Chapter 8 UTE LADIES'-TRESSES

8.1 Status

Ute ladies'-tresses (*Spiranthes diluvialis*), a perennial orchid, was federally listed as threatened in 1992 (57 FR 2048). In 1995, the known population was approximately 20,500 individuals. Subsequent searches of potential habitat have revealed a greater number of populations and individual plants than was known when listed; the estimated population in 1999 was less than 60,000 individuals (Jordan 1999). The USFWS (1995) prepared a draft recovery plan for the Ute ladies'-tresses, but this plan has not been finalized.

8.2 Distribution

The Ute ladies'-tresses are only known to occur in Colorado, Idaho, Montana, Nebraska, Nevada, Utah, Washington, and Wyoming (Moseley 1996; Jordan 1999). Although the orchid has a large geographic range, most occurrences contain fewer than 100 individuals. The Idaho metapopulation (see Figure 8-1) only contains

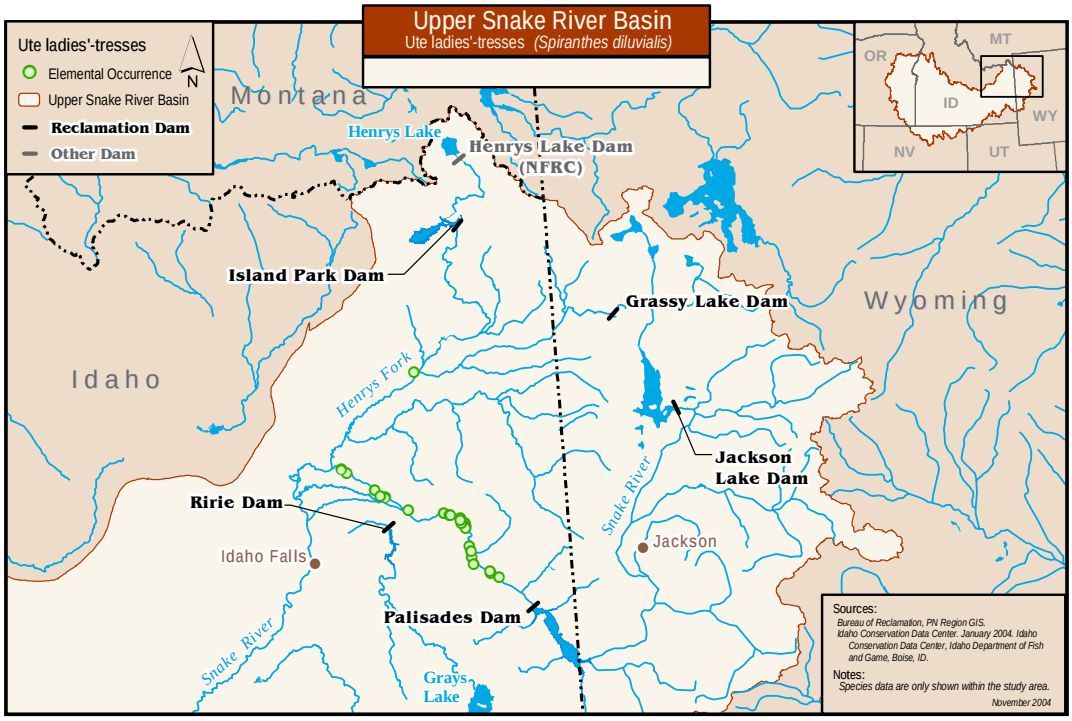

Figure 8-1. Known Ute ladies'-tresses locations in the upper Snake River basin.

populations along the South Fork of the Snake River and the Henrys Fork; these represent about 15 percent of the known population. Figure 8-1 on page 225 shows known locations for 24 elemental occurrences in the Snake River system above Milner Dam action area (22 on the South Fork of the Snake River and 2 on the Henrys Fork) with approximately 4,300 individual flowering plants identified in 2003 (Murphy 2004a, 2004b). BLM lands along the Snake River in Wyoming were surveyed in 1999, but no plants were identified; the species is known to occur only in the southeast portion of Wyoming (Fertig 2000).

8.3 Life History

The Ute ladies'-tresses is a perennial, terrestrial orchid with the stem arising from tuberously thickened roots. Its narrow leaves are about 11 inches long at the base and become reduced in size toward the apex (Jordan 1999). The small white or ivory flowers cluster into a spike arrangement at the top of the stem (see Figure 8-2).


Photo by USFWS

Figure 8-2. Flowering Ute ladies'-tresses.

The species usually flowers from the end of July until early September. Reproductively mature plants do not flower every year. Reproduction appears to be strictly sexual, with bumblebees as the primary pollinators. Each fruit contains thousands of very small seeds. Seeds disseminate primarily through water transport. After seeds reach suitable habitat, they must come in contact with the suitable species of mycorrhizal endophyte. This fungus provides the developing plant with the nutrients necessary for further growth (USFWS 1995; Jordan 1999). The orchid seedlings may remain underground, dependent on mycorrhizal fungi, for up to 8 years (Fertig 2000).

8.4 Habitat Requirements

The Ute ladies'-tresses is a floodplain species that is suspected to require mid-seral riparian habitats created by streams and rivers with actively changing channels (USFWS 1995). The orchid appears to be well adapted to, and perhaps dependent on, regular disturbances from water moving through floodplains. Natural fluvial processes create new habitat. Flooding also maintains the existing habitat by reducing tree and shrub colonization of gravel bars.

The orchid is endemic to moist soils in mesic or wet meadows near springs, lakes, or perennial streams (USFWS 1995). The elevational range of known Ute ladies'-

tresses is 4,300 to 7,000 feet (Stone 1993). In some localities in the eastern Great Basin, Ute ladies'-tresses are found near freshwater lakes or springs (57 FR 2048). The plant seems to require permanent sub-irrigation (Coyner 1989), indicating a close affinity with floodplain areas where the water table is near the surface throughout the growing season. It grows primarily in areas where the vegetation is relatively open and not overly dense or overgrown (Coyner 1989, 1990; Jennings 1989, 1990), although a few populations in eastern Utah and Colorado are found in riparian woodlands. Plants usually occur in small scattered groups and occupy relatively small areas within the riparian system (Stone 1993). These preferred habitat features seem to imply that the plant is most likely to occur in riparian habitats created and maintained by stream activity within their floodplains (USFWS 1995).

This orchid is tolerant of a mix of herbaceous wetland, forb, and grass species but does not compete well with emergent or aggressive species that form dense monocultures, such as Russian olive (*Elaeagnus angustifolia*), reed canary grass (*Phalaris arundinacea*), and other similar non-native invasives (USFWS 1995). Maturing riparian communities with an overstory of trees or shrubs do not provide suitable habitat conditions (USFWS 1995; Moseley 1998). The plants thrive in full sun or partial shade; Moseley (1998) notes that the species is often associated with cottonwood galleries. The plants are not tolerant of long-term standing water throughout the growing season. Beaver dams that raise the water table within 18 inches of the ground surface likely improve habitat conditions in adjacent areas (USFWS 1999).

Within the floodplain of the Snake River, Moseley (2000) identified the five distinct cover types the Ute ladies'-tresses occupies: wandering spike-rush (*Eleocharis rostellata*), silverberry/redtop (*Elaeagnus commutate*), wooly sedge (*Carex lanuginose*), sandbar willow/mesic graminoid (*Salix exigua/mesic graminoid*), and varied scouring rush (*Equisetum variegatum*). The wandering spike-rush and silverberry/redtop tend to occur as larger-scale patches on the Snake River, while the sandbar willow/mesic graminoid and varied scouring rush are rarer and occur as small-scale patches within the cottonwood forests. The Ute ladies'-tresses occurs in connection with the wandering spike-rush and wooly sedge communities only on Kellys Island (Moseley 2000).

8.5 Factors Contributing to Species Decline

Several long-term threats may affect the species and its habitat, including urban development; stream channelization; stream alterations that reduce the natural dynamics of stream systems; increased demands for agricultural, municipal, and industrial water; recreation; and invasion by non-native plant species (USFWS 1995). These threats are expected to intensify as the population of western states grows.

Murphy (2000, 2001, 2003, 2004a) and Moseley (2000) describe short-term effects on the Ute ladies'-tresses from a variety of adverse human actions, including hydrologic and floodplain alterations, livestock grazing/trespass grazing, off-highway vehicle use, recreation, and non-native weed invasions.

Agricultural development has several components that could continue to threaten the species as a whole. Water diversion, channelization, groundwater withdrawal, and increased sedimentation from upland land-clearing and development activities have likely affected some populations. Alterations in hydrology of natural stream and river systems has been reported as both beneficial and detrimental to the orchid, depending on the availability of water throughout the growing season (Jordan 1999).

Heavy livestock grazing is believed to be detrimental to the species. Mild to moderate grazing and mowing early during the growing season may promote flowering by opening the canopy of competing vegetation, permitting the orchid to grow in full sun. However, grazing and mowing later in the growing season may impede fruit set by removing flowering stalks and enhancing harvest of the fruits by small mammals. Livestock trampling may also be detrimental.

Many orchid populations occur on public rangelands where domestic livestock and grasshoppers are commonly viewed as competitors for forage. Insecticides registered for control of grasshoppers on rangelands include acephate, carbaryl, Dimilin, and Malathion (EPA 1985). These pesticides also affect bumblebees, which are the preferred pollinators of the Ute ladies'-tresses (Fertig 2000).

Most recently, Murphy (2004a) identifies threats specific to the Idaho meta-population as alteration of hydrologic regime on the South Fork of the Snake River due to the operation of Palisades Dam since the 1950s, cattle grazing, off-highway vehicle use, non-native plant species invasion, and recreation, such as camping, boating, fishing, etc. The threat from alternation of the flow regime is the result of reduced peak flows that may reduce the ability of the river to maintain existing orchid habitat and create new orchid habitat through erosion and avulsion.

8.6 Recovery Efforts

The managing agencies along the Snake River corridor have instituted several management activities to restrict grazing, prevent recreation damage, and control non-native weeds for the protection of the species. Studies indicate that long-term health of the population of this species is dependent not only in controlling these impacts, but more importantly, in providing flows that maintain a dynamic floodplain.

The BLM, the USFS, and the IDFG Conservation Data Center survey the Snake River below Palisades Dam each growing/flowering season to determine the status of known species locales and to locate new occurrences of the species.

8.7 Current Conditions in the Action Area

Several recent Idaho surveys illustrate fluctuations in species population (Moseley 1998, 2000; Murphy 2000, 2001, 2003, 2004a). Table 8-1 displays the survey results for recent years. Poor understanding of the species and poor survey timing may explain some variations. The number of plants observed in any specific population may also vary considerably from year to year and may lead to false estimates of the population size and vigor. Apparent fluctuations in populations are the result of dormancy periods likely brought on by variation in environmental conditions. During dormancy periods, there may either be no above-ground growth or limited above-ground growth with no floral development.

The 2001 count of 4,133 individuals represents a significant expansion at one location on the Snake River below Palisades Dam (Murphy 2001). The 2002 survey showed a significant decrease in counted individual plants, down 2,380 to 1,753 individuals. Trespass cattle grazing at Annis Island reduced the number of flowering plants counted from 2,557 to 306 individuals (Murphy 2003). When this reduction in observed individuals is removed from the tabulations, the number of flowering individuals fell by 129. In 2003, 2,006 individuals were counted in the Annis Island population. New populations were discovered in 2002 at the Chester Wetlands on the Henrys Fork and in 2003 near Texas Slough between the Snake River below Palisades Dam and Henrys Fork (Murphy 2003, 2004b).

Specific trend data has not been developed for the Idaho occurrences of this species. The species is often difficult to observe for a variety of reasons, including the plant's small size among its grassy habitats, the natural variability in year-to-year flowering

Table 8-1. Recent Snake River basin Ute ladies'-tresses survey results.

Survey Year	Source	Number of Plants	Number of Occurrences
1996	Murphy 2004a	201	4
1997	Moseley 1998	1,171	20
1998	Moseley 1998	2,604	19
1999	Moseley 2000	3,410	20
2000	Murphy 2000	2,600	20
2001	Murphy 2001	4,133	20
2002	Murphy 2003	1,753	20
2003	Murphy 2004a, 2004b	4,341	22

plants, alternations in phenology due to annual climate fluctuations, and mistimed surveys that miss peak flowering (Murphy 2004a). Additionally, counting flowering plants may not determine the long-term health of the population because it does not take into account the general condition of the habitat.

8.7.1 Snake River below Palisades Dam

Extensive surveys in 1996 covered a wide area of eastern Idaho to assess the distribution of potential habitat (Moseley 1996). These surveys documented the existence of four separate occurrences of the plant in the floodplain along the mainstem of the Snake River between Heise and Swan Valley. One population consisted of 12 individuals scattered over about 1 acre while another population consisted of 15 individuals within about 1 acre. The largest population was 173 plants within 1 acre, while the smallest population was one plant at another site (Moseley 1996).

The BLM, the USFS, the IDFG Conservation Data Center, and the USFWS conducted more intensive surveys in 1997. Preliminary analysis of data indicates the existence of 20 occurrences along the Snake River between Swan Valley and the confluence with the Henrys Fork (Moseley 1997). A total of 1,171 individuals (mostly flowering/fruiting plants) were counted. Non-flowering plants were not counted due to the difficulty of species identification (Moseley 1998).

Cattle grazing poses a short-term impact to the species from the loss of flowering plants and a long-term threat from the loss of production (Murphy 2004a). Impacts from recreation activities, such as camping, boating, and fishing, continue to increase in this reach of the Snake River. Murphy (2004a) reports that effects to 11 occurrences are associated with recreation. Off-highway vehicle use causes a minor threat. Non-native weeds may be responsible for nearly extirpating the orchid from two sites and are in competition with the orchid at nearly all sites (Murphy 2004a).

Grazing and recreational use appear to be the most likely activities affecting the plant along the Snake River below Palisades Dam. Recent surveys along the Snake River below Palisades Dam reflect this. It is generally believed that any activity that degrades floodplain riparian or wetland habitats also affects Ute ladies'-tresses (USFWS 1995).

The hydrologic alteration of the Snake River below Palisades Dam presents the greatest threat to the long-term viability of the Ute ladies'-tresses on the South Fork of the Snake River (Murphy 2004a); this alteration is most evident in the suppression of the ecological processes inherent in fluvial systems. Several sources have indicated that reduction in peak flows have reduced geomorphologic processes downstream from Palisades Dam (Murphy 2004a; Moseley 1998; Hauer et al. 2004; Merigliano 1995). In general, floodplains are modified by erosional deposition and channel avulsion, which lead to destruction and development of habitats, both

temporally and spatially; this is described as a "shifting habitat mosaic" within the floodplain (Hauer et al. 2004). The constant creation and destruction of habitats is the basis for the biological diversity within riparian habitats.

The BLM contributed funding for a study by Merigliano (1995) to investigate the effects of natural and managed river flows on maintenance of cottonwood stands below Palisades Dam. This study analyzed pre-dam river flows to identify flows to maintain the cottonwood forest on the South Fork. The study also presents information showing that post-dam flow regulation has reduced large flood flows, sediment transport, and channel migration, causing a reduction in the amount of suitable areas for cottonwood establishment and long-term survival of the existing cottonwood forest and in turn the riparian habitat of the river.

Reclamation has funded two efforts to determine river operation schemes that mimic more natural streamflows to support the IDFG cutthroat trout management program. If implemented, these should also benefit Ute ladies'-tresses. In 2000, Reclamation initiated a project to analyze operations from an ecological perspective. The Ecologically Based System Management (EBSM) project identified annual and inter-annual operations to support long-term ecological functions in the Snake River below Palisades Dam (Hauer et al. 2004). Burnett and Van Kirk (2004b) provided a statistical analysis of a long-term regulated hydrograph and a long-term unregulated hydrograph for the Snake River below Palisades Dam as they relate to the ratio between the high and low flows and the effects of the alteration ratio on cutthroat trout. These two studies looked at post-dam operations that influenced the physical and biological character of the river.

These studies suggest that species that evolved under flow conditions in high-energy Rocky Mountain streams benefit from regulated flow regimes that mimic naturally occurring hydrographs. Flows great enough to cause sediment mobilization that scour rainbow trout redds and give Yellowstone cutthroat trout a competitive edge also provide the mechanism for channel erosion and avulsion processes that benefit Ute ladies'-tresses (Burnett and Van Kirk 2004b; Hauer et al. 2004).

Hauer et al. (2004) and Merigliano (1995) report that in order to maintain the existing habitat mosaic, including cottonwood and Ute ladies'-tresses' habitats on the Snake River below Palisades Dam, flows in excess of 30,000 cfs are needed to cause erosion and avulsion of the floodplain (orthofluvial flows). Hauer et al. (2004) determined that a flow of 17,000 to 19,000 cfs is the average threshold flow needed to begin mobilizing sediment within the active river channel (parafluvial flow). The erosion and avulsion process that creates or destroys habitat begins at this flow. Hauer et al. (2004) also noted that the ramping rate down from these higher flows is important to this process, with a 5 percent ramp-down likely most effective. Hauer et al. (2004) suggest a minimum of around 28,000 cfs in wet years to initiate orthofluvial flow

with sustained flows of 30,000 cfs for as long as possible, with flows over 25,000 cfs for 12 to 15 days in the very wettest of years (4 years out of 45). Merigliano (1995) suggests that flows of 38,000 cfs are necessary every 10 to 15 years for the establishment of new cottonwood stands.

Murphy (2004a) and Moller and Van Kirk (2004) identify that past project operations below Palisades Dam on the Snake River, as measured at the Snake River near Irwin and Heise gages, have decreased winter flows during the storage season, reduced June peak flows, and increased summer flows during the irrigation season. Project operations have significantly reduced the high, annual scouring flows associated with uncontrolled spring runoff. Over the last 87 years, the average unregulated (theoretical operation without the project) peak flow for the Snake River at Heise gage would have been 32,081 cfs as opposed to actual average regulated peak flow of 21,000 cfs since Palisades Dam was completed in 1956.

This reduction in peak flows reduces the mobilization of sediment, which in turn may alter seral development of some plant communities and reduce the amount or development of new mid-seral riparian habitat. Murphy (2004a) notes that over time, the affected mid-seral communities could become drier and allow progressive encroachment of shrub and woody vegetation.

Flows above flood stage still occasionally occur in the river reach below Palisades Dam as measured at the Irwin gage. Flood stage in this reach, 24,500 cfs, has been exceeded in four years since 1956. In June 1997, flows exceeded 38,000 cfs for over a week, peaking at 40,300 cfs on June 20, 1997.

Most of the known populations of Ute ladies'-tresses are inundated for a period of time ranging from several days to several weeks under flow conditions that range from 18,000 cfs to 20,000 cfs (Moseley 1998). Spring inundation is considered a normal occurrence within the habitat of this orchid and is likely necessary for the continued existence of the plant (Moseley 1998) and its habitat. Once the higher flows associated with spring runoff recede, the orchids again become exposed and can begin the normal growth cycle. Actual average daily flows in June at the Snake River near Heise gage exceeded 18,000 cfs for at least one day in 27 years since 1956 (57 percent). The actual monthly average flow during June has exceeded 18,000 cfs in 12 of those years (25.5 percent).

Low summer flows that occur due to extreme drought can cause moisture stress at some orchid sites during July and August, which Murphy (2004a) reports as the prime growing period. Murphy (2004a) reports that inadequate soil moisture is not likely a limiting factor at any site when flows are higher than 6,900 cfs. In 2001, August streamflow on the Snake River dropped to 6,879 cfs and was sufficiently low enough to cause moisture stress (Murphy 2003). As Table 8-1 on page 229 shows, the population

occurrences from 2001 to 2002 did fall significantly, but this reduction is nearly entirely attributable to the loss of 2,251 individuals at Annis Island from trespass cattle grazing (Murphy 2003). Thus, the soil moisture stress from the 6,879 cfs flow did not appear to significantly affect the orchid populations in the Snake River.

Murphy (2003) goes on to report that flows of 8,400 cfs maintain adequate soil moisture at all but one occurrence, and flows of 7,300 cfs or higher are high enough to maintain soil moisture "at most occurrences." Winter flows are not reported as causing adverse growth conditions, most likely because the plants are dormant.

Lower flows during the orchid's growing period occurred regularly in the past. Analysis of pre-Palisades Dam flow at the Snake River near Heise gage shows that flows regularly fell below 7,300 cfs during late summer (it is important to note that upstream from this location, Jackson Lake Dam was in place and operating). For example, in the period between 1910 and 1940, August daily flows dropped below 7,300 cfs for at least one day in August in 24 of 31 years, and they dropped below 7,300 cfs for every day in August in 4 of 31 years. In the 44 water years from 1960 to 2003, August daily flows dropped below 7,300 cfs for at least one day in 13 of 44 years, and they never dropped below 7,300 cfs for every day of the month.

Average July monthly flows at the Snake River near Irwin have been above 8,400 cfs 100 percent of the time. Average August monthly flows have been above 8,400 cfs 66 percent of the time, above 7,300 cfs 92 percent of the time, and above 6,900 cfs 96 percent of the time.

The BLM, the USFS, and the IDFG Conservation Data Center surveyed numerous sites on BLM lands on the Snake River from the Henrys Fork confluence to American Falls Reservoir. They found no Ute ladies'-tresses (Moseley 1998; Murphy 2004a).

8.7.2 Henrys Fork

A new population was discovered at IDFG's Chester Wetlands Wildlife Management Area on the Henrys Fork below the Cross Cut Diversion Dam above St. Anthony, Idaho. This was the first documented occurrence outside the Snake River corridor below Palisades Dam (Murphy 2003). Approximately 300 individuals at 6 to 7 separate sites were found in surveys conducted in 2003 (Aslett 2004).

Island Park Dam partially controls Henrys Fork flows, but irrigation diversions below the Fall River confluence with the Henrys Fork have a greater influence on Henrys Fork flows. These result in low late summer flows but not in a substantial alteration of peak flow (Burnett and Van Kirk 2004b). Burnett and Van Kirk (2004a) further note that Reclamation's operational control of the Henrys Fork only minimally alters the natural hydrograph. Operations at Island Park Dam or the Cross Cut Diversion

Dam immediately downstream from the Fall River confluence with the Henrys Fork most likely have not significantly affected this orchid population.

This population is associated with subsurface flows from nearby canals and a naturally high water table (Murphy 2003). One sub-population is located about 20 meters from the Henrys Fork and may be inundated during peak flow events. This site is also influenced by sub-irrigation from a leaky canal upslope of the site. The rest of the sub-populations are approximately 0.75 mile from the river and are located in a wetland that is sub-irrigated by a high water table and small canals and ditches. Storage and release of water at Island Park Reservoir and its subsequent diversion later in the irrigation season has likely indirectly benefited the orchid by supporting subsurface flows during the orchid's growing season.

A second occurrence was found in the historical floodplain of the Snake River near the Henrys Fork confluence and near Texas Slough in a drainage that flows towards the Henrys Fork. This is a small population with three individuals occurring in two groups (Murphy 2004b). The occurrence is on a piece of private land that apparently is being managed as a private wildlife refuge and residential area and is not influenced by Reclamation operations.

8.8 Effects Analysis

The area of analysis for the Ute ladies'-tresses is in the Snake River corridor below Palisades Dam to the Henrys Fork confluence and in Henrys Fork just above the Snake River confluence. This area is within the action area for future O&M in the Snake River system above Milner Dam. Since implementation of the proposed action will not affect the extent, management, or location of floodplain development, grazing, recreation, off-highway vehicle use, or non-native plant species invasion, these factors will not be analyzed.

8.8.1 Snake River below Palisades Dam

Under the proposed action, Reclamation's future operations at Palisades Dam are likely to slightly reduce the present frequency of Ute ladies'-tresses inundation, the degree of soil moisture, and the erosion and avulsion process on the Snake River from Palisades Dam to its confluence with the Henrys Fork.

Habitat Inundation

Section 8.7.1 describes spring inundation of the orchid's known habitat along the Snake River below Palisades Dam as a normal occurrence that is most likely needed for the plant's continued existence (Moseley 1997) and the maintenance of

appropriate habitat conditions. Flows above the 18,000-to-20,000-cfs range inundate all but one occurrence of Ute ladies'-tresses for a period of time ranging from several days to several weeks (Moseley 1998; Murphy 2004a). For this analysis, Reclamation uses an 18,000-cfs benchmark flow to help determine how the proposed action may cause inundation of known Ute ladies'-tresses occurrences.

Under the proposed action, the model predicts that average monthly flows at the Snake River near Heise gage in June will exceed 18,000 cfs in about 23 percent of years. This is only a 2 percent reduction from the frequency of flows above 18,000 cfs in the historical record since 1956 and is almost identical to the Current Operations scenario (see Figure 8-3). The model's monthly time step does not fully capture how often daily flow will exceed 18,000 cfs in a month when the month's average flow does not exceed 18,000 cfs. With only a 2 percent reduction in frequency for the average monthly flows to exceed 18,000 cfs, it is likely that the 57 percent of years daily flows have exceeded 18,000 cfs will likely not drop below 50 percent; thus, the Ute ladies'-tresses habitat will still likely be inundated for at least one day in at least 50 percent of years.

The proposed action differs slightly from current operations because it includes a provision for Palisades Reservoir powerhead to serve as a source for salmon flow augmentation in dry years. Because Reclamation may vacate this space in some years, this would increase the volume of space Reclamation would need to fill before beginning flood control releases during the subsequent spring. As a result, Palisades

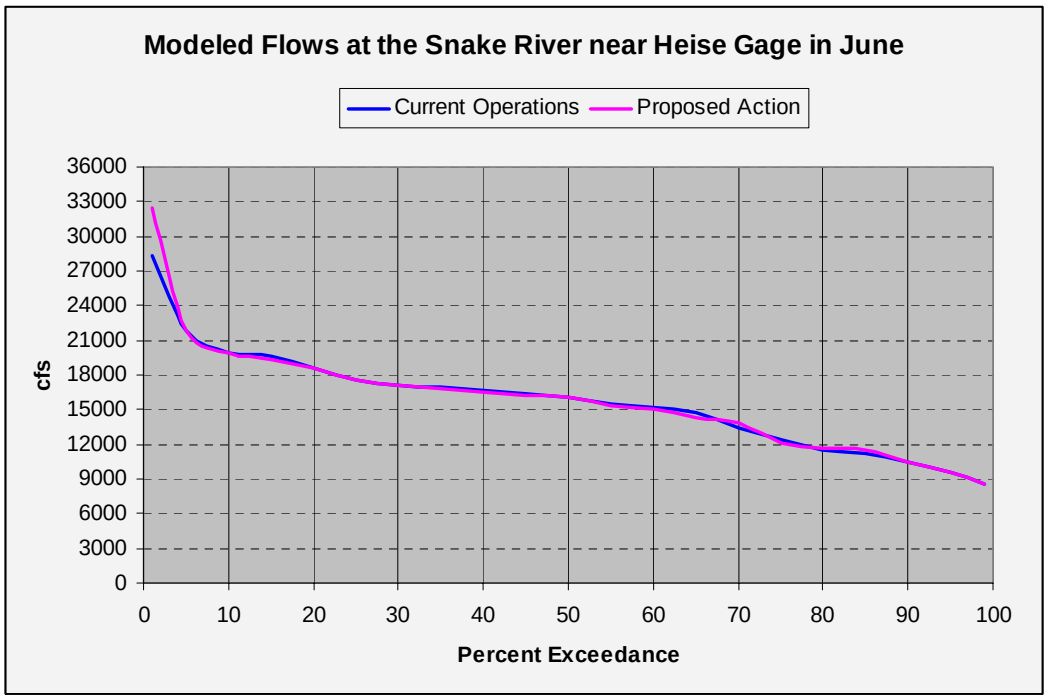

Figure 8-3. Comparison of modeled average monthly flows for current operations and the proposed action for the month of June at the Snake River near Heise gage.

Reservoir would fill slightly slower, and Reclamation would need to release less water than it would otherwise have released. Flows in the Snake River below Palisades Dam above 18,000 cfs will still occur with sufficient frequency to inundate the Ute ladies'-tresses habitat, and flood flows exceeding 24,500 cfs, the official flood stage, will continue with near the same frequency as they have in the past.

Soil Moisture

The model predicts that flows during the prime growing season (July and August) will be sufficient to maintain soil moisture for most orchid occurrences. Murphy (2003) notes that 8,400 cfs maintains moisture at all but one occurrence, and that 7,300 cfs maintains moisture at 16 of 22 occurrences. Murphy (2004a) reports that inadequate soil moisture is not likely a limiting factor at any site when flows are above 6,900 cfs.

The model predicts that average monthly flows for the proposed action at the Snake River near Irwin in July will be above 8,400 cfs 100 percent of the time. The model also predicts that average monthly flows for the proposed action in August will be above 8,400 cfs 58 percent of the time (down from 66 percent under actual operations), above 7,300 cfs 88 percent of the time (down from 92 percent under actual operations), and above 6,900 cfs 96 percent of the time (identical to actual operations). As Figure 8-4 shows, the proposed action will slightly increase soil moisture from current operations. In the 4 percent of years that flows will fall to 6,900 cfs, stress may occur (Murphy 2003), but as described in Section 8.7.1 on low flows in 2001, this stress will not likely be significant.

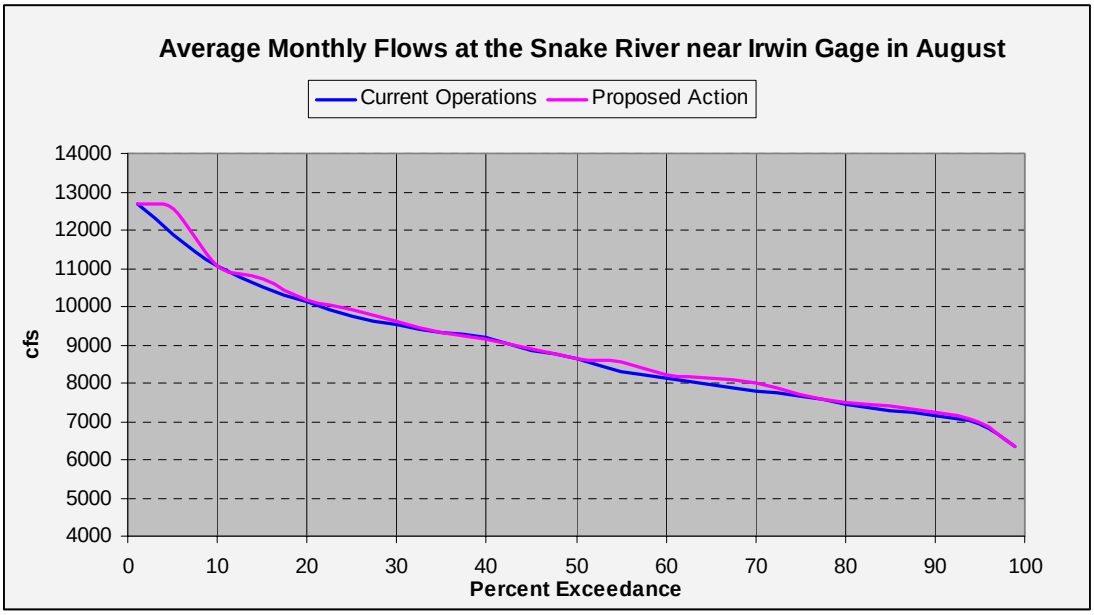

Figure 8-4. Comparison of modeled average monthly flows for current operations and the proposed action for the month of August at the Snake River near Irwin gage.

Erosion and Avulsion Processes

As described in Section 8.7.1, construction and subsequent past and current operations of Palisades and Jackson Lake Dams have altered the geomorphologic processes in the Snake River below Palisades Dam. Hauer et al. (2004) determined that a flow of 17,000 to 19,000 cfs is the average threshold flow needed to begin mobilizing sediment within the active river channel, and flows from 25,000 to 38,000 cfs maintain a shifting habitat mosaic, including cottonwood and Ute ladies'-tresses' habitats.

The model predicts that the proposed action, when compared to actual historical operations (see Figure 8-5), will slightly reduce flows in wetter and drier water years while slightly increasing flows in average water years. The model predicts that in the wettest 5 percent of years (flows near or above 25,000 cfs), the proposed action will reduce flows by an average of 2,600 cfs from what has occurred in the past, or about 10 percent of the Snake River flow.

The model predicts the maximum average monthly flows at the Snake River near Irwin gage in June will be 30,284 cfs for the proposed action (see Figure 8-5). This may correlate to an average daily flow peak of near 40,000 cfs (the June 1997 peak daily flow was 40,300 cfs on June 20, 1997, but the average monthly flow for that month was 29,300 cfs). Peak flooding under the proposed action will likely be of the same magnitude as peak flooding in the past.

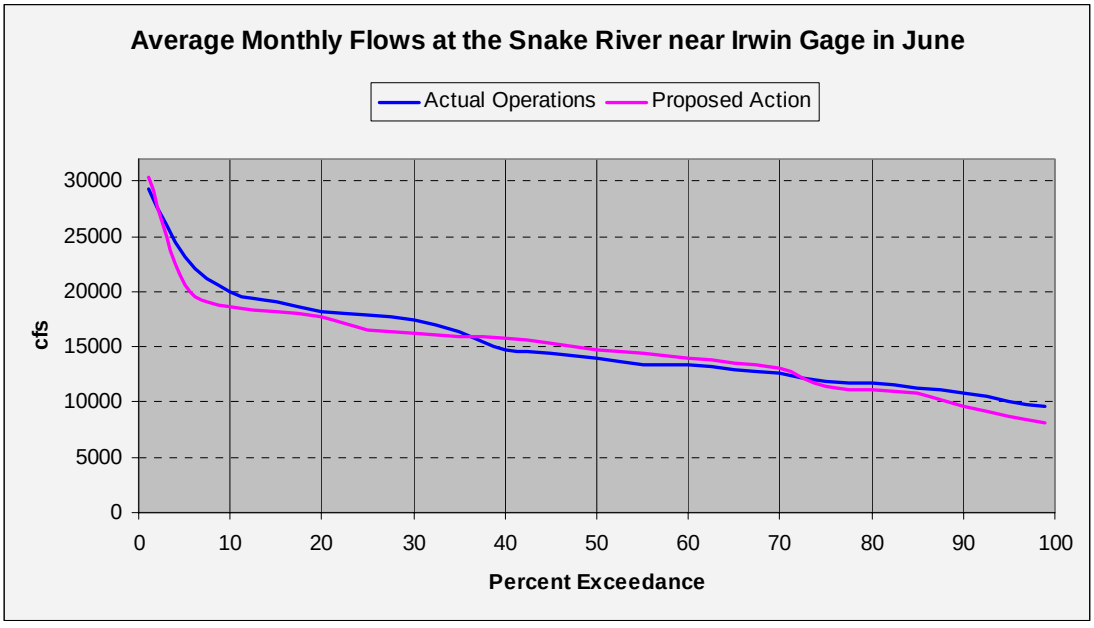

Figure 8-5. Comparison of actual operations and modeled proposed action average monthly flows for the month of June at the Snake River near Irwin gage.

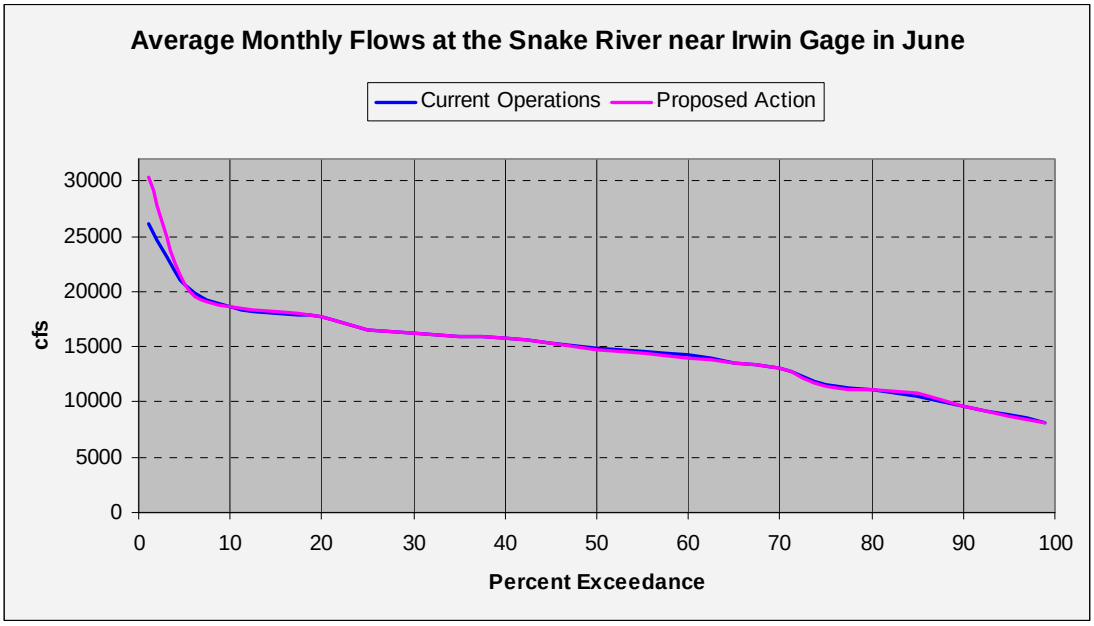

Figure 8-6. Comparison of modeled average monthly flows for current operations and the proposed action for the month of June at the Snake River near Irwin gage.

Though the model predicts peak flows will be slightly less than they have historically been in the Snake River below Palisades Dam, the model also predicts that peak flows under the proposed action will be slightly improved over those flows modeled under current operations (see Figure 8-6).

8.8.2 Henrys Fork

The Henrys Fork population at the Chester Wetlands Wildlife Management Area does not directly depend on the Henrys Fork flows. Diversions into canals benefit the species indirectly by contributing to the subsurface flows and the high water table. The Texas Slough population is not affected by the proposed action.

8.8.3 Cumulative Effects

The Ute ladies'-tresses is distributed primarily on Federal land (only 4 of the 22 known orchid sites below Palisades Dam are on private land or non-Federal land; two of these are partially on Federal land), but private and state activities and management programs may affect Ute ladies'-tresses and its habitat. Future activities that are reasonably certain to occur in the action area are livestock grazing and increased residential development.

Livestock grazing in the area has been an ongoing activity for many years, and future practices may not differ significantly from past practices. Residential development

will also continue in and near the Snake River; future development will likely further alter the floodplain dynamics.

8.9 Effects Conclusion

The proposed action of future O&M in the Snake River system above Milner Dam may affect and is likely to adversely affect the Ute ladies'-tresses. In the wettest 10 percent of years, the model predicts the proposed action may reduce peak flows by up to 10 percent. This modeled reduction in flows may slightly adversely affect the orchid in these years as the erosion and avulsion processes are slightly suppressed.

8.10 Literature Cited

Parenthetical Reference	Bibliographic Citation
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