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DEPARTMENT OF
WATER RESOURCES

STATE OF IDAHO
OFFICE OF THE ATTORNEY GENERAL
LAWRENCE G. WASDEN

June 28, 2006

VIA U. S. MAIL AND FACSIMILE
(208) 436-6804

Mr. Roger D. Ling
Mr. Michael P. Tribe
LING ROBINSON & WALKER
Attorneys at Law
615 H Street
P. O. Box 396
Rupert, ID 83350

Re: Soil Survey Data.

Dear Roger and Michael:

Enclosed are the following documents for your review: (1) excerpt from the Soil Survey of Jefferson County, Idaho and (2) a map of the place of use for subcase no. 31-11845, which shows the acreages of the various soil types. A review of these documents indicates that the total irrigable acreage described for the place of use of 31-11845 is only 21.7 acres.

Sincerely,

A handwritten signature in black ink, reading "David J. Barber".

DAVID J. BARBER
Deputy Attorney General

DJB/ov
Encl.
cc: Candice McHugh

SOIL SURVEY OF JEFFERSON COUNTY, IDAHO



United States Department of Agriculture
Soil Conservation Service

in cooperation with

University of Idaho, College of Agriculture and Idaho Agricultural Experiment Station;
Board of Commissioners, Jefferson County, and United States Department of the Interior
Bureau of Land Management

pasture. An additional 20 percent could be cropped if water for irrigation were available.

Noncultivated areas of this map unit have potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey.

Soil maps for detailed planning

The map units shown on the detailed soil maps at the back of this publication represent the kinds of soil in the survey area. They are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each map unit, or soil, is given in the section "Use and management of the soils."

Preceding the name of each map unit is the symbol that identifies the soil on the detailed soil maps. Each soil description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated and the management concerns and practices needed are discussed.

This survey describes soils that were mapped at two levels of detail. The soils mapped in greater detail are called narrowly defined map units. Those mapped in lesser detail are called broadly defined map units. The boundaries of soil delineations of the narrowly defined map units were plotted and verified at closely spaced intervals. The boundaries of delineations of the broadly defined units were plotted and verified at greater intervals. The intensity of mapping selected for a given soil was based on the anticipated long-term use of the soil. The map units were designed to meet the needs for that use. The broadly defined units described in this section are identified on the soil legend, which immediately precedes the detailed soil maps, and in the tables by an asterisk.

The map units on the detailed soil maps represent an area on the landscape made up mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil maps are phases of soil series.

Soils that have profiles that are almost alike make up a *soil series*. Except for allowable differences in texture of the surface layer or of the substratum, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement in the profile. A soil series commonly is named for a town or geographic feature near the place where a soil of that series was first observed and mapped.

Soils of one series can differ in texture of the surface layer or the substratum and in slope, erosion, stoniness, salinity, wetness, or other characteristics that affect their

use. On the basis of such differences, a soil series is divided into phases. The name of a *soil phase* commonly indicates a feature that affects use or management. For example, Modkin loamy sand, 2 to 12 percent slopes, is one of several phases within the Modkin series.

Some map units are made up of two or more dominant kinds of soil. Such map units in this survey area are called soil complexes and undifferentiated groups.

A *soil complex* consists of areas of two or more soils that are so intricately intermingled or so small in size that they cannot be shown separately on the soil map. Each area includes some of each of the two or more dominant soils, and the pattern and proportion are somewhat similar in all areas. Montlid-Heiseton complex is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because there is little value in separating them. The pattern and proportion of the soils are not uniform. An area shown on the map has at least one of the dominant (named) soils or may have all of them. Minnewaukan soils is an undifferentiated group in this survey area.

Most map units include small, scattered areas of soils other than those that appear in the name of the map unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the map unit. These soils are described in the description of each map unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special symbol on the soil map.

Most mapped areas include places that have little or no soil material and support little or no vegetation. Such places are called *miscellaneous areas*; they are delineated on the soil map and given descriptive names. Riverwash is an example. Some of these areas are too small to be delineated and are identified by a special symbol on the soil map.

The acreage and proportionate extent of each map unit are given in table 3, and additional information on properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of tables.") Many of the terms used in describing soils are defined in the Glossary.

Soil descriptions

1—Aecet-Rock outcrop complex. This complex is on basalt plains. Slope is 0 to 12 percent. The frost-free period is 80 to 115 days.

This complex is about 35 percent Aecet very stony sandy loam, 25 percent Rock outcrop, and 20 percent Bereniceton very stony sandy loam. The Aecet soil is on the sides of ridges and on convex side slopes, Rock outcrop is on the sides of ridges, and the Bereniceton

soil is on convex side slopes. Rock outcrop occurs in an intricate pattern throughout the complex.

Included with this complex in mapping is about 20 percent Bondfarm sandy loam, Aecet sandy clay loam, and Matheson sandy loam.

The Aecet soil is moderately deep and well drained. It formed in wind-laid deposits. Typically, the surface layer is pale brown very stony sandy loam about 5 inches thick. The subsoil is pale brown clay loam 8 inches thick. The substratum is very pale brown clay loam 10 inches thick over basalt. The soil is calcareous throughout. A layer of lime accumulation is at a depth of 13 inches.

Permeability of the Aecet soil is moderately slow. Effective rooting depth is 20 to 40 inches. Available water capacity is moderate. Surface runoff is slow or medium, and the hazard of erosion is slight to high.

Rock outcrop consists of basalt rock. It supports mostly moss and lichens. Crevices in the rock contain some soil material that supports a sparse stand of shrubs, grasses, and forbs. Rock outcrop areas have little value for grazing.

The Bereniceton soil is deep and well drained. It formed in reworked wind-laid deposits over basalt. Typically, the surface layer is about 7 inches of brown very stony sandy loam over pale brown very stony loam. The upper part of the underlying material is pale brown loam 7 inches thick. The lower part is very pale brown clay loam 32 inches thick. Basalt is at a depth of 46 inches.

Permeability of this Bereniceton soil is moderately slow. Effective rooting depth is 40 to 60 inches. Available water capacity is high. Surface runoff is slow or medium, and the hazard of erosion is slight to high.

This complex is used as range, for wildlife habitat, and for recreation.

Where the range vegetation is in good or excellent condition, the dominant native grasses are bluebunch wheatgrass and Thurber needlegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, forbs, grasses, and woody plants increases.

This unit is used for livestock grazing mainly in spring and fall. Mechanical seeding or brush management is difficult because of areas of Rock outcrop and stones on the surface. Management practices suitable for use on this complex are proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

This unit has potential for producing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclass VII_s, nonirrigated.

2—Annis silty clay loam. This very deep, moderately well drained soil is on river terraces. It formed in alluvium derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 100 to 115 days.

Typically, the surface layer is grayish brown silty clay loam and silt loam 12 inches thick. The subsoil is light

brownish gray silt loam 9 inches thick. The upper part of the substratum is light brownish gray and gray silty clay loam 28 inches thick. The lower part to a depth of 60 inches or more is light gray silt loam. The soil is calcareous and moderately alkaline throughout.

Included with this soil in mapping are small areas of Blackfoot silt loam and Annis loam, both of which have slopes of 0 to 1 percent.

Permeability of this Annis soil is moderately slow. Effective rooting depth is 60 inches or more. Available water capacity is very high. Surface runoff is very slow, and the hazard of erosion is slight. A seasonal high water table fluctuates between depths of 3 and 5 feet.

This soil is used for irrigated hay, small grain, pasture, potatoes, and sugar beets (fig. 2).

A suitable cropping system is 4 years of alfalfa for hay, 1 or 2 years of potatoes or sugar beets, 1 year of wheat or barley, and then alfalfa seeded in spring with a grain nurse crop. The grain crop is harvested, and then the alfalfa is used for hay for 4 years. When grass and legume pasture is included in the cropping system, the period of use is 5 or 6 years followed by row crops or grain. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Most crops respond to nitrogen, and legumes respond to phosphate. Good tilth can be maintained by using crop residue and practicing minimum tillage. Furrow, border, and sprinkler irrigation systems are suited to this soil. Furrow irrigation is suited to row crops, border irrigation is suited to grain, hay, and pasture, and sprinkler irrigation is suited to all crops. Regardless of the irrigation method used, water should be applied carefully to avoid raising the water table so much that it affects crop production.

Russian-olive, golden willow, and Scotch pine are examples of trees that are suitable for use in windbreaks on this soil.

This soil has potential for producing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. Habitat for birds that obtain their food and shelter mainly in areas of cropland can be improved by planting shrubs such as Siberian peashrub, European privet, lilac, and Tatarian honeysuckle along fence rows and ditchbanks, in odd field corners, or in windbreaks. These plantings provide cover and protection from predators and inclement weather. Food should be close to shelter. Food crops also provide some cover. Capability subclass II_w, irrigated.

3—Annis silty clay loam, drained. This very deep, moderately well drained soil is on flood plains. It formed in alluvium derived from mixed sources. The frost-free period is 100 to 115 days. Slope is 0 to 1 percent.

Typically, the surface layer is grayish brown silty clay loam and silt loam 12 inches thick. The subsoil is light brownish gray silt loam 9 inches thick. The upper part of the substratum is light brownish gray and gray silty clay

If the range vegetation is in good or excellent condition, the main plants are sedges and tufted hairgrass. Because of the loamy sand surface layer and the high water table, range seeding is difficult. Soil blowing is also a limitation for seeding. Where seeding is necessary, suitable grasses are meadow foxtail, tall wheatgrass, tall fescue, and basin wildrye.

This soil has potential for providing habitat for shore birds, waterfowl, and birds of prey. Capability subclass VIw, nonirrigated.

55—Levelton loam. This deep, very poorly drained soil is on old lakebeds. It formed in lacustrine material derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Typically, the surface is covered by a root mat 2 inches thick. The surface layer is white loam about 7 inches thick. The upper part of the underlying material is light gray silty clay about 30 inches thick. The lower part to a depth of 60 inches or more is stratified light brownish gray sandy loam over silty clay. The soil is calcareous throughout.

Included with this soil in mapping are small areas of Levelton clay loam; Levelton silty clay loam, drained, moderately saline-alkali; Hovey silt loam; and Hovey clay. All of these soils have slopes of less than 2 percent. Also included are small areas of channeled soils.

Permeability of the Levelton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is ponded, and the hazard of erosion is slight. This soil has a high water table that fluctuates between depths of 1 and 2 feet from July through September.

This soil is used for native pasture, recreation, and wildlife habitat.

If the range vegetation is in good or excellent condition, the main plants are sedges and tufted hairgrass. Because of the high water table, it is difficult to cultivate and successfully seed this soil. Where seeding is necessary, grasses such as meadow foxtail, tall wheatgrass, tall fescue, and basin wildrye are suitable.

This soil has potential for providing habitat for shore birds, waterfowl, songbirds, and birds of prey. Capability subclass Vw, nonirrigated.

56—Levelton loam, drained, moderately saline-alkali. This very deep soil is on old lakebeds. It formed in lacustrine material derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Typically, the surface layer is moderately saline-alkali affected white loam about 7 inches thick. The upper part of the underlying material is light gray silty clay about 30 inches thick. The lower part to a depth of 60 inches is stratified light brownish gray sandy loam to silty clay. The soil is calcareous throughout.

Included with this soil in mapping are small areas of Levelton silty clay loam, drained, moderately saline-alkali; Hovey clay; a soil that is similar to this Levelton soil but that has a gravelly loam surface layer; some areas of soils that are 1 to 5 percent lava rock fragments; and some areas that are about 10 percent Matheson loamy sand. Also included, at the western edge of the Camas National Wildlife Refuge, is 5 percent soils that are similar to this Levelton soil but that have a clay loam surface layer or that are loamy sand throughout.

Permeability of this Levelton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is very slow or ponded, and the hazard of erosion is slight. A seasonal high water table fluctuates between depths of 1 and 3 feet from July through September.

This soil is used for native pasture, recreation, and wildlife habitat.

When the range vegetation is in good or excellent condition, the main grasses are alkali sacaton and inland saltgrass. Seeding grasses is difficult because of wetness and the high water table. Suitable grasses for seeding are tall wheatgrass, tall fescue, and meadow foxtail.

This soil has potential for providing habitat for coyote, sage grouse, waterfowl, songbirds, and birds of prey. Capability subclass VIw, nonirrigated.

57—Levelton clay loam. This very deep, very poorly drained soil is on old lakebeds. It formed in lacustrine material derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Typically, the surface is covered by a root mat 2 inches thick. The surface layer is white clay loam about 7 inches thick. The upper part of the underlying material is light gray silty clay about 30 inches thick. The lower part to a depth of 60 inches or more is stratified light brownish gray sandy loam to silty clay. The soil is calcareous throughout.

Included with this soil in mapping are small areas of a soil that is similar to this Levelton soil but that is sandy loam throughout, a Levelton soil that has a clay surface layer, Hovey clay, and a soil that is similar to this Levelton soil but that is 20 to 40 inches deep over sand and gravel. All of these soils have slopes of less than 2 percent.

Permeability of this Levelton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is ponded, and the hazard of erosion is slight. A seasonal high water table fluctuates between depths of 1 and 2 feet from July through September.

This soil is used for native pasture, wildlife habitat, and recreation.

If the range vegetation is in good or excellent condition, the main plants are sedges and tufted hairgrass. Because of the clay loam surface layer and wetness, it is difficult to till this soil and to prepare a suitable seedbed.

Where seeding is necessary, suitable grasses are meadow foxtail, tall wheatgrass, tall fescue, and basin wildrye.

This soil has potential for providing habitat for shore birds, waterfowl, songbirds, and birds of prey. Capability subclass Vw, nonirrigated.

58—Levelton clay loam, moderately saline-alkali.

This very deep, very poorly drained soil is on old lakebeds and river terraces. It formed in alluvium and lacustrine sediment derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 115 days.

Typically, the surface layer is white, moderately saline-alkali affected clay loam about 7 inches thick. The upper part of the underlying material is light gray silty clay about 30 inches thick. The lower part to a depth of 60 inches or more is stratified light brownish gray sandy loam to silty clay. The soil is calcareous throughout.

Included with this soil in mapping are small areas of a soil that is similar to this Levelton soil but that is sandy loam throughout, Levelton clay loam, Hovey clay, and a soil that is less than 20 inches deep to sand.

Permeability of this Levelton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is ponded, and the hazard of erosion is slight. A seasonal high water table fluctuates between depths of 1 and 2 feet.

This soil is used for native pasture.

When the range vegetation is in good or excellent condition, the dominant grasses are alkali sacaton and inland saltgrass. Because of the high water table and the moderate saline-alkali condition, it is difficult to successfully seed pasture or to grow crops. Grasses suitable for seeding are tall wheatgrass and tall fescue.

This soil has potential for providing habitat for shore birds, waterfowl, songbirds, ring-necked pheasant, and birds of prey. Capability subclass Vlw, nonirrigated.

59—Levelton silty clay loam, drained, moderately saline-alkali. This very deep, very poorly drained soil is on old lakebeds. It formed in lacustrine material derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Typically, the surface layer is white, moderately saline-alkali affected silty clay loam about 7 inches thick. The upper part of the underlying material is light gray silty clay about 30 inches thick. The lower part to a depth of 60 inches or more is stratified light brownish gray sandy loam to silty clay. The soil is calcareous throughout.

Included with this soil in mapping are small areas of Levelton loam, Montlid silty clay loam, and Hovey clay, all of which have slopes of 0 to 1 percent. Also included are small areas of Levelton soils that are only slightly saline-alkali affected.

Permeability of this Levelton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is very slow, and the hazard

of erosion is slight. A seasonal high water table fluctuates between depths of 1 and 3 feet.

This soil is used for native pasture, recreation, and wildlife habitat. If this soil is properly managed, it can support salt- and alkali-tolerant crops.

The native vegetation is mainly alkali sacaton and inland saltgrass. Seeding grasses such as tall wheatgrass, tall fescue, and meadow foxtail increases the production of forage in most areas of this soil.

This soil has potential for providing habitat for coyote, jackrabbit, sage grouse, songbirds, and birds of prey. Capability subclass Vlw, nonirrigated.

60—Levelton-Medano complex. This complex is on old lakebeds. Slope is 0 to 1 percent. The frost-free period is 80 to 100 days.

Levelton clay loam makes up 45 percent of this complex, and Medano sandy loam makes up 30 percent. The Levelton soil is in the slightly higher areas, and the Medano soil is in the depressions.

Included with this complex in mapping is about 25 percent a soil that is similar to this Medano soil but that is poorly drained, Zwiefel sand, a soil that is similar to Hovey soils but that is very poorly drained, and Psammaquents.

The Levelton soil is very deep and very poorly drained. It formed in lacustrine material. Typically, the surface is covered by a root mat 2 inches thick. The surface layer is white clay loam about 7 inches thick. The upper part of the underlying material is light gray silty clay about 30 inches thick. The lower part to a depth of 60 inches or more is stratified light brownish gray sandy loam to silty clay. The soil is calcareous throughout.

Permeability of the Levelton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is ponded, and the hazard of erosion is slight. The seasonal high water table fluctuates between depths of 1 and 2 feet.

The Medano soil is very deep and very poorly drained. It formed in alluvial and lacustrine sediment. Typically, the surface is covered by a root mat 2 inches thick. The surface layer is grayish brown sandy loam about 6 inches thick. The upper part of the underlying material is grayish brown and dark grayish brown sandy clay loam and sandy loam about 10 inches thick. The lower part to a depth of 60 inches or more is brown and gray coarse sand, gravelly coarse sand, and sand.

Permeability of the Medano soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is ponded, and the hazard of erosion is slight. The seasonal high water table fluctuates between the surface and a depth of 2 feet. The soil is subject to flooding in years of excessive moisture.

These soils are used for native pasture, wild hay, recreation, and wildlife habitat.

When the range vegetation is in good or excellent condition, the vegetation is mainly sedges and tufted hairgrass.

This complex has potential for providing habitat for shore birds, pronghorn antelope, coyote, songbirds, and birds of prey. Capability subclass Vw, nonirrigated.

61—Lidy sandy loam, 0 to 2 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources. The frost-free season is 80 to 100 days.

Typically, the surface layer is pale brown sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light gray sandy loam 24 inches thick over sand and gravel. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 5 inches. Depth to gravel ranges from 23 to 34 inches.

Included with this soil in mapping are small areas of Matheson sandy loam, Lidy loamy sand, and a soil that is similar to this Lidy soil but that does not have a layer of strong lime accumulation.

Permeability of this Lidy soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is very slow, and the hazard of erosion is slight.

This soil is used for irrigated hay, small grain, potatoes, and pasture.

A suitable cropping system is 3 to 5 years of alfalfa for hay, 1 year of potatoes, and 1 or 2 years of grain. The pasture is usually used for 5 to 8 years. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Generally, legumes respond to phosphate and all crops respond to nitrogen. Border, furrow, and sprinkler irrigation systems are used. Sprinkler irrigation is suited to all crops, furrow irrigation is suited to row crops, and border irrigation is suited to alfalfa, small grain, and pasture. Where border or furrow irrigation systems are used, waste water drains should be adequate to carry the surplus water away and to prevent ponding.

Russian-olive, golden willow, and Scotch pine are examples of trees that are well suited to use in windbreaks on this soil.

This soil has potential for providing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. These birds obtain their food and shelter either directly or indirectly from cropland. To improve the habitat for these birds, shrubs such as Siberian peashrub, European privet, lilac, and Tatarian honeysuckle can be planted along fence rows and ditchbanks, in odd field corners, or in windbreaks. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIs, irrigated.

62—Lidy sandy loam, 2 to 4 percent slopes. This deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources. The frost-free season is 80 to 100 days.

Typically, the surface layer is pale brown sandy loam about 5 inches thick. The underlying material to a depth of 60 inches or more is light gray sandy loam 24 inches thick over sand and gravel. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 5 inches. Depth to sand and gravel ranges from 23 to 34 inches.

Included with this soil in mapping are small areas of Matheson sandy loam and Lidy gravelly loam, both of which have slopes of 0 to 2 percent. Also included are small areas of soils that have slopes of 8 to 12 percent.

Permeability of this Lidy soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is slow, and the hazard of erosion is moderate.

This soil is used for irrigated hay, small grain, potatoes, and pasture.

A suitable cropping system is 3 to 5 years of alfalfa for hay, 1 year of potatoes, and 1 or 2 years of grain. Where pasture is used in the rotation, it is usually used for 5 to 8 years. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Generally, legumes respond to phosphate and all crops respond to nitrogen. Border, furrow, and sprinkler irrigation systems are used. Sprinkler irrigation is suited to all crops, and furrow irrigation is suited to row crops. In some areas border irrigation can be used for alfalfa, small grain, and pasture. Where furrow or border systems are used, waste water drains should be adequate to carry the surplus water away and to prevent ponding.

Russian-olive, golden willow, and Scotch pine are examples of trees that are well suited to use in windbreaks on this soil.

This soil has potential for providing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. These birds obtain their food and shelter either directly or indirectly from cropland. To improve the habitat for these birds, shrubs such as Siberian peashrub, European privet, lilac, and Tatarian honeysuckle can be planted along fence rows and ditchbanks, in odd field corners, or in windbreaks. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIe, irrigated.

63—Lidy gravelly loam. This deep, well drained soil is on alluvial fans. It formed in alluvium derived from mixed sources. Slope is 0 to 2 percent. The frost-free season is 80 to 100 days.

Typically, the surface layer is pale brown gravelly loam 5 inches thick. The underlying material to a depth of 60 inches or more is light gray sandy loam 24 inches thick.

soil blowing is very high. The water table is at a depth of 0 to 2 feet.

The Medano loamy sand is very deep and very poorly drained. It formed in alluvium and in lacustrine sediment. Typically, the surface is covered with a mat of roots 2 inches thick. The surface layer is grayish brown loamy sand about 6 inches thick. The upper part of the underlying material is grayish brown and dark grayish brown sandy clay loam 10 inches thick. The lower part to a depth of 60 inches or more is brown and gray coarse sand, gravelly coarse sand, and sand.

Permeability of the Medano loamy sand is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is ponded. The hazard of erosion is slight. The hazard of soil blowing is very high. The water table is at a depth of 0 to 2 feet in most areas, but it is at a depth of 1 to 3 feet in higher lying areas.

This complex is used for wild hay, native pasture, wildlife habitat, and recreation.

The native grasses are mainly sedges, tufted hairgrass, and slender wheatgrass. If the vegetation deteriorates to poor condition, the proportion of these plants decreases and the proportion of less desirable plants increases. Fall grazing limits the use of this complex for wildlife nesting areas the following spring.

This complex has potential for providing habitat for waterfowl, shore birds, coyote, pronghorn antelope, songbirds, and birds of prey. Capability subclass Vw, nonirrigated.

82—Medano-Psammaquents complex. This complex is in low areas on old lakebeds. Slope is 0 to 2 percent. The frost-free season is 80 to 100 days.

Medano sandy loam makes up about 80 percent of this complex, and Psammaquents make up 15 percent. The Medano soil is in the slightly elevated areas adjacent to areas of Psammaquents. The Psammaquents are in the depressional areas and are frequently covered with water.

Included with this complex in mapping is about 5 percent Grassy Butte loamy sand and Zwiefel sand. Also included, in some places along the western edge of the Camas Wildlife Refuge, are areas of Levelton clay loam.

The Medano soil is very deep and very poorly drained. It formed in alluvium and in lacustrine sediment. Typically, the surface is covered with a root mat 2 inches thick. The surface layer is grayish brown sandy loam 6 inches thick. The upper part of the underlying material is grayish brown and dark grayish brown sandy clay loam and sandy loam about 10 inches thick. The lower part to a depth of 60 inches or more is brown and gray coarse sand and gravelly coarse sand.

Permeability of the Medano soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is ponded or very slow, and the hazard of erosion is slight. The water

table is at a depth of 0 to 2 feet during April through June.

Psammaquents are very deep, sandy, and very poorly drained. They formed in alluvial outwash. They consist of marsh areas that are usually inundated between May and October. Vegetation is mostly cattails and other water-loving plants.

This complex is used for wildlife habitat, recreation, and native pasture.

The native vegetation is sedges, tufted hairgrass, and slender wheatgrass. If the vegetation deteriorates to poor condition, the proportion of these plants decreases and the proportion of less desirable plants increases. Fall grazing limits the use of this complex for wildlife nesting areas the following spring.

This complex has potential for providing habitat for waterfowl, shore birds, coyote, songbirds, and birds of prey. Capability subclass Vw, nonirrigated.

83—Minnewaukan soils. These very deep, poorly drained soils are on river terraces. They formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

This map unit consists of Minnewaukan coarse sandy loam and Minnewaukan loamy coarse sand. Either or both of these soils may occur in any mapped area.

Included with these soils in mapping are small areas of Levelton clay and Hovey clay, both of which have slopes of less than 1 percent. Also included are small areas of channeled soils.

Typically, the surface is covered by a mat of roots 2 inches thick. The surface layer is light brownish gray coarse sandy loam or loamy coarse sand about 8 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and gray loamy coarse sand and coarse sand.

Permeability of these soils is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is ponded, and the hazard of erosion is slight. A seasonal high water table fluctuates between the surface and a depth of 2 feet from April through June.

These soils are used for native pasture and wildlife.

Where the vegetation is in good or excellent condition, the main plants are sedges, tufted hairgrass, and slender wheatgrass. Range seeding is difficult because of the texture of the surface layer and the water table. Suitable grasses for seeding are tall wheatgrass, tall fescue, or meadow foxtail.

These soils have potential for producing habitat for waterfowl, songbirds, and birds of prey. Capability subclass Vw, nonirrigated.

84—Modkin loamy sand, 2 to 12 percent slopes. This moderately deep, well drained soil is on basalt plains. It formed in sandy wind-laid deposits derived from mixed sources. The frost-free season is 80 to 100 days.

This soil is used for irrigated pasture, hay, and small grain. Yields are adversely affected by the moderate saline-alkali content and the high water table.

A suitable cropping system is 4 to 6 years of alfalfa or pasture followed by 1 year of wheat or barley grown as a nurse crop for the alfalfa or pasture seeding. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Generally, legumes respond to phosphate and all crops respond to nitrogen. Border and sprinkler irrigation systems are used. Both systems are suited to the crops commonly grown. Sprinkler irrigation can be more efficiently controlled and therefore usually adds less water to the water table.

Russian-olive, Idahybrid poplar, lilac, and Rocky Mountain juniper are examples of plants that are well suited to use in windbreaks on this soil.

This soil has potential for providing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. These birds obtain their food and shelter to some extent either directly or indirectly from cropland. To improve the habitat for these birds, plants such as tall wheatgrass can be planted along fence rows and ditchbanks and in odd field corners. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIs, irrigated.

91—Montlid silty clay loam. This very deep, moderately well drained soil is on old lakebeds. It formed in lacustrine material derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Typically, the surface layer is very pale brown, slightly saline-alkali affected silty clay loam about 8 inches thick. The underlying material to a depth of 60 inches or more is light gray and gray silty clay loam. The soil is calcareous throughout.

Included with this soil in mapping are small areas of a soil that is similar to this Montlid soil but that is sandy loam throughout, a soil that is similar to this Montlid soil but that does not have a seasonal high water table, and Levelton clay loam. Also included, in the areas transitional to the basalt plain, are areas of Montlid loam, Montlid clay, Montlid loamy sand, and Zwiefel loamy sand. Where this Montlid soil is near Terreton soils are small areas of a soil that is similar to this Montlid soil but that has clay between depths of 7 and 50 inches, small areas of Terreton silty clay loam, and small areas of soils that are moderately saline-alkali or strongly saline-alkali affected.

Permeability of this Montlid soil is moderately slow. Effective rooting depth is 60 inches or more. Available water capacity is very high. Surface runoff is very slow, and the hazard of erosion is slight. The seasonal water table fluctuates between depths of 3 and 5 feet from June through September.

This soil is used for irrigated hay, small grain, and pasture.

A suitable cropping system is 4 or 5 years of alfalfa for hay, 1 or 2 years of grain, and then 1 year of grain grown as a nurse crop for a new seeding of alfalfa or pasture. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Generally, legumes respond to phosphate and all crops respond to nitrogen. Border and sprinkler irrigation systems are used. Both methods are suited to the crops commonly grown. Sprinkler irrigation can be controlled so that less water is added to the water table.

Russian-olive, golden willow, and Scotch pine are examples of trees that are well suited to use in windbreaks on this soil.

This soil has potential for providing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. These birds obtain their food and shelter either directly or indirectly from cropland. To improve wildlife habitat, such plants as Siberian peashrub, European privet, lilac, and Tatarian honeysuckle can be planted along fence rows and ditchbanks, in odd field corners, or in windbreaks. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIs, irrigated.

92—Montlid silty clay loam, moderately saline-alkali. This very deep, moderately well drained soil is on old lakebeds. It formed in lacustrine material derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Typically, the surface layer is very pale brown, moderately saline-alkali affected silty clay loam about 8 inches thick. The underlying material to a depth of 60 inches or more is light gray and gray silty clay loam. The soil is calcareous throughout.

Included with this soil in mapping are small areas of Matheson sandy loam, a soil that is similar to this Montlid soil but that is clay below a depth of 7 inches, and a soil that is similar to this Montlid soil but that is loam throughout.

Permeability of this Montlid soil is moderately slow. Effective rooting depth is 60 inches or more. Available water capacity is very high. Surface runoff is very slow, and the hazard of erosion is slight. A seasonal water table is at a depth of 2 to 4 feet.

This soil is used for irrigated pasture, hay, and small grain. The moderate saline-alkali content and the water table adversely affect crop yields.

A suitable cropping system is 4 to 6 years of alfalfa or pasture followed by 1 year of wheat or barley grown as a nurse crop for a new alfalfa or pasture seeding. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Generally, legumes respond to phosphate and

all crops respond to nitrogen. Border and sprinkler irrigation systems are used. Both methods are suited to the crops commonly grown. Sprinkler irrigation can be controlled so that less water is added to the water table.

Russian-olive, Idahybrid poplar, lilac, and Rocky Mountain juniper are examples of plants that grow well in windbreaks on this soil.

This soil has potential for providing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. These birds obtain their food and shelter to some extent either directly or indirectly from cropland. To improve the habitat for these birds, plants such as tall wheatgrass can be planted along fence rows and ditchbanks and in odd field corners. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIs, irrigated.

93—Montlid-Heiseton complex. This complex is in playas on the fringes of old lakebeds. Slope is mainly 0 to 1 percent, but it is as much as 4 percent. The frost-free season is 80 to 100 days.

Montlid very stony silty clay loam makes up about 65 percent of this complex, and Heiseton very stony loam makes up 15 percent. The Montlid soil is in level areas, and the Heiseton soil is in the steeper areas.

Included with this complex in mapping are areas of a soil that is similar to this Montlid soil but that has a water table that fluctuates between depths of 50 and 60 inches. Also included are areas of Montlid silty clay loam and some areas of channeled soils. Included areas make up about 20 percent of the mapped acreage.

The Montlid soil is very deep and moderately well drained. It formed in lacustrine material. Typically, the surface layer is very pale brown, moderately saline-alkali affected very stony silty clay loam about 8 inches thick. The underlying material to a depth of 60 inches or more is light gray and gray silty clay loam.

Permeability of the Montlid soil is moderately slow. Effective rooting depth is 60 inches or more. Available water capacity is very high. Surface runoff is very slow, and the hazard of erosion is slight. The water table fluctuates between depths of 3 and 4 feet.

The Heiseton soil is deep and moderately well drained. It formed in alluvium derived from mixed sources. Typically, the surface layer is light brownish gray, moderately saline-alkali affected very stony loam about 7 inches thick. The underlying material is light brownish gray and light gray stratified sandy loam to silt loam about 43 inches thick over sand and gravel that extend to a depth of 60 inches or more.

Permeability of the Heiseton soil is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is high. Surface runoff is slow, and the hazard of erosion is slight. The water table fluctuates between depths of 3 and 4.5 feet.

This complex is used as range, for wildlife habitat, and for recreation.

If the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. Range seeding is difficult because of the stones on the surface and the moderate saline-alkali condition. This complex is used for grazing mainly in spring and fall. Management practices suitable for use on this complex include proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

This complex has potential for providing habitat for jackrabbit, coyote, sage grouse, songbirds, and birds of prey. Capability subclass VIIs, nonirrigated.

94—Paesi loam. This deep, well drained soil is on river terraces. It formed in alluvium derived from mixed sources. Slope is 0 to 1 percent. The frost-free season is 100 to 115 days.

Typically, the surface layer is brown loam about 8 inches thick. The subsoil is brown loam about 5 inches thick. The substratum is pale brown and light gray loam and silt loam about 21 inches thick over sand and gravel that extend to a depth of 60 inches or more. Depth to sand and gravel ranges from 20 to 40 inches.

Included with this soil in mapping are small areas of Bannock loam, Bockston loam, Paesi gravelly loam, and Xeric Torriorthents.

Permeability of this Paesi soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is moderate or high. Surface runoff is very slow, and the hazard of erosion is slight.

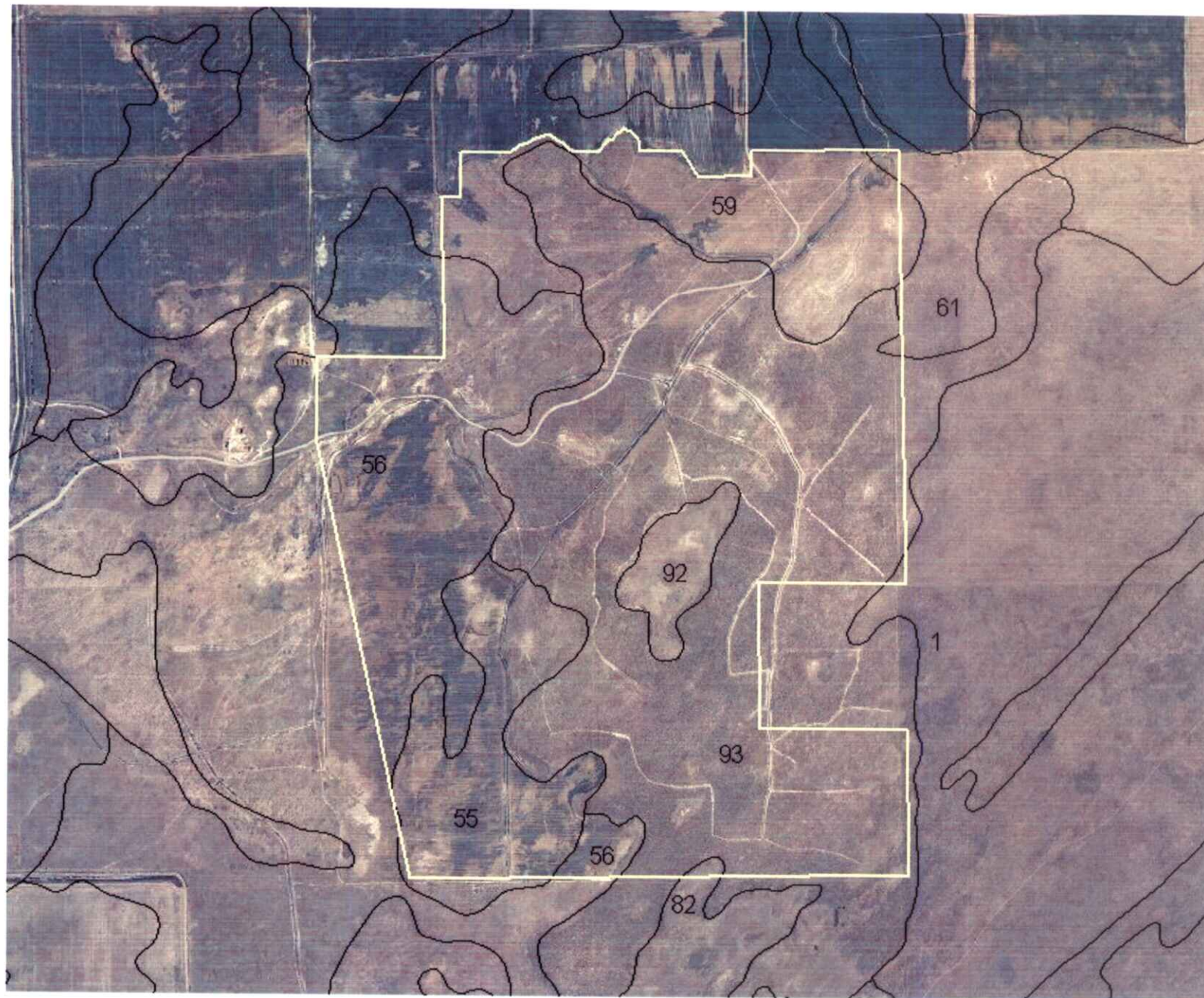
This soil is used for irrigated hay, small grain, pasture, and potatoes.

A suitable cropping system is 3 to 5 years of alfalfa for hay, 1 year of potatoes, and 1 or 2 years of grain. If pasture is used in the cropping system, it is usually used for 5 to 8 years. To maintain high production of crops, commercial fertilizer commonly is needed in addition to manure and plant residue. Generally, legumes respond to phosphate and all crops respond to nitrogen. Sprinkler, border, and furrow irrigation systems are suited to this soil. Sprinkler irrigation is suited to all crops, furrow irrigation is suited to row crops, and border irrigation is suited to alfalfa, small grain, and pasture. If border or furrow irrigation is used, waste water drains should be adequate to carry the surplus water away and to prevent ponding. Irrigation water should be applied with care to avoid creating a high water table.

Russian-olive, golden willow, and Scotch pine are examples of trees that are well suited to use in windbreaks on this soil.

This soil has potential for providing habitat for ring-necked pheasant, mourning dove, songbirds, and birds of prey. These birds obtain their food and shelter to some extent either directly or indirectly from cropland. To

Soil Survey Map



Soil Type 1
Acet-Rock Outcrop Complex
Nonirrigated

Soil Type 55
Levelton Loam
Nonirrigated

Soil Type 56
Levelton Loam
Drained, Moderately Saline-Alkali
Nonirrigated

Soil Type 59
Levelton Silty Clay Loam
Drained, Moderately Saline-Alkali
Nonirrigated

Soil Type 61
Lidy Sandy Loam
0 to 2 Percent Slopes
Irrigated

Soil Type 82
Medano-Psammaquents Complex
Nonirrigated

Soil Type 92
Montlid Silty Clay Loam
Moderately Saline-Alkali
Irrigated

Soil Type 93
Montlid-Heiseton Complex
Nonirrigated

Total Acres Nonirrigated = 651.3

Total Acres Irrigated = 21.7



2000 0 2000 4000 6000 Feet

