



Fig. 5.4 *Vehicular disturbance to biological soil crusts. Recreational disturbances are concentrated in open interspaces, where crusts are most abundant and vulnerable. The tracks in the top photo are approximately 10 years old.*

Stocking levels and season of use should be ascertained on an annual basis, jointly by managers and users, with optimal coverage of both vascular plants and biological soil crusts as the management goal (Kaltenecker and Wicklow-Howard 1994; Kaltenecker et al. 1999b). Optimal coverage should be based on site capability and rangeland health indicators of site stability and nutrient cycling. Livestock exclusion from reference areas and sites with highly erodible soils or low vascular plant cover is appropriate to protect biological crusts and site stability.

5.3 Recreational Use Management

Many recreational activities have impacts similar to those of livestock use. Therefore, principles relating to management of livestock disturbance intensity, timing, frequency, duration, or extent apply to recreational impacts as well. However, there are also major differences. People are often harder to control than livestock. People can carry food and water; thus, access to these essentials does not limit their activities. People tend to go where they want, even in the presence of barriers such as fences. People also have a greater affinity for open vegetation, as it is easier to walk or drive through; however, these same open sites are generally dependent on biological soil crusts for stability (Fig. 5.4). Education, legal restriction and/or use stipulations, and compliance activities may require proportionately

higher management priorities and time requirements than for the control of livestock.

Concentration of recreational use is generally desirable.

Designated campsite use reduces the impact of haphazard placement of sites by individuals. Trails minimize the amount of biological soil crust that is disrupted by trampling. Education can be used to teach people how to camp in areas without designated campsites (e.g., on hardened surfaces, such as rocks, or in areas with minimal crust potential) and how to travel cross-country in areas that lack trails (e.g., in washes, on rock, on fallen logs).

Recommended management practices include the following:

- Restrict road locations to less sensitive areas. Road drainage (culverts, water bars) should be designed so that erosion or sediment fill of adjacent off-site areas is minimized.
- Promote extensive, low-density uses, such as hiking and backpacking, during late fall and winter periods. Restrict access during dry seasons.
- Permit high-density, high-impact uses, such as Christmas tree and firewood cutting areas, for short durations during late fall and winter, preferably when soils are frozen. Areas should be rotated based on a total allowable disturbance threshold with long recovery periods (greater than 10 years minimum on moderate- to high-resiliency sites, such as in sagebrush communities [greater than 230 mm average annual rainfall] in the northern Great Basin) before redesignation for use. Exclude low-resiliency sites.
- Provide designated trails, and restrict use to trails in high-density recreational areas.
- Provide interpretive sites and literature on recognition and value of protecting biological soil crusts at major access points in areas of extensive or unique crust formation.
- Require an analysis of impacts to biological soil crusts and appropriate stipulations on all use applications, such as rights-of-way, oil and gas and other exploration permits, permits to drill, etc.