

SOILS

of Arizona's Conifer Forests

By S. W. BUOL

Much of Arizona that receives over 20 inches of annual rainfall supports stands of conifers. In addition to the forest products, these areas also provide the state with rangeland, wildlife habitat, recreational area and watershed area.

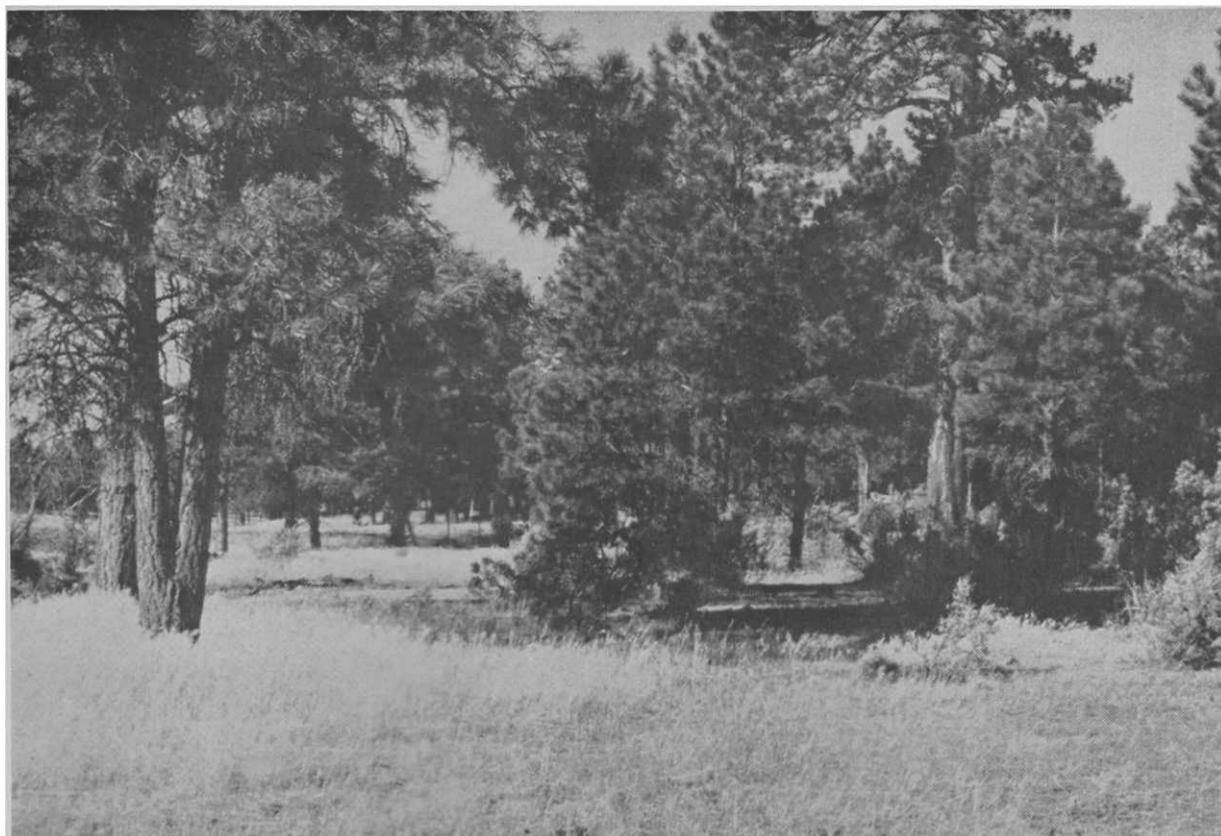
Most of the soil under the conifer forests in Arizona is classified in two great soil groups, the Gray Wooded soils and the Western Brown Forest soils. The Gray Wooded soils have been developed by the process of podzolization. During this process, iron and clay are leached from the top soil. Recognition of these soils is easily made by their characteristic light-colored, ash-like top soil layer under the surface layer of pine needles. This ash-like layer is the origin of the word Podzol from the Slavonic words *poda* (soil) and *zola* (ash).

Include Several Series

Their subsoils are reddish in color and usually of clay or clay loam texture. Soil series in the Gray Wooded group include the deep (over 36") McVickers and the shallow to moderately deep (less than 36") Wildcat series developed over Coconino Sandstone; the moderately deep to deep (over 20"), Elledge series over Dakota sandstone; the deep (over 36"), Soldier series and the moderately deep (20 to 36" deep), Hogg series on cherty limestone of the Kaibab formation, and the Overgaard series developed on Tertiary gravels.

In general, these soils support the better stands of timber in the state. The reasons for this seem to be: (1) the high infiltration rate provided by the coarse textured, ash-like topsoil layer which allows much of the rainfall to enter the soil and (2) the fine textured subsoil which stores the

This is fifth article in a series by Dr. Buol, describing the various soils in Arizona. The author, engaged in a cooperative project for mapping Arizona soils, is eminently well qualified for this subject. He is a member of the Department of Agricultural Chemistry and Soils.



PONDEROSA PINE and understory of grass on a Western Brown Forest soil.

water for plant use during periods of little or no precipitation.

The other group of soils in the forested areas of Arizona, the Western Brown Forest soils, do not have the ash-like top soil. Rather, they have a moderately fine to medium-textured dark-colored surface layer. Soil series recognized in this group of soils include the fine-textured Siesta and Bolliar series on basalt, the medium and moderately fine-textured Sponsellar series developed from vol-

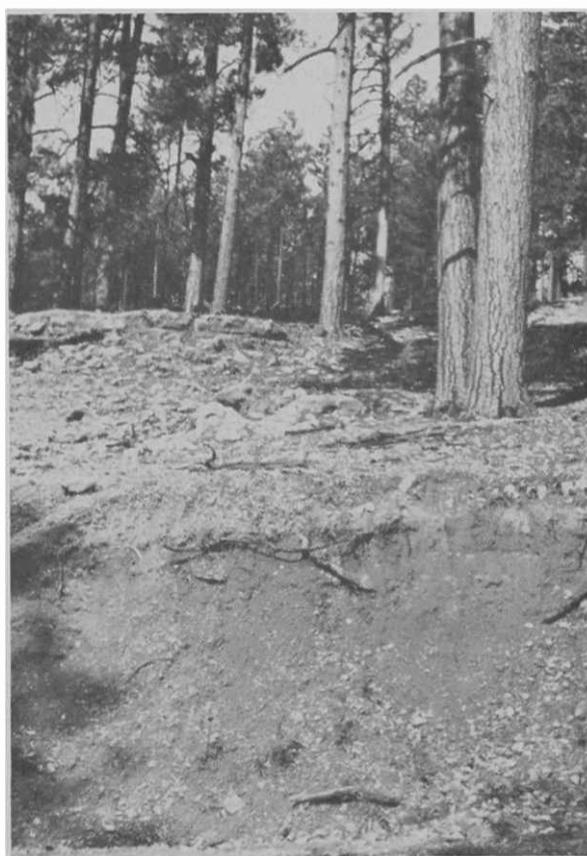
canic ash and cinders over basalt and the gravelly textured Sizer series developed on deep deposits of volcanic cinders.

Poorer Trees, Better Grass

In general the Western Brown Forest soils do not produce as good a stand of trees as do the Gray Wooded soils, however, a better understory of grass is usually found on the Western Brown Forest soils.

Many demands are placed on the forested soils in Arizona. Most of these demands stem from the fact that these soils are in areas of the state with the highest rainfall. Most of the demands can be summarized in the following management alternatives. (1) Should the management attempt to provide as much run-off as possible for use in the irrigated agriculture of the warmer valleys? (2) Should the growth of timber be the primary concern, or should the overstory vegetation be thinned or removed to encourage increased growth of grass for rangeland? (3) How much of the area should be developed for recreation and/or wildlife?

As all of these alternatives have economic considerations, each question is receiving considerable study at present. It now appears that no single use is best for the entire area. Rather, the most reasonable solution would seem to depend largely on the type of soil present. Each kind of soil presents unique features that need to be considered when managing the area.



PROFILE OF SOLDIER soil, a Gray Wooded soil developed on Cherty limestone.