use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, slope, or other soil features can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

crops and pasture

Tom Reedy, soil scientist, Soil Conservation Service, prepared this section

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Each area of cropland is a unique combination of soils, slopes, elevation, climate, and other characteristics. Management should consist of a system that recognizes these characteristics. The objective of a cropland management system is to maintain or improve the quality of the environment; to maintain or improve crop production while conserving energy resources; and to protect the soil from erosion.

Management practices that enhance the environment may include developing watering facilities, planting hedgerows, leaving some standing grain, or establishing permanent cover for wildlife in odd areas. Other environmental concerns such as properly using pesticides, properly disposing of empty containers, trapping sediment in debris basins, and properly disposing of animal waste should also be considered.

Management practices that protect the soil from erosion also may provide additional environmental, production, or energy benefits. Erosion control practices include using an adapted crop rotation that may include cover crops, green manure crops, or grasses and legumes in the rotation; using minimum tillage; using crop residue; stubble mulching; seeding early in fall; divided-slope farming; fall chiseling; and using terraces, field windbreaks, and grassed waterways.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

Approximately 268,880 acres of this survey area is irrigated cropland. A wide variety of crops are grown under irrigation, including apples, cherries, peaches, apricots, mint, hops, asparagus, sweet corn, corn for silage, grapes, hay and pasture, and wheat. Production of crops such as irrigated corn, squash, melons, wheat, and potatoes fluctuates, depending on the market value of the major crops and on the crop rotation system used. About 64,000 acres of the area is nonirrigated cropland. The main nonirrigated crop is winter wheat grown in a wheat-summer fallow cropping system.

The deep, well drained soils in the area that warm up early in spring and have a relatively long growing season—more than 135 frost-free days—are well suited

to irrigated orchard and vegetable crops. These soils include Esquatzel and Cleman soils on flood plains; Cowiche, Ritzville, Shano, and Tieton soils on uplands; and Scooteney and Warden soils on terraces. These soils, as well as Renslow and Taneum soils, are also well suited to nonirrigated small grain.

Most of the well drained soils in irrigated areas are suited to orchard and vegetable crops. Frost control is needed in areas of these soils where frosts occur late in spring as a result of poor air drainage. Suitable practices for frost control include use of orchard heaters, wind machines, and over-tree or under-tree sprinklers (*5*). In these areas it is important, especially when replanting, to consider growing fruit trees that develop later in spring and thus are less subject to frost damage. Whenever possible, trees should be planted up and down the slope to allow air to drain freely.

Most of the crops grown in the survey area respond well to nitrogen, phosphorus, and potassium. Ammonium nitrate, ammonium sulfate, and urea fertilizers commonly are used. Urea fertilizer is most popular and is least expensive per unit of nitrogen applied. Periodic applications of lime are needed because of the acidifying effect of ammonium fertilizer. Where leaching has occurred, applications of boron may be needed. Some areas are deficient in zinc, especially if they have been leveled. Some areas are low in content of sulfur. Some foliar applications of micronutrients are used in orchards.

The soils in the survey area range from slightly acid to very strongly alkaline. Soils that are strongly alkaline or very strongly alkaline, such as the somewhat poorly drained Fiander, Kittitas, Outlook, Sinloc, and Umapine soils and the poorly drained Wanser soils, are high in content of exchangeable sodium. These soils should be leached with elemental sulfur or sulfuric acid if they have an inherently high content of free lime. Gypsum is needed if the content of free lime is not adequate (*22*). Because these soils have a water table at a relatively shallow depth, provisions for improved drainage are needed before the soils are leached.

For all soils in the survey area, the amount of lime, gypsum, fertilizer, and other amendments applied should be based on soil tests, on the needs of the crop, and on the expected yields. The local office of the Cooperative Extension Service can help to determine the kind and amount of amendments to apply.

About 2 percent of the soils in the survey area are somewhat poorly drained and have a sufficiently high water table that drainage is needed for maximum crop production. Many of these wet areas provide critical habitat for wildlife, because permanent vegetation has been removed by intensive farming in many parts of the survey area. Wet areas also provide ground water recharge, serve as sinks for sediment and nutrients, store floodwater temporarily, and improve the esthetic value of the landscape.

Subsurface drainage systems should be designed according to soil permeability, with narrower spacing where permeability is less. The amount of water to be drained should determine the size of drain pipe and the gradient. All drainage systems should be discharged to an acceptable drainage course that will not further contribute to surface water pollution. The wet soils may need amendments to facilitate leaching of excessive sodium.

Generally, soils relatively high in organic matter content have good tilth. As tilth increases, soil erosion and surface crusting decrease and the water intake rate increases. Therefore, it is important to have crops in the cropping system that will maintain or improve the organic matter content. This can be done by incorporating as much residue as possible into the soil and by rotating high residue crops such as grain, grasses, legumes, and corn with low residue row crops. To facilitate the decomposition of residue to organic matter, adequate nitrogen fertilizer is needed.

Irrigation water management is the major resource conservation concern in irrigated areas. If irrigation water is not properly applied, soil erosion results. Erosion is a concern because the surface layer, which is the most fertile layer in the soil profile and contains most of the organic matter and available plant nutrients, is the first to be eroded away. With loss of organic matter, the structure of the soil deteriorates, available water capacity and the water intake rate decrease, and general tilth is lost. Thus, soil erosion reduces the productivity of the soil and eventually results in pollution of streams by deposition of sediment, nutrients, and pesticides.

If irrigation water is not properly conserved and the rate of application is excessive, soil erosion is increased in most areas. Wasteful use of water reduces streamflow of the Yakima River and compounds water pollution problems in most streams in the area. Cropping systems that keep a plant cover and residue on the soil during critical periods reduce soil erosion.

Proper irrigation water management and proper use of agronomic practices minimize the hazard of erosion. Applications of irrigation water should be adjusted to the available water capacity, the water intake rate, and the crop needs to avoid loss of water and leaching of plant nutrients and to minimize erosion. Rotating close-growing crops such as grass and alfalfa in the cropping system on sloping soils reduces erosion by protecting the soil surface and increasing the water intake rate. Use of minimum tillage and high residue crops such as wheat and corn reduces the amount of the surface exposed, minimizes sealing of the surface, slows runoff, and reduces erosion. Growing cover crops in vineyards and orchards during the irrigation season and growing mint in meadows also reduce erosion.

In dryland areas soil blowing and water erosion are reduced if fall grain is seeded early, nitrogen is applied, stubble mulch tillage is used, fields are stripcropped, and

tillage is on the contour or across the slope. Chiseling or subsoiling the stubble fields in fall on the contour or across the slope slows runoff and increases the water intake. Terraces and diversions, which are most practical on deep and moderately deep soils, reduce the length of slopes and thereby reduce runoff and erosion. The shallow Gorst, Lickskillet, Moxee, Scoon, and Starbuck soils are not suited to dryland cultivation and should be seeded to permanent grass.

Soil blowing is a hazard on the sandy Quincy and Hezel soils. If irrigated, these soils should not be left barren during periods when the soils are susceptible to erosion. Use of winter cover crops, strip tillage, and crop residue is needed to control soil blowing in spring. Retaining crop residue on the surface or using straw, manure, and other material as mulch reduces soil blowing, helps to maintain or improve organic matter content, and conserves moisture.

Because of the rapid permeability of the Quincy and Hezel soils, the high streamflow needed for water to reach the full length of the furrows causes excessive erosion. Therefore, the soils are not suited to surface irrigation systems but are suited to sprinkler, trickle, or drip systems. Because of the droughtiness of these soils, frequent light applications of water are needed. Unless irrigated, these soils are poorly suited to cultivation.

Compaction and breakdown of soil structure caused by excessive tillage and continuous use of heavy equipment are common on the silt loams and loams in the area. These also reduce the water intake rate and increase the risk of erosion. Soil compaction can be reduced by use of minimum tillage, proper timing of tillage in relation to moisture content, close-growing crops, and crop residue. Tillage pans may be broken up by subsoiling or chiseling when the soil is dry. Use of minimum tillage and crop residue also helps to maintain soil structure.

Furrow, corrugation, sprinkler, or drip irrigation systems are used in the survey area. Sprinkler and drip irrigation systems are suited to all the soils in the survey area. These systems permit an even, controlled application of irrigation water and, if managed properly, reduce the risk of erosion and leaching of plant nutrients. Furrow and corrugation systems are used on most soils that have slopes of less than 5 percent. Use of surface systems on the shallow Gorst, Moxee, Scoon, and Starbuck soils is not practical regardless of the slope, because the hazard of eroding the furrows is too high. These soils are suited to sprinkler, drip, and trickle systems only. Using a cropping system that provides continuous plant cover, such as hay and pasture, or growing perennial cover crops in orchards reduces erosion on these soils.

yields per acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors. For those soils used as nonirrigated cropland and where a summer-fallow cropping system is used, the yields represent the year that the soils are cropped.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that insures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small or because yield data were not available. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils.

land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed soil map units."

rangeland

By Richard A Pudney, range conservationist, Soil Conservation Service

Approximately 48 percent, or about 425,456 acres, of the Yakima County Area is rangeland. Cow-calf-steer operations are dominant in the area. Although individual operations vary, the livestock commonly are grazed at lower elevations in spring and then are moved to the foothills early in summer. Later, the livestock are transported to the mountainous areas, where they remain in summer and early in fall. Then they are returned to stubble fields and feedlots for the winter.

Many livestock operations are run in combination with nonirrigated and irrigated farming. The farm and livestock operations vary from growing crops to provide feed for livestock in winter to farming operations in which livestock are used to graze odd areas, stubble fields or other crop aftermath.

Forage production is influenced by the amount of precipitation, length of the growing season, and the available water capacity of the soil. Areas at lower elevations receive less precipitation and are fairly low in forage production. As elevation increases, production also increases unless it is limited by a short growing season. The available water capacity varies at both low and high elevations. Shallow soils have less available water capacity and produce less forage than do deep soils, which generally have a high available water capacity.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Table 6 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland are listed. Explanation of the column headings in table 6 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre reduced to a common percent of air-dry moisture.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the potential community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of water erosion and soil blowing. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

The basic soil and plant resources in the survey area can be maintained or improved through proper management. Among the range management practices important for all rangeland in the area are proper grazing use and planned grazing systems, which include deferred grazing, proper season of use, and good distribution of grazing. Distribution of grazing can be accomplished by proper placement of watering facilities and salt and by fencing where needed. The suitability of range improvement practices such as brush management, range seeding, and use of pipelines depends on the characteristics of a given site.

Livestock graze selectively; they seek out the palatable and nutritious plants and graze them intensively. Without proper grazing management, these preferred plants are depleted. As the preferred plants decrease, less palatable plants increase. If poor grazing management is continued, the less palatable plants are depleted by livestock and unpalatable grasses, weeds, shrubs, and annual plants invade. Rangeland that is dominated by these plants produces only a fraction of the usable forage it is capable of producing and supports far fewer livestock than it potentially can support.

Sound range management consists of practices such as balancing the requirements of livestock and wildlife with the forage available, proper grazing use and distribution, and periodically resting the preferred and less palatable vegetation from grazing during the growing season.

In determining how many animals an area can support, it is essential to know how much of the area will be used by the animals. Stock water is often a key factor Livestock in the more nearly level areas generally make good use of vegetation that is as much as 1 mile from water, but in extremely steep areas they may not travel more than one-fourth of a mile from water. Development of stock water in underused areas improves the use of the forage in these areas and reduces use in overgrazed areas. Placing salt blocks in undergrazed areas also helps to entice livestock away from overused areas and to improve use in isolated areas. Cross fencing is another good way to improve livestock distribution, but it should be used in combination with stock water developments and other management practices.

Periodic rest from grazing during the growing season allows the preferred and less palatable vegetation to build up its root reserves and to improve its vigor and production. Various deferred-rotation grazing systems can be developed to insure that each pasture gets periodic rest from grazing during the growing season. Rotation grazing systems can also be tailored to meet the needs of any ranching operation.

Proper grazing use is essential in any grazing operation. Enough of the plant must be left following grazing to allow the plant to continue to manufacture its own food. This process, called photosynthesis, depends on the leaves of the plant to absorb carbon dioxide, an essential element in the process. When all leaves are removed by close grazing, the plant has to use the food reserves stored in its root system to continue to grow and survive. If a plant is continuously overgrazed, its store of food in the root system will eventually run out and the plant will die. Proper grazing use insures that the plants can continue to manufacture food. Good management leads to productive, healthy forage plants that have root systems strong enough to survive through unfavorable years.

woodland management and productivity

By Ronald A Peyton, forester, Soil Conservation Service

About 133,800 acres, or 15 percent, of the survey area is forested. Most of this land is in privately owned commercial holdings. The area has 10 distinct forest cover types (*20*). The major forest cover types that have commercial value are interior ponderosa pine, interior Douglas-fir, grand fir-larch-Douglas-fir, and ponderosa pine-larch-Douglas-fir. The minor forest cover types include Englemann spruce-subalpine fir, lodgepole pine, whitebark pine, western larch-Douglas-fir, black cottonwood-willow, and Oregon white oak.

Moisture and topography generally dictate the character of the forests in the survey area (*11*). Along the eastern fringe of the forest land, timber stands are scattered and occur mainly as narrow bands on canyon bottoms and along canyonsides. These meandering strips of timber merge into sparse stands of ponderosa pine and Oregon white oak, which are adjacent to denser stands of mixed species in the higher lying, more moist areas As a result, a large portion of the timber is along a band 30 miles wide that is east of the crest of the Cascade Range.

Forest management in the survey area ranges from little if any management to intensive cultural practices such as fertilization and precommercial and commercial thinning on a preset time schedule. Present stands vary widely in species, age, and size distribution. Selective harvesting of old growth, high-quality ponderosa pine and Douglas-fir has contributed to this heterogeneous nature of the stands. In addition, the regular occurrence of wildfire has produced numerous areas that are densely stocked with lodgepole pine and western larch. Many of the lodgepole pine stands in the area are overstocked, and reduced yields may be a concern in these areas unless some thinning is done.

Many kinds of insects and disease attack forest trees in this area (*6,12*). The damage they do varies from year to year (*8*). Normally, losses are confined to individual trees or to scattered stands; however, insect populations increase occasionally, and large numbers of trees are damaged or killed.

The most damaging insect in the area has been the mountain pine beetle (*Dendroctonus ponderosae*), which attacks lodgepole pine, western white pine, and young stands of ponderosa pine. The Douglas-fir beetle (*Dendroctonus pseudotsugae*), silver fir beetle (*Pseudohylesinus sericeus*), and western pine beetle (*Dendroctonus brevicomis*) have also caused extensive damage. Several other insects are becoming major problems in the area. The western spruce budworm (*Choristoneura occidentalis*) is highly destructive to Douglas-fir, western larch, grand fir, subalpine fir, and Englemann spruce. The Douglas-fir tussock moth (*Orgyia pseudotsugata*) can cause widespread defoliation. Outbreaks of the moth develop explosively and after about 3 years subside abruptly. The balsam woolly aphid (*Adelges piceae*) has become widely established and is highly destructive to Pacific silver fir, subalpine fir, and grand fir (*16*).

Dwarf mistletoe (*Arceuthobium*) is widespread in the survey area and is a major factor in tree mortality and volume loss. This parasite attacks pines, Douglas-fir, and western larch of all ages. Control of dwarf mistletoe is difficult and costly, but removal of infected trees during harvesting can reduce spread of the disease. Many other diseases such as root rot, heart rot, needle scale, and rust are present and may be serious in a given locality.

Douglas-fir and ponderosa pine provide about 55 percent of the available sawtimber in the area, true firs about 25 percent, western larch and hemlock each about 7 percent, and lodgepole pine about 4 percent. Normal mortality is a continuous problem, and it results in a considerable volume of salvable deadwood. The lack of concentrated volumes, however, often makes harvesting economically unfeasible. Historically, the forest industry in the survey area has been oriented primarily to sawn products. Product diversification and changing economics are now providing markets for smaller logs and minor species.

Soils vary in their ability to produce trees and in the limitations and hazards associated with harvesting them. Depth, fertility, texture, and the available water capacity of soils are among the factors that influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can be expected to grow on any site, especially in mountainous areas. Each map unit in the section "Detailed soil map units" suitable for producing wood crops gives information concerning woodland productivity, limitations for harvesting timber, concerns for producing timber, and common forest understory plants.

Table 7 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential annual production of wood fiber. It is expressed in terms of cubic meters per hectare per year for an indicator tree species. The number 1 indicates a potential production of 1 cubic meter per hectare per year, number 2 indicates a potential production of 2 cubic meters per hectare per year, and so on. A mean annual increment of 1 cubic meter per hectare equals about 14.3 cubic feet per acre. Yields in cubic meters are computed at the culmination of the mean annual increment for the first species listed under common trees. These yields are reduced as appropriate when the stocking of the basal area is consistently below normal (*13,14*).

The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *a* indicates that limitations or restrictions are insignificant. The letter *c* indicates that clay is in the upper part of the soil; *d*, restricted rooting depth; *f*, high content of coarse fragments in the soil profile; *r*, steep slopes; *s*, sandy texture; *t*, toxic substances in the soil; *w*, excessive water in or on the soil; and *x*, a large amount of stones on the surface or rock outcroppings. If a soil has more than one limitation, priority in placing the soil into a limitation class is as follows: x, w, t, d, c, s, f, and r.

In table 7 the soils are also rated for a number of factors to be considered in woodland management. *slight, moderate,* and *severe* are used to indicate the degree of the major soil limitations.

Equipment limitation ratings refer to the limits placed on the year-round or seasonal use of equipment. A rating of *slight* indicates that equipment use normally is not restricted to a particular kind of equipment or time of year because of soil or climatic factors. *Moderate* indicates a short seasonal limitation because of soil wetness, a fluctuating water table, or some other factor. *Severe* indicates a seasonal limitation, a need for special equipment such as a cable-yarding logging system, or a limitation in the use of equipment.

Steepness of slope and soil wetness are the main factors that cause equipment limitations. As slope gradient and length increase, use of wheeled equipment becomes more difficult. On steeper slopes tracked equipment must be used. On the steepest slopes, even tracked equipment cannot be operated safely and more sophisticated systems must be used. Soil wetness, especially where the soil material is fine textured, can severely limit the use of equipment and make harvesting practical only during the dry period in summer.

Seedling mortality ratings refer to the probability of death of naturally occurring or planted tree seedlings of the principal species on the soils. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that is properly planted or germinates naturally during a period of sufficient soil moisture. *Slight* indicates no problem is expected under normal conditions. *Moderate* indicates some problems of mortality can be expected and extra precautions are advisable. *Severe* indicates that mortality will be high, replanting may be necessary, and extra precautions are essential for successful reforestation. Soil wetness; droughtiness of the surface layer, especially on south- or southwest-facing slopes; limited rooting depth; the kind of soil texture; and the conditions on ridgetops account for most seedling mortality problems. To offset these limitations, larger than normal planting stock, special site preparation, surface drainage, or reinforcement planting may be needed.

Windthrow hazard ratings consider the soil characteristics that affect the development of tree roots and the ability of the soil to hold tree roots firmly. A rating of *slight* indicates that trees normally are not blown down by wind; strong winds may break trees but not uproot them. *Moderate* indicates that few trees may be blown down during periods of excessive soil wetness and strong winds. *Severe* indicates that many trees may be blown down during periods of excessive soil wetness and moderate or strong winds. Restricted rooting depth because of a high water table, underlying bedrock, or an impervious layer and poor anchoring of roots because of the sandy texture of the surface layer and subsoil are responsible for most windthrow problems. *Moderate* and *severe* ratings indicate the need for more care in thinning the edges of woodland stands, periodic salvage of windthrown trees, and an adequate road and trail system to allow for salvage operations.

Plant competition ratings refer to the likelihood of the invasion or growth of undesirable species when openings are made in the tree canopy. The invading plants compete with naturally established or planted seedlings for available growing space and hinder the development of a fully stocked stand of desirable trees. In areas that have low annual precipitation or limited rainfall during the growing season, generally on the eastern fringe of the forested zones, plants compete for the limited amount of available soil moisture. A *slight* rating indicates that desirable plants are not likely to delay the development of natural reforestation and that planted tree seedlings have good potential for development without excessive competition. *Moderate* indicates that competition will delay natural or planted reforestation. *Severe* indicates that competition will prevent natural or planted reforestation. In many cases, the key to predicting plant competition problems is the quantity and proximity of seed sources of undesirable plants. *Moderate* and *severe* ratings indicate the need for careful and thorough clean-up after harvesting in preparation for reforestation and for use of mechanical or chemical treatment to retard growth of competing plants and allow tree seedlings to develop.

The *potential productivity* of *common trees* on a soil is expressed as a *site index*. This index is determined by taking height and age measurements on selected trees within stands of a given species. The procedure for doing this is given in the appropriate site index tables. The site index applies to fully stocked, even-aged, unmanaged stands growing on a particular soil. The highest timber yields can be expected from soils that have the highest site indexes.

Site index values can be converted into estimated yields of trees at various ages by using the applicable yield tables. In this survey area, USDA Technical Bulletin 630 (*15*) was used to determine the site index and yield estimates for ponderosa pine and for inland Douglas-fir. For lodgepole pine the site indexes are based on work by Alexander (*3*) and yields on work by Myers (*17*). Site indexes and yields for western larch are based on work by Schmidt (*18*). Site indexes for Englemann spruce and subalpine fir are based on tables by Alexander (*4*), and yield estimates are provided by Edminster (*9*). Estimates of site indexes for grand fir were based on data from the Washington State Department of Natural Resources (*24*); estimates of yield were not available. Common trees are listed in the same order as that of their general occurrence observed in the soil map unit.

Trees to plant are those that are used for reforestation or, if suitable conditions exist, are favored for natural regeneration. Species listed are suited to the soils and to commercial wood production. The growth rate and wood

quality of species vary, which influences their economic value and marketability. The desired product, topographic position, seedling availability, and personal preference are factors that can influence the choice of trees to use for reforestation.

woodland understory vegetation

Nearly all of the 138,000 acres of woodland in the survey area is grazable and is extremely important for both wildlife and livestock. Many species of wildlife use the woodland as range in summer and winter, and many livestock operations, both cattle and sheep, depend on it for grazing in summer and early in fall.

The woodland understory plant communities are ponderosa pine-shrub-grass at the lower elevations, Douglas-fir-pinegrass at the intermediate elevations, and subalpine fir-huckleberry at the higher elevations.

Management practices applicable to grazable understory are discussed in the section "Rangeland."

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

Table 8 shows, for each soil suitable for woodland use, the potential for producing understory vegetation. The total production of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4 1/2 feet. It is expressed in pounds per acre of air-dry vegetation in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the optimum part of the growing season; in a normal year, it is below average.

Table 8 also lists the common names of the characteristic vegetation on each soil and the percentage composition, by air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of woodland in which the production of wood crops is highest.

windbreaks and environmental plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, hold snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Table 9 shows the height that locally grown trees and shrubs are expected to reach in 20 years on various soils. The estimates in table 9 are based on measurements and observation of established plantings that have been given adequate care. They can be used as a guide in planning windbreaks and screens. For those soils not listed in this table, the low average annual precipitation or soil droughtiness is considered to be too severe for windbreak establishment or survival; however, a few of the soils may be suitable for windbreaks if irrigated. Additional information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service or from a nursery.

recreation

The soils of the survey area are rated in table 10 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 10, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 10 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 13 and interpretations for dwellings without basements and for local roads and streets in table 12.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

wildlife habitat

By Donna L Storch, range conservationist, and Ivan L Lines, Jr , biologist, Soil Conservation Service

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 11, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

Many of the soils in this survey area are used as irrigated cropland, nonirrigated cropland, or rangeland, or as all of these. If any areas of a given soil are used as irrigated cropland, the ratings for that soil given in table 11 are those applicable to irrigated cropland. Otherwise, the soil is rated as nonirrigated cropland or as rangeland. Refer to the appropriate map unit in the section "Detailed soil map units" to determine if some areas of a soil are used as irrigated cropland.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are corn, wheat, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, crested wheatgrass, orchardgrass, clover, and alfalfa.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild

herbaceous plants are bluebunch wheatgrass, needlegrass, pigweed, mustard, cheatgrass, filaree, and sedges.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, and available water capacity, and wetness. Examples of these plants are oak, poplar, cherry, sweetgum, apple, hawthorn, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are Russian-olive, autumn-olive, and crabapple.

Coniferous plants furnish browse, seeds, and cones. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine, spruce, fir, and larch.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are Russian-olive, dogwood, bitterbrush, snowberry, and sagebrush.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are smartweed, wild millet, saltgrass, rushes, sedges, and cattails.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include California quail, pheasant, meadowlark, skunk, cottontail, and raccoon.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include ruffed grouse, thrushes, woodpeckers, songbirds, squirrels, raccoon, deer, and elk.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, herons, redwing blackbird, kingfisher, muskrat, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. Wildlife attracted to rangeland include mule deer, sage grouse, meadowlark, coyote, and chukar.

In the following paragraphs use and management of the general soil map units for wildlife habitat are discussed.

The survey area has a wide variety of soils, landforms, precipitation zones, and vegetation. Elevation ranges from 600 feet to more than 7,000 feet. Precipitation ranges from 6 to 50 inches. The vegetation includes grasses and shrubs in areas of arid land, irrigated and nonirrigated crops, and subalpine forest. Thus, the area provides habitat that supports many kinds of wildlife.

Most of the grass-shrub type of vegetation originally in general soil map units 1 to 5 has been replaced by intensively farmed irrigated crops. These units provide habitat for quail, pheasant, dove, rabbit, and waterfowl as well as for numerous nongame birds and mammals. Map units 1 and 2 include numerous wetlands that provide valuable habitat for waterfowl, wading birds, and other wetland wildlife. The large trees in the vicinity of wetlands and streams provide valuable perches and nesting sites for hawks and owls and for cavity nesting birds such as woodpeckers and bluebirds. Areas of farmland that are interspersed with wooded streambanks, wetlands, vegetated irrigation ditches, and patches of noncultivated land still support good populations of wildlife. Habitat can be maintained or improved in most areas by leaving the cover undisturbed along fence rows, in ditches, and in areas of wetland and by planting hedgerows, windbreaks, and herbaceous cover on noncultivated or eroding land.

The upland soils in general soil map units 6 to 11 are used as rangeland, for orchards, and as cropland. These units provide habitat for the kinds of wildlife normally present on cropland as well as for rangeland wildlife such as chukar, mule deer, coyote, bighorn sheep, and wintering elk. Bighorn sheep and wintering elk are mainly on map units 9, 10, and 11. The orchards and cropland support more wildlife if the noncultivated areas are maintained in woody or herbaceous cover. Properly grazed pastures also provide food and cover. Pesticides should be used sparingly in these areas.

The carrying capacity for rangeland wildlife is greatest in those areas that have not been overgrazed. At some stage of their life cycle, most species of rangeland wildlife are dependent on the presence of woody and herbaceous vegetation that is adjacent to streams or other wet areas. The key to maintaining an abundance of rangeland wildlife is to protect the native vegetation from overgrazing, burning, spraying, or other disturbance—particularly in riparian zones. Species such as quail and

chukar will benefit from the development of wildlife watering facilities.

The timbered soils at the higher elevations in general soil map units 12 and 13 provide habitat for elk, deer, bear, forest grouse, and numerous nongame birds and mammals. These areas are the summer range as well as the calving and fawning areas for elk and deer. Cliffs and rocky ledges are preferred nesting sites for eagles, falcons, and other birds of prey. Snags provide nesting and perching sites for birds of prey and for cavity nesting birds such as bluebirds and woodpeckers. As in other areas, undisturbed vegetation along streams provides important habitat necessary for the well-being of many species.

Grazing in wooded areas should be managed to accommodate the forage needs of wildlife and to protect riparian zones. Logging should be done in small, irregularly shaped patches. Snags and riparian zones should be protected from logging activities. To reduce soil erosion and provide food and cover for wildlife, areas that are logged or burned should be seeded to grasses and legumes. After logging has been completed, unneeded roads should be closed and reseeded to prevent undue disturbance to wildlife, particularly big game animals.

engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, and natural soil structure aggregation. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

building site development

Table 12 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to

bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

sanitary facilities

Table 13 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 13 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 13 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function

unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 13 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

construction materials

Table 14 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 14, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain

sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

water management

Table 15 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected

by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

engineering index properties

Table 16 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

physical and chemical properties

Table 17 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

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

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

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Rock fragments in the soil reduce the K value; therefore, the K values expresed in table 17 reflect the amount of rock fragments in the soil. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Depending on the total content of rock fragments in the surface layer, soils containing rock fragments can be assigned to any of the wind erodibility groups. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. Loamy soils that are 18 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.
7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.
8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 17, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

soil and water features

Tables 18 and 19 give estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

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

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

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt and water in swamps and marshes are not considered flooding.

Table 18 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs on an average of once or less in 2 years; and *frequent* that it occurs on an average of more than once in 2 years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 18 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 18.

An apparent water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An artesian water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A perched water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

Depth to bedrock is given in table 19 if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Cemented pans are cemented or indurated subsurface layers within a depth of 5 feet. Such pans cause difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

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

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*23*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 20, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Five soil orders are recognized in this survey area. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquoll (*Aqu*, meaning water, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplaquolls (*Hapl*, meaning minimal horizonation, plus *aquoll*, the suborder of the Mollisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Cumulic* identifies the subgroup that has a mollic epipedon that is thicker than that of the Typic great group. An example is Cumulic Haplaquolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, mesic Cumulic Haplaquolls.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*21*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*23*). Unless otherwise stated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Ashue series

The Ashue series consists of very deep, well drained soils on low terraces in stream valleys. These soils formed in alluvium. Slopes range from 0 to 2 percent. Elevation is 700 to 1,700 feet. The average annual precipitation is 7 to 9 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Ashue loam, about 3 miles southeast of Naches, about 450 feet east and 420 feet south of the northwest corner of sec. 23, T. 14 N., R. 17 E.

Ap—0 to 10 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 roots; many fine tubular pores; 5 percent pebbles; mildly alkaline; gradual wavy boundary.

B21t—10 to 15 inches; yellowish brown (10YR 5/4) very gravelly heavy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; many fine roots; common fine tubular pores; common thin clay films on faces of peds; 45 percent pebbles; mildly alkaline; clear wavy boundary.

B22t—15 to 29 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, very friable, sticky and plastic; common fine roots; common fine pores; common thin clay films on faces of peds; 40 percent pebbles and 10 percent cobbles; mildly alkaline; abrupt wavy boundary.

C1—29 to 34 inches; dark yellowish brown (10YR 4/4) very gravelly sandy loam, dark brown (10YR 3/3) moist; massive; soft, friable, nonsticky and nonplastic; few fine roots; 45 percent pebbles and 15 percent cobbles; mildly alkaline; abrupt wavy boundary.

IIC2—34 to 60 inches; dark grayish brown (10YR 4/2) extremely gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few fine roots; 60 percent pebbles and 15 percent cobbles; mildly alkaline.

The mollic epipedon is 7 to 12 inches thick. The profile is neutral or mildly alkaline.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist.

The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is very gravelly loam or very gravelly sandy clay loam.

The C and IIC horizons have hue of 10YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 to 4 when dry or moist. The C horizon is very gravelly sandy loam or very gravelly loam. The IIC horizon is extremely gravelly sand or extremely cobbly sand.

Bakeoven series

The Bakeoven series consists of very shallow, well drained soils on uplands. These soils formed in loess and in residuum derived from basalt. Slopes range from 0 to 45 percent. Elevation is 1,500 to 3,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 150 days.

Typical pedon of Bakeoven very cobbly silt loam, 0 to 30 percent slopes, about 10 miles north of Sunnyside, about 1,600 feet north and 300 feet east of the southwest corner of sec. 6, T. 11 N., R. 23 E.

A1—0 to 4 inches; brown (10YR 5/3) very cobbly silt loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; few fine tubular pores; 15 percent pebbles and 35 percent cobbles; neutral; abrupt wavy boundary.

B21—4 to 7 inches; dark yellowish brown (10YR 4/4) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common very fine roots; few fine tubular pores; 20 percent pebbles and 5 percent cobbles; neutral; abrupt wavy boundary.

B22—7 to 10 inches; dark yellowish brown (10YR 4/4) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine angular blocky structure; hard, firm, sticky and plastic; few very fine roots; few fine tubular pores; 40 percent pebbles and 15 percent cobbles; neutral, abrupt wavy boundary.

IIR—10 inches; basalt.

Depth to basalt ranges from 4 to 12 inches. The solum has hue of 10YR or 7.5YR. The A horizon has chroma of 2 or 3 when dry or moist. The B2 horizon averages more than 35 percent coarse fragments. It is gravelly clay loam, very gravelly clay loam, very gravelly loam, or very cobbly loam.

Bickleton series

The Bickleton series consists of deep, well drained soils on uplands. These soils formed in loess and in residuum derived from basalt. Slopes range from 0 to 30 percent. Elevation is 2,600 to 3,200 feet. The average annual precipitation is 11 to 14 inches, the average annual air temperature is about 47 degrees F, and the average frost-free season is 120 to 160 days.

Typical pedon of Bickleton silt loam, 0 to 5 percent slopes, about 17 miles southwest of Mabton, about 2,300 feet west and 1,100 feet north of the southeast corner of sec. 35, T. 7 N., R. 20 E.

Ap—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots, neutral; abrupt smooth boundary.

A12—5 to 10 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak fine angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; neutral; abrupt smooth boundary.

B21—10 to 19 inches; brown (10YR 4/3) heavy silt loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots; common very fine pores; mildly alkaline; abrupt smooth boundary.

B22—19 to 26 inches; brown (10YR 5/3) heavy silt loam, dark brown (10YR 3/3) moist; moderate coarse prismatic structure parting to moderate medium prismatic; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots; common very fine pores; mildly alkaline; abrupt smooth boundary.

C1—26 to 35 inches; pale brown (10YR 6/3) heavy silt loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; 10 percent gravel; slightly effervescent; mildly alkaline; abrupt smooth boundary.

IIC2ca—35 to 42 inches; brown (10YR 5/3) extremely gravelly silty clay loam, dark brown (10YR 4/3) moist; massive; hard, friable, sticky and plastic; few very fine roots; few very fine pores; 60 percent pebbles and 10 percent cobbles; violently effervescent; moderately alkaline; abrupt smooth boundary.

IIR—42 inches; basalt.

Depth to basalt ranges from 40 to 60 inches. The 10- to 40-inch control section is 18 to 25 percent clay. The mollic epipedon is 10 to 16 inches thick.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when moist or dry. It is neutral or mildly alkaline.

The B2 horizon has value of 4 to 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist or dry. It is neutral or mildly alkaline.

The C horizon is heavy silt loam or silty clay loam.

The IIC horizon is very gravelly silt loam or extremely gravelly silty clay loam. It is mildly alkaline or moderately alkaline.

Bocker series

The Bocker series consists of very shallow, well drained soils on mountaintops and broad ridgetops. These soils formed in residuum derived from basalt and containing minor amounts of loess. Slopes range from 0 to 25 percent. Elevation is 2,800 to 5,500 feet. The average annual precipitation is 18 to 40 inches, the average annual air temperature is about 42 degrees F, and the average frost-free season is 85 to 130 days.

Typical pedon of Bocker very cobbly loam, 0 to 25 percent slopes, about 12 miles west of Cowiche, about 600 feet south and 400 feet east of the northwest corner of sec. 4, T. 13 N., R. 15 E.

A1—0 to 3 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; 30 percent pebbles and 20 percent cobbles; slightly acid; abrupt smooth boundary.

B2—3 to 7 inches; dark brown (10YR 4/3) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine irregular pores; 15 percent pebbles and 25 percent cobbles; slightly acid; abrupt wavy boundary.

R—7 inches; fractured basalt.

From 10 to 20 percent of the surface is covered with cobbles. The mollic epipedon is 5 to 10 inches thick. Depth to fractured basalt ranges from 5 to 10 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 3 or 4 when dry.

The B horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when dry and 2 or 3 when moist. It is very cobbly loam or very cobbly silt loam.

Burke series

The Burke series consists of moderately deep, well drained soils on uplands. These soils formed in loess overlying a lime- and silica- cemented duripan. Slopes range from 2 to 40 percent. Elevation is 1,000 to 1,300 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 180 days.

Typical pedon of Burke silt loam, 2 to 5 percent slopes, about 5 miles north of Outlook, about 700 feet north and 50 feet east of the southwest corner of sec. 30, T. 11 N., R. 22 E.

Ap—0 to 7 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; mildly alkaline; abrupt smooth boundary.

AC—7 to 16 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common fine pores; mildly alkaline; abrupt wavy boundary.

C1—16 to 24 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common fine pores; moderately alkaline; abrupt smooth boundary.
C2ca—24 to 25 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common fine pores; secondary lime in root channels; strongly effervescent; moderately alkaline; abrupt smooth boundary.
C3casim—25 inches; indurated lime- and silica-cemented duripan.

Depth to the duripan ranges from 20 to 40 inches. The duripan is underlain by basalt at a depth of 30 inches or more. The profile has value of 4 or 5 when moist and 6 or 7 when dry, and it has chroma of 2 or 3 when dry or moist. The A horizon is silt loam or very stony silt loam. The AC and C horizons are silt loam or very fine sandy loam. They are mildly alkaline to strongly alkaline.

Carmack series

The Carmack series consists of very deep, well drained soils on uplands and north-facing mountainsides. These soils formed in residuum derived dominantly from conglomerate and tuffaceous sandstone. Slopes range from 0 to 75 percent. Elevation is 2,200 to 3,500 feet. The average annual precipitation is 20 to 35 inches, the average annual air temperature is about 43 degrees F, and the average length of the growing season, at 28 degrees F, is 145 to 170 days.

Typical pedon of Carmack loam, 0 to 25 percent slopes, about 3 miles southwest of Nile, about 1,000 feet north and 400 feet west of the southeast corner of sec. 16, T. 15 N., R. 15 E.

O1—2 inches to 0; decomposing forest litter.
A11—0 to 1 inch; grayish brown (10YR 5/2) and light gray (10YR 7/2) loamy sand, very dark grayish brown (10YR 3/2) and light brownish gray (10YR 6/2) moist; single grain; loose; few very fine and fine roots; medium acid; abrupt smooth boundary.
A12—1 inch to 15 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine irregular pores; 5 percent pebbles; slightly acid; abrupt smooth boundary.
B1—15 to 21 inches; brown (10YR 5/3) loam, dark yellowish brown (10YR 3/4) moist; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine irregular pores; medium acid; clear wavy boundary.
B2t—21 to 43 inches; pale brown (10YR 6/3) silty clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine and fine roots and common medium roots; common very fine irregular pores; common thin clay films on faces of peds; medium acid; clear wavy boundary.
B3—43 to 60 inches; pale brown (10YR 6/3) loam, dark yellowish brown (10YR 3/4) moist; moderate very fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few fine and common medium roots; few very fine irregular pores; medium acid.

Thickness of the mollic epipedon is 10 to 15 inches. The control section is 0 to 10 percent pebbles and cobbles. Base saturation ranges from 55 to 65 percent.

The A11 horizon is discontinuous in some pedons. The A12 horizon has hue of 7.5YR or 10YR, and it has chroma of 2 or 3 when dry or moist. It is loam or cobbly loam.

The B1 horizon has hue of 7.5YR or 10YR, value of 5 to 7 when dry and 3 to 5 when moist, and chroma of 2 or 3 when dry and 2 to 4 when moist. It is loam, silt loam, or gravelly loam. The B2t horizon has value of 6 or 7 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry and 2 to 4 when moist. It is silty clay loam, clay loam, or loam. The B3 horizon is loam or silt loam.

Cleman series

The Cleman series consists of very deep, well drained soils on flood plains and alluvial fans. These soils formed in alluvium. Slopes range from 0 to 15 percent. Elevation is 700 to 1,600 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 150 days.

Typical pedon of Cleman very fine sandy loam, 0 to 2 percent slopes, about 6 miles southeast of Moxee City, about 680 feet west and 100 feet north of the southeast corner of sec. 13, T. 12 N., R. 20 E.

Ap—0 to 10 inches; brown (10YR 5/3) very fine sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; common fine pores; mildly alkaline; clear wavy boundary.
C1—10 to 25 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; mildly alkaline; abrupt wavy boundary.
C2—25 to 28 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; mildly alkaline; abrupt wavy boundary.

C3—28 to 40 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, nonsticky and nonplastic; mildly alkaline; clear wavy boundary.
C4—40 to 45 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; mildly alkaline; clear wavy boundary.
C5—45 to 55 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; single grain; loose; mildly alkaline; abrupt wavy boundary.
C6—55 to 60 inches; yellowish brown (10YR 5/4) very fine sandy loam, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, slightly sticky and nonplastic; mildly alkaline.

Thickness of the mollic epipedon is 7 to 20 inches. The profile is neutral or mildly alkaline. The control section is 0 to 5 percent coarse fragments.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when moist or dry.

The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 to 4 when moist or dry. It is stratified silt loam to sandy loam above a depth of 40 inches. Below a depth of 40 inches the horizon is stratified silt loam to loamy fine sand and is 0 to 15 percent rock fragments.

Clint series

The Clint series consists of moderately deep, well drained soils on uplands. These soils formed in loess and in residuum derived from basalt. Slopes range from 8 to 75 percent. Elevation is 2,300 to 3,300 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 120 to 135 days.

Typical pedon of Clint very stony loam, 15 to 45 percent slopes, about 7 miles west of Cowiche, about 1,000 feet east and 1,200 feet south of the northwest corner of sec. 29, T. 14 N., R. 16 E.

A11—0 to 6 inches; reddish brown (5YR 5/3) very stony loam, dark reddish brown (5YR 3/3) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; 10 percent pebbles, 5 percent cobbles, and 10 percent stones; neutral; clear wavy boundary.
A12—6 to 10 inches; reddish brown (5YR 5/3) gravelly loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; few fine tubular pores; 15 percent pebbles and 5 percent cobbles; neutral; abrupt wavy boundary.
B2—10 to 19 inches; reddish brown (5YR 5/3) very gravelly loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; few fine tubular pores; 40 percent pebbles and 10 percent cobbles; neutral; abrupt irregular boundary.
C1—19 to 28 inches; dark brown (7.5YR 4/2) extremely gravelly loam, dark brown (7.5YR 3/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots matted between rock fragments; 60 percent pebbles and 15 percent cobbles; neutral; abrupt wavy boundary.
R—28 inches; fractured basalt.

Thickness of the solum is 13 to 20 inches. Depth to basalt is 20 to 40 inches. Thickness of the mollic epipedon is 10 to 15 inches. The control section is 18 to 25 percent clay and 40 to 70 percent coarse fragments. Base saturation is more than 75 percent.

The A horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when moist or dry.

The B horizon has hue of 5YR or 7.5YR, and it has value of 4 or 5 when dry and 2 or 3 when moist. It is very gravelly loam or very gravelly silt loam.

The C horizon has hue of 5YR or 7.5YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 or 3 when moist or dry. It is extremely gravelly loam, extremely gravelly silt loam, or extremely gravelly sandy clay loam.

Cowiche series

The Cowiche series consists of very deep, well drained soils on uplands. These soils formed in residuum derived from sandstone and have a mantle of loess. Slopes range from 2 to 30 percent. Elevation is 1,000 to 2,000 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 135 to 160 days.

Typical pedon of Cowiche loam, 8 to 15 percent slopes, about 6 miles northeast of Naches, about 2,000 feet east and 1,280 feet south of the northwest corner of sec. 27, T. 15 N., R. 18 E.

Ap—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate very thin platy structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; neutral; abrupt smooth boundary.
A12—3 to 10 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores; neutral; clear wavy boundary.

B1—10 to 20 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium prismatic structure; slightly hard, friable, sticky and plastic; few fine roots; few fine tubular pores; neutral; clear wavy boundary

B2t—20 to 29 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; few thin and very thin clay films in pores and on faces of peds; neutral; clear wavy boundary.

B3—29 to 35 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; mildly alkaline; abrupt wavy boundary.

C1—35 to 45 inches; pale brown (10YR 6/3) very fine sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; mildly alkaline; clear wavy boundary.

IIC2ca—45 to 60 inches; brown (10YR 5/3) loamy fine sand, dark brown (10YR 3/3) moist; massive; hard, firm, nonsticky and nonplastic; few fine roots; segregated lime on upper boundary of horizon and in root channels; violently effervescent; moderately alkaline.

Thickness of the mollic epipedon is 10 to 20 inches. The argillic horizon is 0 to 5 percent coarse fragments and 18 to 30 percent clay.

The A1 horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when dry or moist. It is neutral or mildly alkaline

The B2 horizon has value of 5 to 7 when dry, and it has chroma of 3 or 4 when dry or moist. It is heavy silt loam, heavy loam, clay loam, or sandy clay loam. It is neutral or mildly alkaline.

The C horizon has chroma of 2 or 3 when moist or dry. It is loamy fine sand, very fine sandy loam, sandy loam, or loamy sand. It is 0 to 15 percent coarse fragments.

Darland series

The Darland series consists of very deep, well drained soils on mountainsides. These soils formed in colluvium derived from basalt. Slopes range from 45 to 75 percent. Elevation is 5,000 to 6,900 feet. The average annual precipitation is 25 to 45 inches, the average annual air temperature is about 42 degrees F, and the average length of the growing season, at 28 degrees F, is 100 to 120 days.

Typical pedon of Darland stony loam, 45 to 75 percent slopes, about 14 miles west of Tampico, about 2,900 feet west and 2,550 feet north of the southeast corner of sec. 23, T. 12 N., R. 13 E.

A11—0 to 8 inches; dark yellowish brown (10YR 4/4) stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; few fine pores; stones on 5 percent of surface; neutral; abrupt smooth boundary.

A12—8 to 14 inches; dark brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, friable, slightly sticky and slightly plastic; common fine and medium roots; few fine pores; 35 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

A13—14 to 31 inches; dark brown (10YR 4/3) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; 35 percent pebbles and 25 percent cobbles; slightly acid; clear wavy boundary.

B2—31 to 43 inches; dark yellowish brown (10YR 4/4) extremely cobbly loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; 15 percent pebbles and 65 percent cobbles; slightly acid; gradual wavy boundary.

C—43 to 60 inches; dark yellowish brown (10YR 4/4) extremely cobbly sandy loam, dark brown (10YR 3/3) moist; single grain; loose; few fine and medium roots; 10 percent pebbles, 70 percent cobbles, and 10 percent stones; slightly acid.

Thickness of the mollic epipedon is 20 to 33 inches. The control section is 40 to 80 percent rock fragments.

The A horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when moist.

The B horizon has value of 4 or 5 when dry. It is very gravelly loam, very cobbly loam, or extremely cobbly loam.

The C horizon has value of 4 or 5 when dry. It is very cobbly or extremely cobbly sandy loam.

Esquatzel series

The Esquatzel series consists of very deep, well drained soils on flood plains These soils formed in silty alluvium. Slopes range from 0 to 5 percent. Elevation is 650 to 1,500 feet. The average annual precipitation is 6 to 10 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 130 to 160 days.

Typical pedon of Esquatzel silt loam, 0 to 2 percent slopes, about 4 miles northwest of Buena, about 1,340 feet south and 400 feet east of the northwest corner of sec. 6, T. 11 N., R. 20 E.

Ap1—0 to 4 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft, friable, nonsticky and slightly plastic; many very fine roots; common fine tubular pores; neutral; abrupt smooth boundary.

Ap2—4 to 8 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many very fine roots; common fine tubular pores; neutral; abrupt smooth boundary.

A13—8 to 17 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and plastic; common very fine roots; common fine tubular pores; neutral; gradual wavy boundary.

C1—17 to 22 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; common fine tubular pores; mildly alkaline; abrupt wavy boundary.

C2—22 to 46 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; common fine tubular pores; mildly alkaline; abrupt wavy boundary.

C3—46 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and plastic; few very fine roots; common fine tubular pores; mildly alkaline.

Thickness of the mollic epipedon ranges from 15 to 20 inches. Depth to carbonates is 40 to 60 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when moist or dry. It is neutral or mildly alkaline.

The C horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist or dry. It is silt loam but may be stratified with fine sandy loam below a depth of 40 inches. Reaction is mildly alkaline or moderately alkaline.

The Esquatzel soils in this survey area are a taxadjunct to the Esquatzel series because they do not have free carbonates above a depth of 40 inches. This difference, however, does not affect the use and management of the soils.

Fiander series

The Fiander series consists of very deep, somewhat poorly drained, salt- and alkali-affected soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 3 percent. Elevation is 700 to 900 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Fiander silt loam, about 2 miles north of Mabton, about 50 feet east and 1,400 feet south of the northwest corner of sec. 30, T. 9 N., R. 23 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; strong very thin platy structure; slightly hard, friable, slightly sticky and plastic; many fine roots; many fine pores; moderately alkaline; abrupt smooth boundary.

B21t—2 to 9 inches; brown (10YR 5/3) silty clay loam, dark brown (10YR 3/3) moist; strong coarse prismatic structure; hard, firm, sticky and plastic; many fine roots; few fine pores; thin continuous clay films on faces of peds; slightly effervescent; strongly alkaline; gradual wavy boundary.

B22t—9 to 13 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; faces of peds are very dark brown (10YR 2/2) moist; strong coarse prismatic structure; hard, firm, sticky and plastic; many very fine roots; few fine pores; thin continuous clay films on faces of peds; slightly effervescent; very strongly alkaline; gradual wavy boundary.

B23t—13 to 25 inches; pale brown (10YR 6/3) silty clay loam, brown (10YR 4/3) moist; moderate medium granular structure; hard, firm, sticky and plastic; few very fine roots; few fine pores; thin continuous clay films on faces of peds; violently effervescent; very strongly alkaline; gradual wavy boundary.

C1—25 to 50 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; violently effervescent; strongly alkaline; abrupt smooth boundary.

C2—50 to 60 inches; brown (10YR 5/3) loamy very fine sand, dark brown (10YR 3/3) moist; single grain; loose; mildly alkaline.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 1 or 2 when dry or moist. It is moderately alkaline to very strongly alkaline.

The B2t horizon has chroma of 2 or 3 when dry or moist. It is heavy silt loam or silty clay loam and is strongly alkaline or very strongly alkaline.

The C horizon has chroma of 2 or 3 when dry or moist. It is silt loam above a depth of 40 inches and is silt loam or loamy very fine sand below a depth of 40 inches. It is mildly alkaline to strongly alkaline.

Finley series

The Finley series consists of very deep, well drained soils on terraces and alluvial fans. These soils formed in old alluvium. Slopes range from 0 to 15 percent. Elevation is 600 to 1,400 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 180 days.

Typical pedon of Finley cobbly fine sandy loam, 0 to 5 percent slopes, about 14 miles north of Sunnyside, about 1,600 feet south and 1,300 feet west of the northeast corner of sec. 24, T. 12 N., R. 22 E.

A1—0 to 4 inches; brown (10YR 5/3) cobbly fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; common very fine tubular pores; 5 percent pebbles and 15 percent cobbles; mildly alkaline; abrupt smooth boundary.

A3—4 to 14 inches; brown (10YR 5/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 5 percent pebbles; mildly alkaline; clear wavy boundary.

B2—14 to 30 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine roots; 45 percent pebbles and 10 percent cobbles; mildly alkaline; abrupt wavy boundary.

IIC—30 to 60 inches; yellowish brown (10YR 5/4) extremely gravelly sand, dark yellowish brown (10YR 3/4) moist; single grain; loose; 60 percent pebbles and 15 percent cobbles; mildly alkaline.

Depth to free lime is 14 to 60 inches. The profile is mildly alkaline or moderately alkaline. The control section is 50 to 75 percent coarse fragments.

The A horizon has value of 5 to 7 when dry and 3 or 4 when moist. It is fine sandy loam, cobbly fine sandy loam, or silt loam.

The B horizon has value of 5 to 7 when dry and 3 or 4 when moist, and it has chroma of 2 to 4 when dry or moist. It is very gravelly loam, very gravelly fine sandy loam, or extremely cobbly sandy loam.

The IIC horizon is very gravelly, very cobbly, extremely gravelly, or extremely cobbly sand or loamy sand.

Gorskel series

The Gorskel series consists of very shallow and shallow, well drained soils on uplifted terraces and foot slopes. These soils formed in loess and old alluvium. Slopes range from 0 to 25 percent. Elevation is 1,200 to 3,000 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 120 to 150 days.

Typical pedon of Gorskel very stony loam, 0 to 25 percent slopes, about 2 1/2 miles northeast of Naches, about 200 feet east and 2,300 feet north of the southwest corner of sec. 26, T. 15 N., R. 17 E.

A1—0 to 5 inches; brown (10YR 5/3) very stony loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many fine roots; many fine vesicular pores; 5 percent stones, 30 percent cobbles, and 20 percent pebbles; mildly alkaline; abrupt wavy boundary.

B1t—5 to 8 inches; yellowish brown (10YR 5/4) gravelly heavy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and plastic; many fine roots; many very fine vesicular pores; 25 percent pebbles; few thin clay films on faces of peds; mildly alkaline; abrupt wavy boundary.

B2t—8 to 13 inches; dark yellowish brown (10YR 4/4) very gravelly clay loam, dark yellowish brown (10YR 3/4) moist; strong medium angular blocky structure; hard, friable, sticky and plastic; many fine roots; common very fine vesicular pores; 40 percent pebbles and 5 percent cobbles; many moderately thick clay films on faces of peds; mildly alkaline; abrupt wavy boundary.

IICsim—13 inches; indurated, silica-cemented gravelly duripan.

Depth to the duripan is 9 to 15 inches. The mollic epipedon is 7 to 9 inches thick.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist.

The B2t horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is very gravelly loam, very gravelly silt loam, very gravelly silty clay loam, very gravelly clay loam, or very cobbly clay loam.

Gorst series

The Gorst series consists of shallow, well drained soils on dissected terraces. These soils formed in loess and old alluvium. Slopes range from 0 to 30 percent. Elevation is 1,200 to 2,000 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 150 days.

Typical pedon of Gorst loam, 2 to 15 percent slopes, about 2 miles southwest of Harwood, about 1,140 feet west and 400 feet south of the northeast corner of sec. 33, T. 13 N., R. 17 E.

Ap—0 to 7 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; few fine tubular pores; mildly alkaline; abrupt wavy boundary.

B21—7 to 10 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium prismatic structure; hard, firm, slightly sticky and plastic; few very fine roots; common fine tubular pores; 5 percent pebbles and 5 percent cobbles; mildly alkaline; clear wavy boundary.

B22—10 to 15 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; moderate medium angular blocky structure parting to moderate fine blocky; hard, firm, slightly sticky and plastic; few very fine roots; many very fine tubular pores; 5 percent pebbles and 5 percent cobbles; mildly alkaline; abrupt smooth boundary.

IICsim—15 inches; indurated, silica-cemented gravelly duripan.

Depth to the duripan is 12 to 20 inches. Thickness of the mollic epipedon is 7 to 9 inches. The control section is 18 to 25 percent clay.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. It is loam or cobbly loam.

The B horizon is silt loam or loam and is 0 to 15 percent rock fragments.

Harwood series

The Harwood series consists of moderately deep, well drained soils on highly dissected terraces and uplands. These soils formed in loess and old alluvium. Slopes range from 0 to 60 percent. Elevation is 1,200 to 2,000 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 51 degrees F, and the frost-free season is 135 to 150 days.

Typical pedon of Harwood loam, 2 to 5 percent slopes, about 5 miles southwest of Harwood, about 150 feet south and 1,840 feet east of the northwest corner of sec. 31, T. 13 N., R. 17 E.

A11—0 to 4 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; neutral; abrupt wavy boundary.

A12—4 to 8 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure parting to moderate thin platy; hard, friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores; mildly alkaline; clear wavy boundary.

B21—8 to 18 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine tubular pores; 5 percent pebbles; mildly alkaline; clear wavy boundary.

B22—18 to 24 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; moderate medium prismatic structure; hard, firm, slightly sticky and plastic; common fine roots; common fine tubular pores; 5 percent pebbles; mildly alkaline; clear wavy boundary.

B23—24 to 26 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; moderate medium angular blocky structure; very hard, very firm, slightly sticky and plastic; common fine roots; many fine tubular pores; 5 percent pebbles; moderately alkaline; abrupt wavy boundary.

IIC1—26 to 30 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist; massive; very hard, very firm, sticky and plastic; few fine roots; many fine tubular pores; 25 percent pebbles and 5 percent cobbles; silica coatings on pebbles; moderately alkaline; abrupt smooth boundary.

IIC2sim—30 inches; indurated, silica-cemented gravelly duripan.

Depth to the duripan is 20 to 40 inches. Thickness of the mollic epipedon is 7 to 15 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when moist or dry. It is loam, silt loam, or very stony silt loam.

The B horizon has value of 5 or 6 when dry and 3 or 4 when moist. It is loam or silt loam.

The IIC horizon has hue of 10YR or 7.5YR, and it has chroma of 3 or 4 when moist or dry. It is gravelly loam or gravelly silt.

Hezel series

The Hezel series consists of very deep, somewhat excessively drained soils on terraces. These soils formed in lacustrine sediment and have a mantle of eolian sand. Slopes range from 0 to 15 percent. Elevation is 650 to 800 feet. The average annual precipitation is 6 to 8 inches, the average annual air temperature is about 53 degrees F, and the average frost-free season is 150 to 180 days.

Typical pedon of Hezel loamy fine sand, 2 to 15 percent slopes, about 5 miles southeast of Sunnyside, about 120 feet south and 600 feet west of the northeast corner of sec. 3, T. 9 N., R. 23 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; common fine roots; neutral; abrupt smooth boundary.

C1—6 to 16 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few fine roots; neutral; gradual wavy boundary.

C2—16 to 22 inches; light brownish gray (10YR 6/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose; few fine roots; mildly alkaline; abrupt wavy boundary.

IIC3—22 to 28 inches; light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; few fine pores; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC5ca—28 to 34 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; moderate thin platy structure; hard, firm, slightly sticky and plastic; few fine roots; few fine pores; segregated lime; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC6ca—34 to 60 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and plastic; few fine roots; few fine pores; segregated lime in root channels; violently effervescent; moderately alkaline.

Depth to secondary lime is 20 to 30 inches. The A and C horizons have chroma of 2 or 3 when dry or moist. The IIC horizon has value of 6 or 7 when dry and 3 or 4 when moist, and it has chroma of 1 to 3 when moist or dry. It is stratified silt loam, very fine sandy loam, and fine sandy loam.

Jumpe series

The Jumpe series consists of very deep, well drained soils on mountainsides and long, broad mountain ridges and in canyons. These soils formed in residuum and colluvium derived from basalt and containing minor amounts of loess and volcanic ash. Slopes range from 5 to 65 percent. Elevation is 2,800 to 5,800 feet. The average annual precipitation is 25 to 40 inches, the average annual air temperature is about 42 degrees F, and the average length of the growing season, at 28 degrees F, is 135 to 170 days.

Typical pedon of Jumpe stony loam, 25 to 45 percent slopes, about 12 miles west of Tampico, about 250 feet east and 500 feet south of the northwest corner of sec. 23, T. 12 N., R. 13 E.

O1—2 inches to 0; decomposing forest litter, needles, and twigs.

A1—0 to 3 inches; brown (10YR 4/3) stony loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; few very fine and fine roots; 5 percent stones; slightly acid; clear wavy boundary.

B21—3 to 19 inches; brown (7.5YR 4/4) extremely cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate very fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; few very fine roots and common fine and medium roots; 15 percent pebbles, 40 percent cobbles, and 10 percent stones; medium acid; clear wavy boundary.

B22—19 to 41 inches; dark yellowish brown (10YR 4/4) extremely cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; few very fine and fine roots and common medium roots; 15 percent pebbles, 35 percent cobbles, and 20 percent stones; medium acid; clear wavy boundary.

C—41 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and common medium roots; 30 percent pebbles, 20 percent cobbles, and 10 percent stones; medium acid.

The surface layer is 2 to 10 percent stones. The control section averages 40 to 70 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 to 6 when dry and 3 or 4 when moist, and chroma of 2 or 3 when dry or moist.

The B2 horizon has value of 4 to 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when dry or moist. It is very cobbly loam or extremely cobbly loam.

The C horizon has hue of 10YR or 7.5YR, value of 5 or 6 when dry, and chroma of 3 or 4 when dry or moist. It is very cobbly loam or extremely cobbly loam.

Kiona series

The Kiona series consists of very deep, well drained soils on uplands. These soils formed in loess and in colluvium derived from basalt. Slopes range from 15 to 45 percent Elevation is 800 to 2,500 feet. The average annual precipitation is 7 to 12 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 140 to 200 days.

Typical pedon of Kiona stony silt loam, 15 to 45 percent slopes, about 16 miles northwest of Sunnyside, about 1,000 feet north and 300 feet west of the southeast corner of sec. 12, T. 12 N., R. 23 E.

A1—0 to 5 inches; brown (10YR 5/3) stony silt loam, dark brown (10YR 3/3) moist; moderate thin platy structure; soft, very friable, nonsticky and slightly plastic; common fine and very fine roots; common very fine tubular pores; 5 percent pebbles and 5 percent stones; moderately alkaline; abrupt wavy boundary.

B2—5 to 14 inches; pale brown (10YR 6/3) very cobbly silt loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 10 percent pebbles and 40 percent cobbles; moderately alkaline; abrupt irregular boundary.

C1ca—14 to 60 inches; pale brown (10YR 6/3) very cobbly silt loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; 10 percent pebbles and 40 percent cobbles; lime is disseminated and segregated in soft masses; violently effervescent; moderately alkaline.

Depth to lime is 12 to 30 inches. The control section averages 50 to 75 percent coarse fragments and is silt loam, very fine sandy loam, or loam. The profile is mildly alkaline or moderately alkaline.

The A and B horizons have value of 5 to 7 when dry and 3 to 5 when moist, and they have chroma of 2 or 3 when dry or moist. The B horizon is cobbly or very cobbly silt loam or loam.

The C horizon has value of 5 to 7 when dry and 3 to 5 when moist, and it has chroma of 2 or 3 when dry or moist. It is very cobbly or extremely cobbly silt loam, fine sandy loam, or loam.

Kittitas series

The Kittitas series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in mixed alluvium. Slopes range from 0 to 2 percent. Elevation is 700 to 1,100 feet. The average annual precipitation is 6 to 12 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Kittitas silt loam, about 2 miles northwest of Mabton, about 2,200 feet east and 1,100 feet south of the northwest corner of sec. 25, T. 9 N., R. 22 E.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to weak fine granular; slightly hard, friable, slightly sticky and plastic; many fine roots; slightly effervescent; very strongly alkaline; abrupt smooth boundary.

A12—2 to 19 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and plastic; common fine roots; common fine pores; violently effervescent; very strongly alkaline; abrupt wavy boundary.

C1—19 to 30 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; common medium mottles that are gray (10YR 5/1) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; violently effervescent; moderately alkaline; abrupt smooth boundary.

C2—30 to 41 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; violently effervescent; moderately alkaline; gradual wavy boundary.

C3—41 to 52 inches; light brownish gray (10YR 6/2) very fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; common fine pores; slightly effervescent; moderately alkaline; gradual wavy boundary.

C4—52 to 60 inches; light brownish gray (10YR 6/2) fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, very friable, nonsticky and nonplastic; common fine pores; slightly effervescent; moderately alkaline.

The A horizon has value of 3 to 5 when dry, and it has chroma of 1 or 2 when moist or dry. It is moderately alkaline to very strongly alkaline.

The C horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is silt loam or silty clay loam above a depth of 40 inches and is fine sandy loam, very fine sandy loam, or silt loam below that depth. It is mildly alkaline or moderately alkaline.

Lickskillet series

The Lickskillet series consists of shallow, well drained soils on uplands. These soils formed in loess and in residuum and colluvium derived from basalt. Slopes range from 5 to 45 percent. Elevation is 1,500 to 3,200 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is about 48 degrees F, and the average frost-free season is 120 to 150 days.

Typical pedon of Lickskillet very stony silt loam, 5 to 45 percent slopes, about 10 miles south of Sunnyside, about 2,500 feet west and 300 feet north of the southeast corner of sec. 6, T. 11 N., R. 23 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) very stony silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots; few fine tubular pores; 5 percent pebbles and 10 percent stones; neutral; abrupt smooth boundary.

B1—3 to 8 inches; brown (10YR 5/3) very gravelly silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many medium and few fine roots; few fine tubular pores; 20 percent pebbles and 10 percent cobbles; mildly alkaline; clear wavy boundary.

B21—8 to 12 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 3/4) moist; moderate fine prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common medium roots; few fine tubular pores; 25 percent pebbles and 10 percent cobbles; mildly alkaline; abrupt wavy boundary.

B22—12 to 20 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium roots; few fine tubular pores; 30 percent pebbles and 30 percent cobbles; mildly alkaline; abrupt wavy boundary.

IIR—20 inches; fractured basalt.

Depth to basalt is 12 to 20 inches. Thickness of the mollic epipedon is 7 to 12 inches. The A horizon has value of 4 or 5 when dry and 2 or 3 when moist. It is silt loam or very stony silt loam. The B horizon has value of 5 or 6 when dry and 3 or 4 when moist. It is very gravelly loam, very cobbly loam, very gravelly silt loam, or very gravelly silty clay loam.

Logy series

The Logy series consists of very deep, well drained soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 5 percent. Elevation is 700 to 1,200 feet. The average annual precipitation is 7 to 10 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Logy silt loam, 0 to 2 percent slopes, about 4 miles southwest of Wiley City, about 2,550 feet south and 80 feet west of the northeast corner of sec. 18, T. 12 N., R. 17 E.

A11—0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; 5 percent pebbles; neutral; abrupt wavy boundary.

A12—5 to 12 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; 10 percent pebbles; neutral; abrupt wavy boundary.

B2—12 to 33 inches; brown (10YR 4/3) extremely gravelly loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; common fine roots; common fine pores; 45 percent pebbles and 20 percent cobbles; mildly alkaline; gradual wavy boundary.

IIC1—33 to 45 inches; brown (10YR 4/3) extremely cobbly coarse sand, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; 40 percent pebbles and 40 percent cobbles; mildly alkaline; gradual wavy boundary.

IIC2—45 to 60 inches; grayish brown (10YR 5/2) extremely gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; 55 percent pebbles and 20 percent cobbles; neutral.

Thickness of the mollic epipedon is 10 to 20 inches. The profile is neutral or mildly alkaline. The control section averages 50 to 80 percent coarse fragments.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 1 or 2 when dry or moist. It is silt loam or cobbly silt loam. It is 5 to 25 percent coarse fragments.

The B horizon has value of 4 or 5 when dry and 3 or 4 when moist. It is extremely gravelly loam or very gravelly silt loam.

The IIC horizon has value of 3 or 4 when moist, and it has chroma of 2 to 4 when dry or moist.

Loneridge series

The Loneridge series consists of very deep, well drained soils on mountainsides, ridges, benches, and smooth mountaintops. These soils formed in residuum and colluvium derived from basalt and containing a small amount of loess. Slopes range from 0 to 45 percent. Elevation is 2,400 to 5,400 feet. The average annual precipitation is 25 to 40 inches, the average annual air temperature is about 42 degrees F, and the average length of the growing season, at 28 degrees F, is 135 to 170 days.

Typical pedon of Loneridge stony loam, 0 to 25 percent slopes, about 7 miles northwest of Tampico,

about 800 feet south and 1,700 feet east of the northwest corner of sec. 30, T. 13 N., R. 15 E.

O1—1 inch to 0; decomposing forest litter, needles, and twigs.
A—0 to 3 inches; dark grayish brown (10YR 4/2) stony loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; 10 percent pebbles, 5 percent cobbles, and 5 percent stones; medium acid; abrupt smooth boundary.
B11—3 to 13 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; 20 percent pebbles and 20 percent cobbles; slightly acid; clear smooth boundary.
B12—13 to 23 inches; pale brown (10YR 6/3) very cobbly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; 35 percent pebbles and 20 percent cobbles; slightly acid; clear wavy boundary.
B21t—23 to 35 inches; dark yellowish brown (10YR 4/4) very cobbly clay, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common very fine and fine roots and few coarse roots; many thick clay films on faces of peds and on rock fragments; 30 percent pebbles and 20 percent cobbles; slightly acid; gradual wavy boundary.
B22t—35 to 60 inches; yellowish brown (10YR 5/4) very cobbly clay, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, very firm, sticky and very plastic; few very fine roots; many thick clay films on faces of peds and on rock fragments; 25 percent pebbles and 30 percent cobbles; slightly acid.

The control section is 40 to 70 percent rock fragments. The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 when moist, and chroma of 2 or 3 when dry or moist. The B1 horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 2 or 3 when dry or moist. It is very cobbly loam or very gravelly loam. The B2t horizon has value of 4 to 6 when dry and 3 or 4 when moist. It is very cobbly clay, very cobbly clay loam, or very gravelly clay.

McDaniel series

The McDaniel series consists of very deep, well drained soils on uplands. These soils formed in loess and in colluvium derived from basalt. Slopes range from 5 to 65 percent. Elevation is 2,200 to 3,300 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is about 49 degrees F, and the frost-free season is 120 to 135 days.

Typical pedon of McDaniel very stony loam, 30 to 65 percent slopes, about 6 miles southwest of Cowiche, about 1,800 feet east and 1,600 feet north of the southwest corner of sec. 33, T. 14 N., R. 16 E.

A11—0 to 8 inches; grayish brown (10YR 5/2) very stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure parting to moderate fine granular; soft, very friable, nonsticky and slightly plastic; many fine roots; many fine tubular pores; 20 percent pebbles, 5 percent cobbles, and 5 percent stones; neutral; clear wavy boundary.
B21t—8 to 24 inches; brown (7.5YR 5/2) very gravelly clay loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; few fine tubular pores; 30 percent pebbles and 10 percent cobbles; few thin clay films on faces of peds; neutral; gradual wavy boundary.
B22t—24 to 35 inches; brown (7.5YR 5/4) very cobbly silty clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; many fine tubular pores; 25 percent pebbles and 35 percent cobbles; few thin clay films on faces of peds; neutral; gradual wavy boundary.
B23t—35 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly silty clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; hard, firm, sticky and plastic; few fine roots; 25 percent pebbles and 50 percent cobbles; few thin clay films on faces of peds; neutral.

The mollic epipedon is 21 to 30 inches thick. The A horizon has value of 4 or 5 when dry and 2 or 3 when moist. The upper part of the B horizon is very gravelly clay loam, very gravelly silty clay loam, or very cobbly silty clay loam, and the lower part is extremely cobbly silty clay loam, extremely gravelly clay loam, or extremely gravelly silty clay loam.

Meystre series

The Meystre series consists of very deep, well drained soils on uplands. These soils formed in loess and in material derived from sandstone. Slopes range from 0 to 45 percent. Elevation is 2,200 to 3,300 feet. The average annual precipitation is 15 to 20 inches, the average annual air temperature is about 48 degrees F, and the average length of the growing season, at 28 degrees F, is 150 to 175 days.

Typical pedon of Meystre loam, 0 to 15 percent slopes, about 12 miles northwest of Naches, about 2,500

feet east and 1,900 feet south of the northwest corner of sec. 2, T. 16 N., R. 16 E.

O1—1 inch to 0; decaying forest litter.
A11—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy structure; soft, very friable, nonsticky and slightly plastic; common fine roots; slightly acid; abrupt smooth boundary.
A12—3 to 11 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; slightly acid; clear wavy boundary.
B21t—11 to 18 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine roots; few fine tubular pores; few thin patchy clay films on faces of peds; slightly acid; clear wavy boundary.
B22t—18 to 29 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; few thin patchy clay films on faces of peds; slightly acid; clear wavy boundary.
B3t—29 to 41 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; very hard, friable, nonsticky and nonplastic; very few medium roots; few fine tubular pores; very few thin patchy clay films in root channels; neutral; abrupt smooth boundary.
C—41 to 60 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; massive; very hard, friable, nonsticky and nonplastic; very few medium roots; few fine tubular pores; neutral.

The mollic epipedon is 10 to 18 inches thick. The control section is 0 to 5 percent coarse fragments. The A horizon is loam or stony loam. The B2 horizon is clay loam or loam. The C horizon has chroma of 3 or 4 when moist. It is fine sandy loam or sandy loam.

Mikkalo series

The Mikkalo series consists of moderately deep, well drained soils on uplands. These soils formed in loess. Slopes range from 0 to 15 percent. Elevation is 1,200 to 2,500 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Mikkalo silt loam, 0 to 5 percent slopes, about 11 miles south of Mabton, about 100 feet west and 200 feet north of the southeast corner of sec. 31, T. 7 N., R. 23 E.

Ap—0 to 5 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, friable, nonsticky and slightly plastic; many fine roots; common fine pores; neutral; abrupt smooth boundary.
B2—5 to 20 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure; soft, friable, nonsticky and slightly plastic; common fine roots; common fine pores; mildly alkaline; abrupt wavy boundary.
C1ca—20 to 26 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; 5 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.
C2ca—26 to 30 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; 20 percent pebbles; disseminated and segregated lime in root channels and as soft masses; violently effervescent; strongly alkaline; abrupt wavy boundary.
IIR—30 inches; basalt; lime and silica coatings on fractured basalt fragments.

Depth to basalt is 20 to 40 inches. Depth to secondary lime is 20 to 35 inches. The A horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when dry or moist. The B horizon is neutral or mildly alkaline. The C horizon has value of 3 or 4 when moist, and it has chroma of 3 or 4 when dry or moist.

Mippon series

The Mippon series consists of very deep, well drained soils on low terraces and flood plains These soils formed in recent alluvium. Slopes range from 0 to 5 percent. Elevation is 2,400 to 4,800 feet. The average annual precipitation is 20 to 40 inches, the average annual air temperature is about 43 degrees F, and the average frost-free season is 145 to 170 days.

Typical pedon of Mippon very cobbly silt loam, about 5 miles northwest of Tampico, about 2,200 feet south and 3,700 feet west of the northeast corner of sec. 14, T. 13 N., R. 15 E.

O1—1/2 inch to 0; decomposed and decomposing forest litter.

A11—0 to 7 inches; very dark grayish brown (10YR 3/2) very cobbly silt loam, black (10YR 2/1) moist, weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; very few very fine irregular pores; 25 percent pebbles and 35 percent cobbles; neutral; abrupt wavy boundary.

A12—7 to 14 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few medium roots; 35 percent pebbles and 25 percent cobbles; slightly acid; abrupt wavy boundary.

C1—14 to 22 inches; brown (10YR 4/3) extremely gravelly sand, dark brown (10YR 3/3) moist; single grain; loose; common very fine roots; 55 percent pebbles and 25 percent cobbles; slightly acid; gradual wavy boundary.

C2—22 to 60 inches; yellowish brown (10YR 5/4) extremely gravelly sand, dark brown (10YR 3/3) moist, single grain; loose; few coarse roots; 70 percent pebbles and 20 percent cobbles; slightly acid.

The mollic epipedon is 10 to 14 inches thick. The control section averages 50 to 90 percent rock fragments.

The A horizon has value of 3 to 5 when dry, and it has chroma of 1 to 3 when moist or dry. It is 35 to 60 percent rock fragments.

The C horizon has chroma of 3 or 4 when dry and 2 or 3 when moist. It is 60 to 90 percent rock fragments. It is very gravelly sandy loam, very cobbly loam, or very gravelly sand in the upper part and is extremely cobbly loamy sand, extremely gravelly sand, or very cobbly sand in the lower part.

Moxee series

The Moxee series consists of shallow, well drained soils on uplands. These soils formed in loess overlying a lime- and silica-cemented duripan. Slopes range from 0 to 30 percent. Elevation is 1,300 to 2,000 feet The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 125 to 160 days.

Typical pedon of Moxee silt loam, 2 to 15 percent slopes, about 4 miles northeast of Moxee City, about 100 feet north and 110 feet west of the southeast corner of sec. 34, T. 13 N., R. 20 E.

A11—0 to 3 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium platy structure; soft, very friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; 5 percent pebbles; neutral; abrupt wavy boundary.

A12—3 to 7 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; 3 percent pebbles; mildly alkaline; abrupt wavy boundary.

B2—7 to 11 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; 5 percent pebbles and 5 percent cobbles; moderately alkaline; gradual wavy boundary.

IIC1ca—11 to 18 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and slightly plastic; few fine roots; 20 percent pebbles and 5 percent cobbles; soft masses of lime; strongly effervescent; moderately alkaline; abrupt wavy boundary.

IIC2casim—18 inches; lime- and silica-cemented duripan.

Depth to the duripan is 10 to 20 inches. The duripan is underlain by basalt at a depth of 20 inches or more. The mollic epipedon is 7 to 10 inches thick. The control section averages 10 to 35 percent coarse fragments and is 5 to 10 percent clay. The coarse fragments are lime- and silica-cemented material and basalt.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when moist or dry. It is silt loam or cobbly silt loam and is 0 to 30 percent coarse fragments.

The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when moist or dry.

The Cca horizon has value of 5 to 8 when dry and 3 to 6 when moist, and it has chroma of 1 to 4 when moist or dry. It is silt loam or gravelly silt loam.

Naches series

The Naches series consists of very deep, well drained soils on stream terraces in valleys. These soils formed in old alluvium. Slopes range from 0 to 2 percent. Elevation is 700 to 900 feet. The average annual precipitation is 7 to 9 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Naches loam, about 1/2 mile north of Gleed, about 700 feet east and 100 feet south of the northwest corner of sec. 32, T. 13 N., R. 18 E.

Ap—0 to 9 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; many fine roots; many fine tubular pores; neutral; clear wavy boundary.

B21t—9 to 16 inches; brown (10YR 5/3) heavy loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; common fine roots and few medium roots; common fine tubular pores; common thin clay films on faces of peds; mildly alkaline; gradual wavy boundary.

B22t—16 to 21 inches; brown (10YR 5/3) heavy loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, friable, sticky and plastic; few medium roots and common fine roots; common fine tubular pores; common thin clay films on faces of peds; mildly alkaline; gradual wavy boundary.

B3—21 to 28 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few medium roots and common fine roots; few fine tubular pores; mildly alkaline; clear wavy boundary.

C1—28 to 34 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; massive; soft, friable, slightly sticky and slightly plastic; few medium and fine pores; 30 percent pebbles; mildly alkaline; abrupt wavy boundary.

IIC2—34 to 60 inches; dark grayish brown (10YR 4/2) extremely gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few very fine roots; 60 percent pebbles and 15 percent cobbles; mildly alkaline.

Thickness of the mollic epipedon is 7 to 16 inches. Depth to the IIC horizon is 25 to 38 inches.

The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when dry or moist.

The B2t horizon has hue of 10YR or 7.5YR, and it has value of 4 or 5 when dry and 3 or 4 when moist. It is heavy loam, sandy clay loam, or clay loam.

The C horizon has value of 4 to 6 when dry and 3 or 4 when moist, and it has chroma of 2 to 4 when dry or moist. It is fine sandy loam, silt loam, or gravelly loam.

The IIC horizon is extremely gravelly loamy sand or extremely gravelly sand.

Naxing series

The Naxing series consists of very deep, well drained soils on mountains and broad mountain ridges. These soils formed in colluvium derived dominantly from basalt and containing volcanic ash and loess. Slopes range from 5 to 65 percent. Elevation is 5,000 to 7,000 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 41 degrees F, and the average length of the growing season, at 28 degrees F, is 80 to 110 days.

Typical pedon of Naxing stony loam, 25 to 45 percent slopes, about 11 miles northwest of Tampico, about 2,300 feet west and 1,100 feet south of the northeast corner of sec. 5, T. 12 N., R. 14 E.

O1—1 inch to 0; decomposing forest litter.

A11—0 to 7 inches; brown (10YR 4/3) stony loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; few coarse roots and common very fine, fine, and medium roots; stones on 5 percent of surface; medium acid; abrupt wavy boundary.

A12—7 to 14 inches; brown (10YR 4/3) cobbly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and nonplastic; weakly smeary; many fine roots and common medium and coarse roots; 5 percent pebbles, 20 percent cobbles, and 5 percent stones; medium acid; clear smooth boundary.

B2—14 to 21 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; soft, very friable, nonsticky and nonplastic; weakly smeary; few coarse roots and common fine and medium roots; 5 percent pebbles, 30 percent cobbles, and 15 percent stones; medium acid; clear smooth boundary.

C1—21 to 31 inches; yellowish brown (10YR 5/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; soft, very friable, slightly sticky and nonplastic; weakly smeary; few fine and common medium roots; 20 percent pebbles, 40 percent cobbles, and 5 percent stones; medium acid; clear smooth boundary.

C2—31 to 60 inches; yellowish brown (10YR 5/4) extremely cobbly loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few coarse roots; 20 percent pebbles, 40 percent cobbles, and 5 percent stones; medium acid.

The control section averages 40 to 70 percent rock fragments.

The A horizon has hue of 7.5YR or 10YR, value of 4 or 5 when dry and 2 or 3 when moist, and chroma of 2 or 3 when moist or dry. It is loam or stony loam.

The B horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when moist or dry. It is very cobbly loam or very cobbly sandy loam.

The C horizon has hue of 7.5YR or 10YR, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 4

or 5 when dry or moist. It is very cobbly loam, very cobbly sandy loam, or extremely cobbly loam.

Odo series

The Odo series consists of very deep, well drained soils on uplands. These soils formed in residuum and colluvium derived dominantly from basalt and containing some loess and volcanic ash. Slopes range from 5 to 35 percent. Elevation is 2,000 to 3,200 feet. The average annual precipitation is 15 to 19 inches, the average annual air temperature is about 46 degrees F, and the average length of the growing season, at 28 degrees F, is 150 to 180 days.

Typical pedon of Odo cobbly silt loam, 5 to 35 percent slopes, about 4 miles southwest of Tampico, about 1,300 feet north and 100 feet east of the southwest corner of sec. 22, T. 12 N., R. 15 E.

O1—3 inches to 0; decomposing forest litter.
A1—0 to 18 inches; brown (10YR 4/3) cobbly silt loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots and common fine roots; many very fine irregular pores; 10 percent pebbles and 10 percent cobbles; slightly acid; clear wavy boundary.
B21—18 to 32 inches; yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium and fine roots; many very fine irregular pores; 30 percent pebbles; slightly acid; clear wavy boundary.
B22—32 to 60 inches; yellowish brown (10YR 5/4) gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common fine roots; many very fine irregular pores; 20 percent pebbles; slightly acid.

The mollic epipedon is 12 to 18 inches thick. The control section averages 15 to 30 percent coarse fragments. The A horizon has hue of 7.5YR or 10YR, and it has value of 3 or 4 when dry. The B horizon has hue of 5YR, 7.5YR, or 10YR, and it has value of 4 or 5 when dry.

Outlook series

The Outlook series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 3 percent. Elevation is 650 to 2,000 feet. The average annual precipitation is 6 to 12 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 160 days.

Typical pedon of Outlook silt loam, about 2 miles northeast of Outlook, about 1,900 feet west and 2,600 feet south of the northeast corner of sec. 24, T. 10 N., R. 21 E.

Ap1—0 to 2 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many fine roots; violently effervescent; strongly alkaline; abrupt wavy boundary.
Ap2g—2 to 4 inches; very dark grayish brown (2.5Y 3/2) silt loam, grayish brown (2.5Y 5/2) dry; few fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many fine roots; violently effervescent; strongly alkaline; clear wavy boundary.
A3g—4 to 8 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium granular structure; soft, very friable, nonsticky and slightly plastic; many fine roots; violently effervescent; strongly alkaline; clear wavy boundary.
B2g—8 to 18 inches; grayish brown (10YR 5/2) silt loam, light gray (10YR 7/2) dry; common medium distinct yellowish brown (10YR 5/4) mottles; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; few very fine roots; few fine tubular pores; slightly effervescent; moderately alkaline; gradual wavy boundary.
Cg—18 to 60 inches; dark brown (10YR 3/3) silt loam, pale brown (10YR 6/3) dry; common medium distinct dark yellowish brown (10YR 4/4) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few tubular pores; moderately alkaline.

The profile is moderately alkaline or strongly alkaline. The 10- to 40-inch control section is very fine sandy loam or silt loam.

The Ap1 horizon has value of 2 or 3 when moist and 4 or 5 when dry. It is silt loam or fine sandy loam. The Ag horizons have mottles that have value of 4 or 5.

The Bg horizon has value of 3 to 5 when moist and 5 to 7 when dry. It has mottles that have value of 4 or 5.

The Cg horizon has value of 3 to 5 when moist and 5 to 7 when dry. It has mottles that have value of 4 or 5. The horizon is silt loam or very fine sandy loam.

Prosser series

The Prosser series consists of moderately deep, well drained soils on uplands. These soils formed in loess and alluvium. Slopes range from 0 to 15 percent. Elevation is 300 to 1,150 feet. The average annual precipitation is 6 to 9 inches, the average annual air

temperature is about 50 degrees F, and the average frost-free season is 160 to 180 days.

Typical pedon of Prosser silt loam, 0 to 15 percent slopes, about 11 miles southeast of Mabton, about 2,520 feet east and 700 feet north of the southwest corner of sec. 26, T. 7 N., R. 23 E.

Ap—0 to 4 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; mildly alkaline; abrupt smooth boundary.

B2—4 to 14 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine tubular pores; mildly alkaline; clear smooth boundary.

C1—14 to 19 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; moderately alkaline; abrupt wavy boundary.

C2ca—19 to 24 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common very fine tubular pores; mycelial lime; violently effervescent; moderately alkaline; abrupt wavy boundary.

C3ca—24 to 33 inches; light gray (10YR 7/2) silt loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, slightly sticky and nonplastic; few fine roots; common very fine tubular pores; less than 5 percent basalt pebbles; mycelial lime; violently effervescent; moderately alkaline; abrupt smooth boundary.

IIR—33 inches; lime- and silica-coated basalt.

Depth to basalt is 20 to 40 inches. The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is neutral to moderately alkaline. The B horizon has value of 5 or 6 when dry. The C horizon is mildly alkaline or moderately alkaline. It is 0 to 10 percent coarse basalt fragments and is silt loam or very fine sandy loam.

Quincy series

The Quincy series consists of very deep, somewhat excessively drained soils on terraces. These soils formed in eolian sand. Slopes range from 0 to 10 percent. Elevation is 650 to 1,100 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 135 to 180 days.

Typical pedon of Quincy loamy fine sand, 0 to 10 percent slopes, about 4 miles southeast of Sunnyside, about 1,320 feet north and 50 feet west of the southeast corner of sec. 34, T. 10 N., R. 23 E.

A1—0 to 20 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few very fine roots; neutral; gradual wavy boundary.

C2—20 to 60 inches; grayish brown (10YR 5/2) sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; mildly alkaline.

The 10- to 40-inch control section is sand to loamy fine sand. The profile has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist or dry. The A horizon is slightly acid to moderately alkaline. The C horizon is neutral to moderately alkaline.

Renslow series

The Renslow series consists of deep and very deep, well drained soils on uplands. These soils formed in loess. Elevation is 2,500 to 2,800 feet. Slopes range from 0 to 15 percent. The average annual precipitation is 10 to 13 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 130 to 150 days.

Typical pedon of Renslow silt loam, basalt substratum, 5 to 15 percent slopes, about 13 miles southwest of Mabton, about 2,400 feet west and 1,200 feet north of the southeast corner of sec. 35, T. 7 N., R. 21 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; very few fine roots; neutral; abrupt smooth boundary.

B1—7 to 23 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse prismatic structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; common fine pores; mildly alkaline; abrupt smooth boundary.

B2t—23 to 30 inches; brown (10YR 5/3) silt loam, dark brown (10YR 4/3) moist; moderate coarse prismatic structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; common fine pores; thin patchy clay films on faces of peds; moderately alkaline; abrupt smooth boundary.

C1—30 to 33 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; moderately alkaline; abrupt wavy boundary.

C2—33 to 37 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; few fine pores; 10 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

C3ca—37 to 44 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; few fine pores; 20 percent pebbles; mycelial lime; violently effervescent; moderately alkaline; abrupt smooth boundary.
IIR—44 inches; basalt.

Depth to secondary carbonates is 25 to 40 inches. Depth to basalt is 40 to 60 inches or more. The mollic epipedon is 10 to 18 inches thick.

The Ap horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. It is neutral or mildly alkaline.

The B horizon has value of 4 or 5 when dry.

The C horizon has value of 5 or 6 when dry and 3 or 4 when moist. It is moderately alkaline or strongly alkaline.

Ritzville series

The Ritzville series consists of deep and very deep, well drained soils on uplands. These soils formed in loess. Slopes range from 0 to 60 percent. Elevation is 1,200 to 2,500 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 130 to 150 days.

Typical pedon of Ritzville silt loam, 2 to 5 percent slopes, about 7 miles southwest of Mabton, about 3,700 feet west and 75 feet south of the northeast corner of sec. 4, T. 7 N., R. 23 E.

Ap—0 to 7 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; neutral; abrupt smooth boundary.
B2—7 to 26 inches; brown (10YR 5/3) silt loam, very dark brown (10YR 3/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; mildly alkaline; gradual wavy boundary.
B3—26 to 37 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; mildly alkaline; gradual wavy boundary.
C2ca—37 to 52 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; mycelial lime; strongly effervescent; moderately alkaline; gradual wavy boundary.
C3ca—52 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; few very fine roots; common fine pores; disseminated lime; strongly effervescent; moderately alkaline.

The mollic epipedon is 10 to 15 inches thick. Depth to secondary carbonates ranges from 30 to 43 inches. The Ap horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when moist or dry. The B horizon has chroma of 3 or 4 when dry or moist. The C horizon has value of 5 or 6 when dry and 4 or 5 when moist. It is moderately alkaline or strongly alkaline.

Ritzville Variant

The Ritzville Variant consists of very deep, well drained soils on terraces. These soils formed in loess overlying cobbly or gravelly alluvium. Slopes range from 5 to 15 percent. Elevation is 1,200 to 1,800 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 130 to 150 days.

Typical pedon of Ritzville Variant silt loam, 5 to 15 percent slopes, about 9 miles northeast of Sunnyside, about 2,030 feet north and 820 feet west of the southeast corner of sec. 16, T. 11 N., R. 23 E.

Ap1—0 to 3 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; neutral; abrupt smooth boundary.
Ap2—3 to 7 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak thick platy structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; neutral; abrupt smooth boundary.
B2—7 to 18 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; 10 percent pebbles; mildly alkaline; abrupt smooth boundary.
IIC1—18 to 28 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; 20 percent pebbles; mildly alkaline; abrupt smooth boundary.
IIC2—28 to 36 inches; pale brown (10YR 6/3) very cobbly silt loam, brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; many fine roots; 30 percent cobbles and 10 percent pebbles; slightly effervescent; mildly alkaline; clear wavy boundary.

IIC3ca—36 to 39 inches; pale brown (10YR 6/3) very cobbly loam, dark yellowish brown (10YR 4/4) moist; massive; soft, very friable, slightly sticky and slightly plastic; many fine roots; 30 percent cobbles and 10 percent pebbles; segregated and disseminated lime; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC4ca—39 to 60 inches; light gray (10YR 7/2) very cobbly loam, dark grayish brown (10YR 4/2) moist; massive; very hard, firm, nonsticky and slightly plastic; few fine roots; 30 percent cobbles and 10 percent pebbles; lime coatings on coarse fragments; violently effervescent; moderately alkaline.

The mollic epipedon is 8 to 15 inches thick. The Ap horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. It is silt loam or cobbly silt loam. The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when dry or moist. The IIC horizon has value of 5 to 7 when dry and 4 or 5 when moist.

Rock Creek series

The Rock Creek series consists of very shallow and shallow, well drained soils on plateaus and ridgetops on uplands. These soils formed in loess and in residuum derived from basalt. Slopes range from 0 to 45 percent. Elevation is 1,200 to 3,200 feet. The annual precipitation is 10 to 16 inches, the average annual air temperature is about 48 degrees F, and the average frost-free season is 120 to 170 days.

Typical pedon of Rock Creek very stony silt loam, 0 to 30 percent slopes, about 400 feet west and 75 feet north of the southeast corner of sec. 1, T. 15 N., R. 17 E.

A1—0 to 2 inches; grayish brown (10YR 5/2) very stony silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine and few fine roots; stones on 3 percent of surface; 15 percent pebbles and 10 percent cobbles; neutral; clear smooth boundary.

B21t—2 to 4 inches; brown (10YR 5/3) very cobbly clay, dark brown (10YR 3/3) moist; moderate thin platy structure; slightly hard, friable, sticky and plastic; common very fine and few fine roots; few fine tubular pores; few thin patchy clay films on faces of peds; 20 percent pebbles and 20 percent cobbles; neutral; abrupt smooth boundary.

B22t—4 to 10 inches; brown (7.5YR 5/4) very cobbly clay, dark brown (7.5YR 3/4) moist; moderate medium angular blocky structure; hard, firm, sticky and plastic; thick continuous clay films on faces of peds; few dark organic stains on faces of peds; 30 percent pebbles and 20 percent cobbles; neutral; clear smooth boundary.

R—10 inches; fractured basalt.

Depth to basalt ranges from 8 to 15 inches. The control section is 35 to 45 percent clay and 35 to 90 percent coarse fragments. The profile is neutral or slightly acid. The A horizon has hue of 5YR to 10YR, value of 4 or 5 when dry and 3 or 4 when moist, and chroma of 2 or 3 when dry or moist. The B2t horizon has hue of 5YR or 7.5YR, and it has value of 4 or 5 when dry. It is silty clay loam, clay loam, silty clay, or clay and is extremely cobbly, extremely gravelly, very cobbly, or very gravelly.

Roza series

The Roza series consists of very deep, well drained soils on uplands. These soils formed in material derived from fine textured sediment. Slopes range from 5 to 60 percent. Elevation is 1,300 to 2,400 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 135 to 150 days.

Typical pedon of Roza clay loam, 8 to 15 percent slopes, about 4 miles north of Selah, about 300 feet east and 120 feet south of the northwest corner of sec. 14, T. 14 N., R. 18 E.

A11—0 to 2 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; strong fine and very fine granular structure; soft, firm, sticky and plastic; common very fine roots; common very fine tubular pores; mildly alkaline; abrupt wavy boundary.

B21—2 to 11 inches; grayish brown (10YR 5/2) heavy clay loam, dark grayish brown (10YR 4/2) moist; moderate coarse prismatic structure parting to moderate coarse angular blocky; very hard, firm, sticky and plastic; vertical cracks between peds; common very fine roots; many fine and very fine tubular pores; mildly alkaline; abrupt wavy boundary.

B22—11 to 19 inches; light brownish gray (10YR 6/2) silty clay, grayish brown (10YR 5/2) moist; strong medium prismatic structure parting to strong medium subangular blocky; very hard, firm, sticky and plastic; vertical cracks between peds; few very fine roots; many fine and very fine tubular pores; mildly alkaline; abrupt wavy boundary.

C1—19 to 26 inches; light brownish gray (10YR 6/2) silty clay, grayish brown (10YR 5/2) moist; weak coarse prismatic structure; hard, firm, sticky and plastic; few very fine roots; common fine and very fine tubular pores; mildly alkaline; clear wavy boundary.

C2—26 to 38 inches; pale brown (10YR 6/3) silty clay loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm, sticky and plastic; few very fine roots; common fine and very fine tubular pores; moderately alkaline; abrupt wavy boundary.

C3ca—38 to 45 inches; pale brown (10YR 6/3) silty clay loam, dark grayish brown (10YR 4/2) moist; massive; very hard, firm, sticky and plastic; few very fine roots; common fine tubular pores; mycelial lime; violently effervescent; moderately alkaline; clear wavy boundary.

C4ca—45 to 60 inches; light gray (2.5Y 7/2) clay loam, grayish brown (2.5Y 5/2) moist; massive; weakly laminated; very hard, very firm, sticky and plastic; mycelial lime and coatings of lime on laminations; violently effervescent; moderately alkaline.

Depth to calcareous material is 36 to 60 inches. The solum is 16 to 26 inches thick. The profile is 0 to 5 percent rock fragments throughout. The control section is 35 to 60 percent clay. Vertical cracks 1 centimeter to 2 centimeters wide extend from the surface to a depth of 19 inches. The A horizon has value of 5 or 6 when dry and 4 or 5 when moist, and it has chroma of 1 or 2 when dry or moist. The B2 horizon is heavy clay loam, heavy silty clay loam, silty clay, or clay. The C horizon is silty clay loam, silty clay, or clay loam.

Sapkin series

The Sapkin series consists of moderately deep, well drained soils on uplands and mountainsides. These soils formed in loess and in residuum and colluvium derived dominantly from basalt. Slopes range from 10 to 75 percent. Elevation is 2,800 to 5,600 feet. The average annual precipitation is 18 to 35 inches, the average annual air temperature is about 43 degrees F, and the average frost-free season is 95 to 130 days.

Typical pedon of Sapkin very stony loam, 10 to 45 percent slopes, about 6 miles northeast of Naches, about 100 feet east and 900 feet south of the northwest corner of sec. 14, T. 15 N., R. 16 E.

A11—0 to 7 inches; dark grayish brown (10YR 4/2) very stony loam, very dark brown (10YR 2/2) moist; moderate medium and fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and few coarse roots; stones on 15 percent of surface; slightly acid; clear wavy boundary.

A12—7 to 15 inches; brown (7.5YR 5/2) loam, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and coarse roots; 10 percent pebbles; slightly acid; clear wavy boundary.

B1—15 to 27 inches; brown (7.5YR 5/4) cobbly loam, dark brown (7.5YR 4/4) gravelly loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common fine roots; few fine tubular pores; 20 percent pebbles and 15 percent cobbles; slightly acid; clear wavy boundary.

B21t—27 to 31 inches; brown (7.5YR 5/4) very cobbly loam, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, firm, slightly sticky and plastic; few fine roots; common fine tubular pores; few thin clay films on faces of peds; 20 percent cobbles and 15 percent pebbles; slightly acid; clear wavy boundary.

B22t—31 to 35 inches; brown (7.5YR 5/4) extremely cobbly clay loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; very few fine roots; few fine tubular pores; few thin clay films on faces of peds; 70 percent cobbles and 20 percent pebbles; slightly acid; abrupt wavy boundary.

R—35 inches; basalt.

Depth to basalt is 20 to 40 inches. The mollic epipedon is 10 to 18 inches thick. The control section is 40 to 80 percent rock fragments. The A horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry, and chroma of 2 or 3 when moist. The B2t horizon has hue of 10YR or 7.5YR, value of 4 or 5 when dry, and chroma of 3 or 4 when moist or dry. It is extremely cobbly loam, very cobbly loam, extremely cobbly clay loam, or very cobbly clay loam.

Saydab series

The Saydab series consists of moderately deep, moderately well drained soils on mountaintops and broad ridgetops. These soils formed in residuum derived dominantly from basalt and containing volcanic ash and loess. Slopes range from 0 to 5 percent. Elevation is 5,500 to 7,000 feet. The average annual precipitation is 40 to 50 inches, the average annual air temperature is about 41 degrees F, and the average length of the growing season, at 28 degrees F, is 80 to 110 days.

Typical pedon of Saydab cobbly loam, 0 to 5 percent slopes, about 11 miles west of Tampico, about 2,300 feet west and 660 feet south of the northeast corner of sec. 5, T. 12 N., R. 14 E.

O1—1 inch to 0; decomposing forest litter.

A11—0 to 5 inches; dark brown (10YR 4/3) cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common coarse roots and many very fine, fine, and medium roots; 5 percent pebbles and 10 percent cobbles; medium acid; abrupt wavy boundary.

A12—5 to 11 inches; dark brown (10YR 4/3) loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; few coarse roots and common medium and very fine roots; 5 percent pebbles; medium acid; clear smooth boundary.

B2—11 to 15 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; weakly smeary; few very fine and medium roots; 10 percent pebbles, 35 percent cobbles, and 5 percent stones; medium acid; clear wavy boundary.

B3—15 to 27 inches; yellowish brown (10YR 5/4) very cobbly loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and medium roots; 10 percent pebbles, 40 percent cobbles, and 5 percent stones; medium acid; abrupt wavy boundary.

R—27 inches; basalt.

Depth to bedrock is 25 to 30 inches. The control section is 40 to 60 percent rock fragments. The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. The B horizon has value of 3 or 4 when moist, and it has chroma of 3 or 4 when dry. It is very cobbly loam or very cobbly silt loam.

Scoon series

The Scoon series consists of shallow, well drained soils on uplands. These soils formed in loess overlying a lime- and silica-cemented duripan. Slopes range from 2 to 30 percent. Elevation is 800 to 1,400 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 180 days.

Typical pedon of Scoon silt loam, 5 to 8 percent slopes, about 5 miles north of Sunnyside, about 200 feet west and 1,100 feet south of the northeast corner of sec. 36, T. 11 N., R. 22 E.

Ap—0 to 6 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; 5 percent pebbles; mildly alkaline; abrupt smooth boundary.

B2—6 to 10 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 15 percent pebbles; moderately alkaline; gradual wavy boundary.

C1ca—10 to 16 inches; light brownish gray (10YR 6/2) gravelly silt loam, dark grayish brown (10YR 4/2) moist; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; 30 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC2casim—16 to 60 inches; indurated lime- and silica-cemented duripan.

Depth to the duripan is 10 to 20 inches. The duripan is underlain by basalt at a depth of 20 inches or more. The control section averages less than 35 percent rock fragments.

The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist or dry. It is 0 to 5 percent rock fragments and is mildly alkaline or moderately alkaline.

The B2 horizon has value of 6 or 7 when dry and 4 or 5 when moist, and it has chroma of 2 or 3 when dry or moist. It is gravelly silt loam, silt loam, or gravelly very fine sandy loam. It is mildly alkaline or moderately alkaline.

The C horizon has value of 6 or 7 when dry and 4 or 5 when moist. It is gravelly silt loam, loam, or gravelly very fine sandy loam.

Scooteney series

The Scooteney series consists of very deep, well drained soils on terraces. These soils formed in alluvium. Slopes range from 0 to 15 percent. Elevation is 650 to 1,300 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 135 to 170 days.

Typical pedon of Scooteney silt loam, 0 to 2 percent slopes, about 1 mile northeast of Mabton, about 600 feet north and 50 feet west of the southeast corner of sec. 31, T. 9 N., R. 23 E.

Ap—0 to 6 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate fine granular structure; slightly hard, friable, nonsticky and slightly plastic; many fine roots; many fine pores; neutral; abrupt smooth boundary.

B2—6 to 22 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, friable, nonsticky and slightly plastic; many fine roots; many fine pores; neutral; gradual wavy boundary.

C1ca—22 to 33 inches; light brownish gray (10YR 6/2) gravelly fine sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many fine roots; many fine pores; 20 percent pebbles; violently effervescent; moderately alkaline; gradual wavy boundary.

IIC2—33 to 60 inches; light brownish gray (10YR 6/2) very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, friable, nonsticky and nonplastic; few fine roots; few pores; 50 percent pebbles; moderately alkaline.

The control section averages 20 to 35 percent coarse fragments. The A horizon has chroma of 2 or 3 when moist or dry. It is silt loam or cobbly silt loam.

The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist or dry. It is silt loam, loam, or very fine sandy loam. It is neutral or mildly alkaline.

The C horizon has value of 4 or 5 when moist and 6 or 7 when dry, and it has chroma of 2 or 3 when moist or dry. It is gravelly fine sandy loam or gravelly silt loam.

Selah series

The Selah series consists of moderately deep, well drained soils on high, dissected terraces. These soils formed in loess and alluvium overlying a lime- and silica-cemented duripan. Slopes range from 2 to 30 percent. Elevation is 1,100 to 1,800 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 52 degrees F, and the average frost-free season is 150 to 180 days.

Typical pedon of Selah silt loam, 5 to 8 percent slopes, about 1 mile northwest of Selah, about 1,400 feet west and 700 feet north of the southeast corner of sec. 26, T. 14 N , R. 18 E.

Ap—0 to 4 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

A12—4 to 7 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; few fine tubular pores; neutral; clear wavy boundary.

B1—7 to 13 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine tubular pores; mildly alkaline; clear wavy boundary.

B21t—13 to 24 inches; pale brown (10YR 6/3) heavy silt loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure; slightly hard, friable, slightly sticky and plastic; few fine roots; many fine tubular pores; thin patchy siliceous coatings on faces of peds; mildly alkaline; clear wavy boundary.

B22t—24 to 29 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; common fine tubular pores; few thin patchy clay films on faces of peds and in pores; mildly alkaline; abrupt smooth boundary.

B22tca—29 to 34 inches; brown (10YR 5/3) clay loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; common thin clay films on faces of peds and in pores; lime on faces of peds and in veins throughout peds; violently effervescent; moderately alkaline; abrupt smooth boundary.

IIC2casm—34 inches; indurated lime- and silica-cemented duripan.

Depth to the duripan is 20 to 40 inches. The duripan is 6 to 24 inches thick and overlies old gravelly alluvial material, tuffaceous sandstone, or basalt. The mollic epipedon is 7 to 15 inches thick. The A horizon has value of 4 or 5 when dry and 2 or 3 when moist. The B2t horizon is heavy silt loam, clay loam, or silty clay loam. The B2tca horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist or dry. It is clay loam or silty clay loam

Shano series

The Shano series consists of very deep, well drained soils on uplands. These soils formed in loess. Slopes range from 2 to 30 percent. Elevation is 650 to 1,200 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 130 to 170 days.

Typical pedon of Shano silt loam, 8 to 15 percent slopes, about 5 miles southwest of Mabton, about 1,800 feet north and 130 feet west of the southeast corner of sec. 27, T. 8 N., R. 22 E.

A1—0 to 4 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate thin platy structure; soft, friable, nonsticky and nonplastic; many very fine and common fine roots; mildly alkaline; abrupt smooth boundary.

B2—4 to 20 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium prismatic structure parting to weak medium angular blocky; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots and few medium roots; very fine tubular pores; mildly alkaline; gradual smooth boundary.

B3—20 to 30 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; soft, friable, slightly sticky and slightly plastic; common very fine roots; few very fine tubular pores; mildly alkaline; abrupt smooth boundary.

C2ca—30 to 43 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few fine and common very fine roots; few very fine tubular pores; segregated lime in root channels; slightly effervescent; strongly alkaline; clear wavy boundary.

C3—43 to 60 inches; pale brown (10YR 6/3) silt loam, grayish brown (10YR 5/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; few very fine tubular pores; strongly effervescent; strongly alkaline.

Depth to secondary carbonates is 24 to 40 inches. The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is neutral to moderately alkaline. The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is mildly alkaline or moderately alkaline. The C horizon has value of 6 or 7 when dry.

Simcoe series

The Simcoe series consists of moderately deep, well drained soils on uplands. These soils formed in loess and in residuum derived from basalt and contain a small amount of volcanic ash. Slopes range from 5 to 30 percent. Elevation is 1,200 to 2,300 feet. The average annual precipitation is 10 to 12 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 120 to 170 days.

Typical pedon of a Simcoe silt loam (5 to 15 percent slopes), in an area of Rock Creek-Clint-Simcoe complex, 0 to 45 percent slopes, about 4 miles west of Fruitvale, about 1,620 feet south and 2,340 feet west of the northeast corner of sec. 13, T. 13 N., R. 17 E.

A1—0 to 3 inches; brown (7.5YR 4/4) silt loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many fine roots; many very fine tubular pores; 10 percent pebbles; neutral; clear wavy boundary.

B1—3 to 14 inches; brown (7.5YR 4/4) silt loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky and plastic; common fine roots; many very fine tubular pores; 5 percent pebbles; neutral; clear wavy boundary.

B22t—14 to 27 inches; brown (7.5YR 4/4) heavy silt loam, dark brown (7.5YR 3/2) moist; strong medium angular blocky structure; slightly hard, firm, sticky and plastic; common fine roots; common very fine vesicular pores; common thin clay films on faces of peds; 10 percent pebbles; mildly alkaline; abrupt wavy boundary.

R—27 inches; basalt.

Depth to basalt is 20 to 40 inches. The mollic epipedon is 10 to 20 inches thick. The A horizon has hue of 10YR or 7.5YR, and it has value of 4 or 5 when dry and 2 or 3 when moist. The B2t horizon has hue of 10YR or 7.5YR, and it has value of 4 to 6 when dry and 3 or 4 when moist. It is heavy silt loam, silty clay loam, or clay loam and is 0 to 15 percent coarse fragments.

Sinloc series

The Sinloc series consists of very deep, somewhat poorly drained soils on terraces. These soils formed in lacustrine sediment that has a mantle of loess. Slopes range from 0 to 8 percent. Elevation is 650 to 1,200 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 180 days.

Typical pedon of Sinloc silt loam, 2 to 5 percent slopes, about 3 miles west of Outlook, about 1,600 feet north and 340 feet west of the southeast corner of sec. 24, T. 10 N., R. 21 E.

A11—0 to 1/2 inch; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; salt incrustations on the surface and on faces of peds; violently effervescent; strongly alkaline; abrupt smooth boundary.

A12—1/2 inch to 3 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; violently effervescent; strongly alkaline; abrupt smooth boundary.

B2—3 to 15 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine roots; violently effervescent; strongly alkaline; abrupt smooth boundary.

C1ca—15 to 31 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5YR 6/2) dry; massive; hard, firm, slightly sticky and slightly plastic; few very fine roots; threadlike veins of lime; violently effervescent; strongly alkaline; abrupt wavy boundary.

C2—31 to 35 inches; dark grayish brown (2.5Y 4/2) fine sandy loam, light brownish gray (2.5Y 6/2) dry; massive; soft, friable, nonsticky and nonplastic; common very fine roots; violently effervescent; strongly alkaline; abrupt wavy boundary.

C3—35 to 45 inches; dark grayish brown (2.5Y 4/2) silt loam, light brownish gray (2.5Y 6/2) dry; massive; slightly hard, friable, nonsticky and slightly plastic; few very fine roots; violently effervescent; moderately alkaline; abrupt wavy boundary.

C4—45 to 60 inches; dark grayish brown (2.5Y 4/2) loamy fine sand, light brownish gray (2.5Y 6/2) dry; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; thin lenses of silt loam; slightly effervescent; moderately alkaline.

The profile is moderately alkaline or strongly alkaline. The solum is 15 to 30 inches thick.

The A horizon has value of 3 or 4 when moist and 5 or 6 when dry. It is silt loam or fine sandy loam.

The B horizon has value of 3 or 4 when moist and 5 or 6 when dry. It is silt loam or very fine sandy loam.

The C horizon has value of 4 or 5 when moist, and it has chroma of 1 or 2 when dry or moist. Between depths of 15 and 40 inches the C horizon is silt loam or very fine sandy loam, is less than 15 percent sand that is fine or coarse, and is less than 18 percent clay. Below a depth of 40 inches it is silt loam, sandy loam, or loamy fine sand.

Starbuck series

The Starbuck series consists of shallow, well drained soils on uplands. These soils formed in loess overlying basalt. Slopes range from 0 to 60 percent. Elevation is 700 to 2,000 feet. The average annual precipitation is 6 to 10 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 170 days.

Typical pedon of Starbuck silt loam, 2 to 15 percent slopes, about 1/2 mile north of Byron, about 2,800 feet east and 3,500 feet south of the northwest corner of sec. 12, T. 8 N., R. 23 E.

A11—0 to 3 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak thin platy structure; soft, very friable, nonsticky and slightly plastic; many fine roots; many very fine tubular pores; neutral; clear smooth boundary.

A12—3 to 6 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium platy structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine tubular pores; neutral; clear wavy boundary.

B21—6 to 9 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 10 percent pebbles; neutral; clear smooth boundary.

B22—9 to 16 inches; pale brown (10YR 6/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak medium prismatic structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; 20 percent pebbles; neutral; abrupt smooth boundary.

R—16 inches; basalt.

Depth to basalt is 12 to 20 inches. The control section is 5 to 25 percent coarse fragments. The profile is neutral or mildly alkaline. The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when moist. The B2 horizon has value of 5 or 6 when dry, and it has chroma of 3 or 4 when dry or moist. It is gravelly silt loam, loam, or fine sandy loam.

Sutkin series

The Sutkin series consists of very deep, well drained soils on mountainsides, on smooth mountaintops, and in canyons. These soils formed in colluvium and residuum derived dominantly from basalt and containing a small amount of loess. Slopes range from 0 to 65 percent. Elevation is 2,400 to 4,800 feet. The average annual precipitation is 18 to 22 inches, the average annual air temperature is about 43 degrees F, and the average length of the growing season, at 28 degrees F, is 145 to 170 days.

Typical pedon of Sutkin stony loam, 0 to 25 percent slopes, about 6 miles west of Tampico, about 1,100 feet west and 2,300 feet south of the northeast corner of sec. 14, T. 12 N., R. 14 E.

O1&O2—1/2 inch to 0; decomposing forest litter.

A1—0 to 10 inches; dark brown (10YR 3/3) stony loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many fine and common coarse roots; 5 percent stones; slightly acid; clear wavy boundary.

B1—10 to 20 inches; dark yellowish brown (10YR 4/4) very cobbly loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common coarse and many fine roots; 30 percent pebbles and 20 percent cobbles; neutral; clear irregular boundary.

B2—20 to 38 inches; dark yellowish brown (10YR 4/4) extremely cobbly loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common coarse and many fine roots; 35 percent pebbles and 35 percent cobbles; neutral; clear wavy boundary.
C—38 to 60 inches; dark yellowish brown (10YR 4/4) extremely cobbly loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, slightly sticky and plastic; common fine and coarse roots; 30 percent pebbles and 40 percent cobbles; neutral.

The mollic epipedon is 10 to 18 inches thick. The control section averages 40 to 60 percent rock fragments and 18 to 30 percent clay.

The A horizon has value of 3 or 4 when dry and 2 or 3 when moist, and it has chroma of 3 or 4 when dry and 1 to 3 when moist.

The B2 horizon has value of 4 to 6 when dry, and it has chroma of 3 or 4 when moist. It is extremely cobbly loam, very gravelly loam, or very cobbly loam.

The C horizon has value of 3 or 4 when moist, and it has chroma of 3 or 4 when moist. It is extremely cobbly loam or very cobbly clay loam.

Sutkin Variant

The Sutkin Variant consists of very deep, well drained soils on alluvial fans. These soils formed in loess overlying cobbly or gravelly alluvium. Slopes range from 0 to 5 percent. Elevation is 2,400 to 2,600 feet. The average annual precipitation is 14 to 17 inches, the average annual air temperature is about 48 degrees F, and the average length of the growing season, at 28 degrees F, is 150 to 170 days.

Typical pedon of Sutkin Variant stony loam, 0 to 5 percent slopes, about 12 miles northwest of Naches, about 750 feet west and 40 feet north of the southeast corner of sec. 15, T. 16 N., R. 16 E.

O1—1/2 inch to 0; decomposing forest litter.
A1—0 to 8 inches; grayish brown (10YR 5/2) stony loam, very dark grayish brown (10YR 3/2) moist; moderate thin platy structure; soft, very friable, nonsticky and nonplastic; many fine roots and common coarse roots; 5 percent stones; neutral; clear wavy boundary.
B1—8 to 14 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; many fine roots and common coarse roots; 20 percent pebbles; neutral; clear wavy boundary.
B2—14 to 18 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine roots and common coarse roots; 40 percent pebbles; neutral; clear wavy boundary.
C—18 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots and common coarse roots; 70 percent pebbles; neutral.

The mollic epipedon is 10 to 16 inches thick. The control section averages 40 to 60 percent coarse fragments.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 1 to 3 when moist.

The B2 horizon has chroma of 3 or 4 when dry or moist. It is very cobbly loam or very gravelly loam.

The C horizon has value of 4 to 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when moist. It is very gravelly sandy loam or extremely gravelly sandy loam.

Taneum series

The Taneum series consists of very deep, well drained soils on uplands. These soils formed in loess overlying material weathered from sandstone. Slopes range from 5 to 60 percent. Elevation is 2,300 to 3,000 feet. The average annual precipitation is 15 to 18 inches, the average annual air temperature is about 48 degrees F, and the average frost-free season is 120 to 135 days.

Typical pedon of Taneum loam, 5 to 15 percent slopes, about 6 miles west of Cowiche, about 2,000 feet west and 20 feet south of the northeast corner of sec. 29, T. 14 N., R. 16 E.

A11—0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; neutral; abrupt wavy boundary.
A12—4 to 10 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; neutral; abrupt wavy boundary.
A3—10 to 14 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; neutral; clear wavy boundary.

B22t—14 to 27 inches; brown (7.5YR 5/4) silty clay loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; few fine tubular pores; thin patchy clay films on faces of peds; neutral; clear wavy boundary.

B23t—27 to 43 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; few fine tubular pores; thin patchy clay films on faces of peds; neutral; clear wavy boundary.

C1—43 to 50 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few very fine roots; common fine tubular pores; neutral; abrupt wavy boundary.

C2—50 to 60 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 3/3) moist; massive; hard, friable, nonsticky and nonplastic; common fine tubular pores; neutral.

The mollic epipedon is 12 to 19 inches thick. The control section is 27 to 35 percent clay, is more than 15 percent sand that is fine or coarser, and is less than 15 percent rock fragments. The B horizon has hue of 10YR or 7.5YR.

Tekison series

The Tekison series consists of very deep, well drained soils on mountainsides, mountain ridges and benches, and smooth mountaintops. These soils formed in residuum and colluvium derived from basalt and containing a small amount of loess. Slopes range from 0 to 25 percent. Elevation is 2,800 to 3,600 feet. The average annual precipitation is 16 to 20 inches, the average annual air temperature is about 47 degrees F, and the average length of the growing season, at 28 degrees F, is 150 to 170 days.

Typical pedon of Tekison stony loam, 0 to 25 percent slopes, about 5 miles northwest of Tampico, about 150 feet east and 900 feet north of the southwest corner of sec. 27, T. 13 N., R. 15 E.

A1—0 to 4 inches; brown (10YR 4/3) stony loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common very fine roots; few fine and many very fine tubular pores; 5 percent stones; neutral; abrupt smooth boundary.

B1—4 to 12 inches; brown (10YR 4/3) stony loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and plastic; common fine roots; few fine and many very fine tubular pores; 10 percent stones and 15 percent pebbles; slightly acid; clear smooth boundary.

B21t—12 to 20 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; hard, very firm, sticky and very plastic; few fine and medium roots; common very fine tubular pores; common moderately thick clay films on faces of peds; 20 percent pebbles and 20 percent cobbles; slightly acid; gradual wavy boundary.

B22t—20 to 31 inches; yellowish brown (10YR 5/4) very gravelly clay, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; many thick clay films on faces of peds; 30 percent pebbles and 10 percent cobbles; slightly acid; gradual wavy boundary.

B23t—31 to 60 inches; brown (10YR 5/3) very cobbly clay, dark brown (10YR 3/3) moist; strong fine and medium angular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; continuous thick clay films on faces of peds; 25 percent pebbles and 15 percent cobbles; slightly acid.

The mollic epipedon is 10 to 18 inches thick. The control section is 40 to 50 percent rock fragments. The A horizon has value of 4 or 5 when dry, and it has chroma of 2 or 3 when moist. The B2t horizon has chroma of 2 to 4 when dry or moist. It is very cobbly clay loam, very gravelly clay, or very cobbly clay.

Tieton series

The Tieton series consists of deep, well drained soils on uplands. These soils formed in loess and in material weathered from andesite. Slopes range from 0 to 30 percent. Elevation is 1,500 to 2,300 feet. The average annual precipitation is 11 to 15 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 135 to 150 days.

Typical pedon of Tieton loam, 2 to 5 percent slopes, about 1 mile northeast of Cowiche, about 1,300 feet south and 900 feet east of the northwest corner of sec. 22, T. 14 N., R. 17 E.

Ap—0 to 3 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; neutral; abrupt smooth boundary.

A12—3 to 9 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; few fine tubular pores; neutral; clear wavy boundary.

B1—9 to 15 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; few fine tubular pores; neutral; clear wavy boundary.

B21t—15 to 31 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, slightly sticky and plastic; few fine roots; few fine tubular pores; siliceous coatings on faces of peds; neutral; clear wavy boundary.

B22t—31 to 37 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; hard, firm, slightly sticky and plastic; few fine roots; few fine tubular pores; neutral; abrupt smooth boundary.

B23t—37 to 44 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 3/4) moist; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few fine roots; few fine tubular pores; thin discontinuous clay films on faces of peds and in pores; neutral; clear wavy boundary.

C1—44 to 48 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; 5 percent fragments of andesite; lime coatings on upper boundary; neutral; abrupt smooth boundary.

Crca—48 to 50 inches; light yellowish brown (2.5Y 6/4) weathered andesite, olive brown (2.5Y 4/4) moist; massive; hard, firm; lime coatings on upper boundary; neutral; abrupt smooth boundary.

IIR—50 inches; andesite.

The mollic epipedon is 10 to 16 inches thick. The control section is 27 to 35 percent clay. Depth to weathered andesite ranges from 40 to 60 inches. The A horizon has value of 4 or 5 when dry and 2 or 3 when moist. It is loam or fine sandy loam. The B horizon has value of 4 to 6 when dry and 3 or 4 when moist. The C horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 3 or 4 when dry or moist. It is loam or clay loam.

Toppenish series

The Toppenish series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 2 percent. Elevation is 700 to 1,800 feet. The average annual precipitation is 8 to 10 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Toppenish silt loam, about 3 miles southeast of Yakima, about 1,400 feet east and 2,600 feet south of the northwest corner of sec. 33, T. 13 N., R. 19 E.

Ap—0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate thin platy structure; soft, very friable, slightly sticky and slightly plastic; many fine and common medium roots; common very fine vesicular pores; violently effervescent; strongly alkaline; abrupt smooth boundary.

B1—4 to 14 inches; gray (10YR 5/1) silty clay loam, black (10YR 2/1) moist; moderate medium angular blocky structure; slightly hard, friable, sticky and plastic; common fine and few medium roots; common very fine vesicular pores; violently effervescent; strongly alkaline; clear wavy boundary.

IIB21g—14 to 35 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; common medium distinct mottles that are yellowish brown (10YR 5/6) when moist; slightly hard, friable, slightly sticky and slightly plastic; common fine and few medium roots; common very fine vesicular pores and few fine tubular pores; moderately alkaline; gradual wavy boundary.

IIIB22—35 to 50 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; many medium distinct mottles that are yellowish brown (10YR 5/6) when moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common fine and few medium roots; common very fine vesicular pores; 5 percent pebbles; mildly alkaline; clear smooth boundary.

IVC1—50 to 60 inches; brown (10YR 5/3) extremely gravelly sand, very dark grayish brown (10YR 3/2) moist; massive; loose; few very fine and medium roots; 60 percent pebbles; mildly alkaline.

The mollic epipedon is 10 to 20 inches thick. The IVC horizon is at a depth of 40 inches or more. The profile is mildly alkaline to strongly alkaline.

The A and B1 horizons have value of 2 or 3 when moist.

The B2g horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 1 or 2 when dry or moist. It has distinct or prominent mottles. This horizon is silt loam, loam, or clay loam and averages 20 to 30 percent clay.

The C horizon has hue of 10YR or 2.5Y, value of 4 to 6 when dry, and chroma of 2 to 4 when dry or moist. It is extremely gravelly sandy loam or extremely gravelly sand.

Track series

The Track series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in mixed alluvium. Slopes range from 0 to 2 percent. Elevation is 800 to 1,500 feet. The average annual precipitation is 8 to 10 inches, the average annual air

temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Track loam, about 1 mile east of Union Gap, about 1,500 feet west and 100 feet south of the northeast corner of sec. 4, T. 12 N., R. 19 E.

A11—0 to 14 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; common very fine pores; 0 to 5 percent pebbles; disseminated carbonates; violently effervescent; strongly alkaline; abrupt smooth boundary.

IIB21g—14 to 21 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; few fine distinct yellowish brown (10YR 5/6) mottles; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine pores; 50 percent pebbles and 10 percent cobbles; disseminated carbonates and filaments of segregated carbonates; violently effervescent; strongly alkaline; abrupt wavy boundary.

IIB22—21 to 26 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; common fine distinct yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine pores; 40 percent pebbles and 10 percent cobbles; moderately alkaline; abrupt wavy boundary.

IIC1—26 to 60 inches; brown (10YR 5/3) very gravelly loamy sand, dark brown (10YR 3/3) moist; many fine distinct yellowish brown (10YR 5/6) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; 40 percent pebbles and 10 percent cobbles; moderately alkaline.

The control section averages 45 to 65 percent coarse fragments. The mollic epipedon is 10 to 20 inches thick. The IIC horizon is at a depth of 20 to 30 inches.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 1 or 2 when dry or moist. It is mildly alkaline to strongly alkaline.

The IIB horizon has value of 4 or 5 when dry and 2 or 3 when moist. It is moderately alkaline or strongly alkaline.

The C horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 1 to 3 when dry or moist. It has distinct or prominent mottles. The horizon is very gravelly sand or very gravelly loamy sand and is moderately alkaline or strongly alkaline.

Tumac series

The Tumac series consists of very deep, well drained soils on south-facing uplands and mountainsides. These soils formed in colluvium derived from basalt and andesite and containing volcanic ash. Slopes range from 5 to 45 percent. Elevation is 4,100 to 5,200 feet. The average annual precipitation is 30 to 60 inches, the average annual air temperature is about 43 degrees F, and the average length of the growing season, at 28 degrees F, is 145 to 170 days.

Typical pedon of Tumac very stony sandy loam, 5 to 45 percent slopes, about 20 miles west of Tampico, about 200 feet east and 100 feet south of the northwest corner of sec. 27, T. 12 N., R. 12 E.

O1—2 inches to 0; decomposing forest litter.

A11—0 to 4 inches; brown (10YR 5/3) very stony sandy loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; few very fine and common fine roots; 10 percent stones; medium acid; abrupt wavy boundary.

A12—4 to 15 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; common very fine, fine, and medium roots; 40 percent pebbles; medium acid; abrupt wavy boundary.

B21—15 to 30 inches; yellowish brown (10YR 5/4) very gravelly loam, dark brown (7.5YR 3/4) moist; common very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few very fine and common fine roots; 45 percent pebbles and 5 percent cobbles; medium acid; clear wavy boundary.

B22—30 to 50 inches; yellowish brown (10YR 5/4) extremely gravelly loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few fine roots; 55 percent pebbles and 10 percent cobbles; medium acid; clear wavy boundary.

B23—50 to 60 inches; strong brown (7.5YR 5/6) extremely gravelly loam, dark yellowish brown (10YR 3/4) moist; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; 60 percent pebbles and 5 percent cobbles; medium acid.

The control section is 35 to 70 percent rock fragments. The A horizon has chroma of 2 or 3 when moist. The B horizon has chroma of 4 to 6 when moist. It is very gravelly loam, extremely gravelly loam, or very cobbly sandy loam.

Umapine series

The Umapine series consists of very deep, somewhat poorly drained soils on flood plains and low terraces. These soils formed in alluvium. Slopes range from 0 to 5 percent. Elevation is 650 to 900 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Umapine silt loam, 0 to 5 percent slopes, about 3 miles northeast of Mabton, about 2,510 feet north and 660 feet west of the southeast corner of sec. 23, T. 9 N., R. 22 E.

Ap—0 to 7 inches; light brownish gray (2.5Y 6/2) silt loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and plastic; common fine roots; common fine pores; violently effervescent; very strongly alkaline; abrupt smooth boundary.

C1—7 to 16 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; weak medium angular blocky structure; hard, friable, sticky and plastic; common fine roots; common fine pores; disseminated lime; violently effervescent; very strongly alkaline; gradual wavy boundary.

C2—16 to 34 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 plastic; few fine roots; common fine pores; disseminated lime; slightly effervescent; very strongly alkaline; abrupt smooth boundary.

IIC3—34 to 41 inches; light gray (2.5Y 7/2) silt loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; disseminated lime; violently effervescent; strongly alkaline; abrupt smooth boundary.

IIIC4—41 to 60 inches; light brownish gray (2.5Y 6/2) silt loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, friable, slightly sticky and plastic; common fine pores; disseminated lime; violently effervescent; strongly alkaline.

In most years the profile is saturated with water to a depth of 40 inches at some time during the year. The profile has hue of 2.5Y or 10YR. The A horizon has value of 5 or 6 when dry and 3 to 5 when moist, and it has chroma of 2 or 3. The C horizon has value of 5 to 7 when dry and 3 to 5 when moist, and it has chroma of 1 or 2.

Wanser series

The Wanser series consists of very deep, poorly drained soils on terraces in basins. These soils formed in sand derived from mixed sources. Slopes range from 0 to 5 percent. Elevation is 650 to 1,100 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 120 to 150 days.

Typical pedon of Wanser loamy fine sand, about 2 miles southwest of Sunnyside, about 900 feet west and 1,100 feet north of the southeast corner of sec. 2, T. 9 N., R. 22 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose; many fine roots; moderately alkaline; clear smooth boundary.

C1g—6 to 18 inches; dark grayish brown (10YR 4/2) loamy fine sand, dark gray (5Y 4/1) moist; few fine distinct mottles that are yellowish brown (10YR 5/6) when moist; single grain; loose; many fine roots; moderately alkaline; abrupt wavy boundary.

C2g—18 to 20 inches; grayish brown (10YR 5/2) loamy fine sand, dark bluish gray (5B 4/1) moist; common fine prominent mottles that are bluish gray (5B 6/1) when moist; massive; soft, very friable, nonsticky and nonplastic; few medium roots; slightly effervescent; strongly alkaline; clear smooth boundary.

C3g—20 to 25 inches; grayish brown (10YR 5/2) loamy fine sand, bluish gray (5B 6/1) moist; single grain; loose; few fine roots; strongly alkaline; gradual wavy boundary.

C4g—25 to 57 inches; grayish brown (10YR 5/2) loamy fine sand, bluish gray (5B 5/1) moist; mottles that are dark greenish gray (5Y 4/1) when moist; single grain; loose; few fine roots; strongly alkaline; gradual smooth boundary.

C5g—57 to 60 inches; light brownish gray (10YR 6/2) fine sand, gray (N 5/0) moist; single grain; loose; strongly alkaline.

Where these soils are not artifically drained, the water table fluctuates between the surface and a depth of 12 inches. The profile is moderately alkaline or strongly alkaline. The 10- to 40-inch control section is sand to loamy fine sand. The A horizon has value of 5 or 6 when dry and 3 or 4 when moist. The Cg horizon has value of 3 to 6 when moist.

Warden series

The Warden series consists of very deep, well drained soils on terraces. These soils formed in lacustrine sediment and have a mantle of loess. Slopes range from 0 to 30 percent. Elevation is 600 to 1,000 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 135 to 180 days.

Typical pedon of Warden silt loam, 8 to 15 percent slopes, about 4 miles south of Mabton, about 100 feet

south and 100 feet east of the northwest corner of sec. 26, T. 8 N., R. 22 E.

Ap—0 to 5 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots; mildly alkaline; clear smooth boundary.

B2—5 to 19 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common fine and many very fine roots; many very fine pores; mildly alkaline; abrupt wavy boundary.

IIC1ca—19 to 41 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; massive; hard, very firm, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; disseminated and segregated lime; violently effervescent; strongly alkaline; clear smooth boundary.

IIIC2ca—41 to 60 inches; pale brown (10YR 6/3) silt loam, grayish brown (10YR 5/2) moist; massive; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; disseminated and segregated lime; violently effervescent; strongly alkaline.

The solum is 15 to 30 inches thick. Depth to secondary lime is 15 to 30 inches. The Ap horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is silt loam or very fine sandy loam and is neutral or mildly alkaline. The B horizon is very fine sandy loam or silt loam and is neutral or mildly alkaline. The C horizon has value of 4 or 5 when moist. It is stratified silt loam, loam, and very fine sandy loam, but the 10- to 40-inch control section averages less than 15 percent sand that is fine or coarser.

Weirman series

The Weirman series consists of very deep, somewhat excessively drained soils on low terraces and flood plains. These soils formed in mixed alluvium. Slopes range from 0 to 5 percent. Elevation is 700 to 1,700 feet. The average annual precipitation is 7 to 14 inches, the average annual air temperature is about 51 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Weirman sandy loam, channeled, about 3 miles northwest of Buena, about 660 feet south and 220 feet east of the northwest corner of sec. 7, T. 11 N., R. 20 E.

Ap—0 to 8 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, nonsticky and nonplastic; common fine roots; mildly alkaline; abrupt smooth boundary.

AC—8 to 15 inches; grayish brown (10YR 5/2) loamy fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; few very fine roots; mildly alkaline; abrupt smooth boundary.

C1—15 to 21 inches; light brownish gray (10YR 6/2) loamy fine sand, dark grayish brown (10YR 4/2) moist; few medium faint dark yellowish brown (10YR 4/4) mottles; massive; soft, very friable, nonsticky and slightly plastic; few very fine roots; mildly alkaline; gradual wavy boundary.

IIC2—21 to 60 inches; grayish brown (10YR 5/2) extremely gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; 75 percent pebbles and 5 percent cobbles; few very fine roots; mildly alkaline.

The profile is neutral or mildly alkaline. The control section averages 35 to 60 percent coarse fragments. The mollic epipedon is 10 to 17 inches thick.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3 when dry or moist. It is fine sandy loam, sandy loam, or gravelly fine sandy loam.

The C horizon has value of 4 or 5 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when moist. It is loamy fine sand, sand, or loamy sand and in places has strata of sandy loam. The IIC horizon is extremely gravelly sand, very gravelly sand, or very gravelly loamy sand.

Wenas series

The Wenas series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 2 percent. Elevation is 1,100 to 1,800 feet. The average annual precipitation is 8 to 12 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Wenas silt loam, about 4 miles north of Selah, about 400 feet east and 700 feet north of the southwest corner of sec. 12, T. 14 N., R. 18 E.

Ap—0 to 8 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; moderate coarse granular structure; hard, firm, sticky and plastic; many fine roots; common fine pores; mildly alkaline; abrupt smooth boundary.

B1—8 to 28 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium and fine prismatic structure; hard, firm, sticky and plastic; common fine roots; many fine pores; mildly alkaline; gradual wavy boundary.

B2g—28 to 37 inches; gray (10YR 5/1) silty clay loam, very dark gray (10YR 3/1) moist; few fine distinct light yellowish brown (10YR 6/4) mottles; moderate subangular blocky structure; hard, firm, sticky and plastic; common fine roots; many fine pores; neutral; gradual wavy boundary.

C1g—37 to 47 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; common medium prominent brownish yellow (10YR 6/6) mottles; massive; hard, friable, slightly sticky and slightly plastic; common fine roots; common medium pores; neutral; clear wavy boundary.

IIC2g—47 to 55 inches; light brownish gray (2.5Y 6/2) loamy sand, dark grayish brown (2.5Y 4/2) moist; many medium prominent reddish yellow (7.5YR 7/8) mottles; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; 5 percent pebbles; mildly alkaline; abrupt smooth boundary.

IIC3g—55 to 60 inches; light brownish gray (2.5Y 6/2) gravelly loamy sand, dark grayish brown (2.5Y 4/2) moist; few fine faint olive yellow (2.5Y 6/6) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; 20 percent pebbles; mildly alkaline.

The mollic epipedon is 24 to 35 inches thick. The profile is neutral or mildly alkaline. The control section is 0 to 15 percent rock fragments.

The A and B1 horizons have value of 4 or 5 when dry and 2 or 3 when moist. The B1 horizon is silt loam or clay loam.

The B2g horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 1 or 2 when moist or dry. It is clay loam or silty clay loam.

The Cg horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 1 or 2. It is loam or sandy loam.

The IICg horizon has hue of 10YR or 2.5Y, value of 5 or 6 when dry and 3 or 4 when moist, and chroma of 1 or 2 when moist or dry.

Wiehl series

The Wiehl series consists of moderately deep, well drained soils on uplands. These soils formed in loess overlying laminated sediment and soft sandstone. Slopes range from 2 to 60 percent. Elevation is 1,000 to 1,200 feet. The annual precipitation is 6 to 9 inches, the average annual air temperature is about 50 degrees F, and the average frost-free season is 160 to 180 days.

Typical pedon of a Wiehl silt loam, in an area of Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes, about 3 miles north of Buena, about 1,620 feet south and 2,340 feet west of the northeast corner of sec. 13, T. 13 N., R. 17 E.

A1—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, friable, slightly sticky and slightly plastic; many fine roots; common fine pores; neutral; abrupt smooth boundary.

B21—3 to 12 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure; soft, friable, slightly sticky and slightly plastic; common fine roots; common fine pores; neutral; gradual wavy boundary.

B22—12 to 21 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; common fine pores; mildly alkaline; abrupt wavy boundary.

C1—21 to 27 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine roots matted around pebbles; common fine pores; 20 percent pebbles; violently effervescent; moderately alkaline; abrupt wavy boundary.

IIC2r—27 inches; weathered sandstone.

Depth to the paralithic contact ranges from 20 to 40 inches.

The A horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is silt loam or very stony silt loam and is neutral or mildly alkaline.

The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 2 or 3 when dry or moist. It is fine sandy loam, very fine sandy loam, or silt loam.

The C horizon has value of 6 or 7 when dry and 4 or 5 when moist, and it has chroma of 2 or 3 when dry or moist. It is very fine sandy loam, fine sandy loam, or gravelly silt loam.

Willis series

The Willis series consists of moderately deep, well drained soils on uplands. These soils formed in loess. Slopes range from 0 to 15 percent. Elevation is 1,200 to 2,500 feet. The average annual precipitation is 9 to 12 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 125 to 160 days.

Typical pedon of Willis silt loam, 8 to 15 percent slopes, about 9 miles north of Sunnyside, about 1,500 feet north and 200 feet east of the southwest corner of sec. 1, T. 11 N., R. 22 E.

A11—0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many fine roots; mildly alkaline; abrupt wavy boundary.

A12—3 to 6 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine angular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; mildly alkaline; clear wavy boundary.

B2—6 to 22 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common fine roots; common fine tubular pores; mildly alkaline; abrupt wavy boundary.

C1—22 to 26 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, nonsticky and slightly plastic; common fine roots; few fine tubular pores; slightly effervescent; moderately alkaline; abrupt wavy boundary.

C2ca—26 to 34 inches; pale brown (10YR 6/3) heavy silt loam, brown (10YR 4/3) moist; massive; hard, firm, slightly sticky and plastic; few very fine roots; many fine tubular pores; filaments of lime; violently effervescent; moderately alkaline; abrupt wavy boundary.

C3casim—34 inches; lime- and silica-cemented duripan.

Depth to the duripan is 20 to 40 inches. The duripan is underlain by basalt at a depth of 30 inches or more. The mollic epipedon is 12 to 15 inches thick. The A horizon has value of 4 or 5 when dry and 2 or 3 when moist. The B horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 3 or 4 when moist or dry. The C1 and Cca horizons have value of 5 to 7 when dry and 3 to 5 when moist, and they have chroma of 2 to 4.

Yakima series

The Yakima series consists of very deep, well drained soils on flood plains. These soils formed in alluvium. Slopes range from 0 to 2 percent. Elevation is 700 to 1,200 feet. The average annual precipitation is 9 to 14 inches, the average annual air temperature is about 54 degrees F, and the average frost-free season is 120 to 170 days.

Typical pedon of Yakima silt loam, about 1 mile southwest of Buena, about 2,440 feet east and 1,400 feet north of the southwest corner of sec. 21, T. 11 N., R. 20 E.

Ap—0 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak moderate granular structure; hard, friable, slightly sticky and slightly plastic; many fine roots; common fine pores; mildly alkaline; abrupt smooth boundary.

A12—6 to 13 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak moderate granular structure parting to weak moderate subangular blocky; hard, friable, slightly sticky and slightly plastic; few very fine roots; common fine pores; mildly alkaline; abrupt smooth boundary.

A13—13 to 17 inches; dark grayish brown (10YR 4/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; common fine pores; 10 percent basalt pebbles; mildly alkaline; gradual wavy boundary.

A14—17 to 27 inches; brown (10YR 5/3) gravelly very fine sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; common fine pores; 20 percent basalt pebbles; neutral; gradual wavy boundary.

C1—27 to 30 inches; brown (10YR 5/3) gravelly very fine sandy loam, dark brown (10YR 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; common fine pores; 30 percent basalt pebbles; neutral; abrupt wavy boundary.

IIC2—30 to 60 inches; dark grayish brown (10YR 4/2) extremely gravelly coarse sand, very dark grayish brown (10YR 3/2) moist; single grain; loose; 60 percent pebbles and 5 percent cobbles; few very fine roots; neutral.

The mollic epipedon is 20 to 40 inches thick. The A horizon has value of 2 or 3 when moist, and it has chroma of 1 to 3 when moist or dry. The C horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 2 or 3. It is gravelly loam, gravelly very fine sandy loam, or gravelly silt loam. The IIC horizon is very gravelly sand, very gravelly loamy sand, or extremely gravelly coarse sand.

Zillah series

The Zillah series consists of very deep, somewhat poorly drained soils on flood plains adjacent to the Yakima River. These soils formed in recent alluvium. Slopes range from 0 to 2 percent. Elevation is 600 to 1,100 feet. The average annual precipitation is 6 to 9 inches, the average annual air temperature is about 49 degrees F, and the average frost-free season is 130 to 180 days.

Typical pedon of Zillah silt loam, about 5 miles southwest of Sunnyside, about 300 feet north of the southeast corner of sec. 8, T. 9 N., R. 22 E.

A11—0 to 6 inches; grayish brown (10YR 5/2) heavy silt loam, very dark grayish brown (10YR 3/2) moist; common fine prominent mottles that are dark reddish brown (5YR 3/4) when moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; common fine roots; common fine pores; moderately alkaline; abrupt smooth boundary.

A12—6 to 12 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; few fine prominent mottles that are dark reddish brown (5YR 3/4) when moist; weak fine granular structure; slightly hard, friable, sticky and plastic; common fine roots; common fine pores; moderately alkaline; gradual wavy boundary.

C1—12 to 42 inches; gray (10YR 6/1) heavy silt loam, dark gray (10YR 4/1) moist; many large prominent mottles that are dark reddish brown (5YR 3/4) when moist; massive; slightly hard, friable, sticky and plastic; few very fine roots; common fine pores; mildly alkaline; abrupt smooth boundary.

IIC2—42 to 60 inches; gray (10YR 5/1) loamy sand, very dark gray (10YR 3/1) moist; single grain; loose; few very fine roots; mildly alkaline.

Where these soils are not artificially drained, they are saturated with water at some period during the year. The profile is neutral to moderately alkaline.

The A horizon has value of 4 or 5 when dry and 2 or 3 when moist, and it has chroma of 1 or 2 when dry or moist. It is silt loam or sandy loam.

The C horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 1 or 2 when moist or dry. It is silt loam or very fine sandy loam and has strata of loamy sand below a depth of 40 inches The IIC horizon has value of 5 or 6 when dry and 3 or 4 when moist, and it has chroma of 1 or 2 when moist or dry. It is loamy sand, gravelly loamy sand, or very gravelly loamy sand.

formation of the soils

Soil is defined as a natural three-dimensional body on the earth's surface that supports plants. As a natural body, a soil has properties that differ from those of the underlying bedrock or unconsolidated material that is not soil. Properties of soils are a reflection of soil forming processes that are initiated and sustained by the effects of climate and living organisms acting on parent material and modified by topography over a period of time. In a given area, one factor may exert a stronger influence on soil formation than another, but the interaction of all the factors determines the kind of soil that forms.

In this survey, soil forming factors are discussed individually; however, the reader should be aware that there is a strong interdependence of all soil forming factors.

climate

Precipitation, by affecting the amount of water that enters the soil, influences the chemical and physical processes involved in the weathering of minerals, in erosion, and in leaching. Biological processes that determine the amount of residue returned to the soil and the rate at which the residue undergoes decomposition are dependent on moisture relationships in the soil forming environment. Temperature is a measure of the heat available for all physical, chemical, and biological processes involved in soil development. Heat, in the presence of adequate moisture, accelerates the weathering processes. Heat also increases evapotranspiration and thus reduces the amount of water available for chemical and geological processes.

Most of the precipitation in the survey area occurs in winter. The amount and seasonal distribution of the precipitation, together with soil temperature, have influenced the weathering of the parent material. The degree of weathering is reflected by the depth to which carbonates have been leached and by the amount of clay that has been translocated.

Soils in the 6- to 9-inch precipitation zone support grassland vegetation that is relatively low in productivity. Soils in this precipitation zone are partly recharged with moisture in winter. Because of low rainfall and high evapotranspiration, these soils are aridic but border on xeric. Organic matter content of the surface layer is relatively low. Some translocation of calcium carbonate from the solum and accumulation in the substratum are evident in Camborthids such as the Prosser, Scooteney, Shano, and Warden soils.

Soils in the 8- to 12-inch precipitation zone support grassland vegetation. The soil moisture regime in this part of the survey area is aridic, but it borders on xeric. The precipitation in this zone has promoted more plant growth and a higher content of organic matter in the surface layer of these soils than in those of the 6- to 9-inch precipitation zone. Carbonates generally are leached deeper in this part of the survey area than in the lower precipitation zone. The Cleman and Ritzville soils formed in the 8- to 12-inch precipitation zone. Some soils in this precipitation zone have been leached sufficiently of carbonates for clay illuviation to have occurred. The argillic horizon in these soils is not strongly expressed. The Cowiche, Renslow, and Simcoe soils are examples of these soils.

Soils in the 12- to 18-inch precipitation zone also support grassland vegetation. They have a xeric moisture regime. Carbonates have been leached from the profile of these soils. The mollic epipedon generally is darker colored than in soils that receive less precipitation. The agrillic horizon is more strongly developed and has a more pronounced structure. The McDaniel, Taneum, and Tieton soils are examples of these soils.

Soils in the 16- to 40-inch precipitation zone support conifers. They do not have carbonates in the soil profile. Base saturation is less than 75 percent in some part of the soils within a depth of 30 inches from the surface. This is a result of the low base cycling of most conifers and the leaching of bases. The Carmack, Meystre, Tekison, Odo, Sutkin, and Jumpe soils are examples of these soils.

In the extreme western part of the survey area, at elevations of 4,700 to 7,000 feet, precipitation is as high as 50 inches and cryic temperatures prevail. This cool, moist climate produces soils with an A horizon that is high in content of organic matter because of the slow rate of decomposition. These soils are strongly influenced by volcanic ash, do not have carbonates, and have less than 50 percent base saturation in the surface layer. Low base cycling, the leaching effects of high precipitation, and cold temperatures have influenced the development of the Naxing and Saydab soils.

parent material

Parent material is consolidated or unconsolidated mineral material. The formation of soils results from changes in the parent material. The nature of the changes involved is strongly influenced by the character of the parent material, particularly by its mineralogy and texture. Mineralogy and texture affect various physical and chemical aspects of the soil forming environment.

Parent material in the survey area includes recent alluvium; material derived from Yakima Basalt; loess; lacustrine sediment; material derived from siltstone, sandstone, and conglomerate of the Ellensburg Formation; volcanic ash; and eolian sand.

Most of the soils on terraces and uplands formed in loess. They are underlain by basalt, by a duripan, or by lacustrine sediment. The soils that formed in loess are dominantly silt loam. Soils of the Shano, Ritzville, and Renslow series are examples of these soils.

Warden soils formed in a thin mantle of loess over stratified glaciolacustrine sediment known as the Touchet Formation. This late Pleistocene sediment is not well laminated. The Hezel soils formed in a mantle of eolian sand over glaciolacustrine sediment of the Touchet Formation.

Quincy soils formed in very deep eolian sand. These soils are dominantly loamy fine sand and are somewhat excessively drained.

Some of the soils in the survey area formed in loess over a lime- and silica-cemented duripan, and others formed over a silica-cemented duripan. The genesis of the duripan is not entirely understood. A commonly accepted theory is that the duripan is a relict feature associated with a previous soil forming cycle. It is thought to be an erosional remnant of an ancient soil. The upper material was eroded away during the late Pleistocene. The loess presently overlying the duripan is dominantly Holocene in age. The Willis, Burke, Scoon, and Moxee soils formed in a mantle of loess over a lime- and silica-cemented duripan. The Harwood, Gorst, and Gorskel soils formed in a thin mantle of loess over a silica-cemented duripan.

Some of the soils in the survey area formed in a mixture of loess and underlying sandstone of the Ellensburg Formation. The Cowiche, Taneum, and Meystre soils are examples of these soils. The Roza soils formed in fine textured material of the Ellensburg Formation. These soils have a high shrink-swell potential and are characterized by wide cracks in the surface that extend to a depth of 20 inches or more when the soils are dry. The Roza soils are Xerertic Camborthids.

Soils that formed in loess mixed with residuum and colluvium derived from basalt are those of the Bakeoven, Clint, Jumpe, McDaniel, Sapkin, and Sutkin series. The Loneridge and Tekison soils also formed in material derived from basalt and have accumulations of clay in the subsoil.

Soils that formed in material weathered from basalt with additions of volcanic ash and loess are those of the Naxing and Saydab series. Because of the properties of weathered volcanic ash, these soils have low bulk density. They are medial-skeletal Andic Cryumbrepts.

The most recent soil parent material is the Quaternary alluvium that is in stream valleys throughout the survey area. Soils of the Esquatzel, Kittitas, Fiander, Zillah, Umapine, and Outlook series formed in alluvium and have a silty control section. The Wenas, Toppenish, and Cleman soils are more influenced by sand or by sand and gravel, and they have a loamy control section. The Weirman and Mippon soils are sandy-skeletal and are near major drainageways. The Logy, Ashue, and Track soils are loamy-skeletal.

topography

Topography influences the soil forming processes by affecting runoff, drainage, and microclimate. In nearly level areas, runoff is very slow. Much of the water drains through the soil, and some evaporates. In sloping to steep areas, runoff generally increases with increasing slope. The more water that enters the soil, the greater the depth to which the soil is leached and weathered. The topography, through variations in exposure to the sun and wind and in air drainage, creates noticeable differences in vegetation and soil properties within short distances. For example, south-facing slopes receive more direct radiation from the sun than do the north-facing slopes. Consequently, south-facing slopes are warmer and drier.

Aspect has influenced the amount of loess that has accumulated. South and southwest aspects are exposed to the prevailing wind, and thus loess accumulation is less on these aspects than on north aspects. Also, because of the higher evapotranspiration rate on south and southwest aspects, plant density is less than on north aspects. With decreased plant density, the potential for water erosion becomes greater on south and southwest aspects. Representative soils that are on south and southwest aspects are the moderately deep Burke and Willis soils. Examples of soils on north aspects are the deep and very deep Ritzville and Shano soils. Water erosion in some areas has moved loess downslope. There has been little accumulation of loess on the edges of ridgetops and on narrow ridges. The Bakeoven, Bocker, and Rock Creek soils formed in residuum and colluvium derived from basalt in these areas.

Local relief modifies the moisture regime of soils. This is especially evident in soils on bottom lands. Possibly as a result of overirrigation, runoff from adjacent upland soils accumulates on bottom lands. A seasonal high water table is common in some of the soils on bottom lands. Mottling gives evidence of reducing regimes. Examples of soils that exhibit mottling and are somewhat

poorly drained are the Haplaquolls such as the Kittitas, Toppenish, Track, Wenas, and Zillah soils. These soils are along the Yakima, Naches, and Wenas Rivers. Some well drained soils on bottom lands are the Esquatzel, Clemen, Logy, and Yakima soils.

In some areas where the free water in the soil contains salts and is sufficiently close to the surface, evapotranspiration concentrates the salts in the surface layer. Included among these soils are the Fiander, Kittitas, Outlook, Sinloc, Umapine, and Wanser soils.

living organisms

The major biotic factor in soil development is vegetation. It is the principal source of the organic matter responsible for various chemical and physical properties of soils. Rodents, earthworms, and various other animals and insects assist in decomposing organic substances, and they mix the soil as a consequence of their burrowing activities.

The influence of vegetation is most evident in the A horizon. Plant species, productivity, and the rate at which residue decomposes strongly influence the properties of the A horizon. Dark colors in the A horizon generally indicate high organic matter content. Soils that receive about 6 to 16 inches of precipitation support grassland vegetation. Many of the soils that receive more than 16 inches of precipitation support coniferous forest. A relationship exists between the kind and amount of plant production and the color and thickness of the A horizon. Grass generally produces more organic matter in the A horizon than trees. Where plant production is high, the A horizon is thicker or darker colored than where production is low. The color and thickness of the A horizon of the Ritzville, Taneum, and Meystre soils reflect the influence of higher plant production than those of the Prosser, Shano, and Warden soils.

Soils on bottom lands contain the most organic matter relative to precipitation. One of the reasons is the relatively higher plant production stimulated by the accumulation of runoff from adjacent upland soils. Some soils formed under the influence of a seasonal high water table that reduces the rate of decomposition of organic matter. This is because of poor soils aeration, which reduces the activity of micro-organisms. The Wenas soil is an example of these soils.

Soils under forest vegetation are more leached of bases and other products of weathering than soils under grasses. One reason for the lower base saturation is the acidity of the leaching water under a coniferous forest canopy. Base saturation is less than 75 percent in the solum of the Carmack, Sutkin, and Tekison soils.

An ochric epipedon is common on the more densely forested soils. The Jumpe and Loneridge soils are examples of these soils. However, a thick, dark-colored A horizon is typical of soils in coniferous forests in the cryic temperature regime. One reason is the reduced biological activity of micro-organisms in cold temperatures, which results in reduced decomposition of organic matter. The Naxing and Saydab soils are examples of these soils.

time

Soil formation begins as soon as rock is exposed on the earth's surface. As soil formation progresses, characteristic layers called horizons form within the soil profile. Generally, the larger the number of horizons and the greater their thickness and distinctness, the more mature is the soil. Depending on the nature of the parent material and the vigor of the soil forming process, it takes hundreds or even thousands of years to form pronounced genetic horizons.

The parent material in the survey area is material derived from basalt and the Ellensburg Formation of Miocene age, stream terrace sand and gravel of Pleistocene and Pliocene age, volcanic ash of Pleistocene and Recent age, and Recent alluvium.

The soils in the area have been forming since Pliocene time. Some soils on basalt uplands have a strongly expressed argillic horizon. The Loneridge, Tekison, and Rock Creek soils are examples of these soils. A duripan formed in many of the soils on terraces during that time. Many of these soils since have been eroded to the duripan. Loess has been deposited in Pleistocene and Recent times over this old duripan, and a new soil is now forming in the loess. Stratigraphic studies in the Columbia Basin (*25*) indicate that the duripan is pre-Bull Lake in age (more than 50,000 years old). The Harwood, Gorst, and Gorskel soils are examples of these soils.

During the late Pleistocene (13,000 to 18,000 years ago) glacial water covered parts of the survey area. The parent material for the Warden, Scooteney, and Finley soils was deposited during this time.

Some of the younger soils in the area formed in recent alluvium on bottom lands, which are the youngest landforms in the area and are subject to flooding. These soils generally have an AC profile. The Esquatzel, Umapine, Weirman, and Yakima soils are examples of these soils.

Man's influence in the survey area has been considerable. Since the advent of irrigation, for example, overirrigation of soils in the higher lying areas has produced saline-alkali soils in the lower lying areas. The Outlook and Sinloc soils are examples of these soils. Through irrigation, land leveling, soil erosion, and alteration of native plant communities, man's presence will remain a highly significant soil forming factor in this survey area.

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glossary

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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

	Inches
Low	Less than 3 75
Moderate	3.75 to 5
Moderately high	5 to 7 5
High	More than 7 5

Basal area (forestry). The area of a cross section of a tree (including bark), usually expressed in square feet, and usually referring to the section at breast height. The basal area of a stand is the sum of the basal areas of individual trees and is computed per acre.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a winch with poles and pulleys to suspend and control the movement of wire cables. To reduce friction and soil disturbance, felled trees generally are yarded in with one end lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

Chiseling. Loosening the soil, without inverting the soil material and with minimum of mixing of the surface soil, to shatter restrictive layers (in the upper 16 inches) that inhibit water movement and root development.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels.

Coarse fragments. Mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter.

Coarse textured (light textured) soil. Sand or loamy sand.

Cobble. A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Codominant trees. Well developed trees that are part of the main canopy but are subject to some competition from other trees.

Colluvium. Soil material, rock fragments, or both moved by creep, slide, or local wash and deposited at the base of steep slopes.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.
Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.
Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.
Soft.—When dry, breaks into powder or individual grains under very slight pressure.
Cemented.—Hard; little affected by moistening.

Corrugations. Small channels used to carry water for surface irrigation of close-growing, noncultivated crops such as legumes, grasses, small grain, and mint. Water flowing through the corrugations soaks into the soil and spreads laterally, irrigating the areas between furrows.

Cover crop. A crop of close-growing grasses, legumes, or small grain grown to control seasonal erosion or for permanent cover in orchards and vineyards.

Culmination of the mean annual increment (CMAI). The average yearly volume growth of a stand of trees from the year of origin to the age that gives the highest average.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diameter at breast height. The diameter of a tree (including bark), usually expressed in inches, measured at a height of 4.5 feet above the average ground level.

Diversion. A channel that has a supporting ridge constructed across the slope on the lower side to divert excess water to sites where it can be used or disposed of safely.

Dominant trees. The largest, tallest, and most vigorous trees in a stand.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:
Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.
Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.
Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.
Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Drip irrigation. Very slow (about 1 gallon per hour), frequent applications of irrigation water. Water is applied through plastic emitters that normally are placed around the base of the plant commonly measured with a tensiometer. Drip irrigation helps to prevent the depletion of oxygen in the soil and allows optimum combinations of water and oxygen for plant growth.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Duripan. A cemented layer. The layer normally is cemented by silica or calcium carbonate, or both.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Fallow (or summer fallow). Cropland left idle every other year in rotation with small grain. Weeds are controlled and moisture conserved during the idle year to retain adequate moisture for the cropping year. This 2-year rotation is common in regions of limited rainfall.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It is commonly on the downhill side of the road.

Firebreak. Areas cleared of flammable material to stop or help to control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of men and equipment in fire fighting. Designated roads also serve as firebreaks.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover type. A descriptive term used to group stands of similar character as regards species composition and development because of ecological factors.

Furrow. Small channels used to carry water for surface irrigation of cultvated crops planted in rows. Water flowing in the furrows soaks into the soil and spreads laterally, irrigating the areas between furrows.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion.

Gravel. Rounded or angular fragments of rock up to 3 inches (2 millimeters to 7.5 centimeters) in diameter. An individual piece is a pebble.

Grazable woodland. Forest land that produces, at least for a time, sufficient understory vegetation suitable for forage that can be grazed without significantly impairing the production of wood and other forest products.

Gully. A severely eroded site that has steep ditches cut by concentrated running water that ordinarily flows only after runoff. The distinction between a gully and a rill is one of depth and location. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage. A rill is less than 1 foot deep and generally can be smoothed over by ordinary tillage.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Meadow farmed (mint). A cultural practice that consists of using tillage only during establishment of the mint crop. In some instances, the original corrugations are reestablished if water does not stay in the corrugations or flow to the end of the field.

Mean annual increment. The average yearly volume growth of a stand of trees from the year of origin to the age under consideration.

Minimum tillage. Properly timed noninversion conservation tillage that is limited to only those operations essential to crop production and prevention of soil damage. The purpose of minimum tillage is to avoid deterioration of soil structure; to reduce soil compaction and formation of a tillage pan; to improve soil aeration, permeability, tilth; and to maintain residue on the surface.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4

Natural reforestation. Seedlings that become established from seed disseminated by nearby cone-bearing trees. The expected period of time it takes for an area to naturally reforest is described by the terms *readily*, seedlings adequately occupy the area in 2 to 5 years; *periodically*, 5 to 10 years; and *infrequently*, 10 to 20 years.

Normal stand (woodland). A normal stand, at a given age, contains as many trees per acre as can properly use the growing space available. It is considered to be fully stocked.

Nurse crop. A companion crop grown to protect some other crop sown with it.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it is generally low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Planned grazing system. A system in which two or more grazing units are alternately rested from grazing in a planned sequence over a period of years. The rest period can be throughout the year during the growing season of the key plants.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Reforestation. Tree seedlings that are planted or are naturally established in an area of land that was once forested. It includes the practices associated with planting.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. An obvious erosion pattern resulting from rainfall or runoff from snowmelt. Usually referred to as sheet and rill erosion. See 'gully' for more detail.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve.

Site index. The height that dominant or dominant and codominant trees reach at 50 years total age, of breast height age, of 100 years total age, or at breast height age. With this index and the age of the stand of trees, yield can be determined by using the appropriate yield table.

Skid trail. The path left by skidded logs and by the equipment used to pull them.

Skidding. A method of moving felled trees to a nearby, central area for transport to a processing facility. Most skidding systems involve pulling the trees with wire cables attached to a bulldozer or rubber-tired tractor. To reduce friction and soil disturbance, felled trees generally are pulled with one end lifted.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

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

Slope length. The distance from the origin of the overland flow to the point where the slope gradient decreases enough that deposition begins or the runoff water enters a well-defined channel.

Stocking (woodland). The degree to which an area is effectively covered with living trees. It is expressed as a percentage of the basal area or crown closure relative to that of a normal stand. *Well stocked* is 70 to 100 percent of a normal stand; *medium stocked* is 40 to 70 percent; *poorly stocked* is 10 to 40 percent; *nonstocked* is less than 10 percent; and *overstocked* is more than 100 percent.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

Stripcropping. Growing crops in a systematic arrangement of strips or bands to reduce erosion. The crops are arranged so that a protective strip of

grass or a close-growing crop is alternated with a strip of a clean-tilled crop or fallow. Contour strips follow the contour of the slope and are designed to reduce sheet and rill erosion and control water. Field strips are placed across the slope to reduce sheet and rill erosion. Wind strips are arranged at angles generally perpendicular to erosive winds to control soil blowing, trap snow, and increase the soil moisture content.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Residue of small grain left on the surface of the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Loosening the soil without inverting it and with a minimum of mixing of the surface layer to shatter restrictive layers (at a depth of more than 16 inches) that inhibit water movement or root development.

Substratum. The part of the soil below the solum.

Suitable surfacing (logging roads). Rock of adequate hardness and size used to cover a road so that it can withstand repeated and long-term logging truck traffic.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Terrace. An earth embankment, channel or ridge and channel constructed across the slope (gradient terrace) or on the contour (level terrace) to (1) reduce slope length, (2) reduce erosion, (3) reduce the content of sediment in runoff water, (4) intercept and conduct surface runoff to a stable outlet, (5) retain runoff for moisture conservation, (6) prevent development of gullies, (7) reform the land surface, (8) improve the soil for farming, and (9) reduce flooding.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Upland (geology). Land at a higher elevation, in general, than bottom land or terraces.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Water bar. A smooth, shallow ditch or depressional area that is excavated at an angle across a sloping road. It is used to reduce the downward velocity of water and to divert the water off and away from the road surface. Water bars can easily be driven over is constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

Yarding path. The path left by cable-yarded logs as they are pulled uphill or downhill to a nearby, central area.

Yield table, normal (woodland). Table showing the number and size of trees, total basal area, and yield per acre. These tables commonly are for even-aged, unmanaged stands. Values are given for stands at different ages on sites of different quality.

Yield (woodland). The volume of wood fiber from trees harvested from a certain area. Yield commonly is measured in board feet or cubic feet per acre.

tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1951-78 at Yakima, Washington]

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average daily	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days[1]	Average	Less than--	More than--	Average number of days with 0.1 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	37.4	20.5	29.0	60	-10	47	1.43	.59	2.11	5	9.7
February	46.4	26.1	36.3	65	5	69	.73	.19	1.15	3	2.6
March	54.4	29.0	41.8	71	14	104	.67	.17	1.07	2	2.1
April	63.4	34.5	49.0	82	22	277	.50	.04	.84	2	.0
May	72.4	41.9	57.2	93	27	533	.48	.14	.75	2	.0
June	79.9	49.1	64.5	97	34	735	.58	.10	.95	2	.0
July	87.8	52.9	70.4	103	39	942	.14	---	.25	1	.0
August	85.7	51.5	68.6	102	38	887	.36	.01	.61	1	.0
September	77.4	44.1	60.8	94	31	624	.33	.02	.54	1	.0
October	64.4	34.9	49.7	81	20	301	.47	.08	.76	2	.3
November	48.4	28.1	38.3	66	11	78	.95	.29	1.48	4	2.1
December	39.3	23.2	31.3	59	-1	22	1.25	.44	1.90	5	7.8
Yearly:											
Average	63.1	36.3	49.7	---	---	---	---	---	---	---	---
Extreme	---	---	---	104	-12	---	---	---	---	---	---
Total	---	---	---	---	---	4,619	7.89	6.34	9.38	30	24.6

[Recorded in the period 1951-77 at Rimrock, Washington]

January	34.3	19.1	26.7	52	-9	20	5.10	1.81	7.72	12	33.9
February	40.9	22.8	31.9	57	1	19	2.74	1.14	4.02	7	15.4
March	44.7	24.6	34.7	65	3	18	2.14	.90	3.14	7	14.5
April	52.9	30.6	41.8	75	19	106	1.28	.32	2.04	4	3.5
May	62.3	36.4	49.4	86	24	302	.81	.22	1.28	3	.3
June	69.8	43.3	56.6	91	30	498	.73	.28	1.09	3	.0
July	79.4	46.9	63.1	97	34	716	.37	.02	.63	1	.0
August	78.0	45.8	62.0	97	34	682	.74	---	1.28	2	.0

See footnote at end of table.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average daily	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.1 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
September-	71.0	40.0	55.5	91	27	465	.70	.09	1.16	2	.0
October---	57.8	32.8	45.3	80	20	183	2.07	.67	3.19	5	1.0
November--	43.1	27.0	35.1	61	10	27	3.85	1.71	5.58	9	10.1
December--	36.3	21.9	29.1	53	-2	11	4.91	2.66	6.74	11	28.2
Yearly:											
Average-	55.9	32.6	44.3	---	---	---	---	---	---	---	---
Extreme-	---	---	---	99	-13	---	---	---	---	---	---
Total---	---	---	---	---	---	3,047	25.44	20.48	30.66	66	106.9
[Recorded in the period 1951-78 at Sunnyside, Washington]											
January---	40.2	23.8	32.0	64	-4	74	1.00	.34	1.51	4	5.0
February--	48.9	28.4	38.7	66	9	88	.55	.12	.89	2	1.5
March-----	56.8	31.7	44.3	74	16	153	.43	.10	.68	2	.4
April-----	65.3	37.7	51.6	84	24	348	.51	.06	.86	2	.0
May-------	74.2	45.3	59.8	95	31	614	.52	.12	.83	2	.0
June------	82.0	52.0	67.0	99	38	810	.43	.07	.71	2	.0
July------	89.4	55.0	72.2	105	43	998	.19	---	.34	1	.0
August----	87.7	53.1	70.4	103	41	942	.30	---	.53	1	.0
September-	79.7	46.3	63.0	96	34	690	.36	.03	.60	1	.0
October---	66.8	37.0	51.9	84	23	369	.48	.07	.78	2	.1
November--	50.6	30.4	40.5	69	14	104	.82	.26	1.26	3	1.4
December--	41.6	26.0	33.8	61	5	30	.95	.34	1.44	4	3.9
Yearly:											
Average-	65.3	38.9	52.1	---	---	---	---	---	---	---	---
Extreme-	---	---	---	105	-7	---	---	---	---	---	---
Total---	---	---	---	---	---	5,220	6.54	4.98	8.00	26	12.3

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and substracting the temperature below which growth is minimal for the principal crops in the area (40°F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded in the period 1951-78 at Yakima, Washington]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	April 21	May 13	May 29
2 years in 10 later than--	April 14	May 7	May 24
5 years in 10 later than--	March 31	April 25	May 15
First freezing temperature in fall:			
1 year in 10 later than--	October 17	September 28	September 20
2 years in 10 later than--	October 22	October 4	September 24
5 years in 10 later than--	November 2	October 15	October 3

[Recorded in the period 1951-77 at Rimrock, Washington]

Last freezing temperature in spring:			
1 year in 10 later than--	May 7	May 29	June 24
2 years in 10 later than--	May 1	May 24	June 17
5 years in 10 later than--	April 19	May 16	June 3
First freezing temperature in fall:			
1 year in 10 later than--	October 10	September 15	August 1
2 years in 10 later than--	October 16	September 20	August 13
5 years in 10 later than--	October 27	October 1	September 4

[Recorded in the period 1951-78 at Sunnyside, Washington]

Last freezing temperature in spring:			
1 year in 10 later than--	April 6	April 25	May 13
2 years in 10 later than--	March 31	April 18	May 8
5 years in 10 later than--	March 19	April 6	April 27
First freezing temperature in fall:			
1 year in 10 later than--	October 20	October 13	September 26
2 years in 10 later than--	October 26	October 17	September 30
5 years in 10 later than--	November 5	October 25	October 8

TABLE 3.--GROWING SEASON

[Recorded in the period 1951-78 at Yakima, Washington]

Probability	Daily minimum temperature		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	191	145	121
8 years in 10	199	155	128
5 years in 10	215	172	140
2 years in 10	231	189	153
1 year in 10	240	198	159

[Recorded in the period 1951-77 at Rimrock, Washington]

9 years in 10	162	117	50
8 years in 10	172	124	65
5 years in 10	190	138	92
2 years in 10	208	151	119
1 year in 10	217	158	134

[Recorded in the period 1951-78 at Sunnyside, Washington]

9 years in 10	208	181	140
8 years in 10	216	188	148
5 years in 10	230	201	163
2 years in 10	244	215	179
1 year in 10	252	221	187

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Aquic Cryandepts, gently sloping	217	*
2	Ashue loam	5,745	0.6
3	Bakeoven very cobbly silt loam, 0 to 30 percent slopes	14,609	1.6
4	Bickleton silt loam, 0 to 5 percent slopes	2,720	0.3
5	Bickleton silt loam, 5 to 20 percent slopes	2,896	0.3
6	Bocker very cobbly loam, 0 to 25 percent slopes	10,665	1.2
7	Bocker-Jumpe complex, 0 to 15 percent slopes	1,332	0.1
8	Bocker-Sapkin complex, 0 to 25 percent slopes	9,449	1.1
9	Bocker-Sutkin complex, 0 to 7 percent slopes	2,133	0.2
10	Burke silt loam, 2 to 5 percent slopes	1,492	0.2
11	Burke silt loam, 5 to 8 percent slopes	956	0.1
12	Burke silt loam, 8 to 15 percent slopes	1,695	0.2
13	Carmack loam, 0 to 25 percent slopes	3,615	0.4
14	Carmack cobbly loam, 25 to 50 percent slopes	1,200	0.1
15	Carmack cobbly loam, 50 to 75 percent slopes	999	0.1
16	Carmack cobbly loam, 25 to 50 percent north slopes	2,045	0.2
17	Carmack-Rock outcrop complex, 40 to 70 percent slopes	1,375	0.2
18	Cleman very fine sandy loam, 0 to 2 percent slopes	4,418	0.5
19	Cleman very fine sandy loam, 2 to 5 percent slopes	3,906	0.4
20	Cleman very fine sandy loam, 5 to 8 percent slopes	929	0.1
21	Cleman very fine sandy loam, 8 to 15 percent slopes	611	0.1
22	Clint very stony loam, 15 to 45 percent slopes	4,715	0.5
23	Clint-Rubble land complex, 8 to 75 percent slopes	7,383	0.8
24	Cowiche loam, 2 to 5 percent slopes	1,004	0.1
25	Cowiche loam, 5 to 8 percent slopes	1,250	0.1
26	Cowiche loam, 8 to 15 percent slopes	5,321	0.6
27	Cowiche loam, 15 to 30 percent slopes	2,475	0.3
28	Cowiche-Rock Creek complex, 5 to 15 percent slopes	758	0.1
29	Cryumbrepts, gently sloping	854	0.1
30	Darland stony loam, 45 to 75 percent slopes	3,288	0.4
31	Darland-Rubble land complex, 45 to 75 percent complex	2,365	0.3
32	Esquatzel silt loam, 0 to 2 percent slopes	23,118	2.6
33	Esquatzel silt loam, 2 to 5 percent slopes	3,403	0.4
34	Fiander silt loam	1,063	0.1
35	Finley fine sandy loam, 0 to 5 percent slopes	566	0.1
36	Finley cobbly fine sandy loam, 0 to 5 percent slopes	681	0.1
37	Finley silt loam, 0 to 2 percent slopes	1,408	0.2
38	Finley silt loam, 2 to 5 percent slopes	1,450	0.2
39	Finley silt loam, 5 to 8 percent slopes	296	*
40	Finley silt loam, 8 to 15 percent slopes	318	*
41	Gorskel very stony loam, 0 to 25 percent slopes	1,627	0.2
42	Gorskel-Harwood complex, 0 to 25 percent slopes	6,328	0.7
43	Gorst loam, 2 to 15 percent slopes	8,798	1.0
44	Gorst loam, 15 to 30 percent slopes	934	0.1
45	Gorst cobbly loam, 0 to 25 percent slopes	3,299	0.4
46	Harwood loam, 2 to 5 percent slopes	7,148	0.8
47	Harwood loam, 5 to 8 percent slopes	2,015	0.2
48	Harwood loam, 8 to 15 percent slopes	4,587	0.5
49	Harwood loam, 15 to 30 percent slopes	1,180	0.1
50	Harwood-Burke-Wiehl silt loams, 2 to 5 percent slopes	817	0.1
51	Harwood-Burke-Wiehl silt loams, 5 to 8 percent slopes	1,104	0.1
52	Harwood-Burke-Wiehl silt loams, 8 to 15 percent slopes	9,325	1.0
53	Harwood-Burke-Wiehl silt loams, 15 to 30 percent slopes	7,829	0.9
54	Harwood-Burke-Wiehl silt loams, 30 to 60 percent slopes	3,498	0.4
55	Harwood-Burke-Wiehl very stony silt loams, 15 to 30 percent slopes	3,666	0.4
56	Harwood-Gorst complex, 0 to 25 percent slopes	2,713	0.3
57	Hezel loamy fine sand, 0 to 2 percent slopes	1,223	0.1
58	Hezel loamy fine sand, 2 to 15 percent slopes	3,343	0.4
59	Jumpe stony loam, 5 to 25 percent slopes	13,809	1.5
60	Jumpe stony loam, 25 to 45 percent slopes	14,490	1.6
61	Jumpe stony loam, 45 to 65 percent slopes	1,622	0.2
62	Jumpe stony loam, 25 to 45 percent north slopes	18,173	2.0
63	Jumpe stony loam, 45 to 65 percent north slopes	4,102	0.5
64	Jumpe-Rock outcrop complex, 40 to 80 percent slopes	2,368	0.3
65	Kiona stony silt loam, 15 to 45 percent slopes	16,101	1.8
66	Kittitas silt loam	3,289	0.4
67	Lickskillet silt loam, 5 to 30 percent slopes	4,470	0.5
68	Lickskillet very stony silt loam, 5 to 45 percent slopes	22,704	2.5
69	Logy silt loam, 0 to 2 percent slopes	3,357	0.4
70	Logy cobbly silt loam, 0 to 5 percent slopes	3,468	0.4

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
71	Loneridge stony loam, 0 to 25 percent slopes	909	0.1
72	Loneridge stony loam, 25 to 45 percent slopes	758	0.1
73	Loneridge stony loam, 25 to 45 percent north slopes	597	0.1
74	McDaniel very stony loam, 5 to 30 percent slopes	6,167	0.7
75	McDaniel very stony loam, 30 to 65 percent slopes	9,631	1.1
76	McDaniel-Rock Creek complex, 5 to 30 percent slopes	1,877	0.2
77	Meystre loam, 0 to 15 percent slopes	5,446	0.6
78	Meystre stony loam, 15 to 45 percent slopes	3,944	0.4
79	Mikkalo silt loam, 0 to 5 percent slopes	866	0.1
80	Mikkalo silt loam, 5 to 15 percent slopes	2,794	0.3
81	Mikkalo silt loam, 15 to 30 percent slopes	1,898	0.2
82	Mippon very cobbly silt loam	2,242	0.3
83	Moxee silt loam, 2 to 15 percent slopes	2,989	0.3
84	Moxee silt loam, 15 to 30 percent slopes	335	*
85	Moxee cobbly silt loam, 0 to 30 percent slopes	5,733	0.6
86	Naches loam	3,289	0.4
87	Naxing loam, 5 to 25 percent slopes	8,051	0.9
88	Naxing stony loam, 25 to 45 percent slopes	10,954	1.2
89	Naxing stony loam, 45 to 65 percent slopes	2,342	0.3
90	Odo cobbly silt loam, 5 to 35 percent slopes	1,414	0.2
91	Outlook fine sandy loam	876	0.1
92	Outlook silt loam	3,214	0.4
93	Pits	462	0.1
94	Prosser silt loam, 0 to 15 percent slopes	1,069	0.1
95	Quincy loamy fine sand, 0 to 10 percent slopes	5,594	0.6
96	Renslow silt loam, 5 to 15 percent slopes	1,378	0.2
97	Renslow silt loam, basalt substratum, 0 to 5 percent slopes	3,610	0.4
98	Renslow silt loam, basalt substratum, 5 to 15 percent slopes	3,869	0.4
99	Ritzville silt loam, 2 to 5 percent slopes	8,136	0.9
100	Ritzville silt loam, 5 to 8 percent slopes	2,725	0.3
101	Ritzville silt loam, 8 to 15 percent slopes	16,484	1.8
102	Ritzville silt loam, 15 to 30 percent slopes	12,058	1.4
103	Ritzville silt loam, 30 to 60 percent slopes	4,799	0.5
104	Ritzville silt loam, basalt substratum, 0 to 5 percent slopes	20,358	2.3
105	Ritzville silt loam, basalt substratum, 5 to 15 percent slopes	10,219	1.1
106	Ritzville silt loam, basalt substratum, 15 to 30 percent slopes	4,371	0.5
107	Ritzville Variant silt loam, 5 to 15 percent slopes	858	0.1
108	Ritzville Variant cobbly silt loam, 5 to 15 percent slopes	521	0.1
109	Rock Creek very stony silt loam, 0 to 30 percent slopes	30,690	3.4
110	Rock Creek-Clint-Simcoe complex, 0 to 45 percent slopes	27,106	3.0
111	Roza clay loam, 5 to 8 percent slopes	382	*
112	Roza clay loam, 8 to 15 percent slopes	978	0.1
113	Roza clay loam, 15 to 30 percent slopes	3,736	0.4
114	Roza clay loam, 30 to 60 percent slopes	4,851	0.5
115	Rubble land-Rock outcrop association	7,610	0.9
116	Sapkin very stony loam, 10 to 45 percent slopes	20,520	2.3
117	Sapkin very stony loam, 45 to 75 percent slopes	2,770	0.3
118	Sapkin-Rubble land complex, 30 to 75 percent slopes	8,193	0.9
119	Saydab cobbly loam, 0 to 5 percent slopes	2,252	0.3
120	Scoon silt loam, 2 to 5 percent slopes	6,017	0.7
121	Scoon silt loam, 5 to 8 percent slopes	1,798	0.2
122	Scoon silt loam, 8 to 15 percent slopes	1,798	0.2
123	Scoon silt loam, 15 to 30 percent slopes	503	0.1
124	Scooteney silt loam, 0 to 2 percent slopes	1,553	0.2
125	Scooteney silt loam, 2 to 5 percent slopes	1,142	0.1
126	Scooteney silt loam, 5 to 15 percent slopes	232	*
127	Scooteney cobbly silt loam, 0 to 5 percent slopes	1,177	0.1
128	Selah silt loam, 2 to 5 percent slopes	1,812	0.2
129	Selah silt loam, 5 to 8 percent slopes	2,417	0.3
130	Selah silt loam, 8 to 15 percent slopes	2,821	0.3
131	Selah silt loam, 15 to 30 percent slopes	432	*
132	Shano silt loam, 2 to 5 percent slopes	878	0.1
133	Shano silt loam, 5 to 8 percent slopes	317	*
134	Shano silt loam, 8 to 15 percent slopes	4,432	0.5
135	Shano silt loam, 15 to 30 percent slopes	2,112	0.2
136	Simcoe silt loam, 5 to 15 percent slopes	1,782	0.2
137	Simcoe silt loam, 15 to 30 percent slopes	949	0.1
138	Sinloc fine sandy loam, 0 to 2 percent slopes	1,339	0.2
139	Sinloc silt loam, 0 to 2 percent slopes	1,251	0.1
140	Sinloc silt loam, 2 to 5 percent slopes	1,213	0.1

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
141	Sinloc silt loam, 5 to 8 percent slopes	212	*
142	Starbuck silt loam, 2 to 15 percent slopes	13,284	1.5
143	Starbuck-Rock outcrop complex, 0 to 45 percent slopes	22,714	2.5
144	Starbuck-Rock outcrop complex, 45 to 60 percent slopes	3,289	0.4
145	Sutkin stony loam, 0 to 25 percent slopes	7,874	0.9
146	Sutkin stony loam, 25 to 45 percent slopes	14,976	1.7
147	Sutkin stony loam, 45 to 65 percent slopes	3,304	0.4
148	Sutkin stony loam, 25 to 45 percent south slopes	3,130	0.4
149	Sutkin-Rock outcrop complex, 25 to 75 percent slopes	1,835	0.2
150	Sutkin Variant stony loam, 0 to 5 percent slopes	576	0.1
151	Taneum loam, 5 to 15 percent slopes	6,766	0.8
152	Taneum loam, 15 to 30 percent slopes	3,712	0.4
153	Taneum loam, 30 to 60 percent slopes	1,969	0.2
154	Taneum-Rock Creek complex, 5 to 15 percent slopes	3,453	0.4
155	Tekison stony loam, 0 to 25 percent slopes	1,274	0.1
156	Tieton fine sandy loam, 2 to 5 percent slopes	468	0.1
157	Tieton loam, 0 to 2 percent slopes	912	0.1
158	Tieton loam, 2 to 5 percent slopes	3,534	0.4
159	Tieton loam, 5 to 8 percent slopes	2,857	0.3
160	Tieton loam, 8 to 15 percent slopes	3,022	0.3
161	Tieton loam, 15 to 30 percent slopes	1,010	0.1
162	Tieton-Rock outcrop complex, 0 to 30 percent slopes	3,448	0.4
163	Toppenish silt loam	1,067	0.1
164	Torriorthents, steep	3,053	0.3
165	Track loam	1,382	0.2
166	Tumac very stony sandy loam, 5 to 45 percent slopes	803	0.1
167	Tumac very stony sandy loam, 45 to 65 percent slopes	460	0.1
168	Umapine silt loam, 0 to 5 percent slopes	312	*
169	Umapine silt loam, drained, 0 to 2 percent slopes	9,483	1.1
170	Umapine silt loam, drained, 2 to 5 percent slopes	284	*
171	Wanser loamy fine sand	1,672	0.2
172	Warden fine sandy loam, 0 to 2 percent slopes	3,198	0.4
173	Warden fine sandy loam, 2 to 5 percent slopes	7,013	0.8
174	Warden fine sandy loam, 5 to 8 percent slopes	2,282	0.3
175	Warden fine sandy loam, 8 to 15 percent slopes	1,311	0.1
176	Warden silt loam, 0 to 2 percent slopes	9,074	1.0
177	Warden silt loam, 2 to 5 percent slopes	31,296	3.5
178	Warden silt loam, 5 to 8 percent slopes	10,386	1.2
179	Warden silt loam, 8 to 15 percent slopes	17,972	2.0
180	Warden silt loam, 15 to 30 percent slopes	5,482	0.6
181	Weirman sandy loam, channeled	9,265	1.0
182	Weirman fine sandy loam	4,211	0.5
183	Weirman gravelly fine sandy loam	4,054	0.5
184	Weirman fine sandy loam, wet	1,119	0.1
185	Wenas silt loam	2,926	0.3
186	Willis fine sandy loam, 2 to 5 percent slopes	459	0.1
187	Willis silt loam, 2 to 5 percent slopes	10,625	1.2
188	Willis silt loam, 5 to 8 percent slopes	1,753	0.2
189	Willis silt loam, 8 to 15 percent slopes	12,101	1.4
190	Yakima silt loam	2,583	0.3
191	Zillah sandy loam	373	*
192	Zillah silt loam	2,034	0.2
193	Zillah silt loam, channeled	474	0.1
	Total	892,136	100.0

* Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

[Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. Only the soils suited to crops are listed]

Soil name and map symbol	Winter wheat		Alfalfa hay		Corn		Asparagus		Distillate mint		Apples	
	N	I	N	I	N	I	N	I	N	I	N	I
	Bu	Bu	Ton	Ton	Bu	Bu	Crate	Crate	Lb	Lb	Bu	Bu
2---------- Ashue	---	---	---	6.0	---	105	---	167	---	100	---	735
4---------- Bickleton	50	---	---	---	---	---	---	---	---	---	---	---
5---------- Bickleton	50	---	---	---	---	---	---	---	---	---	---	---
10---------- Burke	20	110	---	7.0	---	140	---	---	---	110	---	840
11---------- Burke	---	100	---	6.0	---	120	---	---	---	100	---	840
12---------- Burke	15	100	---	6.0	---	120	---	---	---	---	---	840
18, 19---------- Cleman	---	110	---	7.0	---	---	---	---	---	---	---	1,000
20---------- Cleman	---	100	---	7.0	---	---	---	---	---	---	---	950
21---------- Cleman	30	90	---	6.5	---	---	---	---	---	---	---	835
24---------- Cowiche	---	80	---	---	---	---	---	---	---	---	---	800
25---------- Cowiche	---	70	---	---	---	---	---	---	---	---	---	800
26---------- Cowiche	35	70	---	---	---	---	---	---	---	---	---	800
27---------- Cowiche	35	70	---	---	---	---	---	---	---	---	---	800
32---------- Esquatzel	---	110	---	7.5	---	130	---	250	---	105	---	1,000
33---------- Esquatzel	40	110	---	7.5	---	130	---	250	---	105	---	1,000
34---------- Fiander	---	100	---	6.0	---	125	---	---	---	100	---	---
37---------- Finley	---	90	---	7.0	---	---	---	---	---	110	---	---
38---------- Finley	---	90	---	7.0	---	---	---	---	---	110	---	---
39---------- Finley	---	90	---	6.5	---	---	---	---	---	---	---	---
40---------- Finley	---	80	---	6.5	---	---	---	---	---	---	---	---

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat		Alfalfa hay		Corn		Asparagus		Distillate mint		Apples	
	N	I	N	I	N	I	N	I	N	I	N	I
	Bu	Bu	Ton	Ton	Bu	Bu	Crate	Crate	Lb	Lb	Bu	Bu
43--Gorst	---	---	---	5.0	---	---	---	---	---	---	---	415
44--Gorst	---	---	---	4.0	---	---	---	---	---	---	---	335
45--Gorst	---	---	---	4.0	---	---	---	---	---	---	---	335
46--Harwood	30	90	---	6.0	---	---	---	---	---	---	---	835
47--Harwood	25	90	---	6.0	---	---	---	---	---	---	---	835
48--Harwood	25	75	---	5.0	---	---	---	---	---	---	---	750
49--Harwood	25	70	---	4.0	---	---	---	---	---	---	---	500
50--Harwood-Burke-Wiehl	25	95	---	7.0	---	---	---	---	---	---	---	800
51--Harwood-Burke-Wiehl	---	90	---	6.0	---	---	---	---	---	---	---	785
52--Harwood-Burke-Wiehl	20	85	---	5.0	---	---	---	---	---	---	---	735
53--Harwood-Burke-Wiehl	20	65	---	4.0	---	---	---	---	---	---	---	500
56--Harwood-Gorst	---	---	---	4.0	---	---	---	---	---	---	---	500
57--Hezel	---	100	---	7.0	---	130	---	---	---	---	---	---
58--Hezel	---	90	---	7.0	---	---	---	---	---	---	---	---
66--Kittitas	---	100	---	6.0	---	---	---	---	---	---	---	---
69--Logy	---	90	---	6.0	---	---	---	---	---	---	---	---
79, 80, 81--Mikkalo	25	---	---	---	---	---	---	---	---	---	---	---
83--Moxee	---	35	---	6.0	---	---	---	---	---	90	---	---
84--Moxee	---	---	---	5.0	---	---	---	---	---	---	---	---
85--Moxee	---	---	---	4.0	---	---	---	---	---	---	---	---
86--Naches	---	110	---	8.0	---	125	---	250	---	110	---	770
91, 92--Outlook	---	100	---	7.0	---	120	---	250	---	100	---	---

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat		Alfalfa hay		Corn		Asparagus		Distillate mint		Apples	
	N	I	N	I	N	I	N	I	N	I	N	I
	Bu	Bu	Ton	Ton	Bu	Bu	Crate	Crate	Lb	Lb	Bu	Bu
95--- Quincy	---	100	---	7.0	---	130	---	---	---	---	---	630
96--- Renslow	40	---	1.5	---	---	---	---	---	---	---	---	---
97--- Renslow	35	---	---	---	---	---	---	---	---	---	---	---
98--- Renslow	35	---	---	---	---	---	---	---	---	---	---	---
99--- Ritzville	35	100	1.5	6.0	---	---	---	---	---	---	---	950
100--- Ritzville	---	100	1.5	6.0	---	---	---	---	---	---	---	950
101--- Ritzville	35	90	1.0	5.5	---	---	---	---	---	---	---	950
102--- Ritzville	25	80	1.0	5.0	---	---	---	---	---	---	---	950
104, 105, 106--- Ritzville	30	---	---	---	---	---	---	---	---	---	---	---
107--- Ritzville Variant	30	---	---	---	---	---	---	---	---	---	---	---
111--- Roza	---	85	---	5.0	---	---	---	---	---	---	---	665
112--- Roza	---	85	---	5.0	---	---	---	---	---	---	---	665
113--- Roza	---	---	---	4.0	---	---	---	---	---	---	---	500
120, 121, 122--- Scoon	---	70	---	6.0	---	---	---	---	---	95	---	330
123--- Scoon	---	---	---	5.0	---	---	---	---	---	---	---	330
124--- Scooteney	---	75	---	8.0	---	140	---	---	---	---	---	---
125--- Scooteney	20	75	---	7.0	---	125	---	---	---	---	---	---
126--- Scooteney	20	---	---	6.0	---	---	---	---	---	---	---	---
128--- Selah	---	100	---	7.0	---	---	---	---	---	---	---	835
129--- Selah	---	90	---	6.0	---	---	---	---	---	---	---	770
130--- Selah	30	75	---	5.0	---	---	---	---	---	---	---	750
131--- Selah	25	65	---	4.0	---	---	---	---	---	---	---	500

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat		Alfalfa hay		Corn		Asparagus		Distillate mint		Apples	
	N	I	N	I	N	I	N	I	N	I	N	I
	Bu	Bu	Ton	Ton	Bu	Bu	Crate	Crate	Lb	Lb	Bu	Bu
132---------- Shano	25	110	---	8.0	---	130	---	---	---	110	---	---
133---------- Shano	---	110	---	7.0	---	130	---	---	---	110	---	---
134---------- Shano	20	100	---	7.0	---	---	---	---	---	---	---	
135---------- Shano	20	---	---	---	---	---	---	---	---	---	---	
136---------- Simcoe	30	90	---	6.0	---	---	---	---	---	---	---	750
137---------- Simcoe	20	75	---	5.0	---	---	---	---	---	---	---	500
138, 139, 140---------- Sinloc	---	90	---	7.0	---	120	---	250	---	100	---	---
141---------- Sinloc	---	85	---	6.0	---	115	---	225	---	90	---	---
142---------- Starbuck	---	55	---	---	---	---	---	---	---	---	---	---
156---------- Tieton	---	110	---	6.0	---	---	---	---	---	---	---	1,000
157---------- Tieton	---	110	---	6.0	---	---	---	---	---	---	---	1,000
158---------- Tieton	---	110	---	6.0	---	---	---	---	---	---	---	1,000
159---------- Tieton	---	110	---	6.0	---	---	---	---	---	---	---	1,000
160---------- Tieton	45	100	---	5.0	---	---	---	---	---	---	---	835
161---------- Tieton	30	90	---	5.0	---	---	---	---	---	---	---	800
163---------- Toppenish	---	110	---	7.0	---	145	---	250	---	---	---	---
165---------- Track	---	90	---	6.0	---	105	---	166	---	---	---	---
169, 170---------- Umapine	---	100	---	7.0	---	120	---	250	---	---	---	---
171---------- Wanser	---	75	---	6.0	---	95	---	---	---	---	---	---
172---------- Warden	---	120	---	8.0	---	120	---	---	---	110	---	835
173---------- Warden	20	110	---	8.0	---	115	---	---	---	90	---	835

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Winter wheat		Alfalfa hay		Corn		Asparagus		Distillate mint		Apples	
	N	I	N	I	N	I	N	I	N	I	N	I
	Bu	Bu	Ton	Ton	Bu	Bu	Crate	Crate	Lb	Lb	Bu	Bu
174---------- Warden	---	110	---	7.0	---	100	---	---	---	---	---	800
175---------- Warden	20	80	---	6.0	---	---	---	---	---	---	---	800
176---------- Warden	---	120	---	8.0	---	130	---	---	---	110	---	835
177---------- Warden	20	110	---	8.0	---	130	---	---	---	90	---	835
178---------- Warden	---	110	---	7.0	---	120	---	---	---	---	---	800
179, 180---------- Warden	20	80	---	6.0	---	---	---	---	---	---	---	800
182---------- Weirman	---	90	---	6.0	---	100	---	---	---	---	---	---
183---------- Weirman	---	75	---	6.0	---	100	---	---	---	---	---	---
185---------- Wenas	---	110	---	7.0	---	---	---	---	---	---	---	---
186---------- Willis	---	110	---	7.0	---	140	---	---	---	110	---	---
187---------- Willis	25	110	---	7.0	---	140	---	---	---	110	---	---
188, 189---------- Willis	25	100	---	6.0	---	130	---	---	---	100	---	---
190---------- Yakima	---	100	---	8.0	---	---	---	250	---	---	---	---
191---------- Zillah	---	100	---	7.0	---	140	---	250	---	---	---	---
192---------- Zillah	---	110	---	8.0	---	145	---	250	---	---	---	---

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
3---------- Bakeoven	Very Shallow, 9- to 12-inch precipitation zone----------	Favorable	500	Sandberg bluegrass----------	50
		Normal	300	Stiff sagebrush----------	30
		Unfavorable	150	Thyme eriogonum----------	5
				Bottlebrush squirreltail------	5
4, 5---------- Bickleton	Loamy Upland, 12- to 15-inch precipitation zone----------	Favorable	1,200	Bluebunch wheatgrass----------	50
		Normal	800	Idaho fescue----------	20
		Unfavorable	400	Sandberg bluegrass----------	5
				Threadleaf sedge----------	5
6---------- Bocker	Very Shallow, 18-inch precipitation zone----------	Favorable	400	Sandberg bluegrass----------	50
		Normal	300	Douglas eriogonum----------	30
		Unfavorable	200	Bottlebrush squirreltail------	5
				Biscuitroot----------	5
7*:					
Bocker----------	Very Shallow, 18-inch precipitation zone----------	Favorable	400	Sandberg bluegrass----------	50
		Normal	300	Douglas eriogonum----------	30
		Unfavorable	200	Bottlebrush squirreltail------	5
				Biscuitroot----------	5
Jumpe.					
8*:					
Bocker----------	Very Shallow, 18-inch precipitation zone----------	Favorable	400	Sandberg bluegrass----------	50
		Normal	300	Douglas eriogonum----------	30
		Unfavorable	200	Bottlebrush squirreltail------	5
				Biscuitroot----------	5
Sapkin----------	Loamy Upland, 18-inch precipitation zone----------	Favorable	1,200	Idaho fescue----------	40
		Normal	800	Bluebunch wheatgrass----------	15
		Unfavorable	500	Threetip sagebrush----------	10
				Prairie junegrass----------	5
				Bitterbrush----------	5
				Arrowleaf balsamroot----------	5
				Lupine----------	5
				Eriogonum----------	5
				Cusick bluegrass----------	5
9*:					
Bocker----------	Very Shallow, 18-inch precipitation zone----------	Favorable	400	Sandberg bluegrass----------	50
		Normal	300	Douglas eriogonum----------	30
		Unfavorable	200	Bottlebrush squirreltail------	5
				Biscuitroot----------	5
Sutkin.					
12---------- Burke	Loamy, 6- to 9-inch precipitation zone----------	Favorable	800	Bluebunch wheatgrass----------	70
		Normal	500	Sandberg bluegrass----------	10
		Unfavorable	250	Thurber needlegrass----------	5
				Carey balsamroot----------	5
				Big sagebrush----------	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
19, 20, 21--------- Cleman	Loamy Bottom----------	Favorable Normal Unfavorable	1,000 700 400	Bluebunch wheatgrass---------- Needleandthread---------- Sandberg bluegrass---------- Big sagebrush---------- Antelope bitterbrush---------- Basin wildrye----------	50 15 5 5 5 5
22---------- Clint	Shallow, 15- to 18-inch precipitation zone----------	Favorable Normal Unfavorable	1,000 550 300	Bluebunch wheatgrass---------- Idaho fescue---------- Sandberg bluegrass---------- Antelope bitterbrush---------- Threetip sagebrush---------- Biscuitroot----------	45 15 10 5 5 5
23*: Clint----------	Shallow, 15- to 18-inch precipitation zone----------	Favorable Normal Unfavorable	1,000 550 300	Bluebunch wheatgrass---------- Idaho fescue---------- Sandberg bluegrass---------- Antelope bitterbrush---------- Threetip sagebrush---------- Biscuitroot----------	45 15 10 5 5 5
Rubble land.					
26, 27---------- Cowiche	Loamy Upland, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	1,200 800 400	Bluebunch wheatgrass---------- Idaho fescue---------- Balsamroot---------- Lupine---------- Sandberg bluegrass----------	50 15 5 5 5
28*: Cowiche----------	Loamy Upland, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	1,200 800 400	Bluebunch wheatgrass---------- Idaho fescue---------- Balsamroot---------- Lupine---------- Sandberg bluegrass----------	50 15 5 5 5
Rock Creek---------	Very Shallow, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	300 200 100	Sandberg bluegrass---------- Stiff sagebrush---------- Eriogonum----------	40 40 10
30---------- Darland	Loamy, 18-inch precipitation zone----------	Favorable Normal Unfavorable	1,500 1,000 600	Idaho fescue---------- Cusick bluegrass---------- Elk sedge---------- Mountain brome---------- Arrowleaf balsamroot---------- Antelope bitterbrush----------	40 15 10 10 5 5
31*: Darland----------	Loamy, 18-inch precipitation zone----------	Favorable Normal Unfavorable	1,500 1,000 600	Idaho fescue---------- Cusick bluegrass---------- Elk sedge---------- Mountain brome---------- Arrowleaf balsamroot---------- Antelope bitterbrush----------	40 15 10 10 5 5
Rubble land.					

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
33---------- Esquatzel	Loamy Bottom----------	Favorable	2,000	Bluebunch wheatgrass----------	45
		Normal	1,400	Basin wildrye----------	25
		Unfavorable	700	Sandberg bluegrass----------	5
				Thurber needlegrass----------	5
34---------- Flander	Alkali----------	Favorable	2,200	Basin wildrye----------	55
		Normal	1,500	Inland saltgrass----------	20
		Unfavorable	800	Black greasewood----------	10
				Alkali bluegrass----------	5
				Alkali cordgrass----------	5
35---------- Finley	Sandy Loam, 6- to 9-inch precipitation zone----------	Favorable	800	Bluebunch wheatgrass----------	45
		Normal	600	Needleandthread----------	20
		Unfavorable	300	Thurber needlegrass----------	10
				Sandberg bluegrass----------	5
				Big sagebrush----------	5
36---------- Finley	Sandy Loam, 6- to 9-inch precipitation zone----------	Favorable	800	Bluebunch wheatgrass----------	45
		Normal	600	Needleandthread----------	20
		Unfavorable	400	Thurber needlegrass----------	5
				Sandberg bluegrass----------	5
				Big sagebrush----------	5
41---------- Gorskel	Very Shallow, 9- to 12-inch precipitation zone----------	Favorable	300	Sandberg bluegrass----------	40
		Normal	200	Stiff sagebrush----------	40
		Unfavorable	100	Eriogonum----------	10
42*: Gorskel----------	Very Shallow, 9- to 12-inch precipitation zone----------	Favorable	300	Sandberg bluegrass----------	40
		Normal	200	Stiff sagebrush----------	40
		Unfavorable	100	Eriogonum----------	10
Harwood----------	Loamy, 9- to 12-inch precipitation zone----------	Favorable	1,200	Bluebunch wheatgrass----------	60
		Normal	800	Cusick bluegrass----------	5
		Unfavorable	300	Sandberg bluegrass----------	5
				Big sagebrush----------	5
				Antelope bitterbrush----------	5
43, 44, 45--------- Gorst	Shallow, 9- to 12-inch precipitation zone----------	Favorable	600	Bluebunch wheatgrass----------	55
		Normal	450	Thurber needlegrass----------	10
		Unfavorable	300	Sandberg bluegrass----------	5
				Eriogonum----------	5
				Antelope bitterbrush----------	5
				Big sagebrush----------	5
46, 47, 48, 49----- Harwood	Loamy, 9- to 12-inch precipitation zone----------	Favorable	1,200	Bluebunch wheatgrass----------	60
		Normal	800	Cusick bluegrass----------	5
		Unfavorable	300	Sandberg bluegrass----------	5
				Big sagebrush----------	5
				Antelope bitterbrush----------	5
50*, 51*, 52*, 53*, 54*: Harwood----------	Loamy, 9- to 12-inch precipitation zone----------	Favorable	1,200	Bluebunch wheatgrass----------	60
		Normal	800	Cusick bluegrass----------	5
		Unfavorable	300	Sandberg bluegrass----------	5
				Big sagebrush----------	5
				Antelope bitterbrush----------	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
50*, 51*, 52*, 53*, 54*:					
Burke	Loamy, 6- to 9-inch precipitation zone	Favorable	800	Bluebunch wheatgrass	70
		Normal	500	Sandberg bluegrass	10
		Unfavorable	250	Thurber needlegrass	5
				Carey balsamroot	5
				Big sagebrush	5
Wiehl	Loamy, 6- to 9-inch precipitation zone	Favorable	800	Bluebunch wheatgrass	45
		Normal	600	Needleandthread	20
		Unfavorable	300	Sandberg bluegrass	5
				Big sagebrush	5
55*:					
Harwood	Loamy, 9- to 12-inch precipitation zone	Favorable	600	Bluebunch wheatgrass	60
		Normal	450	Cusick bluegrass	5
		Unfavorable	300	Sandberg bluegrass	5
				Big sagebrush	5
				Antelope bitterbrush	5
Burke	Loamy, 6- to 9-inch precipitation zone	Favorable	500	Bluebunch wheatgrass	70
		Normal	350	Sandberg bluegrass	10
		Unfavorable	250	Thurber needlegrass	5
				Carey balsamroot	5
				Big sagebrush	5
Wiehl	Loamy, 6- to 9-inch precipitation zone	Favorable	500	Bluebunch wheatgrass	50
		Normal	350	Needleandthread	20
		Unfavorable	200	Sandberg bluegrass	5
				Big sagebrush	5
56*:					
Harwood	Loamy, 9- to 12-inch precipitation zone	Favorable	1,200	Bluebunch wheatgrass	60
		Normal	800	Cusick bluegrass	5
		Unfavorable	300	Sandberg bluegrass	5
				Big sagebrush	5
				Antelope bitterbrush	5
Gorst	Shallow, 9- to 12-inch precipitation zone	Favorable	600	Bluebunch wheatgrass	55
		Normal	450	Thurber needlegrass	10
		Unfavorable	300	Sandberg bluegrass	5
				Eriogonum	5
				Antelope bitterbrush	5
				Big sagebrush	5
58 Hezel	Sandy, 6- to 9-inch precipitation zone	Favorable	700	Needleandthread	65
		Normal	500	Sandberg bluegrass	5
		Unfavorable	250	Bluebunch wheatgrass	5
				Big sagebrush	5
				Indian ricegrass	5
65 Kiona	Loamy, 6- to 9-inch precipitation zone	Favorable	700	Bluebunch wheatgrass	65
		Normal	550	Sandberg bluegrass	10
		Unfavorable	300	Thurber needlegrass	10
				Big sagebrush	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
67---------- Lickskillet	Shallow, 9- to 12-inch precipitation zone----------	Favorable	700	Bluebunch wheatgrass----------	60
		Normal	500	Sandberg bluegrass----------	10
		Unfavorable	200	Arrowleaf balsamroot----------	5
				Lomatium----------	5
				Big sagebrush----------	5
				Silky lupine----------	5
				Thruber needlegrass----------	5
68---------- Lickskillet	Shallow, 9- to 12-inch precipitation zone----------	Favorable	700	Bluebunch wheatgrass----------	65
		Normal	500	Sandberg bluegrass----------	15
		Unfavorable	200	Big sagebrush----------	5
70---------- Logy	Loamy Bottom----------	Favorable	2,000	Bluebunch wheatgrass----------	55
		Normal	1,400	Basin wildrye----------	10
		Unfavorable	700	Sandberg bluegrass----------	10
74, 75---------- McDaniel	North Exposure, 15- to 18-inch precipitation zone----------	Favorable	1,300	Bluebunch wheatgrass----------	40
		Normal	900	Idaho fescue----------	20
		Unfavorable	400	Sandberg bluegrass----------	5
				Lupine----------	5
				Threetip sagebrush----------	5
				Biscuitroot----------	5
				Arrowleaf balsamroot----------	5
				Antelope bitterbrush----------	5
				Cusick bluegrass----------	5
76*:					
McDaniel----------	North Exposure, 15- to 18-inch precipitation zone----------	Favorable	1,300	Bluebunch wheatgrass----------	40
		Normal	900	Idaho fescue----------	20
		Unfavorable	400	Sandberg bluegrass----------	5
				Lupine----------	5
				Threetip sagebrush----------	5
				Biscuitroot----------	5
				Arrowleaf balsamroot----------	5
				Antelope bitterbrush----------	5
				Cusick bluegrass----------	5
Rock Creek--------	Very Shallow, 12- to 18-inch precipitation zone----------	Favorable	300	Sandberg bluegrass----------	40
		Normal	200	Stiff sagebrush----------	40
		Unfavorable	100	Eriogonum----------	10
79, 80, 81--------- Mikkalo	Loamy, 9- to 12-inch precipitation zone----------	Favorable	850	Bluebunch wheatgrass----------	50
		Normal	700	Cusick bluegrass----------	10
		Unfavorable	350	Big sagebrush----------	10
				Sandberg bluegrass----------	5
83, 85---------- Moxee	Shallow, 9- to 12-inch precipitation zone----------	Favorable	600	Bluebunch wheatgrass----------	65
		Normal	450	Sandberg bluegrass----------	10
		Unfavorable	300	Thurber needlegrass----------	10
				Big sagebrush----------	5
94---------- Prosser	Loamy, 6- to 9-inch precipitation zone----------	Favorable	800	Bluebunch wheatgrass----------	65
		Normal	500	Sandberg bluegrass----------	10
		Unfavorable	300	Thurber needlegrass----------	5
				Carey balsamroot----------	5
				Big sagebrush----------	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
96, 97, 98--------- Renslow	Loamy, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	1,300 900 400	Bluebunch wheatgrass---------- Idaho fescue---------- Sandberg bluegrass---------- Big sagebrush----------	50 15 10 5
99, 100, 101, 102, 103, 104, 105, 106---------- Ritzville	Loamy, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	1,200 800 300	Bluebunch wheatgrass---------- Idaho fescue---------- Sandberg bluegrass---------- Threadleaf sedge---------- Big sagebrush----------	55 15 5 5 5
107, 108---------- Ritzville Variant	Loamy, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	1,100 700 200	Bluebunch wheatgrass---------- Idaho fescue---------- Sandberg bluegrass---------- Threadleaf sedge---------- Big sagebrush----------	55 15 5 5 5
109---------- Rock Creek	Very Shallow, 12- to 18-inch precipitation zone----------	Favorable Normal Unfavorable	300 200 100	Sandberg bluegrass---------- Stiff sagebrush---------- Eriogonum----------	40 40 10
110*: Rock Creek-------- Very Shallow, 12- to 18-inch precipitation zone----------		Favorable Normal Unfavorable	300 200 100	Sandberg bluegrass---------- Stiff sagebrush---------- Eriogonum----------	40 40 10
Clint---------- Shallow, 15- to 18-inch precipitation zone----------		Favorable Normal Unfavorable	1,000 550 300	Bluebunch wheatgrass---------- Idaho fescue---------- Sandberg bluegrass---------- Antelope bitterbrush---------- Threetip sagebrush---------- Biscuitroot----------	45 15 10 5 5 5
Simcoe---------- Loamy, 9- to 12-inch precipitation zone----------		Favorable Normal Unfavorable	1,200 800 300	Bluebunch wheatgrass---------- Cusick bluegrass---------- Sandberg bluegrass---------- Big sagebrush---------- Antelope bitterbrush----------	60 5 5 5 5
112, 113, 114------ Roza	Clay Loam, 9- to 12-inch precipitation zone----------	Favorable Normal Unfavorable	1,000 700 500	Bluebunch wheatgrass---------- Spiny hopsage---------- Cusick bluegrass---------- Big sagebrush---------- Sandberg bluegrass----------	50 12 10 8 6
116. 117---------- Sapkin	Loamy, 18-inch precipitation zone----------	Favorable Normal Unfavorable	1,200 800 500	Idaho fescue---------- Bluebunch wheatgrass---------- Threetip sagebrush---------- Prairie junegrass---------- Bitterbrush---------- Arrowleaf balsamroot---------- Lupine---------- Eriogonum---------- Cusick bluegrass----------	40 15 10 5 5 5 5 5 5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
118*:					
Sapkin	Loamy, 18-inch precipitation zone	Favorable	1,200	Idaho fescue	40
		Normal	800	Bluebunch wheatgrass	15
		Unfavorable	500	Threetip sagebrush	10
				Prairie junegrass	5
				Bitterbrush	5
				Arrowleaf balsamroot	5
				Lupine	5
				Eriogonum	5
				Cusick bluegrass	5
Rubble land.					
120, 121, 122, 123-Scoon	Shallow, 6- to 9-inch precipitation zone	Favorable	500	Bluebunch wheatgrass	65
		Normal	350	Sandberg bluegrass	10
		Unfavorable	200	Thurber needlegrass	5
				Big sagebrush	5
125, 126-Scooteney	Loamy, 6- to 9-inch precipitation zone	Favorable	800	Bluebunch wheatgrass	60
		Normal	500	Sandberg bluegrass	10
		Unfavorable	250	Thurber needlegrass	10
				Carey balsamroot	5
				Big sagebrush	5
127-Scooteney	Shallow, 6- to 9-inch precipitation zone	Favorable	500	Bluebunch wheatgrass	60
		Normal	350	Sandberg bluegrass	10
		Unfavorable	200	Thurber needlegrass	10
130, 131-Selah	Loamy, 9- to 12-inch precipitation zone	Favorable	800	Bluebunch wheatgrass	55
		Normal	500	Big sagebrush	10
		Unfavorable	250	Sandberg bluegrass	5
				Antelope bitterbrush	5
				Needleandthread	5
				Thurber needlegrass	5
132, 133, 134, 135-Shano	Loamy, 6- to 9-inch precipitation zone	Favorable	650	Bluebunch wheatgrass	60
		Normal	500	Sandberg bluegrass	10
		Unfavorable	200	Big sagebrush	10
				Needleandthread	5
136, 137-Simcoe	Loamy, 9- to 12-inch precipitation zone	Favorable	1,200	Bluebunch wheatgrass	60
		Normal	800	Cusick bluegrass	5
		Unfavorable	300	Sandberg bluegrass	5
				Big sagebrush	5
				Antelope bitterbrush	5
142-Starbuck	Shallow, 6- to 9-inch precipitation zone	Favorable	500	Bluebunch wheatgrass	65
		Normal	350	Sandberg bluegrass	10
		Unfavorable	200	Big sagebrush	5
				Thurber needlegrass	5
143*, 144*:					
Starbuck	Shallow, 6- to 9-inch precipitation zone	Favorable	500	Bluebunch wheatgrass	65
		Normal	350	Sandberg bluegrass	10
		Unfavorable	200	Big sagebrush	5
				Thurber needlegrass	5
Rock outcrop.					

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
151, 152, 153----- Taneum	Loamy, 15- to 18-inch precipitation zone----------	Favorable	1,000	Bluebunch wheatgrass----------	45
		Normal	700	Idaho fescue----------	15
		Unfavorable	400	Sandberg bluegrass----------	5
				Cusick bluegrass----------	5
				Threetip sagebrush----------	5
				Antelope bitterbrush----------	5
				Big sagebrush----------	5
				Arrowleaf balsamroot----------	5
154*:					
Taneum----------	Loamy, 15- to 18-inch precipitation zone----------	Favorable	1,000	Bluebunch wheatgrass----------	45
		Normal	700	Idaho fescue----------	15
		Unfavorable	400	Sandberg bluegrass----------	5
				Cusick bluegrass----------	5
				Threetip sagebrush----------	5
				Antelope bitterbrush----------	5
				Big sagebrush----------	5
				Arrowleaf balsamroot----------	5
Rock Creek--------	Very Shallow, 15- to 18-inch precipitation zone----------	Favorable	300	Sandberg bluegrass----------	40
		Normal	200	Stiff sagebrush----------	40
		Unfavorable	100	Eriogonum----------	10
160, 161---------- Tieton	Loamy Upland, 12- to 15-inch precipitation zone----------	Favorable	1,200	Bluebunch wheatgrass----------	50
		Normal	800	Idaho fescue----------	15
		Unfavorable	400	Cusick bluegrass----------	5
				Sandberg bluegrass----------	5
				Big sagebrush----------	5
				Antelope bitterbrush----------	5
162*:					
Tieton----------	Loamy Upland, 12- to 15-inch precipitation zone----------	Favorable	1,200	Bluebunch wheatgrass----------	50
		Normal	800	Idaho fescue----------	15
		Unfavorable	400	Cusick bluegrass----------	5
				Sandberg bluegrass----------	5
				Big sagebrush----------	5
				Antelope bitterbrush----------	5
Rock outcrop.					
168---------- Umapine	Alkali----------	Favorable	2,200	Basin wildrye----------	65
		Normal	1,500	Inland saltgrass----------	20
		Unfavorable	800	Black greasewood----------	5
				Alkali cordgrass----------	5
173, 174, 175------ Warden	Sandy Loam, 6- to 9-inch precipitation zone----------	Favorable	650	Bluebunch wheatgrass----------	35
		Normal	500	Needleandthread----------	30
		Unfavorable	200	Big sagebrush----------	10
				Sandberg bluegrass----------	5
				Indian ricegrass----------	5
177, 178, 179, 180- Warden	Loamy, 6- to 9-inch precipitation zone----------	Favorable	650	Bluebunch wheatgrass----------	60
		Normal	500	Sandberg bluegrass----------	10
		Unfavorable	200	Big sagebrush----------	10
181---------- Weirman	Loamy Bottom----------	Favorable	1,500	Bluebunch wheatgrass----------	40
		Normal	1,000	Basin wildrye----------	20
		Unfavorable	500	Big sagebrush----------	5
				Willow----------	5
				Big bluegrass----------	5

See footnote at end of table.

TABLE 6.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Soil name and map symbol	Range site name	Total production		Characteristic vegetation	Composition
		Kind of year	Dry weight		
			Lb/acre		Pct
187. 188, 189---------- Willis	Loamy, 9- to 12-inch precipitation zone----------	Favorable	800	Bluebunch wheatgrass----------	55
		Normal	500	Sandberg bluegrass----------	15
		Unfavorable	300	Big sagebrush----------	5
				Thurber needlegrass----------	5
193---------- Zillah	Loamy Bottom----------	Favorable	2,000	Basin wildrye----------	40
		Normal	1,500	Tufted hairgrass----------	20
		Unfavorable	700	Sedge----------	10
				Willow----------	5
				Big sagebrush----------	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
7*: Bocker.								
Jumpe	3f	Moderate	Moderate	Slight	Moderate	Ponderosa pine Douglas-fir	67 80	Ponderosa pine, Douglas-fir.
9*: Bocker.								
Sutkin	3f	Moderate	Moderate	Slight	Moderate	Ponderosa pine Douglas-fir	67 81	Ponderosa pine, Douglas-fir.
13--- Carmack	5a	Moderate	Moderate	Slight	Moderate	Douglas-fir Ponderosa pine Western larch Grand fir	105 82 --- ---	Douglas-fir, ponderosa pine.
14--- Carmack	4r	Severe	Moderate	Slight	Moderate	Douglas-fir Ponderosa pine	87 77	Douglas-fir, ponderosa pine.
15, 16--- Carmack	6r	Severe	Moderate	Slight	Moderate	Douglas-fir Ponderosa pine Grand fir Western larch	93 81 --- ---	Douglas-fir, ponderosa pine.
17*: Carmack	3x	Severe	Moderate	Slight	Moderate	Ponderosa pine Douglas-fir	77 87	Ponderosa pine.
Rock outcrop.								
59*: Jumpe	3f	Moderate	Moderate	Slight	Moderate	Douglas-fir Ponderosa pine Grand fir Western larch	80 67 73 59	Douglas-fir, ponderosa pine.
60--- Jumpe	4r	Moderate	Moderate	Slight	Moderate	Douglas-fir Ponderosa pine Grand fir Western larch Lodgepole pine	86 64 73 --- ---	Douglas-fir, ponderosa pine.
61--- Jumpe	3r	Severe	Moderate	Slight	Moderate	Douglas-fir Ponderosa pine Grand fir Western larch	86 64 73 49	Douglas-fir, ponderosa pine.
62--- Jumpe	4r	Severe	Moderate	Slight	Moderate	Douglas-fir Grand fir Engelmann spruce Subalpine fir Western larch Lodgepole pine	75 73 --- --- 49 68	Douglas-fir, grand fir, subalpine fir.
63--- Jumpe	4r	Severe	Moderate	Slight	Moderate	Douglas-fir Grand fir Engelmann spruce Subalpine fir Western larch Lodgepole pine	75 73 --- --- 49 68	Douglas-fir, grand fir, subalpine fir.

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
64*:								
Jumpe	4r	Severe	Moderate	Slight	Moderate	Douglas-fir	75	Douglas-fir, grand fir, subalpine fir.
						Grand fir	73	
						Engelmann spruce	---	
						Subalpine fir	---	
						Western larch	49	
						Lodgepole pine	68	
Rock outcrop.								
71	2f	Moderate	Moderate	Slight	Moderate	Ponderosa pine	75	Ponderosa pine, Douglas-fir.
Loneridge						Douglas-fir	86	
						Western larch	61	
						Grand fir	---	
72	4r	Severe	Moderate	Slight	Moderate	Ponderosa pine	80	Ponderosa pine, Douglas-fir.
Loneridge						Douglas-fir	92	
						Grand fir	90	
						Lodgepole pine	---	
						Western larch	---	
73	5r	Severe	Moderate	Slight	Moderate	Douglas-fir	96	Douglas-fir, ponderosa pine.
Loneridge						Ponderosa pine	80	
77	3a	Moderate	Moderate	Slight	Moderate	Ponderosa pine	63	Ponderosa pine.
Meystre						Douglas-fir	74	
						Oregon white oak	---	
78	3r	Severe	Moderate	Slight	Moderate	Ponderosa pine	63	Ponderosa pine.
Meystre						Douglas-fir	74	
82	7f	Moderate	Moderate	Slight	Moderate	Ponderosa pine	108	Ponderosa pine, Douglas-fir.
Mippon						Douglas-fir	113	
						Grand fir	107	
						Western larch	---	
						Lodgepole pine	87	
						Engelmann spruce	---	
87	5f	Moderate	Moderate	Slight	Moderate	Subalpine fir	68	Subalpine fir, lodgepole pine.
Naxing						Lodgepole pine	70	
						Engelmann spruce	74	
						Western larch	55	
						Whitebark pine	---	
88	4f	Moderate	Moderate	Slight	Moderate	Western larch	52	Subalpine fir, western larch.
Naxing						Subalpine fir	75	
						Lodgepole pine	85	
						Grand fir	81	
						Engelmann spruce	74	
						White bark pine	---	
89	4r	Severe	Moderate	Slight	Moderate	Subalpine fir	59	Subalpine fir, Engelmann spruce.
Naxing						Engelmann spruce	74	
						Western larch	52	
						Whitebark pine	---	
						Douglas-fir	---	
						Grand fir	---	
90	3a	Moderate	Moderate	Slight	Moderate	Ponderosa pine	75	Ponderosa pine.
Odo						Douglas-fir	96	
						White oak	---	
						Rocky Mountain maple	---	
119	3d	Moderate	Moderate	Moderate	Slight	Subalpine fir	74	Subalpine fir.
Saydab						Western larch	49	
						Whitebark pine	---	
						Lodgepole pine	87	
						Engelmann spruce	---	

See footnote at end of table.

TABLE 7.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	
145---------- Sutkin	3f	Moderate	Moderate	Slight	Moderate	Ponderosa pine------	67	Ponderosa pine, Douglas-fir.
						Douglas-fir---------	81	
146---------- Sutkin	3f	Moderate	Moderate	Slight	Moderate	Ponderosa pine------	67	Ponderosa pine, Douglas-fir.
						Douglas-fir---------	81	
						Western larch-------	---	
						Oregon white oak----	---	
147---------- Sutkin	3r	Severe	Moderate	Slight	Moderate	Ponderosa pine------	67	Ponderosa pine, Douglas-fir.
						Douglas-fir---------	81	
						Oregon white oak----	---	
						Western larch-------	---	
						Grand fir-----------	---	
148---------- Sutkin	2r	Severe	Severe	Slight	Severe	Ponderosa pine------	49	Ponderosa pine.
						Douglas-fir---------	65	
						Oregon white oak----	---	
149*: Sutkin----------	3r	Severe	Moderate	Slight	Moderate	Ponderosa pine------	67	Ponderosa pine.
						Douglas-fir---------	81	
Rock outcrop.								
150---------- Sutkin Variant	2f	Moderate	Moderate	Slight	Moderate	Ponderosa pine------	70	Ponderosa pine.
155---------- Tekison	4f	Slight	Moderate	Slight	Moderate	Ponderosa pine------	69	Ponderosa pine.
						Douglas-fir---------	80	
166---------- Tumac	5x	Moderate	Slight	Slight	Moderate	Lodgepole pine------	90	Douglas-fir, ponderosa pine, grand fir, lodgepole pine.
						Grand fir-----------	87	
						Douglas-fir---------	88	
						Ponderosa pine------	73	
						Western larch-------	---	
						Engelmann spruce----	---	
						Subalpine fir-------	---	
167---------- Tumac	5r	Severe	Slight	Slight	Moderate	Lodgepole pine------	90	Douglas-fir, ponderosa pine, grand fir, lodgepole pine.
						Grand fir-----------	87	
						Douglas-fir---------	88	
						Ponderosa pine------	73	
						Western larch-------	---	
						Engelmann spruce----	---	
						Subalpine fir-------	---	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION

[Only the soils suitable for production of commercial trees are listed]

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
7*: Bocker.				
Jumpe	Favorable	500	Elk sedge	30
	Normal	300	Pinegrass	20
	Unfavorable	100	Pinemat manzanita	15
			Ceanothus	15
			Bitterbrush	5
			Lupine	5
			Snowberry	5
9*: Bocker.				
Sutkin	Favorable	500	Pinegrass	25
	Normal	350	Elk sedge	20
	Unfavorable	200		
13 Carmack	Favorable	450	Pinegrass	20
	Normal	250	Elk sedge	15
	Unfavorable	100	Bitterbrush	15
			Lupine	10
			American vetch	5
			Spirea	5
			Western yarrow	5
			Oregon-grape	5
			Fescue	5
			Common snowberry	5
			Creambush oceanspray	5
			Bluebunch wheatgrass	5
14 Carmack	Favorable	800	Pinegrass	20
	Normal	500	Elk sedge	15
	Unfavorable	200	Bitterbrush	15
			Lupine	10
			Spirea	5
			Western yarrow	5
			Oregon-grape	5
			Common snowberry	5
			Creambush oceanspray	5
			Bluebunch wheatgrass	5
			Fescue	5
			American vetch	5
15, 16 Carmack	Favorable	350	Elk sedge	30
	Normal	250	Pinegrass	30
	Unfavorable	100	Ceanothus	5
			Lupine	5
			Spirea	5
			Western yarrow	5
			Oregon-grape	5
			Common snowberry	5
			American vetch	5
			Antelope bitterbrush	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
17*:				
Carmack	Favorable	450	Pinegrass	20
	Normal	250	Elk sedge	15
	Unfavorable	100	Bitterbrush	15
			Lupine	10
			American vetch	5
			Spirea	5
			Western yarrow	5
			Oregon-grape	5
			Fescue	5
			Common snowberry	5
			Creambush oceanspray	5
			Bluebunch wheatgrass	5
Rock outcrop.				
59, 60, 61	Favorable	500	Elk sedge	30
Jumpe	Normal	300	Pinegrass	20
	Unfavorable	100	Pinemat manzanita	15
			Ceanothus	15
			Bitterbrush	5
			Lupine	5
			Snowberry	5
62, 63	Favorable	300	Elk sedge	30
Jumpe	Normal	150	Pinegrass	30
	Unfavorable	50	Lupine	10
			Ceanothus	10
			Spirea	10
			Pinemat manzanita	5
64*:				
Jumpe	Favorable	250	Elk sedge	20
	Normal	150	Pinegrass	15
	Unfavorable	50	Eriogonum	15
			Lupine	10
			Ceanothus	10
			Spirea	10
			Pinemat manzanita	10
			Pachystima	5
Rock outcrop.				
71, 72	Favorable	400	Pinegrass	25
Loneridge	Normal	200	Elk sedge	20
	Unfavorable	50	Ceanothus	10
			Lupine	5
			Oregon-grape	5
			Yarrow	5
			Spirea	5
			Oceanspray	5
			Bitterbrush	5
			Pinemat manzanita	5
			Common snowberry	5
73	Favorable	350	Elk sedge	35
Loneridge	Normal	200	Pinegrass	25
	Unfavorable	50	Oregon-grape	10
			Lupine	5
			Spirea	5
			Oceanspray	5
			Pinemat manzanita	5
			Common snowberry	5
			Penstemon	5

See footnote at end of table.

TABLE 3.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
77, 78----------	Favorable	350	Elk sedge----------	20
Meystre	Normal	200	Pinegrass----------	15
	Unfavorable	50	Pinegrass----------	15
			Idaho fescue----------	10
			Antelope bitterbrush----------	5
			Oregon-grape----------	5
			Spirea----------	5
			Common snowberry----------	5
			Ceanothus----------	5
82----------	Favorable	250	Blackberry----------	15
Mippon	Normal	100	Elk sedge----------	15
	Unfavorable	50	Common snowberry----------	15
			Oceanspray----------	10
			Yarrow----------	10
			Spirea----------	5
			Pinegrass----------	5
			Idaho fescue----------	5
			Currant----------	5
			Alder----------	5
			Elderberry----------	5
			Rose----------	---
			Redosier dogwood----------	---
			Oregon-grape----------	---
87, 88, 89----------	Favorable	200	Elk sedge----------	10
Naxing	Normal	100	Dwarf huckleberry----------	10
	Unfavorable	50	Arnica----------	10
			Huckleberry----------	5
			Jacobs-ladder----------	5
			Pinegrass----------	5
			Lupine----------	5
			Western yarrow----------	5
			Vetch----------	5
			Currant----------	5
			Pachystima----------	5
			Pinemat manzanita----------	5
			Strawberry----------	5
			Rusty menziesia----------	5
90----------	Favorable	300	Pinegrass----------	20
Odo	Normal	200	Elk sedge----------	15
	Unfavorable	100	Oregon white oak----------	10
			Bitterbrush----------	10
			Common snowberry----------	10
			Bluebunch wheatgrass----------	5
			Rose----------	5
			Spirea----------	5
			Serviceberry----------	5
			Oceanspray----------	5
			Yarrow----------	5
			Snowbrush ceanothus----------	5
119----------	Favorable	300	Elk sedge----------	20
Saydab	Normal	175	Currant----------	10
	Unfavorable	50	Dwarf huckleberry----------	10
			Bluebunch wheatgrass----------	10
			Sagebrush----------	5
			Vetch----------	5
			Yarrow----------	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
145, 146, 147------	Favorable	500	Pinegrass----------	25
Sutkin	Normal	350	Elk sedge----------	20
	Unfavorable	200	Lupine----------	10
			Bitterbrush----------	5
			Common snowberry----------	5
			Ceanothus----------	5
			Arrowleaf balsamroot----------	5
			Idaho fescue----------	5
			Yarrow----------	5
			Bluebunch wheatgrass----------	5
			Bottlebrush squirreltail----------	5
			Oregon-grape----------	---
			Oregon white oak----------	---
			Pinemat manzanita----------	---
			American vetch----------	---
148----------	Favorable	500	Pinegrass----------	25
Sutkin	Normal	300	Elk sedge----------	15
	Unfavorable	100	Bitterbrush----------	10
			Common snowberry----------	5
			Ceanothus----------	5
			Oregon-grape----------	5
			Arrowleaf balsamroot----------	5
			Idaho fescue----------	5
			Yarrow----------	5
			Oregon white oak----------	5
			Pinemat manzanita----------	5
			American vetch----------	5
			Oceanspray----------	5
149*:				
Sutkin----------	Favorable	500	Pinegrass----------	25
	Normal	350	Elk sedge----------	20
	Unfavorable	200	Lupine----------	10
			Bitterbrush----------	5
			Common snowberry----------	5
			Ceanothus----------	5
			Arrowleaf balsamroot----------	5
			Idaho fescue----------	5
			Yarrow----------	5
			Bluebunch wheatgrass----------	5
			Bottlebrush squirreltail----------	5
			Oregon-grape----------	---
			Oregon white oak----------	---
			Pinemat manzanita----------	---
			American vetch----------	---
Rock outcrop.				
150----------	Favorable	200	Elk sedge----------	25
Sutkin Variant	Normal	100	Pinegrass----------	20
	Unfavorable	50	Ceanothus----------	15
			Common snowberry----------	10
			Lupine----------	10
			Oregon-grape----------	5
			Oregon white oak----------	5
			American vetch----------	5
			Idaho fescue----------	5

See footnote at end of table.

TABLE 8.--WOODLAND UNDERSTORY VEGETATION--Continued

Soil name and map symbol	Total production		Characteristic vegetation	Composition
	Kind of year	Dry weight		
		Lb/acre		Pct
155---------- Tekison	Favorable	200	Elk sedge----------	25
	Normal	100	Pinegrass----------	20
	Unfavorable	50	Bitterbrush----------	5
			Arrowleaf balsamroot----------	5
			Bluebunch wheatgrass----------	5
			Oregon-grape----------	5
			Lupine----------	5
			Bluegrass----------	5
			Serviceberry----------	5
			Oceanspray----------	5
			Currant----------	5
			Western Yarrow----------	5
166, 167---------- Tumac	Favorable	500	Elk sedge----------	25
	Normal	300	Pinegrass----------	10
	Unfavorable	100	Fescue----------	5
			Bluegrass----------	5
			Hawkweed----------	5
			Western yarrow----------	5
			Lupine----------	5
			Pachystima----------	5
			Spirea----------	5
			Strawberry----------	5
			Creambush oceanspray----------	5
			Ceanothus----------	5
			Oregon-grape----------	5
			Tufted hairgrass----------	5
			Princes pine----------	5

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS

[The symbol < means less than; > means more than. Absence of an entry indicates that trees generally do not grow to the given height on that soil. Only the soils suited to windbreaks and environmental plantings are listed]

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
2---------- Ashue	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Blue spruce, Rocky Mountain juniper, northern white-cedar.	Russian-olive, golden willow.	Green ash, Lombardy poplar, Austrian pine.
4, 5---------- Bickleton	Peking cotoneaster	Rocky Mountain juniper, Siberian peashrub, lilac, honeysuckle, blue spruce.	Green ash, Russian-olive, Austrian pine.	Black locust, Scotch pine, ponderosa pine.	---
10, 11, 12-------- Burke	---	Siberian peashrub, honeysuckle.	Lilac, blue spruce, northern white-cedar, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
18, 19, 20, 21---- Cleman	---	Honeysuckle, Siberian peashrub.	Blue spruce, northern white-cedar, Rocky Mountain juniper, lilac.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
24, 25, 26, 27---- Cowiche	---	Siberian peashrub, lilac, honeysuckle.	Rocky Mountain juniper, blue spruce, northern white-cedar.	Russian-olive, golden willow.	Green ash, Lombardy poplar, Austrian pine.
28*: Cowiche----------	Lilac, honeysuckle, Nanking cherry.	Siberian peashrub, Russian-olive, Rocky Mountain juniper.	Scotch pine, ponderosa pine.	Black locust------	---
Rock Creek.					
32, 33---------- Esquatzel	Peking cotoneaster	Siberian peashrub, honeysuckle.	Lilac, blue spruce, northern white-cedar, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
34---------- Flander	---	Lilac----------	Russian-olive, Rocky Mountain juniper.	Golden willow-----	Lombardy poplar, green ash.
37, 38, 39, 40---- Finley	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Rocky Mountain juniper, blue spruce, northern white-cedar.	Russian-olive-----	Austrian pine, Lombardy poplar, green ash.
42*: Gorskel.					
Harwood----------	Lilac, honeylocust, Nanking cherry.	Siberian peashrub, Russian-olive, Rocky Mountain juniper.	Scotch pine, ponderosa pine.	Black locust------	---

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
43, 44, 45-------- Gorst	---	Siberian peashrub, lilac, honeysuckle.	Rocky Mountain juniper, blue spruce, northern white-cedar.	Russian-olive, golden willow.	---
46, 47, 48, 49---- Harwood	---	Siberian peashrub, Nanking cherry, northern white-cedar, multiflora rose.	Russian-olive-----	Austrian pine, ponderosa pine, Scotch pine, Douglas-fir, green ash, blue spruce.	Lombardy poplar.
50*, 51*, 52*, 53*: Harwood---------	---	Siberian peashrub, Nanking cherry, northern white-cedar, multiflora rose.	Russian-olive-----	Austrian pine, ponderosa pine, Scotch pine, Douglas-fir, green ash, blue spruce.	Lombardy poplar.
Burke-----------	---	Siberian peashrub, honeysuckle.	Lilac, blue spruce, northern white-cedar, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
Wiehl-----------	Peking cotoneaster	Siberian peashrub, lilac, honeysuckle.	Northern white-cedar, blue spruce, Rocky Mountain juniper.	Russian-olive-----	Austrian pine, green ash, Lombardy poplar.
54*: Harwood----------	Lilac, honeylocust, Nanking cherry.	Siberian peashrub, Russian-olive, Rocky Mountain juniper.	Scotch pine, ponderosa pine.	Black locust------	---
Burke.					
Wiehl.					
56*: Harwood----------	---	Siberian peashrub, Nanking cherry, northern white-cedar, multiflora rose.	Russian-olive-----	Austrian pine, ponderosa pine, Scotch pine, Douglas-fir, green ash, blue spruce.	Lombardy poplar.
Gorst------------	---	Siberian peashrub, lilac, honeysuckle.	Rocky Mountain juniper, blue spruce, northern white-cedar.	Russian-olive, golden willow.	---
57, 58------------ Hezel	Peking cotoneaster	Siberian peashrub, honeysuckle.	Lilac, blue spruce, northern white-cedar, Rocky Mountain juniper.	Russian-olive, golden willow.	Lombardy poplar, Austrian pine, green ash.
66---------------- Kittitas	---	Rocky Mountain juniper.	Russian-olive-----	Scotch pine, golden willow, green ash.	Lombardy poplar.

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
67---------- Lickskillet	---	Siberian peashrub, Russian-olive, ponderosa pine, black locust, Siberian elm.	---	---	---
69, 70---------- Logy	Peking cotoneaster	Siberian peashrub, lilac, honeylocust.	Northern white-cedar, blue spruce, Rocky Mountain juniper.	Russian-olive, Scotch pine, golden willow.	Lombardy poplar, Austrian pine, green ash.
77, 78---------- Meystre	Peking cotoneaster	Siberian peashrub, lilac, honeysuckle, Rocky Mountain juniper.	Russian-olive, green ash, Austrian pine.	Scotch pine, ponderosa pine.	Black locust.
83, 84, 85-------- Moxee	Peking cotoneaster	Siberian peashrub, lilac, honeysuckle.	Rocky Mountain juniper, blue spruce, northern white-cedar.	Russian-olive, golden willow.	---
86---------- Naches	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Northern white-cedar, blue spruce, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
91, 92---------- Outlook	---	Lilac.	Russian-olive, Rocky Mountain juniper.	Golden willow.	Lombardy poplar, green ash.
95---------- Quincy	Peking cotoneaster	Siberian peashrub, honeysuckle.	Lilac, blue spruce, northern white-cedar, Rocky Mountain juniper.	Russian-olive, golden willow.	Lombardy poplar, Austrian pine, green ash.
96---------- Renslow	Lilac, honeysuckle, Nanking cherry.	Rocky Mountain juniper, Russian-olive, Siberian peashrub.	Austrian pine, green ash, ponderosa pine, Scotch pine.	Black locust------	---
97, 98---------- Renslow	Lilac, honeysuckle, Nanking cherry.	Rocky Mountain juniper, Siberian peashrub, Russian-olive.	Scotch pine, ponderosa pine.	Black locust------	---
99, 100, 101, 102- Ritzville	Peking cotoneaster	Honeysuckle, Siberian peashrub.	Lilac, northern white-cedar, blue spruce, Rocky Mountain juniper.	Russian-olive, golden willow.	Green ash, Austrian pine, Lombardy poplar.
103---------- Ritzville	Lilac, honeysuckle, Nanking cherry.	Rocky Mountain juniper, Siberian peashrub, Russian-olive.	Green ash, Austrian pine, Scotch pine, ponderosa pine.	Black locust------	---
104, 105, 106----- Ritzville	Lilac, honeysuckle, Nanking cherry.	Rocky Mountain juniper, Siberian peashrub, Russian-olive.	Scotch pine, ponderosa pine.	Black locust------	---
111, 112, 113----- Roza	Peking cotoneaster	Honeysuckle, Rocky Mountain juniper.	Northern white-cedar, blue spruce, lilac.	Russian-olive, golden willow, Scotch pine.	Lombardy poplar, green ash.

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
114---------- Roza	Siberian peashrub, lilac, honeysuckle, Nanking cherry.	Russian-olive, Rocky Mountain juniper.	Scotch pine, ponderosa pine.	Black locust------	---
120, 121, 122, 123---------- Scoon	Peking cotoneaster	Lilac, honeysuckle, Siberian peashrub.	Northern white-cedar, blue spruce, Rocky Mountain juniper.	Golden willow, Russian-olive.	---
124, 125---------- Scooteney	Peking cotoneaster	Lilac, honeysuckle	Rocky Mountain juniper, blue spruce, northern white-cedar.	Russian-olive, golden willow.	Green ash, Lombardy poplar, Austrian pine.
128, 129, 130, 131---------- Selah	---	Lilac, Siberian peashrub, honeysuckle.	Rocky Mountain juniper, northern white-cedar, blue spruce.	Russian-olive-----	Austrian pine, Lombardy poplar, green ash.
132, 133, 134----- Shano	Peking cotoneaster	Honeysuckle, Siberian peashrub.	Northern white-cedar, blue spruce, lilac, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, green ash, Lombardy poplar.
136, 137---------- Simcoe	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Blue spruce, northern white-cedar.	Russian-olive, golden willow.	Austrian pine, green ash, Lombardy poplar.
138, 139, 140, 141---------- Sinloc	---	Lilac.	Rocky Mountain juniper.	Russian-olive, golden willow.	Green ash, Lombardy poplar.
156, 157, 158, 159, 160, 161---- Tieton	Peking cotoneaster	Honeysuckle, lilac, Siberian peashrub.	Russian-olive, blue spruce.	Scotch pine, Rocky Mountain juniper, green ash, Austrian pine.	Lombardy poplar, black locust.
162*: Tieton----------	Peking cotoneaster	Siberian peashrub, lilac, honeysuckle, Rocky Mountain juniper, blue spruce.	Russian-olive, green ash, Austrian pine.	Black locust, Scotch pine, ponderosa pine.	---
Rock outcrop.					
163---------- Toppenish	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Northern white-cedar, blue spruce, Rocky Mountain juniper.	Golden willow, Russian-olive, Norway spruce.	Lombardy poplar, Austrian pine, green ash.
165---------- Track	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Blue spruce, northern white-cedar, Rocky Mountain juniper.	Golden willow, Russian-olive, Norway spruce.	Lombardy poplar, Austrian pine, green ash.
169, 170---------- Umapine	---	Lilac----------	Russian-olive-----	Rocky Mountain juniper, golden willow.	Green ash, Lombardy poplar.

See footnote at end of table.

TABLE 9.--WINDBREAKS AND ENVIRONMENTAL PLANTINGS--Continued

Soil name and map symbol	Trees having predicted 20-year average heights, in feet, of--				
	<8	8-15	16-25	26-35	>35
171---------- Wanser	---	Redosier dogwood	Russian-olive-----	Golden willow, Scotch pine, black willow.	Lombardy poplar.
172, 173, 174, 175, 176, 177, 178, 179, 180---- Warden	Peking cotoneaster	Siberian peashrub, lilac, honeysuckle.	Northern white-cedar, blue spruce, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, green ash, Lombardy poplar.
182, 183---------- Weirman	Peking cotoneaster	Honeysuckle, Siberian peashrub, lilac.	Blue spruce, northern white-cedar, Rocky Mountain juniper.	Russian-olive, golden willow.	Austrian pine, green ash, Lombardy poplar.
184---------- Weirman	---	Redosier dogwood.	Russian-olive-----	Golden willow, black willow, Scotch pine.	Lombardy poplar.
185---------- Wenas	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Rocky Mountain juniper, blue spruce, northern white cedar.	Golden willow, Russian-olive.	Lombardy poplar, Austrian pine, green ash.
186, 187, 188, 189---------- Willis	Peking cotoneaster	Siberian peashrub, lilac, honeysuckle.	Rocky Mountain juniper, northern white-cedar, blue spruce.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
190---------- Yakima	Peking cotoneaster	Siberian peashrub, honeysuckle, lilac.	Rocky Mountain juniper, northern white-cedar, blue spruce.	Russian-olive, golden willow.	Austrian pine, Lombardy poplar, green ash.
191,192---------- Zillah	Peking cotoneaster	Honeysuckle, Siberian peashrub.	Northern white cedar, Rocky Mountain juniper, blue spruce.	Russian-olive, golden willow.	Lombardy poplar, Austrian pine, green ash.
193---------- Zillah	---	Redosier dogwood	Russian-olive-----	Golden willow, black willow, Scotch pine.	Lombardy poplar.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1. Aquic Cryandepts					
2---------- Ashue	Moderate: dusty.	Moderate: dusty.	Moderate: small stones, dusty.	Severe: erodes easily.	Moderate: droughty.
3---------- Bakeoven	Severe: slope, large stones, depth to rock.	Severe: slope, large stones, depth to rock.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope, thin layer.
4---------- Bickleton	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
5---------- Bickleton	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
6---------- Bocker	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, dusty.	Severe: small stones, large stones.
7*: Bocker----------	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, dusty.	Severe: small stones, large stones.
Jumpe----------	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Moderate: large stones, dusty.	Severe: large stones.
8*: Bocker----------	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, slope, small stones.	Moderate: large stones, dusty.	Severe: small stones, large stones.
Sapkin----------	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, slope.
9*: Bocker----------	Severe: large stones, small stones.	Severe: large stones, small stones.	Severe: large stones, small stones.	Moderate: large stones, dusty.	Severe: small stones, large stones.
Sutkin----------	Moderate: dusty.	Moderate: dusty.	Moderate: large stones, slope, small stones.	Moderate: dusty.	Moderate: large stones.
10---------- Burke	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock, dusty.	Severe: erodes easily.	Moderate: thin layer.
11---------- Burke	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12--- Burke	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
13--- Carmack	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
14, 15, 16--- Carmack	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: slope.	Severe: large stones, slope.
17*: Carmack---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Rock outcrop.					
18--- Cleman	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.	Slight.
19--- Cleman	Severe: flooding.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
20--- Cleman	Severe: flooding.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
21--- Cleman	Severe: flooding.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
22--- Clint	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
23*: Clint---	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Rubble land.					
24--- Cowiche	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
25--- Cowiche	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
26--- Cowiche	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
27--- Cowiche	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
28*: Cowiche---	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
28*: Rock Creek	Severe: depth to rock.	Severe: depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, dusty.	Severe: large stones, droughty.
29. Cryumbrepts					
30--- Darland	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
31*: Darland	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rubble land.					
32--- Esquatzel	Severe: flooding.	Moderate: dusty.	Slight---	Severe: erodes easily.	Slight.
33--- Esquatzel	Severe: flooding.	Moderate: dusty.	Moderate: slope.	Severe: erodes easily.	Slight.
34--- Fiander	Severe: flooding, excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: excess sodium, excess salt.	Severe: erodes easily.	Severe: excess salt, excess sodium.
35--- Finley	Slight---	Slight---	Moderate: slope.	Severe: erodes easily.	Moderate: droughty.
36--- Finley	Moderate: small stones.	Moderate: small stones.	Severe: large stones, small stones.	Slight---	Moderate: small stones, large stones.
37, 38--- Finley	Slight---	Slight---	Moderate: small stones.	Severe: erodes easily.	Moderate: droughty.
39--- Finley	Slight---	Slight---	Severe: slope.	Severe: erodes easily.	Moderate: droughty.
40--- Finley	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: droughty, slope.
41--- Gorskel	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, thin layer.
42*: Gorskel	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, slope, small stones.	Severe: large stones.	Severe: large stones, thin layer.
Harwood	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
43--- Gorst	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: erodes easily.	Severe: thin layer.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
44--- Gorst	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: erodes easily.	Severe: slope, thin layer.
45--- Gorst	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, slope, cemented pan.	Moderate: dusty.	Severe: large stones, thin layer.
46--- Harwood	Moderate: dusty.	Moderate: dusty.	Moderate: slope, cemented pan, dusty.	Severe: erodes easily.	Moderate: thin layer.
47--- Harwood	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
48--- Harwood	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
49--- Harwood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
50*: Harwood---	Moderate: dusty.	Moderate: dusty.	Moderate: slope, cemented pan, dusty.	Severe: erodes easily.	Moderate: thin layer.
Burke---	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock, dusty.	Severe: erodes easily.	Moderate: thin layer.
Wiehl---	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock.	Severe: erodes easily.	Moderate: thin layer.
51*: Harwood---	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
Burke---	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
Wiehl---	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
52*: Harwood---	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Burke---	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Wiehl---	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
53*: Harwood---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Burke---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
53*:					
Wiehl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
54*:					
Harwood	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Burke	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
Wiehl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
55*:					
Harwood	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: erodes easily.	Severe: slope.
Burke	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: erodes easily.	Severe: slope.
Wiehl	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Severe: erodes easily.	Severe: slope.
56*:					
Harwood	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
Gorst	Severe: cemented pan.	Severe: cemented pan.	Severe: large stones, slope, cemented pan.	Moderate: dusty.	Severe: large stones, thin layer.
57--- Hezel	Slight---	Slight---	Slight---	Slight---	Slight.
58--- Hezel	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight---	Moderate: slope.
59--- Jumpe	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: large stones, slope, dusty.	Severe: large stones, slope.
60, 61, 62, 63--- Jumpe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
64*:					
Jumpe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
Rock outcrop.					
65--- Kiona	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
66--- Kittitas	Severe: flooding.	Moderate: wetness, excess salt, percs slowly.	Moderate: wetness, percs slowly, excess salt.	Severe: erodes easily.	Moderate: excess salt, wetness.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
67--Lickskillet	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, thin layer.
68--Lickskillet	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: thin layer.
69--Logy	Severe: flooding.	Moderate: dusty.	Moderate: small stones, flooding.	Severe: erodes easily.	Moderate: droughty, flooding.
70--Logy	Severe: flooding.	Moderate: large stones, dusty.	Severe: large stones.	Moderate: dusty.	Moderate: large stones, droughty, flooding.
71--Loneridge	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: large stones, droughty, slope.
72, 73--Loneridge	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
74--McDaniel	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.	Severe: slope.
75--McDaniel	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
76*:					
McDaniel	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.	Severe: slope.
Rock Creek	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.	Severe: large stones, droughty, slope.
77--Meystre	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
78--Meystre	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
79--Mikkalo	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock, dusty.	Severe: erodes easily.	Moderate: thin layer.
80--Mikkalo	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
81--Mikkalo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
82--Mippon	Severe: flooding, large stones.	Severe: large stones.	Severe: large stones, small stones.	Severe: large stones.	Severe: large stones, droughty.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
83--- Moxee	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: erodes easily.	Severe: thin layer.
84--- Moxee	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: erodes easily.	Severe: slope, thin layer.
85--- Moxee	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: large stones, slope, cemented pan.	Moderate: slope.	Severe: large stones, slope, thin layer.
86--- Naches	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
87--- Naxing	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
88, 89--- Naxing	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
90--- Odo	Severe: slope.	Severe: slope.	Severe: large stones, slope.	Moderate: large stones, slope, dusty.	Severe: slope.
91--- Outlook	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Slight---	Severe: excess sodium.
92--- Outlook	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Severe: erodes easily.	Severe: excess sodium.
93*. Pits					
94--- Prosser	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
95--- Quincy	Slight---	Slight---	Moderate: slope.	Slight---	Moderate: droughty.
96--- Renslow	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
97--- Renslow	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
98--- Renslow	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
99--- Ritzville	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
100--- Ritzville	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
101--- Ritzville	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
102--- Ritzville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
103--Ritzville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, erodes easily.	Severe: slope.
104--Ritzville	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
105--Ritzville	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
106--Ritzville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
107--Ritzville Variant	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
108--Ritzville Variant	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: large stones, slope.	Slight	Moderate: large stones, slope.
109--Rock Creek	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.	Severe: large stones, droughty, slope.
110*:					
Rock Creek	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.	Severe: large stones, droughty, slope.
Clint	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope, dusty.	Severe: slope.
Simcoe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
111--Roza	Slight	Slight	Severe: slope.	Slight	Slight.
112--Roza	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
113--Roza	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
114--Roza	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
115*:					
Rubble land.					
Rock outcrop.					
116, 117--Sapkin	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
118*:					
Sapkin	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: large stones, slope.	Severe: large stones, slope.
Rubble land.					

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
119--- Saydab	Moderate: large stones.	Moderate: large stones.	Severe: large stones.	Slight---	Moderate: large stones, thin layer.
120--- Scoon	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: erodes easily.	Severe: thin layer.
121, 122--- Scoon	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: erodes easily.	Severe: thin layer.
123--- Scoon	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: slope, cemented pan.	Severe: erodes easily.	Severe: slope, thin layer.
124--- Scooteney	Moderate: dusty.	Moderate: dusty.	Moderate: small stones, dusty.	Severe: erodes easily.	Slight.
125--- Scooteney	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Severe: erodes easily.	Slight.
126--- Scooteney	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
127--- Scooteney	Moderate: dusty.	Moderate: dusty.	Severe: large stones.	Moderate: large stones, dusty.	Moderate: large stones.
128--- Selah	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock, dusty.	Severe: erodes easily.	Moderate: thin layer.
129--- Selah	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
130--- Selah	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
131--- Selah	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
132--- Shano	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
133--- Shano	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
134--- Shano	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
135--- Shano	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
136--- Simcoe	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
137--- Simcoe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
138, 139, 140--------- Sinloc	Severe: excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Severe: erodes easily.	Severe: excess sodium.
141------------------- Sinloc	Severe: excess sodium.	Severe: excess sodium.	Severe: slope, excess sodium.	Severe: erodes easily.	Severe: excess sodium.
142------------------- Starbuck	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: thin layer.
143*: Starbuck------------- Rock outcrop.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: erodes easily.	Severe: slope, thin layer.
144*: Starbuck------------- Rock outcrop.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, erodes easily.	Severe: slope, thin layer.
145------------------- Sutkin	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: large stones, slope.
146------------------- Sutkin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
147, 148--------------- Sutkin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
149*: Sutkin--------------- Rock outcrop.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
150------------------- Sutkin Variant	Slight----------	Slight----------	Moderate: large stones, slope, small stones.	Slight----------	Moderate: large stones, droughty.
151------------------- Taneum	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
152------------------- Taneum	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
153------------------- Taneum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
154*: Taneum--------------- Rock Creek-----------	Moderate: slope, dusty. Severe: depth to rock.	Moderate: slope, dusty. Severe: depth to rock.	Severe: slope. Severe: large stones, slope, small stones.	Moderate: dusty. Moderate: large stones, dusty.	Moderate: slope. Severe: large stones, droughty.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
155--Tekison	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: large stones, droughty, slope.
156--Tieton	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
157--Tieton	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.	Slight.
158--Tieton	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
159--Tieton	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
160--Tieton	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
161--Tieton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
162*: Tieton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
Rock outcrop.					
163--Toppenish	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: erodes easily.	Slight.
164. Torriorthents					
165--Track	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: small stones, wetness, percs slowly.	Severe: erodes easily.	Moderate: droughty.
166, 167--Tumac	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
168--Umapine	Severe: flooding, wetness, excess sodium.	Severe: excess sodium.	Severe: wetness, excess sodium.	Severe: erodes easily.	Severe: excess sodium.
169, 170--Umapine	Severe: flooding, excess sodium.	Severe: excess sodium.	Severe: excess sodium.	Severe: erodes easily.	Severe: excess sodium.
171--Wanser	Severe: flooding.	Slight	Moderate: slope, flooding.	Slight	Moderate: droughty, flooding.
172--Warden	Slight	Slight	Slight	Severe: erodes easily.	Slight.
173--Warden	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.

See footnote at end of table.

TABLE 10.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
174--Warden	Slight	Slight	Severe: slope.	Severe: erodes easily.	Slight.
175--Warden	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
176--Warden	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Severe: erodes easily.	Slight.
177--Warden	Moderate: dusty.	Moderate: dusty.	Moderate: slope, dusty.	Severe: erodes easily.	Slight.
178--Warden	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Slight.
179--Warden	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope.
180--Warden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
181--Weirman	Severe: flooding.	Moderate: flooding, small stones.	Severe: small stones, flooding.	Moderate: flooding.	Severe: droughty, flooding.
182--Weirman	Severe: flooding.	Slight	Moderate: small stones.	Slight	Severe: droughty.
183--Weirman	Severe: flooding.	Moderate: small stones.	Severe: small stones.	Slight	Severe: droughty.
184--Weirman	Severe: flooding, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
185--Wenas	Severe: flooding.	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: erodes easily.	Slight.
186--Willis	Slight	Slight	Moderate: slope, depth to rock.	Severe: erodes easily.	Moderate: thin layer.
187--Willis	Moderate: dusty.	Moderate: dusty.	Moderate: slope, depth to rock.	Severe: erodes easily.	Moderate: thin layer.
188--Willis	Moderate: dusty.	Moderate: dusty.	Severe: slope.	Severe: erodes easily.	Moderate: thin layer.
189--Willis	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Severe: erodes easily.	Moderate: slope, thin layer.
190--Yakima	Severe: flooding.	Moderate: dusty.	Moderate: small stones, flooding, dusty.	Severe: erodes easily.	Moderate: flooding.
191--Zillah	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
192--Zillah	Severe: flooding.	Moderate: wetness.	Moderate: wetness.	Severe: erodes easily.	Slight.
193--Zillah	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness, erodes easily.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
1. Aquic Cryandepts												
2---------- Ashue	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	---
3---------- Bakeoven	Very poor.	Very poor.	Fair	---	---	Fair	Very poor.	Very poor.	Very poor.	---	Very poor.	Fair.
4---------- Bickleton	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	Good.
5---------- Bickleton	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	Good.
6---------- Bocker	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
7*:												
Bocker----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Jumpe----------	Poor	Poor	Poor	---	Fair	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.	---
8*:												
Bocker----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Sapkin----------	Poor	Poor	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
9*:												
Bocker----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Sutkin----------	Poor	Poor	Fair	---	Fair	Good	Poor	Very poor.	Fair	Good	Very poor.	---
10, 11, 12--------- Burke	Fair	Fair	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
13---------- Carmack	Poor	Fair	Good	---	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.	---
14---------- Carmack	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
15---------- Carmack	Very poor.	Very poor.	Good	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	---
16---------- Carmack	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
17*:												
Carmack----------	Very poor.	Very poor.	Good	---	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.	---
Rock outcrop.												
18---------- Cleman	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	---	Fair	---

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Shrubs	Wetland plants	Shallow water areas	Open-land wild-life	Wood-land wild-life	Wetland wild-life	Range-land wild-life
19, 20---------- Cleman	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
21---------- Cleman	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
22---------- Clint	Very poor.	Very poor.	Good	Fair	Fair	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
23*: Clint----------	Very poor.	Very poor.	Good	Fair	Fair	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Rubble land.												
24, 25, 26, 27----- Cowiche	Fair	Good	Good	---	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
28*: Cowiche----------	Poor	Fair	Fair	---	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Rock Creek--------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
29. Cryumbrepts												
30---------- Darland	Very poor.	Very poor.	Good	---	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
31*: Darland----------	Very poor.	Very poor.	Good	---	---	Good	Very poor.	Very poor.	Poor	---	Very poor.	Good.
Rubble land.												
32---------- Esquatzel	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	---	Fair	---
33---------- Esquatzel	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
34---------- Fiander	Good	Good	Good	Fair	Fair	Good	Fair	Fair	Good	---	Fair	---
35---------- Finley	Poor	Poor	Poor	---	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
36---------- Finley	Poor	Poor	Poor	---	---	Poor	Very poor.	Very poor.	Fair	---	Very poor.	Poor.
37---------- Finley	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	---
38, 39---------- Finley	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	---
40---------- Finley	Fair	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
41---------- Gorskel	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.
42*: Gorskel----------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
42*:												
Harwood	Fair	Fair	Fair	Good	Good	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
43 Gorst	Fair	Good	Poor	---	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	---
44 Gorst	Poor	Fair	Poor	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	---
45 Gorst	Fair	Good	Poor	---	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	---
46 Harwood	Good	Good	Good	Good	Good	Good	Fair	Poor	Good	---	Poor	---
47, 48, 49 Harwood	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
50*:												
Harwood	Good	Good	Good	Good	Good	Good	Fair	Poor	Good	---	Poor	---
Burke	Fair	Fair	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
Wiehl	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	---
51*:												
Harwood	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
Burke	Fair	Fair	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
Wiehl	Fair	Fair	Good	Good	Good	Good	Poor	Very poor.	Fair	---	Very poor.	---
52*, 53*:												
Harwood	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
Burke	Fair	Fair	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
Wiehl	Fair	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
54*:												
Harwood	Very poor.	Very poor.	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Burke	Poor	Poor	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Wiehl	Poor	Poor	Poor	---	---	Poor	Very poor.	Very poor.	Fair	---	Very poor.	Poor.
55*:												
Harwood	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Burke	Poor	Poor	Good	---	---	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Wiehl	Poor	Poor	Poor	---	---	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
56*:												
Harwood	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
Gorst	Fair	Good	Poor	---	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	---
57, Hezel	Fair	Good	Good	Fair	Fair	Good	Very poor.	Very poor.	Good	---	Very poor.	---
58, Hezel	Fair	Good	Good	Fair	Fair	Good	Very poor.	Very poor.	Good	---	Very poor.	---
59, Jumpe	Poor	Poor	Poor	---	Fair	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.	---
60, 61, Jumpe	Very poor.	Very poor.	Poor	---	Fair	Poor	Very poor.	Very poor.	Very poor.	Poor	Very poor.	---
62, Jumpe	Poor	Poor	Poor	---	Fair	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.	---
63, Jumpe	Very poor.	Very poor.	Poor	---	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---
64*:												
Jumpe	Very poor.	Very poor.	Poor	---	Fair	Poor	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	---
Rock outcrop.												
65, Kiona	Poor	Poor	Poor	---	---	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.
66, Kittitas	Fair	Good	Good	Fair	Fair	Good	Good	Fair	Good	---	Fair	---
67, Lickskillet	Poor	Poor	Fair	---	Poor	Fair	Poor	Very poor.	Poor	Fair	Very poor.	---
68, Lickskillet	Very poor.	Very poor.	Fair	---	---	Very poor.	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
69, 70, Logy	Fair	Fair	Good	---	---	Good	Poor	Very poor.	Fair	---	Very poor.	---
71, 72, 73, Loneridge	Poor	Poor	Good	---	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.	Good.
74, McDaniel	Poor	Poor	Fair	Good	Good	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
75, McDaniel	Very poor.	Very poor.	Fair	Good	Good	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
76*:												
McDaniel	Poor	Poor	Fair	Good	Good	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
Rock Creek	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
77, Meystre	Good	Good	Good	---	Fair	Good	Poor	Very poor.	Good	Good	Very poor.	---
78, Meystre	Poor	Fair	Good	---	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herba-ceous plants	Hard-wood trees	Conif-erous plants	Shrubs	Wetland plants	Shallow water areas	Open-land wild-life	Wood-land wild-life	Wetland wild-life	Range-land wild-life
79, 80, 81---------- Mikkalo	Fair	Good	Fair	---	---	Poor	Very poor.	Very poor.	Fair	---	Very poor.	Poor.
82---------- Mippon	Poor	Poor	Fair	---	Good	Fair	Poor	Very poor.	Poor	Fair	Very poor.	---
83, 84, 85---------- Moxee	Poor	Poor	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	---
86---------- Naches	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
87, 88, 89---------- Naxing	Very poor.	Very poor.	Fair	---	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
90---------- Odo	Fair	Fair	Good	---	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
91, 92---------- Outlook	Fair	Fair	Good	Fair	Fair	Good	Good	Fair	Fair	---	Fair	---
93*. Pits												
94---------- Prosser	Poor	Poor	Poor	---	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
95---------- Quincy	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	---	Very poor.	---
96---------- Renslow	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
97---------- Renslow	Fair	Fair	Fair	Fair	Poor	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
98---------- Renslow	Fair	Fair	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
99, 100---------- Ritzville	Good	Good	Good	Good	Good	Good	Fair	Poor	Good	---	Poor	---
101, 102---------- Ritzville	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
103---------- Ritzville	Poor	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
104---------- Ritzville	Fair	Fair	Fair	Fair	Poor	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
105, 106---------- Ritzville	Fair	Fair	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
107---------- Ritzville Variant	Fair	Good	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
108---------- Ritzville Variant	Fair	Good	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
109---------- Rock Creek	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
110*: Rock Creek--------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
110*:												
Clint	Poor	Poor	Good	Fair	Fair	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
Simcoe	Poor	Fair	Fair	---	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
111 Roza	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
112, 113 Roza	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
114 Roza	Poor	Poor	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
115*: Rubble land.												
Rock outcrop.												
116, 117 Sapkin	Very poor.	Very poor.	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
118*:												
Sapkin	Very poor.	Very poor.	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
Rubble land.												
119 Saydab	Poor	Poor	Poor	---	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	---
120, 121, 122 Scoon	Fair	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	---	Very poor.	---
123 Scoon	Poor	Fair	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	---	Very poor.	---
124 Scooteney	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	---	Fair	---
125 Scooteney	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
126 Scooteney	Poor	Poor	Poor	---	---	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.
127 Scooteney	Poor	Poor	Poor	---	---	Poor	Poor	Very poor.	Poor	---	Very poor.	Poor.
128, 129 Selah	Fair	Good	Good	Fair	Fair	Good	Fair	Very poor.	Good	---	Very poor.	---
130 Selah	Fair	Good	Good	Fair	Fair	Good	Very poor.	Very poor.	Good	---	Very poor.	---
131 Selah	Fair	Good	Good	Fair	Fair	Good	Very poor.	Very poor.	Good	---	Very poor.	---
132, 133 Shano	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
134 Shano	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
135---------- Shano	Poor	Fair	Fair	---	---	Fair	Very poor.	Very poor.	Fair	---	Very poor.	Fair.
136, 137---------- Simcoe	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
138, 139---------- Sinloc	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	---	Fair	---
140, 141---------- Sinloc	Fair	Fair	Fair	Fair	Fair	Fair	Poor	Very poor.	Fair	---	Very poor.	---
142---------- Starbuck	Poor	Poor	Fair	Fair	Poor	Fair	Very poor.	Very poor.	Poor	---	Very poor.	---
143*: Starbuck----------	Poor	Poor	Poor	---	---	Poor	Very poor.	Very poor.	Poor	---	Very poor.	Poor.
Rock outcrop.												
144*: Starbuck----------	Very poor.	Very poor.	Poor	---	---	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
Rock outcrop.												
145, 146---------- Sutkin	Poor	Poor	Fair	---	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
147---------- Sutkin	Very poor.	Very poor.	Fair	---	Fair	Good	Very poor.	Very poor.	Poor	Good	Very poor.	---
148---------- Sutkin	Poor	Poor	Good	---	Fair	Good	Very poor.	Very poor.	Fair	Good	Very poor.	---
149*: Sutkin----------	Very poor.	Very poor.	Fair	---	Fair	Good	Very poor.	Very poor.	Poor	Good	Very poor.	---
Rock outcrop.												
150---------- Sutkin Variant	Poor	Poor	Fair	---	Fair	Fair	Poor	Very poor.	Fair	Good	Very poor.	Fair.
151, 152---------- Taneum	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	Good.
153---------- Taneum	Poor	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	Good.
154*: Taneum----------	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	Good.
Rock Creek---------	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.	Very poor.	---	Very poor.	Poor.
155---------- Tekison	Poor	Poor	Fair	---	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
156---------- Tieton	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
157---------- Tieton	Good	Good	Good	Good	Good	Good	Fair	Fair	Good	---	Fair	---

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
158, 159---------- Tieton	Good	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
160, 161---------- Tieton	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
162*: Tieton----------	Fair	Fair	Fair	---	---	Fair	Poor	Very poor.	Fair	---	Very poor.	Fair.
Rock outcrop.												
163---------- Toppenish	Fair	Fair	Good	Good	Good	Good	Good	Fair	Fair	---	Fair	---
164. Torriorthents												
165---------- Track	Fair	Fair	Good	Good	Good	Good	Good	Fair	Good	---	Good	---
166, 167---------- Tumac	Very poor.	Very poor.	Fair	---	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.	---
168---------- Umapine	Poor	Poor	Poor	Fair	---	Poor	Fair	Poor	Poor	---	Poor	Poor.
169---------- Umapine	Good	Good	Fair	Fair	Poor	Fair	Good	Fair	Good	---	Fair	---
170---------- Umapine	Good	Good	Fair	Fair	Poor	Fair	Good	Very poor.	Good	---	Poor	---
171---------- Wanser	Poor	Fair	Good	Fair	Poor	Good	Good	Poor	Fair	---	Fair	---
172---------- Warden	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	---	Fair	---
173, 174---------- Warden	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
175---------- Warden	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
176---------- Warden	Fair	Good	Good	Good	Good	Good	Fair	Fair	Good	---	Fair	---
177, 178---------- Warden	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
179, 180---------- Warden	Fair	Good	Good	Cood	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
181---------- Weirman	Poor	Poor	Fair	---	---	Fair	Very poor.	Very poor.	Poor	---	Very poor.	Fair.
182, 183---------- Weirman	Poor	Poor	Good	Good	Good	Good	Very poor.	Very poor.	Fair	---	Very poor.	---
184---------- Weirman	Poor	Fair	Good	Fair	---	Poor	Good	Good	Poor	---	Good	---
185---------- Wenas	Good	Good	Good	Good	Good	---	Good	Fair	Good	---	Fair	---

See footnote at end of table.

TABLE 11.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements								Potential as habitat for--			
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Shrubs	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife	Rangeland wildlife
186, 187, 188------ Willis	Fair	Good	Good	Good	Good	Good	Poor	Very poor.	Good	---	Very poor.	---
189---------- Willis	Fair	Good	Good	Good	Good	Good	Very poor.	Very poor.	Good	---	Very poor.	---
190---------- Yakima	Fair	Good	Good	Good	Good	Good	Good	Fair	Good	---	Fair	---
191, 192---------- Zillah	Good	Good	Good	---	---	Good	Good	Fair	Good	---	Fair	---
193---------- Zillah	Fair	Fair	Good	---	---	Good	Fair	Fair	Fair	---	Fair	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1. Aquic Cryandepts						
2---- Ashue	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Severe: frost action.	Moderate: droughty.
3---- Bakeoven	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: large stones, slope, thin layer.
4---- Bickleton	Moderate: depth to rock.	Slight----------	Moderate: depth to rock.	Slight----------	Moderate: frost action.	Slight.
5---- Bickleton	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
6---- Bocker	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, large stones.
7*: Bocker----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, large stones.
Jumpe----------	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.	Severe: large stones.
8*: Bocker----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: small stones, large stones.
Sapkin----------	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
9*: Bocker----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, large stones.
Sutkin----------	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action, large stones.	Moderate: large stones.
10---- Burke	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: frost action.	Moderate: thin layer.
11---- Burke	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: frost action.	Moderate: thin layer.
12---- Burke	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
13--Carmack	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: low strength, slope, frost action.	Moderate: slope.
14, 15, 16--Carmack	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: large stones, slope.
17*: Carmack	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
18, 19, 20--Cleman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
21--Cleman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding, slope.	Severe: frost action.	Moderate: slope.
22--Clint	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
23*: Clint	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rubble land.						
24--Cowiche	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: frost action.	Slight.
25--Cowiche	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: frost action.	Slight.
26--Cowiche	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action.	Moderate: slope.
27--Cowiche	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
28*: Cowiche	Severe: cutbanks cave.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: frost action.	Moderate: slope.
Rock Creek	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: large stones, droughty.
29. Cryumbrepts						
30--Darland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
31*: Darland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rubble land.						

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
32, 33---------- Esquatzel	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: frost action.	Slight.
34---------- Fiander	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Severe: excess salt, excess sodium.
35---------- Finley	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: small stones, droughty.
36---------- Finley	Severe: cutbanks cave.	Moderate: large stones.	Moderate: large stones.	Moderate: large stones.	Moderate: frost action.	Moderate: small stones, large stones.
37, 38---------- Finley	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: small stones, droughty.
39---------- Finley	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Moderate: frost action.	Moderate: small stones, droughty.
40---------- Finley	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: small stones, droughty, slope.
41---------- Gorskel	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: large stones, thin layer.
42*:						
Gorskel----------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: large stones, thin layer.
Harwood----------	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
43---------- Gorst	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan, frost action.	Severe: thin layer.
44---------- Gorst	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope, frost action.	Severe: slope, thin layer.
45---------- Gorst	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan, frost action.	Severe: large stones, thin layer.
46---------- Harwood	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: cemented pan.	Severe: frost action.	Moderate: thin layer.
47---------- Harwood	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: frost action.	Moderate: thin layer.
48---------- Harwood	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
49---------- Harwood	Severe: cemented pan, slope.	Severe: slope.	Severe: cemented pan, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
50*:						
Harwood	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: cemented pan.	Severe: frost action.	Moderate: thin layer.
Burke	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: frost action.	Moderate: thin layer.
Wiehl	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Slight	Severe: frost action.	Moderate: thin layer.
51*:						
Harwood	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: frost action.	Moderate: thin layer.
Burke	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: frost action.	Moderate: thin layer.
Wiehl	Moderate: depth to rock.	Slight	Moderate: depth to rock.	Moderate: slope.	Severe: frost action.	Moderate: thin layer.
52*:						
Harwood	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
Burke	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
Wiehl	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
53*, 54*:						
Harwood	Severe: cemented pan, slope.	Severe: slope.	Severe: cemented pan, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Burke	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Wiehl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
55*:						
Harwood	Severe: cemented pan, slope.	Severe: slope.	Severe: cemented pan, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Burke	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
Wiehl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
56*:						
Harwood	Severe: cemented pan.	Moderate: slope, cemented pan.	Severe: cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
56*: Gorst	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan, frost action.	Severe: large stones, thin layer.
57--- Hezel	Slight	Slight	Slight	Slight	Slight	Slight.
58--- Hezel	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
59, 60, 61, 62, 63--- Jumpe	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
64*: Jumpe	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
Rock outcrop.						
65--- Kiona	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
66--- Kittitas	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, frost action.	Moderate: excess salt, wetness.
67--- Lickskillet	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, thin layer.
68--- Lickskillet	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: thin layer.
69--- Logy	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
70--- Logy	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: large stones, droughty, flooding.
71--- Loneridge	Moderate: too clayey, large stones, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell.	Moderate: large stones, droughty, slope.
72, 73--- Loneridge	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: slope.
74, 75--- McDaniel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
76*: McDaniel	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock Creek	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: large stones, droughty, slope.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
77---------- Meystre	Slight---------	Moderate: shrink-swell.	Slight---------	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
78---------- Meystre	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
79---------- Mikkalo	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Moderate: depth to rock, frost action.	Moderate: thin layer.
80---------- Mikkalo	Severe: depth to rock.	Moderate: slope, slope,	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope, frost action.	Moderate: slope, thin layer.
81---------- Mikkalo	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
82---------- Mippon	Severe: cutbanks cave, large stones.	Severe: flooding, large stones.	Severe: flooding, large stones.	Severe: flooding, large stones.	Severe: flooding, large stones.	Severe: large stones, droughty.
83---------- Moxee	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope.	Severe: frost action.	Severe: thin layer.
84---------- Moxee	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope, thin layer.
85---------- Moxee	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: slope, frost action.	Severe: large stones, slope, thin layer.
86---------- Naches	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
87, 88, 89-------- Naxing	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
90---------- Odo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
91, 92---------- Outlook	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Severe: excess sodium.
93*. Pits						
94---------- Prosser	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: frost action.	Moderate: thin layer.
95---------- Quincy	Severe: cutbanks cave.	Slight---------	Slight---------	Moderate: slope.	Slight---------	Moderate: droughty.
96---------- Renslow	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
97---------- Renslow	Moderate: depth to rock.	Slight---------	Moderate: depth to rock.	Slight---------	Severe: frost action.	Slight.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
98---------- Renslow	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
99---------- Ritzville	Slight----------	Slight----------	Slight----------	Slight----------	Severe: frost action.	Slight.
100---------- Ritzville	Slight----------	Slight----------	Slight----------	Moderate: slope.	Severe: frost action.	Slight.
101---------- Ritzville	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
102, 103---------- Ritzville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
104---------- Ritzville	Moderate: depth to rock.	Slight----------	Moderate: depth to rock.	Slight----------	Severe: frost action.	Slight.
105---------- Ritzville	Moderate: depth to rock, slope.	Moderate: slope.	Moderate: depth to rock, slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
106---------- Ritzville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
107---------- Ritzville Variant	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: slope.
108---------- Ritzville Variant	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope, frost action.	Moderate: large stones, slope.
109---------- Rock Creek	Severe: depth to rock, large stones, slope.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: large stones, droughty, slope.
110*: Rock Creek------- Clint---------- Simcoe---------- Roza---------- Roza---------- Roza----------	Severe: depth to rock, large stones, slope. Severe: depth to rock, slope. Severe: depth to rock, slope. Moderate: too clayey. Moderate: too clayey, slope. Severe: slope.	Severe: slope, depth to rock, large stones. Severe: slope. Severe: slope. Severe: shrink-swell. Severe: shrink-swell. Severe: shrink-swell, slope.	Severe: depth to rock, slope, large stones. Severe: depth to rock, slope. Severe: depth to rock, slope. Severe: shrink-swell. Severe: shrink-swell. Severe: slope, shrink-swell.	Severe: slope, depth to rock, large stones. Severe: slope. Severe: slope. Severe: shrink-swell. Severe: shrink-swell, slope. Severe: shrink-swell, slope.	Severe: depth to rock, slope, large stones. Severe: slope. Severe: slope, frost action. Severe: low strength, shrink-swell. Severe: low strength, shrink-swell. Severe: low strength, slope, shrink-swell.	Severe: large stones, droughty, slope. Severe: slope. Severe: slope. Slight. Moderate: slope. Severe: slope.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
115*: Rubble land. Rock outcrop.						
116, 117---- Sapkin	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
118*: Sapkin----	Severe: depth to rock, large stones, slope.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: large stones, slope.
Rubble land.						
119---- Saydab	Severe: depth to rock.	Moderate: depth to rock, large stones.	Severe: depth to rock.	Moderate: depth to rock, large stones.	Moderate: depth to rock, frost action.	Moderate: large stones, thin layer.
120, 121---- Scoon	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: thin layer.
122---- Scoon	Severe: depth to rock, cemented pan.	Severe: cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope, cemented pan.	Severe: cemented pan.	Severe: thin layer.
123---- Scoon	Severe: depth to rock, cemented pan, slope.	Severe: slope, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: slope, cemented pan.	Severe: cemented pan, slope.	Severe: slope, thin layer.
124, 125---- Scooteney	Slight----	Slight----	Slight----	Slight----	Severe: frost action.	Slight.
126---- Scooteney	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
127---- Scooteney	Slight----	Slight----	Slight----	Slight----	Severe: frost action.	Moderate: large stones.
128---- Selah	Severe: depth to rock, cemented pan.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock, cemented pan.	Moderate: shrink-swell, depth to rock.	Severe: low strength, frost action.	Moderate: thin layer.
129---- Selah	Severe: depth to rock, cemented pan.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock, cemented pan.	Moderate: shrink-swell, slope, depth to rock.	Severe: low strength, frost action.	Moderate: thin layer.
130---- Selah	Severe: depth to rock, cemented pan.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock, cemented pan.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope, thin layer.
131---- Selah	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: depth to rock, cemented pan, slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
132---- Shano	Slight----	Slight----	Slight----	Slight----	Severe: frost action.	Slight.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
133---------- Shano	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
134---------- Shano	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
135---------- Shano	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
136---------- Simcoe	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
137---------- Simcoe	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope, frost action.	Severe: slope.
138, 139, 140----- Sinloc	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Severe: frost action.	Severe: excess sodium.
141---------- Sinloc	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: frost action.	Severe: excess sodium.
142---------- Starbuck	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock, frost action.	Severe: thin layer.
143*, 144*: Starbuck---------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope, frost action.	Severe: slope, thin layer.
Rock outcrop.						
145---------- Sutkin	Moderate: large stones, slope.	Moderate: slope, large stones.	Moderate: slope, large stones.	Severe: slope.	Moderate: slope, frost action, large stones.	Moderate: large stones, slope.
146, 147, 148----- Sutkin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
149*: Sutkin----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop.						
150---------- Sutkin Variant	Slight---------	Slight---------	Slight---------	Slight---------	Moderate: frost action.	Moderate: large stones, droughty.
151---------- Taneum	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
152, 153---------- Taneum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
154*:						
Taneum	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Rock Creek	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: slope, depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: large stones, droughty.
155--- Tekison	Moderate: too clayey, large stones, slope.	Moderate: shrink-swell, slope, large stones.	Moderate: slope, shrink-swell, large stones.	Severe: slope.	Moderate: slope, frost action, shrink-swell.	Moderate: large stones, droughty, slope.
156, 157, 158--- Tieton	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell.	Severe: low strength, frost action.	Slight.
159--- Tieton	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength, frost action.	Slight.
160--- Tieton	Moderate: depth to rock, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength, frost action.	Moderate: slope.
161--- Tieton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
162*:						
Tieton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope, frost action.	Severe: slope.
Rock outcrop.						
163--- Toppenish	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: low strength, frost action.	Slight.
164. Torriorthents						
165--- Track	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Moderate: droughty.
166, 167--- Tumac	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
168--- Umapine	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: excess sodium.
169, 170--- Umapine	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Severe: excess sodium.
171--- Wanser	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.

See footnote at end of table.

TABLE 12.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
172, 173---------- Warden	Slight---------	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
174---------- Warden	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
175---------- Warden	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
176, 177---------- Warden	Slight---------	Slight---------	Slight---------	Slight---------	Severe: frost action.	Slight.
178---------- Warden	Slight---------	Slight---------	Slight---------	Moderate: slope.	Severe: frost action.	Slight.
179---------- Warden	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Severe: frost action.	Moderate: slope.
180---------- Warden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.	Severe; slope.
181---------- Weirman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: droughty, flooding.
182, 183---------- Weirman	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
184---------- Weirman	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, frost action.	Severe: droughty.
185---------- Wenas	Severe; cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Slight.
186, 187---------- Willis	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: frost action.	Moderate: thin layer.
188---------- Willis	Severe: depth to rock, cemented pan.	Moderate: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: frost action.	Moderate: thin layer.
189---------- Willis	Severe: depth to rock, cemented pan.	Moderate: slope, depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: slope.	Severe: frost action.	Moderate: slope, thin layer.
190---------- Yakima	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding, frost action.	Moderate: flooding.
191, 192---------- Zillah	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: frost action.	Slight.
193---------- Zillah	Severe: cutbanks cave. wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding, frost action.	Severe: wetness, flooding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1. Aquic Cryandepts					
2---------- Ashue	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy, large stones.	Severe: seepage.	Poor: seepage, too sandy, small stones.
3---------- Bakeoven	Severe: slope, depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, depth to rock.	Poor: slope, area reclaim.
4---------- Bickleton	Moderate: depth to rock, percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, thin layer.
5---------- Bickleton	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, slope, thin layer.
6---------- Bocker	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim.
7*: Bocker----------	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim.
Jumpe----------	Severe: large stones.	Severe: slope, large stones.	Severe: large stones.	Slight----------	Poor: large stones.
8*: Bocker----------	Severe: depth to rock.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim.
Sapkin----------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
9*: Bocker----------	Severe: depth to rock.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: area reclaim.
Sutkin----------	Moderate: percs slowly, large stones.	Moderate: seepage, slope, large stones.	Severe: large stones.	Slight----------	Poor: small stones.
10, 11---------- Burke	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
12---------- Burke	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
13---------- Carmack	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
14, 15, 16---------- Carmack	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
17*: Carmack----------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Rock outcrop.					
18, 19, 20---------- Cleman	Moderate: flooding, percs slowly.	Severe: seepage, flooding.	Severe: seepage.	Moderate: flooding.	Fair: too sandy, thin layer.
21---------- Cleman	Moderate: flooding, percs slowly, slope.	Severe: seepage, flooding, slope.	Severe: seepage.	Moderate: flooding, slope.	Fair: too sandy, slope, thin layer.
22---------- Clint	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
23*: Clint----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rubble land.					
24, 25---------- Cowiche	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
26---------- Cowiche	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
27---------- Cowiche	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
28*: Cowiche----------	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
Rock Creek---------	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
29. Cryumbrepts					

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30--- Darland	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
31*: Darland---	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, large stones.	Severe: seepage, slope.	Poor: small stones, slope.
Rubble land.					
32, 33--- Esquatzel	Moderate: flooding, percs slowly.	Severe: flooding.	Moderate: flooding.	Moderate: flooding.	Good.
34--- Fiander	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness, excess sodium, excess salt.	Severe: wetness.	Poor: excess sodium.
35--- Finley	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight---	Poor: seepage, too sandy, small stones.
36--- Finley	Severe: poor filter.	Severe: seepage.	Severe: large stones.	Slight---	Poor: seepage, small stones.
37, 38, 39--- Finley	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight---	Poor: seepage, too sandy, small stones.
40--- Finley	Severe: poor filter.	Severe: seepage, slope.	Severe: too sandy.	Moderate: slope.	Poor: seepage, too sandy, small stones.
41--- Gorskel	Severe: cemented pan.	Severe: cemented pan, slope, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan.	Poor: area reclaim, small stones.
42*: Gorskel---	Severe: cemented pan.	Severe: cemented pan, slope, large stones.	Severe: cemented pan, large stones.	Severe: cemented pan.	Poor: area reclaim, small stones.
Harwood---	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
43--- Gorst	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
44--- Gorst	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Poor: area reclaim, slope.
45--- Gorst	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
46, 47---------- Harwood	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
48---------- Harwood	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
49---------- Harwood	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Poor: area reclaim, slope.
50*, 51*: Harwood----------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
Burke----------	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
Wiehl----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
52*: Harwood----------	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
Burke----------	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
Wiehl----------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
53*, 54*, 55*: Harwood----------	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Severe: cemented pan, slope.	Poor: area reclaim, slope.
Burke----------	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, slope.
Wiehl----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
56*: Harwood----------	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
Gorst----------	Severe: cemented pan.	Severe: cemented pan, slope.	Severe: cemented pan.	Severe: cemented pan.	Poor: area reclaim.
57---------- Hezel	Severe: percs slowly.	Severe: seepage.	Slight----------	Slight----------	Good.
58---------- Hezel	Severe: percs slowly.	Severe: seepage, slope.	Moderate: slope.	Moderate: slope.	Fair: slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
59, 60, 61, 62, 63-- Jumpe	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
64*: Jumpe	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: large stones, slope.
Rock outcrop.					
65 Kiona	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
66 Kittitas	Severe: wetness, percs slowly.	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness.
67 Lickskillet	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
68 Lickskillet	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
69, 70 Logy	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy, small stones.
71 Loneridge	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, small stones.
72, 73 Loneridge	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, small stones, slope.
74, 75 McDaniel	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope, small stones.
76*: McDaniel	Severe: percs slowly, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.	Poor: slope, small stones.
Rock Creek	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
77 Meystre	Severe: percs slowly.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Good.
78 Meystre	Severe: percs slowly, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: slope.
79 Mikkalo	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
80--- Mikkalo	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
81--- Mikkalo	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
82--- Mippon	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
83--- Moxee	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
84, 85--- Moxee	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, slope.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, slope.
86--- Naches	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
87, 88, 89--- Naxing	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
90--- Odo	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
91, 92--- Outlook	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness, excess sodium.	Severe: wetness.	Poor: excess sodium.
93*. Pits					
94--- Prosser	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
95--- Quincy	Severe: poor filter.	Severe: seepage.	Severe: too sandy.	Slight---	Poor: too sandy.
96--- Renslow	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
97--- Renslow	Moderate: depth to rock.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, thin layer.
98--- Renslow	Moderate: depth to rock, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, slope, thin layer.
99, 100--- Ritzville	Slight---	Moderate: seepage, slope.	Slight---	Slight---	Good.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
101---------- Ritzville	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
102, 103---------- Ritzville	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
104---------- Ritzville	Moderate: depth to rock.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, thin layer.
105---------- Ritzville	Moderate: depth to rock, slope.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, slope, thin layer.
106---------- Ritzville	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
107, 108---------- Ritzville Variant	Moderate: slope.	Severe: slope.	Moderate: slope, large stones.	Moderate: slope.	Poor: large stones.
109---------- Rock Creek	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
110*: Rock Creek----------	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: area reclaim, too clayey, small stones.
Clint----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Simcoe----------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.
111---------- Roza	Severe: percs slowly.	Moderate: slope.	Slight----------	Slight----------	Good.
112---------- Roza	Severe: percs slowly.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
113, 114---------- Roza	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
115*: Rubble land.					
Rock outcrop.					
116, 117---------- Sapkin	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
118*: Sapkin	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rubble land.					
119--- Saydab	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, large stones.
120, 121--- Scoon	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim, small stones.
122--- Scoon	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim, small stones.
123--- Scoon	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, small stones, slope.
124, 125--- Scooteney	Slight---	Severe: seepage.	Moderate: large stones.	Slight---	Poor: small stones.
126--- Scooteney	Moderate: slope.	Severe: seepage, slope.	Moderate: slope, large stones.	Moderate: slope.	Poor: small stones.
127--- Scooteney	Slight---	Severe: seepage.	Moderate: large stones.	Slight---	Poor: large stones.
128, 129--- Selah	Severe: depth to rock, cemented pan, percs slowly.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
130--- Selah	Severe: depth to rock, cemented pan, percs slowly.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
131--- Selah	Severe: depth to rock, cemented pan, percs slowly.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan, slope.	Poor: area reclaim, slope.
132, 133--- Shano	Slight---	Moderate: seepage, slope.	Slight---	Slight---	Good.
134--- Shano	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
135--- Shano	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
136--- Simcoe	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim.
137--- Simcoe	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, slope.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
138, 139, 140, 141--Sinloc	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, excess sodium.	Severe: wetness.	Poor: excess sodium.
142--Starbuck	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: area reclaim, small stones.
143*, 144*: Starbuck	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: area reclaim, small stones, slope.
Rock outcrop.					
145--Sutkin	Moderate: slope, large stones.	Severe: slope.	Severe: large stones.	Moderate: slope.	Poor: small stones.
146, 147, 148--Sutkin	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
149*: Sutkin	Severe: slope.	Severe: slope.	Severe: slope, large stones.	Severe: slope.	Poor: small stones, slope.
Rock outcrop.					
150--Sutkin Variant	Slight	Severe: seepage.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
151--Taneum	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
152, 153--Taneum	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
154*: Taneum	Severe: percs slowly.	Severe: slope.	Moderate: slope, too clayey.	Moderate: slope.	Fair: too clayey, slope.
Rock Creek	Severe: depth to rock, large stones.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: area reclaim, too clayey, small stones.
155--Tekison	Severe: percs slowly.	Severe: slope, large stones.	Severe: too clayey, large stones.	Moderate: slope.	Poor: too clayey, small stones.
156--Tieton	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
157--Tieton	Severe: percs slowly.	Moderate: seepage, depth to rock.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
158, 159---------- Tieton	Severe: percs slowly.	Moderate: seepage, depth to rock, slope.	Severe: depth to rock.	Moderate: depth to rock.	Fair: area reclaim, too clayey.
160---------- Tieton	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: area reclaim, too clayey, slope.
161---------- Tieton	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
162*: Tieton---------- Rock outcrop.	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
163---------- Toppenish	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness, thin layer.
164. Torriorthents					
165---------- Track	Severe: wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, small stones.
166, 167---------- Tumac	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
168---------- Umapine	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness, excess sodium.	Severe: flooding, wetness.	Poor: wetness, excess sodium.
169, 170---------- Umapine	Severe: wetness.	Severe: flooding, wetness.	Severe: wetness, excess sodium.	Severe: wetness.	Poor: excess sodium.
171---------- Wanser	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Poor: too sandy.
172---------- Warden	Moderate: percs slowly.	Moderate: seepage.	Slight----------	Slight----------	Good.
173, 174---------- Warden	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Good.
175---------- Warden	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
176---------- Warden	Moderate: percs slowly.	Moderate: seepage.	Slight----------	Slight----------	Good.
177, 178---------- Warden	Moderate: percs slowly.	Moderate: seepage, slope.	Slight----------	Slight----------	Good.

See footnote at end of table.

TABLE 13.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
179--Warden	Moderate: percs slowly, slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.
180--Warden	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
181--Weirman	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
182, 183--Weirman	Severe: poor filter.	Severe: seepage, flooding.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
184--Weirman	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, small stones.
185--Wenas	Severe: wetness, percs slowly.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: too clayey, wetness.
186, 187, 188--Willis	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
189--Willis	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan, slope.	Severe: depth to rock, cemented pan.	Severe: depth to rock, cemented pan.	Poor: area reclaim.
190--Yakima	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy, small stones
191--Zillah	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Fair: wetness.
192--Zillah	Severe: wetness.	Severe: seepage, flooding, wetness.	Severe: seepage, wetness.	Severe: wetness.	Fair: wetness.
193--Zillah	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," "poor," "probable," and "improbable." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1. Aquic Cryandepts				
2---------- Ashue	Fair: large stones.	Probable----------	Probable----------	Poor: small stones, area reclaim.
3---------- Bakeoven	Poor: area reclaim, large stones.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, large stones, slope.
4, 5---------- Bickleton	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
6---------- Bocker	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
7*: Bocker----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Jumpe----------	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim.
8*: Bocker----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Sapkin----------	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
9*: Bocker----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Sutkin----------	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones.
10, 11---------- Burke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, area reclaim.
12---------- Burke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, area reclaim, slope.
13---------- Carmack	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
14, 15, 16---------- Carmack	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
17*: Carmack	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rock outcrop.				
18, 19, 20--- Cleman	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
21--- Cleman	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
22--- Clint	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
23*: Clint	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rubble land.				
24, 25--- Cowiche	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
26--- Cowiche	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
27--- Cowiche	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
28*: Cowiche	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
Rock Creek	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones.
29. Cryumbrepts				
30--- Darland	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
31*: Darland	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Rubble land.				
32, 33--- Esquatzel	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
34--- Fiander	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess salt, excess sodium.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
35--Finley	Good	Probable	Probable	Poor: small stones, area reclaim.
36--Finley	Fair: large stones.	Probable	Probable	Poor: small stones, area reclaim.
37, 38, 39, 40--Finley	Good	Probable	Probable	Poor: small stones, area reclaim.
41--Gorskel	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
42*:				
Gorskel	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
43--Gorst	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
44--Gorst	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
45--Gorst	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
46, 47--Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
48--Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
49--Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
50*, 51*:				
Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
Burke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
Wiehl	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
52*:				
Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
52*:				
Burke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, area reclaim, slope.
Wiehl	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
53*:				
Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Burke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Wiehl	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
54*:				
Harwood	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Burke	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Wiehl	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
55*:				
Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Burke	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Wiehl	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
56*:				
Harwood	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
Gorst	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
57--- Hezel	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
58--- Hezel	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy, slope.
59--- Jumpe	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
60, 61, 62, 63-------- Jumpe	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
64*: Jumpe----------	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
Rock outcrop.				
65-------------------- Kiona	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
66-------------------- Kittitas	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, excess salt.
67-------------------- Lickskillet	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
68-------------------- Lickskillet	Poor: area recliam, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
69, 70---------- Logy	Fair: large stones.	Probable----------	Probable----------	Poor: small stones, area reclaim.
71-------------------- Loneridge	Poor: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
72, 73---------- Loneridge	Poor: slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
74-------------------- McDaniel	Fair: large stones, slope, shrink-swell.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
75-------------------- McDaniel	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
76*: McDaniel----------	Fair: large stones, slope, shrink-swell.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Rock Creek----------	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
77-------------------- Meystre	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
78--- Meystre	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
79--- Mikkalo	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
80--- Mikkalo	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
81--- Mikkalo	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
82--- Mippon	Poor: large stones.	Improbable: large stones.	Improbable: large stones.	Poor: small stones, area reclaim.
83--- Moxee	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
84--- Moxee	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
85--- Moxee	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
86--- Naches	Good	Probable	Probable	Poor: small stones, area reclaim.
87--- Naxing	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim, slope.
88, 89--- Naxing	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, area reclaim, slope.
90--- Odo	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
91, 92--- Outlook	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
93*. Pits				
94--- Prosser	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones.
95--- Quincy	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
96--- Renslow	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
97--- Renslow	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
98--- Renslow	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
99, 100--- Ritzville	Good---	Improbable: excess fines.	Improbable: excess fines.	Good.
101--- Ritzville	Good---	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
102--- Ritzville	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
103--- Ritzville	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
104--- Ritzville	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Good.
105--- Ritzville	Fair: area reclaim, thin layer.	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
106--- Ritzville	Fair: area reclaim, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
107, 108--- Ritzville Variant	Good---	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
109--- Rock Creek	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
110*: Rock Creek---	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Clint---	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Simcoe---	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
111, 112--- Roza	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
113--- Roza	Poor: low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
114--- Roza	Poor: low strength, slope, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
115*: Rubble land. Rock outcrop.				
116, 117---------- Sapkin	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
118*: Sapkin---------- Rubble land.	Poor: area reclaim, large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, slope.
119---------- Saydab	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
120, 121, 122--------- Scoon	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
123---------- Scoon	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
124, 125, 126--------- Scooteney	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
127---------- Scooteney	Good----------	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
128, 129---------- Selah	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
130---------- Selah	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, slope.
131---------- Selah	Poor: area reclaim, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
132, 133---------- Shano	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
134---------- Shano	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
135---------- Shano	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
136---------- Simcoe	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim, small stones, slope.
137---------- Simcoe	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
138, 139, 140, 141---- Sinloc	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
142---------- Starbuck	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones.
143*: Starbuck----------	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
144*: Starbuck----------	Poor: area reclaim, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
145---------- Sutkin	Fair: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones.
146---------- Sutkin	Fair: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
147, 148---------- Sutkin	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
149*: Sutkin----------	Poor: slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones, slope.
Rock outcrop.				
150---------- Sutkin Variant	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
151---------- Taneum	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
152---------- Taneum	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
153---------- Taneum	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
154*: Taneum----------	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
Rock Creek----------	Poor: area reclaim, large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: area reclaim, small stones.
155---------- Tekison	Fair: large stones, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
156, 157, 158, 159---- Tieton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
160---------- Tieton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, slope.
161---------- Tieton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
162*: Tieton----------	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rock outcrop.				
163---------- Toppenish	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
164. Torriorthents				
165---------- Track	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
166, 167---------- Tumac	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
168, 169, 170--------- Umapine	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess sodium.
171---------- Wanser	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
172, 173, 174--------- Warden	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
175---------- Warden	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
176, 177, 178--------- Warden	Good----------	Improbable: excess fines.	Improbable: excess fines.	Good.
179---------- Warden	Good----------	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
180---------- Warden	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
181, 182, 183--------- Weirman	Good----------	Probable----------	Probable----------	Poor: small stones, area reclaim.
184---------- Weirman	Fair: wetness.	Probable----------	Probable----------	Poor: small stones, area reclaim.
185---------- Wenas	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.
186, 187, 188--------- Willis	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim.

See footnote at end of table.

TABLE 14.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
189--- Willis	Poor: area reclaim.	Improbable: excess fines.	Improbable: excess fines.	Fair: area reclaim. slope.
190--- Yakima	Good---	Probable---	Probable---	Poor: small stones, area reclaim.
191, 192--- Zillah	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Good.
193--- Zillah	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated]

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1. Aquic Cryandepts						
2---- Ashue	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty.	Large stones, erodes easily, too sandy.	Large stones, erodes easily, droughty.
3---- Bakeoven	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, depth to rock, large stones.	Large stones, slope, droughty.
4---- Bickleton	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
5---- Bickleton	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
6---- Bocker	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
7*:						
Bocker----	Severe: depth to rock.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Large stones, depth to rock.	Large stones, droughty.
Jumpe----	Moderate: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Large stones---	Large stones, droughty.
8*:						
Bocker----	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Sapkin----	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
9*:						
Bocker----	Severe: depth to rock.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Large stones, depth to rock.	Large stones, droughty.
Sutkin----	Moderate: seepage, slope.	Severe: large stones.	Deep to water	Large stones, slope.	Large stones---	Large stones.
10, 11---- Burke	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan, slope.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
12---- Burke	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan, slope.	Slope, depth to rock, cemented pan.	Slope, erodes easily, depth to rock.
13---- Carmack	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
14, 15, 16---- Carmack	Severe: slope.	Severe: piping.	Deep to water	Slope----	Slope, erodes easily.	Slope, erodes easily.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
17*: Carmack	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Rock outcrop.						
18--- Cleman	Moderate: seepage.	Severe: piping.	Deep to water	Soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
19, 20--- Cleman	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
21--- Cleman	Severe: slope.	Severe: piping.	Deep to water	Soil blowing, slope, erodes easily.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
22--- Clint	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
23*: Clint	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rubbleland.						
24, 25--- Cowiche	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
26, 27--- Cowiche	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
28*: Cowiche	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
Rock Creek	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
29. Cryumbrepts						
30--- Darland	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
31*: Darland	Severe: seepage, slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Rubble land.						
32--- Esquatzel	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
33--- Esquatzel	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope	Erodes easily	Erodes easily.
34--- Fiander	Moderate: seepage.	Severe: excess sodium, excess salt.	Percs slowly, frost action.	Wetness	Erodes easily, wetness.	Excess salt, excess sodium, erodes easily.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
35---------- Finley	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, soil blowing, slope.	Large stones, erodes easily.	Large stones, erodes easily.
36---------- Finley	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Large stones, too sandy.	Large stones, droughty.
37---------- Finley	Severe: seepage.	Severe: seepage.	Deep to water	Droughty-------	Large stones, erodes easily.	Large stones, erodes easily.
38, 39---------- Finley	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, slope.	Large stones, erodes easily.	Large stones, erodes easily.
40---------- Finley	Severe: seepage, slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.	Large stones, slope.
41---------- Gorskel	Severe: cemented pan, slope.	Severe: large stones.	Deep to water	Large stones, droughty, cemented pan.	Slope, large stones, cemented pan.	Large stones, slope, droughty.
42*: Gorskel----------	Severe: cemented pan, slope.	Severe: large stones.	Deep to water	Large stones, droughty, cemented pan.	Slope, large stones, cemented pan.	Large stones, slope, droughty.
Harwood----------	Severe: slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Slope, cemented pan, erodes easily.	Slope, erodes easily, cemented pan.
43, 44---------- Gorst	Severe: cemented pan, slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Slope, cemented pan.	Slope, erodes easily.
45---------- Gorst	Severe: cemented pan, slope.	Severe: thin layer.	Deep to water	Cemented pan, slope.	Slope, large stones, cemented pan.	Large stones, slope, erodes easily.
46, 47---------- Harwood	Moderate: seepage, cemented pan, slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Cemented pan, erodes easily.	Erodes easily, cemented pan.
48, 49---------- Harwood	Severe: slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Slope, cemented pan, erodes easily.	Slope, erodes easily, cemented pan.
50*, 51*: Harwood----------	Moderate: seepage, cemented pan, slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Cemented pan, erodes easily.	Erodes easily, cemented pan.
Burke----------	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan, slope.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
Wiehl----------	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
52*, 53*, 54*: Harwood----------	Severe: slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Slope, cemented pan, erodes easily.	Slope, erodes easily, cemented pan.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
52*, 53*, 54*:						
Burke	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan, slope.	Slope, depth to rock, cemented pan.	Slope, erodes easily, depth to rock.
Wiehl	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
55*:						
Harwood	Severe: slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Slope, cemented pan, erodes easily.	Slope, erodes easily, cemented pan.
Burke	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan, slope.	Slope, depth to rock, cemented pan.	Slope, erodes easily, depth to rock.
Wiehl	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
56*:						
Harwood	Severe: slope.	Severe: thin layer.	Deep to water	Cemented pan, slope, erodes easily.	Slope, cemented pan, erodes easily.	Slope, erodes easily, cemented pan.
Gorst	Severe: cemented pan, slope.	Severe: thin layer.	Deep to water	Cemented pan, slope.	Slope, large stones, cemented pan.	Large stones, slope, erodes easily.
57--Hezel	Slight	Severe: piping.	Deep to water	Fast intake, soil blowing.	Erodes easily, soil blowing.	Erodes easily.
58--Hezel	Severe: slope.	Severe: piping.	Deep to water	Fast intake, soil blowing, slope.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
59, 60, 61, 62, 63--Jumpe	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
64*:						
Jumpe	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
Rock outcrop.						
65--Kiona	Severe: slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope.
66--Kittitas	Slight	Severe: wetness.	Frost action	Wetness, erodes easily, excess salt.	Erodes easily, wetness.	Excess salt, erodes easily.
67--Lickskillet	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
68--Lickskillet	Severe: depth to rock, slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
69--Logy	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty.	Large stones, erodes easily, too sandy.	Large stones, erodes easily, droughty.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
70---------- Logy	Severe: seepage.	Severe: seepage.	Deep to water	Large stones, droughty.	Large stones, too sandy.	Large stones, droughty.
71, 72, 73-------- Loneridge	Severe: slope.	Moderate: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, percs slowly.	Large stones, slope, droughty.
74, 75---------- McDaniel	Severe: slope.	Severe: large stones.	Deep to water	Large stones, slope, droughty.	Slope, large stones.	Large stones, slope, droughty.
76*: McDaniel--------- Rock Creek-------	Severe: slope. Severe: depth to rock, slope.	Severe: large stones. Severe: seepage, large stones.	Deep to water Deep to water	Large stones, slope, droughty. Large stones, droughty, depth to rock.	Slope, large stones. Slope, large stones, depth to rock.	Large stones, slope, droughty. Large stones, slope, droughty.
77---------- Meystre	Severe: seepage.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
78---------- Meystre	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope----------	Slope, erodes easily.	Slope, erodes easily.
79---------- Mikkalo	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Depth to rock, erodes easily.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
80, 81---------- Mikkalo	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
82---------- Mippon	Severe: seepage.	Severe: seepage, large stones.	Deep to water	Large stones, droughty.	Large stones, too sandy.	Large stones, droughty.
83, 84---------- Moxee	Severe: cemented pan, slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan.	Slope, depth to rock.	Slope, erodes easily.
85---------- Moxee	Severe: cemented pan, slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan.	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
86---------- Naches	Severe: seepage.	Severe: seepage.	Deep to water	Percs slowly---	Large stones, too sandy.	Percs slowly.
87---------- Naxing	Severe: slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
88, 89---------- Naxing	Severe: slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
90---------- Odo	Severe: slope.	Moderate: piping, large stones.	Deep to water	Slope----------	Slope, large stones.	Large stones, slope.
91---------- Outlook	Moderate: seepage.	Severe: piping, excess sodium.	Frost action, excess sodium.	Wetness, soil blowing, excess sodium.	Erodes easily, wetness, soil blowing.	Excess salt, excess sodium, erodes easily.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
92---------- Outlook	Moderate: seepage.	Severe: piping, excess sodium.	Frost action, excess sodium.	Wetness, excess sodium.	Erodes easily, wetness.	Excess salt, excess sodium, erodes easily.
93*. Pits						
94---------- Prosser	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Depth to rock, erodes easily.	Erodes easily, depth to rock.
95---------- Quincy	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
96---------- Renslow	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
97---------- Renslow	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
98---------- Renslow	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
99, 100---------- Ritzville	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
101, 102, 103----- Ritzville	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
104---------- Ritzville	Moderate: seepage, depth to rock.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
105, 106---------- Ritzville	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
107---------- Ritzville Variant	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, large stones, erodes easily.	Slope, erodes easily.
108---------- Ritzville Variant	Severe: slope.	Severe: piping.	Deep to water	Slope----------	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
109---------- Rock Creek	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
110*: Rock Creek-------	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Clint----------	Severe: slope.	Severe: thin layer.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Simcoe----------	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
111---------- Roza	Moderate: slope.	Slight---------	Deep to water	Percs slowly, slope.	Percs slowly---	Percs slowly.
112, 113, 114----- Roza	Severe: slope.	Slight---------	Deep to water	Percs slowly, slope.	Slope, percs slowly.	Slope, percs slowly.
115*: Rubble land.						
Rock outcrop.						
116, 117---------- Sapkin	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
118*: Sapkin----------	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
Rubble land.						
119---------- Saydab	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Large stones, depth to rock.	Large stones, depth to rock.	Large stones, depth to rock.
120, 121---------- Scoon	Severe: cemented pan.	Severe: piping.	Deep to water	Depth to rock, cemented pan.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
122, 123---------- Scoon	Severe: cemented pan, slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan.	Slope, depth to rock, cemented pan.	Slope, erodes easily, depth to rock.
124---------- Scooteney	Severe: seepage.	Severe: seepage.	Deep to water	Erodes easily	Large stones, erodes easily.	Large stones, erodes easily.
125---------- Scooteney	Severe: seepage.	Severe: seepage.	Deep to water	Slope, erodes easily.	Large stones, erodes easily.	Large stones, erodes easily.
126---------- Scooteney	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, erodes easily.	Slope, large stones, erodes easily.	Large stones, slope, erodes easily.
127---------- Scooteney	Severe: seepage.	Severe: seepage.	Deep to water	Favorable------	Large stones, erodes easily.	Large stones, erodes easily.
128, 129---------- Selah	Moderate: depth to rock, cemented pan, slope.	Severe: thin layer.	Deep to water	Depth to rock, cemented pan, slope.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
130, 131---------- Selah	Severe: slope.	Severe: thin layer.	Deep to water	Depth to rock, cemented pan, slope.	Slope, depth to rock, cemented pan.	Slope, erodes easily, depth to rock.
132, 133---------- Shano	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
134, 135---------- Shano	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
136, 137---------- Simcoe	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, slope, erodes easily.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
138---------- Sinloc	Moderate: seepage.	Severe: piping, wetness, excess sodium.	Frost action, excess sodium.	Wetness, soil blowing.	Erodes easily, wetness, soil blowing.	Excess salt, excess sodium, erodes easily.
139---------- Sinloc	Moderate: seepage.	Severe: piping, wetness, excess sodium.	Frost action, excess sodium.	Wetness--------	Erodes easily, wetness.	Excess salt, excess sodium, erodes easily.
140, 141---------- Sinloc	Moderate: seepage, slope.	Severe: piping, wetness, excess sodium.	Frost action, slope, excess sodium.	Wetness, slope.	Erodes easily, wetness.	Excess salt, excess sodium, erodes easily.
142---------- Starbuck	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
143*, 144*: Starbuck---------	Severe: depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, slope.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Rock outcrop.						
145, 146, 147, 148---------- Sutkin	Severe: slope.	Severe: large stones.	Deep to water	Large stones, slope.	Slope, large stones.	Large stones, slope.
149*: Sutkin----------	Severe: slope.	Severe: large stones.	Deep to water	Large stones, slope.	Slope, large stones.	Large stones, slope.
Rock outcrop.						
150---------- Sutkin Variant	Severe: seepage.	Severe: seepage.	Deep to water	Droughty-------	Large stones---	Large stones, droughty.
151, 152, 153----- Taneum	Severe: slope.	Severe: thin layer.	Deep to water	Slope----------	Slope----------	Slope.
154*: Taneum----------	Severe: slope.	Severe: thin layer.	Deep to water	Slope----------	Slope----------	Slope.
Rock Creek-------	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Large stones, droughty, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
155---------- Tekison	Severe: slope.	Severe: large stones.	Deep to water	Large stones, droughty, percs slowly.	Slope, large stones, percs slowly.	Large stones, slope, droughty.
156---------- Tieton	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Soil blowing, slope, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
157---------- Tieton	Moderate: seepage, depth to rock.	Severe: thin layer.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
158, 159---------- Tieton	Moderate: seepage, depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
160, 161---------- Tieton	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
162*: Tieton---------- Rock outcrop.	Severe: slope.	Severe: thin layer.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
163---------- Toppenish	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
164. Torriorthents						
165---------- Track	Severe: seepage.	Severe: seepage.	Frost action, cutbanks cave.	Wetness, droughty, erodes easily.	Large stones, erodes easily, wetness.	Large stones, erodes easily, droughty.
166, 167---------- Tumac	Severe: slope.	Severe: seepage.	Deep to water	Droughty, slope.	Slope, large stones.	Large stones, slope, droughty.
168---------- Umapine	Moderate: seepage.	Severe: piping, wetness, excess sodium.	Flooding, frost action.	Wetness--------	Erodes easily, wetness.	Wetness, excess salt, excess sodium.
169---------- Umapine	Moderate: seepage.	Severe: piping, excess sodium.	Frost action, excess sodium.	Wetness, erodes easily.	Erodes easily, wetness.	Excess sodium, erodes easily.
170---------- Umapine	Moderate: seepage, slope.	Severe: piping, excess sodium.	Frost action, slope, excess sodium.	Wetness, slope, erodes easily.	Erodes easily, wetness.	Excess sodium, erodes easily.
171---------- Wanser	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
172---------- Warden	Moderate: seepage.	Severe: piping.	Deep to water	Soil blowing, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
173, 174---------- Warden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Soil blowing, slope, erodes easily.	Erodes easily, soil blowing.	Erodes easily.
175---------- Warden	Severe: slope.	Severe: piping.	Deep to water	Soil blowing, slope, erodes easily.	Slope, erodes easily, soil blowing.	Slope, erodes easily.
176---------- Warden	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
177, 178---------- Warden	Moderate: seepage, slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
179, 180---------- Warden	Severe: slope.	Severe: piping.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
181---------- Weirman	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, soil blowing.	Large stones, too sandy.	Large stones, droughty.

See footnote at end of table.

TABLE 15.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
182--- Weirman	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, soil blowing.	Large stones, too sandy, soil blowing.	Large stones, droughty.
183--- Weirman	Severe: seepage.	Severe: seepage.	Deep to water	Droughty---	Large stones, too sandy.	Large stones, droughty.
184--- Weirman	Severe: seepage.	Severe: seepage, wetness.	Flooding, large stones, frost action.	Wetness, droughty, soil blowing.	Large stones, wetness, too sandy.	Large stones, wetness, droughty.
185--- Wenas	Moderate: seepage.	Severe: piping.	Frost action---	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
186--- Willis	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Soil blowing, depth to rock, cemented pan.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
187, 188--- Willis	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan.	Depth to rock, cemented pan.	Erodes easily, depth to rock.
189--- Willis	Severe: slope.	Severe: piping.	Deep to water	Depth to rock, cemented pan.	Slope, depth to rock, cemented pan.	Slope, erodes easily, depth to rock.
190--- Yakima	Severe: seepage.	Severe: seepage.	Deep to water	Flooding---	Erodes easily, too sandy.	Erodes easily.
191--- Zillah	Moderate: seepage.	Severe: piping.	Frost action---	Wetness, soil blowing.	Erodes easily, wetness, soil blowing.	Erodes easily.
192--- Zillah	Moderate: seepage.	Severe: piping.	Frost action---	Wetness---	Erodes easily, wetness.	Erodes easily.
193--- Zillah	Moderate: seepage.	Severe: piping, wetness.	Flooding, frost action.	Wetness---	Erodes easily, wetness.	Wetness, erodes easily.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--ENGINEERING INDEX PROPERTIES

[The symbol > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1. Aquic Cryandepts											
2---------- Ashue	0-10	Loam----------	ML, CL-ML	A-4	0	85-100	80-100	65-95	50-75	20-30	NP-10
	10-29	Very gravelly sandy clay loam, very gravelly loam, very cobbly loam.	GM	A-2	10-45	30-50	30-45	25-35	15-25	30-35	5-10
	29-34	Very gravelly sandy loam, very gravelly loam, very cobbly sandy loam.	GM	A-1	10-45	30-50	30-45	20-35	10-25	---	NP
	34-60	Extremely gravelly sand, extremely cobbly sand.	GP	A-1	10-55	30-40	15-25	10-15	0-5	---	NP
3---------- Bakeoven	0-4	Very cobbly silt loam.	GM	A-2, A-4	35-60	50-70	40-65	35-55	30-50	25-35	NP-10
	4-10	Very gravelly clay loam, very cobbly loam, very gravelly loam.	GM	A-4	20-55	50-65	45-60	40-55	35-50	30-40	5-10
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
4, 5---------- Bickleton	0-10	Silt loam--------	ML	A-4	0	100	95-100	85-100	65-90	20-30	NP-5
	10-26	Silt loam--------	ML	A-4	0	100	95-100	90-100	75-85	25-35	NP-10
	26-35	Silt loam, silty clay loam.	ML, CL-ML	A-4	0	85-100	80-95	75-95	55-85	20-30	NP-10
	35-42	Extremely gravelly silty clay loam, very gravelly silt loam.	GC	A-2	15-25	40-65	20-40	15-40	10-35	35-40	15-20
	42	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
6---------- Bocker	0-3	Very cobbly loam	GM	A-4	25-40	55-65	45-55	40-50	35-45	20-30	NP-5
	3-7	Very gravelly loam, very cobbly silt loam, very cobbly loam.	GM	A-2	0-40	50-60	40-50	35-45	25-35	20-30	NP-5
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
7*: Bocker----------	0-3	Very cobbly loam	GM	A-4	25-40	55-65	45-55	40-50	35-45	20-30	NP-5
	3-7	Very gravelly loam, very cobbly silt loam, very cobbly loam.	GM	A-2	0-40	50-60	40-50	35-45	25-35	20-30	NP-5
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
7*:											
Jumpe	0-3	Stony loam	ML	A-4	5-40	85-100	80-95	60-75	50-65	30-40	NP-5
	3-41	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	SM	A-4, A-2	45-55	65-80	35-65	30-60	20-40	30-40	5-10
	41-60	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	GM	A-2, A-1	45-70	40-60	35-55	25-40	20-35	20-30	NP-5
8*:											
Bocker	0-3	Very cobbly loam	GM	A-4	25-40	55-65	45-55	40-50	35-45	20-30	NP-5
	3-7	Very gravelly loam, very cobbly silt loam, very cobbly loam.	GM	A-2	0-40	50-60	40-50	35-45	25-35	20-30	NP-5
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sapkin	0-7	Very stony loam	ML, SM, GM	A-4	50-75	70-80	60-75	50-70	40-60	20-30	NP-5
	7-15	Very cobbly loam, cobbly loam, loam.	ML, SM	A-4	10-55	85-95	75-90	60-80	45-70	20-30	NP-5
	15-27	Very cobbly loam, cobbly loam.	ML, GM, SM	A-4	35-55	70-90	60-80	50-75	40-65	20-30	NP-5
	27-35	Very cobbly loam, extremely cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	55-65	30-60	25-50	20-45	15-40	25-35	5-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
9*:											
Bocker	0-3	Very cobbly loam	GM	A-4	25-40	55-65	45-55	40-50	35-45	20-30	NP-5
	3-7	Very gravelly loam, very cobbly silt loam, very cobbly loam.	GM	A-2	0-40	50-60	40-50	35-45	25-35	20-30	NP-5
	7	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sutkin	0-10	Stony loam	ML	A-4	10-15	85-95	80-90	65-75	50-60	25-35	NP-5
	10-38	Very cobbly loam, very gravelly loam, extremely cobbly loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	30-50	40-70	35-65	30-45	25-40	25-35	5-15
	38-60	Extremely cobbly loam, very cobbly clay loam.	GC, SC, GM-GC, SM-SC	A-4, A-6	45-70	55-75	50-70	45-55	35-45	25-35	5-15
10, 11, 12--- Burke	0-7	Silt loam	ML	A-4	0	100	95-100	85-95	75-95	20-30	NP-5
	7-25	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	95-100	80-95	20-30	NP-5
	25	Indurated	---	---	---	---	---	---	---	---	---
13--- Carmack	0-7	Loam	ML	A-4	0	100	100	75-85	50-65	20-30	NP-5
	7-15	Loam, silt loam	ML	A-4	0	100	100	90-100	80-90	20-30	NP-5
	15-21	Loam, silt loam, gravelly loam.	ML	A-4	0-5	70-100	65-90	60-80	50-65	15-25	NP-5
	21-43	Silty clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	0-5	100	90-100	75-95	70-85	20-40	5-20
	43-60	Loam, silt loam	ML	A-4	0-5	100	90-100	80-90	70-80	20-30	NP-5

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
14, 15, 16---------	0-7	Cobbly loam------	ML	A-4	30-45	100	100	75-85	50-65	20-30	NP-5
Carmack	7-15	Loam, silt loam	ML	A-4	0	100	100	90-100	80-90	20-30	NP-5
	15-21	Loam, silt loam, gravelly loam.	ML	A-4	0-5	70-100	65-90	60-80	50-60	15-25	NP-5
	21-43	Silty clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	0-5	100	90-100	75-95	70-85	20-40	5-20
	43-60	Loam, silt loam	ML	A-4	0-5	100	90-100	80-90	70-80	20-30	NP-5
17*:											
Carmack----------	0-7	Loam-------------	ML	A-4	0	100	100	75-85	50-65	20-30	NP-5
	7-15	Loam, silt loam	ML	A-4	0	100	100	90-100	80-90	20-30	NP-5
	15-21	Loam, silt loam, gravelly loam.	ML	A-4	0-5	70-100	65-90	60-80	50-65	15-25	NP-5
	21-43	Silty clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	0-5	100	90-100	75-95	70-85	20-40	5-20
	43-60	Loam, silt loam	ML	A-4	0-5	100	90-100	80-90	70-80	20-30	NP-5
Rock outcrop.											
18, 19, 20, 21---	0-10	Very fine sandy loam.	ML, SM	A-4	0	95-100	90-100	80-95	40-70	---	NP
Cleman	10-40	Stratified silt loam to loamy fine sand.	ML, SM	A-4	0	95-100	90-100	70-85	40-70	---	NP
	40-60	Stratified silt loam to sand.	ML, SM	A-2, A-4	0	90-100	75-100	50-70	20-50	---	NP
22----------	0-10	Very stony loam	CL-ML, CL	A-4	10-30	80-90	70-90	60-85	50-65	25-30	5-10
Clint	10-19	Very gravelly loam, very gravelly silt loam.	GM-GC	A-2, A-1	5-25	45-55	35-45	30-40	20-35	25-30	5-10
	19-28	Extremely gravelly loam, extremely gravelly silt loam, extremely gravelly sandy loam.	GM-GC, GP-GC	A-2, A-1	20-30	15-35	5-30	5-25	5-20	25-30	5-10
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
23*:											
Clint----------	0-10	Very stony loam	CL-ML, CL	A-4	10-30	80-90	70-90	60-85	50-65	25-30	5-10
	10-19	Very gravelly loam, very gravelly silt loam.	GM-GC	A-2, A-1	5-25	45-55	35-45	30-40	20-35	25-30	5-10
	19-28	Extremely gravelly loam, extremely gravelly silt loam, extremely gravelly sandy loam.	GM-GC, GP-GC	A-2, A-1	20-30	15-35	5-30	5-25	5-20	25-30	5-10
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rubble land.											
24, 25, 26, 27---	0-10	Loam-------------	CL-ML, ML	A-4	0	95-100	90-100	75-95	50-90	15-30	NP-10
Cowiche	10-35	Silt loam, sandy clay loam, loam.	CL, SC	A-2, A-6	0-5	95-100	95-100	50-90	30-85	30-40	10-15
	35-60	Sandy loam, loamy fine sand, very fine sandy loam.	SM	A-2, A-4	0-5	85-100	80-100	40-75	25-50	15-25	NP-5

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
28*:											
Cowiche	0-10	Loam	CL-ML, ML	A-4	0	95-100	90-100	75-95	50-90	15-30	NP-10
	10-35	Silt loam, sandy clay loam, loam.	CL, SC	A-2, A-6	0-5	95-100	95-100	50-90	30-35	30-40	10-15
	35-60	Sandy loam, loamy fine sand, very fine sandy loam.	SM	A-2, A-4	0-5	85-100	80-100	40-75	25-50	15-25	NP-5
Rock Creek	0-2	Very stony silt loam.	ML	A-4	15-40	85-95	70-90	65-85	55-75	20-30	NP-5
	2-10	Extremely cobbly clay loam, very cobbly clay, very gravelly clay.	GM	A-2, A-7	15-70	35-70	25-50	20-45	15-40	40-50	10-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
29. Cryumbrepts											
30 Darland	0-8	Stony loam	SM-SC, SC, GM-GC, GC	A-2, A-4, A-6	5-10	65-75	55-65	40-50	30-40	25-35	5-15
	8-31	Very gravelly loam, very cobbly loam.	GM-GC, GC	A-2	20-40	55-65	40-50	30-40	25-35	25-35	5-15
	31-43	Extremely cobbly loam, very gravelly loam, very cobbly loam.	GM-GC, GC	A-2, A-1	15-75	50-50	35-50	25-35	20-30	25-35	5-15
	43-60	Extremely cobbly sandy loam, very cobbly sandy loam.	GM, SM	A-1, A-2	35-85	50-80	40-60	25-50	15-35	---	NP
31*:											
Darland	0-8	Stony loam	SM-SC, SC, GM-GC, GC	A-2, A-4, A-6	5-10	65-75	55-65	40-50	30-40	25-35	5-15
	8-31	Very gravelly loam, very cobbly loam.	GM-GC, GC	A-2	20-40	55-65	40-50	30-40	25-35	25-35	5-15
	31-43	Extremely cobbly loam, very gravelly loam, very cobbly loam.	GM-GC, GC	A-2, A-1	15-75	50-50	35-50	25-35	20-30	25-35	5-15
	43-60	Extremely cobbly sandy loam, very cobbly sandy loam.	GM, SM	A-1, A-2	35-85	50-80	40-60	25-50	15-35	---	NP
Rubble land.											
32, 33 Esquatzel	0-17	Silt loam	ML	A-4	0	100	100	90-100	75-90	---	NP
	17-60	Silt loam	ML	A-4	0	100	100	95-100	80-95	20-30	NP-5
34 Fiander	0-2	Silt loam	ML	A-4	0	100	100	90-100	70-90	20-25	NP-5
	2-25	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	85-95	30-40	10-15
	25-50	Silt loam	CL-ML	A-4	0-5	95-100	95-100	90-100	70-90	20-25	5-10
	50-60	Silt loam, loamy very fine sand, very fine sandy loam.	SM, ML	A-4	0-5	95-100	95-100	75-90	35-70	---	NP-5

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
35---------- Finley	0-4	Fine sandy loam	ML, SM	A-4	0-5	90-100	85-95	70-90	35-60	---	NP
	4-14	Fine sandy loam, gravelly loam, gravelly sandy loam.	SM, GM	A-1, A-2, A-4	0-5	60-80	50-80	40-65	20-50	---	NP
	14-30	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam.	GM, GP-GM	A-1, A-2	5-10	40-60	25-45	10-30	5-30	---	NP
	30-60	Very cobbly loamy sand, extremely gravelly loamy sand, extremely gravelly sand.	GP, GP-GM	A-1	25-35	20-50	15-45	5-10	0-10	---	NP
36---------- Finley	0-4	Cobbly fine sandy loam.	SM	A-2, A-4	10-25	75-85	70-80	55-60	25-40	---	NP
	4-14	Fine sandy loam, gravelly loam, gravelly sandy loam.	SM, GM	A-1, A-2, A-4	0-10	60-85	50-80	40-60	20-50	---	NP
	14-30	Very gravelly loam, very cobbly sandy loam, extremely cobbly fine sandy loam.	GM, SM	A-1, A-2	35-55	40-70	25-60	20-40	10-30	---	NP
	30-60	Very cobbly loamy sand, extremely gravelly loamy sand, extremely cobbly loamy sand.	GP, GP-GM	A-1	35-50	20-50	15-45	5-10	0-10	---	NP
37, 38, 39, 40--- Finley	0-12	Silt loam--------	ML	A-4	0-5	90-100	85-100	70-95	50-70	---	NP
	12-30	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam.	GM, GP-GM	A-1, A-2	5-10	40-60	25-45	10-30	5-30	---	NP
	30-60	Very cobbly loamy sand, extremely gravelly loamy sand, extremely gravelly sand.	GP, GP-GM	A-1	25-35	20-50	15-45	5-10	0-10	---	NP
41---------- Gorskel	0-5	Very stony loam	GM-GC, GC	A-4	30-55	55-70	50-60	45-55	35-45	15-25	NP-10
	5-13	Very gravelly loam, very gravelly clay loam, very cobbly clay loam.	GC, SC	A-2, A-6	5-30	55-70	45-60	35-50	25-45	30-40	10-20
	13	Indurated--------	---	---	---	---	---	---	---	---	---
42*: Gorskel----------	0-5	Very stony loam	GM-GC, GC	A-4	30-55	55-70	50-60	45-55	35-45	15-25	NP-10
	5-13	Very gravelly loam, very gravelly clay loam, very cobbly clay loam.	GC, SC	A-2, A-6	5-30	55-70	45-60	35-50	25-45	30-40	10-20
	13	Indurated--------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
42*:											
Harwood	0-8	Loam	ML	A-4	0-5	95-100	95-100	80-95	60-75	20-25	NP-5
	8-26	Loam, silt loam	CL	A-6	0-5	95-100	95-100	80-95	60-75	25-35	10-15
	26-30	Gravelly loam, gravelly silt loam.	GC	A-6	0-5	60-70	55-65	50-60	35-45	25-35	10-15
	30	Indurated	---	---	---	---	---	---	---	---	---
43, 44	0-7	Loam	CL-ML	A-4	0-5	95-100	95-100	80-95	60-75	20-25	5-10
Gorst	7-15	Loam, silt loam	CL	A-6	0-5	95-100	85-100	80-95	60-75	25-35	10-15
	15	Cemented	---	---	---	---	---	---	---	---	---
45	0-7	Cobbly loam	CL-ML	A-4	30-35	95-100	90-95	85-90	55-65	20-25	5-10
Gorst	7-15	Loam, silt loam	CL	A-6	0-5	95-100	85-100	80-95	60-75	25-35	10-15
	15	Cemented	---	---	---	---	---	---	---	---	---
46, 47, 48, 49	0-8	Loam	ML	A-4	0-5	95-100	95-100	80-95	60-75	20-25	NP-5
Harwood	8-26	Loam, silt loam	CL	A-6	0-5	95-100	95-100	80-95	60-75	25-35	10-15
	26-30	Gravelly loam, gravelly silt loam.	GC	A-6	0-5	60-70	55-65	50-60	35-45	25-35	10-15
	30	Indurated	---	---	---	---	---	---	---	---	---
50*, 51*, 52*, 53*, 54*:											
Harwood	0-8	Silt loam	ML	A-4	0-5	95-100	95-100	80-95	60-75	20-25	NP-5
	8-26	Loam, silt loam	CL	A-6	0-5	95-100	95-100	80-95	60-75	25-35	10-15
	26-30	Gravelly loam, gravelly silt loam.	GC	A-6	0-5	60-70	55-65	50-60	35-45	25-35	10-15
	30	Indurated	---	---	---	---	---	---	---	---	---
Burke	0-7	Silt loam	ML	A-4	0	100	95-100	85-95	75-95	20-30	NP-5
	7-25	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	95-100	80-95	20-30	NP-5
	25	Indurated	---	---	---	---	---	---	---	---	---
Wiehl	0-3	Silt loam	ML	A-4	0	100	100	85-95	60-70	---	NP
	3-21	Fine sandy loam, very fine sandy loam, silt loam.	SM, ML	A-4	0-5	100	100	80-95	40-65	---	NP
	21-27	Very fine sandy loam, fine sandy loam, gravelly silt loam.	SM, ML	A-4	0-5	70-100	60-100	55-95	40-65	---	NP
	27	Weathered bedrock	---	---	---	---	---	---	---	---	---
55*:											
Harwood	0-8	Very stony silt loam.	ML	A-4	15-25	90-100	90-100	75-95	55-75	20-25	NP-5
	8-26	Silt loam, loam	CL	A-6	0-5	95-100	95-100	80-95	60-75	25-35	10-15
	26-30	Gravelly silt loam, gravelly loam.	GC	A-6	0-5	60-70	55-65	50-60	35-45	25-35	10-15
	30	Indurated	---	---	---	---	---	---	---	---	---
Burke	0-7	Very stony silt loam.	ML	A-4	15-25	90-100	90-100	80-90	75-90	20-30	NP-5
	7-25	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	95-100	80-95	20-30	NP-5
	25	Indurated	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
55*:											
Wiehl	0-3	Very stony silt loam.	ML, SM	A-4	15-25	90-100	90-100	70-95	40-65	---	NP
	3-21	Fine sandy loam, very fine sandy loam, silt loam.	SM, ML	A-4	0	90-100	90-100	70-95	40-65	---	NP
	21-27	Very fine sandy loam, fine sandy loam, gravelly silt loam.	ML, SM	A-4	0	70-100	60-100	55-95	40-65	---	NP
	27	Weathered bedrock	---	---	---	---	---	---	---	---	---
56*:											
Harwood	0-8	Loam	ML	A-4	0-5	95-100	95-100	80-95	60-75	20-25	NP-5
	8-26	Loam, silt loam	CL	A-6	0-5	95-100	95-100	80-95	60-75	25-35	10-15
	26-30	Gravelly loam, gravelly silt loam.	GC	A-6	0-5	60-70	55-65	50-60	35-45	25-35	10-15
	30	Indurated	---	---	---	---	---	---	---	---	---
Gorst	0-7	Cobbly loam	CL-ML	A-4	30-35	95-100	90-95	85-90	55-65	20-25	5-10
	7-15	Loam, silt loam	CL	A-6	0-5	95-100	85-100	80-95	60-75	25-35	10-15
	15	Cemented	---	---	---	---	---	---	---	---	---
57, 58	0-6	Loamy fine sand	SM	A-2	0	100	100	50-85	15-35	---	NP
Hezel	6-22	Loamy fine sand, loamy sand, fine sand.	SM	A-2	0	100	100	50-75	15-35	---	NP
	22-60	Stratified silt loam to fine sandy loam.	ML	A-4	0	100	100	80-100	50-80	---	NP
59, 60, 61	0-3	Stony loam	ML	A-4	5-40	85-100	80-95	60-75	50-65	30-40	NP-5
Jumpe	3-41	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	SM	A-4, A-2	45-55	65-80	35-65	30-60	20-40	30-40	5-10
	41-60	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	GM	A-2, A-1	45-70	40-60	35-55	25-40	20-35	20-30	NP-5
62, 63	0-6	Stony loam	ML	A-4	5-40	85-100	80-95	60-75	50-65	30-40	NP-5
Jumpe	6-37	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	SM	A-4, A-2	45-55	65-80	35-65	30-60	20-40	30-40	5-10
	37-60	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	GM	A-2, A-1	45-70	40-60	35-55	25-40	20-35	20-30	NP-5
64*:											
Jumpe	0-6	Stony loam	ML	A-4	5-40	85-100	80-95	60-75	50-65	30-40	NP-5
	6-37	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	SM	A-4, A-2	45-55	65-80	35-65	30-60	20-40	30-40	5-10
	37-60	Extremely cobbly loam, very cobbly silt loam, very cobbly loam.	GM	A-2, A-1	45-70	40-60	35-55	25-40	20-35	20-30	NP-5
Rock outcrop.											

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
65---------- Kiona	0-5	Stony silt loam	ML	A-4	10-15	90-95	80-90	70-85	55-70	25-35	NP-5
	5-14	Cobbly silt loam, very cobbly loam, cobbly very fine sandy loam.	ML, GM, SM	A-4	20-30	60-85	50-75	45-70	35-65	25-35	NP-5
	14-60	Extremely cobbly loam, very cobbly silt loam, very cobbly sandy loam.	GM	A-2, A-1, A-4	35-55	45-70	40-60	35-50	15-45	25-35	NP-5
66---------- Kittitas	0-19	Silt loam--------	CL-ML	A-4	0	100	100	90-100	80-90	20-30	5-10
	19-41	Silt loam, silty clay loam, very fine sandy loam.	CL	A-6	0	100	90-100	90-100	85-95	30-40	10-20
	41-60	Stratified silty clay loam to fine sandy loam.	ML	A-4	0	100	100	70-90	60-85	20-30	NP-5
67---------- Lickskillet	0-8	Silt loam--------	CL	A-6	0-5	90-100	85-95	75-90	65-80	25-35	10-15
	8-20	Very gravelly clay loam, very gravelly loam, very cobbly loam.	GC	A-6, A-2	0-15	35-55	30-50	25-50	20-40	30-40	10-20
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
68---------- Lickskillet	0-3	Very stony silt loam.	CL-ML	A-4	10-20	80-90	70-80	60-70	50-60	25-30	5-10
	3-20	Very gravelly clay loam, very gravelly loam, very cobbly loam.	GC	A-2, A-6, A-7	15-50	40-65	30-50	25-50	20-40	35-45	15-20
	20	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
69---------- Logy	0-12	Silt loam--------	ML	A-4	0-5	95-100	85-95	80-90	60-80	20-25	NP-5
	12-33	Extremely gravelly loam, very gravelly silt loam.	GM	A-2, A-1	20-35	55-65	25-40	20-40	15-30	20-25	NP-5
	33-60	Extremely gravelly coarse sand, extremely cobbly coarse sand.	GP, SP	A-1	25-40	40-60	15-35	5-20	0-5	---	NP
70---------- Logy	0-12	Cobbly silt loam	ML	A-4	15-30	90-95	85-90	55-65	50-60	20-25	NP-5
	12-33	Extremely gravelly loam, very gravelly silt loam.	GM	A-2, A-1	20-35	55-65	25-40	20-40	15-30	20-25	NP-5
	33-60	Extremely gravelly coarse sand, extremely cobbly coarse sand.	GP, SP	A-1	25-40	40-60	15-35	5-20	0-5	---	NP
71, 72, 73------- Loneridge	0-3	Stony loam-------	CL-ML, ML	A-4	10-15	90-95	85-95	65-75	55-65	20-30	NP-10
	3-23	Very gravelly loam, very cobbly silt loam cobbly loam.	GM-GC, SM-SC	A-2, A-4	15-40	60-90	50-65	40-60	30-45	20-30	5-10
	23-60	Very cobbly clay, very cobbly clay loam, extremely gravelly clay.	GC, SC	A-2, A-7	15-45	45-80	25-50	20-45	20-45	45-55	20-30

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
74, 75---------- McDaniel	0-8	Very stony loam	CL-ML	A-4	10-30	75-80	70-75	65-75	50-65	25-30	5-10
	8-24	Very gravelly clay loam, very cobbly silty clay loam, very gravelly silty clay loam.	GC	A-6, A-2	15-40	40-70	35-55	30-50	25-50	35-40	15-20
	24-60	Extremely cobbly silty clay loam, very gravelly silty clay loam.	GC	A-2	25-65	40-60	20-60	15-30	10-25	35-40	15-20
76*:											
McDaniel--------	0-8	Very stony loam	CL-ML	A-4	10-30	75-80	70-75	65-75	50-65	25-30	5-10
	8-35	Very gravelly clay loam, very cobbly silty clay loam, very gravelly silty clay loam.	GC	A-6, A-2	15-40	40-70	35-55	30-50	25-50	35-40	15-20
	35-60	Extremely cobbly silty clay loam, very gravelly silty clay loam.	GC	A-2	25-65	40-60	20-60	15-30	10-25	35-40	15-20
Rock Creek------	0-2	Very stony silt loam.	ML	A-4	15-40	85-95	70-90	65-85	55-75	20-30	NP-5
	2-10	Extremely cobbly clay loam, very cobbly clay, very gravelly clay.	GM	A-2, A-7	15-70	35-70	25-50	20-45	15-40	40-50	10-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
77---------- Meystre	0-3	Loam----------	CL-ML, ML	A-4	0	100	100	85-95	60-75	20-30	NP-10
	3-11	Loam----------	CL-ML	A-4	0	100	100	85-95	60-75	20-30	5-10
	11-29	Clay loam, loam	CL	A-6	0-5	100	100	90-100	70-80	35-40	15-20
	29-60	Fine sandy loam, sandy loam.	SM, ML	A-4	0	100	100	70-85	40-55	---	NP
78---------- Meystre	0-3	Stony loam-------	CL-ML, ML	A-4	5-10	95-100	95-100	80-90	60-75	20-30	NP-10
	3-11	Loam----------	CL-ML	A-4	0	100	100	85-95	60-75	20-30	5-10
	11-29	Clay loam, loam	CL	A-6	0-5	100	100	90-100	70-80	35-40	15-20
	29-60	Fine sandy loam, sandy loam.	SM, ML	A-4	0	100	100	70-85	40-55	---	NP
79, 80, 81------- Mikkalo	0-5	Silt loam--------	ML	A-4	0	100	95-100	95-100	80-95	20-30	NP-5
	5-30	Silt loam--------	ML	A-4	0	100	90-100	90-100	80-90	20-30	NP-5
	30	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
82---------- Mippon	0-7	Very cobbly silt loam.	SM, GM	A-2, A-4	30-55	60-80	50-70	40-60	30-50	20-30	NP-5
	7-14	Very gravelly sandy loam, very cobbly loam.	GP-GM, GM	A-1	10-45	40-60	35-50	15-30	5-20	---	NP
	14-60	Extremely cobbly loamy sand, extremely gravelly sand, very cobbly sand.	GP, SP, GP-GM, SP-SM	A-1	25-55	25-75	15-45	10-40	0-10	---	NP
83, 84---------- Moxee	0-7	Silt loam--------	ML	A-4	0	95-100	95-100	90-100	70-90	---	NP
	7-11	Silt loam--------	ML	A-4	0	90-100	90-100	85-95	70-90	---	NP
	11-18	Silt loam, gravelly silt loam.	SM, ML, GM	A-4	0-5	60-90	55-85	50-80	40-70	---	NP
	18	Cemented---------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
85----------	0-7	Cobbly silt loam	ML	A-4	20-35	90-100	80-90	75-85	70-80	---	NP
Moxee	7-11	Silt loam--------	ML	A-4	0	90-100	90-100	85-95	70-90	---	NP
	11-18	Silt loam, gravelly silt loam.	SM, ML, GM	A-4	0-5	60-90	55-85	50-80	40-70	---	NP
	18	Cemented---------	---	---	---	---	---	---	---	---	---
86----------	0-9	Loam----------	ML	A-4	0	95-100	95-100	80-90	50-65	20-25	NP-5
Naches	9-21	Loam, clay loam, sandy clay loam.	CL, SC	A-6	0	85-100	75-100	50-90	35-60	30-35	15-20
	21-34	Fine sandy loam, gravelly loam, silt loam.	SM, ML	A-4, A-2	0-5	70-95	55-90	40-80	25-65	25-30	NP-5
	34-60	Extremely gravelly sand, extremely gravelly loamy sand.	GP, GP-GM	A-1	10-45	30-40	10-25	5-15	0-10	---	NP
87----------	0-14	Loam----------	ML	A-4	0-10	85-95	80-90	60-75	50-65	25-35	NP-5
Naxing	14-21	Very cobbly loam, very cobbly sandy loam.	GM, SM	A-2, A-4, A-1	45-65	55-85	50-80	35-70	15-50	25-35	NP-5
	21-60	Extremely gravelly loam, very cobbly sandy loam, extremely cobbly loam.	GM, SM	A-2, A-4, A-1	30-50	35-75	30-60	20-55	10-40	25-35	NP-5
88, 89----------	0-14	Stony loam-------	ML	A-4	5-15	80-95	75-90	60-75	50-65	25-35	NP-5
Naxing	14-21	Very cobbly loam, very cobbly sandy loam.	GM, SM	A-2, A-4, A-1	45-65	55-85	50-80	35-70	15-50	25-35	NP-5
	21-60	Extremely gravelly loam, very cobbly sandy loam, extremely cobbly loam.	GM, SM	A-2, A-4, A-1	30-50	35-75	30-60	20-55	10-40	25-35	NP-5
90----------	0-18	Cobbly silt loam	SM, ML	A-4	15-30	75-95	75-90	65-80	40-60	20-30	NP-5
Odo	18-60	Gravelly loam, loam.	GM-GC, GM, SM, SM-SC	A-4	0-15	60-85	55-80	45-70	35-50	25-35	5-10
91----------	0-8	Fine sandy loam	SM, ML	A-4	0	100	95-100	70-85	40-55	---	NP
Outlook	8-60	Very fine sandy loam, silt loam.	ML	A-4	0	100	95-100	90-100	80-95	---	NP
92----------	0-8	Silt loam--------	ML	A-4	0	100	95-100	85-100	70-90	---	NP
Outlook	8-60	Very fine sandy loam, silt loam.	ML	A-4	0	100	95-100	90-100	80-95	---	NP
93*. Pits											
94----------	0-4	Silt loam--------	ML	A-4	0	100	95-100	85-95	50-90	20-30	NP-5
Prosser	4-33	Very fine sandy loam, silt loam.	ML	A-4	0-5	95-100	90-100	80-90	50-80	20-30	NP-5
	33	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
95----------	0-20	Loamy fine sand	SM	A-2	0	100	100	85-100	15-30	---	NP
Quincy	20-60	Loamy fine sand, fine sand, sand.	SM	A-2	0	100	100	65-80	10-30	---	NP
96----------	0-7	Silt loam--------	ML	A-4	0	100	95-100	95-100	80-95	---	NP
Renslow	7-30	Silt loam--------	CL-ML	A-4	0	100	95-100	95-100	80-95	20-30	5-10
	30-60	Silt loam, silt	ML, CL-ML	A-4	0	100	95-100	95-100	80-90	20-30	NP-10

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
97, 98---------- Renslow	0-7	Silt loam--------	ML	A-4	0	100	100	95-100	80-100	---	NP
	7-30	Silt loam--------	ML	A-4	0	100	100	95-100	80-100	20-25	NP-10
	30-44	Silt loam, silt	ML	A-4	0	90-100	90-100	90-100	75-100	20-25	NP-5
	44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
99, 100, 101, 102, 103-------- Ritzville	0-7	Silt loam--------	ML	A-4	0	100	90-100	95-100	95-100	---	NP
	7-37	Silt loam--------	ML	A-4	0	100	100	95-100	80-90	---	NP
	37-60	Silt loam--------	ML	A-4	0	100	100	95-100	75-90	---	NP
104, 105--------- Ritzville	0-7	Silt loam--------	ML	A-4	0	100	100	95-100	70-90	---	NP
	7-37	Silt loam--------	ML	A-4	0	100	100	95-100	75-90	---	NP
	37-45	Silt loam--------	ML	A-4	0	100	100	95-100	75-90	---	NP
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
106---------- Ritzville	0-7	Silt loam--------	ML	A-4	0	100	100	95-100	70-90	---	NP
	7-37	Silt loam--------	ML	A-4	0	100	100	95-100	75-90	---	NP
	37-45	Silt loam--------	ML	A-4	0	100	100	95-100	75-90	---	NP
	45	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
107---------- Ritzville Variant	0-7	Silt loam--------	ML	A-4	0	90-100	90-100	85-95	80-90	---	NP
	7-18	Silt loam--------	ML	A-4	0	90-100	90-100	85-95	80-90	---	NP
	18-28	Gravelly silt loam.	ML	A-4	0	70-85	60-75	55-70	50-65	---	NP
	28-60	Very cobbly silt loam, very cobbly loam.	ML	A-4	40-50	80-90	75-85	65-75	50-60	---	NP
108---------- Ritzville Variant	0-7	Cobbly silt loam	ML	A-4	15-25	90-100	85-100	80-90	75-80	---	NP
	7-18	Silt loam--------	ML	A-4	0	90-100	90-100	85-95	80-90	---	NP
	18-28	Gravelly silt loam.	ML	A-4	0	70-85	60-75	55-70	50-65	---	NP
	28-60	Very cobbly silt loam, very cobbly loam.	ML	A-4	40-50	80-90	75-85	65-75	50-60	---	NP
109---------- Rock Creek	0-2	Very stony silt loam.	ML	A-4	15-40	85-95	70-90	65-85	55-75	20-30	NP-5
	2-10	Extremely cobbly clay loam, very cobbly clay, very gravelly clay.	GM	A-2, A-7	15-70	35-70	25-50	20-45	15-40	40-50	10-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
110*: Rock Creek------	0-2	Very stony silt loam.	ML	A-4	15-40	85-95	70-90	65-85	55-75	20-30	NP-5
	2-10	Extremely cobbly clay loam, very cobbly clay, very gravelly clay.	GM	A-2, A-7	15-70	35-70	25-50	20-45	15-40	40-50	10-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
110*:											
Clint----------	0-10	Very stony loam	CL-ML, CL	A-4	10-30	80-90	70-90	60-85	50-65	25-30	5-10
	10-19	Very gravelly loam, very gravelly silt loam.	GM-GC	A-2, A-1	5-25	45-55	35-45	30-40	20-35	25-30	5-10
	19-28	Extremely gravelly loam, extremely gravelly silt loam, extremely gravelly sandy	GM-GC, GP-GC	A-2, A-1	20-30	15-35	5-30	5-25	5-20	25-30	5-10
	28	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Simcoe----------	0-14	Silt loam--------	CL-ML	A-4	0-5	95-100	90-100	90-100	70-90	25-30	5-10
	14-27	Silt loam, silty clay loam, clay loam.	ML	A-4, A-6	0-5	90-100	85-95	80-90	70-85	30-40	5-15
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
111, 112, 113, 114----------	0-2	Clay loam--------	CL	A-7	0-5	95-100	95-100	85-100	60-80	40-45	20-25
Roza	2-19	Silty clay, clay loam, clay.	CH	A-7	0-5	95-100	95-100	85-100	75-95	50-60	25-30
	19-60	Silty clay loam, clay loam, silty clay.	CL	A-7	0-5	95-100	95-100	85-100	60-95	40-50	20-30
115*:											
Rubble land.											
Rock outcrop.											
116, 117----------	0-7	Very stony loam	ML, SM, GM	A-4	50-75	70-80	60-75	50-70	40-60	20-30	NP-5
Sapkin	7-15	Very cobbly loam, cobbly loam, loam.	ML, SM	A-4	10-55	85-95	75-90	60-80	45-70	20-30	NP-5
	15-27	Very cobbly loam, cobbly loam.	ML, GM, SM	A-4	35-55	70-90	60-80	50-75	40-65	20-30	NP-5
	27-35	Very cobbly loam, extremely cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	55-65	30-60	25-50	20-45	15-40	25-35	5-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
118*:											
Sapkin----------	0-7	Very stony loam	ML, SM, GM	A-4	50-75	70-80	60-75	50-70	40-60	20-30	NP-5
	7-15	Very cobbly loam, cobbly loam, loam.	ML, SM	A-4	10-55	85-95	75-90	60-80	45-70	20-30	NP-5
	15-27	Very cobbly loam, cobbly loam.	ML, GM, SM	A-4	35-55	70-90	60-80	50-75	40-65	20-30	NP-5
	27-35	Very cobbly loam, extremely cobbly clay loam.	GM-GC, GC	A-2, A-4, A-6	55-65	30-60	25-50	20-45	15-40	25-35	5-15
	35	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rubble land.											
119----------	0-11	Cobbly loam------	ML	A-4	15-25	85-95	80-90	55-75	50-60	30-40	NP-5
Saydab	11-27	Very cobbly loam, very cobbly silt loam.	GM, SM	A-4	30-55	55-80	50-70	45-65	35-50	30-40	NP-5
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
120, 121, 122, 123---------- Scoon	0-6	Silt loam--------	ML	A-4	0	95-100	90-100	70-100	60-80	15-25	NP-5
	6-16	Silt loam, gravelly silt loam, gravelly very fine sandy loam.	GM, SM, ML	A-4	0-10	60-100	55-100	50-85	35-75	20-25	NP-5
	16	Indurated--------	---	---	---	---	---	---	---	---	---
124, 125, 126---- Scooteney	0-6	Silt loam--------	ML, SM	A-4	0-5	90-100	75-95	70-90	40-60	---	NP
	6-22	Loam, very fine sandy loam, silt loam.	ML, SM	A-4	0-5	90-100	75-95	70-90	40-60	---	NP
	22-33	Gravelly very fine sandy loam, gravelly fine sandy loam, cobbly loam.	SM	A-2, A-4	0-20	80-85	70-80	55-75	30-50	---	NP
	33-60	Very gravelly fine sandy loam, very cobbly sandy loam, very gravelly sandy loam.	SM	A-2, A-1	20-45	70-90	40-55	40-50	15-30	---	NP
127---------- Scooteney	0-6	Cobbly silt loam	SM, ML, GM	A-4	15-30	70-90	65-85	60-80	40-70	---	NP
	6-22	Loam, very fine sandy loam, silt loam.	ML, SM	A-4	0-5	90-100	75-95	70-90	40-60	---	NP
	22-33	Gravelly very fine sandy loam, gravelly fine sandy loam.	SM	A-2, A-4	5-15	75-85	70-80	65-75	30-50	---	NP
	33-60	Very gravelly sandy loam, very cobbly sandy loam.	SM	A-2, A-1	20-55	70-90	50-60	30-50	15-30	---	NP
128, 129, 130, 131---------- Selah	0-7	Silt loam--------	ML	A-4	0	100	100	90-100	70-90	20-25	NP-5
	7-34	Silt loam, silty clay loam, clay loam.	CL	A-6	0-5	100	95-100	85-95	65-85	30-40	10-20
	34	Indurated--------	---	---	---	---	---	---	---	---	---
132, 133, 134, 135---------- Shano	0-4	Silt loam--------	ML	A-4	0	100	100	90-100	75-80	---	NP
	4-30	Silt loam--------	ML	A-4	0	100	100	95-100	80-90	---	NP
	30-60	Silt loam--------	ML	A-4	0	100	100	95-100	80-90	---	NP
136, 137--------- Simcoe	0-14	Silt loam--------	CL-ML	A-4	0-5	95-100	90-100	90-100	70-90	25-30	5-10
	14-27	Silt loam, silty clay loam, clay loam.	ML	A-4, A-6	0-5	90-100	85-95	80-90	70-85	30-40	5-15
	27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
138---------- Sinloc	0-3	Fine sandy loam	ML	A-4	0	100	95-100	80-90	50-60	---	NP
	3-15	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	75-90	---	NP
	15-45	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	75-90	---	NP
	45-60	Sandy loam, loamy fine sand, loamy sand.	SM	A-2, A-4	0	100	95-100	65-95	25-50	---	NP

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
139, 140, 141---- Sinloc	0-3	Silt loam--------	ML	A-4	0	100	95-100	90-100	70-100	---	NP
	3-15	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	75-90	---	NP
	15-45	Silt loam, very fine sandy loam.	ML	A-4	0	100	95-100	90-100	75-90	---	NP
	45-60	Sandy loam, loamy fine sand, loamy sand.	SM	A-2, A-4	0	100	95-100	65-95	25-50	---	NP
142---------- Starbuck	0-6	Silt loam--------	ML	A-4	0-5	100	90-100	80-90	70-80	20-30	NP-5
	6-16	Silt loam, fine sandy loam, gravelly silt loam.	ML, SM	A-4	0-15	80-90	50-85	50-60	35-50	20-30	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
143*, 144*: Starbuck--------	0-6	Silt loam--------	ML	A-4	0-5	100	90-100	80-90	70-80	20-30	NP-5
	6-16	Silt loam, fine sandy loam, gravelly silt loam.	ML, SM	A-4	0-15	80-90	60-85	50-60	35-60	20-30	NP-5
	16	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
145, 146, 147---- Sutkin	0-10	Stony loam-------	ML	A-4	10-15	85-95	80-90	65-75	50-60	25-35	NP-5
	10-38	Very cobbly loam, very gravelly loam, extremely cobbly loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	30-50	40-70	35-65	30-45	25-40	25-35	5-15
	38-60	Extremely cobbly loam, very cobbly clay loam.	GC, SC, GM-GC, SM-SC	A-4, A-6	45-70	55-75	50-70	45-55	35-45	25-35	5-15
148---------- Sutkin	0-10	Stony loam-------	ML	A-4	10-15	85-95	80-90	65-75	50-60	25-35	NP-5
	10-38	Very cobbly loam, very gravelly loam, extremely cobbly loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	20-50	40-85	35-65	30-45	25-40	25-35	5-15
	38-60	Extremely cobbly loam, very cobbly clay loam.	GM-GC, SM-SC, SC	A-4, A-6	45-70	55-75	50-70	45-55	35-45	25-35	5-15
149*: Sutkin----------	0-10	Stony loam-------	ML	A-4	10-15	85-95	80-90	65-75	50-60	25-35	NP-5
	10-38	Very cobbly loam, very gravelly loam, extremely cobbly loam.	GM-GC, GC, SM-SC, SC	A-2, A-4, A-6	30-50	40-70	35-65	30-45	25-40	25-35	5-15
	38-60	Extremely cobbly loam, very cobbly clay loam.	GC, SC, GM-GC, SM-SC	A-4, A-6	45-70	55-75	50-70	45-55	35-45	25-35	5-15
Rock outcrop.											

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
150---------- Sutkin Variant	0-8	Stony loam-------	ML	A-4	5-15	85-95	80-90	65-75	50-60	20-25	NP-5
	8-14	Gravelly loam----	ML, GM, SM	A-4	0-5	70-80	65-75	55-65	45-55	20-25	NP-5
	14-18	Very gravelly loam, very cobbly loam.	GM, SM	A-2, A-4, A-1	20-35	40-85	35-55	25-50	20-40	20-30	NP-5
	18-60	Extremely gravelly sandy loam, very gravelly sandy loam.	GP-GM, GM	A-1	10-15	20-45	10-35	10-25	5-15	---	NP
151, 152, 153---- Taneum	0-14	Loam----------	CL-ML	A-4	0	95-100	95-100	85-95	60-75	20-30	5-10
	14-43	Silty clay loam, clay loam.	CL	A-6	0	95-100	95-100	85-90	70-85	35-40	15-20
	43-60	Loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	95-100	95-100	60-95	30-75	15-30	NP-10
154*: Taneum----------	0-14	Loam----------	CL-ML	A-4	0	95-100	95-100	85-95	60-75	20-30	5-10
	14-43	Silty clay loam, clay loam.	CL	A-6	0	95-100	95-100	85-90	70-85	35-40	15-20
	43-60	Loam, sandy loam.	SM, ML, CL-ML, SM-SC	A-2, A-4	0	95-100	95-100	60-95	30-75	15-30	NP-10
Rock Creek------	0-2	Very stony silt loam.	ML	A-4	15-40	85-95	70-90	65-85	55-75	20-30	NP-5
	2-10	Extremely cobbly clay loam, very cobbly clay, very gravelly clay.	GM	A-2, A-7	15-70	35-70	25-50	20-45	15-40	40-50	10-20
	10	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
155---------- Tekison	0-12	Stony loam-------	CL-ML, CL	A-4, A-6	10-15	90-95	85-95	65-75	55-65	25-35	5-15
	12-20	Very cobbly clay loam, very cobbly loam.	SC, GC	A-2, A-6	30-50	60-90	40-65	30-45	25-40	30-40	10-20
	20-60	Very cobbly clay, very gravelly clay, very cobbly clay loam.	GC	A-2, A-7	20-50	50-70	35-50	30-40	25-40	45-60	20-30
156---------- Tieton	0-9	Fine sandy loam--	SM	A-4	0	95-100	95-100	65-85	40-50	---	NP
	9-15	Loam----------	CL-ML	A-4	0	95-100	95-100	80-95	60-75	20-25	5-10
	15-44	Silty clay loam, clay loam, loam.	CL	A-6	0	95-100	90-100	80-90	60-85	30-40	10-20
	44-50	Loam, clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-90	60-70	25-40	5-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
157, 158, 159, 160, 161-------- Tieton	0-9	Loam----------	ML	A-4	0	95-100	95-100	80-95	60-75	20-25	NP-5
	9-15	Loam----------	CL-ML	A-4	0	95-100	95-100	80-95	60-75	20-25	5-10
	15-44	Silty clay loam, clay loam, loam.	CL	A-6	0	95-100	90-100	80-90	60-85	30-40	10-20
	44-50	Loam, clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-90	60-70	25-40	5-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
162*:											
Tieton	0-9	Loam	ML	A-4	0	95-100	95-100	80-95	60-75	20-25	NP-5
	9-15	Loam	CL-ML	A-4	0	95-100	95-100	80-95	60-75	20-25	5-10
	15-44	Silty clay loam, clay loam, loam.	CL	A-6	0	95-100	90-100	80-90	60-85	30-40	10-20
	44-50	Loam, clay loam.	CL, CL-ML	A-4, A-6	0	95-100	95-100	80-90	60-70	25-40	5-20
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop.											
163	0-4	Silt loam	ML	A-4	0	100	95-100	90-100	80-90	20-30	NP-5
Toppenish	4-50	Clay loam, silt loam, silty clay loam.	CL	A-6	0	100	75-95	70-90	60-90	30-40	10-20
	50-60	Extremely gravelly sandy loam, extremely gravelly sand.	GP, GP-GM	A-1	10-40	30-40	10-25	5-20	0-10	---	NP
164. Torriorthents											
165	0-14	Loam	ML	A-4	0-5	90-95	80-90	70-85	50-65	20-25	NP-5
Track	14-26	Very gravelly loam.	GM	A-4, A-2, A-1	5-30	40-60	35-50	30-50	20-40	20-25	NP-5
	26-60	Very gravelly sand, very gravelly loamy sand.	GP-GM, SP-SM	A-1	10-25	50-70	35-50	20-35	5-10	---	NP
166, 167	0-4	Very stony sandy loam.	SM, ML, GM	A-2, A-4	5-20	70-90	60-75	50-70	30-55	25-35	NP-5
Tumac	4-15	Very gravelly loam.	GM, SM	A-1, A-2, A-4	0-10	55-75	40-50	25-45	20-40	25-35	NP-5
	15-60	Very gravelly loam, very cobbly sandy loam, extremely gravelly loam.	GM, SM	A-1	5-30	40-70	20-50	15-40	10-25	25-35	NP-5
168	0-7	Silt loam	ML	A-4	0	95-100	95-100	95-100	75-95	20-30	NP-5
Umapine	7-60	Silt loam	ML	A-4	0	100	100	95-100	75-95	20-30	NP-5
169, 170	0-7	Silt loam	ML	A-4	0	100	100	95-100	75-85	20-30	NP-5
Umapine	7-60	Silt loam	ML	A-4	0	100	100	95-100	75-85	20-30	NP-5
171	0-6	Loamy fine sand	SM	A-2	0	100	100	75-85	15-35	---	NP
Wanser	6-60	Sand, fine sand, loamy fine sand.	SM	A-2	0	100	100	70-80	15-35	---	NP
172, 173, 174, 175	0-5	Fine sandy loam	ML, SM	A-4	0	95-100	95-100	85-95	40-65	---	NP
Warden	5-19	Very fine sandy loam, silt loam.	ML	A-4	0	95-100	95-100	95-100	75-90	25-30	NP-5
	19-60	Stratified silt loam to very fine sandy loam.	ML	A-4	0	95-100	95-100	95-100	75-90	25-30	NP-5
176, 177, 178, 179, 180	0-5	Silt loam	ML	A-4	0	95-100	95-100	85-100	70-80	25-30	NP-5
Warden	5-19	Very fine sandy loam, silt loam.	ML	A-4	0	95-100	95-100	95-100	75-90	25-30	NP-5
	19-60	Stratified silt loam to very fine sandy loam.	ML	A-4	0	95-100	95-100	95-100	75-90	25-30	NP-5

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
181---------- Weirman	0-8	Sandy loam-------	SM	A-4	0-5	90-95	80-90	65-75	35-50	---	NP
	8-21	Loamy fine sand, sand, loamy sand.	SM	A-2, A-1	0-5	90-95	85-90	45-65	15-30	---	NP
	21-60	Very gravelly loamy sand, very gravelly sand, extremely gravelly sand.	GP, GP-GM	A-1	10-30	30-50	10-45	5-20	0-10	---	NP
182---------- Weirman	0-8	Fine sandy loam	SM	A-4	0-5	90-95	80-90	65-75	35-50	---	NP
	8-21	Loamy fine sand, sand, loamy sand.	SM	A-2, A-1	0-5	90-95	85-90	45-65	15-30	---	NP
	21-60	Very gravelly loamy sand, very gravelly sand, extremely gravelly sand.	GP, GP-GM	A-1	10-30	30-50	10-45	5-20	0-10	---	NP
183---------- Weirman	0-8	Gravelly fine sandy loam.	SM	A-2	0-5	65-75	60-70	45-55	25-35	---	NP
	8-21	Loamy fine sand, sand, loamy sand.	SM	A-2, A-1	0-5	90-95	85-90	45-65	15-30	---	NP
	21-60	Very gravelly loamy sand, very gravelly sand, extremely gravelly sand.	GP, GP-GM	A-1	10-30	30-50	10-45	5-20	0-10	---	NP
184---------- Weirman	0-8	Fine sandy loam	SM	A-4	0-5	90-95	80-90	65-75	35-50	---	NP
	8-21	Loamy fine sand, sand, loamy sand.	SM	A-2, A-1	0-5	90-95	85-90	45-65	15-30	---	NP
	21-60	Very gravelly loamy sand, very gravelly sand, extremely gravelly sand.	GP, GP-GM	A-1	10-30	30-50	10-45	5-20	0-10	---	NP
185---------- Wenas	0-8	Silt loam--------	CL-ML	A-4	0	95-100	95-100	85-100	65-90	25-30	5-10
	8-28	Silt loam, clay loam.	CL-ML, CL	A-4, A-6	0	95-100	95-100	85-100	65-90	25-35	5-15
	28-37	Silty clay loam, clay loam.	CL	A-6	0	95-100	95-100	85-95	70-85	35-40	15-20
	37-47	Loam, sandy loam	CL-ML	A-4	0	95-100	95-100	80-95	60-75	25-30	5-10
	47-60	Loamy sand, gravelly loamy sand.	SM	A-1, A-2	0	70-95	60-90	45-70	10-30	---	NP
186---------- Willis	0-6	Fine sandy loam	ML, SM	A-4	0	95-100	95-100	80-95	40-65	---	NP
	6-22	Silt loam--------	ML	A-4	0	100	95-100	95-100	85-95	20-30	NP-5
	22-34	Silt loam--------	ML	A-4	0	95-100	90-100	90-100	80-90	20-30	NP-5
	34	Indurated--------	---	---	---	---	---	---	---	---	---
187, 188, 189---- Willis	0-6	Silt loam--------	ML	A-4	0	100	100	90-100	70-80	---	NP
	6-22	Silt loam--------	ML	A-4	0	100	95-100	95-100	85-95	20-30	NP-5
	22-34	Silt loam--------	ML	A-4	0	95-100	90-100	90-100	80-90	20-30	NP-5
	34	Indurated--------	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 16.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
190---------- Yakima	0-13	Silt loam--------	ML	A-4	0	90-95	85-90	80-85	65-70	15-20	NP-5
	13-30	Gravelly silt loam, gravelly loam, gravelly very fine sandy loam.	ML, GM	A-4	0-10	60-80	55-75	50-70	35-60	15-20	NP-5
	30-60	Very gravelly sand, very gravelly loamy sand, extremely gravelly coarse sand.	GP	A-1	5-15	30-45	15-35	10-15	0-5	---	NP
191---------- Zillah	0-12	Sandy loam-------	SM	A-2, A-4	0	100	100	60-70	30-40	20-25	NP-5
	12-42	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	75-100	20-30	NP-5
	42-60	Loamy sand, gravelly loamy sand, very gravelly loamy sand.	SM, GM	A-2, A-1	0	50-100	45-100	40-75	15-30	---	NP
192, 193--------- Zillah	0-12	Silt loam--------	ML	A-4	0	100	100	95-100	80-90	20-30	NP-5
	12-42	Silt loam, very fine sandy loam.	ML	A-4	0	100	100	95-100	75-100	20-30	NP-5
	42-60	Loamy sand, gravelly loamy sand, very gravelly loamy sand.	SM, GM	A-2, A-1	0	50-100	45-100	40-75	15-30	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
1. Aquic Cryandepts											
2---------- Ashue	0-10	15-20	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.37	2	5	1-2
	10-29	20-30	0.2-0.6	0.04-0.06	6.6-7.8	<2	Low--------	0.10			
	29-34	5-10	2.0-6.0	0.04-0.05	6.6-7.8	<2	Low--------	0.05			
	34-60	0-2	>20	0.02-0.03	6.6-7.8	<2	Low--------	0.02			
3---------- Bakeoven	0-4	15-25	0.2-0.6	0.06-0.09	6.1-7.8	<2	Low--------	0.15	1	8	1-3
	4-10	18-33	0.2-0.6	0.10-0.14	6.6-7.8	<2	Low--------	0.20			
	10	---	---	---	---	---	----------	----			
4, 5---------- Bickleton	0-10	10-15	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.37	3	5	2-3
	10-26	18-25	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.43			
	26-35	18-25	0.6-2.0	0.19-0.21	7.4-8.4	<2	Low--------	0.43			
	35-42	28-30	0.6-2.0	0.05-0.08	7.4-8.4	<2	Low--------	0.10			
	42	---	---	---	---	---	----------	----			
6---------- Bocker	0-3	18-22	0.6-2.0	0.10-0.12	6.1-6.5	<2	Low--------	0.15	1	8	1-2
	3-7	20-24	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low--------	0.20			
	7	---	---	---	---	---	----------	----			
7*:											
Bocker----------	0-3	18-22	0.6-2.0	0.10-0.12	6.1-6.5	<2	Low--------	0.15	1	8	1-2
	3-7	20-24	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low--------	0.20			
	7	---	---	---	---	---	----------	----			
Jumpe----------	0-3	8-15	0.6-2.0	0.11-0.13	5.1-6.5	<2	Low--------	0.32	5	8	.5-1
	3-41	15-27	0.6-2.0	0.07-0.08	5.1-6.5	<2	Low--------	0.15			
	41-60	8-14	0.6-2.0	0.06-0.08	5.1-6.5	<2	Low--------	0.15			
8*:											
Bocker----------	0-3	18-22	0.6-2.0	0.10-0.12	6.1-6.5	<2	Low--------	0.15	1	8	1-2
	3-7	20-24	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low--------	0.20			
	7	---	---	---	---	---	----------	----			
Sapkin----------	0-7	10-20	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low--------	0.15	2	8	3-5
	7-15	10-20	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low--------	0.17			
	15-27	10-20	0.6-2.0	0.10-0.13	6.1-7.3	<2	Low--------	0.15			
	27-35	18-30	0.6-2.0	0.06-0.10	6.1-6.5	<2	Low--------	0.10			
	35	---	---	---	---	---	----------	----			
9*:											
Bocker----------	0-3	18-22	0.6-2.0	0.10-0.12	6.1-6.5	<2	Low--------	0.15	1	8	1-2
	3-7	20-24	0.6-2.0	0.09-0.11	6.1-7.3	<2	Low--------	0.20			
	7	---	---	---	---	---	----------	----			
Sutkin----------	0-10	15-25	0.6-2.0	0.12-0.15	6.1-7.3	<2	Low--------	0.24	5	8	1-2
	10-38	18-27	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low--------	0.15			
	38-60	20-30	0.6-2.0	0.09-0.12	6.1-7.3	<2	Low--------	0.10			
10, 11, 12------- Burke	0-7	5-15	0.6-2.0	0.19-0.21	7.4-8.4	<2	Low--------	0.49	2	4L	.5-1
	7-25	5-15	0.6-2.0	0.19-0.21	7.4-9.0	<2	Low--------	0.49			
	25	---	---	---	---	---	----------	----			
13---------- Carmack	0-7	10-20	0.6-2.0	0.19-0.21	6.1-6.5	<2	Low--------	0.37	5	5	1-3
	7-15	10-20	0.6-2.0	0.19-0.21	6.1-6.5	<2	Low--------	0.37			
	15-21	10-20	0.6-2.0	0.17-0.21	5.6-6.0	<2	Low--------	0.37			
	21-43	18-35	0.2-0.6	0.19-0.21	5.6-6.0	<2	Moderate	0.32			
	43-60	10-25	0.6-2.0	0.19-0.21	5.6-6.0	<2	Low--------	0.37			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
14, 15, 16------- Carmack	0-7 7-15 15-21 21-43 43-60	10-20 10-20 10-20 18-35 10-25	0.6-2.0 0.6-2.0 0.6-2.0 0.2-0.6 0.2-0.6	0.12-0.14 0.19-0.21 0.17-0.21 0.19-0.21 0.19-0.21	6.1-6.5 6.1-6.5 5.6-6.0 5.6-6.0 5.6-6.0	<2 <2 <2 <2 <2	Low------- Low------- Low------- Moderate Low-------	0.32 0.37 0.37 0.32 0.37	5	6	1-3
17*: Carmack---------	0-7 7-15 15-21 21-43 43-60	10-20 10-20 10-20 18-35 10-25	0.6-2.0 0.6-2.0 0.6-2.0 0.2-0.6 0.6-2.0	0.19-0.21 0.19-0.21 0.17-0.21 0.19-0.21 0.19-0.21	6.1-6.5 6.1-6.5 5.6-6.0 5.6-6.0 5.6-6.0	<2 <2 <2 <2 <2	Low------- Low------- Low------- Moderate Low-------	0.37 0.37 0.37 0.32 0.37	5	5	1-3
Rock outcrop.											
18, 19, 20, 21--- Cleman	0-10 10-40 40-60	5-10 5-10 2-10	2.0-6.0 0.6-2.0 2.0-6.0	0.14-0.18 0.13-0.15 0.10-0.13	6.6-7.8 6.6-7.8 6.6-8.4	<2 <2 <2	Low------- Low------- Low-------	0.49 0.55 0.28	5	3	1-2
22---------- Clint	0-10 10-19 19-28 28	18-25 18-25 18-25 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.18 0.09-0.13 0.03-0.06 ---	6.6-7.3 6.6-7.3 6.6-7.3 ---	<2 <2 <2 ---	Low------- Low------- Low------- ---	0.28 0.15 0.10 ---	2	8	1-2
23*: Clint----------	0-10 10-19 19-28 28	18-25 18-25 18-25 ---	0.6-2.0 0.6-2.0 0.6-2.0 ---	0.16-0.18 0.09-0.13 0.03-0.06 ---	6.6-7.3 6.6-7.3 6.6-7.3 ---	<2 <2 <2 ---	Low------- Low------- Low------- ---	0.28 0.15 0.10 ---	2	8	1-2
Rubble land.											
24, 25, 26, 27--- Cowiche	0-10 10-35 35-60	10-20 18-30 5-20	0.6-2.0 0.6-2.0 0.6-2.0	0.17-0.19 0.15-0.19 0.12-0.14	6.6-7.8 6.6-7.8 7.4-8.4	<2 <2 <2	Low------- Moderate Low-------	0.43 0.32 0.28	5	5	1-3
28*: Cowiche---------	0-10 10-35 35-60	10-20 18-30 5-20	0.6-2.0 0.6-2.0 0.6-2.0	0.17-0.19 0.15-0.19 0.12-0.14	6.6-7.8 6.6-7.8 7.4-8.4	<2 <2 <2	Low------- Moderate Low-------	0.43 0.32 0.28	5	5	1-3
Rock Creek------	0-2 2-10 10	20-27 35-45 ---	0.6-2.0 0.2-0.6 ---	0.10-0.12 0.04-0.06 ---	6.1-7.3 6.1-7.3 ---	<2 <2 ---	Low------- Moderate ---	0.24 0.05 ---	1	8	1-2
29. Cryumbrepts											
30---------- Darland	0-8 8-31 31-43 43-60	10-18 10-18 10-18 5-15	0.6-2.0 2.0-6.0 2.0-6.0 2.0-6.0	0.11-0.13 0.10-0.11 0.03-0.04 0.01-0.02	6.1-7.3 6.1-7.3 6.1-7.3 6.1-6.5	<2 <2 <2 <2	Low------- Low------- Low------- Low-------	0.24 0.15 0.15 0.10	5	8	2-4
31*: Darland---------	0-8 8-31 31-43 43-60	10-18 10-18 10-18 5-15	0.6-2.0 2.0-6.0 2.0-6.0 2.0-6.0	0.11-0.13 0.10-0.11 0.03-0.04 0.01-0.02	6.1-7.3 6.1-7.3 6.1-7.3 6.1-6.5	<2 <2 <2 <2	Low------- Low------- Low------- Low-------	0.24 0.15 0.15 0.10	5	8	2-4
Rubble land.											
32, 33---------- Esquatzel	0-17 17-60	2-6 5-15	0.6-2.0 0.6-2.0	0.19-0.23 0.19-0.23	6.6-7.8 7.4-8.4	<2 <2	Low------- Low-------	0.43 0.43	5	5	1-2
34---------- Fiander	0-2 2-25 25-50 50-60	10-15 24-35 15-18 2-10	0.6-2.0 0.06-0.2 0.6-2.0 0.6-2.0	0.14-0.18 0.11-0.15 0.13-0.17 0.10-0.13	>7.3 >8.4 7.4-9.0 7.4-9.0	>16 4-8 2-4 2-4	Low------- Moderate Low------- Low-------	0.37 0.32 0.43 0.43	5	4L	1-3

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
35----------	0-4	4-10	2.0-6.0	0.13-0.15	7.4-8.4	<2	Low--------	0.37	2	3	.5-1
Finley	4-14	4-10	2.0-6.0	0.09-0.13	7.4-8.4	<2	Low--------	0.20			
	14-30	4-10	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low--------	0.10			
	30-60	0-4	>20	0.03-0.05	7.4-8.4	<2	Low--------	0.10			
36----------	0-4	4-7	2.0-6.0	0.10-0.14	7.4-8.4	<2	Low--------	0.32	2	8	.5-1
Finley	4-14	4-10	2.0-6.0	0.09-0.13	7.4-8.4	<2	Low--------	0.32			
	14-30	4-10	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low--------	0.28			
	30-60	0-4	>20	0.03-0.05	7.4-8.4	<2	Low--------	0.10			
37, 38, 39, 40---	0-12	5-10	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.43	5	5	.5-1
Finley	12-30	4-10	2.0-6.0	0.08-0.11	7.4-8.4	<2	Low--------	0.10			
	30-60	0-4	>20	0.03-0.05	7.4-8.4	<2	Low--------	0.10			
41----------	0-5	5-15	0.6-2.0	0.06-0.08	7.4-7.8	<2	Low--------	0.15	1	8	1-2
Gorskel	5-13	20-35	0.2-0.6	0.08-0.11	7.4-7.8	<2	Low--------	0.17			
	13	---	---	---	---	---	----------	----			
42*:											
Gorskel---------	0-5	5-15	0.6-2.0	0.06-0.08	7.4-7.8	<2	Low--------	0.15	1	8	1-2
	5-13	20-35	0.2-0.6	0.08-0.11	7.4-7.8	<2	Low--------	0.17			
	13	---	---	---	---	---	----------	----			
Harwood---------	0-8	16-22	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.37	2	5	1-2
	8-26	18-25	0.6-2.0	0.16-0.18	7.4-8.4	<2	Low--------	0.37			
	26-30	18-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.32			
	30	---	---	---	---	---	----------	----			
43, 44----------	0-7	16-22	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low--------	0.37	1	5	1-2
Gorst	7-15	18-25	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low--------	0.37			
	15	---	---	---	---	---	----------	----			
45----------	0-7	16-22	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low--------	0.32	1	8	1-2
Gorst	7-15	18-25	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low--------	0.37			
	15	---	---	---	---	---	----------	----			
46, 47, 48, 49---	0-8	16-22	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.37	2	5	1-2
Harwood	8-26	18-25	0.6-2.0	0.16-0.18	7.4-8.4	<2	Low--------	0.37			
	26-30	18-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.32			
	30	---	---	---	---	---	----------	----			
50*, 51*, 52*, 53*, 54*:											
Harwood---------	0-8	16-22	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.37	2	5	1-2
	8-26	18-25	0.6-2.0	0.16-0.18	7.4-8.4	<2	Low--------	0.37			
	26-30	18-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.32			
	30	---	---	---	---	---	----------	----			
Burke----------	0-7	5-15	0.6-2.0	0.19-0.21	7.4-8.4	<2	Low--------	0.49	2	4L	.5-1
	7-25	5-15	0.6-2.0	0.19-0.21	7.4-9.0	<2	Low--------	0.49			
	25	---	---	---	---	---	----------	----			
Wiehl----------	0-3	5-8	0.6-2.0	0.15-0.19	6.6-7.8	<2	Low--------	0.49	3	5	.5-1
	3-21	5-8	0.6-2.0	0.15-0.19	6.6-7.8	<2	Low--------	0.43			
	21-27	5-8	0.6-2.0	0.13-0.17	7.4-8.4	<2	Low--------	0.43			
	27	---	---	---	---	---	----------	----			
55*:											
Harwood---------	0-8	15-18	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.43	2	8	1-2
	8-26	18-25	0.6-2.0	0.16-0.18	7.4-8.4	<2	Low--------	0.37			
	26-30	18-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low--------	0.32			
	30	---	---	---	---	---	----------	----			
Burke----------	0-7	5-15	0.6-2.0	0.19-0.21	7.4-8.4	<2	Low--------	0.43	2	6	.5-1
	7-25	5-15	0.6-2.0	0.19-0.21	7.4-9.0	<2	Low--------	0.49			
	25	---	---	---	---	---	----------	----			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
55*:											
Wiehl	0-3	5-8	0.6-6.0	0.13-0.17	6.6-7.8	<2	Low	0.37	3	8	.5-1
	3-21	5-8	0.6-2.0	0.13-0.17	6.6-7.8	<2	Low	0.37			
	21-27	5-8	0.6-2.0	0.13-0.17	7.9-8.4	<2	Low	0.32			
	27	---	---	---	---	---	---	---			
56*:											
Harwood	0-8	16-22	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low	0.37	2	5	1-2
	8-26	18-25	0.6-2.0	0.16-0.18	7.4-8.4	<2	Low	0.37			
	26-30	18-25	0.6-2.0	0.12-0.14	7.9-8.4	<2	Low	0.32			
	30	---	---	---	---	---	---	---			
Gorst	0-7	16-22	0.6-2.0	0.12-0.14	7.4-7.8	<2	Low	0.32	1	8	1-2
	7-15	18-25	0.6-2.0	0.16-0.18	7.4-7.8	<2	Low	0.37			
	15	---	---	---	---	---	---	---			
57, 58	0-6	2-5	6.0-20	0.09-0.13	6.6-8.4	<2	Low	0.24	5	2	<.5
Hezel	6-22	0-5	6.0-20	0.08-0.12	6.6-8.4	<2	Low	0.24			
	22-60	5-8	0.2-0.6	0.18-0.21	7.4-9.0	<2	Low	0.43			
59, 60, 61	0-3	8-15	0.6-2.0	0.11-0.13	5.1-6.5	<2	Low	0.32	5	8	.5-1
Jumpe	3-41	15-27	0.6-2.0	0.07-0.08	5.1-6.5	<2	Low	0.15			
	41-60	8-14	0.6-2.0	0.06-0.08	5.1-6.5	<2	Low	0.15			
62, 63	0-6	8-15	0.6-2.0	0.11-0.13	5.1-6.5	<2	Low	0.32	5	8	.5-1
Jumpe	6-37	15-27	0.6-2.0	0.07-0.08	5.1-6.5	<2	Low	0.15			
	37-60	8-14	0.6-2.0	0.06-0.08	5.1-6.5	<2	Low	0.15			
64*:											
Jumpe	0-6	8-15	0.6-2.0	0.11-0.13	5.1-6.5	<2	Low	0.32	5	8	.5-1
	6-37	15-27	0.6-2.0	0.07-0.08	5.1-6.5	<2	Low	0.15			
	37-60	8-14	0.6-2.0	0.06-0.08	5.1-6.5	<2	Low	0.15			
Rock outcrop.											
65	0-5	7-15	0.6-2.0	0.14-0.17	7.4-8.4	<2	Low	0.37	5	8	.5-1
Kiona	5-14	7-15	0.6-2.0	0.08-0.11	7.4-8.4	<2	Low	0.20			
	14-60	5-15	0.6-2.0	0.05-0.09	7.4-8.4	<2	Low	0.10			
66	0-19	10-20	0.6-2.0	0.19-0.21	>8.4	4-8	Low	0.43	5	4L	2-5
Kittitas	19-41	25-30	0.2-0.6	0.17-0.21	7.4-8.4	<2	Moderate	0.43			
	41-60	15-25	0.2-0.6	0.16-0.19	7.4-8.4	<2	Low	0.32			
67	0-8	20-30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low	0.37	1	---	1-2
Lickskillet	8-20	20-30	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low	0.20			
	20	---	---	---	---	---	---	---			
68	0-3	15-25	0.6-2.0	0.08-0.14	6.1-7.3	<2	Low	0.17	1	---	1-2
Lickskillet	3-20	23-33	0.6-2.0	0.10-0.14	6.6-7.8	<2	Low	0.24			
	20	---	---	---	---	---	---	---			
69	0-12	10-15	0.6-2.0	0.18-0.20	6.6-7.8	<2	Low	0.37	2	5	1-2
Logy	12-33	10-15	0.6-2.0	0.07-0.11	6.6-7.8	<2	Low	0.10			
	33-60	0-5	>20	0.03-0.05	6.6-7.8	<2	Low	0.02			
70	0-12	10-15	0.6-2.0	0.13-0.17	6.6-7.8	<2	Low	0.32	2	8	1-2
Logy	12-33	10-15	0.6-2.0	0.07-0.11	6.6-7.8	<2	Low	0.10			
	33-60	0-5	>20	0.03-0.05	6.6-7.8	<2	Low	0.02			
71, 72, 73	0-3	15-25	0.6-2.0	0.16-0.18	5.6-6.5	<2	Low	0.32	5	8	2-4
Loneridge	3-23	18-25	0.6-2.0	0.09-0.13	5.6-6.5	<2	Low	0.20			
	23-60	35-55	0.06-0.2	0.08-0.11	5.6-6.5	<2	High	0.10			
74, 75	0-8	15-20	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low	0.28	5	8	2-4
McDaniel	8-24	27-35	0.2-0.6	0.08-0.11	6.6-7.3	<2	Moderate	0.10			
	24-60	30-35	0.2-0.6	0.08-0.11	6.6-7.3	<2	Moderate	0.10			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
76*:											
McDaniel	0-8	15-20	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low	0.28	5	8	2-4
	8-35	27-35	0.2-0.6	0.08-0.11	6.6-7.3	<2	Moderate	0.10			
	35-60	30-35	0.2-0.6	0.08-0.11	6.6-7.3	<2	Moderate	0.10			
Rock Creek	0-2	20-27	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low	0.24	1	8	1-2
	2-10	35-45	0.2-0.6	0.04-0.06	6.1-7.3	<2	Moderate	0.05			
	10	---	---	---	---	---	---	---			
77	0-3	10-20	0.6-2.0	0.16-0.18	6.1-6.5	<2	Low	0.37	5	5	2-4
Meystre	3-11	16-22	0.6-2.0	0.16-0.18	6.1-6.5	<2	Low	0.37			
	11-29	25-35	0.2-0.6	0.19-0.21	6.1-6.5	<2	Moderate	0.37			
	29-60	5-10	2.0-6.0	0.13-0.15	6.6-7.3	<2	Low	0.32			
78	0-3	10-20	0.6-2.0	0.14-0.16	6.1-6.5	<2	Low	0.28	5	6	2-4
Meystre	3-11	16-22	0.6-2.0	0.16-0.18	6.1-6.5	<2	Low	0.37			
	11-29	25-35	0.2-0.6	0.19-0.21	6.1-6.5	<2	Moderate	0.37			
	29-60	5-10	2.0-6.0	0.13-0.15	6.6-7.3	<2	Low	0.32			
79, 80, 81	0-5	8-12	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low	0.43	2	5	1-2
Mikkalo	5-30	8-12	0.6-2.0	0.18-0.20	7.4-9.0	<2	Low	0.49			
	30	---	---	---	---	---	---	---			
82	0-7	7-15	0.6-2.0	0.08-0.10	6.1-7.3	<2	Low	0.15	5	8	1-3
Mippon	7-14	2-10	>20.0	0.06-0.08	6.1-7.3	<2	Low	0.10			
	14-60	0-5	>20.0	0.03-0.06	6.1-7.3	<2	Low	0.05			
83, 84	0-7	5-10	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low	0.49	1	5	1-2
Moxee	7-11	5-10	0.6-2.0	0.19-0.21	7.9-8.4	<2	Low	0.43			
	11-18	5-10	0.6-2.0	0.15-0.18	7.9-8.4	<2	Low	0.28			
	18	---	---	---	---	---	---	---			
85	0-7	5-10	0.6-2.0	0.15-0.18	6.6-7.8	<2	Low	0.32	1	8	1-2
Moxee	7-11	5-10	0.6-2.0	0.19-0.21	7.9-8.4	<2	Low	0.43			
	11-18	5-10	0.6-2.0	0.15-0.18	7.9-8.4	<2	Low	0.28			
	18	---	---	---	---	---	---	---			
86	0-9	14-17	0.6-2.0	0.17-0.20	6.6-7.8	<2	Low	0.32	2	5	1-2
Naches	9-21	25-35	0.06-0.2	0.16-0.18	7.4-8.4	<2	Moderate	0.32			
	21-34	18-25	0.6-2.0	0.17-0.20	7.4-8.4	<2	Low	0.24			
	34-60	0-2	>20	0.03-0.04	7.4-8.4	<2	Low	0.10			
87	0-14	---	0.6-2.0	0.11-0.13	5.1-6.0	<2	Low	0.37	5	5	3-5
Naxing	14-21	---	0.6-2.0	0.05-0.06	5.1-6.0	<2	Low	0.05			
	21-60	---	0.6-2.0	0.06-0.07	5.1-6.0	<2	Low	0.05			
88, 89	0-14	---	0.6-2.0	0.11-0.13	5.1-6.0	<2	Low	0.28	5	8	3-5
Naxing	14-21	---	0.6-2.0	0.05-0.06	5.1-6.0	<2	Low	0.05			
	21-60	---	0.6-2.0	0.06-0.07	5.1-6.0	<2	Low	0.05			
90	0-18	15-20	0.6-2.0	0.11-0.14	6.1-7.3	<2	Low	0.24	5	6	2-4
Odo	18-60	15-20	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low	0.20			
91	0-8	5-10	2.0-6.0	0.12-0.16	8.5-9.0	4-8	Low	0.32	5	3	1-2
Outlook	8-60	5-10	0.6-2.0	0.16-0.20	7.9-9.0	2-4	Low	0.55			
92	0-8	5-10	0.6-2.0	0.18-0.21	8.5-9.0	4-8	Low	0.43	5	4L	1-2
Outlook	8-60	5-10	0.6-2.0	0.16-0.20	7.9-9.0	2-4	Low	0.55			
93*.											
Pits											
94	0-4	5-12	0.6-2.0	0.16-0.20	6.6-8.4	<2	Low	0.43	2	5	.5-1
Prosser	4-33	5-12	0.6-2.0	0.16-0.20	7.4-8.4	<2	Low	0.49			
	33	---	---	---	---	---	---	---			
95	0-20	1-6	6.0-20	0.11-0.15	6.1-8.4	<2	Low	0.17	5	2	.5-1
Quincy	20-60	1-7	6.0-20	0.06-0.09	6.6-8.4	<2	Low	0.17			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
96----------	0-7	5-10	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.49	5	5	1-2
Renslow	7-30	10-18	0.6-2.0	0.19-0.21	7.4-8.4	<2	Low--------	0.43			
	30-60	7-15	0.6-2.0	0.19-0.21	7.9-9.0	<4	Low--------	0.43			
97, 98----------	0-7	5-10	0.6-2.0	0.17-0.20	6.6-7.8	<2	Low--------	0.43	3	5	1-2
Renslow	7-30	10-18	0.6-2.0	0.18-0.21	7.4-8.4	<2	Low--------	0.49			
	30-44	10-13	0.6-2.0	0.18-0.21	7.9-9.0	<2	Low--------	0.43			
	44	---	---	---	---	---	----------	----			
99, 100, 101, 102, 103--------	0-7	5-10	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.43	5	5	1-2
Ritzville	7-37	5-10	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.55			
	37-60	5-10	0.6-2.0	0.19-0.21	7.9-9.0	<2	Low--------	0.55			
104, 105---------	0-7	5-10	0.6-2.0	0.17-0.20	6.6-7.8	<2	Low--------	0.49	3	5	1-2
Ritzville	7-37	5-10	0.6-2.0	0.17-0.20	6.6-7.8	<2	Low--------	0.55			
	37-45	5-10	0.6-2.0	0.17-0.20	7.9-9.0	<2	Low--------	0.55			
	45	---	---	---	---	---	----------	----			
106----------	0-7	5-10	0.6-2.0	0.17-0.20	6.6-7.8	<2	Low--------	0.49	3	5	1-2
Ritzville	7-37	5-10	0.6-2.0	0.17-0.20	6.6-7.8	<2	Low--------	0.55			
	37-45	5-10	0.6-2.0	0.17-0.20	7.9-9.0	<2	Low--------	0.55			
	45	---	---	---	---	---	----------	----			
107----------	0-7	5-10	0.6-2.0	0.17-0.21	6.6-7.8	<2	Low--------	0.49	5	5	1-2
Ritzville Variant	7-18	5-10	0.6-2.0	0.17-0.21	6.6-7.8	<2	Low--------	0.55			
	18-28	5-10	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low--------	0.28			
	28-60	5-10	0.6-2.0	0.10-0.12	7.4-8.4	<2	Low--------	0.17			
108----------	0-7	5-10	0.6-2.0	0.15-0.17	6.6-7.8	<2	Low--------	0.20	5	8	1-2
Ritzville Variant	7-18	5-10	0.6-2.0	0.17-0.21	6.6-7.8	<2	Low--------	0.55			
	18-28	5-10	0.6-2.0	0.11-0.13	7.4-8.4	<2	Low--------	0.28			
	28-60	5-10	0.6-2.0	0.10-0.12	7.4-8.4	<2	Low--------	0.17			
109----------	0-2	20-27	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low--------	0.24	1	8	1-2
Rock Creek	2-10	35-45	0.2-0.6	0.04-0.06	6.1-7.3	<2	Moderate	0.05			
	10	---	---	---	---	---	----------	----			
110*:											
Rock Creek------	0-2	20-27	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low--------	0.24	1	8	1-2
	2-10	35-45	0.2-0.6	0.04-0.06	6.1-7.3	<2	Moderate	0.05			
	10	---	---	---	---	---	----------	----			
Clint----------	0-10	18-25	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low--------	0.28	2	8	1-2
	10-19	18-25	0.6-2.0	0.09-0.13	6.6-7.3	<2	Low--------	0.15			
	19-28	18-25	0.6-2.0	0.03-0.06	6.6-7.3	<2	Low--------	0.10			
	28	---	---	---	---	---	----------	----			
Simcoe----------	0-14	18-22	0.6-2.0	0.19-0.21	6.6-7.3	<2	Low--------	0.43	2	5	1-2
	14-27	25-35	0.2-0.6	0.17-0.19	6.6-7.8	<2	Moderate	0.37			
	27	---	---	---	---	---	----------	----			
111, 112, 113, 114----------	0-2	35-40	0.06-0.2	0.19-0.21	7.4-7.8	<2	High-------	0.32	5	4	.5-1
Roza	2-19	35-60	0.06-0.2	0.15-0.17	7.4-7.8	<2	High-------	0.28			
	19-60	35-60	0.06-0.2	0.14-0.17	7.4-8.4	<4	High-------	0.32			
115*:											
Rubble land.											
Rock outcrop											
116, 117----------	0-7	10-20	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low--------	0.15	2	8	3-5
Sapkin	7-15	10-20	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low--------	0.17			
	15-27	10-20	0.6-2.0	0.10-0.13	6.1-7.3	<2	Low--------	0.15			
	27-35	18-30	0.6-2.0	0.06-0.10	6.1-6.5	<2	Low--------	0.10			
	35	---	---	---	---	---	----------	----			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
118*:											
Sapkin	0-7	10-20	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low	0.15	2	8	3-5
	7-15	10-20	0.6-2.0	0.13-0.16	6.1-7.3	<2	Low	0.17			
	15-27	10-20	0.6-2.0	0.10-0.13	6.1-7.3	<2	Low	0.15			
	27-35	18-30	0.6-2.0	0.06-0.10	6.1-6.5	<2	Low	0.10			
	35	---	---	---	---	---	---	---			
Rubble land.											
119	0-11	---	0.6-2.0	0.14-0.17	5.6-6.0	<2	Low	0.24	2	8	1-2
Saydab	11-27	---	0.6-2.0	0.09-0.12	5.1-6.0	<2	Low	0.15			
	27	---	---	---	---	---	---	---			
120, 121, 122, 123	0-6	5-12	0.6-2.0	0.15-0.18	7.4-8.4	<2	Low	0.49	1	4L	.5-1
Scoon	6-16	5-12	0.6-2.0	0.13-0.17	7.4-8.4	<2	Low	0.32			
	16	---	---	---	---	---	---	---			
124, 125, 126	0-6	5-10	0.6-2.0	0.18-0.20	6.6-7.3	<2	Low	0.43	5	5	.5-1
Scooteney	6-22	5-10	0.6-2.0	0.18-0.20	6.6-7.8	<2	Low	0.43			
	22-33	5-10	2.0-6.0	0.10-0.13	7.9-8.4	<2	Low	0.24			
	33-60	0-5	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10			
127	0-6	5-10	0.6-2.0	0.18-0.21	6.6-7.3	<2	Low	0.24	5	8	.5-1
Scooteney	6-22	5-10	0.6-2.0	0.18-0.20	6.6-7.8	<2	Low	0.43			
	22-33	5-10	2.0-6.0	0.10-0.13	7.9-8.4	<2	Low	0.28			
	33-60	0-5	2.0-6.0	0.05-0.09	7.9-8.4	<2	Low	0.10			
128, 129, 130, 131	0-7	15-18	0.6-2.0	0.19-0.21	6.6-7.3	<2	Low	0.49	2	5	1-2
Selah	7-34	25-34	0.2-0.6	0.19-0.21	7.4-8.4	<2	Moderate	0.32			
	34	---	---	---	---	---	---	---			
132, 133, 134, 135	0-4	5-10	0.6-2.0	0.18-0.20	6.6-8.4	<2	Low	0.49	5	5	.5-1
Shano	4-30	5-10	0.6-2.0	0.18-0.20	7.4-8.4	<2	Low	0.43			
	30-60	5-10	0.6-2.0	0.18-0.20	7.4-9.0	<2	Low	0.43			
136, 137	0-14	18-22	0.6-2.0	0.19-0.21	6.6-7.3	<2	Low	0.43	2	5	1-2
Simcoe	14-27	25-35	0.2-0.6	0.17-0.19	6.6-7.8	<2	Moderate	0.37			
	27	---	---	---	---	---	---	---			
138	0-3	5-10	0.6-2.0	0.13-0.17	8.5-9.0	4-8	Low	0.37	5	3	.5-1
Sinloc	3-15	5-10	0.6-2.0	0.17-0.21	8.5-9.0	4-8	Low	0.43			
	15-45	5-10	0.6-2.0	0.17-0.21	7.9-9.0	4-8	Low	0.43			
	45-60	5-10	2.0-6.0	0.08-0.11	7.9-8.4	4-8	Low	0.32			
139, 140, 141	0-3	5-10	0.6-2.0	0.17-0.21	8.5-9.0	4-8	Low	0.43	5	4L	.5-1
Sinloc	3-15	5-10	0.6-2.0	0.17-0.21	8.5-9.0	4-8	Low	0.43			
	15-45	5-10	0.6-2.0	0.17-0.21	7.9-9.0	4-8	Low	0.43			
	45-60	5-10	2.0-6.0	0.08-0.11	7.9-8.4	4-8	Low	0.32			
142	0-6	5-15	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low	0.43	1	5	.5-1
Starbuck	6-16	5-15	0.6-2.0	0.12-0.15	6.6-7.8	<2	Low	0.28			
	16	---	---	---	---	---	---	---			
143*, 144*:											
Starbuck	0-6	5-15	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low	0.43	1	5	.5-1
	6-16	5-15	0.6-2.0	0.12-0.15	6.6-7.8	<2	Low	0.28			
	16	---	---	---	---	---	---	---			
Rock outcrop.											
145, 146, 147	0-10	15-25	0.6-2.0	0.12-0.15	6.1-7.3	<2	Low	0.24	5	8	1-2
Sutkin	10-38	18-27	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low	0.15			
	38-60	20-30	0.6-2.0	0.09-0.12	6.1-7.3	<2	Low	0.10			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
148----------	0-10	15-25	0.6-2.0	0.12-0.15	6.1-7.3	<2	Low-------	0.24	5	8	1-2
Sutkin	10-38	18-30	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low-------	0.15			
	38-60	20-30	0.6-2.0	0.09-0.12	6.1-7.3	<2	Low-------	0.10			
149*:											
Sutkin----------	0-10	15-25	0.6-2.0	0.12-0.15	6.1-7.3	<2	Low-------	0.24	5	8	1-2
	10-38	18-27	0.6-2.0	0.11-0.13	6.1-7.3	<2	Low-------	0.15			
	38-60	20-30	0.6-2.0	0.09-0.12	6.1-7.3	<2	Low-------	0.10			
Rock outcrop.											
150----------	0-3	10-18	0.6-2.0	0.15-0.17	6.1-7.3	<2	Low-------	0.24	5	8	1-2
Sutkin Variant	8-14	10-18	0.6-2.0	0.13-0.15	6.1-7.3	<2	Low-------	0.24			
	14-18	11-20	0.6-2.0	0.06-0.08	6.1-7.3	<2	Low-------	0.15			
	18-60	5-10	2.0-6.0	0.04-0.06	6.1-7.3	<2	Low-------	0.10			
151, 152, 153----	0-14	10-20	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.32	5	5	1-2
Taneum	14-43	27-35	0.2-0.6	0.19-0.21	6.6-7.3	<2	Moderate	0.32			
	43-60	5-20	0.6-2.0	0.11-0.15	6.6-7.3	<2	Low-------	0.28			
154*:											
Taneum----------	0-14	10-20	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.32	5	5	1-2
	14-43	27-35	0.2-0.6	0.19-0.21	6.6-7.3	<2	Moderate	0.32			
	43-60	5-20	0.6-2.0	0.11-0.15	6.6-7.3	<2	Low-------	0.28			
Rock Creek------	0-2	20-27	0.6-2.0	0.10-0.12	6.1-7.3	<2	Low-------	0.24	1	8	1-2
	2-10	35-45	0.2-0.6	0.04-0.06	6.1-7.3	<2	Moderate	0.05			
	10	---	---	---	---	---	----------	----			
155----------	0-12	15-25	0.6-2.0	0.13-0.16	5.6-7.3	<2	Low-------	0.28	5	8	1-3
Tekison	12-20	27-30	0.6-2.0	0.11-0.14	5.6-6.5	<2	Low-------	0.10			
	20-60	35-55	0.06-0.2	0.07-0.10	5.6-6.5	<2	Moderate	0.10			
156----------	0-9	5-10	2.0-6.0	0.13-0.15	6.6-7.3	<2	Low-------	0.37	3	3	2-3
Tieton	9-15	15-18	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.37			
	15-44	27-35	0.2-0.6	0.15-0.20	6.6-7.3	<2	Moderate	0.32			
	44-50	15-30	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low-------	0.37			
	50	---	---	---	---	---	----------	----			
157, 158, 159,											
160, 161--------	0-9	10-15	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.37	3	5	2-3
Tieton	9-15	15-18	0.6-2.0	0.15-0.13	6.6-7.3	<2	Low-------	0.37			
	15-44	27-35	0.2-0.6	0.16-0.20	6.6-7.3	<2	Moderate	0.32			
	44-50	15-30	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low-------	0.37			
	50	---	---	---	---	---	----------	----			
162*:											
Tieton----------	0-9	10-15	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.37	3	5	2-3
	9-15	15-18	0.6-2.0	0.16-0.18	6.6-7.3	<2	Low-------	0.37			
	15-44	27-35	0.2-0.6	0.16-0.20	6.6-7.3	<2	Moderate	0.32			
	44-50	15-30	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low-------	0.37			
	50	---	---	---	---	---	----------	----			
Rock outcrop.											
163----------	0-4	15-20	0.6-2.0	0.19-0.21	7.4-9.0	2-4	Low-------	0.37	3	4L	2-5
Toppenish	4-50	25-30	0.2-0.6	0.19-0.21	7.4-9.0	<4	Moderate	0.37			
	50-60	0-5	>20	0.03-0.07	7.4-8.4	<4	Low-------	0.02			
164.											
Torriorthents											
165----------	0-14	14-18	0.6-2.0	0.14-0.16	7.4-9.0	<2	Low-------	0.37	2	4L	3-5
Track	14-26	14-18	0.2-0.6	0.05-0.08	7.9-9.0	2-4	Low-------	0.32			
	26-60	0-2	>20	0.02-0.04	7.9-9.0	2-4	Low-------	0.10			

See footnote at end of table.

TABLE 17.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	In/hr	In/in	pH	Mmhos/cm					Pct
166, 167---------	0-4	---	0.6-2.0	0.08-0.11	5.6-6.0	<2	Low--------	0.15	5	8	2-4
Tumac	4-15	---	0.6-2.0	0.08-0.12	5.6-6.0	<2	Low--------	0.15			
	15-60	---	0.6-2.0	0.08-0.11	5.6-6.0	<2	Low--------	0.10			
168---------	0-7	10-15	0.6-2.0	0.18-0.20	>8.4	4-8	Low--------	0.37	5	4L	.5-1
Umapine	7-60	10-20	0.6-2.0	0.18-0.21	>8.4	4-8	Low--------	0.43			
169, 170---------	0-7	10-15	0.6-2.0	0.18-0.20	>8.4	2-4	Low--------	0.43	5	4L	.5-1
Umapine	7-60	10-20	0.6-2.0	0.18-0.21	>8.4	2-4	Low--------	0.43			
171---------	0-6	0-3	6.0-20	0.10-0.12	7.9-9.0	<4	Low--------	0.24	5	2	.2-.4
Wanser	6-60	0-3	6.0-20	0.06-0.09	7.9-9.0	2-4	Low--------	0.24			
172, 173, 174, 175---------	0-5	5-10	0.6-2.0	0.13-0.15	6.6-7.8	<2	Low--------	0.43	5	3	.5-1
Warden	5-19	8-15	0.6-2.0	0.15-0.20	6.6-7.8	<2	Low--------	0.55			
	19-60	8-15	0.6-2.0	0.19-0.21	7.9-9.0	<2	Low--------	0.55			
176, 177, 178, 179, 180---------	0-5	8-15	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.49	5	5	.5-1
Warden	5-19	8-15	0.6-2.0	0.16-0.20	6.6-7.8	<2	Low--------	0.55			
	19-60	8-15	0.6-2.0	0.19-0.21	7.9-9.0	<2	Low--------	0.55			
181, 182---------	0-8	5-8	2.0-6.0	0.10-0.14	6.6-7.8	<2	Low--------	0.28	2	3	1-2
Weirman	8-21	2-5	6.0-20	0.07-0.10	6.6-7.8	<2	Low--------	0.17			
	21-60	0-2	>20	0.01-0.02	6.6-7.8	<2	Low--------	0.05			
183---------	0-8	5-8	2.0-6.0	0.08-0.11	6.6-7.8	<2	Low--------	0.24	2	8	1-2
Weirman	8-21	2-5	6.0-20	0.07-0.10	6.6-7.8	<2	Low--------	0.17			
	21-60	0-2	>20	0.01-0.02	6.6-7.8	<2	Low--------	0.05			
184---------	0-8	5-8	2.0-6.0	0.10-0.14	6.6-7.8	<2	Low--------	0.28	2	3	1-2
Weirman	8-21	2-5	6.0-20	0.07-0.10	6.6-7.8	<2	Low--------	0.17			
	21-60	0-2	>20	0.01-0.02	6.6-7.8	<2	Low--------	0.05			
185---------	0-8	10-20	0.6-2.0	0.19-0.21	6.6-7.8	2-4	Low--------	0.37	5	5	2-5
Wenas	8-28	18-30	0.6-2.0	0.19-0.21	6.6-7.8	2-4	Moderate	0.37			
	28-37	27-35	0.2-0.6	0.19-0.21	6.6-7.8	<2	Moderate	0.32			
	37-47	10-20	0.6-2.0	0.16-0.18	6.6-7.8	<2	Low--------	0.37			
	47-60	0-5	6.0-20	0.05-0.08	6.6-7.8	2-4	Low--------	0.17			
186---------	0-6	5-10	0.6-2.0	0.13-0.15	7.4-7.8	<2	Low--------	0.43	2	3	1-2
Willis	6-22	10-15	0.6-2.0	0.13-0.21	7.4-8.4	<2	Low--------	0.49			
	22-34	10-15	0.6-2.0	0.18-0.20	7.9-9.0	<2	Low--------	0.49			
	34	---	---	---	---	---	----------	----			
187, 188, 189----	0-6	5-10	0.6-2.0	0.19-0.21	6.6-7.8	<2	Low--------	0.49	2	5	1-2
Willis	6-22	10-15	0.6-2.0	0.18-0.21	7.4-8.4	<2	Low--------	0.49			
	22-34	10-15	0.6-2.0	0.18-0.20	7.9-9.0	<2	Low--------	0.49			
	34	---	---	---	---	---	----------	----			
190---------	0-13	5-12	0.6-2.0	0.17-0.19	6.1-7.8	<2	Low--------	0.37	2	5	2-3
Yakima	13-30	5-12	0.6-2.0	0.12-0.16	6.1-7.8	<2	Low--------	0.32			
	30-60	0-2	>20	0.03-0.04	6.1-7.8	<2	Low--------	0.10			
191---------	0-12	10-14	2.0-6.0	0.11-0.13	6.6-8.4	<2	Low--------	0.20	3	3	2-5
Zillah	12-42	12-16	0.6-2.0	0.18-0.21	6.6-8.4	<2	Low--------	0.43			
	42-60	0-5	6.0-20	0.06-0.08	6.6-8.4	<2	Low--------	0.24			
192---------	0-12	12-16	0.6-2.0	0.19-0.21	6.6-8.4	<2	Low--------	0.37	3	5	2-5
Zillah	12-42	12-16	0.6-2.0	0.18-0.21	6.6-8.4	<2	Low--------	0.43			
	42-60	0-5	6.0-20	0.06-0.08	6.6-8.4	<2	Low--------	0.24			
193---------	0-12	12-16	0.6-2.0	0.19-0.21	6.6-8.4	<2	Low--------	0.37	4	5	2-5
Zillah	12-42	12-16	0.6-2.0	0.18-0.21	6.6-8.4	<2	Low--------	0.43			
	42-60	0-5	6.0-20	0.06-0.08	6.6-8.4	<2	Low--------	0.24			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1. Aquic Cryandepts							
2---------- Ashue	B	None----------	---	---	>6.0	---	---
3---------- Bakeoven	D	None----------	---	---	>6.0	---	---
4, 5---------- Bickleton	B	None----------	---	---	>6.0	---	---
6---------- Bocker	D	None----------	---	---	>6.0	---	---
7*:							
Bocker----------	D	None----------	---	---	>6.0	---	---
Jumpe----------	B	None----------	---	---	>6.0	---	---
8*:							
Bocker----------	D	None----------	---	---	>6.0	---	---
Sapkin----------	C	None----------	---	---	>6.0	---	---
9*:							
Bocker----------	D	None----------	---	---	>6.0	---	---
Sutkin----------	B	None----------	---	---	>6.0	---	---
10, 11, 12---------- Burke	C	None----------	---	---	>6.0	---	---
13, 14, 15, 16---------- Carmack	B	None----------	---	---	>6.0	---	---
17*:							
Carmack----------	B	None----------	---	---	>6.0	---	---
Rock outcrop.							
18, 19, 20, 21---------- Cleman	B	Rare----------	---	---	>6.0	---	---
22---------- Clint	B	None----------	---	---	>6.0	---	---
23*:							
Clint----------	B	None----------	---	---	>6.0	---	---
Rubble land.							
24, 25, 26, 27---------- Cowiche	B	None----------	---	---	>6.0	---	---
28*:							
Cowiche----------	B	None----------	---	---	>6.0	---	---
Rock Creek----------	D	None----------	---	---	>6.0	---	---
29. Cryumbrepts							

See footnote at end of table.

TABLE 18.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
30---------- Darland	B	None----------	---	---	>6.0	---	---
31*: Darland----------	B	None----------	---	---	>6.0	---	---
Rubble land.							
32, 33---------- Esquatzel	B	Rare----------	---	---	>6.0	---	---
34---------- Fiander	C	Rare----------	---	---	2.0-3.0	Apparent	Jun-Dec
35, 36, 37, 38, 39, 40-- Finley	B	None----------	---	---	>6.0	---	---
41---------- Gorskel	D	None----------	---	---	>6.0	---	---
42*: Gorskel----------	D	None----------	---	---	>6.0	---	---
Harwood----------	C	None----------	---	---	>6.0	---	---
43, 44, 45---------- Gorst	D	None----------	---	---	>6.0	---	---
46, 47, 48, 49---------- Harwood	C	None----------	---	---	>6.0	---	---
50*, 51*, 52*, 53*, 54*, 55*: Harwood----------	C	None----------	---	---	>6.0	---	---
Burke----------	C	None----------	---	---	>6.0	---	---
Wiehl----------	C	None----------	---	---	>6.0	---	---
56*: Harwood----------	C	None----------	---	---	>6.0	---	---
Gorst----------	D	None----------	---	---	>6.0	---	---
57, 58---------- Hezel	B	None----------	---	---	>6.0	---	---
59, 60, 61, 62, 63------ Jumpe	B	None----------	---	---	>6.0	---	---
64*: Jumpe----------	B	None----------	---	---	>6.0	---	---
Rock outcrop.							
65---------- Kiona	B	None----------	---	---	>6.0	---	---
66---------- Kittitas	C	Rare----------	---	---	1.5-3.5	Apparent	Jun-Nov
67---------- Lickskillet	C	None----------	---	---	>6.0	---	---
68---------- Lickskillet	D	None----------	---	---	>6.0	---	---

See footnote at end of table.

TABLE 18.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
69, 70---------- Logy	B	Occasional------	Long----------	Jan-Apr	>6.0	---	---
71, 72, 73---------- Loneridge	C	None----------	---	---	>6.0	---	---
74, 75---------- McDaniel	B	None----------	---	---	>6.0	---	---
76*:							
McDaniel----------	B	None----------	---	---	>6.0	---	---
Rock Creek----------	D	None----------	---	---	>6.0	---	---
77---------- Meystre	B	None----------	---	---	>6.0	---	---
78---------- Meystre	B	None----------	---	---	>6.0	---	---
79, 80, 81---------- Mikkalo	C	None----------	---	---	>6.0	---	---
82---------- Mippon	B	Occasional------	Brief---------	Mar-May	3.0-5.0	Apparent	Feb-Apr
83, 84, 85---------- Moxee	D	None----------	---	---	>6.0	---	---
86---------- Naches	B	None----------	---	---	>6.0	---	---
87, 88, 89---------- Naxing	B	None----------	---	---	>6.0	---	---
90---------- Odo	B	None----------	---	---	>6.0	---	---
91, 92---------- Outlook	C	Rare----------	---	---	2.0-4.0	Apparent	May-Dec
93*. Pits							
94---------- Prosser	C	None----------	---	---	>6.0	---	---
95---------- Quincy	A	None----------	---	---	>6.0	---	---
96, 97, 98---------- Renslow	B	None----------	---	---	>6.0	---	---
99, 100, 101, 102, 103, 104, 105, 106---------- Ritzville	B	None----------	---	---	>6.0	---	---
107, 108---------- Ritzville Variant	B	None----------	---	---	>6.0	---	---
109---------- Rock Creek	D	None----------	---	---	>6.0	---	---
110*:							
Rock Creek----------	D	None----------	---	---	>6.0	---	---
Clint----------	B	None----------	---	---	>6.0	---	---

See footnote at end of table.

TABLE 18.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
110*: Simcoe	C	None	---	---	>6.0	---	---
111, 112, 113, 114--- Roza	D	None	---	---	>6.0	---	---
115*: Rubble land. Rock outcrop.							
116, 117--- Sapkin	C	None	---	---	>6.0	---	---
118*: Sapkin--- Rubble land.	C	None	---	---	>6.0	---	---
119--- Saydab	C	None	---	---	>6.0	---	---
120, 121, 122, 123--- Scoon	D	None	---	---	>6.0	---	---
124, 125, 126, 127--- Scooteney	B	None	---	---	>6.0	---	---
128, 129, 130, 131--- Selah	D	None	---	---	>6.0	---	---
132, 133, 134, 135--- Snano	B	None	---	---	>6.0	---	---
136, 137--- Simcoe	C	None	---	---	>6.0	---	---
138, 139, 140, 141--- Sinloc	C	None	---	---	1.5-3.5	Apparent	May-Oct
142--- Starbuck	D	None	---	---	>6.0	---	---
143*, 144*: Starbuck--- Rock outcrop.	D	None	---	---	>6.0	---	---
145, 146, 147, 148--- Sutkin	B	None	---	---	>6.0	---	---
149*: Sutkin--- Rock outcrop.	B	None	---	---	>6.0	---	---
150--- Sutkin Variant	B	None	---	---	>6.0	---	---
151, 152, 153--- Taneum	C	None	---	---	>6.0	---	---
154*: Taneum---	C	None	---	---	>6.0	---	---
Rock Creek---	D	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 18.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
155---------- Tekison	C	None----------	---	---	>6.0	---	---
156, 157, 158, 159, 160, 161---------- Tieton	B	None----------	---	---	>6.0	---	---
162*: Tieton----------	B	None----------	---	---	>6.0	---	---
Rock outcrop.							
163---------- Toppenish	C	Rare----------	---	---	2.0-4.0	Apparent	Jun-Nov
164. Torriorthents							
165---------- Track	C	Rare----------	---	---	2.0-4.0	Apparent	Jun-Nov
166, 167---------- Tumac	B	None----------	---	---	>6.0	---	---
168---------- Umapine	C	Occasional------	Brief---------	Jan-Apr	1.0-3.5	Apparent	Nov-Jun
169, 170---------- Umapine	C	Rare----------	---	---	2.0-4.0	Apparent	Nov-Jun
171---------- Wanser	B	Rare----------	---	---	3.5-5.0	Apparent	Jan-Jun
172, 173, 174, 175, 176, 177, 178, 179, 180----- Warden	B	None----------	---	---	>6.0	---	---
181---------- Weirman	B	Frequent--------	Long----------	Jan-Apr	3.0-5.0	Apparent	Apr-Nov
182, 183---------- Weirman	B	Rare----------	---	---	>6.0	---	---
184---------- Weirman	D	Occasional------	Long----------	Jan-Apr	1.0-2.0	Apparent	Apr-Nov
185---------- Wenas	C	Rare----------	---	---	2.0-3.5	Apparent	Jun-Nov
186, 187, 188, 189------ Willis	C	None----------	---	---	>6.0	---	---
190---------- Yakima	B	Occasional------	Brief to long	Jan-Mar	>6.0	---	---
191, 192---------- Zillah	C	Rare----------	---	---	2.0-4.0	Apparent	Apr-Nov
193---------- Zillah	C	Frequent--------	Long----------	Jan-Mar	0-1.0	Apparent	Apr-Nov

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--SOIL FEATURES

[The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
	In		In				
1. Aquic Cryandepts							
2---------- Ashue	>60	---	---	---	High----------	Moderate-------	Low.
3---------- Bakeoven	4-12	Hard	---	---	Moderate-------	Moderate-------	Low.
4, 5---------- Bickleton	40-60	Hard	---	---	Moderate-------	High----------	Low.
6---------- Bocker	5-10	Hard	---	---	Moderate-------	Moderate-------	Low.
7*:							
Bocker----------	5-10	Hard	---	---	Moderate-------	Moderate-------	Low.
Jumpe----------	>60	---	---	---	Moderate-------	Moderate-------	High.
8*:							
Bocker----------	5-10	Hard	--	---	Moderate-------	Moderate-------	Low.
Sapkin----------	20-40	Hard	---	---	Moderate-------	Moderate-------	Low.
9*:							
Bocker----------	5-10	Hard	---	---	Moderate-------	Moderate-------	Low.
Sutkin----------	>60	---	---	---	Moderate-------	Moderate-------	Low.
10, 11, 12---------- Burke	>20	Hard	20-40	Thick	High----------	High----------	Low.
13, 14, 15, 16---------- Carmack	>60	---	---	---	Moderate-------	Moderate-------	Moderate.
17*:							
Carmack----------	>60	---	---	---	Moderate-------	Moderate-------	Moderate.
Rock outcrop.							
18, 19, 20, 21---------- Cleman	>60	---	---	---	High----------	High----------	Low.
22---------- Clint	20-40	Hard	---	---	Moderate-------	Moderate-------	Low.
23*:							
Clint----------	20-40	Hard	---	---	Moderate-------	Moderate-------	Low.
Rubble land.							
24, 25, 26, 27---------- Cowiche	>60	---	---	---	High----------	High----------	Low.
28*:							
Cowiche----------	>60	---	---	---	High----------	High----------	Low.
Rock Creek----------	8-15	Hard	---	---	Moderate-------	Moderate-------	Low.
29. Cryumbrepts							

See footnote at end of table.

TABLE 19.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
	In		In				
30--Darland	>60	---	---	---	Moderate	Moderate	Low.
31*:							
Darland	>60	---	---	---	Moderate	Moderate	Low.
Rubble land.							
32, 33--Esquatzel	>60	---	---	---	High	High	Low.
34--Fiander	>60	---	---	---	High	High	Low.
35, 36, 37, 38, 39, 40--Finley	>60	---	---	---	Moderate	High	Low.
41--Gorskel	>60	---	9-15	Thick	Low	High	Low.
42*:							
Gorskel	>60	---	9-15	Thick	Low	High	Low.
Harwood	>60	---	20-40	Thick	High	High	Low.
43, 44, 45--Gorst	>60	---	12-20	Thick	High	High	Low.
46, 47, 48, 49--Harwood	>60	---	20-40	Thick	High	High	Low.
50*, 51*, 52*, 53*, 54*:							
Harwood	>60	---	20-40	Thick	High	High	Low.
Burke	>30	Hard	20-40	Thick	High	High	Low.
Wiehl	20-40	Soft	---	---	High	High	Low.
55*:							
Harwood	>60	---	20-40	Thick	Moderate	High	Low.
Burke	>30	Hard	20-40	Thick	High	High	Low.
Wiehl	20-40	Soft	---	---	High	High	Low.
56*:							
Harwood	>60	---	20-40	Thick	High	High	Low.
Gorst	>60	---	12-20	Thick	High	High	Low.
57, 58--Hezel	>60	---	---	---	Low	High	Low.
59, 60, 61--Jumpe	>60	---	---	---	Moderate	Moderate	High.
62, 63--Jumpe	>60	---	---	---	Moderate	Moderate	Moderate.
64*:							
Jumpe	>60	---	---	---	Moderate	Moderate	Moderate.
Rock outcrop.							
65--Kiona	>60	---	---	---	Moderate	High	Low.

See footnote at end of table.

TABLE 19.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
	In		In				
66--- Kittitas	>60	---	---	---	High	High	Low.
67, 68--- Lickskillet	12-20	Hard	---	---	Moderate	Moderate	Low.
69, 70--- Logy	>60	---	---	---	Moderate	Moderate	Low.
71, 72, 73--- Loneridge	>60	---	---	---	Moderate	Moderate	Moderate.
74, 75--- McDaniel	>60	---	---	---	Moderate	Moderate	Low.
76*:							
McDaniel---	>60	---	---	---	Moderate	Moderate	Low.
Rock Creek---	8-15	Hard	---	---	Moderate	Moderate	Low.
77--- Meystre	>60	---	---	---	Moderate	Moderate	Low.
78--- Meystre	>60	---	---	---	Moderate	Moderate	Low.
79, 80, 81--- Mikkalo	20-40	Hard	---	---	Moderate	High	Low.
82--- Mippon	>60	---	---	---	Low	Moderate	Low.
83, 84, 85--- Moxee	>20	Hard	10-20	Thin	High	High	Low.
86--- Naches	>60	---	---	---	High	High	Low.
87, 88, 89--- Naxing	>60	---	---	---	High	Moderate	Moderate.
90--- Odo	>60	---	---	---	Moderate	Moderate	Moderate.
91, 92--- Outlook	>60	---	---	---	High	High	Low.
93*. Pits							
94--- Prosser	20-40	Hard	---	---	High	High	Low.
95--- Quincy	>60	---	---	---	Low	Moderate	Low.
96--- Renslow	>60	---	---	---	High	High	Low.
97, 98--- Renslow	40-60	Hard	---	---	High	High	Low.
99, 100, 101, 102, 103--- Ritzville	>60	---	---	---	High	High	Low.
104, 105, 106--- Ritzville	40-60	Hard	---	---	High	High	Low.

See footnote at end of table.

TABLE 19.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
	In		In				
107, 108---------- Ritzville Variant	>60	---	---	---	Moderate-------	High----------	Low.
109---------- Rock Creek	8-15	Hard	---	---	Moderate-------	Moderate-------	Low.
110*: Rock Creek----------	8-15	Hard	---	---	Moderate-------	Moderate-------	Low.
Clint----------	20-40	Hard	---	---	Moderate-------	Moderate-------	Low.
Simcoe----------	20-40	Hard	---	---	High----------	Moderate-------	Low.
111, 112, 113, 114------ Roza	>60	---	---	---	Moderate-------	High----------	Low.
115*: Rubble land. Rock outcrop.							
116, 117---------- Sapkin	20-40	Hard	---	---	Moderate-------	Moderate-------	Low.
118*: Sapkin---------- Rubble land.	20-40	Hard	---	---	Moderate-------	Moderate-------	Low.
119---------- Saydab	25-30	Hard	---	---	Moderate-------	Moderate-------	Moderate.
120, 121, 122, 123------ Scoon	>20	Hard	10-20	Thick	Moderate-------	High----------	Low.
124, 125, 126, 127------ Scooteney	>60	---	---	---	High----------	High----------	Low.
128, 129, 130, 131------ Selah	>30	Hard	20-40	Thick	High----------	High----------	Low.
132, 133, 134, 135------ Shano	>60	---	---	---	High----------	High----------	Low.
136, 137---------- Simcoe	20-40	Hard	---	---	High----------	Moderate-------	Low.
138, 139, 140, 141------ Sinloc	>60	---	---	---	High----------	High----------	Low.
142---------- Starbuck	12-20	Hard	---	---	High----------	Moderate-------	Low.
143*, 144*: Starbuck---------- Rock outcrop.	12-20	Hard	---	---	High----------	Moderate-------	Low.
145, 146, 147, 148------ Sutkin	>60	---	---	---	Moderate-------	Moderate-------	Low.
149*: Sutkin---------- Rock outcrop.	>60	---	---	---	Moderate-------	Moderate-------	Low.
150---------- Sutkin Variant	>60	---	---	---	Moderate-------	Moderate-------	Low.

See footnote at end of table.

TABLE 19.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Potential frost action	Risk of corrosion	
	Depth	Hardness	Depth	Thickness		Uncoated steel	Concrete
	In		In				
151, 152, 153---------- Taneum	>60	---	---	---	Moderate-------	Moderate-------	Low.
154*: Taneum----------	>60	---	---	---	Moderate-------	Moderate-------	Low.
Rock Creek----------	8-15	Hard	---	---	Moderate-------	Moderate-------	Low.
155---------- Tekison	>60	---	---	---	Moderate-------	Moderate-------	Moderate.
156, 157, 158, 159, 160, 161---------- Tieton	40-60	Hard	---	---	High-----------	Moderate-------	Low.
162*: Tieton----------	40-60	Hard	---	---	High-----------	Moderate-------	Low.
Rock outcrop.							
163---------- Toppenish	>60	---	---	---	High-----------	High-----------	Low.
164. Torriorthents							
165---------- Track	>60	---	---	---	High-----------	High-----------	Low.
166, 167---------- Tumac	>60	---	---	---	Moderate-------	Moderate-------	Moderate.
168---------- Umapine	>60	---	---	---	High-----------	High-----------	Moderate.
169, 170---------- Umapine	>60	---	---	---	High-----------	High-----------	Low.
171---------- Wanser	>60	---	---	---	Moderate-------	High-----------	Low.
172, 173, 174, 175, 176, 177, 178, 179, 180----- Warden	>60	---	---	---	High-----------	High-----------	Low.
181---------- Weirman	>60	---	---	---	Low------------	Moderate-------	Low.
182, 183---------- Weirman	>60	---	---	---	Low------------	Moderate-------	Low.
184---------- Weirman	>60	---	---	---	High-----------	Moderate-------	Low.
185---------- Wenas	>60	---	---	---	High-----------	High-----------	Low.
186, 187, 188, 189------ Willis	>20	Hard	20-40	Thick	High-----------	High-----------	Low.
190---------- Yakima	>60	---	---	---	High-----------	Moderate-------	Low.
191, 192---------- Zillah	>60	---	---	---	High-----------	High-----------	Low.
193---------- Zillah	>60	---	---	---	High-----------	High-----------	Low.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 20.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series]

Soil name	Family or higher taxonomic class
Ashue	Loamy-skeletal, mixed, mesic Aridic Argixerolls
Bakeoven	Loamy-skeletal, mixed, mesic Lithic Haploxerolls
Bickleton	Fine-loamy, mixed, mesic Calcic Haploxerolls
Bocker	Loamy-skeletal, mixed, frigid Lithic Haploxerolls
Burke	Coarse-silty, mixed, mesic Xerollic Durorthids
Carmack	Fine-loamy, mixed, frigid Ultic Argixerolls
Cleman	Coarse-loamy, mixed, mesic Torrifluventic Haploxerolls
Clint	Loamy-skeletal, mixed, mesic Typic Haploxerolls
Cowiche	Fine-loamy, mixed, mesic Aridic Argixerolls
Darland	Loamy-skeletal, mixed Pachic Cryoborolls
*Esquatzel	Coarse-silty, mixed, mesic Torrifluventic Haploxerolls
Flander	Fine-silty, mixed, mesic Typic Natraquolls
Finley	Loamy-skeletal, mixed, mesic Xerollic Camborthids
Gorskel	Loamy-skeletal, mixed, mesic, shallow Aridic Durixerolls
Gorst	Loamy, mixed, mesic, shallow Orthidic Durixerolls
Harwood	Fine-loamy, mixed, mesic Orthidic Durixerolls
Hezel	Sandy over loamy, mixed, nonacid, mesic Xeric Torriorthents
Jumpe	Loamy-skeletal, mixed, frigid Dystric Xerochrepts
Kiona	Loamy-skeletal, mixed, mesic Xerollic Camborthids
Kittitas	Fine-silty, mixed (calcareous), mesic Fluvaquentic Haplaquolls
Lickskillet	Loamy-skeletal, mixed, mesic Lithic Haploxerolls
Logy	Loamy-skeletal, mixed, mesic Torrifluventic Haploxerolls
Loneridge	Clayey-skeletal, mixed, frigid Ultic Haploxeralfs
McDaniel	Loamy-skeletal, mixed, mesic Pachic Argixerolls
Meystre	Fine-loamy, mixed, mesic Ultic Argixerolls
Mikkalo	Coarse-silty, mixed, mesic Calciorthidic Haploxerolls
Mippon	Sandy-skeletal, mixed, frigid Fluventic Haploxerolls
Moxee	Loamy, mixed, mesic, shallow Orthidic Durixerolls
Naches	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Aridic Argixerolls
Naxing	Medial-skeletal Andic Cryumbrepts
Odo	Fine-loamy, mixed, mesic Ultic Haploxerolls
Outlook	Coarse-silty, mixed (calcareous), mesic Aeric Halaquepts
Prosser	Coarse-loamy, mixed, mesic Xerollic Camborthids
Quincy	Mixed, mesic Xeric Torripsamments
Renslow	Coarse-silty, mixed, mesic Aridic Calcic Argixerolls
Ritzville	Coarse-silty, mixed, mesic Calciorthidic Haploxerolls
Ritzville Variant	Coarse-loamy,mixed,mesic Calciorthidic Haploxerolls
Rock Creek	Clayey-skeletal, montmorillonitic, mesic Lithic Mollic Haploxeralfs
Roza	Fine, montmorillonitic, mesic Xerertic Camborthids
Sapkin	Loamy-skeletal, mixed, frigid Ultic Argixerolls
Saydab	Medial-skeletal Andic Cryumbrepts
Scoon	Loamy, mixed, mesic, shallow Xerollic Durorthids
Scooteney	Coarse-loamy, mixed, mesic Xerollic Camborthids
Selah	Fine-loamy, mixed, mesic Aridic Durixerolls
Shano	Coarse-silty, mixed, mesic Xerollic Camborthids
Simcoe	Fine-loamy, mixed, mesic Aridic Argixerolls
Sinloc	Coarse-silty, mixed (calcareous), mesic Typic Halaquepts
Starbuck	Loamy, mixed, mesic Lithic Xerollic Camborthids
Sutkin	Loamy-skeletal, mixed, frigid Ultic Haploxerolls
Sutkin Variant	Loamy-skeletal, mixed, frigid Ultic Haploxerolls
Taneum	Fine-loamy, mixed, mesic Typic Argixerolls
Tekison	Clayey-skeletal, mixed, mesic Ultic Argixerolls
Tieton	Fine-loamy, mixed, mesic Typic Argixerolls
Toppenish	Fine-loamy, mixed, mesic Fluvaquentic Haplaquolls
Track	Loamy-skeletal, mixed (calcareous), mesic Fluvaquentic Haplaquolls
Tumac	Medial-skeletal, frigid Andic Xerumbrepts
Umapine	Coarse-silty, mixed (calcareous), mesic Aquic Torriorthents
Wanser	Mixed, mesic Typic Psammaquents
Warden	Coarse-silty, mixed, mesic Xerollic Camborthids
Weirman	Sandy-skeletal, mixed, mesic Torrifluventic Haploxerolls
Wenas	Fine-loamy, mixed, mesic Cumulic Haplaquolls
Wiehl	Coarse-loamy, mixed, mesic Xerollic Camborthids
Willis	Coarse-silty, mixed, mesic Orthidic Durixerolls
Yakima	Coarse-loamy over sandy or sandy-skeletal, mixed, mesic Cumulic Haploxerolls
Zillah	Coarse-silty, mixed, mesic Fluvaquentic Haplaquolls

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