INEL-95/0051
January 1995

THE STATUS OF SOIL MAPPING FOR THE IDAHO NATIONAL ENGINEERING LABORATORY

G. L. Olson
Environmental Assessment Technologies
Idaho National Engineering Laboratory
Lockheed Idaho Technologies Co.
Idaho Falls, ID

D. J. Jeppesen
U.S. Department of Interior
Bureau of Land Management
Idaho Falls, ID

R. D. Lee
Environmental Assessment Technologies
Idaho National Engineering Laboratory
Lockheed Idaho Technologies Co.
Idaho Falls, ID

January 1995

Idaho National Engineering Laboratory
Lockheed Idaho Technologies Co.
Idaho Falls, ID 83415

Work supported by the U.S. Department of Energy Assistant Secretary for Environmental Management, under DOE Idaho Operations Office Contract DE-AC07-94ID13223.

ABSTRACT

This report discusses the production of a revised version of the general soil map of the 2304-km^2 (890-mi^2) Idaho National Engineering Laboratory (INEL) site in southeastern Idaho and the production of a geographic information system (GIS) soil map and supporting database. The revised general soil map replaces an INEL soil map produced in 1978 and incorporates the most current information on INEL soils. The general soil map delineates large soil associations based on National Resources Conservation Services [formerly the Soil Conservation Service (SCS)] principles of soil mapping. The GIS map incorporates detailed information that could not be presented on the general soil map and is linked to a database that contains the soil map unit descriptions, surficial geology codes, and other pertinent information.

CONTENTS

FIGURES

TABLES

THE STATUS OF SOIL MAPPING FOR THE IDAHO NATIONAL ENGINEERING LABORATORY

1. INTRODUCTION

The Department of Energy's (DOE) Idaho National Engineering Laboratory (INEL) site is an 2304 km^2 (890 mi^2) reservation in southeastern Idaho located within the eastern Snake River Plain at the base of the Lost River, Lemhi, and Beaverhead mountain ranges in southern Idaho (Figure 1-1). The site extends approximately 63 km (39 miles) north and south and 58 km (36 mi) from east to west in its longest dimensions, and occupies five counties: Bingham, Butte, Bonneville, Clark, and Jefferson. Most of the INEL site, especially the interior, is located in Butte County. The average elevation is 1483 m (4865 ft).

During World War II, the area was used as a gunnery range by the U. S. Navy, and in 1949, was established by the U. S. government as an area for building, testing, and operating experimental nuclear reactors and related facilities. Access to the central corridor of the INEL is restricted to personnel with official DOE or U. S. Navy business. Access to the grazing perimeter (Figure 1-2) is granted to authorized Bureau of Land Management (BLM) personnel and grazing permittees. The grazing perimeter was established within the INEL boundary as part of an interagency agreement between the DOE and the BLM.

This report discusses the development of a revised general soil map, a more detailed geographic information system (GIS) map, and database for the soils within the INEL in southeastern Idaho. This report also discusses what the revised general soil map means and how it can be used, and what the uses for the GIS map are as well as what work remains. There are technical and non-technical discussions about soils throughout the body of the report; qualitative and quantitative descriptions of the soils are also found in the Appendices.

Idaho National Engineering Laboratory

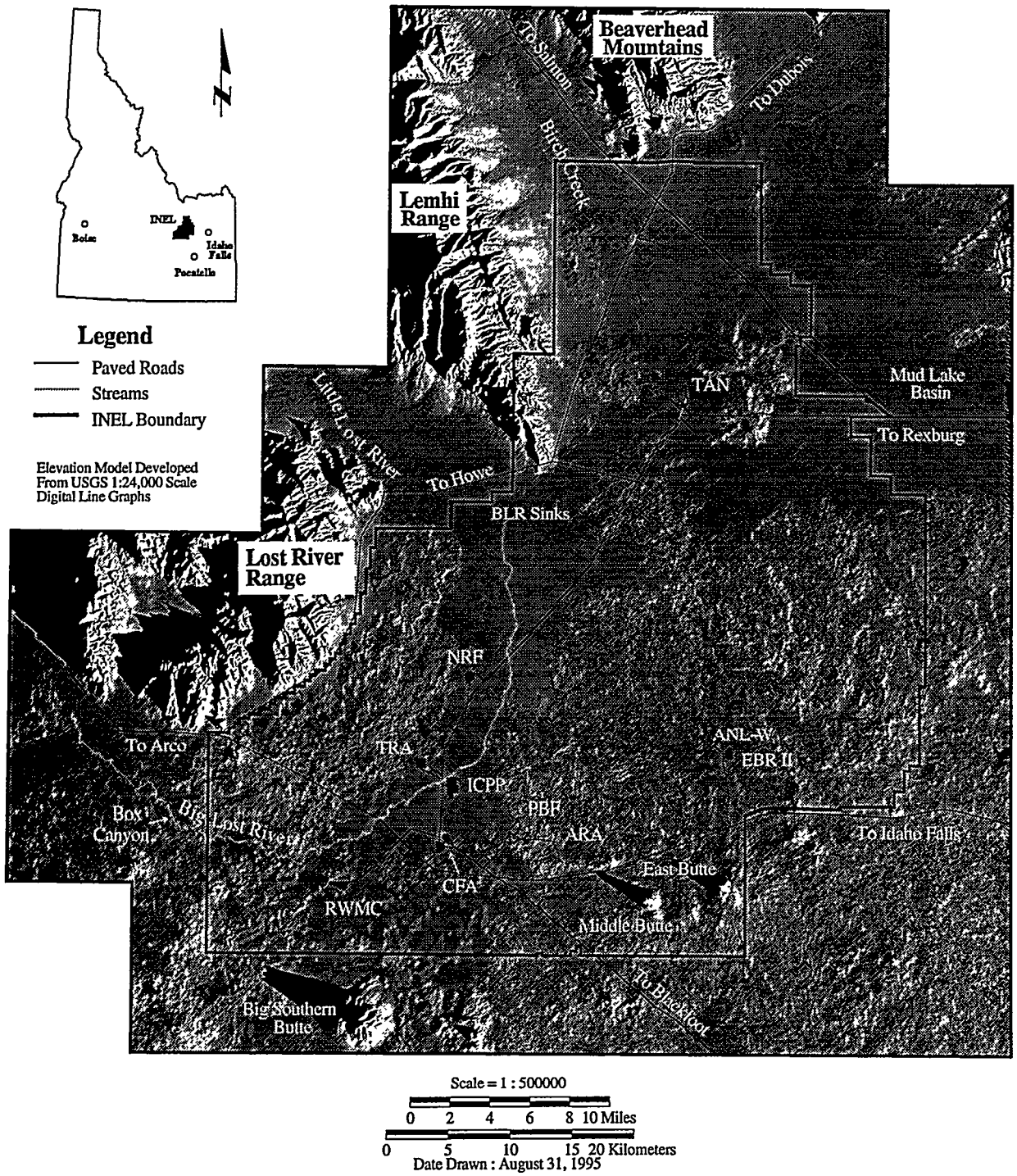


Figure 1-1. General location of the INEL

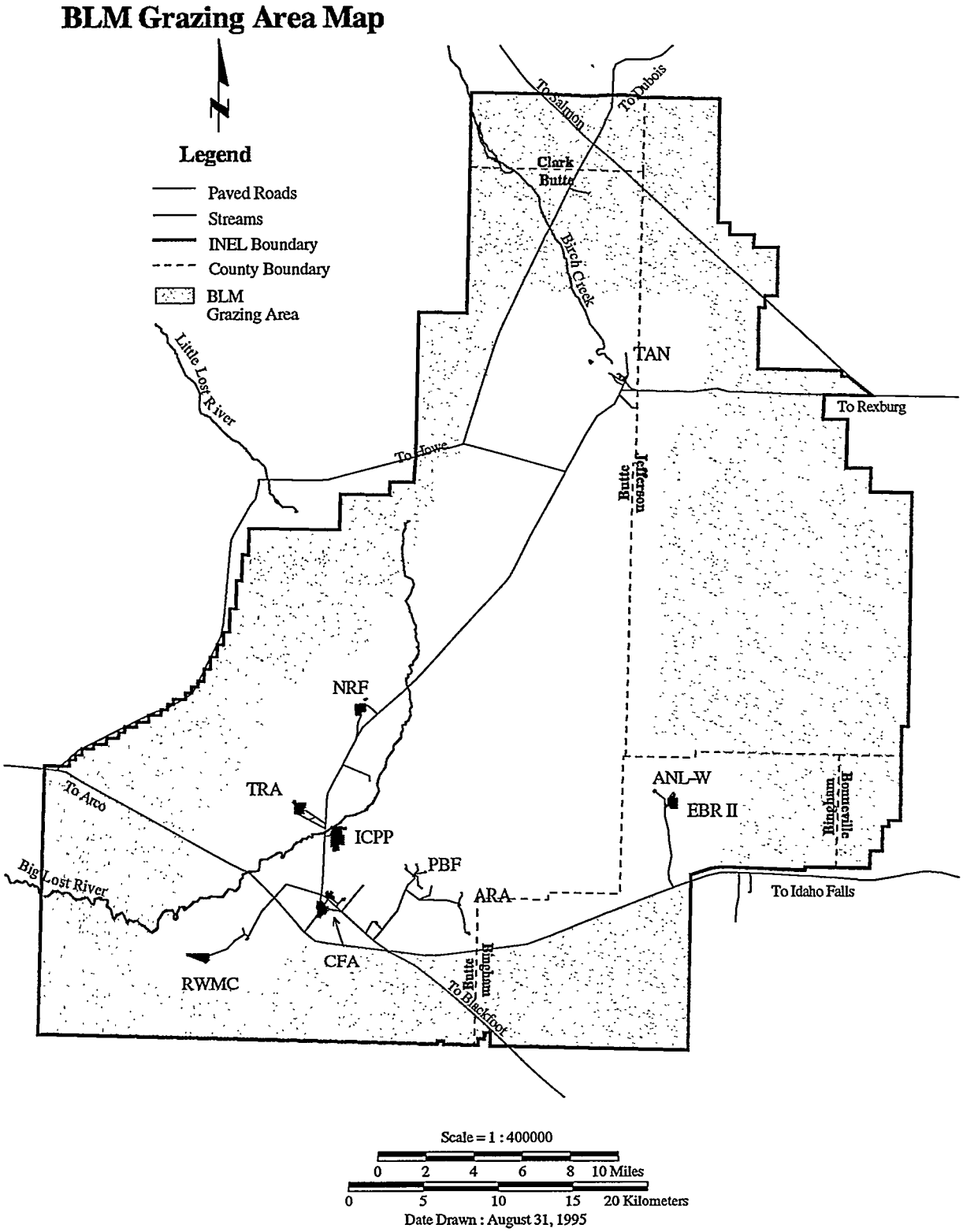


Figure 1-2. Grazing perimeter and county boundaries within the INEL.

2. HISTORY OF SOIL MAPPING AT THE INEL

The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS) is the official soil mapping agency of the Federal government and is responsible for mapping all private lands. Through interagency agreements and the National Cooperative Soil Survey Program, the NRCS also develops soil maps of Federal lands. To date, no such agreement has been made between the DOE and NRCS for mapping INEL soils.

In the absence of a formal agreement, soil mapping on the INEL has been sporadic. In 1968, the NRCS worked with the Idaho Water Resource Board and the University of Idaho Agricultural Experiment Station to compile "special" soil surveys for Butte and Bonneville Counties (Chugg et al., 1968a, 1968b). These soil surveys identified the approximate acreage and distribution of arable soils in these counties and provided descriptions of some of the soils. Both of these surveys mapped some soils within the INEL boundary. The Bingham County soil map was published in 1973 (USDA, 1973), but did not include mapping within the INEL boundary. The Jefferson County soil map was published in 1979 (Jorgensen et al., 1979), and included mapping inside the INEL boundary. Clark County has not been mapped.

In 1978, McBride et al. (1978) compiled information from pertinent county soil maps into a soil map of the INEL (Table 2-1 and Figure 2-1). The map combined the information from the Butte and Bonneville County Special Soil Surveys (Chugg et al. 1968a, 1968b), and from the Jefferson County Soil Survey (Jorgensen et al., 1979), which was in draft form at the time. The McBride report has been cited frequently in INEL documents and represented the most current information on INEL soils prior to this report.

The soil map in the McBride report has several limitations:

- The approach used to resolve or correlate the map units across counties was not described. Original map boundaries were modified so that the final, single-page map would not be

Table 2-1. Original INEL soil mapping unit descriptions (McBride et al. 1978).

Mapping Unit	Arable	Description
A	3, 6	Low water-holding capacity, very stony in places (lower slopes of Big Southern Butte).
B1, B2, B9C, B10J	2, 3, 6	Thin loam over deep sands and gravels yielding low water-holding capacity (surface loam over glacial till) limestone alluvium in valleys of Birch Creek
B3, B4	2, 3, 6	Similar to B1 and B2 but in Little Lost River bottoms.
B5, B6, B8	3	Similar to B1 and B2 but in Little Lost River bottoms.
C1, C3	3	Similar to B1 and B2 but on upper slopes of alluvial fans near mountains of Little Lost River
D	3, 6	Similar to B1 and B2 but more cobbly on upper slopes of alluvial fans across valley north of Howe.
E1, E2	2, 3, 6	Sandy loams derived largely from eolian sands. Strongly calcareous including cemented subsurfaces of calcium carbonates. Overlies basalt rock. Low water-holding capacity and stony to rocky (north of INEL).
E3, E4, E6J	3, 6	Similar to E1 and E2 but with greater depth to bedrock.
E5, E7J	2, 3, 6	Similar to E1 and E2.
E8J	2, 3, 6	Sandy loams derived largely from eolian sands. Strongly calcareous. Overlies basalt rock. Low water-holding capacity north of Mud Lake.
F1	2	Playas in the sinks area. Clay loam over low permeability clay at root zone. Strongly calcareous.
F2, F, F3, F4, F5, F6, F7	1, 2, 3	Similar to F1 with added limitation of high alkalinity and sodicity.
G	1, 2	Limitations slight. Soil is deep, well drained, laminated clay loam. Moderately calcareous. Slightly sodic. (Lacustrine sediments in a playa east and south of Howe.
H, HJ	1, 2, 6	Sandy loam surface, low permeability clay at root zone. Sand dunes in places. (At north end of Big Lost River flood plain continuing to Mud Lake including remanents of prehistoric Lake Terreton.
I	1, 2	Stream bottoms and stream terraces of Little Lost River. Loam and silty clay loam. Limitations slight.
J	1, 2, 3, 6	Sandy loam on alluvial fans adjacent to Lemhi Range northwest of INEL. Moderate water-holding characteristics, shallow depth in places, local rockiness and slope in places are limitations.
L1, L4, L8, L9, L10Bi, L11Bi	6	Very shallow soils, very steep slopes, very rocky, mixed geologic materials of hills and mountains.
N5	3	Stony to gravelly loam on sand and gravel substratum, low water-holding capacity (alluvial fans west of Lemhi Range).
O2, O4, O5Bo	6	Barren lava plains of geologically recent lava flows. Shallow soil and rockiness are limitations.
P	1, 2, 3	Loam and gravelly loam overlying gravel on ends of alluvial fans in Arco hills region. Low water-holding capacity locally.
Q	2, 3	Sandy loam and over loamy sand overlying subsoil of sand and gravel on alluvial fans next to mountains. Low water-holding capacity.
W2	1, 3, 6	Thin loess-covered basalt plains on western border of INEL. Small areas surrounded by bare basalt. Stoniness, rockiness and small areas are limitations.
W3, W5	1, 3, 6	Similar to W2 but having more rockiness.
W4	1, 3, 6	Similar to mapping unit W2 soil.
W7	1, 3, 6	Similar to mapping unit W2 soil.
W8	1, 3, 6	Similar to mapping unit W2 soil.
W9, W11Bi, W12Bo	1, 2, 3, 6	Similar to mapping unit W2 soil, however, areas of arable soil larger than W2 and some soil deeper than W2. Less rockiness that W2 soils (southeastern INEL).
W10, W13, W14Bi	1, 2, 3, 6	Similar to mapping unit W9 soil, however, more rockiness than W9 and more small plots of good soil like W2 as compared to W9.
Y4J	3, 6	Poor and very poorly drained soils near Mud Lake; 97% nonirrigated pasture.
Z1, Z2, Z3	1, 2, 3, 6	Stream bottoms of the Big Lost River on the INEL. Moderate depth of soil and moderate water-holding capacity. In some areas the soil is shallow and has low water-holding capacity.
Z4, Z5	1, 2	Lower alluvial plains of the Little Lost River. Only slight limitations in these soils.

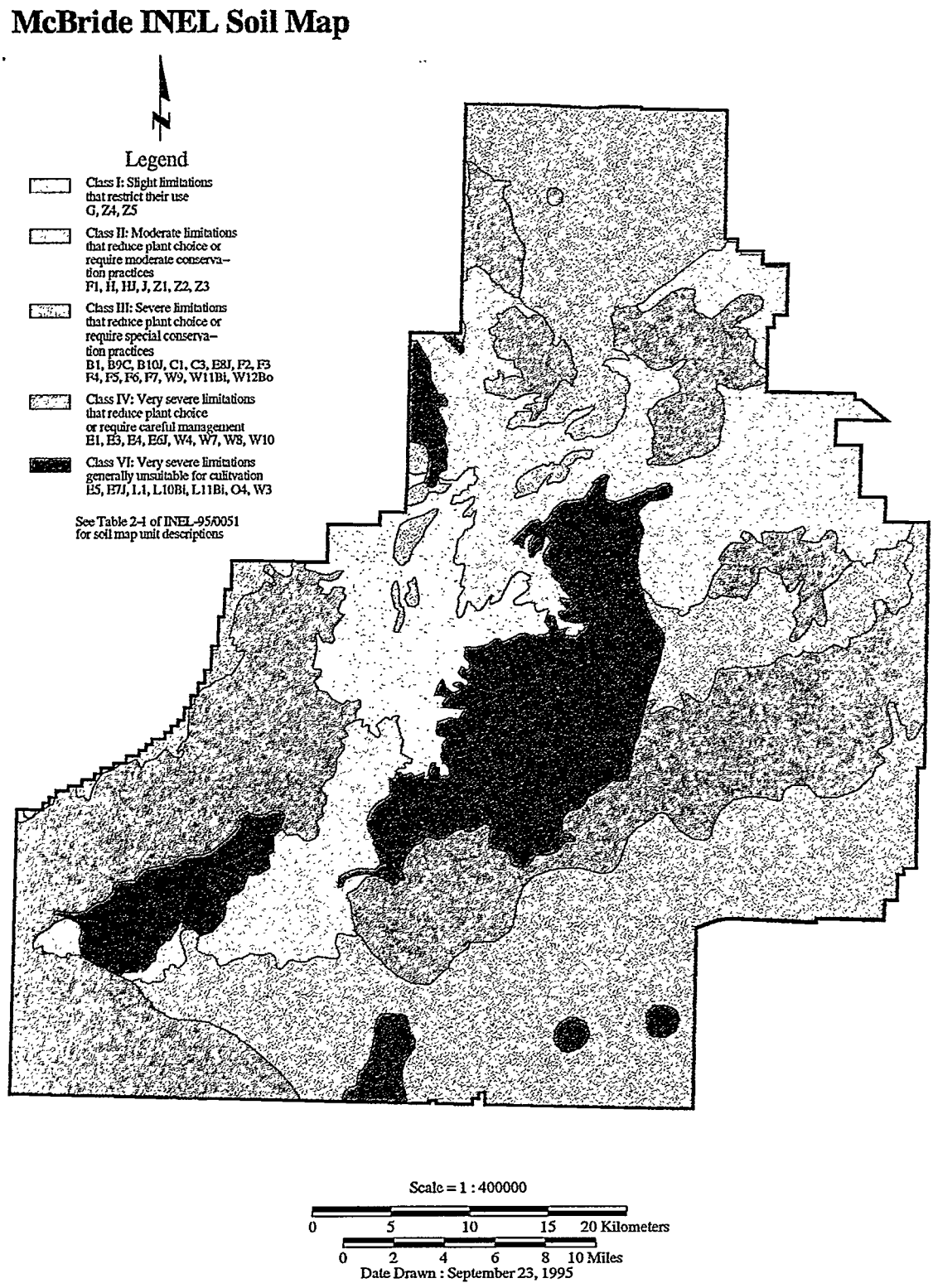


Figure 2-1. Original soil map of the INEL by McBride et al. (1978).

disjointed, however, the basis for these adjustments (e.g., aerial photograph interpretation,field work) was not identified.

- There is no published information on soils for the section of the INEL located in Clark County and it is unclear where the mapping units in Clark County originated.

- The map units from Butte County are based on arability classes (for agricultural use), which are of limited use for most activities on the INEL. In this system of classification, arable soils are grouped on the basis of their potential for sustained production of the common cultivated crops (USDA, 1961). Nonarable soils are grouped according to their potential and limitations for producing permanent vegetation and according to the risk of soil damage under mismanagement (USDA, 1961). While it is generally true that prime agricultural land is also suitable for development (e.g., roads and construction), poor agricultural land is not necessarily unsuitable for development. Therefore, the classes used to group soils in Butte County are not useful for evaluating soils for most INEL activities.

In 1983, detailed (Order 1 or 2, see Table 2-2) soil mapping was completed on two proposed sites for the New Production Reactor (NPR) on the INEL (Breckenridge and McGrath, 1989). The sites were each 1 mi^2 (about 1300 acres total), and mapping units were as small as 5 acres. The locations of the mapped areas are not clearly documented in the report and the authors did not identify where the sites were located with respect to the INEL, the county, or prominent landscape features. Aerial photographs are presented in their document, but there is no prominent feature present (e.g., the Chemical Processing Plant, PBF, a road) to offer any context for the landscape.

In 1989, soil mapping was completed around active EG&G, Idaho facilities on the INEL (Martin et al., 1992). The mapping identifies soil types and distributions around Test Area North (TAN), Central Facilities Area (CFA), Test Reactor Area (TRA) and the Power Burst Facility (PBF) complex. The total area mapped as part of this effort was approximately 3,500 acres. The Martin et al. and Breckenridge and McGrath efforts have limited value with regard to the overall mapping of the INEL, but can be used to verify the relevance of the general soil map. The results of these efforts are discussed in the context of the general soils map later in this report.

Recent progress has been made in mapping the distribution of soils and surface geology at the INEL, including: (a) the Jefferson County soil survey was finalized (Jorgensen et al., 1979), (b) the Bureau of Land Management (Jeppesen, personal communication) mapped the grazing perimeter of the INEL (but has not yet published this information), (c) Scott (1982) published information on surface geology of the INEL, and (d) Rathburn (1991) documented the geomorphology of the Big Lost River (which covers a significant portion of the INEL inside the grazing perimeter). These developments, along with the need to provide soil characterization data for the Environmental Restoration/Waste Management (ER/WM) Environmental Impact Statement (EIS), provided the impetus to update the McBride INEL soil map. New information has been compiled to develop a revised general soil map of the INEL, as well as a GIS map and database.

Table 2-2. Criteria for Identifying Soil Survey Order[a] (USDA, 1993)

Order	Kinds of Map Units	Kinds of Taxonomic Units	Field Procedures	Appropriate Scales for Field Mapping	Minimum Size Delineation
1	Mainly soil consociations and some complexes	Phases of soil series	The soils in each delineation are identified by transecting or traversing. Soil boundaries are observed throughout their length. Air photo interpretation used to aid boundary delineation.	>1:10,000	<1.0 acre
2	Soil consociations, associations, and complexes	Phases of soil series	The soils in each delineation are identified by transecting or traversing. Soil boundaries are plotted by observation and air photo interpretation and verified at closely spaced intervals.	1:10,000 to 1:30,000	1 to 9 acres
3	Soil associations and some soil consociations and complexes	Phases of soil series and soil families	The soils in each delineation are identified by transecting, traversing and some observations. Boundaries are plotted by observation and air photo interpretation and verified by some observation.	1:30,000 to 1:80,000	9 to 64 acres
4	Soil associations with some soil consociations	Phases of soil families and soil subgroups	The soils of delineations representative of each map unit are identified and their patterns and composition determined by transecting. Subsequent delineations are mapped by some traversing, by some observation, and by air photo interpretation verified by occasional observations. Boundaries are plotted by air photo interpretations.	1:60,000 to 1:125,000	36 to 156 acres
5	Soil associations	Phases of soil subgroups, great groups, suborders and orders	The soils, their patterns, and their compositions for each map unit are identified through mapping selected areas (15 to 25 sq miles) with Order 1 or 2 surveys, or alternatively, by transecting. Subsequently, mapping is by widely spaced observations, or by air photo interpretation with occasional verification by observation or traversing.	1:125,000 to 1:1,000,000	156 to 10,000 acres

a. **Hierarchy in soil classification:** (USDA, 1993)
Order--> Suborder--> Great Group--> Subgroup--> Family--> Series

Phase - a subdivision of a soil type or other unit of classification having characteristics that affect the use and management of the soil but that do not vary sufficiently to differentiate it as a separate type. A variation in a property or characteristic such as degree of slope, degree of erosion, content of stones, etc.

Consociation - soil map unit, 75% of which is a single map unit (taxon)

Complex - a map unit of two or more kinds of soil occurring in such an intricate pattern that they cannot be shown separately on a soil map at the selected scale of mapping and publication.

Association - a group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

3. METHODS FOR DEVELOPING A REVISED INEL GENERAL SOIL MAP

The objective of this effort was to compile all existing soil mapping information into a revised general soil map for the INEL (Figure 3-1). This map constitutes and Order 4 or 5 soil survey as defined by the NRCS (Table 2-2). The soil map presented here as well as the more detailed maps compiled during this effort (Olson, 1995) are suitable for conveying broad-scale landscape associations, but not for depicting details associated with a particular area or siting a facility.

The information sources for each area of the INEL are referenced in Figure 3-2. Soil associations for each of the mapping units shown on Figure 3-1 are defined in Table 3-1. Complete descriptions of these mapping units (associations) are provided in Appendix A, and detailed descriptions of the soil series that comprise the mapping units are presented in Appendix B. Appendix C is the NRCS Tables of Engineering Index Properties, Rangeland Productivity, and Characteristic Plant Communities, and Physical and Chemical Properties of the soils for many of the soil groups found on the INEL.

When possible, mapping units on the INEL were correlated with existing NRCS or BLM mapping units, and to use existing soil series rather than attempt to develop new ones. An exception to this was in the central part of the INEL where additional characterization of the Big Lost River plain is yet required to justify the use of existing mapping units or soil series. For this area, geomorphologic descriptions of the plain (Rathburn, 1991) and field notes from a 1989 study of the soil types around EG&G Idaho facilities (Martin et al. 1992) were reviewed, and limited field work was conducted to develop mapping units and soil descriptions. Many of the existing soil series established by NRCS have associated soil characteristic and engineering properties data (Appendix B).

The following soil surveys were used to delineate soil map units and identify soil series within the map units:

- Jefferson County Soil Survey (Jorgensen et al., 1978)
- Bonneville County Soil Survey (USDA, 1981)

Table 3-1. Revised general soil map units.

Map Unit	Soil Association
B	Buttes
BAR	Bereniceton-Acet
BMA	Blackfoot-Mooretown-Arco
CNA	Coffee-Nargon-Atom
DNL	Deuce-Nargon-Lava flow
JRH	Jimbee-Rock outcrop-Ike
MBM	Malm-Bondfarm-Matheson
MG	Matheson-Grassy Butte
MoS	Mogg-Shagel
P	Playa (mostly Menan)
R	Lava flow-Pingree
SSp	Starlite-Sparmo (in association)
STL	Soelberg-Techick-Lesbut
TCC	Typic Camborthids-Typic Calciorthids
Ter	Terreton silty clay loam
TeZ	Terreton-Zwiefel
TTF	Typic Torrifluvents
Whi	Whiteknob gravelly loam
ZGT	Zwiefel-Grassy Butte-Terreton

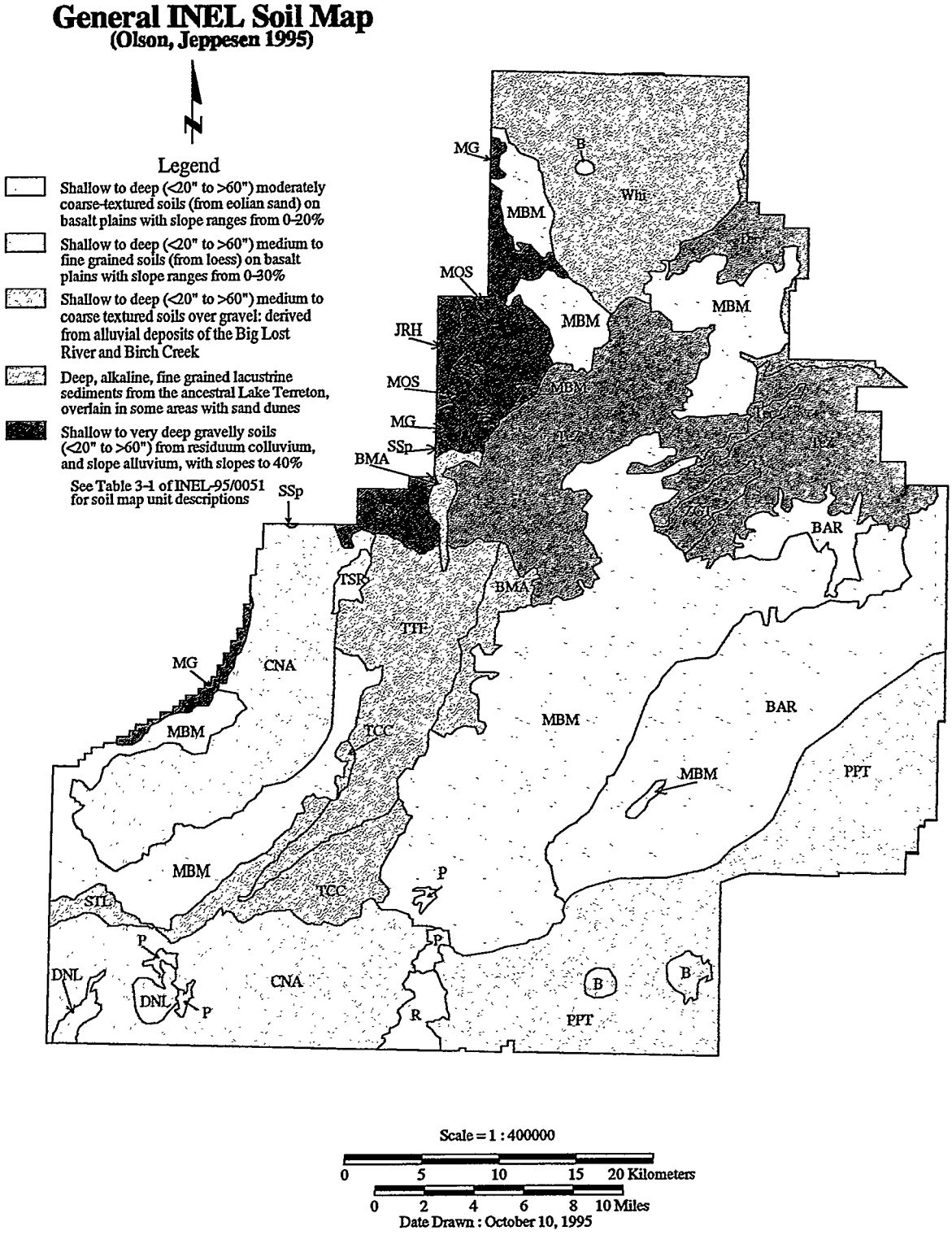


Figure 3-1. Revised soil map of the INEL

Information Sources Map

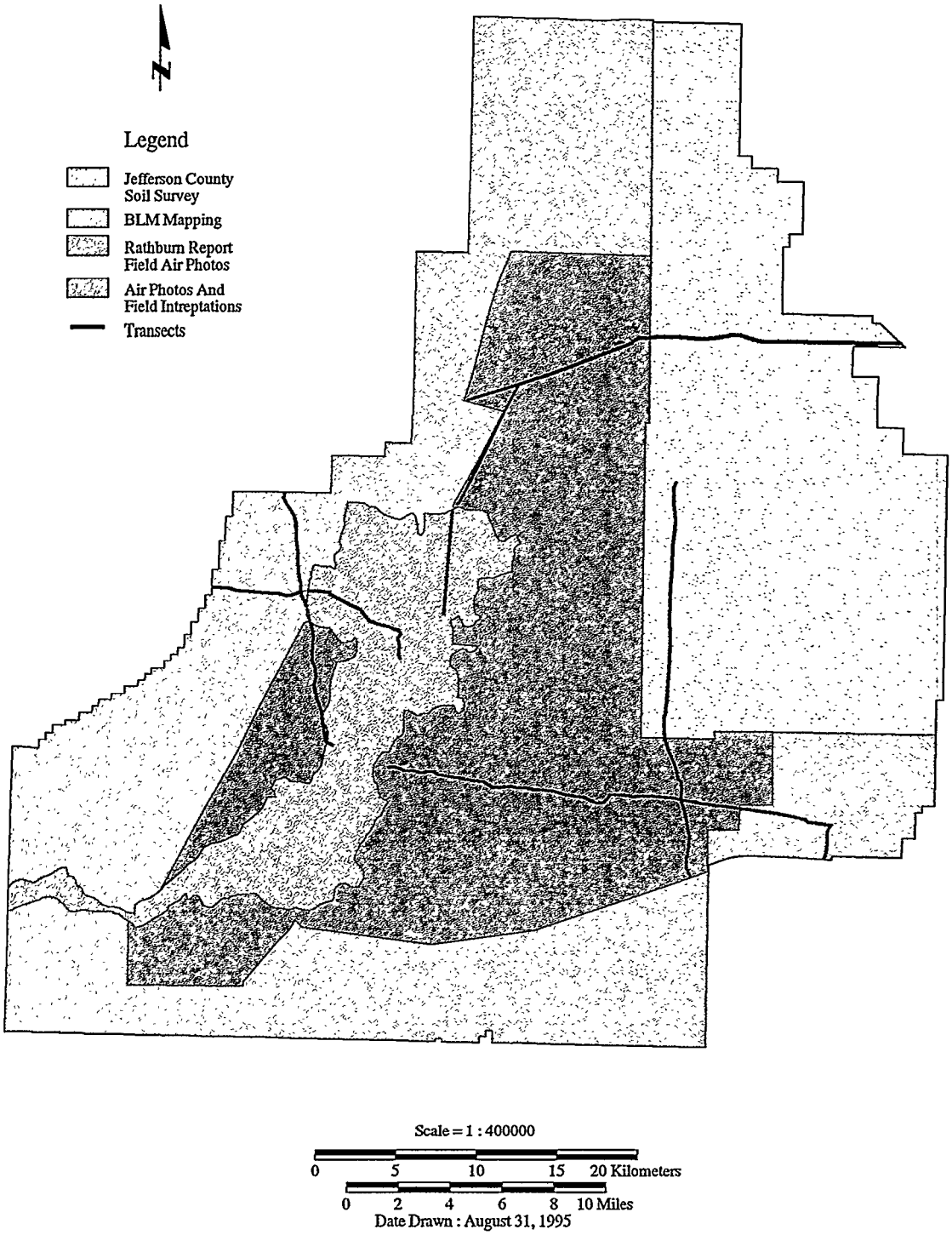


Figure 3-2. Information sources for the INEL soils map.

- Butte County Special Soil Survey (Chugg et al. 1968a)
- BLM unpublished surveys for the grazing perimeter (Jeppesen, personal communication)

Mapping approaches are discussed on a county-by-county basis in Sections 2.1 through 2.3.

Map development involved integrating existing maps with aerial photograph interpreations, and field work findings. Existing data were in a variety of formats, from 1:24,000 scale aerial photographs in Jefferson and Bonneville Counties and on the grazing perimeter, to a smaller scale for Butte County. All data were transferred from their original form to ortho photo quads and then to 1:24,000 scale 7.5 minute USGS mylar quadrangle sheets. The mylar sheets where then digitized to produce the GIS map (see section 3.0 for details on GIS map production). All source maps used to construct the revised general and GIS soils maps are archived in the Engineering Design File (EDF) "Soils Mapping for the Idaho National Engineering Laboratory," (Olson 1995).

BLM's Order 3 or 4 mapping of the grazing perimeter had been done on aerial photographs using the concept of soil-vegetation associations or "range sites". In using the range site approach to soil mapping, the soil scientist selects an area that contains a fairly uniform stand of an "indicator" vegetation association (e.g., basin big sagebrush [*Artemisia tridentata* spp. *tridentata*] and Indian ricegrass [*Oryzopsis hymenoides*]) then determines the typical soils present. From this investigation, a hypothesis about soil-vegetation is developed and tested in various areas within the survey area. The range sites (soil-vegetation associations) may then be used throughout the survey area to draft soil mapping units. For example, a basin big sagebrush site (typical of deep, sandy soils) juxtaposed with black sagebrush (*Artemisia nova*) (frequently in areas with very shallow soils), would suggest changing soil conditions. Preliminary mapping units would distinguish these areas. Depending on the detail and accuracy required for the map, transects might be run between these units to verify the soil types.

The range site approach to soil mapping differs from the NRCS-prescribed approach to Order 2 soil mapping, and generally results in an Order 3 soil map (see Table 2-2). An Order 2 map requires more frequent and detailed examinations of the soils to verify diagnostic horizons and other soil characteristics. Order 3 mapping permits more use of vegetation and aerial photography to

delineate soil types, and results in mapping units of broad soil associations rather than map units that delineate more homogeneous soil units.

Taxonomic categories for each of the components of the soil associations mapping within the INEL are listed in Table 3-2.

3.1 Jefferson and Bonneville Counties

Mapping units from the Jefferson County Soil Survey (Jorgensen et al. 1978) and the Bonneville County Soil Survey (Miles et al., 1981) were transcribed from aerial photographs published in the soil surveys to 1:24,000 scale ortho photo quadrangles (quads) using a light table. The scales of the detailed surveys and the ortho photo quads were almost identical, although there was some minor distortion in some areas. Because the soil survey maps are printed on both sides of the paper, they had to be photocopied so information could be transmitted unambiguously. This may have resulted in some minor distortion of the lines. Adjustments were made during the transcription process to align the maps with one another based on prominent features on the landscape such as light areas (e.g., playas), roads, buildings, or lava ridges. Lines were checked to ensure that they connected smoothly from one ortho photo quad to the next. The mapping compiled for INEL ortho photo quads is published in an Engineering Design File (Olson, 1993).

General mapping units from the Jefferson County Soil Survey were transcribed from published aerial photos to the 1:24,000 scale ortho photo quads. This process revealed some errors with the general map for Jefferson County (Jorgenson et al., 1979) which were repeated on the McBride map. Some smaller mapping units had been combined fromthe detailed maps, but were not carefully transcribed to the general soils map. For example, the ancestral Lake Terreton delineations follow the accepted (geomorphically-correct) shoreline on the detailed maps, but deviate from it on the general map. In the revised soil map presented here (Figure 3-1), the old shoreline incorporates the detailed Jefferson County soil delineations, aerial photo interpretation, Scott's surface geology map (Scott, 1982), and the 1,459 meter (4,800 ft) contour (cited by Nace et al. 1975 as the high water mark of the lake).

Aerial photographs were also used to delineate some of the sand dune-lake bed complexes. Areas on the photographs that appeared to be dominated by lake sediments at the surface were delineated as Terreton-Zwiefel series; areas that appeared to have significant numbers of sand dunes were delineated as Zweifel-Grassy Butte-Terreton series; areas appearing devoid of sand dunes were delineated as Terreton series; and areas that appear to be primarily sandy soils were delineated as Zwiefel series.

On the southern end of Jefferson County, soil delineations do not match Bonneville County delineations. Both surveys were developed using standard NRCS soil mapping techniques and both were approved by the State Conservationist; however, the map unit delineations have not been correlated across counties. Both of the surveys map Pancheri soil series in the eastern part of the INEL, but close to and in the INEL, Bonneville County shows mostly Polatis and Pancheri soil series, while Jefferson County just to the north of Bonneville County shows primarily Aecet and Bereniceton soil series. The distinction between these mapping units is that the Pancheri-Polatis series mapped in Bonneville County consists primarily of silty materials, while the Aecet-Bereniceton series mapped in Jefferson County are coarser. While some of the soils in that area of Jefferson County are mapped as map unit 14 (which consists of Bereniceton silt loam, Terreton silt loam and Aecet loam), the majority are mapped as the coarser unit 1 (Aecet-Rock outcrop complex). Map unit 1 consists of 35% Aecet very stony sandy loam, 25 percent rock outcrop, and 20 percent Bereniceton very stony sandy loam.

No attempt was made to resolve these differences on the detailed ortho photo quads (Olson, 1993); however, a field survey was conducted to resolve these differences. A transect was struck from east to west, through the unresolved units. Field investigations in this area reveal a complex of loamy and silty soils. The eastern part of the transect contained silty soils, which grade to more sandy soils to the west. Vegetation in the eastern part of the transect corresponds with the silty soils, and in the western part corresponds with sandier soils. From this transect, the Aecet-Bereniceton and Coffee-Nargon-Atom units (Coffee-Nargon-Atom are generally siltier or less sandy than Aecet-Bereniceton) were delineated. This southern-most boundary of the Aecet-Bereniceton unit does not show carefully crafted lines which would arise from a detailed investigation, buy rather, a smooth approximation of the mapping unit. Within the Aecet-Bereniceton unit a pocket of Malm-Bondfarm-

Table 3-2. Taxonomic classes of soil series at the INEL.

Soil Series	Family	Suborder
Aecet	fine-loamy, mixed, frigid	Xerollic Calciorthids
Arco	fine-silty, mixed, frigid	Aquic Calcixerolls
Atom	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Beartrap	coarse-loamy, mixed, frigid	Aridic Calcixerolls
Bereniceton	fine-loamy, mixed (calcareous), frigid	Xeric Torriorthents
Blackfoot	fine-loamy, loamy, frigid	Fluvaquentic Haploxerolls
Bondfarm	loamy, mixed, frigid	Lithic Xerollic Calciorthids
Borah	coarse-loamy over sandy or sandy skeletal, mixed, frigid	Fluvaquentic Haploxerolls
Calciorthids	n/a	Typic and Lithic Calciorthids
Camborthids	n/a	Typic and Lithic Camborthids
Coffee	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Cinderhurst	loamy-skeletal, mixed, frigid	Lithic Mollic Haploxeralfs
Deuce	coarse-loamy, mixed, frigid	Lithic Xerollic Calciorthids
Diston	sandy, mixed, frigid	Xerollic Durothids
Hondoho	loamy-skeletal, mixed, frigid	Calcic Haploxerolls
Grassy Butte	sandy, mixed, frigid	Typic Calciorthids
Fallert	sandy-skelatal, carbonitic, frigid	Duri Xerollic Calciorthids
Ike	loamy-skeletal, carbonitic, frigid	Lithic Xerollic Calciorthids
Inel	loamy-skeletal, carbonitic, frigid	Lithic Calciorthids
Jimbee	loamy-skeletal, carbonitic	Lithic Cryoborolls
Lesbut	sandy-skeletal, mixed, frigid	Calciorthidic Haploxerolls
Lidy	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Malm	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Matheson	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Matheson - very deep	coarse-loamy, mixed. frigid	Xerollic Calciorthids
Menan	fine-loamy, mixed , frigid	Xerollic Haploargids
McCarey	fine-loamy, mixed, frigid	Calcic Argixerolls
Modkin	coarse-loamy, mixed, frigid	Xerollic Camborthids
Mogg	loamy-skeletal, mixed, frigid	Lithic Calciorthids
Mooretown	coarse-loamy, mixed, frigid	Pachic Calcixerolls
Nargon	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Paint	loamy-skeletal, carbonitic shallow, frigid	Xerollic Durorthids
Pancheri	coarse-silty, mixed, frigid	Xerollic Calciorthids
Pingree	loamy, mixed, frigid	Lithic Xerollic Camborthids
Polatis	coarse-silty, mixed. frigid	Xerollic Calciorthids
Soelberg	fine-loamy over sandy or sandy-skeleton. mixed, frigid aridic calcic	Calcic Argixerolls
Shagel	loamy-skeletal, mixed. frigid	Lithic Calcixerolls
Simeroi	loamy-skeletal, carbonitic, frigid	Xerollic Calciorthids
Sparmo	coarse-loamy, mixed, frigid	Xerollic Calciorthids
Splittop	fine-loamy. mixed, frigid	Xerollic Camborthids
Starlite	fine-silty, carbonitic, frigid	Xerollic Calciorthids
Techick	fine-loamy, mixed, frigid aridic	Calcic Argixerolls
Techicknot	fine-loamy, mixed, frigid	Aridic Calici Argixerolls
Tenno	loamy, mixed, frigid lithic	Xerollic Camborthids
Terreton	fine, montmorillonitic (calcareous), frigid	Typic Torriorthents
Torrifluvents		Torrifluvents
Vickton	fine, loamy, mixed, frigid	Calcic Argixerolls
Whiteknob	sand-skeletal, mixed, frigid	Xerollic Calciorthids
Zwiefel	sandy over clayey, mixed (calcareous) frigid	Xeric Torriorthents

Matheson, noted during the field investigation, was delineated. This pocket may be an isolated area of sandy material or may be a regularly occurring feature within the Aecet-Bereniceton unit.

3.2 Butte County

The Butte County Special Soil Survey (Chugg et al., 1968a) was used as the primary reference, and reveals delineations similar to those outlined in this work. Some of the delineations on the original Butte County map are not distinct from each other in the descriptions. If broad distinctions between two units could not be described, they were not divided on the revised general soils map. A considerable amount of "lumping" was performed during compilation of the revised general soils map.

The Butte County map distinguishes between the fine-grained loess deposits of the southern and western parts of the INEL and the sandier eolian deposits in the central part of the site. As mentioned in previous sections, general areas of sandier and siltier deposits are recognized on the Bonneville and Jefferson County maps as well, but there is some confusion over the distribution of these deposits. Field work to verify delineations of the Coffee-Nargon-Atom, Aecet-Bereniceton, and Malm-Bondfarm-Matheson units in Butte County was not possible. However, a transect through the Coffee-Nargon-Atom unit along the western side of the INEL was investigated and primarily silty soils over lava were found. The Deuce-Nargon-Lava flow units, which are areas of pressure ridges (steep slopes and shallower soils), were delineated based on stereo pairs of aerial photographs, which revealed higher relief flows with more rock outcrops.

Lacustrine deposits of the ancestral Lake Terreton delineated on the Butte County survey are very similar to the delineations presented here, which are based both on aerial photograph investigations and contour lines. Nace et al. (1975) report that the margins of the lake occur at the 1,459-m (4,800-ft) contour. This contour was drafted on a 1:100,000 scale general soils map. Aerial photographs and grazing perimeter mapping were then examined to verify that lacustrine deposits were (apparently) present. In the grazing perimeter, the BLM noted lacustrine sediments within the areas that fell within the 4,800 ft contour. The lake deposits are clearly shown on aerial photographs since they are light-colored, and the topography is flat. These delineations of the lake are believed to be fairly accurate, -28 except where it intersects with the Big Lost River alluvial deposits and the Big Lost River Sinks area. Field work is required in these areas to make a more accurate distinction. Rather than distinguishing alluvial from lacustrine, Rathburn (1991) also mapped the deposits as grading into one another.

In the Butte survey, Chugg et al. (1968a) note that some of the areas within the lacustrine deposits and playas contain sodic soils. Sodicity has not been verified, however several areas in the ancestral Lake Terreton deposits and elsewhere are probably sodic. Sodic soils would likely be inclusions to the mapping units on the revised INEL general map.

Information from the Martin et al. (1992) report on surface soils in the playa around TAN and from field investigations revealed that the soils to a depth of about 25 cm (10 in) were generally silty clay loams or loams and high in sodium (Martin et al. 1992, DOE 1992, and field notes); below that depth, soils were generally fine-textured soils that reacted strongly with dilute (10%) hydrochloric acid (HCl). The Jefferson Soil Survey classifies the lacustrine deposits as the Terreton soil series, and the sand dunes as Zwiefel soil series. To be consistent, this classification was carried through Butte County. Fine-grained Lake Terreton sediments were classified as Terreton soil series and the sands as Zwiefel series. Additional field and laboratory work is necessary to verify that properties for these soils are within the allowable limits of the Terreton and Zwiefel series.

The Soelberg-Techick-Lesbut unit of the Big Lost River (where it enters the INEL) has not been verified. The designation of this unit is based on limited investigation of the area by the BLM in 1990-1991, and mapping experience elsewhere on the Big Lost River in Butte County. Soelberg and Techick units may have stronger argillic horizons (accumulated clay in the subsurface) than those found in this Big Lost River unit.

The mapping of the northwestern part of the INEL (west of the Terreton-Zwiefel complex) has not been closely examined. This includes the Big Lost River Sinks area (the Ike-Jimbee-Inel unit), and the northernmost Simeroi-Sparmo-Grassy Butte units. A transect from the Big Lost River sinks south about 5 miles, revealed that the soils in that area differ from the soils in the Birch Creek playa; namely, the soils were darker, siltier, more porous, supported more biomass, and did not have the "slick" appearance of the Birch Creek playa soils, which are probably sodic. Some aquic soils were identified in the Sinks and some high shrink-swell soils were located south of the Sinks. The extent of these soils is not known. Hydrophobic (water-repellant) soils were also identified in this area, the origin of which is unknown.

The Ike-Jimbee-Inel association, formerly thought to be Mogg-Shagel, was reclassified after reviewing geologic maps which indicated the predominance of limestone. Additional work is required in

this unit to verify these soil series are present. Limited areas within the MG units have been verified by BLM (although there is a wide range of characteristics allowed within these units).

The Whiteknob unit at the north end of the INEL is mapped as a single soil type, however, there are many soil series in this unit. Alluvial deposits are typically difficult to map because their characteristics vary over short intervals, and are variable with depth.

3.3 Clark and Bingham Counties

Clark County has not yet been mapped by the NRCS, and the portion of Bingham County that has been mapped does not include the INEL. However, areas of the INEL in these counties are also inside the BLM grazing perimeter and mapping by the BLM has been conducted in these areas. The southern part of the INEL occupying Bingham County is predominantly the Pancheri-Polatis-Tenno mapping unit, and that the northern part of the INEL occupying Clark County is predominantly Whiteknob mapping unit.

For Bingham County delineations, the mapping units were transcribed from BLM aerial photographs to the ortho photo quads as outlined for Jefferson and Bonneville survey units. Photocopying was not required to transcribe the soil lines for copying.

Map units transcribed to ortho photo quads were combined to make larger map units appropriate for the revised general soils map of the INEL. Units were combined into broad soil type categories that could be clearly displayed on standard size paper. Distinctive landforms, such as R (rock) and Pla (playa) units were delineated since they pose limitations for many land uses.

3.4 Use of Detailed Mapping From Previous INEL Studies

Two detailed mapping efforts have been conducted on the INEL. Breckenridge and McGrath (1989) produced a detailed map of the two NPR sites, and Martin et al. (1992) produced soil maps for several active EG&G Idaho facilities (i.e., TRA, TAN, CFA, and the PBF area). The use of these surveys in the compilation of the general map is discussed below.

3.4.1 Mapping of proposed NPR sites. In 1983, two areas that were selected as possible sites for the New Production Reactor (NPR) were mapped jointly by EG&G Idaho, Inc. and NRCS (Breckenridge and McGrath, 1989). The sites are located just north of the PBF area. Each site was 6.76 km^2 (1 mi^2) which was too detailed for use in compiling the revised general soils map. The mapping units were compared to the revised general map to verify that the two efforts consistently identified the same soil types. The revised general map shows the Malm-Bondfarm-Matheson soil association in this area, while the detailed mapping also showed these additional series: Bockston, Grassy Butte, Whiteknob, and Wolverine. This detailed mapping agrees with the revised general mapping of coarse-textured soils over basalt lava.

3.4.2 Mapping of active INEL facilities. In 1989, soil maps were produced of the TAN, TRA, CFA, and PBF areas (Martin et al., 1992). The effort involved preliminary mapping of the area, then verification of the mapping units by NRCS and BLM personnel. These surveys were too detailed to use for the general soil map presented in this report, however, the units were compared with the revised general map. Mapping around CFA and TRA provides detail about general mapping units for which little information is available.

Martin et al. (1989) mapped alluvial soils at CFA, and Bannock sandy loams in the older deposits of TRA. These soils are deep, well drained soils on river terraces. This soil is classified as a coarse-loamy over sandy or sandy-skeletal mixed Aridic Calcixeroll, which differs from the Typic Calciorthids and Typic Camborthids mapped in this report. The Calcixerolls have a darker, more organically-enriched surface horizon than the Calciorthids or Camborthids. In the younger deposits at TRA, Martin et al. (1992) mapped Whiteknob gravelly loams, which differ from the Typic Torrifluvents mapped on the revised general soils map. Whiteknob gravelly loams are sandy-skeletal, mixed, frigid Xerollic Calciorthids, which are markedly different than Torrifluvents since they exhibit soil development, including a calcic horizon. A calcic horizon implies a passage of time sufficient for pedologic processes to proceed. Additional work is required to identify or verify the ages of the Big Lost River deposits on the INEL.

3.5 Mapping from Aerial Photograph Investigations

Aerial photographs of the INEL were viewed in stereo pairs to facilitate the extension of some map units from the county maps to the interior of the INEL. In the lava flows, the stereo pairs helped

identify changes in topography that would be significant enough to justify separate map units or map unit extensions. In the Big Lost River plain, the stereo pairs revealed the different ages of the alluvial deposits. This information was used to corroborate Rathburn's (1991) map delineations in the plain. In the ancestral Lake Terreton sediments, the photographs revealed light colored soils, characteristic of the lacustrine and playa deposits.

3.6 Mapping from Field Work

Limited field work was conducted in areas where no documented soil mapping had been done, or where units were being extended across jurisdictional boundaries (e.g., from the grazing perimeter to the interior). However, the main focus of this effort was to compile existing information. Transects established for this mapping effort were placed along roads, and augering was done periodically to check the soil types. Soils in typical and atypical areas were investigated to identify both common soils and inclusions. At each site, augering was done to approximately four feet, field textures on the various horizons were determined, depth of carbonates was determined, and other diagnostic characteristics were identified (e.g., mottles, argillic horizons).

4. GIS MAP AND DATABASE PRODUCTION

This section addresses, (a) the methodologies used to produce the GIS map and its associated database, (b) how the GIS map can be used, and (c) what work remains on the map. The primary purpose for constructing the GIS map and associated database was to compile all the information found on the ortho photo quad sheets into one dataset. The GIS map contains all the soil boundaries mapped on the ortho photo quads (Figure 4-1), and the associated GIS database houses the soil mapping units, surfical geology codes for most of the soil types, and soil mapping unit descriptions for each polygon.

4.1 Spatial Data Entry

Soil outlines and polygons mapped on the USGS mylar sheets (Olson 1995), were entered into the GIS using a digitizing tablet while following digital data capture standards from two different sources: U.S. Geological Survey (USGS) "Standards for Digital Line Graphs (DLG)" and U.S Dept. of Agriculture (USDA) Soil Conservation Service "Soil Map Digitizing Requirements And Specifications for Soil Survey." The USGS requirements for DLG production state that "the ground length in meters of the smallest data collection unit is 0.001 inches" (USGS, 1988). For a 1:24,000 scale map anything under 0.001 inches in length on a paper or mylar original will not be reproduced with the required accuracy. For the USDA digitizing standards, lines must be digitized "within a 0.010 inch line width of the source document" (USDA, 1994). Each mylar quad sheet was secured to the digitizing tablet and registered to an existing GIS coverage containing the tic marks for the corner of each USGS quad (Figure 4-2). As the mylar quad was registered to the GIS coverage using the tic marks, a root mean square (RMS) error was calculated by the GIS software. If the RMS error was greater than .005 inches, the mylar sheet was re-registered to the coverage. Also, if the digitizing session for an individual sheet was more than 3 hours the map was re-registered to ensure accuracy. After the polygons for each mylar sheet were digitized, a link to the database in the form of a label point was placed inside each polygon tying the polygon to the appropriate soil mapping description stored in the database.

4.1.1 Spatial Data Accuracy. The RMS error was calculated for each quad sheet during its registration to the GIS coverage. The RMS errors for the 30 quad sheets ranged from .001 to .004 inches.

To ensure that each line was digitized within .010 inches of the source line, paper maps for each quad were printed for overlay with the mylar source sheets. The accuracy of the lines proved to be within the tolerance.

4.2 Attribute Data Entry

The GIS soil coverage was produced as a polygon coverage since each soil type is defined by a spatial boundary, and as mentioned above, a label point was placed inside each polygon to link the attribute data to the polygon. The attributes recorded for each label point in the database were divided into the following database fields:

soil-code	an alpha numeric code for the soil map unit description
geo-code	a three letter code used to indicate the surficial geology type based on Scott (1982)
comments	any information about the polygon that was deemed important
status	information on the completeness of the polygon (e.g., did the lines between each quad sheet match, was the polygon complete)
character	the soil map unit descriptions for the polygon (see appendix A for a list of GIS soil map units descriptions)

Unlike the general soils map discussed in section 2, the GIS map distinguishes soil map units between counties. In order to keep the soil map units the same as they appear in the Jefferson County Soil Survey and the Bonneville County Soil Survey, the letter J and B respectively were added to the end of the map unit indicating which county the map unit came from. Table 4-1 contains a list of all the soil map units found on the GIS map and a summary description of each. A more detailed description of each soil map unit can be found in Appendix A and a detailed description of the soil series associated with each map unit can be found in Appendix B.

4.2.1 Attribute Data Accuracy. The attribute accuracy of the GIS soil coverage was checked by printing paper maps for overlay with the mylar sheets and checking the accuracy of the lines. When the paper overlay maps were produced, the soil map unit for each polygon was printed inside each polygon. As the lines were checked for accuracy, the map unit located next to each label was examined to ensure it was the same as the one on the mylar sheet. Once the soil map unit was checked, a list of

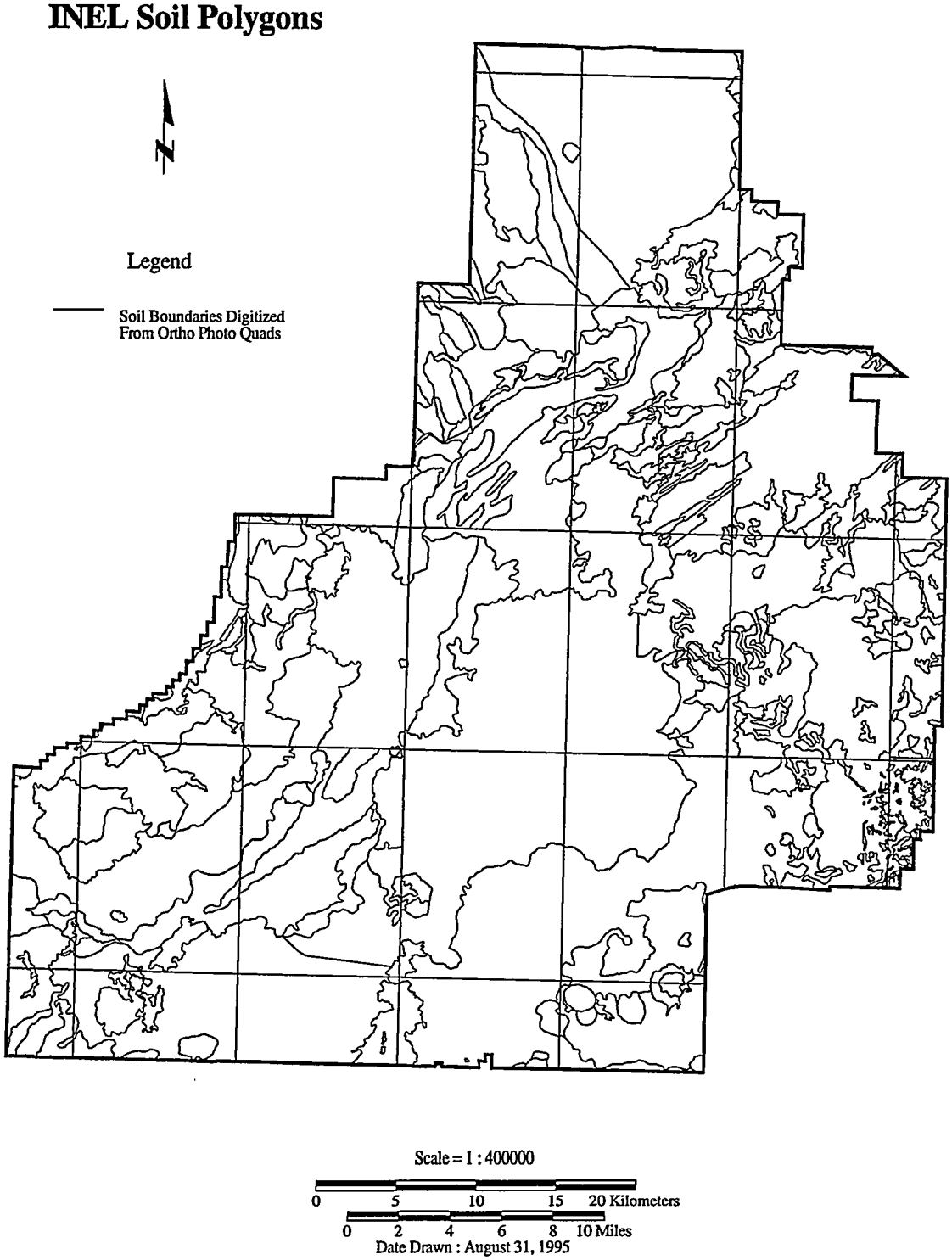


Figure 4-1. INEL soil polygons

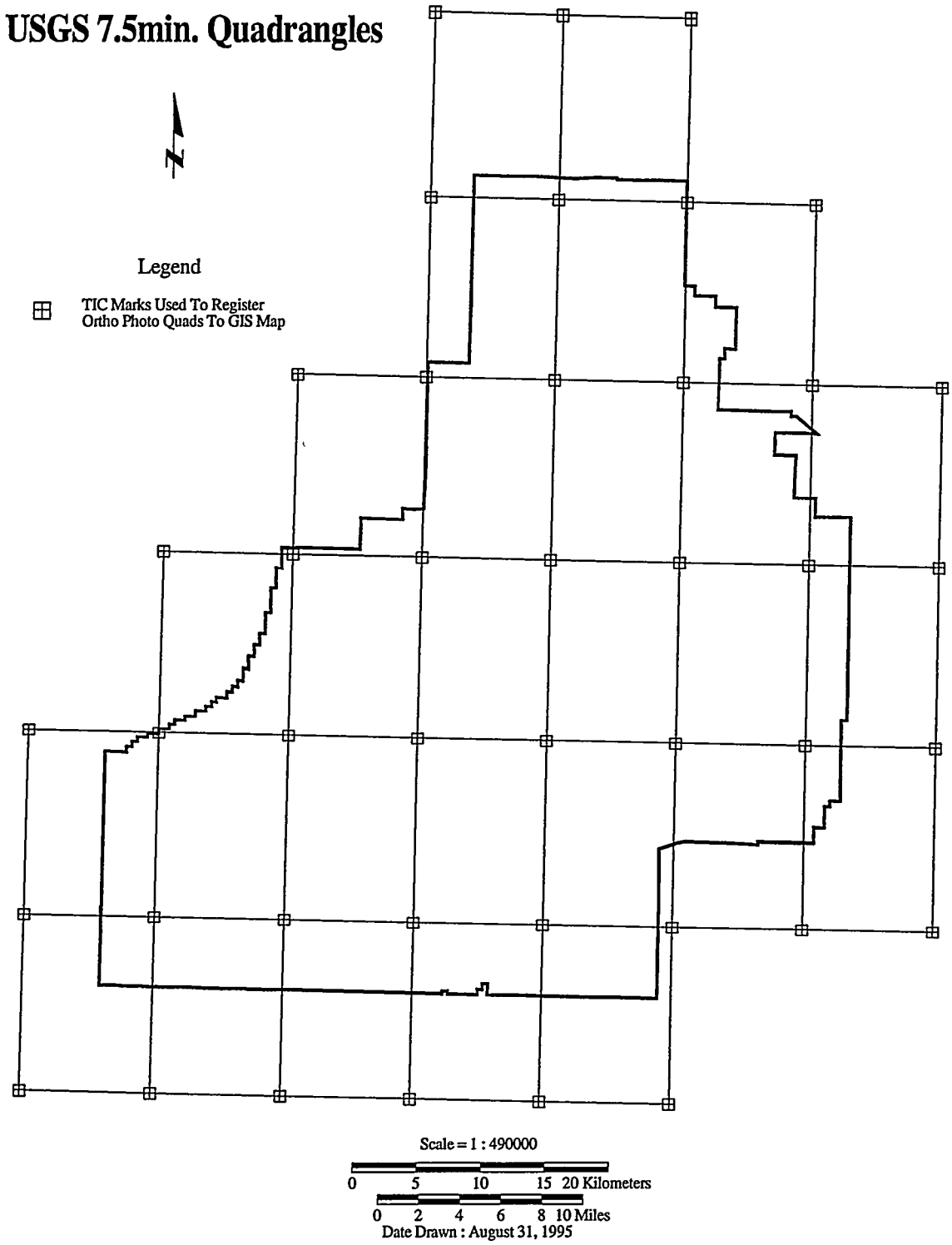


Figure 4-2. USGS 7.5-min. quadrangles

the other attributes in the database for each map unit was printed to check the rest of the data. All the attributes for the GIS map checked with the original mylar quad sheets.

4.3 GIS Map Uses

The GIS facilitates analyses as well as storing, tracking, and graphically representing the soil data. Spatial analysis can be performed with the GIS by overlaying different datasets such as soil, vegetation and topography. The result of such an analysis can reveal areas of known vegetation types, slopes, and aspects which are crucial to soil scientists in determining soil classifications. Moreover, having entered the soils dataset into the GIS, the data are now accessible to other scientists and researchers, and are part of a larger environmental dataset which is backed up on a regular basis. As a part of the INEL GIS, information about the dataset is recorded in a Source Lineage Report (SLR) which logs information such as projection, scale, analyst name, machine type, coverage location, problem comments, and revision text about the coverage and the sources used to build the coverage. As revisions to this map are made, the SLR can be updated to reflect the current status of the coverage.

The GIS soil map is compatible with other agencies, such as BLM and NRCS, who are mapping soils in Idaho using a GIS. As new soil map coverages become available, they can be combined with or replace the current INEL soil map reducing costs and the possibility of introducing error during digitizing.

Finally, the GIS also provides a tool for producing a hardcopy map of the soil data (Figure 4-3). While the GIS soils map of the INEL presented in Figure 4-3 covers the entire INEL, more detailed (larger scale) maps can also be produced (Figure 4-4).

Table 4-1. GIS soil map units and descriptions.

GIS Soil Map Unit	GIS Soil Map Unit Description	Combined Soil Groups
1J	Aecet-rock outcrop complex	Sands over basalt
424	Atom silt loam, 2 to 8 percent slopes	Loess (silt, loam, windblown)
430	Atom silt loam, 2 to 8 percent slopes	Loess (silt, loam, windblown)
9J	Bereniceton loam	Mixed sand loess over basalt
13J	Bereniceton–Rock outcrop-Aecet complex	Mixed sand loess over basalt
14J	Bereniceton–Terreton-Aecet complex	Mixed sand loess over basalt
15J	Bereniceton–Terreton-Rock outcrop complex	Mixed sand loess over basalt
12J	Bereniceton-Aecet loams	Flood plain
BMA	Blackfoot-Mooretown-Arco	Sands over basalt
20J	Bondfarm-Rock outcrop complex	Sands over basalt
21J	Bondfarm-Rock outcrop-Grassy Butte complex	Sands over basalt
C	Cinder	Cinder cone
419	Coffee-Nargon complex, 4 to 20 percent slopes	Loess (silt, loam, windblown)
425	Coffee-Nargon-Atom complex, 2 to 12 percent slopes	Loess (silt, loam, windblown)
XHX	Cryborlls-Rubble-Rock outcrop complex, 30 to 90 percent slopes	Foothills
429	Deuce-nargon-Lava Flow complex, 12 to 20 percent slopes	Loess (silt, loam, windblown)
423	Deuce-Nargon-Lava Flows complex, 2 to 20 percent slopes	Loess (silt, loam, windblown)
24J	Diston loamy sand, 0 to 4 percent slopes	Loess (silt, loam, windblown)
AFC	Fallert gravelly loam, 2 to 8 percent slopes	Mixed sand loess over basalt
34J	Grassy Butte loamy sand, 2 to 20 percent slopes	Sands (deep, small dunes)
32J	Grassy Butte loamy sand, 2 to 4 percent slopes	Sands (deep, small dunes)
33J	Grassy Butte loamy sand, 4 to 8 percent slopes	Sands (deep, small dunes)
31J	Grassy Butte sand, 2 to 20 percent slopes	Sands (deep, small dunes)
37J	Grassy Butte-Rock outcrop complex	Sands over basalt
426	Hondo cobbly loam, 4 to 30 percent slopes	Foothills
IR	Ike-Rock outcrop-Jimbee association, 10 to 80 percent slopes	Foothills
Ju	INEL-Matheson-Rock outcrop association. 8 to 45 percent slope	Foothills
JRH	Jimbee-Rock outcrop-Ike association. 10 to 90 percent slopes	Foothills
409	Lava flows	Lava
17B	Lava Flows	Lava
411	Lava Flows-Cinderhurst complex, 2 to 15 percent slopes	Lava
413	Lava Flows-Pingree complex. 0 to 8 percent slopes	Lava
63J	Lidy gravelly loam	Terrace
61J	Lidy sandy loam, 0 to 2 percent slopes	Terrace
432	Malm-Bondfarm-Matheson complex, 2 to 8 percent slopes	Sands over basalt
64J	Malm-Matheson loamy sands	Sands over basalt
66J	Malm-Matheson-Rock outcrop complex	Sands over basalt
67J	Malm-Rock outcrop complex	Sands over basalt
78J	Matheson complex	Sands (deep, small dunes)
70J	Matheson loamy sand, 2 to 8 percent slopes	Sands (deep, small dunes)
MG	Matheson-Grassy Butte complex, 2 to 15 percent slopes	Sands (deep, small dunes)
407	McCarey-Beartrap complex, 1 to 6 percent slopes	Loess (silt, loam, windblown)
410	McMarey-Beartrap complex. 6 to 20 percent slopes	Loess (silt, loam, windblown)

Table 4-1. (continued)

GIS Soil Map Unit	GIS Soil Map Unit Description	Combined Soil Groups
406B	McMarey-Vickton-Lava Flows complex. 0 to 15 percent slopes	Loess (silt, loam, windblown)
41	Menan silt loam, 0 to 2 percent slopes	Loess (silt, loam, windblown)
MS	Mogg-Shagel association, 15 to 60 percent slopes	Foothills
MB1	Mooretown-Borco complex, 0 to 2 percent slopes	Sands over basalt
420	Nargon-Atom-Techicknot complex, 0 to 20 percetn slopes	Loess (silt, loam, windblown)
422	Nargon-Deuce-Lava Flows complex, 0 to 20 percent slopes	Loess (silt, loam, windblown)
XHS	Orthids-Rubble-Rock outcrop complex, 30 to 80 percent slopes	Foothills
425B	Pancheri Polatis complex, 2 to 12 percent slopes	Loess (silt, loam, windblown)
22B	Pancheri silt loam, 0 to 2 percent slopes	Loess (silt, loam, windblown)
23B	Pancheri silt loam, 2 to 4 percent slopes	Loess (silt, loam, windblown)
424B	Pancheri silt loam, 2 to 8 percent slopes	Loess (silt, loam, windblown)
24B	Pancheri silt loam, 4 to 8 percent slopes	Loess (silt, loam, windblown)
99J	Pancheri stony silt loam, 2 to 30 percent slopes	Loess (silt, loam, windblown)
1	Playa silty clay loam, 0 to 1 percent slopes	Playa
33B	Polatis-Rock outcrop complex, 2 to 25 percent slopes	Loess (silt, loam, windblown)
R	Rock	Foothills
105J	Rock outcrop-Modkin complex	Lava
249	Simeroi complex, 5 to 30 percent slopes	Terrace
SP2	Simeroi-Sparmo complex. 4 to 8 percent slopes	Terrace
SP1	Sparmo silt loam, 1 to 4 percent slopes	Terrace
408B	Split-Coffee complex, 2 to 8 percent slopes	Loess (silt, loam, windblown)
408	Splittop-Atomic complex, 6 to 20 percent slopes	Loess (silt, loam, windblown)
DC1	Starlite loam, 0 to 4 percent slopes	Playa
STL	Techick-Soelberg-Lesbut complex, 0 to 4 percent slopes	Flood plain
433	Techick-Soelberg-Lesbut complex, 0 to 4 percent slopes	Flood plain
116J	Terreton complex	Playa
109J	Terreton loam	Playa
107J	Terreton loamy sand	Playa
108J	Terreton sandy loam	Playa
111J	Terreton silty clay loam	Playa
115J	Terreton-Rock outcrop complex	Playa
TeZ	Terreton-Zwiefel	Playa
117J	Terreton-Zwiefel complex	Playa
TCC	Typic Camborthids-Typic Calciorthids	Flood plain
TTF	Typic Torrifluvents	Flood plain
122	Whiteknob gravelly loam	Terrace
126J	Zwiefel fine sand, 0 to 2 percent slopes	Playa
130J	Zwiefel-Grassy Butte-Terreton complex	Playa

INEL

Soils Map

Combined Soil Groups:
SOIL MAP UNITS *

- Flood plain: STL, TCC, TTF, 12J
- Loess (silt, loam, windblown): 424, 430, 419, 425, 429, 423, 24J, 407, 410, 406B, 41, 420, 422, 425B, 22B, 23B, 424B, 24B, 99J, 33B, 408B, 408
- Lava: 409, 17B, 411, 413, 105J
- Foothills: XHX, 426, IR, Ju, JRH, MS, XHS, R
- Playa: 1, DC1, 116J, 109J, 107J, 108J, 111J, 115J, TeZ, 117J, 126J, 130J
- Sands (deep, small dunes): 34J, 32J, 33J, 31J, 78J, 70J, MG
- Sands over basalt: 1J, BMA, 20J, 21J, 37J, 432, 64J, 66J, MB1
- Mixed sand loess over basalt: 9J, 13J, 14J, 15J, AFC
- Terrace: 63J, 61J, 249, SP2, SP1, 122
- Cinder cone: C

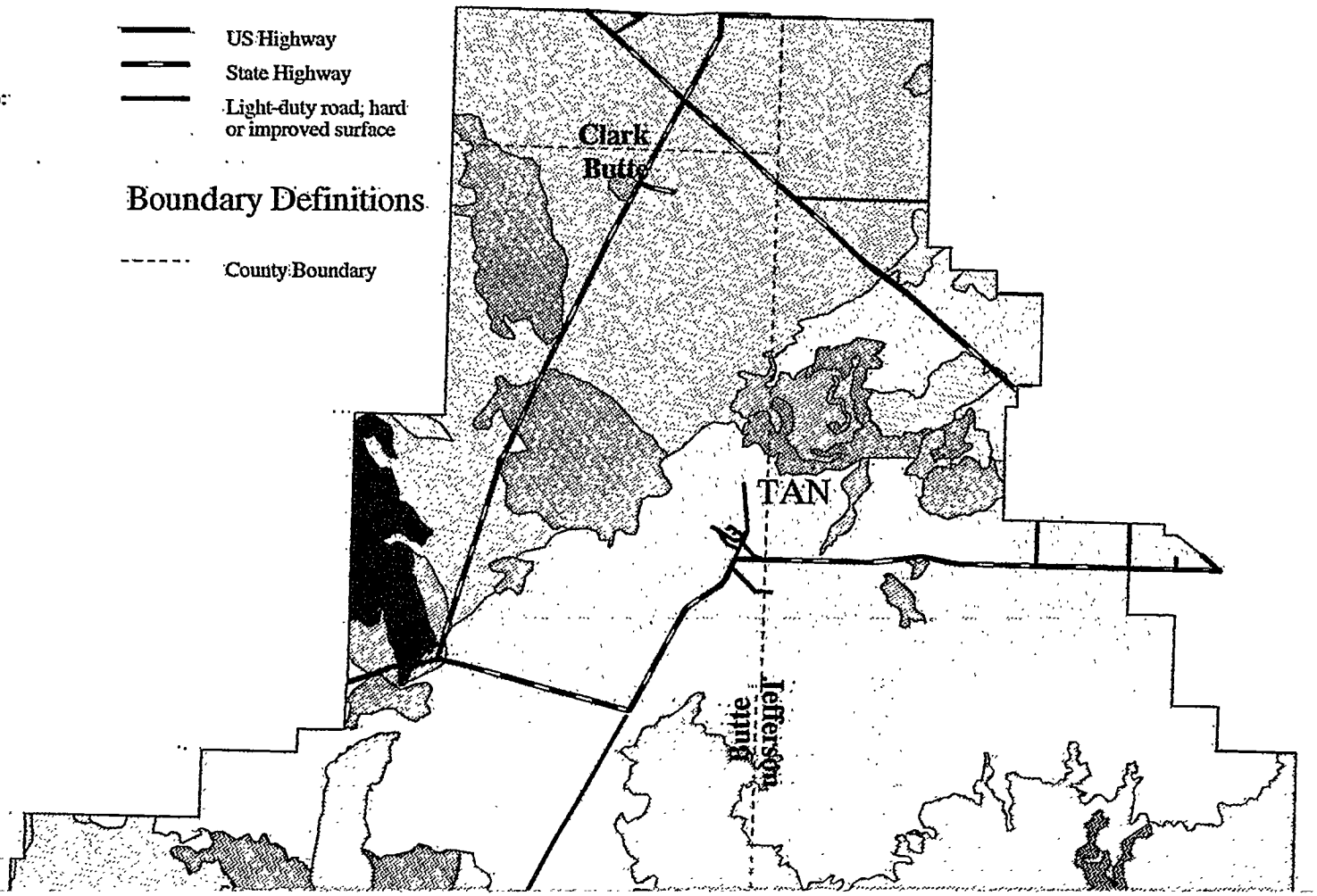
*Refer to table 3-1 of INEL-95/0051 for Soil Map Unit descriptions.

Road Classes

- US Highway
- State Highway
- Light-duty road, hard or improved surface

Boundary Definitions

- County Boundary



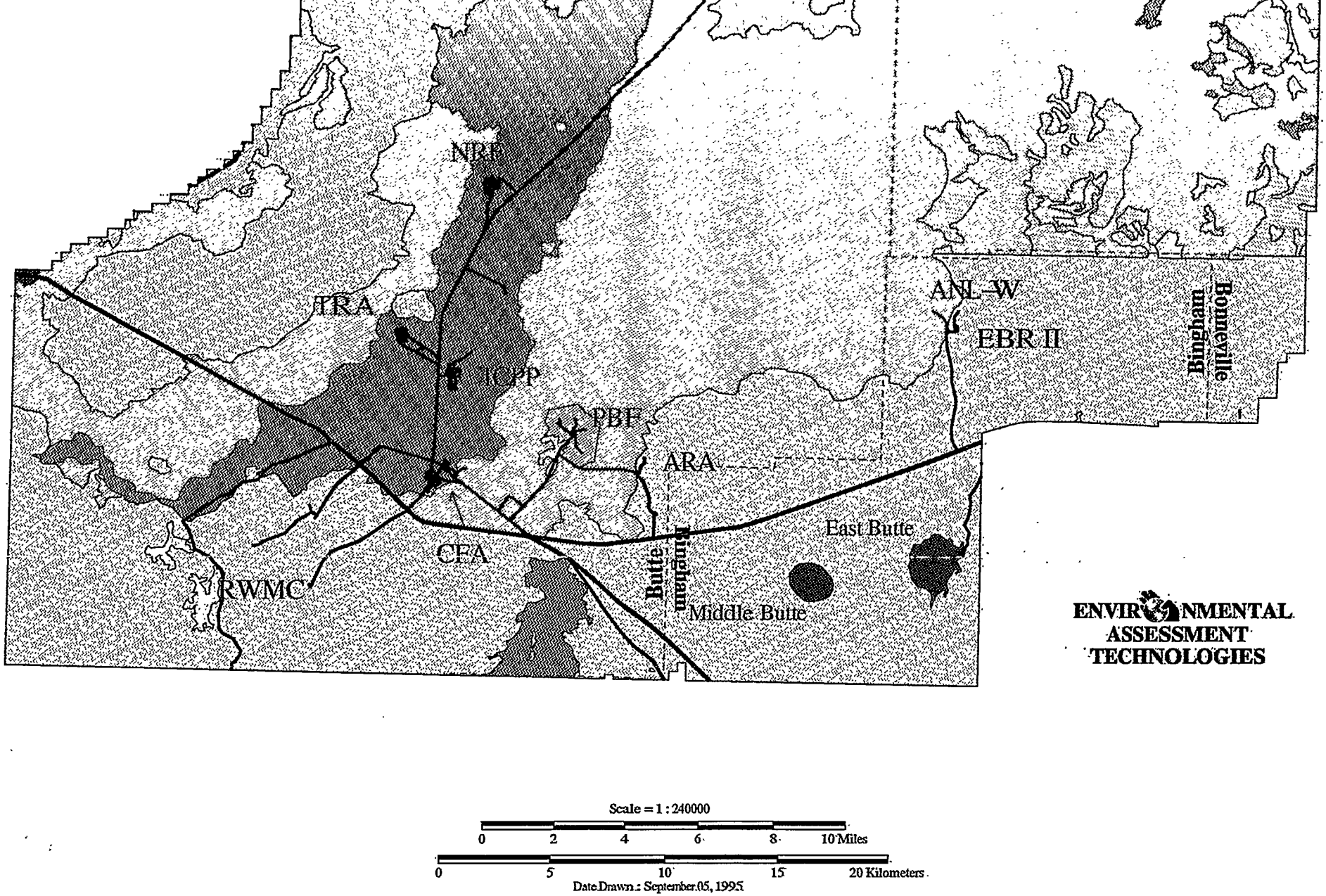
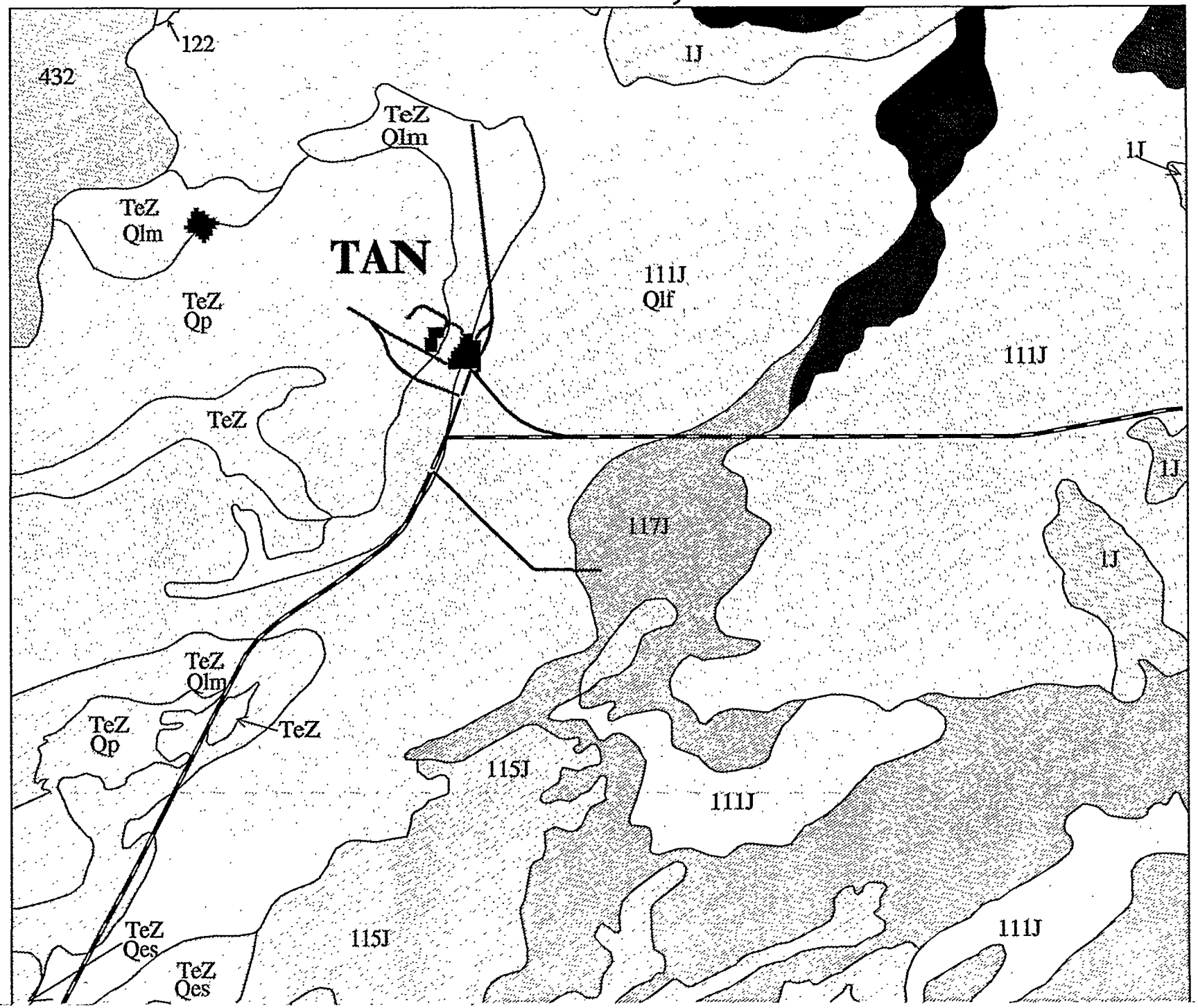
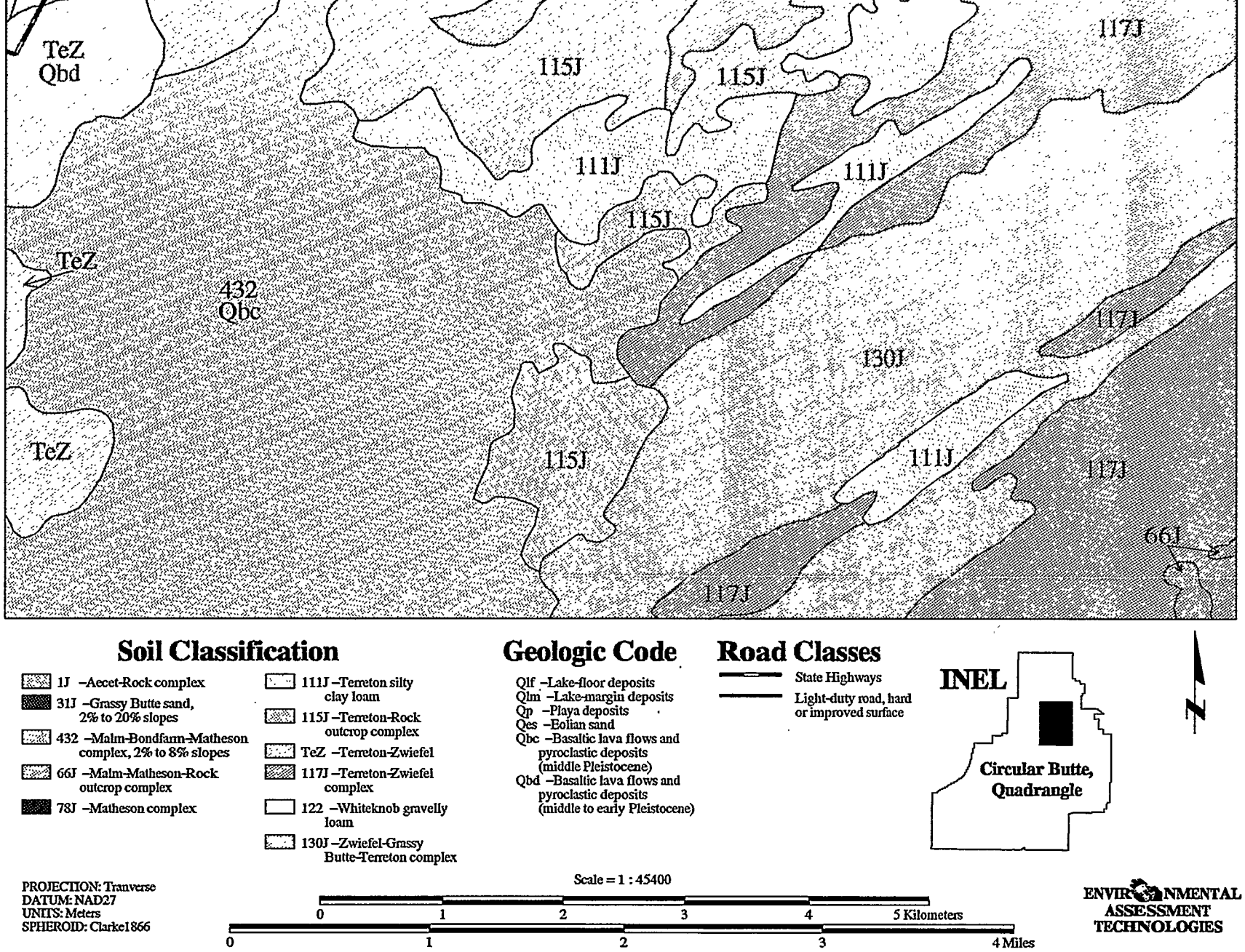


Figure 4-3. INEL GIS Soils Map

Circular Butte, Idaho





Soil Classification

- 1J –Aecet-Rock complex
- 31J –Grassy Butte sand, 2% to 20% slopes
- 432 –Malm-Bondfarm-Matheson complex, 2% to 8% slopes
- 66J –Malm-Matheson-Rock outcrop complex
- 78J –Matheson complex
- 111J –Terreton silty clay loam
- 115J –Terreton-Rock outcrop complex
- TeZ –Terreton-Zwiefel
- 117J –Terreton-Zwiefel complex
- 122 –Whiteknob gravelly loam
- 130J –Zwiefel-Grassy Butte-Terreton complex

Geologic Code

- Qlf –Lake-floor deposits
- Qlm –Lake-margin deposits
- Qp –Playa deposits
- Qes –Eolian sand
- Qbc –Basaltic lava flows and pyroclastic deposits (middle Pleistocene)
- Qbd –Basaltic lava flows and pyroclastic deposits (middle to early Pleistocene)

Road Classes

- State Highways
- Light-duty road, hard or improved surface

PROJECTION: Tranverse
DATUM: NAD27
UNITS: Meters
SPHEROID: Clarke1866

Scale = 1 : 45400

0 1 2 3 4 5 Kilometers

0 1 2 3 4 Miles

ENVIRONMENTAL ASSESSMENT TECHNOLOGIES

Figure 4-4. Circular Butte Quadrangle GIS soils map.

4.4 GIS Map Remaining Work

The GIS Soil map for the INEL is a direct reflection of the data which were transposed first to ortho photo quads from numerous sources, and then to mylar topo sheets. In addition, since it is very difficult to lay all the topo sheets out in one place, it is not possible to see if all the lines which cross the edges of the quads match; consequently, many of the polygons in the GIS map are not complete. Now however, since the data are in a GIS coverage, the soil scientists will be able to see these places of inconsistency and will be able to focus their attention there. In order to make this coverage more complete, all the incomplete polygons should be identified and resolved. Also, as more detailed surveys are done, the data should be added to this coverage until the whole site is mapped to the same resolution.

5. REFERENCES

Breckenridge, R. P. and C. L. McGrath (1989). Soil Classification of Propose NPR Sites at the Idaho National Engineering Laboratory. Informal Report EGG CEMA-8510. May 1989.

Chugg, J.C., W. Jorgensen, M. A. Fosberg (1968a). Special Soil Survey Butte County. Idaho Water Resources Board Report No. 5, September, 1968.

Chugg, J.C., V. S. Webb, M. A. Fosberg (1968b). Special Soil Survey Bonneville County. Idaho Water Resources Board Report No. 7, September, 1968.

Jorgensen, W., H. R. Noe, D. M. Daniels (1979). Soil Survey of Jefferson County, Idaho. USDA Soil Conservation Service.

Martin, K. L., C. J. Barnard, A. L. Freeman, M. R. Groh, K. T. Kissell, S. J. Lord, G. L. Olson, P. D. Randolph, R. N. Wilhelmsen (May 1992). Preliminary Assessment of Surface Soils at Active EG&G Idaho Facilities Data Document. EGG-ESQ-9225, Rev. 1.

McBride, Ray, Norman R. French, Adrian H. Dahl, and Jack E. Detmer, 1978, Vegetation types and surface soils of the Idaho National Engineering Laboratory Site, IDO-12084, April 1978.

Nace, R. L., P. T. Voegeli, J. R. Jones, M. Deutsch (1975). Generalized Geologic Framework of the National Reactor Testing Station, Idaho. Geological Survey Professional Paper 725-B.

Olson, G. L. (1995). The compilation of soil information for the Idaho National Engineering Laboratory, Engineering Design File No. SNF&EIS 0005-95, EG&G Idaho, Inc., Idaho Falls, ID, April, 1995.

Rathburn, Sarah (1991). "Quaternary channel changes and paleoflooding along the Big Lost River, Idaho National Engineering Laboratory," INEL Informal Report, EGG-WM-9909, January, 1991.

Scott, W. E. (1982). "Surficial geologic map of the eastern Snake River Plain and adjacent areas," Idaho and Wyoming, U. S. Geological Survey Miscellaneous Investigation Map I-1372.

U.S. Department of Agriculture, Soil Conservation Service, 1994, Soil Map Digitizing Requirements and Specifications for Soil Survey, March 1994 National Cartography and GIS Center, Fort Worth, TX.

U.S. Department of Agriculture Soil Conservation Service, (1993). National Soil Survey Handbook. Nov. 1993.

U.S. Department of Agriculture, Soil Conservation Service, 1981, Soil Survey of Bonneville County, July, 1981.

U.S. Department of Agriculture, Soil Conservation Service, 1973. Soil Survey of Bingham Area, Idaho. October, 1973.

U.S. Deaprtment of Agriculture, Soil Conservation Service, 1961, Land Capability Classification, Agriculture Handbook No. 210, September 1961.

U.S. Department of Energy, 1992, Track Sites: Guidance for Assessing Low Probability Hazard Sites at the INEL, DOE/ID-10340 (92) July 1992, Rev. 2, Appendix F, p. 31.

U.S. Geological Survey, 1988, Standards for Digital Line Graphs (DLG), National Mapping Division, May 1988.

APPENDIX A
SOIL MAP UNIT DESCRIPTIONS

Bonneville and Jefferson Counties

Bonneville and Jefferson Counties

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 VIIs, nonirrigated.

Bereniceton loam.

This deep, well drained soil is on alluvial fans and old lakebeds. It formed in lacustrine and alluvial 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 brown and pale brown loam about 7 inches thick. The underlying material is pale brown and very pale brown clay loam and loam that extends to a depth of 60 inches or more. The soil is calcareous throughout.

Included with this soil in mapping are about 25 percent, Lidy sandy loam, Matheson sandy loam, and a soil that is similar to this Bereniceton soil but that has a subsoil.

Permeability of this Bereniceton soil is moderately slow. Effective rooting depth is 60 inches or more. Available water capacity is very high. Surface runoff is veri 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 4 to 5 years of alfalfa for hay, 1 to 2 years of grain, and then 1 year of grain grown as a nurse crop with a new seeding of alfalfa. Potatoes can be substituted for 1 year of grain following the alfalfa. To maintain high production of crops, commercial fertilizer is commonly needed in addition to manure and plant residue. Generally, legumes respond to phosphate and all crops respond to nitrogen. Furrow, border, and sprinkler irrigation systems are suitable for use on 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. Surface drainage should be provided to carry off surplus waste water and prevent ponding.

Russian-olive, golden willow, and Scotch pine are examples of trees that can be used in windbreaks on this soil.

This soil has potential for producing habitat for ringnecked pheasant, mourning dove, and songbirds. These birds obtain their food and shelter mainly in areas of cropland. Planting shrubs such as Siberian peashrub, European privet, lilac, and Tatarian honeysuckle along fence rows and ditchbanks, in odd field corners, and in windbreaks improves the habitat for these birds. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIc, irrigated.

Bereniceton-Aecet loams.

This complex is on basalt plains. Slope is 1 to 6 percent. The frost-free period is 80 to 115 days.

This complex is 60 percent Bereniceton loam, 15 percent Aecet loam, and 25 percent included areas. The Bereniceton soil is on concave and convex side slopes, and the Aecet soil is on convex slopes near areas of Rock outcrop.

Included with this soil in mapping are areas of Bereniceton loam that is more than 60 inches deep over bedrock, Bondfarm sandy loam, Terreton loam or clay loam, Matheson loam, and Rock outcrop. Also included are some small hummocky areas of loamy sand.

The Bereniceton soil is deep and well drained. It formed in wind-deposited material. Typically, the

surface layer is brown and pale brown loam about 7 inches thick. The underlying material is pale brown and very pale brown clay loam and loam 39 inches thick. Basalt is at a depth of 46 inches.

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

The Aecet soil is moderately deep and well drained. It formed in eolian deposits. Typically, the surface layer is pale brown loam about 15 inches thick. The subsoil is pale brown clay loam 8 inches thick. The substratum is very pale brown clay loam 13 inches thick. Basalt is at a depth of 23 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.

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

If these soils are irrigated, they can be suited to hay, small grain, pasture, and potatoes.

If these soils are irrigated, Russian-olive, golden willow, Scotch pine, Siberian peashrub, European privet, and lilac grow well in windbreaks. These trees and shrubs also provide cover.

If the range is in good or excellent condition, the native vegetation on these soils is mainly bluebunch wheatgrass and Thurber needlegrass. When the range vegetation deteriorates, the proportion of these two grasses decreases and the proportion of less desirable forbs, weeds, grasses, and woody plants increases. Range seeding is a good practice if the range is in poor condition. Suitable grasses for seeding are Nordan crested wheatgrass, Siberian wheatgrass, bluebunch wheatgrass, and Indian ricegrass. The grass selected for seeding should meet the seasonal requirements of livestock or wildlife, or both. Minimum tillage is needed to control soil blowing.

A suitable cropping system is 3 or 4 years of alfalfa for hay, 2 years of potatoes, 1 year of wheat or barley for grain, and then 1 year of grain grown as a nurse crop for alfalfa. The grain is cut, and the alfalfa is left standing. To maintain high production of crops, commercial fertilizer is needed in addition to manure and plant residue. Generally, legumes respond to phosphate fertilizer and all crops respond to nitrogen fertilizer. Sprinkler irrigation is best suited to these soils.

Range areas of this complex have potential for producing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclasses IIIe, irrigated, and VIe, nonirrigated.

Bereniceton-Rock outcrop-Aecet complex.

This complex is on basalt plains. Slope is 2 to 12 percent. The frost-free season is 80 to 115 days.

This complex is about 50 percent Bereniceton very stony sandy loam, 20 percent Rock outcrop, and 20 percent Aecet very stony sandy loam. The Bereniceton soil is on concave side slopes, Rock outcrop is on ridges and sides of ridges and is intermingled with areas of Bereniceton soils, and the Aecet soil is on convex side slopes.

Included with this complex in mapping is Bondfarm sandy loam. Also included are hummocky areas of

loamy sand.

The Bereniceton soil is deep and well drained. It formed in wind-laid deposits. Typically, the surface layer is brown and pale brown very stony sandy loam and very stony loam about 7 inches thick. The underlying material is pale brown loam and very pale brown clay loam 39 inches thick. Basalt is at a depth of 46 inches.

Permeability of the Bereniceton soil is moderately slow. Effective rooting depth is 40 to 60 inches or more. Available water capacity is high. Surface runoff is slow or medium, and the hazard of erosion is moderate or 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, forbs, and grasses. Rock outcrop has little value for grazing.

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 about 8 inches thick. The substratum is very pale brown clay loam 10 inches thick. Basalt is at a depth of 23 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 to medium, and the hazard of erosion is moderate or high.

This complex is used as range, for wildlife habitat, and for recreation. If the range is in good to excellent condition, the native vegetation is mainly bluebunch wheatgrass and Thurber needlegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, forbs, annual grasses, and woody plants increases.

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

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

Bereniceton-Terreton-Aecet complex.

This complex is on basalt plains. Slope is 1 to 6 percent. The frost-free period is 80 to 115 days.

This complex is 30 percent Bereniceton silt loam, 25 percent Terreton silt loam, and 20 percent Aecet loam. The Bereniceton and Terreton soils are on concave and complex side slopes, and the Aecet soil is near areas of Rock outcrop on ridges.

Included with this complex in mapping are areas of soil that are similar to this Bereniceton soil but that are silty clay loam throughout, areas of Rock outcrop, and areas of Bondfarm loam.

The Bereniceton soil is deep and well drained. It formed in wind-laid deposits. Typically, the surface

layer is brown and pale brown silt loam about 7 inches thick. The underlying material is pale brown and very pale brown loam and clay loam 39 inches thick. Basalt is at a depth of 46 inches. The soil is calcareous throughout.

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

The Terreton soil is very deep and well drained. It formed in lacustrine sediment. Typically, the surface layer is light brownish gray silt loam about 6 inches thick. The underlying material to a depth of 60 inches or more is stratified light brownish gray and light gray clay and silty clay loam. The soil is calcareous throughout.

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

The Aecet soil is moderately deep and well drained. It formed in eolian deposits. Typically, the surface layer is pale brown loam about 6 inches thick. The subsoil is pale brown clay loam about 8 inches thick. The substratum is very pale brown clay loam 10 inches thick. Basalt is at a depth of 23 inches. This soil is calcareous throughout and has a layer of lime accumulation at a depth of 13 inches.

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

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

When the range vegetation is in good or excellent condition, the native grasses on these soils are mainly 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.

Range seeding is a suitable practice if the range vegetation is in Poor condition. Grasses suitable for seeding are Nordan crested wheatgrass, Siberian wheatgrass, bluebunch wheatgrass, or Indian ricegrass. The grass species selected for seeding should meet the seasonal requirements of livestock or wildlife, or both.

This complex has potential for producing habitat for jackrabbit, Pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey.

If these soils are irrigated, they can be used for hay, small grain, pasture, or potatoes. Sprinkler irrigation is best suited to these soils.

A suitable cropping system for irrigated cropland is 3 to 4 years of alfalfa hay, 2 years of potatoes, 1 year of wheat or barley for grain, and then 1 year of grain grown as a nurse crop for alfalfa. The grain is cut, and the alfalfa is left to start the cropping system again. To maintain high production of crops, commercial fertilizer is commonly needed in addition to manure and plant residue. Legumes generally respond to phosphate fertilizer, and all crops respond to nitrogen fertilizer.

If these soils are irrigated, Russian-olive, golden willow, scotch pine, Siberian peashrub, European privet, and lilac are suitable trees and shrubs for use in windbreaks. These plants also provide food and cover for wildlife. Capability subclasses IIIe, irrigated, and VIe, nonirrigated.

Bereniceton soils, and the Aecet soil is on convex side slopes.

Included with this complex in mapping is Bondfarm sandy loam. Also included are hummocky areas of loamy sand.

The Bereniceton soil is deep and well drained. It formed in wind-laid deposits. Typically, the surface layer is brown and pale brown very stony sandy loam and very stony loam about 7 inches thick. The underlying material is pale brown loam and very pale brown clay loam 39 inches thick. Basalt is at a depth of 46 inches.

Permeability of the Bereniceton soil is moderately slow. Effective rooting depth is 40 to 60 inches or more. Available water capacity is high. Surface runoff is slow or medium, and the hazard of erosion is moderate or 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, forbs, and grasses. Rock outcrop has little value for grazing.

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 about 8 inches thick. The substratum is very pale brown clay loam 10 inches thick. Basalt is at a depth of 23 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 to medium, and the hazard of erosion is moderate or high.

This complex is used as range, for wildlife habitat, and for recreation. If the range is in good to excellent condition, the native vegetation is mainly bluebunch wheatgrass and Thurber needlegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, forbs, annual grasses, and woody plants increases.

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

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

Bereniceton-Terreton-Rock outcrop complex.

This complex is on basalt plains and on the edges of old lakebeds. Slope is 3 to 6 percent. The frost-free period is 80 to 115 days.

This complex is about 30 percent Bereniceton very stony silt loam, 25 percent Terreton very stony silt loam, and 20 percent Rock outcrop. The Bereniceton and Terreton soils are both on convex and concave side slopes, and Rock outcrop is intermingled with areas of these soils.

Included with this complex in mapping are areas of Aecet very stony loam, a soil that is similar to the Bereniceton soil but that is silty clay throughout, and Bondfarm loam. Included soils make up about 25 percent of this complex.

The Bereniceton soil is deep and well drained. it formed in wind-laid deposits. Typically, the surface layer is brown and pale brown very stony silt loam about 7 inches thick. The underlying material is pale brown and very pale brown loam and clay loam 39 inches thick. Basalt is at a depth of 46 inches. The soil is calcareous throughout.

Permeability of the 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 moderate.

The Terreton soil is very deep and well drained. It formed in old lake sediment. Typically, the surface layer is light brownish gray very stony silt loam about 6 inches thick. The underlying material to a depth of 60 inches or more is stratified light brownish gray and light gray clay and silty clay loam. The soil is calcareous throughout.

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

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, forbs, and grasses. Rock outcrop has little value for grazing.

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

If the vegetation is in good or excellent condition, the main 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 grazing mainly in spring and fall. Mechanical seeding or brush management is very difficult or impracticable because of stones on the surface and intermingled areas of Rock outcrop. Management practices suitable for use on this complex are proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

Range areas of this complex have potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclass VIIs, nonirrigated.

Bondfarm-Rock outcrop complex.

This complex is on basalt plains. Slope is 2 to 12 percent. The frostfree season is 80 to 100 days.

Bondfarm sandy loam makes up 60 percent of the complex, and Rock outcrop makes up 25 percent. The Bondfarm soil is in the lower, concave areas, and Rock outcrop is in the higher, convex areas.

Included with this complex in mapping is about 15 percent Malm sandy loam and Matheson sandy loam. Also included are areas of soils that have as much as 5 percent stones on the surface.

The Bondfarm soil is shallow and well drained. It formed in sandy wind-laid deposits. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil and substratum are very pale brown sandy loam 14 inches thick. Basalt is at a depth of about 18 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 4 inches.

Permeability of this Bondfarm soil is moderately rapid. Effective rooting depth is 10 to 20 inches. Available water capacity is low. Surface runoff is slow or medium, and the hazard of erosion is slight or moderate.

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 has little value for grazing.

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

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

This complex is used for grazing mainly in spring and fall. Mechanical treatment, such as seeding or brush control, is very difficult because of the shallow depth to bedrock and the areas of Rock outcrop. Management practices suitable for use on this soil are proper range use, deferred grazing, and rotation grazing. Aerial spraying for brush control is practical in places where adequate quantities of desirable plants are present.

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

Bondfarm-Rock outcrop-Grassy Butte complex.

This complex is on basalt plains. Slope is 2 to 6 percent. The frost-free period is 80 to 100 days.

The complex is about 40 percent Bondfarm loamy sand, 30 percent Rock outcrop, and 20 percent Grassy Butte loamy sand. The Bondfarm soil is on concave and convex side slopes and is surrounded by areas of the Grassy Butte soils, Rock outcrop is in areas slightly higher than areas of Bondfarm soils, and the Grassy Butte soil is in hummocky areas.

Included with this complex in mapping are about 10 percent Matheson loamy sand, a soil that is similar to the Grassy Butte soils but that is less than 40 inches deep to bedrock, and Terreton loamy sand.

The Bondfarm soil is shallow and well drained. It formed in eolian material. Typically, the surface layer is light brownish gray loamy sand about 4 inches thick. The subsoil and substratum are very pale brown sandy loam 14 inches thick. Basalt is at a depth of 18 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 4 inches.

Permeability of the Bondfarm soil is moderately rapid. Effective rooting depth is 10 to 20 inches.

Available water capacity is low. Surface runoff is slow or medium, and the hazard of erosion is slight or moderate. The hazard of soil blowing is very 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 grasses, forbs, and shrubs. Rock outcrop has little value for grazing.

The Grassy Butte soil is very deep and somewhat excessively drained. It formed in sandy eolian material. Typically, the surface layer is grayish brown loamy sand about 7 inches thick. The underlying material to a depth of 60 inches or more is grayish brown and gray loamy sand. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 19 inches.

Permeability of the Grassy Butte soil is rapid. Effective rooting depth is 60 inches or more, and the available water capacity is low or moderate. Surface runoff is very slow or slow. The hazard of soil blowing is very high. The hazard of erosion is slight.

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

It the range vegetation is in good or excellent condition, the native grasses are mainly bluebunch wheatgrass and needleandthread. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of annual grasses, forbs, and woody plants increases. Less desirable weeds and annual grasses become more abundant as the range condition further deteriorates.

This complex is used for grazing mainly in spring and fall. Mechanical treatment for seeding or brush management is limited by the very high hazard of soil blowing. Management practices suitable for use on this complex include proper range use, deferred grazing, and rotation grazing. Aerial spraying for brush control is practical where a reasonable understory of desirable grasses is present.

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

Pancheri silt loam, 0 to 2 percent slopes.

This very deep, well drained soil is on basalt plains. It formed in loess. Elevation is 4,600 to 5,400 feet. The average annual precipitation is about 10 inches, the average annual air temperature is about 43 degrees F, and the frost-free period is about 110 days.

Typically, the surface layer is light brownish gray, moderately alkaline silt loam about 6 inches thick. The subsoil is pale brown, moderately alkaline silt loam about 4 inches thick. The substratum to a depth of 60 inches or more is light gray and very pale brown, strongly alkaline silt loam.

Included with this soil in mapping are small areas of Polatis silt loam that has slopes of 2 to 25 percent, a soil that has bedrock at a depth of less than 20 inches, and a soil in playas that is similar to this Pancheri soil but has a clay accumulation in the subsoil. Also included are small areas of a soil that is similar to this Pancheri soil but has a high concentration of carbonatic clay in the substratum.

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

This soil is used mainly for irrigated crops. Some areas are used for wildlife habitat and recreational development.

This soil is well suited to irrigated potatoes, sugar beets, alfalfa, and wheat. Yields are limited by the cool climate.

A suitable cropping system is one that includes 3 to 4 years of alfalfa, 2 years of potatoes or sugar beets, and 1 to 2 years of grain.

The layer of lime below the subsoil restricts the movement of water. Excessive land leveling may expose this lime layer, which tends to reduce yields because of lime induced chlorosis.

The hazard of erosion is increased in the more sloping areas if this soil is tilled intensively. Tillage should be kept to a *minimum,* and crop residue should be returned to the soil. Chemical weed control is needed.

Furrow, border, corrugation, and sprinkler irrigation systems are suited to this soil. The method used generally is governed by the crop. Proper irrigation water management is needed to reduce erosion and puddling.

Suitable grazing management practices for alfalfa or grass are rotation grazing during the growing season and delaying grazing until the stubble reaches a minimum height. Plants suitable for grazing are orchardgrass, bromegrass, and wheatgrasses. Small areas of this soil have native plant cover consisting mainly of bluebunch wheatgrass, big sagebrush, and threetip sagebrush.

Crops and brushy areas of this soil provide food and cover for pheasant, mourning dove, songbirds, various birds of prey, rabbits, and coyote. Migrating ducks and some Canadian geese feed in the harvested grainfields near the Snake River. Lack of adequate cover limits the wildlife population. Planting shrubs and windbreaks provides cover and food for upland game birds. Wildlife habitat is improved by managing crop residue and using a suitable cropping system.

The main limitation for urban development is low soil strength, the main limitation for septic tank absorption fields is moderate permeability, the main limitations for roads and streets are potential frost action and low soil strength, and the main limitation for recreational development is the tendency of the surface to become dusty when dry.

This soil is in capability subclasses IIc, irrigated, and VIc, nonirrigated.

Pancheri silt loam, 2 to 4 percent slopes.

This very deep, well drained soil is on basalt plains. It formed in loess. Elevation is 4,600 to 5,400 feet. The average annual precipitation is about 10 inches, the average annual air temperature is about 43 degrees F, and the frost-free period is about 110 days.

Typically, the surface layer is light brownish gray, moderately alkaline silt loam about 6 inches thick. The subsoil is pale brown, moderately alkaline silt loam about 4 inches thick. The substratum to a depth of 60 inches or more is light gray and very pale brown, strongly alkaline silt loam.

Included with this soil in mapping are small areas of Polatis silt loam that has slopes of 2 to 25 percent, a soil that is similar to Polatis soils but has bedrock at a depth of less than 20 inches, and a soil in playas that is similar to this Pancheri soil but has a clay accumulation in the subsoil. Also included are small areas of a soil that is similar to this Pancheri soil but has a high concentration of carbonatic clay in the substratum.

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

Most areas of this soil are used for irrigated crops. Some small areas in the extreme western part of the survey area are used as rangeland and for wildlife habitat and recreational development.

This soil is well suited to irrigated crops such as potatoes, sugar beets, alfalfa, and wheat. Yields are limited by the cool climate.

A suitable cropping system is one that includes 3 to 4 years of alfalfa, 2 years of potatoes or sugar beets, and 1 to 2 years of grain.

The layer of lime below the subsoil restricts the movement of water. Excessive land leveling may expose the lime layer and reduce yields because of lime-induced chlorosis.

Tillage should be kept to a minimum, and crop residues should be returned to the soil. Chemical weed control is needed.

Furrow, border, corrugation, and sprinkler irrigation systems are suited to this soil. The method used generally is governed by the crop. If furrow or corrugation irrigation systems are used, runs should be on the contour or across the slope. Piping, ditch lining, or drop structures should be installed in irrigation ditches to facilitate irrigation and prevent excessive ditch erosion . Proper irrigation water management is needed to prevent erosion and puddling.

Suitable grazing management practices for alfalfa or grass are rotation grazing during the growing season and delaying grazing until the stubble reaches a minimum height. Plants suitable for grazing are orchardgrass, bromegrass, and wheatgrass.

Where this soil is used as rangeland, the potential native plant community is mainly big sagebrush, threetip sagebrush, and bluebunch wheatgrass. If range condition deteriorates, the proportion of cheatgrass, rabbitbrush, and Canada thistle increases. Range seeding and brush management improve production on this soil. Crested wheatgrass, pubescent wheatgrass, and Siberian wheatgrass are suitable for seeding.

Crops and brushy areas of this soil provide food and cover for pheasant, mourning dove, songbirds, various birds of prey, rabbits, and coyote. Migrating ducks and some Canadian geese feed in the harvested grainfields. Lack of adequate cover limits the wildlife population. Planting shrubs and windbreaks provides cover and food for upland game birds. Wildlife habitat is improved by managing crop residue and using a suitable cropping system.

The main limitation for urban development is low soil strength, the main limitation for septic tank absorption fields is moderate permeability, the main limitations for roads and streets are potential frost action and low soil strength, and the main limitation for recreational development is the tendency of the surface to become dusty when dry.

This soil is in capability subclasses IIe, irrigated, and VIc, nonirrigated.

Pancheri silt loam, 4 to 8 percent slopes.

This very deep, well drained soil is on basalt plains. It formed in loess. Elevation is 4,600 to 5,400 feet. The average annual precipitation is about 10 inches, the average annual air temperature is about 43 degrees F, and the frost-free period is about 110 days.

Typically, the surface layer is light brownish gray, moderately alkaline silt loam about 6 inches thick. The subsoil is pale brown, moderately alkaline silt loam about 4 inches thick. The substratum to a depth of 60 inches or more is light gray and very pale brown, strongly alkaline silt loam.

Included with this soil in mapping are small areas of Polatis silt loam that has slopes of 2 to 25 percent; a soil that has bedrock at a depth of less than 20 inches; and a soil, in playas, that is similar to this Pancheri soil but has a clay accumulation in the subsoil. Also included are small areas of a soil that is similar to this Pancheri soil but has a high concentration of carbonatic clay in the substratum.

Permeability of this Pancheri soil is moderate. Available water capacity is very high. Effective rooting depth is 60 inches or more. Runoff is medium, and the hazard of erosion is moderate.

Most areas of this soil are used for irrigated crops. Some small areas are used as rangeland and for wildlife habitat and recreational development.

This soil is well suited to irrigated crops such as potatoes, sugar beets, alfalfa, and small grain. Yields are limited by the cool climate.

A suitable cropping system is one that includes 3 to 4 years of alfalfa, 2 years of potatoes or sugar beets, and 1 to 2 years of grain. The layer of lime below the subsoil restricts the movement of water. Tillage should be kept to a minimum, and crop residue should be returned to the soil. Chemical weed control is needed.

Sprinkler irrigation systems are suited to this soil. Proper irrigation water management is needed to prevent erosion and puddling.

Suitable grazing management practices for alfalfa or grass are rotation grazing during the growing season and delaying grazing until the stubble reaches a minimum height. Plants suitable for grazing are orchardgrass, bromegrass, and wheatgrasses.

Where this soil is used as rangeland, the potential native plant community is mainly big sagebrush, threetip sagebrush, and bluebunch wheatgrass. If the range condition deteriorates, the proportion of cheatgrass, rabbitbrush, and Canada thistle increases. Range seeding and brush management improve production on this soil. Crested wheatgrass, pubescent wheatgrass, and Siberian wheatgrass are suitable for seeding.

Crops and the brushy areas of this soil provide food and cover for pheasant, mourning dove, songbirds, variOus birds of prey, rabbits, and coyote. Migrating ducks and some Canadian geese feed in the harvested grainfields. Lack of adequate cover limits the wildlife population. Planting shrubs and windbreaks provides cover and Food for upland game birds. Wildlife habitat is improved by managing crop residue and using a suitable cropping System.

The main limitation for urban development is low soil strength, the main limitation for septic tank absorption fields is moderate permeability, and the main limitations for roads and streets are potential frost action and low soil strength. The tendency of the surface to become dusty when dry is the main limitation for recreational development.

This soil is in capability subclasses IIIe, irrigated, and VIe, nonirrigated.

Polatis Rock outcrop complex, 2 to 25 percent slopes.

This map unit is on loess covered basalt plains. Elevation is 4,600 to 5,400 feet. The average annual is about 10 inches, the average annual air temperature is about 43 degrees F, and the frost-free is about 110 days.

This complex is about 65 percent Polatis silt loam and Rock outcrop. The components of this unit are so intricately intermingled that it was not practical to map them separately at the scale used.

Included with this complex in mapping are small areas of Pancheri soils and a soil that is similar to this Polatis has bedrock at a depth of 10 to 20 inches. The Polatis soil is moderately deep and well drained. It formed mainly in loess. Typically, the surface layer is light brownish gray, moderately alkaline silt loam about 3 inches thick. The subsoil is pale brown, strongly alkaline silt loam about 3 inches thick. The substratum is light gray or very pale brown, strongly alkaline silt loam about 22 inches thick. Basalt is at a depth of 31 inches.

Permeability of the Polatis soil is moderate. Available water capacity is high. Effective rooting depth is 25 to 39 inches. Runoff is very rapid, and the hazard of erosion is very high.

Rock outcrop is bare exposures of basalt that protrude through the mantle of loess. Rock outcrop resists weathering and, except for the soil material deposited in cracks and depressions, supports few plants other than lichens.

This complex is used mainly as rangeland. Some areas are used for wildlife habitat and recreational development.

The potential native plant community on this complex is mainly big sagebrush, bluebunch wheatgrass, Nevada bluegrass, and threetip sagebrush. If the range deteriorates, the proportion of bluebunch wheatgrass decreases and the proportion of unpalatable forbs and shrubs increases. Less desirable weeds and annual plants increase as the condition of the range further deteriorates.

This complex is best suited to grazing by sheep in winter and spring.

The Polatis soil produces good forage for livestock. Seeding is a suitable practice if the range is in poor condition. In places, seeding by mechanical means is limited by Rock outcrop.

This complex provides habitat for jackrabbits, pronghorn antelope, sage grouse, coyote, songbirds, and various birds of prey. Small mammals and songbirds are common. Sage grouse is the principal game bird. Proper range management practices help to maintain the quality of wildlife habitat.

The main limitations for urban development on the Polatis soil are depth to bedrock and slope, the main limitations for roads and streets are potential frost action and slope, and the main limitations for septic

tank absorption fields are depth to rock, slope, and moderate permeability. The main limitations for recreational development are slope and the tendency of the soil to become dusty when dry. Rock outcrop limits excavation.

This soil is in capability subclass VIe, nonirrigated.

Grassy Butte sand, 2 to 20 percent slopes.

This very deep, somewhat excessively drained soil is on basalt plains. It formed in wind-laid deposits of sand derived from mixed sources. The frost-free season is 80 to 115 days.

Typically, the surface layer is grayish brown sand about 7 inches thick. The underlying material to a depth of 60 inches or more is grayish brown and gray loamy sand. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 19 inches.

Included with this soil in mapping are small areas of Matheson loamy sand, a soil that is similar to this Grassy Butte soil but that is 20 to 40 inches deep over bedrock, and Rock outcrop.

Permeability of this Grassy Butte soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is very slow or slow, and the hazard of erosion is slight. The hazard of soil blowing is very high.

This soil is used mainly as range, for wildlife habitat, and for recreation. Some areas have been cultivated.

Sprinkler irrigation is suitable for use on this soil. The main limitations for management are the impaired trafficability of machinery and the very high hazard of soil blowing. Soil blowing usually makes it necessary to replant about one-half of the close-growing crops each year.

When the range vegetation is in good or excellent condition, the dominant native grasses are needleandthread and Indian ricegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable annual grasses, forbs, and woody plants increases. This soil is used for grazing mainly in spring and fall. It generally is not suited to mechanical treatments such as those used for seeding or brush control because of the very high hazard of soil blowing. Management practices suitable for use on this soil include proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

This soil has potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Elk also use areas of this soil in the east-central part of the county for winter range and as a migratory path.

If this soil is irrigated, it can be used mostly for permanent pasture. Crop seedings are difficult to establish because of the very high hazard of soil blowing. Sprinkler systems are suitable for use on this soil. Capability subclasses VIe, irrigated, and VIIe, nonirrigated.

Grassy Butte-Rock outcrop complex.

This complex is on basalt plains. Slope is 2 to 20 percent. The frost-free season is 80 to 100 days.

Grassy Butte very stony loamy sand makes up 30 Percent of this complex, and Rock outcrop makes up 20 percent- The Grassy Butte soil is in the lower areas, and Rock Outcrop is in the higher areas on convex ridges.

Included with this complex in mapping are about 10 percent each of a soil that is similar to this Grassy Butte soil but that is 10 to 40 inches deep to bedrock, a Grassy Butte soil that is 40 to 60 inches deep to bedrock, Matheson loamy sand, Bondfarm sandy loam, and Grassy Butte loamy sand.

The Grassy Butte soil is deep and somewhat excessively drained. It formed in sandy eolian deposits. Typically, the surface layer is grayish brown very stony loamy sand about 7 inches thick. The underlying material to a depth of 60 inches or more is grayish brown and gray loamy sand. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 19 inches.

Permeability of the Grassy Butte soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is very slow or slow, and the hazard of erosion is slight. The hazard of soil blowing is very 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 grasses, forbs, and shrubs. Rock outcrop areas have little value for grazing.

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

If the range vegetation is in good or excellent condition, the native grasses are mainly needleandthread and Indian ricegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases.

This complex is used for grazing mainly in spring and fall. Mechanical treatment for range seeding or brush control is difficult because of the very high hazard of soil blowing and the intermingled areas of Rock outcrop. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Elk also use areas of this complex for winter range and as a migratory path to the east-central part of the county. Capability subclass VIIe, nonirrigated.

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 1 00 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 ringnecked 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.

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 over sand and gravel. The soil is calc 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 loam, both of which have slopes of 0 to 2 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 slight.

This soil is used for irrigated hay, small grain, potatoes, and pasture. The gravelly surface layer adversely affects tillage and the quality of potatoes.

A suitable cropping system is 3 to 5 years of alfalfa for hay, 1 year of potatoes, and 1 to 2 years of grain. Where pasture is used in the cropping system, it generally is 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. If border or furrow systems are used, waste water drains should be adequate to carry the surplus water away and to

prevent ponding.

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

This soil has potential for providing habitat for ringnecked 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.

Malm-Matheson loamy sands.

This complex is on basalt plains. Slope is 2 to 8 percent.-The frost-free season is 80 to 1 00 days.

Malm loamy sand makes up about 75 percent of the complex, and Matheson loamy sand makes up about 15.percent.

Included with this complex in mapping is about 10 percent Bereniceton loamy sand, Bondranch loamy sand, and Rock outcrop.

The Malm soil is moderately deep and well drained. It formed in eolian sandy material. Typically, the surface layer is brown loamy sand about 4 inches thick. The underlying material is pale brown and white sandy loam. Basalt is at a depth of 24 inches. The profile is calcareous throughout and has a layer of lime accumulation at a depth of 12 inches.

Permeability of the Malm soil is moderately rapid. Effective rooting depth is 20 to 40 inches. Available water capacity is low or moderate. Surface runoff is slow, and the hazard of erosion is slight. The hazard of soil blowing is very high.

The Matheson soil is deep and well drained. It formed in sandy eolian material. Typically, the surface layer is light brownish gray loamy sand about 10 inches thick. The underlying material is light brownish gray and light gray sandy loam about 36 inches thick. Basalt bedrock is at a depth of 46 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 10 inches.

Permeability of the Matheson soil is moderately rapid. Effective rooting depth is 40 to 60 inches. Available water capacity is moderate. Surface runoff is slow, and the hazard of erosion is slight. The hazard of soil blowing is very high.

These soils are used as range, for wildlife habitat, and for recreation.

If the range vegetation is in good or excellent condition, the main grasses are needleandthread, bluebunch wheatgrass, and Indian ricegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. These soils are used for grazing mainly in spring and fall. They are not suited to mechanical seeding or brush control because of the very high hazard of soil blowing. Management practices suitable for use on these soils are proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

These soils have potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey.

If these soils are irrigated, they can be used for 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. Where pasture is used in the cropping system, it is generally 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 irrigation systems are used. The main limitations are impaired trafficability of machinery and a very high hazard of soil blowing. Soil blowing makes it necessary to plant close grown crops about 1 year in 4.

If these soils are irrigated, Russian-olive, green ash, Rocky Mountain juniper, Siberian peashrub, and lilac are well suited to use in windbreaks. Capability subclasses IVe, irrigated, and VIIe, nonirrigated.

Malm-Matheson-Rock outcrop complex.

This complex is on basalt plains. Slope is 2 to 8 percent. The frost-free season is 80 to 115 days.

Malm loamy sand makes up about 35 percent of this complex. Matheson loamy sand makes up 20 percent, and Rock outcrop makes up 20 percent. The Malm soil is in convex areas and on flat ridgetops, the Matheson soil is in convex and undulating areas, and Rock outcrop is on the upper parts of ridges.

Included with this complex in mapping is about 25 percent Bondranch loamy sand, Malm sandy loam, Bondfarm loamy sand, and Grassy Butte sand.

The Malm soil is moderately deep and well drained. It formed in sandy eolian material. Typically, the surface layer is brown loamy sand about 4 inches thick. The underlying material is pale brown and white sandy loam. Basalt is at a depth of 24 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 12 inches.

Permeability of the Malm soil is moderate. Effective rooting depth is 20 to 40 inches. Available water capacity is low or moderate. Surface runoff is slow, and the hazard of erosion is slight. The hazard of soil blowing is very high.

The Matheson soil is deep and well drained. It formed in sandy eolian material. Typically, the surface layer is light brownish gray loamy sand about 10 inches thick. The underlying material is light brownish gray and light gray sandy loam. Basalt is at a depth of 46 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 10 inches.

Permeability of the Matheson soil is moderately rapid. Effective rooting depth is 40 to 60 inches. Available water capacity is moderate. Surface runoff is slow, and the hazard of erosion is slight. The hazard of soil blowing is very 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 grasses, forbs, and shrubs. Rock outcrop areas have little value for grazing.

These soils are used as range, for wildlife habitat, and for recreation.

If the range vegetation is in good or excellent condition, the main grasses are needleandthread, bluebunch wheatgrass, and Indian ricegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of annual grasses, forbs, and woody plants increases.

This complex is used for grazing mainly in spring and fall. It generally is not suited to mechanical seeding or brush control because of the very high hazard of soil blowing. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclass VIIe, nonirrigated.

Malm-Rock outcrop complex.

This complex is on basalt plains. The frost-free season is 80 to 100 days.

Malm extremely stony sandy loam makes up about 40 percent of this complex, Rock outcrop makes up about 30 percent, and Bondfarm sandy loam makes up about 20 percent. The Malm soil is in concave and nearly level areas; Rock outcrop and the Bondfarm soil are on, convex slopes.

Included with this complex in mapping is about 10 percent Matheson sandy loam and a soil that is similar to the Malm soil but that is loamy sand throughout. Also included are some areas of soils that have slopes of 30 to 60 percent.

The Malm soil is moderately deep and well drained. It formed in sandy wind-laid material. Slope is 2 to 20 percent. Typically, the surface layer is brown extremely stony sandy loam about 4 inches thick. The underlying -material is pale brown and white sandy loam. Basalt is at a depth of 24 inches. The soil is calcareous throughout ind has a layer of lime accumulation at a depth of 12 inches.

Permeability of the Malm soil is moderately rapid. Effective rooting depth is 20 to 40 inches. Available water capacity is low or 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 grasses, forbs, and shrubs. Rock outcrop areas have little value for grazing.

The Bondfarm soil is shallow and well drained. It formed in sandy eolian material. Slope is 4 to 12 percent. Typically, the surface layer is light brownish gray sandy loam about 4 inches thick. The subsoil and substratum are very pale brown sandy loam. Basalt is at a depth of 18 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 4 inches.

Permeability of the Bondfarm soil is moderately rapid. Effective rooting depth is 10 to 20 inches. Available water capacity is low. Surface runoff is medium, and the hazard of erosion is moderate or high.

These soils are used as range, for wildlife habitat, and for recreation.

If the range vegetation is in good or excellent condition, the native grasses are mainly bluebunch

wheatgrass and Thurber needlegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. This complex is used for grazing mainly in spring and fall. It generally is not suited to mechanical seeding or brush control because of the extremely stony surface and the areas of Rock outcrop. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclass Vlls, nonirrigated.

Matheson loamy sand, 2 to 8 percent slopes.

This very 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 115 days.

Typically, the surface layer is light brownish gray loamy sand about 10 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and light gray sandy loam. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 10 inches.

Included with this soil in mapping are areas of Grassy Butte loamy sand, Zwiefel sand, and Rock outcrop. Also included, in the area north of Mud Lake, is Lidy loamy sand.

Permeability of this Matheson 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 slight. The hazard of soil blowing is very high.

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

If this soil is irrigated and properly managed, it can be used as cropland. The main limitations are impaired trafficability of machinery and the very high hazard of soil blowing. Soil blowing makes it necessary to replant close grown crops about 1 year in 4.

If the range vegetation is in good or excellent condition, the main grasses are needleandthread, bluebunch wheatgrass, and Indian ricegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of forbs and woody plants increases. Areas of rangeland are used for grazing mainly in spring and fall. They are not suited to mechanical seeding or brush control because of the loamy sand surface layer and the very high hazard of soil blowing. Management practices suitable for use on these soils include proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

This Matheson soil has potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey.

If this soil is irrigated, it can be used for hay, small grain, pasture, and potatoes. An example of 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 generally 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 irrigation systems are used.

If this soil is irrigated, Russian-olive, green ash, Rocky Mountain juniper, Siberian peashrub, and lilac are examples of trees and shrubs that are well suited to use in windbreaks. These plants also improve the wildlife habitat. Capability subclasses IVe, irrigated, and Vlle, nonirrigated.

Matheson complex.

This complex is on basalt plains. Slope is 1 to 8 percent. The frost-free season is 80 to 100 days.

Matheson loamy sand makes up about 45 percent of this complex, and Matheson loam makes up 35 percent. The Matheson loamy sand occurs as hummocks less than 12 inches high, and the Matheson loam is between the hummocks.

Included with this complex in mapping is about 20 percent Bereniceton loamy sand, Bereniceton loam, Terreton loamy sand, Terreton sandy clay loam, and Rock outcrop.

The Matheson loamy sand is deep and well drained. It formed in eolian deposits. Typically, the surface layer is right brownish gray loamy sand about 1 0 inches thick. The underlying material is light brownish gray and light gray sandy loam. Basalt is at a depth of 46 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 10 inches.

Permeability of the Matheson loamy sand is moderately rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate or high. Surface runoff is slow or medium, and the hazard of erosion is slight or moderate. The hazard of soil blowing is very high.

The Matheson loam is deep and well drained. It formed in eolian deposits. Typically, the surface layer is light brownish gray loam about 10 inches thick. The underlying material is light brownish gray and light gray loam. Basalt is at a depth of 46 inches. The soil is calcareous throughout and has a layer of lime accumulation at a depth of 10 inches.

Permeability of the Matheson loam is moderately effective rooting depth is 60 inches or more. Available water capacity is moderate or high. Surface runoff is slow or medium, and the hazard of erosion is slight or moderate.

These soils are used as range, for wildlife habitat, and for recreation.

If the range vegetation is in good or excellent condition, the native grasses are needleandthread, Indian ricegrass, and Thurber needlegrass. When the range condition deteriorates, the proportion of these grasses decreases and the proportion of annual grasses, forbs, and woody plants increases.

This complex is used for grazing mainly in spring and fall. Generally, mechanical seeding or brush management is not practical on this complex because of the very high hazard of soil blowing. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey.

If these soils are irrigated, they can be used as cropland. The main limitations are restricted trafficability of machinery and a very high hazard of soil blowing on the Matheson loamy sand. It may be necessary

Permeability of this Terreton 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. The hazard of soil blowing is very high.

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, 1 or 2 years of grain, and then return to alfalfa or pasture. Where pasture is used in the cropping system, it is commonly 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 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 systems are 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 also avoid ponding.

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

This Terreton 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, shrubs such as caragana, Nanking cherry, 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 IVe, nonirrigated.

Terreton sandy loam.

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

Typically, the surface layer is light brownish gray sandy loam about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and light gray clay and silty clay loam. The soil is moderately calcareous in the surface layer and strongly calcareous below. It is moderately alkaline throughout.

Included with this soil in mapping are small areas of Terreton loamy sand, Terreton sandy clay loam, and Terreton clay, all of which have slopes of 0 to 1 percent. Also included are small areas of Zwiefel loamy sand, 0 to 2 percent slopes. Some areas of soils adjacent to standing or moving water have a high water table and are slightly or moderately saline-alkali affected.

Permeability of this Terreton 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. The hazard of soil blowing 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, 1 or 2 years of grain, and then return to alfalfa or pasture. When pasture is used in the rotation, it is commonly 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 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 systems are 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 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 ringnecked 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, shrubs such as Siberian peashrub, Tatarian honeysuckle, lilac, and European privet 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 IIe, irrigated.

Terreton loam.

This very deep, 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 light brownish gray loam about 6 inches thick. The substratum is light brownish gray and light gray clay and silty clay loam to a depth of 51 inches and light gray clay to a depth of more than 60 inches. The soil is moderately calcareous in the surface layer and strongly calcareous below. It is moderately alkaline throughout.

Included with this soil in mapping are small areas of Terreton sandy clay loam and Terreton sandy loam, both of which have slopes of 0 to 1 percent. Also included are some areas of soils, adjacent to standing or moving water, that have a high water table and that are slightly or moderately saline-alkali affected.

Permeability of this Terreton 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.

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

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 suited to this soil. Sprinkler irrigation is suited to all crops, and border irrigation is suited to alfalfa, small grain, and pasture. If border irrigation is used, waste water drains should be adequate to carry away the surplus water and to prevent ponding. Irrigation water should be applied with care to avoid 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 ringnecked 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, shrubs such as Siberian peashrub, Tatarian honeysuckle, lilac, and European privet can be planted along fence rows and ditchbanks, in odd field corners, and in windbreaks. These plantings provide shelter that protects the birds from predators and inclement weather. Food crops provide some cover. Capability subclass IIIc, irrigated.

Terreton silty clay loam.

This very deep, 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 115 days.

Typically, the surface layer is light brownish gray silty clay loam about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and light gray clay and silty clay loam. The soil is moderately calcareous in the surface layer and strongly calcareous below. It is moderately alkaline throughout.

Included with this soil in mapping are small areas of Terreton sandy loam and Terreton loamy sand, both of which have slopes of 0 to 1 percent, and Zwiefel loamy sand, 0 to 2 percent slopes. Also included are some areas, adjacent to standing or moving water, that have a high water table and that are slightly or moderately saline-alkali affected.

Permeability of this Terreton 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.

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

A suitable cropping system is 4 or 5 years of alfalfa for hay or pasture, 1 or 2 years of grain, and 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 suited to this son. Sprinkler irrigation is suited to all crops, and border irrigation is suited to alfalfa, small grain, and pasture. If border irrigation is used, waste water drains should be adequate to carry away the surplus water and prevent ponding. Irrigation water should be applied with care to avoid ponding.

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

If the vegetation is in good or excellent condition, the main grasses are bluebunch wheatgrass and Thurber needlegrass. When the vegetation deteriorates, the proportion of these grasses decreases and the proportion of the less desirable grasses, forbs, and woody plants increases. Seeding is a good practice if the range vegetation is in poor condition. Suitable grasses for seeding are Nordan crested wheatgrass, Siberian wheatgrass, bluebunch wheatgrass, and Indian ricegrass. The grass selected should meet the seasonal grazing requirements of livestock or wildlife, or both.

This soil has potential for providing habitat for ringnecked 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, 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 subclasses IIIc, irrigated, and VIc, nonirrigated.

Terreton-Rock outcrop complex.

This complex is on the outer edge of old lakebeds on basalt plains. Slope is 2 to 6 percent. The frost-free season is 80 to 100 days.

Terreton sandy clay loam makes up 50 percent of this complex, and Rock outcrop makes up 30 percent. The Terreton soil is on the old lakebeds, and Rock outcrop is on the basalt plains.

Included with this complex in mapping is about 25 percent Bondfarm loamy sand, Terreton loamy sand, and Aecet soils.

The Terreton soil is very deep and well drained. It formed in lacustrine material. Typically, the surface layer is light brownish gray sandy clay loam about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and light gray clay and silty clay loam.

Permeability of the Terreton soil is slow. Effective rooting depth is more than 60 inches. Available water capacity is very high. Surface runoff is slow or medium, and the hazard of erosion is moderate or 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 grasses, forbs, and woody plants. Rock outcrop areas have little value for grazing.

This complex is used as range and for wildlife habitat.

If the range vegetation is in good or excellent condition, the native grasses are mainly bluebunch wheatgrass and Thurber needlegrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. This complex is used for grazing mainly in spring and fall. Mechanical seeding or brush control is difficult because of the Rock outcrop. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclass VIIs, irrigated.

Terreton complex.

This complex is on old lakebeds. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Terreton loamy sand makes up 55 percent of the complex, and Terreton sandy clay loam makes up 20 percent. The Terreton loamy sand is on mounds about 12 inches high, and the Terreton sandy clay loam is in the areas between the mounds.

Included with this complex in mapping is about 25 percent Grassy Butte loamy sand, Zwiefel fine sand, and Rock outcrop.

The Terreton soil is deep and well drained. It formed in lacustrine material. Typically, the surface layer is light brownish gray loamy sand about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and light gray clay and silty clay loam.

A typical profile of the Terreton sandy clay loam is similar to that of the Terreton loamy sand, but the surface layer is sandy clay loam.

Permeability of these Terreton soils is 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 hazard of soil blowing on the Terreton loamy sand is very high.

This complex is used as range and for wildlife habitat.

If these soils are irrigated, they can be used for hay, small grain, pasture, and potatoes. A suitable cropping system is 3 to 5 years of alfalfa hay, 1 year of potatoes, 1 or 2 years of grain, and then return to hay or pasture. If pasture is used in the cropping system, it is generally 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 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 and furrow irrigation systems are used, waste water drains should be adequate to carry away the surplus water and to prevent ponding. Irrigation water should be applied with care to avoid ponding.

In irrigated areas, Russian-olive, golden willow, Scotch pine, Siberian peashrub, European privet, and lilac are examples of trees and shrubs that are well suited to use in windbreaks, They also improve the wildlife habitat.

If the range vegetation is in good or excellent condition, the native grasses are mainly needleandthread and bluebunch wheatgrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. This complex is used for grazing mainly in spring and fall. Mechanical seeding or brush control is difficult because of the very high hazard of soil blowing. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclasses IVe, irrigated, and VIIe, nonirrigated.

Terreton-Zwiefel complex.

This complex is on old lakebeds. Slope is 0 to 1 percent. The frost-free season is 80 to 100 days.

Terreton silty clay loam makes up 60 percent of the complex, and Zwiefel fine sand makes up 20 percent. The Terreton soil is in nearly level areas without hummocks, and the Zwiefel soil is in dunelike areas about 20 inches high.

Included with this complex in mapping is about 20 percent Grassy Butte sand and Terreton loamy sand.

The Terreton soil is very deep and well drained. It formed in lacustrine material. Typically, the surface layer is light brownish gray silty clay loam about 6 inches thick. The underlying material to a depth of

60 inches or more is light brownish gray and light gray clay and silty clay loam.

Permeability of the Terreton soil is slow. Effective rooting depth is 60 inches or more. Available water capacity is very high. Surface runoff is slow. The hazard of erosion is slight.

The Zwiefel soil is very deep and well drained. It formed in sandy wind-laid material over lacustrine deposits. Typically, the surface layer is grayish brown fine sand about 3 inches thick. The upper part of the substratum is grayish brown fine sand about 18 inches thick. The lower part to a depth of 60 inches or more is light brownish gray sandy clay and silty clay.

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

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

If these soils are irrigated, they can be used as cropland. The main management concerns on the Zweifel soil are impaired trafficability of machinery and the very high hazard of soil blowing. The risk of soil blowing makes it necessary to replant close grown crops about 1 year in 4.

If the range vegetation is in good or excellent condition, the native grasses are mainly needleandthread and bluebunch wheatgrass. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. This complex is used for grazing mainly in spring and fall. Mechanical seeding or brush control is difficult because of the very high hazard of soil blowing. 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, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclasses IVe, irrigated, and VIIe, nonirrigated.

Whiteknob gravelly loam.

This deep, well drained soil is on alluvial fans. It formed in alluvium 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 gravelly loam about 5 inches thick. The upper part of the underlying material is very pale brown gravelly loam about 9 inches thick. The lower part to a depth of 60 inches or more is very pale brown very gravelly sandy loam and very gravelly sand.

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

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

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

If this soil is irrigated, it can be used for alfalfa hay, small grain, pasture, and potatoes.

A suitable cropping system is 3 to 5 years of alfalfa hay, 1 year of potatoes, 1 to 2 years of grain, and then return to alfalfa or pasture. If pasture is used in the cropping system, it is commonly 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 systems are used, waste water drains should be adequate to carry the surplus water away and prevent ponding. Irrigation water should be applied with care to avoid creating a high water table.

If irrigated, Russian-olive, golden willow, Scotch pine, Siberian peashrub, Tatarian honeysuckle, and lilac are well suited to use in windbreaks. These plants also improve the wildlife habitat.

If the range vegetation is in good or excellent condition, the native grasses are mainly Indian ricegrass and sand dropseed. When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable grasses, forbs, and woody plants increases. Range seeding is a good practice if the range vegetation is in poor condition. Suitable grasses for seeding are Nordan crested wheatgrass, Siberian wheatgrass, bluebunch wheatgrass, or Indian ricegrass. The grass selected for seeding should meet the seasonal requirements of livestock or wildlife, or both.

This soil has potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclasses IVs, irrigated, and VIs, nonirrigated.

Zwiefel fine sand, 0 to 2 percent slopes.

This very deep, well drained soil is on old lakebeds. It formed in lacustrine sediment and wind-laid deposits derived from mixed sources. The frost-free season is 80 to 100 days.

Typically, the surface layer is grayish brown fine sand about 3 inches thick. The upper part of the underlying material is grayish brown fine sand about 18 inches thick. The lower part to a depth of 60 inches or more is light brownish gray sandy clay and silty clay.

Included with this soil in mapping are small areas of Terreton loamy sand, 0 to 1 percent slopes.

Permeability of this Zwiefel soil is slow. 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. The hazard of soil blowing is very high.

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, 1 or 2 years of grain, and then return to alfalfa or pasture. If pasture is used in the cropping system, it is commonly 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 systems are used, waste water drains should be adequate to carry the surplus water away and to prevent ponding.

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

This soil has potential for providing habitat for ringnecked 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 wildlife habitat, such species as Siberian peashrub, 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 IVe, irrigated.

Zwiefel-Grassy Butte-Terreton complex.

This complex is in undulating areas in playas. Slope is 0 to 6 percent. The frost-free season is 80 to 100 days.

Zweifel sand makes up 35 percent of this complex, sand makes up 25 percent, and Terreton loamy sand makes up 25 percent. The Zwiefel soil is in convex areas on small stabilized dunes, the Grassy Butte soil is in large convex areas on stabilized dunes, Terreton soil is in the more nearly level interdune areas.

Included with this complex in mapping is about 15 percent Terreton sandy clay loam, Terreton silty clay loam, and Rock outcrop.

The Zwiefel soil is very deep and well drained. It formed in sandy eolian and lacustrine sediment derived from mixed sources. Typically, the surface layer is grayish brown fine sand about 3 inches thick. The upper part of the underlying material is grayish brown fine sand 18 inches thick. The lower part of the underlying material is grayish brown find sand 18 inches thick. The lower part to a depth of 60 inches or more is light brownish gray sandy clay and silty clay.

The Zweifel soil is very deep and well drained. It formed in sandy eolian and its derived from mixed sources. Typical layer is grayish brown sand about 7 inches thick. The underlying material to a depth of 60 inches or more is grayish brown and gray loamy sand.

Permeability of the Grassy Butte soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is low. Surface runoff is slow, and the hazard of erosion is slight. The hazard of soil blowing is very high.

The Terreton soil is very deep and well drained. It formed in sandy lacustrine material derived from mixed sources and is on old lake bottoms. Typically, the surface layer is light brownish gray loamy sand about 6 inches thick. The underlying material to a depth of 60 inches or more is light brownish gray and light gray clay and silty clay loam.

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

This complex is used as range and for wildlife habitat.

If these soils are irrigated, they can be used for hay, small grain, pasture, and potatoes. The main management concerns are impaired trafficability of machinery and the very high hazard of soil blowing.

The hazard of soil blowing makes it necessary to replant close grown crops about 1 year in 4.

A suitable cropping system is 3 to 5 years of alfalfa for hay, 1 year of potatoes, 1 or 2 years of grain, and then return to alfalfa or plant to pasture. If pasture is used in the cropping system, it is generally 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 irrigation systems are suited to these soils.

If the soil is irrigated, Russian-olive, green ash, Rocky Mountain juniper, Siberian peashrub, and lilac are well suited to use in windbreaks. These plantings also improve the wildlife habitat.

If the range vegetation is in good or excellent condition, the main native grasses are needleandthread and Indian ricegrass- When the range vegetation deteriorates, the proportion of these grasses decreases and the proportion of less desirable weeds, grasses, forbs, and woody plants increases. These soils are used for grazing mainly in spring and fall. Mechanical seeding or brush control is not practical because of the very high hazard of soil blowing and the sandy surface layer. Management practices suitable for use on these soils include proper range use, deferred grazing, rotation grazing, and aerial spraying for brush control.

This complex has potential for providing habitat for jackrabbit, pronghorn antelope, coyote, sage grouse, songbirds, and birds of prey. Capability subclasses IVe, irrigated, and VIIe, nonirrigated.

Atom silt loam, 2 to 8 percent slopes.

COMPOSITION
Atom soil and similar inclusions - 75 percent
Contrasting inclusions: - 25 percent

ATOM SOIL
Position on landscape: lava plains

Elevation: 4,500 to 5,500 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 45 degrees F
frost-free period - about 85 days

Typical profile: (DJ79-16)
0 to 3 inches - pale brown silt loam
3 to 10 inches - pale brown silty clay loam
10 to 39 inches - pale brown silt loam
39 to 60 inches - pale brown silt loam

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 10 to 12 inches

Potential rooting depth: 60 inches or more

Runoff: slow

Hazard of erosion by water: slight to moderate

INCLUDED AREAS

CONTRASTING INCLUSIONS:
Nargon soils under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)

Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)

Menan soils under basin big sagebrush and wheatgrass species. (5 percent)
Soils with strong natric horizons under Wyoming big sagebrush and bluebunch wheatgrass. (2 percent)

Deuce soils under Wyoming big sagebrush and bluebunch wheatgrass. (1 percent)

Playas in run in areas (1 percent)

Rock outcrop (1 percent)

MAJOR USES

Current uses:
rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors:
low available precipitation

RANGELAND

Dominant vegetation in potential natural plant community:
Atom soil - Wyoming big sagebrush with bluebunch wheatgrass

General management considerations:
good suitability for rangeland drill seeding

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate to drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor due to seepage.

Brush management:
prescribed burning, chemical spraying, mechanical treatment,

INTERPRETIVE GROUPS

Capability classification:
Vle nonirrigated

Range site:
Atom soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSPMenan silt loam, 0 to 2 percent slopes

Blackfoot-Mooretown-Arco

Sediments of the area are fine-grained deposits of the Big Lost River. These soils exhibit features associated with moisture (e.g., mottles from redoximorphic conditions) and Blackfoot and Arco series have wetness designated in their taxonomic classes (i.e., Fluvaquentic Haploxerolls and Aquic Calcixerolls, respectively).

COMPOSITION

Blackfoot soil and similar inclusions - unknown
Mooretown soil - unknown
Arco soil - unknown
Contrasting inclusions - less developed soils (Torriorthents and Torrifluvents)

SETTING

Landform: alluvium from the Big Lost River

Elevation: 4,700-5,000 feet

Climatic Data:
precipitation: about 8 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

Butte

This unit is mapped on Cerro Grande, and East, Middle and Richard Buttes. While there may be soils included in these units, the general nature of the unit is one of rock outcrop. These areas are generally not suitable for most developments (e.g., construction, irrigation, dry farming), but may be ecologically significant.

Contrasting inclusions:
Pancheri soils under Wyoming big sagebrush and bluebunch wheatgrass (10 percent)
Techicknot soil under threetip sagebrush with bluebunch wheatgrass (5 percent)
Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass (5 percent)
Pingree soils under Wyoming big sagebrush and bluebunch wheatgrass (5 percent)

Coffee-Nargon complex, 4 to 20 percent slopes

COMPOSITION

Coffee soil and similar inclusions - 45 percent
Nargon soil and similar inclusions - 30 percent
Contrasting inclusions: - 25 percent

SETTING

Landform: lava plains

Elevation: 4,700 to 5,500 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 44 degrees F
frost-free period - about 90 days

COFFEE SOIL

Position on landscape: concave position on lava plains

Typical profile: (DG79-8)
0 to 7 inches - pale brown silt loam
7 to 16 inches - very pale brown silt loam
16 to 48 inches - very pale brown silt loam and silty clay loam
48 inches - bedrock

Depth class: deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 8 to 11 inches

Restriction to rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

NARGON SOIL

Position on landscape: convex positions on lava plains 2 percent stones on the surface

Typical profile: (DG79-3)
0 to 5 inches - pale brown loam
5 to 15 inches - pale brown clay loam
15 to 22 inches - white stony loam
22 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 3 to 5 inches

Potential rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Atom soils under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)
Deuce soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)
Soils with more rock fragments in the soil profile. (5 percent)
rock outcrop (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: low available water capacity

RANGELAND

Dominant vegetation in potential natural plant community:

Coffee soil - Wyoming big sagebrush with bluebunch wheatgrass and some juniper.
Nargon soil - Wyoming big sagebrush with bluebunch wheatgrass and some juniper.

Production is limited mainly by: available water holding capacity and available precipitation

General management considerations: fair suitability for rangeland drill seeding. Fence and Pipeline installation is difficult because the soils in this map unit are stony and moderately deep and deep to bedrock.

Rangeland improvement seeding of adapted species is limited by: available water capacity, available precipitation, stones in some areas

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor.

Brush management:
prescribed burning, chemical spraying, mechanical treatment,

INTERPRETIVE GROUPS

Capability classification: Coffee - VIe nonirrigated
Nargon - VIe nonirrigated

Range site:
Coffee soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Nargon soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP

Coffee-Nargon-Atom complex, 2 to 12 percent slopes

COMPOSITION

Coffee soil and similar inclusions - 30 percent
Nargon soil and similar inclusions - 30 percent
Atom soil and similar inclusions - 15 percent

Contrasting inclusions: - 25 percent

SETTING

Landform: lava plains

Elevation: 4,500 to 5,500 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 45 degrees F
frost-free period - about 90 days

COFFEE SOIL

Position on landscape: concave position on lava plains

Typical profile: (DG79-8)
0 to 7 inches - pale brown silt loam
7 to 16 inches - very pale brown silt loam
16 to 48 inches - very pale brown silt loam and silty clay loam
48 inches - bedrock

Depth class: deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 8 to 11 inches

Restriction to rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

NARGON SOIL

Position on landscape: convex positions on lava plains 2 percent stones on the surface

Typical profile: (DG79-3)
0 to 5 inches - pale brown loam
5 to 15 inches - pale brown clay loam
15 to 22 inches - white stony loam
22 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

ATOM SOIL

Position on landscape: lava plains

Climatic Data:
precipitation - about 11 inches
air temperature - about 45 degrees F
frost-free period - about 85 days

Typical profile: (DJ79-16)
0 to 3 inches - pale brown silt loam
3 to 10 inches - pale brown silty clay loam
10 to 39 inches - pale brown silt loam
39 to 60 inches - pale brown silt loam

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 10 to 12 inches

Potential rooting depth: 60 inches or more

Runoff: slow

Hazard of erosion by water: slight to moderate

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Deuce soils under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)
Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)
Soils with more rock fragments in the soil profile. (5 percent)
rock outcrop (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: low available water capacity in some soils

RANGELAND

Dominant vegetation in potential natural plant community:

Coffee soil - Wyoming big sagebrush with bluebunch wheatgrass
Nargon soil - Wyoming big sagebrush with bluebunch wheatgrass.
Atom soil - Wyoming big sagebrush with bluebunch wheatgrass.
Production is limited mainly by: low available precipitation and available water holding capacity in the Nargon soils

General management considerations: good suitability for rangeland drill seeding
Fence and Pipeline installation is difficult because the Coffee and the Nargon soils in this map unit are moderately deep and deep to bedrock.

Rangeland improvement seeding of adapted species is limited by: available water capacity in some soils, available precipitation

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment

INTERPRETIVE GROUPS

Capability classification: Coffee - VIc nonirrigated
Nargon - VIc nonirrigated; Atom - VIc nonirrigated

Range site:
Coffee soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Nargon soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Atom soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP

Deuce-Nargon-Lava Flows complex, 2 to 12 percent slopes

COMPOSITION

Deuce soil and similar inclusions - 45 percent
Nargon soil and similar inclusions - 20 percent
Lava flows - 15 percent

Contrasting inclusions: - 20 percent

SETTING

Landform: lava plains

Elevation: 4,700 to 5,500 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 45 degrees F
frost-free period - about 85 days

DEUCE SOIL

Position on landscape: convex positions on lava plains 3 percent stones on the surface

Typical profile: (DJ93-11)
0 to 2 inches - light brownish gray stone silt loam
2 to 6 inches - pale brown silt loam
6 to 19 inches - very pale brown silt loam
19 inches - bedrock

Depth class: shallow

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 2 to 3 inches

Potential rooting depth: 10 to 20 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

NARGON SOIL

Position on landscape: concave positions on lava plains 3 percent stones on the surface

Typical profile: (DJ79-23)
0 to 2 inches - light brownish gray silt loam
2 to 7 inches - pale brown clay loam
7 to 21 inches - pale brown and very pale brown loam and stony loam
21 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

LAVA FLOWS

Lava flows consist of barren flows of basalt associated with recent volcanic activity. Pressure ridges, fissures, and sinkholes are common features.

INCLUDED AREAS

CONTRASTING INCLUSIONS:
Pingree soils under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)
Coffee soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)
Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: shallow to bedrock, low available water capacity, stones on the surface, rooting depth

RANGELAND

Dominant vegetation in potential natural plant community:

Deuce soil - Wyoming big sagebrush with bluebunch wheatgrass
Nargon soil - Wyoming big sagebrush with bluebunch wheatgrass

Production is limited mainly by: available water holding capacity and soil depth to bedrock

General management considerations: unsuitability for rangeland drill seeding
Fence and Pipeline installation is difficult because the soils in this map unit are moderately deep and shallow to bedrock.

Rangeland improvement seeding of adapted species is limited by: available water capacity, depth to the bedrock, rooting depth, stones on the surface

Suitable management practices: Seed suitable plants by aerial seeding. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is very poor.

Brush management: prescribed burning, chemical spraying

INTERPRETIVE GROUPS

Capability classification: Deuce - VIe nonirrigated
Nargon - VIe nonirrigated

Range site:
Deuce soil - 011BY009ID Shallow Stony 8-12" PPT. ARTRW8/AGSP
Nargon soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP

Deuce-Nargon-Lava Flows complex, 12 to 20 percent slopes

COMPOSITION

Deuce soil and similar inclusions - 35 percent
Nargon soil and similar inclusions - 20 percent
Lava Flows - 20 percent

Contrasting inclusions: - 25 percent

SETTING

Landform: lava plains

Elevation: 4,700 to 5,500 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 44 degrees F
frost-free period - about 85 days

DEUCE SOIL

Position on landscape: convex positions on lava plains 3 percent stones on the surface

Slope range: 4 to 20 percent

Typical profile: (DG79-13)
0 to 3 inches - pale brown stony silt loam
3 to 12 inches - yellowish brown cobbly clay loam
12 to 19 inches - very pale brown stony clay loam
19 inches - bedrock

Depth class: shallow

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 2 to 3 inches

Restriction to rooting depth: 10 to 20 inches

Runoff: very high

Hazard of erosion by water: very high

NARGON SOIL

Position on landscape: convex positions on lava plains 3 percent stones on the surface

Slope range: 4 to 20 percent

Typical profile: (DJ79-23)
0 to 2 inches - light brownish gray silt loam
2 to 7 inches - pale brown clay loam
7 to 21 inches - pale brown and very pale brown loam and stony loam
21 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: very high

Hazard of erosion by water: moderate to high

Hazard of erosion by wind: slight

LAVA FLOWS

Slope range: 4 to 30 percent

Lava river flows of basalt associated with recent volcanic activity typified by the Craters of the Moon National Monument. Pressure ridges, fissures, vertical cliffs and sinkholes are common features.

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Coffee soils under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)
Techicknot soil under threetip sagebrush with bluebunch wheatgrass. (5 percent)
Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)
Pingree soils on lesser slopes under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: shallow to bedrock, low available water capacity, stones on the surface, rooting depth

RANGELAND

Dominant vegetation in potential natural plant community:

Deuce soil - Wyoming big sagebrush with bluebunch wheatgrass
Nargon soil - Wyoming big sagebrush with bluebunch wheatgrass

Production is limited mainly by: available water holding capacity and soil depth to bedrock

General management considerations: poor suitability for rangeland drill seeding
Fence and Pipeline installation is difficult because the soils in this map unit are shallow to bedrock and on steep slopes.

Rangeland improvement seeding of adapted species is limited by: available water capacity, depth to the bedrock, rooting depth

Suitable management practices:
Seed suitable plants by aerial seeding. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is very poor.

Brush management: prescribed burning, chemical spraying

INTERPRETIVE GROUPS

Capability classification: Deuce - VIe nonirrigated
Nargon - VIe nonirrigated

Range site:
Deuce soil - 011BY009ID Shallow Stony 8-12" PPT. ARTRW8/AGSP
Nargon soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP

Hondoho cobbly loam, 4 to 30 percent slopes

COMPOSITION

Hondoho soils and similar inclusions - 75 percent
Contrasting inclusions: - 25 percent

HONDOHO SOIL

Position on landscape: convex alluvial fans

Elevation: 5,000 to 5,400 feet

Climatic Data:
precipitation - about 12 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

Typical profile: (DJ79-19)
0 to 3 inches - grayish brown cobbly loam
3 to 6 inches - brown cobbly loam
6 to 10 inches - brown cobbly loam
10 to 38 inches - pale brown very cobbly loam
38 to 60 inches - yellowish brown very cobbly loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderate

Available water capacity: 8 to 11 inches

Restriction to rooting depth: 60 inches or more

Runoff: medium to rapid

Hazard of erosion by water: slight to severe

INCLUDED AREAS

Contrasting inclusions:

Soils similar to Hondoho with deep dark soil surfaces under Wyoming sagebush and bluebunch wheatgrass (10 percent)
Deuce soils under Wyoming sagebush and bluebunch wheatgrass (5 percent)
A similar soil to Nargon with more rock fragments in the soil profile (5 percent)
Rock outcrop (5 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity

Dominant vegetation in potential natural plant community:

Hondoho soil - Wyoming big sagebrush with bluebunch wheatgrass and some areas of black sagebrush with bluebunch wheatgrass (15 percent)

Production is limited mainly by available water capacity and available precipitation

General management considerations: good suitability for rangeland drill seeding. Fence and pipeline installation is difficult because the Polatis soils are shallow to bedrock.

Suitable management practices: seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: VIc nonirrigated

Range site:

Hondoho soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP

Ike-Rock outcrop-Jimbee association, 10 to 80 percent slopes

COMPOSITION

Ike soil and similar inclusions - 35 percent
Rock outcrop - 20 percent
Jimbee soil and similar inclusions - 15 percent
Contrasting inclusions - 30 percent

IKE SOIL

Position on landscape: ridgetops and southern convex positions of sideslopes of foothills and mountains

Elevation: 5,000 to 7,600 feet

Climatic Data:

precipitation - about 9 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

Typical profile: (DJ89-106)
0 to 2 inches - pale brown stony silt loam
2 to 7 inches - very pale brown very gravelly silt loam
7 to 18 inches - very pale brown extremely gravelly and pale yellow extremely cobbly silt loam
18 inches - dark gray hard limestone

Depth class: shallow to bedrock (10 to 20 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 1.5 to 2.5 inches

Restriction to rooting depth: bedrock at 10 to 20 inches

Runoff: medium to very rapid

Hazard of erosion by water: slight to severe

ROCK OUTCROP

Rock outcrop in this unit consists of gentle to steep and very steep slope of limestone rock outcrop.

JIMBEE SOIL

Position on landscape: ridgetops and northern concave positions of slideslopes of foothills and mountains

Elevation: 5,500 to 8,500 feet

Climatic Data:
precipitation - about 12 inches
air temperature - about 40 degrees F
frost-free period - about 60 days

Typical profile: (DJ86-20)
0 to 5 inches - brown stony loam
5 to 17 inches - pale brown gravelly loam and very pale brown very stony loam
17 inches - white lime coated dark gray hard limestone

Depth class: shallow to bedrock (10 to 20 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 1.5 to 3.5 inches

Restriction to rooting depth: 10 to 20 inches

Runoff: rapid

Hazard of erosion by water: moderate to severe

INCLUDED AREAS

Contrasting inclusions:

Simeroi soils that are on south slopes at lower elevations under black sagebrush and bluebunch wheatgrass (10 percent)

Simeroi soils that are on south slopes at lower elevations under Wyoming big sagebrush and bluebunch wheatgrass (10 percent)

Nitchly soils that are higher elevations under black sagebrush and bluebunch wheatgrass (5 Percent)

Zeale soils that are on north slopes under mountain big sagebrush and bluebunch wheatgrass (5 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity, gravel, cobbles and stones, depth to bedrock, water erosion in some areas, rooting depth in some areas, slope

Dominant vegetation in potential natural plant community:

Ike soil - black sagebrush with bluebunch wheatgrass and some mountain maghogany with bluebunch wheatgrass (10 percent)

Jimbee soil - low sagebrush with bluebunch wheatgrass and some mountain mahogany with bluebunch wheatgrass (5 percent)

Production is limited mainly by: low precipitation, AWC and shallow depth to bedrock

General management considerations: nonsuitable for rangeland drill seeding

Suitable management practices: very poor suitability for stock water ponds

Brush management: prescribed burning, chemical spraying

Capability classification: VIIe nonirrigated for Ike and Jimbee soils

Range site:

Ike soils -- 012XY001ID; limey and gravelly soil with 8-13" precipitation - ARARN/AGSP

Jimbee soils - 012XYOO2ID; shallow loamy soils with 12-16" precipitation - ARAR8/AGSP

Inel-Matheson-Rock Outcrop association 8 to 45 percent slopes

COMPOSITION

Inel dry soil and similar inclusions - 35 percent
Matheson soil and similar inclusions - 30 percent
Rock outcrop and similar inclusions - 30 percent
Contrasting inclusions: 5 percent

INEL, DRY SOIL

Position on landscape: ridgetops and convex southern position sideslopes of hills and mountains

Slopes Range: 15 to 45 percent slopes

Typical profile: (DJ91-16)
0 to 2 inches - pale brown stony loam
2 to 16 inches - pale brown and very pale brown very gravelly loam
16 to 20 inches - very pale brown gravelly sandy loam
20 inches - dark gray limestone bedrock

Depth class: shallow to bedrock (10 to 20 inches)

Drainage class: well drained

Permeability: moderately

Available water capacity: 1.5 to 3.5 inches

Potential rooting depth: bedrock at 10 to 20 inches

Runoff: medium to very rapid

Hazard of erosion: slight to moderate

MATHESON SOIL

Position on landscape: fan terraces

Slopes Range: 8 to 12 percent slopes

Typical profile: (DJ91-17)
0 to 5 inches - light brownish gray sandy loam
5 to 8 inches - pale brown sandy loam
8 to 60 inches - pale brown and very pale brown sandy loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: 2.5 to 4.5 inches

Potential rooting depth: 60 inches or more

Runoff: moderately slow

Hazard of erosion:
by water - slight
by wind - moderate

ROCK OUTCROP

Rock outcrop in this unit consists of gentle to steep slope of limestone rock outcrop associated with some juniper.

INCLUDED AREAS

Contrasting inclusions: Ike soil that is under Blacksage brush and bluebunch wheatgrass (5 percent)

Similar inclusions:
Similar soils to Matheson on steeper slopes and with more rock fragments (10 percent)
Similar soils to Inel that are deeper than 20 inches to bedrock (10 percent)

Current uses: rangeland and wildlife

Soil-related factors: low available water capacity, shallow in some areas, wind erosion in some areas, rooting depth in some areas, slope

Dominant vegetation in potential natural plant community:
Inel, dry soil - sparce juniper with salmon wildrye and some shadscale with indian ricegrass (5 percent)
Matheson soil - sparce juniper and basin big sagebrush with indian ricegrass
Production is limited mainly by low precipitation, AWC, moderate to steep slopes and some stony shallow depth to bedrock

General management considerations: poor suitability for rangeland drill seeding on slopes between 10-25%; nonsuitable on steep slopes greater than 25 percent

Suitable management practices: seed suitable plants (e.g., drought tolerant species). After seeding, defer grazing until young plants are well established. Poor suitability for stock water ponds.

Brush management: prescribed burning, chemical spraying

Capability classification: VIs nonirrigated

Range site:
Inel, dry soils -- 012XY022ID; shallow breaks with less than 8" precipitation - ATCO/ELAMS
Matheson soils -- 011BY004ID; sandy soil with 8-12" precipitation - ARTRT/ORHY/STCO4

Jimbee-Rock outcrop-Ike association, 10 to 90 percent slopes

COMPOSITION

Jimbee soil and similar soils - 45 percent
Rock outcrop - 15 percent
Ike soil and similar soils - 15 percent
Contrasting inclusions: 25 percent

JIMBEE SOIL

Position on landscape: ridgetops and north facing convex positions sideslopes of mountains and foothills

Elevation: 5,500 to 9,000 feet

Climatic Data:
precipitation - about 12 inches
air temperature - about 37 degrees F
frost-free period - about 55 days

Typical profile: (DJ86-20)
0 to 5 inches - brown stony loam
5 to 17 inches - pale brown gravelly loam and very pale brown very stony loam
17 inches - white lime coated dark gray hard bedrock

Depth class: shallow to bedrock (10 to 20 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 1.5 to 3.5 inches

Restriction to rooting depth: 10 to 20 inches

Runoff: rapid

Hazard of erosion by water: slight to moderate

ROCK OUTCROP

Rock outcrop in this unit consists of gentle to steep and very steep slope of limestone rock outcrop.

IKE SOIL

Position on landscape: ridgetops on south facing convex position sideslopes of hills and mountains

Elevation: 5,500 to 7,600 feet

Climatic Data:

precipitation - about 9 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

Typical profile: (DJ86-21)

0 to 3 inches - brown stony loam
3 to 10 inches - pale brown very gravelly loam
10 to 16 inches - pale brown extremely stony loam
16 inches - dark gray hard bedrock

Depth class: shallow to bedrock (10 to 20 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 1.5 to 3.5 inches

Restriction to rooting depth: 10 to 20 inches

Runoff: rapid

Hazard of erosion by water: slight to moderate

INCLUDED AREAS

Contrasting inclusions:

Adek, dry soils that are deep soils on northerly concaved slopes under low sagebrush, bluebunch wheatgrass and Adek soils on windswept ridges (10 percent)
Zeale soils that are deep soils on north slopes under mountain big sagebrush and bluebunch wheatgrass (5 percent)
Nitchy soils that are deep soils with light surface horizons on south slopes under black sagebrush and bluebunch wheatgrass (5 percent)
Skibo soils that are deep soils with dark surface horizons at higher elevations under mountain mahogany (5 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity, gravel, cobbles and stones, shallow, water erosion in some areas, rooting depth

Dominant vegetation in potential natural plant community:

Jimbee soil - low sagebrush with bluebunch wheatgrass and some mountain maghogany with bluebunch wheatgrass or Idaho fescue (10 percent)
Rock outcrop - with sparce mountain mahogany
Ike soil - black sagebrush with bluebunch wheatgrass and some mountain maghogany with bluebunch wheatgrass (5 percent)
Production is limited mainly by available water capacity and shallow

General management considerations: unsuitable for rangeland drill seeding. Suitability for stock water ponds is very poor.

Brush management: prescribed burning, chemical spraying

Capability classification: VIIe nonirrigated for Jimbee and Ike soils

Range site:

Jimbee soil - 012XY002ID; shallow loamy soil with 12-16" precipitation - ARAR8/AGSP
Ike soil - 012XY001ID; limey gravelly soil with 8-13" precipitation - ARARN/AGSP

Lava Flows-Pingree complex, 0 to 15 percent

Composition:

Lava flows and similar inclusions - 60 percent
Pingree soil and similar inclusions - 35 percent
Contrasting inclusions - 5 percent

LAVA FLOWS

Lava flows consist of barren flows of basalt associated with recent volcanic activity. Pressure ridges, fissures, and sinkholes are common features.

Landform: basalt plains

Elevation: 4,700 to 5,200 feet

Climatic Data:

precipitation - about 10 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

PINGREE SOIL

Landform: basalt plains

Typical profile: Series

0 to 7 inches - pale brown stony silt loam
7 to 9 inches - pale brown stony silt loam
9 inches - basalt bedrock

Depth class: shallow (7 to 12 inches)

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 1 to 3 inches

Runoff: slow to medium

Hazard of erosion by water: slight to moderate

INCLUDED AREAS

Contrasting inclusions:
Tenno soil under Wyoming big sagebrush and bluebunch wheatgrass (3 percent).
Moderately deep soils (2 percent).

MAJOR USES

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity, shallow
Dominant vegetation in potential natural plant community:
Pingree soil - Wyoming sagebrush with bluebunch wheatgrass. Production is limited mainly by low available water capacity, shallow soils and surface rock.

General management considerations: Unsuitable for rangeland drill seeding.
Fence and pipeline installation is difficult because the soils in this map unit are very shallow to bedrock.

Brush management: prescribed burning, chemical spraying,

Capability classification: VIIs nonirrigated

Range site:
Pingree soil - 011BY005ID; shallow loamy soils with 8-16" precipitation - ARTRW/AGSP

Malm-Bondfarm-Matheson complex, 4 to 8 percent slopes

COMPOSITION

Malm soil - 60 percent
Bondfarm soil - 20 percent
Matheson soil - 15 percent
Contrasting inclusions: - 5 percent

SETTING

Landform: basalt plains

Elevation: 4,700 to 5,500 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

MALM SOIL

Position on landscape: concave positions on basalt plains

Typical profile: (DJ79-38)
0 to 5 inches - brown fine sandy loam
5 to 32 inches - pale brown fine sandy loam
32 to 38 inches - white gravelly fine sandy loam
38 inches - lime and silica coated basalt bedrock

Depth class: moderately deep (20 to 40 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate to severe

Hazard of erosion by wind: slight to moderate

BONDFARM SOIL

Position on landscape: convex ridgetops position on basalt plains

Typical profile: (DJ79-1)
0 to 3 inches - pale brown stony fine sandy loam
3 to 11 inches - pale brown fine sandy loam
11 inches - lime-coated, unweathered basalt bedrock

Depth class: shallow (10 to 20 inches)

Drainage class: well drained

Permeability: moderate rapid

Available water capacity: 2 to 4 inches

Restriction to rooting depth: 10 to 20 inches

Runoff: medium

Hazard of erosion by water: slight

Hazard of erosion by wind: slight to moderate

MATHESON SOIL

Position on landscape: mound and concave position on basalt plains

Typical profile: (DJ79-37)
0 to 6 inches - pale brown fine sandy loam
6 to 45 inches - pale brown and light gray sandy loam
45 inches - lime and silica coated fractured basalt bedrock

Depth class: deep (20 to 40 inches)

Drainage class: well drained

Permeability: moderate rapid to bedrock

Available water capacity: 4 to 6 inches

Restriction to rooting depth: 20 to 40 inches

Runoff: medium

Hazard of erosion by water: slight

Hazard of erosion by wind: slight to moderate

INCLUDED AREAS

Contrasting inclusions: Rock outcrop (5 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity, stone on surface and in soil in some areas, shallow, wind erosion in some areas, rock outcrop in some areas

Dominant vegetation in potential natural plant community:
Malm soil - Wyoming big sagebrush with bluebunch wheatgrass
Bondfarm soil - Wyoming big sagebrush with bluebunch wheatgrass
Matheson soil - basin big sagebrush with bluebunch wheatgrass
Note: These same soils on the dry area of the INEL have Indian Ricegrass in place of bluebunch wheatgrass

General management considerations: fair suitability for rangeland drill seeding. Fence and pipeline installation is difficult because the soils are shallow.

Rangeland improvements by seeding of adapted species is limited by: available water capacity, available precipitation

Suitable management practices: Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are will established. Unsuitable for stock water

ponds. Reduce the risk of wind erosion by accumulating litter on the surface and maintaining the plant cover.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: VIc nonirrigated Malm and Matheson soils, VIIs for Bondfarm soil

Range site:
Malm soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP
Bondfarm soil - 011BY009ID; shallow stony with 8-12" precipitation - ARTRW/AGSP
Matheson soil - 011BY004ID; sandy with 8-12" precipitation - ARTRT/ORHY
INEL dry area has different range sites mainly B11-19 in Malm unit, B11-20 in Bondfarm unit, and B11-4 in Matheson unit. The dry INEL area is north and west of Central Facilities Area (CFA).

Matheson-Grassy Butte complex, 2 to 15 percent slopes

COMPOSITION

Matheson soil and similar inclusions - 75 percent
Grassy Butte soil - 15 percent
Contrasting inclusions: 10 percent

Landform: fan terrace

Elevation: 4,800 to 5,500 feet

Climatic Data:
precipitation - about 8 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

MATHESON SOIL

Position on landscape: western facing fan terrace

Slope Range: 2 to 12 percent

Typical profile: (DJ91-18)
0 to 4 inches - pale brown sandy loam
4 to 20 inches - pale brown sandy loam
20 to 60 inches - pale brown and very pale brown sandy loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderately rapid

Available water capacity: 3 to 5 inches

Potential rooting depth: 60 inches or more

Runoff: slow to medium

Hazard of erosion by:
water - slight
wind - high

GRASSY BUTTE SOIL

Position on landscape: convex wind blown mounds on fan terrace

Slope Range: 5 to 15 percent

Typical profile:
0 to 7 inches - pale brown loamy sand
7 to 60 inches - pale brown loamy sand

Depth class: very deep (60 inches or more)

Drainage class: somewhat excessively drained

Permeability: rapid

Available water capacity: 2.5 to 3.5 inches

Potential rooting depth: 60 inches or more

Runoff: slow to medium

Hazard of erosion by: water - slight; wind - severe

INCLUDED AREAS

Contrasting inclusions: Sparmo soils that are loamy soils under Wyoming big sagebrush and bluebunch wheatgrass (10 percent)

Similar inclusions: soils similar to Matheson soils with more rock fragments (10 percent)

Current uses: rangeland, wildlife

Soil related factors: low available water capacity, blowing sand, water erosion in some areas

RANGELAND

Dominant vegetation in potential natural plant community:
Matheson soil - basin big sagebrush, Indian ricegrass with needle-and-threadgrass

Grassy Butte soil - basin big sagebrush, Indian ricegrass with needle-and-threadgrass
Production is limited mainly by: low precipitation, AWC and blowing soils

General management considerations: poor suitability for rangeland drill seeding

Suitable management practices: seed suitable plants. Among these are plants that tolerate drought and salt. Seed in row strips to reduce wind erosion. After seeding, defer grazing until young plants are will established. Suitability for stock water ponds is very poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: VIs nonirrigated

Range site:
Matheson soil - 011BY004ID; sandy with 8-12" precipitation - ARTRT/ORHY/STOC4
Grassy Butte soil - 011BY004ID; sandy with 8-12" precipitation ARTRT/ORHY/STOC4

McCarey-Vickton-Lava Flow complex, 0 to 15 percent slopes

COMPOSITION

McCarey soil and similar inclusions - 45 percent
Vickton soil and similar inclusions - 20
Rock outcrop - 20 percent
Contrasting inclusions: - 15 percent

SETTING

Landform: lava plains

Elevation: 4,700 to 5,400 feet

Climatic Data:
precipitation - about 13 inches
air temperature - about 44 degrees F
frost-free period - about 70 days

McCAREY SOIL

Position on landscape: convex ridges on lava plains

Slope Range: 2 to 15 percent

Typical profile: (DJ79-5)
0 to 12 inches - brown silt loam
12 to 18 inches - brown silty clay loam
18 to 33 inches - pale brown and light gray silt loam
33 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 4 to 6 inches

Restriction to rooting depth: 20 to 40 inches

Runoff: slow to medium

Hazard of erosion by water: moderate

VICKTON

Position on landscape: concave basins

Slope Range: 0 to 12 percent

Typical profile: (DJ93-34)
0 to 8 inches - dark grayish brown, brown loam and silt loam
8 to 14 inches - brown silty clay loam
14 to 58 inches - very pale brown, light brownish gray silt clay loam and loam
58 inches - bedrock

Depth class: deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 6 to 8 inches

Restriction to rooting depth: 40 to 60 inches

Runoff: slow to medium

Hazard of erosion by water: moderate

ROCK OUTCROP

Position on landscape: pressure ridges and near cracks and fissures

INCLUDED AREAS

CONTRASTING INCLUSIONS:
Soils that are less than 20 inches deep to bedrock under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)

Soils with more rock fragments under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)

Beartrap soils in mounds under basin big sagebrush with great basin wildrye grass. (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: available water capacity, depth to the bedrock, rooting depth

RANGELAND

Dominant vegetation in potential natural plant community:
McCarey soil - Wyoming big sagebrush with bluebunch wheatgrass
Vickton soil - three-tip sagebrush with bluebunch wheatgrass
Production is limited mainly by: available water holding capacity and soil depth to bedrock

General management considerations: fair suitability for rangeland drill seeding
Fence and Pipeline installation is difficult because the soils in this map unit are shallow and moderately deep to bedrock and rock outcrop

Rangeland improvement seeding of adapted species is limited by: available water capacity, depth to the bedrock some soils, rooting depth some soils

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor with bedrock as shallow as 20 inches.

Brush management: prescribed burning, chemical spraying, mechanical treatment

INTERPRETIVE GROUPS

Capability classification: McCarey - IVe nonirrigated
Vickton - IIIe nonirrigated

Range site:
McCarey soil - 011BY010ID Loamy 12-16" PPT. ARTRW8/AGSP
Vickton soil - 011BY011ID Loamy 12-16" PPT. ARTR4/AGSP

Menan silt loam, 0 to 2 percent slopes

COMPOSITION

Menan soil and similar inclusions - 90 percent
Contrasting inclusions - 10 percent

MENAN

Position on landscape: bottomland run in areas

Elevation: 4,700 to 5,200 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

Typical profile: (DJ79-17)
0 to 3 inches - dark brown silt loam
3 to 9 inches - dark brown silty clay loam
9 to 22 inches - dark brown silty clay loam
22 to 60 inches - light gray loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 10 to 12 inches

Potential rooting depth: 60 inches or more

Runoff: slow

Hazard of erosion by water: slight

INCLUDED AREAS

Contrasting inclusions:
Techicknot soils under threetip sagebrush and bluebunch wheatgrass (5 percent).
Splittop soils under Wyoming sagebrush and bluebunch wheatgrass (3 percent).
Terreton soils under basin big sagebrush and wheatgrass species (2 percent).

Current uses: rangeland, wildlife

Soil-related factors: minor season flooding

Dominant vegetation in potential natural plant community: Menan soil - basin big sagebrush with basin wild ryegrass. Production is limited mainly by seasonal flooding.

General management considerations: good suitability for rangeland drill seeding.

Suitable management practices: Seed suitable plants. Among these are plants that tolerate to drought.

After seeding, defer grazing until young plants are well-established. Suitability for stock water ponds is poor due to seepage.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: IVc nonirrigated

Range sites: Menan soil - 011BY006ID.
Loamy soils, 8-12" precipitation - ARTRT/AGSP

Mogg-Shagel association, 15 to 60 percent slopes

COMPOSITION

Mogg soil and similar inclusions- 40 percent
Shagel soil and similar inclusions - 30 percent
Contrasting inclusions: 30 percent

MOGG SOIL

Position on landscape: convex ridgetops and lower south facing sides of foothills and mountains

Elevation: 5,000 to 6,500 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 43 degrees F
frost-free period - about 70 days

Typical profile: (DJ92-49)
0 to 6 inches - brown very gravelly loam
6 to 13 inches - brown, pale brown very gravelly loam and extremely gravelly loam
13 inches - rhyolite

Depth class: shallow to bedrock (12 to 20 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 1.5 to 2.5 inches

Restriction to rooting depth: bedrock at 10 to 20 inches

Runoff: medium to very rapid

Hazard of erosion by water: slight to severe

SHAGEL SOIL

Position on landscape: upper south facing slopes and lower north facing slideslopes of foothills and mountains

Elevation: 5,000 to 7,500 feet

Climatic Data:
precipitation - about 12 inches
air temperature - about 40 degrees F
frost-free period - about 70 days

Typical profile: (DJ92-39)
0 to 3 inches - grayish brown very gravelly loam
3 to 7 inches - brown very gravelly loam
7 to 16 inches - pale brown very gravelly loam and very pale brown extremely gravelly loam
16 inches lime coated very fractured inplace ryolite

Depth class: shallow to bedrock (12 to 20 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 1.5 to 3.5 inches

Restriction to rooting depth: depth to bedrock (10 to 20 inches)

Runoff: rapid

Hazard of erosion by water: moderate to severe

INCLUDED AREAS

Contrasting inclusions:
Soil similiar to Mogg soils that are moderately deep under black sagebrush and bluebunch wheatgrass (10 to percent)
Similar soils to Shagel soils that are moderately deep under low sagebrush and bluebunch wheatgrass (10 percent)
Soils that are deep soils under black sagebrush and bluebunch wheatgrass (5 percent)
Sparmo soils that are rock free under Wyoming sagebrush and bluebunch wheatgrass with some juniper (5 percent)

Similar inclusions:
Similar soils of Mogg and Shagel soils over quartzite on southwest facing mountains of the Little Lost River Valley

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity, gravel, cobbles and stones, depth to bedrock, water erosion in some areas, rooting depth in some areas, slope

Dominant vegetation in potential natural plant community:

Mogg soil - black sagebrush with bluebunch wheatgrass
Shagel soil - low sagebrush with bluebunch wheatgrass and some black sagebrush with bluebunch wheatgrass on quartzite material (20 percent)
Production is limited mainly by: low precipitation, AWC and shallow depth to bedrock

General management considerations: unsuitable for rangeland drill seeding on steep slopes. Very poor suitability for stock water ponds.

Brush management: prescribed burning, chemical spraying,
Capability classification: VIIe nonirrigated for Mogg and Shagel soils

Range site:

Mogg soils -- 012XY001ID; limey gravelly soils with 8-13" precipitation - ARARN/AGSP
Shagel soils - 012XYOO2ID; shallow loamy soils with 12-16" precipitation - ARAR8/AGSP

Nargon-Atom-Techicknot complex, 0 to 20 percent slopes

COMPOSITION

Nargon soil and similar inclusions - 35 percent
Atom soil and similar inclusions - 30 percent
Techicknot soil and similar inclusions - 25 percent
Contrasting inclusions: - 10 percent

SETTING

Landform: lava plains

Elevation: 4,800 to 5,800 feet

Climatic Data:

precipitation - about 11 inches
air temperature - about 44 degrees F
frost-free period - about 85 days

NARGON SOIL

Position on landscape: convex positions on lava plains 2 percent stones on the surface

Slope range: 2 to 20 percent

Typical profile: (DG79-3)

0 to 5 inches - pale brown loam
5 to 15 inches - pale brown clay loam
15 to 22 inches - white stony loam
22 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

ATOM SOIL

Position on landscape: concave position on lava plains

Slope range: 2 to 20 percent

Typical profile: (DJ90-3)
0 to 7 inches - brown silt loam
7 to 15 inches - pale brown silty clay loam
15 to 60 inches - very pale brown silty clay loam, silt loam and loam

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 9 to 12 inches

Restriction to rooting depth: 60 inches or more

Runoff: medium

Hazard of erosion by water: moderate

TECHICKNOT SOIL

Position on landscape: concave position on basalt basins

Slope range: 0 to 12 percent

Typical profile: (DJ79-25)
0 to 4 inches - brown loam
4 to 12 inches - brown loam

12 to 29 inches - brown clay loam
29 to 60 inches - very pale brown loam and pale brown silt loam

Depth class: very deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 10 to 12 inches

Restriction to rooting depth: 60 inches or more

Runoff: medium

Hazard of erosion by water: slight

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Beartrap soils under basin big sagebrush and wildbasin ryegrass. (5 percent)
Deuce soils under Wyoming big sagebrush and bluebunch wheatgrass. (2 percent)
Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass. (2 percent)
rock outcrop (1 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: low available water capacity in some soils

RANGELAND

Dominant vegetation in potential natural plant community:

Nargon soil - Wyoming big sagebrush with bluebunch wheatgrass.
Atom soil - Wyoming big sagebrush with bluebunch wheatgrass
Techicknot soil - threetip sagebrush with bluebunch wheatgrass

General management considerations: good suitability for rangeland drill seeding

Fence and Pipeline installation is difficult because the Nargon soil in this map unit is moderately deep to bedrock.

Rangeland improvement seeding of adapted species is limited by: available water capacity, available precipitation

Suitable management practices:

Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment,

INTERPRETIVE GROUPS

Capability classification: Nargon - 6c nonirrigated
Atom - 6c nonirrigated; Techicknot - 4c nonirrigated

Range site:
Nargon soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Atom soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Techicknot soil - 011BY011ID Loamy 12-16" PPT. ARTR4/AGSP

Nargon-Deuce-Rock Outcrop complex, 2 to 20 percent slopes

COMPOSITION

Nargon soil and similar inclusions - 50 percent
Deuce soil and similar inclusions - 15 percent
Rock Outcrop - 10 percent
Contrasting inclusions: - 25 percent

SETTING

Landform: lava plains

Elevation: 4,500 to 5,800 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 44 degrees F
frost-free period - about 90 days

NARGON SOIL

Position on landscape: concave positions on lava plains 3 percent stones on the surface

Typical profile: (DJ79-23)
0 to 2 inches - light brownish gray silt loam
2 to 7 inches - pale brown clay loam
7 to 21 inches - pale brown and very pale brown loam and stony loam
21 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

DEUCE SOIL

Position on landscape: convex positions on crater rims and lava plains 3 percent stones on the surface

Typical profile: (DJ93-11)
0 to 2 inches - light brownish gray stony silt loam
2 to 6 inches - pale brown silt loam
6 to 19 inches - very pale brown silt loam
19 inches - bedrock

Depth class: shallow

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 2 to 3 inches

Potential rooting depth: 10 to 20 inches

Runoff: medium

Hazard of erosion by water: moderate

Hazard of erosion by wind: slight

ROCK OUTCROP

Rock outcrop consist of barren flows of basalt associated with recent volcanic crater activity. Pressure ridges, crater rims, fissures, and sinkholes are common features.

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Soils with more rock fragments in the profile under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)
Atom soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)
Coffee soils under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)
Soils with more rock fragments in the profile under Wyoming big sagebrush and bluebunch wheatgrass (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: low available water capacity

RANGELAND

Dominant vegetation in potential natural plant community:
Nargon soil - Wyoming big sagebrush with bluebunch wheatgrass
Deuce soil - Wyoming big sagebrush with bluebunch wheatgrass

General management considerations: poor to fair suitability for rangeland drill seeding
Fence and Pipeline installation is difficult because the Nargon and Deuce soils in this map unit are stony and shallow to bedrock.

Rangeland improvement seeding of adapted species is limited by: available water capacity, available precipitation, stones on the surface

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying,
mechanical treatment

INTERPRETIVE GROUPS

Capability classification: Nargon - VIe nonirrigated
Deuce - VIe nonirrigated

Range site:
Nargon soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Deuce soil - 011BY009ID Shallow Stony 8-12" PPT. ARTRW8/AGSP

Paint, Dry-Fallert complex, 4 to 12 percent slopes

COMPOSITION

Paint, Dry soil - 45 percent

Fallert soil and similar inclusions - 40 percent

Contrasting inclusions: 15 percent

SETTING

Landform: fan terraces

Elevation: 5,400 to 6,200 feet

Climatic Data:
precipitation - about 10 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

PAINT, DRY SOIL

Position on landscape: convex fan terraces

Typical profile: (DJ91-44)
0 to 10 inches - light brownish gray and pale brown gravelly loam
10 to 18 inches - light yellowish brown very gravelly loam
18 to 19 inches - duripan (thin 1/16 inch laminar cap)
19 to 60 inches - very pale brown extremely gravelly loamy coarse sand and extremely gravelly sandy loam

Depth class: Shallow to pan (10 to 20 inches)

Drainage class: well drained

Permeability: moderate above the pan

Available water capacity: 1 to 2 inches

Restriction to rooting depth: 10 to 20 inches

Runoff: slow

Hazard of erosion by water: slight

FALLERT SOIL

Position on landscape: fan terraces

Typical profile: (DJ91-28)

0 to 3 inches - brown gravelly loam
3 to 11 inches - brown very gravelly loam
11 to 27 inches - light brownish gray and pale brown very gravelly sandy loam
27 to 60 inches - light brownish gray very gravelly loamy coarse sand

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderate rapid

Available water capacity: 3.5 to 6.5 inches

Potential rooting depth: 60 inches or more

Runoff: rapid

Hazard of erosion by water: slight

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Simeroi soils that are deep soils on the lower fan positions under Wyoming big sagebrush and bluebunch wheatgrass. (10 percent)

Soils similar to Paint, dry soils with a pan depth between 20 to 40 inches. (5 percent)

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: low available water capacity, available water capacity, depth to the hardpan, rooting depth

RANGELAND

Dominant vegetation in potential natural plant community:

Paint, dry soil - black sagebrush with bluebunch wheatgrass
Fallert soil - black sagebrush with bluebunch wheatgrass and some low sagebrush and bluebunch wheatgrass. (05 percent)

Production is limited mainly by: low precipitation, AWC and soil depth to hardpan

General management considerations: poor Suitability for rangeland drill seeding. Fence and Pipeline installation is difficult because: the soils in this map unit are shallow to a hardpan or restrictive layers.

Rangeland improvements by seeding of adapted species is limited by: available water capacity, depth to the hardpan, rooting depth

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are will established. Suitability for stock water ponds is very poor.

Brush management: prescribed burning, chemical spraying,
mechanical treatment

INTERPRETIVE GROUPS

Capability classification: VIe nonirrigated

Range site:
Paint, dry soil - 012XY001ID Limey Gravelly 8-13" PPT. ARARN/AGSP
Fallert soil - 012XY001ID Limey Gravelly 8-13" PPT. ARARN/AGSP

Pancheri silt loam, 2 to 8 percent slopes

COMPOSITION

Pancheri soil - 75 percent
Contrasting inclusions: - 25 percent

PANCHERI SOIL

Position on landscape: basalt plains

Elevation: 4,700 to 5,400 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

Typical profile: (DG79-16)
0 to 3 inches - pale brown silt loam
3 to 29 inches - pale brown silt loam
29 to 60 inches - pale brown silt loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderate

Available water capacity: 10 to 12 inches

Potential rooting depth: 60 inches or more

Runoff: slow

Hazard of erosion by water: slight to moderate

INCLUDED AREAS

Contrasting inclusions:

Polatis soils under Wyoming sagebrush and bluebunch wheatgrass (10 percent)
Bondfarm soils under Wyoming sagebrush and bluebunch wheatgrass (5 percent)
Brunt soils under Wyoming sagebrush and bluebunch wheatgrass (5 percent)
Spilt soils under Wyoming sagebrush and bluebunch wheatgrass (2 percent)
Menan soils under basin big sagebrush and wheatgrass species (1 percent)
Rock outcrop (1 percent)
Playas in run in areas (1 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity

Dominant vegetation in potential natural plant community:

Pancheri soil - Wyoming sagebrush with bluebunch wheatgrass

General management considerations: good suitability for rangeland drill seeding

Suitable management practices: Seed suitable plants. Among these are drought-tolerant species. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor due to seepage.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: IVc nonirrigated

Range site:

Pancheri soil - 011BY001ID; loamy 8-12" precipitation - ARTRW/AGSP

Pancheri-Polatis complex, 2 to 12 percent slopes

COMPOSITION

Pancheri soil - 45 percent
Polatis soil - 30 percent
Contrasting inclusions: - 25 percent

Landform: basalt plains

Elevation: 4,700 to 5,400 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

PANCHERI SOIL

Position on landscape: concave position on basalt plains

Typical profile: (DJ79-11)
0 to 5 inches - brown silt loam
5 to 9 inches - pale brown silt loam
9 to 22 inches - pale brown silt loam
22 to 36 inches - pale brown silt loam
36 to 43 inches - pale brown cobbly silt loam
43 inches - basalt bedrock

Depth class: deep (40 to 60 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 8 to 11 inches

Restriction to rooting depth: 40 to 60 inches

Runoff: rapid to very rapid

Hazard of erosion by water: slight to moderate

POLATIS SOIL

Position on landscape: convex positions on basalt plains

Typical profile: (DJ79-7)
0 to 2 inches - brown stony silt loam
2 to 21 inches - yellowish brown, light yellowish brown and very pale brown silt loam
21 inches - lime and silica coated basalt bedrock

Depth class: moderately deep (20 to 40 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 4 to 6 inches

Potential rooting depth: 40 to 60 inches

Runoff: slow to medium

Hazard of erosion by water: moderate to severe

Hazard of erosion by wind: slight

INCLUDED AREAS

Contrasting inclusions:

Splittop soils under Wyoming sagebush and bluebunch wheatgrass (10 percent)
Tenno soils under Wyoming sagebush and bluebunch wheatgrass (5 percent)
A similar soil to Polatis with more rock fragments in the soil profile (5 percent)
Rock outcrop (5 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity

Dominant vegetation in potential natural plant community:

Pancheri soil - Wyoming big sagebrush with bluebunch wheatgrass
Polatis soil - Wyoming sagebrush with bluebunch wheatgrass.

Production is limited mainly by available water

General management considerations: good suitability for rangeland drill seeding. Fence and pipeline installation is difficult because the Polatis soils in this map unit are shallow to bedrock.

Rangeland improvements by seeding of adapted species is limited by: available water capacity, available precipitation

Suitable management practices: Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are will established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment
Capability classification: VIc nonirrigated

Range site:

Pancheri soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP
Polatis soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP

Playa silty clay loam, 0 to 1 percent slopes

Composition:

Playa soil and similar inclusions - 75 percent

Contrasting inclusions: - 25 percent

Position on landscape: bottomland run in areas

Elevation: 4,700 to 5,200 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 46 degrees F
frost-free period - about 75 days

Typical profile: (DG79-10)
0 to 2.5 inches - light gray silty clay loam
2.5 to 6 inches - pale brown silty clay loam
6 to 21 inches - light yellowish brown silty clay loam
21 to 35 inches - light brownish gray silty clay loam
35 to 44 inches - light yellowish brown silt loam
44 to 60 inches - light yellowish brown clay loam

Depth class: very deep (60 inches or more)

Drainage class: moderately well drained

Permeability: slow

Available water capacity: 10 to 12 inches

Potential rooting depth: 60 inches or more

Runoff: slow

Hazard of erosion by water: none

Included areas:
Similar soils, but moderately deep and deep to basalt bedrock under threetip sagebrush and wheatgrass species (10 percent).
Menan soils under basin big sagebrush and wheatgrass species (10 percent).
Techicknot soils under threetip sagebrush and wheatgrass species (5 percent).

Major uses: rangeland, wildlife

Major management factors: seasonal flooding

Dominant vegetation in potential natural plant community: Threetip sagebrush with wheatgrass species. Production is limited mainly by seasonal flooding.

Suitability for rangeland drill seeding: poor

Suitable management practices: plants that tolerate flooding and extended drought. After seeding, defer

grazing until young plants are will established. Suitability for stock water ponds is good but can be very variable.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: VIs nonirrigated

Range site: Playa soil - 011BY008ID. Playa 8-12" precipitation - ARTR4/AGSP

Rock

Lava flows consist of barren flows of basalt associated with recent volcanic activity. Pressure ridges, fissures, and sinkholes are common features. This unit is mapped on Cerro Grande, and East, Middle and Richard Buttes. While there may be soils included in these units, the general nature of the unit is one of rock outcrop. These areas are generally not suitable for most developments (e.g., construction, irrigation, dry farming), but may be ecologically significant.

Contrasting inclusions:

Pancheri soils under Wyoming big sagebrush and bluebunch wheatgrass (10 percent)
Techicknot soil under threetip sagebrush with bluebunch wheatgrass (5 percent)
Splittop soils under Wyoming big sagebrush and bluebunch wheatgrass (5 percent)
Pingree soils under Wyoming big sagebrush and bluebunch wheatgrass (5 percent)

Sparmo silt loam, 1 to 4 percent slopes

COMPOSITION

Sparmo soils and similar inclusions - 75 percent
Contrasting inclusions - 25 percent

SPARMO SOIL
Position on landscape: fan terraces
Elevation: 4,800 to 6,300 feet Slope features: convex
Climatic Data: (average annual) precipitation - about 9 inches air temperature - about 41 degrees F frost-free period - about 75 days

Typical profile:	0 to 3 inches	pale brown silt loam
	3 to 40 inches	pale brown silt loam and gravelly loam
	*40 to 60 inches	pale brown and light yellowish brown very gravelly loam

Depth Class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderate

Available water capacity: 9 to 11 inches

Potential rooting depth: 60 inches or more

Runoff: slow

Hazard of erosion by water: slight

INCLUDED AREAS

Inclusions: Simeroi soils on upper fans. (5 percent)
Zer soils mixed with other parent materials. (5 percent)
Soils similar to Sparmo, but with greater than 40 percent lime in the profile on steeper slopes. (5 percent)

Atomic soils on convex positions. (5 percent)

Sanfelipe soils in concave positions. (5 percent)

Near the Arco dump, there are about 80 acres of a soil similar to Zer, that has some weak cementation at about 18 inches

MAJOR USES

Current uses: Irrigated - cropland, hayland, pastureland, rangeland

MAJOR MANAGEMENT FACTORS

Soil-related factors: dustiness, water erosion, gully erosion, frost heaving

HAYLAND, PASTURELAND AND CROPLAND

Suitable crops: irrigated - wheat, barley, grass-legume hay, alfalfa, potatoes

General management consideration:
Crops that tolerate drought are best suited. The moisture available is not adequate for good growth of other crops.

The short growing season limits production of crops.

Grass and legumes grow well if they are adequately fertilized.

The most suitable irrigation system is sprinkler.

Grasses and row crops respond to nitrogen. All respond to phosphorus.

For the most productive pasture, plant species that are adapted to the soil and climate.

Suitable management practices:
Maintain or improve fertility by using a cropping system that includes grasses, legumes, or grass-legume mixtures. return crop residue to the soil.

RANGELAND

Dominant vegetation in potential natural plant community:
Wyoming big sagebrush and Bluebunch wheatgrass

General management considerations:
Suitability for rangeland seeding: suitable

Suitable management practices:

Seed late in the fall for best results.
Seed suitable plants. Among these are plants that tolerate drought.
After seeding, defer grazing until young plants are will established.
Suitability for stock water ponds on Sparmo is poor.
Reduce the risk of erosion by accumulating litter on the surface and maintaining the plant cover.
Brush management: prescribed burning, chemical spraying, mechanical treatment

INTERPRETIVE GROUPS

Capability classification: IIIe, irrigated; VIc, nonirrigated

Range site: 012XY032I Loamy 8-11" PPT

Simeroi complex, 5 to 30 percent slopes

COMPOSITION

Simeroi and similar inclusions - 80 percent
Contrasting inclusions: - 20 percent

SETTING

Landform: fan terraces

Elevation: 5,400 to 6,200 feet

Climatic Data: precipitation - about 9 inches
air temperature - about 40 degrees F
frost-free period - about 75 days

SIMEROI, DRY SOIL

Position on landscape: toeslopes

Aspect: southern

Typical profile: (DJ91-29)
0 to 5 inches - brown gravelly loam

5 to 41 inches - pale brown, pale brown very gravelly loam and extremely gravelly loam
41 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderate

Available water capacity: 3 to 5 inches

Potential rooting depth: 60 inches or more

Runoff: rapid

Hazard of erosion by water: slight

SIMEROI SOIL

Position on landscape: toeslopes

Aspect: south

Typical profile: (DJ91-32)
0 to 3 inches - pale brown gravelly loam
3 to 29 inches - pale brown, very pale brown very gravelly loam
29 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderately

Available water capacity: 3 to 5 inches

Potential rooting depth: 60 inches or more

Runoff: rapid

Hazard of erosion by water: slight

INCLUDED AREAS

Contrasting inclusions:
Sanfelipe soils that have dark surfaces under threetip sagebrush and bluebunch wheatgrass (10 percent)
Sparmo soils that are non gravelly under Wyoming big sagebrush and bluebunch wheatgrass (10 percent)

Current uses: rangeland, wildlife

Soil-related factors: low available water, available water capacity

Dominant vegetation in potential natural plant community:
Simeroi soils - black sagebrush with bluebunch wheatgrass (45 percent) and Wyoming big sagebrush with bluebunch wheatgrass (35 percent)

Production is limited mainly by: low precipitation and AWC

General management considerations: fair suitability for rangeland drill seeding

Rangeland improvements by seeding of adapted species is limited by: available water capacity

Suitable management practices: seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is very poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: VIe nonirrigated

Range site:
Simeroi, dry soil - 012XY001ID Limey Gravelly 8-13" PPT. ARARN/AGSP
Simeroi soil - 012XY004ID Gravelly Loam 8-12" PPT. ARTRW/AGSP

Simeroi-Sparmo complex, 4 to 8 percent slopes

COMPOSITION

Simeroi soils and similar inclusions 60 percent
Sparmo soils and similar inclusions 25 percent

Contrasting inclusions - 15 percent SIMEROI SOIL

Position on landscape:
outwash fans, fan terraces

Elevation: 5,400 to 6,000 feet

Climatic data: (average annual) *precipitation - about 10 inches *air temperature - about 41 degrees F *frost free period - about 75 days

Slope features:
convex

Typical profile:
*0 to 4 inches brown gravelly silt loam

*4 to 26 inches pale brown and light brownish gray very gravelly loam and very gravelly sandy loam

*26 to 38 inches - light brownish gray extremely gravelly fine sandy loam

*38 to 60 inches - pale brown and grayish brown very gravelly sandy loam

Depth class: very deep (more than 60 inches)

Drainage class: well drained

Permeability: moderate;

Available water capacity: 3 to 4.5 inches

Potential rooting depth: 60 or more inches

Runoff: slow

Hazard of erosion by water: slight

SPARMO SOIL

Position on landscape: fan terraces

Elevation: 5,400 to 6,000 feet

Climatic data: (average annual) *precipitation - about 10 inches *air temperature - about 41 degrees F *frost free period - about 75 days

Slope features: concave to convex

Typical profile:
*0 to 3 inches pale brown silt loam

*3 to 22 inches pale brown silt loam

*22 to 29 inches - pale brown gravelly loam

*29 to 40 inches - pale brown silt loam

*40 to 60 inches - pale brown and light yellowish brown very gravelly loam

Depth class: very deep (more than 60 inches)

Drainage class: well drained

Permeability: moderate

Available water capacity: 9 to 11 inches

Potential rooting depth: 60 or more inches

Runoff: slow

Hazard of erosion: by water - moderate; by wind - moderate;

INCLUDED AREAS

Inclusions:
*Sanfelipe soils (5 percent)

*soils like Whiteknob that formed in alluvium dominantly from limestone sources (5 percent)

*soils like Paint with the duripan 20 to 40 inches below the surface (5 percent)

MAJOR USES

Current uses:
irrigated cropland,
irrigated pastureland,
rangeland,

MAJOR MANAGEMENT FACTORS

Soil-related factors:
available water capacity in some areas, gravel on surface and in soil in some areas, water erosion in some areas, wind erosion in some areas,

PASTURELAND AND CROPLAND

Suitable crops:
irrigated -
alfalfa,
barley
wheat,
pasture,

General management considerations: The short growing season limits production of crops.

Grasses and legumes grow well if they are adequately fertilized.

Irrigation is needed for crops.

The most suitable irrigation system is sprinkler.

Late fall and winter grazing increases the risk of winterkill of alfalfa.

The gravel on the surface and in the soil limit tillage in some areas.
Gravel in the surface layer causes rapid wear of tillage equipment.

*Suitable management practices:
*Regulate the application of irrigation water to control runoff and erosion.

*Apply enough water to wet the root zone but not so much that it leaches plant nutrients.

Maintain the content of organic matter by using a suitable rotation and returning crop residue to the soil.

Reduce the risk of water erosion by farming across the slope and using minimum tillage.

Reduce the risk of wind erosion by maintaining crop residue on the surface, using minimum tillage, and keeping the surface of soil rough.

RANGELAND

Dominant vegetation in potential natural plant community:
Wyoming big sagebrush and bluebunch wheatgrass

General management considerations:

Suitability for rangeland seeding: suitable,

Rangeland improvements by seeding of adapted species is limited by: low annual precipitation,

Brush Management:
prescribed burning,
chemical spraying,
mechanical treatment

INTERPRETIVE GROUPS

Capability classification:
IIIe, irrigated
VIe, nonirrigated

Range site:
Simeroi soil - 012XY004I - Gravelly loam 8-12" PPT
Sparmo soil - 012XY032I - Loamy 8-11" PPT

Splittop-Coffee complex, 0 to 8 percent slopes

COMPOSITION

Splittop soil - 50 percent
Coffee soil and similar inclusions - 30 percent
Contrasting inclusions: - 20 percent

SETTING

Landform: lava plains

Elevation: 4,600 to 5,400 feet

Climatic Data:
precipitation - about 11 inches
air temperature - about 44 degrees F
frost-free period - about 85 days

SPLITTOP SOIL

Position on landscape: concave positions on lava plains

Typical profile: (DG79-12)
0 to 2 inches - pale brown silt loam
2 to 8 inches - yellowish brown silt loam
8 to 39 inches - very pale brown and white silt loam
39 inches - bedrock

Depth class: moderately deep

Drainage class: well drained

Permeability: moderate

Available water capacity: 4 to 6 inches

Restriction to rooting depth: 20 to 40 inches

Runoff: slow to medium

Hazard of erosion by water: slight to moderate

COFFEE SOIL

Position on landscape: convex positions on lava plains

Typical profile: (DG79-8)
0 to 7 inches - pale brown silt loam
7 to 16 inches - very pale brown silt loam
16 to 48 inches - very pale brown silt loam and silty clay loam
48 inches - basalt

Depth class: deep

Drainage class: well drained

Permeability: moderate

Available water capacity: 6 to 9 inches

Potential rooting depth: 40 to 60 inches

Runoff: slow to medium

Hazard of erosion by water: slight to medium

Hazard of erosion by wind: slight

INCLUDED AREAS

CONTRASTING INCLUSIONS:

Soils that are very deep to bedrock. (10 percent)

Deuce soils that are less than 20 inches deep to bedrock under Wyoming big sagebrush and bluebunch wheatgrass. (5 percent)

Soils that have an accumlation of sodium located on small slick spot areas. (5 percent) [Brunt series]

MAJOR USES

Current uses: rangeland, wildlife

MAJOR MANAGEMENT FACTORS

Soil-related factors: low available water capacity,
depth to the bedrock, rooting depth

RANGELAND

Dominant vegetation in potential natural plant community:

Splittop soil - Wyoming big sagebrush with bluebunch wheatgrass
Coffee soil - Wyoming big sagebrush with bluebunch wheatgrass.
Production is limited mainly by: available water holding capacity and soil depth to bedrock

General management considerations: good suitability for rangeland drill seeding
Fence and Pipeline installation is difficult because the soils in this map unit are moderately deep to bedrock

Rangeland improvement seeding of adapted species is limited by: available water capacity, depth to the bedrock, rooting depth

Suitable management practices:
Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are well established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment,

INTERPRETIVE GROUPS

Capability classification: Splittop - VIe nonirrigated
Coffee - VIe nonirrigated

Range site:
Splittop soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP
Coffee soil - 011BY001ID Loamy 8-12" PPT. ARTRW8/AGSP

Splittop-Atomic complex, 2 to 8 percent slopes

Composition:
- Splittop soil - 50 percent
- Atomic soil and similar inclusions - 30 percent
- Contrasting inclusions: - 20 percent

Landform: concave positions on basalt plains

Elevation: 4,700 to 5,400 feet

Climatic Data:
- precipitation - about 10 inches
- air temperature - about 44 degrees F
- frost-free period - about 75 days

SPLITTOP SOIL

Position on landscape: convex intermounds on basalt plains

Typical profile: (DG79-12)
- 0 to 2 inches - pale brown silt loam
- 2 to 8 inches - yellowish brown silt loam
- 8 to 12 inches - very pale brown silt loam
- 12 to 26 inches - very pale brown silt loam
- 26 to 39 inches - white silt loam
- 39 inches - basalt bedrock

Depth class: moderately deep (20 to 40 inches)

Drainage class: well drained

Permeability: moderate slow

Available water capacity: 4 to 6 inches

Restriction to rooting depth: 20 to 40 inches

Runoff: slow to medium

Hazard of erosion by water: slight to moderate

ATOMIC SOIL

Position on landscape: basalt plains

Typical profile: (DG79-2)

0 to 3 inches - pale brown silt loam
3 to 16 inches - pale brown silt loam
16 to 60 inches - very pale brown and light brownish gray silt loam

Depth class: very deep (60 inches or more)

Drainage class: well drained

Permeability: moderate

Available water capacity: 8 to 10 inches

Potential rooting depth: 60 inches or more

Runoff: slow to medium

Hazard of erosion by water: slight to medium

Hazard of erosion by wind: slight

INCLUDED AREAS

Contrasting inclusions:

Brunt soil series are located on small slick spot areas. These have a natric horizon (10 percent).
Soils similar to Splittop series, except they are less than 20 inches deep to bedrock under Wyoming big sagebrush and bluebunch wheatgrass (10 percent).

Current uses: rangeland, wildlife

Soil-related factors: low available water capacity

Dominant vegetation in potential natural plant community:

Splittop soil - Wyoming big sagebrush with bluebunch wheatgrass
Atomic soil - Wyoming big sagebrush with bluebunch wheatgrass

General management considerations: good suitability for rangeland drill seeding

Suitable management practices: Seed plants that tolerate drought. After seeding, defer grazing until young plants are well established.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: IVe nonirrigated

Range site:
Splittop soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP
Atomic soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP

Starlite loam, 0 to 4 percent slopes

COMPOSITION

Starlite soil and similar inclusions 80 percent
Contrasting inclusions - 20 percent

STARLITE SOIL

Position on landscape: basins, valley flats

Elevation: 4,700 to 5,800 feet

Climatic data: (average annual) *precipitation - about 9 inches *air temperature - about 42 degrees F *frost free period - about 75 days

Slope features: plane to convex

Typical profile:
*0 to 5 inches light brownish gray loam
*5 to 32 inches light brownish gray loam and silt loam
*32 to 37 inches - light gray silty clay loam
*37 to 47 inches - light brownish gray and light gray silt loam
*47 to 60 inches - gray very fine sandy loam

Depth class: very deep (more than 60 inches)

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 9 to 11 inches

Potential rooting depth: 60 or more inches

Runoff: slow

Hazard of erosion: by water - slight: by wind - moderate

Inclusions:
Sparmo soils. (10 percent)
Medicine. (10 percent)

Current uses: irrigated hayland, irrigated cropland

INCLUDED AREAS

Inclusions: Sparmo soils (10 percent)
Medicine. (10 percent)

MAJOR USES

Current uses: irrigated hayland, irrigated cropland

MAJOR MANAGEMENT FACTORS

Soil-related factors : permeability in some areas, wind erosion in some areas

HAYLAND, PASTURELAND, AND CROPLAND

Suitable crops: irrigated - barley, grass-legume hay, alfalfa, pasture, potatoes

General management considerations:
Grasses and legumes grow well if they are adequately fertilized.
For highest yields, crops and pasture must be irrigated.
Late fall and winter grazing increases the risk of winterkill of alfalfa.
The soil responds well to fertilizer if precipitation is adequate.

*Suitable management practices:
*Apply water at a slow rate over a long period to insure that the root zone is properly wetted.
*Apply enough water to wet the root zone but not so much that it leaches plant nutrients.
*Reduce the risk of wind erosion by maintaining crop residue on the surface, planting field windbreaks, using minimum tillage, and keeping the surface of soil rough.

INTERPRETIVE GROUPS

Capability classification: IIIc, irrigated; VIc, nonirrigated

Techick-Soelberg-Lesbut complex, 0 to 4 percent slopes

COMPOSITION

Techick soil and similar inclusions - 40 percent
Soelberg soil - 35 percent
Lesbut gravelly soil - 15 percent
Inclusions: 10 percent

Landform: basalt plains

Elevation: 4,800 to 5,600 feet

Climatic Data:
precipitation - about 12 inches

air temperature - about 42 degrees F
frost-free period - about 69 days

TECHICK SOIL

Position on landscape: stream terraces

Typical profile: (DJ88-56)
0 to 4 inches - yellowish brown loam
4 to 25 inches - yellowish brown and very pale brown clay loam
25 to 46 inches - very pale brown loam
46 to 60 inches - grayish brown very gravelly sand

Depth Class: very deep (more than 60 inches)

Drainage class: well drained

Permeability: moderately slow

Available water capacity: 8 to 10 inches

Runoff: slow

Hazard of erosion by water: slight

SOELBERG SOIL

Position on landscape: stream terraces

Typical profile: (DJ88-47)
0 to 9 inches - brown loam
9 to 36 inches - yellowish brown, very pale brown clay loam, loam and gravelly loam
36 to 60 inches - brown extremely gravelly loamy coarse sand and extremely gravelly sand

Depth Class: very deep (more than 60 inches)

Drainage class: well drained

Permeability: moderately slow in the upper subsoil and rapid in the lower subsoil

Available water capacity: 3 to 6 inches

Runoff: slow

Hazard of erosion by water: slight

LESBUT SOIL

Position on landscape: stream terraces

Typical profile: (DJ88-65)

0 to 7 inches - brown gravelly loam
7 to 20 inches - pale brown gravelly loam extremely gravelly sandy loam
20 to 60 inches - light brownish gray extremely gravelly loamy sand

Depth Class: very deep (more than 60 inches)

Drainage class: somewhat excessive

Permeability: moderate

Available water capacity: 2 to 4 inches

Runoff: slow

Hazard of erosion by water: slight

INCLUDED AREAS

Contrasting inclusions: similar soils that have a duripan above a depth of 40 inches (10 percent)

Current uses:

irrigated - cropland, hayland, and pastureland
non irrigated - range

Soil-related factors: available water capacity

Dominant vegetation in potential natural plant community:

Techick - Wyoming big sagebrush and bluebunch wheatgrass and some threetip sagebrush and bluebunch wheatgrass (10 percent)
Soelberg - Wyoming big sagebrush and bluebunch wheatgrass
Lesbut - Wyoming big sagebrush and bluebunch wheatgrass

General management considerations: good suitability for rangeland drill seeding

Suitable management practices: Seed late in the fall for best results. Seed suitable plants. Among these are plants that tolerate drought. After seeding, defer grazing until young plants are will established. Suitability for stock water ponds is poor.

Brush management: prescribed burning, chemical spraying, mechanical treatment

Capability classification: IVs irrigated, VIc nonirrigated

Range site:

Techick soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP
Soelberg soil - 011BY001ID; loamy with 8-12" precipitation - ARTRW/AGSP
Lesbut soil - 012XY004ID; gravelly loam with 8-12" precipitation - ARTRW/AGSP

Terreton-Zwiefel

This mapping unit is delineated in the deposits of ancestral Lake Terreton. Terreton soils are generally very fine-grained, alkaline lacustrine soils; Zwiefel are the sandy deposits over the Terreton soils. Zwiefel series are typical on the sand dunes of the north end of the INEL, including the northeast-trending elongate dunes at the northeast end of the site. Surface horizons of the Zwiefel series are sandy, while subsurface horizons resemble the fine-grained alkaline soils of the Terreton series. Slopes on the lacustrine deposits are very slight (<2%), but can get up to 20% on some of the dune deposits.

TeZ - consists of a complex of Terreton and Zwiefel series; the Terreton series is slightly more predominant than the Zwiefel

SETTING

Landform: ancestral Lake Terreton, capped in some places with sand

Elevation: 4,800-4,900 feet

Climatic Data:
precipitation: 7-10 inches
air temperature - about 43 degrees F
frost-free period - about 80 days

Typic Camborthids-Typic Calciorthids

These soils have been mapped throughout the older deposits of the Big Lost River through the central part of the INEL. Generally, these soils are capped with a desert pavement, have calcic horizons within the top 10" of soil. Carbonate coatings are noted on the bottoms of alluvial gravels, free lime is present, and the subsoils react with HCl. Soils are generally loams or silt loams over gravelly loams and sandy loams (generally falling into the coarse loamy over sandy or loamy skeletal families). Mima mounds have been noted around the Test Reactor Area, and ant mounds present a regular pattern of bare spots on aerial photographs. Slopes are 0-5%.

COMPOSITION

Typic Camborthids similar inclusions - unknown
Typic Calciorthids - unknown
Contrasting inclusions - less developed soils (Torriorthents, Torrifluvents)

SETTING

Landform: alluvium from the Big Lost River

Elevation: 4,700-5,000 feet

Climatic Data:
precipitation: about 8 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

Typic Torrifluvents

These soils have been mapped on the youngest deposits of the Big Lost River. They typically do not exhibit much solum development, are loamy or sandy loam on the surface and underlain by gravelly subsoils. Gravel deposits on the surface do not resemble the desert pavement in the TCC deposits, which are generally about 1-1/2" in diameter; rather, they appear to be unworked, recent deposits of small (less than 1"), rounded gravels.

COMPOSITION

Typic Torrifluvents - unknown
Contrasting inclusions - unknown, likely Torriorthents and Torripsamments

SETTING

Landform: Recent alluvium from the Big Lost River

Elevation: 4,800-5,000 feet

Climatic Data:
precipitation: 8-10 inches
air temperature - about 43 degrees F
frost-free period - about 75 days

Description of Quaternary Map Units

Surficial Deposits

Alluvial deposits of mainstreams

Qmy Alluvial deposits of modern flood plains (Holocene)-Sand, pebble gravel, silt, and clay; locally humic in poorly drained areas. Subject to flooding.

Qmt Alluvial deposits of cut terraces (Holocene to late Pleistocene)-Pebble and cobble gravel to pebbly sand, minor silty sand. Forms terraces cut into unit Qmp. Finer grained deposits (Qmtf), mapped only along lower Big Lost River, are mainly sand with minor pebble gravel. Along Big Lost River on INEL, unit includes Qmy, which is difficult to differentiate from Qmt.

Qmp Alluvial deposits of Pinedale age along mainstreams (late Pleistocene)-Pebble and cobble gravel to pebbly sand, minor sand. Upper 0.5-2m generally includes admixed sand and silt of eolian and (or) alluvial origin. Forms terraces along major streams and large fluvial fans at mouths of basins north of Snake River Plain.

Qmo Older alluvial deposits along mainstreams (middle Pleistocene)- Lithologically similar to Qmp. Differentiated from Qmp on basis of greater degree of soil development; Qmo has loess cover > 1 m thick and contains at least one buried soil. Also differentiated from Qmp on basis of higher geomorphic position. Near Arco, unit predates basalt flows of unit Qbb and may be older than 30,000 but younger than 50,000 years. Surface of unit may have been overtopped and washed by catastrophic floods of Pinedale age along Big Lost River (Rathburn, 1989), locally leaving sand and gravel of a younger age on top of unit.

Alluvial-fan deposits

Qfc Fan deposits of alluvium and colluvium (Holocene to middle Pleistocene)-Pebble to boulder gravel with matrix of silty sand to clayey silt: very poorly sorted; crudely bedded. Includes material deposited by streams and debris flows at mouths of small drainage basins. Occurs on steeper slopes than Qfy and Qfo. Also includes aprons of debris on slopes of East, Middle, and Big Southern Buttes. Subject to flooding and debris flows.

Qfy Younger fan alluvium (late Pleistocene)-Pebble to cobble gravel, locally bouldery near fan heads, generally clast supported with sand and silty sand as matrix and small lenses. Locally includes alluvium of Holocene age along channels cut into fan surfaces. North of map area, unit is locally faulted along western range fronts of Lost River, Lemhi, and Beaverhead Ranges (Scott, 1982).

Qfo Older fan alluvium (middle Pleistocene) -Lithologically similar to Qfy. Differentiated from Qfy on basis of greater degree of soil development; carbonate coats are 2mm or more thick. Also differentiated from Qfy on basis of higher geomorphic position. Unit commonly faulted along western range fronts of Lost River and Lemhi Ranges. Unit generally > 100,000 years old, except on downthrown (west) side of Arco fault scarp, where map unit includes fan surfaces estimated to be 30,000 to 80,000 years old (Pierce, 1985).

QTg Old alluvial gravel (early Pleistocene to late Tertiary). Locally derived fan of pebble to cobble gravel, bouldery in certain localities. Cemented to uncemented.

Lacustrine deposits

Qp Playa deposits (Holocene to late Pleistocene)-Silty sand to clayey silt; minor gravel, scattered basalt boulders along margins. Forms fills in small depressions and in sink areas of Big and Little Lost Rivers and Birch Creek; deposited in low-gradient streams and ephemeral lakes. Unit is 1-10m thick; more than 30m thick in sink areas.

Qlf Lake-floor deposits (late Pleistocene)-Silty clay to sandy silt. Forms low-relief plain that was formerly the bottom of Lake Terreton, (Scott, 1982), a lake that filled in response to increased runoff from basins north of plain, probably coincident with Pinedale glaciation. Lower-lying areas of Qlf subject to ephemeral modern flooding. Includes thin, discontinuous sheet of unit Qes. One to more than 30m thick.

Qlm Lake-margin deposits (late Pleistocene)-Sand and pebbly sand. Includes beach, bar, and delta deposits at margin of former Lake Terreton. One to 10m thick.

Eolian deposits

Qes Eolian sand (Holocene to late Pleistocene)-Very fine to coarse sand. Forms northeast-trending longitudinal dunes; locally forms transverse dunes. Largely stabilized; but includes some active areas of deflation and migrating sand. One to 5m thick.

Colluvial deposits

Qcv Colluvial deposits on steep slopes (Holocene and Pleistocene)- Angular blocks with a sparse, fine-grained matrix. Grades upslope into bedrock outcrops and downslope into alluvial fan deposits.

Qcl Landslide deposits (Holocene to late Pleistocene)-Blocks of bedrock, pebble to boulder size, in a fine-grained matrix of silty sand to silty clay. Formed by slumps and earthflows derived from sediments and volcanic rocks of Tertiary age.

Basaltic Lava Flows and Rhyolitic Rocks of the Eastern Snake River Plain

Qba Basaltic lava flows and pyroclastic deposits (Holocene and late Pleistocene-younger than 15,000 years old)-Fresh, unweathered, black to gray pahoehoe and a'a lava flows, and bedded, moderately oxidized scoda, cinders, and ash near vent areas. Flows of unit are typically not covered by loess and eolian sand. Several lava fields are covered by very thin, discontinuous deposits of loess and eolian sand along west or southwest margins. Unit includes lava flows and flow units of Craters of the Moon (2,100-15,000 yr B.P.), North Robbers and South Robbers (12,000 yr B.P.), Cerro Grande (13,400 yr B.P.), and Hells Half Acre (5,200 yr B.P.) lava fields. Normal magnetic polarity.

Qbb Basaltic lava flows and pyroclastic deposits (late to middle Pleistocene-estimated to be 15,000 to 200,000 years old)-Dark- gray to black, unweathered to slightly weathered, pahoehoe and a'a lava flows, and bedded, moderately oxidized scoda, cinders, and ash near vent areas. Flows of unit are locally covered by as much as one meter of eolian sand and loess. Unit includes

Quaking Aspen Butte lava field (95 +/- 50ka), Taber Butte lava field (165 +/- 22ka), and an unnamed lava field (<200ka) north of Big Southern Butte. Normal magnetic polarity.

Qbc Basaltic lava flows and pyroclastic deposits (middle Pleistocene- estimated to be 200,000 to 400,000 years old)-Light- to dark- gray, slightly to moderately weathered, pahoehoe and a'a lava flows, and bedded, moderately to strongly oxidized scoda, cinders, and ash near vent areas. Flows of unit are covered by as much as several meters of eolian sand and loess. Unit includes many lava fields throughout the map area. Normal magnetic polarity.

Qbd Basaltic lava flows and pyroclastic deposits (middle to early Pleistocene estimated to be 400,000 to 730,000 years old)- Light- to dark-gray and reddish-oxidized, slightly to strongly weathered and hydrothermally aftered pahoehoe and a'a lava flows and bedded, moderately to deeply oxidized scoda, cinders, and ash near vent areas. Flows of unit are covered by up to several meters of loess and eolian sand. Unit includes flows on north side of Big Southern Butte and andesite flows of Cedar Butte, as well as other lava fields throughout the map area. Normal magnetic polarity.

Qbe Basaltic lava flows and pyrociastic deposits (early Pleistoceneestimated to be older than 730,000 years)-Gray and reddishoxidized, moderately to strongly weathered pahoehoe and a'a lava flows and bedded, moderately to strongly oxidized scoria, cinders, and ash near vent areas. Flows of unit mostly covered by as much as several meters of eolian sand, loess, alluvial, and alluvial-fan deposits. Unit includes the Circular Butte lava field and other lava fields in the Lava Ridge area in the northern part of INEL. Reversed magnetic polarity.

Rhyolitic Rocks

Qr Rhyolite flows, breccia, and obsidian (Pleistocene)-Chiefly tan to pink, flow-laminated (1-10m thick) rhyolite lava flows and minor amounts of rhyolitic flow and vent breccia and banded obsidian. Unit forms rhyolite domes of Big Southern Butte (about 300 ka), East Butte (about 580 ka), Middle Butte, and unnamed rhyolite dome (1.2 Ma) [Sec. 22, T 2 N., R. 32 E.].

* Unit descriptions after Kuntz and others (1990). Pre-Quaternary unit symbols shown on maps are described in Kuntz and others (1990).

APPENDIX B
SOIL SERIES DESCRIPTIONS

CONTENTS

Soil Series Elevation and Climatic Data

The Soil Series identified in this appendix were established in areas near to but not on the INEL Site. The ranges in elevation and climatic data for these soil series are generally broader than the ranges existing at the INEL. Ranges for elevation and climatic data on the INEL are:

Elevation: 4,800 to 5,500 ft

Climatic data (average annual):

precipitation - 8 to 11 inches
air temperature - 41 to 45 degrees F
frost free period - 80 to 115 days

AECET SERIES

The Aecet series consists of moderately deep, well-drained soils that formed in reworked eolian deposits on basalt plains. The principal native plants are big sagebrush, rabbitbrush, and wheatgrasses, squirreltail and prickly pear cactus. Typically, they have pale brown sandy loam surface layer to a depth of 5 inches, a pale brown clay loam subsoil, and a very pale brown clay loam substratum over bedrock at 23 inches.

CLASSIFICATION: Taxonomic Class: Fine-loamy, mixed, frigid Xerollic Calciorthids

SETTING
Depth Class: moderately deep (20-40")
Drainage class: well drained
Permeability: moderately slow
Positions on the landscape: plains and side slopes
Parent Material: kind - reworked eolian deposits
source - Big Lost River
Slope range: 0 to 12 percent

TYPICAL PEDON DESCRIPTION

A1--0 to 5 inches, pale brown (10YR 6/3) very stony sandy loam, dark grayish brown (10YR 4/2) moist; weak very thin platy parting to weak very fine granular structure; loose; many very fine, fine and medium roots; slightly calcareous; moderately alkaline (pH 8.4); clear wavy boundary.

Bw--5 to 13 inches, pale brown (10YR 6/3) clay loam, brown (10YR 5/30 moist; weak fine and medium angular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; many very fine tubular pores; strongly calcareous; strongly alkaline (pH 8.6); clear wavy boundary.

Bk--13 to 23 inches, very pale brown (10YR 7/3) clay loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; strongly calcareous; about 5 percent basalt pebbles and cobbles; strongly alkaline (Ph 9.0); abrupt wavy boundary.

IIR--23 inches, basalt.

TYPICAL PEDON LOCATION: Jefferson County, Idaho; 300 feet north, 1,980 feet east of the southwest corner of Section 14, T.7N., R.34E.

RANGE IN CHARACTERISTICS
Profile:
mean annual soil temperature - 41 to 45 degrees F.
mean summer soil temperature - 66 degrees F (at a depth of 20 inches)

Particle-size control section:
clay content - 18 to 35 percent

texture - loam, silt loam, sandy clay loam or clay loam
fine sand or coarser - 15 percent or more
bedrock - 20 to 40 inches
calcic horizon - depth of 5 to 17 inches
Five to ten percent angular basaltic pebbles are throughout most pedons

A horizon:
value - 5 or 6 dry
chroma - 2 or 3 dry or moist

B horizon:
value - 6 or 7 dry
chroma - 2 or 3 dry or moist

Cca horizon:
value - 7 or 8 dry
chroma - 1 to 3 dry or moist

The soils are usually dry and are dry between depths of 4 and 12 inches for a continuous period of about 70 to 90 days in the late summer.

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	CaCo3
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/ cm	me/ 100g	meg/ 100g	percent
0-5	SL	5-10	20-25	NP-5	1.6-1.7	2.0-6.0	0.11-0.13	7.4-8.4		0-2	4-10	3-10
0-5	L	10-24	25-35	NP-10	1.4-1.5	0.6-2.0	0.16-0.18	7.4-8.4		0-2	8-25	3-10
0-5	SIL	14-20	25-35	5-15	1.4-1.5	0.2-0.6	0.19-0.21	7.4-7.8		0-2	10-20	3-10
5-13	CL,L,SIL	18-35	30-45	10-20	1.4-1.5	0.2-0.6	0.19-0.21	7.4-9.0	0-2	1-5	12-30	5-15
13-23	CL	18-35	30-45	10-20	1.4-1.5	0.2-0.6	0.19-0.21	7.9-9.0	0-2	1-5	12-30	15-30

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

ARCO SERIES

The Arco series consists of very deep, somewhat poorly drained soils formed in mixed alluvium. They are on stream terraces, flood plains, and basin floors. Permeability is moderately slow. Slopes are 0 to 2 percent. The average annual precipitation is about 9 inches and the average annual air temperature is about 42 degrees F. The natural vegetation is sedges, basin big sagebrush, basin wildrye, rabbitbrush, and streambank wheat grass.

CLASSIFICATION Taxonomic Class: Fine-silty, mixed, frigid Aquic Calcixerolls

SETTING
Depth Class: very deep (60" or more)
Drainage class: somewhat poorly drained
Positions on the landscape: stream terraces, basin floors, flood plains
Slope range: 0 to 2 percent
Parent Material: kind - alluvium
source - mixed

TYPICAL PEDON DESCRIPTION

Ak1--0 to 4 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; moderate medium platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine roots; common very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); clear wavy boundary.

Ak2--4 to 15 inches; gray (10YR 5/1) silt loam, very dark gray (10YR 3/1) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine and few fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); gradual wavy boundary.

Bk--15 to 26 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few fine and medium roots; many very fine tubular pores; strongly effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary.

Bkg1--26 to 32 inches; gray (5Y 6/1) silt loam, gray (5Y 5/1) moist; few fine faint light yellowish brown (10YR 6/4) moist mottles; weak fine subangular blocky structure; soft, very fine and few fine and medium roots; common very fine and many fine tubular pores; violently effervescent; mildly alkaline (pH 7.5); clear wavy boundary.

Bkg2--32 to 45 inches; gray (5Y 5/1) silt loam, dark gray (5Y 4/1) moist; common medium faint light yellowish brown (10YR 6/4) moist mottles; massive; soft, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine, many fine, and few medium tubular pores; 50 percent lime veins in matrix; violently effervescent; mildly alkaline (pH 7.4); clear wavy boundary.

Bkg3--45 to 60 inches; gray (5Y 5/1) silt loam, dark gray (5Y 4/1) moist; common fine faint light yellowish brown (10YR 6/4) moist mottles; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; few fine tubular pores; slightly effervescent; mildly alkaline (pH 7.4); abrupt wavy boundary.

TYPICAL PEDON LOCATION: Butte County, Idaho; about 0.5 miles west of Arco; about 1,770 ft south and 420 feet east of the northwest corner of Section 36, T. 4N, R. 26E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 42 to 44 degrees F
mollic epipedon thickness - 11 to 20 in
depth to calcic horizon - 0 to 15 in
depth to mottles - 11 to 30 in
depth to fluctuating water table - 24 to 36 in; April through June

Particle-size control section: clay content - 20 to 32 percent

Ak horizon:

Hue - 10YR or 2.5Y
value - 4 or 5 dry, 2 or 3 moist
chroma - 1 or 2 dry or moist

Bk horizon:

hue - 10YR or 2.5Y
value - 5 to 7 dry; 3 to 5 moist
chroma - 1 or 2 dry or moist
texture - silt loam or silty clay loam

Bkg horizon:

hue - 10YR, 2.5Y, or 5Y
value - 5 to 7 dry; 4 to 6 moist
chroma -0 1 or 2 dry or moist
texture - silt loam, silty clay loam, gravelly loam
reaction - mildly or moderately alkaline
coarse fragment content - 0 to 25 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
10-15	SIL	20-27	20-35	5-15	1.2-1.3	0.2-2.0	0.17-0.19	7.9-8.4	2-4	-	20-25	10-25
10-15	CL	28-33	35-45	15-25	1.3-1.45	0.2-0.6	0.19-0.21	7.9-8.4	0-2	-	25-30	15-20
15-45	SIL,SICL	22-32	25-40	10-20	1.2-1.5	0.2-0.6	0.17-0.19	7.4-8.4	2-4	-	15-25	15-20
45-60	SIL,SICL,GR-L	18-34	20-40	5-20	1.2-1.5	0.2-2.0	0.12-0.21	7.4-8.4	0-2	-	15-25	15-30

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

ATOM SERIES

LOCATION ATOM ID

Tentative Series
Rev. DJ/PB 2/94

The Atom series consists of very deep, well drained soils that formed in alluvium from loess overlying basalt. Atom soils are on basalt plains and alluvial fans. Slopes are 1 to 20 percent. Permeability is moderate. Average annual precipitation is about 10 inches and the average annual air temperature is about 44 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, frigid Xerollic Calciorthids

TYPICAL PEDON: Atom silt loam; rangeland; on a 3 percent southwest slopes at 5,286 feet elevation with Wyoming big sagebrush and bluebunch wheatgrass. When described on July 11, 1979, the soil was slightly moist below 30 inches. (Color is for dry soil unless otherwise noted.)

A1--0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate very thin platy structure; slightly hard, very friable, slightly sticky and plastic; common very fine roots; many fine vesicular pores; slightly effervescent (5 percent calcium carbonate equivalent); 2 percent basalt gravel; slightly alkaline (pH 7.6); clear smooth boundary.

A2--3 to 10 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common fine and very fine roots; common very fine tubular pores; slightly effervescent (7 percent calcium carbonate equivalent); 1 percent basalt gravel; slightly alkaline (pH 7.8); clear smooth boundary. (combined thickness of the A horizons is 7 to 12 inches thick)

Bkq--10 to 29 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common very fine roots; common very fine irregular pores; common hard 3/8 to 3/4 inch nodules of cicada krotovinas; violently effervescent (25 percent calcium carbonate equivalent); 1 mm thick lime and some silica coats under rock fragments; 1 percent basalt gravel; moderately alkaline (pH 8.4); clear wavy boundary. (0 to 20 inches thick)

Bk1--29 to 39 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; violently effervescent (20 percent calcium carbonate equivalent); 1 mm thick lime coats under rock fragments; 1 percent basalt gravel; strongly alkaline (pH 9.0); clear smooth boundary. (8 to 36 inches thick)

Bk2-39 to 60 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and plastic; few very fine roots; common very fine tubular pores; violently effervescent (20 percent calcium carbonate equivalent); 1 mm thick lime coats under rock fragments; 5 percent basalt gravel; strongly alkaline (pH 9.0).

TYPE LOCATION: Bingham County, Idaho; about one-half mile northeast of Middle Butte; approximately 2,400 feet north and 700 feet east of the southwest corner of sec. 16, T.2N., R.32E. Latitude - 43 degrees, 29 minutes, 57 seconds north.

Longitude - 112 degrees, 42 minutes, 55 seconds west.

RANGE IN CHARACTERISTICS:

Profile
Average annual soil temperature - 44 to 46 degrees F.
Depth to calcic - 7 to 12 inches
BA horizons present in some pedons

Particle-size control section
Total clay content - 18 to 35 percent
Carbonate free clay - 10 to 18 percent
0.5 - 20 mm fraction - 15 to 30 percent
Rock fragment content - 0 to 10 percent

A horizons
Value - 5 or 6 dry and 3 or 4 moist
Reaction - slightly or moderately alkaline

Bkq and Bk horizons (Bkq absent in some profiles)
Value - 6 or 7 dry and 4 through 6 moist
Chroma - 2 or 3 dry
Texture - SIL, L, CL or SICL
Rock fragment content - 0 to 15 percent
Reaction - moderately or strongly alkaline

COMPETING SERIES: These are the Nargon (T), Coffee (T), Holsine, Lariat, Lidy, Malm, Matheson, Oxhead (T), Sparmo (T) and Voltage (T) series. Nargon, Lariat and Malm soils are moderately deep to bedrock. Coffee and Matheson soils are deep to bedrock. Holsine soils have sandy loam control sections. Lidy and Sparmo soils have moderately rapid permeability and are over sand and gravel. Malm soils are moderately deep to bedrock and have less than 18 percent total clays and rapid permeability. Oxhead soils are very deep in lacustrine sediments and have less than 18 percent total clay. Voltage soils are very deep saline soils on lake bottoms and have less than 18 percent total clay.

GEOGRAPHIC SETTING: Atom soils are generally on basalt plains, but may also be on alluvial fan terraces that join basalt plains. Elevations range from 4,500 to 5,800 feet. Slopes range from 1 to 20 percent. The parent material is alluvium from loess. The average annual precipitation ranges from 9 to 11 inches. The average annual air temperature is about 43 to 45 degrees F. The frost free season is 70 to 110 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the competing Nargon (T) and Coffee (T) series and the Deuce (T), Pancheri, Polatis, Menan (T) and Techicknot (T) series. Nargon and Polatis soils are moderately deep soils on higher positions. Coffee soils areNa deep to basalt on similar positions. Deuce soils are shallow to basalt bedrock on higher positions near to rock outcrop. Pancheri soils are in similar positions and are coarse-silty. Menan and Techicknot soils are in basin positions with argillic horizons.

DRAINAGE AND PERMEABILITY: Well drained; slow to rapid runoff, moderate permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly Wyoming big sagebrush and bluebunch wheatgrass.

DISTRIBUTION AND EXTENT: Southeastern Idaho. These soils are moderately extensive.

SERIES PROPOSED: Butte County, Idaho 1994. The name is taken from the Idaho National Engineering Laboratory for Atomic Energy.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon - the zone from 0 to 10 inches (The A1 and A2 horizons)
Calcic horizon - the zone from 10 to 60 inches (The Bkq, Bk1 and Bk2 horizons)
Particle size control section - the zone from 10 to 40 inches (the Bkq, Bk1 and part of the Bk2 horizons)

National Cooperative Soil Survey
U.S.A. Mar. 8, 1994 ID0581

BEARTRAP SERIES

CLASSIFICATION

Taxonomic class: coarse-loamy, mixed, frigid Ardic Calcixerolls

SETTING

Depth class: deep
Drainage class: well drained
Permeability: moderate
Positions on the landscape: lava plains
Parent Material:
kind - eolian deposits
source - alluvium from loess
Slopes range: 2 to 15 percent
Elevation: 4,700 to 5,500 feet
Climatic data (average annual):
precipitation - 11 to 13 inches
air temperature - 43 to 45 degrees F
frost-free period - 70 to 90 days

TYPICAL PEDON DESCRIPTION (Blaine)

A1--0 to 2 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots; many fine, fine and medium irregular pores; strongly effervescent (about 15 percent calcium carbonate equivalent); disseminated lime; slightly alkaline (pH 7.6); abrupt smooth boundary.

A2--2 to 16 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine and medium granular blocky structure; soft, friable, nonsticky and nonplastic; many very fine and fine irregular pores; slightly effervescent (about 5 percent calcium carbonate equivalent); disseminated lime; slightly alkaline (pH 7.4); clear smooth boundary.

Bk1--16 to 19 inches; light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, firm, nonsticky and nonplastic; many very fine, fine and few medium roots; many very fine, fine and medium tubular pores; slightly effervescent (about 15 percent calcium carbonate equivalent); 10 percent basalt cobbles; slightly alkaline (pH 7.8); abrupt wavy boundary.

Bk2--19 to 43 inches; light gray (10YR 7/2) fine sandy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, firm, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; violently effervescent (about 30 percent calcium carbonate equivalent); disseminated lime; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3--43 to 52 inches; white (10YR 8/2) fine sandy loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; common very fine and fine roots; common very fine tubular pores; violently effervescent (about 30 percent calcium carbonate equivalent); disseminated lime; moderately alkaline (pH 8.4); abrupt wavy boundary.

2R--52 inches; basalt

TYPICAL PEDON LOCATION

Map unit in which located: McCarey-Beartrap complex, 1 to 6 percent slope (407)
Blaine County, Idaho; about 4 miles south and 1 mile east of Rattlesnake Butte, about 2,800 feet south and 2,500 west of the northeast corner of sec. 31, T.2S., R.28E.

RANGE IN CHARACTERISTICS

Profile
depth to bedrock - 40 to 60 inches
thickness of the mollic 10 to 16 inches
average annual soil temperature - 44 to 46 degrees F.
depth to the calcic horizon - 14 to 22 inches

Particle-size control section
clay content - 12 to 18 percent
rock fragment content - 0 to 5 percent average

A horizons
value - 4 or 5 dry and 2 or 3 moist
chroma - 2 or 3 dry or moist
rock fragment content - 0 to 5 percent

Bk horizons
value - 5 through 8 dry and 4 through 6 moist
chroma - 2 through 4 dry or moist
texture - loam, silt loam and fine sandy loam
rock fragment content - 0 to 15 percent
reaction - slightly or moderately alkaline

BERENICETON SERIES

These soils formed in wind-worked material over basalt or over sand and gravel. The principal natural vegetation is big sagebrush, rabbitbrush, needle-and-thread grass, Indian ricegrass, sod wheatgrasses and squirreltail. Typically, Bereniceton series have a brown sandy loam surface to 3 inches, underlain by a pale brown loam to 14", a very pale brown clay loam subsurface, and rock at about 46".

CLASSIFICATION

Taxonomic Class: Fine-loamy, mixed, (calcareous), frigid Xeric Torriorthents

SETTING

Depth Class: deep (40 to 60 inches)
Drainage class: well drained
Permeability: moderately slow
Positions on the landscape:
Slope range: 1 to 25 percent
Parent Material:

kind - eolian material over basalt
source - mixture of loess from glacial outwash and sand from the Big Lost River or further alluvial sources

TYPICAL PEDON DESCRIPTION

A11--0 to 3 inches; brown (10YR 5/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; slightly hard, very friable; few very fine, fine, medium and coarse roots; slightly calcareous; moderately alkaline (pH 8.4); clear wavy boundary.

A12--3 to 7 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak very fine granular structure; slightly hard, very friable, sticky and slightly plastic; few very fine, fine, medium and course roots; many very fine tubular pores; slightly calcareous; moderately alkaline (pH 8.4); clear wavy boundary.

C1ca--7 to 14 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; few very fine, fine, medium and coarse roots; many very fine tubular pores; strongly calcareous; strongly alkaline (pH 8.6); clear wavy boundary.

IIC2ca--14 to 30 inches, very pale brown (10YR 7/3) clay loam, pale brown (10YR 6/3) moist; moderate fine and medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; strongly calcareous; common cicada nodules; strongly alkaline (pH 8.8); clear wavy boundary.

IIC3ca--30 to 46 inches; very pale brown (10YR 7/3) clay loam, pale brown (10YR 6/3) moist; massive; hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; strongly calcareous; common cicada nodules; strongly alkaline (pH 8.8).

IIIR--46 inches, basalt.

TYPICAL PEDON LOCATION: Jefferson County, Idaho; 1,950 feet north, 2,000 feet east of the SW corner of Section 16, T. 4N., R. 34E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 41 to 46 degrees F
mean summer soil temperature - 64 to 67 degrees F (at 20 inches)
depth to bedrock, sand, and gravel - 40 to 60 inches
reaction - mildly, moderately or strongly alkaline (pH 7.8 to 9.0)

Particle-size control section:

clay - 18 to 35 percent
coarse fragments - up to 10 percent basalt pebbles and cobbles
other - soils usually dry, and are dry between 4 to 12 inches for a continuous period of about 70 to 90 days in late summer

A11 horizon:

value - 5 or 6 dry
chroma - 2 or 3 dry or moist

C horizon:

value - 6 to 8 dry
texture - loam, clay loam, or sandy clay loam.

ASSOCIATED SOILS

Associated soils are Aecet, Bondfarm and Lidy series. Aecet soils are underlain by bedrock at depths of 20 to 40 inches. Bondfarm soils are underlain by bedrock at depths of 10 to 20 inches. Lidy soils are 20 to 40 inches deep over sand and gravel.

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-8	SIL	20-27	25-35	5-10	1.35-1.50	0.2-0.6	0.15-0.17	7.9-8.4	2-4	-	-	-
0-8	GR-L	16-22	25-35	5-10	1.45-1.55	0.6-2.0	0.11-0.14	7.9-8.4	2-4	-	-	-
8-60	L,SIL,SICL	18-30	25-35	5-15	1.40-1.50	0.2-0.6	0.14-0.18	7.9-8.4	2-4	-	-	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

BLACKFOOT SERIES

The Blackfoot series consists of very deep, somewhat poorly drained soils in mixed alluvium. Blackfoot soils are on flood plains, recent alluvial fans, and very low terraces. Slopes are 0 to 2 percent. The average annual precipitation is about 11 inches, and the average annual temperature is about 43 degrees F. The dominant vegetation includes bluebunch wheatgrass, rabbitbrush, three-tip sagebrush, big sagebrush, and streambank wheatgrass.

CLASSIFICATION Taxonomic Class: Fine-loamy, mixed, frigid Fluvaquentic Haploxerolls

SETTING
Depth Class: very deep (>60")
Drainage class: somewhat poorly drained
Positions on the landscape: river terrace
Parent Material: kind - alluvium
source - mixed alluvium
Slope ranges: 0 to 2 percent

TYPICAL PEDON DESCRIPTION (DJ88-25)

A1--0 to 3 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak fine platy structure; slightly hard, very friable, sticky and plastic; common very fine and few fine roots; slightly effervescent (2 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear smooth boundary.

A2--3 to 9 inches: grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; common fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common fine, very fine and few medium roots; common very fine tubular pores; slightly effervescent (3 percent calcium carbonate equivalent); moderately alkaline (pH 7.9); clear wavy boundary.

Bk1--9 to 23 inches: pale brown (10YR 6/3) silty clay loam, dark brown (10YR 4/3) moist; weak fine prismatic, parting to common moderate subangular blocky structure; slightly hard, very friable: sticky and plastic; common fine, very fine and few medium roots; common very fine tubular pores; slightly effervescent (4 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); gradual wavy boundary.

Bk2--23 to 36 inches: brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; few faint dark brown (10YR 4.4) mottles; weak moderate subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine tubular pores; strongly effervescent (6 percent calcium carbonate equivalent); moderately alkaline (pH 8.1); clear wavy boundary.

2Bk--36 to 43 inches: light brownish gray (10YR 6/2) sandy loam, very dark grayish brown (10YR 4/2) moist; common faint dark brown (10YR 4.4) mottles; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine, fine and medium roots; common very fine tubular pores; 1 percent gravel; slightly effervescent (4 percent calcium carbonate equivalent); moderately alkaline (pH 8.9); gradual wavy boundary.

2C1--43 to 53 inches: brown (10YR 5/3) loamy sand, dark brown (10YR 3/3) moist; common faint dark brown (10YR 4.4) mottles; single grained; loose nonsticky and nonplastic; few very fine

roots; 1 percent gravel; slightly effervescent (2 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear wavy boundary.

2C2--53 to 65 inches: grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/3) moist; few faint dark brown (10YR 4.4) mottles; massive; slightly hard, very friable; nonsticky and slightly plastic; few very fine roots; 1 percent gravel; slightly effervescent (1 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear wavy boundary.

2C3--65+ inches: dark brown (10YR 4/2) gravelly loamy sand, very dark brown (10YR 2/2) moist; common faint dark brown (10YR 4/4) mottles; single grained; loose, nonsticky and nonplastic; few very fine roots; 20 percent gravel; mildly alkaline (pH 7.6).

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 30 feet north and 1,950 feet east of the southwest corner of Section 15, T. 5N., R. 26E.

RANGE IN CHARACTERISTICS
Profile: average annual soil temperature - 42 to 46 degrees F.

Particle-size control section:
clay content - 18 to 27 percent
coarse fragments - 0 to 5 percent

A horizon:
Hue - 2.5 Y or 10YR
value - 4 or 5 dry; 2 or 3 moist
chroma - 1 or 2 dry or moist
reaction - mildly or moderately alkaline

Bk horizon:
Hue - 2.5 Y or 10YR
value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - silty clay loam, loam, sandy loam, loamy sand
reaction - mildly or moderately alkaline

2C horizon:
value - 4 or 5 dry; 2 or 3 moist
chroma - 2 or 3 dry or moist
texture - sandy loam, loamy sand, very gravelly fine sand, extremely gravelly loamy sand

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/ 100g	meg/ 100g	percent
0-8	L	16-22	20-35	NP-10	1.2-1.4	0.6-2.0	0.16-0.18	7.4-8.4	0-2	-	-	-
0-8	SIL	18-27	20-35	NP-10	1.2-1.4	0.6-2.0	0.19-0.21	7.4-8.4	2-4	-	-	-
8-18	L	18-26	20-35	NP-10	1.3-1.5	0.6-2.0	0.16-0.18	7.4-8.4	0-2	-	-	-
18-25	SICL,SIL	15-32	25-40	10-20	1.4-1.6	0.2-0.6	0.19-0.21	6.6-8.4	0-2	-	-	-
25-60	SR-FSL-SICL	16-40	20-35	5-15	1.3-1.5	0.6-2.0	0.16-0.19	7.4-8.4	0-2	-	-	-
60-84	GRX-COS	0-5	-	NP	1.6-1.75	20-20	0.01-0.03	6.6-7.3	-	-	-	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

BONDFARM SERIES

The Bondfarm series consists of shallow, well drained soils that formed in eolian material over basalt. These soils are on basalt plains and have slopes of 2 to 12 percent. The mean annual precipitation is about 9 inches. The principal plants are big sagebrush, three-tip sagebrush, small rabbitbrush, bluebunch wheatgrass, cheatgrass, needle-and-thread grass, and Indian ricegrass.

CLASSIFICATION
Taxonomic Class: Loamy, mixed, frigid Lithic Xerollic Calciorthids

SETTING
Depth Class: shallow (10 to 20 inches to basalt bedrock)
Drainage class: well drained
Positions on the landscape: basalt uplands
Slope range: 2 to 20 percent
Parent Material:
kind - eolian
source - wind blown sandy material from Big Lost River alluvium

TYPICAL PEDON DESCRIPTION (DG79-1)

A--0 to 2.5 inches; pale brown (10YR 6/3) stony sandy loam, dark brown (10YR 3/3) moist; common thin platy structure; slightly hard, slightly friable, nonsticky and nonplastic; common very fine roots; 5 percent gravel, 5 percent stones and 10 percent cobble basalt rock fragments; mildly alkaline (pH 7.8); clear smooth boundary.

Bkq1--2.5 to 7 inches: pale brown (10YR 6/3) cobbly sandy loam, dark brown (10YR 3/3) moist; common fine subangular blocky structure; soft, friable, nonsticky and nonplastic; few fine and very fine roots; few very fine tubular pores; 5 percent gravel, 10 percent cobbles and 2 percent stones basalt rock fragments; strongly effervescent (16 percent calcium carbonate equivalent); 1-2 mm silica pendants under rock fragments; moderately alkaline (pH 8.0); clear smooth boundary.

Bkq2--7 to 11 inches: pale brown (10YR 6/3) cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; few fine, very fine and medium roots; few very fine tubular pores; 5 percent gravel, 10 percent cobbles and 2 percent stones basalt rock fragments; strongly effervescence (20 percent calcium carbonate equivalent); 1-2 mm silica pendants under rock fragments; moderately alkaline (pH 8.0); abrupt smooth boundary.

2R--11 inches: lime-coated, unfractured basalt bedrock.

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 1,600 feet south and 1,000 west of the northeast corner of Section 13, T. 3N., R. 27E.

RANGE IN CHARACTERISTICS
Profile:
Average annual soil temperature - 45 to 55 degrees F.

Particle-size control section:
clay content - 15 to 20 percent

depth to basalt bedrock 10 to 20 inches
rock fragment content - 15 to 25 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - cobbly sandy loam, stony loam
reaction - mildly or moderately alkaline
rock fragment content - 15 to 20 percent

Bk horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 4 dry or moist
texture - stony sandy loam, stony loam
reaction - mildly or moderately alkaline
rock fragment content - 15 to 35 percent

The mean annual soil temperature ranges from 41 degrees to 45 degrees F, and the mean summer soil temperature at the lithic contact ranges from 63 degrees to 66 degrees F. The soils are usually dry but are moist in some part between a depth of 8 inches and bedrock for 60 to 80 days in the spring. The organic matter content of the upper 15 inches (or to bedrock if shallower) averages more than 0.6 percent if the weighted average sand/clay ratio for this depth is 6. The control section is dominantly moderately-coarse textured.

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-4	SL,FSL	5-15	20-30	NP-5	1.5-1.6	2.0-6.0	0.11-0.13	7.9-8.4	-	-	5-10	5-10
0-4	LS	2-8	-	NP	1.5-1.6	2.0-6.0	0.06-0.08	7.9-8.4	-	-	1-5	5-10
0-4	L	18-25	30-35	10-15	1.5-1.6	0.6-2.0	0.16-0.18	7.4-8.4	0-2	-	-	15-20
4-18	SL,FSL,L	15-18	20-30	NP-10	1.5-1.6	2.0-6.0	0.11-0.13	7.9-8.4	0-2	-	-	4-10

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

BORAH SERIES

CLASSIFICATION
Taxonomic class: sandy-skeletal, mixed, Aquic Calixerolls

SETTING
Depth class: very deep
Drainage class: poorly
Permeability:
Positions on the landscape: river terrace
Parent Material:
kind - alluvium
source - mixed alluvium
Slope range:
Elevation: 5,000 to 5,700 feet
Climatic data (average annual):
precipitation - 9 to 12 inches
air temperature - about 50 degrees F
frost-free period - about 68 days

CINDERHURST SERIES

CLASSIFICATION

Taxonomic class: loamy-skeletal, mixed, frigid Lithic Mollic Haploxeralfs

SETTING

Depth class: very shallow
Drainage class: well drained
Permeability: moderate
Positions on the landscape: lava plains and recent lave flows
Parent Material: kind - wind deposited volcanic ejecta
source - volcanic
Slope range: 2 to 15 percent
Elevation: 4,800 to 6,000 feet
Climatic data (average annual):
precipitation - 12 to 14 inches
air temperature - 43 to 45 degrees F
frost-free period - 60 to 90 days

TYPICAL PEDON DESCRIPTION (BLAINE)

A1--0 to 3 inches; brown (10YR 4/3) extremely cobbly silt loam, very dark grayish brown (10YR 3/2) moist; weak fine grandular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine irregular pores; about 15 percent gravel, 50 percent cobbles; slightly acid (pH 6.2); clear smooth boundary.

Bt--3 to 8 inches; yellowish brown (10YR 5/4) very cobbly silt loam, dark yellowish brown (10YR 4/4) moist; week fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine medium and coarse roots; many very fine tubular pores; 5 percent gravel, 30 percent cobbles; thin oriented clay on sand grains; slightly acid (pH 6.4); abrupt irregular boundary.

2R--8 inches; basalt bedrock with vertical fractures 0.5 to 2 cm wide (1 to 3 meters apart) with Bt material in cracks, few very fine, fine and medium roots in cracks.

TYPICAL PEDON LOCATION

Map unit in which located: Lava Flows-Cinderhurst complex, 2 to 15 percent slopes (411)
Blaine County, Idaho; about 15 miles southwest of Arco, approximately 500 feet south and 2,500 west of the northeast corner of sec. 5, T. 1 N., R. 27 E.

RANGE IN CHARACTERISTICS

Profile

average annual soil temperature - 43 to 46 degrees F.
depth to basalt bedrock 4 to 10 inches
slightly acid to neutral
O horizons in some profiles

Particle-size control section

clay content - 18 to 25 percent
rock fragment content - 35 to 65 percent

A horizon
value - 4 or 5 dry
chroma - 2 throught 4 dry or moist
rock fragment content - 25 to 65 percent

Bt horizon
Hue 7.5YR or 10YR
value - 4 or 5 dry and 3 or 4 moist
chroma - 3 or 4 dry
rock fragment content - 40 to 55 percent

COFFEE SERIES

LOCATION COFFEE ID

Tentative Series
Rev. DJ/PB 2/94

The Coffee series consists of deep, well drained soils that formed in alluvium from loess. They are on basalt plains. Slopes are 1 to 20 percent. Permeability is moderate. Average annual precipitation is about 10 inches and the average annual air temperature is about 44 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, frigid Xerollic Calciorthids

TYPICAL PEDON: Coffee silt loam, rangeland; on a 1 percent slope at 4,680 feet elevation with Wyoming big sagebrush and bluebunch wheatgrass. When described on June 19, 1979, the soil was slightly moist below 3 inches. (Color is for dry soil unless otherwise noted.

A1--0 to 3 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate very fine platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine and fine vesicular pores; slightly effervescent; 2 percent basalt gravel; slightly alkaline (pH 7.6); clear smooth boundary. (1 to 4 inches thick)

A2--3 to 7 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate very fine platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine and medium roots; few very fine and fine tubular pores; slightly effervescent; (7 percent calcium carbonate equivalent); 1 percent basalt gravel; moderately alkaline (pH 8.2); clear smooth boundary. (3 to 8 inches thick)

Bk--7 to 16 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; many (10 percent) hard 3/8 to 3/4 inch nodules, or cicada krotovinas; violently effervescent (25 percent calcium carbonate equivalent); 1 percent basalt gravel; 1 mm thick lime and some silica coats under rock fragments; moderately alkaline (pH 8.4); clear smooth boundary. (0 to 20 inches thick)

Bkq1--16 to 25 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 4/3) moist; moderate medium angular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; common (25 percent) hard 3/8 to 3/4 inch nodules, or cicada krotovinas; violently effervescent (20 percent calcium carbonate equivalent); 1 mm thick lime and some silica coats under rock fragments;1 percent basalt gravel 2 percent basalt cobbles and 1 percent stone basalt rock fragments; strongly alkaline (pH 9.0); clear smooth boundary. (8 to 21 inches thick)

Bkq2--25 to 48 inches; very pale brown (10YR 8/3) silty clay loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, sticky and plastic; few very fine and fine roots; commen very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); 1-2 mm thick lime and some silica coats under rock fragments; 1 percent basalt gravel, 5 percent basalt cobbles and 5 percent basalt stones basalt rock fragments; strongly alkaline (pH 8.6) abrupt smooth boundary. (10 to 17 inches thick)

2R--48 inches basalt fractured lime coated bedrock

TYPE LOCATION: Bingham County, Idaho; 11 miles northwest of Springfield, Idaho; approximately 1,500 feet east and 950 feet south of the southwest corner of sec. 8, T. 3 S., R. 30 E.
Latitude - 43 degrees, 10 minutes, 24 seconds north.
Longitude - 112 degrees, 51 minutes, 47 seconds west.

RANGE IN CHARACTERISTICS

Profile
Depth to lime
Average annual soil temperature - 45 to 47 degrees F.

Depth to bedrock - 40 to 60 inches
Particle-size control section:
Total clay content - 18 to 35 percent
Carbonate free clay - 10 to 18 percent
0.5 - 20 mm fraction - 15 to 30 percent
Rock fragment content - 0 to 25 percent average

A horizon
Value - 5 or 6 dry and 3 or 4 moist
Rock fragment content - 0 to 5 percent
Reaction - slightly or moderately alkaline

Bk horizons
Value - 6 or 7 dry and 4 or 5 moist
Chroma - 2 or 3 dry
Texture - SIL, L, CL or SICL
Rock fragment content - 0 to 5 percent
cobbles - 0 - 1 percent
Reaction - moderately or strongly alkaline

Bkq horizons
Value - 6 through 8 dry and 4 through 6 moist
Texture - SIL, L, CL, SICL or ST-SICL
Rock fragment content - 0 to 25 percent
gravel - 1 - 10 percent
cobbles - 0 - 10 percent
stones - 0 - 10 percent
Reaction - moderately or strongly alkaline

COMPETING SERIES: This is the Atom (T), Nargon (T) Holsine, Lariat, Lidy, Malm, Matheson, Oxhead (T), Sparmo (T) and Voltage (T) series. Atom, Holsine, Lidy, Oxhead and Voltage soils are very deep. Nargon, Lariat and Malm soils are moderately deep to bedrock. Lidy soils have contrasting sand and gravel at 23 to 34 inches. Matheson soils are deep soils to bedrock with moderately rapid permeability.

GEOGRAPHIC SETTING: Coffee soils are on basalt plains. Elevations range from 4,500 to 5,500 feet. Slopes range from 1 to 20 percent. The parent material is alluvium from loess. The average

annual precipitation ranges from 9 to 11 inches with some additional moisture from snow and early spring runoff. The average annual air temperature is about 43 to 45 degrees F. The frost free season is 70 to 110 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Nargon (T), Atom (T), Deuce (T), Techicknot (T) and Menan (T) soils. Nargon soils are moderately deep to basalt on higher positions. Atom soils are very deep to basalt bedrock on lower positions. Deuce soils are shallow to basalt bedrock on upland postions near rock outcrop. Menan and Techicknot soils are very deep soils on bottomland positions with agrillic horizons.

DRAINAGE AND PERMEABILITY: Well drained; slow to moderate runoff, moderate permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly Wyoming big sagebrush and bluebunch wheatgrass occasionlly mixed with some junipers.

DISTRIBUTION AND EXTENT: Southeast Idaho. These soils are moderately extensive.

SERIES PROPOSED: Bingham County, Idaho 1994. The name is taken from the Coffee Point stage stop station.

REMARKS: (Description DG79-8; Lab data S90-ID-023-004) Diagnostic horizons and features recognized in this pedon are:
Ochric epipedon - the zone from 0 to 7 inches (the A1 and A2 horizons)
Calcic horizon - the zone from 7 to 48 inches (the Bk and part of the Bkq horizons)
Particle size control section - the zone from 10 to 40 inches (the and Bk and part of the Bkq horizons)

National Cooperative Soil Survey
U.S.A.

DEUCE SERIES

LOCATION DEUCE ID

Tentative Series
Rev. DJ/PB 2/94

The Deuce series consists of shallow, well drained soils that formed in alluvium from loess overlying basalt. They are on basalt plains and crater rims. Slopes are 2 to 30 percent. Permeability is moderate. Average annual precipitation is about 9 inches and the average annual air temperature is about 44 degrees F.

TAXONOMIC CLASS: Loamy, mixed, frigid Lithic Xerollic Calciorthids

TYPICAL PEDON: Deuce very stony silt loam, rangeland; on a 7 percent east-facing slope at 5,410 feet elevation. Vegetation is Wyoming big sagebrush and bluebunch wheatgrass. When described on June 24, 1993, the soil was slightly moist throughout. (Color is for dry soil unless otherwise noted.)

A--0 to 2 inches; light brownish gray (10YR 6/3) very stony silt loam, brown (10YR 4/3) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; slightly effervescent (10 percent calcium carbonate equivalent); 5 percent basalt gravel, 5 percent basalt cobbles and 5 percent basalt stones; slightly alkaline (pH 7.6); clear smooth boundary. (2 to 3 inches thick)

BAk-2 to 6 inches; pale brown (10YR 6/3) cobbly silt loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine and common medium roots; common very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); common lime coats 1 to 2 mm thick on undersides of basalt fragments; 5 percent basalt gravel, 5 percent basalt cobbles and 2 percent basalt stones; moderately alkaline (pH 8.0); clear wavy boundary. (0 to 4 inches thick)

Bk--6 to 11 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; strongly effervescent (25 percent calcium carbonate equivalent); common lime coats 1 to 2 mm thick on undersides of basalt fragments; 1 percent basalt gravel and 1 percent basalt cobbles and 1 percent basalt stones; moderately alkaline (pH 8.2); gradual wavy boundary. (3 to 7 inches thick)

Bkq--11 to 19 inches; very pale brown (10YR 8/3) silt loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; few very fine tubular pores; few firm medium and coarse nodules, or cicada krotovinas strongly effervescent (30 percent calcium carbonate equivalent); common lime and few silica coats 1 to 3 mm thick on undersides of basalt fragments; 2 percent basalt gravel and 1 percent basalt cobbles and 1 percent basalt stones; moderately alkaline (pH 8.2); abrupt wavy boundary. (5 to 9 inches thick)

R--19 to 21 inches; hard to slightly weathered basalt

TYPE LOCATION: Bingham County, Idaho; about 8 miles northeast of Twin Buttes; 400 feet east and 2,150 feet north of the southwest corner of section. 14, T.3N., R.33E.

Latitude - 43 degrees, 35 minutes, 22 seconds north.
longitude - 112 degrees, 33 minutes, 25 seconds west.

RANGE IN CHARACTERISTICS:

Average annual soil temperature - 44 to 47 degrees F
Depth to bedrock - 10 to 20 inches
Depth to calcic horizon - 2 to 7 inches
Calcium carbonate equivalent - 15 to 35 percent

Particle size control section
Total clay content - 18 to 35 percent
Carbonate free clay - 10 to 18 percent
0.5 - 20 mm fraction - 15 to 30 percent
Rock fragment content - 0 to 35 percent

A horizon
Value - 5 or 6 dry, 3 or 4 moist
Chroma - 2 or 3 dry

BAk horizon
Value - 5 or 6 dry and 3 or 4 moist
Chroma - 3 or 4 dry
Texture - SIL, CL and CB-SIL
Rock fragment content - 0 to 35 percent

Bk and Bkq horizons
Value - 6 through 8 dry, 4 through 6 moist
Chroma - 2 through 4 dry
Texture - SIL, L, ST-L, ST-CL and GR-SICL
Rock fragment content - 5 to 35 percent

COMPETING SERIES: This is the Bondfarm series. Bondfarm soil have moderately rapid permeability and less 18 percent clay in the particle-size control section.

GEOGRAPHIC SETTING: Deuce soils occur on basalt plains and crater rims. Slopes are 2 to 30 percent. Elevations range from 4,500 to 5,500 feet. The average annual recipitation ranges from 8 to 11 inches, part of which is in the form of snow. The average annual air temperature is 43 to 46 degrees F. The frost free season is about 70 to 105 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Nargon (T), Atom (T), Coffee (T) and Pingree (T) soils. The Nargon soil is moderately deep to basalt bedrock. The Atom soil is very deep to basalt bedrock. The Coffee soil is deep to basalt bedrock. The Pingree soils are noncalcareous and very shallow to basalt bedrock.

DRAINAGE AND PERMEABILITY: Well drained; slow to very rapid runoff; moderate permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly Wyoming big sagebrush, black sagebrush and bluebunch wheatgrass.

DISTRIBUTION AND EXTENT: Southeastern Idaho on the Snake River plains. These soils are moderately extensive.

SERIES PROPOSED: Bingham County, Idaho 1993. The name is taken from the volcanic crater were the series was first mapped.

REMARKS: Description (DJ93-11) Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 2 inches (the A horizon)

Particle-size control section - the zone from 10 to 19 inches (the BAk, Bk and Bkq horizons)

Calcic horizon - the zone from 2 to 19 inches (part Bak, Bk and Bkq horizons)

National Cooperative Soil Survey U.S.A.

DISTON SERIES

The Diston series consists of moderately deep, somewhat excessively drained soils that formed in eolian material containing 40 to 50 percent dark colored sand particles. These soils are on basalt plains and have slopes of 0 to 12 percent. Mean annual precipitation is about 9 inches.

Soil Family: Sand, mixed frigid Xerollic Durothids.

Typical Pedon: Diston loamy sand, rangeland. (Colors are for dry soil unless otherwise noted.)

A1--0 to 5 inches, grayish brown (10yr 5/2) loamy sand, very dark grayish brown (10yr 3/2) moist; weak very thin platy structure; loose very friable; common very fine and fine roots; many very fine and fine interstitial pores; 2 percent duripan fragments less than 3/4 inch in diameter; moderately calcareous; moderately alkaline (ph 8.2); clear wavy boundary. (4 to 11 inches thick)

C1--5 to 13 inches, light brownish gray (10yr 6/2) loamy sand, dark grayish brown (10yr 4/2) moist; weak coarse prismatic structure; loose, very friable; common very fine and fine roots; common very fine and fine tubular pores; about 2 percent duripan fragments less than 3/4 inch diameter; strongly calcareous; moderately alkaline (pH 8.0); clear wavy boundary. (6 to 13 inches thick)

C2ca--13 to 31 inches, light gray (10yr 7/2) loamy sand, grayish brown (10yr 5/2) moist; weak coarse prismatic structure; loose, very friable; few very fine and fine roots; common very fine and fine tubular pores; about 2 percent duripan fragments less that 3/4 inch diameter; strongly calcareous; moderately alkaline (pH 8.0); abrupt wavy boundary. (10 to 20 inches thick)

C3casim--31 to 40 inches, white (2.5yr 8/1) duripan, very pale brown (10yr 7/3) moist; many very fine and fine tubular pores; slightly calcareous; mildly alkaline (pH 7.8); abrupt wavy boundary. (6 to 13 inches thick)

C4--40 to 45 inches, sand, grayish brown (10yr 5/2) moist; single grained; weakly cemented layers; many very fine and fine tubular pores; 10 percent duripan fragments; strongly calcareous; abrupt smooth boundary. (0 to 7 inches thick)

C5casim--45 to 47 inches, duripan, very pale brown (10yr 7/3) moist; few very fine tubular pores; strongly calcareous; abrupt wavy boundary. (0 to 6 inches thick)

C6--47 to 60 inches, sand, grayish brown (10yr 5/2) moist; single grained; slightly hard, friable; common very fine and fine tubular pores; stratified layers of duripan 1 to 5 inches thick; strongly calcareous.

Type Location: Jefferson County, Idaho; about 2 miles north-northwest, 1/4 mile east of Hamer; 12 feet southeast of NW corner of sec. 10, T.7N., R.37E.

Range in Characteristics: the mean annual soil temperature ranges from 41 degrees to 45F degrees, and the mean summer soil temperature at a depth of 20 inches ranges from 64 degrees to 67F degrees. The soils are usually moist, but are dry between depth of 12 and 31 inches for 45 consecutive days in late summer and autumn. Depth to the duripan is 20 to 40 inches. Volume of duripan fragments in the solum ranges from 1 to 15 percent.

The C horizon has hue of 2.5yr or 10yr, value of 5 through 8 dry, 4 through 7 moist, and chroma of

1 through 3. Some pedons have sandy loam in the lower part of the Cca horizon.
Competing Series: This is the Palanush series. The Palanush soils have 20 to 35 percent gravel and 20 to 60 percent ash in the control section.

Geographic Setting: Diston soils are on basalt plains at elevations of 4,800 to 5,100 feet. Slope gradients range from 0 to 12 percent. The soils formed in coarse textured eolian material containing 40 to 50 percent dark colored sand. The semiarid climate has a average freeze-free period of 80 to 100 days and a mean annual precipitation of 8 to 11 inches.

Associated Soils: These are the Grassy Butte soils. Grassy Butte soils are more than 40 inches deep over basalt.

Drainage and Permeability: Somewhat excessively drained; very slow or slow runoff; rapid permeability.

Use and Vegetation: These soils are form irrigated small grains, potatoes, hay pasture, and for range wildlife. The natural vegetation is big sagebrush, needle-and-thread grass and Indian ricegrass.

Distribution and Extent: Southeastern Idaho. The series is of small extent.

Series Established: Jefferson County, Idaho, 1975.

Remarks: Previously classified as Sierozems.

FALLERT SERIES

The Fallert series consists of deep, well drained soils that formed in mixed alluvium. Fallert soils are on alluvial fans and terraces and have slopes of 0 to 20 percent. Mean annual precipitation is about 9 inches and the mean annual temperature is about 440 F.

Taxonomic Class: Sandy-skeletAl, mixed, frigid Durixerollic Calciorthids

Typical Pedon: Fallert gravelly loam - rangeland. (Colors are for dry soil unless otherwise stated.)

Al--O to 3 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; moderate thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine and few medium roots; 20 percent pebbles; moderately calcareous; moderately alkaline (pH 8.0); clear smooth boundary. (2 to 5 inches thick)

B2--3 to 12 inches; pale brown (10YR 6/3) very gravelly loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 40 percent pebbles; moderately calcareous; moderately alkaline (pH 8/4); clear smooth boundary. (6 to 14 inches thick)

B3ca--12 to 20 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky; many fine and\ery fine roots; 80 percent pebbles; moderately calcareous; moderately alkaline (pH 8.2); clear smooth boundary. (O to 9 inches thick)

Clcasi--20 to 32 inches; light brownish gray (10YR 6/2) extremely gravelly loamy coarse sand, dark grayish brown (10YR 4/2) moist; massive; hard, firm; many fine and very fine roots; 80 percent pebbles, 5 percent cobbles; common silica pendants on underside of rock fragments; strongly calcareous; moderately alkaline (PH 8.4); clear smooth boundary. (7 to 19 inches thick)

C2casi--32 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly loamy coarse sand, brown (10YR 4/3) moist; massive; hard, fi,tn, many fine and very fine roots; 90 percent pebbles; common silica pendants on underside of pebbles; strongly-calcareous; moderately alkaline (pH 8.4).

Type Location: Butte County- Idaho; about 0.75 mile north of Richards Butte; approximately 150 feet east and 300 feet south of the northwest corner of section 3, T. 7 N., R. 31 E.

Range in Characteristics:

Solum thickness - 16 to 28 inches
Mean annual soil temperature - 45 degrees to 47 degrees F.
Textural control section - 5 to 12 percent clay
Reaction of profile - mildly to strongly alkaline

Al horizon

Color value, dry - 5 or 6
value, moist - 3 or 4
chroma, - 2 or 3

B2 horizon

Color value, dry - 5 through 7

value, moist - 4 through 6
chroma - 3 through 4
texture - gravelly loam, very gravelly loam, or extremely gravelly loam
rock fragments - 25 to 80 percent

C horizon
Color value, dry - 6 or 7
value, moist - 4 through 6
chroma - 2 through 4
m cementation - weakly cemented with silica and lime, mainly as pendants on under-sides of rock fragments
rock fragments - 60 to 90 percent

Competing Series: This is the Combe series in the same family. Combe soils have a cryic temperature regime.

Geographic Setting: Fallert soils are on alluvial fans and terraces. Elevations range from 5,400 to 6,200 feet. Slopes are 0 to 20 percent. The soils formed in coarse alluvium from sedimentary and metamorphic rock. The climate is cold andi moist in winter and spring, and dry in summer. Mean annual precipitation ranges from 8 to 12 inches. Mean summer temperature is 59 degrees to 64F degrees, and mean annual temperature is 43 degrees to 45F degrees. Frost-free period is about 80 days.

Geographically Associated Soils: These are the Allhands, Lien and Siri soils. Allhands and Lien soils have a duripan. Siri soils have a loamy-skeletal particle-size control section.

Drainage and Pemeability: Well drained; slow or medium runoff; moderate permeability.

Use and Vegetation: The soils are used principally for range. Vegetation is mainly black sagebrush and bluebunch wheatgrass.

Distribution and Extent: Southeastern Idaho. These soils are moderately extensive.

Series Proposed: Butte County, Idaho, 1977.

National Cooperative Soil Survey, U. S. A.

GRASSY BUTTE SERIES

The Grassy Butte series consists of very deep (>60") well-drained coarse-textured soils on fans and terraces, formed in colluvium or alluvium.

CLASSIFICATION
Taxonomic class: Sandy, mixed, frigid Typic Calciorthids

SETTING
Depth class: very deep (60 inches or more)
Drainage class: somewhat excessive
Permeability: rapid
Positions on the landscape: fans, terraces
Parent Material:
kind - eolian over colluvium or alluvium
source - mixed
Slope range: 0 to 20 percent

TYPICAL PEDON DESCRIPTION

A--0 to 7 inches; grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, very friable, nonsticky and nonplastic; common medium roots; slightly effervescent (15 percent calcium carbonate equivalent); moderately alkaline (pH 7.9); clear smooth boundary.

Bk1 -- 7 to 20 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; single grained, loose, very friable, nonsticky and nonplastic; common fine and very fine roots; moderately effervescent (25 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); gradual wavy boundary.

Bk2 -- 20 to 32 inches; light brownish gray (10YR 6/2) loamy sand, dark grayish brown (10YR 4/2) moist; single grained; loose; very friable, nonsticky and nonplastic; common very fine, and fine roots; few very fine interstitial pores; strongly effervescent (30 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); gradual wavy boundary.

Bk3 -- 32 to 50 inches; light brownish gray (10YR 6/2) loamy sand, dark brown (10YR 4/3) moist; single grained; loose, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine interstitial pores; strongly effervescent (35 percent calcium carbonate equivalent); common lime coats 1 to 2 mm thick on undersides of coarse fragments; 2 percent gravel; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk4 -- 50 to 60 inches; light brownish gray (10YR 6/2) loamy sand, pale brown (10YR 6/3) moist; loose; very friable, nonsticky and nonplastic; few very fine roots, 1 to 2 mm thick lime coats on gravel bottoms; moderately effervescent (30 percent calcium carbonate equivalent); lime coats 1 to 2 mm thick on undersides of coarse fragments; 2 percent gravel; moderately alkaline (pH 8.3)

TYPICAL PEDON LOCATION: Butte County, Idaho; nine miles east of Howe Idaho; 20 feet west and 500 south of the northeast corner of Section 29, T. 6N., R. 30E.

RANGE IN CHARACTERISTICS

Profile:

Average annual soil temperature - 41 to 46 degrees F

Particle size control section:

clay - 5 to 10 percent

Bk horizons:

chroma - 1 or 2 dry or moist
texture - loamy sand or sand
coarse fragments - 0 to 3 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/ cm	me/ 100g	meg/ 100g	percent
0-7	LS	5-10	-	NP	1.6-1.7	6.0-20	0.06-0.08	6.6-8.4	-	-	-	-
0-7	S	5-20	-	NP	1.6-1.7	6.0-20	0.06-0.08	6.6-8.4	-	-	-	-
7-60	LFS,S,LS	2-10	-	NP	1.6-1.7	6.0-20	0.06-0.08	6.6-8.4	0-2	-	-	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

HONDOHO SERIES

CLASSIFICATION
Taxonomic class: loamy-skeletal, mixed, frigid Calcic Haploxerolls

SETTING
Depth class: very deep
Drainage class: well drained
Permeability: moderate
Positions on the landscape: fan terraces
Parent Material:
kind - alluvium
source - mixed
Slope range: 4 to 30 percent
Elevation: 5,000 to 5,600 feet
Climatic data (average annual):
precipitation - 12 to 13 inches
air temperature - 43 to 45 degrees F
frost-free period - 70 to 100 days

TYPICAL PEDON DESCRIPTION (DJ79-19)

A1--0 to 3 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine platy structure; soft, very friable, slightly sticky and non plastic; common very fine roots; 15 percent basalt gravel and 5 percent basalt cobbles; slightly alkaline (pH 7.6); clear smooth boundary.

A2--3 to 6 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine and common medium roots; few very fine tubular pores; 15 percent basalt gravel and 15 percent basalt cobbles; slightly alkaline (pH 7.6); clear wavy boundary.

Bw--6 to 10 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine and common medium roots; few very fine tubular; 15 percent basalt gravel and 10 percent basalt cobbles; slightly alkaline (pH 7.6); clear wavy boundary.

Bk1--10 to 38 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; massive; hard, friable, slightly sticky and slightly plastic; common very fine, and fine roots; few fine irregular pores; few coarse hard rounded nodules or cicada krotovinas; strongly effervescent (20 percent calcium carbonate equivalent); 30 percent basalt gravel, 10 percent basalt cobbles and 10 percent basalt stones; moderately alkaline (pH 8.4); clear irregular boundary.

Bkq--38 to 60 inches; yellowish brown (10YR 5/4) very gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few fine roots; slightly effervescent (15 percent calcium carbonate equivalent); 1-2 mm thick silica pendants undersides of rock fragments; 25 percent basalt gravel, 10 percent basalt cobbles and 5 percent basalt stones; moderately alkaline (pH 8.4).

TYPICAL PEDON LOCATION

Map unit in which located: Hondoho gravelly loam, 4 to 30 percent slopes (426)
Butte County, Idaho; about 11 miles southwest of Atomic City, on toe slopes of Big Southern Butte, approximately 1,400 feet south and 850 feet west of the northwest corner of sec. 13 T. 1 N., R. 29 E.
Latitude - 43 degrees, 25 minutes, 17 seconds north.
Longitude - 113 degrees, 00 minutes, 44 seconds west.

RANGE IN CHARACTERISTICS

Profile
average annual soil temperature - 43 to 47 degrees F.
depth to lime 8 to 16 inches

Particle-size control section
clay content - 18 to 27 percent
rock fragment content - 35 to 50 percent

A horizon
value - 4 or 5 dry and 2 or 3 moist
chroma - 2 or 4 dry or moist

Bw horizon
value - 4 through 6 dry
chroma - 2 or 4 dry or moist
rock fragment content - 15 to 30 percent

Bkq horizons
value - 5 or 6 dry and 3 or 4 moist
chroma - 2 or 3 dry or moist
rock fragment content - 35 to 50

IKE SERIES

The Ike series consists of shallow, well-drained soils that formed in residuum and colluvium over limestone bedrock. They are on mountain sideslopes and foothills. Slopes are 5 to 75 percent. Permeability is moderate. Average annual precipitation is about 9 inches; and the average annual air temperature is about 43 degrees F.

TAXONOMIC CLASSIFICATION: Loamy-skeletal, carbonatic, frigid Lithic Xerollic Calciorthids

TYPICAL PEDON DESCRIPTION: Ike stony loam on rangeland; on a 15 percent southwest slope at 5,900 feet elevation with black sagebrush and bluebunch wheatgrass. When described on July 28, 1986, the soil was slightly moist throughout. (Color is for dry soil unless otherwise noted.)

A -- 0 to 3 inches: brown (1OYR 5/3) stony loam, dark brown (1OYR 3/3) moist: moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and common fine roots; common very fine tubular pores; 25 percent gravel, 3 percent limestone cobbles and 2 percent stones: strongly effervescent (30 percent calcium carbonate equivalent); 2 percent stones; moderately alkaline (pH 8.2); clear smooth boundary.

Bkq1 -- 3 to 12 inches: pale brown (1OYR 6/3) very gravelly loam, brown (10YR 4/3) moist: moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, common fine and few medium roots; common very fine tubular pores; 30 percent gravel and 5 percent limestone cobbles; violently effervescent (40 percent calcium carbonate equivalent); common lime and silica coats 1 to 2 mm thick and pendants 3 to 5 mm thick on undersides of coarse fragments; moderately alkaline (pH 8.1); clear smooth boundary.

Bkq2 -- 12 to 17 inches: pale brown (10YR 6/3) extremely gravelly sandy loam, dark yellowish brown (1OYR 4/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; common very fine, fine and medium roots; common very fine tubular pores; 30 percent gravel and 15 percent limestone cobbles; violently effervescent (45 percent calcium carbonate equivalent: common lime and silica coats 1 to 2 mm thick and pendants 3 to 5 mm thick on undersides of coarse fragments; moderately alkaline (pH 8.0); abrupt wavy boundary, (4 to 6 inches thick)

R -- 17 inches: dark gray (N 4/) hard limestone bedrock slightly stained and weathers to reddish brown (5YR/ 5/4).

TYPICAL PEDON LOCATION: Custer County, about three quarters of a mile southeast of Leslie Idaho. 200 feet east and 300 south of the northwest corner of section. 14, T.6N, R.25E.; 43 degrees, 51 minutes, 22 seconds north latitude, 113 degrees, 27 minutes, 19 seconds west longitude.

RANGE IN CHARACTERISTICS:

Average annual soil temperature - 44 to 47 degrees F
Depth to calcic horizon - 2 to 7 inches Calcium carbonate equivalent - 40 to 60 percent
Reaction - mildly to strongly alkaline

Particle size control section
clay - 10 to 20 percent
Rock fragments - 40 to 85 percent

A horizon
Value - 5 through 7 dry and 3 or 4 moist
Chroma - 3 or 4 moist

Bkq2 horizon
Hue - 10YR or 2.5 Y
Chroma -3 or 4 moist
Texture -GR-SIL, GRV-SIL, GRV-L, STV-L, GRX-L, SL
Rock fragments -35 to 60 percent

COMPETING SERIES: There are no competing series. The Highams series in a closely related family lack calcic horizons.

GEOGRAPHIC SETTING: Ike soils occur on limestone foothills and mountains. Slopes are 5 to 75 percent. Elevations range from 5000 to 7500 feet. The precipitation ranges from 8 to 11 inches, most of which is in the form of snow. The average annual air temperature is 43 to 46 degrees F. The frost free season is about 60 to 75 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Jimbee (T), Nitchly (T), Ramius (T), Skibo (Td), Simeroi (Td), and Zeale (t) soils. The Jimbee soils occur on north slopes are cryic and have a mollic epipedon. Ramius, Simeroi and Nitchly soils are on mountain sideslopes and are deep. Skibo and Zeale soils are on mountain sideslopes and have a cryic temperature regime, a mollic epipedon and are deep.

DRAINAGE AND PERMEABILITY--well drained; rapid runoff and moderate permeability.

USE AND VEGETATION: Used primarily for range and wildlife. Vegetation is mainly black sagebrush and bluebunch wheatgrass.

DISTRIBUTION AND EXTENT: Southeast central Idaho. These soils are moderately extensive.

SERIES PROPOSED: Custer County, Idaho 1991. The name is taken from a local stream in Butte County.

REMARKS: Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 3 inches (A horizon)
Calcic horizon - the zone from 3 to 17 inches (Bkq1 and Bkq2 horizons)
Particle size control section - the zone from 10 to 17 inches (part of the Bkq1 and the Bkq2 horizons)

INEL SERIES

The Inel series consists of shallow, well-drained soils that formed in residuum and colluvium over limestone bedrock. They are on ridgetops and sideslopes of mountains and foothills. Slopes are 10 to 45 percent. Permeability is moderate. Average annual precipitation is about 7 inches and the average annual air temperature is about 43 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, carbonatic, frigid Lithic Calciorthids

TYPICAL PEDON: Inel stony silt loam - on a 20 percent west facing slope at an elevation of 5,850 feet in rangeland. The vegetation is shadscale and Indian ricegrass. When described on July 28, 1986, the soil was slightly moist throughout. (Color is for dry soil unless otherwise noted.)

A--O to 3 inches; pale brown (10YR 6/3) stony silt loam, dark brown (10YR 3/3) moist; weak thin platy structure; slightly hard, very friable nonsticky and slightly plastic; many very fine and fine roots; common very fine tubular pores; 20 percent gravel, 5 percent cobbles and 2 percent stones; strongly effervescent (25 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear smooth boundary.

Bw--3 to 9 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine, fine and few medium roots; common very fine tubular pores; 10 percent gravel, 5 percent cobbles and 3 percent stones; strongly effervescent (35 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear smooth boundary.

Bkql--9 to 13 inches; very pale brown (10YR 7/3) very gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; 15 percent gravel, 15 percent cobbles and 5 percent stones; matrix violently effervescent (40 percent calcium carbonate equivalent); common lime and silica coats 1 to 2 mm thick on undersides of rock fragments; moderately alkaline (pH 8.3); gradual wavy boundary.

Bkq2--13 to 19 inches; very pale brown (10YR 7/3) very cobbly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; 15 percent gravel, 20 percent cobbles, and 5 percent stones; violently effervescent (40 percent calcium carbonate equivalent); common lime and silica coats 1 to 2 mm thick on undersides of rock fragments; moderately alkaline (pH 8.2); gradual wavy boundary.

R--19 inches; hard limestone.

TYPICAL SOIL IS LOCATED IN: Butte County, Idaho; about two miles southwest of tailing ponds on North Fork Creek; 750 feet east and 700 feet south of the northwest corner of section 14, T. 7 N., R. 26 E.; 43 degrees, 56 minutes, 32 seconds north latitude, 113 degrees, 5 minutes, 25 seconds west longitude.

RANGE IN CHARACTERISTICS:

Average annual soil temperature - 44 to 47 degrees F.
Calcium carbonate equivalent - 40 to 50 percent (in control section)

Reaction - mildly to strongly alkaline
Depth to bedrock - 10 to 20 inches
Particle-size control section - 10 to 18 percent clay; 35 to 50 percent rock fragments

A horizon - ??
Bw horizon - Stony loam or stony silt loam; rock fragments 25 to 40 percent
Bkq horizon - value 7 or 8 dry and 4 through 6 moist; chroma 2 or 3; texture - gravelly loam, very cobbly loam, or very gravelly sandy loam; 35 to 60 percent rock fragments

COMPETING SERIES: There are no competing series. The Yaki soils is closely related. It is mesic.

GEOGRAPHIC SETTING: Inel soils occur on limestone ridgetops and sideslopes of foothills and mountains. They formed in residuum and colluvium. Slopes are 10 to 45 percent. Elevations range from 4,500 to 6,500 feet. The precipitation ranges from 7 to 8 inches, most of which is in the form of snow. The average annual air temperature is 42 to 45 degrees F. The frost free season is 70 to 90 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Ike, Simeroi, Slide, and McCaleb soils. Ike soils occur on north slopes and higher elevations and contain more than 1 percent organic matter on the surface. Simeroi, Slide, and McCaleb soils are very deep soils on fan terraces. Slide soils are also on foothills.

DRAINAGE AND PERMEABILITY: Well drained; rapid runoff; moderate permeability.

USE AND VEGETATION: Used primarily for rangeland and wildlife habitat. vegetation is mainly shadscale and Indian ricegrass.

DISTRIBUTION AND EXTENT: South-central Idaho. These soils are not extensive.

SERIES PROPOSED: Butte County, Idaho, 1992.

REMARKS: Diagnostic horizons and features recognized in this pedon are:
ochric epipedon [from 0 to 3 inches (A horizon)], calcic horizon [from 9 to 19 inches (Bkql and Bkq2 horizons)]

Particle-size control section - the zone from 10 to 19 inches (part of the Bkql and the Bkq2 horizons)

JIMBEE SERIES

The Jimbee series consists of shallow, well-drained soils formed in slope alluvium from limestone on ridges and mountains. Permeability is moderate. Slopes are 10 to 75 percent. The average annual precipitation is about 12 inches and the average annual temperature is about 37 degrees F.

TAXONOMIC CLASS: Loamy-skeletal, carbonatic Lithic Cryoborolls.

TYPICAL PEDON: Jimbee gravelly loam--on a 30 percent convex, north-facing slope in rangeland at 6,400 feet elevation. (Colors are for dry soil unless otherwise noted. When described on August 18, 1986, the soil was slightly moist throughout.)

A1--O to 3 inches; grayish brown (IOYR 5/2) gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine interstitial pores; 20 percent gravel, 5 percent cobbles; strongly effervescent (45 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear smooth boundary.

A2--3 to 6 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine and few medium roots; common very fine tubular pores; 20 percent gravel, 5 percent cobbles; strongly effervescent (50 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear wavy boundary.

Bkql--6 to 9 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly plastic; many very fine, common fine and few medium roots; common very fine tubular pores; 3O percent gravel, 5 percent cobbles; lime and silica coatings and pendants on undersides of coarse fragments; violently effervescent (55 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); clear wavy boundary.

Bkq2-- 9 to 16 inches; very pale brown (10YR 7/3) very gravelly loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; slightly hard, friable; common very fine and few fine roots; common very fine tubular pores; 35 percent gravel, 5 percent cobbles; lime and silica coatings and pendants on undersides and sides of coarse fragments; violently effervescent (55 percent calcium carbonate equivalent); moderately alkaline (pH 8.4).

R--16 inches; hard limestone bedrock.

TYPICAL SOIL IS LOCATED IN: Custer County, Idaho,; about 4 miles south/southwest of Mackay, about 2,000 feet and 100 feet north of the southwest corner of section 18, T. 6 N., R. 24 E.

RANGE IN CHARACTERISTICS:

Average annual soil temperature - 35 to 39 degrees F.
Average summer soil temperature - 45 to 48 degrees F.
Mollic epipedon thickness - 7 to 10 inches.
Control section, percent clay - 15 to 22.
Rock fragments - 35 to 50 percent.
Calcium carbonate equivalent - 45 to 55 percent.

Depth to hard bedrock - 12 to 20 inches.

A horizon:
Value - 3 through 5 dry. Chroma 2 or 3 dry and moist.

Bkq horizon:
Value - 5 through 7 dry and 3 through 7 moist
Chroma - 3 or 4 dry and moist
Texture - gravelly loam, gravelly sandy loam, very stony loam
Reaction - moderately or strongly alkaline.

GEOGRAPHIC SETTING: Jimbee soils are on ridges and mountains. These soils formed in slope alluvium from limestone. Slopes 10 to 75 percent. Elevations are 6,300 to 8,000 feet. The climate is cold and moist in winter and spring and cool and dry in summer. Average annual precipitation is 11 to 13"; average annual temperature is 34 to 38 degrees F. The frost-free period is 10 to 50 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Highams, Simeroi, and Sparmo soils. Highams soils are on mountains, lack mollic epipedons and have frigid soil temperature regimes. Simeroi and Sparmo soils are on fan terraces and are very deep.

DRAINAGE AND PERMEABILITY: Well-drained. Medium and rapid runoff. Moderate permeability.

USE AND VEGETATION: Rangeland. Vegetation is mainly low sagebrush and bluebunch wheatgrass.

DISTRIBUTION AND EXTENT: East-central Idaho. These soils are not extensive.

REMARKS: Diagnostic horizons and features recognized in this pedon are: mollic epipedon, calcic horizon.

LESBUT SERIES

CLASSIFICATION
Taxonomic Class: Sandy-skeletal, mixed, frigid Calciorthidic Haploxerolls

SETTING
Depth Class: very deep (>60")
Drainage class: somewhat excessive
Positions on the landscape: fan terraces
Parent Material:
kind - alluvium
source - mixed alluvium
Slopes: 1 to 4 percent

TYPICAL PEDON DESCRIPTION (DJ88-36)

A--0 to 3 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; 15 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

Bw1--3 to 7 inches: brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine, few medium roots; common very fine tubular pores; 15 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

Bw2--7 to 13 inches: brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; common medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular; 15 percent gravel and 2 percent cobbles; mildly alkaline (pH 7.7); clear wavy boundary.

Bw3--13 to 19 inches: brown (10YR 5/3) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and non plastic; common very fine, fine and medium roots; common very fine tubular; 45 percent gravel and 5 percent cobbles; mildly alkaline (pH 7.6); gradual wavy boundary.

2Bq--19 to 41 inches: grayish brown (10YR 5/2) extremely gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, loose, nonsticky and nonplastic; many very fine and common fine and medium roots; 55 percent gravel and 10 percent cobbles; 1-2 mm thick silica pendants under gravel; slight effervescence; mildly alkaline (pH 7.5); clear wavy boundary.

2Bqk--41 to 50 inches: grayish brown (10YR 5/2) extremely gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; few very fine roots; 70 percent gravel and 10 percent cobbles; 1-2 mm thick silica pendants under gravel; slight effervescence (>1 percent calcium carbonate equivalent); mildly alkaline (pH 7.6).

2Bkq--50 to 60 inches: grayish brown (10YR 5/2) extremely gravelly loamy sand, very dark grayish brown (10YR 3/2) moist; single grained; loose, nonsticky and nonplastic; very few very fine roots; 65 percent gravel and 10 percent cobbles; 1-2 mm thick silica pendants under gravel; slight effervescence (5 percent calcium carbonate equivalent); mildly alkaline (pH 7.7).

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 1,200 feet north and 2,500 feet east of the southwest corner of Section 16, T. 5 N., R. 26 E.

RANGE IN CHARACTERISTICS

Profile:

Average annual soil temperature - 40 to 46 degrees F.
Mollic epipedon thickness - 10 to 17 inches
Reaction of profile - neutral or mild alkalinity

Particle-size control section:

clay content - 8 to 15 percent
coarse fragments - 35 to 75 percent

A horizon:

value - 4 or 5 dry; 2 to 4 moist
chroma - 2 or 3 dry or moist

Bw horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 3 or 4 dry or moist
texture - gravelly loam, very gravelly loam, extremely gravelly loam or sandy loam
reaction - mildly or moderately alkaline

2Bkq horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - extremely gravelly sand, extremely loamy sand, extremely gravelly loamy coarse sand, extremely cobbly coarse sand

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-4	GR-L	12-22	25-35	5-15	1.10-1.20	0.6-2.0	0.11-0.15	6.6-7.3	-	-	9-15	-
4-18	GR-L,GRV-L, GRX-SL	8-18	20-30	NP-10	1.15-1.30	0.6-2.0	0.09-0.15	6.6-7.8	-	-	4-12	0-5
18-60	SR-GRX-LS-C BX-COS	0-5	-	NP	1.20-1.40	20-20.0	0.01-0.04	7.4-7.8	-	-	1.4	1-5

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

LIDY SERIES

The Lidy series consists of deep, well drained soils that formed in alluvium high in limestone gravel. These soils are in alluvial fans and have slopes of 0 to 4 percent. The mean annual precipitation is about 9 inches.

Soil Family: Coarse-loamy, mixed, frigid Xerollic Calciorthids.

Typical Pedon: Lidy sandy loam, rangeland. (Colors are for dry soil unless otherwise noted.)

Al--O to 5 inches, pale brown (10YR 6/3) sandy loam, dark grayish brown (10YR 4/2) moist; weak thin platy that parts to weak fine granular structure; slightly hard, very friable; many very fine, fine, and medium roots; many very fine and fine interstitial pores; few pebbles; moderately calcareous; moderately alkaline (pH 8.3); clear smooth boundary. (5 to 10 inches thick)

Clca-5 to 21 inches, light gray (10YR 7/2) sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very friable; many very fine, fine, and medium roots; common very fine and fine tubular pores; 10 percent gravel; strongly calcareous; moderately alkaline (pH 8.4); clear wavy boundary. (6 to 19 inches thick)

C2ca--21 to 29 inches, light gray (10YR 7/2) sandy loam, grayish brown I10YR 5/2) moist; massive; slightly hard, very friable; few very fine and fine roots; fev very fine and fine tubular pores; strongly calcareous; moderately alkaline (pH 8.4); abrupt wavy boundary. (6 to 12 inches thick)

IIIC3--29 to 44 inches, sand and gravel.

Type Location: Jefferson County, Idaho; 1.5 miles north and 3.3 miles west of Monteview; 900 feet east and 75 feet north of the center of sec. 30, T.8N., R.33E.

Range in Characteristics: The mean annual soil temperature ranges from 41 degrees to 45F degrees, and the mean summer soil temperature at a depth of 20 inches ranges from 59 degrees to 66F degrees. Depth to sand and gravel is 23 to 34 inches. Gravel content in the upper part of the profile ranges from 2 to 35 percent.

The A horizon or the upper 15 inches when mixed has an organic matter content of 1.00 to 1.5 percent. The A horizon has value of 5 through 7 dry, 3 or 4 moist and chroma of 2 or 3.

The Cca horizon has value of 6 through 8 dry and 5 through 7 moist, and chroma of 1 through 3. It is weakly cemented in some pedons. The C horizon ranges from moderately or strongly alkaline.

Competing Series: These are the Holoine, Malm, Matheson, McCaleb and Medicine Lodge series. Holsine
soils have thick very fine sandy loam or silt loam layers below depths of 9 to 16 inches. Malm soils are
20 to 40 inches deep over basalt. Matheson soils have a B horizon. McCaleb soils have more than 40 percent carbonates in the control section. Medicine Lodge soils have more than 18 percent clay in the upper part of the control section.

Geographic Setting: The Lidy soils are in alluvial fans at elevations of 4,800 to 5,300 feet. Slopes are 0 to 4 percent. The soils formed in sandy alluvial deposits with a high percentge of limestone

gravel. The semiarid climate has a frost-free period of 80 to 115 days and a mean annual precipitation of 8 to 11 inches. Maximum precipitation falls in May and June.

Associated Soils: These are the Bereniceton, Matheson, Montlid and Terreton soils. Bereniceton soils have more than 18 percent clay in the control section. Montlid soils are moderately well drained and have 18 to 35 percent clay in the control section. Terreton soils average 35 to 50 percent clay in the control section.

Drainage and Permeability: Well drained; very slow to slow runoff; moderately rapid permeability.

Use and Vegetation: Used for production of irrigated hay, small grains, potatoes and pasture and for rangeland. The natural vegetation is mainly big sagebrush, squirreltail, rabbitbrush and prickly pear.

Distribution and Extent: Southeastern Idaho. The series is of moderate extent.

Series Established: Jefferson County, Idaho, 1975.

National Cooperative Soil Survey
U. S. A.

MALM SERIES

The Malm series consists of moderately deep, well drained soils that formed mainly in eolian deposits. Malm soils are on basalt plains and have slopes of 0 to 20 percent. The soils formed dominantly in moderately coarse-textured eolian deposits, but the parent material includes alluvium and residuum weathered from the underlying basalt. The parent material is dominantly from basaltic, quartzitic and sedimentary rock sources. The principal native plants are Wyoming big sagebrush, needle-and-thread grass, streambank wheatgrass, Indian ricegrass, bitterbrush and bluebunch wheatgrass.

CLASSIFICATION

Taxonomic Class: Coarse-loamy, mixed, frigid Xerollic Calciorthids

SETTING

Depth Class: moderately deep (20 to 40 inches to basalt bedrock)
Drainage class: well drained
Permeability: moderately rapid
Positions on the landscape: basalt uplands
Slope range: 0 to 20 percent
Parent Material:
- kind - eolian
- source - Big Lost River alluvium

Elevation: 5,000 to 5,500
Climatic data (average annual):
- precipitation - 8 to 12 inches
- air temperature - 40 to 46 degrees F
- frost-free period - 70 to 100 days

TYPICAL PEDON DESCRIPTION (DJ79-38)

A--0 to 5 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; few very fine vesicular pores; 5 percent gravel basalt rock fragments; mildly alkaline (pH 7.6); clear wavy boundary.

Bwk1--5 to 9 inches: pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; 2 percent gravel basalt rock fragments; slightly effervescent (10 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); clear wavy boundary.

Bwk2--9 to 15 inches: pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, fine and few medium roots; common very fine tubular pores; 5 percent basalt rock fragments; strongly effervescent (15 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); clear smooth boundary.

Bk1--15 to 32 inches: pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; massive; hard, friable, nonsticky and slightly plastic; common very fine and few fine, medium roots; few very fine tubular pores; few (2 percent) firm 3/4 inch nodules or cicada krotovinas; 5 percent

basalt cobbles and 10 percent basalt rock fragments; strongly effervescent (18 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); clear wavy boundary.

Bkq--32 to 38 inches: white (10YR 8/2) gravelly sandy loam, pale brown (10YR 6/3) moist; moderate fine subangular blocky structure; hard, friable, nonsticky and non plastic; few very fine, and fine roots; few very fine tubular pores; common (10 percent) firm 3/4 inch nodules, or cicada krotovinas; 15 percent basalt gravel and 5 percent cobble basalt rock fragments; violent effervescence (23 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); abrupt wavy boundary.

2R--38 inches; lime and silica coated fractured basalt bedrock.

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 2,500 feet north and 2,300 feet east of the southeast corner of Section 13, T. 3N., R. 27E.

RANGE IN CHARACTERISTICS
Profile: average annual soil temperature - 45 to 55 degrees F.

Particle-size control section:
- clay content - 7 to 18 percent
- sand content - greater than 15 percent
- depth to basalt bedrock 20 to 40 inches
- rock fragment content - 0 to 25 percent

A horizon:
- value - 5 or 6 dry; 3 or 4 moist
- chroma - 2 or 3 dry or moist
- texture - sandy loam, loam, gravelly loam or sandy loam, stony loam or sandy loam
- rock fragment content - 0 to 15 percent

Bwk horizons:
- value - 5 to 6 dry; 4 or 6 moist
- chroma - 2 or 3 dry or moist
- texture - loam, sandy loam or gravelly or stony loam, or sandy loam
- reaction - mildly or moderately alkaline
- rock fragment content - 0 to 20 percent

Bk horizons:
- value - 6 to 8 dry; 5 to 7 moist
- chroma - 2 or 3 dry or moist
- texture - loam, sandy loam or gravelly or stony loam, or sandy loam
- reaction - moderately or strongly alkaline
- rock fragment content - 0 to 30 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/ cm	me/ 100g	meg/ 100g	percent
0-3	FSL,SL	12-15	15-20	NP-5	1.5-1.6	2.0-6.0	0.13-0.15	7.4-9.0	0-2	-	12-18	0-5
0-3	LS	2-10	-	NP	1.5-1.6	2.0-6.0	0.06-0.08	7.4-9.0	0-2	-	5-14	-
0-3	L	12-18	20-30	NP-10	1.5-1.6	0.6-2.0	0.16-0.18	7.4-9.0	0-2	-	14-20	0-5
3-30	FSL,VFSL	12-15	15-20	NP-5	1.5-1.6	2.0-6.0	0.11-0.13	7.4-9.0	0-2	-	10-17	20-28
30-34	CB-FS,GR-FSL	10-15	15-20	NP-5	1.5-1.65	2.0-6.0	0.08-0.10	7.4-9.0	0-2	-	10-16	20-28

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

MATHESON SERIES

Matheson soils are in level to rolling basalt plains. The soils formed in moderately coarse textured eolian or alluvial deposits consisting mainly of quartzite, basaltic, and sedimentary rock materials. The alluvial deposits often have thin stratifications and exhibit discontinuities. The principal native plants are Wyoming big sagebrush, needle-and-thread grass, streambank wheatgrass, Indian ricegrass, bitterbrush, and lupine.

CLASSIFICATION Taxonomic Class: coarse-loamy, mixed, frigid Xerollic Calciorthids

SETTING
Depth Class: deep (40 to 60 inches to basalt bedrock)
Drainage class: well drained
Permeability: moderately rapid
Positions on the landscape: basalt uplands
Parent Material:
kind - eolian
source - Big Lost River alluvium
Slope range: 2 to 12 percent

TYPICAL PEDON DESCRIPTION (DJ79-37)

A--0 to 6 inches; pale brown (10YR 6/3) fine sandy loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; 5 percent gravel basalt rock fragments; slightly effervescence (7 percent calcium carbonate equivalent); mildly alkaline (pH 7.6); clear smooth boundary.

Bw1--6 to 12 inches: pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine and coarse roots; common very fine tubular pores; 4 percent gravel basalt rock fragments; slightly effervescent (10 percent calcium carbonate equivalent); moderate alkaline (pH 8.2); clear smooth boundary.

Bw2--12 to 19 inches: pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; common fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, and few fine, medium roots; few very fine tubular pores; 10 percent basalt rock fragments; strongly effervescent (12 percent calcium carbonate equivalent); moderate alkaline (pH 8.2); clear smooth boundary.

Bk1--19 to 35 inches: light gray (10YR 7/3) sandy loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; few very fine and few fine, medium roots; few very fine tubular pores; few (3 percent) firm 3/4 inch nodules or cicada krotovinas; 5 percent gravel basalt rock fragments; violent effervescence (24 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); gradual wavy boundary.

Bk2--35 to 45 inches: pale brown (10YR 6/3) gravelly sandy loam, brown (10YR 5/3) moist; single grained; loose, nonsticky and non plastic; few very fine and fine roots; few very fine tubular pores; few (3 percent) firm 3/4 inch nodules or cicada krotovinas; 20 percent basalt gravel and 10 percent cobble basalt rock fragments; strongly effervescent (18 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); abrupt irregular boundary (8 to 13 inches thick).

2R--45 inches; lime and silica coated fractured basalt bedrock.

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 2,400 feet north and 2,600 feet east of the southeast corner of Section 13, T. 3N., R. 27E.

RANGE IN CHARACTERISTICS

Profile: average annual soil temperature - 45 to 55 degrees F.

Particle-size control section:

clay content - 7 to 18 percent
depth to basalt bedrock - 20 to 40 inches
rock fragment content - 0 to 30 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - fine sandy loam, sandy loam, loam, stony sandy loam
rock fragment content - 0 to 5 percent

Bw horizons:

value - 5 or 6 dry; 4 to 6 moist
chroma - 2 or 3 dry or moist
texture - loam, sandy loam, fine sandy loam
reaction - mildly to moderately alkaline
rock fragment content - 0 to 15 percent

Bk horizons:

value - 6 to 8 dry; 5 to 7 moist
chroma - 2 or 3 dry or moist
texture - loam, sandy loam, fine sandy loam, cobbly sandy loam
reaction - moderately or strongly alkaline
rock fragment content - 0 to 30 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-6	SL,FSL	5-15	20-25	NP-5	1.2-1.4	2.0-6.0	0.13-0.15	7.4-8.4	-	-	5-10	0-5
0-6	LS	5-10	-	NP	1.2-1.4	6.0-20	0.06-0.08	7.4-8.4	-	-	5-10	0-5
0-6	L	10-20	20-30	NP-10	1.1-1.2	2.0-6.0	0.16-0.18	7.4-8.4	-	-	10-15	0-5
6-46	SL,VFSL, SL	5-15	20-25	NP-5	1.2-1.4	2.0-6.0	0.11-0.13	7.4-8.4	0-2	-	5-10	10-25

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

MCCAREY SERIES

CLASSIFICATION Taxonomic class: fine-loamy, mixed, frigid Calcic Argixerolls

SETTING
Depth class: moderately deep
Drainage class: well drained
Permeability: moderately slow
Positions on the landscape: lava plains
Parent Material: kind - alluvium from loess
source - loess
Slope range: 1 to 20 percent
Elevation: 4,700 to 5,600 feet
Climatic data (average annual):
precipitation - 12 to 15 inches
air temperature - 42 to 45 degrees F
frost-free period - 60 to 100 days

TYPICAL PEDON DESCRIPTION (DG79-5)

A1--0 to 5 inches; brown (10YR 5/3) silt loam, brown (10YR 3/3) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; 5 percent basalt gravel; slightly alkaline (pH 7.6); clear smooth boundary.

A2--5 to 12 inches; brown (10YR 5/3) silt loam, brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; 5 percent basalt gravel; slightly alkaline (pH 7.8); clear smooth boundary.

Bt--12 to 18 inches; brown (10YR 5/3) silty clay loam, brown (10YR 3/3) moist; weak fine prismatic, parting to moderate medium subangular blocky structure; hard, firm, slightly sticky and plastic; few faint clay films on faces of peds; common very fine and fine roots; common very fine tubular and irregular pores; 5 percent basalt gravel; slightly alkaline (pH 7.8); clear smooth boundary.

Bk1--18 to 28 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; common medium and coarse nodules or cicada krotovinas; strongly effervescent (20 percent calcium carbonate equivalent); 5 percent basalt gravel; moderately alkaline (pH 8.4); clear smooth boundary.

Bk2--28 to 33 inches; light gray (10YR 7/2) silt loam, brown (10YR 5/3) moist; massive; slightly hard, friable, sticky and slightly plastic; few very fine roots; common very fine tubular pores; violently effervescent (25 percent calcium carbonate equivalent); 5 percent basalt gravel; strongly alkaline (pH 8.6); abrupt wavy boundary.

2R--33 inches; fractured basalt. (4 to 20 inches between fractures)

TYPICAL PEDON LOCATION

Map unit in which located: McCarey-Beartrap complex, 1 to 6 percent slopes (407)
Bingham County, Idaho; about 11 miles southwest of Atomic City, approximately 700 feet south and 1,200 feet east of the northeast corner of sec. 8, T.1 S., R. 30 E.

RANGE IN CHARACTERISTICS

Profile
average annual soil temperature - 42 to 46 degrees F.
depth to secondary lime - 15 to 25 inches
depth to basalt bedrock 20 to 40 inches

Particle-size control section
clay content - 20 to 34 percent
rock fragment content - 0 to 10 percent

A horizon
chroma - 2 or 3 dry

Bt horizon
value - 5 or 6 dry and 3 or 4 moist
texture - silt loam, silty clay loam
rock fragment content - 0 to 10 percent
reaction - slightly or moderately alkaline

Bk horizons
value - 6 or 7 dry and 4 or 5 moist
chroma - 2 or 3 dry
Texture - silt loam or loam
reaction - moderately or strongly alkaline

MENAN SERIES

LOCATION MENAN ID

Tentative Series
Rev. DJ/PB 2/94

The Menan series consists of very deep, well drained soils that formed alluvium from loess. They are in concaved positions of basins on basalt plains. Slopes are 0 to 2 percent. Permeability is moderately slow. Average annual precipitation is about 10 inches and the average annual air temperature is about 44 degrees F.

TAXONOMIC CLASS: Fine-silty, mixed, frigid Xerollic Haplargids

TYPICAL PEDON: Menan silt loam, rangeland; on a 1 percent slope at 5,310 feet elevation. Vegetation is basin big sagebrush and basin wild ryegrass. When described on June 24, 1993, the soil was dry throughout. (Color is for dry soil unless otherwise noted.)

A1--0 to 3 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; few very fine tubular pores; 2 percent basalt gravel; slightly alkaline (pH 7.4); clear smooth boundary. (1 to 4 inches thick)

A2--3 to 7 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; few very fine tubular pores; 1 percent basalt gravel; slightly alkaline (pH 7.6); clear smooth boundary. (3 to 7 inches thick)

Bt1--7 to 13 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak moderate subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; few faint clay films on pedons; 1 percent basalt gravel; slightly alkaline (pH 7.7); clear smooth boundary. (0 to 6 inches thick)

Bt2--13 to 27 inches; pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate fine prismatic structure parting to strong fine subangular blocky; hard, friable, sticky and plastic; common very fine, fine and medium roots; common very fine and fine tubular and irregular pores; common faint clay films on faces of peds; 1 percent basalt gravel; slightly alkaline (pH 7.8); gradual wavy boundary. (9 to 14 inches thick)

Bt3--27 to 33 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; common very fine and fine tubular and irregular pores; few faint clay films on pedons; 1 percent basalt gravel; moderately alkaline (pH 7.9); clear smooth boundary. (20 to 35 inches thick)

Btk--33 to 38 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and few medium roots; common very fine tubular pores; common (5 percent) 3/4 inch nodules, or cicada krotovinas; slightly effervescent (12 percent calcium carbonate equivalent); 1 percent basalt gravel; moderately alkaline (pH 8.0); clear wavy boundary. (0 to 12

inches thick)

Bk1--38 to 51 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and few medium roots; common very fine tubular pores; many (15 percent) 3/4 inch nodules, or cicada krotovinas; 1 percent basalt gravel; strongly effervescent (18 percent calcium carbonate equivalent); 1 percent basalt gravel; moderately alkaline (pH 8.0); gradual smooth boundary. (13 to 30 inches thick)

Bk2--51 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; strongly effervescent (22 percent calcium carbonate equivalent); 1 percent basalt gravel; moderately alkaline (pH 8.0).

TYPE LOCATION: Bingham County, Idaho 2 1/2 miles northeast Little Butte; about 2,500 feet south and 2,400 feet east of the northwest corner of sec. 26, T.3N., R.33E.
Latitude - 43 degrees, 33 minutes, 44 seconds north.
Longitude - 112 degrees, 32 minutes, 04 seconds west.

RANGE IN CHARACTERISTICS

Profile
Average annual soil temperature - 45 to 47 degrees F.
Depth to argillic horizon - 4 to 10 inches
Depth to Calcic horizon - 24 to 40 inches

Particle-size control section
Clay content - 29 to 34 percent
Rock fragment content - 0 to 5 percent

A horizon
Value - 5 or 6 dry and 3 or 4 moist
Chroma - 1 through 3 dry or moist
Texture - SIL, L or SIL-CL
Rock fragment content - 0 to 5 percent
Reaction - slightly to moderately alkaline

Bt horizons
Value - 5 or 6 dry and 3 or 4 moist
Chroma - 1 through 3 dry or moist
Rock fragment content - 0 to 5 percent
Reaction - slightly or moderately alkaline

Btk horizon
Value - 6 or 7 dry and 3 or 4 moist
Chroma - 1 through 4 dry or moist
Texture - SIL or SICL
Rock fragment content - 0 to 5 percent
Reaction - moderately or strongly alkaline

Bk horizons
Hue - 10YR or 2.5YR
Value - 6 through 8 dry and 4 or 5 moist
Chroma - 1 through 4 dry or moist
Texture - L, SIL, CL or SICL
Rock fragment content - 0 to 5 percent
Reaction - moderately or strongly alkaline

COMPETING SERIES: Their are no other series listed in this family. A similar soil is the Power series. Power soils have a mesic temperature requime and have 18 to 20 percent total clay in the particle-size control section.

GEOGRAPHIC SETTING: Menan soils formed in alluvium from loess on basalt plains. Slopes are 0 to 2 percent. Elevation ranges from 4,500 to 5,500 feet. The average annual precipitation ranges from 9 to 11 inches, part of which is snow. Additional moisture comes from early spring runoff. The average annual air temperature is about 43 to 45 degrees F. The frost free season is 70 to 110 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Nargon (T), Atom (T), Coffee (T), Deuce (T) and Techicknot (T) soils. The Atom, Coffee and Deuce soils lack argillic horizons and are in higher positions on the landscape than Menan soils. Techicknot soils have a mollic epipedon and are on a similar positions as Menan soils.

DRAINAGE AND PERMEABILITY: Well drained; very slow to slow runoff and moderately slow permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly basin big sagebrush and basin wildrye grass.

DISTRIBUTION AND EXTENT: Southeastern Idaho. The soils of this series are not extensive.

SERIES PROPOSED: Bingham County, Idaho 1993.

REMARKS: The name is taken from Menan Butte, located in Jefferson County. (Description DJ93-12)

Diagonistic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 7 inches (the A1 and A2 horizons).

Argillic horizon - the zone from 7 to 38 inches (the Bt1, Bt2, Bt3 and Btk horizons).

Particle-size control section - the zone 7 to 27 inches (the upper 20 inches of the argillic horizon, Bt1 and Bt2 horizons).

Calcic horizon - the zone from 38 to 60 inches (the Bk1 and Bk2 horizons).

National Cooperative Soil Survey
U.S.A.

MOGG SERIES

The Mogg series consists of shallow and well-drained soils formed in residuum and slope alluvium from extrusive igneous rock. Mogg soils are on foothills and mountains, and slopes range from 20 to 40 percent. Vegetation is mainly Wyoming big sagebrush, bluebunch wheatgrass, Salmon wildrye, phlox, and prickly pear cactus.

CLASSIFICATION Taxonomic class: loamy-skeletal, mixed, frigid lithic Xerollic Calciorthids

SETTING
Depth class: shallow to bedrock (12 to 20 inches)
Drainage class: well drained
Permeability: moderate
Positions on the landform: ridgetops and sideslopes of foothills and mountains
Slope range: 20 to 40 percent
Parent Material:
kind - colluvium and residuum
source - rhyolite and quartzite:

TYPICAL PEDON DESCRIPTION (DJ92-49)

A--0 to 2 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak coarse platy structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; 30 percent gravel, 10 percent rhyolite flags and 2 percent stones; mildly alkaline (pH 7.5); clear smooth boundary.

Bw -- 2 to 6 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine, fine and few medium roots; common very fine tubular pores; 30 percent gravel, 15 percent rhyolite flags and 2 percent stones; mildly alkaline (pH 7.6); clear wavy boundary.

Bk1 -- 6 to 9 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slight plastic; many very fine, fine and common medium roots; common very fine tubular pores; moderately effervescent (15 percent calcium carbonate equivalent); common lime coats 1 to 2 mm thick on undersides of rock fragments; 25 percent gravel, 25 percent rhyolite flags and 3 percent stones; mildly alkaline (pH 7.7); clear wavy boundary.

Bk2 -- 9 to 13 inches; pale brown (10YR 6/3) extremely gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; strongly effervescent (25 percent calcium carbonate equivalent); common lime coats 1 to 2 mm thick on undersides of rock fragments; 30 percent gravel, 25 percent rhyolite flags and 6 percent stones; mildly alkaline (pH 7.8); abrupt wavy boundary.

R -- 13 inches; rhyolite slightly fractured bedrock

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately five and one half miles southwest of Richard Butte, 1,100 feet south and 1,600 feet east of the northwest corner of Section 34, T. 7N., R. 30E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 40 to 45 degrees F
reaction - mildly to moderately alkaline

Particle size control section:

clay - 15 to 20 percent
rock fragments - 35 to 65 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist

Bw horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 3 or 4 dry or moist
rock fragments - 35 to 50 percent

Bk horizons:

value - 5 to 8 dry; 4 to 6 moist
chroma - 3 or 4 dry or moist
texture - very gravelly loam and extremely gravelly loam
rock fragments - 35 to 70 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-2	GRV-L	15-25	25-30	5-10	1.5-1.6	0.6-2.0	0.06-0.09	7.4-8.4	-	-	-	-
2-14	GRVL-L,GRX-L	15-25	25-30	5-10	1.55-1.65	0.6-2.0	0.04-0.07	7.4-8.4	0-4	-	-	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

MODKIN SERIES

The Modkin series consists of moderately deep, well drained soil, that formed in eolian deposits. 1"hese soils are on basalt plains and have slopes of 0 to 30 percent. The mean annual precipitation is about 9 inches.

Soil Family: Coarse-loamy, mixed, frigid Xerollic Camborthids.

Typical Pedon: Modkin sandy loam, rangeland. (Colors are for dry soil unleas otherwise noted.)

All-0 to 2 incheb, brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak thin platy that parts to weak fine granular structure; soft, very friable; many very fine, fine and medium roots; many very fine and fine interstitial pores; about 25 percent of dark ba.salt particles; neutral (pH 7.2); clear wavy boundary. (1 to 6 inches thick)

A12--2 to 6 inches, brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; weak thick platy that parts to weak fine and medium subangular blocky structure; alightly hard, friable; many very fine, fine and medium roots; common very fine and fine tubular pores; about 25 percent dark basalt particles; mildly alkaline (pB 7.6); clear wavy boundary. (O to 6 inches thick)

B21--6 to 20 inches, brown (10Y.R 5/3) sandy loam, dark brown (10YR 4/3) moist; moderate medium prismatic
that parts to weak fine and medium subangular blocky structure; hard, friable; few very fine, fine and medium roots; many very fine and fine tubular pores; about 25 percent dark basalt particles; moderately
alkaline (pH 8.0); clear wavy boundary. (6 to 24 inches thick)

B22-20 to 28 inches, light brownish gray (10YR 6/2) sandy loam, dark grayish bro%in (10YR 4/2) moist; weak
medium prismatic that parts to weak fide and medium subangular blocky structure; bard, friable; few very fine, fine and medium roots; many very fine and fine tubular pores; moderately alkaline (pH 8.0); clear wavy boundary. (O to 10 inches thick)

Cca-28 to 32 inches, white (10YR 8/2) sandy loam, light brownish gray (10YR 6/2) moist; massive; hard. friable; strongly calcareous; few very fine &Dd fine roots; 10 percent basalt gravel; moderately alkaline (pH 8.0); abrupt wavy boundary. (4 to 15 inches thick)

IIR--32 to 35 inches, basalt bedrock with lime fillig all cracks and pores.

Type Location: Jefferson County, Idaho; about 6 miles south and 6 miles east of Barner; about 200 feet north-northwest of the SE corner of sec. 14, T.6N., R.37E.

Range in Characteristics: The mean annual soil temperature ranges from 41 degrees to 45F degrees, and the mean summer soil temperature1 at a depth of 20 inches is about 66F degrees. This soil is usually moist except for 45 or more consecutive days in late summer. Depth to bedrock is 20 to 40 inches.

The A horizon has value of 5 or 6 dry and chroma of 2 or 3. The dark color in this horizon is due partially to dark basaltic sand grains.

The B horizon has value of 5 or 6 dry, 3 or 4 moist, and chroma of 2 or 3. This horizon is sandy loam or fine sandy loam and has weak or moderate fine and medium angular or subangular blocky structure.

The Cca horizon has value of 5 through 8 dry, 4 through 7 moist, and chroma of 2 or 3. It in sandy loam or_fine sandy loam. Some pedons have weak to strong subangular blocky or moderate to strong platy @cture. In some areas the Cca horizon contains fev to common cicada nodules.

Competing Series: These are the Granyon, Mathan, and Ucopia series. Granyon soils have a paralithic contact at depths of less than 40 inches and hard bedrock at depths below 40 inches. Mathon soils are deeper than 40 inches. Ucopin soils do not have a paralithic contact or hard bedrock above depth of 40 inches.

Geographic Setting: The Modkin soils are on basalt plains at elevations of about 4,900 feet. Slopes range from 0 to 30 percent. The soils formed in sandy eolian deposits. The semiarid climate has a frost-free period of 80 to 115 days and a mean annual precipitation of 8 to 11 inches. Maximum precipitation falls in June.

Associated Soils: These are the Bondranch and Grassy Butte soils and the competing Mathon soils. Bondranch soils are less than 20 inches deep over bedrock. Grassy Butte soils have a sandy control section.

Drainage and Permeability: Well drained; slow to rapid runoff; moderately rapid permeability.

MOORETOWN SERIES

The Mooretown series consists of very deep, somewhat poorly drained soils that formed in alluvium from mixed sources. Mooretown soils are on flood plains and stream terraces. The soil formed in mixed alluvium. Drained phases are well drained. Slow runoff. Rare or occasional flooding for brief periods during Spring months. The native vegetation in undrained areas is willows, woods rose, sedges and mountain brome.

CLASSIFICATION Taxonomic Class: coarse-loamy, mixed, frigid Cumulic Haploxerolls

SETTING
Depth Class: very deep (60 inches or more)
Drainage class: somewhat poorly drained
Permeability: moderate
Positions on the landscape: river terrace
Slope range: 0 to 4 percent
Parent Material:
kind - alluvium
source - mixed sources

TYPICAL PEDON DESCRIPTION

A--0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; common very fine tubular pores; very slight effervescence (1 percent calcium carbonate equivalent); 3 percent gravel; mildly alkaline (pH 7.6); clear smooth boundary.

Bk1--3 to 12 inches: grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; common fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine, very fine and few medium roots; common very fine tubular pores; 1 percent gravel; slight effervescence (4 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); abrupt smooth boundary.

2Bk1--12 to 24 inches: grayish brown (10YR 5/2) loamy sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable: nonsticky and nonplastic; many fine, very fine and few medium roots; 4 percent gravel; slight effervescence (1 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear wavy boundary.

3Bk1--24 to 39 inches: grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; few faint dark brown (10YR 4.4) mottles; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine and medium roots; common very fine tubular pores; 2 percent gravel; slight effervescence; moderately alkaline (pH 8.4); clear wavy boundary.

3C1--39 to 48 inches: grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; few faint dark brown (10YR 4.4) mottles; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine tubular pores; 2 percent gravel; mildly alkaline (pH 7.8); abrupt wavy boundary.

4C1—48 to 60 inches: grayish brown (10YR 5/2) extremely gravelly loamy sand, dark brown (10YR 2/2) moist; few faint dark brown (10YR 4.4) mottles; single grained; loose, nonsticky and nonplastic; few very fine and fine roots; 10 percent cobbles and 50 percent gravel; mildly alkaline (pH 7.6).

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 1,000 feet north and 900 feet east of the southwest corner of Section 11, T. 4N., R. 26E.

RANGE IN CHARACTERISTICS

Profile: average annual soil temperature - 35 to 45 degrees F

Particle-size control section:

clay content - 8 to 16 percent
coarse fragments- 0 to 10 percent

A horizon:

Hue - 2.5 Y or 10YR
value - 4 or 5 dry; 2 or 3 moist
chroma - 2 or 3 dry or moist
reaction - mildly or moderately alkaline

Bk horizon:

Hue 2.5 Y or 10YR
value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - loam, sandy loam or loamy sand,
reaction - mildly or moderately alkaline

C horizon:

value - 4 or 5 dry; 2 or 3 moist
chroma - 2 or 3 dry or moist
texture - sandy loam, loamy sand, gravelly sand loam, very gravelly fine sand or extremely gravelly loamy sand

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-7	L	12-20	20-30	5-10	1.10-1.20	0.6-2.0	0.15-0.18	6.6-7.8	-	-	11-24	0-10
7-46	L,FSL	10-18	20-30	5-10	1.15-1.30	0.6-2.0	0.13-0.16	7.4-8.4	0-2	-	8-22	0-15
46-57	LS	0-5	-	NP	1.20-1.40	6.0-20	0.05-0.08	7.4-7.8	-	-	0-8	0-5
57-60	SR-FSL-GRX-LS	5-15	10-20	NP-5	1.20-1.40	2.0-6.0	0.12-0.15	7.4-7.8	-	-	7-15	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

NARGON SERIES

LOCATION NARGON ID

Tentative Series
Rev. DJ/PB
2/94

The Nargon series consists of moderately deep, well drained soils that formed in alluvium from loess overlying basalt. Slopes are 2 to 30 percent. Permeability is moderate. Average annual precipitation is about 10 inches and the average annual air temperature is about 44 degrees F.

TAXONOMIC CLASS: Coarse-loamy, mixed, frigid Xerollic Calciorthids

TYPICAL PEDON: Nargon stony silt loam; rangeland; on a 5 percent northwest facing slopes at 5,220 feet elevation with Wyoming big sagebrush and bluebunch wheatgrass. When described on July 18, 1979, the soil was dry throughout. (Color is for dry soil unless otherwise noted.)

A--0 to 2 inches; light brownish gray (10YR 6/2) very stony silt loam, dark brown (10YR 3/3) moist; weak thin platy structure; slightly hard, very friable, sticky and slightly plastic; few very fine roots; common very fine vesicular pores; slightly effervescent (10 percent calcium carbonate equivalent); 2 percent basalt gravel, 2 percent basalt cobbles and 2 percent basalt stones; slightly alkaline (pH 7.6); clear smooth boundary. (1 to 10 inches thick)

Bk--2 to 7 inches; pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, few very fine and medium roots; common very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); 1 percent basalt gravel and 2 percent basalt cobbles; slightly alkaline (pH 7.8); clear smooth boundary. (1 to 7 inches thick)

Bkq1--7 to 11 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; common fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; few very fine tubular pores; common firm medium and coarse inch nodules, or cicada krotovinas; violently effervescent (25 percent calcium carbonate equivalent); 1 mm thick lime and some silica coats under rock fragments; 2 percent basalt gravel and 5 percent basalt cobbles; slightly alkaline (pH 7.8); clear wavy boundary.

Bkq2--11 to 21 inches; very pale brown (10YR 8/3) stony loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine tubular pores; few firm medium and coarse nodules, or cicada krotovinas; violently effervescent (25 percent calcium carbonate equivalent); 1 mm thick lime and some silica coats under rock fragments; 5 percent basalt gravel, 5 percent basalt cobbles and 10 percent basalt stones; moderately alkaline (pH 8.4); abrupt irregular boundary. (combined thicknes of the Bkq horizons is 10 to 25 inches thick)

R --21 inches; fractured basalt. (4 to 20 inches between fractures)

TYPE LOCATION: Butte County, Idaho; about 1/2 mile east of Tea Kettle Butte; approximately 2,400 feet south and 2,500 feet east of the northwest corner of sec. 18, T.2N., R.28E. Latitude - 43 degrees, 30 minutes, 04 seconds north.

Longitude - 113 degrees, 10 minutes, 00 seconds west.

RANGE IN CHARACTERISTICS

Profile
Depth to calcic - 1 - 10 inches
Average annual soil temperature - 44 to 46 degrees F.

Particle-size control section
Total clay content - 18 to 35 percent
Carbonate free clay - 10 to 18 percent
0.5 - 20 mm fraction - 15 to 30 percent
Rock fragment content - ave 5 to 20 percent

A horizon
Value - 5 or 6 dry and 3 or 4 moist
Chroma - 2 or 3 dry
Rock fragment content - 0 to 15 percent
Reaction - slightly or moderately alkaline

Bk horizon
Chroma - 2 or 3 dry or moist
Textures - SIL or CL
Rock fragment content - 0 to 10 percent
Reaction - slightly or moderately alkaline

Bkq horizons
Value - 6 through 8 dry and 5 through 7 moist
Chroma - 2 or 3 dry or moist
Textures - L, ST-L or GR-SIL
Rock fragment content - 5 to 30 percent

COMPETING SERIES: These are the Holsine (T), Lariat, Lidy, Malm, Matheson, Oxhead (T), Sparmo (T) and Voltage (T) series. Holsine soils have sandy loam control sections. Lariat soils do not have a calcic horizon. Lidy and Matheson soils are very deep and deep soils with moderate rapid permeability. Malm soils have less than 18 percent total clay and moderately rapid permeability. Oxhead soils are very deep in lacustrine sediments and have less than 18 percent total clay. Sparmo soils are over sand and gravel and have less than 18 percent total clay. Voltage soils are are very deep saline soils on lake bottoms and have less than 18 percent total clay.

GEOGRAPHIC SETTING: Nargon soils are on basalt plains at elevations of 4,500 to 5,800 feet. Slopes range from 2 to 30 percent. The soils formed in alluvium from loess overlying basalt. The average annual precipitation ranges from 9 to 11 inches. The average annual air temperature is about 43 to 45 degrees F. The frost free season is 70 to 110 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Atom (T), Coffee (T), Deuce (T), Menan, (T) and Techicknot (T) soils. Atom and Coffee soils are very deep and deep to basalt on lower positions than Argon. Deuce soils are shallow to basalt near rock outcrop. Menan and Techicknot soils are very deep, have argillic horizons and are in bottomland positions below Argon soils.

DRAINAGE AND PERMEABILITY: Well drained; slow to rapid runoff and moderate permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly Wyoming big sagebrush and bluebunch wheatgrass.

DISTRIBUTION AND EXTENT: Southeast Idaho. These soils are moderately extensive.

SERIES PROPOSED: Butte County, Idaho 1994. The name is coined from the Argonne West Lab facility located at the the Idaho National Engineering Laboratory.

REMARKS: Description (DJ79-23) Diagnostic horizons and features recognized in this soil are:
Ochric epipedon - the zone from 0 to 2 inches (the A horizon)
Calcic horizon - the zone from 2 to 21 inches (the Bk, Bkq1 and Bkq2 horizons)
Particle size control section - the zone from 10 to 21 inches (part of the Bkq1 and the Bkq2 horizon)

National Cooperative Soil Survey
U.S.A.

PANCHERI SERIES

Pancheri soils are in level to rolling, loess covered (basaltic and other) uplands and terraces. Extensive in the loess covered basalt plains of southeastern Idaho. The parent material is deep loess, which probably originated from glacial outwash plains. In few places, there are indications of water influence on the deposits. The principal native plants are big sagebrush, bluebunch wheatgrass, Sandberg bluegrass, rabbitbrush, cheatgrass, phlox, aster, and Indian ricegrass.

CLASSIFICATION Taxonomic Class: coarse-silty, mixed, frigid Xerollic Calciorthids

SETTING
Depth Class: very deep (>60" to bedrock)
Drainage class: well drained
Permeability: moderate
Positions on the landscape: basalt uplands
Slope range: 0 to 12 percent
Parent Material:
kind - eolian
source - wind-blown materials from glacial outwash plains

TYPICAL PEDON DESCRIPTION (DJ79-16)

A1--0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate very thin platy structure; slightly hard, very friable, slightly sticky and plastic; common very fine roots; many fine vesicular pores; slightly effervescent (5 percent calcium carbonate equivalent); mildly alkaline (pH 7.6); clear smooth boundary.

A2--3 to 10 inches: pale brown (10YR 6/3) silty clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common fine and very fine roots; common very fine tubular pores; strongly effervescent (7 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear smooth boundary.

Bk1--10 to 29 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; common very fine roots; common very fine interstitial pores; common firm 3/4 inch nodules, or cicada krotovinas; violent effervescence (25 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear wavy boundary.

Bk2--29 to 39 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and plastic; few very fine roots; common very fine tubular pores; violent effervescence (20 percent calcium carbonate equivalent); strongly alkaline (pH 9.0); clear smooth boundary.

C--39 to 60 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and plastic; few very fine roots; common very fine tubular pores; 5 percent small basalt rock fragments; violent effervescence (20 percent calcium carbonate equivalent); strongly alkaline (pH 9.0).

TYPICAL PEDON LOCATION: Bingham County, Idaho; approximately 2,400 feet north and 700 feet east of the southwest corner of Section 16, T. 2N., R. 32E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 45 to 55 degrees F.

Particle-size control section:

clay content - 18 to 30 percent including silica clay
rock fragment content - 0 to 15 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - loam or silt loam
reaction - mildly or moderately alkaline

Bk horizons:

value - 6 to 8 dry; 4 or 6 moist
chroma - 2 or 4 dry or moist
texture - silt loam, silty clay loam
reaction - moderately or strongly alkaline
rock fragment content - 0 to 15 percent

C horizon:

value - 6 or 7 dry; 4 or 6 moist
chroma - 2 or 3 dry or moist
texture - loam, silt loam, clay loam, cobbly silt loam
reaction - moderately or strongly alkaline
rock fragment content - 0 to 20 percent

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Brunt and Tenno soils and the competing Polatis soils. Brunt soils have a natric horizon. Tenno soils have basalt bedrock at depths of 10 to 20 inches.

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-5	SIL	8-17	20-30	NP-10	1.5-1.6	0.6-2.0	0.19-0.21	7.4-8.4	0-2	-	7-18	0-5
5-26	SIL	5-18	20-30	NP-10	1.5-1.6	0.6-2.0	0.19-0.21	7.9-9.0	0-2	-	4-16	15-30
26-60	SIL,L	5-18	20-30	NP-10	1.5-1.6	0.6-2.0	0.11-0.13	7.4-9.0	2-8	2-5	4-15	15-25

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

LOCATION PINGREE ID

Tentative Series
Rev. DJ/PB 1/94

The Pingree series consists of very shallow, well drained soils that formed in alluvium from loess. Pingree soils are on lava flows on slopes of 0 to 4 percent. Permeability is moderate. Average annual precipitation is about 10 inches and the average annual air temperature is about 45 degrees F.

TAXONOMIC CLASS: Loamy, mixed, frigid, shallow Xeric Torriorthents

TYPICAL PEDON: Pingree stony silt loam; rangeland; on a 30 percent northfacing slope at 5,000 feet elevation. Vegetation is Wyoming big sagebrush and sandberg bluegrass. When described on June 5, 1979, the soil was dry throughout. (Color is for dry soil unless otherwise noted.) (DJ79-6)

A1--0 to 2 inches; pale brown (10YR 6/3) stony silt loam, dark brown (10YR 3/3) moist; weak coarse platy structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; many fine vesicular pores; desert pavement present; 15 percent basalt gravel, 3 percent basalt cobbles and 2 percent basalt stones; slightly alkaline (pH 7.8); clear smooth boundary. (1 to 3 inches thick)

A2--2 to 7 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; medium fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine medium roots; few fine tubular pores; 10 percent basalt gravel, 3 percent basalt cobbles and 2 percent basalt stones; slightly alkaline (pH 7.6); clear smooth boundary. (2 to 7 inches thick)

Bw--7 to 9 inches; pale brown (10YR 6/3) cobbly silt loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; 10 percent basalt gravel, 20 percent basalt cobbles and 5 percent basalt stones; slightly alkaline (pH 7.4); abrupt wavy boundary. (1 to 6 inches thick)

2R--9 inches; fractured basalt bedrock. (4 to 20 inches between fractures)

TYPE LOCATION:

Butte County, Idaho; about 4 miles northwest of Atomic City or 1.25 miles southeast of the junction of U.S. Highways 20 and 26; on lava flows, approximately 1,640 feet east and 1,000 feet south of the northwest corner of sec. 22, T.2S., R.30E.
Latitude - 43 degrees, 28 minutes, 53 seconds north.
Longitude - 112 degrees, 52 minutes, 08 seconds west.

RANGE IN CHARACTERISTICS:

Profile average annual soil temperature - 45 to 47 degrees F.

Particle-size control section
clay content - 18 to 25 percent
depth to basalt bedrock 5 to 10 inches

rock fragment content - average 5 to 25 percent

A horizon
value - 5 or 6 dry and 3 or 4 moist
chroma - 3 or 4 dry or moist
rock fragment content - 5 to 20 percent

Bw horizon
value - 6 or 7 dry and 5 or 7 moist
chroma - 3 or 4 dry or moist
texture - CB-SIL, GR-SIL and SIL
reaction - slightly or moderately alkaline

COMPETING SERIES: Their are no other series listed in this family. A similar soil is the Ellett series. Ellett soils are calcareous and have 18 to 20 percent total clay in the particle-size control section.

GEOGRAPHIC SETTING: These soils occur on rolling lava plains at elevations from 4,500 to 5,500 feet. Slopes range from 0 to 4 percent. The soils fromed in alluvium from loess. The climate is semiarid and has dry summers. The average annual precipitation is 8 to 12 inches. The average annual air temperature is 44 to 46 degrees F. The frost free season is 80 to 110 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Argon (T), Bondfarm, Deuce (T), Polatis and Tenno soils. The Argon and Polatis soils are moderately deep to basalt in lower positions. The Bondfarm, Deuce and Tenno soils are shallow to basalt in similar positions of basalt flows.

DRAINAGE AND PERMEABILITY: Well drained; very slow to slow runoff; moderate permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly Wyoming big sagebrush and sandberg Bluegrass.

DISTRIBUTION AND EXTENT: Southeastern Idaho on the Snake River plains. These soils are inextensive.

SERIES PROPOSED: Butte County, Idaho 1993. The name is taken from the town of Pingree, Id.

REMARKS: Description (DJ79-6) Diagnostic horizons and features recognized in this pedon are:

Ochric epipedon - the zone from 0 to 2 inches (the A horizon)

Particle-size control section - the zone from 2 to 10 inches (the A2 and Bw horizons)

National Cooperative Soil Survey
U.S.A.

POLATIS SERIES

CLASSIFICATION
Taxonomic Class: coarse-silty, mixed, frigid Xerollic Calciorthids

SETTING
Depth Class: moderately deep (20 to 40 inches to basalt bedrock)
Drainage class: well drained
Positions on the landscape: basalt uplands
Slope range: 0 to 25 percent
Parent Material:
kind - eolian
source - wind blown materials from alluvial deposits

TYPICAL PEDON DESCRIPTION (DJ79-23)

A1--0 to 2 inches; light brownish gray (10YR 6/2) stony silt loam, dark brown (10YR 3/3) moist; weak thin platy structure; slightly hard, very friable, sticky and slightly plastic; few very fine roots; common very fine vesicular pores; 5 percent basalt rock fragments; slightly effervescent (10 percent calcium carbonate equivalent); mildly alkaline (pH 7.6); clear smooth boundary.

A2--2 to 7 inches: pale brown (10YR 6/3) clay loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, few, very fine and medium roots; common very fine tubular pores; 5 percent basalt rock fragments; strongly effervescent (20 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear smooth boundary.

Bk1--7 to 11 inches: pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; common fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; few very fine tubular pores; few (5 percent) firm 3/4 inch nodules or cicada krotovinas; 10 percent basalt rock fragments; violent effervescence (23 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear wavy boundary.

Bk2--11 to 21 inches: very pale brown (10YR 8/3) silt loam, pale brown (10YR 6/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine tubular pores; few (2 percent) firm 3/4 inch nodules or cicada krotovinas; 5 percent basalt cobbles and 10 percent stone rock fragments; violent effervescence (26 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); abrupt irregular boundary.

R --21 inches; fractured basalt bedrock.

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 2,500 feet south and 2,500 feet east of the northwest corner of Section 18, T. 2N., R. 28E.

RANGE IN CHARACTERISTICS

Profile:
average annual soil temperature - 45 to 55 degrees F.

Particle-size control section:

clay content - 18 to 30 percent including carbonate clay
depth to basalt bedrock 20 to 40 inches
rock fragment content - 0 to 15 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
texture - loam, silt loam, stony loam, silt loam
rock fragment content - 0 to 15 percent

Bk horizon:

value - 6 to 8 dry; 5 or 7 moist
chroma - 2 or 3 dry or moist
texture - silt loam, silty clay loam, clay loam
reaction - mildly or moderately alkaline
rock fragment content - 0 to 15 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-3	SIL	5-18	20-30	NP-10	1.50-1.60	0.6-2.0	0.19-0.21	7.4-9.0	0-2	-	6-15	5-15
3-28	SIL	10-18	20-30	NP-10	1.50-1.60	0.6-2.0	0.19-0.21	7.4-9.0	2-4	-	8-15	15-30

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

SHAGEL SERIES

The Shagel series consists of shallow well drained soils that formed in slope alluvium and loess over rhyolite. Shagel soils are on nearly level to undulating mountain toeslopes at elevations of 5,500 to 6,300 feet. Principal vegetation is low sagebrush, bluebunch wheatgrass, prairie junegrass, and winterfat.

CLASSIFICATION
Taxonomic class: loamy-skeletal, mixed, frigid lithic Calcixerolls

SETTING
Depth class: shallow to bedrock (12 to 20 inches)
Drainage class: well drained
Permeability: moderate
Positions on the landform: ridgetops and sideslopes of foothills and mountains
Slope range: 15 to 60 percent
Parent Material
kind - colluvium and residuum
source - rhyolite

TYPICAL PEDON DESCRIPTION (DJ92-39)

A--0 to 3 inches; grayish brown (10YR 5/2) very gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and fine roots; common very fine tubular pores; 25 percent gravel, 15 percent rhyolite flags and 2 percent stones; moderately alkaline (pH 8.0); clear smooth boundary.

Bw-- 3 to 7 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine, fine and common medium roots; common very fine tubular pores; slightly effervescent (5 percent calcium carbonate equivalent); few lime coats 1 to 2 mm thick on undersides of rock fragments; 30 percent gravel, 10 percent rhyolite flags and 1 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

Bk1 -- 7 to 10 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; medium fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine, fine and common medium roots; common very fine tubular pores; strongly effervescent (25 percent calcium carbonate equivalent); common lime coats 1 to 2 mm thick on undersides of rock fragments; 25 percent gravel, 15 percent rhyolite flags and 1 percent stones; moderately alkaline (pH 8.0); gradual wavy boundary.

Bkq -- 10 to 16 inches; very pale brown (10YR 7/3) extremely gravelly loam, brown (10YR 5/3) moist; massive (rock structure in place); slightly hard, friable, nonsticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); common lime coats and silica layer 1 to 2 mm thick on undersides of rock fragments; 60 percent gravel, 25 percent rhyolite flags and 1 percent stones; moderately alkaline (pH 8.0); abrupt irregular boundary.

R -- 16 inches; fractured bedrock rhyolite

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately five miles southwest of Richard Butte, 1,300 feet south and 400 feet east of the northwest corner of Section 29, T. 7N., R. 30E.

RANGE IN CHARACTERISTICS

Profile:

mollic epipedon - 7 to 10 inches thick
depth to fractured bedrock - 12 to 20 inches
average annual soil temperature - 40 to 44 degrees F

Particle size control section:

clay - 10 to 15 percent
rock fragments - 50 to 85 percent

Bw horizons:

value - 5 or 6 dry; 3 or 4 moist
rock fragments - 40 to 55 percent

Bk horizon:

value - 5 or 6 dry; 4 or 5 moist
chroma - 3 or 4 dry or moist
texture - very gravelly loam, extremely gravelly loam
rock fragments - 45 to 85 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-3	GR-SIL	11-17	20-25	5-10	1.25-1.35	0.6-2.0	0.13-0.17	7.4-8.4	-	-	-	-
3-11	GR-SIL, GRX-SIL	6-12	20-25	5-10	1.30-1.40	0.2-0.6	0.13-0.19	7.9-8.4	-	-	-	-
11-19	GRV-L,GRX-L,GRX-SIL	6-12	15-25	NP-10	1.35-1.45	2.0-6.0	0.09-0.12	7.9-9.0	0-2	-	-	-
37-47	SIL	9-24	35-45	10-15	1.20-1.40	0.6-2.0	0.18-0.20	7.9-9.0	0	-	7-20	

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

SIMEROI SERIES

The Simeroi series consists of very deep, well drained soils formed in alluvium derived dominantly from limestone. Simeroi soils are on outwash fans and fan terraces. Vegetation is mainly Wyoming big sagebrush and bluebunch wheatgrass.

CLASSIFICATION Taxonomic class: Loamy-skeletal, carbonatic, frigid Xerollic Calciorthids

SETTING
Depth class: very deep (>60")
Drainage class: well drained
Permeability: moderate
Positions on the landscape: outwash and fan terraces
Slope range: 1 to 25 percent
Parent Material:
kind - colluvium or alluvium from outwash or fans
source - limestone

TYPICAL PEDON DESCRIPTION (DJ88-27)

A1--0 to 4 inches; brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; moderate thin platy structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and common fine roots; common fine tubular pores; 20 percent gravel; slightly effervescent (10 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear smooth boundary.

A2--4 to 9 inches: pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and common fine roots; common very fine tubular pores; 4 percent cobbles and 35 percent gravel; strongly effervescence (35 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear wavy boundary.

Bk--9 to 26 inches: light brownish gray (10YR 6/2) extremely gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; 4 percent cobbles and 45 percent gravel; violent effervescence (50 percent calcium carbonate equivalent); moderately alkaline (Ph 8.2); gradual wavy boundary.

Bkq1--26 to 38 inches: light brownish gray (10YR 6/2) extremely gravelly fine sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and non plastic; many few very fine, common fine and medium roots; 5 percent cobbles and 55 percent gravel; 1-2 mm thick silica pendants under gravel; violent effervescence (60 percent calcium carbonate equivalent); moderately alkaline (pH 8.1); clear irregular boundary.

Bkq2--38 to 55 inches: pale brown (10YR 6/3) extremely gravelly fine sandy loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and non plastic; common very fine, fine and few medium roots; common very fine tubular pores; 5 percent cobbles and 45 percent gravel; 1-2 mm thick silica pendants under gravel; violent effervescence (50 percent calcium carbonate equivalent); moderately alkaline (pH 8.1).

C--55 to 60 inches: grayish brown (10YR 5/2) extremely gravelly fine sandy loam, dark

brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and non plastic; few very fine roots; few very fine tubular pores; 10 percent cobbles and 45 percent gravel; strongly effervescent (40 percent calcium carbonate equivalent); moderately alkaline (pH 8.0).

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 1,410 feet east and 1,375 feet south of the northwest corner of Section 14, T. 5N., R. 26E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 43 to 46 degrees F.
depth to secondary carbonates - 4 to 10 inches

Particle-size control section:

clay content - 10 to 20 percent
rock fragment content - 40 to 60 percent
calcium carbonate equivalent of 40 to 70 percent (includes 2mm to 20mm rock fragments)

A horizon:

value - 5 to 7 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
reaction - mildly or moderately alkaline

Bk horizon:

value - 6 or 7 dry; 4 to 6 moist
chroma - 2 to 4 dry or moist
texture - very gravelly loam or very gravelly sandy loam

Bkq horizons:

value - 6 or 7 dry; 4 to 6 moist
chroma - 2 or 3 dry or moist
texture - very gravelly sandy loam, extremely gravelly sandy loam, extremely gravelly fine sandy loam
reaction - moderately or strongly alkaline

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-3	L	10-20	20-35	5-15	1.5-1.55	0.6-2.0	0.14-0.18	7.4-8.4	-	-	8-20	5-10
0-3	GR-L	10-20	20-35	5-15	1.5-1.55	0.6-2.0	0.10-0.14	7.4-8.4	-	-	8-20	5-10
0-3	GR-SIL	10-20	20-35	5-15	1.5-1.55	0.6-2.0	0.14-0.18	7.4-8.4	-	-	8-20	5-10
3-16	GRV-L,GRX-L	10-20	20-35	5-15	1.55-1.65	0.6-2.0	0.07-0.09	7.4-8.4	0-2	-	8-20	30-70
16-54	GRV-SL,GRX-COSL	10-15	15-20	NP-5	1.60-1.65	2.0-6.0	0.04-0.07	7.9-9.0	0-2	-	7-14	40-70
54-60	GRV-LCOS, GRX-COS	0-8	-	NP	1.65-1.70	20-20	0.02-0.04	7.9-9.0	0-2	-	1-6	30-50

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

SOELBERG SERIES

CLASSIFICATION Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, frigid Aridic Calcic Argixerolls.

SETTING
Depth Class: very deep (60 in or more)
Drainage class: well drained
Permeability: moderately slow in the upper part and rapid in the lower part
Positions on the landscape: stream terraces, fan terraces
Slope range: 0 to 8 percent
Parent Material:
kind - lacustrine sediments over alluvium
source - mixed

TYPICAL PEDON DESCRIPTION (DJ88-25)

A1--0 to 3 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; 3 percent gravel; mildly alkaline (pH 7.4); clear smooth boundary.

A2--3 to 10 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; 2 percent gravel; mildly alkaline (pH 7.5); clear wavy boundary.

Bt1--10 to 17 inches; yellowish brown (10YR 5/4) clay loam, dark brown (10YR 3/4) moist; moderate medium prismatic structure parting to moderate fine subangular blocky; slightly hard, firm, slightly sticky and plastic; common very fine, fine and medium roots; common very fine tubular and irregular pores; common faint clay films on faces of peds and lining pores; 1 percent gravel; mildly alkaline (pH 7.8); clear wavy boundary.

Bt2--17 to 28 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; moderate fine prismatic structure parting to moderate fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; few faint clay films on faces of peds and lining pores; 3 percent gravel; moderately alkaline (pH 8.1); clear wavy boundary.

Bk--28 to 36 inches; very pale brown (10YR 8/3) gravelly loam, pale brown (10YR 6/3) moist; moderate thin platy structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine irregular pores; lime coatings on all sides of coarse fragments; strongly effervescent; 30 percent gravel, 2 percent cobbles; moderately alkaline (pH 8.0); clear wavy boundary.

2Bqk--36 to 40 inches; brown (10YR 5/3) extremely gravelly loamy coarse sand, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine tubular pores; many prominent lime and silica coatings on coarse fragments; slightly effervescent; 60 percent gravel, 5 percent cobbles; mildly alkaline (pH 7.8); gradual wavy boundary.

2Bq--40 to 60 inches; brown (10YR 5/3) extremely gravelly sand, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; hard, friable, nonsticky and nonplastic; few very fine roots; common very fine irregular pores; many prominent silica coatings on coarse fragments; 65 percent gravel, 5 percent cobbles; moderately alkaline (pH 7.9).

TYPICAL PEDON LOCATION: Butte County, Idaho; about 3 miles south of Moore, Idaho, about 500 ft east and 600 ft north of the southwest corner section 9, T. 4N, R. 26E

RANGE IN CHARACTERISTICS

Profile:

- average annual soil temperature - 39 to 43 degrees F
- thickness of mollic epipedon - 9 to 12 inches
- depth to calcic horizon - 20 to 30 inches
- reaction - mildly or moderately alkaline

Particle-size control section:

- clay content - 24 to 34 percent

A horizon:

- chroma - 2 to 4 dry; 2 or 3 moist

Bt horizons:

- chroma - 3 or 4 dry and moist
- texture - loam, clay loam, or gravelly loam
- coarse fragments - 0 to 30 percent

Bk horizon:

- value - 6 to 8 dry; 4 to 6 moist
- coarse fragments - 20 to 35 percent

2Bqk and 2Bq horizons:

- value - 5 or 6 dry; 3 or 4 moist
- chroma - 2 to 4 dry or moist
- texture - extremely gravelly loamy sand, extremely gravelly sand, or extremely gravelly loamy coarse sand
- coarse fragments - 60 to 80 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-10	L	18-25	25-35	5-15	1.15-1.3	0.6-2.0	0.15-0.19	6.6-7.8	-	-	10-20	-
0-10	SL	10-18	20-25	NP-5	1.10-1.25	2.0-6.0	0.10-0.13	6.6-7.3	-	-	10-20	-
0-10	GR-L	18-25	25-35	5-15	1.15-1.30	0.6-2.0	0.14-0.17	6.6-7.3	-	-	10-20	-
10-36	L,GR-L,CL	25-34	25-40	10-20	1.20-1.40	0.2-0.6	0.15-0.19	7.4-8.4	-	-	15-30	0-20
36-40	GRV-COS, GRX-LCOS	0-2	-	NP	1.20-1.40	20-20.0	0.01-0.03	7.4-8.4	-	-	5-10	5-15
40-60	GRX-S,GRX-COS	0-2	-	NP	1.20-1.40	20-20.0	0.01-0.03	7.4-8.4	-	-	5-10	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

SPARMO SERIES

The Sparmo series consists of very deep, well drained soils that formed in glacial outwash, alluvium, outwash fans, fan terraces, and terraces. The natural vegetation is mainly Wyoming big sagebrush and bluebunch wheatgrass.

CLASSIFICATION Taxonomic Class: Coarse-loamy, mixed, frigid Xerollic Calciorthids

SETTING
Depth Class: very deep (>60")
Drainage class: well drained
Permeability: moderate
Positions on the landscape: alluvial fans and terraces, outwash fans
Slope range: 1 to 12 percent
Parent Material: kind - eolian over alluvium
source - mixed sedimentary and metamorphic alluvium

TYPICAL PEDON DESCRIPTION (DJ88-26)

A1--0 to 3 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; common fine tubular pores; strong effervescence (15 percent calcium carbonate equivalent); mildly alkaline (pH 7.6); clear smooth boundary.

A2--3 to 8 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine, very fine and medium roots; common very fine tubular pores; strong effervescence (15 percent calcium carbonate equivalent); mildly alkaline (pH 7.7); clear wavy boundary.

Bk1--8 to 14 inches: pale brown (10YR 6/3) loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common very fine, fine and medium roots; common very fine tubular pores; strong effervescence (20 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); clear wavy boundary.

Bk2--14 to 19 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine, few fine and medium roots; common very fine tubular pores; common 3/4 inch nodules, or cicada krotovinas; strong effervescence (20 percent calcium carbonate equivalent); moderately alkaline (pH 7.9); clear wavy boundary.

Bk3--19 to 30 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine, fine and medium roots; common very fine tubular pores; 1 percent gravel; violent effervescence (25 percent calcium carbonate equivalent); moderately alkaline (pH 8.0) gradual wavy boundary.

Bk4--30 to 50 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; common very fine tubular pores; few 3/4 inch nodules or cicada krotovinas; strong effervescence (20 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear wavy boundary.

C--50 to 60 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; few very fine tubular pores; 1 percent gravel; strong effervescence (20 percent calcium carbonate equivalent); moderately alkaline (pH 7.9) gradual wavy boundary.

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 700 feet north and 1,600 feet east of the southwest corner of Section 14, T. 5N., R. 26E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 40 to 46 degrees F.

Particle-size control section:

clay content - 12 to 16 percent
coarse fragment content - 0 to 30 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
reaction - mildly or moderately alkaline

Bk horizon:

value - 6 to 8 dry; 5 to 7 moist
chroma - 2 or 3 dry or moist
texture - loam, silt loam, gravelly loam
reaction - moderately or strongly alkaline

C horizon:

value - 6 or 7 dry; 4 to 6 moist
chroma - 3 or 4 dry or moist
texture - loam, silt loam, clay loam, extremely gravelly sandy loam, gravelly loam
reaction - moderately or strongly alkaline

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-3	L	12-18	20-30	NP-10	1.35-1.45	0.6-2.0	0.13-0.18	7.4-8.4	0-4	0-5	10-15	10-20
0-3	SIL	12-18	20-30	NP-10	1.35-1.45	0.6-2.0	0.17-0.20	7.4-8.4	0-4	0-5	10-15	10-20
3-38	L,GR-L,SIL	12-16	20-30	NP-10	1.35-1.5	0.6-2.0	0.09-0.13	7.9-9.0	2-4	2-8	9-13	10-40
38-60	GRV-SL,GRV-L	5-14	15-30	NP-5	1.50-1.65	2.0-6.0	0.05-0.09	7.9-9.0	2-4	2-8	4-8	10-30

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

SPLITTOP SERIES

CLASSIFICATION Taxonomic Class: Fine-loamy, mixed, frigid Xerollic Camborthids

SETTING
Depth Class: moderately deep (20 to 40 inches to basalt bedrock)
Drainage class: well drained
Positions on the landscape: basalt uplands
Slope range: 0 to 30 percent
Parent Material:
kind - eolian
source - alluvium

TYPICAL PEDON DESCRIPTION (DJ79-12)

A--0 to 3 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak medium platy structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many fine vesicular pores; mildly alkaline (pH 7.6); abrupt smooth boundary.

Bw--3 to 8 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; common fine subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; many very fine and few coarse roots; few very fine tubular pores; mildly alkaline (pH 7.6); clear smooth boundary.

Bk1--8 to 12 inches: pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and fine and common coarse roots; few very fine tubular pores; 5 percent gravel, cobbles and stone basalt rock fragments; strongly effervescent (20 percent calcium carbonate equivalent); moderately alkaline (pH 8.0); clear smooth boundary.

Bk2--12 to 17 inches: very pale brown (10YR 8/3) silt loam, grayish brown (10YR 5/3) moist; weak fine platy structure: hard, friable, slightly sticky and plastic; common very fine roots; few very fine tubular pores; 5 percent gravel, cobbles and stone basalt rock fragments; violent effervescence (25 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); clear smooth boundary.

Bk3--17 to 31 inches: white (10YR 8/2) silt loam, pale brown (10YR 6/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots, some root matting;; few very fine interstitial pores; many (20 percent) firm 3/4 inch nodules or cicada krotovinas; 5 percent cobbles and stone basalt rock fragments; violent effervescence (25 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); gradual smooth boundary.

Bkq--31 to 39 inches: very pale brown (10YR 8/3) silt loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, slightly sticky and non plastic; few very fine roots; few very fine tubular pores; few (5 percent) firm 3/4 inch nodules, or cicada krotovinas; 5 percent small basalt rock fragments; 1-2 mm thick silica coats under rock fragments; strongly effervescence (20 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); abrupt irregular boundary.

R --39 inches; fractured basalt bedrock.

TYPICAL PEDON LOCATION: Bingham County, Idaho; approximately 20 feet south and 1,300 feet west of the northeast corner of Section 31, T. 3S., R. 31E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 42 to 46 degrees F.

Particle-size control section:

clay content - 18 to 27 percent
depth to basalt bedrock 20 to 40 inches
rock fragment content - 0 to 25 percent

A horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 3 or 4 dry or moist
texture - loam, gravelly loam, silt loam or stony silt loam
reaction - neutral to mildly alkaline

Bw horizon:

hue - 7YR or 10YR
value - 5 or 6 dry; 3 or 4 moist
chroma - 3 or 4 dry or moist
texture - loam, silt loam
reaction - mildly or moderately alkaline
rock fragment content - 0 to 10 percent

Bk horizon:

Hue - 10YR, 2.5Y
value - 7 or 8 dry; 5 to 7 moist
chroma - 3 or 4 dry or moist
texture - loam, silt loam, cobbly loam, stony loam
reaction - moderately or strongly alkaline
rock fragment content - 0 to 30 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-3	L	18-25	25-30	5-10	1.20-1.40	0.6-2.0	0.14-0.16	6.6-7.8	-	-	15-20	0-5
0-3	SIL	18-25	25-30	5-10	1.20-1.40	0.6-2.0	0.16-0.19	6.6-7.8	-	-	15-20	0-5
3-26	L,SIL	20-27	25-30	5-10	1.20-1.40	0.6-2.0	0.14-0.18	7.4-8.4	0-2	-	15-25	0-20
26-32	CBV-L,CB-L	20-27	25-30	5-10	1.20-1.40	0.6-2.0	0.06-0.12	7.9-8.4	0-2	-	15-25	0-20

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

STARLITE SERIES

Starlite series are very deep, well-drained soils in basins and on valley flats. These soils formed in lacustrine sediments. The principal native vegetation is Wyoming big sagebrush, Bluebunch wheatgrass, and Indian ricegrass.

CLASSIFICATION
Taxonomic Class: Fine-silty, carbonatic, frigid Xerollic Calciorthids.

SETTING
Depth Class: very deep (60 in or more)
Drainage class: well drained
Permeability: moderately slow
Positions on the landscape: basins, valley flats
Slope range: 0 to 4 percent
Parent Material:
kind -
source - mixed lacustrine sediments

TYPICAL PEDON DESCRIPTION

A--0 to 5 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 4/3) moist; weak fine and medium granular structure; loose, very friable, slightly sticky and nonplastic; common very fine and fine roots; strong effervescence (25 percent calcium carbonate equivalent); moderately alkaline (pH 8.3); clear smooth boundary.

Bw--5 to 14 inches; light brownish gray (10YR 6/2) loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to moderate medium granular structure; soft, very friable, slightly sticky and nonplastic; common very fine and fine roots; strong effervescence (25 percent calcium carbonate equivalent); strongly alkaline (pH 8.5); clear smooth boundary.

Bk1--14 to 23 inches; light brownish gray (2.5Y 6/2) loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; few very fine tubular pores; common cicada nodules; common lime splotches 1 to 2 mm thick on ped faces; violent effervescence (40 percent calcium carbonate equivalent); strongly alkaline (pH 8.7); clear smooth boundary.

Bk2--23 to 32 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; few fine roots; few very fine tubular pores; common cicada nodules; common lime splotches 1 to 2 mm thick on ped faces; violent effervescence (45 percent calcium carbonate equivalent); moderately alkaline (pH 8.4); clear smooth boundary.

2Bk3--32 to 37 inches; light gray (10YR 7/2) silty clay loam, grayish brown (10YR 5/2) moist; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium platy structure parting to moderate medium granular; hard, friable, sticky and plastic, few fine roots; many cicada nodules; many lime splotches 1 to 2 mm thick on ped faces; violent effervescence (40 percent calcium carbonate equivalent); strongly alkaline (pH 8.5); clear smooth boundary.

3Bk4--37 to 41 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y

4/2) moist; weak medium subangular blocky structure parting to single grain; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; few lime splotches 1 mm thick on ped faces; violent effervescence (45 percent calcium carbonate equivalent); strongly alkaline (pH 8.6); clear smooth boundary.

3Bk5--41 to 47 inches; light gray (10YR 7/1) silt loam, grayish brown (10YR 5/2) moist; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium platy structure parting to weak fine granular; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; few lime splotches 1 mm thick on ped faces; strong effervescence (45 percent calcium carbonate equivalent); moderately alkaline (pH 8.2); clear smooth boundary.

4Bk6--47 to 60 inches; gray (10YR 5/1) very fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to single grain; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few lime splotches 1 mm thick on ped faces; strong effervescence (40 percent calcium carbonate equivalent); strongly alkaline (pH 8.6).

TYPICAL PEDON LOCATION: Butte County, Idaho; about 5 miles east of Howe, Idaho, about 300 ft north and 500 ft west of the southeast corner of Section 31, T. 6N, R. 30E.

RANGE IN CHARACTERISTICS

Profile:

- average annual soil temperature - 41 to 46 degrees F
- depth to calcic horizon - 9 to 16 inches
- very fine sandy loam does not occur above 40 inches
- mottles are from ancient drainage

Particle-size control section:

- clay content - 18 to 24 percent
- calcium carbonate equivalent averages - 40 to 45 percent

Ak horizon:

- value - 6 or 7 dry; 4 or 5 moist
- chroma - 2 or 3 dry or moist
- reaction - moderately or strongly alkaline

Bk1,2,3 horizons:

- hue - 2.5Y or 10 YR
- value - 6 dry, 4 moist
- chroma - 2 or 3 dry or moist
- reaction - moderately or strongly alkaline
- texture - loam, silt loam, silty clay loam

2Bk horizon:

- hue - 2.5Y or 10YR
- value - 5 to 7 dry; 3 to 5 moist
- chroma - 1 to 4 dry or moist
- texture -loam, silt loam, silty clay loam
- reaction - moderately or strongly alkaline

3Bk and 4Bk horizons:

hue - 2.5Y or 10YR
value - 5 to 7 dry; 3 to 5 moist
chroma - 1 to 4 dry or moist
reaction - moderately or strongly alkaline
texture - loam, silt loam, silty clay loam, very fine sandy loam, gravelly loam

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/ cm	me/ 100g	meg/ 100g	percent
0-5	L	8-15	35-40	10-15	1.2-1.4	0.6-2.0	0.16-0.18	7.9-9.0	0	-	8-13	
0-5	SIL	8-15	35-40	10-15	1.20-1.40	0.6-2.0	0.16-0.18	7.9-9.0	0	-	8-13	
5-32	L,SIL	12-20	35-45	10-15	1.20-1.40	0.6-2.0	0.16-0.18	7.9-9.0	0	-	10-15	
32-37	SICL	30-37	40-55	20-30	1.20-1.40	0.2-0.6	0.18-0.20	7.9-9.0	0	-	20-25	
37-47	SIL	9-24	35-45	10-15	1.20-1.40	0.6-2.0	0.18-0.20	7.9-9.0	0	-	7-20	

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

TECHICK SERIES

CLASSIFICATION
Taxonomic Class: Fine-loamy, mixed, frigid Aridic Calcic Argixerolls.

SETTING
Depth Class: very deep (60 inches or more)
Drainage class: well drained
Permeability: moderately slow
Positions on the landscape: stream terraces, fan terraces
Slope range: 0 to 8 percent
Parent Material:
kind - lacustrine sediments over flood deposited gravels
source - mixed

TYPICAL PEDON DESCRIPTION

A1--0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine platy structure; slightly hard, very friable, nonsticky, slightly plastic; many very fine and common fine roots; 10 percent gravel; mildly alkaline (pH 7.6); abrupt smooth boundary.

Bt--4 to 12 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and plastic; common f\very fine, fine and medium roots; common very fine tubular and irregular pores; common faint clay films on faces of peds and lining pores; mildly alkaline (pH 7.8); clear wavy boundary.

Btk--12 to 25 inches; very pale brown (10YR 8/3) clay loam, pale brown (10YR 6/3) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky, plastic; common very fine, fine and medium roots; common very fine irregular pores; common soft accumulations of calcium carbonates; strongly effervescent; few faint clay films on faces of peds; moderately alkaline (pH 8.0); gradual wavy boundary.

2Bk--25 to 46 inches; very pale brown (10YR 7/3) loam, dark yellowish (10YR 4/4) moist; weak coarse prismatic structure parting to moderate medium prismatic; hard, friable, slightly sticky, slightly plastic; few fine and very fine roots; few very fine irregular pores; thick lime coatings on laminae and in root channels; slightly effervescent; 5 percent gravel; moderately alkaline (pH 8.2); abrupt wavy boundary.

3Bq1--46 to 60 inches; grayish brown (10YR 5/2) extremely gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few very fine roots; silica coatings and pendants 1 to 2 mm thick on undersides of coarse fragments; 55 percent gravel, 5 percent cobbles; mildly alkaline (pH 7.7).

TYPICAL PEDON LOCATION: Butte County, Idaho; about 1 1/2 miles southeast of Arco, Idaho, about 1,800 feet south and 2,000 feet east of Section 11, T. 3N, R. 26E.

RANGE IN CHARACTERISTICS
Profile:
average annual soil temperature - 39 to 45 degrees F

mollic epipedon thickness - 8 to 12 inches
depth to calcic horizon - 10 to 20 inches
reaction - mildly or moderately alkaline

Particle-size control section:
clay content - 25 to 34 percent

A horizon:
chroma - 3 to 4 dry; 2 to 3 moist

Bt horizon:
chroma - 3 or 4 dry and moist
texture - loam, clay loam, silty clay loam

Btk horizon:
value - 6 to 8 dry; 4 to 6 moist
chroma - 3 to 4 dry and moist
texture - loam, clay loam, silty clay loam

2Bk horizon:
value - 5 to 7 dry; 4 to 6 moist
chroma - 3 or 4 dry and moist
coarse fragments - 5 to 15 percent

3Bq horizon:
value - 4 to 7 dry; 2 to 4 moist
chroma - 2 or 3 dry and moist
texture - very gravelly sand, extremely gravelly loamy sand, extremely gravelly sand
coarse fragments - 50 to 75 percent

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-4	L	10-20	20-30	NP-10	1.25-1.50	0.6-2.0	0.16-0.18	6.6-7.8	-	-	10-20	-
0-4	STV-L	10-20	20-30	NP-10	1.30-1.55	0.6-2.0	0.14-0.16	6.6-7.8	-	-	10-20	-
4-25	SICL,CL,L	25-34	30-45	15-30	1.35-1.60	0.2-0.6	0.19-0.21	7.4-8.4	-	-	20-30	0-20
25-46	L	10-20	20-30	NP-10	1.45-4.65	0.6-2.0	0.16-0.18	7.4-8.4	0-2	0-1	10-20	15-25
46-60	GRV-S,GRX-LS,GRX-S	0-3	-	NP	1.45-1.65	20-20.0	0.02-0.03	7.4-8.4	0-2	0-1	1-5	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

TECHICKNOT SERIES

LOCATION TECHICKNOT ID

Tentative Series
Rev. DJ/PB 2/94

The Techicknot series consists of very deep, well drained soils that formed alluvium from loess. They are on run in areas of basalt plains. Slopes are 0 to 12 percent. Permeability is moderately slow. Average annual precipitation is about 12 inches and the average annual air temperature is about 44 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, frigid Aridic Calcic Argixerolls

TYPICAL PEDON: Techicknot loam, on rangeland; on a 1 percent slope at 5,350 feet elevation. Vegetation is basin big sagebrush and great basin wildrye grass. When described on July 19, 1979, the soil was dry throughout. (Color is for dry soil unless otherwise noted.)

A--0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; 2 percent basalt gravel; slightly alkaline (pH 7.4); clear smooth boundary. (2 to 5 inches thick)

Bt1--4 to 12 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; common very fine tubular pores; few faint clay films on faces of peds; 3 percent basalt gravel; slightly alkaline (pH 7.4); clear smooth boundary. (7 to 11 inches thick)

Bt2--12 to 29 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 3/4) moist; weak medium prismatic structure, parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and plastic; common very fine and fine roots; common very fine tubular and irregular pores; few faint clay films on faces of peds; 3 percent basalt gravel; slightly alkaline (pH 7.6); clear smooth boundary. (4 to 17 inches thick)

Bk1--29 to 48 inches; very pale brown (10YR 7/3) loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine tubular pores; many firm medium and coarse nodules, or cicada krotovinas; violently effervescent (25 percent calcium carbonate equivalent); 3 percent basalt gravel; moderately alkaline (pH 8.2); gradual smooth boundary. (15 to 21 inches thick)

Bk2--48 to 60 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and slightly plastic; few very fine roots; common very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); 5 percent basalt gravel; moderately alkaline (pH 8.2).

TYPE LOCATION: Butte County, Idaho; about 7 miles south of Arco; about 75 feet south and 2,000 west of the northeast corner of sec. 1, T.2N., R.26E.
Latitude - 43 degrees, 32 minutes, 13 seconds north.
Longitude - 113 degrees, 19 minutes, 50 seconds west.

RANGE IN CHARACTERISTICS

Profile
Thickness of the mollic 10 to 15 inches
Average annual soil temperature - 44 to 46 degrees F.
Depth to the argillic horizon - 2 to 14 inches
Depth to the calcic horizon - 20 to 33 inches

Particle-size control section -
Clay content - 25 to 34 percent
Rock fragment content - 0 to 10 percent

A horizon
Value - 4 or 5 dry
Chroma - 2 or 3 dry or moist
Rock fragment content - 0 to 5 percent

Bt1 horizon
Value - 4 or 5 dry
Chroma - 2 or 3 dry or moist
Texture - L, SICL or CL
Rock fragment content - 0 to 10 percent
Reaction - slightly or moderately alkaline

Bt2 horizon
Value - 5 or 6 dry and 3 or 4 moist
Chroma - 2 through 4 dry or moist
Texture - SICL or CL
Rock fragment content - 0 to 10 percent
Reaction - slightly or moderately alkaline

Bk horizon
Value - 6 or 7 dry and 4 through 6 moist
Chroma - 2 or 3 dry or moist
Texture - L, SIL, CL or SICL
Rock fragment content - 0 to 15 percent
Reaction - moderately or strongly alkaline

COMPETING SERIES: These are the Dishpan (T), Eldgin (T), Fenelon, Shenon (T), Singletree and Techick T) series. Dishpan soils are moderately deep to basalt. Eldgin soils have hues redder than 10YR in the argillic horizons. Fenelon soils are moderately deep to soft siltstone. Shenon soils have secondary lime at depths of 8 to 14 inches. Singletree soils have a mollic epipedons 15 to 20 inches thick. Techick soils have secondary lime at depths of 8 to 15 inches sand and gravel below 40 inches.

GEOGRAPHIC SETTING: The Techicknot soils formed in alluvium from loess on basalt plains. Slopes are 0 to 12 percent. Elevation ranges from 4,800 to 5,800 feet. The average annual precipitation ranges from 11 to 13 inches, part of which is snow. Additional moisture comes from early spring runoff. The average annual air temperature is about 43 to 45 degrees F. The frost free season is 60 to 90 days.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Atom (T), Nargon (T), Beartrap (T),

Coffee (T), Deuce (T) and Menan (T) soils. All of these soils lack mollic epipedon. Atom and Beartrap soils are on higher positions than Techicknot soils. Argon and Deuce soils are on higher positions and near rock outcrop. McCarey soils are on north-facing slopes on higher positions. Menan soils are on similar positions as Techichnot but are dryer.

DRAINAGE AND PERMEABILITY: Well drained; very slow to medium runoff; moderately slow permeability.

USE AND VEGETATION: Used primarily for range and wildlife habitat. Vegetation is mainly threetip sagebrush and bluebunch wheatgrass.

DISTRIBUTION AND EXTENT: Southeast Idaho. Techicknot soils are not extensive.

SERIES PROPOSED: Butte County, Idaho 1993. The name is taken from Teckick series which is mapped nearby.

REMARKS: Description (DJ93-25) Diagonistic horizons and features recognized in this pedon are:

mollic epipedon - the zone from surface to 12 inches (the A and Bt1 horizons).

Argillic horizon - the zone from 4 to 29 inches (the Bt1 and Bt2 horizons).

Particle-size control section - the zone from 4 to 24 inches (the upper 20 inches of the argillic, (the Bt1 and part of the Bt2 horizons)

Calcic horizon - the zone from 29 to 60 inches the (the Bk1 and Bk2 horizons).

National Cooperative Soil Survey
U.S.A.

VICKTON SERIES

CLASSIFICATION

Taxonomic class: fine-loamy, mixed, frigid Calcic Argixerolls

SETTING

Depth class: deep (40 to 60 inches)
Drainage class: well drained
Permeability: moderately slow
Positions on the landscape: basalt basins
Parent Material: kind - alluvium from loess
source - loess
Slope range: 0 to 12 percent
Elevation: 4,700 to 5,400 feet
Climatic data (average annual):
precipitation - 12 to 16 inches
air temperature - 43 to 45 degrees F
frost-free period - 60 to 90 days

TYPICAL PEDON DESCRIPTION (DJ93-34)

A1--0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; 2 percent basalt gravel; slightly alkaline (pH 7.4); clear smooth boundary.

A2--2 to 8 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine and few medium roots; common very fine tubular pores; 2 percent basalt gravel; slightly alkaline (pH 7.5); clear wavy boundary.

Bt--8 to 14 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure, parting to moderate medium subangular blocky; hard, firm, sticky and plastic; many very fine, fine and few medium roots; common very fine tubular and irregular pores; few faint clay films on faces of peds; 2 percent basalt gravel; slightly alkaline (pH 7.4); abrupt wavy boundary.

Bk1--14 to 22 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; moderate fine and medium sugangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and fine roots; common very fine tubular pores; violently effervescent (30 percent calcium carbonate equivalent); 2 percent basalt gravel; moderately alkaline (pH 8.1); clear wavy boundary.

Bk2--22 to 36 inches; very pale brown (10YR 7/3) silty clay loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine, fine and medium roots; common very fine tubular pores; violently effervescent (25 percent calcium carbonate equivalent); 1 mm thick lime coats undersides of rock fragments; 2 percent basalt gravel and 1 percent basalt cobbles; moderately alkaline (pH 7.9); gradual wavy boundary.

Bk3--36 to 46 inches; pale brown (10YR 6/3) silty clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, sticky and plastic; few very fine, fine and medium roots; common very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); 1

mm thick lime coats undersides of rock fragments; 2 percent basalt gravel and 1 percent basalt cobbles; moderately alkaline (pH 7.9); gradual wavy boundary.

Bk4--46 to 58 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine tubular pores; strongly effervescent (20 percent calcium carbonate equivalent); 1 mm thick lime coats undersides of rock fragments; 2 percent basalt gravel and 2 percent basalt cobbles; moderately alkaline (pH 8.0); abrupt wavy boundary.

2R--58 inches; unweathered basalt. (4 to 20 inches between fractures)

TYPICAL PEDON LOCATION

Map unit in which located: McCarey-Vickton-Rock Outcrop complex, 2 to 15 percent slope (406)
Butte County, Idaho; about 13 miles southwest of Atomic City, about 3 miles southwest of Big Southern Butte; about 200 feet south and 1,200 east of the northwest corner of sec. 20, T.1N., R.29E.
Latitude - 43 degrees, 19 minutes, 40 seconds north.
Longitude - 113 degrees, 16 minutes, 03 seconds west.

RANGE IN CHARACTERISTICS

Profile
thickness of the mollic 10 to 15 inches
average annual soil temperature - 44 to 46 degrees F.
depth to the calcic horizon - 14 to 22 inches

Particle-size control section
clay content - 25 to 35 percent
rock fragment content - 0 to 10 percent average

A horizons
value - 4 or 5 dry
chroma - 2 or 3 dry or moist
rock fragment content - 0 to 5 percent

Bt horizon
value - 4 or 5 dry
rock fragment content - 0 to 10 percent

Bk horizons
value - 6 or 7 dry and 4 or 5 moist
chroma - 3 or 4 dry or moist
texture - loam or silty clay loam
rock fragment content - 0 to 15 percent
reaction - slightly or moderately alkaline

TENNO SERIES

CLASSIFICATION

Taxonomic Class: Loamy, mixed, frigid Lithic Xerollic Camborthids

SETTING

Depth Class: 10 to 20 inches to basalt bedrock
Drainage class: well drained
Positions on the landscape: basalt uplands
Slope range: 15 to 30 percent
Parent Material:
kind - eolian
source - alluvium

TYPICAL PEDON DESCRIPTION (2B-KH88)

A--0 to 4 inches; brown (10YR 5/3) stony loam, brown (10YR 3/3) moist; weak thin platy structure; slightly hard, friable, nonsticky and slightly plastic; common very fine and fine roots; 4 percent basalt rock fragments; mildly alkaline (pH 7.6); clear smooth boundary.

Bw--4 to 11 inches: yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; common very fine and fine tubular pores; 5 percent basalt rock fragments; mildly alkaline (pH 7.8); clear wavy boundary.

Bk--11 to 18 inches: light gray (10YR 7/2) loam, very pale brown (10YR 7/3) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; 10 percent basalt rock fragments; strong effervescence (15 percent calcium carbonate equivalent); mildly alkaline (pH 7.8); abrupt wavy boundary.

R--18 inches: lime-coated, unfractured basalt bedrock.

TYPICAL PEDON LOCATION: Butte County, Idaho; approximately 1,290 feet north and 1,500 west of the southeast corner of Section 28, T. 4N., R. 26E.

RANGE IN CHARACTERISTICS

Profile:
average annual soil temperature - 39 to 46 degrees F.

Particle-size control section:
clay content - 8 to 18 percent
depth to basalt bedrock 10 to 20 inches
rock fragment content - 0 to 30 percent

A horizon:
value - 4 to 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
reaction - mildly or moderately alkaline

Bw horizon:

value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 4 dry or moist
texture - loam, silt loam or stony loam
reaction - mildly or moderately alkaline

Bk horizon:

value - 6 or 7 dry; 4 or 5 moist
chroma - 2 or 3 dry or moist
texture - loam, silt loam or stony loam
reaction - moderately or strongly alkaline

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	percent	percent
0-5	ST-L	8-18	20-30	NP-10	1.20-1.40	0.6-2.0	0.14-0.15	7.4-8.4	-	-	8-15	-
0-5	STV-L	8-18	20-30	NP-10	1.20-1.40	0.6-2.0	0.11-0.13	7.4-8.4	-	-	7-15	3-15
5-17	L,ST-L	8-18	20-30	NP-10	1.25-1.45	0.6-2.0	0.11-0.13	7.4-8.4	0-2	-	7-15	15-20

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

TERRETON SERIES

The Terreton soils are in level to sloping old lake bottoms. Typically, Terreton soils have light brownish gray calcareous silty clay loam A horizons and light brownish gray and light gray strongly calcareous clay C1 and C2 horizons over laminated and massive stratified silty clay loam and clay. The natural vegetation is mainly big sagebrush, rabbitbrush, and dropseed, Elymus species, horsebrush, and winterfat.

CLASSIFICATION
Taxonomic Class: Fine, montmorillonitic, (calcareous), frigid Typic Torriorthents

SETTING
Depth Class: very deep (>60 inches)
Drainage and permeability: well-drained (no mottles); very slow runoff; slow permeability. Slight influence from excess water. A water table is below a depth of 40 inches in some pedons.
Positions on the landscape: ancestral lake bottoms (lacustrine) or large playas
Slope range: 0 to 4 percent
Parent Material:
kind - lacustrine
source - several rivers and creeks

TYPICAL PEDON DESCRIPTION

Ap--0 to 6 inches; light brownish gray (10YR 6/2) silty clay loam, olive brown (2.5Y 4/3) moist; very weak medium subangular blocky structure, moderate very thin platy in upper 2 inches; hard, firm, slightly sticky, slightly plastic; many very fine and few fine and medium roots; common very fine tubular pores in the lower 4 inches; moderately calcareous; moderately alkaline (pH 8.2); abrupt smooth boundary.

C1--6 to 10 inches; light brownish gray (10YR 6/2) clay, olive brown (2.5Y 4/4) moist; weak medium prismatic structure that parts to weak medium and fine subangular blocky structure; hard, friable, sticky and plastic; tubular pores; strongly calcareous, few fine lime veins and splotches in lower part; mildly alkaline (pH 8.0); clear smooth boundary.

C2--10 to 31 inches; light gray (10YR 6/1) clay, light olive brown (2.5Y 5/3) moist; laminated and parts to weak medium and fine subangular blocky structure; hard, firm, sticky and plastic; common very fine and few fine roots; many dead roots and cracks between peds; many very fine tubular pores; strongly calcareous, common lime veins and splotches; mildly alkaline (pH 8.0); gradual smooth boundary.

IIC3--31 to 51 inches; light brownish gray (2.5Y 6/2) silty clay loam, light olive brown (2.5Y 5/3) moist; massive; common very fine and few fine brown (2.5Y 5/3) moist; massive; common very fine and few fine roots; many very fine tubular pores; strongly calcareous; mildly alkaline (pH 7.9); gradual smooth boundary.

IIIC4--51 to 62 inches; light gray (2.5Y 7/2) clay with spots of gray, light olive brown (2.5Y 5/3) moist; massive; hard, firm, sticky and very plastic; 1 to 3 inch lenses of sandy loam and loam that are gray (10YR 5/1) and grayish brown (2.5Y 5/2) moist; strongly calcareous; mildly alkaline (pH 7.9).

TYPICAL PEDON LOCATION: Jefferson County, Idaho; 4 mile east and 2 miles north of Terreton; 10 feet north of road; 528 feet east of the SW corner of Section 3, T.6N., R.33E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature: 43 to 46 degrees F.

mean summer temperature: 62 to 65 degrees F (at a depth of 20 inches)

Particle-size control section:

clay content - 35 to 50 percent

coarse fragments - < 15 percent

There is a continuous zone of free carbonates in all parts of the fine earth fraction between depths of 10 and 20 inches

The lower part of the control section is stratified in some pedons. Mottles or other evidence of wetness are below 40 inches in some pedons.

COMPETING SERIES AND THEIR DIFFERENTIAE

These are the Dollard, Monteview, Ragtown, and Sunburst series. Dollard and Sunburst soils are dry in all parts of the moisture control section less than 3/4 of the time (cumulative) that the soil temperature at a depth of 20 inches is 41 degrees F. or more. Monteview soils average 27 to 35 percent clay in the control section. Ragtown soils have mean annual temperature warmer than 47 degrees F.

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-6	SICL	28-40	30-45	10-25	1.40-1.55	0.2-0.6	0.16-0.19	7.9-8.4	0-2	-	-	-
0-6	L,SIL	20-27	25-40	5-15	1.40-1.55	0.6-2.0	0.14-0.18	7.9-8.4	0-2	-	-	-
0-6	C	40-48	35-50	15-30	1.40-1.55	0.06-0.2	0.16-0.18	7.9-8.4	0-2	-	-	-
6-60	SR-C-SICL	35-45	35-50	15-30	1.50-1.70	0.06-0.2	0.16-0.18	7.9-8.4	0-2	-	-	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

TYPIC CAMBORTHIDS

CLASSIFICATION
Taxonomic Class: Typic Camborthids (coarse loamy over loamy or sandy skeletal)

SETTING
Depth Class: deep
Drainage class: well drained
Positions on the landscape: alluvial plain
Parent Material:
kind - alluvium
source - Big Lost River
Elevation: 4,800 to 5,000 feet
Climatic data (average annual):
precipitation - 8 to 12 inches
air temperature - 40 to 50 degrees F
frost-free period - about 75 days

TYPICAL PEDON DESCRIPTION
not available

TYPIC TORRIFLUVENTS

CLASSIFICATION
Taxonomic Class: Typic Torrifluvents

SETTING
Depth Class: deep
Drainage class: well
Positions on the landscape: alluvial plain
Parent Material:
kind - alluvium
source - Big Lost River

TYPICAL PEDON DESCRIPTION
not available

TYPICAL PEDON LOCATION
not available

WHITEKNOB SERIES

The Whiteknob series consists of deep, well drained soils that formed in mixed alluvium on alluvial fans and terraces. Vegetation is mainly dwarf sagebrush, Indian ricegrass, squirreltail, shadscale and winterfat.

CLASSIFICATION
Taxonomic Class: Sandy-skeletal, mixed, frigid, Xerollic Calciorthids

SETTING
Depth Class: very deep (60 inches or more)
Drainage class: somewhat excessively drained
Permeability: moderate
Positions on the landscape: fan terraces, stream terraces
Slope range: 0 to 8 percent
Parent Material:
kind - alluvium
source - mixed

TYPICAL PEDON DESCRIPTION

A--0 to 5 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; weak think platy structure parting to moderate fine granular; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine vesicular pores; strongly effervescent; strongly alkaline (pH 8.5); abrupt smooth boundary.

Bk--5 to 10 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine, common fine, and few medium roots; many very fine and common fine tubular pores; strongly effervescent; moderately alkaline (pH 8.2); abrupt wavy boundary.

2Bkq1--10 to 18 inches; light gray (10YR 7/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; single grain; loose; nonsticky and nonplastic; many very fine, common fine and few medium roots; many fine and medium interstitial pores; 90 percent gravel; lime and silica coatings 1 to 2 mm thick on lower side, 1 mm thick on upper side of coarse fragments; violently effervescent; moderately alkaline (pH 8.3); clear wavy boundary.

2Bkq2--18 to 60 inches; gray (10YR 6/1) extremely gravelly sand, dark gray (10YR 4/1) moist; single grain; loose; nonsticky and nonplastic; common very fine roots; many fine and medium interstitial pores; 90 percent gravel; lime and silica coatings 1 to 2 mm thick on lower side of coarse fragments; strongly effervescent; moderately alkaline (pH 8.0).

TYPICAL PEDON LOCATION: Butte County, Idaho; about 15 miles northwest of Howe, Idaho, about 2,310 feet south and 1,320 feet west of the northeast corner of Section 25, T. 8N, R. 27E

RANGE IN CHARACTERISTICS
Profile:
average annual soil temperature - 43 to 45 degrees F
average summer soil temperature - 59 to 66 degrees F
depth to calcic horizon - 6 to 12 inches

depth to contrasting sand and gravel - 12 to 20 inches
reaction - moderately or strongly alkaline

Particle-size control section:
coarse fragments - 55 to 80 percent

A horizon:
hue - 10 YR or 2.5Y
value - 5 or 6 dry; 3 or 4 moist
chroma - 2 or 3 dry or moist
coarse fragments - 0 to 30 percent

Bk horizon:
value - 3 or 4 moist
chroma - 2 to 4 dry or moist
texture - loam, gravelly loam, or very gravelly loam

2Bkg horizons:
value - 5 to 7 dry; 3 to 5 moist
chroma - 1 to 3 dry or moist
calcium carbonate equivalent - 15 to 30 percent
texture - extremely gravelly sandy loam, extremely gravelly loamy coarse sand, or extremely gravelly sand

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/cm	me/100g	meg/100g	percent
0-5	GR-L	10-18	20-25	5-10	1.50-1.55	0.6-2.0	0.11-0.14	7.4-9.0	0-2	-	9-10	
0-5	L	10-18	20-25	5-10	1.50-1.55	0.6-2.0	0.14-0.17	7.4-9.0	0-2	-	9-10	
0-5	GRV-L	10-18	20-25	NP-10	1.35-1.45	0.6-2.0	0.09-0.12	7.4-8.4	0-2	-	8-20	
5-10	L,GR-L	10-18	20-25	5-10	1.50-1.60	0.6-2.0	0.11-0.17	7.4-9.0	0-2	-	8-15	
10-18	GRV-L,GRV-SL,GRX-SL	5-10	15-20	NP-5	1.40-1.50	2.0-6.0	0.05-0.10	7.4-9.0	0-2	-	5-9	
18-60	GRV-S,GRX-LCOS,GRX-S	3-8	10-15	NP-5	1.40-1.50	20-20.0	0.03-0.05	7.4-9.0	0-2	-	3-7	

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

ZWIEFEL SERIES

Zwiefel series consists of deep, well drained soils that formed in eolian sand over lacustrine deposits. These soils are in hummocky areas on playas. The principle natural vegetation is big sagebrush, Indian ricegrass, and needle-and-thread grass.

CLASSIFICATION

Taxonomic Class: Sandy over clayey, mixed, (calcareous) Xeric Torriorthents

SETTING

Depth Class: deep (40-60 inches)
Drainage class: well
Runoff: very slow and slow
Permeability: very rapid
Positions on the landscape: in areas of accumulated sand
Slope range: 0 to 20 percent
Parent Material:

kind - eolian over lacustrine

source - eolian sand from Big Lost River and possibly Snake River; lacustrine sediments in the ancestral Lake Terreton

TYPICAL PEDON DESCRIPTION

A1--0 to 3 inches; grayish brown (10YR 5/2) fine sand, dark grayish brown (10YR 4/2) moist; single grained; loose; many very fine and fine roots; many very fine interstitial pores; moderately calcareous; moderately alkaline (pH 8.2); abrupt wavy boundary.

C1--3 to 13 inches; grayish brown (10YR 5/2) fine sand, dark grayish brown (10YR 4/2) moist; massive; soft, very friable; many very fine and fine roots; few very fine and fine tubular pores; strongly calcareous; moderately alkaline (pH 8.2); clear wavy boundary.

C2--13 to 21 inches; grayish brown (10YR 5/2) fine sand, very dark grayish brown (10YR 3/2) moist; single grained; loose; few very fine and fine roots; many very fine and fine interstitial pores; slightly calcareous; moderately alkaline (pH 8.2); clear wavy boundary.

IIC3--21 to 28 inches; light brownish gray (2.5Y 6/2) sandy clay, grayish brown (2.5Y 5/2) moist; weak thin platy structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; many very fine and fine tubular pores; strongly calcareous; moderately alkaline (pH 8.2); clear wavy boundary.

IIC4ca--28 to 36 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist moderate thin platy structure that parts to moderate very fine angular blocky structure; very hard, firm, very sticky and very plastic; few very fine and fine roots; many very fine and fine tubular pores; many fine lime splotches; strongly calcareous; strongly alkaline (pH 8.6); gradual wavy boundary.

IIC5ca--36 to 60 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; strong thin platy that parts to strong very fine angular blocky structure; very hard, firm, very sticky and very plastic; few very fine roots; many very fine and fine tubular pores; many fine lime splotches; strongly calcareous; strongly alkaline (pH 8.6).

TYPICAL PEDON LOCATION: Jefferson County, Idaho; 4 miles east and 2 miles south of Terreton; 350 feet south, 195 feet east of the NW corner, section 28, T.6N., R.35E.

RANGE IN CHARACTERISTICS

Profile:

average annual soil temperature - 41 to 45 degrees F
average summer soil temperature - 64 to 67 degrees F (at depth of 20")
The soils are usually moist but are dry in all parts of the moisture control section for 45 or more consecutive days in the fall.

Particle-size control section:

upper part: loamy fine sand to sand
lower part: heavy silty clay loam to clay
average clay content - 34 to 45 percent (in entire control section)

A horizon:

Hue - 2.5Y or 10YR
value - 5 or 6 dry
chroma - 2 or 3
reaction - not calcareous in some pedons

C horizon:

hue - 2.5Y or 10YR
value - 6 to 8 dry

TYPIC CALCIORTHIDS

CLASSIFICATION

Taxonomic Class: Typic Calciorthids (coarse loamy over loamy or sandy skeletal)

SETTING

Depth Class: deep
Drainage class: well drained
Positions on the landscape: alluvial plains
Parent Material:

kind - alluvium
source - Big Lost River

TYPICAL PEDON DESCRIPTION

not available

TYPICAL PEDON LOCATION: not available

SOIL CHARACTERISTICS

DEPTH	TEXTURE	CLAY	LIQUID LIMIT	PLASTICITY INDEX	BULK DENSITY	PERME-ABILITY	AWC	pH	Sal	SAR	CEC	$CaCo_3$
inches	USDA	percent	percent		g/cm^3	in/hr	in/in		mmhos/ cm	me/ 100g	meg/ 100g	percent
0-3	FS,S	0-5	-	NP	-	20-20.0	0.05-0.07	7.9-8.4	-	-	-	-
0-3	LS	0-10	-	NP	-	6.0-20	0.07-0.10	7.9-8.4	-	-	-	-
3-21	FS	0-5	-	NP	-	6.0-20	0.11-0.13	7.9-8.4	-	-	-	-
21-28	SC	35-45	30-50	10-30	-	0.06-0.2	0.15-0.18	8.5-9.0	0-2	-	-	-
28-60	SIC	40-60	45-60	20-35	-	0.06-0.2	0.15-0.18	8.5-9.0	0-2	-	-	-

AWC - Available Water Capacity
Sal - Salinity
SAR - Sodium Adsorption Ratio
CEC - Cation Exchange Capacity

APPENDIX C
NRCS TABLES

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Clay (pct)	Moist Blk Density (g/cm3)	Permeability (In/hr)	Available water cap (In/in)	Soil React (ph)	Salinity (mmhos/cm)	Shrink Swell Pot.	Erosion Factor K	Erosion Factor T	Wind Erod. Group	Organic Matter (pct)
MB1	MOORETOWN	0- 3	12-20	1.10-1.20	0.60- 2.00	0.15-0.18	6.6-7.8	-	LOW	.37	5	4L	2.0- 4.0
		3-35	12-20	1.15-1.30	0.60- 2.00	0.12-0.15	6.6-7.8	-	LOW	.32			1.0- 3.0
		35-50	5-10	1.20-1.40	6.00-20.00	0.07-0.12	6.6-7.8	-	LOW	.28			1.0- 2.0
		50-60	5-10	1.20-1.40	6.00-20.00	0.04-0.08	6.6-7.8	-	LOW	.10			0.5- 1.0
	BORAH	0- 4	8-15	1.15-1.30	0.60- 2.00	0.05-0.10	7.4-8.4	0- 2	LOW	.15	5	7	1.0- 3.0
		4-12	8-15	1.20-1.40	2.00- 6.00	0.05-0.10	7.4-8.4	0- 2	LOW	.10			1.0- 2.0
		12-60	1- 6	1.20-1.40	20.00-20.00	0.01-0.03	7.9-8.4	-	LOW	.05			0.5- 1.0
1	AECET	0- 5	5-15	1.60-1.70	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.17	2	6	0.5- 1.0
		5-13	18-35	1.40-1.50	0.20- 0.60	0.19-0.21	7.9-9.0	0- 2	MODER	.20			0.0- 0.5
		13-23	18-35	1.40-1.50	0.20- 0.60	0.10-0.21	7.9-9.0	0- 2	MODER	.20			0.0- 0.5
		23-27	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
9	BERENICETON	0- 3	15-20	1.20-1.40	0.60- 2.00	0.19-0.21	7.9-8.4	0- 2	LOW	.37	3	4L	0.5- 1.0
		3-14	18-25	1.25-1.45	0.60- 2.00	0.16-0.18	8.5-9.0	0- 2	LOW	.28			0.5- 1.0
		14-46	28-35	1.25-1.50	0.20- 0.60	0.19-0.21	8.5-9.0	0- 2	MODER	.20			0.0- 0.5
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
12	BERENICETON	0- 3	15-20	1.20-1.40	0.60- 2.00	0.19-0.21	7.9-8.4	0- 2	LOW	.37	3	4L	0.5- 1.0
		3-14	18-25	1.25-1.45	0.60- 2.00	0.16-0.18	8.5-9.0	0- 2	LOW	.28			0.5- 1.0
		14-46	28-35	1.25-1.50	0.20- 0.60	0.19-0.21	8.5-9.0	0- 2	MODER	.20			0.0- 0.5
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	AECET	0- 5	10-24	1.40-1.50	0.60- 2.00	0.16-0.18	7.4-8.4	0- 0	LOW	.32	2	5	1.0- 2.0
		5-13	18-35	1.40-1.50	0.20- 0.60	0.19-0.21	7.4-9.0	0- 2	MODER	.20			0.5- 1.0
		13-23	18-35	1.40-1.50	0.20- 0.60	0.19-0.21	7.9-9.0	0- 2	MODER	.20			0.0- 0.5
		23-27	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
13	BERENICETON	0- 3	5-15	1.30-1.50	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.17	3	3	0.5- 1.0
		3-14	18-25	1.20-1.40	0.60- 2.00	0.16-0.18	8.5-9.0	0- 2	LOW	.28			0.5- 1.0
		14-46	28-35	1.30-1.50	0.20- 0.60	0.19-0.21	8.5-9.0	0- 2	MODER	.20			0.0- 0.5
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	AECET	0- 5	5-15	1.60-1.70	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.17	2	6	0.5- 1.0
		5-13	18-35	1.40-1.50	0.20- 0.60	0.19-0.21	7.9-9.0	0- 2	MODER	.20			0.0- 0.5
		13-23	18-35	1.40-1.50	0.20- 0.60	0.10-0.21	7.9-9.0	0- 2	MODER	.20			0.0- 0.5
		23-27	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
14	BERENICETON	0- 3	15-20	1.20-1.40	0.60- 2.00	0.19-0.21	7.9-8.4	0- 2	LOW	.37	3	4L	0.5- 1.0
		3-14	18-25	1.25-1.45	0.60- 2.00	0.16-0.18	8.5-9.0	0- 2	LOW	.28			0.5- 1.0
		14-46	28-35	1.25-1.50	0.20- 0.60	0.19-0.21	8.5-9.0	0- 2	MODER	.20			0.0- 0.5
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	TERRETON	0- 6	20-27	1.40-1.55	0.60- 2.00	0.14-0.18	7.9-8.4	0- 2	LOW	.32	5	4L	0.0- 0.2
		6-60	35-45	1.50-1.70	0.06- 0.20	0.16-0.18	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
	AECET	0- 5	10-24	1.40-1.50	0.60- 2.00	0.16-0.18	7.4-8.4	0- 0	LOW	.32	2	5	1.0- 2.0
		5-13	18-35	1.40-1.50	0.20- 0.60	0.19-0.21	7.4-9.0	0- 2	MODER	.20			0.5- 1.0
		13-23	18-35	1.40-1.50	0.20- 0.60	0.19-0.21	7.9-9.0	0- 2	MODER	.20			0.0- 0.5
		23-27	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
15	BERENICETON	0- 3	15-20	1.20-1.40	0.60- 2.00	0.19-0.21	7.9-8.4	0- 0	LOW	.32	3	4L	1.0- 2.0
		3-14	18-25	1.20-1.40	0.60- 2.00	0.16-0.18	8.5-9.0	0- 2	LOW	.28			0.5- 1.0
		14-46	28-35	1.30-1.50	0.20- 0.60	0.19-0.21	8.5-9.0	0- 2	MODER	.20			0.0- 0.5
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Clay (pct)	Moist Blk Density (g/cm3)	Permeability (In/hr)	Available water cap (In/in)	Soil React (ph)	Salinity (mmhos/cm)	Shrink Swell Pot.	Erosion Factor K	Erosion Factor T	Wind Erod. Group	Organi Matter (pct)
	TERRETON	0- 6	18-27	1.30-1.45	0.20- 0.60	0.19-0.21	7.9-8.4	0- 2	MODER	.28	5	4L	0.5- 1.0
		6-31	40-55	1.40-1.50	0.06- 0.20	0.14-0.16	7.9-8.4	0- 2	HIGH	.20			0.0- 0.5
		31-51	28-40	1.35-1.50	0.20- 0.60	0.19-0.21	7.9-8.4	0- 2	MODER	.32			0.0- 0.5
		51-60	40-55	1.40-1.55	0.06- 0.20	0.14-0.16	7.9-8.4	0- 2	HIGH	.20			0.0- 0.5
20	BONDFARM	0- 4	5-15	1.50-1.60	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.17	1	3	0.8- 2.0
		4-18	5-18	1.50-1.60	2.00- 6.00	0.11-0.13	7.9-8.4	0- 2	LOW	.17			0.4- 1.0
		18-22	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
21	BONDFARM	0- 4	2- 8	1.50-1.60	2.00- 6.00	0.06-0.08	7.9-8.4	0- 0	LOW	.10	1	2	0.4- 1.0
		4-18	5-18	1.50-1.60	2.00- 6.00	0.11-0.13	7.9-8.4	0- 2	LOW	.17			0.4- 1.0
		18-22	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	GRASSY BUTTE	0- 7	5-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 0	LOW	.10	5	2	0.0- 0.2
		7-60	2-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.2
24	DISTON	0- 5	0- 8	1.45-1.55	6.00-20.00	0.06-0.08	7.9-8.4	0- 0	LOW	.10	2	2	0.5- 1.0
		5-31	0- 5	1.45-1.60	6.00-20.00	0.05-0.08	7.9-8.4	0- 0	LOW	.10			0.0- 0.5
		31-40	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
		40-60	0- 5	1.50-1.60	6.00-20.00	0.04-0.06	7.9-8.4	0- 0	LOW	.10			0.0- 0.5
31	GRASSY BUTTE	0- 7	0-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 0	LOW	.10	5	1	0.0- 0.2
		7-60	2-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.2
32	GRASSY BUTTE	0- 7	5-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 0	LOW	.10	5	2	0.0- 0.2
		7-60	2-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.2
33	GRASSY BUTTE	0- 7	5-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 0	LOW	.10	5	2	0.0- 0.2
		7-60	2-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.2
34	GRASSY BUTTE	0- 7	5-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 0	LOW	.10	5	2	0.0- 0.2
		7-60	2-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.2
37	GRASSY BUTTE	0- 7	5-12	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10	5	2	0.5- 1.0
		7-60	5-12	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.5
61	LIDY	0- 5	4-18	1.45-1.65	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.20	2	3	1.0- 2.0
		5-29	4-18	1.45-1.65	2.00- 6.00	0.11-0.13	7.9-8.4	0- 2	LOW	.20			0.5- 1.0
		29-60	0- 5	1.60-1.70	20.00-20.00	0.03-0.05	7.9-8.4	0- 2	LOW	.02			0.0- 0.5
63	LIDY	0- 5	8-20	1.45-1.65	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.28	2	4L	1.0- 2.0
		5-29	4-18	1.45-1.65	2.00- 6.00	0.11-0.13	7.9-8.4	0- 2	LOW	.20			0.5- 1.0
		29-60	0- 5	1.60-1.70	20.00-20.00	0.03-0.05	7.9-8.4	0- 2	LOW	.02			0.0- 0.5
64	MALM	0- 4	2-10	1.50-1.60	2.00- 6.00	0.06-0.08	7.4-9.0	0- 2	LOW	.10	2	2	1.0- 2.0
		4-24	7-15	1.50-1.60	2.00- 6.00	0.11-0.13	7.4-9.0	0- 2	LOW	.20			0.5- 1.0
		24-28	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	MATHESON	0-10	5-10	1.20-1.40	6.00-20.00	0.06-0.08	7.4-8.4	0- 2	LOW	.10	4	2	0.5- 1.0
		10-46	5-15	1.20-1.40	2.00- 6.00	0.11-0.13	7.4-8.4	0- 2	LOW	.20			0.5- 1.0
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
66	MALM	0- 4	2-10	1.50-1.60	2.00- 6.00	0.06-0.08	7.4-9.0	0- 2	LOW	.10	2	2	1.0- 2.0
		4-24	7-15	1.50-1.60	2.00- 6.00	0.11-0.13	7.4-9.0	0- 2	LOW	.20			0.5- 1.0
		24-28	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	MATHESON	0-10	5-10	1.20-1.40	6.00-20.00	0.06-0.08	7.4-8.4	0- 2	LOW	.10	4	2	0.5- 1.0
		10-46	5-15	1.20-1.40	2.00- 6.00	0.11-0.13	7.4-8.4	0- 2	LOW	.20			0.5- 1.0
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
67	MALM	0- 4	10-20	1.45-1.60	2.00- 6.00	0.13-0.15	7.4-9.0	0- 2	LOW	.10	2	3	1.0- 2.0

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Clay (pct)	Moist Blk Density (g/cm3)	Permeability (In/hr)	Available water cap (In/in)	Soil React (ph)	Salinity (mmhos/cm)	Shrink Swell Pot.	Erosion Factor K	Erosion Factor T	Wind Erod. Group	Organic Matter (pct)
		4-24	8-18	1.45-1.60	2.00- 6.00	0.11-0.13	7.4-9.0	0- 2	LOW	.20			0.5- 2.0
		24-28	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	BONDFARM	0- 4	5-15	1.50-1.60	2.00- 6.00	0.11-0.13	7.9-8.4	0- 0	LOW	.17	1	3	0.8- 2.0
		4-18	5-18	1.50-1.60	2.00- 6.00	0.11-0.13	7.9-8.4	0- 2	LOW	.17			0.4- 1.0
		18-22	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
70	MATHESON	0-10	5-10	1.20-1.40	6.00-20.00	0.06-0.08	7.4-8.4	0- 2	LOW	.10	4	2	0.5- 1.0
		10-60	5-15	1.20-1.40	2.00- 6.00	0.11-0.13	7.4-8.4	0- 2	LOW	.20			0.5- 1.0
78	MATHESON	0-10	5-10	1.20-1.40	6.00-20.00	0.06-0.08	7.4-8.4	0- 2	LOW	.10	4	2	0.5- 1.0
		10-46	5-15	1.20-1.40	2.00- 6.00	0.11-0.13	7.4-8.4	0- 2	LOW	.20			0.5- 1.0
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
	MATHESON	0-10	10-20	1.10-1.20	2.00- 6.00	0.16-0.18	7.4-8.4	0- 2	LOW	.32	3	4	1.0- 3.0
		10-46	5-15	1.20-1.40	2.00- 6.00	0.11-0.13	7.4-8.4	0- 2	LOW	.20			0.5- 1.0
		46-50	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
99	PANCHERI	0- 8	8-17	1.35-1.50	0.60- 2.00	0.18-0.20	7.4-9.0	0- 2	LOW	.43	5	4L	1.0- 2.0
		8-60	5-18	1.40-1.60	0.60- 2.00	0.19-0.21	7.4-9.0	0- 2	LOW	.55			0.0- 1.0
	MODKIN	0- 6	8-14	1.50-1.60	2.00- 6.00	0.11-0.13	6.6-8.4	0- 2	LOW	.10	2	3	0.6- 1.0
		6-32	8-14	1.60-1.70	2.00- 6.00	0.11-0.13	6.6-8.4	0- 2	LOW	.20			0.0- 0.5
		32-36	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0
107	TERRETON	0- 6	0- 6	1.45-1.65	6.00-20.00	0.06-0.10	7.9-8.4	0- 2	LOW	.15	5	2	0.0- 0.2
		6-60	35-50	1.50-1.70	0.06- 0.20	0.16-0.19	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
108	TERRETON	0- 6	4-14	1.35-1.55	2.00- 6.00	0.08-0.12	7.9-8.4	0- 2	LOW	.17	5	3	0.0- 0.2
		6-60	35-50	1.50-1.70	0.06- 0.20	0.16-0.19	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
109	TERRETON	0- 6	20-27	1.40-1.55	0.60- 2.00	0.14-0.18	7.9-8.4	0- 2	LOW	.32	5	4L	0.0- 0.2
		6-60	35-45	1.50-1.70	0.06- 0.20	0.16-0.18	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
111	TERRETON	0- 6	28-40	1.40-1.55	0.20- 0.60	0.16-0.19	7.9-8.4	0- 2	MODER	.37	5	4L	0.5- 1.0
		6-60	35-45	1.50-1.70	0.06- 0.20	0.16-0.18	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
115	TERRETON	0- 6	18-30	1.40-1.60	0.20- 0.60	0.14-0.18	7.9-8.4	0- 2	MODER	.28	5	4L	0.0- 2.0
		6-60	35-50	1.50-1.70	0.06- 0.20	0.16-0.19	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
116	TERRETON	0- 6	0- 6	1.45-1.65	6.00-20.00	0.06-0.10	7.9-8.4	0- 2	LOW	.15	5	2	0.0- 0.2
		6-60	35-50	1.50-1.70	0.06- 0.20	0.16-0.19	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
	TERRETON	0- 6	18-30	1.40-1.60	0.20- 0.60	0.14-0.18	7.9-8.4	0- 2	MODER	.28	5	4L	0.0- 2.0
		6-60	35-50	1.50-1.70	0.06- 0.20	0.16-0.19	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
117	TERRETON	0- 6	28-40	1.40-1.55	0.20- 0.60	0.16-0.19	7.9-8.4	0- 2	MODER	.37	5	4L	0.5- 1.0
		6-60	35-45	1.50-1.70	0.06- 0.20	0.16-0.18	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
	ZWIEFEL	0- 3	0- 5	1.60-1.70	20.00-20.00	0.05-0.07	7.9-8.4	0- 0	LOW	.10	3	1	0.0- 0.3
		3-21	0- 5	1.60-1.70	6.00-20.00	0.11-0.13	7.9-8.4	0- 0	LOW	.10			0.0- 0.3
		21-28	35-45	1.30-1.50	0.06- 0.20	0.15-0.18	8.5-9.0	0- 2	HIGH	.20			0.0- 0.3
		28-60	40-60	1.20-1.40	0.06- 0.20	0.15-0.18	8.5-9.0	0- 2	HIGH	.32			0.0- 0.3
126	ZWIEFEL	0- 3	0- 5	1.60-1.70	20.00-20.00	0.05-0.07	7.9-8.4	0- 0	LOW	.10	3	1	0.0- 0.3
		3-21	0- 5	1.60-1.70	6.00-20.00	0.11-0.13	7.9-8.4	0- 0	LOW	.10			0.0- 0.3
		21-28	35-45	1.30-1.50	0.06- 0.20	0.15-0.18	8.5-9.0	0- 2	HIGH	.20			0.0- 0.3
		28-60	40-60	1.20-1.40	0.06- 0.20	0.15-0.18	8.5-9.0	0- 2	HIGH	.32			0.0- 0.3
130	ZWIEFEL	0- 3	0- 5	1.60-1.70	20.00-20.00	0.05-0.07	7.9-8.4	0- 0	LOW	.10	3	1	0.0- 0.3
		3-21	0- 5	1.60-1.70	6.00-20.00	0.11-0.13	7.9-8.4	0- 0	LOW	.10			0.0- 0.3
		21-28	35-45	1.30-1.50	0.06- 0.20	0.15-0.18	8.5-9.0	0- 2	HIGH	.20			0.0- 0.3

PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Clay (pct)	Moist Blk Density (g/cm3)	Permeability (In/hr)	Available water cap (In/in)	Soil React (ph)	Salinity (mmhos/cm)	Shrink Swell Pot.	Erosion Factor K	Erosion Factor T	Wind Erod. Group	Organic Matter (pct)
		28-60	40-60	1.20-1.40	0.06- 0.20	0.15-0.18	8.5-9.0	0- 2	HIGH	.32			0.0- 0.3
	GRASSY BUTTE	0- 7	0-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 0	LOW	.10	5	1	0.0- 0.2
		7-60	2-10	1.60-1.70	6.00-20.00	0.06-0.08	6.6-8.4	0- 2	LOW	.10			0.0- 0.2
	TERRETON	0- 6	0- 6	1.45-1.65	6.00-20.00	0.06-0.10	7.9-8.4	0- 2	LOW	.15	5	2	0.0- 0.2
		6-60	35-50	1.50-1.70	0.06- 0.20	0.16-0.19	7.9-8.4	0- 2	HIGH	.37			0.0- 1.0
22	PANCHERI	0- 6	8-17	1.35-1.50	0.60- 2.00	0.19-0.21	7.4-8.4	0- 2	LOW	.49	5	4L	1.0- 2.0
		6-10	5-18	1.35-1.50	0.60- 2.00	0.19-0.21	7.9-9.0	0- 2	LOW	.55			0.5- 1.0
		10-60	5-18	1.40-1.60	0.60- 2.00	0.11-0.13	7.4-9.0	2- 8	LOW	.55			0.0- 0.5
23	PANCHERI	0- 6	8-17	1.35-1.50	0.60- 2.00	0.19-0.21	7.4-8.4	0- 2	LOW	.49	5	4L	1.0- 2.0
		6-10	5-18	1.35-1.50	0.60- 2.00	0.19-0.21	7.9-9.0	0- 2	LOW	.55			0.5- 1.0
		10-60	5-18	1.40-1.60	0.60- 2.00	0.11-0.13	7.4-9.0	2- 8	LOW	.55			0.0- 0.5
24	PANCHERI	0- 6	8-17	1.35-1.50	0.60- 2.00	0.19-0.21	7.4-8.4	0- 2	LOW	.49	5	4L	1.0- 2.0
		6-10	5-18	1.35-1.50	0.60- 2.00	0.19-0.21	7.9-9.0	0- 2	LOW	.55			0.5- 1.0
		10-60	5-18	1.40-1.60	0.60- 2.00	0.11-0.13	7.4-9.0	2- 8	LOW	.55			0.0- 0.5
33	POLATIS	0- 6	5-18	1.50-1.60	0.60- 2.00	0.19-0.21	7.4-9.0	0- 2	LOW	.49	2	4L	1.0- 2.0
		6-31	10-18	1.50-1.60	0.60- 2.00	0.19-0.21	7.4-9.0	2- 4	LOW	.55			0.0- 0.5
		31-35	-	0.00-0.00	0.00- 0.00	0.00-0.00	0.0-0.0	-					0.0- 0.0

ENGINEERING INDEX PROPERTIES
TABLE 1

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	USDA Texture	Classification	
				Unified	AASHTO
MB1	MOORETOWN	0- 3	L	CL-ML	A-4
		3-35	L SL	SC-SM CL-ML	A-4
		35-50	SL LS	SM ML	A-4
		50-60	GR-SL GRV-LS GRX-LS	GM	A-1 A-4 A-2
	BORAH	0- 4	GRV-L	GM	A-2
		4-12	GRV-L GRV-SL	GM	A-2
		12-60	GRX-S GRX-LCOS CBX-S	GP GP-GM	A-1
1	AECET	0- 5	STV-SL	SM	A-2 A-4
		5-13	CL L SCL	CL	A-6 A-7
		13-23	CL CB-CL ST-L	CL	A-6 A-7
		23-27	UWB		
9	BERENICETON	0- 3	L	ML CL-ML	A-4
		3-14	L	CL-ML ML	A-4
		14-46	CL	ML CL	A-6 A-7
		46-50	UWB		
12	BERENICETON	0- 3	L	ML CL-ML	A-4
		3-14	L	CL-ML ML	A-4
		14-46	CL	ML CL	A-6 A-7
		46-50	UWB		
	AECET	0- 5	L	ML	A-4
		5-13	CL L SIL	CL	A-6 A-7
		13-23	CL CB-CL CB-L	CL	A-6 A-7
		23-27	UWB		
13	BERENICETON	0- 3	STV-SL	SM	A-2 A-4
		3-14	L	ML CL-ML	A-4
		14-46	CL	ML CL	A-6 A-7
		46-50	UWB		
	AECET	0- 5	STV-SL	SM	A-2 A-4
		5-13	CL L SCL	CL	A-6 A-7
		13-23	CL CB-CL ST-L	CL	A-6 A-7
		23-27	UWB		
14	BERENICETON	0- 3	SIL	ML CL-ML	A-4
		3-14	L	CL-ML ML	A-4
		14-46	CL	ML CL	A-6 A-7
		46-50	UWB		
	TERRETON	0- 6	SIL	CL-ML CL	A-4 A-6
		6-60	SR C SICL	CL	A-6 A-7
	AECET	0- 5	L	ML	A-4
		5-13	CL L SIL	CL	A-6 A-7
		13-23	CL CB-CL CB-L	CL	A-6 A-7
		23-27	UWB		
15	BERENICETON	0- 3	STV-SIL	ML CL-ML	A-4
		3-14	L	ML CL-ML	A-4
		14-46	CL	ML CL	A-6 A-7

ENGINEERING INDEX PROPERTIES
TABLE 1

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	USDA Texture	Classification	
				Unified	AASHTO
		46-50	UWB		
	TERRETON	0- 6	STV-SIL	CL-ML	A-4
		6-31	C	CL CH	A-7
		31-51	SICL	CL	A-6 A-7
		51-60	C	CL CH	A-7
20	BONDFARM	0- 4	SL	SM	A-2 A-4
		4-18	SL FSL L	SM SC-SM	A-2 A-4
		18-22	UWB		
21	BONDFARM	0- 4	LS	SM	A-2
		4-18	SL FSL L	SM SC-SM	A-2 A-4
		18-22	UWB		
	GRASSY BUTTE	0- 7	LS	SM	A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
24	DISTON	0- 5	LS	SM	A-2
		5-31	LS	SM	A-2
		31-40	IND		
		40-60	S	SP SM SP-SM	A-2 A-3
31	GRASSY BUTTE	0- 7	S	SP-SM SM	A-3 A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
32	GRASSY BUTTE	0- 7	LS	SM	A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
33	GRASSY BUTTE	0- 7	LS	SM	A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
34	GRASSY BUTTE	0- 7	LS	SM	A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
37	GRASSY BUTTE	0- 7	STV-LS	SM	A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
61	LIDY	0- 5	SL	SM	A-2 A-4
		5-29	SL	SM	A-2 A-4
		29-60	SG	GP	A-1
63	LIDY	0- 5	GR-L	SM GM	A-4
		5-29	SL	SM	A-2 A-4
		29-60	SG	GP	A-1
64	MALM	0- 4	LS	SM	A-2
		4-24	FSL VFSL	SM	A-2 A-3
		24-28	UWB		
	MATHESON	0-10	LS	SM	A-2
		10-46	SL VFSL SL	SM	A-2 A-4
		46-50	UWB		
66	MALM	0- 4	LS	SM	A-2
		4-24	FSL VFSL	SM	A-2 A-3
		24-28	UWB		
	MATHESON	0-10	LS	SM	A-2
		10-46	SL VFSL SL	SM	A-2 A-4

ENGINEERING INDEX PROPERTIES
TABLE 1

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	USDA Texture	Classification	
				Unified	AASHTO
		46-50	UWB		
67	MALM	0- 4	STX-SL	SM SC-SM	A-2 A-4
		4-24	FSL	SM	A-4
		24-28	UWB		
	BONDFARM	0- 4	SL	SM	A-2 A-4
		4-18	SL FSL L	SM SC-SM	A-2 A-4
		18-22	UWB		
70	MATHESON	0-10	LS	SM	A-2
		10-60	SL VFSL SL	SM	A-2 A-4
78	MATHESON	0-10	LS	SM	A-2
		10-46	SL VFSL SL	SM	A-2 A-4
		46-50	UWB		
	MATHESON	0-10	L	ML CL-ML	A-4
		10-46	SL VFSL SL	SM	A-2 A-4
		46-50	UWB		
99	PANCHERI	0- 8	ST-SIL	ML	A-4
		8-60	SIL	CL-ML CL ML	A-4
	MODKIN	0- 6	STV-SL	SM	A-2
		6-32	SL	SM	A-2 A-4
		32-36	UWB		
107	TERRETON	0- 6	LS	SM	A-1 A-2
		6-60	SR C SICL	CL	A-6 A-7
108	TERRETON	0- 6	SL	SM	A-4
		6-60	SR C SICL	CL	A-6 A-7
109	TERRETON	0- 6	L	CL-ML CL	A-4 A-6
		6-60	SR C SICL	CL	A-6 A-7
111	TERRETON	0- 6	SICL	CL	A-6 A-7
		6-60	SR C SICL	CL	A-6 A-7
115	TERRETON	0- 6	SCL	CL SC	A-6
		6-60	SR C SICL	CL	A-6 A-7
116	TERRETON	0- 6	LS	SM	A-1 A-2
		6-60	SR C SICL	CL	A-6 A-7
	TERRETON	0- 6	SCL	CL SC	A-6
		6-60	SR C SICL	CL	A-6 A-7
117	TERRETON	0- 6	SICL	CL	A-6 A-7
		6-60	SR C SICL	CL	A-6 A-7
	ZWIEFEL	0- 3	FS	SP-SM SM	A-2 A-3
		3-21	FS	SP SP-SM	A-3
		21-28	SC	CL	A-7 A-6
		28-60	SIC	CL CH	A-7
126	ZWIEFEL	0- 3	FS	SP-SM SM	A-2 A-3
		3-21	FS	SP SP-SM	A-3
		21-28	SC	CL	A-7 A-6
		28-60	SIC	CL CH	A-7

ENGINEERING INDEX PROPERTIES
TABLE 1

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	USDA Texture	Classification	
				Unified	AASHTO
130	ZWIEFEL	0- 3	S	SP-SM SM	A-2 A-3
		3-21	FS	SP SP-SM	A-3
		21-28	SC	CL	A-7 A-6
		28-60	SIC	CL CH	A-7
	GRASSY BUTTE	0- 7	S	SP-SM SM	A-3 A-2
		7-60	LFS S LS	SM SP-SM	A-2 A-3
	TERRETON	0- 6	LS	SM	A-1 A-2
		6-60	SR C SICL	CL	A-6 A-7
22	PANCHERI	0- 6	SIL	ML CL-ML	A-4
		6-10	SIL	ML CL-ML	A-4
		10-60	SIL L	ML CL-ML	A-4
23	PANCHERI	0- 6	SIL	ML CL-ML	A-4
		6-10	SIL	ML CL-ML	A-4
		10-60	SIL L	ML CL-ML	A-4
24	PANCHERI	0- 6	SIL	ML CL-ML	A-4
		6-10	SIL	ML CL-ML	A-4
		10-60	SIL L	ML CL-ML	A-4
33	POLATIS	0- 6	SIL	ML CL-ML	A-4
		6-31	SIL	ML CL-ML	A-4
		31-35	UWB		

ENGINEERING INDEX PROPERTIES
TABLE 2

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Fragments >3 Inches (pct)	Percent passing - sieve number 4	10	40	200	Liquid limit (pct)	Plasticity Index
MB1	MOORETOWN	0- 3	0- 0	85-100	80-100	70- 90	60- 80	20- 30	5- 10
		3-35	0- 5	80-100	75- 95	60- 80	45- 65	20- 30	5- 10
		35-50	0- 5	75- 95	70- 90	50- 70	40- 60	20- 25	0- 5
		50-60	0-10	35- 55	30- 50	20- 45	15- 40	20- 25	0- 5
	BORAH	0- 4	0-10	35- 50	30- 45	20- 40	15- 30	15- 25	0- 5
		4-12	0-10	35- 50	30- 40	20- 40	15- 30	15- 25	0- 5
		12-60	0-15	15- 30	10- 25	5- 15	0- 10	-	0- 0
1	AECET	0- 5	5-20	95-100	95-100	60- 80	25- 45	20- 25	0- 5
		5-13	0- 0	100-100	100-100	90-100	70- 80	30- 45	10- 25
		13-23	10-30	95-100	95-100	90-100	70- 80	30- 45	10- 25
		23-27	-	-	-	-	-	-	-
9	BERENICETON	0- 3	0- 0	100-100	100-100	85- 95	60- 85	20- 30	0- 10
		3-14	0- 0	100-100	100-100	85- 95	60- 75	20- 30	0- 10
		14-46	0- 0	100-100	100-100	90-100	70- 80	35- 45	10- 20
		46-50	-	-	-	-	-	-	-
12	BERENICETON	0- 3	0- 0	100-100	100-100	85- 95	60- 85	20- 30	0- 10
		3-14	0- 0	100-100	100-100	85- 95	60- 75	20- 30	0- 10
		14-46	0- 0	100-100	100-100	90-100	70- 80	35- 45	10- 20
		46-50	-	-	-	-	-	-	-
	AECET	0- 5	0- 5	95-100	90- 95	80- 90	60- 75	25- 35	0- 10
		5-13	0- 5	95-100	90- 95	80- 90	65- 75	30- 45	10- 20
		13-23	10-15	90-100	90-100	90-100	70- 80	30- 45	10- 20
		23-27	-	-	-	-	-	-	-
13	BERENICETON	0- 3	5-15	95-100	90-100	55- 70	20- 40	15- 25	0- 5
		3-14	0- 0	100-100	100-100	85- 95	60- 75	20- 30	0- 10
		14-46	0- 0	100-100	100-100	90-100	70- 80	35- 45	10- 20
		46-50	-	-	-	-	-	-	-
	AECET	0- 5	5-20	95-100	95-100	60- 80	25- 45	20- 25	0- 5
		5-13	0- 0	100-100	100-100	90-100	70- 80	30- 45	10- 25
		13-23	10-30	95-100	95-100	90-100	70- 80	30- 45	10- 25
		23-27	-	-	-	-	-	-	-
14	BERENICETON	0- 3	0- 0	100-100	100-100	85- 95	60- 85	20- 30	0- 10
		3-14	0- 0	100-100	100-100	85- 95	60- 75	20- 30	0- 10
		14-46	0- 0	100-100	100-100	90-100	70- 80	35- 45	10- 20
		46-50	-	-	-	-	-	-	-
	TERRETON	0- 6	0- 0	100-100	100-100	85- 95	65- 95	25- 40	5- 15
		6-60	0- 0	100-100	100-100	95-100	90-100	35- 50	15- 30
	AECET	0- 5	0- 5	95-100	90- 95	80- 90	60- 75	25- 35	0- 10
		5-13	0- 5	95-100	90- 95	80- 90	65- 75	30- 45	10- 20
		13-23	10-15	90-100	90-100	90-100	70- 80	30- 45	10- 20
		23-27	-	-	-	-	-	-	-
15	BERENICETON	0- 3	5-15	95-100	90-100	80- 90	70- 85	20- 30	0- 10

ENGINEERING INDEX PROPERTIES
TABLE 2

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Fragments >3 Inches (pct)	Percent passing - sieve number 4	10	40	200	Liquid limit (pct)	Plasticity Index
		3-14	0- 0	100-100	100-100	85- 95	60- 75	20- 30	0- 10
		14-46	0- 0	100-100	100-100	90-100	70- 80	35- 45	10- 20
		46-50	-	-	-	-	-	-	-
	TERRETON	0- 6	5-10	95-100	90-100	85- 90	50- 70	20- 30	5- 10
		6-31	0- 0	100-100	100-100	85-100	75- 95	40- 60	25- 40
		31-51	0- 0	100-100	100-100	85- 95	80- 90	35- 50	15- 25
		51-60	0- 0	100-100	100-100	85-100	75- 95	40- 60	25- 40
20	BONDFARM	0- 4	0- 0	100-100	100-100	60- 75	25- 45	20- 30	0- 5
		4-18	0- 0	100-100	100-100	60- 75	25- 45	20- 30	0- 10
		18-22	-	-	-	-	-	-	-
21	BONDFARM	0- 4	0- 0	100-100	100-100	60- 70	15- 30	-	0- 0
		4-18	0- 0	100-100	100-100	60- 75	25- 45	20- 30	0- 10
		18-22	-	-	-	-	-	-	-
	GRASSY BUTTE	0- 7	0- 0	100-100	100-100	60- 75	15- 25	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
24	DISTON	0- 5	0- 0	100-100	90-100	50- 60	15- 20	0- 0	0- 0
		5-31	0- 0	100-100	90-100	50- 60	15- 25	0- 0	0- 0
		31-40	-	-	-	-	-	-	-
		40-60	0- 0	100-100	100-100	50- 60	0- 15	0- 0	0- 0
31	GRASSY BUTTE	0- 7	0- 0	100-100	100-100	60- 75	5- 20	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
32	GRASSY BUTTE	0- 7	0- 0	100-100	100-100	60- 75	15- 25	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
33	GRASSY BUTTE	0- 7	0- 0	100-100	100-100	60- 75	15- 25	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
34	GRASSY BUTTE	0- 7	0- 0	100-100	100-100	60- 75	15- 25	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
37	GRASSY BUTTE	0- 7	0- 5	95-100	95-100	70- 80	15- 25	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
61	LIDY	0- 5	0- 5	90-100	90-100	60- 75	30- 45	15- 25	0- 5
		5-29	0- 5	90-100	90-100	60- 75	30- 45	15- 25	0- 5
		29-60	10-15	25- 45	20- 40	10- 20	0- 5	0- 0	0- 0
63	LIDY	0- 5	0- 5	70- 80	60- 75	45- 60	35- 45	20- 35	0- 10
		5-29	0- 5	90-100	90-100	60- 75	30- 45	15- 25	0- 5
		29-60	10-15	25- 45	20- 40	10- 20	0- 5	0- 0	0- 0
64	MALM	0- 4	0- 0	95-100	90-100	55- 70	20- 30	-	0- 0
		4-24	0-10	90-100	85-100	65- 85	35- 50	15- 20	0- 5
		24-28	-	-	-	-	-	-	-
	MATHESON	0-10	0- 5	95-100	95-100	60- 70	15- 30	-	0- 0
		10-46	0- 5	95-100	90-100	60- 75	30- 45	20- 25	0- 5
		46-50	-	-	-	-	-	-	-
66	MALM	0- 4	0- 0	95-100	90-100	55- 70	20- 30	-	0- 0

ENGINEERING INDEX PROPERTIES
TABLE 2

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Fragments >3 Inches (pct)	Percent passing - sieve number 4	10	40	200	Liquid limit (pct)	Plasticity Index
		4-24	0-10	90-100	85-100	65- 85	35- 50	15- 20	0- 5
		24-28	-	-	-	-	-	-	-
	MATHESON	0-10	0- 5	95-100	95-100	60- 70	15- 30	-	0- 0
		10-46	0- 5	95-100	90-100	60- 75	30- 45	20- 25	0- 5
		46-50	-	-	-	-	-	-	-
67	MALM	0- 4	10-20	90-100	90-100	60- 75	30- 45	20- 30	0- 10
		4-24	0-10	90-100	90-100	75- 95	35- 50	20- 30	0- 5
		24-28	-	-	-	-	-	-	-
	BONDFARM	0- 4	0- 0	100-100	100-100	60- 75	25- 45	20- 30	0- 5
		4-18	0- 0	100-100	100-100	60- 75	25- 45	20- 30	0- 10
		18-22	-	-	-	-	-	-	-
70	MATHESON	0-10	0- 5	95-100	95-100	60- 70	15- 30	-	0- 0
		10-60	0- 5	95-100	90-100	60- 75	30- 45	20- 25	0- 5
78	MATHESON	0-10	0- 5	95-100	95-100	60- 70	15- 30	-	0- 0
		10-46	0- 5	95-100	90-100	60- 75	30- 45	20- 25	0- 5
		46-50	-	-	-	-	-	-	-
	MATHESON	0-10	0- 5	95-100	95-100	85- 95	60- 75	20- 30	0- 10
		10-46	0- 5	95-100	90-100	60- 75	30- 45	20- 25	0- 5
		46-50	-	-	-	-	-	-	-
99	PANCHERI	0- 8	0- 5	100-100	100-100	85-100	80- 95	20- 30	0- 5
		8-60	0- 0	100-100	100-100	85- 95	75- 90	20- 30	0- 10
	MODKIN	0- 6	5-10	90-100	85- 95	55- 70	25- 35	15- 20	0- 5
		6-32	0- 5	100-100	100-100	60- 75	30- 45	15- 20	0- 5
		32-36	-	-	-	-	-	-	-
107	TERRETON	0- 6	0- 0	100-100	100-100	40- 65	15- 35	0- 0	0- 0
		6-60	0- 0	100-100	100-100	90-100	85-100	35- 50	15- 30
108	TERRETON	0- 6	0- 0	100-100	100-100	60- 90	35- 50	20- 30	0- 5
		6-60	0- 0	100-100	100-100	90-100	85-100	35- 50	15- 30
109	TERRETON	0- 6	0- 0	100-100	100-100	85- 95	65- 95	25- 40	5- 15
		6-60	0- 0	100-100	100-100	95-100	90-100	35- 50	15- 30
111	TERRETON	0- 6	0- 0	100-100	100-100	95-100	85-100	30- 45	10- 25
		6-60	0- 0	100-100	100-100	95-100	90-100	35- 50	15- 30
115	TERRETON	0- 6	0- 0	100-100	100-100	50- 90	40- 60	30- 40	10- 15
		6-60	0- 0	100-100	100-100	90-100	85-100	35- 50	15- 30
116	TERRETON	0- 6	0- 0	100-100	100-100	40- 65	15- 35	0- 0	0- 0
		6-60	0- 0	100-100	100-100	90-100	85-100	35- 50	15- 30
	TERRETON	0- 6	0- 0	100-100	100-100	50- 90	40- 60	30- 40	10- 15
		6-60	0- 0	100-100	100-100	90-100	85-100	35- 50	15- 30
117	TERRETON	0- 6	0- 0	100-100	100-100	95-100	85-100	30- 45	10- 25
		6-60	0- 0	100-100	100-100	95-100	90-100	35- 50	15- 30
	ZWIEFEL	0- 3	0- 0	100-100	100-100	60- 75	5- 15	0- 0	0- 0
		3-21	0- 0	100-100	100-100	75- 85	0- 10	0- 0	0- 0

ENGINEERING INDEX PROPERTIES
TABLE 2

Survey Areas- ID763 ID765 ID769

Map Symbol	Soil Name	Depth (In)	Fragments >3 Inches (pct)	Percent passing - sieve number 4	10	40	200	Liquid limit (pct)	Plasticity Index
		21-28	0- 0	100-100	100-100	85- 95	50- 65	30- 50	10- 30
		28-60	0- 0	100-100	100-100	90-100	85-100	45- 60	20- 35
126	ZWIEFEL	0- 3	0- 0	100-100	100-100	60- 75	5- 15	0- 0	0- 0
		3-21	0- 0	100-100	100-100	75- 85	0- 10	0- 0	0- 0
		21-28	0- 0	100-100	100-100	85- 95	50- 65	30- 50	10- 30
		28-60	0- 0	100-100	100-100	90-100	85-100	45- 60	20- 35
130	ZWIEFEL	0- 3	0- 0	100-100	100-100	60- 75	5- 15	0- 0	0- 0
		3-21	0- 0	100-100	100-100	75- 85	0- 10	0- 0	0- 0
		21-28	0- 0	100-100	100-100	85- 95	50- 65	30- 50	10- 30
		28-60	0- 0	100-100	100-100	90-100	85-100	45- 60	20- 35
	GRASSY BUTTE	0- 7	0- 0	100-100	100-100	60- 75	5- 20	0- 0	0- 0
		7-60	0- 0	95-100	95-100	65- 75	5- 30	0- 0	0- 0
	TERRETON	0- 6	0- 0	100-100	100-100	40- 65	15- 35	0- 0	0- 0
		6-60	0- 0	100-100	100-100	90-100	85-100	35- 50	15- 30
22	PANCHERI	0- 6	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		6-10	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		10-60	0- 0	90-100	90-100	85- 95	75- 90	20- 30	0- 10
23	PANCHERI	0- 6	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		6-10	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		10-60	0- 0	90-100	90-100	85- 95	75- 90	20- 30	0- 10
24	PANCHERI	0- 6	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		6-10	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		10-60	0- 0	90-100	90-100	85- 95	75- 90	20- 30	0- 10
33	POLATIS	0- 6	0- 0	95-100	90-100	85-100	75- 90	20- 30	0- 10
		6-31	0- 0	95-100	95-100	90-100	80- 90	20- 30	0- 10
		31-35	-	-	-	-	-	-	-

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight (Lb/acre)	Characteristic vegetation	Composition (Pct)
1 AECET	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	Thurber needlegrass	5
		Normal	900	other shrubs	5
		Unfavorable	600	sand dropseed	5
				antelope bitterbrush	5
				other perennial grasses	5
				lupine	5
				arrowleaf balsamroot	5
				Indian ricegrass	10
				threetip sagebrush	10
				big sagebrush	10
				needleandthread	15
				bluebunch wheatgrass	15
12 BERENICETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bluebunch wheatgrass	30
		Normal	900	bottlebrush squirreltail	2
		Unfavorable	450	Sandberg bluegrass	2
				Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				big sagebrush	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct
AECET	LOAMY 8-12 ARTRW8/PSSP6	Favorable	800	bluebunch wheatgrass	30
		Normal	650	bottlebrush squirreltail	2
		Unfavorable	450	Sandberg bluegrass	2
				Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				other shrubs	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				Wyoming big sagebrush	15
13 BERENICETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bluebunch wheatgrass	30
		Normal	900	bottlebrush squirreltail	2
		Unfavorable	450	Sandberg bluegrass	2
				Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				big sagebrush	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name		Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
				Lb/acre		(Pct)
	AECET	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	Thurber needlegrass	5
			Normal	900	other shrubs	5
			Unfavorable	600	sand dropseed	5
					antelope bitterbrush	5
					other perennial grasses	5
					lupine	5
					arrowleaf balsamroot	5
					Indian ricegrass	10
					threetip sagebrush	10
					big sagebrush	10
					needleandthread	15
					bluebunch wheatgrass	15
14	BERENICETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bottlebrush squirreltail	2
			Normal	900	Sandberg bluegrass	2
			Unfavorable	450	Nevada bluegrass	2
					Indian ricegrass	2
					tapertip hawksbeard	2
					thickspike wheatgrass	2
					basin wildrye	3
					lupine	5
					prairie junegrass	5
					rabbitbrush	5
					arrowleaf balsamroot	5
					Thurber needlegrass	10
					threetip sagebrush	10
					big sagebrush	15
					bluebunch wheatgrass	30
	TERRETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	lupine	5
			Normal	1000	prairie junegrass	5
			Unfavorable	500	rabbitbrush	5
					arrowleaf balsamroot	5
					Thurber needlegrass	10
					Wyoming big sagebrush	10
					threetip sagebrush	10
					other perennial grasses	15
					bluebunch wheatgrass	30

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct
AECET	LOAMY 8-12 ARTRW8/PSSP6	Favorable	800	bluebunch wheatgrass	30
		Normal	650	bottlebrush squirreltail	2
		Unfavorable	450	Sandberg bluegrass	2
				Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				other shrubs	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				Wyoming big sagebrush	15
15 BERENICETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bottlebrush squirreltail	2
		Normal	900	Sandberg bluegrass	2
		Unfavorable	450	Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				big sagebrush	15
				bluebunch wheatgrass	30

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct)
TERRETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bottlebrush squirreltail	2
		Normal	900	Sandberg bluegrass	2
		Unfavorable	450	Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				big sagebrush	15
				bluebunch wheatgrass	30
21 BONDFARM	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	needleandthread	20
		Normal	1000	Sandberg bluegrass	0
		Unfavorable	500	threadleaf sedge	0
				low sagebrush	0
				other shrubs	5
				other perennial grasslikes	5
				Nevada bluegrass	5
				arrowleaf balsamroot	5
				antelope bitterbrush	8
				Indian ricegrass	10
				big sagebrush	10
				bluebunch wheatgrass	10
				streambank wheatgrass	10
				other perennial grasses	12

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production-- Kind of year	Dry Weight	Characteristic vegetation	Compo siti
			Lb/acre		(Pct)
GRASSY BUTTE	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	bluebunch wheatgrass	10
		Normal	1000	other shrubs	5
		Unfavorable	500	other perennial forbs	5
				Nevada bluegrass	5
				yellow wildrye	5
				arrowleaf balsamroot	5
				western wheatgrass	5
				streambank wheatgrass	5
				thickspike wheatgrass	5
				needleandthread	10
				sand dropseed	10
				antelope bitterbrush	10
				Indian ricegrass	10
				big sagebrush	10
24 DISTON	SANDY 8-16 ARTRT/PSSP6	Favorable	1050	other perennial grasses	5
		Normal	800	Nevada bluegrass	5
		Unfavorable	500	lupine	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				antelope bitterbrush	10
				basin big sagebrush	10
				Indian ricegrass	15
				thickspike wheatgrass	15
				needleandthread	20
32 GRASSY BUTTE	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	other shrubs	5
		Normal	1000	other perennial forbs	5
		Unfavorable	500	Nevada bluegrass	5
				yellow wildrye	5
				arrowleaf balsamroot	5
				western wheatgrass	5
				streambank wheatgrass	5
				thickspike wheatgrass	5
				needleandthread	10
				sand dropseed	10
				antelope bitterbrush	10
				Indian ricegrass	10
				big sagebrush	10
				bluebunch wheatgrass	10

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production-- Kind of year	Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct)
33 GRASSY BUTTE	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	bluebunch wheatgrass	10
		Normal	1000	other shrubs	5
		Unfavorable	500	other perennial forbs	5
				Nevada bluegrass	5
				yellow wildrye	5
				arrowleaf balsamroot	5
				western wheatgrass	5
				streambank wheatgrass	5
				thickspike wheatgrass	5
				needleandthread	10
				sand dropseed	10
				antelope bitterbrush	10
				Indian ricegrass	10
				big sagebrush	10
34 GRASSY BUTTE	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	bluebunch wheatgrass	10
		Normal	1000	other shrubs	5
		Unfavorable	500	other perennial forbs	5
				Nevada bluegrass	5
				yellow wildrye	5
				arrowleaf balsamroot	5
				western wheatgrass	5
				streambank wheatgrass	5
				thickspike wheatgrass	5
				needleandthread	10
				sand dropseed	10
				antelope bitterbrush	10
				Indian ricegrass	10
				big sagebrush	10

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production-- Kind of year	Dry Weight	Characteristic vegetation	Compo siti
			Lb/acre		(Pct
37 GRASSY BUTTE	SANDY 8-16 ARTRT/PSSP6	Favorable	1000	big sagebrush	15
		Normal	650	other shrubs	5
		Unfavorable	300	sand dropseed	5
				other perennial grasses	5
				other perennial forbs	5
				Nevada bluegrass	5
				yellow wildrye	5
				arrowleaf balsamroot	5
				western wheatgrass	5
				antelope bitterbrush	10
				Indian ricegrass	10
				thickspike wheatgrass	10
				needleandthread	15
64 MALM	SANDY 8-16 ARTRT/PSSP6	Favorable	900	other shrubs	5
		Normal	600	antelope bitterbrush	5
		Unfavorable	450	other perennial grasses	5
				lupine	5
				arrowleaf balsamroot	5
				thickspike wheatgrass	5
				basin big sagebrush	15
				bluebunch wheatgrass	15
				needleandthread	20
				Indian ricegrass	20
MATHESON	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	wheatgrass	15
		Normal	1000	other perennial grasslikes	0
		Unfavorable	500	Nevada bluegrass	2
				Thurber needlegrass	3
				rabbitbrush	4
				other perennial grasses	5
				prairie junegrass	5
				basin wildrye	5
				basin big sagebrush	5
				bluebunch wheatgrass	5
				sand dropseed	6
				needleandthread	10
				Indian ricegrass	15
				sagebrush	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct)
66 MALM	SANDY 8-16 ARTRT/PSSP6	Favorable	900	other shrubs	5
		Normal	600	antelope bitterbrush	5
		Unfavorable	450	other perennial grasses	5
				lupine	5
				arrowleaf balsamroot	5
				thickspike wheatgrass	5
				basin big sagebrush	15
				bluebunch wheatgrass	15
				needleandthread	20
				Indian ricegrass	20
MATHESON	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	wheatgrass	15
		Normal	1000	other perennial grasslikes	0
		Unfavorable	500	Nevada bluegrass	2
				Thurber needlegrass	3
				rabbitbrush	4
				other perennial grasses	5
				prairie junegrass	5
				basin wildrye	5
				basin big sagebrush	5
				bluebunch wheatgrass	5
				sand dropseed	6
				needleandthread	10
				Indian ricegrass	15
				sagebrush	15
67 MALM	STONY LOAM 8-12 ARTRW8/PSSP6	Favorable	1000	bluebunch wheatgrass	30
		Normal	700	prairie junegrass	2
		Unfavorable	450	other shrubs	5
				Nevada bluegrass	5
				phlox	5
				threetip sagebrush	5
				sedge	6
				Thurber needlegrass	10
				other perennial grasses	12
				big sagebrush	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct
78 MATHESON	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	other perennial grasslikes	0
		Normal	1000	Nevada bluegrass	2
		Unfavorable	500	Thurber needlegrass	3
				rabbitbrush	4
				other perennial grasses	5
				prairie junegrass	5
				basin wildrye	5
				basin big sagebrush	5
				bluebunch wheatgrass	5
				sand dropseed	6
				needleandthread	10
				Indian ricegrass	15
				sagebrush	15
				wheatgrass	15
MATHESON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bluebunch wheatgrass	30
		Normal	900	needleandthread	0
		Unfavorable	450	sand dropseed	0
				bottlebrush squirreltail	2
				Indian ricegrass	2
				wheatgrass	2
				Nevada bluegrass	5
				prairie junegrass	5
				rabbitbrush	5
				basin big sagebrush	5
				Thurber needlegrass	10
				other perennial grasslikes	11
				other perennial grasses	11
				basin wildrye	15
				sagebrush	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	Total production--Kind of year	Total production--Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct)
99 PANCHERI	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bluebunch wheatgrass	30
		Normal	900	bottlebrush squirreltail	2
		Unfavorable	450	Sandberg bluegrass	2
				Nevada bluegrass	2
				Indian ricegrass	2
				tapertip hawksbeard	2
				thickspike wheatgrass	2
				basin wildrye	3
				lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				big sagebrush	15
105 MODKIN	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1350	bluebunch wheatgrass	30
		Normal	900	other perennial grasses	0
		Unfavorable	450	Thurber needlegrass	5
				other shrubs	5
				Sandberg bluegrass	5
				Nevada bluegrass	5
				Indian ricegrass	5
				lupine	5
				prairie junegrass	5
				basin wildrye	5
				tapertip hawksbeard	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				big sagebrush	15
115 TERRETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	bluebunch wheatgrass	30
		Normal	1000	other perennial grasses	5
		Unfavorable	500	lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				Wyoming big sagebrush	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production -- Kind of year	Dry Weight	Characteristic vegetation	Compo sitio
			Lb/acre		(Pct
116 TERRETON	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	needleandthread	20
		Normal	1000	sand dropseed	5
		Unfavorable	500	antelope bitterbrush	5
				other perennial grasses	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				Indian ricegrass	10
				prairie junegrass	10
				yellow wildrye	10
				Wyoming big sagebrush	10
				bluebunch wheatgrass	10
TERRETON	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	bluebunch wheatgrass	30
		Normal	1000	other perennial grasses	5
		Unfavorable	500	lupine	5
				prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				threetip sagebrush	10
				Wyoming big sagebrush	15
117 TERRETON	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	bluebunch wheatgrass	30
		Normal	1000	lupine	5
		Unfavorable	500	prairie junegrass	5
				rabbitbrush	5
				arrowleaf balsamroot	5
				Thurber needlegrass	10
				Wyoming big sagebrush	10
				threetip sagebrush	10
				other perennial grasses	15

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production-- Kind of year	Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct)
130 GRASSY BUTTE	SAND 8-12 ARTRT-PUTR2/STC04	Favorable	800	big sagebrush	20
		Normal	575	antelope bitterbrush	0
		Unfavorable	300	other perennial forbs	0
				bluebunch wheatgrass	0
				streambank wheatgrass	0
				thickspike wheatgrass	0
				sand dropseed	5
				Nevada bluegrass	5
				arrowleaf balsamroot	5
				western wheatgrass	5
				other shrubs	10
				yellow wildrye	10
				needleandthread	15
				Indian ricegrass	20
TERRETON	SANDY 8-16 ARTRT/PSSP6	Favorable	1200	needleandthread	20
		Normal	1000	sand dropseed	5
		Unfavorable	500	antelope bitterbrush	5
				other perennial grasses	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				Indian ricegrass	10
				prairie junegrass	10
				yellow wildrye	10
				Wyoming big sagebrush	10
				bluebunch wheatgrass	10
22 PANCHERI	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	bluebunch wheatgrass	25
		Normal	1000	other shrubs	5
		Unfavorable	500	antelope bitterbrush	5
				other perennial forbs	5
				Nevada bluegrass	5
				Indian ricegrass	5
				lupine	5
				prairie junegrass	5
				basin wildrye	5
				tall gray rabbitbrush	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				other perennial grasses	10
				Wyoming big sagebrush	10

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production-- Kind of year	Dry Weight	Characteristic vegetation	Compositi
			Lb/acre		(Pct
23 PANCHERI	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	bluebunch wheatgrass	25
		Normal	1000	other shrubs	5
		Unfavorable	500	antelope bitterbrush	5
				other perennial forbs	5
				Nevada bluegrass	5
				Indian ricegrass	5
				lupine	5
				prairie junegrass	5
				basin wildrye	5
				tall gray rabbitbrush	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				other perennial grasses	10
				Wyoming big sagebrush	10
24 PANCHERI	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	bluebunch wheatgrass	25
		Normal	1000	other shrubs	5
		Unfavorable	500	antelope bitterbrush	5
				other perennial forbs	5
				Nevada bluegrass	5
				Indian ricegrass	5
				lupine	5
				prairie junegrass	5
				basin wildrye	5
				tall gray rabbitbrush	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				other perennial grasses	10
				Wyoming big sagebrush	10

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

Survey Areas- ID763 ID765 ID769

Map symbol and soil name	Range site	-- Total production-- Kind of year	Dry Weight	Characteristic vegetation	Composition
			Lb/acre		(Pct)
33 POLATIS	LOAMY 8-12 ARTRW8/PSSP6	Favorable	1200	bluebunch wheatgrass	25
		Normal	1000	other shrubs	5
		Unfavorable	500	antelope bitterbrush	5
				Nevada bluegrass	5
				Indian ricegrass	5
				lupine	5
				prairie junegrass	5
				basin wildrye	5
				tall green rabbitbrush	5
				arrowleaf balsamroot	5
				threetip sagebrush	5
				mountain big sagebrush	10
				other perennial grasslikes	15