

U.S. DEPARTMENT OF ENERGY

**OC  
RW  
M**



# YUCCA MOUNTAIN PROJECT

## NATIVE AMERICAN PLANT RESOURCES IN THE YUCCA MOUNTAIN AREA, NEVADA

### INTERIM REPORT

NOVEMBER 1989

*See Jacket for report*

WORK PERFORMED UNDER CONTRACT NO. DE-AC08-87NV10576

Technical & Management Support Services

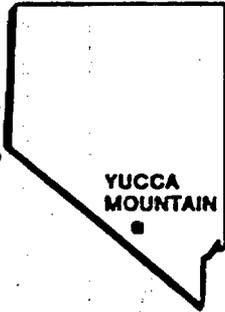


SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

102  
WM-11  
NH03

U.S. DEPARTMENT OF ENERGY

**OR  
CO  
WM**



# YUCCA MOUNTAIN PROJECT

Received w/Ltr Dated 11/30/89

## NATIVE AMERICAN PLANT RESOURCES IN THE YUCCA MOUNTAIN AREA, NEVADA

### INTERIM REPORT

### NOVEMBER 1989

WORK PERFORMED UNDER CONTRACT NO. DE-AC08-87NV10576

Technical & Management Support Services



SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

0/1

9007020264 891130  
PDR WASTE  
WM-11 PDC

102  
WM-11  
NH03

**YUCCA MOUNTAIN PROJECT**  
**NATIVE AMERICAN PLANT RESOURCES IN THE YUCCA**  
**MOUNTAIN AREA, NEVADA**

**Interim Report**  
**November 1989**

**by**

**Richard W. Stoffle**  
**Michael J. Evans**  
**David B. Halmo**

**Institute for Social Research**  
**University of Michigan**  
**Ann Arbor, Michigan**

**and**

**Wesley E. Niles**  
**Joan T. O'Farrell**

**EG&G Energy Measurements, Inc.**  
**Goleta, California**

**Prepared for the**

**U.S. Department of Energy, Nevada Operations Office**  
**under Contract No. DE-AC08-87NV10576**

**by**

**Science Applications International Corporation**  
**Las Vegas, Nevada**

## DISCLAIMER

This report was prepared as an account of work sponsored by the United States Government. Neither the United States nor the United States Department of Energy, nor any of their employees, makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, mark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The view and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

Printed in the United States of America

Available from:

Office of Scientific and Technical Information  
U.S. Department of Commerce  
5285 Port Royal Road  
Springfield, Virginia 22161

Price:	Printed Copy	A08
	Microfiche	A01

## **Acknowledgments**

This report is the result of a diligent effort put forth by many individuals. The authors would like to express their sincere thanks to Dr. Tom Greider, SAIC, Las Vegas, for his tireless assistance in helping to coordinate and arrange the ethnobotany on-site visits, preparing route maps and providing much-needed field equipment.

Tom O'Farrell, Betsy Collins, and Cathy Wills of EG&G Energy Measurements, Goleta, California assisted in site selection and coordinating the on-site visits. Ms. Collins and Ms. Wills also served as escorts and photographers during the early portion of the field work. Angela Colarusso and Steve Woolfolk of SAIC also served as escorts throughout the field work. The efforts of all of these individuals in making the ethnobotany field work a success are greatly appreciated.

A special thanks must go to Dr. Wesley E. Niles and Joan T. O'Farrell for their assistance in the field, collecting voucher specimens and providing the site descriptions which appear in this report. For all of their contributions, we are very grateful. Thanks must also go to Susan Clemmer and Fran Parker for their help in typing the interim report.

Most importantly, this report could not have been written without the participation of the many Native American people who took time out from their busy schedules and traveled many miles to share their knowledge about traditional plants and their uses with us. To them, we extend our deepest appreciation and gratitude.

# TABLE OF CONTENTS

	<u>Page</u>
<b>Chapter One — Introduction . . . . .</b>	<b>1</b>
Repository Site Characterization . . . . .	1
Involved Indian Tribes . . . . .	2
Cultural Resources Study Area . . . . .	2
Future Studies . . . . .	5
Summary of Findings. . . . .	5
Organization of This Report . . . . .	6
A Holistic View of Plants . . . . .	6
How To Refer to a Place . . . . .	7
Teaching, Then and Now . . . . .	7
Uses of Yatumbi . . . . .	7
Talking to Plants Before Harvest . . . . .	8
Breaking the Plant-Land Bond . . . . .	8
Other Uses of Yatumbi . . . . .	9
Plants and Ceremonies. . . . .	10
Plant and Legends . . . . .	11
<b>Chapter Two — Research Design and Methodology. . . . .</b>	<b>14</b>
Ethnobotanical Framework . . . . .	14
Native American Plant Specialists . . . . .	14
Site Selection. . . . .	15
Chronology of Field Work. . . . .	15
In-Field Logistics and Rationale. . . . .	17
Formal Interaction Analysis. . . . .	20
<b>Chapter Three — An Inventory of Native American Identified Plants . . . . .</b>	<b>22</b>
<i>Amelanchier utahensis</i> . . . . .	24
<i>Amsinckia tessellata</i> . . . . .	25
<i>Anemopsis californica</i> . . . . .	26
<i>Arabis pulchra</i> . . . . .	27
<i>Artemisia ludoviciana</i> . . . . .	28
<i>Artemisia tridentata</i> . . . . .	29
<i>Atriplex canescens</i> . . . . .	30
<i>Atriplex</i> sp . . . . .	31
<i>Brodiaea pulchella</i> . . . . .	32
<i>Calochortus flexuosus</i> . . . . .	33
<i>Castilleja chromosa</i> . . . . .	34
<i>Chrysothamnus nauseosus</i> . . . . .	35
<i>Cirsium mohavense</i> . . . . .	36
<i>Coleogyne ramosissima</i> . . . . .	37
<i>Coryphantha vivipara</i> . . . . .	38
<i>Datura meteloides</i> . . . . .	39
<i>Delphinium parishii</i> . . . . .	40

## TABLE OF CONTENTS (Continued)

	<u>Page</u>
<i>Descurainia pinnata</i> . . . . .	41
<i>Descurainia sophia</i> . . . . .	42
<i>Distichlis spicata</i> . . . . .	43
<i>Echinocactus polycephalus</i> . . . . .	44
<i>Echinocereus engelmannii</i> . . . . .	45
<i>Encelia virginensis</i> var. <i>actonii</i> . . . . .	46
<i>Ephedra nevadensis</i> . . . . .	47
<i>Ephedra viridis</i> . . . . .	48
<i>Eriogonum inflatum</i> . . . . .	49
<i>Euphorbia albomarginata</i> . . . . .	50
<i>Geastrum</i> sp . . . . .	51
<i>Gutierrezia microcephala</i> . . . . .	52
<i>Juncus mexicanus</i> . . . . .	53
<i>Juniperus osteosperma</i> . . . . .	54
<i>Krameria parvifolia</i> . . . . .	55
<i>Larrea tridentata</i> . . . . .	56
Lichen . . . . .	57
<i>Lycium andersonii</i> . . . . .	58
<i>Lycium pallidum</i> . . . . .	59
<i>Menodora spinescens</i> . . . . .	60
<i>Mentzelia albicaulis</i> . . . . .	61
<i>Nicotiana trigonophylla</i> . . . . .	62
<i>Opuntia basilaris</i> . . . . .	63
<i>Opuntia echinocarpa</i> . . . . .	64
<i>Opuntia erinacea</i> . . . . .	65
<i>Oryzopsis hymenoides</i> . . . . .	66
<i>Peraphyllum ramosissimum</i> . . . . .	67
<i>Phragmites australis</i> . . . . .	68
<i>Pinus monophylla</i> . . . . .	69
<i>Prosopis glandulosa</i> . . . . .	70
<i>Prosopis pubescens</i> . . . . .	71
<i>Psoralea polydenia</i> . . . . .	72
<i>Purshia glandulosa</i> . . . . .	73
<i>Quercus gambelii</i> . . . . .	74
<i>Rhus trilobata</i> . . . . .	75
<i>Rumex crispus</i> . . . . .	76
<i>Salix exigua</i> . . . . .	77
<i>Salix gooddingii</i> . . . . .	78
<i>Salvia columbariae</i> . . . . .	79
<i>Salvia dorrii</i> . . . . .	80
<i>Sphaeralcea ambigua</i> . . . . .	81
<i>Stanleya pinnata</i> . . . . .	82
<i>Stephanomeria</i> sp . . . . .	83
<i>Stipa speciosa</i> . . . . .	84

## TABLE OF CONTENTS (Continued)

	<u>Page</u>
<i>Streptanthella longirostris</i> . . . . .	85
<i>Streptanthus cordatus</i> . . . . .	86
<i>Suaeda torreyana</i> . . . . .	87
<i>Symphoricarpos longiflorus</i> . . . . .	88
<i>Tessaria sericea</i> . . . . .	89
<i>Thamnosma montana</i> . . . . .	90
<i>Thelypodium integrifolium</i> . . . . .	91
<i>Typha domingensis</i> . . . . .	92
<i>Typha latifolia</i> . . . . .	93
<i>Veronica anagallis-aquatica</i> . . . . .	94
<i>Vitis arizonica</i> . . . . .	95
<i>Xylorhiza tortifolia</i> . . . . .	96
<i>Yucca baccata</i> . . . . .	97
<i>Yucca brevifolia</i> . . . . .	98
<i>Yucca schidigera</i> . . . . .	99
<b>Chapter Four — Environmental Zones and Sites Where Plants Are Located . . . . .</b>	<b>100</b>
Low Elevation Zone Sites . . . . .	100
Rock Valley-Jackass Flats Divide . . . . .	103
Dune Wash/Twin Tinajas . . . . .	103
Cane Spring . . . . .	104
Frenchman Flat Site . . . . .	105
Tarantula Canyon/Specie Spring . . . . .	106
Black Cone/Crater Flats . . . . .	107
Ash Meadows: Point of Rock Springs . . . . .	107
Ash Meadows: Big Spring Site . . . . .	108
Ash Meadows: Collins Spring . . . . .	108
Middle Elevation Zone Sites . . . . .	109
Yucca Ridge . . . . .	109
Prow Pass Ceremonial Area . . . . .	110
Chia Gathering and Pestle Sites . . . . .	110
Petroglyph Cave Site . . . . .	111
Pink Tuff Site . . . . .	112
Fortymile Canyon/Twin Springs . . . . .	113
Tippipah Spring . . . . .	113
Tippipah Highway . . . . .	114
Captain Jack Spring . . . . .	115
Whiterock Spring . . . . .	115
High Elevation Zone Sites . . . . .	116
Rainier Mesa-Top . . . . .	116
<b>Chapter Five — Patterns of Plant Use, Management, and Knowledge Transmission . . . . .</b>	<b>117</b>
Plant Use . . . . .	117
Patterns of Traditional Plant Use . . . . .	117

**TABLE OF CONTENTS (Continued)**

	<u>Page</u>
Patterns of Current Plant Uses . . . . .	121
Plant Management . . . . .	128
Transmission of Plant Knowledge. . . . .	132
Native American Plant Expert Recommendations. . . . .	134
Conclusion . . . . .	139
References . . . . .	140

## LIST OF ILLUSTRATIONS

<u>Map</u>		<u>Page</u>
1	Traditional Ethnic Boundaries and Locations of Tribes Involved in the Yucca Mountain Project . . . . .	3
2	Yucca Mountain Cultural Resources Study Area . . . . .	4
 <u>Photo</u>		
1	<i>Amelanchier utahensis</i> . . . . .	24
2	<i>Amsinckia tessellata</i> . . . . .	25
3	<i>Anemopsis californica</i> . . . . .	26
4	<i>Arabis pulchra</i> . . . . .	27
6	<i>Artemisia ludoviciana</i> . . . . .	28
5	<i>Artemisia tridentata</i> . . . . .	29
6	<i>Atriplex canescens</i> . . . . .	30
7	<i>Atriplex</i> sp . . . . .	31
8	<i>Brodiaea pulchella</i> . . . . .	32
9	<i>Calochortus flexuosus</i> . . . . .	33
10	<i>Castilleja chromosa</i> . . . . .	34
11	<i>Chrysothamnus nauseosus</i> . . . . .	35
12	<i>Cirsium mohavense</i> . . . . .	36
13	<i>Coleogyne ramosissima</i> . . . . .	37
14	<i>Coryphantha vivipara</i> . . . . .	38
15	<i>Datura meteloides</i> . . . . .	39
16	<i>Delphinium parishii</i> . . . . .	40
17	<i>Descurainia pinnata</i> . . . . .	41
18	<i>Descurainia sophia</i> . . . . .	42
19	<i>Distichlis spicata</i> . . . . .	43
20	<i>Echinocactus polycephalus</i> . . . . .	44
21	<i>Echinocereus engelmannii</i> . . . . .	45
22	<i>Encelia virginensis</i> var. <i>actonii</i> . . . . .	46
23	<i>Ephedra nevadensis</i> . . . . .	47
24	<i>Ephedra viridis</i> . . . . .	48
25	<i>Eriogonum inflatum</i> . . . . .	49
26	<i>Euphorbia albomarginata</i> . . . . .	50
27	<i>Geastrum</i> sp . . . . .	51
28	<i>Gutierrezia microcephala</i> . . . . .	52
29	<i>Juncus mexicanus</i> . . . . .	53
30	<i>Juniperus osteosperma</i> . . . . .	54
31	<i>Krameria parvifolia</i> . . . . .	55
32	<i>Larrea tridentata</i> . . . . .	56
33	Lichen . . . . .	57
34	<i>Lycium andersonii</i> . . . . .	58
35	<i>Lycium pallidum</i> . . . . .	59
36	<i>Menodora spinescens</i> . . . . .	60
37	<i>Mentzelia albicaulis</i> . . . . .	61

## LIST OF ILLUSTRATIONS (Continued)

<u>Photo</u>		<u>Page</u>
38	<i>Nicotiana trigonophylla</i> . . . . .	62
39	<i>Opuntia basilaris</i> . . . . .	63
40	<i>Opuntia echinocarpa</i> . . . . .	64
41	<i>Opuntia erinacea</i> . . . . .	65
42	<i>Oryzopsis hymenoides</i> . . . . .	66
43	<i>Peraphyllum ramosissimum</i> . . . . .	67
44	<i>Phragmites australis</i> . . . . .	68
45	<i>Pinus monophylla</i> . . . . .	69
46	<i>Prosopis glandulosa</i> . . . . .	70
47	<i>Prosopis pubescens</i> . . . . .	71
48	<i>Psoralea polydenia</i> . . . . .	72
49	<i>Purshia glandulosa</i> . . . . .	73
50	<i>Quercus gambelii</i> . . . . .	74
51	<i>Rhus trilobata</i> . . . . .	75
52	<i>Rumex crispus</i> . . . . .	76
53	<i>Salix exigua</i> . . . . .	77
54	<i>Salix gooddingii</i> . . . . .	78
55	<i>Salvia columbariae</i> . . . . .	79
56	<i>Salvia dorrii</i> . . . . .	80
57	<i>Sphaeralcea ambigua</i> . . . . .	81
58	<i>Stanleya pinnata</i> . . . . .	82
59	<i>Stephanomeria</i> sp . . . . .	83
60	<i>Stipa speciosa</i> . . . . .	84
61	<i>Streptanthella longirostris</i> . . . . .	85
62	<i>Streptanthus cordatus</i> . . . . .	86
63	<i>Suaeda torreyana</i> . . . . .	87
64	<i>Symphoricarpos longiflorus</i> . . . . .	88
65	<i>Tessaria sericea</i> . . . . .	89
66	<i>Thamnosma montana</i> . . . . .	90
67	<i>Thelypodium integrifolium</i> . . . . .	91
68	<i>Typha domingensis</i> . . . . .	92
69	<i>Typha latifolia</i> . . . . .	93
70	<i>Veronica anagallis-aquatica</i> . . . . .	94
71	<i>Vitis arizonica</i> . . . . .	95
72	<i>Xylorhiza tortifolia</i> . . . . .	96
73	<i>Yucca baccata</i> . . . . .	97
74	<i>Yucca brevifolia</i> . . . . .	98
75	<i>Yucca schidigera</i> . . . . .	99

## LIST OF TABLES

<u>Table</u>		<u>Page</u>
2-1	Yucca Mountain Ethnobotany: Number of Interactions, January 1, 1988 to October 7, 1988 . . . . .	21
3-1	Identified Plant Species and Frequency of Discussion During Interviews . . . . .	23
4-1	Presence of Native American Identified Plants by Ecological Zones. . . . .	101
4-2	Native American Identified Plants at the Rock Valley-Jackass Flats Divide Site . . . . .	103
4-3	Native American Identified Plants at the Dune Wash/Twin Tinajas Site. . . . .	104
4-4	Native American Identified Plants at Cane Spring Site . . . . .	105
4-5	Native American Identified Plants at the Frenchman Flat Site . . . . .	105
4-6	Native American Identified Plants at the Tarantula Canyon/Specie Spring Site . . . . .	106
4-7	Native American Identified Plants at the Black Cone/Crater Flats Site. . . . .	107
4-8	Native American Identified Plants at the Point of Rocks Spring Site. . . . .	108
4-9	Native American Identified Plants at the Big Spring Site (Ash Meadows) . . . . .	108
4-10	Native American Identified Plants at the Collins Spring Site (Ash Meadows). . . . .	109
4-11	Native American Identified Plants at the Yucca Ridge Site (Top of Yucca Mountain) . . . . .	110
4-12	Native American Identified Plants at the Chia Gathering Site . . . . .	111
4-13	Native American Identified Plants at the Pestle Site. . . . .	111
4-14	Native American Identified Plants at the Petroglyph Cave Site . . . . .	111
4-15	Native American Identified Plants at the Pink Tuff Site . . . . .	112
4-16	Native American Identified Plants at the Fortymile Canyon Site . . . . .	113
4-17	Native American Identified Plants at the Twin Springs Site . . . . .	113
4-18	Native American Identified Plants at the Tippipah Spring Site . . . . .	114
4-19	Native American Identified Plants at the Tippipah Highway Site. . . . .	115
4-20	Native American Identified Plants at the Whiterock Spring Site . . . . .	116
4-21	Native American Identified Plants at the Rainier Mesa-Top Site. . . . .	116
5-1	Frequency of Traditional Uses of Identified Plants . . . . .	118
5-2	Traditional Native American Uses of Identified Plant Species . . . . .	119
5-3	Frequency of Current Uses of Identified Plants . . . . .	121

## LIST OF TABLES (Continued)

<u>Table</u>	<u>Page</u>
5-4	Current Native American Uses of Identified Plant Species . . . . .122
5-5	Traditional Uses of Identified Plants by the Different Ethnic Groups . . . . .124
5-6	Current Uses of Identified Plants by the Different Ethnic Groups . . . . .125
5-7	Traditional and Current Use of Plant Species for Each Ethnic Group . . . . .126
5-8	Management Techniques Used by Native Americans . . . . .129
5-9	Correlation of Management Techniques to Plant Species . . . . .130
5-10	Plant Management Techniques for Each Traditional Plant Use . . . . .132
5-11	<i>Have you ever taught anyone about the uses of this plant?</i> . . . . .132
5-12	<i>Are you currently teaching anyone about the uses of this plant?</i> . . . . .133
5-13	<i>Who have you taught and who are you currently teaching about the uses of this plant?</i> . . . . .133
5-14	First-Choice Recommendations for Protecting Native American Plants by Ethnic Group . . . . .135
5-15	Second-Choice Recommendations for Protecting Native American Plants by Ethnic Group . . . . .136
5-16	Plant-Specific Recommendations made by Native American Plant Specialists . . . . .136

# CHAPTER ONE

## INTRODUCTION

This report presents Native American interpretations of and concerns for plant resources on or near Yucca Mountain, Nevada. This is one of three research reports regarding Native American cultural resources that may be affected by site characterization activities related to the Yucca Mountain high-level radioactive waste disposal facility. The other two reports provide research findings regarding (1) the history of Native American people from the Yucca Mountain region as this can be understood through a literature review (Stoffie, Olmsted, and Evans, 1988) and (2) the location and interpretation of Native American archaeological resources located in the Yucca Mountain region (Stoffie, Evans, and Harshbarger, 1988).

Representatives of the sixteen involved American Indian tribes identified and interpreted plant resources as part of a consultation relationship between themselves and the U.S. Department of Energy (DOE). Participants in the ethnobotany studies included botanists who have conducted, and continue to conduct, botanical studies for the Yucca Mountain Project (see Collins et al., 1981; O'Farrell and Collins, 1983, 1984). This report is to be used to review research procedures and findings regarding (1) the process of consulting with the sixteen tribes, (2) interviews with tribal plant specialists and elders, and (3) findings from the ethnobotanical visits with representatives of the sixteen tribes. An annual report will include a chapter that summarizes the key findings from this plant resources study.

### Repository Site Characterization

The Nuclear Waste Policy Act of 1982 proposed a plan to safely dispose of commercial power plant wastes, to conduct environmental investigations, and to involve Native Americans in site selection proceedings. A national search for a site where a high-level radioactive waste facility could be located culminated in the environmental assessment studies recommending three candidate sites for further consideration: Hanford, Washington; Deaf Smith, Texas; and Yucca Mountain, Nevada. When the present study was initiated (July 7, 1987), the DOE was beginning site characterization activities at all three sites. The Nuclear Waste Policy Act, as amended in December 1987 by the United States Congress, specifies that site characterization studies will be conducted first at the Yucca Mountain, Nevada, candidate site.

Site characterization includes laboratory and field activities undertaken to establish the geologic and hydrologic condition of the site and the ranges of parameters needed to evaluate the suitability of the site as a potential location for a repository. In conjunction with site characterization, environmental studies are being conducted to assess how site characterization activities may affect the environment. These studies will form the basis for actions to minimize any significant adverse environmental impacts. The Native American cultural resources study is part of this environmental research.

Science Applications International Corporation (SAIC), Las Vegas, Nevada, is providing support to the DOE for characterization and environmental research at Yucca Mountain. SAIC subcontracted the Native American cultural resources study to anthropologists from the Institute for Social Research at the University of Michigan.

## **Involved Indian Tribes**

As outlined in the Environmental Field Activity Plan for Cultural Resources, Native American Component (DOE, 1988), this Native American study involves three ethnic groups—Owens Valley Paiute, Southern Paiute, and Western Shoshone—whose cultural resources are found in the Yucca Mountain region. Ethnographic experiences in the southern Nevada area and an extensive literature review (Stoffle, Olmsted, and Evans, 1987) led to the selection of sixteen Indian tribes that potentially would be involved in the Yucca Mountain cultural resources project. The sixteen involved tribes are listed below:

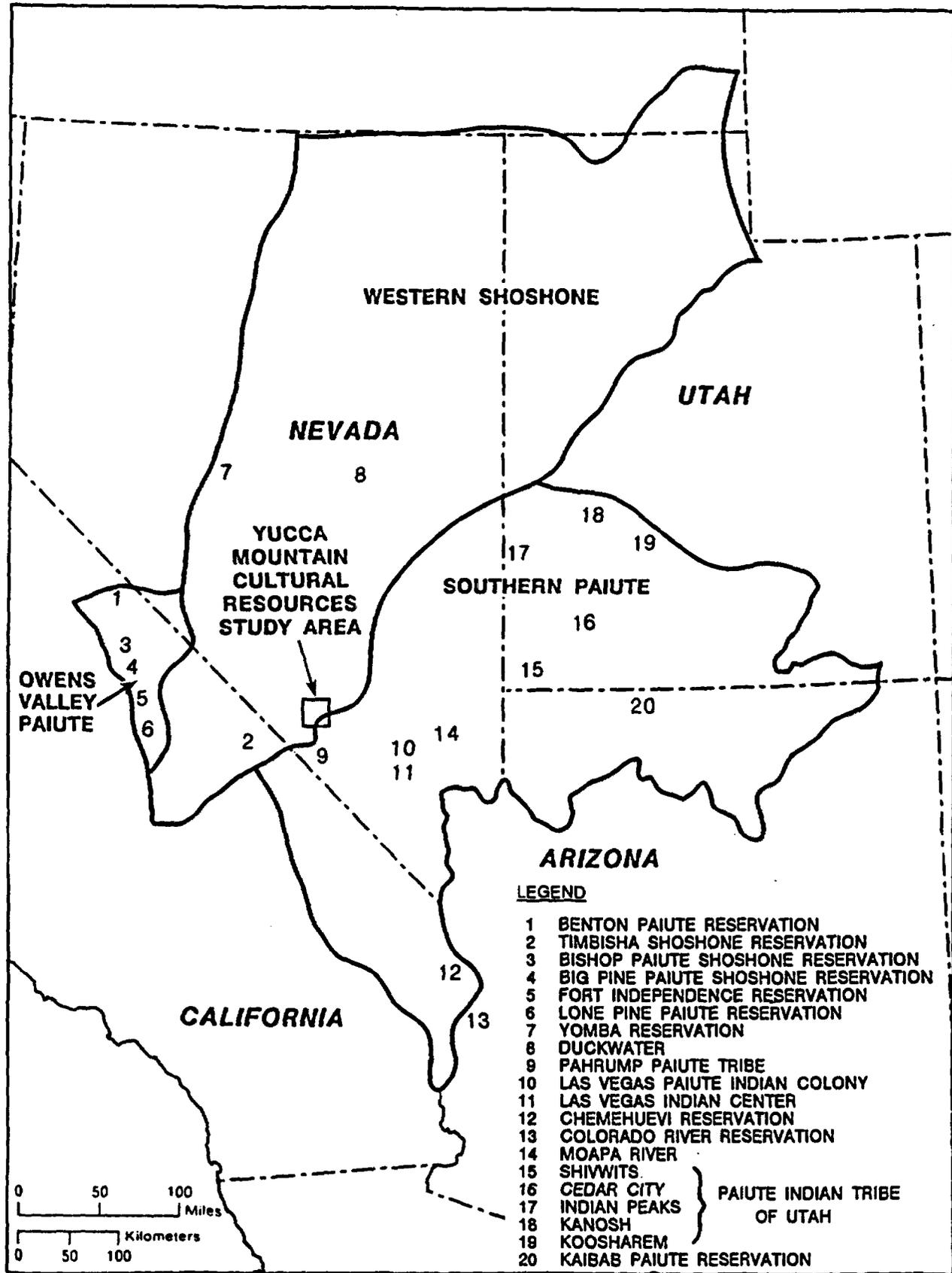
1. Kaibab Paiute Tribe, Arizona.
2. Paiute Indian Tribe of Utah.
3. Moapa Paiute Tribe, Nevada.
4. Las Vegas Paiute Indian Colony, Nevada.
5. Las Vegas Indian Center, Nevada.
6. Chemehuevi Tribe, California.
7. Colorado River Indian Tribes, Arizona.
8. Pahrump Paiute Band, Nevada.
9. Timbisha Shoshone Tribe, California.
10. Lone Pine Indian Tribe, California.
11. Ft. Independence Indian Tribe, California.
12. Big Pine Indian Tribe, California.
13. Bishop Paiute Indian Tribe, California.
14. Benton Paiute Indian Tribe, California.
15. Yomba Shoshone Tribe, Nevada.
16. Duckwater Shoshone Tribe, Nevada.

After meeting with each of the sixteen tribes, all requested that they be included in the Native American cultural resources project. Their involvement includes participating in in-depth ethnographic interviews, tribal council presentations, reviews of cultural resources project reports, and visits to the Yucca Mountain study area.

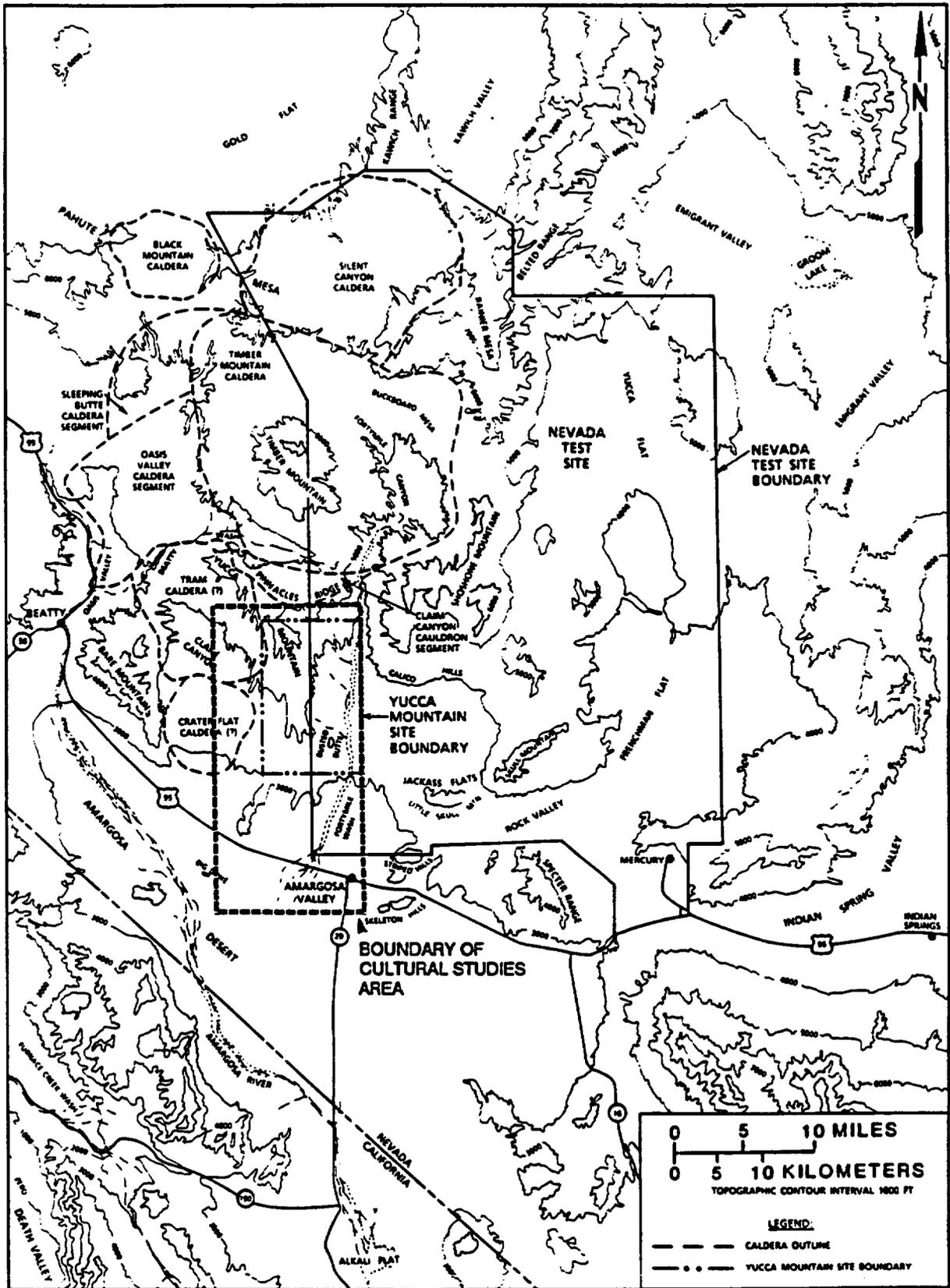
The location of contemporary reservations for the sixteen Indian tribes and the approximate boundary of the Owens Valley Paiute, Southern Paiute, and Western Shoshone ethnic groups in the late 1800s is presented in Map 1. Each of the sixteen tribes has been consulted on a regular basis since July 1987. Details of the continuing involvement of these sixteen tribes are presented in this report.

## **Cultural Resources Study Area**

The Yucca Mountain cultural resources study area comprises more than 70,000 acres (see Map 2). Because it was impossible for Indian people to make meaningful comments on such a large area in a short period of time, the cultural resources project had to be conducted in phases. The first site visits, conducted from September 28 to October 3, 1987, and from December 1 to December 4, 1987, concentrated on archaeological resources such as artifacts, petroglyphs, pictographs, shelters, campsites, and potential burials, as well as sacred religious areas around the eastern flank of Yucca Mountain, Yucca Wash, Fortymile Wash, and Fortymile Canyon. It was decided to concentrate on this area because most of the site characterization activities would occur there. An intensive three-week long series of ethnobotanical visits was conducted from March 28 to April 14, 1988. The purpose of these visits



Map 1. Traditional Ethnic Boundaries and Locations of Tribes Involved in the Yucca Mountain Project (adapted from D'Azevedo, 1986).



Map 2. Yucca Mountain Cultural Resources Study Area (SAIC modification of DOE, 1986).

was to assess the location and use of traditional plants that are located in the Yucca Mountain Project cultural resources study area. This report presents the findings from these visits.

With the culmination of the ethnobotanical resources study, most of the major categories of cultural resources located in the Yucca Mountain study area have been identified. Although the location of all cultural resources is not known at this time, being aware of the types of resources that are present has permitted a discussion of how to best protect these Native American cultural resources. This discussion was held in Las Vegas on May 5, 1988, and involved tribal governments and elders who provided mitigation recommendations to the DOE regarding the disposition of cultural resources. The recommendations were presented for review as a separate interim report (Stoffle, Evans, and Halmo, 1988).

### **Future Studies**

As more information becomes available on the exact location of various site characterization activities, visits that are short in duration and focused in purpose will be made by representatives from the involved Indian tribes and the ethnographic study team. These specialized visits will be designed to accurately record cultural resource concerns for areas of perhaps only a few acres.

### **Summary of Findings**

Prior to withdrawal of portions of the Yucca Mountain area from public use, the area was used by Owens Valley Paiute, Western Shoshone, and Southern Paiute people for several hundred years. The area contains numerous plants, animals, and sacred resources traditionally used by these people. Thirty-nine Native American plant specialists representing the sixteen involved tribes identified a total of 76 species of plants during 381 in-depth interviews conducted by study team ethnographers.

Of the 76 plant species identified by the Native American plant experts, 68 were traditionally used and 56 are still used today. Plants used for food comprised 48 of the total number of identified plants, those used for medicine and/or ceremony accounted for 32, and 27 were used for manufacturing purposes. In addition, 11 woody species were used as fuel. Cultural transmission of traditional knowledge regarding these plants and their uses continues among contemporary members of each ethnic group. Native American plant experts reported that they are currently teaching children, grandchildren, relatives or other (primarily younger) members of their ethnic groups the traditional use, harvest, or preparation methods for 43 of the plants identified.

More than 45 years ago, land now incorporated into the Nevada Test Site and the Nellis Air Force Bombing and Gunnery Range was withdrawn from the public domain. This area includes part of Yucca Mountain. Oral testimony, combined with the presence of the many botanical resources identified, indicate that, in many instances, had the land not been withdrawn, these cultural resources would still be used by Native American people.

## Organization of This Report

This report integrates data from the ethnobotanical fieldwork and visits conducted over a three-week period. Chapter Two outlines the methodology used in the course of this study. Chapter Three presents the inventory of Native American identified plants including scientific name, Indian names, common names, ecozone location, brief summaries of use information, and recommendations for the disposition of each plant provided by the Native American plant experts. Chapter Four provides a qualitative environmental description of each of the 23 sites visited, as well as quantitative data regarding the number of Native American identified plants collected at each site. Chapter Five contains the quantitative analysis of knowledge, use, management, and cultural transmission patterns.

## A Holistic View of Plants

American Indian people and western scientists tend to have opposing perspectives on the world. Indian people tend to view the world as a holistic unit that has integrated parts, some of which cannot be understood. Western scientists tend to believe that the parts of the world can be analyzed and understood in themselves, even though there is no complete understanding of how the parts are integrated to make the world as a whole. This report, being a joint product of Indian people and western scientists, needs to reflect both of these world perceptions.

The bulk of this report divides plants into their logical components: plant parts used; places where used; purposes of uses; and persons who used, do use, and will use the plants. The remainder of this Introduction is devoted to conveying an American Indian holistic perspective on plants as a part of the world.

The following text was provided by a Western Shoshone elder as he, his niece, and an ethnographer talked about plants while sitting near the rockshelter in Dune Wash on the flank of Yucca Mountain. The Western Shoshone elder talked about many of the plants located at this site, but only one plant is discussed here. This one-plant interview contains most of the major themes that are discussed in detail elsewhere in this report.

The subject plant is called *yatumbi* by the Western Shoshone, *Larrea tridentata* by western scientists, and is commonly referred to as creosote bush, frequently called "greasewood" by Indian people. This plant has many uses for both humans and animals. Native American people believe that the plant has its own human-like life force and this plant has rights, similar to those of humans. The plant is considered to be especially bonded to the place where it grows, the other plants around it, and the humans and animals that use it. These interdependencies, many of which may be unknown, are believed to be part of the supernaturally created plan for the world. Knowledge about the plant is said to have existed before there were humans, and the knowledge has been passed down from generation to generation since creation.

The following transcription presents information revealed by the Western Shoshone elder as he raised issues and responded to questions. Every effort has been made to retain the organization and the meaning of the Western Shoshone elder's statements. Although the elder speaks and understands English, he preferred to discuss issues in his own language — translations were provided by his niece. In an attempt to make the transcribed information

easier to read, some redundancies have been eliminated. To ensure accuracy, the elder's niece has reviewed and verified the contents of this transcription.

The transcription of the Western Shoshone elder's comments begins as the ethnographer is asking him how he would describe his immediate environment (a small, partially enclosed valley), as well as other places, in terms of their plants.

### **How To Refer To A Place**

Translator: *Indian people would describe this area as a place where there is [Indian name] greenery growing there, as opposed to a place that is dry with no greenery growing there. In an area that is mixed plants he would say mixed, if one plant is predominant, he would name the area by the predominant plant. Where there are scarce plants growing, they wouldn't bother with them, and those plants would be set aside for the use of the wildlife because you, in return are going to use the wildlife. That way it's also your food source. There are some plants they never bothered to touch, but it was important for the wildlife. They would name the area for the wildlife. He thinks that from those ring of rocks that he saw that it was a place where they gathered mainly seeds. He named two particular seeds [Indian names]. They require a lot of rain. In order for the Indians to know there were these particular plants in this area, they [would] observe the weather, send out a few people to determine how the plants look and they would go back and tell the others. Anyone could go out to check the plants, because they all knew them, because they all ate the same stuff. They had to know.*

### **Teaching, Then And Now**

Translator: *They were taught, from their youth, about the plants, what they were used for and the description of them. It was the duty of the old Indians to teach the young every day, beginning in the morning, about the plants. The girls were taught by the grandmothers, but the young boys were there to listen in. The boys were taught by the grandfather, but the young girls were there to listen in. When they quit gathering the foods, the plants are fully grown and are drying and that's when the gathering ceases. He still teaches his children and grandchildren.*

### **Uses Of Yatumbi**

Translator: *There's just one kind of this plant. The old Indians used this plant for medicinal purposes. The leaves were cut and boiled. They also made a kind of glue [Indian name] out of the plant. Heat the hard part of the plant, it would melt and get soft and it needed to be used immediately or it would get hard again. The parts of the plant used for glue were gathered in mid-summer and fall. You can store it and start using it to melt it down when it's time for you to make the awl. They made awls mainly for basketry, and it was important to have one handy at all times. They would make a bunch, and possibly trade it off with other basketry [makers]. They used the glue in basket making. The glue can be stored. They would possibly trade the parts of the plant for glue making to other tribes if there was an abundance of the plant...*

*No special way to harvest the plant. It was just picked off.*

## Talking To Plants Before Harvest

Ethnographer: *Did you have to talk to the plant and ask it to take the glue so the glue would work?*

Translator: *He said that the main time they talked to the plant was when they were going to use it for medicinal purposes, for medicine. It was more important at that time, picking the leaves off for medicine. For picking for the glue, he says they also talked to the plant for that, but not as strongly as for the medicine.*

Ethnographer: *When they would pick the leaves for medicine, could a man or a woman do that or was it just a medicine person?*

Translator: *He said that to his knowledge it was not done by a medicine man; that anybody could go out and get it. Anybody that knew the plant could then make his own medicine. He said it wasn't used by a medicine man, you know. It could be picked by anyone.*

Ethnographer: *What would you say to the plant?*

Translator: *For the medicinal purposes? [speaking Indian] He says that when you talk to the plant you tell that plant that you have this ailment and that the plant should cure it and you will get well because the plant grows here on the land. They talk to the plant like as if it is a person. I said that because the plant grows here on the land; what he was saying is because "you" grow here on the land.*

*They talk too...I found out when they talk to the plants, they don't talk to that plant...they talk to that plant as if it was a person and they'll say "you", they won't say, you this plant growing here or anything like that. They always refer that it's growing on the land and, you know, that the medicine should be good and they would be healed, they would get well.*

Ethnographer: *And they see themselves as growing on the land, like the plant?*

Translator: *Oh yeah, uh huh. That's why they believe that they have to talk to the plant before they...when they're gonna use it, they always do that.*

## Breaking The Plant-Land Bond

Ethnographer: *What do you think we should do with this plant and others in the study area if something was to happen where they were to bulldoze or in some way scrape the ground in an area that had this plant? What would be the recommendation?*

Translator: *Well, I believe nothing should be bulldozed and if I did make a recommendation, that would be it. But this society does not believe our ways and for development they'd go ahead and do it anyway, because what they would have to say is, there is an overabundance of the creosote growth areas. They would say it's plentiful and we're just gonna bulldoze just a few down.*

Ethnographer: *Why should it not be disturbed?*

Translator: *Because the creosote growing there was put there to grow there. The way that I was always told about being put there naturally was that all things are connected, all plants are connected and like you talk about protecting, one plant protects the other plants and so if it was to be bulldozed or removed ... then the other plants would have to also. They wouldn't get sheltered and possibly would not grow there anymore. But that's the way I was taught, that all plants are connected and they protect one another.*

Ethnographer: *Are the people related to that interconnection?*

Translator: *Yes and once they do that, destroy that connection, they destroy the connection of that plant to the land, and the people are a part of the land.*

Ethnographer: *Does it hurt the people too?*

Translator: *Oh, yes, uh huh. This is the reason why when they're gonna use a plant, especially for medicinal purposes, they will talk to the plant [because] the bond is there. The plant is related to the land and so is the Shoshone.*

*There's different ways they say it, sosoni. We say...when we say Shoshone, we say sosoni.*

*He says, it pertains to something like [Indian word] is something that you lay on the ground to lay on or to sit on or when you [Indian name] you are actually making...you're putting something down on the ground like a blanket or something, a mat or anything. Or you could even like gather a bunch of plants for a bedding, you [Indian name] there. He says that's the only...*

Ethnographer: *Is it like the people were laid on the land?*

Translator: *Something like that. When you sosoni you know you put it down on the ground.*

Elder: *[Indian word] they put [hard to understand] they sat down [Indian word] blankets [hard to understand].*

*You wanna make a bed you say [Indian word] you go make a [Indian word], you make a bed [Indian word].*

Translator: *Well [Indian word] like we say [Indian word]. He's saying that's the way the word sounds, he's deriving it from that [Indian word] when you make your bed or the people who lay on it.*

#### **Other Uses Of Yatumbi**

Translator: *But they used it for other things too, like the limbs of it they used but that was to make implements and stuff like that. Because they say it's a strong wood and it lasts a long time and they use the straight limbs of it. Like sometimes they would even use it in place of willow onto their cradle boards and...that's just sometimes, if they didn't have the willow handy. And they needed that, but only the straight limbs. They would go gather, cut the straight limbs off of different bushes, not just off of one bush, just looking for the straight ones. And then they used it for arrows, just making a plain arrow. They got it straightened out, straightening the limbs out.*

*I would say that they did this around fall because this is when all the new shoots are out and they're about the straightest ones. [speaking Indian] They'd straighten them out first [before storing them] and then after they straightened them out, then they're ready to go ahead and put the tips on them.*

*Well I was gonna say that the fires that they built outta this...uh...they felt that if you're out in an area like this, you would go to that creosote bush, 'cause that's where the best wood is at in an area such as this right now.*

*And it has a gas within the limbs and it'll burn blue and you don't need much to cook anything over it because it's a very hot fire. And it's lasting.*

*[speaking Indian] We were talking about the uses of it and it's sort of a multi-use plant. What I gather is that like we talking about making beds, a place where you're going to heal your body and they would make a bed out of the leaves again, just cutting or gathering where the most leaves are and then they would make a bed out of it, after the ground is heated. Sometimes they would even put rocks down into this bed so it'll hold the heat. Then they'd smooth it out and put little clot of dirt over it and then a layer of this [the yatumbi leaves] onto the dirt and then they would lay on top of this bed and cover themselves up. They had a use of these hot beds especially after a woman's had a child, during that period when she is becoming healed. During that time they believed that the woman was suppose to be by herself and she has her own bed.*

*...and they would again gather the leaves and boil it up and then steam coming out of it, put something over your head, and put your nose to it and inhale it, inhale the hot vapors off of it. That was another way that they used it.*

*...you would break these leaves off of the stems. Then they used it to apply onto wounds in its natural form.*

*Again the leaves. Apply it onto wounds and aches and pains. And when they did brew it up real thick and they would apply it to open wounds and sores, aching muscles. Aching muscles [speaking Indian] — arthritis. Aches and pains.*

*So it's used pretty well in different forms for those different purposes. Except for eating it. That's one thing that they didn't do is eat it. But they drank it. I think that's about it, the brew and the arrows.*

### **Plants And Ceremonies**

**Ethnographer:** *Was yatumbi ever used in any special ceremony? Was there any Indian ceremony or some event where this was the wood that was suppose to be used?*

**Translator:** *Not really, I wouldn't say that they really did it that way but they would go ahead and, like inside of their shelter, they would burn it just so that they could get the smell of it. Then I guess actual inhaling the fumes is something. All they said that it was good for you. That nothing but good is there. No badness.*

*In sweat houses in this area it would be the wood that would be used 'cause it burns real hot. They would gather the dry limbs and sometimes would even break some of the limbs off that is still growing, still alive. Not only the dead [limbs], they'll mix it, if they was going to use it in the sweat houses or someplace where they wanted to smell it.*

*The roots? [speaking Indian] Did they use the roots? I don't know that either. Never heard of it.*

### **Plant And Legends**

Ethnographer: *Are there any songs or stories that have yatumbi in it?*

Translator: *He says in the legends, at the beginning, there was a song for the [Indian name]. [That song was] just for this plant.*

*He's going into the legend. He's saying that...*

Elder: *I could sing that song. Yeah, I still remember. When I was a kid my dad told me a lot of stories about it. It was turtle. The one who sing that song.*

Translator: *The legend is, the turtle is the one that sang the song of the creosote. [speaking Indian] The song belongs to the creosote, but [is] sung by the turtle — the desert tortoise.*

*He says that the legend is quite long but...[speaking Indian].*

*Okay, what he is saying, I'll put it real general, is that the coyote and the tortoise they had these huge families. And these two went out hunting and got themselves a big-horned sheep and then the argument started. Who's going to get the hide, and so they said whoever jumps the furthest over the carcass. And so they both jumped over and the coyote, of course, he jumped way over the carcass but the tortoise landed right smack in the middle of the carcass. So this got a dispute going because the coyote got the hide and it rained all night long. [The turtle, in his madness,] began singing the song of the creosote. And then that's when the next day the heat started up. The sun came out and there was fire all around it or something like that. [speaking Indian].*

*...Then the heat caused the pond of water to start to boil because that's where the coyote and his family had departed to due to the heat. They said let's go down to the pond and live there. However, the heat kept on going and then the water boiled and they were boiled into carcasses and there was nothing but bones left there. This, he says, is from that song that the tortoise was singing of the creosote. [speaking Indian] This is the hot fire from the wood of the creosote which will burn blue and will make sounds. There's something within the wood that makes this real hot fire. But he says that's not the end of the legend. It just goes on. It ties in with other actions and other plants. It just goes on and on. He says everything, like we were saying, [is] all tied together. Such as, like he talked about the two...who was gonna get the hide. Then they go into how the hide was to be used coming from the big-horned sheep.*

Ethnographer: *Did the turtle sing the song to make it stop raining?*

Translator: *[Speaking Indian] He did say they were all washed out or something. [speaking Indian] Yeah, because he lost his family because they all went down with the water, got washed out. And that's the reason why he started to sing.*

*After the washout, he [turtle] went and retrieved his family, his kids, brought them back, bedded them down and asked them what their dreams had been of. The youngest one said he dreamt of fire. Then he sang. Then he sang of the creosote.*

Elder: *I got the songs yet. I don't forget...it was a long time ago when I was a kid [hard to understand].*

Translator: *That song that he sang was of this and that; it's in the legends like they say...and anything that has been put into legends is significant of that particular. And so he's saying, that again all things that was revealed in legends goes back to when the land was formed.*

Ethnographer: *So the yatumbi is important, even though it's common.*

Translator: *Uh huh, yup. I've asked — like in his generation, my mother and my aunts — why is there so much of this all over through the desert areas and all this. They would simply say because it was placed here. Then we would say, why so much of it here and then they would refer to it, well it doesn't grow in cold climates. It was placed here, down here. And that it was placed here for them to use, 'cause they belong to the area. They're just like us. Then they would go ahead and talk like he did on the legends and all this kind of stuff and they would say, they would refer to their legends, their [Indian word], that's the reason why it's like this. In other words, there is no written history or anything, no written studies; but they have the legends pertaining to these plants, and the animals and all things, the mountains and even some rock structures. They always referred to it like you refer to your Bible, on how the earth was made, and all this kind of stuff, and who was there and why and what went wrong, then who came along. Like he talked about the tortoise and coyote and having this feud, personal feud between the two, and then the tortoise decided he was gonna do something about it and that's when he started that song, then that's when the earth got hot.*

Ethnographer: *The song of yatumbi made the earth hot and saved it from a time when it was so wet.*

Translator: *Yes.*

Ethnographer: *Were there people...Shoshone then? Or was it before the Shoshone?*

Translator: *He says this is before the creation of the Shoshone. When these [Indian word], these legends, were made there were no Shoshones.*

*He is saying that all of the animals and all the life that was here before the Shoshones, that they were all [Indian word], they were all new ones. In other words, they were Indian people, like we say Shoshones, that they were people. [speaking Indian] He says that the tortoise was a human being. That he was the people of the land. I asked him, is that where we come from, and he says, yes. He says that the legends was revealed because they were the people at one time and this was passed on.*

Ethnographer: *The memory of the tortoise came down to the memory of the people?*

Translator: *He says it was passed on. Passed on through these other humans. Like we say the tortoise was a human being, then that was passed on to these new people, like the Indian people from them. The more they talk about it, you know talking with different people — like my aunt, who's over a hundred years old — of human forms coming to her father, but to him it wasn't the Indian of today coming to him. It was coming from the other world, before his time, to bring him something of significance and then, after this form left, why*

*then this. [speaking Indian] Anyway, there's a little winged moth or butterfly or beetle or something like that and this form fluttered along, this little winged insect, and through the legends that is a good sign that there is big-horned sheep close by; but where, you don't know. He was pretty tired so he decided I should just go home and forget what I've seen and, maybe, perhaps on my way home. So he started, and he was looking straight ahead where he always looked and then he saw the big-horned sheep standing there right in front of him. That was my grandfather. But that form that came to him, which was a human being, in full dress. When they say you're in full dress, you dress in your best, you wear the moccasins, you wear the headgear, that's what they say, full dress. He was in full dress. It wasn't just anyone coming to him. And this is also in their legends and they say that's where their legends come from. That all things were the people of the land then. Then when you ask them how did you begin to know about these legends. They say it goes back to that generation.*

The foregoing discussion clearly illustrates that Western Shoshone people regard their traditional plants as more than just economic resources in secular terms. In addition to having multiple uses (medicine, manufacture, and fuel), the creosote bush is a primary element in their ethnic creation stories. It is thus revered as a sacred component of the ethnic holy land. This reverence is evidenced by the fact that, prior to harvesting various parts for specific purposes (especially medicine), the plant is asked by its user to provide the necessary function(s) for enhancing individual or group well-being and is thanked for doing so.

This cultural pattern of praying to plants is common among Southern Paiute and Owens Valley Paiute people as well. Southern Paiute people, for example, specifically mentioned rabbitbrush (*Chrysothamnus nauseosus*) and juniper or cedar (*Juniperus osteosperma*) as being significant elements of their ethnic religious stories (often labeled as myths or legends). As in the Christian church calendar, however, in which certain rituals are performed only during certain times of the year, Southern Paiute religious stories are not transmitted to younger ethnic group members until winter, designated by Southern Paiute religious doctrine as the appropriate time of the yearly cycle.

Plants, therefore, are much more significant to the ongoing culture of Native American people in both sacred and secular terms than to many of the Western cultures. It is because the Creator provisioned the ethnic holy land with useful resources and charged the people with taking care of them that they are so significant. They remain sacred, even though the land upon which they were placed has been removed from Indian control. Despite these losses of land and resources, Native Americans remain in proximity to them and continue to believe that they have a sacred charter to shepherd them.

## **CHAPTER TWO**

### **RESEARCH DESIGN AND METHODOLOGY**

The ethnobotanical field work and visits as part of the Yucca Mountain Project Native American cultural resources project were conducted between March 28 and April 14, 1988. In addition, a series of on-reservation interviews were conducted with tribal elders and plant experts between June 20 and June 29, 1988. This chapter discusses the research design and methods employed in the study. It begins by outlining briefly the framework underlying the field methodology in terms of a series of assumptions about traditional and contemporary Native American plant use derived from previous studies (Stoffle and Dobyns, 1983; Stoffle, Dobyns, and Evans, 1983; Halmo, 1987). Subsequent sections describe the process of site selection for the visits, the chronology of field work, in-field logistics and rationale, and a formal interaction analysis of study team contact with each of the 16 tribes involved in the study.

#### **Ethnobotanical Framework**

As mentioned in Chapter One, this study builds upon earlier work conducted by the authors during similar cultural resource assessment projects (Stoffle and Dobyns, 1982, 1983; Stoffle, Dobyns, and Evans, 1983; Stoffle, Dobyns, Evans, and Stewart, 1984; Stoffle, Evans, and Jensen, 1987). The present study significantly extends the scope of previous efforts to include data on the transmission of knowledge about traditional plant use from generation to generation. Cultural transmission of traditional knowledge is an important mechanism by which persistent ethnic groups or peoples endure (Spicer, 1971, 1980); knowledge of plants and their uses constitutes one such cultural domain of knowledge transmitted from one generation to the next (Halmo, 1987). Thus, it follows that any site characterization activities that have the potential to adversely affect plant resources in areas that were once traditional Native American lands also could adversely affect current and future generations of these ethnic groups.

This analysis goes beyond previous work in another way. Rather than simply present a list of traditional plants, study team ethnographers deliberately sought and elicited detailed information regarding (1) which plant parts were (or are) used for specific purposes, (2) the time of year during which these parts were harvested and used, (3) how they were harvested and prepared, (4) the management techniques employed by Indian people to ensure a reliable supply of the resources, and (5) whether the plant is still used by members of the ethnic groups.

#### **Native American Plant Specialists**

Each of the 16 involved tribes were asked to appoint one or more individuals whom they recognized as being knowledgeable experts in the area of traditional plant use. These plant experts were chosen either by the tribal chair, the tribal council, or the Official Tribal Contact Representative (OTCR) (Stoffle, Evans, and Harshbarger, 1988:21) for each of the 16 involved tribes. The ethnographic study team made this request in a tribal contact letter dated February 5, 1988.

A total of 32 Native American plant specialists were subsequently scheduled for participation in the ethnobotanical field work and visits. Unfortunately, because of transportation problems, illness, or other factors, seven of the individuals were not able to participate. Three additional members of the Pahrump Paiute Tribe were present during one visit at Ash Meadows; two were not formally interviewed regarding plant resources, but were consulted on an informal basis during the visit. An additional 12 Indian plant experts were interviewed during the June on-reservation interview period. Thus, a total of 40 Native American plant specialists were interviewed overall.

### **Site Selection**

Staff members at EG&G Energy Measurements, Inc., Goleta, California; SAIC staff; and the principal ethnographer developed an itinerary for each of the site visits at a planning meeting held in Las Vegas on March 7, 1988. This itinerary was influenced by concerns expressed by Native American representatives who had participated in earlier visits to Yucca Mountain that certain sites should be re-visited because of their identification as being important.

Key cultural experts felt that not enough time had been spent in identifying and interpreting the cultural resources at certain locations during visits in the Fall 1987. These individuals expressed a desire that those sites be re-visited during the ethnobotany study, along with other areas that had not been visited previously because of time and other constraints. Project botanists identified sites with more or less ideal combinations of plants in association with one another; ethnographers selected sites based on concerns of the key cultural experts and previous studies that identified microenvironmental habitats traditionally used by Native Americans in the region. Thus, it was decided that at least seven of the sites would be re-visited, along with new sites selected by both project botanists and ethnographers.

In all, 23 sites were selected; during the actual fieldwork, however, some of the sites were excluded because of time constraints and other factors, most notably the concentration of plants at certain sites and the desires of both Native American plant experts and project ethnographers to remain for longer periods at particular sites. It was felt that more in-depth information could be generated as a result of spending additional time at certain sites. Thus, instead of visiting each of the 23 originally selected sites, project ethnographers divided 5 of the sites into components, such that a total of 23 sites was actually visited (see Chapter Four).

### **Chronology of Field Work**

The ethnobotanical field work and visits commenced on March 28, 1988. On March 27, project ethnographers flew to Las Vegas and made final field arrangements with the Manager of the cultural resources studies. The team then drove to Beatty, which served as the "base camp" for the ethnobotanical study.

Three representatives of the Timbisha Shoshone Tribe of Death Valley, California, visited the low-elevation zone site at Dune Wash on March 28. On the following day they visited three middle-elevation zone sites that comprise the Prow Pass Ceremonial Area. On March 30, two representatives of the Bishop community of Owens Valley Paiute, along with a Chemehuevi plant expert and basketmaker from the Colorado River Indian Tribes reservation in Parker, Arizona, visited two middle-elevation zone sites in the Fortymile Canyon area. On

March 31, these individuals visited two low-elevation zone sites west of the Nevada Test Site at Black Cone in the Crater Flats Area, and at Tarantula Canyon. During the following two days (April 1 and 2), one representative from the Pahrump Paiute Tribe and two individuals representing the Owens Valley Paiute people in Fort Independence, California, visited the low elevation zone sites at Cane Spring and Ash Meadows.

During the following week, the Dune Wash and Prow Pass Ceremonial Area sites were visited by representatives of the Las Vegas Indian Center and the Chemehuevi Tribe of California (April 4 and 5). The second two-day sequence (April 6 and 7) consisted of visits to Tarantula Canyon and Black Cone by representatives from the Las Vegas Colony. During the next two days (April 8 and 9), plant specialists from the Moapa Paiute Tribe, along with representatives of the Las Vegas Indian Center and the Pahrump Paiute Tribe visited the Cane Spring and Ash Meadows sites.

During the third week (April 11 to 14), two representatives from the Lone Pine community of Owens Valley Paiute, the tribal chairman from the Yomba Shoshone reservation, two elders from the Paiute Indian Tribe of Utah, and two representatives of the Kaibab Paiute Tribe visited the middle-elevation zone sites of Tippihah and Whiterock Spring, as well as the high-elevation zone site atop Rainier Mesa. The Lone Pine and Yomba representatives also visited Captain Jack Spring.

Following a preliminary analysis of the data generated during the on-site visits, project ethnographers returned to Las Vegas to interview additional members of the urban Las Vegas Indian Center, as well as elders and plant experts who were unable to participate in the earlier on-site visits. Most of these individuals were recommended by participants in the on-site visits as being very knowledgeable about plant resources and their uses. Moreover, many respondents contacted during the on-reservation interviews were members of ethnic/tribal groups that the preliminary analysis of on-site visit data indicated were under-represented. Project ethnographers thus decided that the on-reservation interviews should focus on members of the Las Vegas Indian Center and Western Shoshone tribal groups involved in the project.

On June 19, 1988, an ethnographer departed from Las Vegas for Kaibab, Arizona, to pick up the Native American research associate, an elder of the Kaibab Paiute Tribe who has a long association with the team, as well as extensive experience in cultural resource assessment studies. He accompanied the ethnographers during a trip to the various reservations in Nevada and California. The research team returned to Las Vegas on June 20. On the following day, an ethnographer contacted the Executive Director of the Las Vegas Indian Center to schedule potential interviews with center members. The ethnographic team was subsequently invited to attend a board meeting of the Indian Center that evening. After presenting a brief update on the Yucca Mountain Project to Center board members, the team was given the names and addresses of two individuals who expressed an interest in being interviewed. The ethnographic team was also invited and given approval to conduct interviews during a meeting of the Native American Women's Association to be held during the following week.

On June 22, a Hopi member of the Las Vegas Indian Center was interviewed in her home during an instructional basket-making class, which was led by two members of the Moapa Paiute Tribe and attended by urban Native American women interested in learning the craft.

Later that afternoon, ethnographers interviewed an Oto-Missouri woman member of the Las Vegas Indian Center and the Native American Women's Association at the tribal offices of the Las Vegas Paiute Indian Colony.

On June 23, the ethnographers and the Native American research associate departed for Bishop, California. Enroute, they stopped at Lone Pine, California to interview an elderly Western Shoshone woman from the Timbisha Tribe, whose relatives live there. The interview began in the late afternoon and concluded in the early evening. The following day (June 24), the ethnographers spent an intensive five hours interviewing two Western Shoshone individuals who reside in the Lone Pine Indian community; the team then returned to Bishop. On June 25, the ethnographers traveled to Fort Independence and interviewed an Owens Valley Paiute elder. Following that interview, the team attempted to visit the Yomba Shoshone reservation. However, a heavy hail storm in Lee Vining, California, late that afternoon forced the team to remain there overnight.

On the morning of June 26, the ethnographers departed for Yomba and arrived there early in the afternoon and met with the tribal chairman for approximately one hour. Unfortunately, plant specialists recommended earlier by the chairman had left Yomba to visit relatives. Consequently, no interviews were conducted at Yomba. The chairman was updated on the status of the study before the team departed for the Duckwater Shoshone reservation.

After spending the night in Eureka, Nevada, the ethnographers traveled to Duckwater on the morning of June 27. There they met with a member of the Environmental Protection Committee of the Western Shoshone National Council to discuss the cultural resources project, before interviewing a Duckwater elder about traditional plant resources. After having completed the interviews, the ethnographers departed for Kaibab, Arizona, to drop off the Southern Paiute elder. The next morning (June 28), one ethnographer interviewed the elder regarding plant resources and their uses while another ethnographer visited with the tribal chairperson and OTCR, updating them on the project. After an intensive, five hour interview, the ethnographers departed that afternoon for Las Vegas. Upon arriving, they proceeded to the Las Vegas Paiute Indian Colony to attend the meeting of the Native American Women's Association discussed earlier. After a presentation regarding the nature and scope of the cultural resources studies for the Yucca Mountain Project, the ethnographers interviewed a total of four Native American women (three of them urban residents and one a member of the Las Vegas Colony) regarding contemporary uses of plants. The interviews lasted three and one-half hours. On June 29, the ethnographers left Las Vegas and returned to Ann Arbor, Michigan, to analyze the new data generated from the on-reservation interviews.

All interviews were conducted with the approval and consent of the respondents, tribal chairs, or other tribal officials.

### **In-Field Logistics and Rationale**

Prior to beginning the ethnobotanical fieldwork in March 1988, study team ethnographers set out a strategy for conducting the ethnobotany visits. It was decided that each ethnographer would be responsible for "tracking" one Native American plant expert over each two-day period. It was assumed that this approach would more readily facilitate rapport with the individual and allow more in-depth interaction. In a few instances, however, ethnographers interviewed two plant specialists simultaneously, with one serving as respondent and the other

as interpreter. In cases where both plant specialists were respondents, this was made explicit in the field notes.

Once in the field, it was decided that plant identifications and interviews would proceed in a three-tiered fashion. First priority would be given to the Native American plant expert; i.e., plants that he or she identified first were the object of the interview. Second priority was given to plants that were identified by other Indian people; i.e., a plant specialist who was not any one ethnographer's "key consultant" or who was not being interviewed by one of the study team ethnographers at that particular time. Only after plant identifications by the Native American plant experts were assumed to have ceased and subsequent interviews were complete did the project botanists and ethnographers themselves begin to identify plants and ask the Indian plant specialists about them.

Upon arriving at each site, the ethnographers and their key consultant/plant expert dispersed to separate, somewhat isolated areas in order to provide respondents with maximum privacy during the in-depth interview process. This strategy was also employed for the dual purpose of restricting coloration of data to the maximum extent possible. In a few cases, this strategy proved unsuccessful; in several others, however, two respondents in proximity to each other actually stimulated the memory of each other concerning plant names and uses.

To prevent any identifications being missed, project botanists provided the ethnographers with colored flagging material. Because there was only one botanist dividing his or her time between three ethnographers and their respondents, it was often difficult for him or her to be at each ethnographer's side to provide a scientific identification. For this reason, the ethnographers tagged each plant for which they conducted an interview in the absence of the botanist; at the end of the time spent at that location, tagged plants were pointed out. When all plants had been positively identified to the extent possible, flags were removed to prevent leaving clues as to previous Indian identification. The purpose of this strategy was to encourage independent Native American plant expert identification and also to reduce coloration. In a few cases where plants could not be positively identified in the field (due to the earliness of the season, climate, or other factors) plants were left tagged for future reference and positive identification by the botanists.

Voucher specimens were collected by the botanists for each of the plants identified and for which interviews with the Native American plant specialists were conducted. In the event scientific identification of a plant could not be provided by the botanists in the field, one of two options was exercised: either parts of the plant were collected and examined closely under a microscope in the lab, thus providing positive identification, or it was not collected immediately, but was instead marked for future collection and identification.

Only one specimen was collected for each species identified. If the Native American plant expert identified the same plant twice in the same day (whether at the same site or at two different sites) or more than once during the two-day sequence of visits, it was assumed by project ethnographers that the same information derived from the first plant-specific interview could simply be extrapolated to all other subsequent interviews regarding that plant with that individual (i.e., the data would not differ). It is for this reason that there is only one collection number and voucher specimen for any plant that may have been identified more than once. More than one voucher specimen was collected for further examination only if there was a strong conviction on the part of the botanist that the specimen represented a different species, subspecies, or variety.

During the on-reservation interviews, ethnographers carried dried voucher specimens, which were obtained from the Herbarium at the University of Nevada-Las Vegas. The strategy for the on-reservation interviews was to run through the set of 76 plants with each respondent; for each species which he or she identified, the same series of questions was asked about each plant as was asked during the on-site visits. It was assumed by project ethnographers that visual association with an actual specimen of the plant would stimulate the memories of on-reservation plant experts.

Each of the strategies for identifying plant species had its drawbacks. The on-site visit methodology provided Native American participants with an opportunity to observe and identify plants in their natural ecological context. Unfortunately, none of the participants were able to visit all of the ecozones and sites; therefore, they were not able to identify all of the potentially identifiable species of plants. Conversely, the on-reservation strategy of showing respondents dried voucher specimens of the plants provided them with an opportunity to observe each of the 76 species that had been identified in the field. Unfortunately, on-reservation respondents were unable to observe and identify the plants in their ecological context. Additionally, the voucher specimens were enclosed in plastic wraps, thus preventing respondents from using smell as a technique of identification. Also, the dried and pressed condition of some specimens made respondents unsure of their identification in some instances. On the whole, however, the project ethnographers felt that both strategies were successful.

For each plant identified by a Native American plant expert, both in the field and on-reservation, a variety of questions was asked. The range and categories of questions were developed by project ethnographers prior to the field work. In consultation with the Native American research associate, these categories and questions were refined, based on his extensive knowledge of traditional plant use. The first question attempted to elicit the Indian name for the plant. The next questions attempted to establish indigenous categories of plants (e.g., trees, grasses, plants with berries). In some cases, Native American terms for "bush," "medicine," "tree," and the like were elicited; in most instances, however, such questions were answered with use categories (e.g., "food plant"). Cognitive categorization questions were asked about the variety or kinds of each particular plant identified and how it could be distinguished from other species of the same plant, as well as different species. Although many of the plants identified were one of a kind, the Native American plant experts were quick to point out that characteristics such as color, the size of either the entire plant or certain parts, texture, smell, and other growth characteristics made them easily distinguishable from other kinds of plants, as well as from similar varieties of the same plant. Several significant species were identified as having more than one variety (e.g., yucca and cactus). In other cases, different plants fell under the same category, most notably those species that are used as greens. Additional questions addressed the issues of traditional and current use by both the ethnic group, as perceived by the respondent, as well as a personal (family) use history. Questions regarding purpose of use (food, medicine, etc.) and frequency of use by gender were also asked.

The ethnographic researchers sought and recorded additional detail on the use, for specific purposes, of certain plant parts (e.g., bulbs, roots, new shoots, stems, leaves, flowers, fruits, seeds, nuts, wood, and bark). Questions were asked regarding the time of year in which the part(s) were harvested and used, how they were harvested and prepared, quantity of plants or parts harvested, and whether there were any harvest techniques, methods of propagation,

cultivation, or management techniques employed by the respondents or their ethnic groups, past and present, to ensure a stable, reliable, or increased supply of the resource. In order to understand the process of cultural knowledge transmission, questions were asked about whether the respondents had been or were currently involved in teaching traditional cultural knowledge about plants and their uses to relatives, peers, or other members of their ethnic group, particularly the second and third generations. Finally, the Native American plant specialists were asked to provide recommendations regarding the disposition of each plant they had identified in the event potentially adverse effects were caused by site characterization activities in the area where the plants were present. Summaries of the data generated for each identified plant can be found in Chapter Three.

### **Formal Interaction Analysis**

Formal interaction analysis charts the progress and direction of consultative study designs, such as the cultural resources project (Stoffle and Howell, 1987). Study team members have documented five kinds of formal interactions: (1) letters, (2) phone calls, (3) personal contacts, (4) interviews, and (5) site visit contacts. Personal contacts are distinguished from interviews by the direction and flow of information. During personal contacts, such as tribal presentations, researchers provided project information to council members. During interviews, Indian people provided the study team with information. Site visit contacts represent the person days spent in the Yucca Mountain area.

In Table 2-1, interactions are categorized by the group of people with whom the interactions occurred. For this first analysis, interactions are not subdivided by phase of the study during which they occurred. A later analysis will examine the interactions according to the subdivisions of contact phase, field-work phase, and report-writing phase.

Since each interaction is vital to the organization and implementation of the cultural resources study, it is difficult to assign a rank or weight to each of the five kinds of interactions. For the purposes of this summary, no attempt has been made to weigh or rank the interactions. The total number of interactions is presented as a simple sum of the five types.

Table 2-1. Yucca Mountain Ethnobotany: Number of Interactions from January 1, 1988, to October 7, 1988

Tribe/Band	Contacts					Site Visit Person Days	Total
	Letters	Phone	Personal	Interviews			
Kaibab	7	32	4	49	13	105	
Paiute (Utah)	6	7	0	18	4	35	
Moapa	6	3	1	41	6	57	
Las Vegas Paiute Colony	6	16	1	30	4	57	
Las Vegas Indian Center	6	20	3	36	4	69	
Chemehuevi	7	12	0	19	2	40	
Colorado River Indian Tribes	6	24	1	10	2	43	
Pahrump	7	14	2	33	5	61	
Timbisha	9	22	3	26	6	66	
Lone Pine	5	12	0	48	4	69	
Ft. Independence	6	16	1	31	4	58	
Big Pine	6	13	0	0	0	19	
Bishop	7	18	0	12	4	41	
Benton	5	6	0	0	0	11	
Yomba	5	42	2	11	2	62	
Duckwater	6	24	4	17	0	51	
<b>Subtotal</b>	<b>100</b>	<b>281</b>	<b>22</b>	<b>381</b>	<b>60</b>	<b>844</b>	
Contractors	24	108	3	NA	13	148	
Administrative	2	44	1	NA	NA	47	
Project Personnel	19	73	6	NA	70	168	
Other Project contacts	21	28	2	NA	NA	51	
<b>Subtotal</b>	<b>66</b>	<b>253</b>	<b>12</b>	<b>0</b>	<b>83</b>	<b>414</b>	
<b>Total</b>	<b>166</b>	<b>534</b>	<b>34</b>	<b>381</b>	<b>143</b>	<b>1,258</b>	

## CHAPTER THREE

### AN INVENTORY OF NATIVE AMERICAN IDENTIFIED PLANTS

This chapter may be used as a quick reference guide for each of the identified species of plant. Data presentation has been limited to one page per plant in order to facilitate this reference objective. In later chapters, more detail is provided regarding the ecological zones of the study area, the uses of the identified plants, and the recommendations by the Native American representatives as to what they thought should be the disposition of the identified plants.

In this chapter the 76 species of plants that were identified during the ethnobotany visits and on-reservation interviews are presented. For each species, the various names given to that plant are listed: the scientific name provided by the botanists, the Indian names provided by the participants in the visits, and the common name. Also included is a description of the zone in which the plant is located. Following the listing of the various names and the ecological zone for the identified plant are brief synopses of the contemporary and traditional uses of the plant, and recommendations for the disposition of the plant if specimens are potentially adversely affected by a planned site characterization activity.

Table 3-1 lists each of the 76 identified plant species and the frequency with which the species was discussed in the 381 plant interviews. No one plant dominated the discussions, although some (e.g., *Larrea tridentata*, the *Ephedra* species, and *Artemisia tridentata*) are common throughout most of the Yucca Mountain study area.

Table 3-1. Identified Plant Species and Frequency of Discussion During Interviews

Plant Scientific Name	Frequency	Percent	Plant Scientific Name	Frequency	Percent
<i>Amelanchier utahensis</i>	1	.3	<i>Nicotiana trigonophylla</i>	5	1.3
<i>Amsinckia tessellata</i>	6	1.6	<i>Opuntia basilaris</i>	3	.8
<i>Anemopsis californica</i>	9	2.4	<i>Opuntia echinocarpa</i>	2	.8
<i>Arabis pulchra</i>	2	.5	<i>Opuntia erinacea</i>	1	.3
<i>Artemisia ludoviciana</i>	3	.8	<i>Oryzopsis hymenoides</i>	18	4.7
<i>Artemisia tridentata</i>	13	3.4	<i>Peraphyllum ramosissimum</i>	1	.3
<i>Atriplex canescens</i>	1	.3	<i>Phragmites australis</i>	8	2.1
<i>Atriplex confertifolia</i>	2	.5	<i>Pinus monophylla</i>	13	3.4
<i>Brodiaea pulchella</i>	3	.8	<i>Prosopis glandulosa</i>	7	1.8
<i>Calochortus flexuosus</i>	6	1.6	<i>Prosopis pubescens</i>	7	1.8
<i>Castilleja chromosa</i>	4	1.0	<i>Psoralea polydenius</i>	3	.8
<i>Chrysothamnus nauseosus</i>	5	1.3	<i>Purshia glandulosa</i>	7	1.8
<i>Cirsium mohavense</i>	1	.3	<i>Quercus gambelii</i>	4	1.0
<i>Coleogyne ramosissima</i>	1	.3	<i>Rhus trilobata</i>	5	1.3
<i>Coryphantha vivipara</i>			<i>Rumex crispus</i>	2	.5
var. <i>desertii</i>	1	.3	<i>Salix exigua</i>	14	3.7
<i>Datura meteloides</i>	1	.3	<i>Salix gooddingii</i>	8	2.1
<i>Delphinium parishii</i>	2	.5	<i>Salvia columbariae</i>	6	1.6
<i>Descurainia pinnata</i>	3	.8	<i>Salvia dorrii</i>	2	.5
<i>Descurainia sophia</i>	3	.8	<i>Sphaeralcea ambigua</i>	1	.3
<i>Distichlis spicata</i>	2	.5	<i>Stanleya pinnata</i>	12	3.1
<i>Echinocactus polycephalus</i>	6	1.6	<i>Stephanomeria</i> sp.	1	.3
<i>Echinocereus englemannii</i>			<i>Stipa speciosa</i>	3	.8
var. <i>chrysoentris</i>	5	1.3	<i>Streptanthella longirostris</i>	1	.3
<i>Encelia virginensis</i>			<i>Streptanthus cordatus</i>	1	.3
var. <i>actonii</i>	1	.3	<i>Suaeda torreyana</i>	1	.3
<i>Ephedra nevadensis</i>	14	3.7	<i>Symphoricarpos longiflorus</i>	1	.3
<i>Ephedra viridis</i>	18	4.7	<i>Tessaria sericeae</i>	3	.8
<i>Eriogonum inflatum</i>	10	2.6	<i>Thamnosma montana</i>	3	.8
<i>Euphorbia albomarginata</i>	4	1.0	<i>Thelypodium integrifolium</i>	2	.5
<i>Geastrum</i> sp.	—	—	<i>Typha domingensis</i>	6	1.6
<i>Gutierrezia microcephala</i>	1	.3	<i>Typha latifolia</i>	3	.8
<i>Juncus mexicanus</i>	10	2.6	<i>Veronica anagallis-aquatica</i>	6	1.6
<i>Juniperus osteosperma</i>	9	2.4	<i>Vitis arizonica</i>	7	1.8
<i>Krameria parvifolia</i>	3	.8	<i>Xylorhiza tortifolia</i>	1	.3
<i>Larrea tridentata</i>	22	5.8	<i>Yucca baccata</i>	3	.8
Lichen	1	.3	<i>Yucca brevifolia</i>	8	2.1
<i>Lycium andersonii</i>	12	3.1	<i>Yucca schidigera</i>	8	2.1
<i>Lycium pallidum</i>	3	.8			
<i>Menodora spinescens</i>	1	.3	Total	381	100.0
<i>Mentzelia albicaulis</i>	4	1.0			

*Amelanchier utahensis* Koehne

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

serviceberry

**Habitat:**

Widely distributed and especially common to middle- and high-elevation zones (Beatley, 1976:246).

**Use:**

The fruits of this plant were used for food. It is not known whether this plant is currently used.

**Recommendation(s) for disposition:**

One person commented on serviceberry. No protection action was recommended.



*Amsinckia tessellata* Gray

Indian  
Name(s)

not identified  
not remembered  
*kua*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

fiddleneck

**Habitat:**

This plant is present in all zones, although it is most common in lower- and mid-elevation zones (Beatley, 1976:154).

**Use:**

The small seeds and fresh, green stems of this plant were used as food. Seeds were stored for year-round use; they may have been broadcast in order to increase the harvest. Owens Valley Paiute people currently continue to use this plant.

**Recommendation(s) for disposition:**

Six people commented on fiddleneck. Three people recommended avoiding the plant as a first-choice recommendation. Three people did not respond. No alternative recommendations were made.



*Anemopsis californica* (Nutt.) Hook. & Arn.

Indian  
Name(s)

not remembered  
*tchupaniv*  
*tchawanav; tsawaniv*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

yerba mansa

Habitat:

Common near springs, low- and mid-elevation zones (Beatley, 1976:254).

Use:

The rootstocks of yerba mansa were commonly used for medicinal purposes, being either boiled as a tea or used as a bath or vaporizer in treating a variety of ailments. The rootstocks were dried and stored for year-round use. Yerba mansa is still commonly used today.

Recommendation(s) for disposition:

Nine people commented on yerba mansa. As a first-choice recommendation, four people recommended that the plant be protected, one person recommended avoiding the plant; no protective action was recommended by two people. One person recommended avoidance in the event of severe ground disturbance. One person did not respond. There were no alternative recommendations made.



*Arabis pulchra* M. E. Jones ex S. Wats.  
var. *gracilis* Jones

Indian Name(s)	Ethnic Group	Common Name
not identified <i>ak; ahk</i> not identified	Western Shoshone Southern Paiute Owens Valley Paiute	mustard

**Habitat:**

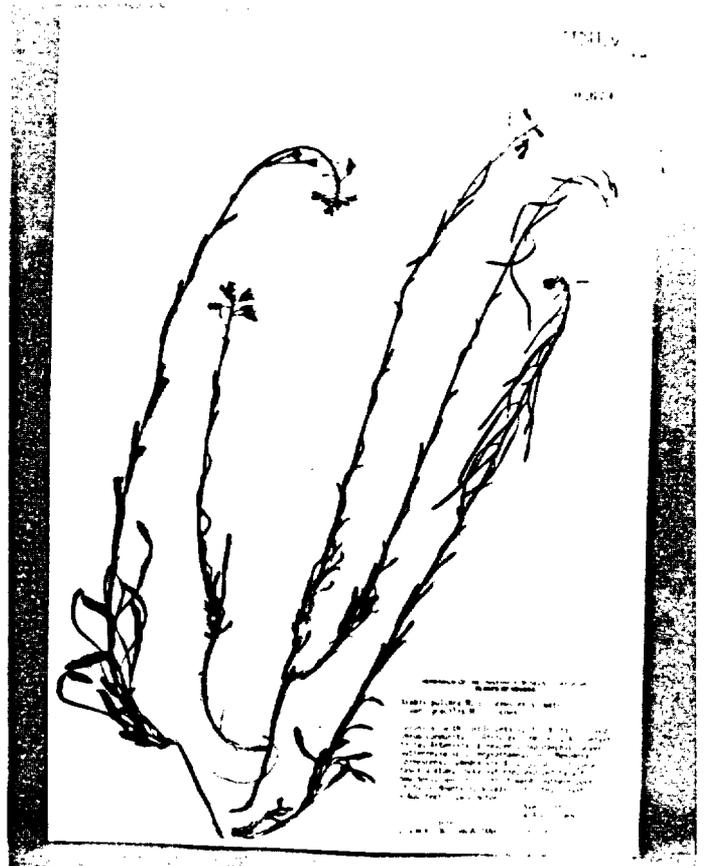
Various subspecies common in all zones (Beatley, 1976:162-163).

**Use:**

The seeds of this wild mustard may have been used for food. It is not known whether the plant is currently used.

**Recommendation(s) for disposition:**

Two people commented on mustard. One person recommended avoiding the plant and one person did not recommend any protective action. No alternative recommendations were made.





*Artemisia tridentata* Nutt.

Indian  
Name(s)

*povi; pohovi*  
*sangwav*  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

sagebrush

Habitat:

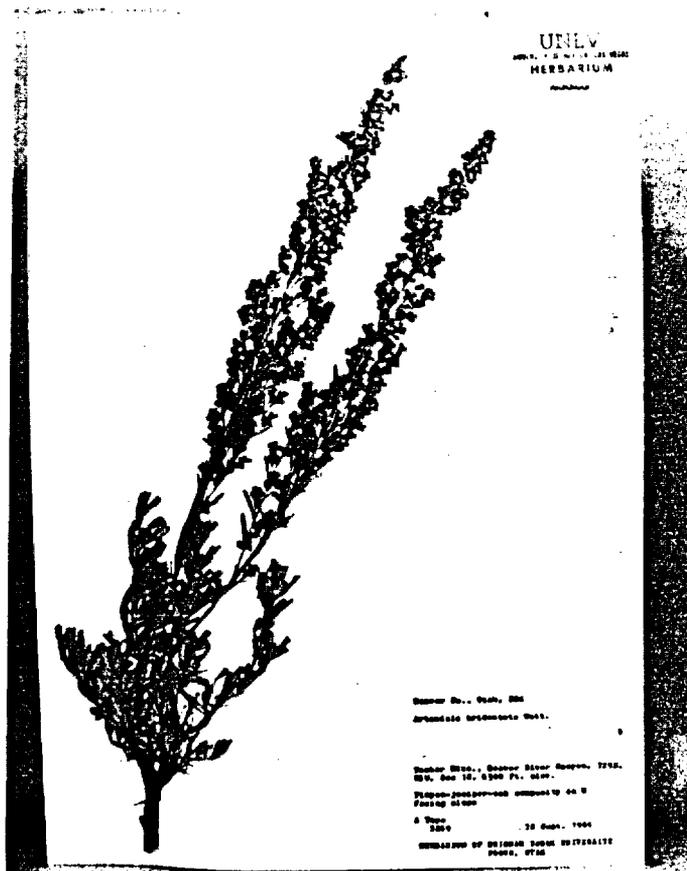
*A. tridentata* is dominant in sandy soils of mid-elevation zones above 5,000 ft (Beatley, 1976:125).

Use:

The leaves of this significant plant were either chewed, boiled as a medicinal tea to cure a variety of ailments, or mixed with water and used as a poultice/compress for sores and infections. Dried leaves were also used in sweatlodges, burned and/or smoked by medicine men to purify the air during certain ceremonies, and smudged on walls of houses and other structures as a purifying agent. This highly valued plant is still used today in all contexts.

Recommendation(s) for disposition:

Fourteen people commented on sagebrush. As a first-choice recommendation, three people recommended avoiding the plant, three recommended protecting it, one person recommended transplanting it if possible, two people recommended avoidance in the event of intensive ground disturbance. No protective action was recommended by three people, and two people did not respond. One person recommended transplanting sage, if possible, as a second-choice alternative.



*Atriplex canescens* (Pursh) Nutt.

Indian  
Name(s)

not identified  
not identified  
*tonoh*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

four-winged  
saltbush

**Habitat:**

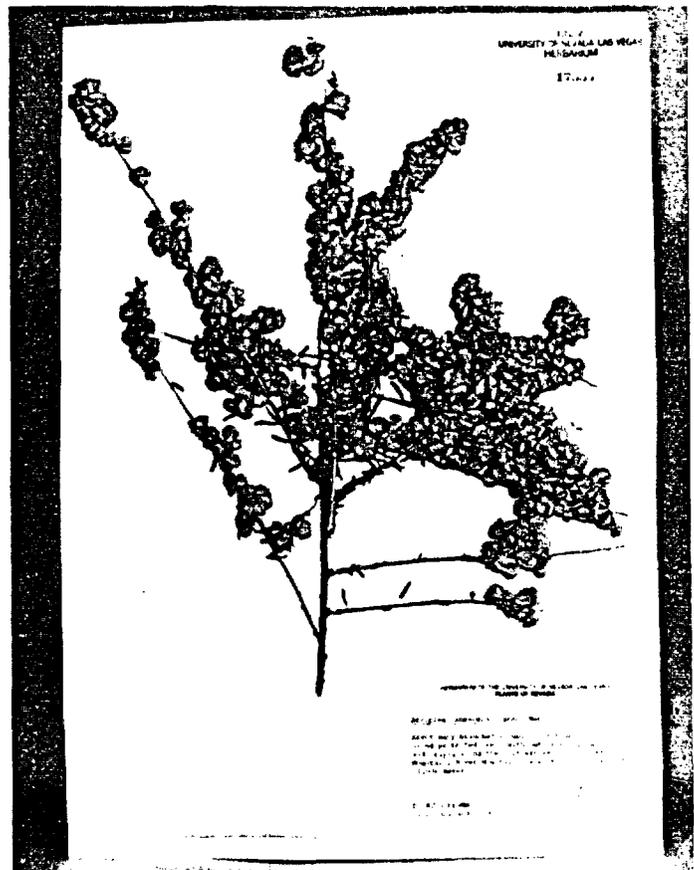
Occasional to common in all zones  
(Beatley, 1976:178-179).

**Use:**

The wood of this plant was burned as  
fuel and used to make arrows. It is  
not known whether the plant is  
currently used.

**Recommendation(s) for disposition:**

One person commented on four-winged  
saltbush and recommended that the  
plant be avoided. No alternative  
recommendations were made.



*Atriplex confertifolia* (Torr. & Frem.) Wats.

Indian  
Name(s)

not identified  
*kakumb*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

shadscale

**Habitat:**

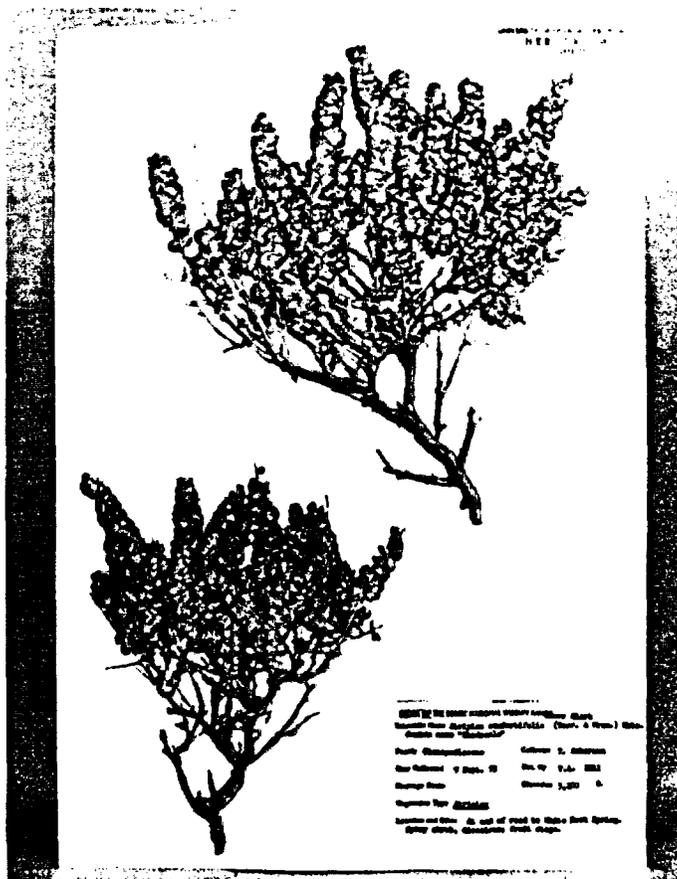
According to Beatley (1976:179),  
"probably the most abundant shrub  
in the region."

**Use:**

The fresh new leaves of this plant  
were used as a poultice and/or powder  
for cuts. Dead wood from the plant  
was burned as fuel. It is still used  
today as a medicine.

**Recommendation(s) for disposition:**

Two people commented on shadscale.  
Both people recommended that the  
plant be protected. No alternative  
recommendations were made.



*Brodiaea pulchella* Salisb.

Indian  
Name(s)

*sigo*  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

desert hyacinth

**Habitat:**

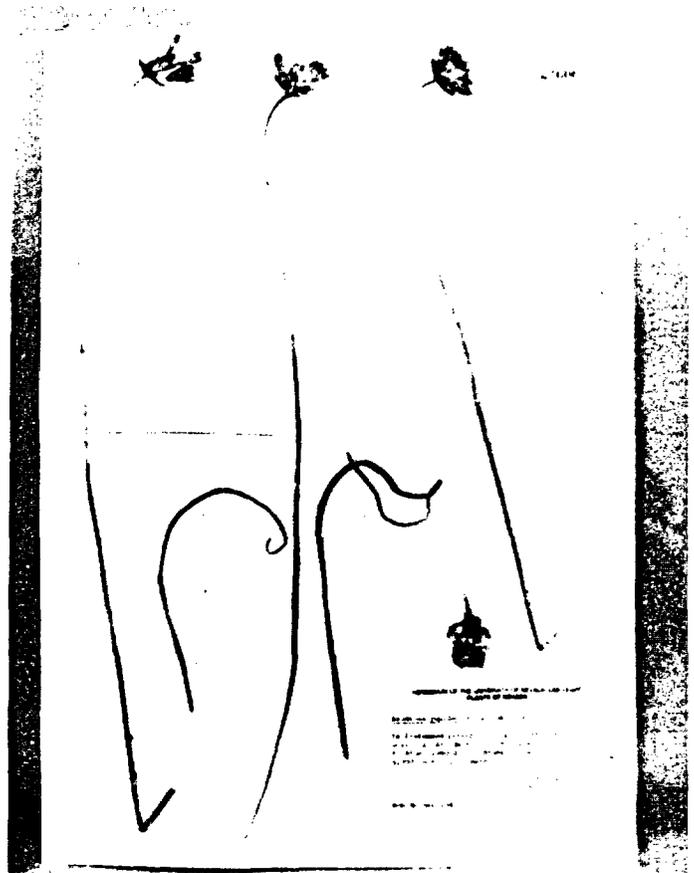
Fluctuating occurrence, mostly in  
low-elevation zones (Beatley,  
1976:271).

**Use:**

Like wild onion and mariposa or sego  
lily, the corms of this plant were  
consumed as food. One plant expert  
reported that the corm was not good  
to eat because it was poisonous.  
It is not known whether desert hyacinth  
is currently used.

**Recommendation(s) for disposition:**

Three people commented on desert  
hyacinth. One person recommended  
avoiding the plant; two people  
did not recommend any protective  
action.



*Calochortus flexuosus* S. Wats.

Indian  
Name(s)

*sigo*  
*six'o'o*  
*kogi*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

mariposa/  
sego lily

**Habitat:**

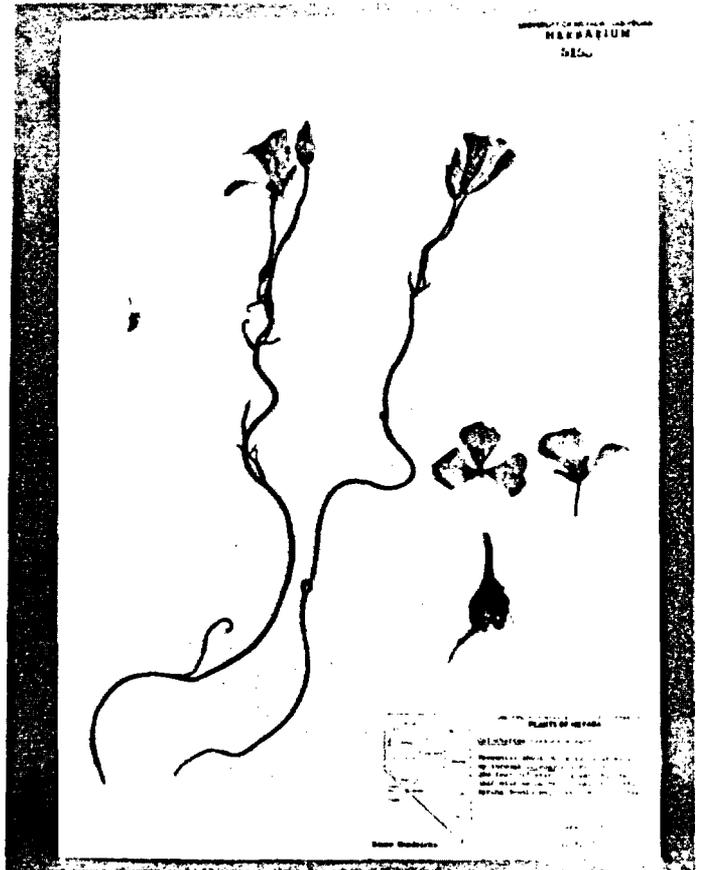
Present in all zones; more common to low and mid-elevation zones (Beatley, 1976:276).

**Use:**

The bulb of this plant was used as food. It is currently used to some extent today.

**Recommendation(s) for disposition:**

Six people commented on mariposa or sego lily. As a first-choice recommendation, two people recommended protecting the plant, and one person recommended avoiding it. Two people did not recommend protective action, and one person did not respond. One person recommended transplanting the plant, if possible, as a second-choice alternative.



*Castilleja chromosa* A. Nels.

Indian  
Name(s)

*angawitambu*  
not remembered  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Indian paintbrush

**Habitat:**

Widely distributed in low- and  
mid-elevation zones (Beatley,  
1976:256).

**Use:**

This plant was used in ornamentation  
(e.g., houses, hair) and in the making  
of soap. One plant expert reported  
that the seeds were eaten, also.

**Recommendation(s) for disposition:**

Four people commented on Indian  
paintbrush. There were no  
recommendations for protective action.



*Chrysothamnus nauseosus* (Pallas) Britt.

Indian  
Name(s)

not remembered  
*sikump*; *s'kump*  
*wa'arump*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Southern Paiute  
Owens Valley Paiute

Common  
Name

rabbitbrush

Habitat:

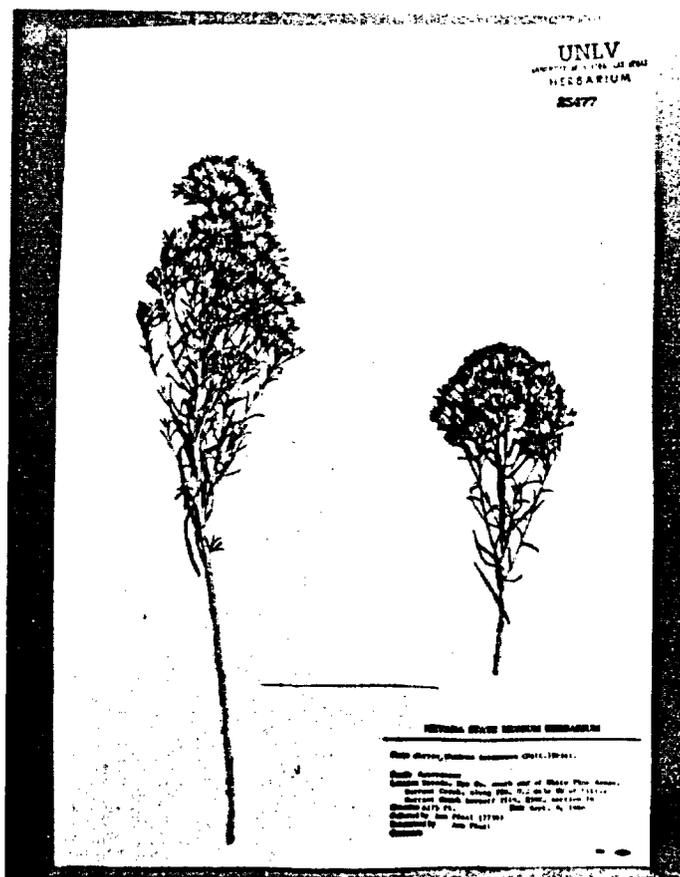
Most common in mountain, hill, and upland wash areas of mid- and high-elevation zones (Beatley, 1976:131, 138).

Use:

The stems and leaves of rabbitbrush were boiled as a medicinal tea. Rabbitbrush was also used in the construction of dwellings (e.g., roofs). It served as an important "indicator" plant to Southern Paiutes, in that pinyon nuts were known to be ripe for harvesting when the flowers of rabbitbrush were in full bloom and at their brightest yellow. Another species of rabbitbrush (*wa'arump*) is significant in Southern Paiute legend.

Recommendation(s) for disposition:

Five people commented on rabbitbrush. As a first-choice recommendation one person recommended protecting the plant. One person recommended transplanting the plant, if possible, as a second-choice alternative. Three people did not recommend protective action, and one person did not respond.



*Cirsium mohavense* (Greene) Petr.

Indian Name(s)	Ethnic Group	Common Name
not identified	Western Shoshone	thistle
<i>tsiev</i>	Southern Paiute	
not identified	Owens Valley Paiute	

**Habitat:**

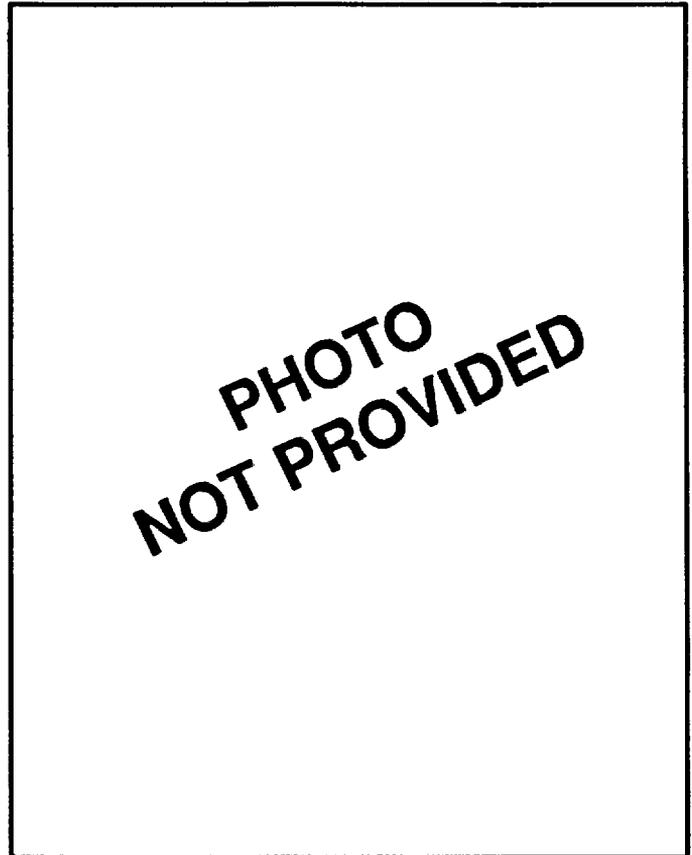
Various species are scattered to common in all zones (Beatley, 1976:133-134).

**Use:**

The young shoots or stems of this plant were eaten raw as food. It is not known whether the plant is currently used.

**Recommendation(s) for disposition**

One person commented on thistle. and recommended that the plant be protected.



*Coleogyne ramosissima* Torr.

**Indian  
Name(s)**

not remembered  
not identified  
not identified

**Ethnic  
Group**

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

**Common  
Name**

blackbrush

**Habitat:**

Co-dominant to dominant in  
middle-elevation zones (Beatley,  
1976:247).

**Use:**

A Native American plant consultant  
recognized this plant, but could not  
recall its use.

**Recommendation(s) for disposition:**

One person commented on blackbrush  
and recommended that the plant be  
protected.



*Coryphantha vivipara* (Nutt.) Britt. & Rose  
var. *desertii* (Engelm.) W.T. Marsh.

Indian Name(s)	Ethnic Group	Common Name
not identified	Western Shoshone	fishhook cactus
not identified	Southern Paiute	
not remembered	Owens Valley Paiute	

**Habitat:**

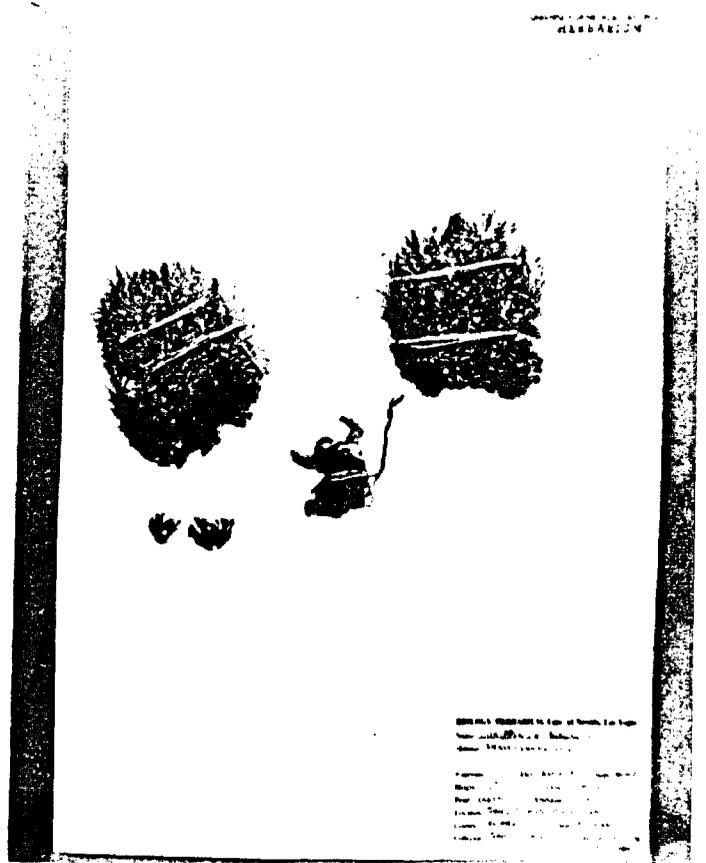
Occasional in middle-elevation zones (Beatley, 1976:171). The project botanist identified this as a rare plant.

**Use:**

The fruits of this cactus were used as food. It is not known whether the plant is currently used.

**Recommendation(s) for disposition:**

One person commented on fishhook cactus. Because it is a rare plant, the recommendation was that it be avoided.



*Datura meteloides* DC.

Indian  
Name(s)

not identified  
*momomp*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

jimsonweed

Habitat:

Uncommon, except along certain washes (e.g., Fortymile Canyon) in low- and middle-elevation zones (Beatley, 1976:263).

Use:

The roots of this famous hallucinogenic were roasted or baked and ground into a powder, mixed with water, and ingested to induce visions as a power/knowledge-seeking ceremonial, probably among apprentice shamans and others. The dosage had to be exact; ingestion of a large dose could potentially be fatal. When using this plant in seeking knowledge, dreams or visions, the user had to be accompanied by another person throughout the effective time period. It is not known whether the plant is currently used.

Recommendation(s) for disposition:

One person commented on jimsonweed. No protective action was recommended.



*Delphinium parishii* Gray ssp. *parishii*

**Indian  
Name(s)**

not identified  
not remembered  
not identified

**Ethnic  
Group**

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

**Common  
Name**

larkspur

**Habitat:**

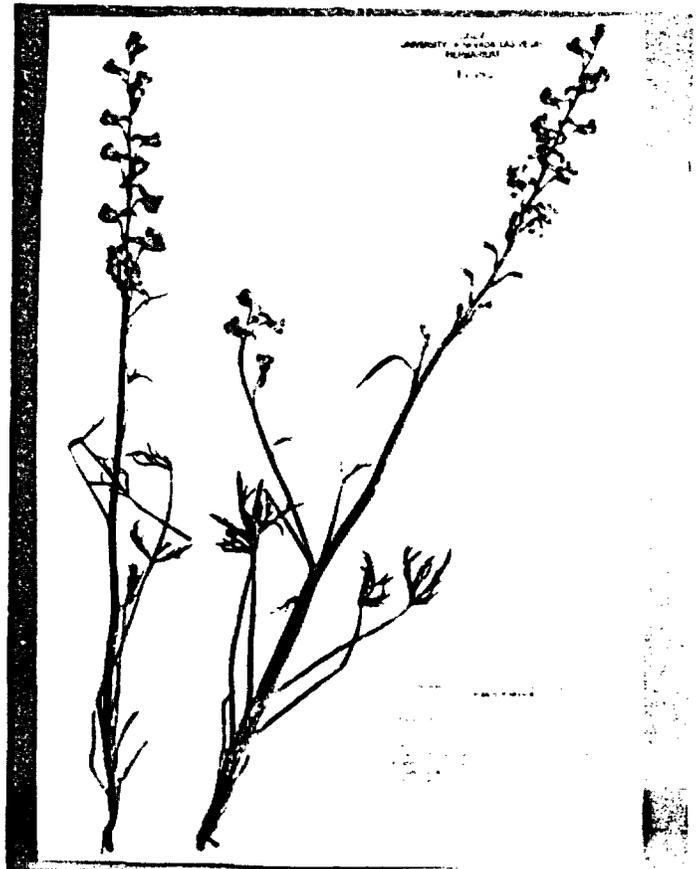
Widely distributed in low- and  
middle-elevation zones (Beatley,  
1976:244).

**Use:**

This plant was recognized as a  
dangerous, poisonous plant. It  
was therefore avoided.

**Recommendation(s) for disposition:**

One person commented on larkspur  
and recommended that the plant be  
protected.



*Descurainia pinnata* (Walt.) Britt.

Indian  
Name(s)

*poyah*  
*ku'u; ahk\**  
not identified  
*cita* (Hopi)

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute  
Las Vegas Indian Center

Common  
Name

tansy mustard

**Habitat:**

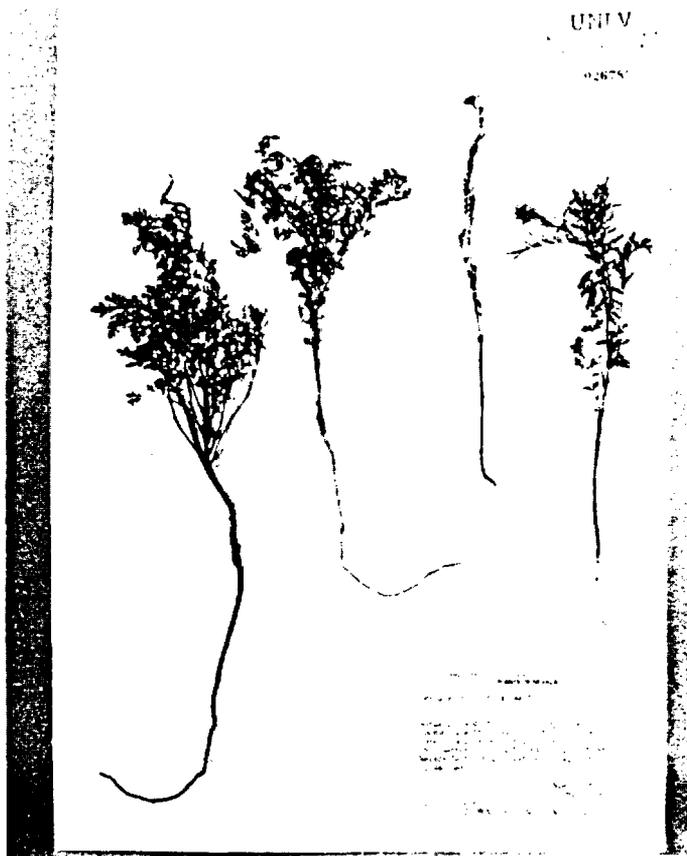
Occasional to common, even abundant, primarily in low- and mid-elevation zones; also present in high elevation zones (Beatley, 1976:165).

**Use:**

The stems and leaves of tansy mustard were boiled as greens, while the small seeds were knocked off into baskets or onto blankets and stored for year-round use.

**Recommendation(s) for disposition:**

Three people commented on tansy mustard. One person recommended avoiding the plant and one recommended protecting it or transplanting it, as a second-choice alternative. One person did not recommend protective action.



*Descurainia sophia* (L.) Webb ex Prantl

**Indian  
Name(s)**

*poyah*  
*ku'u; ahk\**  
not identified  
*cita* (Hopi)

**Ethnic  
Group**

Western Shoshone  
Southern Paiute  
Owens Valley Paiute  
Las Vegas Indian Center

**Common  
Name**

tansy mustard

**Habitat:**

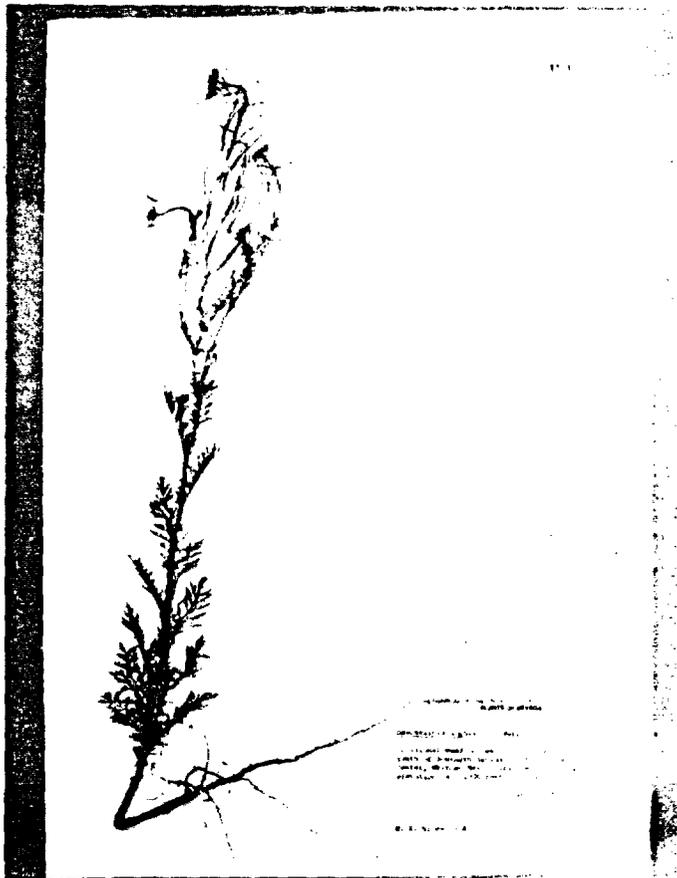
Occasional to common, even abundant, primarily in low- and mid-elevation zones; also present in high elevation zones (Beatley, 1976:165).

**Use:**

The stems and leaves of tansy mustard were boiled as greens, while the small seeds were knocked off into baskets or onto blankets and stored for year-round use.

**Recommendation(s) for disposition:**

Three people commented on *D. sophia*. One person recommended avoiding the plant. Two people did not recommend protective action.



*Distichlis spicata* (L.) Greene

Indian  
Name(s)

not identified  
not identified  
*ongavi*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

saltgrass

**Habitat:**

Dominant in seasonally wet, alkaline soils of low- and upper middle-elevation zones (Beatley, 1976:283).

**Use:**

The salty extract from the leaves of this plant was scraped off and cooked in ashes as a salt supplement to food. It is still used to some extent today.

**Recommendation(s) for disposition:**

Two people commented on saltgrass and recommended that the plant be avoided.



*Echinocactus polycephalus* Engelm. & Bigelow

Indian  
Name(s)

not remembered  
*tash*  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

cotton-top  
cactus

Habitat:

Occasional to common in low- and  
middle-elevation zones (Beatley,  
1976:171).

Use:

The spines of this plant were used  
as needles or awls. It is not known  
whether the plant is currently used.

Recommendation(s) for disposition:

Six people commented on cotton-top  
cactus. Four people recommended that  
the plant be avoided, and one person  
recommended that it be protected.  
One person did not recommend  
protective action.



*Echinocereus engelmannii* Parry var. *chrysocentrus*  
(Engelm. & Bigel.) Engelm. ex Rumpler

Indian  
Name(s)

not identified  
"tule"  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

hedgehog,  
"tule" cactus

**Habitat:**

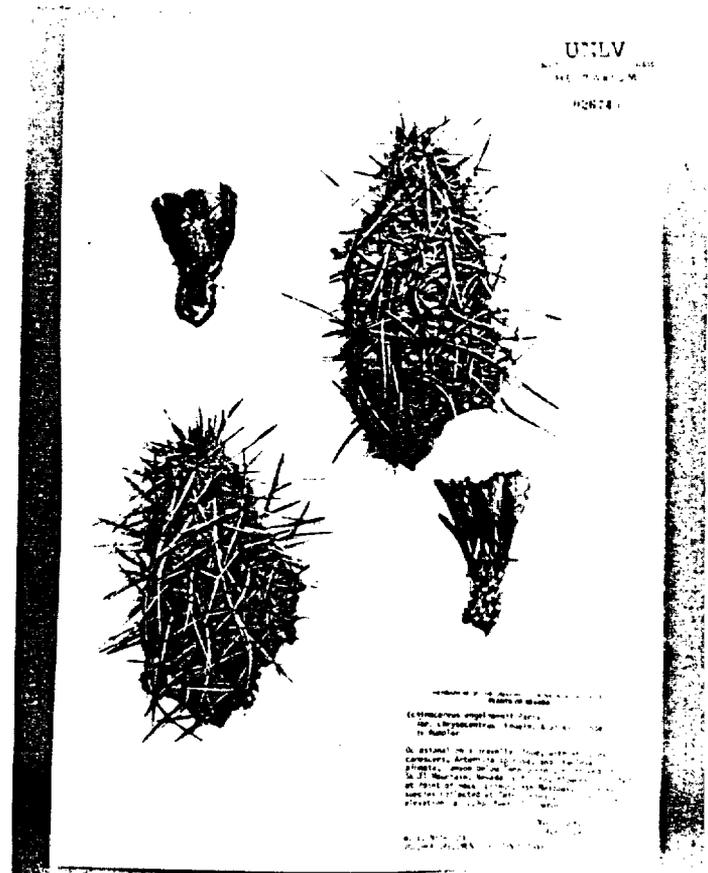
Occasional in lower- to  
middle-elevation zones  
(Beatley, 1976:171).

**Use:**

The fruits of this cactus  
were eaten fresh as food.  
The plant is still used today.

**Recommendation(s) for disposition:**

Four people commented on hedgehog  
or "tule" cactus. As a first-  
choice recommendation one person  
recommended protecting the plant  
and two people recommended trans-  
planting it if possible. The second-  
choice alternative was that the  
plant be transplanted to a different  
area if possible. One person did  
not recommend protective action.



*Encelia virginensis* A. Nels. var. *actonii*  
(Elmer) Keck

Indian  
Name(s)

not identified  
*suopiv*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

brittlebush

**Habitat:**

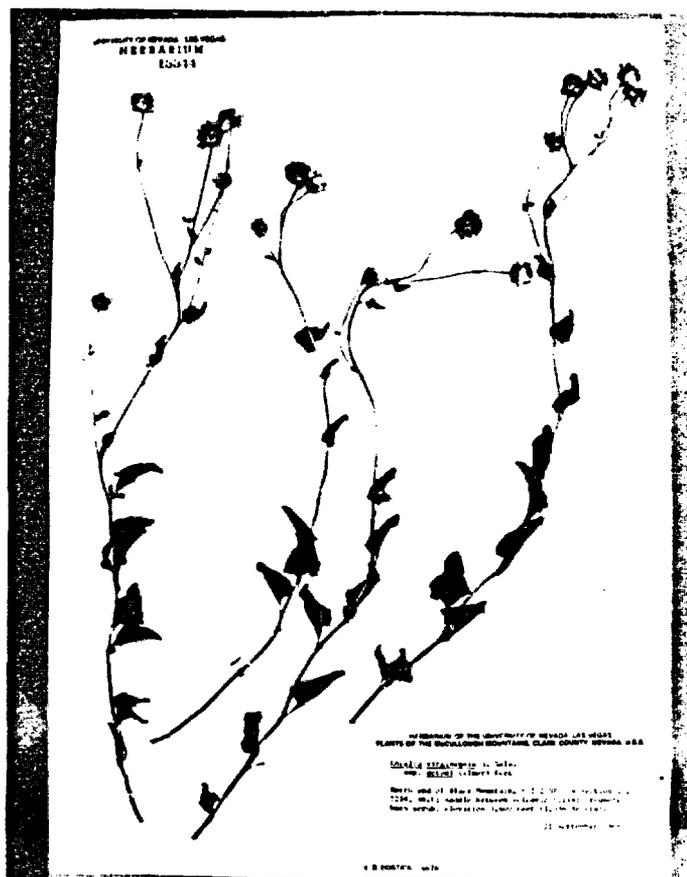
Present in low- and middle-elevation  
zones (Beatley, 1976:135).

**Use:**

This plant was used in making baskets.  
It is not known whether the plant is  
currently used.

**Recommendation(s) for disposition:**

One person commented on brittlebush.  
No protective action was recommended.



*Ephedra nevadensis* S. Wats.

Indian  
Name(s)

*tutumbi*  
*tutupi*; *u'tuup*  
*yatup*  
*turup*  
*nuwu tea*

Ethnic  
Group

Western Shoshone  
  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Indian tea

**Habitat:**

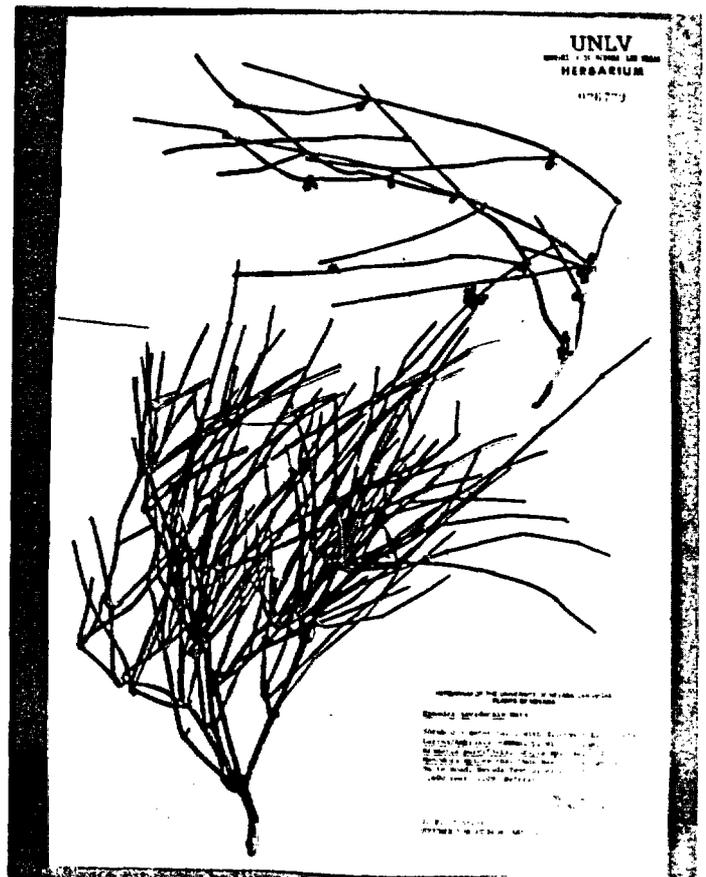
Both species of *Ephedra* occur in all zones. *E. nevadensis* is more common in lower elevation zones, while *E. viridis* is more common in higher elevation zones (Beatley, 1976:114-115).

**Use:**

All plant experts reported the use of *Ephedra* species as a medicinal tea; stems were boiled to cure a variety of ailments. Although *E. nevadensis* was described as being the more bitter of the two varieties, both were used. *E. viridis*, however, was the preferred variety. Indian tea was also used simply as a beverage. Both varieties are still commonly used today.

**Recommendation(s) for disposition:**

Fourteen people commented on *E. nevadensis*. As a first-choice recommendation six people recommended avoidance, four people recommended protecting the plant, and two people recommended avoidance in the event of severe ground disturbance. As second-choice alternatives, two people recommended transplanting the plant if possible and one person recommended protection. One person did not recommend protective action and one did not respond.



*Ephedra viridis* Coville

Indian  
Name(s)

*tutumbi*  
*tutupi; u'tuup*  
*yatup*  
*turup*  
*nuwu tea*

Ethnic  
Group

Western Shoshone  
  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Indian tea

Habitat:

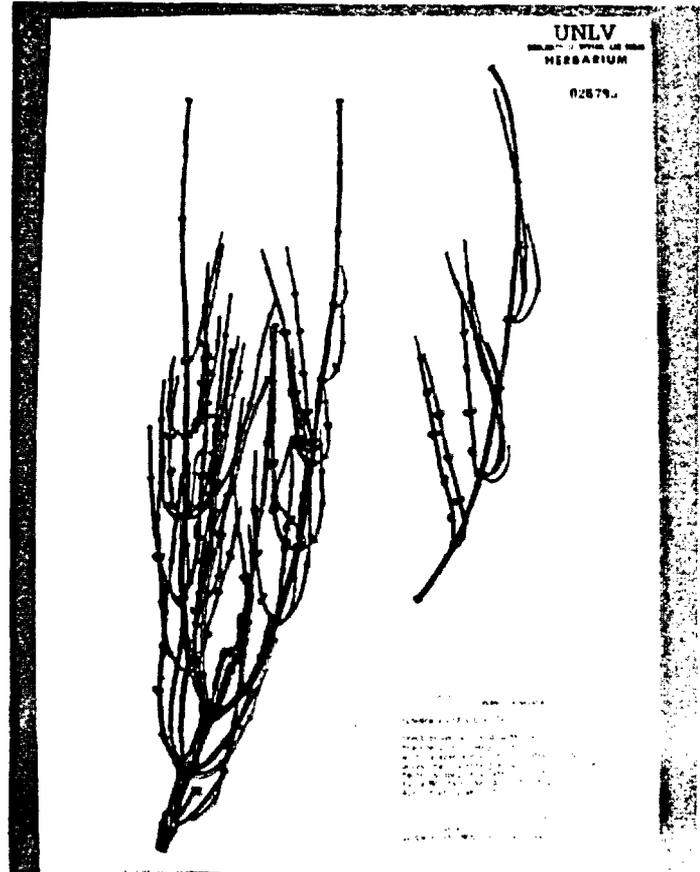
Both species of *Ephedra* occur in all zones. *E. nevadensis* is more common in lower elevation zones, while *E. viridis* is more common in higher elevation zones (Beatley, 1976:114-115).

Use:

All plant experts reported the use of *Ephedra* species as a medicinal tea; stems were boiled to cure a variety of ailments. Although *E. nevadensis* was described as being the more bitter of the two varieties, both were used. *E. viridis*, however, was the preferred variety. Indian tea was also used simply as a beverage. Both varieties are still commonly used today.

Recommendation(s) for disposition:

Eighteen people commented on *E. viridis*. Five people recommended avoiding the plant, three people recommended protecting it, three people recommended transplanting it if possible, one person recommended avoidance in the event of severe ground disturbance. Two people recommended avoiding the plant as a second-choice alternative. Three people did not recommend protective action and three people did not respond.



*Eriogonum inflatum* Torr. & Frem.

Indian  
Name(s)

*tusarambokup*  
*papakurum(p)*  
not identified  
*heleshkefumpte*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute  
Las Vegas Indian Center  
(Seminole)

Common  
Name

desert trumpet

**Habitat:**

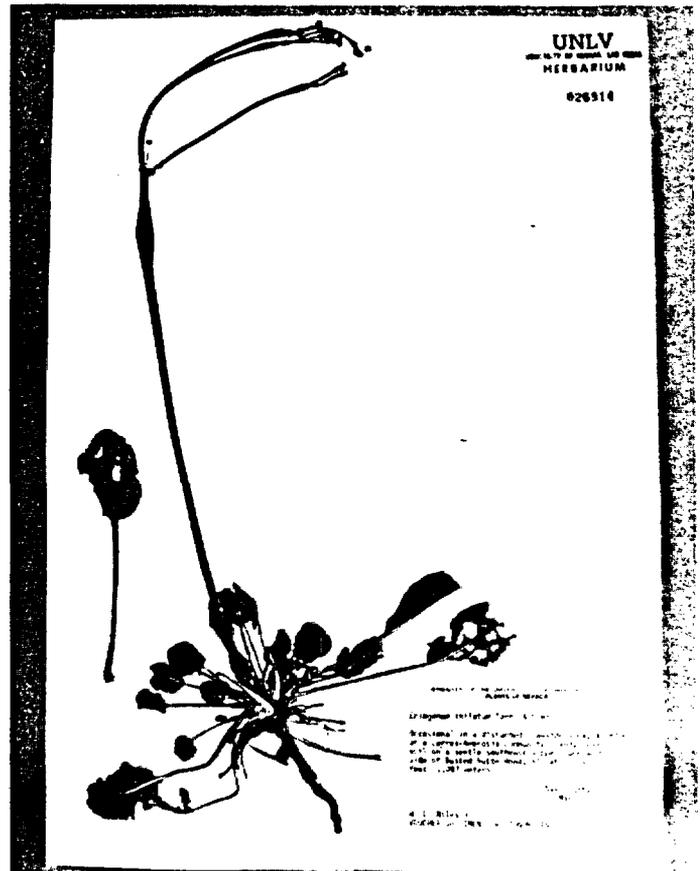
Widely distributed in low-  
and mid-elevation zones  
(Beatley, 1976:236).

**Use:**

The fresh stems of the desert trumpet were eaten raw as a food. Dried, inflated stems were used as pipes (hence, the oft-used name "Indian pipeweed") and as playthings by young children. One plant expert reported that the tiny black "seeds," which were positively identified by the project botanist as insect droppings, can be used as a medicine, but only in the right dosage. Ingestion of large doses can be dangerous in that these "seeds" are apparently hallucinogenic, much like those of jimsonweed.

**Recommendation(s) for disposition:**

Ten people commented on desert trumpet. Three people recommended protecting the plant, one person recommended avoiding it, one person recommended avoiding the plant in the event of severe ground disturbance, and one person recommended transplanting it, if possible. One person did not recommend protective action, and three people did not respond. As second-choice alternatives one person recommended avoiding the plant and one person recommended transplanting it, if possible.



*Euphorbia albomarginata* Torr. & Gray

Indian Name(s)	Ethnic Group	Common Name
not identified <i>axghaiv</i> ; <i>tuvikaxghaiv</i> not identified	Western Shoshone Southern Paiute Owens Valley Paiute	rattlesnake weed

**Habitat:**

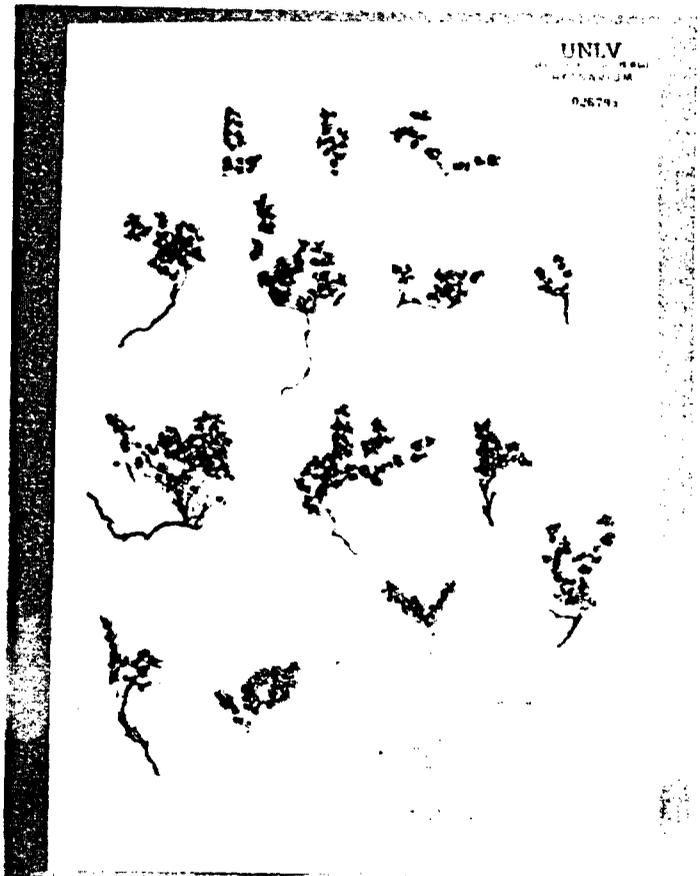
Widely distributed and common in mid-elevation washes (Beatley, 1976:188).

**Use:**

The milky sap from the stems as well as the leaves and flowers of this plant were used in treating eye inflammations, infections, and cataracts. It is still used today.

**Recommendation(s) for disposition:**

Four people commented on rattle-snake weed. Two people recommended protecting the plant, and one person recommended avoiding it. One person did not respond. One person recommended transplanting the plant, if possible, as a second-choice alternative.



*Geastrum* sp.

Indian  
Name(s)

not identified  
*u'nupitsi ompingwu*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

earthstar,  
"devil's powder"

Habitat:

Observed and collected at (or near)  
the top of Rainier Mesa.

Use:

This fungus exudes a reddish powder  
and was avoided. However, a similar  
plant (not observed during the on-  
site visit), known as *u'umpi*, was  
used in medicine and ceremonies, and  
was worn under the eyes as a red  
paint/powder.

Recommendation(s) for disposition:

One person commented informally on  
earthstar. Since the plant was  
traditionally avoided, no protective  
action was recommended.



*Gutierrezia microcephala* (DC.) Gray

Indian  
Name(s)

*tavishepi*  
not identified  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

matchweed,  
snakeweed

Habitat:

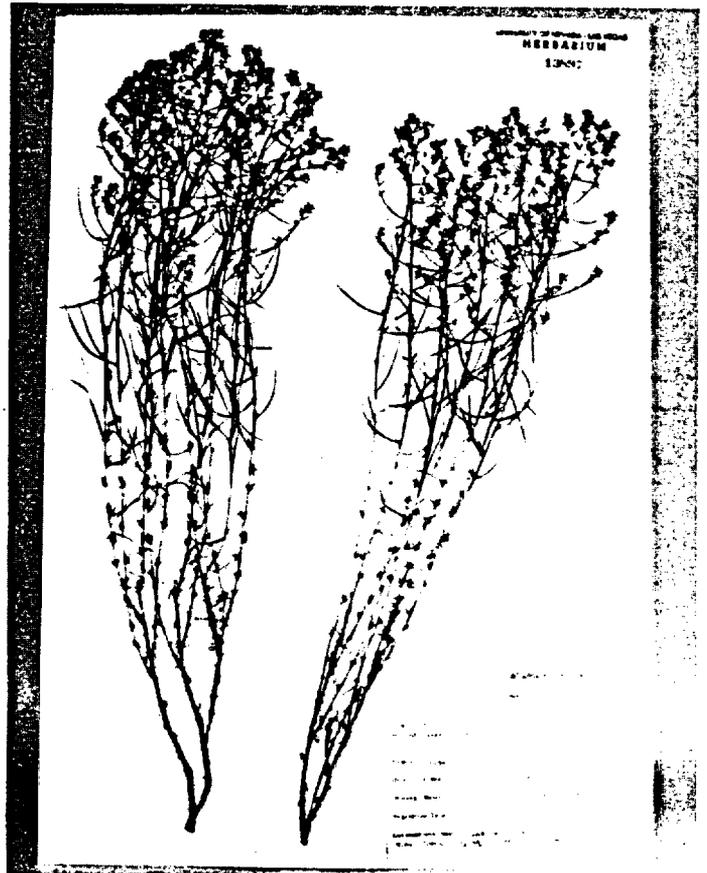
Most common in mountain, hill, and upland wash areas of mid- and high-elevation zones (Beatley, 1976:131, 138).

Use:

The leaves of *Gutierrezia microcephala* were boiled as a medicinal tea.

Recommendation(s) for disposition:

One person commented on matchweed and recommended that the plant be protected.



*Juncus mexicanus* Willd.

**Indian  
Name(s)**

*sonohpi*  
*pa'sip; parasiev*  
not remembered

**Ethnic  
Group**

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

**Common  
Name**

wiregrass;  
sedge; rush

**Habitat:**

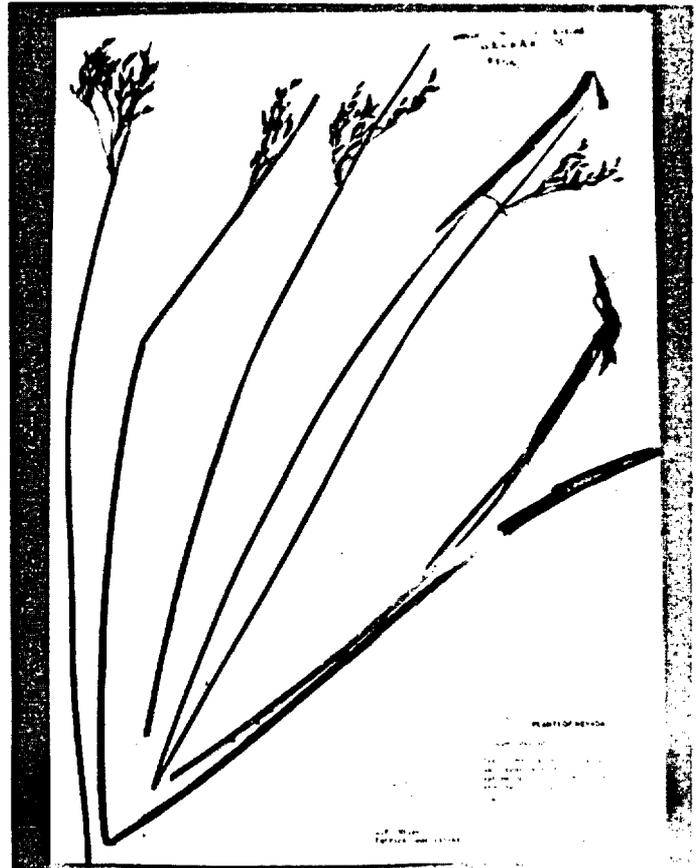
Dominant in wet, alkaline soils such as in spring areas, low- to high-elevation zones (Beatley, 1976:275).

**Use:**

Wiregrass was used for a variety of manufacturing purposes, such as the making of baskets, decoys, insulation for dwelling walls and the like. The base of stems were eaten as a food item, also. Currently, the plant is highly valued among contemporary basket makers.

**Recommendation(s) for disposition:**

Ten people commented on wiregrass or sedge. Four people recommended protecting the plant, and one person recommended transplanting the plant, if possible, as a second-choice alternative. Three people did not recommend protective action and two did not respond.



*Juniperus osteosperma* (Torr.) Little

Indian  
Name(s)

*sahwavi*  
*wa'ap*  
*hunuvu*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

juniper; cedar

Habitat:

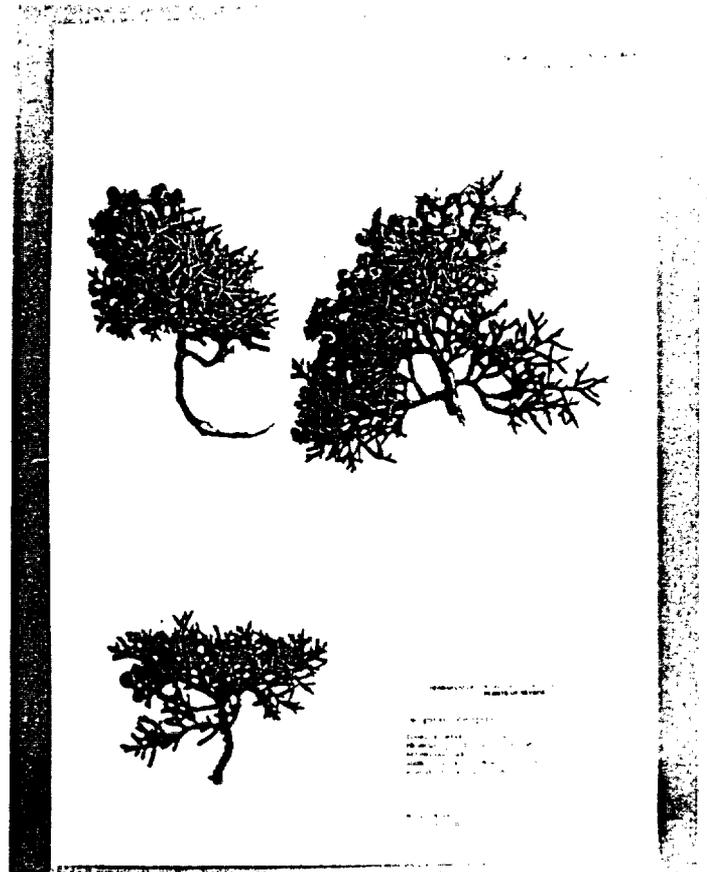
A dominant tree of high-elevation zones (Beatley, 1976:114).

Use:

The juniper tree or cedar was and continues to be another all-purpose plant. Small branches and leaves were boiled as a medicinal tea or burned as a ceremonial purifier. The wood was burned for fuel and used in the construction of pens, corrals, and dwellings. Bark from the tree was used in making sandals, skirts, and other utilitarian items. There is some indication that the juniper berries were used as food; the seeds are made into necklaces. The cedar tree is an important resource that is still used today.

Recommendation(s) for disposition:

Ten people commented on juniper or cedar tree. Two people recommended that the plant be protected, five people recommended avoiding it, and one person recommended transplanting it if possible. One person recommended that cedar trees be planted in an area set aside for access by Indian people as a second-choice alternative. One person did not recommend protective action and one did not respond.



*Krameria parvifolia* Benth.

Indian  
Name(s)

not identified  
*nagavaronump*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

range ratany

**Habitat:**

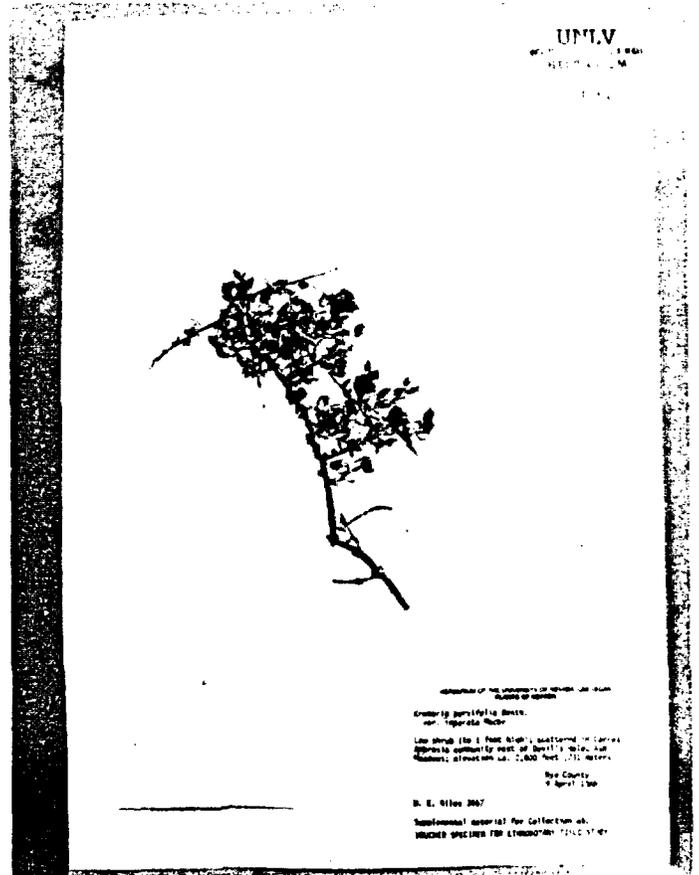
Common to low- and mid-elevation  
zones (Beatley, 1976:204).

**Use:**

The tiny seeds of this plant were  
consumed as food; the roots were  
used as a medicine and as a dye.  
Use of the plant continues today.

**Recommendation(s) for disposition:**

Three people commented on range  
ratany. Two people recommended  
protecting the plant and one person  
recommended avoiding it. One person  
recommended transplanting the plant,  
if possible, as a second-choice  
alternative.



*Larrea tridentata* (Sesse & Moc. ex DC.) Coville

Indian Name(s)	Ethnic Group	Common Name
<i>yatumbi</i> <i>yatamp</i> ; <i>yatumb</i> not remembered <i>uvseh</i> (Quechan)	Western Shoshone Southern Paiute Owens Valley Paiute Las Vegas Indian Center	creosote bush

**Habitat:**

Predominantly in lower- and mid-elevation zones (Beatley, 1976:269).

**Use:**

A multiple use plant, *Larrea* was described primarily as a medicinal used in curing a wide variety of ailments by boiling the leaves for a tea. Other uses include wood for fuel and medicine, sap for glue, leaves burned for ceremonial purposes, branches used in manufacture. Plant experts from all ethnic groups reported its use. It is of primary significance in Western Shoshone legends.

**Recommendation(s) for disposition:**

Twenty-one Indian people commented on creosote bush. Twelve people recommended that the plant be avoided, two recommended protection, one recommended transplanting if possible. One person felt uneasy about recommending a course of action which involved resources she did not feel belonged to her. As a second-choice, one person recommended transplanting if possible. Two people did not recommend protective action, and three did not respond.



Lichen

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

lichen

**Habitat:**

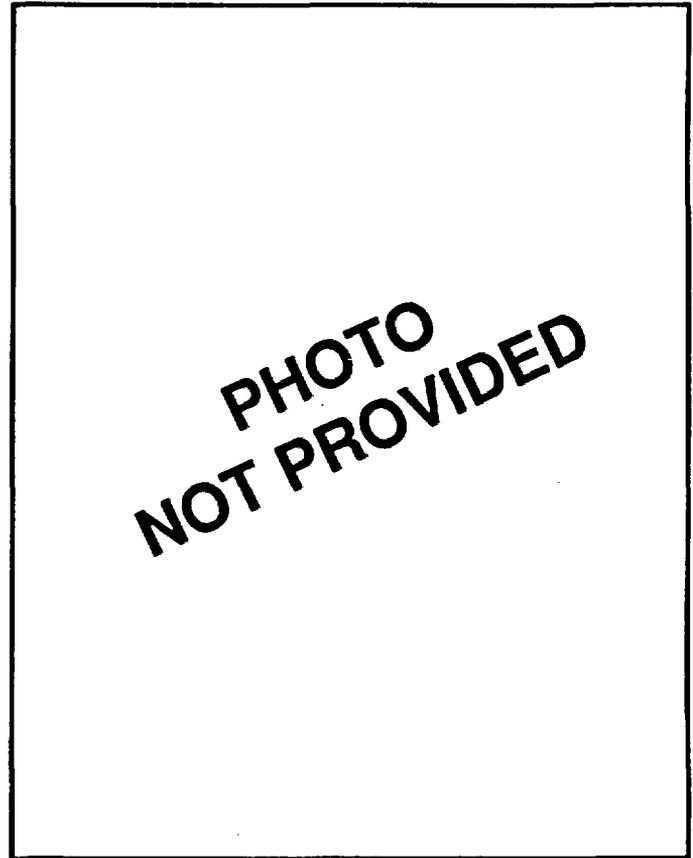
Identified at Whiterock Spring;  
observed and collected at or  
near the top of Rainier Mesa.

**Use:**

Lichen was ground up, mixed with  
water, and used as a poultice for  
mouth and other sores. It is still  
used to some extent today.

**Recommendation(s) for disposition:**

One person commented on lichen  
and recommended that the plant be  
avoided. No alternative recommenda-  
tions were made.



*Lycium andersonii* Gray

Indian  
Name(s)

*huupi*  
*pa'up; u'up;*  
*hu'up*  
*huupia*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
  
Owens Valley Paiute

Common  
Name

wolfberry

**Habitat:**

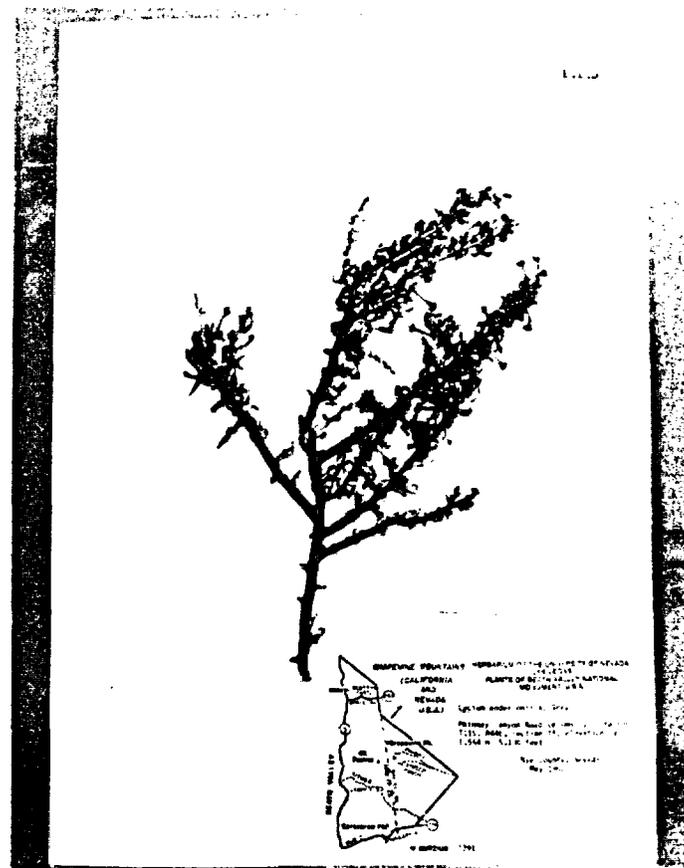
Common to low- and mid-elevation zones; a dominant of the transitional desert (Beatley, 1976:263).

**Use:**

The red berries of both species of wolfberry were used as food and beverage. The berries were dried, mashed, and stored for year-round consumption. Varieties of this plant are still used today.

**Recommendation(s) for disposition:**

Eleven people commented on *L. andersonii*. Four people recommended avoiding the plant, three recommended protecting it, two recommended avoidance in the event of severe ground disturbance. One person recommended transplanting the plant, if possible, as a second-choice alternative. Two people did not recommend protective action.



*Lycium pallidum* Miers  
var. *oligospermum* C. L. Hitchc.

Indian  
Name(s)

*huupi*  
*pa'up; u'up;*  
*hu'up*  
*huupia*

Ethnic  
Group

Western Shoshone  
Southern Paiute

Common  
Name

wolfberry

Owens Valley Paiute

Habitat:

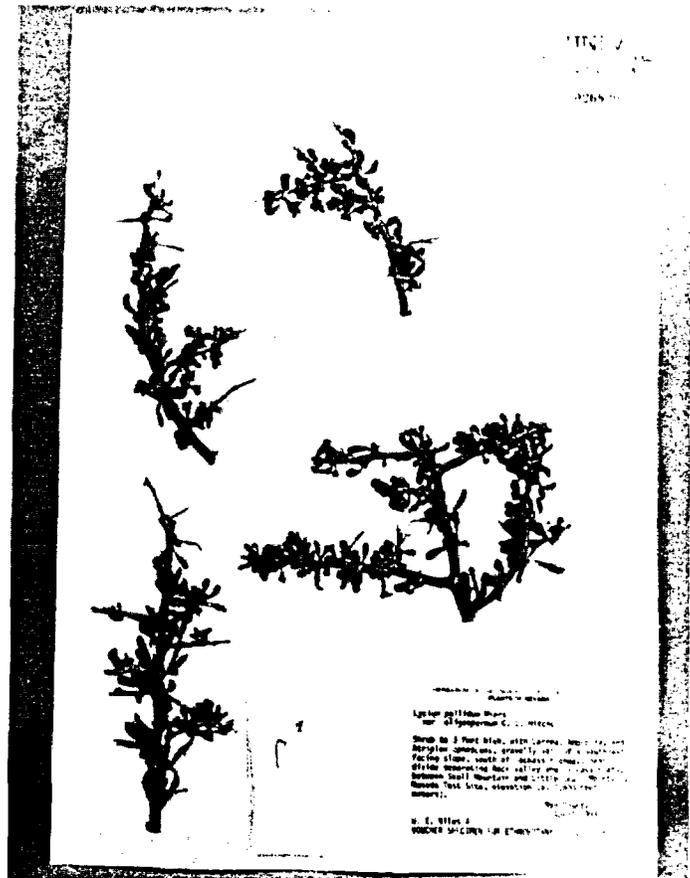
Common to low- and mid-elevation zones; a dominant of the transitional desert (Beatley, 1976:263).

Use:

The red berries of both species of wolfberry were used as food and beverage. The berries were dried, mashed, and stored for year-round consumption. Varieties of this plant are still used today.

Recommendation(s) for disposition:

Three people commented on *L. pallidum*. Two people recommended avoiding the plant and one person did not recommend protective action. No alternative recommendations were made.



*Menodora spinescens* Gray

Indian  
Name(s)

*huupi*  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

spiny menodora

**Habitat:**

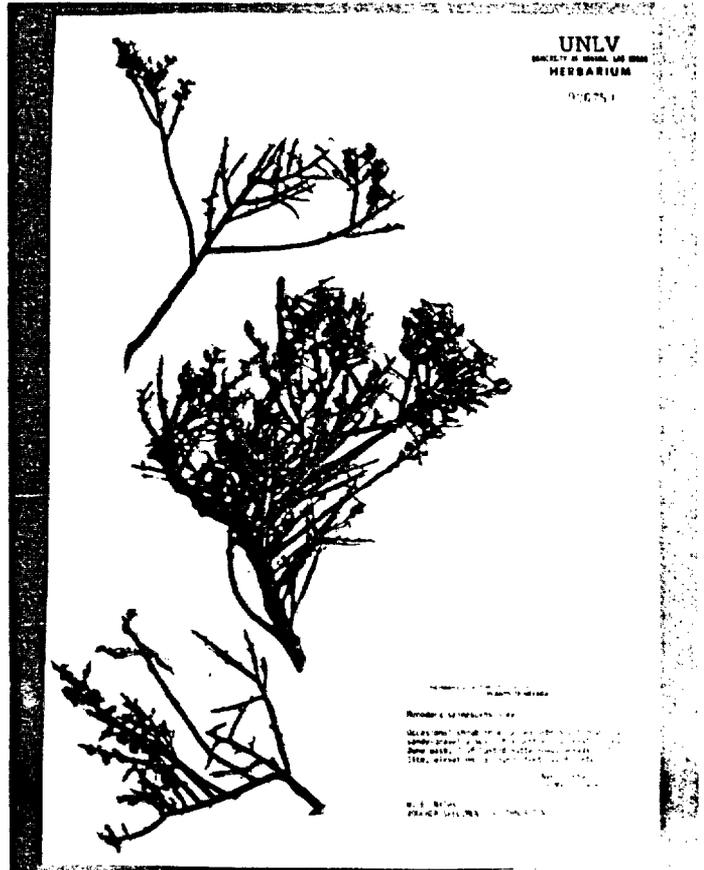
Widely distributed in low-  
and mid-elevation zones (Beatley,  
1976:214-215).

**Use:**

The seeds of this plant may have  
been eaten as food.

**Recommendation(s) for disposition:**

Two people commented on spiny  
menodora. They did not recommend  
protective action.



*Mentzelia albicaulis* (Doug. ex Hook.) Torr. & Gray

Indian  
Name(s)

*pacita; kua*  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

desert corsage

**Habitat:**

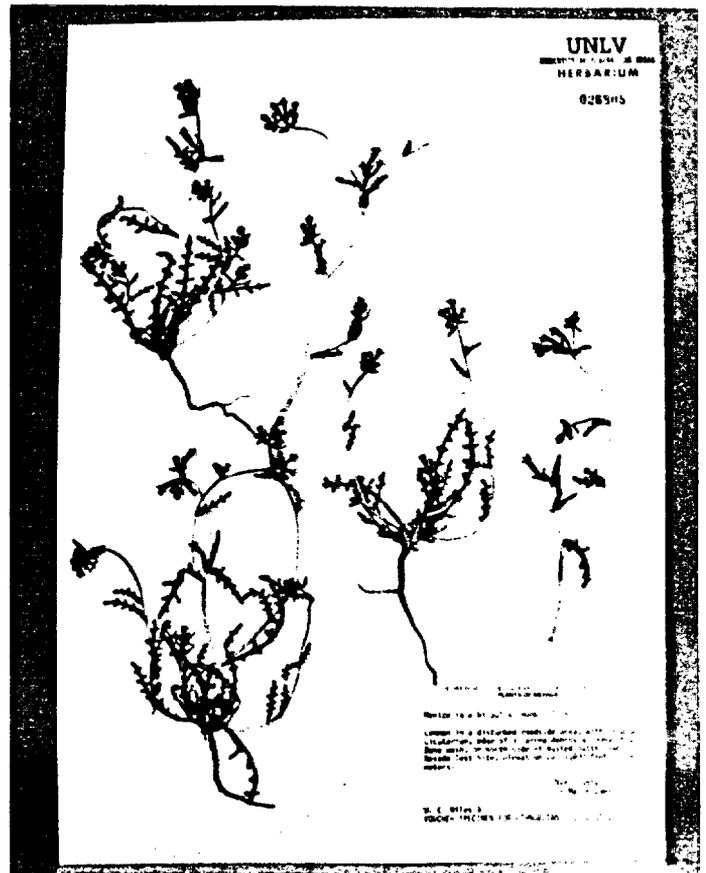
Widely distributed and common  
in middle-elevation zones  
(Beatley, 1976:207).

**Use:**

The seeds of this plant were  
used as food. A Southern Paiute  
woman at Kaibab currently  
cultivates *Mentzelia* in her home  
garden, indicating that it remains  
a valued contemporary food item  
among at least some members of that  
ethnic group.

**Recommendation(s) for disposition:**

Four people commented on desert  
corsage. Two people recommended  
avoiding the plant and one  
recommended replanting the seeds  
in the event ground breaking activities  
destroy mature plants. One person did  
not recommend protective action. No  
alternative recommendations were  
made.



*Nicotiana trigonophylla* Dunal

Indian  
Name(s)

*pombi*  
*saxwaxwapi*  
not identified  
*tsolagayoli*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute  
Las Vegas Indian Center  
(Cherokee)

Common  
Name

Indian tobacco

**Habitat:**

Occasional to common on ledges,  
cliff bases and washes in low-  
and middle-elevation zones  
(Beatley, 1976:265).

**Use:**

The leaves of Indian tobacco  
were dried and smoked for  
pleasure, as well as for  
medicinal and ceremonial purposes.  
It is not known whether the plant  
is currently used.

**Recommendation(s) for disposition:**

Five people commented on Indian  
tobacco. Two people recommended  
transplanting or reseeding the  
plant in the event of ground  
disturbance. Three individuals  
did not recommend protective action.  
No alternative recommendations were  
made.



*Opuntia basilaris* Engelm. & Bigelow var. *basilaris*

Indian  
Name(s)

*nugwia*  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

beavertail  
cactus

**Habitat:**

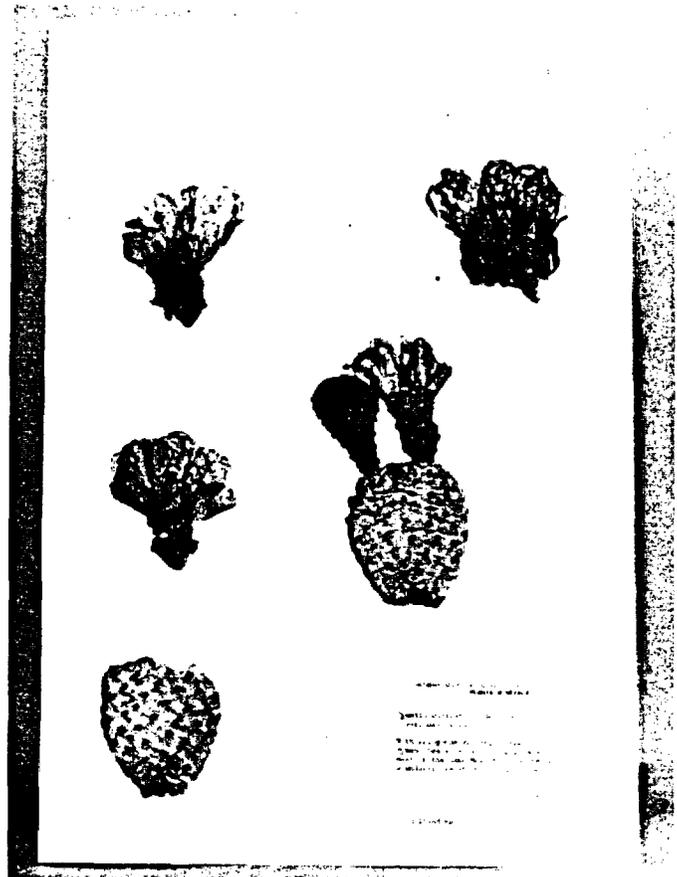
Widely distributed in low-  
and mid-elevation zones  
(Beatley, 1976:172).

**Use:**

The meaty fruits of beavertail  
cactus were knocked off of the  
plant with a stick and consumed  
fresh as food. The fruits may  
have been dried and stored for  
year-round use. Beavertail  
cactus may have been traditionally  
transplanted to various ecozones to  
increase the crop. The plant is  
still used today.

**Recommendation(s) for disposition:**

Three people commented on beavertail  
cactus. One person recommended  
avoiding the plant, and one recom-  
mended transplanting it if possible.  
One person did not respond. No  
alternative recommendations were  
made.



*Opuntia echinocarpa* Engelm. & Bigelow var. *echinocarpa*

Indian  
Name(s)

*wiatumbu*  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

golden cholla  
cactus

**Habitat:**

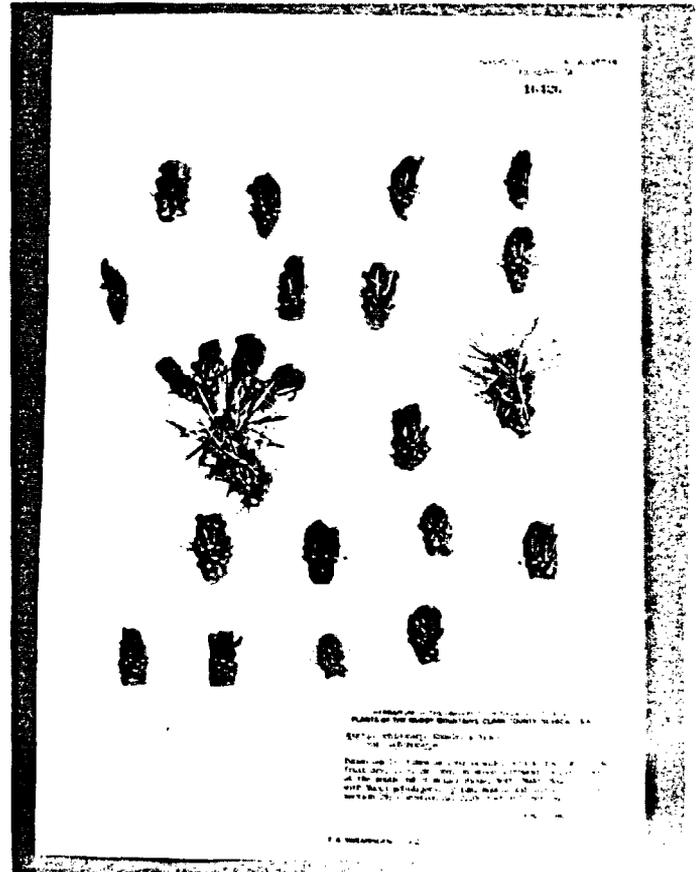
Widely distributed in low- and middle-elevation zones (Beatley, 1976:172-173).

**Use:**

The spines of this cactus were used as needles or awls for sewing and basketmaking. It is not known whether the plant is currently used.

**Recommendation(s) for disposition:**

Two people commented on golden cholla cactus and recommended that the plant be avoided, particularly in the event of intensive ground disturbance. No alternative recommendations were made.



*Opuntia erinacea* Engelm. & Bigelow var. *erinacea*

Indian  
Name(s)

not identified  
*manavi*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Mojave prickly  
pear

**Habitat:**

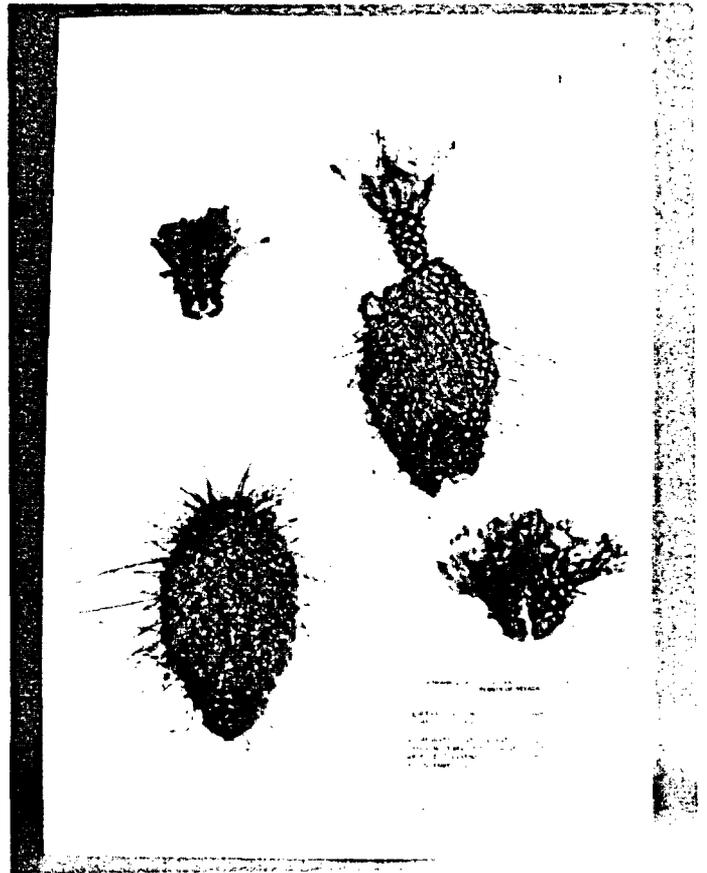
Common in middle- and high-elevation  
zones (Beatley, 1976:173).

**Use:**

The fruits of this cactus were eaten  
raw, roasted or made into jam. It  
could be dried and stored for  
year-round use. It is not known  
whether the plant is currently used.

**Recommendation(s) for disposition:**

One person commented on Mojave  
prickly pear and recommended that  
the plant be avoided. No alterna-  
tive recommendations were made.



*Oryzopsis hymenoides* (Roemer & Schultes) Ricker

Indian  
Name(s)

*wai*  
*wa'ai; wa'iv*  
*wai*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Indian ricegrass

**Habitat:**

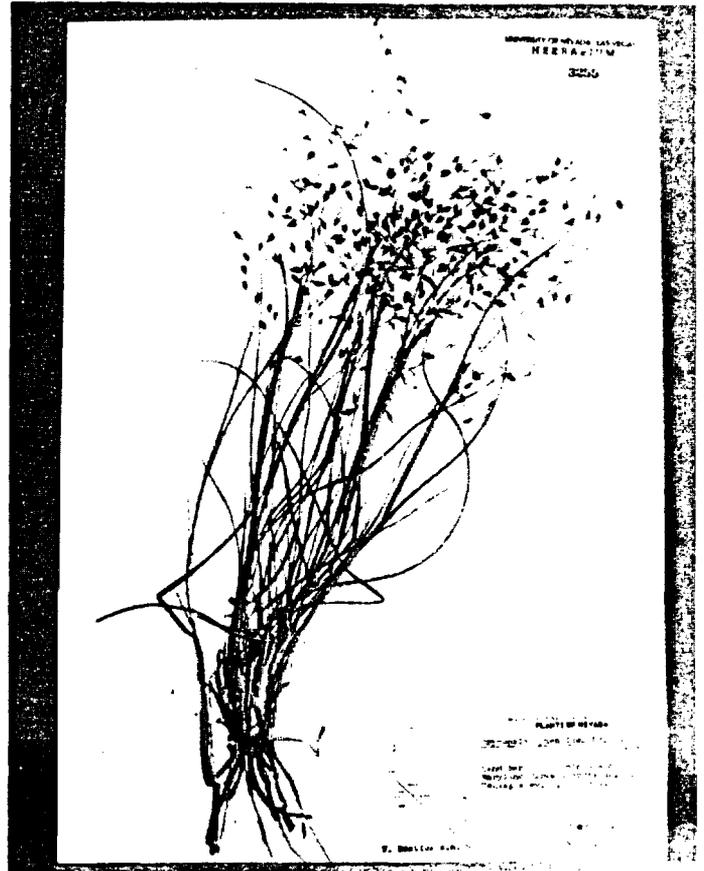
Widely distributed in all zones,  
according to Beatley (1976:288).

**Use:**

The seeds of Indian ricegrass were traditionally a common food of all three ethnic groups; they were gathered by beating the seeds into a basket with a stick, thrashed in a flat curved basket, dried, and stored for use throughout the year. *Oryzopsis* was managed by replanting seeds and burning areas to stimulate regrowth of this important resource. The seeds are still harvested today by members of each ethnic group, although its use does not seem to be as widespread as in the past, perhaps due to lack of access. Nevertheless, it remains an important resource.

**Recommendation(s) for disposition:**

Eighteen people commented on Indian ricegrass. Five people recommended protecting the plant, three recommended avoiding it, two recommended avoidance in the event of severe ground disturbance, and one recommended replanting the seeds of ricegrass if possible. Two people recommended avoidance and two recommended transplanting the plant, if possible, as second-choice alternatives. Three people did not recommend protective action and three did not respond.



*Peraphyllum ramosissimum* Nutt.

Indian  
Name(s)

not identified  
*suovi*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

squawapple

**Habitat:**

Local populations occur on slopes and in washes of middle- and high-elevation zones (Beatley, 1976:248-249).

**Use:**

The young shoots and stems of this plant were used to make baskets, much like *Rhus trilobata* (squawbush). The plant was encouraged and valued in that it was transplanted to houseyards. The plant is still used today.

**Recommendation(s) for disposition:**

One person commented on squawapple and recommended that the plant be protected. No alternative recommendations were made.



*Phragmites australis* (Cav.) Trin. ex Steud.

Indian  
Name(s)

not remembered  
*pa'xamp*  
*pihavi*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

cane; reed

Habitat:

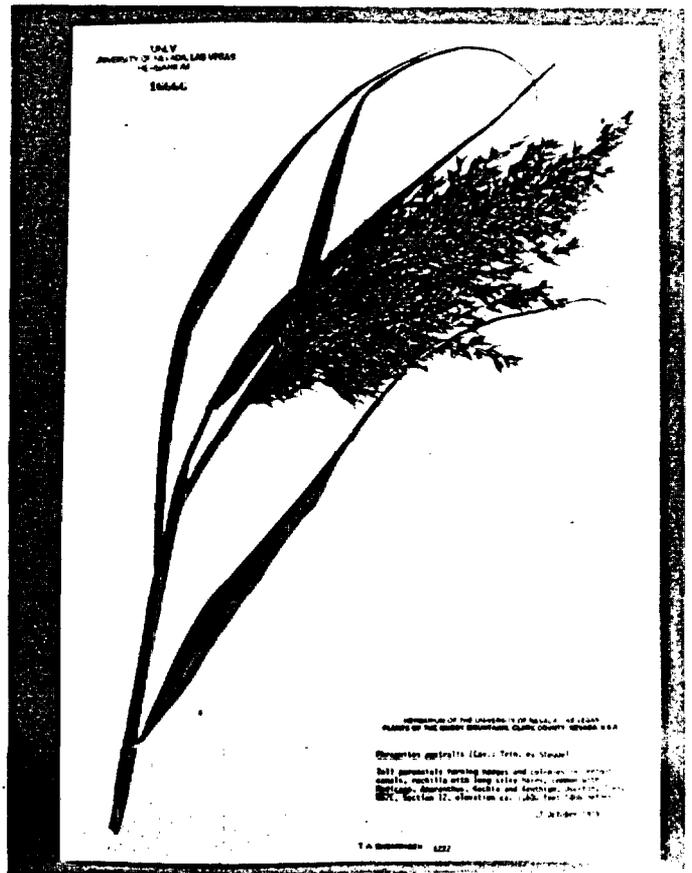
Mostly present in spring areas  
and wet sites of low- to  
mid-elevation zones (Beatley,  
1976:289).

Use:

The stems of this plant were  
used to make arrowshafts and  
wickiup walls. The candy-like,  
"honey dew" exudate was scraped  
off the leaves and eaten as a  
sugary food. Food use is  
mentioned in Southern Paiute  
legend. The plant is thus  
sometimes called "sugar cane."  
It is also known as wild bamboo  
and is still used to some extent  
today.

Recommendation(s) for disposition:

Eight people commented on cane or  
reed. Four people recommended  
protecting the plant, and three  
people recommended avoiding it. One  
person did not respond. No alternative  
recommendations were made.



*Pinus monophylla* Torr. & Frem.

**Indian  
Name(s)**

*wahpi; tuvah  
tuvap; tuvwap  
tuvah (nuts); tuvap*

**Ethnic  
Group**

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

**Common  
Name**

singleleaf  
pinyon pine

**Habitat:**

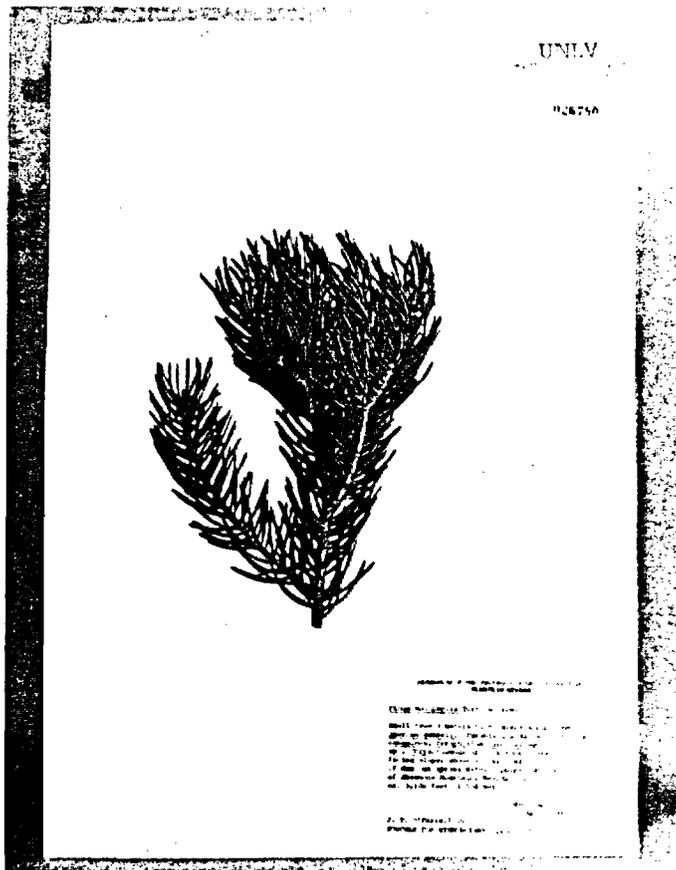
A dominant tree of high-elevation zones (Beatley, 1976:115).

**Use:**

The pinyon pine was an all-purpose plant and continues to be an important food source today. Individuals, families and perhaps larger groups harvested pine nuts each fall. The nuts were prepared either by boiling or roasting in a charcoal pit and then ground into a gravy-like mush. Pitch from the pine was and is an important bonding agent for baskets and water jugs. The gummy sap is chewed and used as a medicine and ceremonial substance. In addition, the wood of pinyon pine was used for fuel. Trees were pruned by beating off dead branches to ensure a continual supply of nuts. All of the uses mentioned above continue today and it remains a very important resource. Pinyon pine is important in Western Shoshone legends.

**Recommendation(s) for disposition:**

Thirteen people commented on single-leaf pine. Ten people recommended that the plant be protected, and one person recommended that the plant be transplanted if possible. As second-choice alternatives, two people recommended that the plant be avoided and one person recommended planting additional trees in an area set aside for access by Indian people. One person did not respond.



*Prosopis glandulosa* Torr. var. *torreyana*  
(L. Benson) Johnston

Indian  
Name(s)

*o'phi*  
*o'pimb*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

mesquite

**Habitat:**

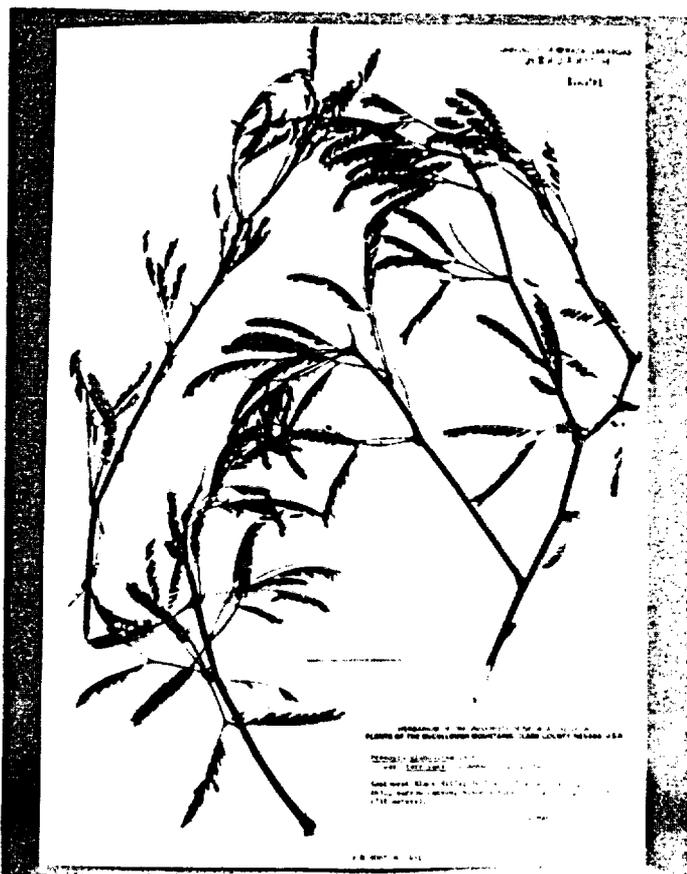
*P. glandulosa* is common in low sandy dunes and near springs; (Beatley, 1976:196-197).

**Use:**

The pods and seeds of both mesquite and screwbean were used as food. They were mashed and ground into a mush or a gravy, as well as cakes. The sweet-tasting pods were also eaten raw. The wood of mesquite was used as fuel and also in the construction of dwellings. Both resources are used today.

**Recommendation(s) for disposition:**

Seven people commented on mesquite. Two people recommended protecting the plant, and four people recommended avoiding it. One person recommended protecting mesquite as a second-choice alternative.



*Prosopis pubescens* Benth.

Indian  
Name(s)

*wi'ump; kwierum*  
not identified  
not identified

Ethnic  
Group

Southern Paiute  
Western Shoshone  
Owens Valley Paiute

Common  
Name

screwbean

**Habitat:**

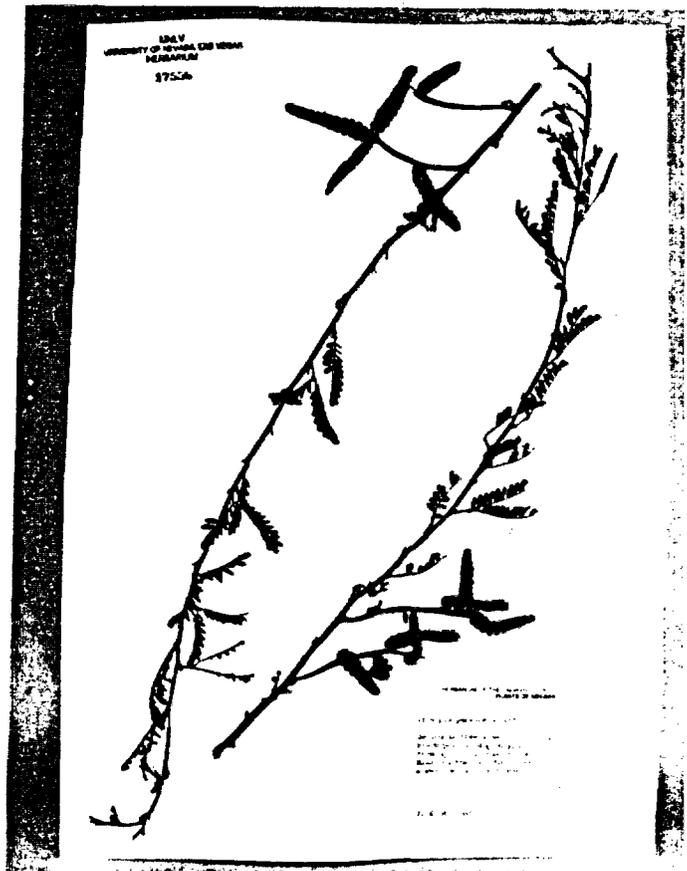
*P. pubescens* occurs in areas containing springs and low sandy dunes. (Beatley, 1976:196-197).

**Use:**

The pods and seeds of both mesquite and screwbean were used as food. They were mashed and ground into a mush or a gravy, as well as cakes. The sweet-tasting pods were also eaten raw. The wood of mesquite was used as fuel and also in the construction of dwellings. Both resources are used today.

**Recommendation(s) for disposition:**

There were seven comments on screwbean. Four recommended avoiding the plant, and three recommended protecting it. There were three recommendations to protect it as a second-choice alternative.



*Psoralea polydenius* (Torr. ex S. Wats.) Rydb.

Indian  
Name(s)

*muipuh*  
not identified  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

dotted dalea

**Habitat:**

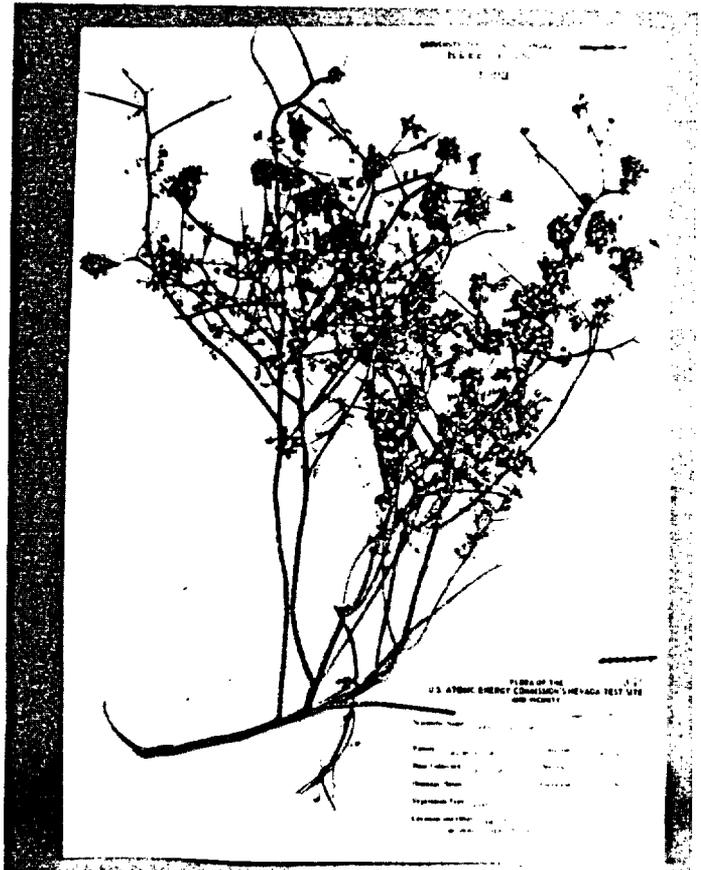
Present in loose sands, usually  
in low- and middle-elevation  
zones (Beatley, 1976:197).

**Use:**

The flowers of this plant were  
used as a medicine or mixed with  
tobacco. The plant is still used  
today.

**Recommendation(s) for disposition:**

Three people commented on dotted  
dalea. One person recommended  
avoiding the plant and two people  
did not recommend protective  
action.



*Purshia glandulosa* Curran

Indian Name(s)	Ethnic Group	Common Name
<i>hunavi</i> <i>u'nup</i> not identified	Western Shoshone Southern Paiute Owens Valley Paiute	buckbrush

**Habitat:**

Widely distributed and common in washes of low- and mid-elevation zones (Beatley, 1976:250).

**Use:**

Strips of bark from this plant were woven or otherwise used for a variety of utilitarian items such as diapers, rope/twine, skirts, sandals, a kind of wrapping blanket for infants, and house crosses for protection against thunder and lightning. It was also used in certain ceremonies and as a medicinal poultice. Buckbrush was valued as fuelwood, also. The plant is still used today.

**Recommendation(s) for disposition:**

Seven people commented on buckbrush. Two people recommended protecting the plant, two people recommended avoiding it, especially in the event of severe ground disturbance. Two people did not recommend protective action. No alternative recommendations were made.



*Quercus gambelii* Nutt.

Indian  
Name(s)

not identified  
*kwiav*  
*tsiginoh*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

scrub oak

Habitat:

Present in thickets near washes and springs of mid- and high-elevation zones (Beatley, 1976:198).

Use:

Acorns from the oak tree were roasted, boiled and ground into a food. The wood was burned as fuel and in ceremonies, as well as being used to make spears, bows, canes, and other utilitarian items. This important resource is still used today.

Recommendation(s) for disposition:

Three people commented on scrub oak. One person recommended that the plant be protected, and one recommended avoidance in the event of severe ground disturbance. One person did not respond. No alternative recommendations were made.



*Rhus trilobata* (Nutt.) Gray var. *anisophylla*  
(Greene) Jepson

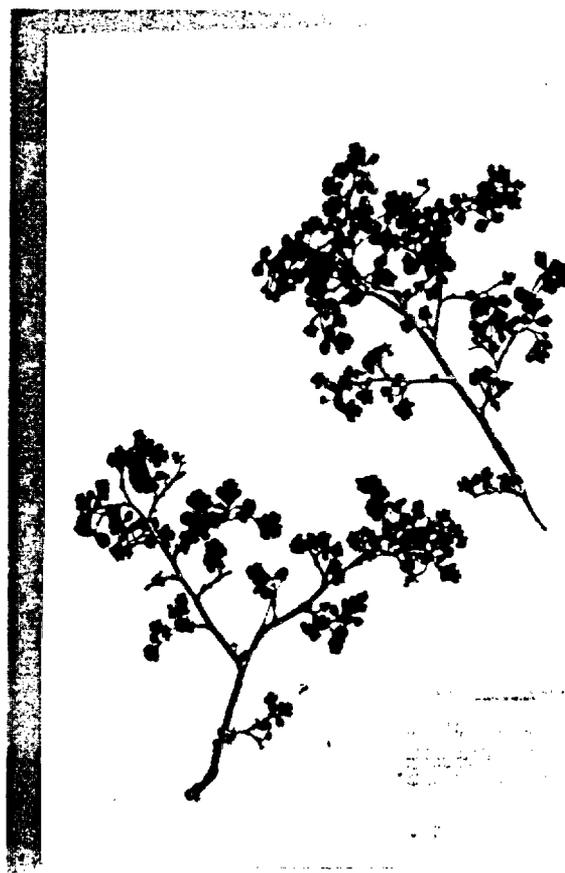
Indian Name(s)	Ethnic Group	Common Name
not identified <i>su'uv</i> not identified	Western Shoshone Southern Paiute Owens Valley Paiute	squawbush

**Habitat:**

Occasional in mid-elevation zones and mountain areas (Beatley, 1976:117-118).

**Use:**

Squawbush is an extremely important plant among Southern Paiute people. Besides using the red berries as food, the young shoots of squawbush are preferred over all others for making baskets—it is often categorized as a type of willow. It is used in making the famous Navajo wedding basket (a basket that Southern Paiutes make and one that Navajo medicine men actively seek out for purchase) as well as cradle-boards, winnowing baskets, and other utilitarian items. The plant appears to have been intensively managed by transplanting, burning to stimulate regrowth, and pruning methods, which encourage ideal growth for basketry. Parts used for both food and manufacture are stored for year-round use. It is now perceived as becoming increasingly rare, but remains a very significant and highly valued resource.



**Recommendation(s) for disposition:**

Five people commented on squawbush. Four people recommended that the plant be avoided. One person did not respond. No alternative recommendations were made.

*Rumex crispus* L.

Indian  
Name(s)

not identified  
*nambitu*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

curly dock;  
wild rhubarb

**Habitat:**

Frequent and locally common  
in wet or moist soils near  
springs and water impoundments  
in low- to high-elevation zones  
(Beatley, 1976:241).

**Use:**

The leaves of wild rhubarb were  
boiled and eaten as greens. The  
plant is still used today.

**Recommendation(s) for disposition:**

One person commented on curly dock  
or wild rhubarb and recommended  
protecting the plant. The alternative  
recommendation was to transplant it if  
possible to another area.



*Salix exigua* Nutt.

Indian  
Name(s)

*kwishisuuvi*  
*kanav*  
*su'huva*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

willow

**Habitat:**

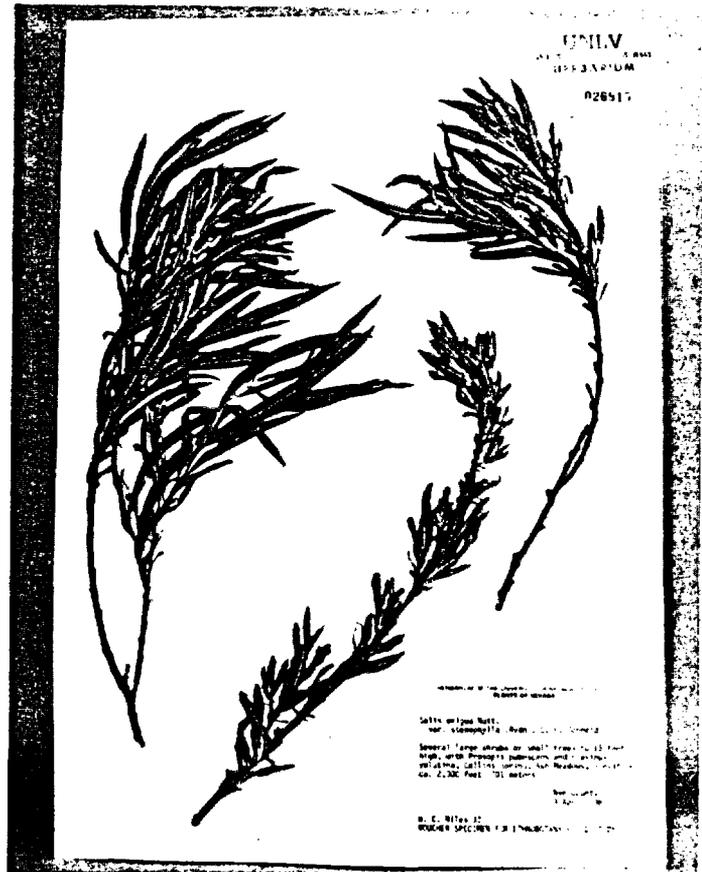
Predominantly in lower elevation zones near springs and streams (Beatley, 1976:253).

**Use:**

The young shoots or splints of the willow were very important resources used for the manufacture of baskets, water jugs, cradle-boards, dwellings, and other utilitarian items. In addition, the bark of *Salix exigua* was either boiled or chewed as an aspirin-type of medicine. Willows were also managed through harvest techniques that ensured reliable supplies, and was reported to have been transplanted to advantageous locations (i.e., near homes). The significance of willow remains very high among contemporary basket makers.

**Recommendation(s) for disposition:**

Fourteen people commented on willow. Five people recommended avoiding the plant, two recommended protecting it and two recommended avoidance in the event ground disturbance was severe. Two people did not recommend protective action and three people did not respond. As second-choice alternatives, three people recommended protection of the plant, one person recommended transplanting it if possible, and one person recommended setting an area planted with willow aside for use by Indian.



*Salix gooddingii* Ball var. *gooddingii*

Indian  
Name(s)

*suuvi*  
*pawaxanav*  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

black willow

**Habitat:**

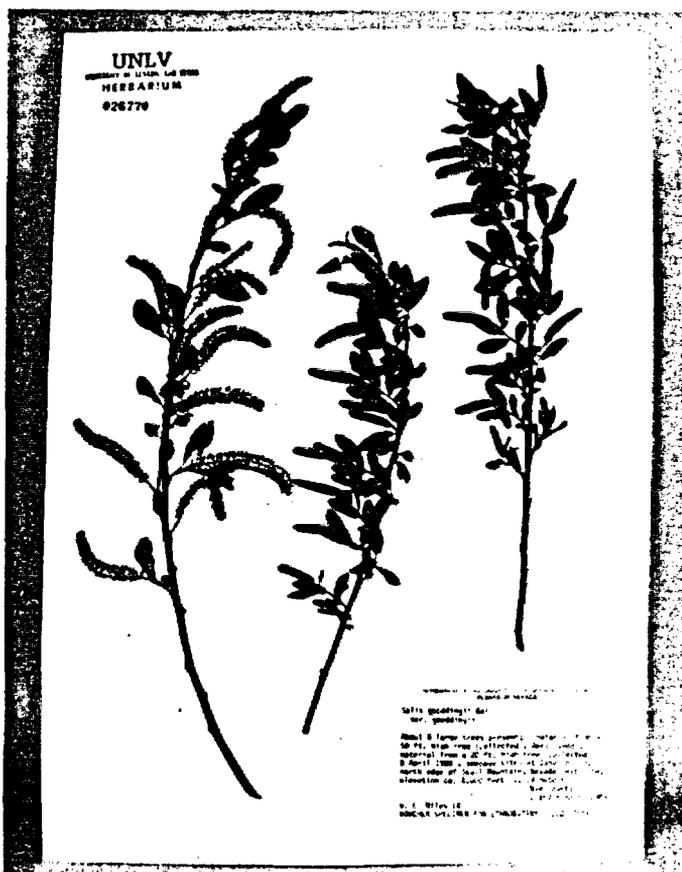
Predominantly in lower elevation  
zones near springs and streams  
(Beatley, 1976:253).

**Use:**

The young shoots or splints of the  
willow were very important resources  
used for the manufacture of baskets,  
water jugs, cradle-boards, dwellings,  
and other utilitarian items. In  
addition, the bark of *Salix exigua* was  
either boiled or chewed as an  
aspirin-type of medicine. Willows were  
also managed through harvest techni-  
ques that ensured reliable supplies,  
and was reported to have been trans-  
planted to advantageous locations  
(i.e., near homes). The significance  
of willow remains very high among  
contemporary basket makers.

**Recommendation(s) for disposition:**

Eight people commented on black  
willow. Three people recommended  
that the plant be avoided, two  
recommended protecting it, and two  
recommended avoidance in the event  
ground disturbance was severe. One  
person did not recommend any protec-  
tive action. No alternative recom-  
mendations were made.



*Salvia columbariae* Benth. var. *columbariae*

Indian  
Name(s)

*pacita*  
*pasiits*  
*pacita*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

chia

**Habitat:**

Widely distributed and locally common on wash slopes in low- and middle-elevation zones (Beatley, 1976:205-206).

**Use:**

The "seeds" of chia were cooked and eaten as food. It is not known whether the plant is currently used.

**Recommendation(s) for disposition:**

Six people commented on chia. Three people recommended avoiding the plant and one person recommended replanting chia "seeds" if possible. Two people did not recommend protective action.



*Salvia dorrii* (Kellogg) Abrams

Indian  
Name(s)

not identified  
*nungwukoap*;  
*kwatamanum*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
  
Owens Valley Paiute

Common  
Name

purple sage;  
Indian tobacco

Habitat:

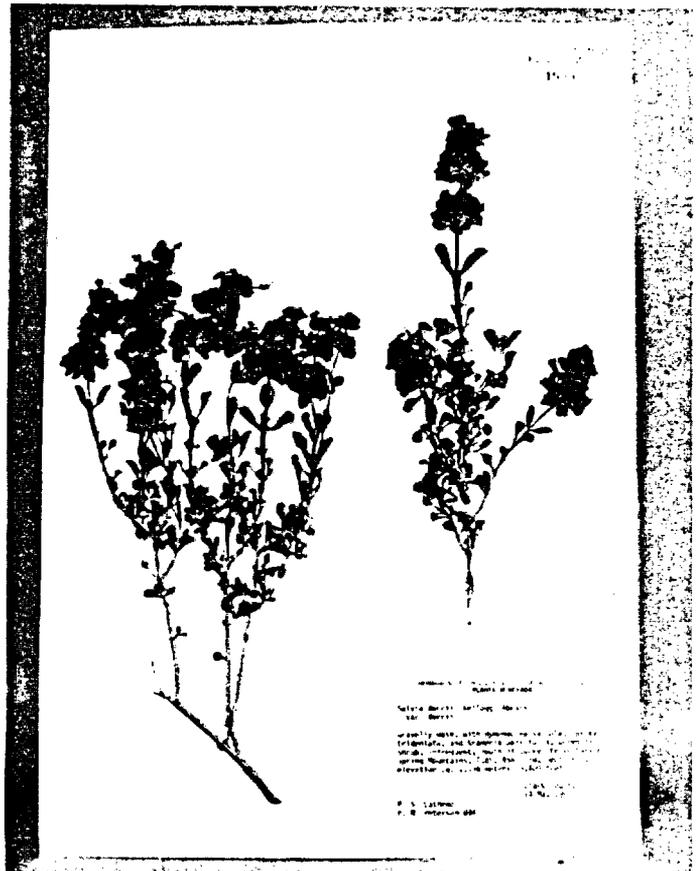
Common to middle- and high-elevation  
zones (Beatley, 1976:206).

Use:

The leaves of this plant were dried  
and smoked as a medicinal. Use of  
the plant continues today.

Recommendation(s) for disposition:

Two people commented on purple sage  
or Indian tobacco and recommended  
that the plant be avoided. No  
alternative recommendations were  
made.



*Sphaeralcea ambigua* Gray ssp. *ambigua*

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

globe mallow

**Habitat:**

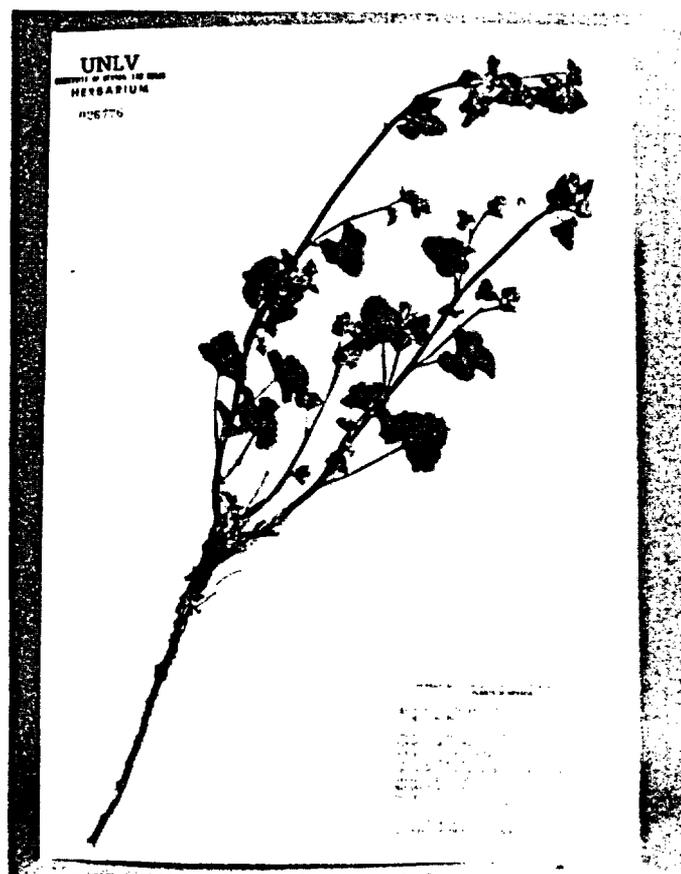
Various species are common in all zones (Beatley, 1976:210-211).

**Use:**

The fruits of this plant were used for food. It is not known whether the plant is currently used, but it is still recognized as a potential food source.

**Recommendation(s) for disposition:**

One person commented on globe mallow and recommended that the plant be protected. No alternative recommendations were made.



*Stanleya pinnata* (Pursh) Britt. var. *pinnata*

Indian  
Name(s)

*tuwarra; tuhuara*  
*tumar*  
*yuhuara*

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Indian spinach

Habitat:

Most common in lower elevation zones such as washes and drainage slopes as widely scattered plants (Beatley, 1976:169). A dense stand of approximately 409 plants was found at the entrance to Tarantula Canyon, however.

Use:

The leaves of *Stanleya* are one of several types of leafy plants boiled, fried or eaten fresh as greens. It appears to be one of the preferred foods, as it was stored and used throughout the entire year. It is still enthusiastically sought out for food today. Evidence from the site visits indicate that the plant was intensively managed through certain harvest methods, which ensured a stable and reliable supply of fresh leaves in succeeding years.

Recommendation(s) for disposition:

Twelve people commented on Indian spinach. Six people recommended protecting the plant, and three recommended that the plant be avoided. Two people recommended transplanting the plant, if possible, as a second-choice alternative. Two people did not recommend protective action and one person did not respond.



*Stephanomeria* sp.

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

"gum bush"

Habitat:

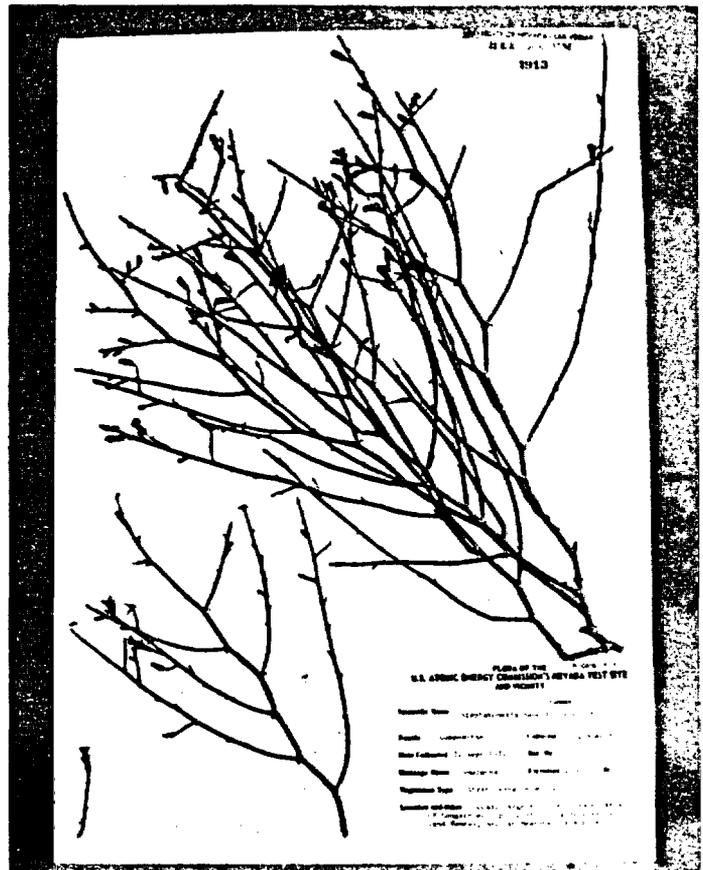
Common to abundant in low- and middle-elevation canyon walls, washes and outcrops (Beatley, 1976:151).

Use:

A gummy extract was scraped off the roots of this plant and chewed like gum. The plant is still used today.

Recommendation(s) for disposition:

One person commented on "gum bush" and recommended that the plant be protected. No alternative recommendations were made.



*Stipa speciosa* Trin. & Rupr.

Indian  
Name(s)

not identified  
*monomp*  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

bunchgrass

**Habitat:**

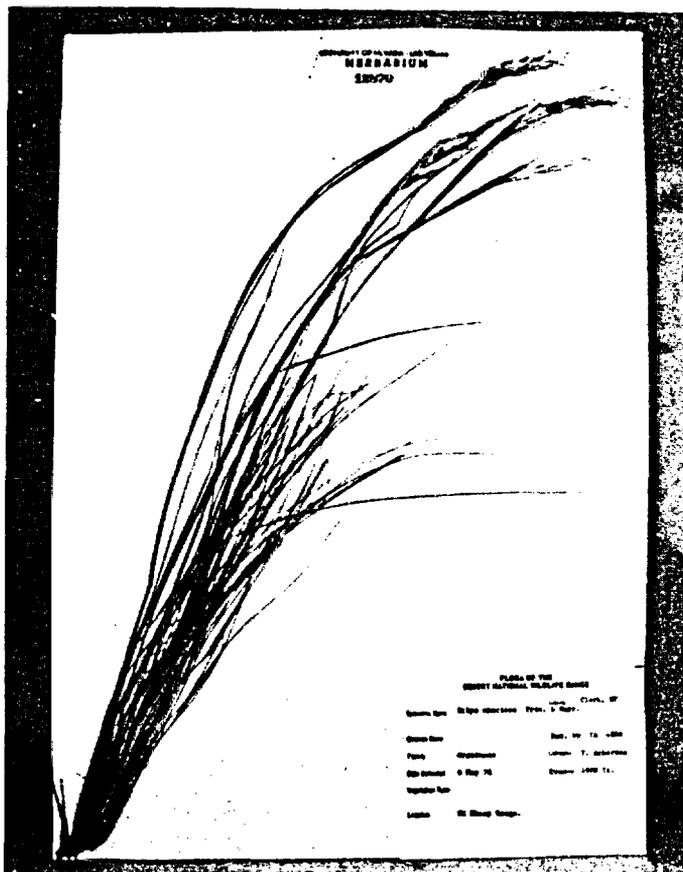
Widely distributed and common in mid-elevation zones (Beatley, 1976:293).

**Use:**

The seeds of bunchgrass were used as food among Owens Valley Paiute people. Southern Paiute people used the roots of the plant to make hairbrushes. It is not known with certainty if the plant is still used today.

**Recommendation(s) for disposition:**

Three people commented on bunchgrass. Two people recommended avoiding the plant and one person did not recommend protective action. No alternative recommendations were made.



*Streptanthella longirostris* (Wats.) Rydb.

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

mustard

**Habitat:**

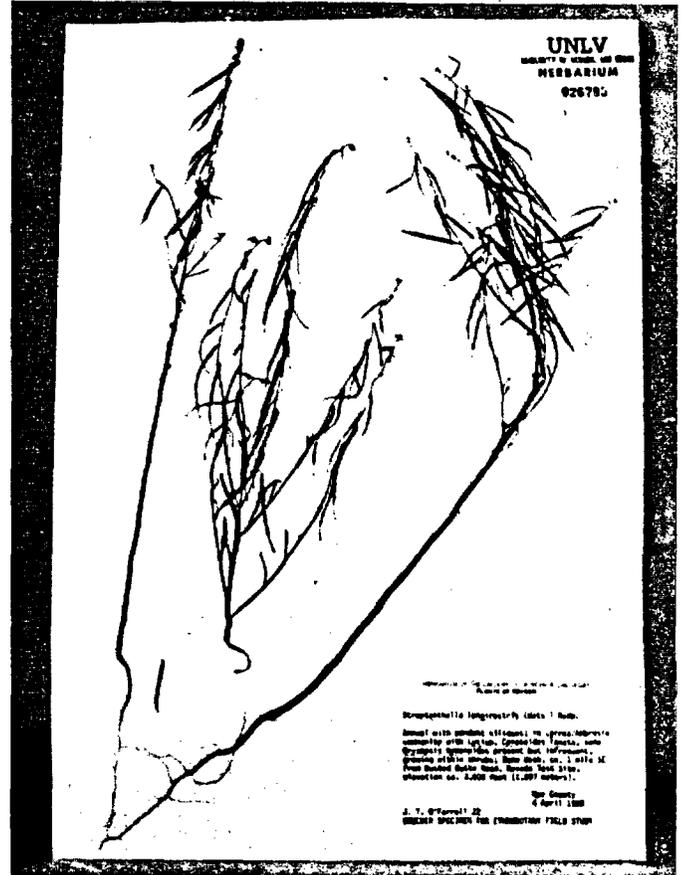
Widely distributed in low- and  
middle-elevation zones  
(Beatley, 1976:170).

**Use:**

The seeds of this wild mustard may  
have been used for food. It is not  
known whether the plant is currently  
used.

**Recommendation(s) for disposition:**

One person commented on mustard  
and did not recommend protective  
action.



*Streptanthus cordatus* Nutt. ex Torr. & Gray

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

mustard

**Habitat:**

Common to widely distributed in mid-  
and high-elevation zones (Beatley,  
1976:170).

**Use:**

The seeds of this plant were used  
for food. It is not known whether  
seeds are still eaten today.

**Recommendation(s) for disposition:**

One person commented on mustard at  
two different sites. No recommenda-  
tions were made for protective action.



*Suaeda torreyana* Wats. var. *ramosissima*  
(Standl.) Munz

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

seepweed

**Habitat:**

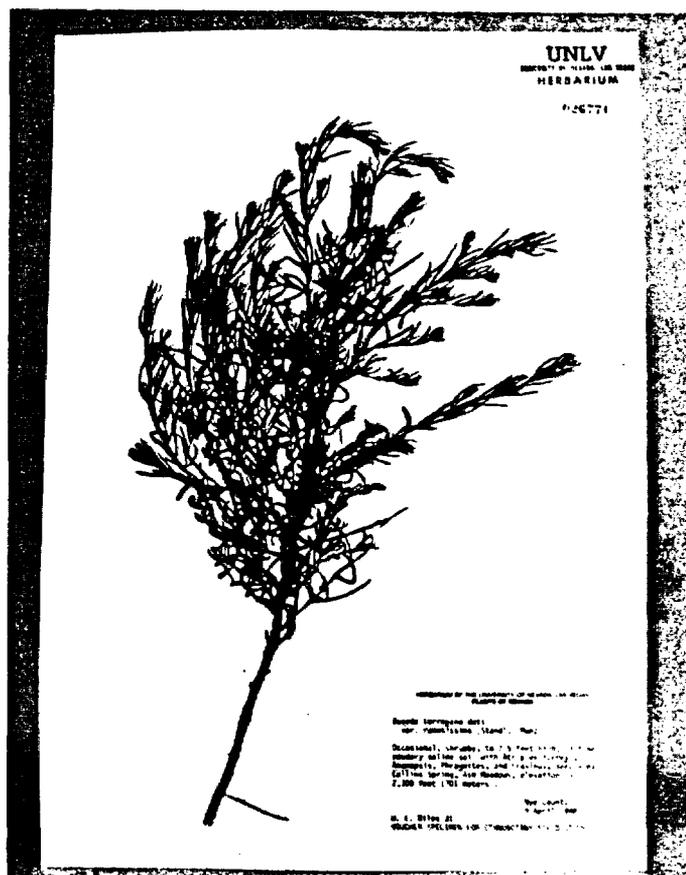
Common to low-elevation dunes,  
playas and seepages (Beatley,  
1976:185).

**Use:**

The stems and leaves of this plant  
were mashed and used as a poultice  
for cuts and sores. The plant is  
still used today for medicinal purposes.

**Recommendation(s) for disposition:**

One person commented on seepweed  
and recommended that the plant be  
protected. No alternative recom-  
mendations were made.



*Symphoricarpos longiflorus* Gray

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

snowberry

**Habitat:**

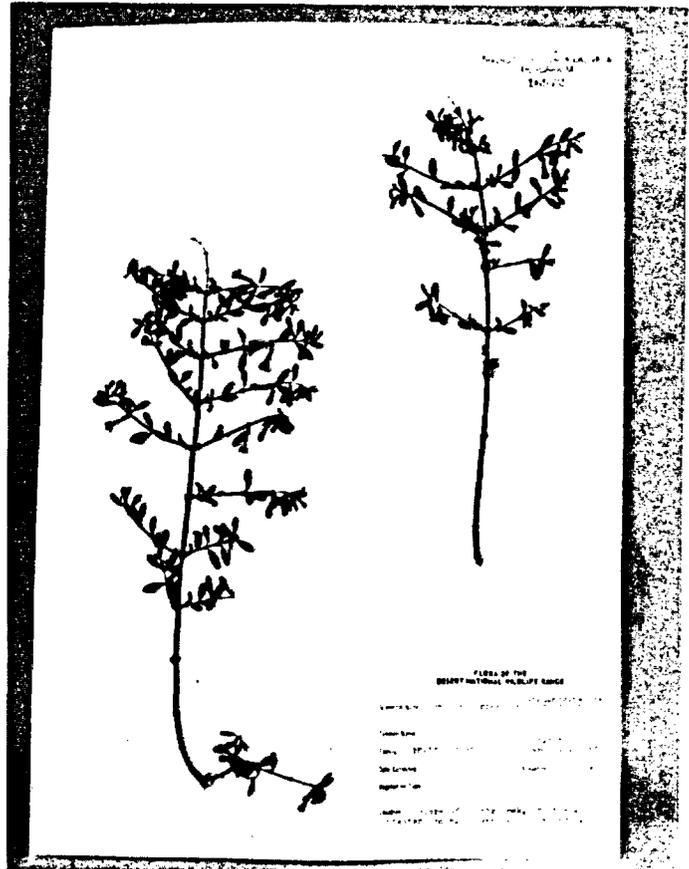
Common to cliff bases and rock  
ledges in low- and middle-elevation  
zones (Beatley, 1976:176).

**Use:**

The berries of this plant may have  
been used for food. It is not known  
whether the plant is currently used.

**Recommendation(s) for disposition:**

One person commented on snowberry  
and made no recommendation for  
protective action.



*Tessaria sericeae* (Nutt.) Shinnars

Indian  
Name(s)

not identified  
not remembered  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

arrowweed

**Habitat:**

Occasional to common near  
low-elevation springs, particularly  
at Ash Meadows (Beatley, 1976:148).

**Use:**

The young, straight shoots, stems,  
and branches of arrowweed were  
used to make arrows and in house  
construction. Arrowweed apparently  
was an important trade item among  
Paiute women at Ash Meadows. The  
plant is still used to some extent  
today.

**Recommendation(s) for disposition:**

Three people commented on arrow-  
weed. One person recommended  
protecting the plant and one person  
recommended transplanting it if  
possible. One person did not  
respond.



*Thamnosma montana* Torr. & Frem.

Indian  
Name(s)

not identified  
*mugru'upi*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

turpentine bush

**Habitat:**

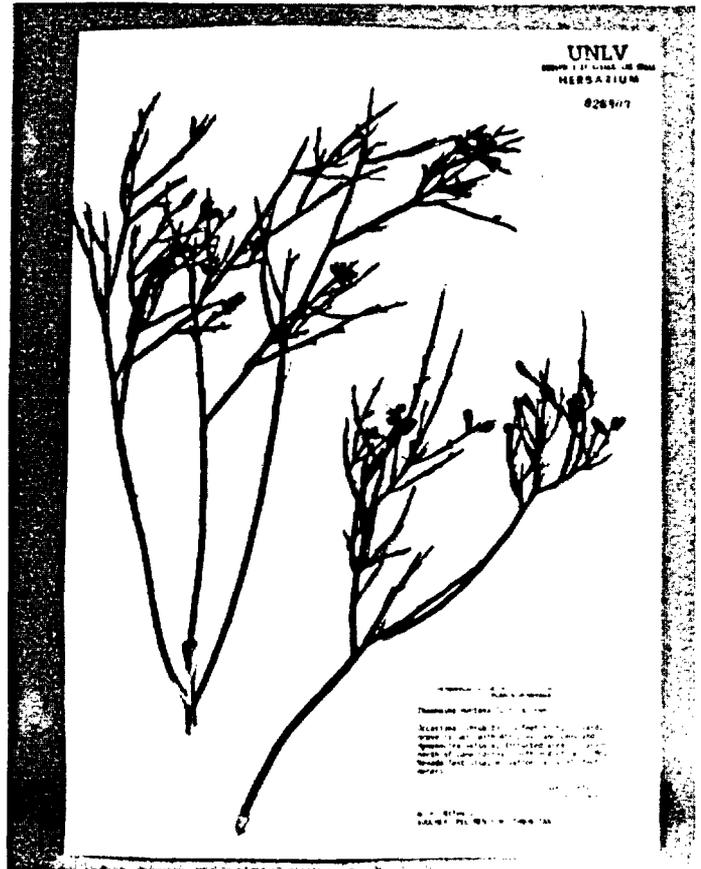
Common in mid-elevation washes  
(Beatley, 1976:252).

**Use:**

The stems and leaves of turpentine bush were boiled and used as a medicine for colds. The sharp stem tips were used to pierce ears, also. It is not known whether the plant is currently used.

**Recommendation(s) for disposition:**

Three people commented on turpentine bush. Two people recommended protecting the plant. One person recommended transplanting the plant, if possible, as a second-choice alternative. One person did not recommend protective action.



*Thelypodium integrifolium* (Nutt.) Endl. ssp. *affine* Greene

Indian  
Name(s)

not identified  
*nambitu*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

wild cabbage

**Habitat:**

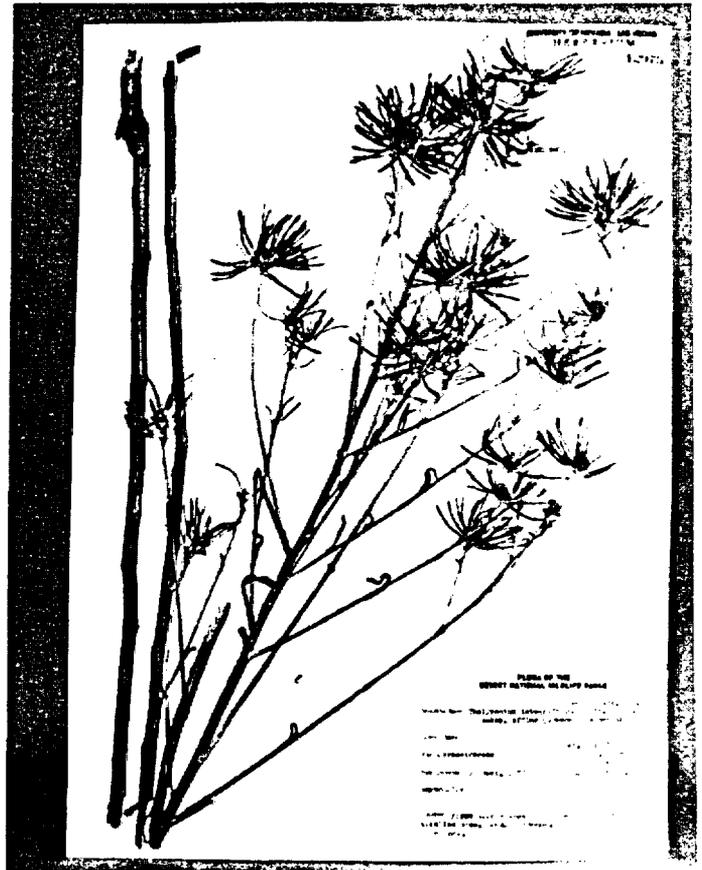
Common in low- and mid-elevation zones; conspicuous at Ash Meadows (Beatley, 1976:164, 170).

**Use:**

The young stems and leaves of this wild cabbage were boiled and eaten as greens. They were harvested in such a fashion so as to ensure two to three crops a year and a continually reliable supply. The plant is still used for food today.

**Recommendation(s) for disposition:**

Two people commented on wild cabbage. One person recommended protecting the plant and one person did not respond.



*Typha domingensis* Pers.

Indian  
Name(s)

*toyh*  
not remembered;  
*pa'amp* (?)  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
  
Owens Valley Paiute

Common  
Name

cattail

Habitat:

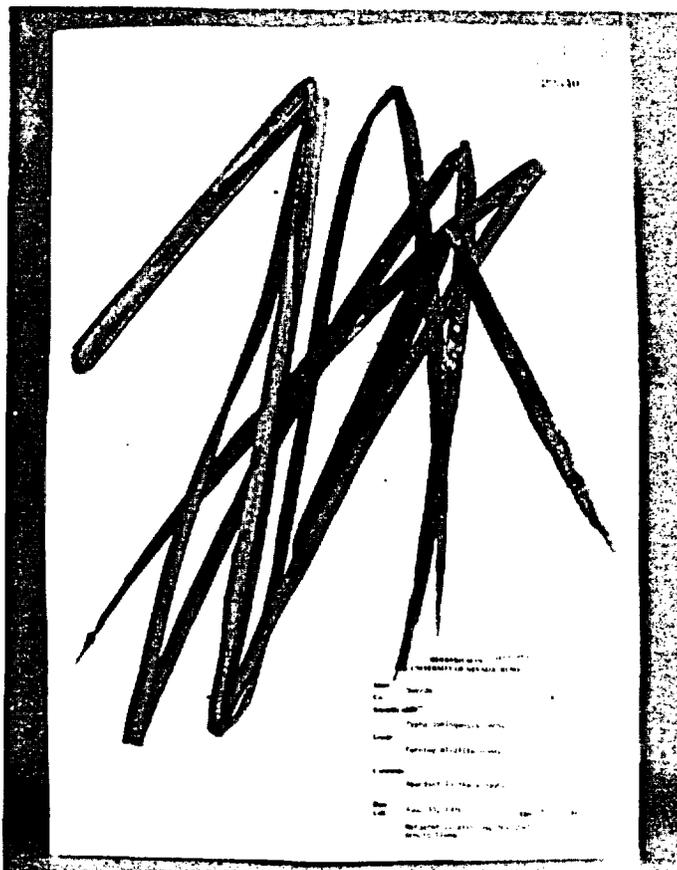
*T. domingensis* is found in wet soils of low elevation zones (Beatley, 1976:295).

Use:

Cattails had a number of uses. The submerged portion of stems and roots, as well as the flower pollen, were used as food. The young shoots and stems were used in making decoys, baskets, sweat-house mats, shelters, and boats. Dried stems were sometimes used as kindling for fires. All parts were dried and stored for year-round use. This important plant continues to be highly valued and used today.

Recommendation(s) for disposition:

Five people commented on *T. domingensis* (cattail). Four people recommended that the plant be protected and one person recommended that it be avoided. No alternative recommendations were made.



*Typha latifolia* L.

Indian  
Name(s)

*toyh*  
not remembered;  
*pa'amp* (?)  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
  
Owens Valley Paiute

Common  
Name

cattail

Habitat:

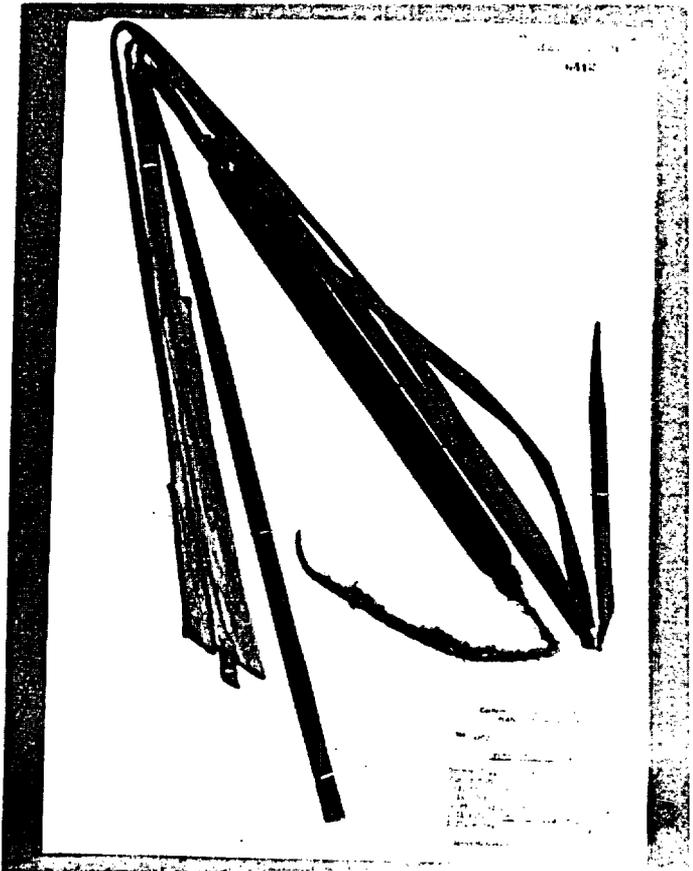
*T. latifolia* is more common to mid-elevation zones, such as at Whiterock Spring (Beatley, 1976:295).

Use:

Cattails had a number of uses. The submerged portion of stems and roots, as well as the flower pollen, were used as food. The young shoots and stems were used in making decoys, baskets, sweat-house mats, shelters, and boats. Dried stems were sometimes used as kindling for fires. All parts were dried and stored for year-round use. This important plant continues to be highly valued and used today.

Recommendation(s) for disposition:

Four people commented on *T. latifolia*. Three people recommended protecting the plant and one person did not respond. No alternative recommendations were made.



*Veronica anagallis-aquatica* L.

**Indian  
Name(s)**

not identified  
not remembered  
not remembered

**Ethnic  
Group**

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

**Common  
Name**

speedwell

**Habitat:**

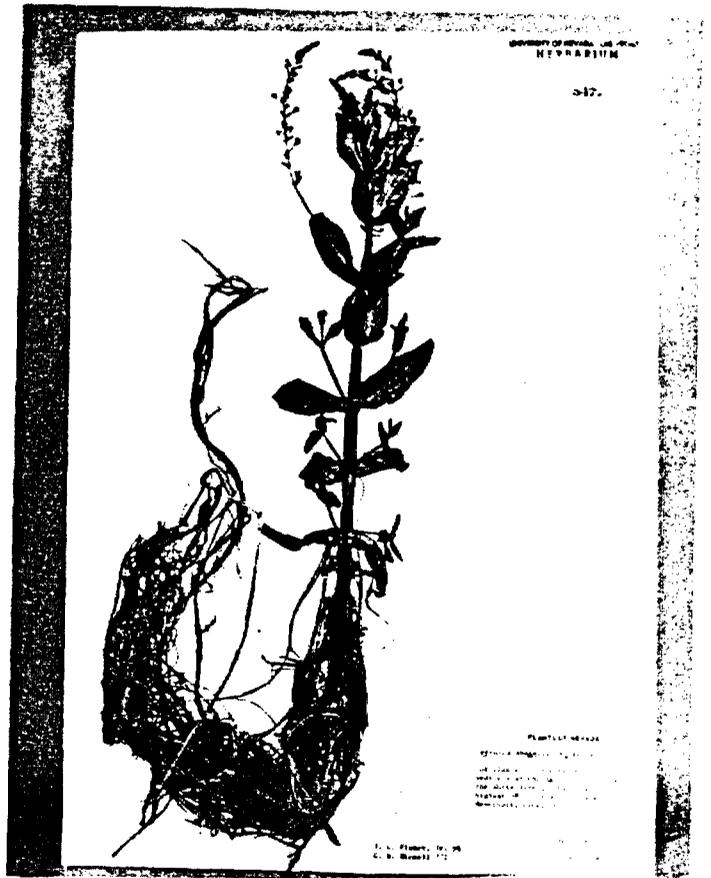
Common near streams, pools, and  
springs (Beatley, 1976:258).

**Use:**

The leaves and stems of speedwell  
were eaten fresh or occasionally  
boiled as salad greens. It is  
still eaten today.

**Recommendation(s) for disposition:**

Five people commented on speedwell.  
Three people recommended protecting  
the plant, one person recommended  
avoiding it, and one person  
recommended transplanting it if  
possible. One person recommended  
transplanting the plant, if possible,  
as a second-choice alternative.



*Vitis arizonica* Engelm.

Indian  
Name(s)

*muvasi*  
*i'av; kuripsup*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

wild grape

**Habitat:**

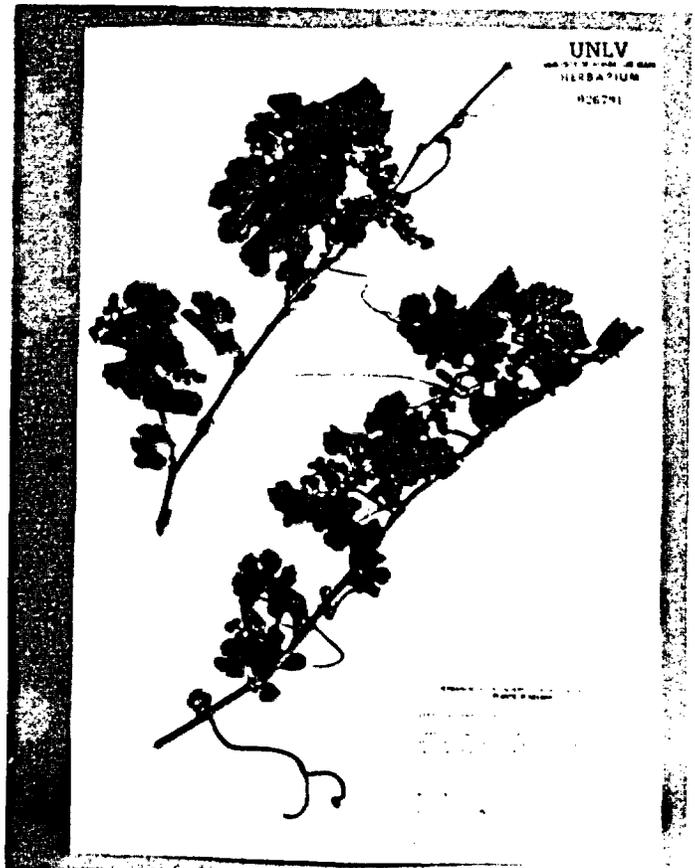
Found in wet and moist soils,  
e.g., near springs in low-  
and mid-elevation zones  
(Beatley, 1976:268).

**Use:**

The fruits of wild grapes were  
used in making foods (e.g., jelly)  
and beverage (wine). The fruit was  
also eaten raw. Fruits were stored  
for year-round consumption. This  
plant was encouraged and managed,  
and very likely cultivated (Stoffle  
and Dobyns, 1983) by planting seeds  
of the grape in different locations.  
The plant is still used to some extent  
today.

**Recommendation(s) for disposition:**

Seven people commented on wild  
grape. Five people recommended  
that the plant be protected and  
one person recommended trans-  
planting the plant, if possible,  
as a second-choice alternative.  
Two people did not recommend  
protective action.



*Xylorhiza tortifolia* (Torr. & Gray) Greene  
var. *tortifolia*

Indian  
Name(s)

not identified  
not identified  
not identified  
not remembered

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute  
Las Vegas Indian Center

Common  
Name

desert aster

Habitat:

Widely distributed in low- and middle-elevation zones (Beatley, 1976:145).

Use:

The stems of this plant were crushed up and used as a topical poultice. The plant is still used for this medicinal purpose today.

Recommendation(s) for disposition:

One person commented on desert aster and recommended that the plant be transplanted to another area if possible. Avoidance of the plant was recommended as a second-choice alternative.



*Yucca baccata* Torr. var. *vespertina* McKelvey

Indian  
Name(s)

not identified  
*u'wivi*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

banana yucca

**Habitat:**

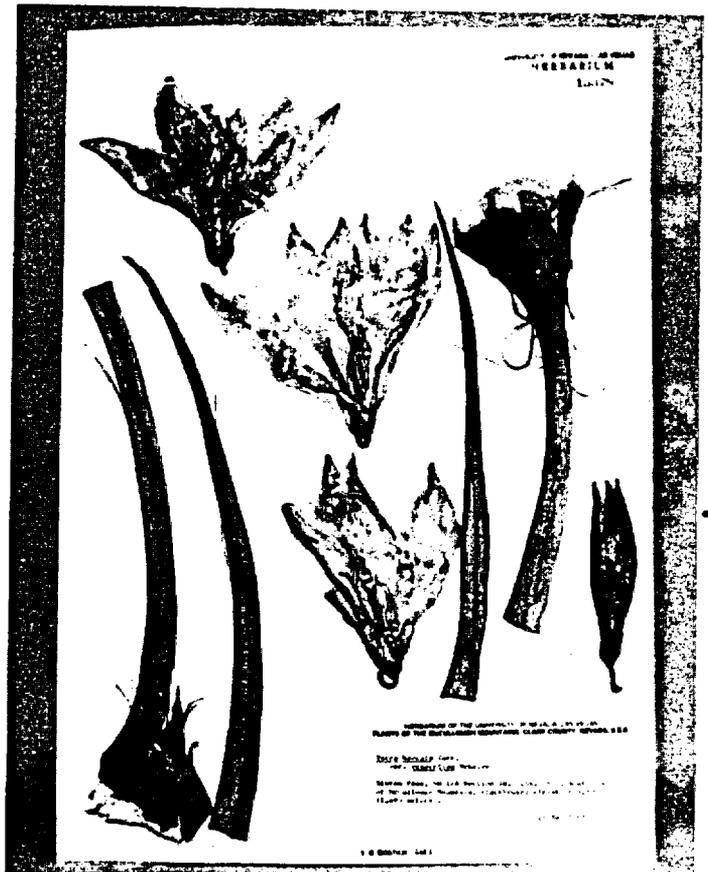
Occasional to common in mid- and high-elevation zones (Beatley, 1976:269).

**Use:**

The fruits of this plant were used as food and the fiber for making baskets. The plant was also used for soap and shampoo. It is still used today.

**Recommendation(s) for disposition:**

Three people commented on banana yucca. One person recommended avoiding the plant, one person recommended protecting it, and one person recommended that it be transplanted if possible. One person recommended transplanting the plant, if possible, as a second-choice alternative.





*Yucca schidigera* Roezl ex Ortgies

Indian  
Name(s)

not remembered  
*tachumb*; *u'vimp*  
not identified

Ethnic  
Group

Western Shoshone  
Southern Paiute  
Owens Valley Paiute

Common  
Name

Mojave yucca  
Spanish bayonet

Habitat:

Most common in low-elevation zones  
(Beatley, 1976:270).

Use:

The fruit of this yucca was roasted for food; the fiber was used in making baskets and the pithy insides used for shampoo. Food and fiber parts were stored for long-term use. The plant is still used today.

Recommendation(s) for disposition:

Eight people commented on Mojave yucca or Spanish bayonet. Four people recommended avoiding the plant, two people recommended protecting it, and one person recommended avoidance in the event of severe ground disturbance. One person recommended protecting the plant and one recommended transplanting as a second-choice alternative. One person did not respond.



## CHAPTER FOUR

### ENVIRONMENTAL ZONES AND SITES WHERE PLANTS ARE LOCATED

This chapter presents brief environmental descriptions of each of the 23 sites visited during the course of the ethnobotanical field work. These descriptions include the location, elevation, soil characteristics, vegetation associated with each site, and the ecological zones in which they occur. For each site, plants identified by Native American consultants are listed in a table, and a preliminary assessment of cultural significance is presented. Assessment of the cultural significance of sites will be expanded as historical, archaeological, and botanical data are integrated and analyzed comparatively.

The Nevada Test Site is located astride the boundaries of two southwestern deserts, the Mojave and Great Basin. These two phytogeographical regions are separated by a transitional area, occurring along an undulating contour, marking a rather abrupt rise in elevation. Valley floors to the north of the line (in the Great Basin Desert) are generally above 4,000 feet (1,220 meters); those south of the line (in the Mojave Desert) are largely between 2,000 and 4,000 feet (610 to 1,220 meters).

Owing to its location, the Nevada Test Site possesses floristic and vegetational features representative of two deserts, as well as the transitional area between them. The vegetational aspect of the region is essentially one of shrubbiness; trees are restricted to higher, mountainous elevations, and to occasional spring sites and their drainages. The vegetation is characterized by communities in which particular shrubs (or shrubs and trees) are the dominant plants. Many of these communities are similar in their physiognomy (i.e., in structure and aspect), but they are diverse with respect to their floristic composition. For the ethnobotanical study, sites were preselected so that participants could view vegetation and flora representative of low, middle, and high elevations.

Table 4-1 summarizes the presence of plants identified by the Native American plant experts in each of the three ecological zones. The reader should not assume, however, that the plants in Table 4-1 are present only in the zones marked. The table is meant to illustrate which plants were identified in each zone and for which in-depth interviews were conducted. Thirty-four percent (N=131) of the interviews were about plants present in the low-elevation ecological zone; 31 percent (N=117) were in the mid-elevation zone, and 2 percent (N=9) were in the high-elevation zone. The small number of species identified in the high-elevation zone reflects less time spent at sites in this zone due to time constraints, scheduling decisions, and the presence of snow cover and cool temperatures in the higher elevations. Significant in-depth data were elicited, however, for each of the species identified at the site in this zone.

#### Low-Elevation Zone Sites

Sites defined in this report as low-elevation zone sites are in areas that are usually below 4,000 feet (1,220 meters), primarily on bajadas in the southern portion of the Nevada Test Site, in what is termed by ecologists as the Low or Mojave Desert. Plant communities in this zone are largely dominated by *Larrea*. Sites visited by the ethnographic study team and Native American plant specialists in this zone are described below.

Table 4-1. Presence of Native American Identified Plants by Ecological Zones

Plant Name	Low	Middle	High
<i>Amelanchier utahensis</i>		x	
<i>Amsinckia tessellata</i>	x	x	
<i>Anemopsis californica</i>	x		
<i>Arabis pulchra</i>		x	
<i>Artemisia ludoviciana</i>		x	
<i>Artemisia tridentata</i>		x	
<i>Atriplex canescens</i>	x		
<i>Atriplex confertifolia</i>	x		
<i>Brodiaea pulchella</i>	x	x	
<i>Calochortus flexuosus</i>	x	x	
<i>Castilleja chromosa</i>		x	
<i>Chrysothamnus nauseosus</i>		x	
<i>Cirsium mohavense</i>	x		
<i>Coleogyne ramosissima</i>		x	
<i>Coryphantha vivipara</i>	x		
<i>Datura meteloides</i>		x	
<i>Delphinium parishii</i>	x	x	
<i>Descurainia pinnata</i>		x	
<i>Descurainia sophia</i>		x	
<i>Distichlis spicata</i>	x		
<i>Echinocactus polycephalus</i>	x		
<i>Echinocereus engelmannii</i>	x	x	
<i>Encelia virginensis</i>	x		
<i>Ephedra nevadensis</i>	x	x	
<i>Ephedra viridis</i>		x	
<i>Eriogonum inflatum</i>	x	x	
<i>Euphorbia albomarginata</i>	x	x	
<i>Geastrum</i> sp.			x
<i>Gutierrezia</i> sp.	x	x	
<i>Juncus mexicanus</i>	x	x	
<i>Juniperus osteosperma</i>			x
<i>Krameria parvifolia</i>	x	x	
<i>Larrea tridentata</i>	x	x	
Lichen		x	
<i>Lycium andersonii</i>	x	x	
<i>Lycium pallidum</i>	x	x	
<i>Menodora spinescens</i>		x	
<i>Mentzelia albicaulis</i>	x		
<i>Nicotiana trigonophylla</i>		x	
<i>Opuntia basilaris</i>	x		
<i>Opuntia echinocarpa</i>		x	
<i>Opuntia erinacea</i>			x
<i>Oryzopsis hymenoides</i>	x	x	

Table 4-1. Presence of Native American Identified Plants by Ecological Zones (continued)

Plant Name	Low	Middle	High
<i>Peraphyllum ramosissimum</i>		x	
<i>Phragmites australis</i>	x		
<i>Pinus monophylla</i>		x	x
<i>Prosopis glandulosa</i>	x		
<i>Prosopis pubescens</i>	x		
<i>Psoralea polydenia</i>		x	
<i>Purshia glandulosa</i>		x	
<i>Quercus gambelii</i>		x	
<i>Rhus trilobata</i>		x	
<i>Rumex crispus</i>	x	x	
<i>Salix gooddingii</i>	x		
<i>Salix exigua</i>	x	x	
<i>Salvia columbariae</i>	x		
<i>Salvia dorrii</i>		x	
<i>Sphaeralcea ambigua</i>		x	
<i>Stanleya pinnata</i>	x	x	
<i>Stephanomeria</i> sp.	x		
<i>Stipa speciosa</i>	x	x	
<i>Streptanthella longirostris</i>	x		
<i>Streptanthus cordatus</i>		x	
<i>Suaeda torreyana</i>	x		
<i>Symphoricarpos longiflorus</i>		x	
<i>Tessaria sericeae</i>	x		
<i>Thamnosma montana</i>	x		
<i>Thelypodium integrifolium</i>	x		
<i>Typha domingensis</i>	x	x	
<i>Typha latifolia</i>		x	
<i>Veronica anagallis-aquatica</i>	x	x	
<i>Vitis arizonica</i>	x		
<i>Xylorhiza tortifolia</i>	x		
<i>Yucca baccata</i>	x	x	
<i>Yucca brevifolia</i>	x	x	
<i>Yucca schidigera</i>	x		

### Rock Valley-Jackass Flats Divide (Site #2)

This site constitutes a mixed shrub community at the northeastern base of Little Skull Mountain, near the divide between Rock Valley and Jackass Flats, south of the Jackass Flats Road, in Area 28. Collections and interviews were made in a southeast-running draw and on slopes to the north of this, at an elevation of approximately 3,800 feet (1,158 meters). Soils are primarily of sands and gravels derived from the Tertiary (Pliocene) volcanic rocks of Little Skull Mountain and Skull Mountain. Vegetation is predominantly shrubby, with a few, scattered yuccas, some cacti, and a modest display of annuals. Dominant taxa are: *Larrea*, *Lycium andersonii*, *Ambrosia*, and *Ephedra nevadensis*. Associates include *Salazaria*, *Stipa speciosa*, *Krameria*, *Atriplex confertifolia*, *Yucca brevifolia*, *Lycium pallidum*, *Haplopappus cooperi*, *Acamptopappus shockleyi*, *Psoralea fremontii*, *Xylorhiza*, *Eriogonum inflatum*, and *Sitanion hystrix*. Table 4-2 lists the plants identified by Native American consultants at this site.

Table 4-2. Native American Identified Plants at the Rock Valley-Jackass Flats Divide Site

Scientific Name	Common Name
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Echinocactus polycephalus</i>	Barrel cactus
<i>Ephedra nevadensis</i>	Indian tea
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Krameria parvifolia</i>	Range ratany
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Stipa speciosa</i>	Bunchgrass
<i>Xylorhiza tortifolia</i>	Desert aster
<i>Yucca brevifolia</i>	Joshua tree

### Dune Wash/Twin Tinajas (Site #4)

This area is located to the east of Yucca Mountain proper, in Area 25, on a line slightly northwest of Busted Butte. It straddles the Busted Butte Road, and varies in both elevation and substrate texture. At the road, and southward into the principal drainage for the area, the elevation is approximately 3,500 feet (1,067 meters). North of the road, on the lower slopes of a hill supporting several well preserved tinajas, the elevation is approximately 3,600 feet (1,097 meters). While substrates throughout the area are of similar origin, representing Tertiary rhyolites, their texture ranges from hillside boulders and rocks to Quaternary gravels flanking the hill; these then grade outward into the sands and silts characteristic of the valley and wash. The site supports a mixed shrub community, dominated by *Larrea*, *Ambrosia*, and *Lycium andersonii*. Associate shrubs include *Lycium pallidum*, *Haplopappus cooperi*, *Menodora*, *Hymenoclea*, *Ephedra nevadensis*, *Krameria*, *Grayia*, *Ceratoides*, *Atriplex confertifolia*, and *Psoralea fremontii*. Annuals and perennial herbs were common throughout the area, including the geophytes *Brodiaea* and *Calochortus*. Exotic annual grasses (*Bromus*) were abundant on the hillsides. This general site area was discussed as having a great deal of cultural significance in the study team's previous report (Stoffle, Evans, and Harshbarger, 1988:37-47). Plants identified by Native American consultants at this site are listed in Table 4-3.

Table 4-3. Native American Identified Plants at the Dune Wash/Twin Tinajas Site

Scientific Name	Common Name
<i>Calochortus flexuosus</i>	Mariposa lily
<i>Streptanthella longirostris</i>	Mustard
<i>Delphinium parishii</i>	Larkspur
<i>Ephedra nevadensis</i>	Indian tea
<i>Eriogonium inflatum</i>	Desert trumpet
<i>Euphorbia albomarginata</i>	Rattlesnake weed; spurge
<i>Larrea tridentata</i>	Creosote bush
<i>Lycium andersonii</i>	Wolfberry
<i>Mentzelia albicaulis</i>	Desert corsage
<i>Opuntia basilaris</i>	Beavertail cactus
<i>Oryzopsis hymenoides</i>	Indian ricegrass

#### Cane Spring (Site #12)

Cane Spring lies at the base of the north slope of Skull Mountain, in Area 5 at an elevation of 4,000 feet (1,218 meters). The northern portion of Skull Mountain is composed of Tertiary (Miocene) rhyolitic flows (the Wahomine and Salyer Formations). Soil texture at and below the spring varies from gravels to fine sands. The spring drainage is roughly to the north, through a shallow draw with gently sloping sides. Vegetation at the spring site proper is visually dominated by four groupings of large willows (*Salix gooddingii*) established in the seeps. With the willows in these restricted habitats are *Typha domingensis*, *Fumex crispus*, *Juncus mexicanus*, and *Veronica anagallis-aquatica*. Surrounding the seeps is a dense stand of *Atriplex canescens*, which gives way below the spring to *Elymus triticoides*, a tall, coarse, clump-forming grass. The middle and lower portions of the draw are disturbed areas, with *Atriplex canescens* again the dominant shrub. Also present are *Lycium andersonii*, *Larrea*, *Hymenoclea*, *Thamnosma*, *Gutierrezia microcephala*, *Prosopis glandulosa*, *Stanleya pinnata*, *Ephedra nevadensis*, *Sphaeralcea ambigua*, *Chrysothamnus teretifolius*, *Salazaria*, *Sitanion hystris*, and a sparse covering of non-native winter annuals. The sides of the draw are covered by a *Coleogyne* community, with scattered *Yucca schidigera* and some cacti. Other hillside associates are *Krameria parvifolia*, *Haplopappus cooperi*, *Encelia virginensis*, *Eriogonum fasciculatum*, *Psoralea fremontii*, *Xylorhiza tortifolia*, and some *Artemisia spinescens*. Eighteen species of plants were identified by Native American consultants at this site and are listed in Table 4-4.

Table 4-4. Native American Identified Plants at the Cane Spring Site

Scientific Name	Common Name
<i>Atriplex canescens</i>	4-winged saltbush
<i>Echinocereus engelmannii</i>	Hedgehog cactus
<i>Ephedra nevadensis</i>	Indian tea
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Euphorbia albomarginata</i>	Rattlesnake weed; spurge
<i>Juncus mexicanus</i>	Wiregrass
<i>Krameria parvifolia</i>	Range ratany
<i>Larrea tridentata</i>	Creosote bush
<i>Lycium andersonii</i>	Wolfberry
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Phragmites australis</i>	Cane
<i>Prosopis glandulosa</i>	Mesquite
<i>Salix gooddingii</i>	Willow
<i>Stanleya pinnata</i>	Indian spinach
<i>Thamnosma montana</i>	Turpentine bush
<i>Typha domingensis</i>	Cattail
<i>Veronica anagallis-aquatica</i>	Speedwell
<i>Yucca baccata</i>	Mohave yucca

Cane Spring was an important habitation area for Southern Paiutes until 1849, when Euroamerican explorers and their livestock at least temporarily displaced the Indian residents from their homes and gardens (see Stoffle, Olmsted, and Evans, 1988). Grinding stones, lithic scatters, rock rings, and the water attest to the importance of this site.

#### Frenchman Flat Site (Site #13)

This site lies at the northeastern base of Mt. Salyer, overlooking Frenchman Flat, three miles south of the Cane Spring-Mercury Highway junction, Area 5. It is a rocky-gravelly, east-facing slope, composed of Tertiary (Miocene) rhyolites (of the Wahomine and Salyer Formations). Elevation is approximately 3,200 feet (975 meters). The slope supports a typical *Larrea-Ambrosia* community. Associates include *Grayia*, *Krameria*, *Ceratoides*, *Ephedra nevadensis*, and *Lycium andersonii*. A few native and exotic grass species are present, along with a sparse representation of winter annuals.

Table 4-5. Native American Identified Plants at the Frenchman Flat Site

Scientific Name	Common Name
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Oryzopsis hymenoides</i>	Indian ricegrass

### Tarantula Canyon/Specie Spring (Sites #24a,b,c)

This narrow, east-west trending canyon is located in northeastern Bare Mountain, where it drains onto north Crater Flat. Elevation varies from 4,000 feet (1,219 meters) at the canyon mouth, to about 4,400 feet (1,341 meters) at Specie Spring. Substrate is of several types of Paleozoic sedimentary rocks (limestone, dolomite, shale, quartzite, chert, argillite, and sandstone). Within the canyon, alluvial gravels and sands have rather dense stands of *Coleogyne*, with interspersed *Ephedra nevadensis*, *Ephedra viridis*, *Haplopappus cooperi*, *Haplopappus laricifolius*, and *Stanleya pinnata*. The canyon bottom proper is strewn with large boulders, providing a habitat for locally dense populations of *Salazaria*, *Prunus fasciculata*, and *Purshia glandulosa*. *Buddleja utahensis* and *Haplopappus nanus* are found on cliff faces. On rocky, south-facing slopes are scattered individuals of *Viguiera reticulata*. The presence of this suffrutescent perennial at this site expands the known distribution for the species; it was previously thought to have its easternmost occurrence in the Funeral Mountains of Inyo County, California. The narrow, shady, more mesic environment below Specie Spring is ideal for the growth of a variety of native annual and perennial herbs. Among those present are *Mirabilis bigelovii*, *Tricardia watsonii*, and *Montia perfoliata*. Table 4-6 lists the plant species identified by Native American consultants at this site.

Table 4-6. Native American Identified Plants at the Tarantula Canyon/Specie Spring Site\*

Scientific Name	Common Name
<i>Salvia columbariae</i>	Chia
<i>Stanleya pinnata</i>	Indian spinach

\*No interviews were conducted at Specie Spring.

Perhaps one of the most significant features at this site was a dense stand of *Stanleya pinnata*, known commonly as prince's plume or Indian spinach, in a mixed shrub community of *Ephedra*, *Lycium*, and *Eriogonum* on the northeast-facing slope at the entrance of the canyon. This plant is called *tumar* by Southern Paiutes, *tuhuara* by Western Shoshones, and *yuhuara* by Owens Valley Paiute people. It is a highly valued contemporary food item, the leaves of which are boiled as greens. The first visit to this site elicited much information about its use and preparation from Southern Paiute and Owens Valley Paiute participants. It was only during the second visit to the site that project ethnographers and botanists realized the extent of the *Stanleya* population in this stand.

Accompanied by two plant specialists from the Las Vegas Paiute Indian Colony, the team began to roughly map out the boundaries of the stand. After the botanists had determined both the uppermost and lowest extent of *Stanleya* individuals at the boundaries, one person stood in each of the four "corners." Another person paced off each line to determine the dimensions of the stand in feet. Each pace equaled approximately one yard. The next step involved both ethnographers and botanists walking through the stand at approximately 15 yards apart, counting each *Stanleya* individual plainly visible above the shrub canopy. Proceeding from the uppermost portion of the stand down to its lowest extent, a total of 409 plants was counted. According to the botanist, it was definitely unusual to find so many individual *Stanleya* plants in such a dense stand. *Stanleya* has been reported as normally occurring as widely scattered plants (Beatley, 1976:169).

Once the boundaries of the stand had been mapped and measured, the Las Vegas Southern Paiute plant experts began demonstrating a management technique used in maintaining stands of *Stanleya*. This technique involved breaking off the tall, dry central stem or stalk at the base of the plant. In this way, according to the Las Vegas Paiute plant specialists, fresh green leaves in thick bunches could be counted on the following year. What began as a site visit designed to elicit oral information from interviews became an actual demonstration of Southern Paiute plant management with regard to *tumar*.

#### Black Cone/Crater Flats (Site #25)

This area is located between two cinder cones that dominate the southern portion of Crater Flat, viz. Black Cone and Red Cone. The substrate is of gravels and finer-grained alluvium derived from Quaternary basaltic flows. Elevation is approximately 3,200 feet (875 meters). Topography is nearly level, with a few broad, shallow, southward-draining washes. A mixed shrub vegetation is present, with *Larrea*, *Ambrosia*, and *Lycium* dominant. Woody associates are *Ephedra nevadensis*, *Krameria*, *Xylorhiza tortifolia*, *Grayia*, *Atriplex confertifolia*, *Eriogonum fasciculatum*, and (in washes) *Hymenoclea*. Winter annuals are abundant and conspicuous. Table 4-7 lists the Native American plants identified at this site.

Table 4-7. Native American Identified Plants at the Black Cone/Crater Flats Site

Scientific Name	Common Name
<i>Lycium andersonii</i>	Wolfberry
<i>Opuntia basilaris</i>	Beavertail cactus

#### Ash Meadows: Point of Rock Springs (Site #27a)

This site occurs in northeastern Ash Meadows, at approximately 2,300 feet (701 meters). Several springs issue from the southern base of a mountain composed of Paleozoic sedimentary rock. The area at and below the springs has been greatly altered in recent years, with the waters being impounded in several small reservoirs that are now surrounded by dense vegetation. Several taxa occur at and above the spring sources themselves, scattered on an outcrop of dolomite and limestone (of the Bonanza King Formation). They are *Opuntia basilaris*, *Echinocereus engelmannii*, *Echinocactus polycephalus*, *Krameria parvifolia*, *Encelia virginensis* and *Amphipappus fremontii*. Along (and in) water courses and around the reservoirs, the soils are those typical of Ash Meadows (i.e., sands, silts, and clays). Tree species are *Tamarix* sp. and *Prosopis pubescens*. Common shrubs are *Baccharis emoryii*, *Prosopis glandulosa*, *Lepidium fremontii*, *Atriplex canescens*, and *Atriplex confertifolia*. Herbs are abundant and include *Juncus mexicanus*, *Eleocharis parishii*, *Cladium californicum*, *Anemopsis californicum*, *Stanleya pinnata*, *Phragmites australis*, *Nitrophila occidentalis*, *Lythrum californicum*, *Sisyrinchium demissum*, *Cirsium vulgare*, *Sporobolus airoides*, and *Andropogon glomeratus*. The native grapevine, *Vitis arizonica*, is a common and conspicuous component of the vegetation. Plants identified by Native American consultants at this site are listed in Table 4-8.

Table 4-8. Native American Identified Plants at the Point of Rocks Spring Site (Ash Meadows)

Scientific Name	Common Name
<i>Anemopsis californica</i>	Yerba mansa
<i>Cirsium mohavense</i>	Thistle
<i>Distichlis spicata</i>	Saltgrass
<i>Phragmites australis</i>	Cane
<i>Prosopis glandulosa</i>	Mesquite
<i>Prosopis pubescens</i>	Screwbean
<i>Tessaria sericeae</i>	Arrowweed
<i>Typha domingensis</i>	Cattail
<i>Vitis arizonica</i>	Wild grape
<i>Rumex crispus</i>	Curly dock

**Ash Meadows: Big Spring Site (Site #27b)**

This is an impressive cauldron-type spring located near the eastern edge of Ash Meadows, at approximately 2,200 feet (671 meters). It is situated in Quaternary (Pleistocene/Holocene) playa lake deposits with the surrounding area dominated by salt grass (*Distichlis spicata*). Overflow from the spring drains westward through a narrow channel lined primarily with sedges, rushes, and grasses.

Table 4-9. Native American Identified Plants at the Big Spring Site (Ash Meadows)

Scientific Name	Common Name
<i>Atriplex confertifolia</i>	Shadscale
<i>Stephanomeria</i> sp.	"Gum bush"

**Ash Meadows: Collins Spring (Site #27c)**

This site is located in northeastern Ash Meadows, about one mile southwest of Devil's Hole. Ash Meadows is a lowland area of some 75 square miles, representing the remnant of a Quaternary (Pleistocene) playa. The soils are fine-textured (sands, silts, and clays), light in color, and with a high salt content. They are often perennially moist and heavily salt encrusted. There are several seeps at Collins Spring, located along an east-west line, at about 2,300 feet (701 meters). They support a dense stand of vegetation, including trees, shrubs, perennial herbs, annuals, and vines. The dominant tree is *Fraxinus velutina*; others are *Populus fremontii*, *Prosopis pubescens*, and *Tamarix* sp. The most common shrubs are *Baccharis emoryii*, *Atriplex torreyi*, *Atriplex confertifolia*, *Atriplex parryi*, *Suaeda torreyana*, *Lepidium fremontii*, *Iva acerosa*, *Krameria parvifolia*, and *Salix exigua* (some specimens attaining tree height). A variety of herbaceous materials grow in and around the seeps. The most abundant and conspicuous are *Thelypodium integrifolium*, *Juncus mexicanus*,

*Eleocharis parishii*, *Carex praegracilis*, *Cladium californicum*, *Hydrocotyle verticillata*, *Stanleya pinnata*, *Sisyrinchium demissum*, *Oligomeris linifolia*, *Atriplex phyllostegia*, *Distichlis spicata*, *Phragmites australis*, *Typha domingensis*, *Anemopsis californica*, *Dodecatheon pulchellum*, *Lythrum californicum*, and *Imperata brevifolia*. The vine *Vitis arizonica* is common. Table 4-10 lists the species of plants identified by Native American consultants at this site.

Table 4-10. Native American Identified Plants at the Collins Spring Site (Ash Meadows)

Scientific Name	Common Name
<i>Anemopsis californica</i>	Yerba mansa
<i>Atriplex confertifolia</i>	Shadscale
<i>Juncus mexicanus</i>	Wiregrass
<i>Phragmites australis</i>	Cane
<i>Prosopis pubescens</i>	Screwbean
<i>Salix exigua</i>	Willow
<i>Suaeda torreyana</i>	Seepweed
<i>Thelypodium integrifolium</i>	Wild cabbage
<i>Typha domingensis</i>	Cattail
<i>Vitis arizonica</i>	Wild grape

The entire Ash Meadows area was an important habitation site for Western Shoshone and Southern Paiute people until as late as the 1950s. It continues to be a very significant and sensitive area for Southern Paiute people, in that historic cemeteries are present in the general area which contain the remains of both historically significant individuals as well as close relatives. Plant specialists from the Pahrump Paiute Tribe reacted with near shock upon observing what had once been the houseplots of their relatives and neighbors. They commented on how dry the area had become as opposed to the wet, green garden-filled marshland oasis it had been at the time relatives and friends lived there. Members of the tribes recommended setting aside the Ash Meadows sites for transplanting, use, management, and instructional purposes to offset potentially adverse effects of site characterization activities.

### Middle-Elevation Zone Sites

Sites defined here as middle-elevation zone sites are in areas that are mostly from 4,000 to 5,000 feet (1,220 to 1,525 meters), on upper bajadas and basin floors in what is known as the Middle or Transition Desert. Plant communities in this zone are dominated by *Coleogyne* or *Lycium-Grayia* shrub cover. Sites visited by the study team and Native American plant specialists in this zone are described below.

#### Yucca Ridge (Site #5)

This site is located atop Yucca Mountain, along the south ridge road, in the vicinity of USW H-3, and at an elevation of 4,800 feet (1,402 meters). It is an area of exposed Tertiary rhyolitic rock, sloping eastward, with small pockets of gravel and sand. The area supports a sparse, low-growing stand of mixed shrubs. In non-disturbed locations are *Menodora*, *Ephedra viridis*, *Ephedra nevadensis*, *Lycium andersonii*, *Artemisia spinescens*, *Tetradymia*

*canescens*, *Ceratoides*, *Haplopappus cooperi*, *Eriogonum fasciculatum*, and *Atriplex confertifolia*. At roadside, and in other disturbed places, are *Atriplex canescens*, *Gutierrezia microcephala*, and *Chrysothamnus nauseosus*. There is a modest representation of perennial herbs, including grasses. *Sclerocactus polyancistris*, a relatively rare cactus, is present. The Yucca Ridge site was described previously as having some cultural significance (Stoffle, Evans, and Harshbarger, 1988:34-37). During the ethnobotany visits, the study team returned to this site with plant experts from the Chemehuevi Tribe and the Las Vegas Indian Center. The participants found several additional grinding stones, shelter-like rock-walled structures and *tinajas* on the ridge just below the top of the mountain. The site thus appears to be more significant than was previously assumed. The plants identified by Native American consultants at this site are listed in Table 4-11.

Table 4-11. Native American Identified Plants at the Yucca Ridge Site (Top of Yucca Mountain)

Scientific Name	Common Name
<i>Arabis pulchra</i>	Mustard
<i>Brodiaea pulchella</i>	Desert hyacinth
<i>Castilleja chromosa</i>	Indian paintbrush

#### Prow Pass Ceremonial Area

**Chia Gathering and Pestle Sites (Sites #7a,c).** These two sites are in the same general vicinity. They are located on a south-facing slope of an upper bajada at the base of Prow Pass, northeast Yucca Mountain, at approximately 4,800 feet (1,463 meters). They have similar soils, vegetation, and flora. Soils are rocky, gravelly, or more commonly fine-grained, consisting of Tertiary rhyolitic ash-flows. They are well-defined *Coleogyne* communities, with only a few associated shrub species (i.e., *Ephedra viridis*, *Ephedra nevadensis*, and *Salazaria*; *Artemisia tridentata*, *Purshia glandulosa*, and *Amelanchier utahensis* are occasionally in washes). Herbaceous species are present but in small numbers; most of them are introduced winter annuals. Tables 4-12 and 4-13 list the plant species identified by Native American consultants at these two sites.

Table 4-12. Native American Identified Plants at the Chia Gathering Site

Scientific Name	Common Name
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Artemisia tridentata</i>	Big sagebrush
<i>Coleogyne ramosissima</i>	Blackbrush
<i>Descurainia pinnata</i>	Tansy mustard
<i>Ephedra viridis</i>	Indian tea
<i>Larrea tridentata</i>	Creosote bush
<i>Opuntia echinocarpa</i>	Golden cholla
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Purshia glandulosa</i>	Buckbrush

Table 4-13. Native American Identified Plants at the Pestle Site

Scientific Name	Common Name
<i>Streptanthus cordatus</i>	Mustard

**Petroglyph Cave Site (Site #7b).** This site is located in the bottom of Beatty Wash, near its origin in the depressed area to the south of Timber Mountain dome. Prow Pass is immediately to the south, representing a portion of the eroded southern wall of Timber Mountain caldera. The elevation is approximately 5,000 feet (1,525 meters). The substrate is primarily an alluvium of boulders, rocks, and finer materials derived from the basalt and rhyolite of the area. Ash-flows are also present. Canyon sides are mostly covered by *Coleogyne*, with scattered occurrences of *Atriplex confertifolia*, *Haplopappus laricifolius*, *Eriogonum fasciculatum*, and *Ephedra viridis*. *Juniperus* is present on some of the higher ridges. Among the boulders in the canyon bottom are occasional thick stands of *Purshia glandulosa*, *Lycium andersonii*, and *Artemisia tridentata*. There is a modest representation of annuals and perennial herbs. The plants identified by Native American consultants at this site are listed in Table 4-14.

Table 4-14. Native American Identified Plants at the Petroglyph Cave Site

Scientific Name	Common Name
<i>Amelanchier utahensis</i>	Serviceberry
<i>Castilleja chromosa</i>	Indian paintbrush

Pink Tuff Site (Site #7d). This site is named for a colorful pinnacle situated at approximately the 4,500-foot level (1,372 meters), near the northeastern base of Yucca Mountain, some 1.5 miles south of Prow Pass. It consists of Tertiary (Pliocene and Miocene) rhyolitic ash-flows and minor ash-fall tuffs. The sands and silts surrounding the pinnacle support a *Coleogyne*-dominated community, with a diverse admixture of other shrubby taxa. These include *Menodora*, *Ephedra nevadensis*, *Ephedra viridis*, *Larrea*, *Hymenoclea*, *Lycium andersonii*, *Tetradymia glabra*, *Grayia*, *Salazaria*, *Artemisia tridentata*, *Symphoricarpos longiflorus*, and *Purshia glandulosa*. A few perennial herbs are present (*Stanleya pinnata*, *Calochortus*, *Brodiaea*, and the suffrutescent *Xylorhiza tortifolia*); occasional grasses; scattered winter annuals; and the "pencil cactus," *Opuntia ramosissima*. Several large, and apparently very old, *Yucca brevifolia* occur immediately north of the pinnacle, as well as on surrounding hills and ridges. A north-south drainage is located a short distance to the west of the pinnacle. *Coleogyne* is the dominant shrub among its rocks and boulders; others include *Symphoricarpos* and *Purshia*. A variety of perennial herbs are also present: *Encelia virginiensis*, *Penstemon palmeri*, *Chrysopsis villosa*, *Galium* sp., and *Artemisia dracunculus*. Sixteen species of plants were identified by Native American consultants at this site and are listed in Table 4-15.

Table 4-15. Native American Identified Plants at the Pink Tuff Site

Scientific Name	Common Name
<i>Artemisia tridentata</i>	Big sagebrush
<i>Calochortus flexuosus</i>	Mariposa lily
<i>Delphinium parishii</i>	Larkspur
<i>Descurainia sophia</i>	Tansy mustard
<i>Ephedra nevadensis</i>	Indian tea
<i>Ephedra viridis</i>	Indian tea
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Euphorbia albomarginata</i>	Spurge, rattlesnake weed
<i>Krameria parvifolia</i>	Range ratany
<i>Larrea tridentata</i>	Creosote bush
<i>Lycium andersonii</i>	Wolfberry
<i>Menodora spinescens</i>	Spiny mendora
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Stanleya pinnata</i>	Indian spinach
<i>Symphoricarpos longiflorus</i>	Snowberry
<i>Yucca brevifolia</i>	Joshua tree

The sites that comprise the Prow Pass Ceremonial Area have been described as having a potentially high degree of cultural and ceremonial-religious significance (Stoffle, Evans, and Harshbarger, 1988:67-70). The study team was able to elicit additional interpretation on the petroglyph cave and pestle sites from the Chemehuevi tribal plant specialist.

### Fortymile Canyon/Twin Springs (Sites #8a,b)

This is a location in north Fortymile Canyon of Area 29, between the eastern extension of Yucca Mountain and Shoshone Mountain, at approximately the 4,000-foot (1,219-meter) level. It is a gentle, southward-sloping alluvial fan, whose gravels have been derived from the adjacent Tertiary rhyolitic mountain masses. *Larrea* is the principal shrub; associated with it are *Gutierrezia microcephala*, *Atriplex canescens*, *Hymenoclea*, *Ephedra viridis*, *Ephedra nevadensis*, and *Encelia virginensis*. Exotic annual grasses (*Bromus*) are abundant. Table 4-16 lists the plants identified by Native American consultants at this site.

Table 4-16. Native American Identified Plants at the Fortymile Canyon Site

Scientific Name	Common Name
<i>Datura meteloides</i>	Jimsonweed
<i>Echinocereus engelmannii</i>	Hedgehog, "tule" cactus
<i>Ephedra viridis</i>	Indian tea
<i>Eriogonum inflatum</i>	Desert trumpet
<i>Larrea tridentata</i>	Creosote bush
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Stipa speciosa</i>	Bunchgrass

The Twin Springs site within Fortymile Canyon has been described as one of high significance (Stoffie, Evans, and Harshbarger, 1988:75-91). During the ethnobotany on-site visit, a plant expert from the Las Vegas Paiute Indian Colony reaffirmed that she had observed devil's claw (*Proboscidea* sp.) growing near the spring during a visit the previous fall. Plants identified at Twin Springs are listed in Table 4-17.

Table 4-17. Native American Identified Plants at the Twin Springs Site

Scientific Name	Common Name
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Echinocereus engelmannii</i>	Hedgehog, "tule" cactus
<i>Encelia virginensis</i>	Brittlebush
<i>Opuntia echinocarpa</i>	Golden cholla
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Psoralea polydenius</i>	Dotted dalea

### Tipplah Spring (Site #15)

This site is located at the north base of Shoshone Mountain, in Area 6. It is adjacent to Syndline Ridge (to the west) and the Eleana Range (to the north). The elevation is approximately 5,100 feet (1,554 meters). Soils are primarily alluvial gravels and sands, probably generated from both volcanic and sedimentary rocks found in the immediate area (the Indian Trail Formation of north Shoshone Mountain, representing Tertiary (Miocene) rhyolitic ash-

flows and ash-falls; and the Paleozoic-aged, limestone Tippihah and Eleana Formations of Syncline Ridge and Eleana Range, respectively). Vegetation immediately around the spring is of mixed shrubs, the major components being *Artemisia tridentata*, *Atriplex canescens*, *Chrysothamnus nauseosus*, *Ephedra nevadensis*, *Ephedra viridis*, and *Coleogyne*. *Purshia glandulosa* occurs locally in wash sites. On the nearby, elevated, and more rocky hillsides and ridges are *Eriogonum fasciculatum*, *Rhus trilobata*, *Juniperus osteosperma*, *Pinus monophylla*, and *Quercus gambelii*. The spring seeps provide a habitat for *Juncus mexicanus* and *Carex* sp. Table 4-18 lists the plants identified by Native American consultants at this site.

Table 4-18. Native American Identified Plants at the Tippihah Spring Site

Scientific Name	Common Name
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Artemisia tridentata</i>	Big sagebrush
<i>Castilleja chromosa</i>	Indian paintbrush
<i>Chrysothamnus nauseosus</i>	Rabbitbrush
<i>Juncus mexicanus</i>	Wiregrass
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Peraphyllum ramosissimum</i>	Squawapple
<i>Pinus monophylla</i>	Pinyon pine
<i>Purshia glandulosa</i>	Buckbrush
<i>Quercus gambelii</i>	Scrub oak
<i>Veronica anagallis-aquatica</i>	Speedwell
<i>Sphaeralcea ambigua</i>	Globe mallow
<i>Gutierrezia microcephala</i>	Matchweed, snakeweed

#### Tippihah Highway (Site #15a)

This is a lower bajada site in west Yucca Flat, along the Tippihah Highway, about three miles north of its junction with the Mercury Highway, between mile markers 10 and 11, Area 6. With an elevation of approximately 4,200 feet (1,280 meters) and alluvial soils derived from calcareous rocks, the site supports an upland *Coleogyne* vegetation type with a scattered overstory of *Yucca brevifolia*. Associate shrub species are *Ephedra nevadensis*, *Ceratoides*, *Lycium andersonii*, *Tetradymia glabrata*, *Grayia*, *Atriplex canescens*, *Acamptopappus shockleyi*, *Encelia virginensis*, and (in washes and along the disturbed roadside) *Hymenoclea salsola*. Several perennial herbs are present, including *Erioneuron pulchellum*, and *Mirabilis froebelii*. Annual grasses (*Bromus*) are abundant, and two species of cacti are present: *Opuntia echinocarpa* and *Coryphantha vivipara* var. *desertii*. Table 4-19 lists the plants identified by Native American plant specialists at this site.

Table 4-19. Native American Identified Plants at the Tippipah Highway Site

Scientific Name	Common Name
<i>Coryphantha vivipara</i> var. <i>desertii</i>	Fishhook cactus
<i>Yucca brevifolia</i>	Joshua tree

#### Captain Jack Spring (Site #17)

This spring is located on the west side of Yucca Flat, near the northeastern base of the exposed Eleana Formation, in Area 12. The formation is of Paleozoic (probably of Late Devonian Age) sedimentary rocks. Field trip participants observed a variety of plants about one mile distant below the spring, in a westward-draining canyon, at an elevation of approximately 5,200 feet (1,585 meters). The rocky-gravelly, calcareous substrate of this area supports a general covering of *Coleogyne*. This shrub, along with *Ephedra viridis*, *Eriogonum fasciculatum*, and *Purshia glandulosa*, is dominant on north-facing canyon sides. South-facing canyon sides are covered primarily by *Purshia glandulosa*, *Salazaria mexicana*, and *Ephedra viridis*. In the canyon bottom itself *Juniperus osteosperma*, *Pinus monophylla*, and *Quercus gambelii* are the visual dominants. But other, more abundant, species are present. These include *Coleogyne*, *Purshia glandulosa*, *Ephedra viridis*, *Salazaria mexicana*, *Rhus trilobata*, *Atriplex canescens*, *Artemisia tridentata*, *Chrysothamnus* sp., *Yucca baccata*, and *Haplopappus laricifolius*. Winter annuals, primarily *Bromus*, are abundant. No plants were identified or collected at this site.

#### Whiterock Spring (Site #19)

The site is found in Area 12, on an upper bajada just south of Twin Peaks, at the 5,000-foot (1,524 meter) level. The alluvial gravels and sands of the area are rhyolitic, derived from the Indian Trail Formation of Tertiary (Miocene) age. A population of the "coyote willow," *Salix exigua*, is found in and near the spring seep, as is *Typha latifolia*, *Rumex crispus*, and *Juncus mexicanus*. Above the spring are stands of *Quercus gambelii* and *Purshia glandulosa*. The drainage area below the spring has a good representation of *Chrysothamnus nauseosus*, *Atriplex canescens*, and *Ephedra viridis*. Vegetation otherwise is a mixed shrub type, with *Coleogyne*, *Menodora*, *Tetradymia*, *Ceratoides*, *Grayia*, *Hymenoclea*, *Atriplex canescens*, and *Yucca baccata*. The Whiterock Spring site was described previously as having a very high degree of cultural significance, since one of the participants lived in the cabin at the site (Stoffle, Evans, and Harshbarger, 1988:102-103). Plant species identified by Native American consultants at this site are listed in Table 4-20.

Table 4-20. Native American Identified Plants at the Whiterock Spring Site

Scientific Name	Common Name
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Artemisia ludoviciana</i>	Watersage
<i>Juncus mexicanus</i>	Wiregrass
<i>Lycium pallidum</i>	Wolfberry
<i>Oryzopsis hymenoides</i>	Indian ricegrass
<i>Salix exigua</i>	Willow
<i>Typha domingensis</i>	Cattail
<i>Typha latifolia</i>	Cattail
<i>Yucca baccata</i>	Yucca
<i>Rhus trilobata</i>	Squawbush
<i>Salvia dorrii</i>	Purple sage, Indian tobacco
	Lichen

### High Elevation Zone Sites

High-elevation zone sites occur in what is known as the High or Great Basin Desert ecological zone. The high-elevation zone is comprised of areas that are usually above 5,000 feet (1,525 meters), in drainage basins and their surrounding mountains in the northern portion of the Test Site. Plant communities in this zone are dominated by *Artemisia* or *Pinus-Juniperus* vegetation. The Rainier Mesa site visited by the ethnographic study team and Native American plant specialists is described below.

#### Rainier Mesa-Top (Site #20)

This high-elevation (approximately 7,400 feet (2,255 meters) site is located on northeastern Rainier Mesa, in Area 12, the southwestern terminus of the Belted Range. The area visited was in the vicinity of the U12N facilities. It is one of Tertiary volcanics (Timber Mountain Tuff), with a surface covering of many boulders and rocks. The vegetation is an open pinyon (*Pinus monophylla*) - juniper (*Juniperus osteosperma*) woodland. The understory is comprised of a variety of shrubs, the more commonly occurring ones being *Artemisia tridentata*, *Ephedra viridis*, *Quercus gambelii*, *Symphoricarpos longiflorus*, *Fibes velutinum*, and several species of *Eriogonum* and *Chrysothamnus*. Table 4-21 lists the plants identified by Native American consultants at this site.

Table 4-21. Native American Identified Plants at the Rainier Mesa-Top Site

Scientific Name	Common Name
<i>Opuntia erinacea</i>	Mohave prickly pear
<i>Pinus monophylla</i>	Pinyon pine
<i>Geastrum</i> sp.	Earthstar
<i>Juniperus osteosperma</i>	Juniper, cedar

## CHAPTER FIVE

### PATTERNS OF PLANT USE, MANAGEMENT, AND KNOWLEDGE TRANSMISSION

This chapter discusses the patterns of plant use, traditional plant management techniques, and transmission of plant knowledge as these were derived from the 40 Native American people who represented the 16 involved tribes during the ethnobotany study. The patterns are expressed as statistics that are based on information from 381 separate plant interviews. These interviews covered 76 species of plants. Most of the plant interviews were conducted about plants first seen by the Native American representatives (90 percent, N=314). Only 10 percent (N=37) of the interviews were conducted on a plant that was pointed out either by the botanists or by the ethnographers.

#### Plant Use

The interview data suggest that there are at least four factors that influence knowledge of plants and their uses among Native Americans: (1) to which ethnic group a particular person belongs; (2) the ecological zones with which a person is familiar, and in which their ethnic group traditionally lived and currently lives; (3) historic changes in diet among Native American people; and (4) restricted access to areas where traditional Native American plants grow today. The following sections address each of these four factors.

#### Patterns of Traditional Plant Use

The four ethnic groups<sup>1</sup> involved in the ethnobotany study traditionally did not necessarily use the same plants, nor did they use the same plants in the same ways. An attempt was made to elicit information about the ethnic groups' traditional plant use by asking the participants what their traditional uses were for an identified plant. Responses have been categorized into broad areas: food, medicine, ceremony, to make things, fuel, and other. In the cases where a plant species had more than one use, that particular interview was categorized accordingly. The frequencies of traditional uses of the identified plants are presented in Table 5-1. A majority of the interviews (68 percent, N=260) were about plants that the participants said had only one use traditionally. Twenty-one percent (N=79) of the interviews were about plants that had two or more uses. Seven percent (N=26) of the interviews were about plants the participants knew were used in the past, but they could not remember what their people used it for.

Table 5-2 presents the traditional uses for each of the 76 identified plant species. The Native American representatives said many of the plant species (31) had only one traditional use. Fifteen of the plant species had two traditional uses, nine had three traditional uses, three had four traditional uses. Two of the 76 identified species had more than four traditional uses, according to the Native American representatives.

---

<sup>1</sup> For the purposes of analysis of the ethnobotany data, the representatives from the Las Vegas Indian Center have been categorized as if they were a homogeneous group, (i.e., an urban tribe). This categorization, of course, does not reflect the population of the Indian Center, which is made up of individuals from several different tribal and ethnic groups.

Table 5-1. Frequency of Traditional Uses of Identified Plants

Traditional Use	Frequency	Percent
A (Food)	129	33.9
B (medicine)	72	18.9
C (ceremony)	3	.8
D (to make things)	48	12.6
E (fuel)	2	.5
F (other)	6	1.6
AB	11	2.9
AC	1	.3
AD	17	4.5
AE	5	1.3
AF	4	1.0
BC	8	2.1
BD	6	1.6
BE	2	.5
BF	4	1.0
CD	1	.3
CF	1	.3
DE	2	.5
ADE	5	1.3
ADF	2	.5
BCD	2	.5
BDE	2	.5
CDE	2	.5
ADEF	1	.3
BCDE	1	.3
ABCDE	1	.3
Did not remember	26	6.9
Did not use	<u>15</u>	<u>3.9</u>
Total	381	100.0

Table 5-2. Traditional Native American Use of Identified Plant Species

Plant Name	Total Uses	Food	Medicine	Ceremony	To Make Things	Fuel	Other
<i>Amelanchier utahensis</i>	2	x	x				
<i>Amsinckia tessellata</i>	1	x					
<i>Anemopsis californica</i>	1		x				
<i>Arabis pulchra</i>	1	x					
<i>Artemisia ludoviciana</i>	3		x	x			x
<i>Artemisia tridentata</i>	3		x	x		x	
<i>Atriplex canescens</i>	2				x	x	
<i>Atriplex confertifolia</i>	2		x			x	
<i>Brodiaea pulchella</i>	1	x					
<i>Calochortus flexuosus</i>	1	x					
<i>Castilleja chromosa</i>	2	x			x		
<i>Chrysothamnus nauseosus</i>	3	x	x				x
<i>Cirsium mohavense</i>	1	x					
<i>Coleogyne ramosissima</i>	-						
<i>Coryphantha vivipara</i>	1	x					
<i>Datura meteloides</i>	1		x				
<i>Delphinium parishii</i>	-						
<i>Descurainia pinnata</i>	2	x	x				
<i>Descurainia sophia</i>	2	x	x				
<i>Distichlis spicata</i>	2	x	x				
<i>Echinocactus polycephalus</i>	4	x	x		x		x
<i>Echinocereus englemannii</i>	1	x					
<i>Encelia virginensis</i>	-						
<i>Ephedra nevadensis</i>	3	x	x		x		
<i>Ephedra viridis</i>	3	x	x	x			
<i>Eriogonum inflatum</i>	3	x	x		x		
<i>Euphorbia albomarginata</i>	1		x				
<i>Geastrum sp.</i>	-						
<i>Gutierrezia microcephala</i>	1		x				
<i>Juncus mexicanus</i>	2	x			x		
<i>Juniperus osteosperma</i>	6	x	x	x	x	x	x
<i>Krameria parvifolia</i>	2	x	x				
<i>Larrea tridentata</i>	4	x	x		x	x	
Lichen	1		x				
<i>Lycium andersonii</i>	2	x			x		
<i>Lycium pallidum</i>	1	x					
<i>Menodora spinescens</i>	-						
<i>Mentzelia albicaulis</i>	1	x					
<i>Nicotiana trigonophylla</i>	3		x	x			x
<i>Opuntia basilaris</i>	1	x					
<i>Opuntia echinocarpa</i>	2	x			x		

Table 5-2. Traditional Native American Use of Identified Plant Species (continued)

Plant Name	Total Uses	Food	Medicine	Ceremony	To Make Things	Fuel	Other
<i>Opuntia erinacea</i>	1	x					
<i>Oryzopsis hymenoides</i>	1	x					
<i>Peraphyllum ramosissimum</i>	1				x		
<i>Phragmites australis</i>	2	x			x		
<i>Pinus monophylla</i>	6	x	x	x	x	x	x
<i>Prosopis glandulosa</i>	3	x			x	x	
<i>Prosopis pubescens</i>	4	x	x		x	x	
<i>Psoralea polydenia</i>	1		x				
<i>Purshia glandulosa</i>	4		x	x	x	x	
<i>Quercus gambelii</i>	2	x			x		
<i>Rhus trilobata</i>	2	x			x		
<i>Rumex crispus</i>	4	x	x		x	x	
<i>Salix exigua</i>	4		x	x	x	x	
<i>Salix gooddingii</i>	1				x		
<i>Salvia columbariae</i>	1	x					
<i>Salvia dorrii</i>	2		x				x
<i>Sphaeralcea ambigua</i>	1	x					
<i>Stanleya pinnata</i>	1	x					
<i>Stephanomeria</i> sp.	1						x
<i>Stipa speciosa</i>	2	x			x		
<i>Streptanthella longirostris</i>	-						
<i>Streptanthus cordatus</i>	-						
<i>Suaeda torreyana</i>	1		x				
<i>Symphoricarpos longiflorus</i>	-						
<i>Tessaria sericeae</i>	1				x		
<i>Thamnosma montana</i>	1		x				
<i>Thelypodium integrifolium</i>	1	x					
<i>Typha domingensis</i>	2	x			x		
<i>Typha latifolia</i>	2	x			x		
<i>Veronica anagallis-aquatica</i>	2	x					x
<i>Vitis arizonica</i>	1	x					
<i>Xylorhiza tortifolia</i>	1		x				
<i>Yucca baccata</i>	2	x					x
<i>Yucca brevifolia</i>	2	x			x		
<i>Yucca schidigera</i>	4	x		x	x		x
Total		46	30	10	27	11	11

### Patterns of Current Plant Uses

The participants in the ethnobotany visits provided information about their ethnic groups' current uses of plants. For each plant interview, the information was categorized into the previously described broad categories of food, medicine, ceremony, to make things, fuel, and other. Interviews about plants that had more than one use were categorized accordingly.

The frequencies of current uses of the identified plants are presented in Table 5-3. The current use of plants is somewhat less than in the past. Forty-eight percent (N=183) of the interviews were about plants that currently have only one use. About 13 percent (N=47) of the interviews were about plants that have two or more uses at the present time. Eight percent (N=31) of the interviews were about plants that the participants identified as in use today, but they could not remember the specific use of the plant. Many of the interviews (31 percent, N=119) were about plants that were not known by the visit participants to be in use now. Table 5-4 shows the current uses for each of the 76 identified plant species.

Table 5-3. Frequency of Current Uses of Identified Plants

Current Use	Frequency	Percent
A (food)	80	21.0
B (medicine)	58	15.2
C (ceremony)	2	.5
D (to make things)	34	8.9
E (fuel)	1	.3
F (other)	8	2.1
AB	10	2.6
AC	1	.3
AD	7	1.8
AE	4	1.0
AF	1	.3
BC	7	1.8
BD	3	.8
BE	1	.3
BF	2	.5
CD	1	.3
CF	1	.3
DE	2	.5
ABC	1	.3
ADE	1	.3
ADEF	1	.3
BCDE	1	.3
ABCDE	1	.3
ABCDEF	1	.3
Did not remember	32	8.4
Not in use	<u>119</u>	<u>31.2</u>
Total	381	100.0

Table 5-4. Current Native American Uses of Identified Plant Species

Plant Name	Total Uses	Food	Medicine	Ceremony	To Make Things	Fuel	Other
<i>Amelanchier utahensis</i>	1	x					
<i>Amsinckia tessellata</i>	1	x					
<i>Anemopsis californica</i>	1		x				
<i>Arabis pulchra</i>	-						
<i>Artemisia ludoviciana</i>	3		x	x			x
<i>Artemisia tridentata</i>	3		x	x		x	
<i>Atriplex canescens</i>	-						
<i>Atriplex confertifolia</i>	1		x				
<i>Brodiaea pulchella</i>	-						
<i>Calochortus flexuosus</i>	1	x					
<i>Castilleja chromosa</i>	-						
<i>Chrysothamnus nauseosus</i>	1						x
<i>Cirsium mohavense</i>	-						
<i>Coleogyne ramosissima</i>	-						
<i>Coryphantha vivipara</i>	-						
<i>Datura meteloides</i>	-						
<i>Delphinium parishii</i>	-						
<i>Descurainia pinnata</i>	-						
<i>Descurainia sophia</i>	2	x	x				
<i>Distichlis spicata</i>	2	x	x				
<i>Echinocactus polycephalus</i>	1				x		
<i>Echinocereus englemannii</i>	1	x					
<i>Encelia virginensis</i>	-						
<i>Ephedra nevadensis</i>	2	x	x				
<i>Ephedra viridis</i>	2	x	x				
<i>Eriogonum inflatum</i>	3	x	x		x		
<i>Euphorbia albomarginata</i>	1		x				
<i>Geastrum sp.</i>	-						
<i>Gutierrezia microcephala</i>	1		x				
<i>Juncus mexicanus</i>	1				x		
<i>Juniperus osteosperma</i>	6	x	x	x	x	x	x
<i>Krameria parvifolia</i>	1	x					
<i>Larrea tridentata</i>	3	x	x		x		
Lichen	1		x				
<i>Lycium andersonii</i>	1	x					
<i>Lycium pallidum</i>	1	x					
<i>Menodora spinescens</i>	-						
<i>Mentzelia albicaulis</i>	1	x					
<i>Nicotiana trigonophylla</i>	2		x	x			
<i>Opuntia basilaris</i>	-						
<i>Opuntia echinocarpa</i>	-						
<i>Opuntia erinacea</i>	-						

Table 5-4. Current Native American Uses of Identified Plant Species (continued)

Plant Name	Total Uses	Food	Medicine	Ceremony	To Make Things	Fuel	Other
<i>Oryzopsis hymenoides</i>	1	x					
<i>Peraphyllum ramosissimum</i>	1				x		
<i>Phragmites australis</i>	2	x			x		
<i>Pinus monophylla</i>	6	x	x	x	x	x	x
<i>Prosopis glandulosa</i>	4	x	x		x	x	
<i>Prosopis pubescens</i>	1	x					
<i>Psoralea polydenia</i>	1		x				
<i>Purshia glandulosa</i>	3		x		x	x	
<i>Quercus gambelii</i>	2	x			x		
<i>Rhus trilobata</i>	2	x			x		
<i>Rumex crispus</i>	3	x			x	x	
<i>Salix exigua</i>	3			x	x	x	
<i>Salix gooddingii</i>	1				x		
<i>Salvia columbariae</i>	1	x					
<i>Salvia dorrii</i>	2		x				x
<i>Sphaeralcea ambigua</i>	-						
<i>Stanleya pinnata</i>	1	x					
<i>Stephanomeria</i> sp.	1						x
<i>Stipa speciosa</i>	2	x			x		
<i>Streptanthella longirostris</i>	-						
<i>Streptanthus cordatus</i>	-						
<i>Suaeda torreyana</i>	1		x				
<i>Symphoricarpos longiflorus</i>	-						
<i>Tessaria sericeae</i>	1				x		
<i>Thamnosma montana</i>	-						
<i>Thelypodium integrifolium</i>	1	x					
<i>Typha domingensis</i>	2	x			x		
<i>Typha latifolia</i>	2	x			x		
<i>Veronica anagallis-aquatica</i>	1	x					
<i>Vitis arizonica</i>	1	x					
<i>Xylorhiza tortifolia</i>	1		x				
<i>Yucca baccata</i>	2	x					x
<i>Yucca brevifolia</i>	1				x		
<i>Yucca schidigera</i>	4	x		x	x		x
Total		<u>32</u>	<u>23</u>	<u>7</u>	<u>21</u>	<u>7</u>	<u>8</u>

Table 5-5 shows the frequencies for the traditional uses of plants identified by each of the four ethnic groups involved in the study. As an example, of the 91 plant identifications made by Western Shoshone people, 34 were traditionally used for food. Most of the identified plants were used traditionally by the ethnic groups for food or medicine. The Southern Paiute representatives identified more plants that had multiple uses than the other ethnic groups, as well as identifying more plants for which they could not remember the uses. Plant identification by representatives of the Las Vegas Indian Center generally reflects their personal interests and experience; one representative, for example, was interested in medicinal plants, and another was interested in plants used for basketmaking.

Table 5-5. Traditional Uses of Identified Plants by the Different Ethnic Groups

Traditional Use	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center
	N=199	N=91	N=63	N=28
A (food)	33.7%	34.1%	49.2%	0 %
B (medicine)	17.1	22.0	20.6	17.9
C (ceremony)	1.0	-	-	3.6
D (to make things)	9.5	18.7	12.7	14.3
E (fuel)	.5	1.1	-	-
F (other)	3.0	-	-	-
AB	2.5	1.1	4.8	7.1
AC	.5	-	-	-
AD	5.0	3.3	6.3	-
AE	1.0	3.3	-	-
AF	2.0	-	-	-
BC	2.0	1.1	1.6	7.1
BD	1.0	4.4	-	-
BE	0	2.2	-	-
BF	1.0	-	1.6	3.6
CD	-	-	-	3.6
DE	-	1.1	1.6	-
ABC	-	-	-	3.6
ADE	2.5	-	-	-
ADF	.5	1.1	-	-
BCD	1.0	-	-	-
BDE	.5	1.1	-	-
CDE	.5	1.1	-	-
ABCD	-	-	-	3.6
ADEF	.5	-	-	-
BCDE	.5	-	-	-
ABCDE	.5	-	-	-
Did not remember	11.6	2.2	1.6	0
Did not use	<u>2.0</u>	<u>2.2</u>	<u>0.0</u>	<u>32.2</u>
Total (% of 381)	52.2%	23.9%	16.5%	7.3%

Table 5-6 shows the frequencies for the current uses of the plants identified by each of the four ethnic groups. In other words, of the 91 plant identifications made by Western Shoshone people, only 15 are currently used for food. Both food and medicinal plants are used less frequently than in the past by the Southern Paiutes, Western Shoshone, and the Owens Valley Paiutes. Interviews about plants used to make things, for fuel, and for other purposes showed less of a change between traditional uses and current uses.

Table 5-6. Current Uses of Identified Plants by the Different Ethnic Groups

Current Use	Southern Paiute N=199	Western Shoshone N=91	Owens Valley Paiute N=63	Las Vegas Indian Center N=28
A (food)	22.1%	16.5%	33.3%	- %
B (medicine)	13.6	17.6	17.5	14.3
C (ceremony)	.5	-	-	3.6
D (to make things)	9.0	7.7	7.96	14.3
E (fuel)	-	1.1	-	-
F (Other)	4.0	-	-	-
AB	2.0	1.1	4.8	7.1
AC	.5	-	-	-
AD	3.0	-	1.6	-
AE	1.0	2.2	-	-
AF	.5	-	-	-
BC	2.0	-	1.6	7.1
BD	1.0	1.1	-	-
BE	-	1.1	-	-
BF	-	-	1.6	3.6
CD	-	-	-	3.6
CF	-	-	-	3.6
DE	-	2.2	-	-
ABC	-	-	-	3.6
ADE	.5	-	-	-
CDE	-	1.1	-	-
ADEF	.5	-	-	-
BCDE	.5	-	-	-
ABCDE	.5	-	-	-
ABCDEF	.5	-	-	-
Did not remember	12.1	6.6	1.6	3.6
Did not use	<u>26.1</u>	<u>41.8</u>	<u>30.2</u>	<u>35.7</u>
Total (% of 381)	52.2%	23.9%	16.5%	7.3%

Table 5-7 is a comparison of each ethnic group's traditional and current use of the identified plants. Of the 76 species of plants identified during the ethnobotany study, the Southern Paiute representatives identified 61 as having one or more traditional uses by their people. Of these 61 species, they said 44 were still used in one or more ways by members of the Southern Paiute ethnic group. The Western Shoshone representatives identified 35 of the 76 species telling us of one or more uses for each plant they identified. Of these 35 plants, 22 are still in use by Western Shoshone people today. The Owens Valley Paiute representatives identified 32 of the 76 species, and said that Owens Valley Paiute people are using 24 of these plants today. The representatives from the Las Vegas Indian Center identified 15 of the 76 species, and said that 13 of the plants they identified were still used by Native American people they knew.

Table 5-7. Traditional and Current Use of Plant Species for Each Ethnic Group (x = traditional, o = current)

Plant Name	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center
<i>Amelanchier utahensis</i>	x o			
<i>Amsinckia tessellata</i>	x		x o	
<i>Anemopsis californica</i>	x o	x o	x o	
<i>Arabis pulchra</i>	x			
<i>Artemisia ludoviciana</i>	x o		x o	
<i>Artemisia tridentata</i>	x o	x o	x o	x o
<i>Atriplex canescens</i>			x	
<i>Atriplex confertifolia</i>	x o			
<i>Brodiaea pulchella</i>		x		
<i>Calochortus flexuosus</i>	x o	x		
<i>Castilleja chromosa</i>		x	x	
<i>Chrysothamnus nauseosus</i>	x o	x		
<i>Cirsium mohavense</i>	x			
<i>Coleogyne ramosissima</i>				
<i>Coryphantha vivipara</i>			x	
<i>Datura meteloides</i>	x			
<i>Delphinium parishii</i>				
<i>Descurainia pinnata</i>	x	x		
<i>Descurainia sophia</i>	x			x o
<i>Distichlis spicata</i>			x o	
<i>Echinocactus polycephalus</i>	x	x o	x	
<i>Echinocereus englemannii</i>	x o			
<i>Encelia virginensis</i>				
<i>Ephedra nevadensis</i>	x o	x o	x o	x o
<i>Ephedra viridis</i>	x o	x o	x o	x o
<i>Eriogonum inflatum</i>	x o	x o		x o
<i>Euphorbia albomarginata</i>	x o			
<i>Geastrum sp.</i>				
<i>Gutierrezia microcephala</i>		x o		

Table 5-7. Traditional and Current Use of Plant Species for Each Ethnic Group (x = traditional, o = current) (continued)

Plant Name	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center
<i>Juncus mexicanus</i>	x o	x	x	x o
<i>Juniperus osteosperma</i>	x o	x o	x o	x o
<i>Krameria parvifolia</i>	x o			
<i>Larrea tridentata</i>	x o	x o	x o	x
Lichen	x o			
<i>Lycium andersonii</i>	x o	x o	x o	
<i>Lycium pallidum</i>	x o		x o	
<i>Menodora spinescens</i>				
<i>Mentzelia albicaulis</i>	x o	x		
<i>Nicotiana trigonophylla</i>	x	x o		x o
<i>Opuntia basilaris</i>	x	x		
<i>Opuntia echinocarpa</i>	x	x	x	
<i>Opuntia erinacea</i>	x			
<i>Oryzopsis hymenoides</i>	x o	x o	x o	
<i>Peraphyllum ramosissimum</i>	x o			
<i>Phragmites australis</i>	x o	x	x o	
<i>Pinus monophylla</i>	x o	x o	x o	x o
<i>Prosopis glandulosa</i>	x o	x o	x	
<i>Prosopis pubescens</i>	x o			
<i>Psoralea polydenius</i>		x o	x o	
<i>Furshia glandulosa</i>	x o	x o		
<i>Quercus gambelii</i>	x		x o	
<i>Rhus trilobata</i>	x o			
<i>Rumex crispus</i>	x o	x o		
<i>Salix exigua</i>	x o	x o	x o	x o
<i>Salix gooddingii</i>	x o	x o		x
<i>Salvia columbariae</i>	x	x o	x o	
<i>Salvia dorrii</i>	x o			
<i>Sphaeralcea ambigua</i>	x			
<i>Stanleya pinnata</i>	x o	x o	x o	
<i>Stephanomeria</i> sp.	x o			
<i>Stipa speciosa</i>	x		x o	
<i>Streptanthella longirostris</i>				
<i>Streptanthus cordatus</i>				
<i>Suaeda torreyana</i>	x o			
<i>Symphoricarpos longiflorus</i>				
<i>Tessaria sericeae</i>	x o			
<i>Thamnosma montana</i>	x			
<i>Thelypodium integrifolium</i>	x o			
<i>Typha domingensis</i>	x o	x	x o	x o
<i>Typha latifolia</i>	x o		x o	

Table 5-7. Traditional and Current Use of Plant Species for Each Ethnic Group (x = traditional, o = current) (continued)

Plant Name	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center
<i>Veronica anagallis-aquatica</i>	x o		x o	
<i>Vitis arizonica</i>	x o	x		
<i>Xylorhiza tortifolia</i>				x o
<i>Yucca baccata</i>	x o			
<i>Yucca brevifolia</i>	x	x o	x	
<i>Yucca schidigera</i>	x o	x	x o	x o
	<u>x=60</u>	<u>x=35</u>	<u>x=32</u>	<u>x=15</u>
Totals	o=43	o=22	o=24	o=13

### Plant Management

Plant management techniques are broadly defined here as any strategy or action employed with the purpose of encouraging the propagation, increasing the productive potential, or maintaining the existence of useful plant resources. The Native American representatives who cooperated in this project described different plant management techniques their people traditionally used and currently use with regard to the different plant species. These plant management techniques have been divided into nine major categories: (1) select/store seeds, (2) plant seeds elsewhere, (3) broadcast seeds, (4) transplant cuttings, (5) cultivate, (6) hand water/pot irrigate, (7) weed around plant, (8) pruning, and (9) burning with fire to stimulate regrowth. Table 5-8 presents these nine management technique categories for each of the four participating ethnic groups. The table indicates that the Southern Paiute representatives knew about each of the management techniques, and had either applied them traditionally or were currently applying the techniques to particular plant species. The Western Shoshone representatives indicated that all of the techniques except for "planting seeds elsewhere" had either been applied traditionally or were currently applied for the particular plant species they identified. The Owens Valley Paiute representatives said they used only about half of the management techniques, as did the Las Vegas Indian Center representatives.

Table 5-8. Management Techniques Used by Native Americans

Management Techniques	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center
1. Store seeds	x	x	x	
2. Plant seeds	x		x	x
3. Broadcast	x	x	x	
4. Transplant	x	x	x	x
5. Cultivate	x	x		x
6. Irrigate	x	x		x
7. Weed	x	x		
8. Pruning	x	x		x
9. Burning	x	x		

Plant management techniques can vary by plant species. Some plant species respond well to the transplanting of cuttings, while other will grow only if their seeds are planted. Some plants may respond to more than one management technique, or require more than one. Each of the plant management techniques that were identified by the Native American representatives have been classified by the plant species on which each technique was used. This classification is presented in Table 5-9. The Native American representatives knew of plant management techniques for 35 of the identified plant species. Of the plant species that had management techniques associated with them, most had more than one. The different plant management techniques are classified across the six major traditional plant use categories in Table 5-10.

Table 5-9. Correlation of Management Techniques to Plant Species

Plant Name	Management Techniques*								
	1	2	3	4	5	6	7	8	9
<i>Amelanchier utahensis</i>									
<i>Amsinckia tessellata</i>		x	x						
<i>Anemopsis californica</i>				x					
<i>Arabis pulchra</i>									
<i>Artemisia ludoviciana</i>		x							
<i>Artemisia tridentata</i>									
<i>Atriplex canescens</i>									
<i>Atriplex confertifolia</i>									
<i>Brodiaea pulchella</i>									
<i>Calochortus flexuosus</i>									
<i>Castilleja chromosa</i>									
<i>Chrysothamnus nauseosus</i>									
<i>Cirsium mohavense</i>									
<i>Coleogyne ramosissima</i>									
<i>Coryphantha vivipara</i>									
<i>Datura meteloides</i>									
<i>Delphinium parishii</i>									
<i>Descurainia pinnata</i>									
<i>Descurainia sophia</i>		x		x					
<i>Distichlis spicata</i>									
<i>Echinocactus polycephalus</i>			x						
<i>Echinocereus englemannii</i>				x					
<i>Encelia virginensis</i>									
<i>Ephedra nevadensis</i>	x	x		x				x	
<i>Ephedra viridis</i>				x					
<i>Eriogonum inflatum</i>									
<i>Euphorbia albomarginata</i>									
<i>Geastrum sp.</i>									
<i>Gutierrezia microcephala</i>									x
<i>Juncus mexicanus</i>			x					x	
<i>Juniperus osteosperma</i>	x			x					
<i>Krameria parvifolia</i>								x	x
<i>Larrea tridentata</i>	x			x				x	x
Lichen									
<i>Lycium andersonii</i>	x			x					
<i>Lycium pallidum</i>		x	x	x	x				
<i>Menodora spinescens</i>									
<i>Mentzelia albicaulis</i>					x	x			
<i>Nicotiana trigonophylla</i>				x					
<i>Opuntia basilaris</i>					x				

Table 5-9. Correlation of Management Techniques to Plant Species (continued)

Plant Name	Management Techniques*								
	1	2	3	4	5	6	7	8	9
<i>Opuntia echinocarpa</i>									
<i>Opuntia erinacea</i>									
<i>Oryzopsis hymenoides</i>	x	x	x						x
<i>Peraphyllum ramosissimum</i>			x						x
<i>Phragmites australis</i>				x					
<i>Pinus monophylla</i>	x	x	x				x	x	
<i>Prosopis glandulosa</i>		x		x	x				
<i>Prosopis pubescens</i>									x
<i>Psoralea polydenia</i>									
<i>Purshia glandulosa</i>				x				x	
<i>Quercus gambelii</i>									
<i>Rhus trilobata</i>				x		x	x	x	x
<i>Rumex crispus</i>									
<i>Salix exigua</i>		x		x	x	x	x	x	x
<i>Salix gooddingii</i>			x	x	x			x	x
<i>Salvia columbariae</i>									
<i>Salvia dorrii</i>									
<i>Sphaeralcea ambigua</i>									
<i>Stanleya pinnata</i>				x					x
<i>Stephanomeria</i> sp.									
<i>Stipa speciosa</i>	x	x	x						
<i>Streptanthella longirostris</i>									
<i>Streptanthus cordatus</i>									
<i>Suaeda torreyana</i>									
<i>Symphoricarpos longiflorus</i>									
<i>Tessaria sericeae</i>	x								
<i>Thamnosma montana</i>									
<i>Thelypodium integrifolium</i>					x			x	
<i>Typha domingensis</i>									
<i>Typha latifolia</i>								x	
<i>Veronica anagallis-aquatica</i>				x					
<i>Vitis arizonica</i>	x	x		x					
<i>Xylorhiza tortifolia</i>									
<i>Yucca baccata</i>				x					
<i>Yucca brevifolia</i>				x					
<i>Yucca schidigera</i>				x					

\*Management technique numbers correspond to definitions in Table 5-8.

Table 5-10. Plant Management Techniques for Each Traditional Plant Use

Plant Use	Management Techniques*								
	1	2	3	4	5	6	7	8	9
Food	x	x	x	x	x	x	x	x	x
Medicine	x	x		x	x			x	x
Ceremony		x		x				x	x
To Make Things	x	x		x	x	x	x	x	x
Fuel	x	x	x	x	x	x	x	x	
Other				x					

\*Management technique numbers correspond to definitions in Table 5-8.

### Transmission of Plant Knowledge

An important aspect of plant knowledge\*is whether members of the ethnic groups are teaching their offspring and other ethnic group members such knowledge. For each plant that was identified, the Native American plant experts were asked if they had previously taught anyone about the plant and its uses; if they are currently teaching anyone; and who they had taught or are teaching. Tables 5-11, 5-12, and 5-13 indicate the responses to these questions.

Table 5-11. *Have you ever taught anyone about the uses of this plant?*

	Southern Paiute		Western Shoshone		Owens Valley Paiute		Las Vegas Indian Center		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	122	70.9	43	49.4	46	74.2	15	55.6	226	64.9
No	50	29.1	44	50.6	16	25.8	12	44.4	122	35.1
Totals	172	100.0	87	100.0	62	100.0	27	100.0	348	100.0
Not applicable or no response										33
Total plant-specific interviews										381

Table 5-12. *Are you currently teaching anyone about the uses of this plant?*

	Southern Paiute		Western Shoshone		Owens Valley Paiute		Las Vegas Indian Center		Total	
	N	%	N	%	N	%	N	%	N	%
Yes	128	74.9	37	44.0	32	52.5	15	55.6	212	61.8
No	43	25.1	47	56.0	29	47.5	12	44.4	131	38.2
Totals	171	100.0	84	100.0	61	100.0	27	100.0	343	100.0
Not applicable or no response										38
Total plant-specific interviews										381

Table 5-13. *Who have you taught and who are you currently teaching about the uses of this plant?*

	Have taught		Are currently teaching	
	N	%	N	%
Children	124	70.0	53	39.0
Grandchildren	7	4.0	59	43.4
Other family members	32	18.1	7	5.1
Other ethnic group members	13	7.3	14	10.3
Other people	1	0.6	3	2.2
Totals	177	100.0	136	100.0
No response	49		76	
Total plant-specific interviews	226		212	

The Native American plant experts indicated in more than 60 percent of the plant-specific interviews that they had taught or are currently teaching someone about the plant and its uses. As indicated in Tables 5-11 and 5-12, past and current transmission of knowledge varies by ethnic group. Among the Southern Paiute, teaching may be slightly more prevalent now than in the past, while the opposite may be the case among the Western Shoshone. This pattern, however, may be due to the fact that Western Shoshone people said that they more often learned, and continue to learn, traditional knowledge as a result of participation, observation, and interaction—experiential learning—than by direct oral teaching. Although this kind of cultural teaching occurs among the other ethnic groups also, it may be that

Western Shoshone emphasize experiential learning to a somewhat greater degree than the other groups. The data also indicate a noticeable decline in teaching among Owens Valley Paiute, which may be due to historic circumstances, as discussed below. Among members of the urban Las Vegas Indian Center, the cultural transmission of plant knowledge has remained relatively consistent.

Table 5-13 indicates who the Native American plant experts had taught or were currently teaching about the plant and its uses. In the majority of plant-specific interviews related to past teaching (70 percent), the Indian people indicated they had taught their children. In the plant-specific interviews related to current teaching, children and grandchildren are being taught about the plant and its uses, which indicates that cultural transmission of knowledge is continuing through the teaching of second and third generations.

The differences between the four ethnic groups probably reflect different historical and cultural processes. The historical literature shows that the Owens Valley Paiute people were forcibly removed from their land by Euroamericans in the 1860s. They were shot and beaten and survivors were forced to flee the valley (Stoffle, Olmsted, and Evans, 1988). Prior to this forced relocation, Owens Valley Paiute people grew both domesticated plants and wild plants using a sophisticated irrigation system and cooperative labor. As a consequence of the forced relocation, much of the traditional cultural knowledge about plants (e.g., how to grow, transplant, harvest, and care for them) was lost. Southern Paiute people, while suffering from forced relocation and genocide (Stoffle and Evans, 1976), were able to retain more of their traditional cultural knowledge about plants. The Southern Paiute people have often grown and managed both wild and domesticated plants throughout their traditional territory. There is some indication from historical literature that plant knowledge was shared among members of different Native American ethnic groups.

While some of the differences in plant knowledge among Southern Paiute people, Western Shoshone people, and Owens Valley Paiute people can be traced to historical causes, the differences between representatives from these groups and representatives from the Las Vegas Indian Center are probably more cultural in origin. The people representing the Las Vegas Indian Center, while living in Las Vegas (some for thirty years or more), originally came from very diverse locations, such as Oklahoma and Texas, and are members of many different ethnic groups, such as Hopi, Cherokee, Quechan, Cheyenne-Arapaho, and Northern Paiute. Many of the plants identified in the Yucca Mountain region do not grow in the areas where these people originate and where they learned about plants. Consequently, the Las Vegas Indian Center representatives were best able to identify plants that they have used since they arrived in the southern Nevada area.

### **Native American Plant Expert Recommendations**

At the end of each plant interview, each Native American plant expert was asked what they would recommend be done if a planned site characterization activity potentially could harm the plant. Table 5-14 presents the first-choice recommendations by the Indian ethnic group representatives who made the recommendation. The most frequent first-choice recommendation of all four ethnic groups was to avoid disturbing the plant (61.7 percent, N=235). The other recommendations were to move the plant to another location where it would be protected (5.0 percent, N=19), or avoid the plant in the event ground disturbance is severe (i.e., deep trenches are dug) (4.7 percent, N=18).

Table 5-14. First-Choice Recommendations For Protecting Native American Plants by Ethnic Group

Recommendation	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center	Total
	N=199	N=91	N=63	N=28	N=381
Avoid/Protect	60.8%	58.2%	65.1%	71.4%	61.7%
Move If Possible	4.5	4.4	0	21.4	5.0
Conditional If...Then	3.5	6.6	4.8	7.1	4.7
No Recommended Action	13.6	22.0	15.9	0	15.0
No Response	17.6	8.8	14.3	0	13.6

In 28.6 percent (N=109) of the interviews, the person either did not recommend protective action or did not respond. Most people had never been asked such a question and were not certain what types of protection alternatives might be possible. The ethnographers were reluctant to suggest alternatives, believing instead that the ideas should come from the Native American people. Some people felt such decisions should be left to other tribal members who had more authority and more understanding of the protection process. Other people pointed out that certain types of people, such as Native American doctors, have culturally defined responsibility to understand and interact with specific plants and only these people should make recommendations about that plant. Many people said that they did not want to make a recommendation because they did not know enough about the type of site characterization activity to make a judgment on how to best protect the plant. They pointed out that some types of site characterization activities, such as where a road or facility would be located, would have more extensive and more permanent effects than other site characterization activities, such as clearing a small area for a weather monitor. The representatives tended to be cautious in their responses to this question. When more than one response was possible, people tended not to choose without having more specific information.

Table 5-15 presents the second-choice plant protection recommendations by the ethnic group making the response. Most people did not mention a second choice. The most frequently mentioned recommendation was to move the plant or reseed the area after it has been scraped (73.6 percent). This recommendation was mentioned by Southern Paiute representatives and one person from the Las Vegas Indian Center. Many Indian people were concerned about the issue of the transplanting causing a break between the plant and its place on the earth. However, reseeding with seeds taken from the plants at that location, basically puts the same plant back into the same location. Other recommendations were to avoid the plant (21 percent) and to set aside a plant area containing similar plants for use by Indian people (5.3 percent).

Table 5-15. Second-Choice Recommendations For Protecting Native American Plants by Ethnic Group

Recommendation	Southern Paiute	Western Shoshone	Owens Valley Paiute	Las Vegas Indian Center	Total
	N=31	N=1	N=0	N=6	N=38
Avoid/Protect	6.5%	100%	0	83.3%	21.0%
Transplant/Reseed	87.0	0	0	16.7	73.6
Set Aside an Area for Indian People	6.5	0	0	0	5.3

Table 5-16 lists the plant-specific recommendations made by the Native American plant specialists. While the preceding tables show the cumulative recommendations made for the disposition of plant resources, Table 5-16 lists the recommendations made for each plant. Respondents recommended avoidance or protection of plants in the majority of plant-specific cases. Second-choice recommendations represented by the numbers in parentheses, were dominated by the choice of either transplanting plants to be disturbed to another area or reseeding disturbed areas with traditional Native American plants.

Table 5-16. Plant-Specific Recommendations Made by Native American Plant Specialists

Plant	Avoid/Protect	Transplant or Reseed	Avoid if Ground Disturbance Severe	No Protective Action	No Response	Total
<i>Amelanchier utahensis</i>				1		1
<i>Amsinckia tessellata</i>	3				3	6
<i>Anemopsis californica</i>	5		1	2	1	9
<i>Arabis pulchra</i>	1			1		2
<i>Artemisia ludoviciana</i>	1				1	2
<i>Artemisia tridentata</i>	6	1(1)*	2		2	11
<i>Atriplex canescens</i>	1					1
<i>Atriplex confertifolia</i>	2					2
<i>Brodiaea pulchella</i>	1				2	3
<i>Calochortus flexuosus</i>	4	(1)		2		6
<i>Castilleja chromosa</i>					4	4
<i>Chrysothamnus nauseosus</i>	1	(1)		3	1	5
<i>Cirsium mohavense</i>		1				1
<i>Coleogyne ramosissima</i>	1					1
<i>Coryphantha vivipara</i>	1					1

Table 5-16. Plant-Specific Recommendations Made by Native American Plant Specialists  
(continued)

Plant	Avoid/ Protect	Transplant or Reseed	Avoid if Ground Disturbance Severe	No Protective Action	No Response	Total
<i>Datura meteloides</i>					1	1
<i>Delphinium parishii</i>	1					1
<i>Descurainia pinnata</i>	2	(1)		1	3	3
<i>Descurainia sophia</i>	1				2	3
<i>Distichlis spicata</i>	2					2
<i>Echinocactus polycephalus</i>	5				1	6
<i>Echinocereus englemannii</i>	1	2(1)				3
<i>Encelia virginensis</i>				1		1
<i>Ephedra nevadensis</i>	10		2	1	1	14
<i>Ephedra viridis</i>	8	3	1	3	3	18
<i>Eriogonum inflatum</i>	4(1)	1(1)	1	1	3	10
<i>Euphorbia albomarginata</i>	3	(1)	1			4
<i>Geastrum sp.</i>					1	1
<i>Gutierrezia microcephala</i>	1					1
<i>Juncus mexicanus</i>	4	(1)		3	2	9
<i>Juniperus osteosperma</i>	7	1(1)		1	1	10
<i>Krameria parvifolia</i>	3	(1)				3
<i>Larrea tridentata</i>	14	1(1)		2	4	21
Lichen	1					1
<i>Lycium andersonii</i>	7	(1)	2	2		11
<i>Lycium pallidum</i>	2				1	3
<i>Menodora spinescens</i>					2	2
<i>Mentzelia albicaulis</i>	2	1		1		4
<i>Nicotiana trigonophylla</i>	2				3	5
<i>Opuntia basilaris</i>	1	1			1	3
<i>Opuntia echinocarpa</i>	1			1		2
<i>Opuntia erinacea</i>	1					1
<i>Oryzopsis hymenoides</i>	9	1	2	3	3	18
<i>Peraphyllum ramosissimum</i>	1					1
<i>Phragmites australis</i>	8					8
<i>Pinus monophylla</i>	11(2)	1(1)				12
<i>Prosopis glandulosa</i>	7(1)					7
<i>Prosopis pubescens</i>	7(3)					7
<i>Psoralea polydenius</i>	1				2	3
<i>Purshia glandulosa</i>	4			1	2	7
<i>Quercus gambelii</i>	1			1		2
<i>Rhus trilobata</i>	4					4
<i>Rumex crispus</i>	1	(1)				1
<i>Salix exigua</i>	7(3)	(2)	2	2	3	14

Table 5-16. Plant-Specific Recommendations Made by Native American Plant Specialists  
(continued)

Plant	Avoid/ Protect	Transplant or Reseed	Avoid if Ground Disturbance Severe	No Protective Action	No Response	Total
<i>Salix gooddingii</i>	5			2	1	8
<i>Salvia columbariae</i>	3	1		2		6
<i>Salvia dorrii</i>	2					2
<i>Sphaeralcea ambigua</i>	1					1
<i>Stanleya pinnata</i>	9	(2)		2	1	12
<i>Stephanomeria</i> sp.	1					1
<i>Stipa speciosa</i>	2				1	3
<i>Streptanthella longirostris</i>					1	1
<i>Streptanthus cordatus</i>					1	1
<i>Suaeda torreyana</i>	1					1
<i>Symphoricarpos longiflorus</i>					1	1
<i>Tessaria sericeae</i>	1	1			1	3
<i>Thamnosma montana</i>	2	(1)			1	3
<i>Thelypodium integrifolium</i>	1				1	2
<i>Typha domingensis</i>	5					5
<i>Typha latifolia</i>	3				1	4
<i>Veronica anagallis-aquatica</i>	4	1(1)				5
<i>Vitis arizonica</i>	5	(1)		2		7
<i>Xylorhiza tortifolia</i>	(1)	1				1
<i>Yucca baccata</i>	2	1(1)	1	1		5
<i>Yucca brevifolia</i>	6	(2)	1	1		8
<i>Yucca schidigera</i>	6	(1)	1		1	8

\*Numbers in parentheses represent alternative, "second-choice" recommendations made by Native American plant specialists.

## Conclusion

The foregoing analysis demonstrates that plant resources continue to be important resources among contemporary Southern Paiute, Western Shoshone, and Owens Valley Paiute people. They are still considered to be useful economic resources and are still used today. They continue to be significant in traditional rituals and ceremonies, as well as in tribal and ethnic religion. There remains among members of the ethnic groups a strong attachment to and a high degree of value placed upon these resources. As components of their traditional holy lands, they are symbols which form part of the definition of themselves as a people or ethnic group. Because the portion of the holy lands on which these plants grow is no longer occupied by Indian people, sentiment toward the plants has intensified which is common among Native American peoples who have lost large portions of their land and resources (Spicer, 1971). Because plants are elements with which Native American people continue to interact on a daily basis, as well as being elements of human social interaction, these plant resources have become symbolic of Southern Paiute, Western Shoshone and Owens Valley Paiute definition of themselves as a people. These plants make significant contributions to contemporary Native American cultural systems.

## REFERENCES

Beatley, Janice C.

- 1976 *Vascular Plants of the Nevada Test Site: Ecologic and Geographic Distributions*. Springfield, VA: National Technical Information Service, Office of Technical Information for the Division of Biomedical and Environmental Research, Energy Research and Development Administration.

Bretting, P. and G. Nabhan

- 1986 "Ethnobotany of Devil's Claw (*Proboscidea parviflora* ssp. *parviflora:martyniacege*) in the greater Southwest," *Journal of California and Great Basin Anthropology* 8:2, 226-237.

Collins, Elizabeth, T.P. O'Farrell, and W.A. Rhoads

- 1981 *Annotated Bibliography for Biologic Overview for the Nevada Nuclear Waste Storage Investigations, Nevada Test Site, Nye County, Nevada*. Goleta, CA: EG&G/Energy Measurements, Inc.

D'Azevedo, Warren L.

- 1986 *Handbook of North American Indians*. Vol. II: Great Basin. Washington, D.C.: Smithsonian Institute.

Dobyns, Henry F.

- 1986 *Native American Diabetes: Testing a Genetic Causation Theory*. Report submitted to the Gila River Pima Indian Community.

DOE (U.S. Department of Energy)

- 1986 *Environmental Assessment: Yucca Mountain, Nevada*. Vols. I, II, III. Washington, D.C.: U.S. Department of Energy.

DOE (U.S. Department of Energy)

- 1988 *Environmental Field Activity Plan for Cultural Resources: Native American Component*, Las Vegas, Nevada: DOE, Nevada Operations Office.

Halmo, David B.

- 1987 *An Economic Ethnobotany of Resettled Lowland Mazatec Indians: Diversity and Ethnodevelopment*. Unpublished Master's Thesis, Dept. of Anthropology, Georgia State University, Atlanta, GA.

Lawton, H.W., P. Wilke, M. DeDecker, and W. Mason

- 1976 "Agriculture among the Palute of Owens Valley," *Journal of California and Great Basin Anthropology* 3:1, 13-50.

O'Farrell, T.P. and E. Collins

- 1983 1982 Biotic Survey of Yucca Mountain, Nevada Test Site, Nye County, Nevada. Goleta, CA: EG&G/Energy Measurements, Inc.
- 1984 1983 Biotic Studies of Yucca Mountain, Nevada Test Site, Nye County, Nevada. Goleta, CA: EG&G/Energy Measurements, Inc.

Spicer, Edward H.

- 1971 "Persistent Cultural Systems," *Science* 174:4011, 795-800.
- 1980 *The Yaquis: A Cultural History*. Tucson: University of Arizona Press.

Stoffle, Richard W. and Henry F. Dobyns

- 1982 *Puaxant Tuvip: Utah Indians Comment on the Intermountain Power Project, Utah Section of the Intermountain-Adelanto Bipole I Proposal*. Kenosha, WI: University of Wisconsin-Parkside.
- 1983 *Nuvagantu: Nevada Indians Comment on the Intermountain Power Project*. Cultural Resources Series No. 7. Reno: Bureau of Land Management, Nevada State Office.

Stoffle, Richard W. and Michael J. Evans

- 1976 "Resource Competition and Population Change: A Kaibab Paiute Ethnohistorical Case," *Ethnohistory* 23:2, 173-197.
- 1988 '*Holistic Conservation*' vs. '*Cultural Triage*': *American Indian Perspectives on Cultural Resources and Development*. Unpublished manuscript, Institute for Social Research, University of Michigan, Ann Arbor, Michigan.

Stoffle, Richard W. and Todd L. Howell

- 1987 "Chapter 5: Formal Interaction Analysis: A Method for Understanding the Process of Public Ethnography," in *Ethnography in the Public Sector*. R. Laidlaw, ed. History Series 18. Washington, D.C.: U.S. Dept. of the Interior, Bureau of Land Management. (In Press).

Stoffle, Richard W., Henry F. Dobyns and Michael J. Evans

- 1983 *Nungwu-uakapi: Southern Paiute Indians Comment on the Intermountain Power Project, Revised Intermountain-Adelanto Bipole I Proposal*. Kenosha, WI: University of Wisconsin-Parkside.

Stoffle, Richard W., Henry F. Dobyns, Michael J. Evans and Omer C. Stewart

- 1984 *Toyavita Piavuhuru Koroin: Ethnohistory and Native American Religious Concerns in the Fort Carson-Pinon Canyon Maneuver Area*. Kenosha, WI: University of Wisconsin-Parkside.

Stoffle, Richard W., Michael J. Evans and Florence V. Jensen

- 1987 *Native American Concerns and State of California Low-Level Radioactive Waste Disposal Facility: Mohave, Navajo, Chemehuevi and Nevada Paiute Responses: Draft Report*. Ann Arbor, MI: University of Michigan, Institute for Social Research.

Stoffle, Richard W., Michael J. Evans and Camilla L. Harshbarger

- 1987 *Location and Interpretation of Native American Cultural Resources, Yucca Mountain, Nevada*. Draft Report submitted to Science Applications International Corporation, Las Vegas, Nevada. Ann Arbor, MI: University of Michigan, Institute for Social Research.

1988 *Native American Interpretation of Cultural Resources in the Area of Yucca Mountain, Nevada Interim Report*. Report number E/NV/10576-17 of the U.S. Department of Energy, Yucca Mountain Project Office, Las Vegas, Nevada: U.S. Department of Energy, Nevada Operations Office.

Stoffle, Richard W., Michael J. Evans and David B. Halmo

1988 *Recommended Actions for Reducing Potential Adverse Effects on Native American Cultural Resources Caused by Site Characterization Activities*. Draft Interim Report submitted to Science Applications International Corporation, Las Vegas, Nevada. Ann Arbor, MI: University of Michigan, Institute for Social Research.

Stoffle, Richard W., John E. Olmsted and Michael J. Evans

1988 *Literature Review and Ethnohistory of Native American Occupancy and Use in the Yucca Mountain Region*. Draft report submitted to Science Applications International Corporation, Las Vegas, Nevada. Ann Arbor, MI: University of Michigan, Institute for Social Research.

Turner, Nancy J.

1988 "The Importance of a Rose': Evaluating the Cultural Significance of Plants in Thompson and Lillooet Interior Salish," *American Anthropologist* 90:2, 272-290.