36.7 | 29.7 | 7 |
| A3 | 1.34 | 34 | 25 | 16.0 | 15.8 | 35.2 | 28.5 | 7 |
| AB | 1.41 | 33 | 24 | 15.0 | 14.4 | 32.4 | 23.6 | 9 |
| Cg1 | 1.44 | 33 | 23 | 14.6 | 14.1 | 31.5 | 25.3 | 6 |
| Cg2 | 1.49 | 32 | 21 | 13.2 | 12.4 | 28.2 | 20.5 | 8 |
| Cg3 | 1.75 | 34 | 25 | 15.8 | 15.4 | 31.3 | 20.1 | 11 |
| C | 1.81 | 35 | 26 | 16.8 | 16.1 | 31.5 | 20.5 | 11 |

Table A10a. Chemical properties of Latahco series (77 Ida 2978).

| Horizon | Depth | pH paste | ECX10³ | PW at saturation |
|---|---|---|---|---|
| | (inches) | | (mmhos/cm) | (%) |
| Ap | 0 to 8 | 6.0 | 1.1 | 48 |
| AB | 8 to 14 | 6.2 | 0.2 | 48 |
| Bw | 14 to 20 | 6.2 | 0.2 | 56 |
| Ec1 | 20 to 24 | 6.4 | 0.1 | 40 |
| Ec2 | 24-28 | 6.5 | 0.2 | 31 |
| Btcb1 | 28-36 | 6.3 | 0.2 | 46 |
| Btcb2 | 36-46 | 6.4 | 0.2 | 48 |
| Btcb3 | 46-70 | 6.3 | 0.2 | 48 |

Table A10b. Chemical properties of Latahco series (77 Ida 2978).

| Horizon | Exchangeable ions | | | | Ext. acidity | | Base saturation | OM | C | N | C:N ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ca | Mg | Na | K | H | CEC | | | | | |
| | (meq/100 gms) | | | | | | (%) | | | | |
| Ap | 8.0 | 2.0 | 0.3 | 0.7 | 5.8 | 19.1 | 65.4 | 3.2 | 1.9 | 0.16 | 11.8 |
| AB | 8.0 | 2.5 | 0.5 | 0.5 | 5.0 | 20.3 | 69.6 | 1.8 | 0.1 | 0.10 | 11.0 |
| Bw | 8.8 | 3.3 | 0.6 | 0.6 | 5.7 | 27.7 | 69.8 | 1.4 | 0.8 | 0.08 | 10.7 |
| Ec1 | 4.8 | 1.5 | 0.4 | 0.4 | 3.0 | 14.3 | 70.3 | 0.8 | 0.5 | 0.05 | 10.2 |
| Ec2 | 5.3 | 1.5 | 0.4 | 0.2 | 2.1 | 10.5 | 78.2 | 0.6 | 0.3 | 0.03 | 10.3 |
| Btcb1 | 8.8 | 4.0 | 0.8 | 0.4 | 4.7 | 29.6 | 75.0 | 0.7 | 0.4 | 0.04 | 9.3 |
| Btcb2 | 10.8 | 4.5 | 0.9 | 0.3 | 4.7 | 30.5 | 77.7 | 0.4 | 0.2 | 0.03 | 6.8 |
| Btcb3 | 10.8 | 4.5 | 0.9 | 0.3 | 4.0 | 28.2 | 80.4 | 0.3 | 0.2 | 0.03 | 6.7 |

Table A11. Soil physical properties of Latahco series (77 Ida 2978).

| Horizon | Very coarse sand | Coarse sand | Medium sand | Fine sand | Very fine sand | Total sand | Total silt | Total clay | Textural class |
|---|---|---|---|---|---|---|---|---|---|
| | (mm) | | | | | | | | |
| | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (%) | | | | | | | | |
| AP | 0.1 | 0.3 | 0.1 | 0.9 | 5.6 | 7.0 | 75 | 18.5 | silt loam |
| AB | 0.2 | 0.3 | 0.1 | 0.8 | 4.7 | 6.0 | 69 | 24.2 | silt loam |
| Bw | 0.2 | 0.2 | 0.1 | 0.3 | 5.9 | 7.3 | 67 | 26.0 | silt loam |
| Ec1 | 0.6 | 0.7 | 0.4 | 1.0 | 3.8 | 6.4 | 80 | 14.0 | silt loam |
| Ec2 | 0.3 | 0.6 | 0.3 | 1.1 | 4.1 | 6.5 | 84 | 9.5 | silt |
| Btcb1 | 0.2 | 0.3 | 0.2 | 0.8 | 3.7 | 5.2 | 63 | 32.1 | silty clay loam |
| Btcb2 | 0.1 | 0.3 | 0.2 | 0.5 | 2.3 | 3.5 | 64 | 32.1 | silty clay loam |
| Btcb3 | 0.3 | 0.3 | 0.2 | 0.5 | 4.2 | 5.4 | 63 | 31.1 | silty clay loam |

| Horizon | Bulk density | Water content ⅓ bar | Water content 1 bar | Water content 5 bar | Liquid limit | Plastic limit | Plastic index |
|---|---|---|---|---|---|---|---|
| | (g/cc) | (%) | | | | | |
| Ap | 1.43 | 32 | 22 | 15 | 32.8 | 27.0 | 6 |
| AB | 1.42 | 36 | 29 | 20 | 36.2 | 28.2 | 8 |
| Bw | 1.41 | 38 | 32 | 23 | 42.6 | 35.1 | 8 |
| Ec1 | 1.59 | 30 | 21 | - | - | - | - |
| Ec2 | 1.67 | 27 | 17 | - | - | - | - |
| Btcb1 | 1.78 | 38 | 32 | 23 | 37.3 | 25.1 | 12 |
| Btcb2 | 1.79 | 40 | 32 | 23 | 38.1 | 28.2 | 10 |
| Btcb3 | 1.83 | 39 | 32 | 23 | 39.0 | 25.1 | 14 |

Table A12a. Chemical properties of Naff series (77 Ida 2977).

| Horizon | Depth | pH paste | ECX10³ | PW at saturation |
|---|---|---|---|---|
| | (inches) | | (mmhos/cm) | (%) |
| Ap | 0 to 5 | 6.3 | 0.2 | 49 |
| A | 5 to 9 | 6.0 | 0.2 | 46 |
| Bt1 | 9 to 13 | 6.0 | 0.2 | 45 |
| Bt2 | 13 to 19 | 6.0 | 0.2 | 46 |
| Bt3 | 19 to 26 | 6.1 | 0.2 | 47 |
| Bt4 | 26 to 40 | 6.2 | 0.2 | 44 |
| Bt5 | 40 to 50 | 6.3 | 0.1 | 48 |
| Bt6 | 50 to 60 | 6.2 | 0.2 | 42 |

Table A12b. Chemical properties of Naff series (77 Ida 2977).

| Horizon | Exchangeable ions | | | | Ext. acidity | | Base saturation | OM | C | N | C:N ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ca | Mg | Na | K | H | CEC | | | | | |
| | (meq/100 gms) | | | | | | (%) | | | | |
| Ap | 8.0 | 4.5 | 0.1 | 0.6 | 6.5 | 20.7 | 68.6 | 3.9 | 2.3 | 0.19 | 12.0 |
| A | 8.2 | 2.8 | 0.1 | 0.5 | 6.9 | 22.9 | 60.8 | 3.0 | 1.8 | 0.16 | 11.1 |
| Bt1 | 8.5 | 2.8 | 0.2 | 0.5 | 6.5 | 23.4 | 64.4 | 2.0 | 1.2 | 0.11 | 10.6 |
| Bt2 | 8.5 | 3.0 | 0.2 | 0.4 | 6.2 | 23.1 | 66.3 | 1.5 | 0.9 | 0.09 | 9.7 |
| Bt3 | 8.8 | 7.0 | 0.3 | 0.3 | 5.5 | 24.1 | 74.7 | 0.9 | 0.5 | 0.07 | 8.0 |
| Bt4 | 8.0 | 3.8 | 0.3 | 0.3 | 4.3 | 24.1 | 74.2 | 0.7 | 0.4 | 0.05 | 7.6 |
| Bt5 | 7.5 | 3.5 | 0.3 | 0.3 | 4.6 | 22.3 | 71.8 | 0.5 | 0.3 | 0.05 | 5.8 |
| Bt6 | 8.0 | 3.5 | 0.3 | 0.3 | 3.6 | 20.4 | 77.2 | 0.3 | 0.2 | 0.04 | 4.6 |

Table A13. Physical properties of Naff series (77 Ida 2977).

| Horizon | Very coarse sand | Coarse sand | Medium sand | Fine sand | Very fine sand | Total sand | Total silt | Total clay | Textural class |
|---|---|---|---|---|---|---|---|---|---|
| | (mm) | | | | | | | | |
| | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (%) | | | | | | | | |
| Ap | 0.23 | 0.2 | 0.1 | 0.8 | 5.2 | 6.6 | 69.5 | 23.9 | silt loam |
| A | 0.06 | 0.2 | 0.1 | 0.6 | 7.1 | 8.1 | 67.0 | 24.9 | silt loam |
| Bt1 | 0.07 | 0.1 | 0.1 | 0.5 | 4.2 | 5.0 | 65.4 | 29.6 | silty clay loam |
| Bt2 | 0.13 | 0.1 | 0.1 | 0.5 | 4.5 | 5.3 | 67.1 | 28.7 | silty clay loam |
| Bt3 | 0.14 | 0.1 | 0.1 | 0.4 | 4.4 | 5.1 | 65.1 | 29.7 | silty clay loam |
| Bt4 | 0.14 | 0.2 | 0.1 | 0.3 | 2.4 | 3.1 | 66.3 | 30.6 | silty clay loam |
| Bt5 | 0.18 | 0.3 | 0.2 | 0.5 | 4.7 | 5.9 | 64.3 | 29.9 | silty clay loam |
| Bt6 | 0.12 | 0.3 | 0.2 | 0.6 | 1.8 | 3.0 | 71.6 | 25.4 | silt loam |

| Horizon | Bulk density | Water content | | | | Liquid limit | Plastic limit | Plastic index |
|---|---|---|---|---|---|---|---|---|
| | | ⅓ bar | 1 bar | 5 bar | 15 bar | | | |
| | (g/cc) | (%) | | | | | | |
| Ap | 1.42 | 30 | 23 | 17.7 | 15.0 | 33.7 | 24.3 | 9 |
| A | 1.55 | 32 | 22 | 18.0 | 16.3 | 32.8 | 21.8 | 11 |
| Bt1 | 1.58 | 33 | 25 | 20.1 | 16.8 | 33.6 | 20.0 | 17 |
| Bt2 | 1.73 | 34 | 27 | 20.6 | 18.7 | 35.6 | 21.0 | 15 |
| Bt3 | 1.66 | 33 | 29 | 21.0 | 19.3 | 35.7 | 21.8 | 14 |
| Bt4 | 1.84 | 33 | 28 | 21.2 | 19.1 | 35.7 | 20.8 | 15 |
| Bt5 | 1.72 | 35 | 29 | 21.4 | 19.2 | 33.9 | 21.6 | 12 |
| Bt6 | 1.76 | 33 | 25 | 18.6 | 19.3 | 31.9 | 20.3 | 12 |

**Table A14a. Chemical properties of Palouse series (77 Ida 2979).**

| Horizon | Depth | pH paste | ECX10³ | PW at saturation |
|---|---|---|---|---|
| | (inches) | | (mmhos/cm) | (%) |
| Ap1 | 0 to 7 | 5.6 | 0.5 | 42 |
| Ap2 | 7 to 9 | 5.7 | 0.4 | 42 |
| A | 9 to 15 | 5.9 | 0.4 | 46 |
| AB | 15 to 25 | 6.0 | 0.5 | 45 |
| Bw1 | 25 to 33 | 6.1 | 0.3 | 44 |
| Bw2 | 33 to 43 | 6.3 | 0.2 | 41 |
| Bt | 43 to 52 | 6.2 | 0.2 | 44 |
| Btb | 52 to 62 | 6.1 | 0.2 | 46 |

**Table A14b. Chemical properties of Palouse series (77 Ida 2979).**

| Horizon | Exchangeable ions | | | | Ext. acidity | | Base saturation | OM | C | N | C:N ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ca | Mg | Na | K | H | CEC | | | | | |
| | (meq/100 gms) | | | | | | (%) | | | | |
| Ap1 | 6.0 | 1.3 | 0.4 | 0.9 | 7.8 | 19.6 | 52.2 | 3.4 | 2.0 | 0.16 | 12.3 |
| Ap2 | 8.5 | 1.5 | 0.2 | 1.1 | 7.5 | 20.5 | 60.0 | 3.1 | 1.8 | 0.15 | 11.9 |
| A | 8.0 | 1.8 | 0.2 | 0.9 | 6.0 | 20.4 | 64.4 | 2.4 | 1.4 | 0.12 | 11.4 |
| AB | 8.0 | 2.0 | 0.3 | 0.8 | 5.0 | 20.9 | 66.8 | 1.9 | 1.1 | 0.11 | 10.3 |
| Bw1 | 7.0 | 2.0 | 0.2 | 0.7 | 4.8 | 18.9 | 67.1 | 1.7 | 1.0 | 0.09 | 10.4 |
| Bw2 | 6.5 | 2.3 | 0.2 | 0.5 | 3.7 | 19.8 | 71.8 | 0.7 | 0.4 | 0.05 | 8.0 |
| Bt | 8.8 | 4.0 | 0.2 | 0.4 | 4.2 | 22.5 | 76.1 | 0.5 | 0.3 | 0.04 | 7.4 |
| Btb | 9.3 | 4.5 | 0.3 | 0.4 | 4.7 | 24.9 | 75.3 | 0.5 | 0.3 | 0.04 | 6.6 |

Table A15. Physical properties of Palouse series (77 Ida 2979).

| Horizon | Very coarse sand | Coarse sand | Medium sand | Fine sand | Very fine sand | Total sand | Total silt | Total clay | Textural class |
|---|---|---|---|---|---|---|---|---|---|
| | (mm) | | | | | | | | |
| | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (%) | | | | | | | | |
| Ap1 | 0.14 | 0.3 | 0.2 | 0.9 | 5.0 | 6.5 | 71.0 | 22.5 | silt loam |
| Ap2 | 0.17 | 0.2 | 0.1 | 0.7 | 4.8 | 6.0 | 68.5 | 25.5 | silt loam |
| A | 0.18 | 0.2 | 0.1 | 0.7 | 4.2 | 5.4 | 68.1 | 26.5 | silt loam |
| AB | 0.04 | 0.2 | 0.2 | 0.7 | 0.6 | 1.8 | 72.3 | 26.0 | silt loam |
| Bw1 | 0.19 | 0.3 | 0.1 | 0.7 | 3.5 | 4.8 | 70.2 | 24.6 | silt loam |
| Bw2 | 0.03 | 0.2 | 0.1 | 0.6 | 4.7 | 5.7 | 72.9 | 21.5 | silt loam |
| Bt | 0.12 | 0.3 | 0.2 | 0.5 | 3.3 | 4.4 | 69.3 | 26.3 | silt loam |
| Btb | 0.20 | 0.2 | 0.2 | 0.5 | 3.1 | 4.2 | 64.8 | 31.0 | silty clay loam |

| Horizon | Bulk density | Water content ⅓ bar | Water content 15 bar | Liquid limit | Plastic limit | Plastic index |
|---|---|---|---|---|---|---|
| | (g/cc) | (%) | | | | |
| Ap1 | 1.53 | 25 | 19 | 29.4 | 22.1 | 7 |
| Ap2 | 1.49 | 31 | 22 | 31.7 | 21.6 | 10 |
| A | 1.45 | 33 | 21 | 33.1 | 20.1 | 13 |
| AB | 1.43 | 32 | 21 | 32.9 | 21.4 | 12 |
| Bw1 | 1.47 | 31 | 20 | 30.7 | 22.0 | 9 |
| Bw2 | 1.78 | 40 | 20 | 30.0 | 21.4 | 9 |
| Bt | 1.81 | 32 | 14 | 34.6 | 22.0 | 13 |
| Btb | 1.85 | 37 | 15 | 35.5 | 18.1 | 17 |

Table A16. Particle size distribution of Staley series (60 Ida 2918).

| Horizon | Depth | Very coarse sand | Coarse sand | Medium sand | Fine sand | Very fine sand | Total sand | Total silt | Total clay | Textural class |
|---|---|---|---|---|---|---|---|---|---|---|
| | | (mm) | | | | | | | | |
| | | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (in) | (%) | | | | | | | | |
| Ap | 0 to 8 | 0.10 | 0.2 | 0.1 | 0.8 | 6.0 | 7.2 | 72 | 21.3 | silt loam |
| A | 8 to 12 | 0.04 | 0.4 | 0.7 | 1.8 | 12.7 | 15.6 | 80 | 3.2 | silt |
| Bt | 12 to 16 | 0.06 | 0.2 | 0.2 | 0.8 | 9.0 | 10.3 | 69 | 20.3 | silt loam |
| Bk1 | 16 to 27 | 0.04 | 0.4 | 0.6 | 1.4 | 8.8 | 11.2 | 68 | 20.5 | silt loam |
| Bk2 | 27 to 48 | 0.01 | 0.2 | 0.4 | 3.2 | 28.9 | 32.7 | 56 | 11.3 | silt loam |
| C | 48 to 72+ | 0.11 | 0.2 | 0.2 | 0.6 | 9.1 | 10.1 | 70 | 20.1 | silt loam |

Table 17a. Soil chemical characteristics of Thatuna series (65 Ida 2924).

| Horizon | Depth | pH paste | ECX10³ | PW at saturation |
|---|---|---|---|---|
| | (inches) | | (mmhos/cm) | (%) |
| Ap | 0 to 8 | 5.9 | 6.4 | 0.5 |
| A1 | 8 to 17 | 6.3 | 6.7 | 0.3 |
| A2 | 17 to 24 | 6.3 | 6.8 | 0.3 |
| A3 | 24 to 29 | 6.5 | 6.7 | 0.4 |
| E1 | 29 to 33 | 6.7 | 6.7 | 0.3 |
| E2 | 33 to 34 | 6.8 | 6.7 | 0.3 |
| Btb1 | 34 to 38 | 6.2 | 6.9 | 0.3 |
| Btb2 | 38 to 51 | 5.9 | 6.8 | 0.3 |
| Btb3 | 51 to 61 | 6.2 | 7.0 | 0.3 |

Table A17b. Soil chemical characteristics of Thatuna series (65 Ida 2924).

| Horizon | Exchangeable ions | | | | Ext. acidity | | Base saturation | OM | C | N | C:N ratio |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Ca | Mg | Na | K | H | CEC | | | | | |
| | (meq/100 gms) | | | | | | (%) | | | | |
| Ap | 12.4 | 3.0 | 0.1 | 0.7 | 8.6 | 21.7 | 65 | 3.0 | 1.8 | 0.15 | 12 |
| A1 | 13.7 | 4.1 | 0.2 | 0.7 | 6.3 | 24.2 | 75 | 2.2 | 1.3 | 0.12 | 11 |
| A2 | 12.8 | 4.5 | 0.3 | 0.6 | 6.8 | 23.1 | 73 | 1.7 | 1.0 | 0.10 | 10 |
| A3 | 9.0 | 3.1 | 0.3 | 0.4 | 3.5 | 14.8 | 78 | 0.9 | 0.5 | 0.06 | 10 |
| E1 | 6.6 | 2.0 | 0.3 | 0.2 | 2.3 | 10.6 | 80 | 0.6 | 0.3 | 0.04 | 9 |
| E2 | 6.5 | 2.0 | 0.3 | 0.1 | 1.8 | 10.6 | 84 | 0.3 | 0.2 | 0.03 | 7 |
| Btb1 | 11.9 | 4.8 | 0.6 | 0.3 | 4.9 | 22.1 | 78 | 0.6 | 0.3 | 0.04 | 8 |
| Btb2 | 16.3 | 7.3 | 1.0 | 0.4 | 6.1 | 32.9 | 80 | 0.4 | 0.2 | 0.04 | 6 |
| Btb3 | 15.6 | 7.4 | 1.2 | 0.4 | 5.6 | 30.6 | 81 | 0.3 | 0.2 | 0.03 | 5 |

Table A18. Particle size distribution of Thatuna silt loam (65 Ida 2924).

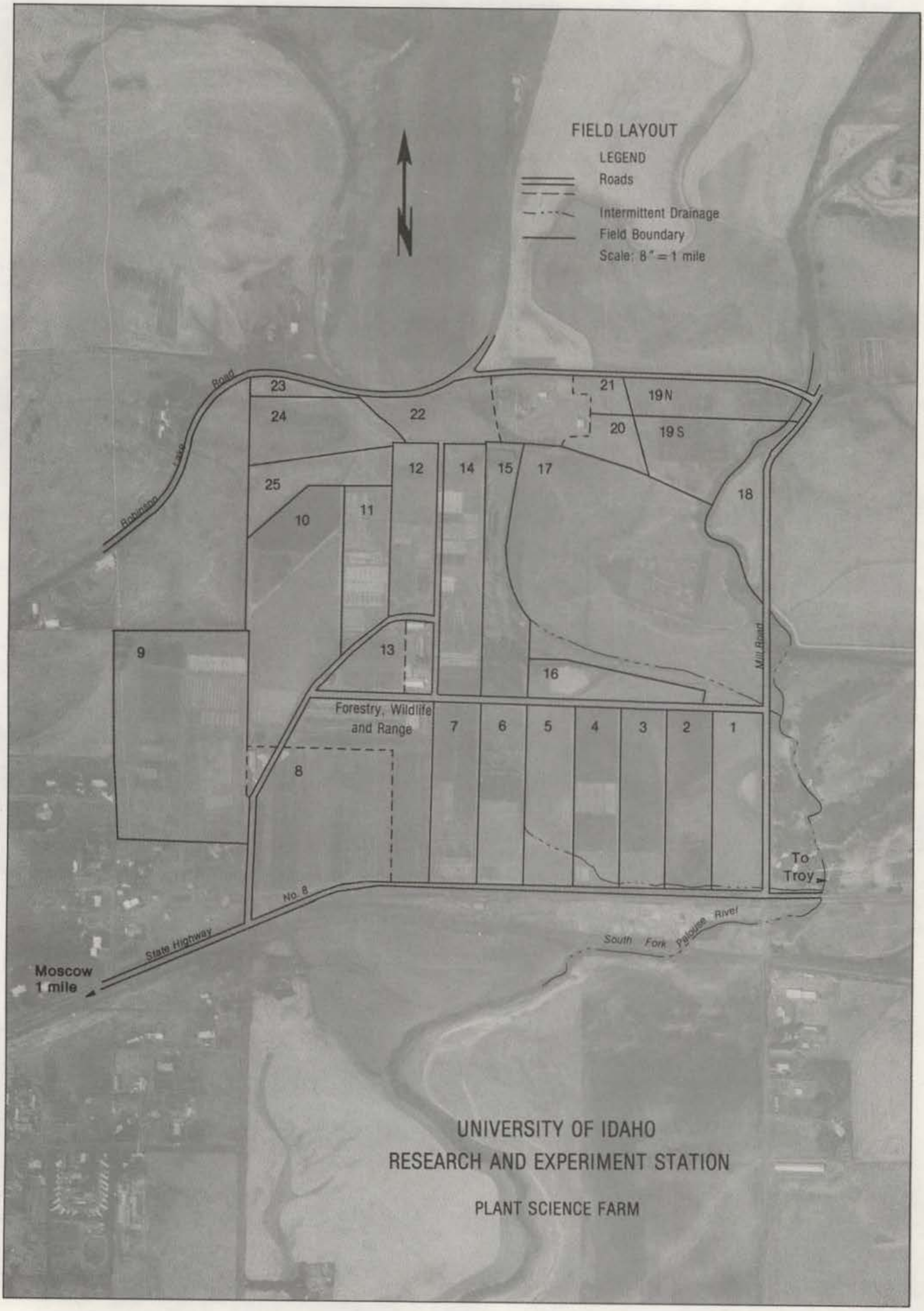
| | Very coarse | Coarse | Medium | Fine | Very | Total | Total | Total | Textural |
|---|---|---|---|---|---|---|---|---|---|
| | (mm) | | | | | | | | |
| | 2-1.0 | 1-0.5 | 0.5-0.25 | 0.25-0.1 | 0.1-0.05 | 2-0.05 | 0.05-0.002 | <0.002 | |
| | (%) | | | | | | | | |
| AP | 0.07 | 0.2 | 0.2 | 0.9 | 5.5 | 6.8 | 67 | 25.8 | silt loam |
| A1 | 0.15 | 0.2 | 0.2 | 0.6 | 5.2 | 6.4 | 65 | 28.2 | silty clay loam |
| A2 | 0.02 | 0.2 | 0.2 | 1.0 | 3.4 | 4.8 | 69 | 26.5 | silt loam |
| A3 | 0.18 | 0.4 | 0.2 | 0.8 | 6.6 | 8.1 | 75 | 17.4 | silt loam |
| E1 | 0.22 | 0.3 | 0.3 | 1.1 | 6.3 | 8.2 | 81 | 11.3 | silt |
| E2 | 0.34 | 0.5 | 0.5 | 1.5 | 4.8 | 7.6 | 84 | 8.8 | silt |
| Btb1 | 0.10 | 0.3 | 0.4 | 1.1 | 3.6 | 5.5 | 70 | 24.0 | silt loam |
| Btb2 | 0.23 | 0.3 | 0.3 | 0.7 | 4.0 | 5.6 | 57 | 37.4 | silty clay loam |
| Btb3 | 0.18 | 0.4 | 0.2 | 0.5 | 3.8 | 5.1 | 64 | 30.7 | silty clay loam |

# Appendix IV

Maps on the following pages include aerial base, roads/streams/buildings, etc., soil surveys, contour lines and field information (aerial base photos taken in 1981). An index and location map appear on the inside back cover.


SOILS MAP
LEGEND
Roads
Intermittent Drainage
Soils Boundary
Lt1
Lo2
Troy
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
PLANT SCIENCE FARM

TOPOGRAPHIC MAP
LEGEND
Roads
Intermittent Drainage
Contours
Scale: 8" = 1 mile
CONTOUR INTERVAL
10 FEET
Lake
Road
Robinson
2620
2680
2670
2660
2650
2640
2630
2620
2610
2600
2610
2610
2590
2590
2590
2590
2590
2610
Road
Mill
To
Troy
State Highway No. 8
South Fork Palouse River
Moscow
1 mile
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
PLANT SCIENCE FARM


FIELD LAYOUT
LEGEND
Roads
Intermittent Drainage
Field Boundary
Scale: 8" = 1 mile
Robinson Lake Road
23
24
22
21
19N
20
19S
25
10
11
12
14
15
17
18
9
13
16
Mill Road
Forestry, Wildlife and Range
7
6
5
4
3
2
1
8
To Troy
State Highway No. 8
Moscow 1 mile
South Fork Palouse River
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
PLANT SCIENCE FARM

## SOILS MAP

LEGEND

- — — — Roads
- -·-·- Intermittent Drainage
- ——— Soils Boundary

Scale: 8" = 1 mile

## UNIVERSITY OF IDAHO
## RESEARCH AND EXPERIMENT STATION

UNIVERSITY OF IDAHO CAMPUS — 1

TOPOGRAPHIC MAP

LEGEND

| | |
|---|---|
| — — — | Roads |
| ~·-·· — | Intermittent Drainage |
| ——— | Contours |

Scale: 8″ = 1 mile

CONTOUR INTERVAL
20 FEET


UNIVERSITY OF IDAHO

RESEARCH AND EXPERIMENT STATION

UNIVERSITY OF IDAHO CAMPUS — 1

## FIELD LAYOUT

LEGEND

- - - Roads

-·-·- Intermittent Drainage

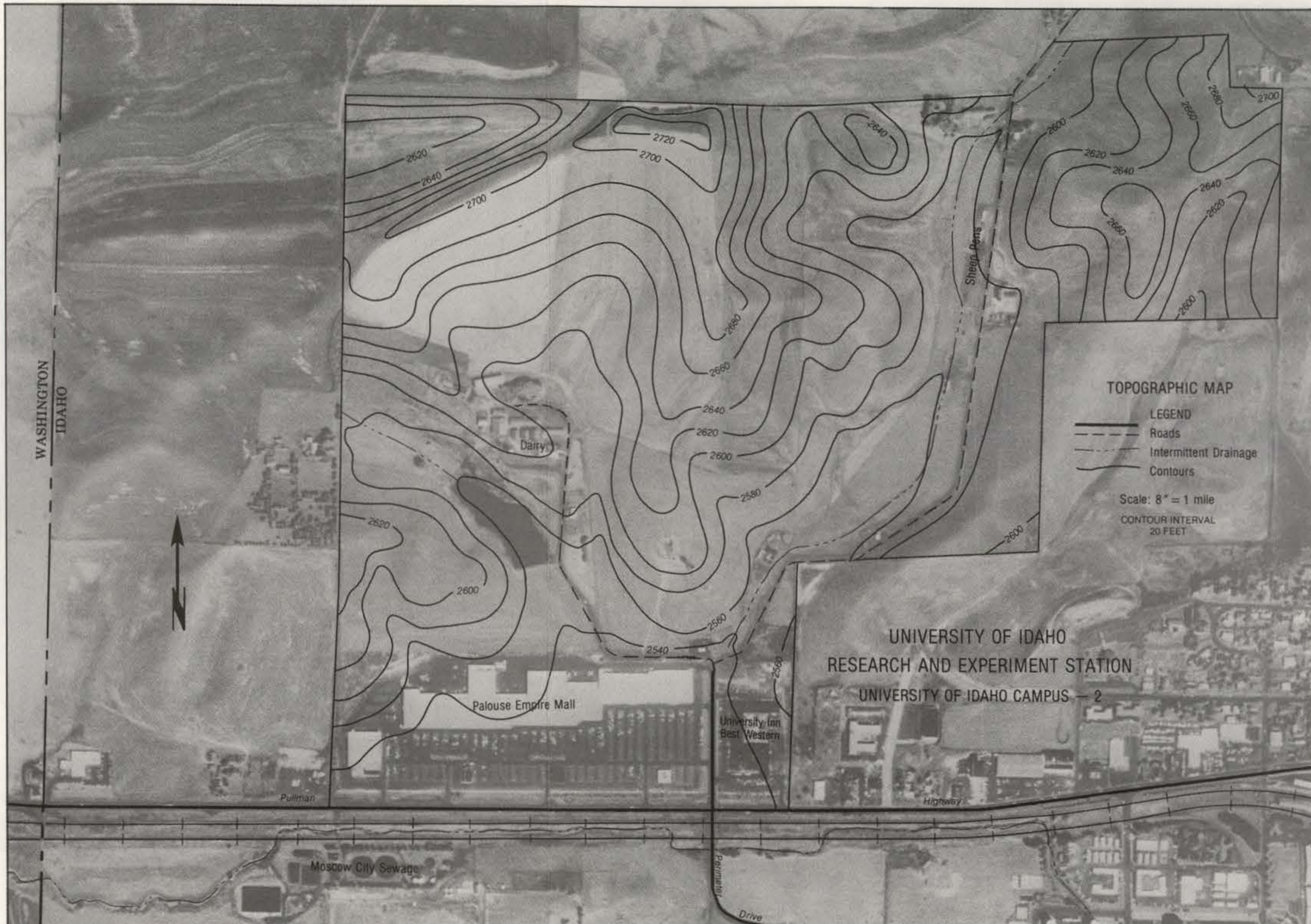
——— Field Boundary

Scale: 8″ = 1 mile

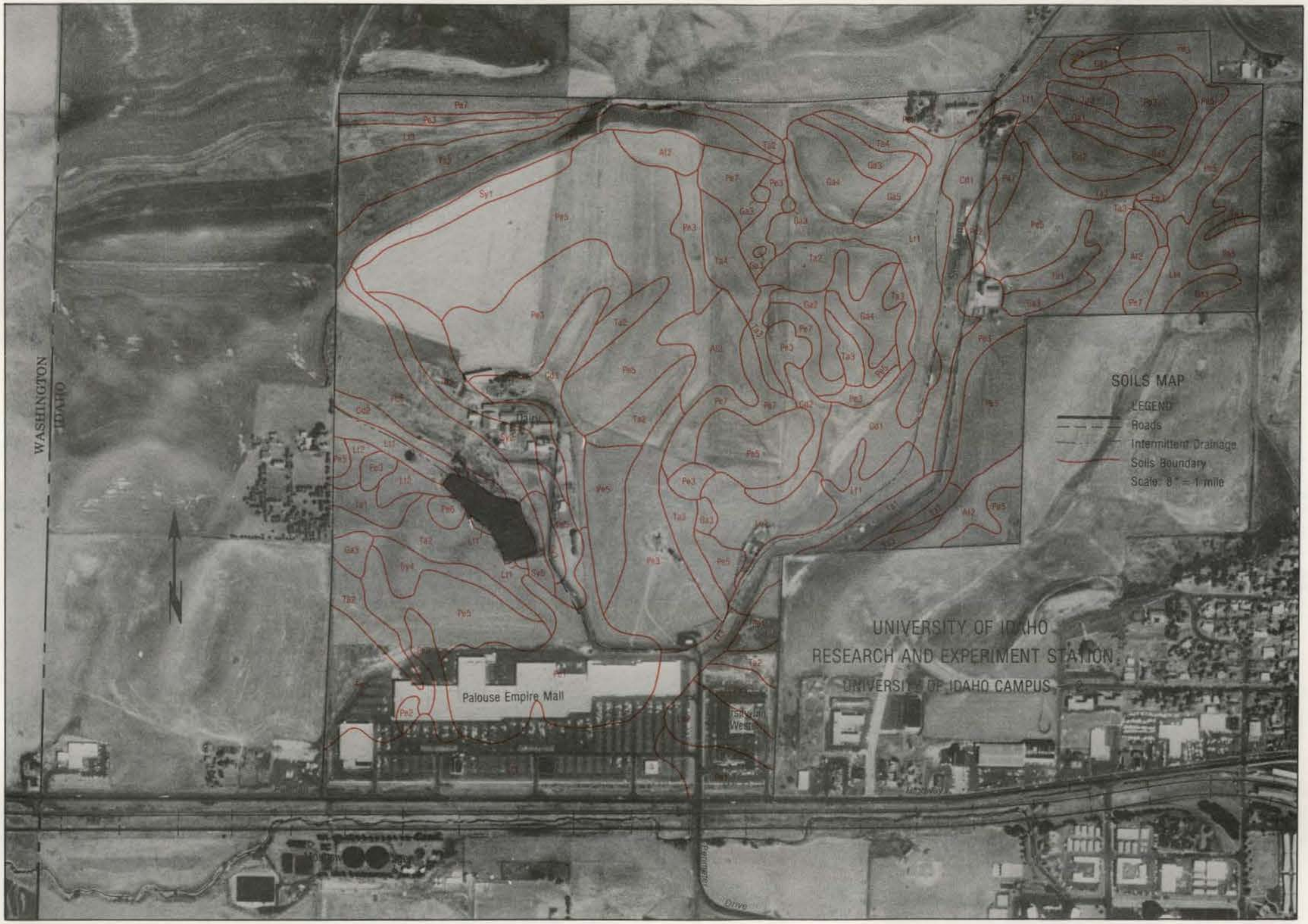

UNIVERSITY OF IDAHO

RESEARCH AND EXPERIMENT STATION

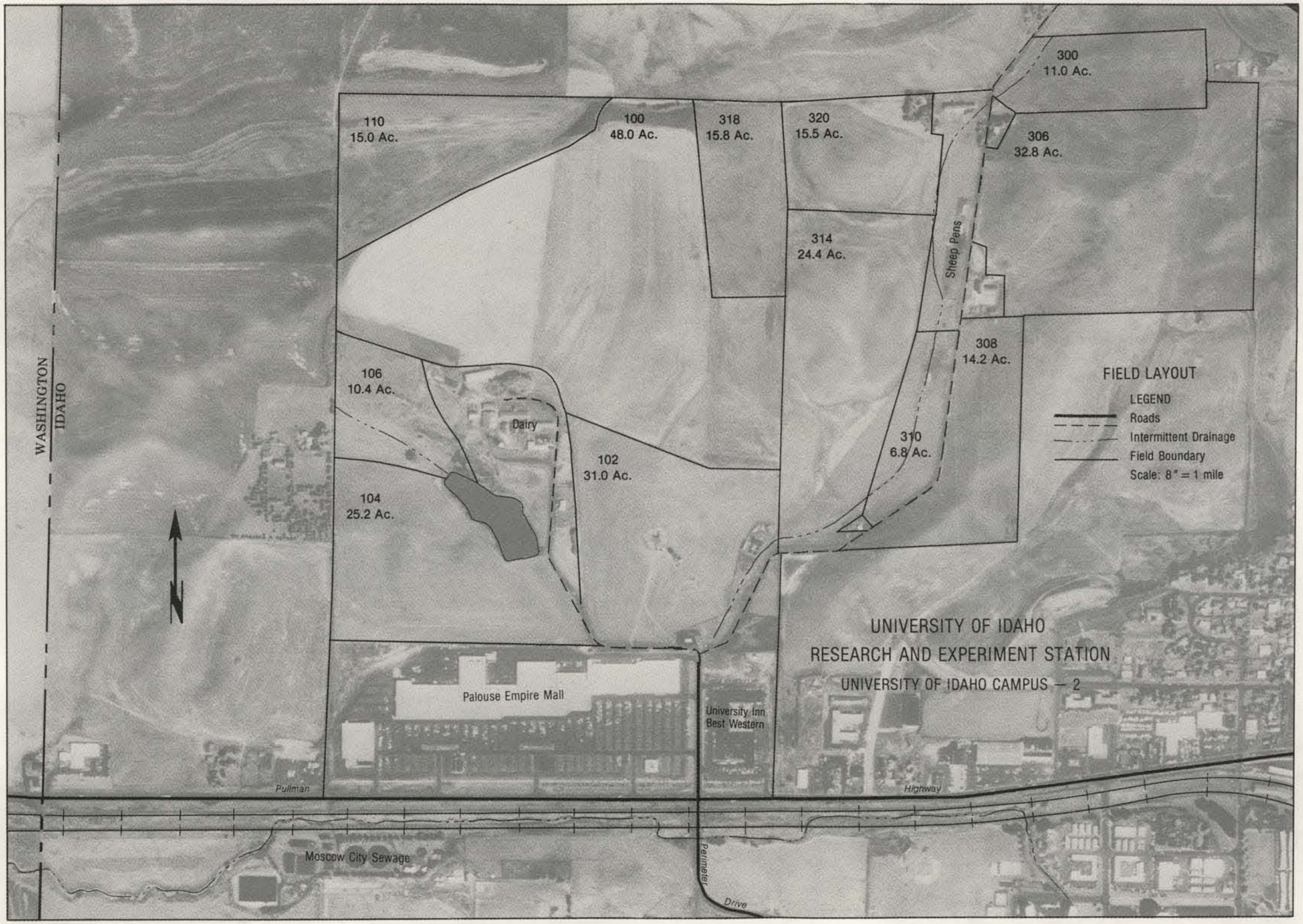
UNIVERSITY OF IDAHO CAMPUS — 1



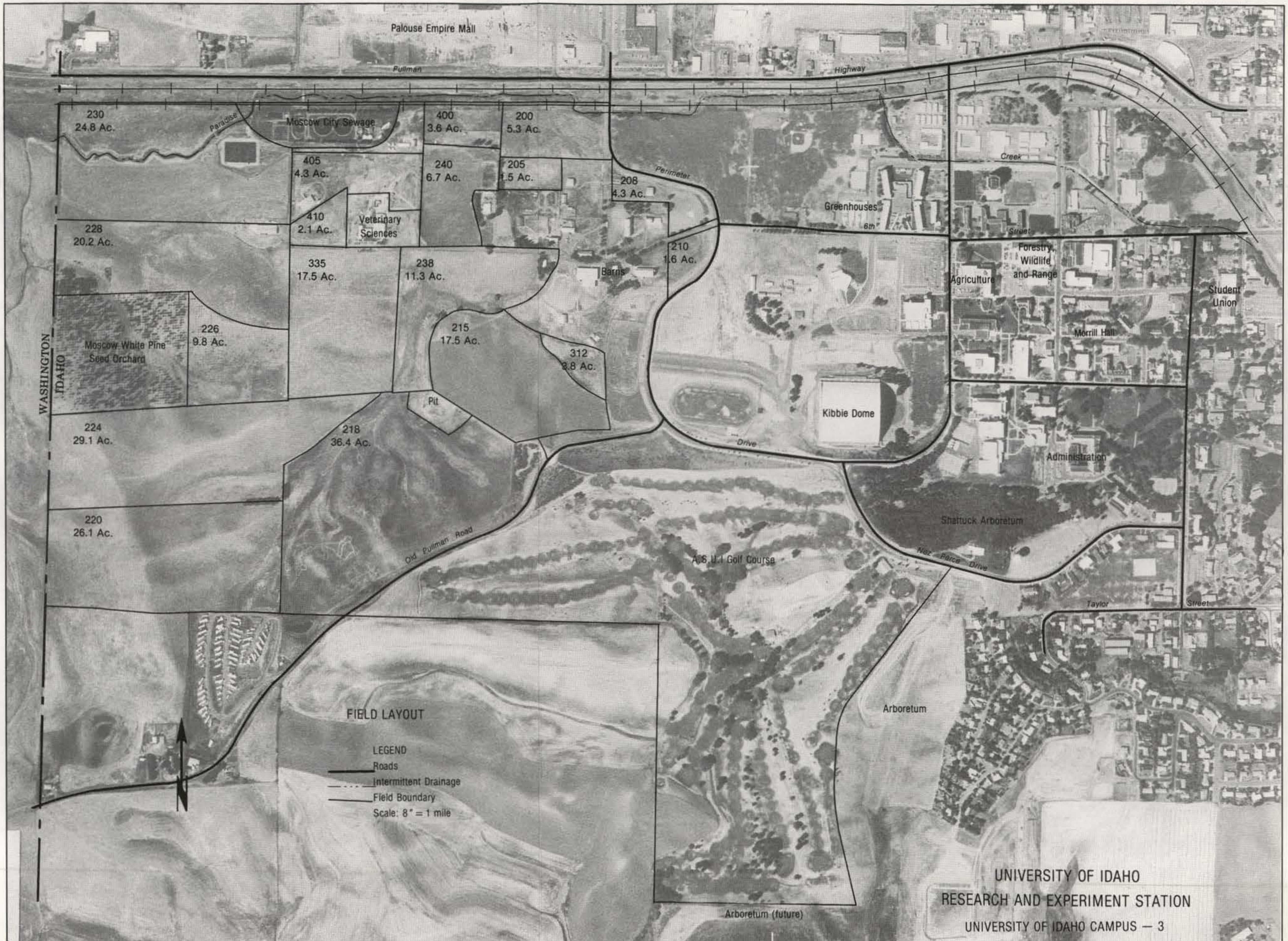
TOPOGRAPHIC MAP
LEGEND
Roads
Intermittent Drainage
Contours
Scale: 8" = 1 mile
CONTOUR INTERVAL
20 FEET
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 2
WASHINGTON
IDAHO
Dairy
Sheep Pens
Palouse Empire Mall
University Inn
Best Western
Pullman
Highway
Moscow City Sewage
Perimeter
Drive
2720
2700
2680
2660
2640
2620
2600
2580
2560
2540


SOILS MAP
LEGEND
Roads
Intermittent Drainage
Soils Boundary
Scale: 8" = 1 mile
WASHINGTON
IDAHO
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS
Palouse Empire Mall


Palouse Empire Mall
Pullman
Highway
Perimeter
Creek
Greenhouses
Veterinary Sciences
Forestry Wildlife and Range
Agriculture
Student Union
Morrill Hall
Kibbie Dome
Drive
Administration
Pit
WASHINGTON
IDAHO
Golf Course
Taylor
Street
Arboretum
Arboretum (future)
SOILS MAP
LEGEND
Roads
Intermittent Drainage
Soils Boundary
Scale: 8" = 1 mile
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 3



110
15.0 Ac.
100
48.0 Ac.
318
15.8 Ac.
320
15.5 Ac.
300
11.0 Ac.
306
32.8 Ac.
314
24.4 Ac.
Sheep Pens
308
14.2 Ac.
106
10.4 Ac.
Dairy
102
31.0 Ac.
310
6.8 Ac.
104
25.2 Ac.
WASHINGTON
IDAHO
FIELD LAYOUT
LEGEND
Roads
Intermittent Drainage
Field Boundary
Scale: 8" = 1 mile
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 2
Palouse Empire Mall
University Inn
Best Western
Pullman
Highway
Moscow City Sewage
Perimeter
Drive




UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 3

Palouse Empire Mall
Pullman
Highway
Paradise
Moscow City Sewage
Creek
Perimeter
Greenhouses
6th
Street
Veterinary Sciences
Barns
Forestry, Wildlife and Range
Agriculture
Student Union
Morrill Hall
Moscow White Pine Seed Orchard
WASHINGTON
IDAHO
Pit
Kibbie Dome
Drive
Administration
Shattuck Arboretum
Old Pullman Road
A.S.U.I Golf Course
Nez Perce Drive
Taylor
Street
Arboretum
Arboretum (future)
TOPOGRAPHIC MAP
LEGEND
Roads
Intermittent Drainage
Contours
Scale: 8" = 1 mile
CONTOUR INTERVAL 20 FEET
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 3

To Pullman
Barns
Agricultural Engineering
Golf Course
Kibbie Dome
Greenhouses
Forestry Wildlife and Range
Administration
Morrill Hall
Student Union
Pe5
Pe3
Ta2
Lo1
Lt3
Pe2
Lt3
SOILS MAP
LEGEND
Roads
Intermittent Drainage
Soils Boundary
UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 4
To Troy


UNIVERSITY OF IDAHO

RESEARCH AND EXPERIMENT STATION

UNIVERSITY OF IDAHO CAMPUS — 4


SOILS MAP

LEGEND

Roads

Intermittent Drainage

Soils Boundary

Scale: 8″ = 1 mile

## UNIVERSITY OF IDAHO
## RESEARCH AND EXPERIMENT STATION

UNIVERSITY OF IDAHO CAMPUS — 5


## TOPOGRAPHIC MAP

LEGEND

Roads

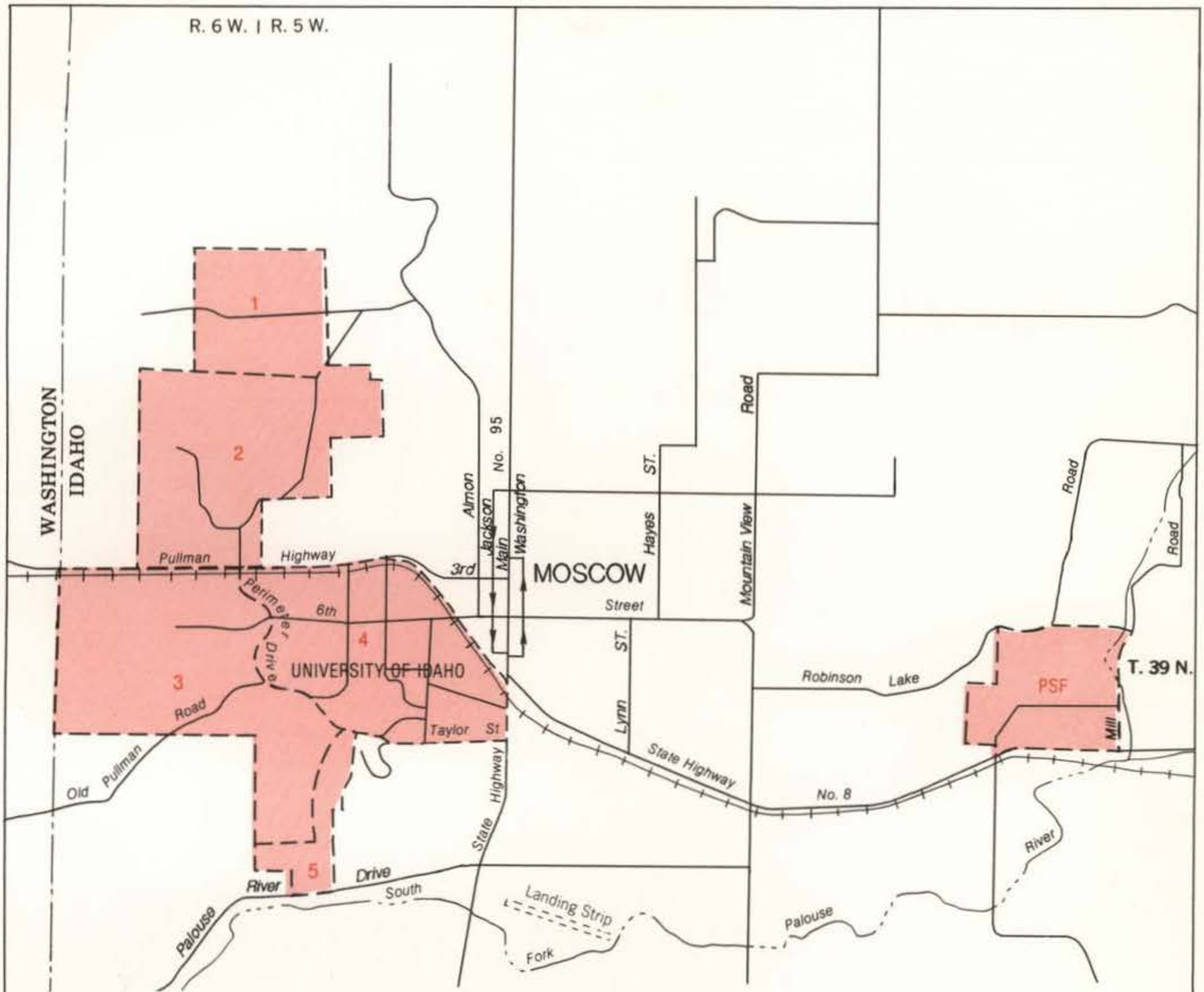
Intermittent Drainage

Contours

Scale: 8″ = 1 mile

CONTOUR INTERVAL
20 FEET

UNIVERSITY OF IDAHO
RESEARCH AND EXPERIMENT STATION
UNIVERSITY OF IDAHO CAMPUS — 5




## UNIVERSITY OF IDAHO
## RESEARCH AND EXPERIMENT STATION

### INDEX MAP
LEGEND

1 University of Idaho Campus — 1
2 University of Idaho Campus — 2
3 University of Idaho Campus — 3
4 University of Idaho Campus — 4
5 University of Idaho Campus — 5
PSF Plant Science Farm

Scale: 1″ = 3,531 feet

Source: 1:24000 USGS 7½′ Topographic Series Moscow East and Moscow West, Idaho.


LOCATION MAP

Prepared by K. S. Gibbs, USDA-SCS, Boise, ID. April, 1989

# SERVING THE STATE

Teaching . . . Research . . . Service . . . this is the three-fold charge of the College of Agriculture at your state Land-Grant institution, the University of Idaho. To fulfill this charge, the College extends its faculty and resources to all parts of the state.

**Service** . . . The Cooperative Extension Service has offices in 42 of Idaho's 44 counties under the leadership of men and women specially trained to work with agriculture, home economics and youth. The educational programs of these College of Agriculture faculty members are supported cooperatively by county, state and federal funding.

**Research** . . . Agricultural Research scientists are located at the campus in Moscow, at Research and Extension Centers near Aberdeen, Caldwell, Parma, Tetonia and Twin Falls and at the U. S. Sheep Experiment Station, Dubois and the USDA/ARS Soil and Water Laboratory at Kimberly. Their work includes research on every major agricultural program in Idaho and on economic activities that apply to the state as a whole.

**Teaching** . . . Centers of College of Agriculture teaching are the University classrooms and laboratories where agriculture students can earn bachelor of science degrees in any of 20 major fields, or work for master's and Ph.D. degrees in their specialties. And beyond these are a variety of workshops and training sessions developed throughout the state for adults and youth by College of Agriculture faculty.