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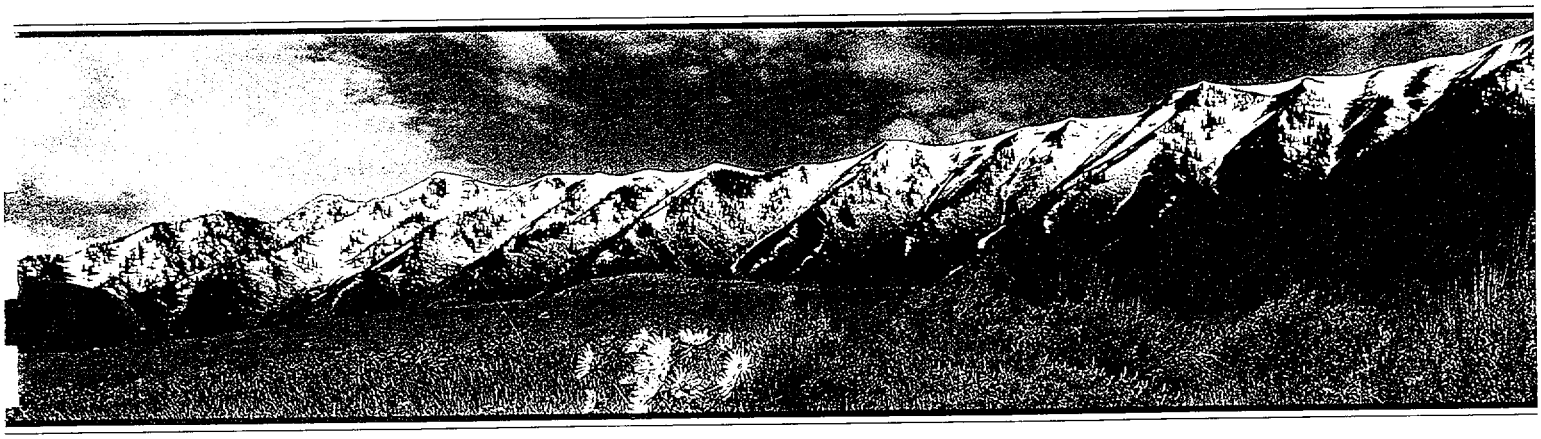
Ecological Solutions, LC

The Great Salt Lake and Southern Railroad:

Wetland and Stream Survey

January 2001



The Great Salt Lake and Southern Railroad:

Wetland and Stream Survey

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Introduction

Cirrus Ecological Solutions, L.C. (Cirrus) of Logan, Utah, was retained to inspect the proposed railroad alignment between the Low interchange on I-80 and the Skull Valley Goshute Indian Reservation (Figures 1 and 2) (hereinafter referred to as the "alignment" or "the delineation study area"). The purpose of this survey was to determine if any jurisdictional waters of the United States, particularly wetlands or perennial, intermittent, or ephemeral streams, are present along the alignment.

Field work confirmed that the alignment would cross topographic features, none of which can be characterized as wetlands. Accordingly, this report evaluated the features for jurisdictional properties consistent with the three types of non-wetland waters, i.e., perennial, intermittent, and ephemeral streams. This survey and associated evaluation relied on the U.S. Army Corps of Engineers ("Corps") definitions distinguishing stream types. In particular, perennial streams have flowing water year-round during a typical year. 65 Fed. Reg. 12817, 12898 (March 9, 2000). Perennial streams usually have characteristic ecosystems (i.e., riparian/wetland communities) along their banks that distinguish them from the surrounding environment. Intermittent streams have flowing water during certain times of the year, when ground water provides water for stream flow. 65 Fed. Reg. at 12898. Intermittent streams often have characteristic ecosystems along their banks, but they may not be as well developed as those associated with perennial streams due to the reduced availability of water. Ephemeral streams have flowing water only during, and for a short duration after, precipitation events. 65 Fed. Reg. at 12898. Due to the unpredictability and short duration of the flow, ephemeral streams typically are not associated with characteristic ecosystems.

Regulatory Background. Section 404 of the Clear Water Act requires that a Corps' permit be obtained prior to discharging dredged or fill material into a water of the United States. Corps' regulations (33 CFR 328.3(a)) define "Waters of the United States" as follows:

> (1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
>
> (2) All interstate waters including interstate wetlands;
>
> (3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:
>
> (i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or
>
> (ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
>
> (iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1)-(4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1)-(6) of this section.

In the preamble to the regulations promulgated in 1986, the Corps further defined the "other waters" which could affect interstate commerce as waters:

a. Which are or would be used as habitat by birds protected by Migratory Bird Treaties; or

b. Which are or would be used as habitat by other migratory birds which cross state lines; or

c. Which are or would be used as habitat for endangered species; or

d. Used to irrigate crops sold in interstate commerce.

51 Fed. Reg. 41206, 41217 (Nov. 13, 1986).

The alignment is within an isolated drainage basin. The delineation study area does not cross any perennial or intermittent streams. The scope of the Corps' potential jurisdiction is, therefore, limited to that associated with isolated ephemeral drainages. Jurisdiction is founded on (1) the geomorphic characteristics of those drainages; and (2) any nexus with interstate commerce. The associated regulatory requirements are described below.

Geomorphic Characteristics. Unlike standards for delineating jurisdictional wetlands, there are no specific guidelines for delineating non-wetland waters of the United States. However, the Corps has clarified that there is a point where ephemeral drainages cease to be jurisdictional waters for 404 permitting purposes. Specifically, the Corps provides that an ephemeral stream that does not have an Ordinary High Water Mark ("OHWM") is not a water of the United States. 65 Fed. Reg. at 12823.

The Corps' regulations provide some criteria for determining the presence of an OHWM:

> ... that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of surrounding areas.

33 CFR 328.3(e).

The determination of the OHWM can be complicated in areas with an arid environment. In arid environments, soils are often highly erodible and slower to recover from such erosion. As a result, a drainage that may be subject to flowing water on a less-than-annual basis and/or for extremely brief periods may have a pronounced bed and banks but does not have a clearly visible OHWM. Although the Corps' current regulations do not provide specific criteria pertaining to periodicity of flows, the evolution of the regulatory definition of the OHWM does provide additional insight.

On July 25, 1975, the Corps published interim final regulations to expand jurisdiction under Section 404 of the Clean Water Act. 40 Fed. Reg. 31320. The interim regulations utilized a 25 percent inundation factor for determination of ordinary high water, i.e., that point on shore which is inundated 25 percent of the time (as derived by flow duration curves). 40 Fed. Reg. at 31321. On July 19, 1977, the Corps issued final regulations, that among other things, revised the definition of OHWM. The preamble explains that the Corps: "returned to [its] definition of ordinary high water mark used in the administration of [the] 1899 Act program . . . in waters where no wetlands are present, the definition will include those areas that are part of the aquatic system along these freshwater lakes, rivers, and streams, as this mark is intended to include those areas where water will be present with predictable regularity." 42 Fed. Reg. 37122, 37129 (emphasis added).

Based on the above and consistent with the longstanding approach of the Sacramento District, we conclude that the OHWM should correspond to hydrologic conditions that would be expected on an average annual basis (i.e., equal to or less than a two-year precipitation event). Since indicators of flow frequency are often not available or observable in the types of drainages characterizing the delineation study area, we based our determination of potential waters of the United States on a variety of criteria, including flow indicators, as discussed below.

a. Presence of a defined bed - a linear bed in a topographic depression which would transport surface water within a watershed.

b. Presence of defined banks - near vertical or steep-sided banks formed by erosion from flowing water. This is opposed to topographic swales that have more gradually sloping sides.

c. Evidence of ordinary high water mark - indicators include a clear natural line impressed on the bank, shelving, changes in the character of the soil, absence of terrestrial vegetation (particularly perennials) and recent alluvial or litter deposition or other evidence that water has flowed recently.

We consider the presence of defined bed and banks along with some evidence of an OHWM to be indicative of a drainage with the geomorphic characteristics of a **potential** water of the United States.

Interstate Commerce Nexus. With respect to the interstate commerce nexus and for purposes of ensuring an expansive delineation, we assumed that all wetlands and playas within Skull Valley would, or could, be used by migratory birds and would therefore be considered waters of the United States. Consequently and consistent with the delineation approach relied upon by the Corps' Sacramento District, if any given channel exhibited the requisite geomorphic characteristics and drains into either wetlands or playas existing within Skull Valley, it would be delineated as a jurisdictional water of the United States.

Conversely, where a given channel exhibited the requisite geomorphic characteristics but did not have a surface connection with either wetlands or playas within Skull Valley, it would not be delineated as a water of the United States.

The Supreme Court issued its decision in *Solid Waste Agency v. United States Army Corps of Engineers* on January 9, 2001. That decision holds that the Clean Water Act does not allow for jurisdiction based on the "Migratory Bird Rule." Accordingly, while the broad interstate commerce nexus assumptions of the survey team were unnecessary in light of the actual field conditions, the results of the survey are further bolstered by the Supreme Court's decision.

Methodology

Fieldwork was completed September 29, and October 3, 4, and 17 by John Stewart of Cirrus, and November 28–30 by John Stewart of Cirrus and Tom Skordal of Gibson and Skordal. This report was prepared by John Stewart with review and consultation by Tom Skordal.

A Global Positioning System (GPS) was used to locate and follow the alignment. The entire length of the corridor was traversed twice to verify the presence or absence of wetlands or streams, beginning at the south end of the railroad route at the Goshute Indian Reservation and ending at the north end at the Low interchange on Interstate-80. Features were numbered consecutively from south to north. In cases where an upstream and downstream observation were on the same feature, they were given the same number, but the upstream point was designated "a" and the downstream point "b." Features encountered along the route were classified as either general (G), swale (S), or bed-and-bank (B) features. These terms are described in the results section. In cases where a feature was on the borderline between a swale and a bed-and-bank feature, it was recorded as a S/B feature (Table 1). Several data points documenting the downstream extent of features with indicators of an OHWM were classified as flat (F) due to the absence of topographic depression (Table 1).

In addition to classifying the feature, a check list matrix was used to systematically determine if any indicators of an OHWM was present at each station (Table 1). Each feature was specifically evaluated for those indicators listed in the Corps definition of OHWM. These indicators are the occurrence of shelving, a break in the vegetation, a scoured bed, or recent alluvial or litter deposition. In order to evaluate potential waters as broadly as possible, the identification of any of one of these characteristics was presumed to indicate the potential presence of an OHWM. Features with a OHWM were further investigated to determine if they were tributary to a water of the United States, such as playa or wetlands in the valley bottom. The downstream extent of these features was documented and identified as point "b" of the same system. Data points downstream of the alignment were also used to document the absence of a drainage with indicators of an OHWM at four blue line features, namely 43, 44, 45, and 46.

Photographs were taken of the features and are included as attachment A. The location of each feature was recorded using a GPS. The locations of the features were then overlain on digital 7.5- minute quadrangle maps, which accompany this report as attachment B. Five map sheets were required to display the line from the storage site to the Low interchange on I-80: Hickman Knolls, Hastings Pass SE, Hastings Pass NE, Delle, and Low.

Initially and in order to document the full range of topographic features, all landscape features crossed by the alignment were inspected, including general features, swale features, and bed-and-bank features.

After the full range of features was documented, only those with a bed and bank were evaluated. Where possible, all blue line features shown on the USGS 7.5-minute maps (and identified as representing intermittent streams) were evaluated to determine the presence of a bed and bank. Blue line features were located by determining the approximate coordinates and then finding the largest topographic feature in the vicinity of the coordinates. When several corresponding features were located in close proximity and it was not obvious which was represented by the blue line on the map, the largest or best developed feature was documented thereby ensuring that the survey identifies the broadest possible delineation. There were cases in which the blue lines did not correspond to an observable topographic feature (possibly because the map was generated from aerial photography rather than ground-level observations).

Results

The proposed alignment is located on the west side of Skull Valley, beginning at the northwest end of the Cedar Mountains at the Low interchange on Interstate-80 and running east around the north end of the mountains before turning south into Skull Valley (Figure 2). It continues south along the gentle slopes between the base of the Cedar Mountains and the valley bottom. The location of this alignment in the landscape places it above the playa wetlands and mudflats that occur in the north end of Skull Valley. The final segment of the alignment turns east to enter the Goshute Indian Reservation at a point south of the playa wetlands found in the north end of the valley. In fact, there are no wetlands of any kind along the alignment.

This alignment traverses two main vegetation types. The north portion along the toe of the Cedar Mountain Range is dominated by dropseed (*Sporobolus spp.*), cheatgrass (*Bromus tectorum*), and tumbleweeds (*Salsola spp.*), while further south the alignment moves into the valley bottom and the associated greasewood (*Sarcobatus vermiculatus*) community. In some areas, range fires have replaced the greasewood community with cheatgrass and tumbleweeds.

Three classes of landscape features of concern in this survey were found to be common along the toe of the Cedar Mountain Range and in the flats of Skull Valley: general features, swale features, and bed-and-bank features. These classes are described below.

General Features. This category of features is limited to gentle depressions or dips in the topography with no evidence of water movement. In addition, there is no change in the vegetation community as a general feature is crossed. Two general features were documented on the south end of the line near the Goshute Indian Reservation during the initial calibration phase of the work, and several additional general features corresponding to blue lines on the USGS maps were subsequently documented along the alignment. Consequently, although general features are common along the alignment, they were not described unless they corresponded to blue lines on the USGS maps.

Swale Features. This category of features is characterized by a more pronounced linear depression in the topography. Swales typically have sides and a bottom, but the sides are typically not as steep and the bottom is often rounded. In cross-section, a swale is often bowl-shaped with a smooth transition from one side, across the bottom, and up the other side. Swales are not associated with flowing water and therefore do not have shelving, a vegetation break, a scoured bed, or recent deposition. Due to the absence of these indicators, no OHWM is present. Many swales catch tumbleweeds and commonly have several years accumulation. Although some swales have a change in vegetation, this is often due to the accumulated tumbleweeds forming a mat too thick to allow plant growth rather than to flowing water.

Bed-and-Bank Features. This category includes those features that have an identifiable bed and bank. In cross-section, bed-and-bank features are more trapezoidal in shape, with steeper sides, a flat bottom and an abrupt change in the angle between the sides and the bottom. Generally, these features tend to be the largest of the three classes with the most pronounced change in topography. The beds tend to retain and therefore are generally filled with tumbleweeds. Most bed-and-bank features are not associated with flowing water and do not have indicators of an OHWM, such as shelving, a vegetation break, a scoured bed, or recent deposition, that would make them a potential waters of the United States. However, the field work revealed four bed-and-bank features with one or more field indicators of an OHWM. These four features show indications of recent water flow. Tumbleweeds and other debris have been washed from the channel and deposited in drift lines. There is a break in the vegetation, consisting of an abrupt change from upland vegetation to the scoured streambed with little to no vegetation present. There is no riparian vegetation associated with any of these features, each of which is described in the following paragraphs.

The four bed-and-bank features identified as potential waters of the United States due to the presence of an OHWM indicator are numbers 9a, 31a, 33a, and 49a (Table 1 and maps). Feature 9a is located on the south end of the alignment where the route makes the east bend to enter the reservation. This feature is a small ephemeral drainage approximately 4 feet wide. Due to recent water flows, tumbleweeds and other debris have been washed from the channel. The OHWM indicators include recent debris deposits and natural lines impressed on the bank. This feature was subsequently inspected approximately 5 miles downstream of the proposed alignment at point 9b. At this location, there were no observable indicators of an OHWM. Further, there were no indications that there had been flowing water. The water that was present at 9a dissipated in the flats prior to reaching 9b. Therefore, because this ephemeral drainage is not tributary to a water of the United States, it is not a water of the United States.

Feature 31a is the largest ephemeral drainage along the proposed railroad alignment. This channel cuts abruptly into the landscape and is approximately 12 feet wide. The OHWM indicators include shelving, a break in the vegetation, a scoured bed, and recent deposition. However, this channel ends in a delta in the greasewood flat at data point 31b, approximately 0.5 miles east of the location of the railroad crossing. Near its downstream terminus, the drainage braids, exhibits more of a swale topography and then disappears. Indicators of overland flow continue for a short distance beyond, but cease without reaching a water of the United States. Because this ephemeral drainage is not tributary to a water of the United States, it is not a water of the United States.

Feature 33a is another relatively large ephemeral drainage. The drainage is located within an arroyo that is cut 10 to 12 feet into the surrounding landscape. OHWM indicators include shelving, a break in the vegetation, a scoured bed, and recent deposition. Although the arroyo is much wider, the channel, as defined by OHWM indicators, is approximately 8 feet wide. This ephemeral drainage also ends in a delta in the greasewood flats, approximately 0.8 miles east of the alignment crossing at data point 33b. The drainage begins to braid, develops swale characteristics and then ends, with overland flow continuing for a short distance. Because this ephemeral drainage is not tributary to a water of the United States, it is not a water of the United States.

Feature 49a is a small ephemeral drainage approximately 3 feet wide. Several indicators of an OHWM are present, including a break in the vegetation and recent deposition. However, this feature ends approximately 500 feet east of the crossing in a delta area (see data point 49b). Because this ephemeral drainage is not tributary to a water of the United States, it is not a water of the United States.

As noted above, these four features end and have no connection to any water of the United States. This was also noted with other swale and bed-and-bank features. Many end within view of the alignment.

Conclusions

There are no wetlands or perennial or seasonal streams along the alignment. The majority of features are classified as swales or bed-and-bank features which do not have an OHWM and thus are not potential waters of the United States. Four ephemeral drainages have one or more indicators of an OHWM making them potential waters of the United States. However, in each case, these drainages end without reaching any water of the United States. Because these ephemeral drainages are not tributary to waters of the United States, they are not waters of the United States and are not subject to regulation under Section 404 of the Clean Water Act.

References

65 Federal Register. 2000. Final Notice of Issuance and Modification of Nationwide Permits; Notice. Department of the Army, Corps of Engineers. March 9, pp. 12817, 12823, 12898.

51 Federal Register. 1986. Regulatory Programs of the Corps of Engineers; Final Rule. Department of the Army, Corps of Engineers. November 12, pp 41206, 41217.

42 Federal Register 1977. Regulatory Programs of the Corps of Engineers. Department of the Army, Corps of Engineers. July 19, pp. 37121, 37129.

40 Federal Register 1975. Permits for Activities in Navigable Waters or Ocean Waters. Department of the Army, Corps of Engineers. July 25, pp. 31320 – 31321.

Table 1. Classification and description of topographic features encountered along the alignment.

Reference Number	Coordinates (Latitude & Longitude)	Topographic Type	Shelving	Vegetation Break	Scoured Bed	Recent Deposition	Potential Water of the U.S.	Soil Change	Average Width[1]	Comments (If applicable)
1	40°24'31".598 N 112°48'06".180 E	G	N	N	N	N	N	N	–	
2	40°24'31".211 N 112°48'11".180 E	G	N	N	N	N	N	N	–	
3	40°24'30".862 N 112°48'13".353 E	S	N	N	N	N	N	N	–	Swale connects two terrace levels
4	40°24'28".730 N 112°48'26".026 E	S	N	N	N	N	N	N	–	Swale connects two terrace levels
5	40°24'29".973 N 112°48'41".153 E	S	N	N	N	N	N	N	–	Species inside and outside of the swale are the same, but within the swale, dried plants are protected from the wind and have not been blown away.
6a	40°24'35".323 N 112°49'50".777 E	S	N	N	N	N	N	N	–	
6b	40°29'07".195 N 112°48'29".697 E	S	N	N	N	N	N	N	–	
7	40°24'23".767 N 112°50'13".618 E	S	N	N	N	N	N	N	–	
8a	40°24'28".126 N 112°50'31".019 E	B	N	N	N	N	N	N	–	Small bed and bank without an OHWM that is full of tumbleweeds. Bed and bank characteristics end approximately 550 feet downstream of this data point.
8b	40°24'31".006 N 112°50'24".899 E	S	N	N	N	N	N	N	–	End of 8a.
9a	40°24'37".089 N 112°50'40".106 E	S	N	N	N	Y	Y	N	4	Field indicators of OHWM present. Recent water movement has cleaned the channel of tumbleweeds.
9b	40°28'38".673 N 112°49'00".631 E	S	N	N	N	N	N	N	–	End of 9a.

Table 1. Classification and description of topographic features encountered along the alignment.

Reference Number	Coordinates (Latitude & Longitude)	Topographic Type	Shelving	Vegetation Break	Scoured Bed	Recent Deposition	Potential Water of the U.S.	Soil Change	Average Width[1]	Comments (If applicable)
10	40°25'30".697 N 112°50'43".049 E	S	N	N	N	N	N	N	–	Generally flat area with sheetflow.
11a	40°25'48".478 N 112°50'42".781 E	S/B	N	N	N	N	N	N	–	Feature is on the verge of having a bed/bank.
11b	40°25'49".035 N 112°50'24".073 E	S	N	N	N	N	N	N	–	End of 11a.
12	40°26'11".162 N 112°50'43".382 E	s	N	N	N	N	N	N	–	Very small swale crossing nearly flat terrain.
13	40°27'46".178 N 112°50'40".359 E	s	N	N	N	N	N	N	–	Very small swale crossing nearly flat terrain.
14	40°28'26".578 N 112°50'41".061 E	s	N	N	N	N	N	N	–	Very small swale crossing nearly flat terrain.
15	40°28'40".729 N 112°50'41".178 E	s	N	N	N	N	N	N	–	Very small swale crossing nearly flat terrain.
16	40°29'15".319 N 112°50'41".646 E	S	N	N	N	N	N	N	–	
17	40°29'21".378 N 112°50'39".339 E	s	N	N	N	N	N	N	–	Very small swale crossing nearly flat terrain.
18	40°30'25".762 N 112°50'35".767 E	G	N	N	N	N	N	N	–	Top of a blue line feature, only a slight depression.
19	40°31'57".918 N 112°50'41".604 E	s	N	N	N	N	N	N	–	Very small swale crossing nearly flat terrain.
20	40°32'48".379 N 112°50'43".154 E	S	N	N	N	N	N	N	–	
21	40°33'13".093 N 112°50'40".537 E	S/B	N	N	N	N	N	N	–	
22a	40°33'16".216 N 112°50'44".770 E	B	N	N	N	N	N	N	–	

Table 1. Classification and description of topographic features encountered along the alignment.

Reference Number	Coordinates (Latitude & Longitude)	Topographic Type	Shelving	Vegetation Break	Scoured Bed	Recent Deposition	Potential Water of the U.S.	Soil Change	Average Width[1]	Comments (If applicable)
22b	40°33'18".481 N 112°50'13".263 E	B	N	N	N	N	N	N	–	
23	40°33'17".110 N 112°50'48".538 E	S	N	N	N	N	N	N	–	
24	40°33'24".888 N 112°50'41".817 E	S	N	N	N	N	N	N	–	
25	40°33'58".565 N 112°50'49".108 E	B	N	N	N	N	N	N	–	
26	40°34'35".323 N 112°50'44".808 E	S/B	N	N	N	N	N	N	–	
27	40°35'00".511 N 112°50'40".524 E	S	N	N	N	N	N	N	–	
28	40°36'50".795 N 112°50'52".365 E	B/S	N	N	N	N	N	N	–	
29	40°37'10".652 N 112°50'51".300 E	S	N	N	N	N	N	N	–	
30	40°37'22".802 N 112°50'49".299 E	B	N	N	N	N	N	N	–	
31a	40°37'44".701 N 112°50'41".634 E	B	Y	Y	Y	Y	Y	Y	12	Field indicators of OHWM present. Vegetation break consists of an abrupt end of the upland vegetation at the edge of the bed scoured by water. No riparian vegetation is present.
31b	40°37'44".966 N 112°50'11".751 E	F	N	N	N	N	N	N	–	End of channel 31a.
32	40°38'18".532 N 112°50'37".085 E	S	N	N	N	N	N	N	–	

Table 1. Classification and description of topographic features encountered along the alignment.

Reference Number	Coordinates (Latitude & Longitude)	Topographic Type	Shelving	Vegetation Break	Scoured Bed	Recent Deposition	Potential Water of the U.S.	Soil Change	Average Width[1]	Comments (If applicable)
33a	40°38'48".935 N 112°50'41".724 E	B	N	N	N	N	N	Y	8	Field indicators of OHWM present. Vegetation break consists of an abrupt end of the upland vegetation at the edge of the bed scoured by water. No riparian vegetation is present.
33b	40°38'32".050 N 112°49'48".732 E	F	N	N	N	N	N	N	–	End of channel 33a.
34	40°38'51".245 N 112°50'39".843 E	B	N	N	N	N	N	N	–	
35	40°39'41".061 N 112°50'46".824 E	S	N	N	N	N	N	N	–	
36	40°39'50".199 N 112°50'45".576 E	B	N	N	N	N	N	Y	–	
37	40°40'16".254 N 112°50'43".516 E	S	N	N	N	N	N	N	–	
38	40°41'26".262 N 112°50'45".626 E	G	N	N	N	N	N	N	–	Route crosses near the point were this feature disappears into the terrain.
39	40°41'52".501 N 112°50'46".129 E	B	N	N	N	N	N	N	–	
40	40°41'55".264 N 112°50'44".111 E	S	N	N	N	N	N	N	–	
41	40°42'05".467 N 112°50'37".071 E	S	N	N	N	N	N	Y	–	
42	40°43'10".672 N 112°50'41".219 E	S/B	N	N	N	N	N	N	–	
43	40°43'28".996 N 112°50'27".127 E	S	N	N	N	N	N	N	–	
44	40°43'37".676 N 112°50'31".435 E	S	N	N	N	N	N	N	–	

Table 1. Classification and description of topographic features encountered along the alignment.

Reference Number	Coordinates (Latitude & Longitude)	Topographic Type	Shelving	Vegetation Break	Scoured Bed	Recent Deposition	Potential Water of the U.S.	Soil Change	Average Width[1]	Comments (If applicable)
45	40°44'21".646 N 112°50'35".923 E	F	N	N	N	N	N	N	–	
46	40°44'46".603 N 112°50'31".050 E	F	N	N	N	N	N	N	–	
47a	40°45'09".786 N 112°50'43".421 E	B	N	Y	N	N	N	N	–	
47b	40°45'00".404 N 112°50'28".318 E	F	N	N	N	N	N	N	–	
48	40°45'18".164 N 112°50'42".767 E	S/B	N	N	N	N	N	N	–	
49a	40°45'42".692 N 112°50'48".331 E	B	N	Y	N	Y	Y	Y	3	Field indicators of OHWM. present.
49b	40°45'42".150 N 112°50'46".555 E	G/S	N	N	N	N	N	N	–	End of channel 49a.
50	40°46'10".083 N 112°50'35".407 E	S/B	N	N	N	N	N	N	–	
51	40°47'06".099 N 112°50'45".258 E	S	N	N	N	N	N	N	–	
52	40°48'09".241 N 112°52'13".499 E	S	N	N	N	N	N	N	–	
53	40°49'11".261 N 112°53'29".287 E	B	N	N	N	N	N	N	–	

[1] Applicable to those features with an OHWM.
G = General
S = Swale
s = Barely a swale
B = Bed and Bank
F = Flat

Attachment 1:

Site Photos

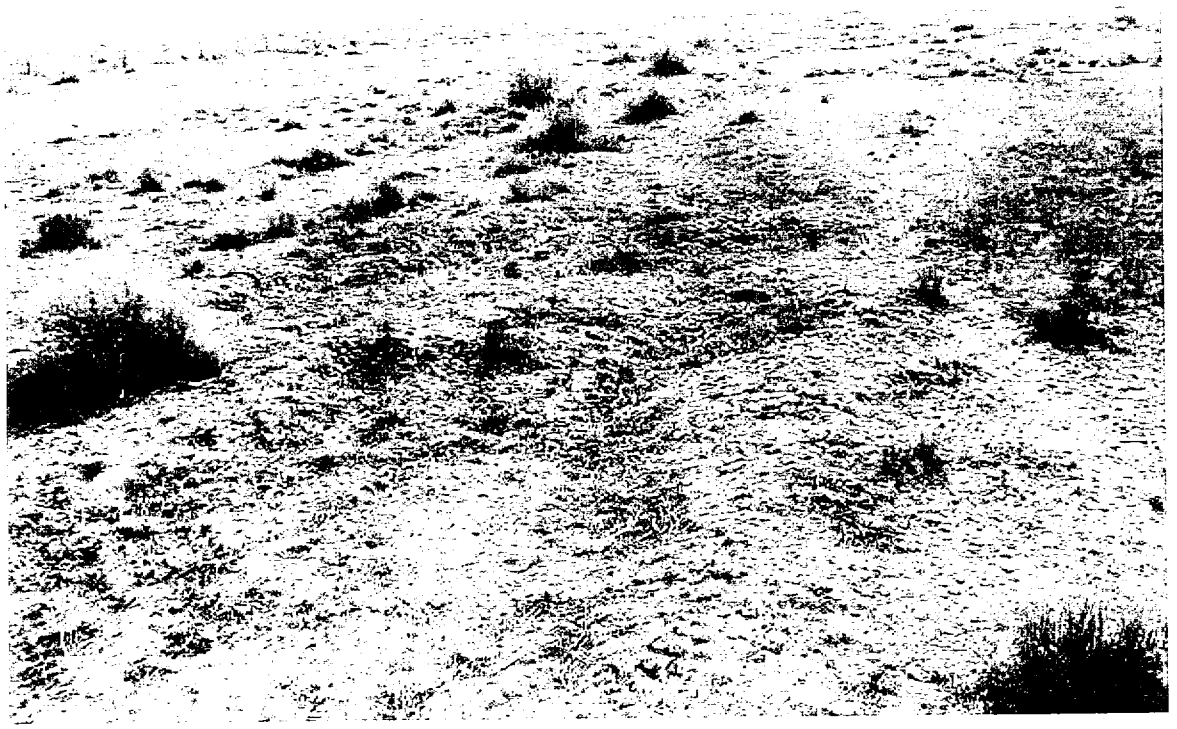

Photo 1. Feature 1, looking south.

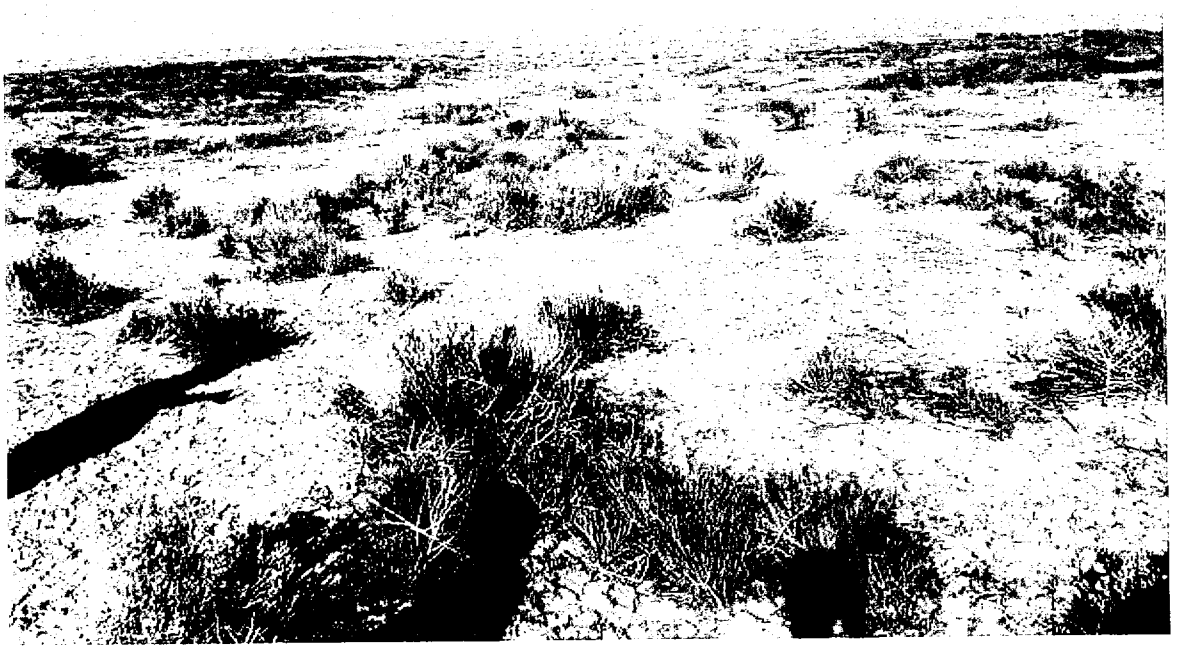

Photo 2. Feature 2, looking north.

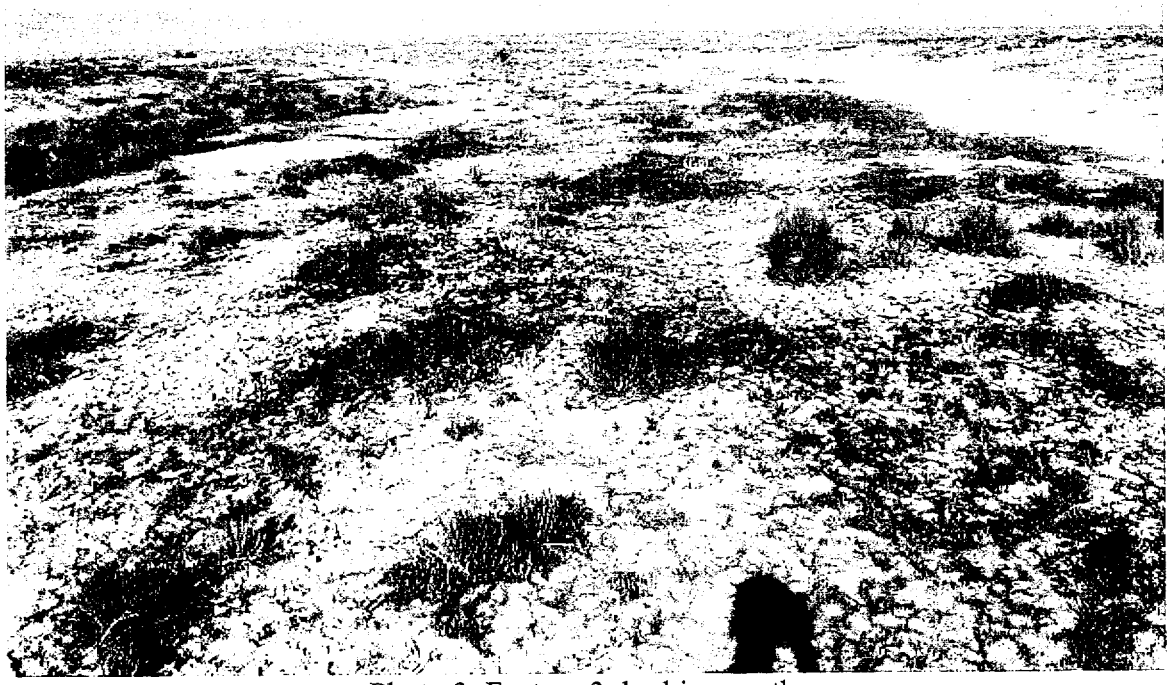

Photo 3. Feature 3, looking north.

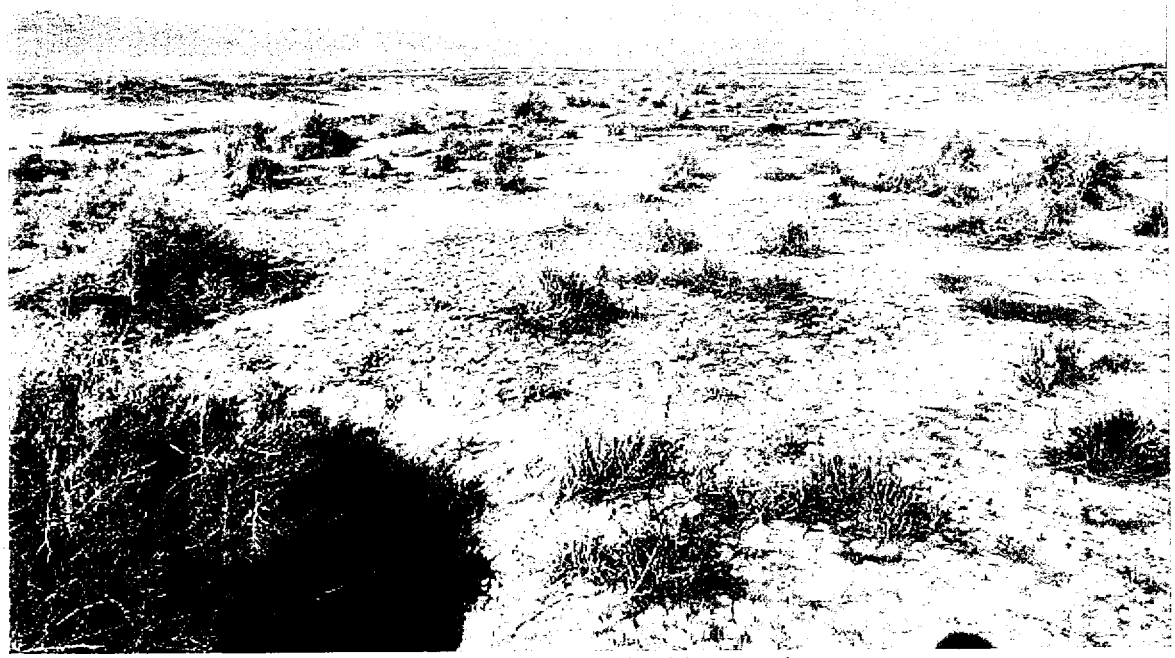

Photo 4. Feature 4, looking north.

Photo 5. Feature 5, looking north.

Photo 6. Feature 6a, looking north.

Photo 7. Feature 6a at the downstream location 6b, looking east.

Photo 8. Feature 7, looking south.

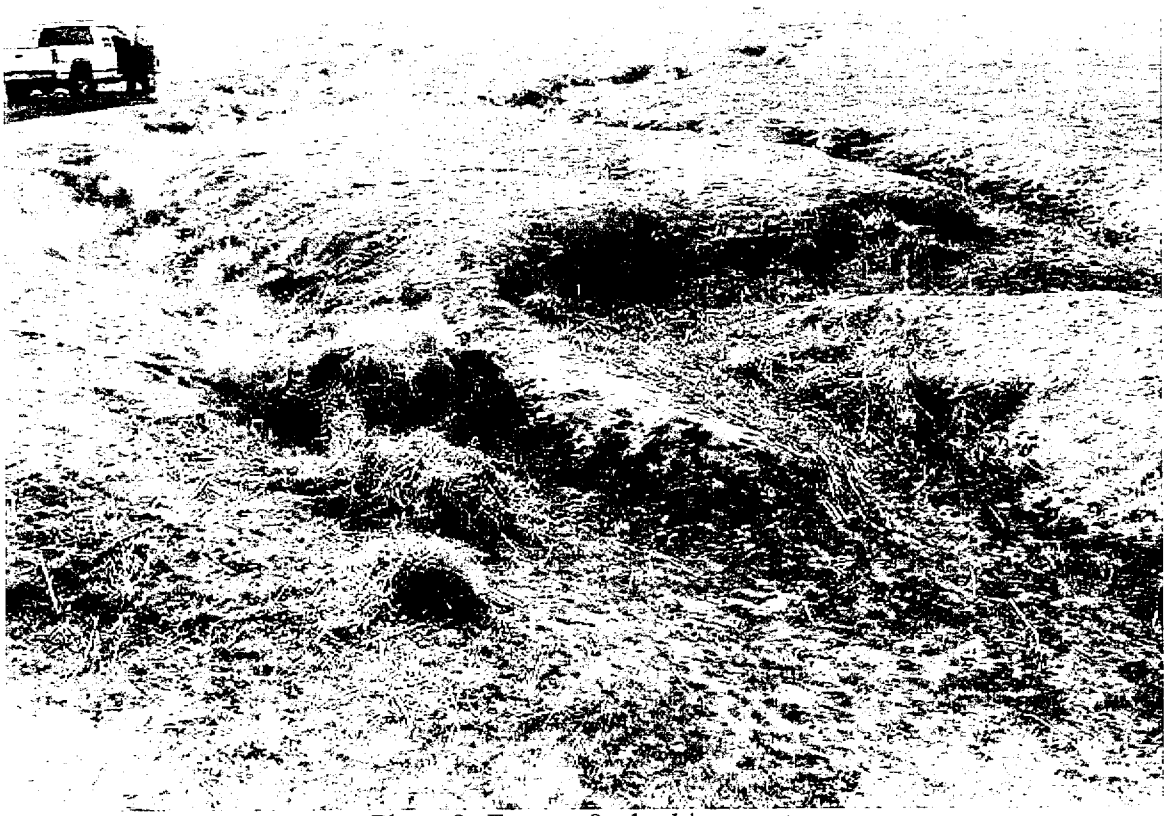

Photo 9. Feature 8a, looking west.

Photo 10. This photo shows Feature 8a at the downstream location 8b, looking west.

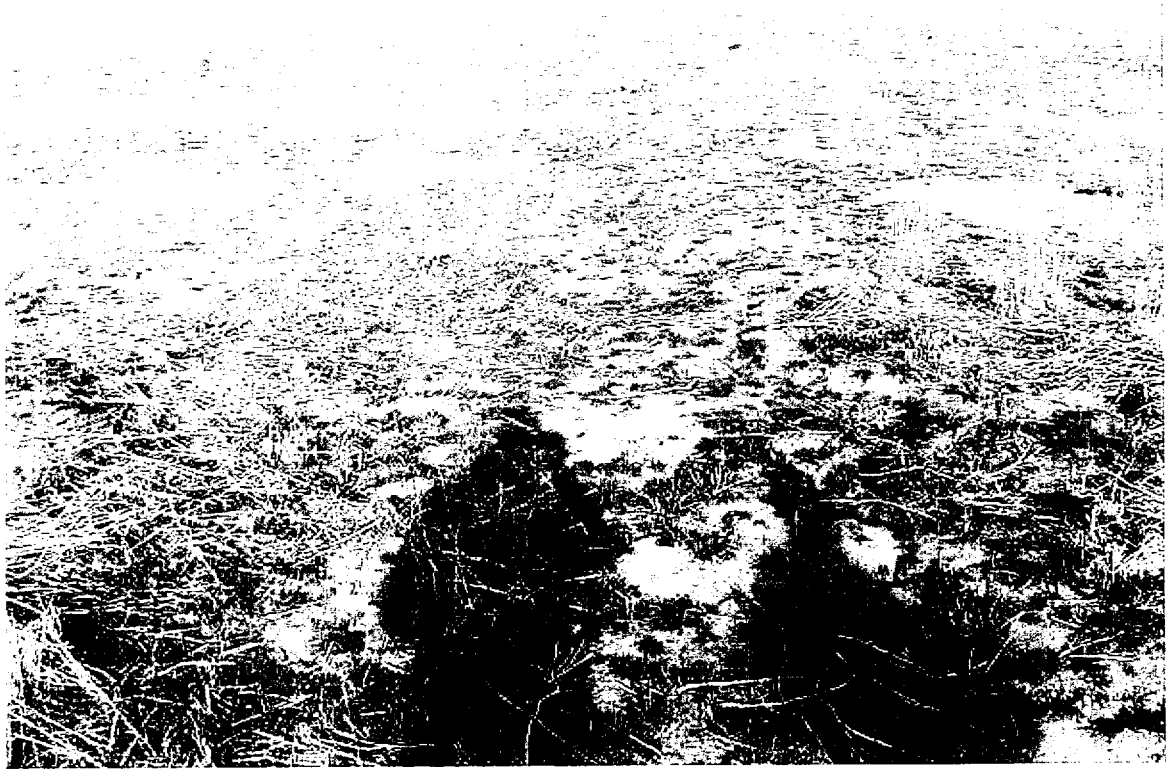

Photo 11. This photo shows Feature 8a at the downstream location 8b, looking east.

Photo 12. Feature 9a, looking west

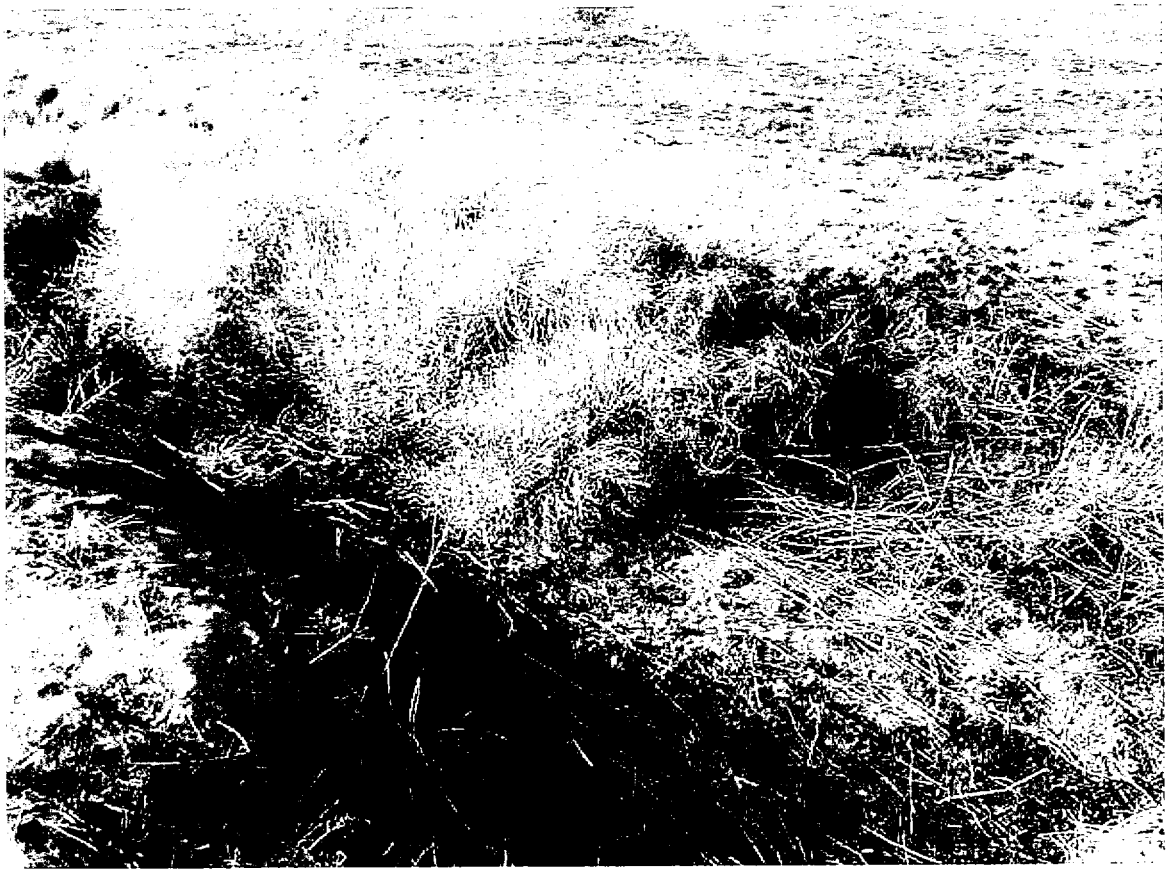

Photo 13. Feature 9a, looking east.

Photo 14. This photo shows Feature 9a at the downstream location 9b, looking west.

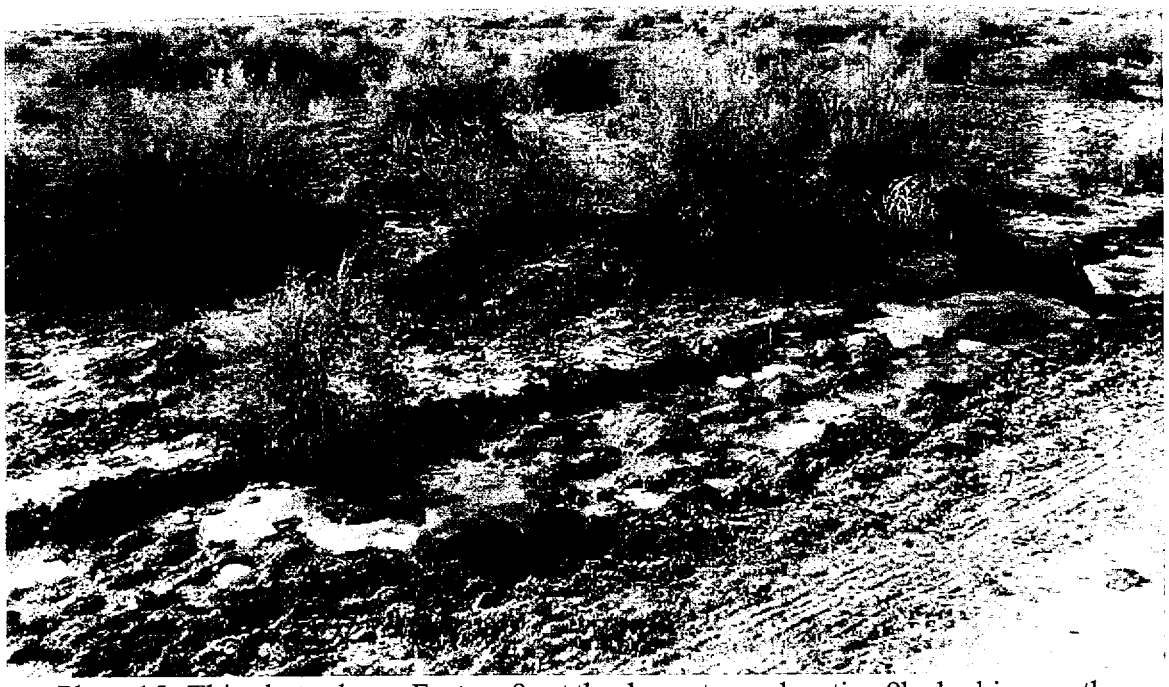

Photo 15. This photo shows Feature 9a at the downstream location 9b, looking south.

Photo 16. Feature 10, looking east.

Photo 17. Feature11a, looking west.

Photo 18. This photo shows Feature 11a at the downstream location 11b, looking west.

Photo 19. This photo shows Feature 11a at the downstream location 11b, looking east.

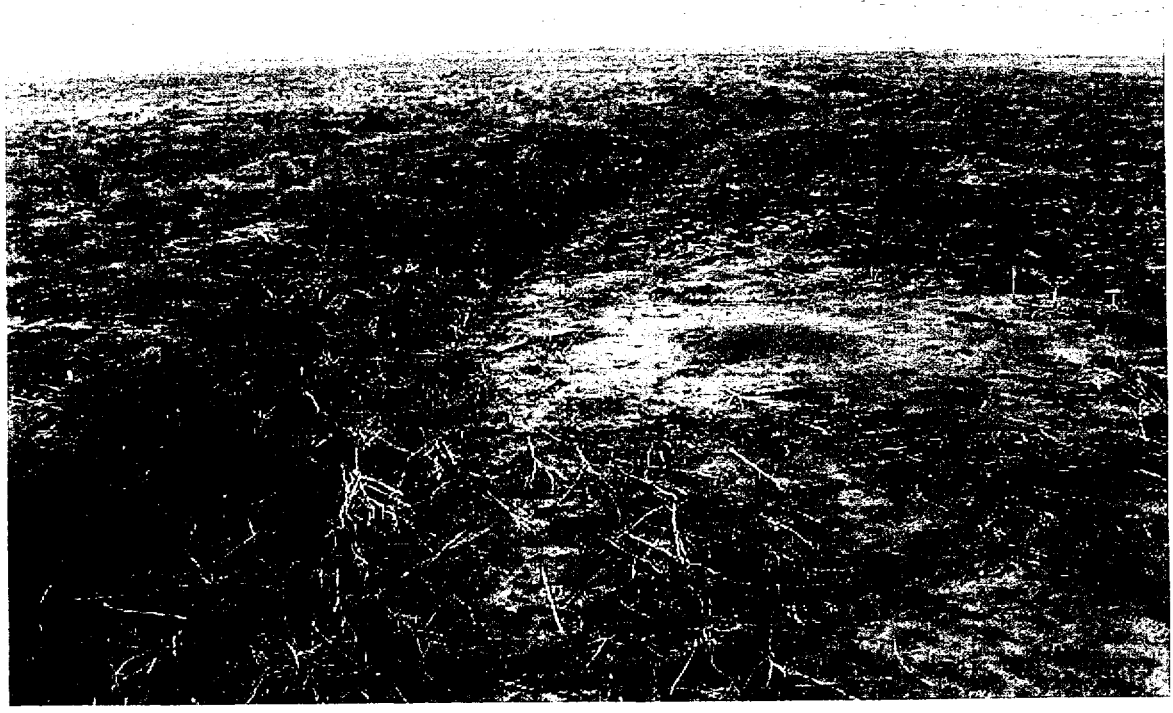

Photo 20. Feature 12, looking west.

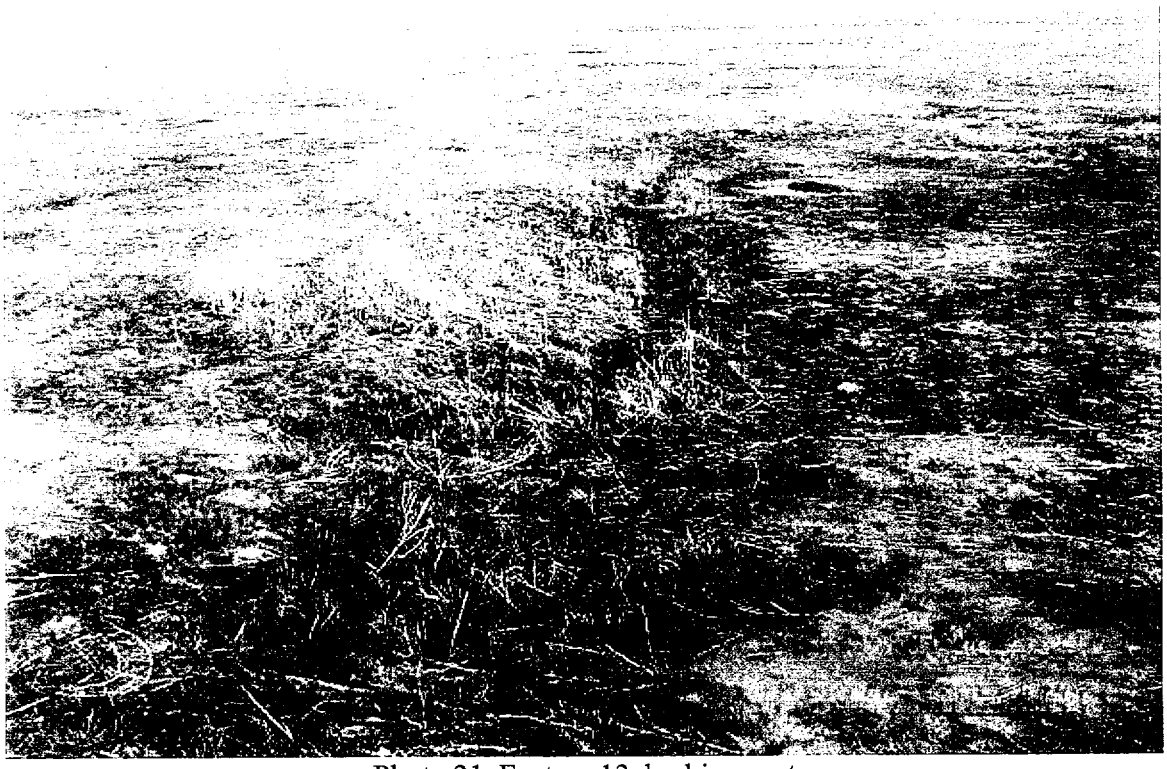

Photo 21. Feature 13, looking east

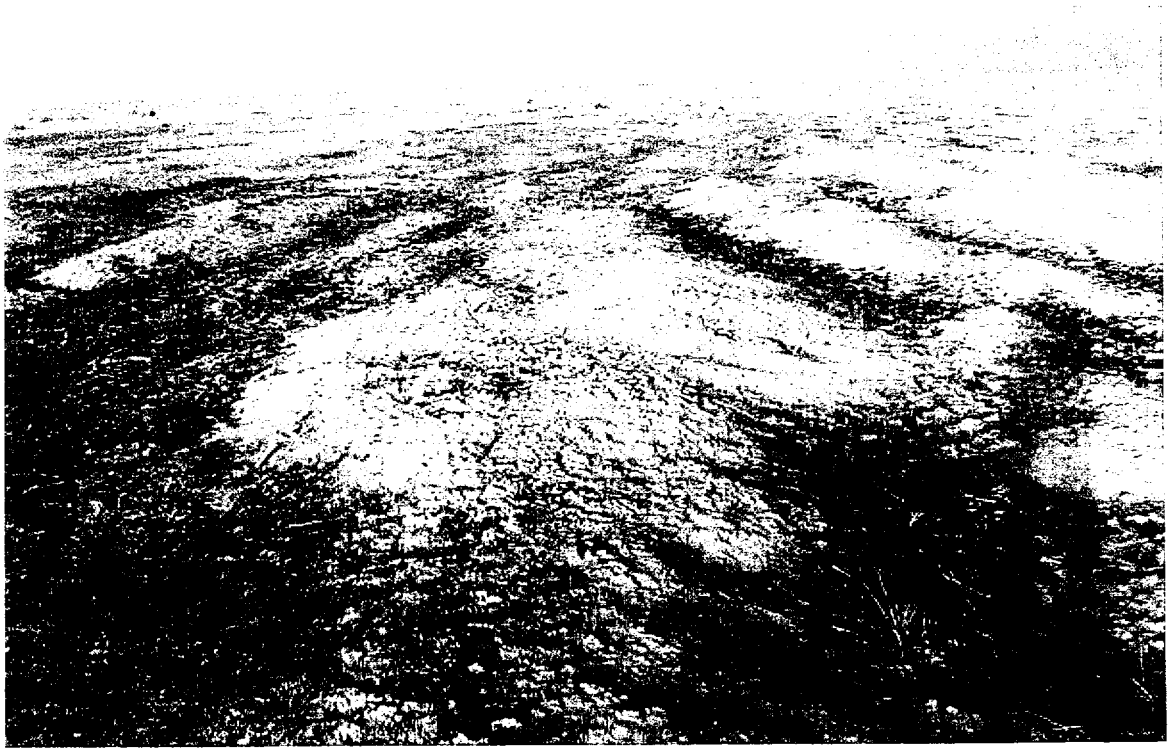

Photo 22. Feature 14 looking northeast.

Photo 23. Feature15, looking northeast.

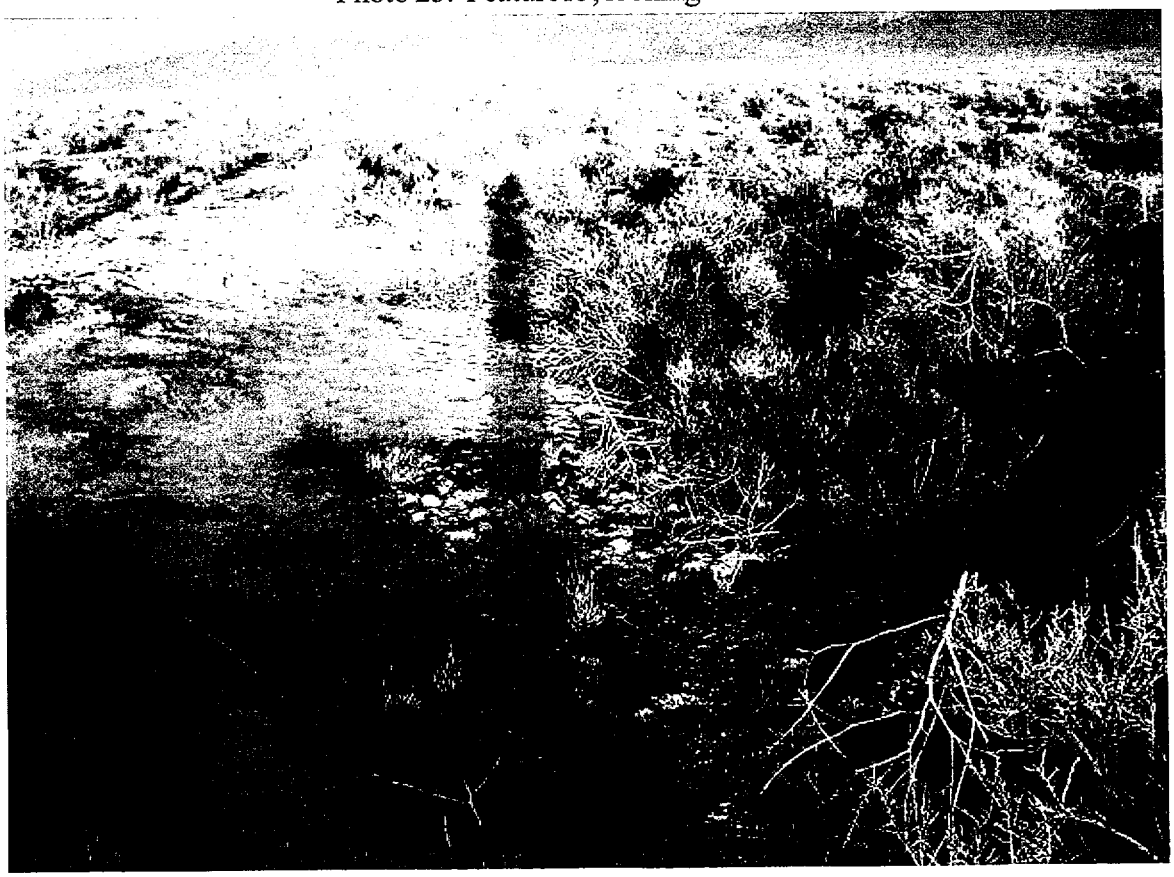

Photo 24. Feature16, looking northeast.

Photo 25. Feature 17, looking northeast.

Photo 26. Feature 19, looking west.

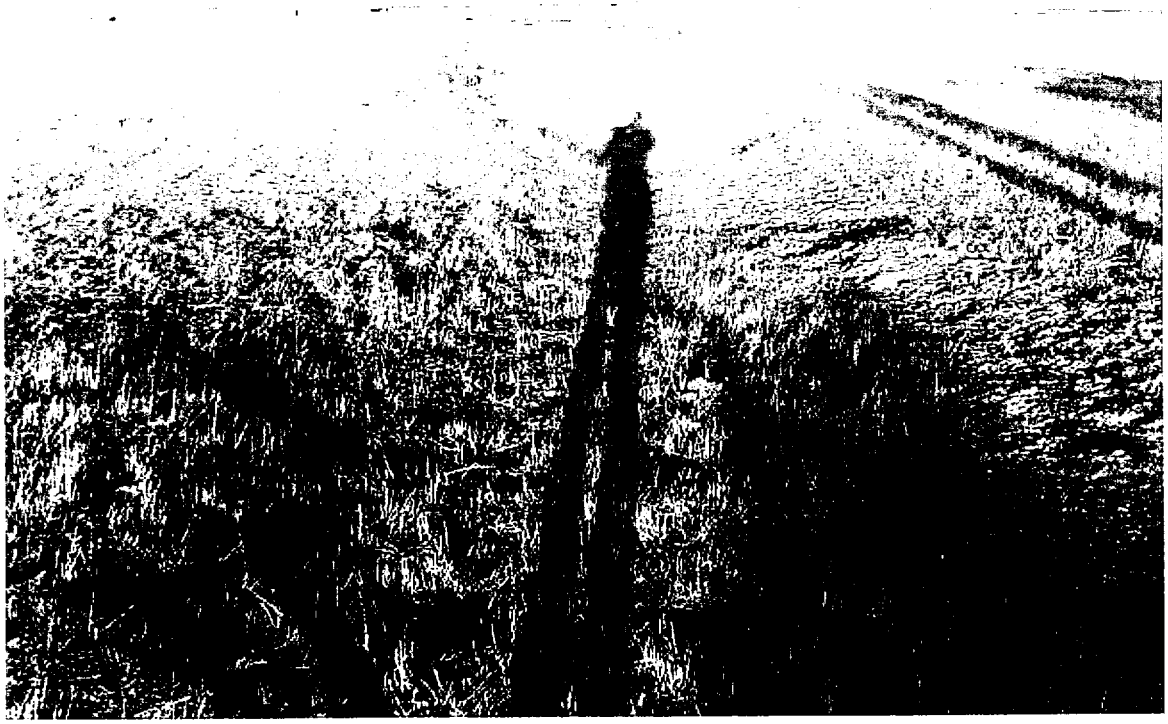

Photo 27. Feature 20, looking west.

Photo 28. Feature 20, looking east.

Photo29. Feature 22a, looking east.

Photo 30. This photo shows Feature 22a at the downstream location 22b, looking east.

Photo 31. Feature 23, looking east.

Photo 32. Feature 24, looking west.

Photo 33. Feature 25, looking east.

Photo 34. Feature 26, looking east.

Photo 35. Feature 27, looking east.

Photo 36. Feature 28, looking west.

Photo 37. Feature 29, looking southeast.

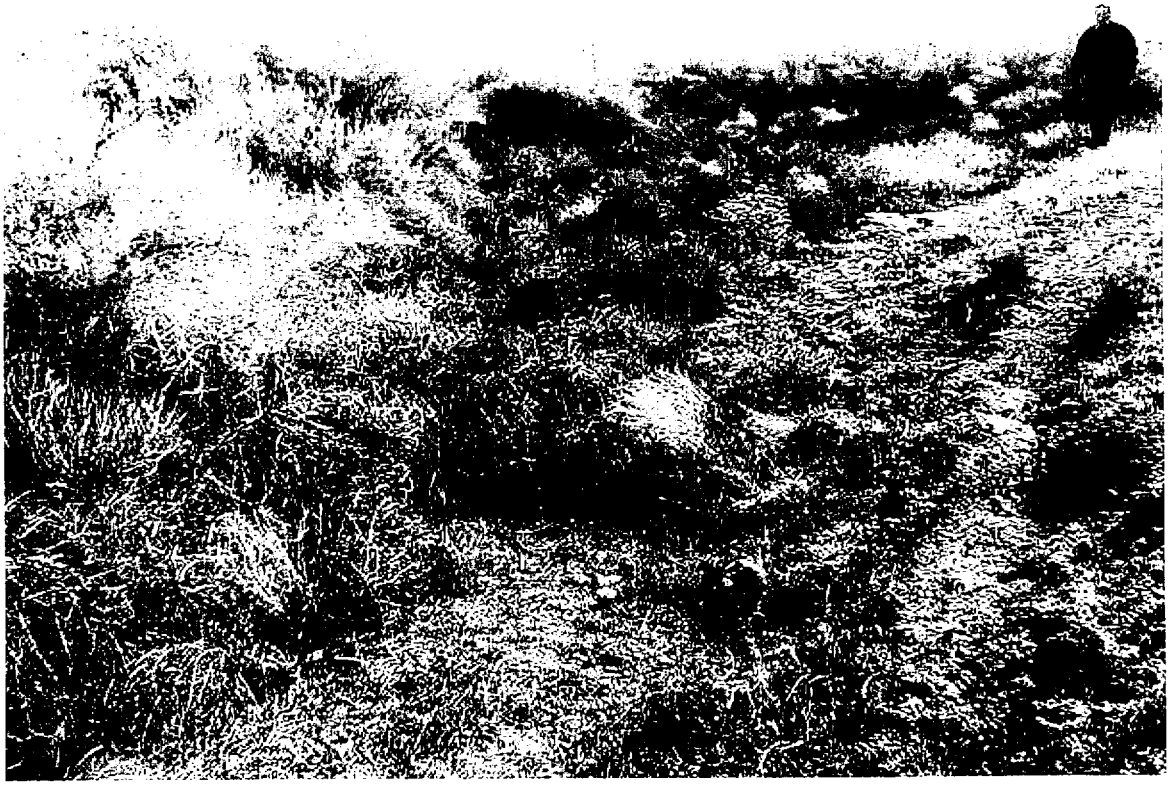

Photo 38. Feature 30, looking east.

Photo 39. Feature 31a, looking west.

Photo 40. Feature 31a, looking east.

Photo 41. This photo shows Feature 31a at the downstream location 31b, looking east.

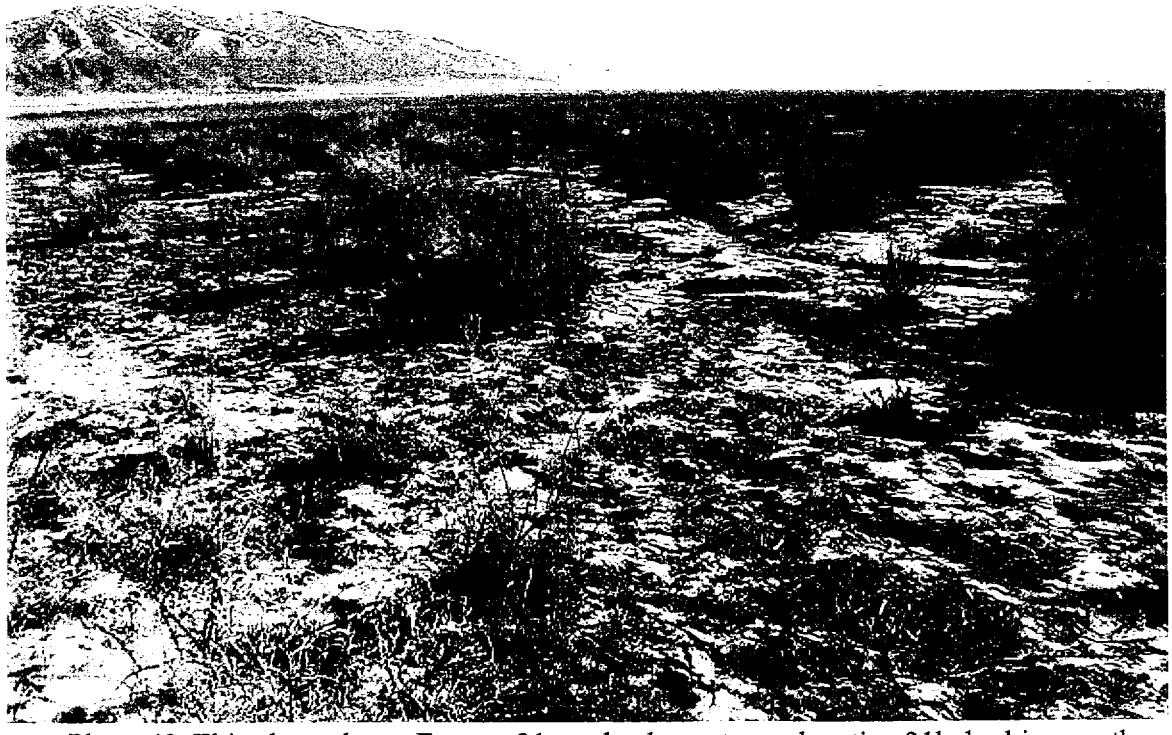

Photo 42. This photo shows Feature 31a at the downstream location 31b, looking southeast.

Photo 43. Feature 32, looking west.

Photo 44. Feature 33a, looking east.

Photo 45. This photo shows Feature 33a at the downstream location 33b, looking east.

Photo 46. This photo shows Feature 33a at the downstream location 33b, looking northeast.

Photo 47. Feature 34, looking west.

Photo 48. Feature 34, looking west.

Photo 49. Feature 35, looking east.

Photo 50. Feature 36, looking east.

Photo 51. Feature 37, looking west.

Photo 52. Feature 38, looking east.

Photo 53. Feature 39, looking west.

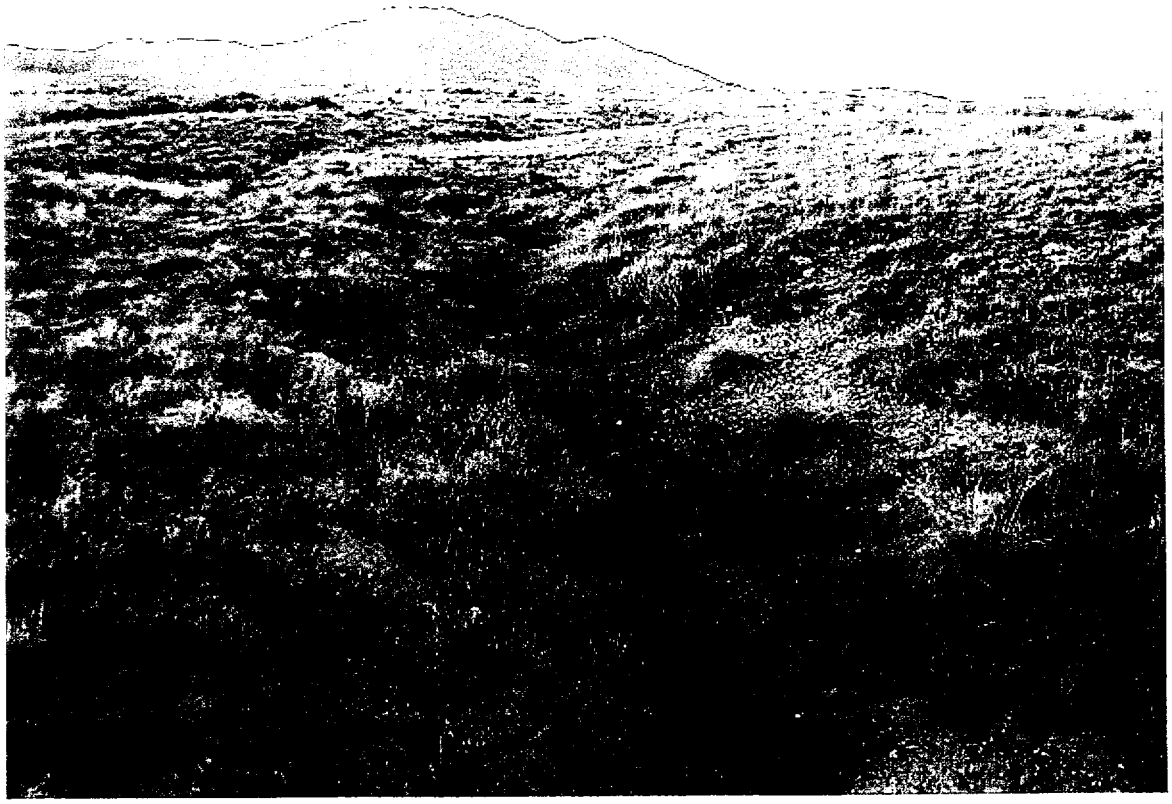

Photo 54. Feature 40, looking west.

Photo 55. Feature 41, looking east.

Photo 56. Feature 42, looking east.

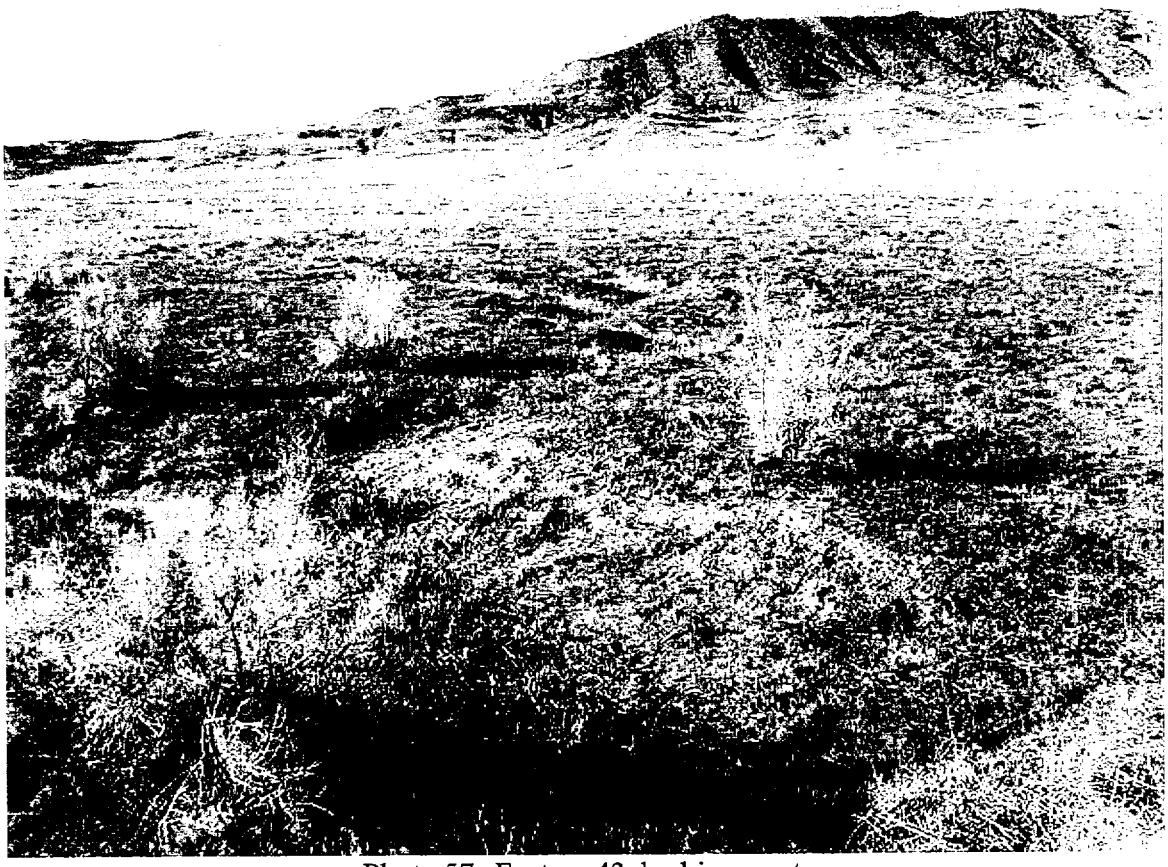

Photo 57. Feature 43, looking west.

Photo 58. Feature 44, looking west.

Photo 59. Feature 45, looking west.

Photo 60. Feature 46, looking west.

Photo 61. Feature 47a, looking west.

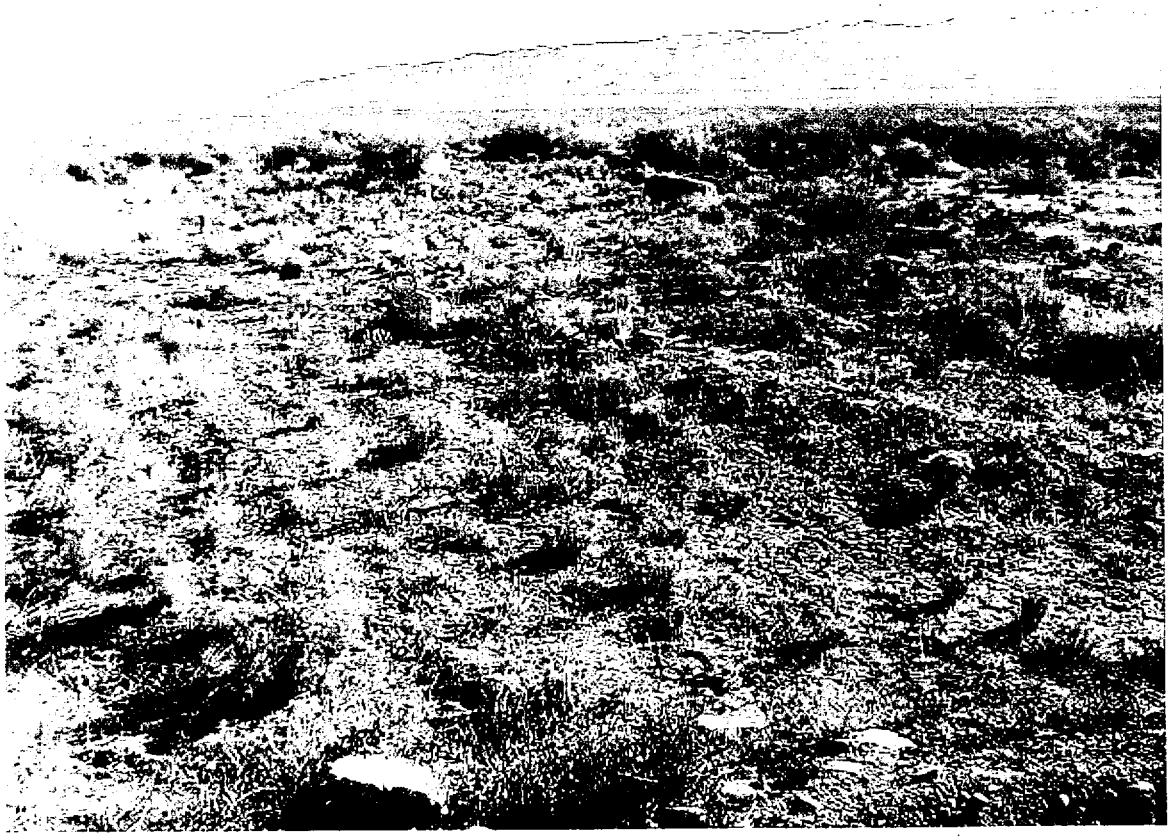

Photo 62. This photo shows Feature 47a at the downstream location 47b, looking east.

Photo 63. Feature 48, looking east.

Photo 64. Feature 49a, looking east.

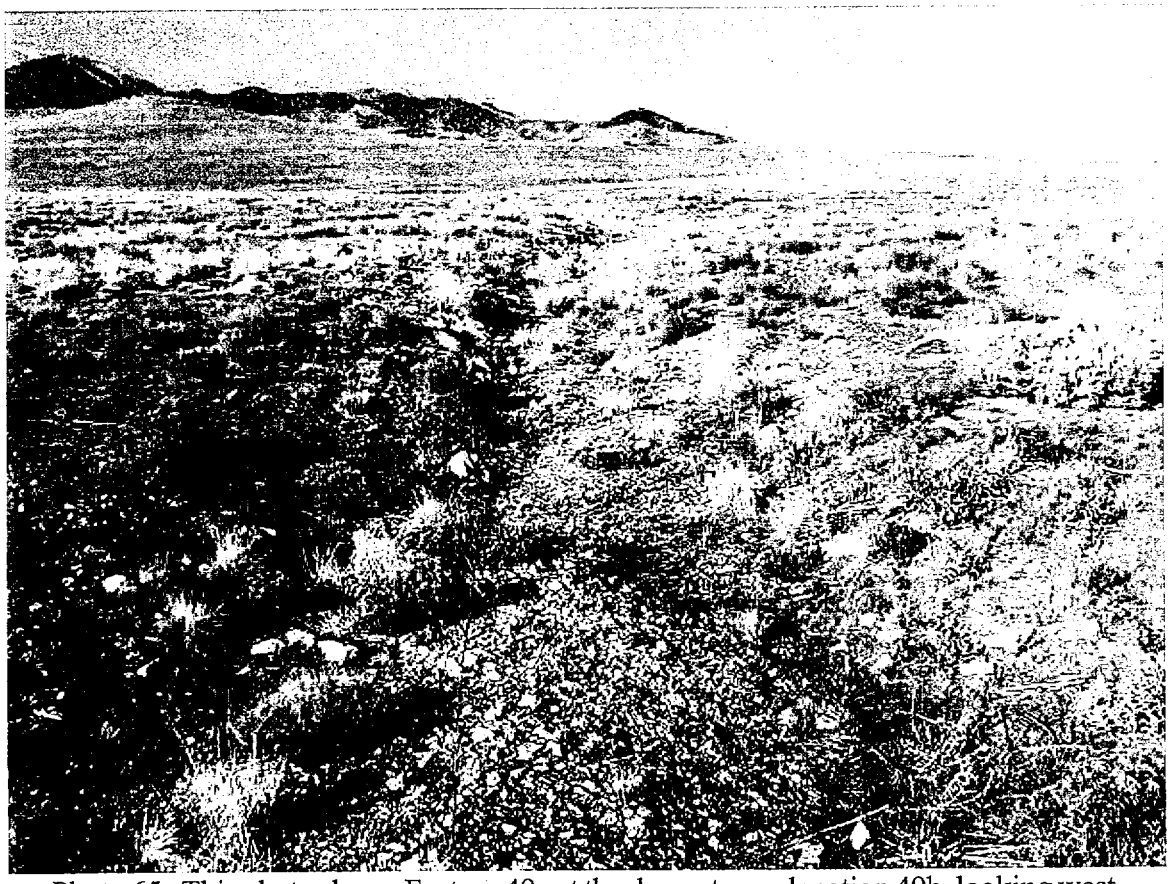

Photo 65. This photo shows Feature 49a at the downstream location 49b, looking west.

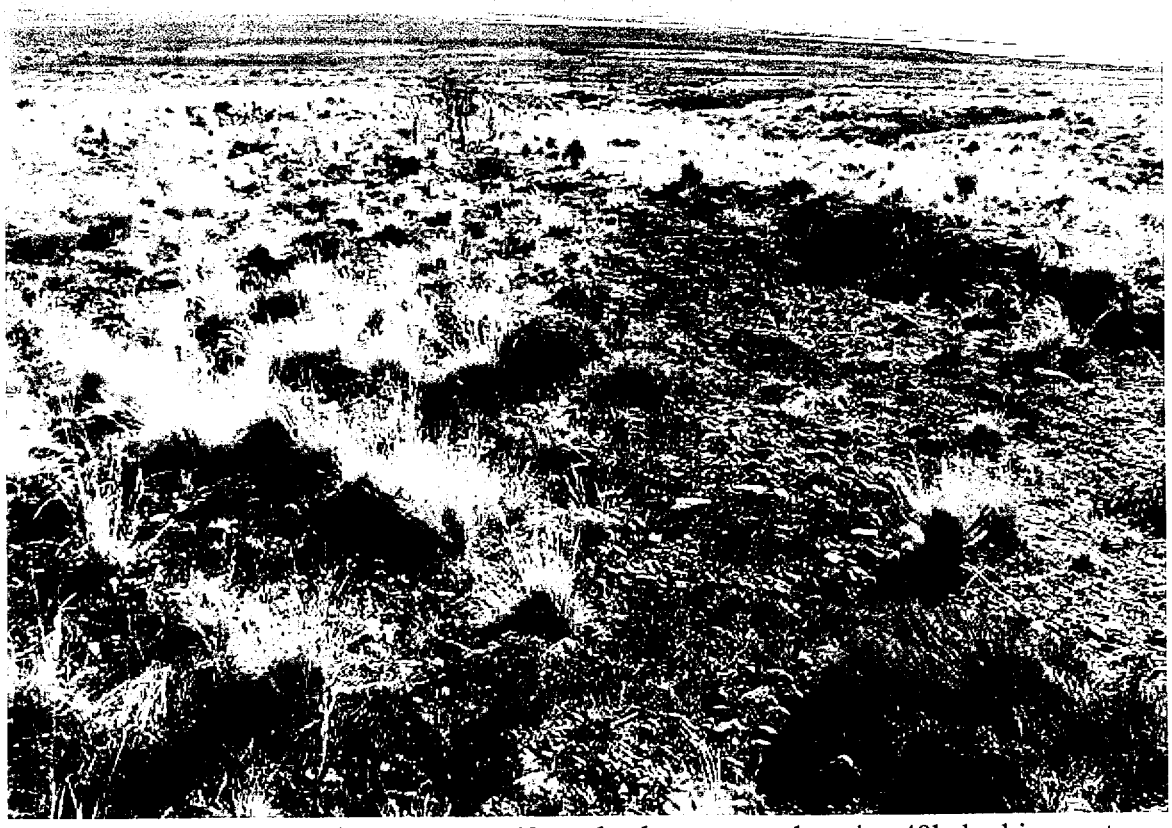

Photo 66. This photo shows Feature 49a at the downstream location 49b, looking east.

Photo 67. Feature 50, looking east.

Photo 68. Feature 50, downstream of crossing at end of swale, looking west.

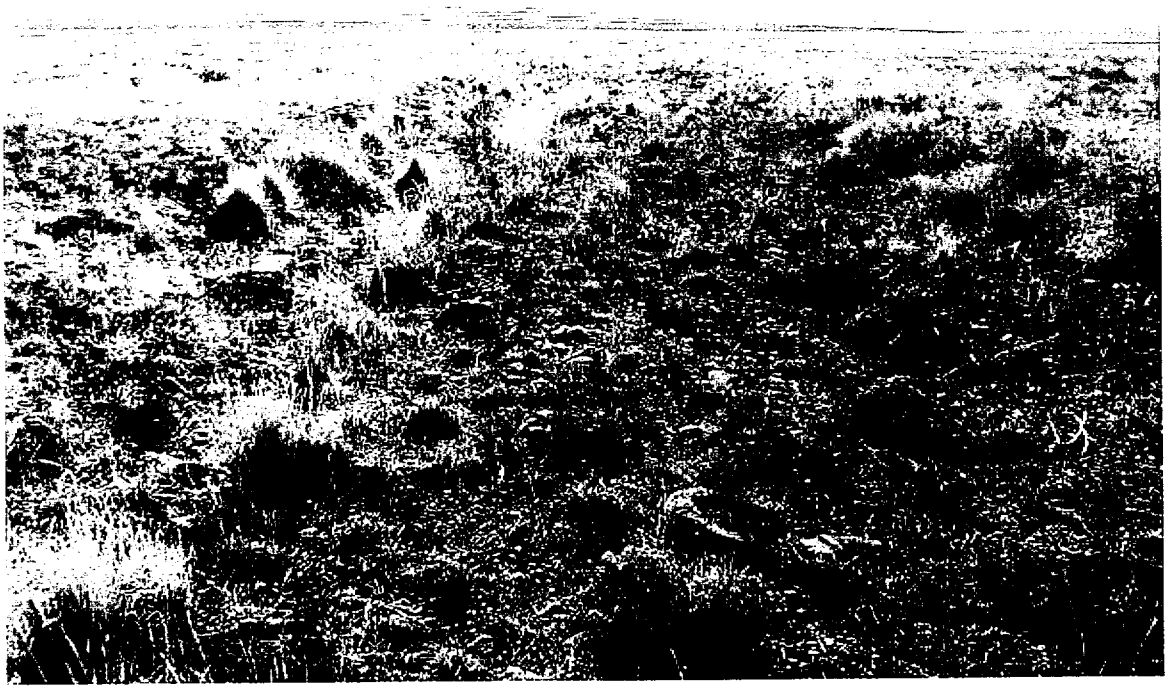

Photo 69. Feature 51, looking southeast.

Photo 70. Feature 52, looking west.

Photo 71. Feature 53, looking south.

Attachment 2:

Maps

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED:

GREAT SALT LAKE AND SOUTHERN RAILROAD WETLAND AND STREAM SURVEY

MAP 1 OF 5

HICKMAN KNOLLS, QUAD.

UTAH

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D1

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GREAT SALT LAKE AND SOUTHERN RAILROAD WETLAND AND STREAM SURVEY

MAP 2 OF 5

HASTINGS PASSE, QUAD. UTAH

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GREAT SALT LAKE AND SOUTHERN RAILROAD WETLAND AND STREAM SURVEY

MAP 3 OF 5

HASTINGS PASS SE, QUAD.

UTAH

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GREAT SALT LAKE AND SOUTHERN RAILROAD WETLAND AND STREAM SURVEY

MAP 4 OF 5

DELLE, QUAD. UTAH

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GREAT SALT LAKE AND SOUTHERN RAILROAD WETLAND AND STREAM SURVEY

MAP 5 OF 5

LOW, QUAD. UTAH

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D5