

potential. Roads should be designed to overcome the limitations of low soil strength and high shrink-swell potential. The slow permeability should be considered when planning septic tank absorption fields. Sewage lagoons work well.

This map unit is in capability subclasses IIIe, irrigated, and IIIc, nonirrigated.

27—Falfa clay loam, 3 to 8 percent slopes. This deep, well drained soil is on mesa tops. It formed in calcareous loess. Elevation is 6,500 to 7,000 feet. The average annual precipitation is 15 to 18 inches. The average annual air temperature is about 48 to 49 degrees F, and the average frost-free period is 100 to 120 days.

Typically, the surface layer is reddish brown clay loam about 9 inches thick. The upper part of the subsoil is reddish brown clay loam about 5 inches thick, the next part is reddish brown clay about 20 inches thick, and the lower part is reddish brown clay loam about 23 inches thick. The substratum is yellowish red clay loam that extends to a depth of 60 inches or more.

Included in this unit are about 10 percent Corta loam, 5 percent soils that are similar to this Falfa soil but have a dark-colored surface layer, and small areas of Witt loam and Simpatico loam.

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

This unit is used mainly for irrigated and nonirrigated crops and as rangeland and homesites. The main irrigated crops are corn for silage; small grain such as wheat, barley, and oats; pasture; and alfalfa hay. The main nonirrigated crops are wheat and pinto beans.

In irrigated areas, the main concerns of management are controlling water erosion, maintaining the organic matter content and fertility of the surface layer, and properly using irrigation water. Incorporating crop residue into the surface layer increases the water intake rate, improves tilth, reduces erosion, and helps to maintain adequate organic matter content. Realignment of ditches and irrigation structures is needed in some areas to achieve a more uniform distribution of irrigation water. Irrigation methods suited to this unit are furrow, corrugation, and sprinkler systems. Furrow irrigation is best suited to row crops. Furrows should run across the slope. Sprinkler irrigation is well suited to most crops. Use of this method permits the even, controlled application of water, reduces runoff, and minimizes the risk of erosion. Corrugation systems are suited to alfalfa, pasture, and small grain. Regardless of the irrigation method used, water should be applied carefully to reduce runoff and control erosion. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain the fertility and tilth. The use of fertilizer

helps to maintain the fertility of the soil. Grain and grasses respond to nitrogen, and legumes respond to phosphorus.

In nonirrigated areas, management is needed to conserve moisture, control erosion, and maintain the productivity of the soil. Stubble mulch tillage and returning crop residue help to reduce runoff and erosion and to conserve moisture. Chiseling or subsoiling can be used to break up the tillage pan and thus improve the water intake rate. Tillage should be kept to a minimum. Diversions and grassed waterways may be needed to reduce gully erosion.

The native vegetation of the unit consists of western wheatgrass, muttongrass, junegrass, Indian ricegrass, big sagebrush, Gambel oak, serviceberry, Rocky Mountain juniper, and pinyon. Proper grazing use as part of a planned grazing system helps to maintain the quality and quantity of the preferred rangeland vegetation. Seeding and deferring grazing facilitate revegetation of areas depleted by heavy grazing, cultivation, and other disturbances. Developing livestock watering facilities, fencing, and deferring grazing improve the distribution of grazing and help to maintain the condition of the rangeland. The production of forage is limited by low rainfall in summer. Contour furrowing and pitting increase the water intake rate and reduce runoff. These practices are especially effective on rangeland in poor or fair condition.

This unit generally is suited to windbreaks and environmental plantings. It is limited mainly by lack of sufficient rainfall in summer. Supplemental irrigation may be needed when planting and during the early stages of growth. Cultivation to reduce plant competition commonly is necessary, particularly while the plantings are young.

Among the trees that are suitable for planting are ponderosa pine, Russian-olive, Colorado blue spruce, and eastern redcedar. Among the shrubs are caragana, lilac, honeysuckle, and sumac. Some areas support stands of pinyon and juniper. Woodland products such as firewood, fenceposts, Christmas trees, and pinyon nuts can be obtained from these areas. The unit is capable of producing about 18 cords of firewood per acre in a stand of trees that average 5 inches in diameter at a height of 1 foot, if all limbs larger than 2 inches in diameter are used.

Limiting soil disturbance when harvesting trees helps to minimize erosion. Seeding to adapted grasses may be needed in some areas after harvesting. Low precipitation and the presence of brushy plants may influence seedling survival. Areas can be maintained in pinyon and juniper by selective cutting, leaving small trees and a few of the larger seed producing trees, and controlling livestock grazing so that seedlings can become established.

Wildlife such as cottontail, mule deer, coyote, squirrel, pheasant, and mourning dove use this unit. Irrigated

cropland provides food and shelter for some wildlife. Native rangeland and nearby areas of pinyon and juniper provide shelter and nesting areas. Suitable management for wildlife should include protecting the unit from overgrazing, providing protection from wildfire, and maintaining adequate plant cover, including areas of pinyon and juniper. In cropland areas, favorable habitat can be developed by maintaining plant cover along fences and ditches and in corners of fields.

Low soil strength and high shrink-swell potential are the main limitations for homesite and urban development. The foundations of buildings should be designed to compensate for the high shrink-swell potential of the soil. Roads should be designed to overcome the limitations of low soil strength and high shrink-swell potential. The slow permeability should be considered when planning septic tank absorption fields. Sewage lagoons work well if the limitation of slope is overcome.

This map unit is in capability subclass IVe, irrigated and nonirrigated.

28—Fluvaquents, sandy, frequently flooded. This unit consists of deep, somewhat poorly drained and poorly drained, nearly level soils that formed in recent alluvial deposits bordering major drainageways on alluvial valley floors. The areas are dissected by old river channels and by smaller streams. Elevation is 6,000 to 8,000 feet. The average annual precipitation is 15 to 20 inches. The average annual air temperature is 42 to 50 degrees F, and the frost-free period is 90 to 130 days.

The soils in this unit are extremely variable. The surface layer ranges from gravelly or cobbly loam to sandy loam. Stratified sandy loam, sand, and gravel are at a depth of 5 to 20 inches.

Permeability of these Fluvaquents is moderately rapid or rapid. Effective rooting depth is 12 to 40 inches or more because of the presence of a fluctuating water table. Available water capacity is very low to low. Runoff is slow, and the hazard of erosion is slight. The soils have a fluctuating water table between depths of 12 and 40 inches year round.

Included in this unit are small areas of Pescar fine sandy loam, Tefton loam, Riverwash, gravel, and sand bars.

This unit is used for livestock grazing and wildlife habitat.

The native vegetation is mainly cottonwood, willows, sedges, rushes, tufted hairgrass, yarrow, and iris. Proper grazing use as part of a planned grazing system helps to maintain the desired quality and quantity of the rangeland vegetation. Deferred grazing facilitates revegetation and improves areas of rangeland in poor condition. Brush control may be needed in some places.

Wildlife such as squirrel, mule deer, coyote, rabbit, and waterfowl use this unit. The unit is suited to the production of wetland plants that provide nesting areas,

protective cover, and food for waterfowl. The location of this unit near areas of irrigated cropland makes it valuable to both wetland and rangeland wildlife. Suitable management for wildlife should include protecting the unit from overgrazing.

If this unit is used for homesite development, the main limitations are the fluctuating water table and hazard of flooding. Buildings and roads should be designed to overcome these limitations. These limitations restrict the construction of sewage systems and may contribute to the pollution of ground water. Drainage and protection from flooding should be established before construction is begun.

This map unit is in capability subclass VIIw, nonirrigated.

29—Fortwingate stony sandy loam, 3 to 12 percent slopes. This moderately deep, well drained soil is on mountainsides. It formed in material derived from sandstone and mixed with loess. Elevation is 7,600 to 8,800 feet. The average annual precipitation is 18 to 22 inches. The average annual air temperature 41 to 45 degrees F, and the frost-free period is 90 to 110 days.

Typically, the surface is covered with a layer of organic material 1 inch thick. The surface layer is brown stony fine sandy loam about 1 inch thick. The next layer is pinkish gray stony fine sandy loam about 6 inches thick. The upper part of the subsoil is light brown loam about 5 inches thick, the next part is reddish brown clay loam about 13 inches thick, and the lower part is reddish yellow stony sandy clay loam about 7 inches thick over sandstone. Sandstone commonly is at a depth of 20 to 40 inches. In some places the surface layer is stony loam.

Included in this unit are about 15 percent Goldvale very stony fine sandy loam and small areas of Rock outcrop, Valto very stony fine sandy loam, Nordicol very stony sandy loam, and Anvik loam.

Permeability of this Fortwingate soil is moderately slow. Effective rooting depth is 20 to 40 inches because of the presence of hard bedrock. Available water capacity is low. Runoff is medium, and the hazard of erosion is slight.

This unit is used mainly as woodland and for livestock grazing and homesite development. It is also used for wildlife habitat.

This unit is well suited to the production of ponderosa pine. On the basis of a site index of 65, the potential production of marketable timber per acre is 4,025 cubic feet or 16,300 board feet (International rule) from an even-aged, fully stocked stand of trees 100 years old.

The main concerns in producing and harvesting timber are reforestation and providing protection from erosion along roads and in other areas where vegetation has been removed. Harvesting may be restricted during periods of heavy snowfall or rainfall or during snowmelt. Reforestation should be carefully managed to reduce