vigor was poor, willow reproduction was very limited, and wildlife habitat was nonproductive (Smith pers. comm.). After 16 years, conditions are much improved (Figures 15 and 16). Willow reproduction is apparent, banks are stabilized, plant vigor is improved, and the fish, beaver, moose, and duck habitat is productive again (Krosting and Christensen pers. comm.).

Figure 15. Riparian conditions on Little Sandy River in Little Sandy Allotment following July grazing treatment, 1986.

Figure 16. Riparian conditions on Lander Creek in Little Sandy Allotment, July 1986.

9. Rest-Rotation Grazing (Rotational Stocking)

Though the term "rotational stocking" is recommended over the term "rest-rotation grazing" (Forage and Grazing Terminology Committee 1991), rest-rotation is still commonly used in both application and literature, and thus, it is retained throughout this document. Rest-rotation is a grazing method that uses recurring periods of grazing and rest among two or more paddocks in a grazing management unit throughout the period when grazing is allowed. It differs from rotational deferred grazing in that it includes a year (or full growing season) with no grazing in the rotation for each pasture at least once in each cycle. There are great differences of opinion on the value of rest-rotation grazing, as generally applied, in the proper management of riparian areas.

Hormay (1976) emphasized that each rest-rotation system should be designed to meet the resource needs of the area. The amount of rest, stocking rate, and season of use should be determined by the manager based on the growth requirements of the vegetation present, all species considered. Rest-rotation does not dictate heavy grazing under any treatment (emphasis added).

As with deferred and deferred rotation strategies, a system that uses more pastures is usually better than one that uses fewer; however, in practical application, rest-rotation grazing has often used a three-pasture system. Cost and simplicity have often been factors in choosing a three-pasture system, and riparian objectives have rarely influenced pasture design and grazing strategy. Variation in ecological conditions and among stream types with different sensitivities to disturbance have contributed to mixed results, sometimes in the same management unit.

Masters and others (1996b) provide examples of two, three-pasture rest-rotation strategies in northern Nevada; one worked, the other did not. The goals on Strawberry Creek, (Figure 17) were to maintain healthy streamside vegetation and stable channel conditions. Continued success since the strategy was implemented in 1969 was attributed to cooperation between agencies and the permittee, inherently stable stream channel conditions, long-term attention to resource conditions, and careful herd management practices, including salt placement and herding livestock to improve distribution. On Wildcat Creek (Figure 18), past management had resulted in unstable eroding banks and deteriorated ecological conditions. Applying a three-pasture, rest-rotation strategy in a degraded system without adjusting livestock numbers resulted in the overgrazing of two pastures, and 1 year of rest did not allow system recovery. (Authors' note: In this case, temporary exclusion to allow a "jumpstart" in the recovery process was probably warranted.) In addition to limitations imposed by the initial conditions, specified herd management practices were not followed, upland water developments had failed, and salt blocks continued to be placed near the stream channel.

Figure 17. Strawberry Creek maintained riparian condition with a three-pasture, rest-rotation system.

Figure 18. Wildcat Creek did not improve under the same kind of system.

Elmore and Kauffman (1994) cite 10 years of continued channel degradation in a high-gradient, high-energy stream system under three-pasture, rest-rotation grazing (Figure 19). Yet, in the same allotment, with the same system and the same livestock, another stream made an excellent recovery (Figure 20). The differences are due to stream type, sensitivity to disturbance, vegetation potential, and kind of vegetation required to stabilize each stream. Rest-rotation favors herbaceous bank-forming vegetation, which is entirely adequate for the low-gradient stream depicted in Figure 20. However, willows needed for stabilizing the high-energy stream in Figure 19 continued to show a downward trend.

Figure 19. Higgins Creek, 1984. Channel degradation continued with 10 years of three pasture rest-rotation.

Figure 20. Beaver Creek, 1984. Three-pasture rest-rotation provided recovery of herbaceous bank-forming vegetation and associated channel characteristics.