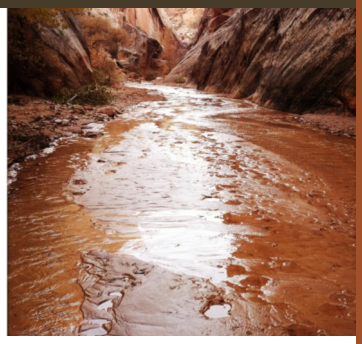
# FACT SHEET: Water and Soils



## Water

Water resources (aquatic resources) include all natural sources of water: precipitation, river and streams, springs and seeps, tinajas, groundwater and soil water. Water resources are important because all living things, plants and animals, are fundamentally dependent on water, whether they live in water (aquatic plants, fish and many insects) or on land (plants, animals and humans). In arid environments, much of life is concentrated near water sources, so those places typically have high diversity of plants and animals (for example, riparian zones along streams or next to springs). Life depends on having both enough water (water quantity) and clean water (water quality). Consequently, the condition of water resources (quantity and quality) is a basic indicator of land health, and the ability of the land to sustain uses such as grazing.

Water and natural water sources within the planning area are scarce and scattered. Lake Powell borders the southeast portion of the planning area .

The planning area encompasses portions of four watersheds, all of which are part of the Colorado River system. The Escalante River system flows from the Aquarius Plateau and Boulder Mountain into the upper end of Lake Powell. Last Chance Creek and Wahweap Creek (in the Lower Lake Powell watershed) are the principle tributaries draining the Kaiparowits Plateau, flowing into the main body of Lake Powell. The Paria River watershed (including Hackberry Creek, Cottonwood Creek and Buckskin Wash) extends from the Bryce Canyon-Bryce Valley area, emptying into the Colorado River below Glen Canyon Dam near Lee's Ferry. On the west side of the planning area, the Kanab Creek watershed (including Johnson Wash and its tributaries) drains into the Grand Canyon. Altogether, there are approximately 2,500 miles of stream channels and washes. Less than 10 percent of these are perennial streams: primarily the Escalante River and tributaries, and the upper reaches of the Paria River and Last Chance Creek. Federal and state water quality standards are used to regulate the use and quality of waters in the planning area.

*Water Resources and Livestock Grazing*
BLM Utah Land Health Standards 2 and 4, below, are the primary measurements of healthy water resources as it relates to rangeland management.

> *Standard 2: Riparian and wetland communities are in properly functioning condition, stream channel morphology and functions are appropriate to soil type, climate and landform.*

> *Standard 4: BLM will apply and comply with water quality standards established by the state of Utah (R3172) and the federal Clean Water and Safe Drinking Water acts. Activities on BLM lands will fully support the designated beneficial uses described in the Utah water quality standards (RS317.2) for surface and groundwater.*

## Soils

*What is soil?*
Soil is a dynamic resource that supports plants. It consists of mineral particles of different sizes (sand, silt, and clay), organic matter, and numerous species of living organisms. Soil has biological, chemical, and physical properties, some of which change in response to how the soil is managed.

*What is soil quality?*
Soil quality is the capacity of a specific kind of soil to function within natural or managed ecosystem boundaries, sustain plant and animal productivity,

# Water and Soils *(continued)*

maintain or enhance the quality of water and air, and support human health and habitation. Changes in the capacity of soil to function are reflected in soil properties that change in response to management or climate.

*Why is soil quality important?*
Changes in soil quality that occur as a result of management affect:

- the amount of water from rainfall and snowmelt that is available for plant growth
- runoff, water infiltration, and the potential for erosion
- the availability of nutrients for plant growth
- the conditions needed for germination, seedling establishment, vegetative reproduction, and root growth
- the ability of the soil to act as a filter and protect water and air quality

Soils in arid and semiarid regions are vulnerable to degradation because they are sensitive to change from natural processes and human-induced disturbances that can lead to accelerated erosion, soil loss, reduced soil and plant productivity, and altered water retention. One of the key components to guarding against soil erosion is adequate vegetation cover, which can also promote water infiltration and moisture retention.

Most of the soils in the planning area are semiarid, young, and poorly developed. Chemical and biological soil development processes, such as rock weathering, decomposition of plant materials, accumulation of organic matter, and nutrient cycling proceed slowly in the planning area. Biological soil crusts, often referred to as cryptobiotic, cryptogamic, microbiotic, or cyanobacterial-lichen soil crusts, consist of lichens, mosses, and algae usually binding a matrix of clay, silt, and sand. Biological soil crusts are formed by living organisms and their by-products, creating a surface crust of soil particles bound together by organic materials. Biological soil crusts, which are widespread but not pervasive, play an important ecological role in the Monument by stabilizing soils and reducing erosion, contributing to nutrient cycling, and enhancing plant soil-water relations by regulating the water runoff-infiltration balance, all of which affect vascular plant distribution, germination, and growth.

*Soils and Livestock Grazing*
Rangeland health and soil quality are interdependent. Rangeland health is characterized by the functioning of both the soil and the plant communities. The capacity of the soil to function affects ecological processes, including the capture, storage, and redistribution of water; the growth of plants; and the cycling of plant nutrients. For example, increased physical crusting decreases the infiltration capacity of the soil and thus the amount of water available to plants. As the availability of water decreases, plant production declines, some plant species may disappear, and other species may increase in abundance. Changes in vegetation may precede or follow changes in soil properties and processes. Large shifts in vegetation generally are associated with changes in soil properties and processes and/or the redistribution of soil resources across the landscape. In some cases, such as accelerated erosion resulting in a change in the soil profile, this shift may be irreversible, while in others, recovery is possible.

BLM Utah Land Health Standard 1, below, is the primary measurement of healthy soil resources as it relates to rangeland management.

> *Standard 1: Upland soils exhibit permeability and infiltration rates that sustain or improve site productivity, considering the soil type, climate and landform.*

When soil degradation occurs, site productivity is slow to recover because of the slow rate of natural soil processes in arid and semiarid regions.

**Would you like more information?**

All soils data and additional soils information are available on-line at: http://websoilsurvey.sc.egov.usda.gov/.

For more information, please visit the GSENM Livestock Grazing Plan Amendment Webpage: ***http://blm.gov/pgld***

**Please submit your comments by January 13, 2013.**

You can email, fax, or mail your comments.

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