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## **Potential Effects of Four Flaming Gorge Dam Hydropower Operational Scenarios on Riparian Vegetation of the Green River, Utah and Colorado**

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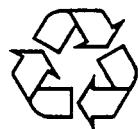
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## FOREWORD

This report is one of a series of technical memorandums prepared to support an environmental impact statement (EIS) on power marketing prepared by Argonne National Laboratory for the U.S. Department of Energy's Western Area Power Administration (Western). Western markets electricity produced at hydroelectric facilities operated by the Bureau of Reclamation. The facilities are known collectively as the Salt Lake City Area Integrated Projects (SLCA/IP) and include dams equipped for power generation on the Colorado, Green, Gunnison, and Rio Grande rivers and on Plateau Creek in the states of Arizona, Colorado, New Mexico, Utah, and Wyoming.

Western proposes to establish a level of commitment (sales) of long-term firm electrical capacity and energy from the SLCA/IP hydroelectric power plants; the impacts of this proposed action are evaluated in the EIS. Of the SLCA/IP facilities, only the Glen Canyon Dam, Flaming Gorge Dam, and Aspinall Unit (which includes Blue Mesa, Morrow Point, and Crystal dams) are influenced by Western's power scheduling and transmission decisions. For this reason, the impacts of hydropower operations at these three facilities were examined in the EIS.

The technical memorandums present detailed findings of studies conducted by Argonne National Laboratory specifically for the EIS. These studies are summarized in the EIS, and the results were used to assess environmental impacts related to alternative commitment levels. Technical memorandums were prepared on a number of socioeconomic and natural resource topics. Staff members of Argonne National Laboratory's Decision and Information Sciences Division and Environmental Assessment Division prepared these technical memorandums and the EIS as part of a joint effort managed by the Environmental Assessment Division.



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**POTENTIAL EFFECTS OF FOUR FLAMING GORGE DAM HYDROPOWER  
OPERATIONAL SCENARIOS ON RIPARIAN VEGETATION  
OF THE GREEN RIVER, UTAH AND COLORADO**

by

K.E. LaGory and R.A. Van Lonkhuyzen

**ABSTRACT**

Four hydropower operational scenarios at Flaming Gorge Dam were evaluated to determine their potential effects on riparian vegetation along the Green River in Utah and Colorado. Data collected in June 1992 indicated that elevation above the river had the largest influence on plant distribution. A lower riparian zone occupied the area between the approximate elevations of 800- and 4,200-cfs flows — the area within the range of hydropower operational releases. The lower zone was dominated by wetland plants such as cattail, common spikerush, coyote willow, juncus, and carex. An upper riparian zone was above the elevation of historical maximum power plant releases from the dam (4,200 cfs), and it generally supported plants adapted to mesic, nonwetland conditions. Common species in the upper zone included box elder, rabbitbrush, grasses, golden aster, and scouring rush. Multispectral aerial videography of the Green River was collected in May and June 1992 to determine the relationship between flow and the areas of water and the riparian zone. From these relationships, it was estimated that the upper zone would decrease in extent by about 5% with year-round high fluctuation, seasonally adjusted high fluctuation, and seasonally adjusted moderate fluctuation, but it would increase by about 8% under seasonally adjusted steady flow. The lower zone would increase by about 13% for both year-round and seasonally adjusted high fluctuation scenarios but would decrease by about 40% and 74% for seasonally adjusted moderate fluctuation and steady flows, respectively. These changes are considered to be relatively minor and would leave pre-dam riparian vegetation unaffected. Occasional high releases above power plant capacity would be needed for long-term maintenance of this relict vegetation.

**1 INTRODUCTION**

Rivers of the arid and semiarid western United States generally have a distinctive riparian zone where plant species typically found in moist soils are abundant (Knopf et al. 1988). Beyond this riparian zone, above the area affected by river flow, more xerophytic species are present. These xerophytic species do not require the elevated soil moisture

provided by the river. Riparian areas generally have higher productivity than nearby upland areas in terms of plant and animal biomass and tend to support more species. Riparian areas also are important in the ecological functioning of rivers and streams and regulate nutrient input to the aquatic system (Gregory et al. 1991; Gilliam 1994; Vought et al. 1994).

The elevation of riparian zones above rivers and the species composition within these zones are largely functions of river flow, especially minimum and maximum flows and seasonal variations in these values (Stromberg 1993; Auble et al. 1994). Disturbance, especially as related to flood events, also plays a major role in determining species composition in riparian zones (Bendix 1994). For these reasons, the riparian vegetation of regulated rivers, where all of these parameters are often modified, is usually different than the riparian vegetation of unregulated rivers (Carothers and Brown 1991; Nilsson et al. 1991).

The study reported herein was undertaken to evaluate the effects on riparian vegetation of several potential hydropower operational scenarios at Flaming Gorge Dam, Utah. The Green River below the dam supports a well-defined riparian zone that has increased and changed in response to hydropower operations and other dam operations that began following completion of the dam in 1963. Changes in hydropower operations could result in further changes in the size of the riparian zone as well as the species composition within that zone.

The hydropower operational scenarios evaluated in this report include (1) year-round high fluctuation, (2) seasonally adjusted high fluctuation, (3) seasonally adjusted moderate fluctuation, and (4) seasonally adjusted steady flow (Figure 1\*). All scenarios would feature minimum releases of 800 cfs and maximum releases of 4,700 cfs (maximum power plant capacity), but the amount of daily fluctuation would be very different among scenarios. For the three seasonally adjusted scenarios, the magnitude of fluctuations would vary from month to month and would be restricted to meet target flows at Jensen, Utah (approximately 90 mi downstream of the dam). These target flows were established by the U.S. Fish and Wildlife Service in its Biological Opinion regarding operation of the dam, which was issued in 1992 (USFWS 1992). Details on these operational scenarios are provided by Yin et al. (1995). The principal differences among the operational scenarios are summarized as follows:

- **Year-Round High Fluctuation:** Under the year-round high fluctuation scenario, there would be no limit on maximum daily fluctuations, and releases would vary from 800 to 4,700 cfs each day. Ramp-rate restrictions would be 3,900 cfs/h (minimum flow to maximum power plant capacity). This operational scenario is representative of current maximum power plant operations using monthly release volumes historically set by the Bureau of Reclamation and was evaluated for comparative purposes. This operational scenario would not comply with the USFWS Biological Opinion. Consideration of this operational

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\*For readability, all figures and tables are placed in sequence following Section 5 of this report.

scenario enabled a determination of the environmental consequences of the seasonal and daily adjustment of releases required by the Opinion.

- ***Seasonally Adjusted High Fluctuation:*** Under the seasonally adjusted high fluctuation scenario, fluctuations would be maximized to the extent possible within constraints of the USFWS Biological Opinion. Release volumes would be adjusted seasonally to meet requirements of the Opinion. These seasonal adjustments would result in a pattern of operation much different from historical operations. Most importantly, this scenario would feature a month-long 4,700-cfs release in spring, reduced summer flows and fluctuations to meet the restrictions at Jensen, and a two-month period of steady flows during the winter to prevent disruption of ice cover.
- ***Seasonally Adjusted Moderate Fluctuation:*** The seasonally adjusted moderate fluctuation scenario would be similar to the seasonally adjusted high fluctuation scenario in terms of the seasonal pattern of releases, but daily fluctuations would be reduced by 50%. This scenario would also feature the month-long sustained spring release, reduced summer flows, and a two-month period of steady flows in the winter.
- ***Seasonally Adjusted Steady Flow:*** The seasonally adjusted steady flow scenario would be similar to the other seasonally adjusted scenarios, but hourly releases would be constant during the day for each season or period specified by the USFWS Biological Opinion (USFWS 1992). This scenario would feature a month-long sustained spring release and reduced summer flows.

## 2 METHODS

### 2.1 RIPARIAN FIELD STUDIES

From June 17 to 24, 1992, the authors participated in a data-collecting trip by raft on the Green River from Flaming Gorge Dam to Split Mountain campground, a distance of about 80 mi. Traveling by raft enabled the collection of data along the river, much of which is largely inaccessible by road. Data were collected from June 17 to 22, 1992, along 27 transects between the dam and Echo Park, the confluence between the Green River and the Yampa River. During this period, releases from Flaming Gorge Dam were steady (i.e., no fluctuations) and at the minimum allowable release (about 800 cfs); flows from the Yampa River contributed an additional 1,200 to 1,500 cfs below Echo Park. Data from an additional 11 transects were collected below the confluence with the Yampa River. Characteristics of the transects — including location, length, and total elevation change — are presented in Tables A.1 and A.2 of the appendix. Transect data are presented in Table A.3. The relationships between distance from the river and elevation above the river along each transect are presented in Figures A.1 through A.11. Photographs of the riparian zone in five different reaches of the river are shown in Figure 2.

Transects were placed perpendicular to the river from the water to the upper outside edge of the riparian zone, and data on species occurrence were collected at sampling points located at 0.5-m (1.6-ft) intervals along the transects. Relative abundance of species was determined from the transect data by calculating the percentage of sampling points at which a species was recorded. (See Goldsmith and Harrison [1976] for a discussion of the use of transects in determining species distributions across gradients.) Elevation was measured with a hand level at points of discernible change in slope along the transect (e.g., a bench or terrace), and the elevation of sampling points in between was calculated using slope and distance values (see Table A.2). The outside edge of the riparian zone was readily discernible; beyond this edge, plant cover was reduced, xerophytic plants (e.g., sagebrush and cacti) were dominant, and mesophytic or hydrophytic species did not occur or were much reduced. A steep slope or cliff sometimes defined the edge of the riparian zone. The wetland indicator status of each species found in the riparian zone was determined from Reed (1988).

### 2.2 AERIAL VIDEOGRAPHY

Three-band multispectral aerial videography was collected under different flow conditions at four selected segments of the Green River — Red Canyon, Little Hole, upper Browns Park (Taylor Flat), and lower Browns Park (near Swinging Bridge) (Figure 3). The videographic system used three video cameras mounted on a fixed wing aircraft to simultaneously record ground reflectance in three different spectral bands (Neale 1992). Separate video cameras recorded the green (0.55  $\mu\text{m}$ ), red (0.65  $\mu\text{m}$ ), and near-infrared (0.85  $\mu\text{m}$ ) bands of the electromagnetic spectrum. These bands are similar to the Landsat Multispectral Scanner green, red, and infrared bands that are used extensively for determining vegetation classes. During each videotaping flight, system operator comments

about the river corridor were recorded on audio channel #1 of the red-band videotape. A time code was recorded on audio channel #2 and as a banner on the green-band tape. This time code was used to retrieve synchronized video frames from each of the videotapes to construct three-band composite images. Other information was recorded as a banner on the red-band tape, including latitude and longitude position from a global positioning system, airplane altitude, ground speed and direction, date, and time of day.

Videography was collected on five dates from May 15 to June 5, 1992, by flying about 2,000 ft above the river surface at each study site. Videotaping at this altitude provided an image resolution of 0.5 to 1.0 m per pixel and typically kept both shorelines and riparian vegetation in the fields of view of the cameras. Because of the meandering river channel, weather conditions, and topography, several flightlines were required to videotape each study site. During videography, releases from the dam ranged from approximately 800 to 4,000 cfs.

Immediately prior to the first videotaping session, field crews visited each study site to collect site-specific information and to place panel markers that would be used to provide scale measurements during analysis of the imagery. Information gathered included descriptions of each site, shoreline substrate, and measurements of features likely to be visible in the videography. The scale markers, which consisted of 6.6-ft  $\times$  6.6-ft (2-m  $\times$  2-m) white plastic panels, were placed approximately 33 ft (10 m) apart near the shoreline. Photographs and narrated videotapes were also collected at each site to show positioning of the markers and other features of interest, such as vegetation and topographic features.

After videography was collected, images were catalogued to identify river segments that had been videotaped at three or four different flows, including the highest and lowest flows. The number of flows at which a particular site was successfully videotaped depended, in part, on weather conditions (e.g., cloud cover) during data-collecting flights. After these segments were identified, the appropriate images were captured and transferred to a computer format by using commercially available hardware and software. Further details of videoprocessing are discussed by Snider et al. (1994).

The upper boundary of the riparian zone was identified on the low-flow images, and the images were trimmed along this boundary to reduce the overall size of the image and the amount of disk storage required for each image (Figure 4). Total area and area of water in acres were then determined for each image. Area above water and area above the 800-cfs level were calculated from these values, and the relationships to flow were determined for each study area.

### 3 RESULTS

#### 3.1 VEGETATION OF RIPARIAN ZONES

The width and height of the riparian zone as measured in different reaches of the Green River is presented in Table 1. No clear difference between canyon and park areas was detected from these data. The riparian zone was narrowest in Red Canyon just below Flaming Gorge Dam, but on average was widest in Lodore Canyon. The upper boundary of the riparian zone was lowest in Browns Park, but relatively high in Island and Rainbow Parks.

Fifty-four plant species were identified at 2,165 sampling points along the transects; an additional 14 taxa were identified to genus or family (plant nomenclature follows Goodrich and Neese 1986). The relative abundance of species and taxa is presented in Table 2. Grasses, which were recorded at 44% of all sampling points, were the most common of all taxa recorded but were not identified to species. Other common species in the river corridor included scouring rush (19%), *juncus* (14%), western goldenrod (12%), common spikerush (11%), box elder (11%), *carex* (9%), tamarisk (7%), field horsetail (7%), and coyote willow (7%). (See the appendix, Table A.4, for the scientific names and wetland indicator status [Reed 1988] of all species observed.)

For most species, abundance varied considerably among reaches, especially between canyon and park reaches (Table 2). Species most common in canyons included box elder (especially Lodore Canyon), western goldenrod, and scouring rush. Species more common in the parks than in the canyons included common spikerush, coyote willow, and Fremont cottonwood.

Both distance from and elevation above the river were important determinants of species abundance (Tables 3 and 4). Presumably these factors were important insofar as they determined soil moisture, and species-specific requirements for moisture and flood tolerance determined where those species occurred on the distance/elevation gradient. This interpretation is supported by the observed position of each species along the elevation gradient and their wetland indicator status (see Table A.4) — obligate wetland species (i.e., species that occur almost always in wetlands) were found closer to the river, whereas facultative wetland species (i.e., wetland species sometimes found in uplands) or nonwetland species were found farther from the river.

As might be expected, elevation appeared to have a stronger influence than distance on species occurrence because of the effect of elevation on depth to the water table. Some woody riparian species (e.g., box elder and rabbitbrush) increased in abundance with increasing distance and elevation; others (e.g., coyote willow and tamarisk) appeared to occupy a specific elevation midway between the lower and upper boundaries of the riparian zone. Wetland species decreased in abundance with distance and elevation (e.g., cattail, common spikerush, and coyote willow) or were more prevalent at a particular elevation or

distance (e.g., *carex*, *juncus*, and *scirpus*). Species common in a wide range of elevations and distances included grasses and scouring rush.

Although changes in species composition along the elevation gradient were gradual (Table 4), the riparian zone could be divided into upper and lower zones (Figure 5). The upper riparian zone was that area above the level of maximum power plant releases (historically, 4,200 cfs, about 4 ft above the 800-cfs level on the basis of the stage-flow relationships shown in Figure 6) and generally supported facultative wetland and upland plants adapted to mesic, but drier, conditions. Species common in the upper zone included box elder, rabbitbrush, grasses, scouring rush, and golden aster. The lower riparian zone was that area typically within the normal operational fluctuation zone of the river (800 to 4,200 cfs, or 0 to 4 ft above minimum) and supported a variety of obligate wetland species. Although much of this vegetation was herbaceous (e.g., common spikerush, cattail, and *juncus*), some shrubs were also common within this zone (e.g., coyote willow). Along most transects, there was a narrow unvegetated band (average 10.1 ft wide; 0.8 ft elevation above the 800-cfs flow elevation) nearest the river (Table 1).

### 3.2 AREAS OF RIPARIAN ZONES

The results of the aerial videographic analysis of riparian zones along the Green River above the Yampa River confluence are presented in Table 5. These values were used in plotting the relationships between flow and area shown in Figure 7. Differences in the flow-area relationships reflect differences in channel morphology in different reaches of the river. The average relationship for the four reaches is also presented in Figure 7.

## 4 ASSESSMENT OF POTENTIAL EFFECTS ON RIPARIAN VEGETATION

The assessment of potential effects of hydropower operational scenarios on riparian vegetation focused on changes in the boundaries of upper and lower riparian zones. The assessment was based on (1) information on species distributions collected during field studies and (2) the relationship between riparian area and flow determined from aerial videography.

### 4.1 ASSESSMENT APPROACH

The daily and seasonal patterns and durations of inundation and exposure characteristic of each hydropower operational scenario were evaluated to determine impacts on the riparian zone. Flows that occurred during the growing season (mid April through mid October) were considered most important because plants can tolerate a wider range of conditions when they are in a dormant state (Walters et al. 1980). The impacts considered included changes in the size of lower and upper riparian zones and changes in the relative abundance of species within these zones.

All projected impacts were compared with the existing characteristics of the riparian zone below Flaming Gorge Dam, as determined from field studies and aerial videography. These characteristics are the result of pre-dam river conditions and the effects of flow regulation. Changes in operational scenarios would not affect plants such as Fremont cottonwood, box elder, and rabbitbrush in the higher elevations of the upper riparian zone (above the elevation of pre-dam annual floods, i.e., about 7,000 cfs or 7 ft above the elevation of 800-cfs flows). These plants became established prior to construction of the dam and persist because they have well established root systems that can reach deeper soil with higher moisture levels. Recruitment at these higher elevations is limited, however, because of the reduction or elimination of the occurrence of large flooding events needed for germination; eventually this vegetation will be replaced by nonriparian xerophytic vegetation. Pre-dam vegetation below Flaming Gorge Dam is analogous to the vegetation of the old high-water zone of the Colorado River below Glen Canyon Dam, as described by Carothers and Brown (1991).

Changes in the relative abundance of riparian species in the remainder of the riparian zone were inferred from changes in the hydrologic regime and observed relationships between species abundance and position along the elevation gradient. It was assumed that if a new hydropower operational scenario were established, plant populations would move up or down the gradient into newly favorable areas through normal processes of propagation. The ability of a population to move was determined on the basis of its current position along the gradient and the direction of flow changes as described below.

Higher operational flows would force the populations of some upper zone species to move up the elevation gradient. If the species currently occupied the entire upper zone (e.g.,

box elder), there would be an expected decrease in population of that species because the area of the zone would shrink. If, however, the species was restricted to lower elevations within the zone (e.g., tamarisk, giant whitetop, and scouring rush), it was assumed that no decrease would occur because the population could move to higher elevations within the zone as flows increased. It was also assumed that upper zone species could not survive on substrates that were inundated continuously or daily for more than one month each year. The flow velocity of the sustained spring peak of the seasonally adjusted operational scenarios was not considered sufficient to remove rooted upper zone plants.

Reductions in maximum flows would result in some expansion of upper riparian zone vegetation. These reductions in flow would not affect established deep-rooted vegetation in the upper riparian zone because their root systems would be able to utilize soil moisture at greater depths. Drier soil conditions at lower elevations, however, could result in new areas favorable for expansion of populations. Species that occur near the current boundary between the lower and upper zone — including tamarisk, giant whitetop, box elder, golden aster, and artemisia — would be expected to benefit most from such a change. It was assumed that upper zone species would not colonize substrates that were inundated continuously or daily for more than one month each year. The duration of the sustained spring peak of the seasonally adjusted operational scenarios would not be sufficient to prevent some expansion of vegetation.

To support the wetland species typical of the lower riparian zone, fluctuations would have to occur frequently enough to maintain the high soil-moisture levels required by this vegetation, but without the drowning that would occur with continuous inundation. Continuous inundation (i.e., nonfluctuating high flows) for more than one month during the growing season was considered sufficient to drown existing lower-zone vegetation if the water was more than 1 ft deep. Additionally, if a two-month or longer period of continuous exposure occurred during the growing season (i.e., without inundation due to fluctuating flows), it was assumed that this exposure would result in a dieback of any existing drought-intolerant species (e.g., cattail) and replacement by more drought-tolerant species (e.g., common reed). Peak flows in the spring were not considered to be of sufficient duration to drown vegetation in the lower riparian zone. Because the vegetation of this zone (especially herbaceous species) can respond rather quickly (within several years) to changes in the moisture regime, adaptation to operational scenarios was assumed to occur rapidly.

Although the boundaries for upper and lower riparian zones were predicted for different operational scenarios, these boundaries are not absolute and would vary according to site-specific conditions. For the upper riparian zone, the lower boundary of the zone might be at higher or lower elevations at different locations. Wetland vegetation typical of the lower zone could occur outside of the fluctuation zone along the river, especially near tributary mouths, springs, or seeps where soil moisture is not dependent on river flow alone. Unprotected areas exposed to scouring flows might not support any vegetation, especially at the lowest elevations above minimum flows. For all operational scenarios, inundation would be constant below the 800-cfs level, preventing establishment of nonaquatic vegetation below this level.

The assessment of impacts of operational scenarios addresses only those riparian areas above the confluence of the Green River with the Yampa River. Below the confluence, the Green River experiences a combination of the seasonal flow regime of the unregulated Yampa River, with high spring flows, and the daily fluctuations of the upper portion of the Green River (Fischer et al. 1983). As a consequence, flows below the confluence are strongly and less predictably affected by input from the Yampa River, making the effects of operational scenarios on vegetation more difficult to predict.

## 4.2 EXPECTED RESPONSES OF RIPARIAN VEGETATION TO OPERATIONAL SCENARIOS

On the basis of the assumptions discussed in Section 4.1, areas above and below water and above the 800-cfs flow (Table 5) were used to determine the areas of various riparian habitats, as presented in Tables 6 and 7. The expected elevations of riparian zone boundaries for different operational scenarios are depicted in Figure 8. The expected boundaries for each operational scenario are discussed in Sections 4.2.1 through 4.2.4.

### 4.2.1 Year-Round High Fluctuation

The year-round high fluctuation scenario would feature higher maximum daily flows (4,700 cfs) than occurred historically (4,200 cfs). The boundary between the upper and lower zones would shift upward, resulting in a slight change in the area occupied by each zone. The resulting changes in area represent a 5% decrease in the size of the upper riparian zone and a 13% increase in the size of the lower riparian zone. Species in the upper portion of the lower zone are most likely to increase, including Canada thistle, carex, common reed, coyote willow, juncus, and scouring rush. Box elder is likely to decrease because this species occurs across the entire upper zone and the total area of this zone would decrease. Species such as giant whitetop and tamarisk, which occur near the boundary of the two zones, would probably be unaffected by this scenario.

### 4.2.2 Seasonally Adjusted High Fluctuation

Under the seasonally adjusted high fluctuation scenario, the lower boundary of the upper riparian zone is expected to shift upward to the elevation of the 4,700-cfs flow. Although lower maximum flows would occur from mid July through October, 4,700-cfs releases would occur through the entire first half of the growing season (to July 10). Any species of the upper zone that colonized the area below the 4,700-cfs elevation during the second half of the growing season would not survive the prolonged inundation during the following year.

Under this scenario, the lower riparian zone is expected to occupy the area between the elevations of 800- and 4,700-cfs flows because of the periodic, but not constant, inundation that would occur between these stages. The area between the elevations of 3,000- and

4,700-cfs flows would be inundated regularly during the first half of the growing season only. Wetland vegetation in this area would probably survive, but there could be a shift from drought-intolerant species — such as cattail, common spikerush, and juncus — to more drought-tolerant species — such as common reed and scouring rush. As with the year-round high fluctuation scenario, the expected shift in the boundary between the upper and lower riparian zones would result in a 5% decrease in the area occupied by the upper zone and a 13% increase in the area of the lower-zone.

#### **4.2.3 Seasonally Adjusted Moderate Fluctuation**

Under the seasonally adjusted moderate fluctuation scenario, the lower boundary of the upper riparian zone is expected to occur at the elevation of the 4,700-cfs flow. As with the seasonally adjusted high fluctuation scenario, 4,700-cfs releases would occur through the entire first half of the growing season (to July 10). Although lower flows would occur during the last half of the growing season, any species of the upper zone that colonized lower elevations during this period would not survive the inundation during the following year.

Under this scenario, the lower riparian zone is expected to occur between the elevations of the 2,400- and 4,700-cfs flows. This area would be inundated daily during the first half of the growing season, but then would be above the area of fluctuating flows from mid July through October. As for seasonally adjusted high fluctuations, vegetation in the lower riparian zone is expected to undergo a shift toward more drought-tolerant species because of the extended period of low flows after July 10 of each year. The area below the 2,400-cfs level would be inundated continuously for most of the year. Any existing vegetation below this elevation would drown, and the unvegetated zone would increase in size. Species most likely to be adversely affected by this prolonged inundation include cattail, common spikerush, field horsetail, juncus, and scirpus. Shifts in riparian zone boundaries and creation of unvegetated areas are expected to result in a 5% decrease in the size of the upper zone and a 40% decrease in the size of the lower zone.

#### **4.2.4 Seasonally Adjusted Steady Flow**

Under the seasonally adjusted steady flow scenario, the upper riparian zone is expected to expand down to the elevation of the 3,400-cfs flow. Below this level, inundation would be too prolonged to allow establishment of upper-zone species. The higher flows during the spring peak would not prevent establishment of these species to the 3,400-cfs level because higher flows would be of relatively short duration. Species most likely to increase under this scenario include tamarisk, giant whitetop, golden aster, box elder, and artemisia.

For this scenario, the lower riparian zone is expected to occur between the elevations of the 2,400- and 3,400-cfs flows. Areas above the 3,400-cfs level would be too dry to support lower-zone species, except for scattered locations along the river where local conditions would permit wetland vegetation to persist at slightly higher elevations. Species that would be adversely affected because of drying include Canada thistle, carex, coyote willow, field

horsetail, juncus, scirpus, silverweed, sow thistle, western goldenrod, and wild licorice. Vegetation below the 2,400-cfs level would be inundated by more than 1 ft of water for the first two months of the growing season. Thus, all vegetation below 2,400 cfs would be eliminated by drowning, resulting in a larger unvegetated zone. Species most likely to decrease as a result of the prolonged inundation include cattail, common spikerush, field horsetail, juncus, and scirpus. Shifts in the boundaries between riparian zones and the creation of unvegetated areas would result in a 5% decrease in the size of the upper zone and a 74% decrease in the size of the lower zone.

## 5 DISCUSSION

The potential impacts identified for the four hydropower operational scenarios under consideration represent relatively minor shifts in species abundance along the elevation gradient. The largest impacts would occur in the lower riparian zone, with decreases of 40% (2.1 acres/mile) to 74% (3.9 acres/mile) for the seasonally adjusted moderate fluctuation and seasonally adjusted steady flow scenarios, respectively. However, lower-zone vegetation was not abundant prior to flow regulation and is therefore not considered an important component of the natural system.

Relatively minor impacts are anticipated because all of the operational scenarios are within the operational capacity of the dam. Thus, all releases would be between 800 and 4,700 cfs, and for the most part, fluctuations in flow would occur within the existing channel that has been incised by past operations. The sediment transport modeling conducted for the four operational scenarios and historical operations revealed little difference among scenarios (Williams et al. 1995). Although a slightly greater amount of sediment (about 15%) was expected to be moved by scenarios featuring higher fluctuations, all estimates were within the range of uncertainty of the model used. This result indicates that the operational scenarios are not likely to differ in their potential to erode existing riparian areas.

From a conservation standpoint, the pre-dam vegetation in the upper portion of the upper riparian zone is of concern. This portion of the riparian zone contains many of the large native trees, especially Fremont cottonwoods, that are considered important elements of the riparian ecosystem of western rivers. Several studies have documented dramatic reductions in recruitment of cottonwoods and other trees (e.g., box elder) following flow regulation, apparently as a result of changes in flooding regime and sediment transport processes that affect creation of suitable germination sites (Johnson et al. 1976; Fenner et al. 1985; Bradley and Smith 1986; Rood and Heinze-Milne 1989; Rood and Mahoney 1990).

Although all of the seasonally adjusted flow scenarios would follow a pattern somewhat similar to the pre-dam flow regime (i.e., spring peak in flows followed by low summer flows), none would have flows of sufficient magnitude to significantly rework sediment deposits (Williams et al. 1995) and create the new germination sites that appear to be important for these species. Periodic spring releases at levels similar to pre-dam annual floods (approximately 7,000 cfs), followed by a gradual reduction in flow to lower summer flows, might be necessary to maintain this vegetation over the long term (Rood and Mahoney 1990).

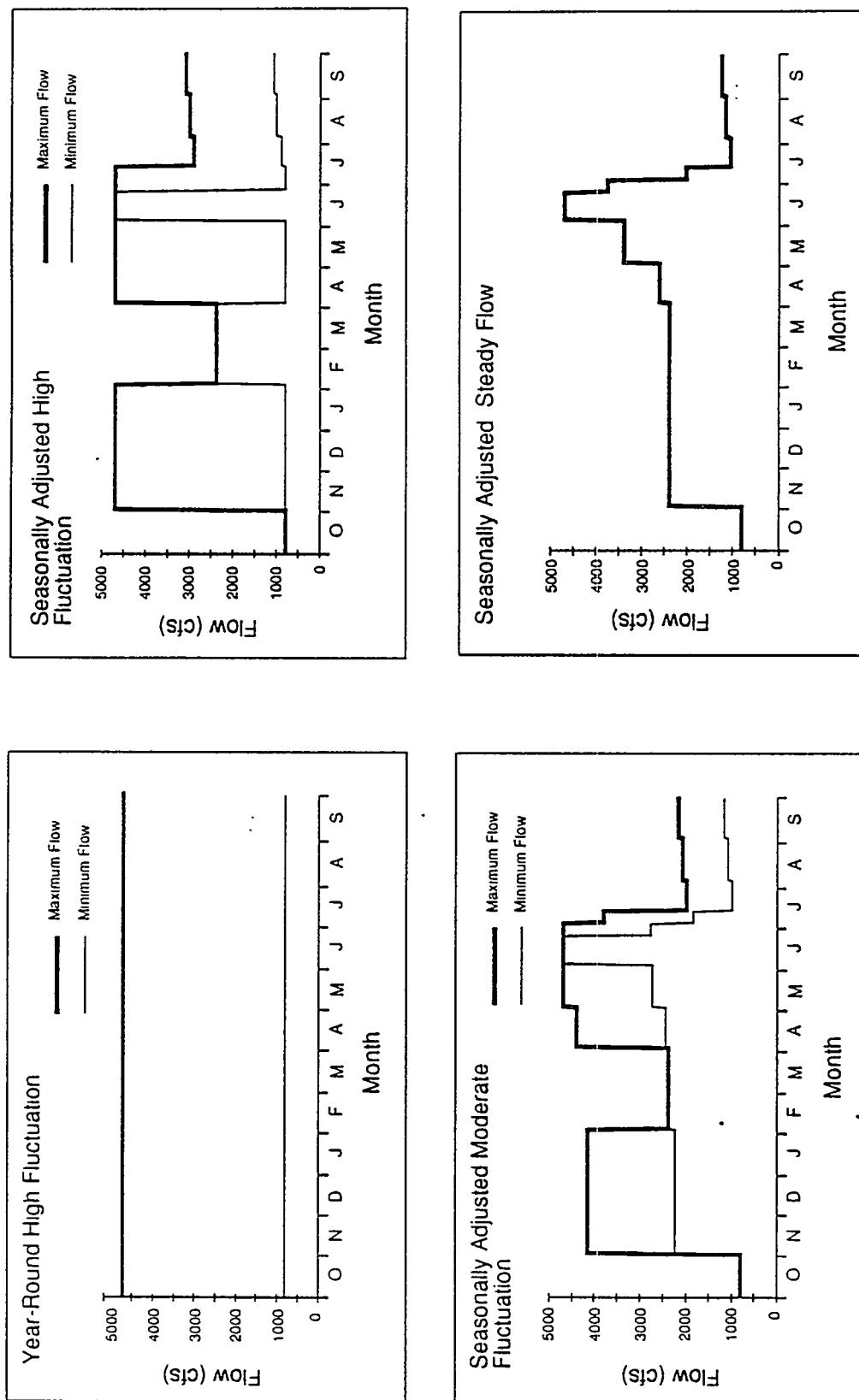


FIGURE 1 Maximum and Minimum Flows for Four Flaming Gorge Dam Hydropower Operational Scenarios



Red Canyon



Browns Park



Lodore Canyon

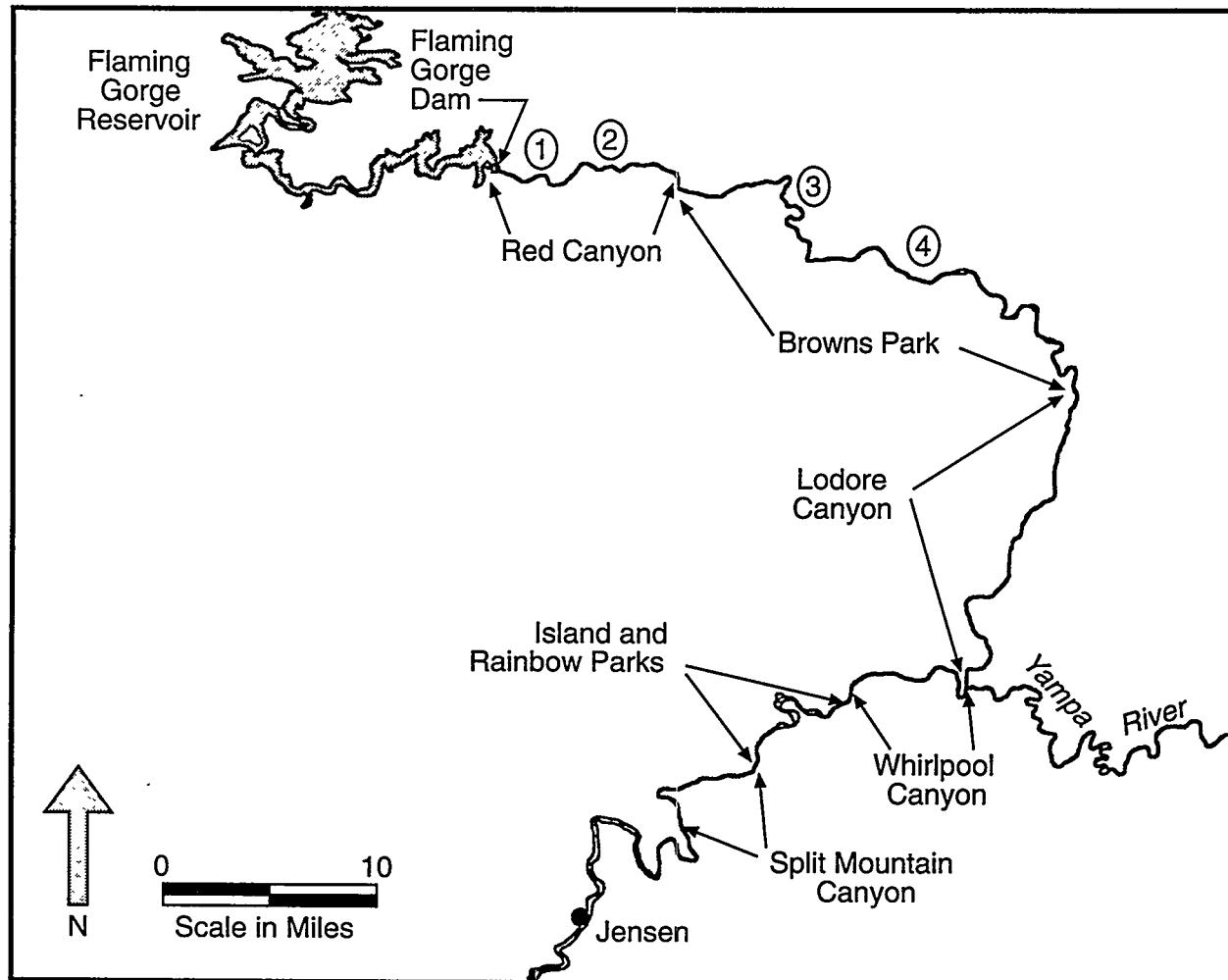


Whirlpool Canyon

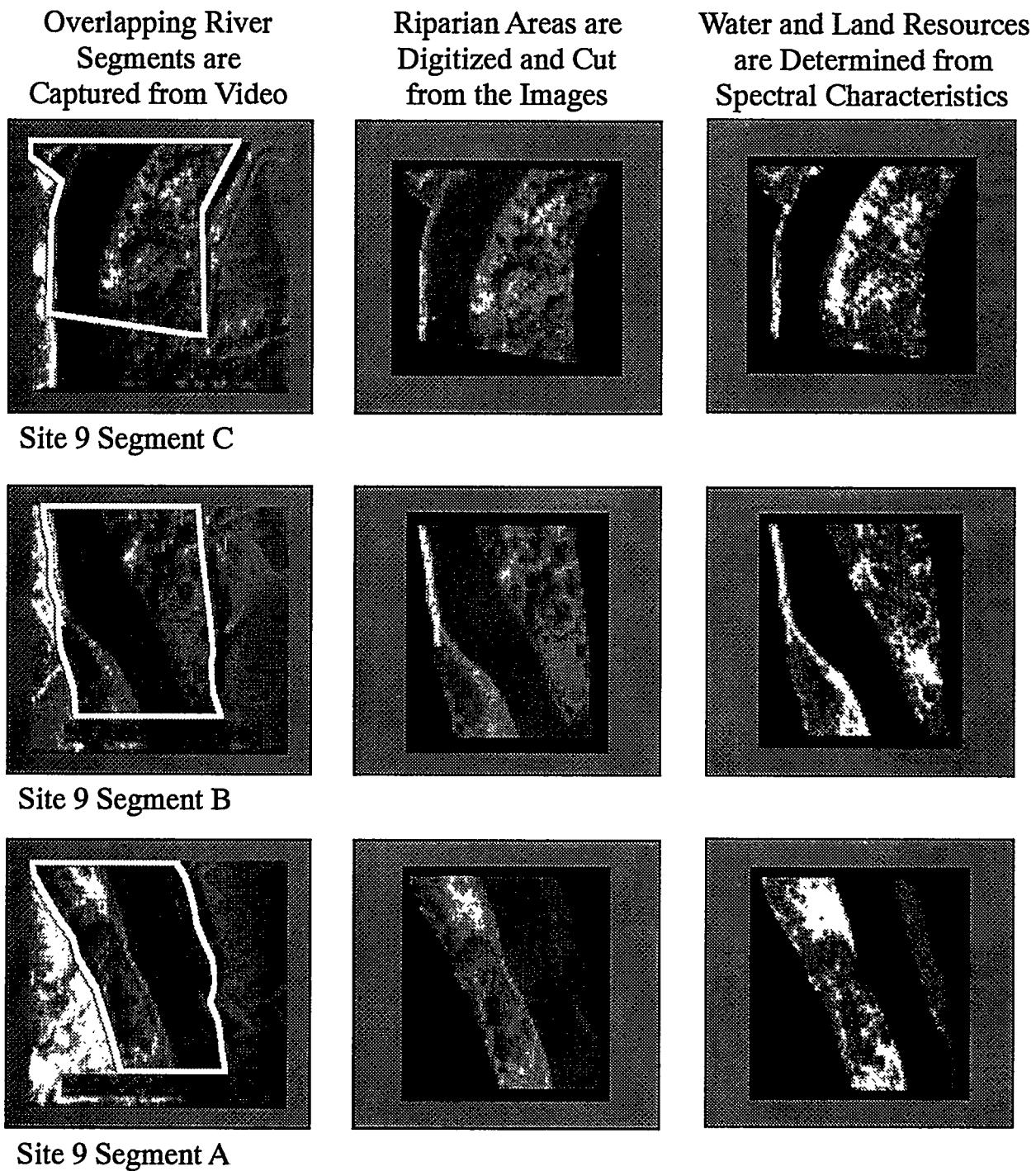


Island Park

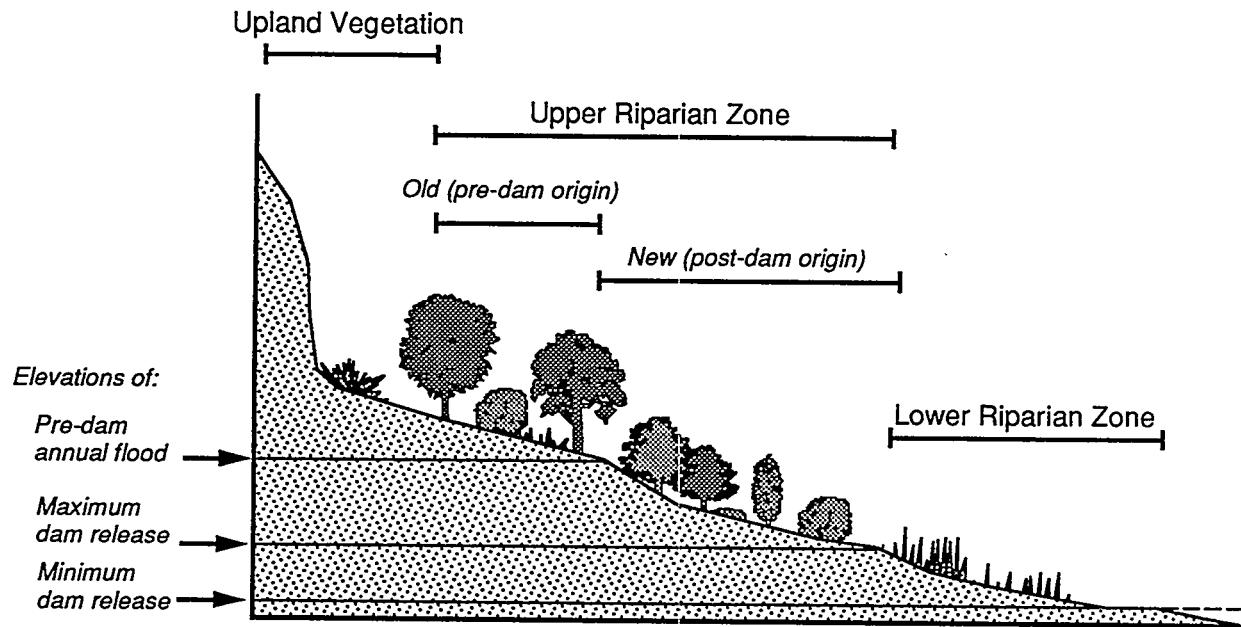
**FIGURE 2** Photographs of the Riparian Zone in Five Different Reaches of the Green River below Flaming Gorge Dam, June 1992



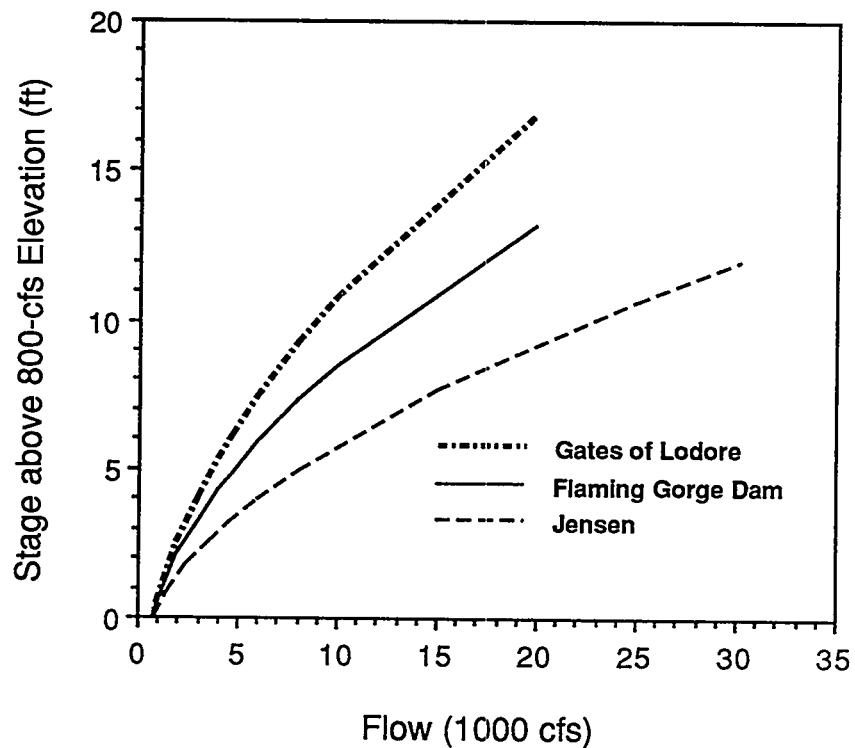
**FIGURE 3** Map of the Green River between Flaming Gorge Dam and Jensen, Utah, Showing the Major Reaches Evaluated in This Study (numbers refer to the locations where aerial videography was obtained)



**FIGURE 4 Approach Used in Processing Videography for This Study**



**FIGURE 5 Schematic Representation of the Location of Riparian Zones along the Green River**



**FIGURE 6 Relationship between Flow and Stage at Three Locations along the Green River below Flaming Gorge Dam**

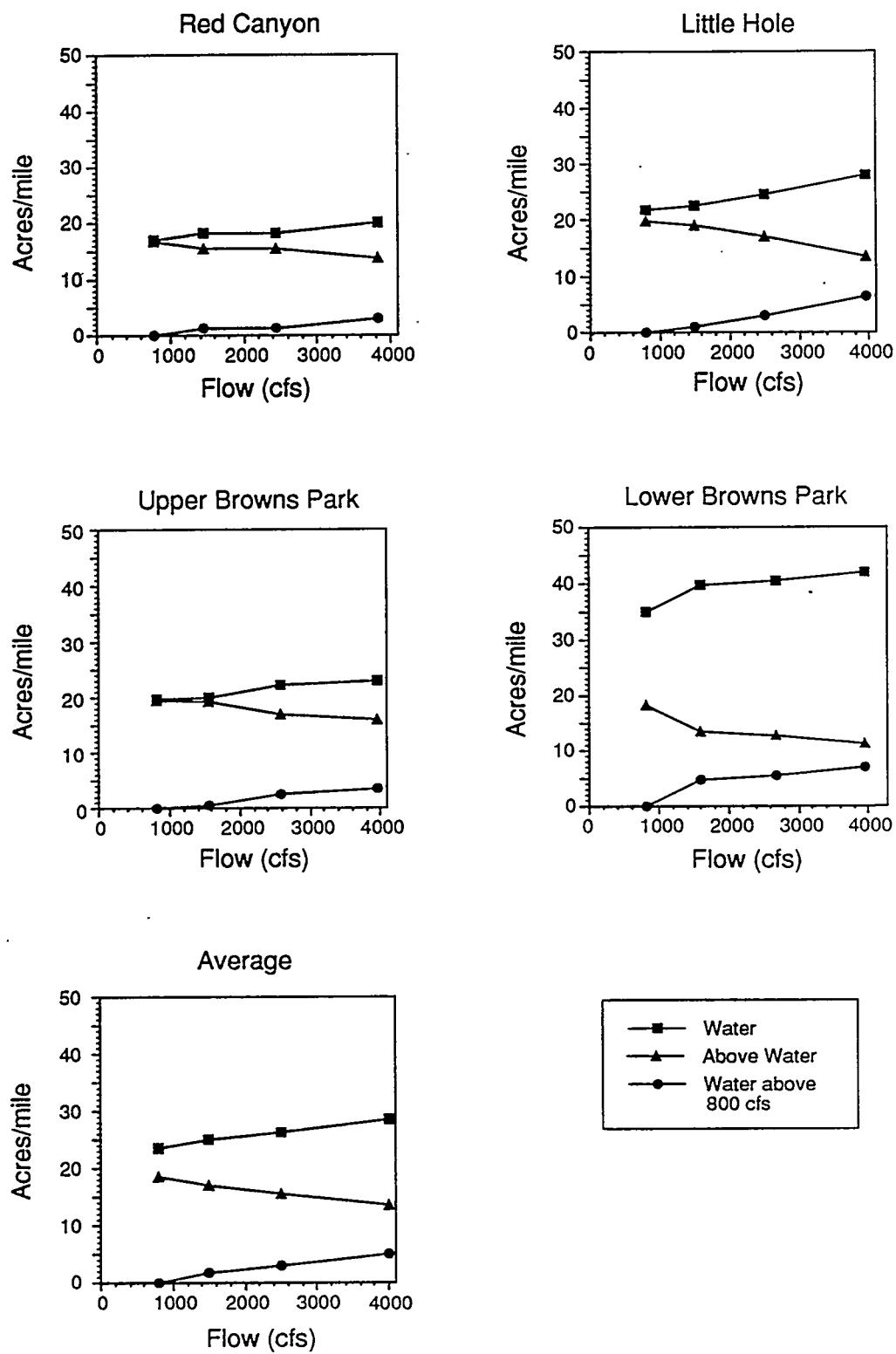


FIGURE 7 Relationship between Area and Flow as Measured from Aerial Videography

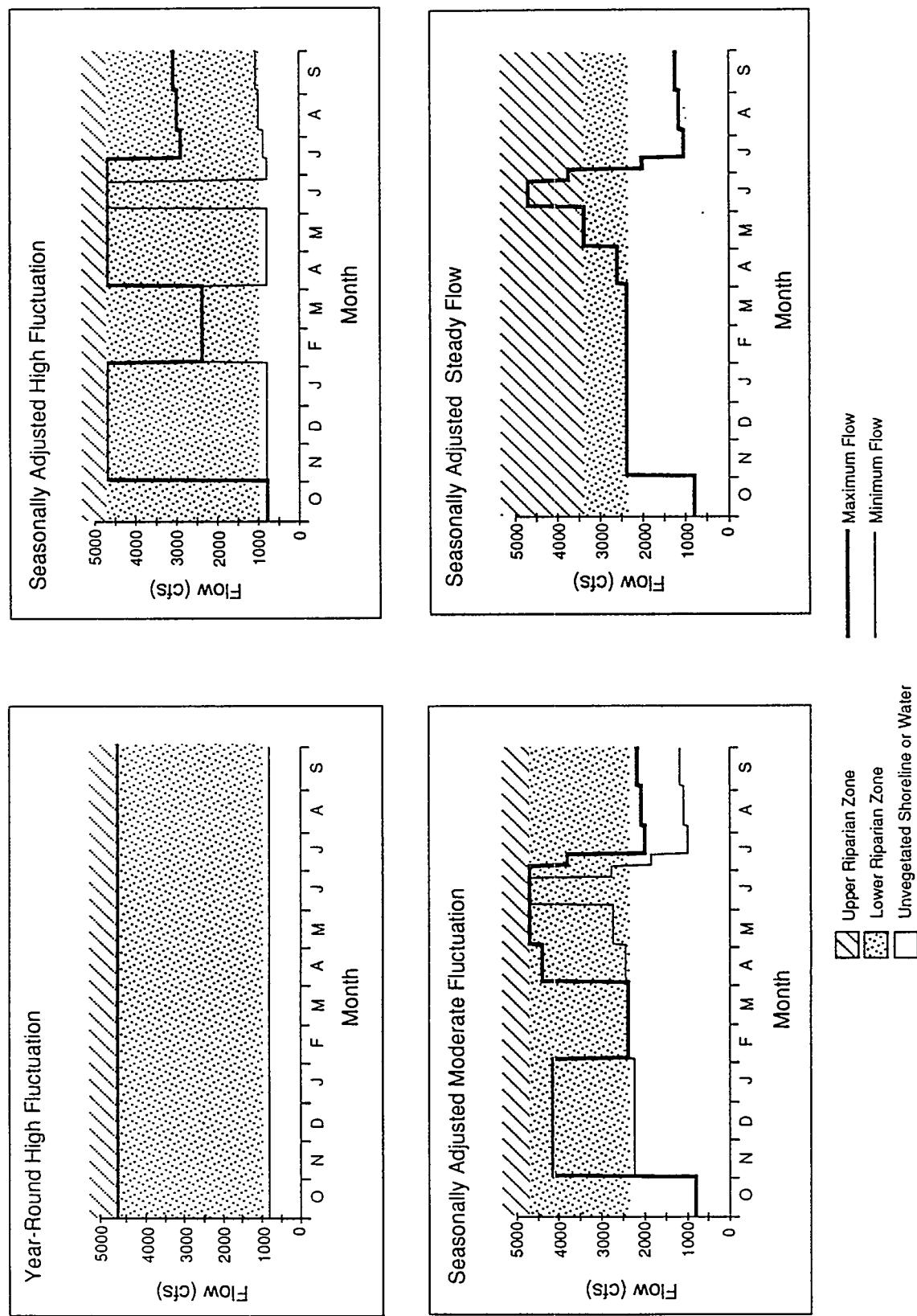


FIGURE 8 Location of Riparian Zones for Four Flaming Gorge Dam Hydropower Operational Scenarios

TABLE 1 Measured Widths and Heights of the Riparian Zone in Different Reaches of the Green River

Reach	Width of Riparian Zone (ft)			Width of Vegetated Portion (ft)			Width of Unvegetated Beach (ft)			Elevation at Upper Edge of Riparian Zone (ft)			Elevation at Upper Edge of Unvegetated Beach (ft)		
	N <sup>a</sup>	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	Range	Mean	
Red Canyon	5	64.1	27.9 - 90.2	43.6	23.0 - 60.7	10.5	1.6 - 29.5	10.2	4.6 - 24.0	0.5	0.0 - 2.3				
Browns Park	9	85.4	18.0 - 165.7	72.0	16.4 - 165.7	12.6	0.0 - 75.5	5.8	1.6 - 12.8	0.7	0.0 - 1.9				
Lodore Canyon	12	113.6	34.4 - 337.9	105.7	26.2 - 328.1	7.9	0.0 - 26.2	14.1	5.9 - 33.5	1.1	0.0 - 2.7				
Whirlpool Canyon	8	93.3	21.3 - 341.2	47.0	14.7 - 116.5	46.3	4.9 - 232.9	9.4	4.6 - 16.1	3.0	1.4 - 5.7				
Island and Rainbow Parks	3	112.1	23.0 - 239.5	107.7	23.0 - 232.9	4.4	0.0 - 6.6	12.0	5.2 - 16.4	0.6	0.6 - 1.1				

<sup>a</sup> N = number of transects.

**TABLE 2** Relative Abundance of Plant Species or Taxa in Different Reaches of the Green River

Common Name <sup>a</sup>	Percent of Sampling Points Occupied in Reaches of the Green River					
	Red Canyon	Browns Park	Lodore Canyon	Whirlpool Canyon	Island and Rainbow Parks	All Reaches
Alkali bulrush	0.00	0.18	0.00	0.00	0.00	0.05
Artemisia	0.00	3.70	9.38	0.22	3.40	4.85
Box elder	0.58	0.00	20.40	11.88	1.36	10.62
Canada thistle	5.85	10.17	2.02	4.10	3.40	4.90
Carex	8.19	12.57	4.27	12.74	19.73	9.51
Cattail	0.00	8.69	0.00	0.00	0.00	2.17
Cladophora	0.00	0.00	0.59	0.00	0.00	0.23
Clasping peppergrass	0.00	0.18	0.00	0.00	0.00	0.05
Cocklebur	0.00	0.00	0.00	0.22	0.68	0.09
Common dandelion	6.43	0.55	0.00	0.00	0.00	0.65
Common evening-primrose	0.00	0.00	0.00	0.43	0.00	0.09
Common plantain	4.68	2.59	1.19	0.22	0.00	1.52
Common reed	0.00	1.11	2.85	2.38	0.00	1.89
Common sea-milkwort	0.58	2.03	0.00	0.00	0.00	0.55
Common spikerush	4.68	28.65	1.90	9.72	14.29	11.32
Common threesquare	0.00	10.17	2.37	4.32	2.04	4.53
Coyote willow	5.26	20.70	0.83	1.08	6.80	6.61
Dock	0.58	0.00	0.00	0.86	0.00	0.23
Dogwood	0.58	0.00	0.00	0.00	0.00	0.05
Field horsetail	7.60	9.06	3.44	8.86	9.52	6.74
Field mint	0.00	1.29	1.42	1.30	2.04	1.29
Fremont cottonwood	0.00	0.00	0.12	0.86	24.49	1.89
Giant whitetop	11.70	3.51	1.42	0.65	11.56	3.28
Globe-podded whitetop	0.00	0.18	0.00	0.00	0.00	0.05
Golden aster	1.75	0.00	7.83	0.00	0.00	3.19
Goldenrod	0.00	0.00	0.36	1.08	0.00	0.37
Grasses	56.14	34.20	52.91	33.69	46.26	43.93
Green mormon-tea	0.00	0.00	0.24	0.00	0.00	0.09
Hairleaf water-buttercup	0.00	0.00	0.12	0.00	0.00	0.05
Hardstem bulrush	0.00	4.25	0.00	0.00	0.00	1.06
Hemp dogbane	4.68	0.00	1.42	4.10	0.00	1.80
Juncus	16.96	31.61	8.78	3.89	3.40	13.72
Knotweed	1.17	0.00	0.00	0.86	0.00	0.28
Orache	0.00	0.55	0.00	0.00	2.04	0.28
Orange sneezeweed	0.58	0.00	0.47	0.43	0.00	0.32
Panicled bulrush	0.00	0.18	0.00	0.43	0.00	0.14
Poison ivy	1.17	0.00	0.00	0.00	0.00	0.09
Prickly pear	0.00	0.18	0.12	0.00	0.00	0.09

TABLE 2 (Cont.)

Common Name <sup>a</sup>	Percent of Sampling Points Occupied in Reaches of the Green River					
	Red Canyon	Browns Park	Lodore Canyon	Whirlpool Canyon	Island and Rainbow Parks	All Reaches
Rabbitbrush	2.34	3.14	5.81	0.65	2.72	3.56
Scouring rush	16.37	5.36	22.54	30.45	10.20	18.61
Shore buttercup	4.09	2.22	0.24	0.86	0.00	1.15
Showy milkweed	0.00	0.00	0.83	0.86	0.00	0.51
Silverweed	9.36	6.84	1.42	0.22	0.00	3.05
Skullcap	0.00	0.18	0.00	0.00	0.00	0.05
Sow thistle	1.75	14.42	0.47	0.22	0.00	3.97
Spikemoss	0.58	0.00	0.00	0.00	0.00	0.05
Stinking povertyweed	0.00	0.00	4.51	0.00	2.04	1.89
Swamp milkweed	0.00	0.00	0.36	1.08	0.00	0.37
Sweet clover	0.58	0.00	1.54	0.65	0.00	1.39
Tamarisk	0.00	1.11	12.34	8.42	4.76	7.21
Utah juniper	3.51	0.00	1.42	0.22	0.00	0.88
Water hemlock	0.58	0.00	0.00	0.00	0.00	0.05
Water ladysthumb	0.00	0.00	0.00	1.08	0.00	0.23
Water speedwell	1.75	0.55	0.36	0.86	0.68	0.65
Watercress	0.00	0.00	0.00	1.94	0.00	0.42
Western goldenrod	15.79	6.84	16.49	11.23	5.44	12.15
Western virgin-bower	0.00	0.00	0.47	0.00	0.00	0.18
White clover	1.17	0.00	0.12	0.00	0.00	0.14
Wild licorice	11.70	6.47	0.47	1.08	0.00	2.96
Yellow salsify	0.00	0.00	0.24	0.22	0.00	0.14
Number of sampling points	171	541	843	463	147	2,165
Percent of sampling points	7.90	24.99	38.94	21.39	6.79	100.00

<sup>a</sup> See the appendix, Table A.4, for the scientific names of these species.

TABLE 3 Relative Abundance of Plant Species or Taxa at Different Distances from the Green River at Low Flow<sup>a</sup>

Species or Taxon <sup>b</sup>	N <sup>c</sup>	Percent of Sampling Points Occupied at Different Distances from the River <sup>d</sup>						Distance (ft)		
		0-4 ft	5-9 ft	10-19 ft	20-49 ft	50-99 ft	100-149 ft	>149 ft	All Distances	Mean
Artemisia	99	0.00	1.23	0.00	8.49	12.63	1.10	4.86	6.37	74.6
Box elder	173	0.00	0.00	0.62	2.18	20.30	10.38	30.10	11.13	134.6
Canada thistle	82	0.00	1.23	3.73	9.47	4.46	9.84	0.00	5.27	61.2
Carex	118	3.70	6.17	1.86	7.28	5.45	19.13	9.22	7.59	86.5
Cattail	47	0.93	4.94	4.35	0.73	2.72	11.48	0.00	3.02	75.9
Common plantain	32	0.93	2.47	3.73	2.91	1.98	1.64	0.00	2.06	43.6
Common reed	30	1.85	3.70	6.21	2.91	0.74	0.00	0.00	1.93	25.6
Common spikerush	179	13.89	17.28	13.66	13.35	13.61	9.84	0.00	11.51	46.3
Coyote willow	128	1.85	1.23	1.24	7.77	13.61	19.13	0.49	8.23	75.1
Field horsetail	91	1.85	4.94	9.94	9.95	5.20	2.73	0.97	5.85	48.1
Giant whitetop	51	0.00	1.23	5.59	8.25	1.49	0.55	0.00	3.28	34.9
Golden aster	69	0.00	0.00	3.73	9.71	5.69	0.00	0.00	4.44	43.2
Grasses	727	7.41	34.57	35.40	49.03	44.80	52.46	75.24	46.75	93.7
Juncus	274	6.48	17.28	16.77	19.66	23.51	26.78	0.49	17.62	59.2
Rabbitbrush	70	0.00	1.23	3.11	1.94	3.22	6.01	15.53	4.50	169.1
Scirpus	98	12.04	38.27	11.80	5.58	0.00	53.55	0.00	0.00	53.9
Scouring rush	247	1.85	11.11	22.36	19.66	14.85	15.85	14.56	15.88	70.8
Silverweed	65	0.00	6.17	7.45	7.28	3.22	1.64	0.97	4.18	43.8
Sow thistle	85	0.00	1.23	1.86	6.07	9.41	9.29	0.49	5.47	68.8
Stinking povertyweed	38	0.00	0.00	0.00	0.00	0.00	4.92	14.08	2.44	166.2
Tamarisk	110	1.85	2.47	3.73	10.68	2.72	18.03	5.83	7.07	79.2
Western goldenrod	203	1.85	14.81	16.15	19.66	10.89	16.94	3.40	13.05	55.6
Wild licorice	59	0.00	1.23	2.48	5.58	3.22	9.84	0.00	3.79	68.4
Number of sampling points	108	81	161	412	404	183	206	1,555	-	-
Percent of sampling points	6.95	5.21	10.35	26.50	25.98	11.77	13.25	100.00	-	-

<sup>a</sup> Low flow = 800 cfs.<sup>b</sup> Only species or taxa with 25 or more observations are included.<sup>c</sup> N = number of sampling points where the species or taxon was observed.<sup>d</sup> Only transects upstream of the Yampa River confluence are presented.

TABLE 4 Relative Abundance of Plant Species or Taxa at Different Elevations above the Green River at Low Flow<sup>a</sup>

Species or Taxon <sup>b</sup>	N <sup>c</sup>	Percent of Sampling Points Occupied at Different Elevations above the River <sup>d</sup>							Elevation (ft)		
		0.0-0.9 ft	1.0-1.9 ft	2.0-3.9 ft	4.0-5.9 ft	6.0-9.9 ft	10.0-13.9 ft	>13.9 ft	All Elevations	Mean	Range
Artemisia	99	0.00	0.31	1.58	11.86	16.87	11.84	9.23	6.37	8.5	2-19
Box elder	173	0.00	0.00	0.40	4.12	25.10	38.82	33.85	11.13	12.7	4-32
Canada thistle	82	0.00	2.16	22.92	6.70	0.82	1.32	0.00	5.27	3.7	2-13
Carex	116	1.93	2.47	30.43	10.31	1.65	1.32	0.00	7.46	3.7	0-11
Cattail	44	4.25	10.19	0.00	0.00	0.00	0.00	0.00	2.83	1.6	1-2
Common plantain	31	0.77	8.02	1.19	0.00	0.00	0.00	0.00	1.99	1.8	1-4
Common reed	29	0.39	0.31	0.79	8.25	3.70	0.00	0.00	1.86	5.4	0-10
Common spikerush	172	24.32	29.94	3.95	1.03	0.00	0.00	0.00	11.06	1.4	0-5
Coyote willow	128	0.39	8.02	36.36	3.61	0.82	0.00	0.00	8.23	3.1	1-7
Field horsetail	90	1.54	14.20	7.51	7.73	1.23	1.97	0.00	5.79	2.9	1-14
Giant whitetop	51	0.00	1.23	4.35	10.31	5.76	1.32	0.00	3.28	5.2	1-10
Golden aster	69	0.00	0.00	1.19	6.19	14.81	9.21	3.08	4.44	8.3	4-18
Grasses	722	9.27	33.64	54.55	67.01	61.32	69.08	51.54	46.43	6.7	0-34
Juncus	269	13.90	28.40	30.83	15.46	13.17	0.66	0.00	17.30	3.1	0-11
Rabbitbrush	70	0.00	0.00	1.98	0.52	6.58	23.68	9.23	4.50	11.2	3-18
Scirpus	94	6.18	16.67	7.51	2.58	0.00	0.00	0.00	6.05	2.0	1-5
Scouring rush	244	0.77	3.09	10.67	52.06	31.28	18.42	0.00	15.69	6.3	1-13
Silverweed	65	2.70	5.86	13.44	2.58	0.00	0.00	0.00	4.18	2.5	0-6
Sow thistle	85	0.00	1.54	31.23	0.52	0.00	0.00	0.00	5.47	3.1	1-5
Stinking povertyweed	38	0.00	0.31	7.11	9.28	0.41	0.00	0.00	2.44	4.4	2-6
Tamarisk	110	0.00	6.79	7.11	23.71	9.88	0.00	0.00	7.07	4.5	1-9
Western goldenrod	199	1.54	32.72	18.18	21.13	0.82	0.00	0.00	12.80	2.7	0-7
Wild licorice	59	0.00	0.00	17.79	4.12	2.06	0.66	0.00	3.79	4.0	2-10
Number of sampling points	259	324	253	194	243	152	130	1,555	-	-	-
Percent of sampling points	16.66	20.84	16.27	12.48	15.63	9.77	8.36	100.00	-	-	-

<sup>a</sup> Low flow = 800 cfs.<sup>b</sup> Only species or taxa with 25 or more observations are included.<sup>c</sup> N = number of sampling points where species or taxon was observed.<sup>d</sup> Only transects upstream of the Tampa River confluence are presented.

TABLE 5 Areas of Riparian Vegetation below Flaming Gorge Dam as Determined from Aerial Videography

Site Name/ Segment Length	Estimated Discharge (cfs)	Total Area <sup>a</sup>		Water Area		Area above Water <sup>b</sup>		Area of Water above Minimum <sup>c</sup> acres acres/mile
		acres	acres/mile	acres	acres/mile	acres	acres/mile	
Red Canyon (0.92 miles)	3,823	31.1	33.6	18.4	19.9	12.7	13.7	2.7 3.0
	2,427	31.1	33.6	16.8	18.2	14.2	15.4	1.2 1.2
	1,442	31.1	33.6	16.7	18.1	14.3	15.5	1.1 1.1
	778	31.1	33.6	15.7	17.0	15.4	16.7	0.0 0.0
Little Hole (1.37 miles)	3,961	56.5	41.3	38.2	27.9	18.3	13.4	8.7 6.3
	2,493	56.5	41.3	33.4	24.4	23.1	16.9	3.8 2.8
	1,500	56.5	41.3	30.8	22.5	25.7	18.8	1.2 0.9
	795	56.5	41.3	29.5	21.6	27.0	19.7	0.0 0.0
Upper Browns Park (0.59 mile)	3,953	23.0	39.0	13.6	22.9	9.5	16.0	2.0 3.4
	2,578	23.0	39.0	13.0	22.1	10.0	16.9	1.5 2.5
	1,544	23.0	39.0	11.7	19.8	11.3	19.2	0.1 0.3
	813	23.0	39.0	11.6	19.6	11.5	19.4	0.0 0.0
Lower Browns Park (0.80 miles)	3,942	42.4	53.2	33.5	42.0	8.9	11.1	5.6 7.0
	2,679	42.4	53.2	32.2	40.5	10.1	12.7	4.4 5.5
	1,602	42.4	53.2	31.6	39.7	10.7	13.4	3.8 4.7
	815	42.4	53.2	27.9	35.0	14.5	18.2	0.0 0.0

<sup>a</sup> Total area is the area between the upper boundaries of the riparian zone on each side of the river and represents the area of water and riparian zone videographed within a site.

<sup>b</sup> Area above water is the area from the water's edge to the upper boundaries of the riparian zone. This area equals total area minus the water area.

<sup>c</sup> Area of water above minimum is the area between the water's edge at the flow videographed and the water's edge at 800 cfs. This area equals water area at flow minus the water area at 800 cfs.

TABLE 6 Calculated Areas of Riparian Zones for Different Flows

Site	Flow (cfs)	Water Area (acres/mile)	Area above Water <sup>a</sup> (acres/mile)	Area of Water above Minimum <sup>b</sup> (acres/mile)
Red Canyon	4,700	21.0	12.6	4.1
	4,200	20.4	13.2	3.4
	3,400	19.4	14.2	2.4
	2,400	18.3	15.4	1.3
	800	17.0	16.6	0.0
Little Hole	4,700	29.7	11.6	8.1
	4,200	28.5	12.8	6.9
	3,400	26.6	14.7	5.0
	2,400	24.2	17.1	2.6
	800	21.6	19.7	0.0
Upper Browns Park	4,700	23.5	15.5	3.9
	4,200	23.1	15.9	3.6
	3,400	22.6	16.4	3.0
	2,400	21.7	17.3	2.1
	800	19.6	19.4	0.0
Lower Browns Park	4,700	42.9	10.2	7.9
	4,200	42.3	10.8	7.4
	3,400	41.4	11.8	6.4
	2,400	40.2	12.9	5.2
	800	34.9	18.3	0.0
Average	4,700	29.3	12.5	6.0
	4,200	28.6	13.2	5.3
	3,400	27.5	14.3	4.2
	2,400	26.1	15.7	2.8
	800	23.3	18.5	0.0

<sup>a</sup> Area above water is the area from the water's edge to the upper boundaries of the riparian zone. This area equals total area minus the water area.

<sup>b</sup> Area of water above minimum is the area between the water's edge at the flow videographed and the water's edge at 800 cfs. This area equals water area at flow minus the water area at 800 cfs.

**TABLE 7 Areas of Riparian Zones for Different Operational Scenarios as Determined by Aerial Videography**

Reach/Operational Scenario	Upper Zone			Lower Zone		
	Area (acres/mile)	Change from Historical Operations		Area (acres/mile)	Change from Historical Operations	
		acres/mile	%		acres/mile	%
<b>Red Canyon</b>						
Year-round high fluctuation	12.6	-0.6	-5	4.0	0.6	18
Seasonally adjusted high fluctuation	12.6	-0.6	-5	4.0	0.6	18
Seasonally adjusted moderate fluctuation	12.6	-0.6	-5	2.8	-0.6	-18
Seasonally adjusted steady flow	14.2	1.0	8	1.2	-2.2	-65
Historical operations	13.2	0.0	0	3.4	0.0	0
<b>Little Hole</b>						
Year-round high fluctuation	11.6	-1.2	-9	8.1	1.2	17
Seasonally adjusted high fluctuation	11.6	-1.2	-9	8.1	1.2	17
Seasonally adjusted moderate fluctuation	11.6	-1.2	-9	5.5	-1.4	-20
Seasonally adjusted steady flow	14.7	1.9	15	2.4	-4.5	-65
Historical operations	12.8	0.0	0	6.9	0.0	0
<b>Upper Browns Park</b>						
Year-round high fluctuation	15.5	-0.4	-3	3.9	0.4	11
Seasonally adjusted high fluctuation	15.5	-0.4	-3	3.9	0.4	11
Seasonally adjusted moderate fluctuation	15.5	-0.4	-3	1.8	-1.7	-49
Seasonally adjusted steady flow	16.4	0.5	3	0.9	-2.6	-74
Historical operations	15.9	0.0	0	3.5	0.0	0
<b>Lower Browns Park</b>						
Year-round high fluctuation	10.2	-0.6	-6	8.1	0.6	8
Seasonally adjusted high fluctuation	10.2	-0.6	-6	8.1	0.6	8
Seasonally adjusted moderate fluctuation	10.2	-0.6	-6	2.7	-4.8	-64
Seasonally adjusted steady flow	11.8	1.0	9	1.1	-6.4	-85
Historical operations	10.8	0.0	0	7.5	0.0	0
<b>Average</b>						
Year-round high fluctuation	12.5	-0.7	-5	6.0	0.7	13
Seasonally adjusted high fluctuation	12.5	-0.7	-5	6.0	0.7	13
Seasonally adjusted moderate fluctuation	12.5	-0.7	-5	3.2	-2.1	-40
Seasonally adjusted steady flow	14.3	1.1	8	1.4	-3.9	-74
Historical operations	13.2	0.0	0	5.3	0.0	0

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**APPENDIX:**

**DATA COLLECTED ALONG GREEN RIVER TRANSECTS, JUNE 1992**



TABLE A.1 Transect Location, Length, and Change in Elevation

Transect	Distance below Dam (mi)	Reach	Side of River	Compass Bearing <sup>a</sup>	Length of Transect (ft)	Elevation Change (ft)
1	1.2	Red Canyon	Left	1	34.4	7.5
2	3.6	Red Canyon	Right	235	65.6	24.0
3	8.7	Red Canyon	Right	118	52.5	4.6
4	11.1	Red Canyon	Right	39	90.2	8.5
5	11.8	Red Canyon	Right	237	27.9	6.6
6	13.5	Browns Park	Left	354	32.8	11.8
7	16.5	Browns Park	Right	158	165.7	3.9
8	21.5	Browns Park	Left	172	77.1	3.3
9	25	Browns Park	Right	168	47.6	5.2
10	29.9	Browns Park	Left	36	39.4	5.2
11	32	Browns Park	Middle	165	137.8	2.0
12	32	Browns Park	Middle	162	139.4	1.6
13	37	Browns Park	Left	274	<sup>b</sup>	<sup>b</sup>
14	46.5	Browns Park	Left	82	114.8	12.8
15	46.5	Browns Park	Left	65	18.0	6.2
16	49	Lodore Canyon	Left	74	77.1	11.5
17	50.8	Lodore Canyon	Right	293	91.9	15.7
18	54.5	Lodore Canyon	Right	312	34.4	7.9
19	55	Lodore Canyon	Right	299	277.2	33.5
20	55	Lodore Canyon	Right	295	88.6	7.5
21	57	Lodore Canyon	Right	285	80.4	15.7
22	58.3	Lodore Canyon	Right	0	49.2	16.4
23	59.5	Lodore Canyon	Left	95	42.7	5.9
24	61.8	Lodore Canyon	Left	37	154.2	19.4
25	61.8	Lodore Canyon	Left	27	86.9	17.1
26	62.5	Lodore Canyon	Right	318	42.7	8.5
27	64.5	Lodore Canyon	Right	233	337.9	9.5
28	67.6	Whirlpool Canyon	Right	30	103.3	6.2
29	69.2	Whirlpool Canyon	Right	344	50.9	13.5
30	70.7	Whirlpool Canyon	Left	222	21.3	5.6
31	71.4	Whirlpool Canyon	Right	339	26.2	11.2
32	71.4	Whirlpool Canyon	Right	335	341.2	16.1
33	71.4	Whirlpool Canyon	Right	348	141.1	12.1
34	74.1	Whirlpool Canyon	Right	294	36.1	5.6
35	75.4	Whirlpool Canyon	Right	294	26.2	4.6
36	77	Island Park	Right	14	23.0	5.2
37	81.7	Rainbow Park	Right	315	239.5	14.4
38	82	Rainbow Park	Left	145	73.8	16.4

<sup>a</sup> All transects were perpendicular to the river's edge.

<sup>b</sup> Data not available.

**TABLE A.2 Distance, Elevation, and Slope for Transect Segments<sup>a</sup>**

Transect	Section <sup>b</sup>	Distance from River (ft)		Elevation above River (ft)		Slope <sup>c</sup>
		Start	End	Start	End	
1	A	0.0	10.8	0.0	0.0	0.00
	B	10.8	34.4	3.3	7.5	0.18
2	A	0.0	9.8	0.0	2.3	0.23
	B	9.8	21.7	2.3	2.3	0.00
	C	21.7	33.5	4.9	4.9	0.00
	D	33.5	68.2	8.2	25.3	0.49
3	A	0.0	30.8	0.0	2.3	0.07
	B	30.8	53.1	2.3	4.6	0.10
4	A	0.0	43.6	0.0	0.0	0.00
	B	43.6	78.4	1.6	1.6	0.00
	C	78.4	86.6	7.2	7.2	0.00
	D	86.6	90.2	8.5	8.5	0.00
5	A	0.0	8.5	0.0	0.0	0.00
	B	8.5	27.9	2.6	6.6	0.20
6	A	0.0	7.5	0.0	0.7	0.09
	B	7.5	13.1	0.7	5.9	0.94
	C	13.1	32.8	5.9	11.8	0.30
7	A	0.0	15.4	0.0	1.3	0.09
	B	15.4	18.7	1.6	2.0	0.10
	C	18.7	165.7	3.0	3.9	0.01
8	A	0.0	28.2	0.0	1.6	0.06
	B	28.2	77.1	2.3	3.3	0.02
9	A	0.0	8.9	0.0	1.6	0.19
	B	8.9	35.4	1.6	2.3	0.03
	C	35.4	39.0	2.3	4.3	0.55
	D	39.0	48.6	4.3	5.2	0.10
10	A	0.0	40.7	0.0	5.6	0.14
11	A	0.0	5.9	0.0	0.8	0.14
	B	5.9	18.7	0.8	1.5	0.05
	C	18.7	44.3	0.5	0.5	0.00
	D	44.3	67.6	1.0	1.0	0.00
	E	67.6	78.1	-	-	-
	F	78.1	87.9	-	-	-
	G	87.9	97.8	0.3	0.3	0.00
	H	97.8	138.8	1.8	1.8	0.00

TABLE A.2 (Cont.)

Transect	Section <sup>b</sup>	Distance from River (ft)		Elevation above River (ft)		Slope <sup>c</sup>
		Start	End	Start	End	
12	A	0.0	140.7	2.0	1.6	0.00
13	A	0.0	31.2	1.3	1.3	0.00
	B	31.2	49.2	6.2	6.2	0.00
	C	49.2	98.4	4.6	4.6	0.00
14	A	0.0	48.6	0.0	1.3	0.03
	B	48.6	64.0	1.3	1.3	0.00
	C	64.0	94.5	0.5	0.5	0.00
	D	94.5	106.6	0.5	7.2	0.55
	E	106.6	115.2	7.2	13.0	0.67
15	A	0.0	1.6	0.0	0.0	0.00
	B	1.6	3.3	0.0	1.0	0.60
	C	3.3	13.0	1.0	3.6	0.27
	D	13.0	13.8	3.6	5.2	2.00
	E	13.8	18.7	5.2	6.6	0.27
	F	18.7	19.0	6.6	9.2	8.00
16	A	0.0	25.9	0.0	2.6	0.10
	B	25.9	33.8	2.6	3.6	0.13
	C	33.8	35.1	3.6	4.9	1.00
	D	35.1	59.7	4.9	6.9	0.08
	E	59.7	60.4	6.9	8.0	1.75
	F	60.4	65.0	8.0	8.4	0.07
	G	65.0	67.9	8.4	9.2	0.28
	H	67.9	77.1	9.2	11.3	0.23
17	A	0.0	12.8	0.0	-	-
	B	12.8	18.4	3.6	4.9	0.24
	C	18.4	19.7	4.9	5.9	0.75
	D	19.7	91.9	5.9	15.6	0.13
18	A	0.0	7.9	0.0	1.1	0.15
	B	7.9	9.8	1.1	2.1	0.50
	C	9.8	13.8	2.1	2.1	0.00
	D	13.8	16.4	2.1	4.6	0.94
	E	16.4	34.4	4.6	7.7	0.17
19	A	0.0	14.8	0.0	4.6	0.31
	B	14.8	38.7	4.6	8.0	0.14
	C	38.7	68.9	8.0	7.5	-0.02
	D	68.9	80.7	7.5	11.0	0.29
	E	80.7	111.2	11.0	8.7	-0.08
	F	111.2	115.5	6.1	6.1	0.00
	G	115.5	127.3	6.4	6.4	0.00

TABLE A.2 (Cont.)

Transect	Section <sup>b</sup>	Distance from River (ft)		Elevation above River (ft)		Slope <sup>c</sup>
		Start	End	Start	End	
19 (cont.)	H	127.3	144.4	4.3	4.3	0.00
	I	144.4	157.5	4.3	8.7	0.34
	J	157.5	210.0	8.7	13.3	0.09
	K	210.0	277.2	13.3	33.5	0.30
20	A	0.0	8.2	0.0	1.3	0.16
	B	8.2	23.0	1.3	2.6	0.09
	C	23.0	55.1	3.6	5.2	0.05
	D	55.1	68.2	5.2	8.2	0.23
	E	68.2	89.2	8.2	7.4	-0.04
21	A	0.0	17.7	0.0	1.8	0.10
	B	17.7	40.7	1.8	4.4	0.11
	C	40.7	52.5	4.4	8.4	0.33
	D	52.5	59.1	8.4	9.0	0.10
	E	59.1	82.0	9.0	16.2	0.31
22	A	0.0	8.9	0.0	2.1	0.24
	B	8.9	34.1	2.1	9.7	0.30
	C	34.1	49.2	9.7	16.2	0.44
23	A	0.0	2.0	0.0	2.8	1.42
	B	2.0	4.3	2.8	1.3	-0.64
	C	4.3	5.9	1.3	3.6	1.40
	D	5.9	34.1	3.6	4.9	0.05
	E	34.1	44.0	4.9	5.9	0.10
24	A	0.0	26.2	0.0	2.0	0.08
	B	26.2	45.6	2.0	3.0	0.05
	C	45.6	57.7	5.2	5.2	0.00
	D	57.7	65.9	7.5	7.5	0.00
	E	65.9	77.4	8.9	8.9	0.00
	F	77.4	86.6	9.7	9.7	0.00
	G	86.6	154.2	10.5	19.4	0.13
25	A	0.0	6.9	0.0	-	-
	B	6.9	12.5	-	4.9	-
	C	12.5	23.0	4.9	5.6	0.06
	D	23.0	24.9	5.6	6.6	0.50
	E	24.9	29.9	6.6	7.5	0.20
	F	29.9	31.8	7.5	8.5	0.50
	G	31.8	35.4	8.5	8.5	0.00
	H	35.4	37.4	8.5	9.8	0.67
	I	37.4	53.1	9.8	9.8	0.00
	J	53.1	57.4	9.8	11.8	0.46
	K	57.4	86.9	11.8	17.1	0.18

TABLE A.2 (Cont.)

Transect	Section <sup>b</sup>	Distance from River (ft)		Elevation above River (ft)		Slope <sup>c</sup>
		Start	End	Start	End	
26	A	0.0	2.6	0.0	1.0	0.38
	B	2.6	4.6	1.0	1.6	0.33
	C	4.6	17.4	1.6	2.3	0.05
	D	17.4	19.7	2.3	4.9	1.14
	E	19.7	27.2	4.9	5.9	0.13
	F	27.2	31.5	5.9	7.5	0.39
	G	31.5	44.3	7.5	8.5	0.08
27	A	0.0	5.6	0.0	1.0	0.18
	B	5.6	12.1	1.0	1.6	0.10
	C	12.1	126.3	1.6	1.6	0.00
	D	126.3	131.2	1.6	4.9	0.67
	E	131.2	164.0	4.9	4.9	0.00
	F	164.0	194.9	3.9	3.9	0.00
	G	194.9	204.1	3.9	8.2	0.46
	H	204.1	217.8	8.2	8.2	0.00
	I	217.8	251.3	14.1	14.1	0.00
	J	251.3	338.6	14.1	9.5	-0.05
28	A	0.0	15.7	0.0	1.5	0.09
	B	15.7	47.2	2.0	3.0	0.03
	C	47.2	54.1	3.0	3.6	0.10
	D	54.1	69.2	3.6	4.6	0.07
	E	69.2	77.4	4.6	6.2	0.20
	F	77.4	104.3	6.2	6.4	0.01
29	A	0.0	9.2	0.0	3.1	0.34
	B	9.2	21.0	3.1	4.4	0.11
	C	21.0	23.6	4.4	7.2	1.06
	D	23.6	31.5	7.2	9.2	0.25
	E	31.5	33.8	9.2	10.2	0.43
	F	33.8	51.8	10.2	13.8	0.20
30	A	0.0	6.2	0.0	2.0	0.32
	B	6.2	10.5	2.0	3.6	0.39
	C	10.5	12.5	3.6	3.6	0.00
	D	12.5	15.4	3.6	5.6	0.67
	E	15.4	21.7	5.6	5.7	0.03
31	A	0.0	4.6	0.0	1.8	0.39
	B	4.6	8.2	2.0	1.0	-0.27
	C	8.2	26.2	1.0	11.2	0.56

TABLE A.2 (Cont.)

Transect	Section <sup>b</sup>	Distance from River (ft)		Elevation above River (ft)		Slope <sup>c</sup>
		Start	End	Start	End	
32	A	0.0	203.4	0.0	2.0	0.01
	B	203.4	217.5	2.0	5.2	0.23
	C	217.5	327.4	5.2	8.2	0.03
	D	327.4	341.2	8.2	16.1	0.57
33	A	0.0	20.0	0.0	2.0	0.10
	B	20.0	42.0	2.0	2.6	0.03
	C	42.0	45.9	2.3	2.3	0.00
	D	45.9	63.6	2.6	3.4	0.05
	E	63.6	78.4	3.9	3.9	0.00
	F	78.4	88.3	4.3	4.9	0.07
	G	88.3	90.9	4.9	6.6	0.63
	H	90.9	132.2	6.6	9.7	0.08
	I	132.2	141.1	9.8	12.1	0.26
34	A	0.0	3.0	0.0	1.1	0.39
	B	3.0	6.6	1.1	2.5	0.36
	C	6.6	23.6	2.5	3.8	0.08
	D	23.6	26.2	3.8	3.6	-0.06
	E	26.2	34.4	3.6	4.9	0.16
	F	34.4	36.4	5.6	5.6	0.00
35	A	0.0	1.0	0.0	0.0	0.00
	B	1.0	4.3	0.3	0.3	0.00
	C	4.3	6.2	1.3	1.3	0.00
	D	6.2	9.2	1.3	2.1	0.28
	E	9.2	14.1	2.1	3.3	0.23
	F	14.1	27.7	3.3	4.9	0.12
36	A	0.0	5.9	0.0	1.3	0.22
	B	5.9	7.9	1.6	1.8	0.08
	C	7.9	22.0	2.3	3.6	0.09
	D	22.0	24.6	3.6	7.5	1.50
37	A	0.0	3.9	0.0	1.0	0.25
	B	3.9	9.5	1.0	1.3	0.06
	C	9.5	11.5	2.0	2.0	0.00
	D	11.5	17.4	3.0	3.0	0.00
	E	17.4	29.5	4.9	4.9	0.00
	F	29.5	39.7	7.9	9.4	0.15
	G	39.7	57.1	11.5	14.3	0.16
	H	57.1	239.5	14.3	14.3	0.00

TABLE A.2 (Cont.)

Transect	Section <sup>b</sup>	Distance from River (ft)		Elevation above River (ft)		Slope <sup>c</sup>
		Start	End	Start	End	
38	A	0.0	6.2	0.0	0.7	0.11
	B	6.2	11.2	0.7	1.0	0.07
	C	11.2	13.5	1.0	1.5	0.21
	D	13.5	15.7	1.5	1.5	0.00
	E	15.7	19.4	1.5	2.3	0.23
	F	19.4	36.1	2.3	2.6	0.02
	G	36.1	38.7	2.6	4.4	0.69
	H	38.7	48.9	4.4	6.1	0.16
	I	48.9	52.5	6.1	8.4	0.64
	J	52.5	64.3	8.4	9.0	0.06
	K	64.3	75.1	9.0	17.4	0.77

<sup>a</sup> The relationships between distance from the river and elevation above the river along each transect are presented in Figures A.1 through A.11.

<sup>b</sup> Sections were contiguous segments along a transect that had similar slope. An abrupt change in slope along a transect defined the end of one section and the beginning of the next. Sections were delineated in this fashion to allow a determination of elevation for each sampling point along a transect without taking an elevation measurement at each point. Elevation at each sampling point was then calculated using the formula:

$$\text{Elevation} = E_s + [ S \times (D_n - D_s) ]$$

where:  $E_s$  = Elevation of section start relative to elevation of river,

$S$  = Slope of section (see footnote b),

$D_n$  = Distance of sampling point from transect origin, and

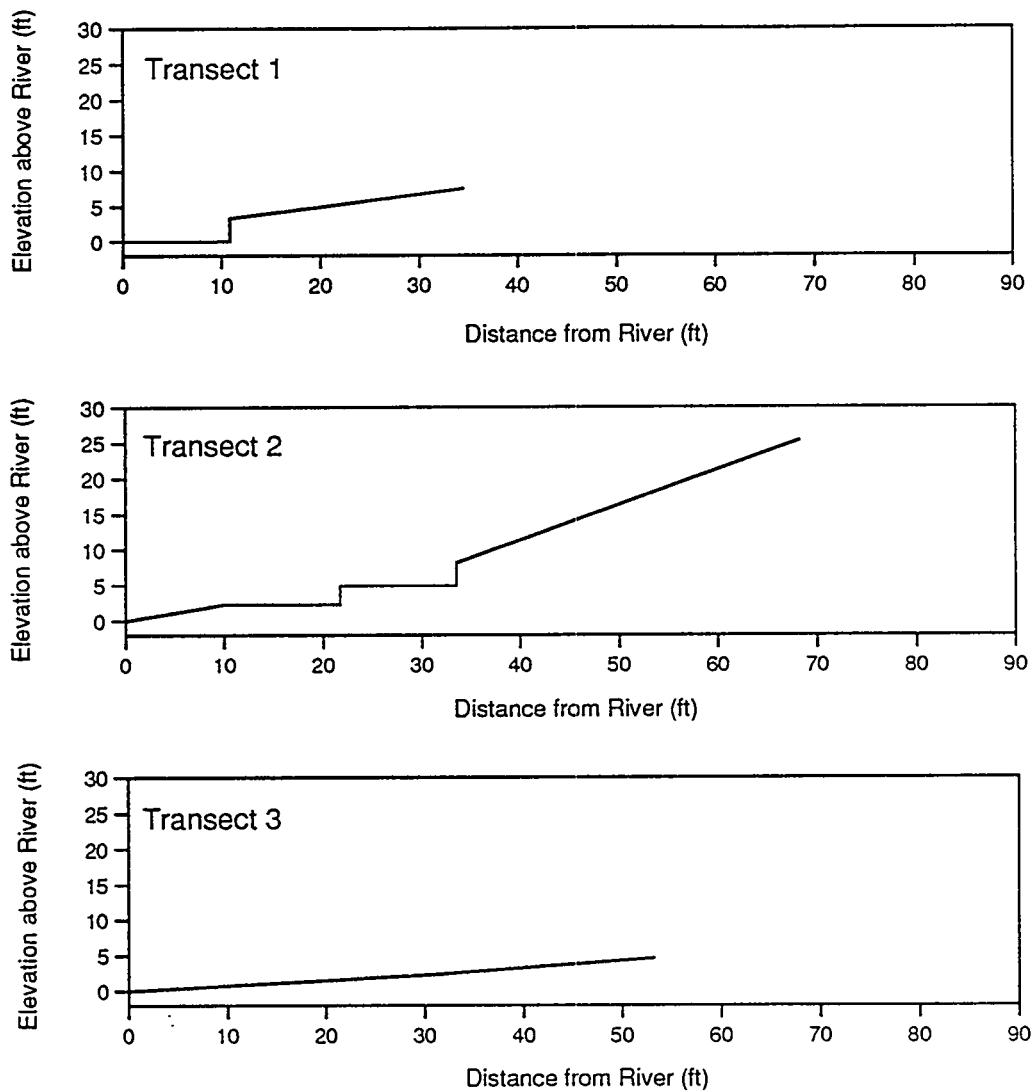
$D_s$  = Distance of section start from transect origin.

<sup>c</sup> Slope was calculated using the formula:

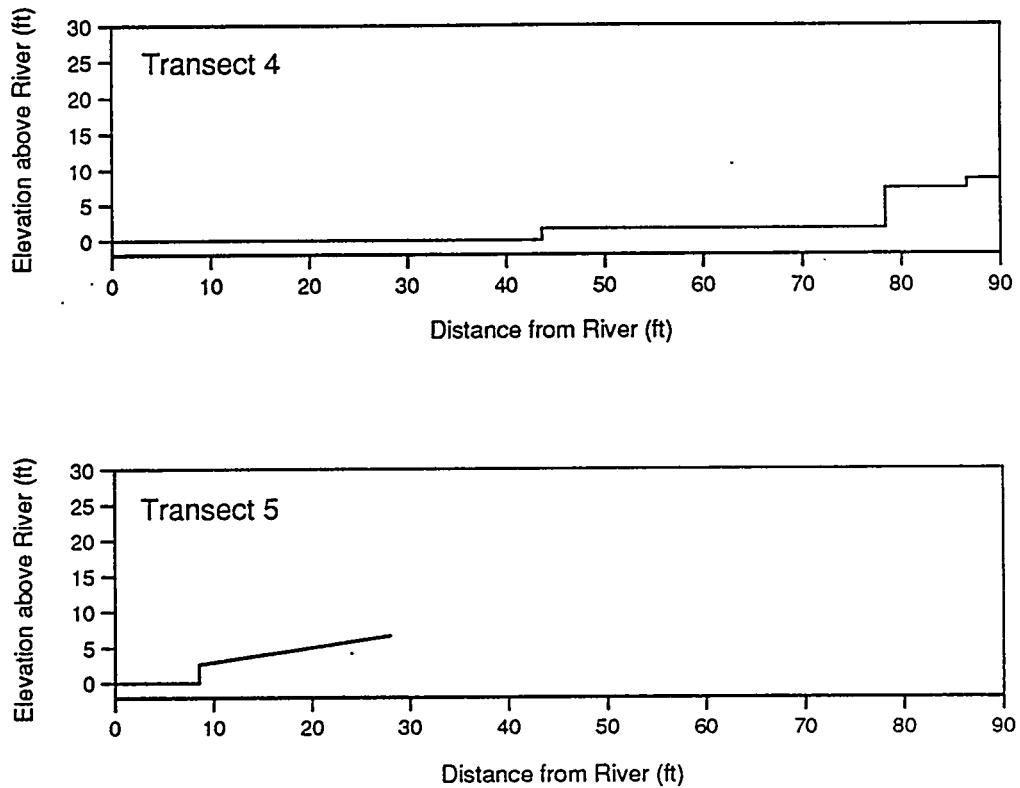
$$\text{Slope} = (E_e - E_s)/(D_e - D_s)$$

where:  $E_e$  = Elevation at end of section and

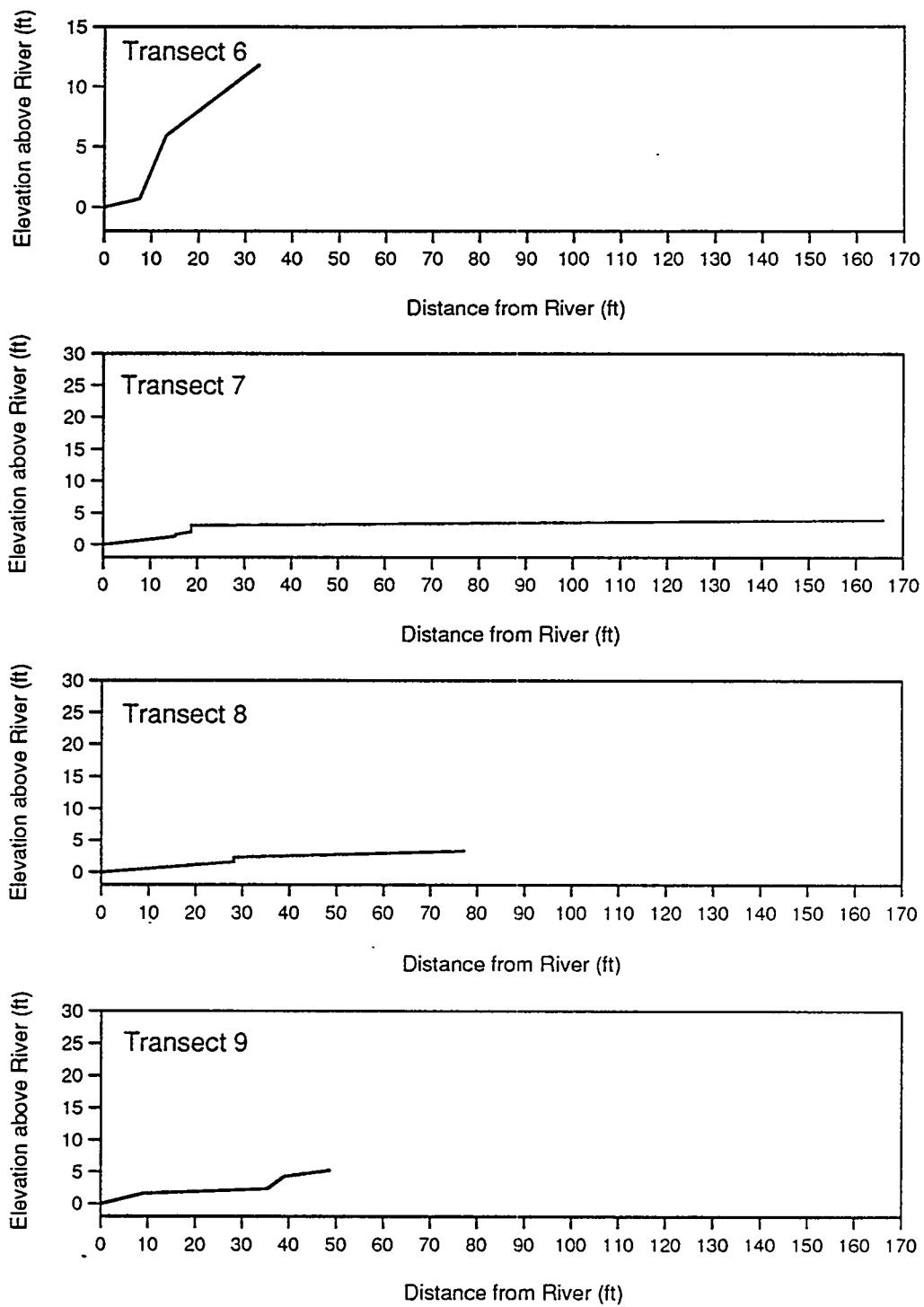
$D_e$  = Distance of section end from transect origin.



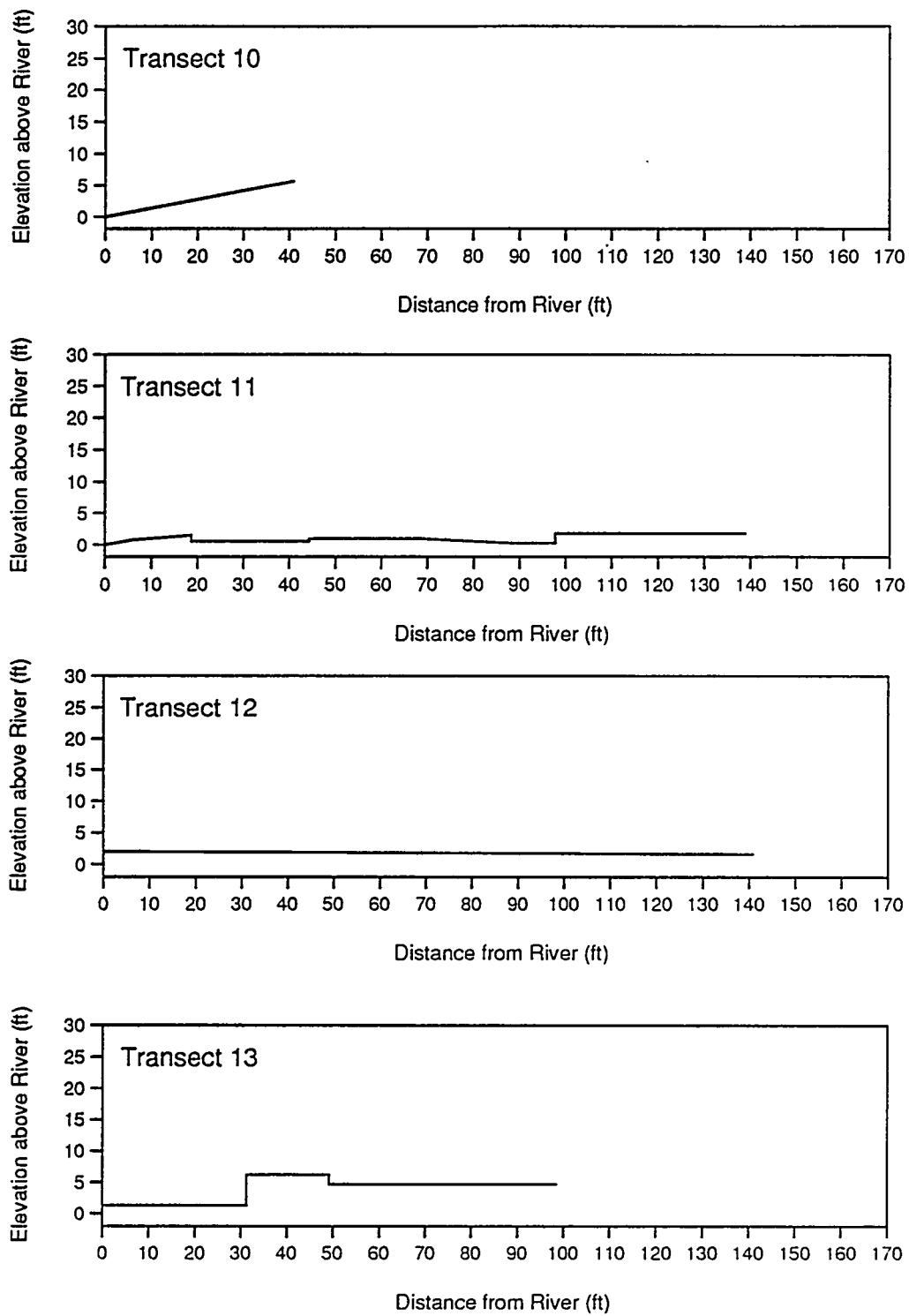
**FIGURE A.1 Relationship between Distance from River and Elevation above River in the Red Canyon Reach of the Green River, Transects 1-3**



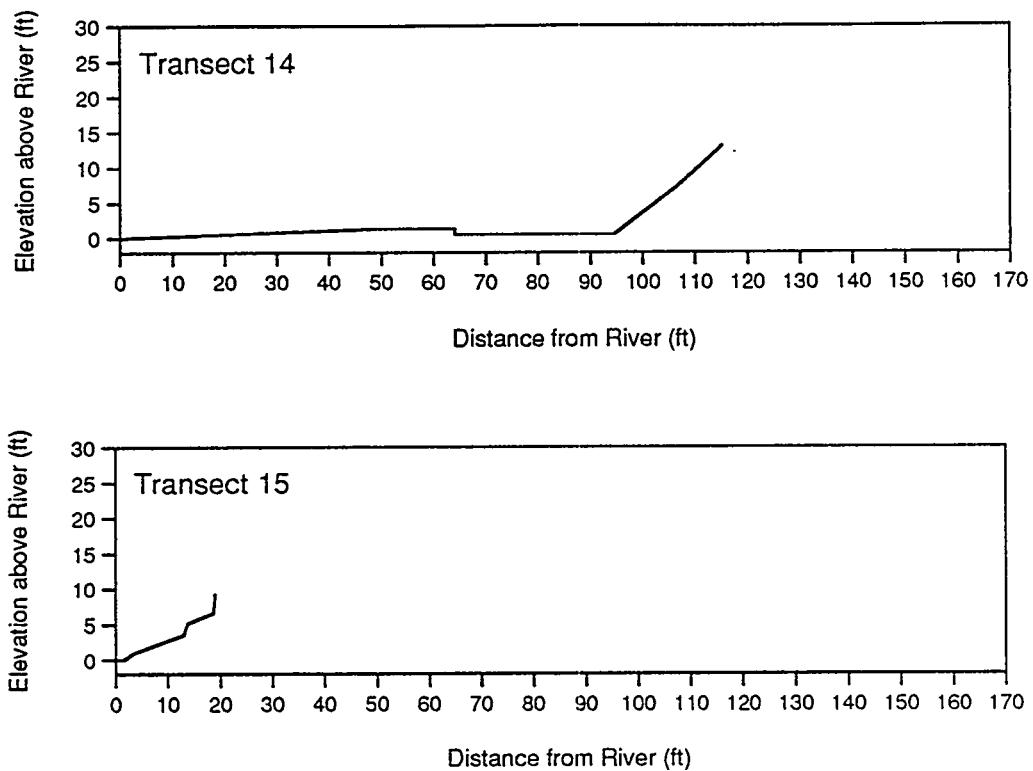
**FIGURE A.2 Relationship between Distance from River and Elevation above River in the Red Canyon Reach of the Green River, Transects 4-5**



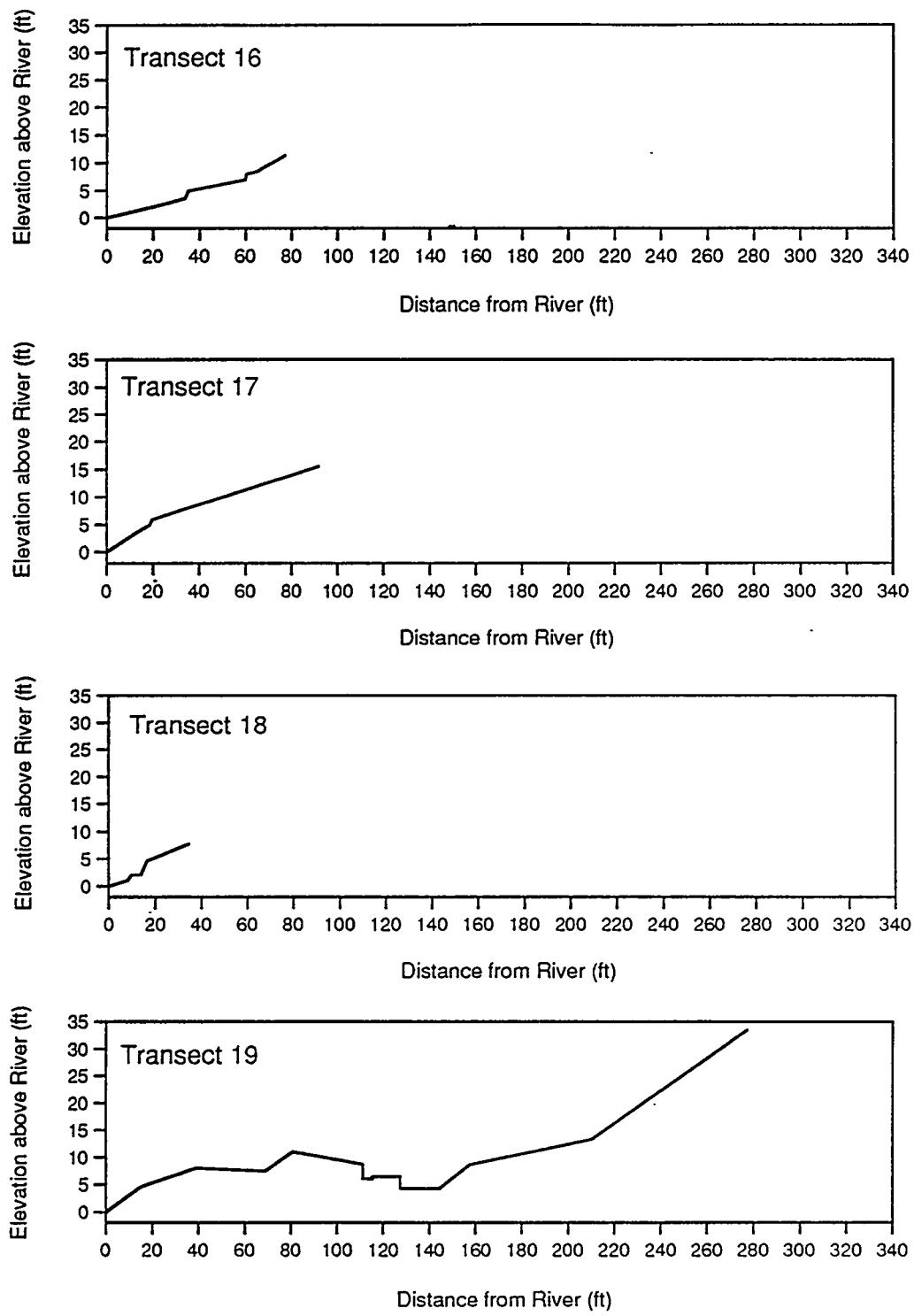
**FIGURE A.3 Relationship between Distance from River and Elevation above River in the Browns Park Reach of the Green River, Transects 6-9**



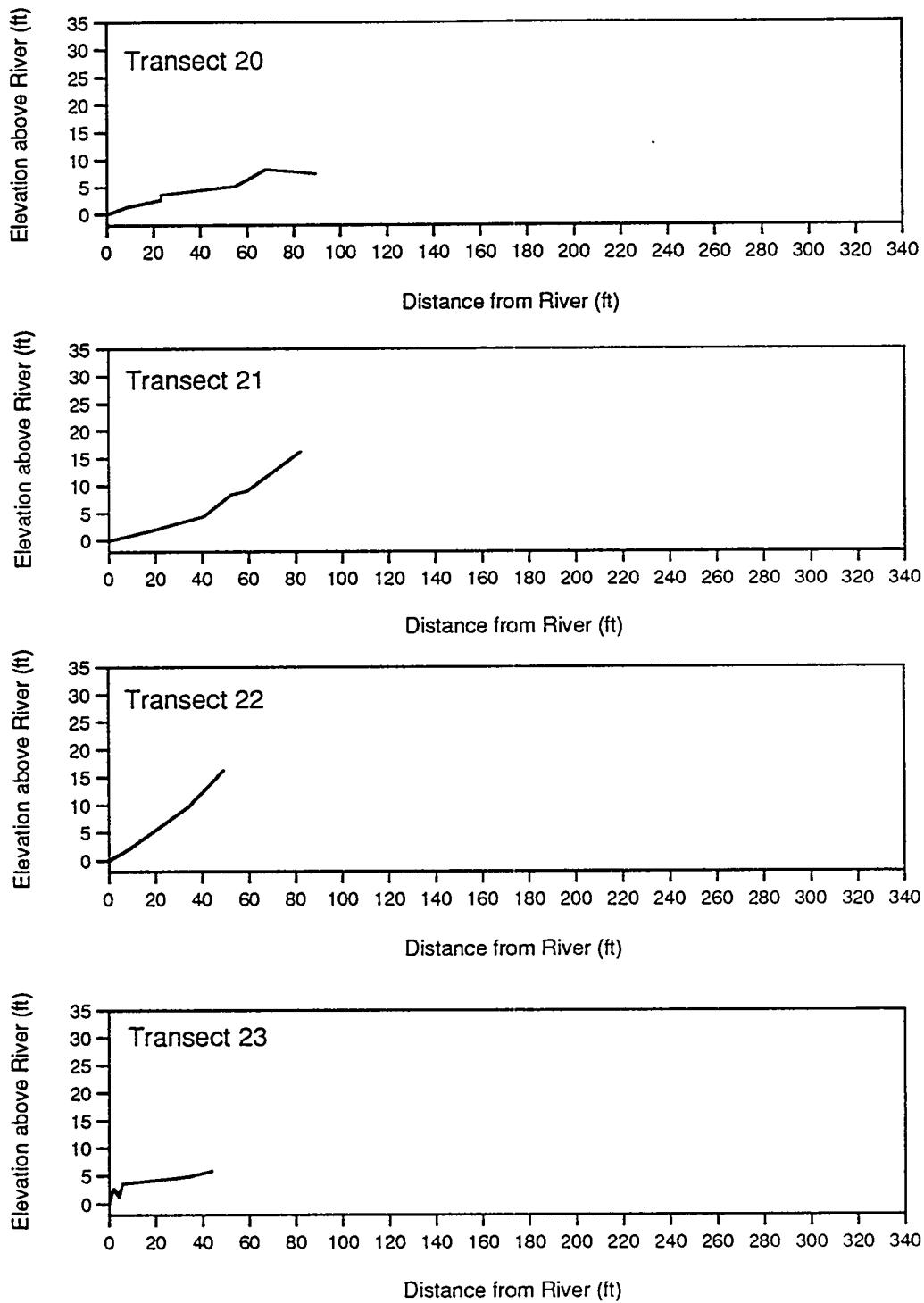
**FIGURE A.4 Relationship between Distance from River and Elevation above River in the Browns Park Reach of the Green River, Transects 10-13**



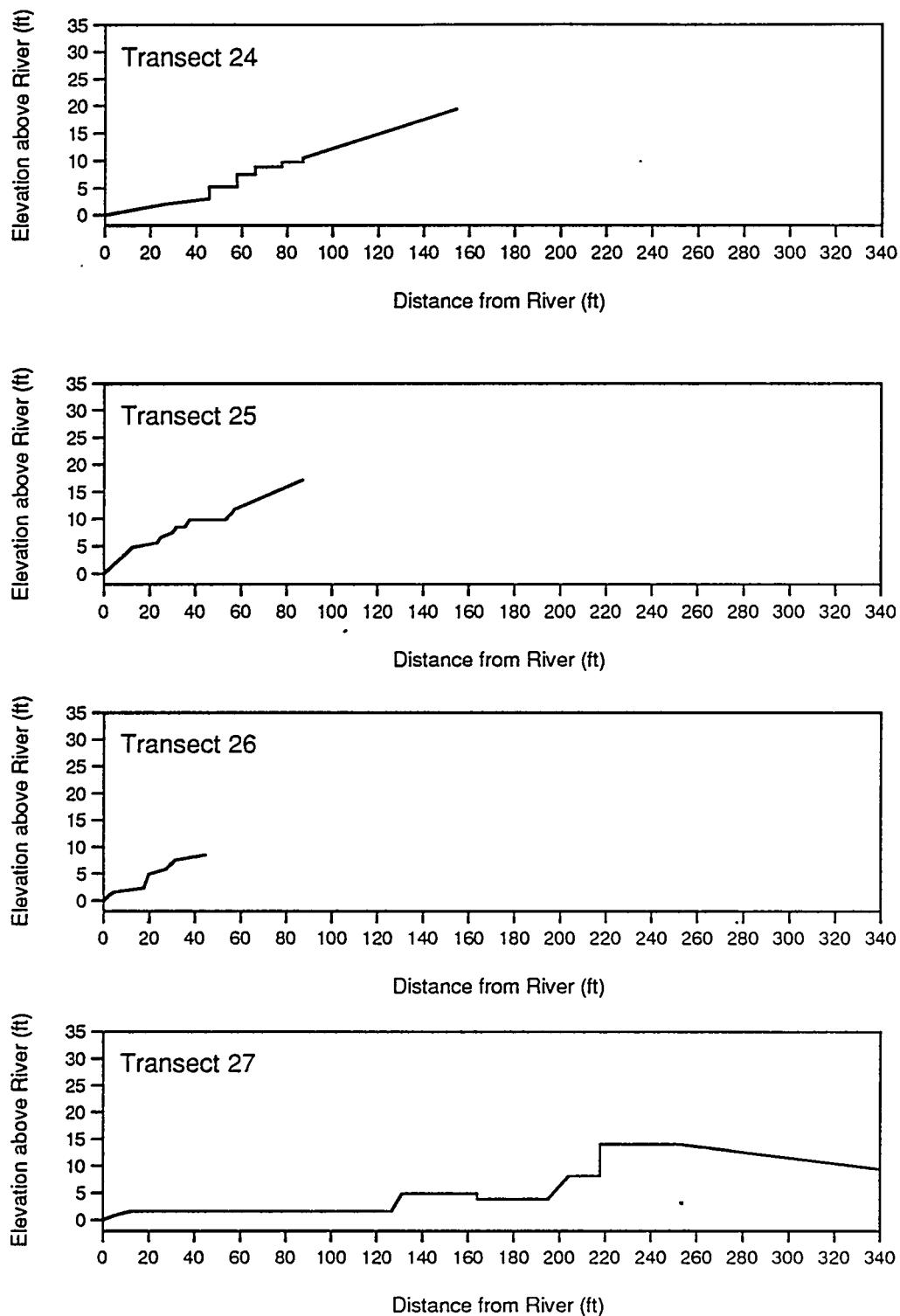
**FIGURE A.5 Relationship between Distance from River and Elevation above River in the Browns Park Reach of the Green River, Transects 14-15**



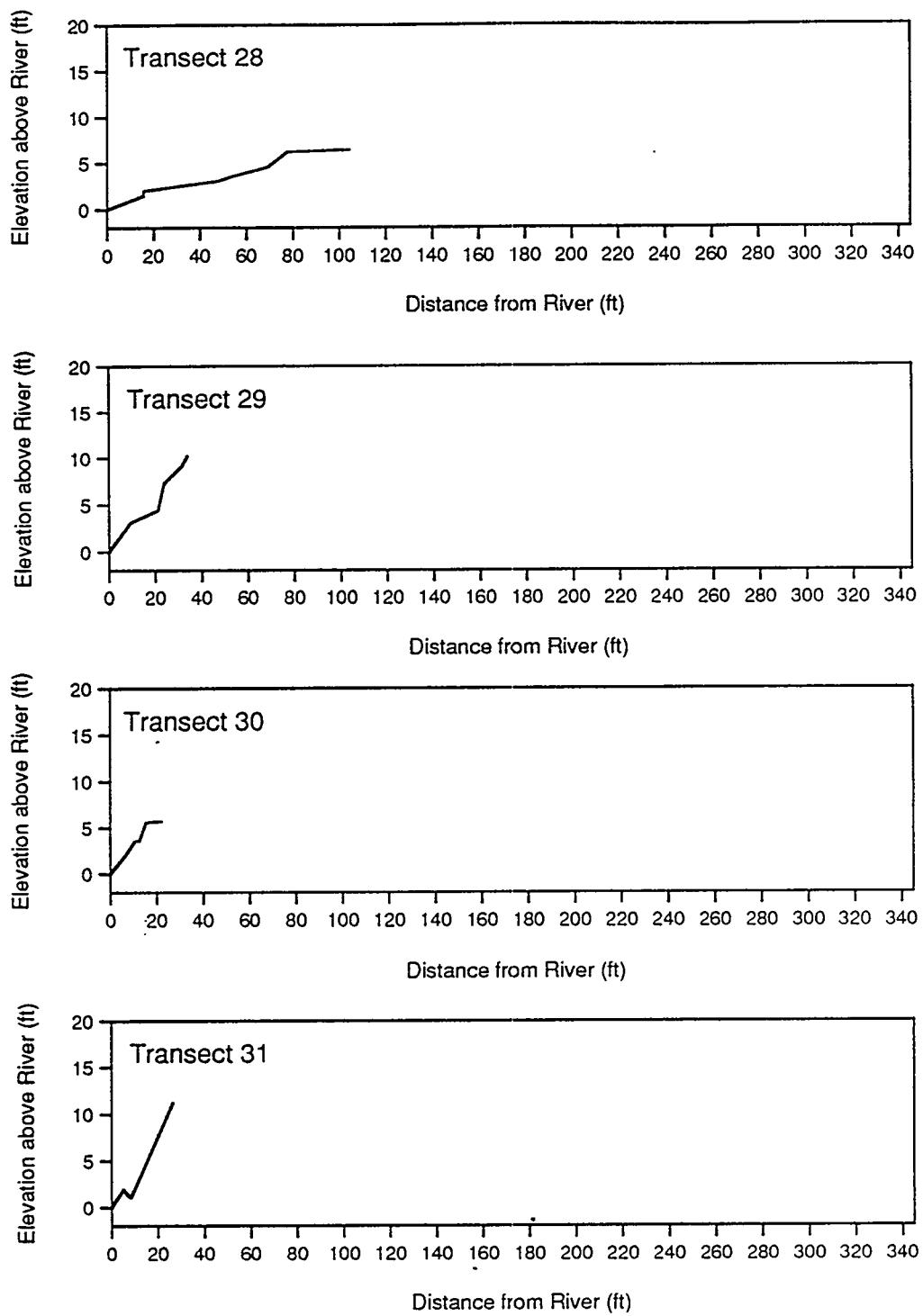
**FIGURE A.6 Relationship between Distance from River and Elevation above River in the Lodore Canyon Reach of the Green River, Transects 16-19**



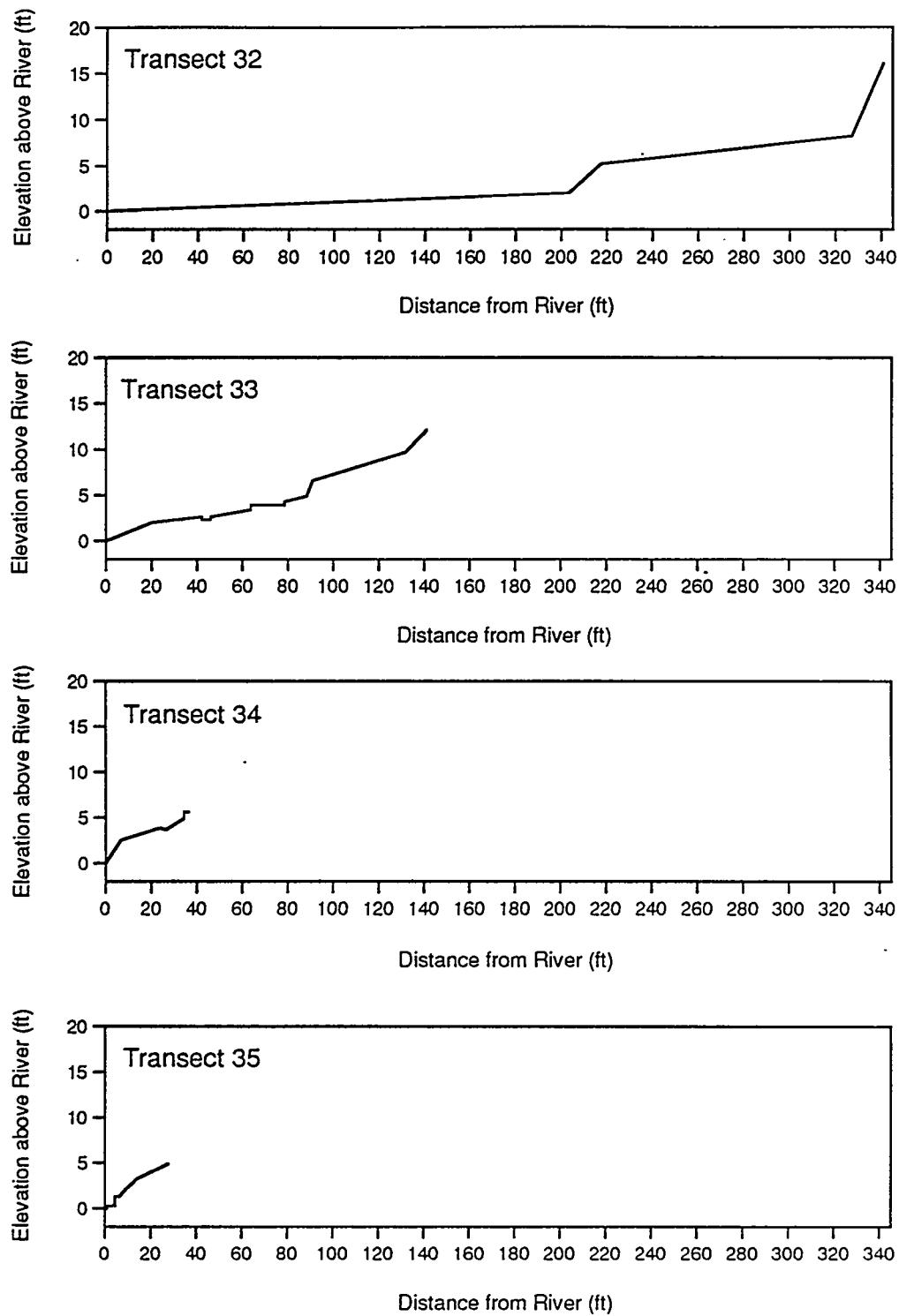
**FIGURE A.7 Relationship between Distance from River and Elevation above River in the Lodore Canyon Reach of the Green River, Transects 20-23**



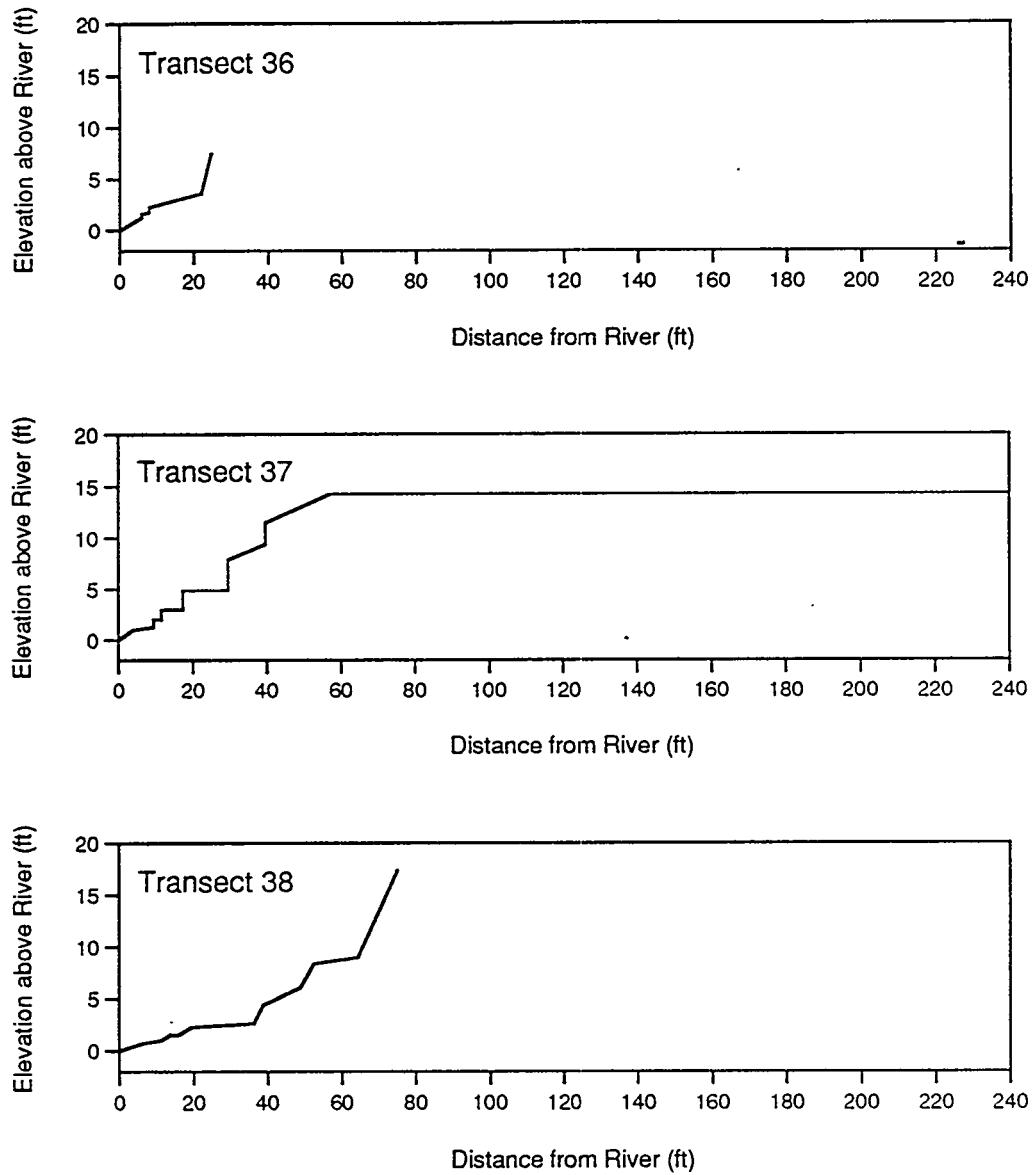
**FIGURE A.8 Relationship between Distance from River and Elevation above River in the Lodore Canyon Reach of the Green River, Transects 24-27**



**FIGURE A.9 Relationship between Distance from River and Elevation above River along Transects in the Whirlpool Canyon Reach of the Green River, Transects 28-31**



**FIGURE A.10 Relationship between Distance from River and Elevation above River along Transects in the Whirlpool Canyon Reach of the Green River, Transects 32-35**



**FIGURE A.11 Relationship between Distance from River and Elevation above River in the Island Park and Rainbow Park Reaches of the Green River, Transects 36-38**

TABLE A.3 Distance, Elevation, Substrate, and Species at Transect Sampling Points

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
1	0.0	0.0	Cobble, gravel	None
1	1.6	0.0	Cobble, gravel	None
1	3.3	0.0	Boulder	None
1	4.9	0.0	Boulder	None
1	6.6	0.0	Cobble, gravel	Unidentified grass
1	8.2	0.0	Cobble, gravel	Shore buttercup, silverweed
1	9.8	0.0	Sand	Unidentified grass
1	11.5	3.3	Sand	Unidentified grass, unidentified forb, scouring rush
1	13.1	3.6	Sand	Silverweed, unidentified grass, scouring rush, hemp dogbane
1	14.8	3.9	Sand	Unidentified grass
1	16.4	4.3	Sand	Scouring rush, giant whitetop, unidentified forb
1	18.0	4.6	Sand	Wild licorice, unidentified grass, Utah juniper
1	19.7	4.9	Sand	Scouring rush, giant whitetop, unidentified grass
1	21.3	5.2	Sand	Unidentified grass, dogwood
1	23.0	5.6	Sand	Giant whitetop, unidentified grass
1	24.6	5.9	Sand	Utah juniper, unidentified grass, scouring rush
1	26.2	5.9	Sand	Utah juniper, unidentified grass, scouring rush, giant whitetop
1	27.9	6.2	Sand	Utah juniper, unidentified grass, giant whitetop
1	29.5	6.6	Sand	Wild licorice, giant whitetop, unidentified grass, scouring rush
1	31.2	6.9	Sand	Wild licorice, unidentified grass, scouring rush
1	32.8	7.2	Sand	Wild licorice, scouring rush, sweet clover, unidentified grass, giant whitetop, unidentified forb
1	34.4	7.5	Sand	Unidentified grass, scouring rush
2	0.0	0.0	Sand	None
2	1.6	0.3	Sand	None
2	3.3	0.7	Sand	None
2	4.9	1.3	Sand	None
2	6.6	1.6	Sand	None
2	8.2	2.0	Sand	None
2	9.8	2.3	Sand	Unidentified grass
2	11.5	2.3	Sand	Unidentified grass
2	13.1	2.3	Sand	Unidentified grass
2	14.8	2.3	Sand	Unidentified grass
2	16.4	2.3	Sand	Giant whitetop
2	18.0	2.3	Sand	None
2	19.7	2.3	Sand	Unidentified grass, giant whitetop
2	21.3	2.3	Sand	Unidentified grass, unidentified forb, spikemoss
2	23.0	4.9	Sand	Unidentified grass, giant whitetop
2	24.6	4.9	Sand	Unidentified grass, giant whitetop, juncus
2	26.2	4.9	Sand	Unidentified grass, giant whitetop
2	27.9	4.9	Sand	Giant whitetop, unidentified grass
2	29.5	4.9	Sand	Giant whitetop
2	31.2	4.9	Sand	Giant whitetop
2	32.8	4.9	Sand	Giant whitetop, unidentified grass
2	34.4	8.5	Sand	Unidentified grass
2	36.1	9.5	Sand	Unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
2	37.7	10.2	Sand	Wild licorice, unidentified grass
2	39.4	11.2	Sand	None
2	41.0	11.8	Sand	Unidentified grass
2	42.7	12.8	Sand	None
2	44.3	13.5	Sand	None
2	45.9	14.4	Sand	Unidentified grass
2	47.6	15.1	Sand	None
2	49.2	16.1	Sand	Golden aster, unidentified grass, Utah juniper, box elder
2	50.9	16.7	Sand	Unidentified grass, Utah juniper
2	52.5	17.4	Sand	None
2	54.1	18.4	Sand	Golden aster, unidentified grass
2	55.8	19.0	Sand	Unidentified grass
2	57.4	20.0	Sand	Unidentified grass
2	59.1	20.7	Sand	Unidentified grass
2	60.7	21.7	Sand	None
2	62.3	22.3	Sand	Unidentified grass
2	64.0	23.3	Sand	Unidentified grass
2	65.6	24.0	Sand	None
3	0.0	0.0	Cobble, silt, sand	None
3	1.6	0.0	Cobble, silt, sand	Unidentified grass, unidentified forb
3	3.3	0.3	Boulder	None
3	4.9	0.3	Cobble	None
3	6.6	0.3	Cobble, sand	Unidentified grass
3	8.2	0.7	Cobble, sand	Common spikerush, unidentified grass
3	9.8	0.7	Cobble, sand	Common spikerush, unidentified grass, western goldenrod
3	11.5	1.0	Cobble, sand	Unidentified grass, juncus, common plantain, shore buttercup
3	13.1	1.0	Cobble, sand	Unidentified grass, western goldenrod, common dandelion
3	14.8	1.0	Cobble, sand	Juncus, common plantain
3	16.4	1.3	Cobble, sand	Silverweed, shore buttercup, common plantain, unidentified grass, western goldenrod, common dandelion
3	18.0	1.3	Cobble, sand	Western goldenrod, shore buttercup, unidentified grass
3	19.7	1.3	Cobble, sand	Silverweed, unidentified grass, field horsetail
3	21.3	1.6	Cobble, sand	Western goldenrod, unidentified grass
3	23.0	1.6	Cobble, sand	Silverweed, white clover, field horsetail, western goldenrod, unidentified grass
3	24.6	2.0	Cobble, sand	Unidentified grass, silverweed, scouring rush, common dandelion, knotweed
3	26.2	2.0	Boulder	Field horsetail, unidentified grass, silverweed
3	27.9	2.0	Cobble, sand	Orange sneezeweed, Canada thistle, unidentified grass, carex, western goldenrod, common dandelion, silverweed
3	29.5	2.3	Sand	Western goldenrod, wild licorice, sow thistle, silverweed, field horsetail
3	31.2	2.3	Sand	Wild licorice, carex, field horsetail, sow thistle, western goldenrod

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
3	32.8	2.6	Sand	Hemp dogbane, carex, wild licorice, unidentified grass, Canada thistle
3	34.4	2.6	Sand	Western goldenrod, wild licorice, Canada thistle, carex, field horsetail, scouring rush, unidentified grass
3	36.1	3.0	Sand	Western goldenrod, Canada thistle, carex, wild licorice, unidentified grass
3	37.7	3.0	Sand	Giant whitetop, western goldenrod, wild licorice, carex, Canada thistle, silverweed
3	39.4	3.3	Sand	Wild licorice, silverweed, carex, unidentified grass, Canada thistle
3	41.0	3.3	Sand	Wild licorice, carex, unidentified grass, Canada thistle, hemp dogbane, juncus
3	42.7	3.6	Sand	Western goldenrod, carex, scouring rush, Canada thistle, white clover, juncus, common sea-milkwort
3	44.3	3.6	Sand	Western goldenrod, wild licorice, carex, sow thistle, unidentified grass
3	45.9	3.9	Sand	Unidentified grass, wild licorice, hemp dogbane, scouring rush, knotweed
3	47.6	3.9	Sand	Carex, hemp dogbane, scouring rush, unidentified grass, wild licorice
3	49.2	4.3	Sand	Wild licorice, unidentified grass, carex, scouring rush
3	50.9	4.3	Sand	Unidentified grass, wild licorice, scouring rush, water speedwell
3	52.5	4.6	Sand	Scouring rush, unidentified grass, water speedwell, wild licorice
4	0.0	0.0	Sand	None
4	1.6	0.0	Sand, gravel	None
4	3.3	0.0	Gravel, sand	None
4	4.9	0.0	Gravel, sand	None
4	6.6	0.0	Gravel, sand	None
4	8.2	0.0	Gravel, sand	None
4	9.8	0.0	Gravel, sand	None
4	11.5	0.0	Gravel, sand	None
4	13.1	0.0	Gravel, sand	None
4	14.8	0.0	Gravel, sand	None
4	16.4	0.0	Sand	None
4	18.0	0.0	Sand	None
4	19.7	0.0	Sand	None
4	21.3	0.0	Sand	None
4	23.0	0.0	Sand	None
4	24.6	0.0	Sand	None
4	26.2	0.0	Sand	None
4	27.9	0.0	Sand	None
4	29.5	0.0	Sand	None
4	31.2	0.0	Sand	Unidentified grass
4	32.8	0.0	Sand	None
4	34.4	0.0	Sand	Unidentified grass
4	36.1	0.0	Cobble, sand	Common spikerush
4	37.7	0.0	Cobble, sand	Common spikerush
4	39.4	0.0	Cobble, sand	Unidentified grass, shore buttercup, juncus
4	41.0	0.0	Cobble, sand	Juncus, silverweed, unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
4	42.7	0.0	Cobble, sand	Juncus, unidentified grass, shore buttercup, common dandelion
4	44.3	1.6	Cobble, sand	Silverweed, unidentified grass, juncus, western goldenrod, common dandelion
4	45.9	1.6	Sand	Common plantain, silverweed, unidentified grass
4	47.6	1.6	Sand	Unidentified grass, juncus
4	49.2	1.6	Sand	Unidentified grass, coyote willow
4	50.9	1.6	Sand	Common plantain, juncus, unidentified grass
4	52.5	1.6	Sand	Unidentified grass, common plantain, common dandelion, western goldenrod, common spikerush
4	54.1	1.6	Sand	Water hemlock, common plantain, unidentified grass, juncus
4	55.8	1.6	Sand	Unidentified grass, common dandelion, western goldenrod, shore buttercup
4	57.4	1.6	Sand	Juncus, common dandelion, common plantain
4	59.1	1.6	Sand	Juncus, western goldenrod, unidentified forb, carex
4	60.7	1.6	Sand	Carex, common dandelion, juncus
4	62.3	1.6	Sand	Curly dock, western goldenrod, juncus, field horsetail, common dandelion
4	64.0	1.6	Sand	None
4	65.6	1.6	Sand	Unidentified grass, giant whitetop
4	67.3	1.6	Sand	Juncus, field horsetail
4	68.9	1.6	Sand	Western goldenrod, juncus, water speedwell
4	70.5	1.6	Sand	Unidentified grass, juncus, western goldenrod
4	72.2	1.6	Sand	Common spikerush, western goldenrod, field horsetail
4	73.8	1.6	Sand	Juncus, common spikerush, unidentified grass
4	75.5	1.6	Sand	Unidentified grass, juncus, western goldenrod, unidentified forb, common spikerush
4	77.1	1.6	Sand	Field horsetail, western goldenrod, scouring rush, juncus
4	78.7	7.2	Sand	Juncus, unidentified forb
4	80.4	7.2	Sand	Scouring rush, western goldenrod, unidentified forb, juncus, field horsetail
4	82.0	7.2	Sand	Scouring rush, unidentified forb, coyote willow, unidentified grass
4	83.7	7.2	Sand	Giant whitetop, scouring rush, unidentified forb, juncus
4	85.3	7.2	Sand	Coyote willow, unidentified forb, scouring rush, unidentified grass, juncus, flax-leaved rabbitbrush
4	86.9	8.5	Sand	Poison ivy, scouring rush, flax-leaved rabbitbrush
4	88.6	8.5	Sand	Flax-leaved rabbitbrush, poison ivy
4	90.2	8.5	Sand	Scouring rush, giant whitetop, flax-leaved rabbitbrush
5	0.0	0.0	Cobble, boulder	None
5	1.6	0.0	Boulder	None
5	3.3	0.0	Boulder	None
5	4.9	0.0	Boulder, sand	Juncus
5	6.6	0.0	Sand	Silverweed, juncus
5	8.2	0.0	Sand	Silverweed, unidentified grass, western goldenrod
5	9.8	3.0	Sand	Unidentified grass, western goldenrod, coyote willow
5	11.5	3.3	Sand	Unidentified forb, unidentified grass
5	13.1	3.6	Boulder, sand	Hemp dogbane, unidentified grass, Canada thistle

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
5	14.8	3.9	Boulder, sand	Unidentified grass, Canada thistle
5	16.4	4.3	Boulder, sand	Hemp dogbane, juncus, unidentified grass
5	18.0	4.6	Boulder, sand	Coyote willow, field horsetail, scouring rush, unidentified grass
5	19.7	4.9	Boulder, sand	Coyote willow, unidentified grass, scouring rush
5	21.3	5.2	Boulder, sand	Coyote willow
5	23.0	5.6	Boulder, sand	Coyote willow, unidentified grass
5	24.6	5.9	Boulder, sand	Coyote willow, unidentified grass, hemp dogbane, field horsetail, scouring rush
5	26.2	6.2	Boulder, sand	Unidentified grass, golden aster
5	27.9	6.6	Boulder, sand	Wild licorice, unidentified grass
6	0.0	0.0	Sand	None
6	1.6	0.0	Sand	None
6	3.3	0.3	Sand	None
6	4.9	0.3	Sand	Common spikerush
6	6.6	0.7	Sand	Silverweed, common spikerush
6	8.2	1.3	Sand	Unidentified grass, common reed, silverweed, western goldenrod, sow thistle
6	9.8	3.0	Sand	Giant whitetop, common reed, wild licorice, flax-leaved rabbitbrush
6	11.5	4.3	Sand	Common reed, unidentified grass
6	13.1	5.9	Sand	Giant whitetop, common reed
6	14.8	6.6	Sand	Flax-leaved rabbitbrush, common reed
6	16.4	6.9	Sand	Giant whitetop, common reed, flax-leaved rabbitbrush
6	18.0	7.5	Sand	Unidentified grass, giant whitetop, flax-leaved rabbitbrush
6	19.7	7.9	Sand	Flax-leaved rabbitbrush
6	21.3	8.5	Sand	Flax-leaved rabbitbrush
6	23.0	8.9	Sand	Flax-leaved rabbitbrush
6	24.6	9.5	Sand	Flax-leaved rabbitbrush
6	26.2	9.8	Sand	Flax-leaved rabbitbrush
6	27.9	10.5	Sand	Prickly pear, flax-leaved rabbitbrush, orache
6	29.5	10.8	Sand	Flax-leaved rabbitbrush, orache
6	31.2	11.5	Sand	Flax-leaved rabbitbrush
6	32.8	11.8	Sand	Flax-leaved rabbitbrush
7	0.0	0.0	Sand	Common spikerush
7	1.6	0.0	Sand	Common spikerush
7	3.3	0.3	Sand	Juncus, unidentified grass
7	4.9	0.3	Sand	Common spikerush
7	6.6	0.7	Sand	Common spikerush
7	8.2	0.7	Sand	Common spikerush, juncus
7	9.8	1.0	Sand	Common spikerush
7	11.5	1.0	Sand	Juncus, common spikerush, common threesquare, silverweed, field horsetail, unidentified grass
7	13.1	1.0	Sand	Common spikerush, common threesquare, silverweed, juncus
7	14.8	1.3	Sand	Silverweed, common spikerush, common threesquare, common dandelion, shore buttercup
7	16.4	1.6	Sand	Silverweed, unidentified grass, common threesquare, common spikerush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
7	18.0	2.0	Sand	Silverweed, unidentified grass, <i>juncus</i>
7	19.7	3.0	Sand	Canada thistle, unidentified grass, silverweed
7	21.3	3.0	Sand	Silverweed, unidentified grass, common threesquare
7	23.0	3.0	Sand	Silverweed, coyote willow, field horsetail, common threesquare
7	24.6	3.0	Sand	Canada thistle, common threesquare, <i>juncus</i> , unidentified grass, silverweed
7	26.2	3.0	Sand	Unidentified grass, <i>juncus</i> , coyote willow
7	27.9	3.0	Sand	Unidentified grass, common threesquare, Canada thistle
7	29.5	3.0	Sand	<i>Juncus</i> , unidentified grass, silverweed, coyote willow, Canada thistle, common sea-milkwort
7	31.2	3.0	Sand	Unidentified grass, <i>juncus</i>
7	32.8	3.0	Sand	<i>Juncus</i> , unidentified grass, shore buttercup, coyote willow
7	34.4	3.0	Sand	Coyote willow, <i>juncus</i> , unidentified grass
7	36.1	3.0	Sand	Coyote willow, Canada thistle, common threesquare, unidentified grass
7	37.7	3.0	Sand	Coyote willow, Canada thistle, <i>juncus</i> , unidentified grass
7	39.4	3.0	Sand	Coyote willow, Canada thistle, unidentified grass, unidentified forb
7	41.0	3.0	Sand	Coyote willow, unidentified grass, Canada thistle, <i>juncus</i>
7	42.7	3.0	Sand	Coyote willow, Canada thistle, unidentified grass, <i>juncus</i>
7	44.3	3.3	Sand	Coyote willow, Canada thistle, <i>juncus</i>
7	45.9	3.3	Sand	Coyote willow, Canada thistle, <i>juncus</i>
7	47.6	3.3	Sand	Coyote willow, Canada thistle, <i>juncus</i> , sow thistle
7	49.2	3.3	Sand	Coyote willow, Canada thistle, unidentified grass, sow thistle, common dandelion
7	50.9	3.3	Sand	Coyote willow, Canada thistle, sow thistle, common threesquare
7	52.5	3.3	Sand	Coyote willow, Canada thistle, sow thistle, unidentified grass, common threesquare, <i>juncus</i>
7	54.1	3.3	Sand	Coyote willow, Canada thistle, common dandelion, <i>juncus</i> , common threesquare, sow thistle
7	55.8	3.3	Sand	Sow thistle, <i>juncus</i> , coyote willow, common threesquare
7	57.4	3.3	Sand	Coyote willow, Canada thistle, sow thistle, common threesquare, <i>juncus</i>
7	59.1	3.3	Sand	Canada thistle, coyote willow, sow thistle, <i>juncus</i>
7	60.7	3.3	Sand	Coyote willow, sow thistle, Canada thistle, <i>juncus</i>
7	62.3	3.3	Sand	Coyote willow, sow thistle, Canada thistle, <i>juncus</i>
7	64.0	3.3	Sand	Coyote willow, sow thistle, Canada thistle, <i>juncus</i>
7	65.6	3.3	Sand	Coyote willow, sow thistle, <i>juncus</i> , silverweed
7	67.3	3.3	Sand	Coyote willow, sow thistle, <i>juncus</i>
7	68.9	3.3	Sand	Coyote willow, sow thistle, <i>juncus</i>
7	70.5	3.3	Sand	Sow thistle, coyote willow, <i>juncus</i>
7	72.2	3.3	Sand	Coyote willow, sow thistle, silverweed, <i>juncus</i>
7	73.8	3.3	Sand	Silverweed, coyote willow, <i>juncus</i> , unidentified forb
7	75.5	3.3	Sand	Coyote willow, <i>juncus</i> , sow thistle, common sea-milkwort

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
7	77.1	3.3	Sand	Juncus, common sea-milkwort, sow thistle, silverweed
7	78.7	3.3	Sand	Common sea-milkwort, sow thistle, coyote willow, juncus, Canada thistle
7	80.4	3.3	Sand	Common sea-milkwort, coyote willow, silverweed, unidentified forb, unidentified grass
7	82.0	3.3	Sand	Unidentified forb, silverweed, common sea-milkwort, coyote willow, unidentified grass, sow thistle
7	83.7	3.3	Sand	Wild licorice, coyote willow, sow thistle, silverweed, unidentified grass
7	85.3	3.3	Sand	Wild licorice, unidentified grass, coyote willow, sow thistle, common sea-milkwort, juncus
7	86.9	3.3	Sand	Wild licorice, sow thistle, juncus, unidentified grass
7	88.6	3.3	Sand	Wild licorice, sow thistle, carex, juncus
7	90.2	3.3	Sand	Wild licorice, coyote willow, juncus, sow thistle, unidentified grass
7	91.9	3.3	Sand	Wild licorice, coyote willow, juncus, carex, sow thistle
7	93.5	3.6	Sand	Wild licorice, coyote willow, Canada thistle, sow thistle, carex, unidentified grass
7	95.1	3.6	Sand	Wild licorice, coyote willow, sow thistle, juncus
7	96.8	3.6	Sand	Coyote willow, wild licorice, sow thistle, silverweed, juncus
7	98.4	3.6	Sand	Coyote willow, wild licorice, sow thistle, carex
7	100.1	3.6	Sand	Carex, juncus, wild licorice, Canada thistle, coyote willow
7	101.7	3.6	Sand	Sow thistle, coyote willow, juncus
7	103.3	3.6	Sand	Wild licorice, coyote willow, carex, juncus
7	105.0	3.6	Sand	Wild licorice, coyote willow, silverweed, sow thistle, carex
7	106.6	3.6	Sand	Wild licorice, coyote willow, common sea-milkwort, carex, sow thistle
7	108.3	3.6	Sand	Wild licorice, carex, sow thistle
7	109.9	3.6	Sand	Wild licorice, coyote willow, sow thistle
7	111.5	3.6	Sand	Wild licorice, coyote willow, sow thistle, carex, common sea-milkwort, unidentified grass
7	113.2	3.6	Sand	Wild licorice, carex, unidentified grass
7	114.8	3.6	Sand	Wild licorice, coyote willow, carex, unidentified grass
7	116.5	3.6	Sand	Coyote willow, wild licorice, sow thistle, carex
7	118.1	3.6	Sand	Wild licorice, coyote willow, carex, sow thistle
7	119.8	3.6	Sand	Wild licorice, coyote willow, sow thistle, carex, unidentified grass
7	121.4	3.6	Sand	Wild licorice, Canada thistle, coyote willow, juncus, carex, sow thistle, unidentified grass
7	123.0	3.6	Sand	Wild licorice, coyote willow, juncus, sow thistle, Canada thistle, unidentified grass
7	124.7	3.6	Sand	Coyote willow, wild licorice, carex, sow thistle
7	126.3	3.6	Sand	Juncus, Canada thistle, coyote willow, carex, unidentified grass
7	128.0	3.6	Sand	Juncus, sow thistle, coyote willow, carex, wild licorice, unidentified grass
7	129.6	3.6	Sand	Coyote willow, sow thistle, unidentified grass, carex
7	131.2	3.6	Sand	Coyote willow, sow thistle, wild licorice, carex

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
7	132.9	3.6	Sand	Canada thistle, unidentified grass, coyote willow, sow thistle
7	134.5	3.6	Sand	Canada thistle, <i>juncus</i> , unidentified grass
7	136.2	3.6	Sand	Sow thistle, unidentified grass, coyote willow, unidentified forb, <i>carex</i>
7	137.8	3.6	Sand	Coyote willow, Canada thistle, <i>carex</i>
7	139.4	3.6	Sand	<i>Juncus</i> , coyote willow, <i>carex</i> , Canada thistle
7	141.1	3.6	Sand	Coyote willow, <i>carex</i> , Canada thistle, <i>juncus</i>
7	142.7	3.9	Sand	Coyote willow, Canada thistle, <i>carex</i> , <i>juncus</i>
7	144.4	3.9	Sand	Coyote willow, <i>juncus</i> , <i>carex</i>
7	146.0	3.9	Sand	<i>Juncus</i> , coyote willow, <i>carex</i>
7	147.6	3.9	Sand	<i>carex</i> , Canada thistle
7	149.3	3.9	Sand	<i>carex</i> , coyote willow, Canada thistle, <i>juncus</i>
7	150.9	3.9	Sand	<i>carex</i> , coyote willow, unidentified grass, silverweed
7	152.6	3.9	Sand	<i>carex</i> , silverweed, sow thistle, unidentified grass, field mint
7	154.2	3.9	Sand	Unidentified grass, <i>carex</i>
7	155.8	3.9	Sand	Unidentified grass
7	157.5	3.9	Sand	Unidentified grass
7	159.1	3.9	Sand	Unidentified grass
7	160.8	3.9	Sand	Unidentified grass
7	162.4	3.9	Sand	Unidentified grass, <i>carex</i>
7	164.0	3.9	Sand	Unidentified grass
7	165.7	3.9	Sand	Unidentified grass
8	0.0	0.0	Sand	None
8	1.6	0.0	Sand	None
8	3.3	0.3	Sand	None
8	4.9	0.3	Sand	None
8	6.6	0.3	Sand	None
8	8.2	0.3	Sand	None
8	9.8	0.7	Sand	None
8	11.5	0.7	Sand	None
8	13.1	0.7	Sand	None
8	14.8	1.0	Sand	None
8	16.4	1.0	Sand	None
8	18.0	1.0	Sand	None
8	19.7	1.0	Sand	Common threesquare
8	21.3	1.3	Sand	Common threesquare, <i>juncus</i>
8	23.0	1.3	Sand	Common spikerush, unidentified grass, common threesquare, silverweed
8	24.6	1.3	Sand	Common spikerush, common threesquare, silverweed, field horsetail, unidentified grass
8	26.2	1.6	Sand	Coyote willow, common spikerush, common threesquare, sow thistle
8	27.9	1.6	Sand	Western goldenrod, unidentified forb, common threesquare, common spikerush
8	29.5	2.3	Sand	Western goldenrod, unidentified forb, sow thistle, common threesquare, common spikerush
8	31.2	2.3	Sand	Western goldenrod, sow thistle, <i>juncus</i>
8	32.8	2.3	Sand	Western goldenrod, silverweed, sow thistle, field horsetail

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
8	34.4	2.3	Sand	Common threesquare, western goldenrod, Canada thistle, coyote willow, sow thistle, silverweed
8	36.1	2.3	Sand	Sow thistle, silverweed, common threesquare, western goldenrod
8	37.7	2.6	Sand	Coyote willow, sow thistle, field horsetail, carex
8	39.4	2.6	Sand	Western goldenrod, sow thistle, coyote willow, carex, common threesquare
8	41.0	2.6	Sand	Coyote willow, sow thistle, carex, western goldenrod
8	42.7	2.6	Sand	Coyote willow, sow thistle, common sea-milkwort, western goldenrod, carex
8	44.3	2.6	Sand	Coyote willow, sow thistle, common sea-milkwort, unidentified grass, carex
8	45.9	2.6	Sand	Carex, sow thistle
8	47.6	2.6	Sand	Carex, Canada thistle, sow thistle
8	49.2	2.6	Sand	Carex, sow thistle, unidentified forb
8	50.9	2.6	Sand	Coyote willow, carex, Canada thistle, sow thistle
8	52.5	2.6	Sand	Carex, Canada thistle
8	54.1	3.0	Sand	Coyote willow, carex, sow thistle, Canada thistle
8	55.8	3.0	Sand	Coyote willow, carex
8	57.4	3.0	Sand	Coyote willow, carex, sow thistle, juncus
8	59.1	3.0	Sand	Coyote willow, sow thistle, carex, juncus, silverweed
8	60.7	3.0	Sand	Coyote willow, western goldenrod, unidentified forb, carex, juncus
8	62.3	3.0	Sand	Coyote willow, carex, unidentified forb, sow thistle
8	64.0	3.0	Sand	Coyote willow, sow thistle, carex, juncus
8	65.6	3.0	Sand	Coyote willow, sow thistle, carex
8	67.3	3.0	Sand	Coyote willow, sow thistle, unidentified forb, western goldenrod, carex
8	68.9	3.0	Sand	Wild licorice, silverweed, Canada thistle, carex, coyote willow
8	70.5	3.3	Sand	Coyote willow, flax-leaved rabbitbrush, Canada thistle
8	72.2	3.3	Sand	Coyote willow, flax-leaved rabbitbrush, sow thistle, carex, giant whitetop
8	73.8	3.3	Sand	Juncus, flax-leaved rabbitbrush, unidentified grass
8	75.5	3.3	Sand	None
8	77.1	3.3	Sand	Flax-leaved rabbitbrush
9	0.0	0.0	Sand, muck	None
9	1.6	0.3	Sand, muck	None
9	3.3	0.7	Sand, muck	None
9	4.9	1.0	Sand, muck	Cattail
9	6.6	1.3	Sand, muck	Cattail
9	8.2	1.6	Sand, muck	Cattail
9	9.8	1.6	Sand, muck	Cattail
9	11.5	1.6	Sand, muck	Cattail
9	13.1	1.6	Sand, muck	Cattail
9	14.8	1.6	Sand, muck	Cattail
9	16.4	2.0	Sand, muck	Cattail, giant whitetop
9	18.0	2.0	Sand, muck	Cattail, western goldenrod, Canada thistle
9	19.7	2.0	Clay	Cattail, common spikerush
9	21.3	2.0	Clay	Western goldenrod, common spikerush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
9	23.0	2.0	Clay	Giant whitetop, western goldenrod, unidentified grass, field horsetail, common spikerush
9	24.6	2.0	Clay	Western goldenrod, cattail, common spikerush, field horsetail
9	26.2	2.0	Clay	Field mint, western goldenrod, common spikerush
9	27.9	2.0	Clay	Western goldenrod, common spikerush, field mint, unidentified grass
9	29.5	2.3	Clay	Field mint, common spikerush, field horsetail, giant whitetop
9	31.2	2.3	Clay	Common spikerush, western goldenrod, field mint
9	32.8	2.3	Clay	Western goldenrod, common spikerush, giant whitetop, unidentified grass
9	34.4	2.3	Clay	Western goldenrod, common spikerush, unidentified grass, field horsetail, juncus
9	36.1	2.6	Boulder	None
9	37.7	3.6	Clay	Sagebrush
9	39.4	4.3	Clay	Western goldenrod, sagebrush, unidentified grass, tamarisk, field horsetail
9	41.0	4.6	Clay	Tamarisk, sagebrush, unidentified grass, field horsetail
9	42.7	4.6	Clay	Sagebrush, unidentified grass
9	44.3	4.9	Clay	Sagebrush, field horsetail, unidentified grass
9	45.9	4.9	Clay	Unidentified grass, sagebrush
9	47.6	5.2	Clay	Sagebrush, unidentified grass
10	0.0	0.0	Cobble	None
10	1.6	0.3	Cobble, sand	None
10	3.3	0.3	Sand	Carex, common spikerush, juncus
10	4.9	0.7	Sand	Juncus, unidentified grass, common spikerush, carex
10	6.6	1.0	Sand	Carex, juncus, unidentified grass
10	8.2	1.0	Sand	Carex, juncus
10	9.8	1.3	Sand	Carex, unidentified grass, juncus
10	11.5	1.6	Sand	Western goldenrod, carex, juncus, common threesquare, common plantain
10	13.1	1.6	Sand	Juncus, carex, skullcap, common plantain, unidentified grass
10	14.8	2.0	Sand	Juncus, unidentified grass, silverweed, common spikerush, sow thistle
10	16.4	2.3	Sand	Common spikerush, unidentified grass
10	18.0	2.6	Sand	Unidentified grass, sow thistle, silverweed, common spikerush
10	19.7	2.6	Sand	Silverweed, sow thistle, unidentified grass
10	21.3	3.0	Sand	Juncus, sow thistle
10	23.0	3.3	Sand	Western goldenrod, juncus, coyote willow
10	24.6	3.3	Sand	Wild licorice, coyote willow, carex, western goldenrod, unidentified grass
10	26.2	3.6	Sand	Wild licorice, giant whitetop
10	27.9	3.9	Sand	Giant whitetop, Canada thistle, wild licorice
10	29.5	3.9	Sand	Giant whitetop, coyote willow, wild licorice, Canada thistle, unidentified grass, western goldenrod
10	31.2	4.3	Sand	Giant whitetop, Canada thistle, unidentified grass, coyote willow, carex
10	32.8	4.6	Sand	Giant whitetop, unidentified grass, carex

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
10	34.4	4.6	Sand	Wild licorice, unidentified grass, giant whitetop, coyote willow
10	36.1	4.9	Sand	Wild licorice, unidentified grass, giant whitetop
10	37.7	5.2	Sand	Unidentified grass, giant whitetop
10	39.4	5.2	Sand	Unidentified grass, scouring rush, giant whitetop
11	0.0	0.0	Sand	Common spikerush
11	1.6	0.2	Sand	None
11	3.3	0.5	Sand	None
11	4.9	0.7	Sand	None
11	6.6	0.9	Sand	Common spikerush
11	8.2	0.9	Sand	Common spikerush, hardstem bulrush
11	9.8	1.0	Sand	Cattail, hardstem bulrush, common spikerush
11	11.5	1.1	Sand	Common spikerush
11	13.1	1.2	Sand	Common spikerush
11	14.8	1.3	Sand	Common spikerush
11	16.4	1.4	Sand	Common spikerush
11	18.0	1.4	Sand	Common spikerush
11	19.7	0.5	Sand	Common spikerush
11	21.3	0.5	Sand	Common spikerush
11	23.0	0.5	Sand	Common spikerush
11	24.6	0.5	Sand	Common spikerush
11	26.2	0.5	Sand	Common spikerush, juncus
11	27.9	0.5	Sand	Common threesquare, common spikerush
11	29.5	0.5	Sand	Common spikerush, common threesquare
11	31.2	0.5	Sand	Common spikerush
11	32.8	0.5	Sand	None
11	34.4	0.5	Sand	Juncus
11	36.1	0.5	Sand	Common spikerush
11	37.7	0.5	Sand	Common spikerush, juncus
11	39.4	0.5	Sand	Common spikerush, hardstem bulrush, juncus
11	41.0	0.5	Sand	Common spikerush, hardstem bulrush
11	42.7	0.5	Sand	Common spikerush
11	44.3	0.5	Sand	Common spikerush, hardstem bulrush
11	45.9	1.0	Sand	Common spikerush, hardstem bulrush, shore buttercup
11	47.6	1.0	Sand	Common spikerush, hardstem bulrush, unidentified grass
11	49.2	1.0	Sand	Common spikerush, cattail, shore buttercup
11	50.9	1.0	Sand	Hardstem bulrush, common spikerush, water speedwell
11	52.5	1.0	Sand	Common spikerush, water speedwell, cattail
11	54.1	1.0	Sand	Cattail, common spikerush
11	55.8	1.0	Sand	Cattail, common spikerush
11	57.4	1.0	Sand	Cattail, common spikerush
11	59.1	1.0	Sand	Common spikerush, cattail
11	60.7	1.0	Sand	Common spikerush, cattail, water speedwell
11	62.3	1.0	Sand	Juncus, common spikerush
11	64.0	1.0	Sand	Juncus, cattail, common spikerush
11	65.6	1.0	Sand	Juncus, cattail, common spikerush, unidentified forb
11	67.3	1.0	Sand	Juncus, common spikerush
11	68.9	- <sup>b</sup>	Sand	Common spikerush, juncus
11	70.5	-	Sand	Common spikerush, common threesquare, juncus
11	72.2	-	Sand	Common spikerush, common threesquare

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
11	73.8	-	Sand	Juncus, common spikerush
11	75.5	-	Sand	Common spikerush, juncus
11	77.1	-	Sand	Common spikerush, common threesquare
11	78.7	-	Sand	Cattail, common spikerush
11	80.4	-	Sand	Field horsetail
11	82.0	-	Sand	Panicled bulrush
11	83.7	-	Sand	Cattail
11	85.3	-	Sand	Hardstem bulrush, cattail
11	86.9	-	Sand	Hardstem bulrush
11	88.6	0.3	Sand	Juncus, common spikerush
11	90.2	0.3	Sand	Common spikerush, juncus
11	91.9	0.3	Sand	Common spikerush
11	93.5	0.3	Sand	Common spikerush, unidentified forb
11	95.1	0.3	Sand	Common spikerush, juncus
11	96.8	0.3	Sand	Common spikerush
11	98.4	1.8	Sand	Hardstem bulrush, common spikerush
11	100.1	1.8	Sand	Cattail, common spikerush, hardstem bulrush
11	101.7	1.8	Sand	Hardstem bulrush, common spikerush
11	103.3	1.8	Sand	Cattail, common spikerush, hardstem bulrush
11	105.0	1.8	Sand	Hardstem bulrush, common spikerush, juncus
11	106.6	1.8	Sand	Hardstem bulrush, common spikerush, juncus
11	108.3	1.8	Sand	Hardstem bulrush, common spikerush, juncus
11	109.9	1.8	Sand	Common spikerush, hardstem bulrush
11	111.5	1.8	Sand	Cattail, hardstem bulrush, common spikerush
11	113.2	1.8	Sand	Common spikerush, cattail, hardstem bulrush
11	114.8	1.8	Sand	Cattail, common spikerush
11	116.5	1.8	Sand	Cattail
11	118.1	1.8	Sand	Cattail, juncus
11	119.8	1.8	Sand	Cattail, juncus
11	121.4	1.8	Sand	Cattail
11	123.0	1.8	Sand	Cattail, juncus, unidentified grass
11	124.7	1.8	Sand	Cattail, juncus
11	126.3	1.8	Sand	Cattail, juncus
11	128.0	1.8	Sand	Hardstem bulrush, common threesquare
11	129.6	1.8	Sand	Hardstem bulrush, unidentified grass
11	131.2	1.8	Sand	Cattail, hardstem bulrush
11	132.9	1.8	Sand	Cattail, unidentified grass
11	134.5	1.8	Sand	Cattail
11	136.2	1.8	Sand	Cattail
11	137.8	1.8	Sand	Cattail, unidentified grass
12	0.0	2.0	Sand	None
12	1.6	2.0	Sand	None
12	3.3	2.0	Sand	None
12	4.9	2.0	Sand	None
12	6.6	2.0	Sand	None
12	8.2	1.9	Sand	Juncus
12	9.8	1.9	Sand	None
12	11.5	1.9	Sand	Field horsetail, tamarisk
12	13.1	1.9	Sand	Juncus
12	14.8	1.9	Sand	Juncus
12	16.4	1.9	Sand	Field horsetail

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
12	18.0	1.9	Sand	Juncus, common spikerush
12	19.7	1.9	Sand	Common spikerush, juncus
12	21.3	1.9	Sand	Common spikerush, field horsetail, juncus
12	23.0	1.9	Sand	Common spikerush, unidentified grass
12	24.6	1.9	Sand	Common spikerush, unidentified forb
12	26.2	1.9	Sand	Common spikerush, carex, common threesquare, shore buttercup
12	27.9	1.9	Sand	Common spikerush, unidentified forb, unidentified grass
12	29.5	1.9	Sand	Common spikerush, common threesquare, common plantain
12	31.2	1.9	Sand	Common spikerush, common threesquare, common plantain, field horsetail
12	32.8	1.9	Sand	Common spikerush, western goldenrod, common plantain, common threesquare, unidentified grass
12	34.4	1.9	Sand	Common spikerush, juncus, shore buttercup, common plantain
12	36.1	1.9	Sand	Common spikerush, common plantain, shore buttercup
12	37.7	1.9	Sand	Juncus, common spikerush, field horsetail, common plantain
12	39.4	1.9	Sand	Juncus, common spikerush, common plantain, unidentified grass, silverweed
12	41.0	1.9	Sand	Common spikerush, unidentified grass, juncus
12	42.7	1.9	Sand	Juncus, unidentified grass, shore buttercup
12	44.3	1.9	Sand	Common spikerush, western goldenrod, common plantain, unidentified forb, unidentified fungus
12	45.9	1.9	Sand	Common spikerush, unidentified grass, juncus, common plantain, western goldenrod, field horsetail
12	47.6	1.9	Sand	Juncus, unidentified grass, field horsetail, common plantain, common spikerush
12	49.2	1.9	Sand	Juncus, unidentified grass, field horsetail, common spikerush
12	50.9	1.8	Sand	Juncus, common spikerush, unidentified grass
12	52.5	1.8	Sand	Unidentified grass, juncus, common spikerush
12	54.1	1.8	Sand	Unidentified grass, juncus, common spikerush
12	55.8	1.8	Sand	Juncus, unidentified grass, silverweed, common plantain, common spikerush
12	57.4	1.8	Sand	Unidentified grass, common spikerush
12	59.1	1.8	Sand	Common spikerush, unidentified grass, juncus, shore buttercup
12	60.7	1.8	Sand	Juncus, common spikerush, unidentified grass
12	62.3	1.8	Sand	Common threesquare, common spikerush, juncus
12	64.0	1.8	Sand	Common spikerush, common threesquare, silverweed, coyote willow, unidentified grass, western goldenrod
12	65.6	1.8	Sand	Unidentified grass, common spikerush, silverweed, common threesquare, coyote willow
12	67.3	1.8	Sand	Unidentified grass, common spikerush, juncus
12	68.9	1.8	Sand	Unidentified grass, common threesquare, common spikerush
12	70.5	1.8	Sand	Unidentified grass, juncus
12	72.2	1.8	Sand	Unidentified grass, common spikerush, unidentified forb, juncus

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
12	73.8	1.8	Sand	Common threesquare, common spikerush, western goldenrod, field horsetail
12	75.5	1.8	Sand	Juncus, common threesquare, field horsetail, coyote willow, unidentified grass
12	77.1	1.8	Sand	Coyote willow, juncus
12	78.7	1.8	Sand	Juncus, coyote willow, unidentified grass
12	80.4	1.8	Sand	Juncus, common spikerush, unidentified grass
12	82.0	1.8	Sand	Unidentified grass, field horsetail, coyote willow, Canada thistle
12	83.7	1.8	Sand	Juncus, coyote willow, unidentified grass, common spikerush
12	85.3	1.8	Sand	Juncus, unidentified grass, common spikerush, Canada thistle, western goldenrod, field horsetail
12	86.9	1.8	Sand	Unidentified grass, juncus, field horsetail, common spikerush, coyote willow
12	88.6	1.8	Sand	Unidentified grass, juncus, field horsetail, coyote willow, common spikerush
12	90.2	1.8	Sand	Juncus, unidentified grass, field horsetail, common spikerush
12	91.9	1.8	Sand	Canada thistle, field horsetail, unidentified grass
12	93.5	1.8	Sand	Juncus, field horsetail, common spikerush
12	95.1	1.7	Sand	Common spikerush, juncus, coyote willow
12	96.8	1.7	Sand	Common spikerush, coyote willow, shore buttercup, field horsetail
12	98.4	1.7	Sand	Common spikerush
12	100.1	1.7	Sand	Western goldenrod, juncus
12	101.7	1.7	Sand	Coyote willow
12	103.3	1.7	Sand	Common spikerush, juncus
12	105.0	1.7	Sand	Juncus
12	106.6	1.7	Sand	None
12	108.3	1.7	Sand	Coyote willow
12	109.9	1.7	Sand	Common threesquare, juncus, coyote willow, common spikerush
12	111.5	1.7	Sand	Juncus, western goldenrod, common threesquare, common spikerush
12	113.2	1.7	Sand	None
12	114.8	1.7	Sand	Juncus, common threesquare, coyote willow, Canada thistle, field horsetail, common spikerush
12	116.5	1.7	Sand	Juncus, common threesquare, western goldenrod, unidentified grass
12	118.1	1.7	Sand	Juncus, coyote willow
12	119.8	1.7	Sand	Juncus
12	121.4	1.7	Sand	Common threesquare
12	123.0	1.7	Sand	Common threesquare
12	124.7	1.7	Sand	Common threesquare
12	126.3	1.7	Sand	Common threesquare, coyote willow, juncus
12	128.0	1.7	Sand	Coyote willow, cattail
12	129.6	1.7	Sand	Common threesquare
12	131.2	1.7	Sand	Common threesquare
12	132.9	1.7	Sand	Cattail
12	134.5	1.7	Sand	None
12	136.2	1.7	Sand	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
12	137.8	1.6	Sand	Cattail
12	139.4	1.6	Sand	Cattail, common spikerush
13	0.0	1.3	Sand	None
13	1.6	1.3	Sand	Common spikerush
13	3.3	1.3	Sand	None
13	4.9	1.3	Sand	Common spikerush, unidentified grass, tamarisk, unidentified forb
13	6.6	1.3	Sand	Unidentified grass, juncus
13	8.2	1.3	Sand	Juncus, unidentified forb
13	9.8	1.3	Sand	Juncus, unidentified forb
13	11.5	1.3	Sand	Common spikerush, unidentified grass, tamarisk
13	13.1	1.3	Sand	Field horsetail
13	14.8	1.3	Sand	Field horsetail, unidentified forb
13	16.4	1.3	Sand	None
13	18.0	1.3	Sand	Cattail
13	19.7	1.3	Sand	None
13	21.3	1.3	Sand	Juncus
13	23.0	1.3	Sand	Juncus, field horsetail
13	24.6	1.3	Sand	Common spikerush, cattail
13	26.2	1.3	Sand	Common spikerush, western goldenrod, sow thistle, field mint
13	27.9	1.3	Sand	Unidentified grass, western goldenrod, field mint, scouring rush
13	29.5	1.3	Sand	Giant whitetop, orache, unidentified grass
13	31.2	1.3	Sand	None
13	32.8	6.2	Sand	Juncus, unidentified grass
13	34.4	6.2	Sand	Unidentified grass, juncus, sagebrush
13	36.1	6.2	Sand	Sagebrush, juncus, unidentified grass
13	37.7	6.2	Sand	Juncus, sagebrush, unidentified grass
13	39.4	6.2	Sand	Unidentified grass, juncus, sagebrush
13	41.0	6.2	Sand	Unidentified grass, juncus, sagebrush
13	42.7	6.2	Sand	Unidentified grass, sagebrush
13	44.3	6.2	Sand	Unidentified grass, scouring rush
13	45.9	6.2	Sand	Sagebrush, scouring rush, unidentified grass
13	47.6	6.2	Sand	Unidentified grass, scouring rush, sagebrush
13	49.2	6.2	Sand	Scouring rush, unidentified grass
13	50.9	4.6	Sand	Unidentified grass, scouring rush
13	52.5	4.6	Sand	Scouring rush, unidentified grass
13	54.1	4.6	Sand	Unidentified grass, scouring rush
13	55.8	4.6	Sand	Scouring rush, unidentified grass, sow thistle
13	57.4	4.6	Sand	Unidentified grass, scouring rush, sagebrush
13	59.1	4.6	Sand	Unidentified grass, scouring rush, sagebrush
13	60.7	4.6	Sand	Tamarisk, unidentified grass, scouring rush
13	62.3	4.6	Sand	Unidentified grass
13	64.0	4.6	Sand	Unidentified grass
13	65.6	4.6	Sand	Unidentified grass, juncus
13	67.3	4.6	Sand	Unidentified grass, juncus
13	68.9	4.6	Sand	Juncus, unidentified grass
13	70.5	4.6	Sand	Unidentified grass
13	72.2	4.6	Sand	Unidentified grass
13	73.8	4.6	Sand	Unidentified grass, scouring rush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
13	75.5	4.6	Sand	Unidentified grass
13	77.1	4.6	Sand	Unidentified grass
13	78.7	4.6	Sand	Unidentified grass
13	80.4	4.6	Sand	Scouring rush, unidentified grass
13	82.0	4.6	Sand	Scouring rush, unidentified grass
13	83.7	4.6	Sand	Scouring rush, unidentified grass
13	85.3	4.6	Sand	Scouring rush, unidentified grass, sagebrush
13	86.9	4.6	Sand	Scouring rush, unidentified grass
13	88.6	4.6	Sand	Scouring rush, unidentified grass
13	90.2	4.6	Sand	Scouring rush, unidentified grass
13	91.9	4.6	Sand	Unidentified grass, scouring rush
13	93.5	4.6	Sand	Unidentified grass, scouring rush
13	95.1	4.6	Sand	Unidentified grass, scouring rush
13	96.8	4.6	Sand	Unidentified grass, scouring rush, sagebrush
13	98.4	4.6	Sand	Scouring rush, unidentified grass
14	0.0	0.0	Sand	None
14	1.6	0.0	Sand	None
14	3.3	0.1	Sand	None
14	4.9	0.1	Sand	None
14	6.6	0.2	Sand	None
14	8.2	0.2	Sand	None
14	9.8	0.3	Sand	None
14	11.5	0.3	Sand	None
14	13.1	0.4	Sand	None
14	14.8	0.4	Sand	None
14	16.4	0.4	Sand	None
14	18.0	0.5	Sand	None
14	19.7	0.5	Sand	None
14	21.3	0.6	Sand	None
14	23.0	0.6	Sand	None
14	24.6	0.7	Sand	None
14	26.2	0.7	Sand	None
14	27.9	0.8	Sand	None
14	29.5	0.8	Sand	None
14	31.2	0.8	Sand	None
14	32.8	0.9	Sand	None
14	34.4	0.9	Sand	None
14	36.1	1.0	Water	None
14	37.7	1.0	Water	None
14	39.4	1.1	Water	None
14	41.0	1.1	Sand	None
14	42.7	1.2	Sand	None
14	44.3	1.2	Sand	None
14	45.9	1.2	Sand	None
14	47.6	1.3	Sand	None
14	49.2	1.3	Sand	None
14	50.9	1.3	Sand	None
14	52.5	1.3	Sand	None
14	54.1	1.3	Sand	None
14	55.8	1.3	Sand	None
14	57.4	1.3	Sand	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
14	59.1	1.3	Sand	None
14	60.7	1.3	Sand	None
14	62.3	1.3	Sand	None
14	64.0	1.3	Sand	None
14	65.6	0.5	Silt, sand	None
14	67.3	0.5	Silt, sand	None
14	68.9	0.5	Silt, sand	None
14	70.5	0.5	Silt, sand	None
14	72.2	0.5	Silt, sand	None
14	73.8	0.5	Silt, sand	None
14	75.5	0.5	Silt, sand	<i>Juncus</i>
14	77.1	0.5	Silt, sand	None
14	78.7	0.5	Silt, sand	<i>Juncus</i>
14	80.4	0.5	Silt, sand	None
14	82.0	0.5	Silt, sand	<i>Juncus</i> , unidentified forb
14	83.7	0.5	Silt, sand	None
14	85.3	0.5	Silt, sand	None
14	86.9	0.5	Silt, sand	<i>Juncus</i>
14	88.6	0.5	Silt, sand	<i>Juncus</i>
14	90.2	0.5	Silt, sand	<i>Juncus</i>
14	91.9	0.5	Silt, sand	<i>Juncus</i>
14	93.5	0.5	Silt, sand	<i>Juncus</i>
14	95.1	0.9	Silt, sand	Field horsetail, alkali bulrush
14	96.8	1.8	Silt, sand	Field horsetail, common spikerush, unidentified grass, common threesquare
14	98.4	2.7	Silt, sand	Common spikerush, <i>juncus</i> , field horsetail
14	100.1	3.6	Silt, sand	Common spikerush, unidentified grass, field horsetail, shore buttercup
14	101.7	4.5	Silt, sand	Field horsetail, common spikerush, unidentified grass, shore buttercup
14	103.3	5.4	Silt, sand	Unidentified grass, common spikerush, field horsetail
14	105.0	6.3	Silt, sand	Unidentified grass, Canada thistle, field horsetail
14	106.6	7.2	Silt, sand	Unidentified grass
14	108.3	8.3	Silt, sand	<i>Juncus</i> , unidentified grass, sagebrush
14	109.9	9.4	Silt, sand	<i>Juncus</i> , unidentified grass, Canada thistle
14	111.5	10.5	Silt, sand	Canada thistle
14	113.2	11.6	Silt, sand	Unidentified grass, <i>carex</i> , <i>juncus</i>
14	114.8	12.7	Silt, sand	Canada thistle, unidentified grass
15	0.0	0.0	Sand	None
15	1.6	0.0	Sand	Common spikerush
15	3.3	1.0	Sand	Field horsetail, common threesquare, common spikerush, unidentified grass
15	4.9	1.4	Sand	Common plantain, unidentified grass, field horsetail, <i>juncus</i>
15	6.6	1.9	Sand	Field horsetail, unidentified grass, common threesquare, common spikerush
15	8.2	2.3	Sand	<i>Juncus</i> , unidentified grass, unidentified forb, Canada thistle, common spikerush, field horsetail
15	9.8	2.8	Sand	Unidentified forb, unidentified grass, <i>juncus</i>
15	11.5	3.2	Sand	<i>Juncus</i> , field horsetail, unidentified grass, common threesquare

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
15	13.1	3.7	Sand	Unidentified grass, field horsetail
15	14.8	5.5	Sand	Field horsetail, unidentified grass, scouring rush
15	16.4	5.9	Sand	Scouring rush, clasping peppergrass, unidentified grass
15	18.0	6.4	Sand	Globe-podded whitetop, scouring rush
16	0.0	0.0	Sand	None
16	1.6	0.2	Sand	None
16	3.3	0.3	Sand	None
16	4.9	0.5	Sand	None
16	6.6	0.7	Sand	None
16	8.2	0.8	Sand	None
16	9.8	1.0	Sand	None
16	11.5	1.2	Sand	None
16	13.1	1.3	Sand	None
16	14.8	1.5	Sand	None
16	16.4	1.7	Sand	None
16	18.0	1.8	Sand	None
16	19.7	2.0	Sand	None
16	21.3	2.2	Sand	None
16	23.0	2.3	Sand	None
16	24.6	2.5	Sand	None
16	26.2	2.7	Sand	Field horsetail, unidentified grass, unidentified forb
16	27.9	2.9	Sand	Field horsetail, juncus, Canada thistle, unidentified grass
16	29.5	3.1	Sand	Field horsetail, juncus, Canada thistle, field mint
16	31.2	3.3	Sand	Field horsetail, juncus, unidentified grass
16	32.8	3.5	Sand	Juncus, Canada thistle, sow thistle
16	34.4	4.3	Sand	Juncus, western goldenrod, Canada thistle, field horsetail, unidentified grass
16	36.1	5.0	Sand	Field horsetail, Canada thistle, scouring rush, juncus, silverweed, unidentified grass
16	37.7	5.1	Sand	Field horsetail, juncus, unidentified grass, Canada thistle, western goldenrod
16	39.4	5.3	Sand	Canada thistle, unidentified grass
16	41.0	5.4	Sand	Canada thistle, field horsetail, juncus, tamarisk
16	42.7	5.5	Sand	Western goldenrod, Canada thistle, unidentified grass, scouring rush
16	44.3	5.7	Sand	Canada thistle, western goldenrod, unidentified grass
16	45.9	5.8	Sand	Canada thistle, western goldenrod, scouring rush, field horsetail
16	47.6	5.9	Sand	Juncus, unidentified grass
16	49.2	6.0	Sand	Canada thistle, unidentified grass, juncus
16	50.9	6.2	Sand	Unidentified grass
16	52.5	6.3	Sand	Scouring rush, unidentified grass
16	54.1	6.4	Sand	Juncus, scouring rush, unidentified grass
16	55.8	6.6	Sand	Unidentified moss, scouring rush, unidentified grass
16	57.4	6.7	Sand	Golden aster, juncus, unidentified grass
16	59.1	6.8	Sand	Western mugwort, unidentified grass
16	60.7	8.1	Sand	Western mugwort, unidentified grass, scouring rush
16	62.3	8.2	Sand	Scouring rush
16	64.0	8.3	Sand	Unidentified grass
16	65.6	8.5	Sand	Western mugwort

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
16	67.3	9.0	Sand	None
16	68.9	9.4	Sand	None
16	70.5	9.8	Sand	None
16	72.2	10.2	Sand	None
16	73.8	10.6	Sand	None
16	75.5	10.9	Sand	Western mugwort
16	77.1	11.3	Sand	Box elder
17	0.0	0.0	Sand	None
17	1.6	- <sup>b</sup>	Sand	None
17	3.3	-	Sand	None
17	4.9	-	Sand	None
17	6.6	-	Sand	None
17	8.2	-	Sand	None
17	9.8	-	Sand	None
17	11.5	-	Sand	Unidentified grass
17	13.1	3.7	Sand	Unidentified grass
17	14.8	4.1	Sand	Unidentified grass, field mint
17	16.4	4.5	Sand	Field mint, field horsetail
17	18.0	4.8	Sand	Field horsetail
17	19.7	5.9	Sand	Tamarisk
17	21.3	6.1	Sand	Tamarisk
17	23.0	6.3	Sand	Tamarisk
17	24.6	6.6	Sand	Field horsetail, unidentified grass
17	26.2	6.8	Sand	Tamarisk, unidentified grass
17	27.9	7.0	Sand	Unidentified grass, tamarisk
17	29.5	7.2	Sand	Giant whitetop, unidentified grass
17	31.2	7.4	Sand	Unidentified grass, giant whitetop, tamarisk
17	32.8	7.7	Sand	Tamarisk, unidentified grass, giant whitetop
17	34.4	7.9	Sand	Tamarisk, unidentified grass
17	36.1	8.1	Sand	Giant whitetop, unidentified grass, tamarisk
17	37.7	8.3	Sand	Unidentified grass, tamarisk, scouring rush
17	39.4	8.5	Sand	Unidentified grass, tamarisk, giant whitetop, scouring rush
17	41.0	8.8	Sand	Unidentified grass
17	42.7	9.0	Sand	Unidentified grass
17	44.3	9.2	Sand	Unidentified grass
17	45.9	9.4	Sand	Golden aster, unidentified grass
17	47.6	9.6	Sand	Golden aster, unidentified grass
17	49.2	9.9	Sand	Unidentified grass, giant whitetop
17	50.9	10.1	Sand	Golden aster, unidentified grass, giant whitetop
17	52.5	10.3	Sand	Giant whitetop
17	54.1	10.5	Sand	Golden aster, field horsetail
17	55.8	10.7	Sand	Golden aster, unidentified grass
17	57.4	11.0	Sand	Unidentified grass
17	59.1	11.2	Sand	Unidentified grass
17	60.7	11.4	Sand	Golden aster
17	62.3	11.6	Sand	Golden aster
17	64.0	11.8	Sand	None
17	65.6	12.1	Sand	None
17	67.3	12.3	Sand	None
17	68.9	12.5	Sand	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
17	70.5	12.7	Sand	Golden aster
17	72.2	12.9	Sand	Golden aster, unidentified grass
17	73.8	13.2	Sand	Golden aster
17	75.5	13.4	Sand	Sagebrush
17	77.1	13.6	Sand	Sagebrush
17	78.7	13.8	Sand	Sagebrush, golden aster
17	80.4	14.0	Sand	Golden aster, sagebrush
17	82.0	14.3	Sand	Box elder, sagebrush, western mugwort
17	83.7	14.5	Sand	Box elder
17	85.3	14.7	Sand	Box elder
17	86.9	14.9	Sand	Box elder
17	88.6	15.1	Sand	Box elder
17	90.2	15.4	Sand	Box elder
17	91.9	15.6	Sand	Box elder
18	0.0	0.0	Sand	None
18	1.6	0.2	Sand	None
18	3.3	0.5	Sand	None
18	4.9	0.7	Sand	None
18	6.6	1.0	Sand	None
18	8.2	1.3	Sand	Juncus, common threesquare, unidentified grass
18	9.8	2.1	Sand	Scouring rush, common threesquare, unidentified grass
18	11.5	2.1	Sand	Common threesquare
18	13.1	2.1	Sand	Unidentified grass, common threesquare, Canada thistle
18	14.8	3.1	Sand	Wild licorice, unidentified grass, scouring rush
18	16.4	4.6	Sand	Wild licorice, scouring rush, unidentified grass
18	18.0	4.9	Sand	Wild licorice, rabbitbrush, unidentified grass
18	19.7	5.2	Sand	Canada thistle, scouring rush
18	21.3	5.4	Sand	Canada thistle, scouring rush
18	23.0	5.7	Sand	Scouring rush
18	24.6	6.0	Sand	Scouring rush
18	26.2	6.3	Sand	Utah juniper, scouring rush
18	27.9	6.6	Sand	Utah juniper
18	29.5	6.9	Sand	Scouring rush, Utah juniper
18	31.2	7.1	Boulder, sand	Utah juniper
18	32.8	7.4	Boulder, sand	Utah juniper
18	34.4	7.7	Boulder, sand	Utah juniper
19	0.0	0.0	Cobble	None
19	1.6	0.5	Cobble	None
19	3.3	1.0	Cobble	None
19	4.9	1.5	Cobble	Tamarisk, unidentified grass, western goldenrod
19	6.6	2.0	Cobble	Western mugwort, unidentified grass, swamp milkweed, unidentified forb, unidentified grass, tamarisk
19	8.2	2.6	Cobble	Unidentified grass
19	9.8	3.1	Cobble	Scouring rush
19	11.5	3.6	Cobble	Golden aster, scouring rush, unidentified grass
19	13.1	4.1	Cobble	Golden aster, scouring rush
19	14.8	4.6	Cobble	Golden aster, scouring rush
19	16.4	4.8	Cobble	Scouring rush, golden aster, unidentified forb

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
19	18.0	5.1	Cobble	Scouring rush, golden aster
19	19.7	5.3	Cobble	Golden aster, scouring rush
19	21.3	5.5	Sand	Golden aster, scouring rush, juncus
19	23.0	5.8	Sand	Golden aster
19	24.6	6.0	Sand	Juncus, white clover
19	26.2	6.2	Sand	Golden aster
19	27.9	6.5	Sand	Golden aster
19	29.5	6.7	Sand	Unidentified grass
19	31.2	7.0	Sand	Golden aster
19	32.8	7.2	Sand	None
19	34.4	7.4	Sand	None
19	36.1	7.7	Sand	Juncus
19	37.7	7.9	Sand	Golden aster
19	39.4	8.0	Sand	Golden aster
19	41.0	8.0	Sand	Golden aster
19	42.7	8.0	Sand	Golden aster
19	44.3	7.9	Sand	Golden aster
19	45.9	7.9	Sand	Golden aster
19	47.6	7.9	Sand	Golden aster
19	49.2	7.9	Sand	Golden aster
19	50.9	7.8	Sand	None
19	52.5	7.8	Sand	None
19	54.1	7.8	Sand	Unidentified grass
19	55.8	7.8	Sand	None
19	57.4	7.7	Sand	Unidentified grass
19	59.1	7.7	Sand	Unidentified grass, unidentified forb
19	60.7	7.7	Sand	Unidentified forb
19	62.3	7.7	Sand	Golden aster
19	64.0	7.6	Sand	None
19	65.6	7.6	Sand	Golden aster, unidentified forb
19	67.3	7.6	Sand	None
19	68.9	7.5	Sand	None
19	70.5	8.0	Sand	None
19	72.2	8.5	Sand	None
19	73.8	9.0	Sand	None
19	75.5	9.5	Sand	None
19	77.1	9.9	Sand	None
19	78.7	10.4	Sand	Unidentified grass
19	80.4	10.9	Sand	Box elder
19	82.0	10.9	Sand	Box elder
19	83.7	10.8	Sand	Box elder
19	85.3	10.6	Sand	Box elder, carex
19	86.9	10.5	Sand	Box elder
19	88.6	10.4	Sand	Box elder, unidentified grass
19	90.2	10.3	Sand	Box elder, unidentified grass
19	91.9	10.2	Sand	Box elder, unidentified grass, scouring rush
19	93.5	10.0	Sand	Unidentified grass, box elder, scouring rush
19	95.1	9.9	Sand	Unidentified grass, box elder
19	96.8	9.8	Sand	Unidentified grass, box elder
19	98.4	9.7	Sand	Unidentified grass, box elder
19	100.1	9.5	Sand	Unidentified grass, box elder
19	101.7	9.4	Sand	Unidentified grass, box elder

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
19	103.3	9.3	Sand	Unidentified grass, <i>juncus</i> , box elder
19	105.0	9.2	Sand	Unidentified grass, <i>juncus</i> , scouring rush, box elder
19	106.6	9.0	Sand	Unidentified grass, <i>juncus</i> , scouring rush, box elder
19	108.3	8.9	Sand	Unidentified grass, scouring rush, <i>juncus</i>
19	109.9	8.8	Sand	Unidentified grass, scouring rush, <i>juncus</i>
19	111.5	6.1	Sand	Unidentified grass, scouring rush, <i>juncus</i>
19	113.2	6.1	Sand	Scouring rush, <i>juncus</i> , unidentified grass
19	114.8	6.1	Sand	<i>Juncus</i> , scouring rush, tamarisk, unidentified grass, wild licorice
19	116.5	6.4	Sand	Tamarisk, scouring rush, unidentified grass, <i>juncus</i>
19	118.1	6.4	Sand	Tamarisk, scouring rush, <i>juncus</i> , unidentified grass
19	119.8	6.4	Sand	Scouring rush, tamarisk, <i>juncus</i> , unidentified grass
19	121.4	6.4	Sand	Tamarisk, scouring rush, <i>juncus</i>
19	123.0	6.4	Sand	Scouring rush, tamarisk, <i>juncus</i> , unidentified grass
19	124.7	6.4	Sand	Scouring rush, tamarisk, unidentified grass
19	126.3	6.4	Sand	Scouring rush, tamarisk, unidentified grass, <i>juncus</i>
19	128.0	4.3	Sand	Scouring rush, tamarisk, unidentified grass, unidentified forb
19	129.6	4.3	Sand	Scouring rush, tamarisk, unidentified grass
19	131.2	4.3	Sand	Unidentified grass, scouring rush, tamarisk
19	132.9	4.3	Sand	Unidentified grass, scouring rush, silverweed
19	134.5	4.3	Sand	Unidentified grass, scouring rush, tamarisk
19	136.2	4.3	Sand	Tamarisk, scouring rush, unidentified grass
19	137.8	4.3	Sand	Tamarisk, scouring rush, unidentified grass, silverweed
19	139.4	4.3	Sand	Box elder, tamarisk, scouring rush, unidentified grass
19	141.1	4.3	Sand	Box elder, tamarisk, scouring rush, unidentified grass
19	142.7	4.3	Sand	Box elder, scouring rush, unidentified grass, tamarisk
19	144.4	4.3	Sand	Box elder, scouring rush, tamarisk, unidentified grass
19	146.0	4.8	Sand	Box elder, scouring rush
19	147.6	5.4	Sand	Box elder, scouring rush
19	149.3	5.9	Sand	Box elder, scouring rush, hemp dogbane
19	150.9	6.5	Sand	Box elder, scouring rush
19	152.6	7.0	Sand	Box elder, scouring rush
19	154.2	7.6	Sand	Box elder, scouring rush
19	155.8	8.1	Sand	Box elder, scouring rush, unidentified grass
19	157.5	8.7	Sand	Box elder, unidentified grass, scouring rush
19	159.1	8.8	Sand	Utah juniper, unidentified grass, box elder
19	160.8	9.0	Sand	Utah juniper, scouring rush, box elder, unidentified grass
19	162.4	9.1	Sand	Utah juniper, scouring rush, box elder, unidentified grass
19	164.0	9.3	Sand	Box elder, Utah juniper, scouring rush
19	165.7	9.4	Sand	Box elder, scouring rush
19	167.3	9.6	Sand	Box elder, scouring rush
19	169.0	9.7	Sand	Box elder, scouring rush, unidentified forb
19	170.6	9.8	Sand	Box elder, scouring rush, unidentified grass
19	172.2	10.0	Sand	Box elder, unidentified grass
19	173.9	10.1	Sand	Box elder, scouring rush, unidentified grass
19	175.5	10.3	Sand	Box elder, scouring rush, unidentified grass
19	177.2	10.4	Sand	Box elder, scouring rush, unidentified grass
19	178.8	10.6	Sand	Box elder, scouring rush, unidentified grass
19	180.4	10.7	Sand	Box elder, unidentified grass, scouring rush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
19	182.1	10.8	Sand	Box elder, scouring rush, unidentified grass
19	183.7	11.0	Sand	Box elder, unidentified grass
19	185.4	11.1	Sand	Box elder, unidentified grass, scouring rush
19	187.0	11.3	Sand	Box elder, unidentified grass
19	188.6	11.4	Sand	Box elder, unidentified grass, scouring rush
19	190.3	11.6	Sand	Box elder, scouring rush, unidentified grass
19	191.9	11.7	Sand	Box elder, unidentified grass
19	193.6	11.9	Sand	Box elder, unidentified grass
19	195.2	12.0	Sand	Unidentified grass, scouring rush
19	196.9	12.1	Sand	Unidentified grass
19	198.5	12.3	Sand	Unidentified grass
19	200.1	12.4	Sand	Unidentified grass
19	201.8	12.6	Sand	Unidentified grass
19	203.4	12.7	Sand	Unidentified grass
19	205.1	12.9	Sand	Unidentified grass
19	206.7	13.0	Sand	Unidentified grass
19	208.3	13.1	Sand	Unidentified grass, western mugwort
19	210.0	13.3	Sand	Western mugwort, unidentified grass
19	211.6	13.8	Boulder, sand	None
19	213.3	14.3	Boulder, sand	None
19	214.9	14.8	Boulder, sand	Unidentified grass
19	216.5	15.3	Boulder, sand	Unidentified grass
19	218.2	15.7	Boulder, sand	Unidentified grass
19	219.8	16.2	Boulder, sand	Unidentified grass
19	221.5	16.7	Boulder, sand	Unidentified grass, showy milkweed
19	223.1	17.2	Boulder, sand	Unidentified grass, showy milkweed
19	224.7	17.7	Boulder, sand	None
19	226.4	18.2	Boulder, sand	Unidentified grass, showy milkweed, swamp milkweed
19	228.0	18.7	Boulder, sand	Unidentified grass
19	229.7	19.2	Boulder, sand	Showy milkweed
19	231.3	19.7	Boulder, sand	None
19	232.9	20.2	Boulder, sand	Box elder
19	234.6	20.7	Boulder, sand	Box elder
19	236.2	21.2	Boulder, sand	Box elder
19	237.9	21.7	Boulder, sand	Box elder
19	239.5	22.1	Boulder, sand	Box elder
19	241.1	22.6	Boulder, sand	Box elder
19	242.8	23.1	Boulder, sand	Box elder
19	244.4	23.6	Boulder, sand	Box elder
19	246.1	24.1	Boulder, sand	Box elder
19	247.7	24.6	Boulder, sand	Box elder
19	249.3	25.1	Boulder, sand	Box elder
19	251.0	25.6	Boulder, sand	Box elder
19	252.6	26.1	Boulder, sand	Box elder, unidentified grass
19	254.3	26.6	Boulder, sand	Box elder, unidentified grass
19	255.9	27.1	Boulder, sand	Box elder, unidentified grass
19	257.5	27.6	Boulder, sand	Box elder
19	259.2	28.1	Boulder, sand	Box elder
19	260.8	28.5	Boulder, sand	Box elder
19	262.5	29.0	Boulder, sand	Box elder
19	264.1	29.5	Boulder, sand	Box elder
19	265.7	30.0	Boulder, sand	Box elder

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
19	267.4	30.5	Boulder, sand	Box elder
19	269.0	31.0	Boulder, sand	Box elder
19	270.7	31.5	Boulder, sand	Box elder
19	272.3	32.0	Boulder, sand	None
19	274.0	32.5	Boulder, sand	None
19	275.6	33.0	Boulder, sand	Unidentified grass
19	277.2	33.5	Boulder, sand	Unidentified grass
20	0.0	0.0	Sand	None
20	1.6	0.3	Sand	None
20	3.3	0.5	Sand	None
20	4.9	0.8	Sand	None
20	6.6	1.0	Sand	Field horsetail
20	8.2	1.3	Sand	Juncus
20	9.8	1.5	Sand	Juncus, field horsetail
20	11.5	1.6	Sand	Juncus, field horsetail
20	13.1	1.7	Sand	Juncus
20	14.8	1.9	Sand	None
20	16.4	2.0	Sand	Scouring rush
20	18.0	2.2	Sand	Scouring rush, western goldenrod, field horsetail
20	19.7	2.3	Sand	Scouring rush
20	21.3	2.5	Sand	Tamarisk
20	23.0	2.6	Sand	Unidentified forb, western mugwort, juncus, unidentified grass, tamarisk
20	24.6	3.7	Sand	Juncus, unidentified grass, unidentified forb, tamarisk
20	26.2	3.8	Sand	Unidentified grass, unidentified forb, golden aster, scouring rush, western goldenrod, tamarisk
20	27.9	3.9	Sand	Tamarisk, unidentified grass, scouring rush, western goldenrod
20	29.5	3.9	Sand	Tamarisk, unidentified grass, scouring rush, unidentified forb
20	31.2	4.0	Sand	Unidentified grass, juncus, scouring rush
20	32.8	4.1	Sand	Unidentified grass, juncus, scouring rush, Canada thistle
20	34.4	4.2	Sand	Unidentified grass, scouring rush
20	36.1	4.3	Sand	Juncus, unidentified grass, scouring rush
20	37.7	4.4	Sand	Juncus, unidentified grass
20	39.4	4.4	Sand	Golden aster, scouring rush, juncus, unidentified grass
20	41.0	4.5	Sand	Juncus, unidentified grass
20	42.7	4.6	Sand	Juncus, western mugwort, scouring rush, unidentified grass
20	44.3	4.7	Sand	Western mugwort, juncus, unidentified forb, unidentified grass
20	45.9	4.8	Sand	Western mugwort, juncus, tamarisk
20	47.6	4.9	Sand	Tamarisk, juncus, unidentified grass, scouring rush
20	49.2	4.9	Sand	Tamarisk, juncus, unidentified grass
20	50.9	5.0	Sand	Golden aster, scouring rush, juncus, western mugwort, unidentified grass
20	52.5	5.1	Sand	Scouring rush
20	54.1	5.2	Sand	None
20	55.8	5.4	Sand	Golden aster, juncus
20	57.4	5.8	Sand	Western mugwort, box elder

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
20	59.1	6.1	Sand	Western mugwort, box elder, golden aster
20	60.7	6.5	Sand	Box elder, western mugwort
20	62.3	6.9	Sand	Box elder, western mugwort
20	64.0	7.2	Sand	Box elder, golden aster, western mugwort
20	65.6	7.6	Sand	Box elder, western mugwort, unidentified grass
20	67.3	8.0	Sand	Box elder, unidentified grass, golden aster, western mugwort
20	68.9	8.2	Sand	Unidentified grass, western mugwort
20	70.5	8.1	Sand	Unidentified grass, western mugwort
20	72.2	8.0	Sand	Unidentified grass, western mugwort
20	73.8	8.0	Sand	Unidentified grass, western mugwort
20	75.5	7.9	Sand	Unidentified grass, box elder, western mugwort
20	77.1	7.9	Sand	Box elder, western mugwort, unidentified grass, scouring rush
20	78.7	7.8	Sand	Box elder, western mugwort, unidentified grass
20	80.4	7.7	Sand	Box elder, unidentified grass, western mugwort
20	82.0	7.7	Sand	Box elder, western mugwort, unidentified grass
20	83.7	7.6	Sand	Box elder, western mugwort, unidentified grass
20	85.3	7.5	Sand	Box elder, western mugwort, unidentified grass
20	86.9	7.5	Sand	Box elder, unidentified grass
20	88.6	7.4	Sand	None
21	0.0	0.0	Cobble, sand	None
21	1.6	0.2	Cobble, sand	None
21	3.3	0.3	Sand	None
21	4.9	0.5	Sand	None
21	6.6	0.7	Sand	None
21	8.2	0.8	Sand	None
21	9.8	1.0	Sand	None
21	11.5	1.2	Sand	None
21	13.1	1.3	Sand	None
21	14.8	1.5	Sand	None
21	16.4	1.7	Sand	None
21	18.0	1.8	Sand	Juncus
21	19.7	2.0	Sand	Common threesquare, juncus
21	21.3	2.2	Sand	Common threesquare
21	23.0	2.4	Sand	None
21	24.6	2.6	Sand	Western goldenrod
21	26.2	2.8	Sand	Unidentified grass
21	27.9	3.0	Sand	None
21	29.5	3.2	Sand	Unidentified grass
21	31.2	3.3	Sand	None
21	32.8	3.5	Sand	Unidentified grass
21	34.4	3.7	Sand	Unidentified grass
21	36.1	3.9	Sand	Unidentified forb, western mugwort, silverweed
21	37.7	4.1	Sand	None
21	39.4	4.3	Sand	None
21	41.0	4.5	Sand	Yellow sweetclover
21	42.7	5.1	Sand	Yellow sweetclover, scouring rush
21	44.3	5.6	Sand	Scouring rush, yellow sweetclover
21	45.9	6.2	Boulder, sand	Unidentified grass
21	47.6	6.7	Boulder, sand	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
21	49.2	7.3	Boulder, sand	Goldenrod, juncus, golden aster
21	50.9	7.8	Boulder, sand	Goldenrod, unidentified grass, tamarisk
21	52.5	8.4	Boulder, sand	Goldenrod, western mugwort, unidentified grass
21	54.1	8.5	Boulder, sand	Western mugwort, juncus
21	55.8	8.7	Boulder, sand	Western mugwort, box elder
21	57.4	8.9	Boulder, sand	Western mugwort, unidentified grass, box elder
21	59.1	9.0	Boulder, sand	Box elder, western mugwort, unidentified grass
21	60.7	9.5	Boulder, sand	Box elder, western mugwort
21	62.3	10.1	Boulder, sand	Box elder, western mugwort, unidentified forb
21	64.0	10.6	Boulder, sand	Box elder, western mugwort
21	65.6	11.1	Boulder, sand	Box elder, unidentified grass, golden aster
21	67.3	11.6	Boulder, sand	Golden aster, box elder
21	68.9	12.1	Boulder, sand	Golden aster
21	70.5	12.6	Boulder, sand	Western mugwort
21	72.2	13.1	Boulder, sand	Box elder, western mugwort, golden aster
21	73.8	13.7	Boulder, sand	Box elder, western mugwort
21	75.5	14.2	Boulder, sand	Box elder, western mugwort, unidentified moss
21	77.1	14.7	Boulder, sand	Western mugwort, unidentified grass
21	78.7	15.2	Boulder, sand	Western mugwort, unidentified grass
21	80.4	15.7	Boulder, sand	Western mugwort
22	0.0	0.0	Boulder, cobble, sand	None
22	1.6	0.4	Boulder, cobble, sand	None
22	3.3	0.8	Boulder, cobble, sand	Scouring rush, coyote willow, hemp dogbane
22	4.9	1.2	Boulder, cobble, sand	Coyote willow
22	6.6	1.6	Boulder, cobble, sand	Unidentified forb
22	8.2	2.0	Boulder, cobble, sand	Unidentified grass, hemp dogbane, scouring rush
22	9.8	2.4	Boulder, cobble, sand	Western goldenrod
22	11.5	2.9	Boulder, cobble, sand	Western goldenrod, scouring rush
22	13.1	3.4	Boulder, cobble, sand	None
22	14.8	3.9	Boulder, cobble, sand	None
22	16.4	4.4	Boulder, cobble, sand	None
22	18.0	4.9	Boulder, cobble, sand	Scouring rush
22	19.7	5.4	Boulder, cobble, sand	Scouring rush
22	21.3	5.9	Boulder, cobble, sand	Western mugwort
22	23.0	6.3	Boulder, cobble, sand	Unidentified forb, unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
22	24.6	6.8	Boulder, cobble, sand	Golden aster
22	26.2	7.3	Boulder, cobble, sand	Golden aster
22	27.9	7.8	Boulder, cobble, sand	Scouring rush, golden aster
22	29.5	8.3	Boulder, cobble, sand	Golden aster
22	31.2	8.8	Boulder, cobble, sand	Green mormon-tea, western mugwort, golden aster
22	32.8	9.3	Boulder, cobble, sand	Green mormon-tea
22	34.4	9.8	Boulder, cobble, sand	Scouring rush
22	36.1	10.5	Boulder, cobble, sand	Western mugwort
22	37.7	11.2	Boulder, cobble, sand	Golden aster, western mugwort, western virgin-bower
22	39.4	12.0	Boulder, cobble, sand	Western mugwort
22	41.0	12.7	Boulder, cobble, sand	Western virgin-bower, western mugwort
22	42.7	13.4	Boulder, cobble, sand	None
22	44.3	14.1	Boulder, cobble, sand	Western mugwort
22	45.9	14.8	Boulder, cobble, sand	Western mugwort, golden aster, western virgin-bower
22	47.6	15.5	Boulder, cobble, sand	Western mugwort
22	49.2	16.2	Boulder, cobble, sand	Western virgin-bower
23	0.0	0.0	Sand	Common reed, carex
23	1.6	2.3	Sand	Common reed, carex, unidentified grass
23	3.3	1.9	Sand	None
23	4.9	0.9	Sand	Juncus, western goldenrod, scouring rush
23	6.6	3.6	Sand	Scouring rush, unidentified grass, field mint
23	8.2	3.7	Sand	Western goldenrod, scouring rush, unidentified grass
23	9.8	3.8	Sand	Western goldenrod, scouring rush, common plantain, unidentified grass
23	11.5	3.9	Sand	Western goldenrod, scouring rush, unidentified grass, juncus
23	13.1	3.9	Sand	Scouring rush, yellow sweetclover, western goldenrod, juncus
23	14.8	4.0	Sand	Scouring rush, juncus, western goldenrod, hemp dogbane
23	16.4	4.1	Sand	Western goldenrod, scouring rush, juncus, box elder, swamp milkweed
23	18.0	4.2	Sand	Scouring rush, juncus, western goldenrod
23	19.7	4.2	Sand	Western goldenrod, scouring rush, common reed, juncus

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
23	21.3	4.3	Sand	Scouring rush, western goldenrod, <i>juncus</i> , common threesquare, common reed
23	23.0	4.4	Sand	Common reed, scouring rush, western goldenrod, common threesquare, hemp dogbane, unidentified grass
23	24.6	4.5	Sand	Scouring rush, unidentified grass, common threesquare
23	26.2	4.6	Sand	Western goldenrod, scouring rush, unidentified grass, common threesquare, tamarisk
23	27.9	4.6	Sand	Scouring rush, western goldenrod, sweet clover
23	29.5	4.7	Sand	Scouring rush, western goldenrod, common reed
23	31.2	4.8	Sand	Scouring rush, common reed, western goldenrod, unidentified grass, common threesquare
23	32.8	4.9	Sand	Scouring rush, western goldenrod, unidentified grass, tamarisk
23	34.4	5.0	Sand	Tamarisk, scouring rush, western goldenrod, golden aster
23	36.1	5.1	Sand	Tamarisk, scouring rush, western goldenrod
23	37.7	5.3	Sand	Tamarisk, unidentified grass, scouring rush
23	39.4	5.4	Sand	Tamarisk, scouring rush, western mugwort
23	41.0	5.6	Sand	Western mugwort, scouring rush
23	42.7	5.8	Sand	Scouring rush, western mugwort, unidentified grass
24	0.0	0.0	Cobble	Cladophora
24	1.6	0.1	Cobble	Cladophora
24	3.3	0.2	Cobble	Cladophora, hairleaf water-buttercup
24	4.9	0.4	Cobble	Cladophora, common spikerush
24	6.6	0.5	Cobble	Cladophora
24	8.2	0.6	Cobble	Common spikerush
24	9.8	0.7	Cobble	Common spikerush, unidentified grass
24	11.5	0.9	Cobble	<i>Juncus</i> , unidentified grass, water speedwell
24	13.1	1.0	Sand	Common spikerush, unidentified grass, shore buttercup, water speedwell
24	14.8	1.1	Sand	Common spikerush, water speedwell, unidentified grass
24	16.4	1.2	Sand	Common spikerush
24	18.0	1.4	Sand	Common spikerush, field horsetail
24	19.7	1.5	Sand	Common spikerush, field horsetail, common threesquare
24	21.3	1.6	Sand	Common spikerush, field horsetail, <i>juncus</i> , unidentified forb
24	23.0	1.7	Sand	Common spikerush, <i>juncus</i>
24	24.6	1.8	Sand	Coyote willow, unidentified grass, common spikerush, <i>juncus</i>
24	26.2	2.0	Sand	Common spikerush, western goldenrod, field horsetail, <i>juncus</i> , unidentified grass
24	27.9	2.1	Sand	<i>Juncus</i> , unidentified grass, sow thistle, western goldenrod, field horsetail
24	29.5	2.1	Sand	Unidentified grass, orange sneezeweed, western goldenrod, field horsetail, shore buttercup, giant whitetop
24	31.2	2.2	Sand	Unidentified grass, unidentified forb, tamarisk, common plantain, <i>juncus</i>

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
24	32.8	2.3	Sand	Unidentified grass, sow thistle, western goldenrod, tamarisk, silverweed
24	34.4	2.4	Sand	Unidentified grass, silverweed, sow thistle
24	36.1	2.5	Sand	Silverweed, unidentified grass, unidentified forb, juncus
24	37.7	2.6	Sand	Unidentified grass, unidentified forb, silverweed
24	39.4	2.6	Sand	Unidentified grass, silverweed, unidentified forb
24	41.0	2.7	Sand	Unidentified grass, unidentified forb
24	42.7	2.8	Sand	Unidentified grass
24	44.3	2.9	Sand	Unidentified grass, silverweed
24	45.9	5.2	Sand	Unidentified grass, silverweed, western mugwort, common reed, scouring rush
24	47.6	5.2	Sand	Scouring rush, unidentified grass, unidentified forb, white sweetclover
24	49.2	5.2	Sand	White sweetclover, scouring rush, unidentified grass, common reed
24	50.9	5.2	Sand	White sweetclover, scouring rush, carex, unidentified grass
24	52.5	5.2	Sand	White sweetclover, unidentified grass, carex, unidentified forb
24	54.1	5.2	Sand	Unidentified grass, scouring rush, unidentified forb
24	55.8	5.2	Sand	Unidentified grass, scouring rush, unidentified forb
24	57.4	5.2	Sand	Unidentified grass, unidentified forb
24	59.1	7.5	Sand	Unidentified grass
24	60.7	7.5	Sand	Unidentified forb, unidentified grass
24	62.3	7.5	Sand	Unidentified grass, unidentified forb, scouring rush
24	64.0	7.5	Sand	Unidentified grass, scouring rush
24	65.6	7.5	Sand	Unidentified grass, juncus, scouring rush
24	67.3	8.9	Sand	Unidentified grass, western mugwort, scouring rush
24	68.9	8.9	Sand	Western mugwort, scouring rush, unidentified grass
24	70.5	8.9	Sand	Western mugwort, common reed, unidentified grass
24	72.2	8.9	Sand	Unidentified grass
24	73.8	8.9	Sand	Unidentified grass
24	75.5	8.9	Sand	Unidentified grass
24	77.1	8.9	Sand	Common reed, unidentified grass
24	78.7	9.7	Sand	Box elder, common reed, unidentified grass
24	80.4	9.7	Sand	Box elder, unidentified grass
24	82.0	9.7	Sand	Box elder, unidentified grass
24	83.7	9.7	Sand	Box elder, unidentified grass
24	85.3	9.7	Sand	Box elder, unidentified grass
24	86.9	10.5	Sand	Box elder, unidentified grass
24	88.6	10.8	Sand	Box elder, unidentified grass
24	90.2	11.0	Sand	Box elder, unidentified grass
24	91.9	11.2	Sand	Box elder, unidentified grass
24	93.5	11.4	Sand	Box elder, unidentified grass
24	95.1	11.6	Sand	Box elder
24	96.8	11.8	Sand	Box elder
24	98.4	12.0	Sand	Box elder
24	100.1	12.3	Sand	Box elder, unidentified grass
24	101.7	12.5	Sand	Box elder, unidentified grass
24	103.3	12.7	Sand	Box elder, unidentified grass
24	105.0	12.9	Sand	Box elder, unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
24	106.6	13.1	Sand	Box elder, unidentified grass
24	108.3	13.3	Sand	Box elder, unidentified grass
24	109.9	13.6	Sand	Box elder, unidentified grass
24	111.5	13.8	Sand	Unidentified grass
24	113.2	14.0	Sand	Unidentified grass
24	114.8	14.2	Sand	Unidentified grass
24	116.5	14.4	Sand	Unidentified grass, prickly pear
24	118.1	14.6	Sand	Unidentified grass
24	119.8	14.8	Sand	None
24	121.4	15.1	Sand	Unidentified grass
24	123.0	15.3	Sand	None
24	124.7	15.5	Sand	Unidentified grass
24	126.3	15.7	Sand	Unidentified grass
24	128.0	15.9	Sand	Rabbitbrush, unidentified grass
24	129.6	16.1	Sand	Rabbitbrush
24	131.2	16.3	Sand	Rabbitbrush
24	132.9	16.6	Sand	Rabbitbrush
24	134.5	16.8	Sand	Rabbitbrush
24	136.2	17.0	Sand	Rabbitbrush
24	137.8	17.2	Sand	Rabbitbrush
24	139.4	17.4	Sand	Rabbitbrush
24	141.1	17.6	Sand	Rabbitbrush
24	142.7	17.9	Sand	Unidentified grass
24	144.4	18.1	Sand	Unidentified grass
24	146.0	18.3	Sand	Rabbitbrush, unidentified grass
24	147.6	18.5	Sand	Rabbitbrush, unidentified grass
24	149.3	18.7	Sand	Unidentified grass
24	150.9	18.9	Sand	Unidentified grass
24	152.6	19.1	Sand	Sagebrush
24	154.2	19.4	Boulder, sand	Sagebrush
25	0.0	0.0	Sand	None
25	1.6	- <sup>b</sup>	Sand	None
25	3.3	-	Sand	None
25	4.9	-	Sand	Juncus
25	6.6	-	Sand	Unidentified grass, unidentified moss, western goldenrod
25	8.2	-	Sand	Unidentified forb, unidentified grass, western goldenrod, carex, scouring rush, common plantain
25	9.8	-	Sand	Western goldenrod, scouring rush, carex, common reed, unidentified grass
25	11.5	-	Sand	Western goldenrod, scouring rush, unidentified forb, unidentified grass
25	13.1	5.0	Sand	Western goldenrod, scouring rush, unidentified grass, common reed, unidentified forb, giant whitetop
25	14.8	5.1	Sand	Common reed, western goldenrod, scouring rush
25	16.4	5.2	Sand	Common reed, western goldenrod, unidentified forb, scouring rush, unidentified grass
25	18.0	5.3	Sand	Common reed, western goldenrod, unidentified forb, carex
25	19.7	5.4	Sand	Tamarisk, western goldenrod, common reed, juncus, scouring rush, unidentified forb

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
25	21.3	5.5	Sand	Common reed, tamarisk, western goldenrod, carex, scouring rush, hemp dogbane, unidentified forb, silverweed
25	23.0	5.6	Sand	Common reed, tamarisk, western goldenrod, carex, scouring rush, unidentified forb, field mint
25	24.6	6.4	Sand	Tamarisk, common reed, scouring rush, field mint, unidentified grass
25	26.2	6.8	Sand	Scouring rush, common reed, unidentified grass, unidentified forb
25	27.9	7.2	Sand	Common reed, tamarisk, unidentified grass, scouring rush, western goldenrod, hemp dogbane, unidentified forb
25	29.5	7.5	Sand	Tamarisk, scouring rush, unidentified grass, hemp dogbane, carex
25	31.2	8.2	Sand	Unidentified grass, scouring rush, tamarisk, common reed, unidentified forb, carex
25	32.8	8.5	Sand	Unidentified grass, scouring rush, showy milkweed, giant whitetop, carex
25	34.4	8.5	Sand	Unidentified grass, scouring rush, carex
25	36.1	9.0	Sand	Scouring rush, unidentified grass, showy milkweed
25	37.7	9.8	Sand	Box elder, scouring rush, unidentified grass
25	39.4	9.8	Sand	Box elder, scouring rush, unidentified grass
25	41.0	9.8	Sand	Box elder, scouring rush, unidentified grass
25	42.7	9.8	Sand	Box elder, scouring rush, unidentified grass, unidentified forb
25	44.3	9.8	Sand	Box elder, scouring rush, unidentified grass
25	45.9	9.8	Sand	Box elder, scouring rush, unidentified grass, showy milkweed
25	47.6	9.8	Sand	Box elder, scouring rush, unidentified grass
25	49.2	9.8	Sand	Box elder, scouring rush, unidentified grass, yellow salsify
25	50.9	9.8	Sand	Box elder, scouring rush, yellow salsify, unidentified grass
25	52.5	9.8	Sand	Box elder, scouring rush, unidentified grass
25	54.1	10.3	Sand	Box elder, scouring rush, unidentified grass
25	55.8	11.1	Sand	Box elder, scouring rush, unidentified grass
25	57.4	11.8	Sand	Box elder, scouring rush, unidentified grass
25	59.1	12.1	Sand	Box elder, unidentified grass, scouring rush
25	60.7	12.4	Sand	Box elder, unidentified grass, scouring rush, rabbitbrush
25	62.3	12.7	Sand	Box elder, rabbitbrush, scouring rush
25	64.0	13.0	Sand	Box elder, rabbitbrush, scouring rush, unidentified grass
25	65.6	13.3	Sand	Box elder, rabbitbrush, scouring rush, unidentified grass
25	67.3	13.6	Sand	Box elder, scouring rush, unidentified grass
25	68.9	13.9	Sand	Box elder, unidentified grass
25	70.5	14.1	Sand	Box elder, unidentified grass
25	72.2	14.4	Sand	Box elder, unidentified grass
25	73.8	14.7	Sand	Box elder, unidentified grass, Utah juniper
25	75.5	15.0	Sand	Box elder
25	77.1	15.3	Sand	Box elder

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
25	78.7	15.6	Sand	Box elder
25	80.4	15.9	Sand	Box elder, unidentified grass
25	82.0	16.2	Sand	Box elder, Utah juniper
25	83.7	16.5	Sand	Box elder
25	85.3	16.8	Sand	Box elder, unidentified grass
25	86.9	17.1	Sand	Box elder, rabbitbrush, unidentified grass
26	0.0	0.0	Gravel	None
26	1.6	0.6	Gravel	Common threesquare, common spikerush
26	3.3	1.2	Sand	Common threesquare, common spikerush
26	4.9	1.7	Sand	Common threesquare, common spikerush
26	6.6	1.7	Sand	Common threesquare, common spikerush
26	8.2	1.8	Sand	Common threesquare, western goldenrod
26	9.8	1.9	Sand	Common threesquare, western goldenrod, scouring rush
26	11.5	2.0	Sand	Common threesquare, unidentified grass, western goldenrod
26	13.1	2.1	Sand	Unidentified grass, common threesquare
26	14.8	2.2	Sand	Unidentified grass, western goldenrod, scouring rush
26	16.4	2.2	Sand	Unidentified grass, common plantain, western goldenrod
26	18.0	3.0	Sand	Unidentified grass, sweet clover
26	19.7	4.9	Sand	Sweet clover, unidentified grass
26	21.3	5.1	Sand	Western goldenrod, unidentified grass, white sweetclover, golden aster
26	23.0	5.3	Sand	Western goldenrod, white sweetclover, tamarisk, golden aster, unidentified grass
26	24.6	5.6	Sand	Western goldenrod, tamarisk, unidentified grass
26	26.2	5.8	Sand	Tamarisk
26	27.9	6.2	Sand	Golden aster
26	29.5	6.8	Sand	Golden aster
26	31.2	7.4	Sand	Golden aster
26	32.8	7.6	Sand	Golden aster
26	34.4	7.8	Sand	Golden aster, unidentified grass
26	36.1	7.9	Sand	Tamarisk, golden aster
26	37.7	8.0	Sand	Golden aster, unidentified grass
26	39.4	8.2	Sand	Golden aster, unidentified grass
26	41.0	8.3	Sand	Western mugwort, golden aster
26	42.7	8.4	Sand	Western mugwort, golden aster
27	0.0	0.0	Cobble, sand	None
27	1.6	0.3	Cobble, sand	None
27	3.3	0.6	Cobble, sand	None
27	4.9	0.9	Sand, cobble	None
27	6.6	1.1	Sand	None
27	8.2	1.2	Sand	None
27	9.8	1.4	Sand	Tamarisk
27	11.5	1.6	Sand	Western goldenrod
27	13.1	1.6	Sand	Western goldenrod
27	14.8	1.6	Sand	Western goldenrod, field mint, juncus
27	16.4	1.6	Sand	Western goldenrod
27	18.0	1.6	Sand	Tamarisk

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
27	19.7	1.6	Sand	Tamarisk
27	21.3	1.6	Sand	Western goldenrod, field horsetail
27	23.0	1.6	Sand	None
27	24.6	1.6	Sand	Western goldenrod
27	26.2	1.6	Sand	Western goldenrod
27	27.9	1.6	Sand	Tamarisk, western goldenrod, Fremont cottonwood
27	29.5	1.6	Sand	Western goldenrod
27	31.2	1.6	Sand	Western goldenrod
27	32.8	1.6	Sand	Western goldenrod
27	34.4	1.6	Sand	Western goldenrod
27	36.1	1.6	Sand	Western goldenrod
27	37.7	1.6	Sand	Western goldenrod
27	39.4	1.6	Sand	Western goldenrod, field horsetail
27	41.0	1.6	Sand	Western goldenrod, field horsetail
27	42.7	1.6	Sand	Western goldenrod, tamarisk
27	44.3	1.6	Sand	Western goldenrod, tamarisk, unidentified grass, scouring rush
27	45.9	1.6	Sand	Western goldenrod, coyote willow, tamarisk, scouring rush
27	47.6	1.6	Sand	Western goldenrod
27	49.2	1.6	Sand	Western goldenrod
27	50.9	1.6	Sand	Western goldenrod
27	52.5	1.6	Sand	Western goldenrod
27	54.1	1.6	Sand	Western goldenrod
27	55.8	1.6	Sand	Western goldenrod, tamarisk
27	57.4	1.6	Sand	Western goldenrod, unidentified grass
27	59.1	1.6	Sand	Western goldenrod
27	60.7	1.6	Sand	Western goldenrod, tamarisk, unidentified forb
27	62.3	1.6	Sand	Western goldenrod, tamarisk
27	64.0	1.6	Sand	Western goldenrod
27	65.6	1.6	Sand	Western goldenrod, unidentified grass, common plantain
27	67.3	1.6	Sand	Western goldenrod, orange sneezeweed
27	68.9	1.6	Sand	Coyote willow, tamarisk
27	70.5	1.6	Sand	Western goldenrod, field mint, tamarisk
27	72.2	1.6	Sand	Western goldenrod, tamarisk, field mint
27	73.8	1.6	Sand	Western goldenrod
27	75.5	1.6	Sand	Western goldenrod, tamarisk
27	77.1	1.6	Sand	Field horsetail, scouring rush, western goldenrod, tamarisk
27	78.7	1.6	Sand	Coyote willow, western goldenrod, orange sneezeweed, unidentified grass
27	80.4	1.6	Sand	Western goldenrod, unidentified grass
27	82.0	1.6	Sand	Tamarisk, western goldenrod
27	83.7	1.6	Sand	Western goldenrod, unidentified grass
27	85.3	1.6	Sand	Western goldenrod, unidentified grass
27	86.9	1.6	Sand	Western goldenrod
27	88.6	1.6	Sand	Western goldenrod
27	90.2	1.6	Sand	Western goldenrod, common plantain
27	91.9	1.6	Sand	Western goldenrod, unidentified grass, scouring rush
27	93.5	1.6	Sand	Common plantain, western goldenrod, unidentified grass

TABLE A.3 (Cont.)

Transsect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
27	95.1	1.6	Sand	Unidentified grass, western goldenrod
27	96.8	1.6	Sand	Western goldenrod, field mint
27	98.4	1.6	Sand	Western goldenrod
27	100.1	1.6	Sand	Western goldenrod
27	101.7	1.6	Sand	Common plantain, western goldenrod, unidentified grass
27	103.3	1.6	Sand	Common plantain, unidentified grass
27	105.0	1.6	Sand	Unidentified grass, western goldenrod
27	106.6	1.6	Sand	Western goldenrod, common plantain
27	108.3	1.6	Sand	Stinking povertyweed, unidentified grass, orange sneezeweed, coyote willow, western goldenrod
27	109.9	1.6	Sand	Western goldenrod
27	111.5	1.6	Sand	Unidentified grass, western goldenrod
27	113.2	1.6	Sand	Unidentified grass, western goldenrod
27	114.8	1.6	Sand	Western goldenrod, unidentified grass
27	116.5	1.6	Sand	Unidentified grass, western goldenrod
27	118.1	1.6	Sand	Western goldenrod, unidentified grass
27	119.8	1.6	Sand	Unidentified grass, western goldenrod
27	121.4	1.6	Sand	Unidentified grass, western goldenrod
27	123.0	1.6	Sand	Unidentified grass, western goldenrod, carex
27	124.7	1.6	Sand	Western goldenrod, unidentified grass, field mint
27	126.3	1.6	Sand	Unidentified grass, tamarisk, field mint, Canada thistle
27	128.0	2.7	Sand	Western mugwort, tamarisk, western goldenrod, unidentified grass
27	129.6	3.8	Sand	Tamarisk, western goldenrod, carex, stinking povertyweed
27	131.2	4.9	Sand	Tamarisk, western goldenrod, carex
27	132.9	4.9	Sand	Tamarisk, western goldenrod, carex
27	134.5	4.9	Sand	Tamarisk, western goldenrod
27	136.2	4.9	Sand	Tamarisk, stinking povertyweed, carex, western goldenrod
27	137.8	4.9	Sand	Tamarisk, stinking povertyweed, western goldenrod
27	139.4	4.9	Sand	Tamarisk, stinking povertyweed, western goldenrod, unidentified grass
27	141.1	4.9	Sand	Tamarisk, western goldenrod, unidentified grass
27	142.7	4.9	Sand	Tamarisk, stinking povertyweed, western goldenrod, scouring rush, unidentified grass, giant whitetop
27	144.4	4.9	Sand	Tamarisk, western goldenrod, unidentified grass
27	146.0	4.9	Sand	Tamarisk, western goldenrod, unidentified grass, stinking povertyweed, carex
27	147.6	4.9	Sand	Tamarisk, unidentified grass, western goldenrod, stinking povertyweed, carex
27	149.3	4.9	Sand	Tamarisk, stinking povertyweed, unidentified grass
27	150.9	4.9	Sand	Western goldenrod, stinking povertyweed, unidentified grass
27	152.6	4.9	Sand	Tamarisk, stinking povertyweed, western mugwort, unidentified grass
27	154.2	4.9	Sand	Western mugwort, carex, stinking povertyweed
27	155.8	4.9	Sand	Western mugwort, stinking povertyweed, carex
27	157.5	4.9	Sand	Tamarisk, stinking povertyweed, western goldenrod, carex
27	159.1	4.9	Sand	Tamarisk, stinking povertyweed, carex, juncus

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
27	160.8	4.9	Sand	Tamarisk, stinking povertyweed, carex
27	162.4	4.9	Sand	Stinking povertyweed, carex
27	164.0	4.9	Sand	Carex, stinking povertyweed, western goldenrod
27	165.7	3.9	Sand	Carex, western goldenrod, stinking povertyweed, unidentified grass
27	167.3	3.9	Sand	Tamarisk, carex, unidentified grass, stinking povertyweed, western goldenrod
27	169.0	3.9	Sand	Tamarisk, carex, unidentified grass
27	170.6	3.9	Sand	Unidentified grass, carex, western goldenrod, stinking povertyweed
27	172.2	3.9	Sand	Tamarisk, carex, unidentified grass, stinking povertyweed, western goldenrod
27	173.9	3.9	Sand	Tamarisk, carex, unidentified grass, stinking povertyweed, scouring rush
27	175.5	3.9	Sand	Tamarisk, unidentified grass, stinking povertyweed, carex
27	177.2	3.9	Sand	Tamarisk, stinking povertyweed, unidentified grass, carex
27	178.8	3.9	Sand	Tamarisk, stinking povertyweed, unidentified grass
27	180.4	3.9	Sand	Stinking povertyweed, unidentified grass, tamarisk
27	182.1	3.9	Sand	Stinking povertyweed, unidentified grass
27	183.7	3.9	Sand	Unidentified grass, stinking povertyweed
27	185.4	3.9	Sand	Stinking povertyweed, unidentified grass
27	187.0	3.9	Sand	Unidentified grass, stinking povertyweed
27	188.6	3.9	Sand	Unidentified grass, stinking povertyweed
27	190.3	3.9	Sand	Unidentified grass, stinking povertyweed
27	191.9	3.9	Sand	Stinking povertyweed, unidentified grass
27	193.6	3.9	Sand	Unidentified grass, stinking povertyweed
27	195.2	4.1	Sand	Unidentified grass
27	196.9	4.9	Sand	Unidentified grass, stinking povertyweed
27	198.5	5.6	Sand	Unidentified grass, stinking povertyweed
27	200.1	6.4	Sand	Unidentified grass, stinking povertyweed
27	201.8	7.1	Sand	Unidentified grass
27	203.4	7.9	Sand	Unidentified grass
27	205.1	8.2	Sand	Unidentified grass
27	206.7	8.2	Sand	Unidentified grass
27	208.3	8.2	Sand	Rabbitbrush, unidentified grass
27	210.0	8.2	Sand	Rabbitbrush
27	211.6	8.2	Sand	Rabbitbrush
27	213.3	8.2	Sand	Rabbitbrush, unidentified grass
27	214.9	8.2	Sand	Unidentified grass
27	216.5	8.2	Sand	Unidentified grass
27	218.2	14.1	Sand	Unidentified grass
27	219.8	14.1	Sand	Unidentified grass
27	221.5	14.1	Sand	Unidentified grass
27	223.1	14.1	Sand	Unidentified grass
27	224.7	14.1	Sand	Unidentified grass
27	226.4	14.1	Sand	Unidentified grass
27	228.0	14.1	Sand	Unidentified grass
27	229.7	14.1	Sand	Unidentified grass
27	231.3	14.1	Sand	Unidentified grass
27	232.9	14.1	Sand	Unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
27	234.6	14.1	Sand	Unidentified grass
27	236.2	14.1	Sand	Unidentified grass
27	237.9	14.1	Sand	Unidentified grass
27	239.5	14.1	Sand	Unidentified grass
27	241.1	14.1	Sand	Unidentified grass
27	242.8	14.1	Sand	Unidentified grass
27	244.4	14.1	Sand	Unidentified grass
27	246.1	14.1	Sand	Unidentified grass
27	247.7	14.1	Sand	Unidentified grass
27	249.3	14.1	Sand	Unidentified grass
27	251.0	14.1	Sand	Unidentified grass
27	252.6	14.0	Sand	Unidentified grass
27	254.3	14.0	Sand	Unidentified grass
27	255.9	13.9	Sand	Unidentified grass, field horsetail
27	257.5	13.8	Sand	Unidentified grass
27	259.2	13.7	Sand	Unidentified grass
27	260.8	13.6	Sand	Unidentified grass
27	262.5	13.5	Sand	Unidentified grass, field horsetail
27	264.1	13.4	Sand	Unidentified grass
27	265.7	13.3	Sand	Rabbitbrush, unidentified grass
27	267.4	13.3	Sand	Rabbitbrush, unidentified grass
27	269.0	13.2	Sand	Rabbitbrush, unidentified grass
27	270.7	13.1	Sand	Rabbitbrush, unidentified grass
27	272.3	13.0	Sand	Unidentified grass, rabbitbrush
27	274.0	12.9	Sand	Unidentified grass
27	275.6	12.8	Sand	Rabbitbrush, unidentified grass
27	277.2	12.7	Sand	Rabbitbrush, unidentified grass
27	278.9	12.7	Sand	Unidentified grass
27	280.5	12.6	Sand	Rabbitbrush, unidentified grass
27	282.2	12.5	Sand	Rabbitbrush, unidentified grass
27	283.8	12.4	Sand	Rabbitbrush, unidentified grass
27	285.4	12.3	Sand	Unidentified grass, rabbitbrush
27	287.1	12.2	Sand	Rabbitbrush, unidentified grass, scouring rush
27	288.7	12.1	Sand	Rabbitbrush, unidentified grass
27	290.4	12.1	Sand	Rabbitbrush, unidentified grass
27	292.0	12.0	Sand	Unidentified grass, rabbitbrush
27	293.6	11.9	Sand	Rabbitbrush, unidentified grass
27	295.3	11.8	Sand	Unidentified grass, rabbitbrush
27	296.9	11.7	Sand	Unidentified grass
27	298.6	11.6	Sand	Unidentified grass
27	300.2	11.5	Sand	Unidentified grass, hemp dogbane
27	301.8	11.4	Sand	Rabbitbrush, unidentified grass, scouring rush
27	303.5	11.4	Sand	Unidentified grass, hemp dogbane, scouring rush, rabbitbrush
27	305.1	11.3	Sand	Unidentified grass, rabbitbrush
27	306.8	11.2	Sand	Unidentified grass, scouring rush, rabbitbrush
27	308.4	11.1	Sand	Rabbitbrush, unidentified grass
27	310.0	11.0	Sand	Rabbitbrush, unidentified grass, scouring rush
27	311.7	10.9	Sand	Rabbitbrush, unidentified grass, scouring rush, hemp dogbane
27	313.3	10.8	Sand	Unidentified grass
27	315.0	10.8	Sand	Rabbitbrush, unidentified grass, hemp dogbane

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
27	316.6	10.7	Sand	Rabbitbrush, unidentified grass
27	318.2	10.6	Sand	Rabbitbrush, unidentified grass, scouring rush
27	319.9	10.5	Sand	Rabbitbrush, unidentified grass
27	321.5	10.4	Sand	Box elder, sagebrush, unidentified grass
27	323.2	10.3	Sand	Box elder, sagebrush, unidentified grass
27	324.8	10.2	Sand	Box elder, unidentified grass, sagebrush
27	326.4	10.2	Sand	Box elder, unidentified grass
27	328.1	10.1	Sand	Box elder, unidentified grass
27	329.7	10.0	Sand	Box elder, unidentified grass
27	331.4	9.9	Sand	Box elder
27	333.0	9.8	Sand	Box elder
27	334.6	9.7	Sand	Box elder
27	336.3	9.6	Sand	Box elder
27	337.9	9.5	Sand	Box elder
28	0.0	0.0	Sand	None
28	1.6	0.2	Sand	None
28	3.3	0.3	Sand	None
28	4.9	0.5	Sand	None
28	6.6	0.6	Sand	None
28	8.2	0.8	Sand	None
28	9.8	0.9	Sand	None
28	11.5	1.1	Sand	None
28	13.1	1.2	Sand	None
28	14.8	1.4	Sand	None
28	16.4	2.0	Sand	None
28	18.0	2.0	Sand	None
28	19.7	2.1	Sand	None
28	21.3	2.1	Sand	None
28	23.0	2.2	Sand	None
28	24.6	2.2	Sand	None
28	26.2	2.3	Sand	None
28	27.9	2.3	Sand	None
28	29.5	2.4	Sand	None
28	31.2	2.5	Sand	None
28	32.8	2.5	Sand	None
28	34.4	2.6	Sand	None
28	36.1	2.6	Sand	None
28	37.7	2.7	Sand	None
28	39.4	2.7	Sand	None
28	41.0	2.8	Sand	None
28	42.7	2.8	Sand	None
28	44.3	2.9	Sand	None
28	45.9	2.9	Sand	None
28	47.6	3.0	Sand	None
28	49.2	3.1	Sand	None
28	50.9	3.3	Sand	None
28	52.5	3.5	Sand	None
28	54.1	3.6	Sand	None
28	55.8	3.7	Sand	None
28	57.4	3.8	Sand	None
28	59.1	3.9	Sand	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
28	60.7	4.0	Sand	None
28	62.3	4.1	Sand	None
28	64.0	4.3	Sand	None
28	65.6	4.4	Sand	None
28	67.3	4.5	Sand	None
28	68.9	4.6	Sand	Tamarisk
28	70.5	4.9	Sand	Tamarisk
28	72.2	5.2	Sand	Tamarisk, unidentified grass
28	73.8	5.5	Sand	Tamarisk, hemp dogbane, unidentified forb
28	75.5	5.8	Sand	Western mugwort, tamarisk, cocklebur
28	77.1	6.2	Sand	Unidentified grass, tamarisk, unidentified forb
28	78.7	6.2	Sand	Tamarisk, unidentified grass, unidentified forb
28	80.4	6.3	Sand	Unidentified grass, tamarisk, box elder, unidentified forb
28	82.0	6.3	Sand	Unidentified grass, tamarisk
28	83.7	6.3	Sand	Tamarisk, unidentified grass, unidentified forb, box elder
28	85.3	6.3	Sand	Tamarisk, unidentified grass, sweet clover, box elder, goldenrod
28	86.9	6.3	Sand	Tamarisk, unidentified grass, goldenrod, unidentified forb
28	88.6	6.3	Sand	Goldenrod, tamarisk, unidentified grass
28	90.2	6.3	Sand	Tamarisk, goldenrod, unidentified forb, box elder
28	91.9	6.3	Sand	Tamarisk, unidentified forb, box elder
28	93.5	6.3	Sand	Tamarisk, box elder, giant whitetop
28	95.1	6.3	Boulder, sand	Box elder, white sweetclover, giant whitetop
28	96.8	6.4	Sand	Box elder, sweet clover, unidentified forb, unidentified grass, giant whitetop, knotweed
28	98.4	6.4	Sand	Box elder, goldenrod, unidentified grass, tamarisk, unidentified forb
28	100.1	6.4	Sand	Box elder, unidentified forb, unidentified grass
28	101.7	6.4	Sand	Box elder, rabbitbrush, unidentified forb
28	103.3	6.4	Sand	Box elder, unidentified grass
29	0.0	0.0	Silt, sand	None
29	1.6	0.6	Silt, sand	None
29	3.3	1.1	Silt, sand	None
29	4.9	1.7	Silt, sand	None
29	6.6	2.2	Silt, sand	None
29	8.2	2.8	Silt, sand	None
29	9.8	3.2	Silt, sand	Common reed
29	11.5	3.4	Silt, sand	Common reed
29	13.1	3.6	Silt, sand	Common reed
29	14.8	3.7	Silt, sand	Common reed, scouring rush
29	16.4	3.9	Silt, sand	Common reed, scouring rush, hemp dogbane
29	18.0	4.1	Silt, sand	Common reed, scouring rush, tamarisk
29	19.7	4.3	Silt, sand	Common reed, scouring rush, tamarisk
29	21.3	4.8	Silt, sand	Common reed, scouring rush, tamarisk
29	23.0	6.5	Silt, sand	Common reed, scouring rush, box elder
29	24.6	7.5	Silt, sand	Box elder, scouring rush, hemp dogbane, common reed
29	26.2	7.9	Silt, sand	Box elder, scouring rush, common reed, hemp dogbane, unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
29	27.9	8.3	Silt, sand	Box elder, unidentified grass, scouring rush
29	29.5	8.7	Silt, sand	Box elder, scouring rush, unidentified grass, hemp dogbane
29	31.2	9.1	Silt, sand	Box elder, scouring rush
29	32.8	9.7	Silt, sand	Box elder, scouring rush
29	34.4	10.3	Silt, sand	Box elder, scouring rush
29	36.1	10.6	Silt, sand	Box elder, scouring rush
29	37.7	11.0	Silt, sand	Box elder, scouring rush
29	39.4	11.3	Silt, sand	Box elder, scouring rush, unidentified grass
29	41.0	11.6	Silt, sand	Box elder, scouring rush, unidentified grass
29	42.7	11.9	Silt, sand	Box elder, unidentified grass, scouring rush
29	44.3	12.3	Silt, sand	Box elder, unidentified grass, scouring rush
29	45.9	12.6	Silt, sand	Unidentified grass, unidentified forb
29	47.6	12.9	Silt, sand	Unidentified grass, scouring rush
29	49.2	13.3	Silt, sand	Unidentified grass, yellow salsify
29	50.9	13.6	Silt, sand	Unidentified grass, Utah juniper
30	0.0	0.0	Silt, sand	None
30	1.6	0.5	Silt, sand	None
30	3.3	1.0	Silt, sand	None
30	4.9	1.6	Silt, sand	None
30	6.6	2.1	Silt, sand	Carex
30	8.2	2.7	Silt, sand	Carex, scouring rush, hemp dogbane, unidentified grass
30	9.8	3.4	Silt, sand	Carex, scouring rush, unidentified grass
30	11.5	3.6	Silt, sand	Carex, scouring rush
30	13.1	4.0	Silt, sand	Carex, scouring rush, common evening-primrose, sow thistle
30	14.8	5.1	Silt, sand	Carex, scouring rush, unidentified grass
30	16.4	5.6	Silt, sand	Carex, scouring rush, unidentified grass
30	18.0	5.6	Silt, sand	Scouring rush, unidentified grass, carex
30	19.7	5.7	Silt, sand	Unidentified grass, scouring rush
30	21.3	5.7	Silt, sand	Unidentified grass, scouring rush
31	0.0	0.0	Boulder	None
31	1.6	0.6	Boulder	None
31	3.3	1.3	Boulder	None
31	4.9	1.9	Boulder, sand	Common spikerush
31	6.6	1.4	Sand	Common spikerush
31	8.2	1.0	Boulder, sand	Common spikerush
31	9.8	1.9	Boulder, cobble	Hemp dogbane, knotweed
31	11.5	2.8	Boulder	None
31	13.1	3.8	Gravel, cobble	Knotweed
31	14.8	4.7	Gravel, cobble	Box elder
31	16.4	5.6	Boulder, gravel, sand	Box elder
31	18.0	6.5	Boulder, gravel	Box elder
31	19.7	7.5	Boulder	Box elder
31	21.3	8.4	Cobble	Box elder, scouring rush
31	23.0	9.3	Gravel	Box elder, scouring rush
31	24.6	10.2	Gravel	Box elder, unidentified forb
31	26.2	11.2	Boulder, sand	Box elder, unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
32	0.0	0.0	Cobble	None
32	1.6	0.0	Cobble	None
32	3.3	0.0	Cobble	None
32	4.9	0.0	Cobble	None
32	6.6	0.1	Cobble	Tamarisk
32	8.2	0.1	Cobble	None
32	9.8	0.1	Cobble	None
32	11.5	0.1	Cobble	None
32	13.1	0.1	Cobble	None
32	14.8	0.1	Cobble	None
32	16.4	0.2	Cobble	Field horsetail
32	18.0	0.2	Cobble	None
32	19.7	0.2	Cobble	None
32	21.3	0.2	Cobble	None
32	23.0	0.2	Cobble	Field horsetail
32	24.6	0.2	Cobble	Unidentified forb
32	26.2	0.3	Cobble	None
32	27.9	0.3	Cobble	None
32	29.5	0.3	Cobble	None
32	31.2	0.3	Cobble	None
32	32.8	0.3	Cobble	None
32	34.4	0.3	Cobble	None
32	36.1	0.3	Cobble	None
32	37.7	0.4	Cobble	None
32	39.4	0.4	Cobble	None
32	41.0	0.4	Cobble	None
32	42.7	0.4	Cobble	None
32	44.3	0.4	Cobble	None
32	45.9	0.4	Cobble	None
32	47.6	0.5	Cobble	None
32	49.2	0.5	Cobble	None
32	50.9	0.5	Cobble	None
32	52.5	0.5	Cobble	None
32	54.1	0.5	Cobble	None
32	55.8	0.5	Cobble	None
32	57.4	0.6	Cobble	None
32	59.1	0.6	Cobble	None
32	60.7	0.6	Cobble	None
32	62.3	0.6	Cobble	None
32	64.0	0.6	Cobble	None
32	65.6	0.6	Cobble	None
32	67.3	0.7	Cobble	None
32	68.9	0.7	Cobble	None
-32	70.5	0.7	Cobble	None
32	72.2	0.7	Cobble	None
32	73.8	0.7	Cobble	None
32	75.5	0.7	Cobble	None
32	77.1	0.7	Cobble	None
32	78.7	0.8	Cobble	None
32	80.4	0.8	Cobble	None
32	82.0	0.8	Cobble	Common spikerush
32	83.7	0.8	Cobble	Common spikerush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
32	85.3	0.8	Cobble	None
32	86.9	0.8	Cobble	None
32	88.6	0.9	Cobble	None
32	90.2	0.9	Cobble	None
32	91.9	0.9	Cobble	None
32	93.5	0.9	Cobble	None
32	95.1	0.9	Cobble	None
32	96.8	0.9	Cobble	None
32	98.4	1.0	Cobble	None
32	100.1	1.0	Cobble	None
32	101.7	1.0	Cobble	None
32	103.3	1.0	Cobble	None
32	105.0	1.0	Cobble	None
32	106.6	1.0	Cobble	None
32	108.3	1.0	Cobble	None
32	109.9	1.1	Cobble	None
32	111.5	1.1	Cobble	None
32	113.2	1.1	Cobble	None
32	114.8	1.1	Cobble	None
32	116.5	1.1	Cobble	Common spikerush, field horsetail
32	118.1	1.1	Cobble	Field horsetail
32	119.8	1.2	Cobble	None
32	121.4	1.2	Cobble	None
32	123.0	1.2	Cobble	Common spikerush
32	124.7	1.2	Cobble	None
32	126.3	1.2	Cobble	None
32	128.0	1.2	Cobble	None
32	129.6	1.3	Cobble	None
32	131.2	1.3	Cobble	None
32	132.9	1.3	Cobble	None
32	134.5	1.3	Cobble	None
32	136.2	1.3	Cobble	None
32	137.8	1.3	Cobble	None
32	139.4	1.3	Cobble	None
32	141.1	1.4	Cobble	None
32	142.7	1.4	Cobble	None
32	144.4	1.4	Cobble	None
32	146.0	1.4	Cobble	None
32	147.6	1.4	Cobble	None
32	149.3	1.4	Cobble	None
32	150.9	1.5	Cobble	None
32	152.6	1.5	Cobble	None
32	154.2	1.5	Cobble	None
32	155.8	1.5	Cobble	None
32	157.5	1.5	Cobble	None
32	159.1	1.5	Cobble	None
32	160.8	1.6	Cobble	None
32	162.4	1.6	Cobble	None
32	164.0	1.6	Cobble	None
32	165.7	1.6	Cobble	None
32	167.3	1.6	Cobble	None
32	169.0	1.6	Cobble	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
32	170.6	1.7	Cobble	None
32	172.2	1.7	Cobble	None
32	173.9	1.7	Cobble	None
32	175.5	1.7	Cobble	None
32	177.2	1.7	Cobble	None
32	178.8	1.7	Cobble	None
32	180.4	1.7	Cobble	None
32	182.1	1.8	Cobble	None
32	183.7	1.8	Cobble	None
32	185.4	1.8	Cobble	None
32	187.0	1.8	Cobble	None
32	188.6	1.8	Cobble	None
32	190.3	1.8	Cobble	None
32	191.9	1.9	Cobble	None
32	193.6	1.9	Cobble	None
32	195.2	1.9	Cobble	None
32	196.9	1.9	Cobble	None
32	198.5	1.9	Cobble	None
32	200.1	1.9	Cobble	None
32	201.8	2.0	Cobble	None
32	203.4	2.0	Cobble	None
32	205.1	2.3	Cobble	None
32	206.7	2.7	Cobble	None
32	208.3	3.1	Cobble	None
32	210.0	3.5	Cobble	None
32	211.6	3.9	Cobble	None
32	213.3	4.3	Cobble	None
32	214.9	4.6	Cobble	None
32	216.5	5.0	Cobble	Field horsetail
32	218.2	5.3	Cobble	None
32	219.8	5.3	Cobble	Scouring rush, field horsetail
32	221.5	5.4	Cobble	Unidentified grass
32	223.1	5.4	Cobble	Common spikerush
32	224.7	5.4	Cobble	None
32	226.4	5.5	Cobble	None
32	228.0	5.5	Cobble	None
32	229.7	5.6	Cobble	None
32	231.3	5.6	Cobble	None
32	232.9	5.7	Cobble	Tamarisk, carex
32	234.6	5.7	Cobble	Common spikerush, field horsetail, carex
32	236.2	5.8	Cobble	Common spikerush, field horsetail
32	237.9	5.8	Cobble	Common spikerush, field horsetail
32	239.5	5.8	Cobble, sand	Common spikerush, scouring rush, shore buttercup, field horsetail, western goldenrod
32	241.1	5.9	Sand	Common spikerush, field horsetail, field mint, scouring rush, western goldenrod
32	242.8	5.9	Sand	Scouring rush, common spikerush, field horsetail, common plantain, carex
32	244.4	6.0	Sand	Scouring rush, field horsetail, carex, common threesquare
32	246.1	6.0	Sand	Scouring rush, western goldenrod, carex, common spikerush, field horsetail

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
32	247.7	6.1	Sand	Scouring rush, common threesquare, western goldenrod, carex
32	249.3	6.1	Sand	Scouring rush, western goldenrod, common threesquare, field horsetail
32	251.0	6.1	Sand	Scouring rush, western goldenrod, common threesquare, field horsetail
32	252.6	6.2	Sand	Scouring rush, western goldenrod, common threesquare, field horsetail
32	254.3	6.2	Sand	Scouring rush, field horsetail, unidentified grass, silverweed, field horsetail, common threesquare
32	255.9	6.3	Sand	Scouring rush, western goldenrod, field horsetail, carex
32	257.5	6.3	Sand	Scouring rush, unidentified grass, field horsetail, western goldenrod, hemp dogbane, shore buttercup
32	259.2	6.4	Sand	Scouring rush, western goldenrod, unidentified grass, common threesquare, carex
32	260.8	6.4	Sand	Scouring rush, western goldenrod, field horsetail, carex, orange sneezeweed, common threesquare
32	262.5	6.5	Sand	Scouring rush, western goldenrod, carex, orange sneezeweed
32	264.1	6.5	Sand	Scouring rush, carex, western goldenrod, hemp dogbane, unidentified grass
32	265.7	6.5	Sand	Scouring rush, carex, western goldenrod, Canada thistle, hemp dogbane
32	267.4	6.6	Sand	Scouring rush, carex, western goldenrod, showy milkweed, unidentified grass
32	269.0	6.6	Sand	Scouring rush, western goldenrod, carex, hemp dogbane, unidentified grass, juncus
32	270.7	6.7	Sand	Scouring rush, western goldenrod, carex, unidentified grass, swamp milkweed
32	272.3	6.7	Sand	Scouring rush, western goldenrod, Canada thistle, carex, unidentified grass
32	274.0	6.8	Sand	Scouring rush, western goldenrod, Canada thistle, carex, juncus
32	275.6	6.8	Sand	Scouring rush, Canada thistle, carex, unidentified grass, water ladysthumb, unidentified forb
32	277.2	6.9	Sand	Scouring rush, western goldenrod, knotweed, water ladysthumb, carex, unidentified grass
32	278.9	6.9	Sand	Scouring rush, carex, Canada thistle, water ladysthumb, unidentified forb, unidentified grass
32	280.5	6.9	Sand	Scouring rush, unidentified grass, western goldenrod, water ladysthumb, carex
32	282.2	7.0	Sand	Scouring rush, unidentified grass, Canada thistle, western goldenrod, water ladysthumb, prairie cordgrass
32	283.8	7.0	Sand	Prairie cordgrass, scouring rush, western goldenrod, carex, unidentified grass
32	285.4	7.1	Sand	Prairie cordgrass, scouring rush, western goldenrod, carex, unidentified grass, Canada thistle
32	287.1	7.1	Sand	Prairie cordgrass, western goldenrod, scouring rush, carex

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
32	288.7	7.2	Sand	Prairie cordgrass, scouring rush, Canada thistle, unidentified grass, carex
32	290.4	7.2	Sand	Prairie cordgrass, Canada thistle, western goldenrod, carex, unidentified grass, scouring rush
32	292.0	7.3	Sand	Prairie cordgrass, Canada thistle, scouring rush, juncus, unidentified grass
32	293.6	7.3	Sand	Prairie cordgrass, scouring rush, juncus, unidentified grass, Canada thistle, carex
32	295.3	7.3	Sand	Prairie cordgrass, scouring rush, unidentified grass, unidentified forb, carex
32	296.9	7.4	Sand	Unidentified grass, scouring rush, juncus, carex
32	298.6	7.4	Sand	Unidentified grass, scouring rush, carex
32	300.2	7.5	Sand	Unidentified grass, scouring rush, western goldenrod, juncus
32	301.8	7.5	Sand	Coyote willow, scouring rush, juncus, unidentified grass, carex, western goldenrod
32	303.5	7.6	Sand	Scouring rush, unidentified grass, juncus, tamarisk, carex
32	305.1	7.6	Sand	Scouring rush, carex, unidentified grass
32	306.8	7.6	Sand	Tamarisk, scouring rush, unidentified grass, carex
32	308.4	7.7	Sand	Tamarisk, scouring rush, unidentified grass, carex
32	310.0	7.7	Sand	Scouring rush, unidentified grass, tamarisk, carex
32	311.7	7.8	Sand	Tamarisk, scouring rush, unidentified grass, carex, box elder
32	313.3	7.8	Sand	Scouring rush, unidentified grass, tamarisk, showy milkweed, box elder
32	315.0	7.9	Sand	Scouring rush, unidentified grass, showy milkweed
32	316.6	7.9	Sand	Scouring rush, unidentified grass
32	318.2	8.0	Sand	Scouring rush, unidentified grass
32	319.9	8.0	Sand	Scouring rush, unidentified grass
32	321.5	8.0	Sand	Scouring rush, unidentified grass
32	323.2	8.1	Sand	Scouring rush, unidentified grass
32	324.8	8.1	Sand	Unidentified grass, scouring rush
32	326.4	8.2	Sand	Unidentified grass, scouring rush
32	328.1	8.6	Sand	Unidentified grass, scouring rush
32	329.7	9.5	Sand	Scouring rush, unidentified grass
32	331.4	10.5	Sand	Scouring rush, unidentified grass
32	333.0	11.4	Sand	Box elder, scouring rush, unidentified grass
32	334.6	12.3	Sand	Box elder, scouring rush, unidentified grass, unidentified forb
32	336.3	13.3	Sand	Box elder, scouring rush, unidentified grass
32	337.9	14.2	Sand	Box elder, scouring rush, unidentified grass
32	339.6	15.1	Sand	Box elder, scouring rush, unidentified grass
32	341.2	16.1	Sand	Box elder, scouring rush, unidentified grass
33	0.0	0.0	Cobble, sand	None
33	1.6	0.2	Sand, cobble	None
33	3.3	0.3	Sand	None
33	4.9	0.5	Sand	None
33	6.6	0.6	Cobble, sand	None
33	8.2	0.8	Sand	None
33	9.8	1.0	Sand, cobble	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
33	11.5	1.1	Sand, cobble	None
33	13.1	1.3	Sand	None
33	14.8	1.5	Sand, cobble	None
33	16.4	1.6	Sand, cobble	None
33	18.0	1.8	Sand	None
33	19.7	1.9	Sand	None
33	21.3	2.0	Cobble, sand	None
33	23.0	2.1	Sand	None
33	24.6	2.1	Sand	Common spikerush
33	26.2	2.2	Cobble, sand	Dock
33	27.9	2.2	Sand	Unidentified grass, common spikerush, western goldenrod
33	29.5	2.3	Sand, cobble	Common spikerush
33	31.2	2.3	Sand	None
33	32.8	2.4	Sand	None
33	34.4	2.4	Sand	None
33	36.1	2.4	Sand	None
33	37.7	2.5	Sand	Common spikerush
33	39.4	2.5	Sand	Common spikerush, unidentified grass
33	41.0	2.6	Sand	Common spikerush
33	42.7	2.3	Cobble	Common spikerush, unidentified grass, watercress
33	44.3	2.3	Cobble	None
33	45.9	2.3	Sand	Curly dock, common spikerush, unidentified grass, tamarisk
33	47.6	2.7	Sand	Tamarisk, common spikerush, dock, unidentified grass
33	49.2	2.8	Sand	Common spikerush, unidentified grass, tamarisk, western goldenrod
33	50.9	2.9	Sand	Common spikerush, unidentified grass, unidentified forb, scouring rush
33	52.5	2.9	Sand	Common spikerush, unidentified grass, porcupine sedge
33	54.1	3.0	Sand	Common spikerush, porcupine sedge, scouring rush, field horsetail, coyote willow, common threesquare
33	55.8	3.1	Sand	Common spikerush, scouring rush, unidentified grass, carex
33	57.4	3.2	Sand	Common spikerush, scouring rush, unidentified grass, western goldenrod, field horsetail, common threesquare
33	59.1	3.2	Sand	Field horsetail, unidentified grass, scouring rush, common spikerush, carex, coyote willow, western goldenrod
33	60.7	3.3	Sand	Unidentified grass, field horsetail, porcupine sedge, scouring rush, common threesquare, common spikerush
33	62.3	3.4	Sand	Unidentified grass, common threesquare, scouring rush, field horsetail
33	64.0	3.9	Sand	Unidentified grass, common threesquare
33	65.6	3.9	Sand	Field horsetail, common threesquare, unidentified grass, western goldenrod, shore buttercup
33	67.3	3.9	Sand	Common threesquare, unidentified grass, field horsetail, shore buttercup, watercress, common spikerush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
33	68.9	3.9	Sand	Common threesquare, field horsetail, unidentified grass, common spikerush, water speedwell, watercress
33	70.5	3.9	Sand	Field horsetail, common threesquare, unidentified grass, common spikerush, water speedwell, watercress
33	72.2	3.9	Sand	Field horsetail, common spikerush, common threesquare, western goldenrod, unidentified moss, watercress
33	73.8	3.9	Sand	Unidentified grass, field horsetail, scouring rush, common spikerush, juncus, common threesquare
33	75.5	3.9	Sand	Field horsetail, common spikerush, scouring rush, unidentified grass, common threesquare, field mint
33	77.1	3.9	Sand	Field horsetail, unidentified grass, common spikerush, field mint, juncus, water speedwell
33	78.7	4.3	Sand	Common spikerush, scouring rush, field mint, juncus, field horsetail
33	80.4	4.4	Sand	Common spikerush, unidentified grass, juncus, scouring rush, field horsetail, western goldenrod, watercress, water speedwell
33	82.0	4.5	Sand	Juncus, common spikerush, western goldenrod, scouring rush, watercress, coyote willow, unidentified forb
33	83.7	4.6	Sand	Porcupine sedge, field horsetail, common spikerush, juncus, watercress, unidentified grass
33	85.3	4.7	Sand	Porcupine sedge, panicled bulrush, field horsetail, unidentified grass, juncus, watercress
33	86.9	4.8	Sand	Panicled bulrush, unidentified grass, field horsetail, western goldenrod, common spikerush, curly dock
33	88.6	5.1	Sand	Unidentified grass, field horsetail, western goldenrod, unidentified forb
33	90.2	6.2	Sand	Unidentified grass, scouring rush, western goldenrod, juncus, carex
33	91.9	6.6	Sand	Unidentified grass, scouring rush, western goldenrod
33	93.5	6.8	Sand	Scouring rush, unidentified grass
33	95.1	6.9	Sand	Scouring rush, Canada thistle, western goldenrod, unidentified grass, showy milkweed
33	96.8	7.0	Sand	Scouring rush, unidentified grass, western goldenrod
33	98.4	7.1	Sand	Scouring rush, unidentified grass, western goldenrod, Canada thistle, carex
33	100.1	7.3	Sand	Scouring rush, unidentified grass, Fremont cottonwood
33	101.7	7.4	Sand	Fremont cottonwood, scouring rush, unidentified grass
33	103.3	7.5	Sand	Scouring rush, western goldenrod, Fremont cottonwood, unidentified grass, carex
33	105.0	7.6	Sand	Scouring rush, unidentified grass, Canada thistle, western goldenrod
33	106.6	7.7	Sand	Scouring rush, unidentified grass, hemp dogbane, juncus
33	108.3	7.9	Sand	Scouring rush, unidentified grass, hemp dogbane, juncus
33	109.9	8.0	Sand	Unidentified grass, scouring rush, hemp dogbane, western goldenrod

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
33	111.5	8.1	Sand	Unidentified grass, scouring rush, western goldenrod, Canada thistle
33	113.2	8.2	Sand	Unidentified grass, scouring rush
33	114.8	8.4	Sand	Unidentified grass, scouring rush, hemp dogbane
33	116.5	8.5	Sand	Unidentified grass, scouring rush, field mint, western goldenrod
33	118.1	8.6	Sand	Unidentified grass, scouring rush, field mint, unidentified forb
33	119.8	8.7	Sand	Unidentified grass, scouring rush, hemp dogbane, western goldenrod, box elder, unidentified forb
33	121.4	8.9	Sand	Unidentified grass, scouring rush, unidentified forb, swamp milkweed
33	123.0	9.0	Sand	Unidentified grass, hemp dogbane, western goldenrod, Canada thistle, box elder, swamp milkweed, scouring rush
33	124.7	9.1	Sand	Unidentified grass, box elder, scouring rush, unidentified forb, swamp milkweed
33	126.3	9.2	Sand	Unidentified grass, Canada thistle, scouring rush, box elder, swamp milkweed
33	128.0	9.4	Sand	Box elder, unidentified grass, Canada thistle, scouring rush
33	129.6	9.5	Silt, sand	Box elder, unidentified grass, Canada thistle, hemp dogbane, scouring rush, carex, unidentified grass
33	131.2	9.6	Silt, sand	Box elder, carex, unidentified grass
33	132.9	10.0	Silt, sand	Box elder, carex, unidentified grass
33	134.5	10.4	Silt, sand	Box elder, unidentified grass, carex
33	136.2	10.9	Silt, sand	Box elder, unidentified grass
33	137.8	11.3	Silt, sand	Box elder
33	139.4	11.7	Silt, sand	Box elder
33	141.1	12.1	Silt, sand	Box elder, unidentified grass
34	0.0	0.0	Sand	None
34	1.6	0.6	Sand	None
34	3.3	1.3	Sand	None
34	4.9	1.9	Sand	None
34	6.6	2.5	Sand	None
34	8.2	2.6	Sand	None
34	9.8	2.7	Sand	None
34	11.5	2.8	Sand	None
34	13.1	3.0	Sand	None
34	14.8	3.1	Sand	None
34	16.4	3.2	Sand	Tamarisk
34	18.0	3.3	Sand	Tamarisk
34	19.7	3.5	Sand	Tamarisk
34	21.3	3.6	Sand	Tamarisk
34	23.0	3.7	Sand	Tamarisk
34	24.6	3.7	Sand	Tamarisk
34	26.2	3.6	Sand	Tamarisk
34	27.9	3.9	Sand	Tamarisk
34	29.5	4.1	Sand	Scouring rush
34	31.2	4.4	Sand	None
34	32.8	4.7	Sand	None

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
34	34.4	4.9	Sand	None
34	36.1	5.6	Sand	Unidentified grass
35	0.0	0.0	Sand	None
35	1.6	0.3	Sand	None
35	3.3	0.3	Sand	None
35	4.9	1.3	Sand	None
35	6.6	1.4	Sand	Prairie cordgrass, scouring rush, common spikerush
35	8.2	1.9	Sand	Prairie cordgrass, coyote willow, scouring rush, wild licorice
35	9.8	2.3	Sand	Prairie cordgrass, scouring rush, wild licorice
35	11.5	2.7	Sand	Fremont cottonwood, prairie cordgrass, unidentified grass
35	13.1	3.1	Sand	Wild licorice, prairie cordgrass, scouring rush
35	14.8	3.4	Sand	Wild licorice, scouring rush
35	16.4	3.6	Sand	Wild licorice, common evening-primrose
35	18.0	3.8	Sand	Western goldenrod, scouring rush
35	19.7	4.0	Sand	Western goldenrod
35	21.3	4.2	Sand	None
35	23.0	4.3	Cobble	Rubber rabbitbrush, scouring rush, hemp dogbane, unidentified grass
35	24.6	4.5	Boulder	Scouring rush, unidentified grass, rubber rabbitbrush
35	26.2	4.7	Boulder	None
36	0.0	0.0	Water	Common spikerush
36	1.6	0.4	Sand	Common spikerush
36	3.3	0.7	Sand	Common spikerush
36	4.9	1.1	Sand	Common spikerush
36	6.6	1.7	Sand	Common spikerush, western goldenrod
36	8.2	2.3	Sand	Common spikerush, western goldenrod
36	9.8	2.5	Sand	Common spikerush, field horsetail
36	11.5	2.6	Sand	Western goldenrod, field horsetail, common spikerush
36	13.1	2.8	Sand	Western goldenrod, common spikerush, field horsetail
36	14.8	2.9	Sand	Common spikerush, western goldenrod, field horsetail
36	16.4	3.1	Sand	Western goldenrod, field horsetail
36	18.0	3.2	Sand	Western goldenrod, coyote willow
36	19.7	3.4	Sand	Field horsetail, western goldenrod, giant whitetop
36	21.3	3.5	Sand	Tamarisk, field horsetail
36	23.0	5.1	Sand	Tamarisk, unidentified grass
37	0.0	0.0	Sand	None
37	1.6	0.4	Sand	None
37	3.3	0.8	Sand	None
37	4.9	1.0	Sand	None
37	6.6	1.1	Sand	Coyote willow
37	8.2	1.2	Sand	Coyote willow
37	9.8	2.0	Sand	Coyote willow, scouring rush
37	11.5	3.0	Sand	Coyote willow, scouring rush
37	13.1	3.0	Sand	Scouring rush, unidentified forb
37	14.8	3.0	Sand	White sweetclover, unidentified grass, Canada thistle, scouring rush

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
37	16.4	3.0	Sand	White sweetclover, yellow sweetclover, scouring rush, Canada thistle, water speedwell
37	18.0	4.9	Sand	White sweetclover, yellow sweetclover, cocklebur, Canada thistle, tamarisk, coyote willow
37	19.7	4.9	Sand	White sweetclover, field mint, coyote willow, unidentified grass, scouring rush
37	21.3	4.9	Sand	White sweetclover, unidentified grass, unidentified forb
37	23.0	4.9	Sand	White sweetclover, coyote willow, Canada thistle, field mint, unidentified forb, juncus
37	24.6	4.9	Sand	White sweetclover, coyote willow, Canada thistle, giant whitetop, scouring rush, field mint, unidentified forb
37	26.2	4.9	Sand	White sweetclover, scouring rush
37	27.9	4.9	Sand	White sweetclover, tamarisk, scouring rush, unidentified forb
37	29.5	7.9	Sand	Tamarisk, unidentified grass, scouring rush
37	31.2	8.1	Sand	Unidentified grass, white sweetclover, yellow sweetclover, scouring rush, tamarisk, Fremont cottonwood
37	32.8	8.4	Sand	Rabbitbrush, unidentified grass, scouring rush, tamarisk
37	34.4	8.6	Sand	Rabbitbrush, unidentified grass, scouring rush
37	36.1	8.8	Sand	Unidentified grass
37	37.7	9.1	Sand	Unidentified grass, giant whitetop
37	39.4	9.3	Sand	Unidentified grass, orache, unidentified forb
37	42.7	12.0	Sand	Unidentified forb
37	45.9	12.5	Sand	Stinking povertyweed, orache, unidentified forb
37	49.2	13.0	Sand	Unidentified forb, orache, unidentified grass, stinking povertyweed
37	52.5	13.5	Sand	Unidentified grass
37	55.8	14.1	Sand	Unidentified grass, stinking povertyweed
37	59.1	14.3	Sand	Unidentified forb
37	62.3	14.3	Soil	Rabbitbrush, unidentified grass, giant whitetop
37	65.6	14.3	Soil	Rabbitbrush, giant whitetop, unidentified grass
37	68.9	14.3	Soil	Unidentified grass, giant whitetop
37	72.2	14.3	Soil	Unidentified grass, giant whitetop
37	75.5	14.3	Soil	Giant whitetop, unidentified grass
37	78.7	14.3	Soil	Giant whitetop
37	82.0	14.3	Soil	Giant whitetop
37	85.3	14.3	Soil	Giant whitetop
37	88.6	14.3	Soil	Giant whitetop
37	91.9	14.3	Soil	Giant whitetop
37	95.1	14.3	Soil	Giant whitetop, unidentified grass
37	98.4	14.3	Soil	Unidentified grass, giant whitetop
37	101.7	14.3	Soil	Unidentified grass, giant whitetop
37	105.0	14.3	Soil	Giant whitetop
37	108.3	14.3	Soil	Unidentified grass
37	111.5	14.3	Soil	Unidentified grass, Fremont cottonwood
37	114.8	14.3	Soil	Unidentified grass, Fremont cottonwood
37	118.1	14.3	Soil	Fremont cottonwood, unidentified grass
37	121.4	14.3	Soil	Unidentified grass
37	124.7	14.3	Soil	Unidentified grass
37	128.0	14.3	Soil	Unidentified grass

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
37	131.2	14.3	Soil	Fremont cottonwood, unidentified grass
37	134.5	14.3	Soil	Fremont cottonwood, unidentified grass
37	137.8	14.3	Soil	Fremont cottonwood, unidentified grass
37	141.1	14.3	Soil	Fremont cottonwood
37	144.4	14.3	Soil	Fremont cottonwood, unidentified grass
37	147.6	14.3	Soil	Fremont cottonwood, unidentified grass
37	150.9	14.3	Soil	Fremont cottonwood, unidentified grass
37	154.2	14.3	Soil	Fremont cottonwood, unidentified grass
37	157.5	14.3	Soil	Fremont cottonwood, unidentified grass
37	160.8	14.3	Soil	Fremont cottonwood, unidentified grass
37	164.0	14.3	Soil	Fremont cottonwood, unidentified grass
37	167.3	14.3	Soil	Fremont cottonwood, unidentified grass
37	170.6	14.3	Soil	Fremont cottonwood, unidentified grass
37	173.9	14.3	Soil	Fremont cottonwood, unidentified grass
37	177.2	14.3	Soil	Fremont cottonwood, unidentified grass
37	180.4	14.3	Soil	Fremont cottonwood, unidentified grass
37	183.7	14.3	Soil	Fremont cottonwood, unidentified grass
37	187.0	14.3	Soil	Fremont cottonwood, unidentified grass
37	190.3	14.3	Soil	Fremont cottonwood, unidentified grass
37	193.6	14.3	Soil	Fremont cottonwood, unidentified grass
37	196.9	14.3	Soil	Fremont cottonwood, unidentified grass
37	200.1	14.3	Soil	Fremont cottonwood, unidentified grass
37	203.4	14.3	Soil	Fremont cottonwood, unidentified grass
37	206.7	14.3	Soil	Fremont cottonwood, unidentified grass
37	210.0	14.3	Soil	Fremont cottonwood, unidentified grass
37	213.3	14.3	Soil	Fremont cottonwood, unidentified grass
37	216.5	14.3	Soil	Fremont cottonwood, unidentified grass
37	219.8	14.3	Soil	Fremont cottonwood, unidentified grass
37	223.1	14.3	Soil	Fremont cottonwood, unidentified grass
37	226.4	14.3	Soil	Fremont cottonwood, unidentified grass
37	229.7	14.3	Soil	Fremont cottonwood, unidentified grass
37	232.9	14.3	Soil	Fremont cottonwood, unidentified grass
37	236.2	14.3	Soil	Unidentified grass
37	239.5	14.3	Soil	Unidentified grass
38	0.0	0.0	Sand	Common spikerush
38	1.6	0.2	Sand	Juncus
38	3.3	0.3	Sand	None
38	4.9	0.5	Sand	None
38	6.6	0.7	Sand	Common threesquare, juncus
38	8.2	0.8	Sand	Common spikerush
38	9.8	0.9	Sand	Common spikerush, common threesquare, juncus
38	11.5	1.1	Sand	Common spikerush
38	13.1	1.4	Sand	Common spikerush, common threesquare, field horsetail
38	14.8	1.5	Sand	Juncus, field horsetail
38	16.4	1.6	Sand	Common spikerush, field horsetail
38	18.0	2.0	Sand	Common spikerush
38	19.7	2.3	Sand	Common spikerush
38	21.3	2.3	Sand	Field horsetail
38	23.0	2.4	Sand	Field horsetail, common spikerush
38	24.6	2.4	Sand	Carex, field horsetail

TABLE A.3 (Cont.)

Transect	Distance (ft)	Elevation (ft)	Substrate	Species <sup>a</sup>
38	26.2	2.4	Sand	Carex, field horsetail
38	27.9	2.5	Sand	Carex, coyote willow
38	29.5	2.5	Sand	Carex
38	31.2	2.5	Sand	Carex
38	32.8	2.6	Sand	Common spikerush, carex
38	34.4	2.6	Sand	Common spikerush, carex
38	36.1	2.6	Sand	Carex
38	37.7	3.8	Sand	Carex
38	39.4	4.5	Sand	Carex
38	41.0	4.8	Sand	Carex
38	42.7	5.1	Sand	Carex
38	44.3	5.3	Sand	Carex
38	45.9	5.6	Sand	Carex
38	47.6	5.9	Sand	Carex
38	49.2	6.3	Sand	Carex
38	50.9	7.3	Sand	Carex, unidentified grass
38	52.5	8.4	Sand	Carex
38	54.1	8.5	Sand	Carex
38	55.8	8.5	Sand	Carex, unidentified grass
38	57.4	8.6	Sand	Carex, unidentified grass
38	59.1	8.7	Sand	Carex, unidentified grass
38	60.7	8.8	Sand	Box elder, carex
38	62.3	8.9	Sand	Box elder, carex
38	64.0	9.0	Sand	Carex
38	65.6	10.0	Sand	Carex
38	67.3	11.3	Sand	Sagebrush, carex
38	68.9	12.6	Sand	Sagebrush, carex
38	70.5	13.8	Sand	Sagebrush, unidentified grass
38	72.2	15.1	Sand	Sagebrush, carex, scouring rush
38	73.8	16.4	Sand	Sagebrush, unidentified grass, scouring rush

<sup>a</sup> The species are listed in descending order of abundance.

<sup>b</sup> A hyphen indicates that data are not available.

**TABLE A.4 Scientific Names and Wetland Indicator Status of Plant Species or Taxa Identified in This Survey**

Common Name <sup>a</sup>	Scientific Name	Wetland Indicator Status <sup>b</sup>
Alkali bulrush	<i>Scirpus maritimus</i>	OBL
Box elder	<i>Acer negundo</i>	FACW
Canada thistle	<i>Cirsium arvense</i>	FACU
Carex	<i>Carex</i> spp.	<sup>c</sup>
Cattail	<i>Typha</i> spp.	OBL
Cladophora	<i>Cladophora glomerata</i>	Aquatic <sup>d</sup>
Clasping peppergrass	<i>Lepidium perfoliatum</i>	FAC-
Cocklebur	<i>Xanthium strumarium</i>	FAC
Common dandelion	<i>Taraxacum officinale</i>	FACU+
Common evening-primrose	<i>Oenothera biennis</i>	FACU
Common plantain	<i>Plantago major</i>	FACU
Common reed	<i>Phragmites australis</i>	FACW+
Common sea-milkwort	<i>Glaux maritima</i>	OBL
Common spikerush	<i>Eleocharis palustris</i>	OBL
Common threesquare	<i>Scirpus pungens</i>	OBL
Coyote willow	<i>Salix exigua</i>	OBL
Curly dock	<i>Rumex crispus</i>	FACW
Dock	<i>Rumex</i> spp.	<sup>c</sup>
Dogwood	<i>Cornus stolonifera</i>	FACW
Field horsetail	<i>Equisetum arvense</i>	FAC+
Field mint	<i>Mentha arvensis</i>	FACW
Flax-leaved rabbitbrush	<i>Chrysothamnus linifolius</i>	UPL
Fremont cottonwood	<i>Populus fremontii</i>	FACW
Giant whitetop	<i>Lepidium latifolium</i>	FAC
Globe-podded whitetop	<i>Cardaria pubescens</i>	UPL
Golden aster	<i>Heterotheca villosa</i>	UPL
Goldenrod	<i>Solidago</i> spp.	<sup>c</sup>
Grasses	<i>Poaceae</i>	<sup>c</sup>
Green mormon-tea	<i>Ephedra viridis</i>	UPL
Hairleaf water-buttercup	<i>Ranunculus aquatilis</i>	OBL
Hardstem bulrush	<i>Scirpus acutus</i>	OBL
Hemp dogbane	<i>Apocynum cannabinum</i>	FAC
Juncus	<i>Juncus</i> spp.	<sup>c</sup>
Knotweed	<i>Polygonum</i> spp.	<sup>c</sup>
Orache	<i>Atriplex</i> spp.	<sup>c</sup>
Orange sneezeweed	<i>Helenium autumnale</i> var. <i>montanum</i>	FACW+
Panicled bulrush	<i>Scirpus microcarpus</i>	OBL
Poison ivy	<i>Toxicodendron rydbergii</i>	FACU
Porcupine sedge	<i>Carex hystricina</i>	OBL

TABLE A.4 (Cont.)

Common Name <sup>a</sup>	Scientific Name	Wetland Indicator Status <sup>b</sup>
Prairie cordgrass	<i>Spartina pectinata</i>	OBL
Prickly pear	<i>Opuntia</i> spp.	UPL
Rabbitbrush	<i>Chrysothamnus</i> spp.	UPL
Rubber rabbitbrush	<i>Chrysothamnus nauseosus</i>	UPL
Sagebrush	<i>Artemisia</i> spp.	FACW-UPL
Scouring rush	<i>Equisetum</i> spp.	FACW
Shore buttercup	<i>Ranunculus cymbalaria</i>	OBL
Showy milkweed	<i>Asclepias speciosa</i>	FACW
Silverweed	<i>Potentilla anserina</i>	OBL
Skullcap	<i>Scutellaria galericulata</i>	OBL
Sow thistle	<i>Sonchus</i> spp.	- <sup>c</sup>
Spikemoss	<i>Selaginella mutica</i>	OBL
Stinking povertyweed	<i>Iva axillaris</i>	FACW
Swamp milkweed	<i>Asclepias incarnata</i>	OBL
Sweet clover	<i>Melilotus</i> spp.	FACU
Tamarisk	<i>Tamarix ramosissima</i>	FACW
Utah juniper	<i>Juniperus osteosperma</i>	UPL
Water hemlock	<i>Cicuta maculata</i> var. <i>angustifolia</i>	OBL
Water lady's-thumb	<i>Polygonum amphibium</i>	OBL
Water speedwell	<i>Veronica anagallis-aquatica</i>	OBL
Watercress	<i>Nasturtium officinale</i>	OBL
Western goldenrod	<i>Solidago occidentalis</i>	OBL
Western mugwort	<i>Artemisia ludoviciana</i>	FACU
Western virgin-bower	<i>Clematis ligusticifolia</i>	FACU
White clover	<i>Trifolium repens</i>	FACU
White sweetclover	<i>Melilotus alba</i>	FACU
Wild licorice	<i>Glycyrrhiza lepidota</i>	FAC-
Yellow salsify	<i>Tragopogon dubius</i>	UPL
Yellow sweetclover	<i>Melilotus officinalis</i>	FACU

<sup>a</sup> Nomenclature follows Goodrich and Neese (1986).

<sup>b</sup> Wetland indicator status (from Reed 1988) refers to the likelihood of finding a plant species in wetlands. OBL = plants that occur almost always in wetlands; FACW = plants that usually occur in wetlands but also occur in nonwetlands; FAC = plants with a similar likelihood of occurring in both wetlands and nonwetlands; FACU = plants that usually occur in nonwetlands but are occasionally found in wetlands; UPL = plants that occur almost always in nonwetlands. For a given indicator status, a "+" following an indicator denotes a greater likelihood of occurring within wetlands, whereas a "-" indicates a lesser likelihood of occurring within wetlands.

<sup>c</sup> No indicator status can be given for this genus because it contains species that differ in probability of being found in wetlands.

<sup>d</sup> Species is a nonemergent aquatic plant and is not given a wetland indicator status by Reed (1988).

**REFERENCES (APPENDIX)**

Goodrich, S., and E. Neese, 1986, *Uintah Basin Flora*, U.S. Forest Service, Intermountain Region, Ogden, Utah.

Reed, P.B., Jr., 1988, *National List of Plant Species that Occur in Wetlands: Intermountain (Region 8)*, U.S. Fish and Wildlife Service Biological Report 88 (26.8).