

Deer Creek RESERVOIR

Resource Management Plan

July 1998

U.S. Department of Interior
Bureau of Reclamation
Upper Colorado Region
Provo, Utah

Prepared By:
The Bear West Consulting Team
145 South 400 East
Salt Lake City, Utah 84111

This Resource Management Plan was prepared by the Bear West Consulting Team in cooperation with and for the Department of the Interior, Bureau of Reclamation, Upper Colorado Region, under Contract No. 1425-2-CA-40-12580, entitled *Resource Management Planning* and under Delivery Order No. 1425-2-PD-40-12580-002, entitled *Preparation of Resource Management Plan for Deer Creek*.

FINDING OF NO SIGNIFICANT IMPACT

Deer Creek Reservoir Resource Management Plan

United States Department of the Interior
Bureau of Reclamation

Upper Colorado Region
Provo Area Office
Provo, Utah

PRO-FONSI-98-001

Recommended:


Manager, Environmental Staff

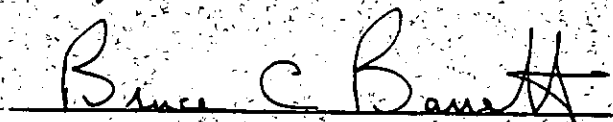
Date: 8/3/98

Recommended:


Manager, Resource Management Division

Date: 8/3/98

Approved:


Area Manager

Date: 8/6/98

FINDING OF NO SIGNIFICANT IMPACT

Deer Creek Reservoir Resource Management Plan

FINDING

In accordance with the National Environmental Policy Act of 1969, as amended, and the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR parts 1500-1508), the Bureau of Reclamation (Reclamation) has determined that implementing the Proposed Alternative of the Resource Management Plan (RMP) for Deer Creek Reservoir will not have a significant impact on the quality of the human environment and that an environmental impact statement is not required.

DECISION

Reclamation has decided to implement Alternative 1, the Proposed Alternative, described in the Final EA (pgs. 2-3 to 2-6). Briefly, this alternative would implement management policies and practices on project lands that allow continuation of the original project purposes while protecting water quality and accommodating anticipated recreation and public use of project lands. Reclamation has modified one element of the selected alternative to address public and agency concerns regarding elimination of domestic livestock grazing on project lands. These concerns were expressed during the comment period on the Revised Draft EA. Reclamation has decided to allow livestock grazing on project lands east of U.S. Highway 189 (side of highway away from reservoir), with grazing management practices being implemented to maintain fuel loading adequate for wildfire protection and provide wildlife habitat diversity. Livestock grazing will be discontinued on all project lands west of U.S. Highway 189 (reservoir side of highway). Four other alternatives were considered in detail, including the No Action Alternative. Implementation of the selected alternative may begin immediately according to the implementation schedule described in Chapter 4 of the RMP.

REASONS FOR THE DECISION

Reclamation considered the analyses of environmental effects, the public comments on the Revised Draft EA and the ability of the alternatives considered in detail to achieve the stated resource management goals and objectives. Reclamation believes the Proposed Alternative best meets those considerations. However, the Proposed Alternative described in the Revised Draft EA eliminated domestic livestock grazing from all project lands because of the potential, albeit low, for adverse effects on the water quality of Deer Creek Reservoir. Of specific concern to the municipal water users was the potential for contamination of the reservoir by pathogens such as *giardia* and *cryptosporidium* and another contaminants found in the fecal matter of domestic livestock. Deer Creek Reservoir is the primary source of drinking water for a large segment of the population along the Wasatch Front in Utah, including major metropolitan areas such as Salt Lake City. During preparation of the Revised Draft EA, Reclamation believed that a cautious, conservative approach to protecting the water quality of Deer Creek Reservoir from all potential sources of contamination was prudent because of the large human population potentially at

risk. However, further consideration of several factors such as evaluation of available scientific information, the concerns raised by resource management agencies such as the U.S. Fish and Wildlife Service and Utah Department of Natural Resources about elimination of grazing, the comments from Wasatch County and numerous private individuals affected by the potential discontinuance of grazing compel Reclamation, at this time, to allow continued limited, managed grazing on selected project lands. Reclamation believes this approach strikes a reasonable balance between avoiding/reducing potential impacts on water quality and minimizing the economic effect on affected livestock grazers. By eliminating grazing west of U.S. Highway 189, there will be an effectual buffer established to keep livestock away from the close proximity to the reservoir. Appropriate grazing management plans to achieve the resource management objectives stated in the RMP will be developed and implemented.

PUBLIC INVOLVEMENT

Reclamation initiated public involvement activities for the RMP in March 1993. A news release and scoping document were mailed to interested parties. A public scoping meeting was conducted in Heber City, Utah on September 8, 1993 and attended by 22 people. A Draft EA was released for public review and comment in June 1995. A public meeting to receive comments on the Draft EA was conducted on July 20, 1995 at Deer Creek State Park. 31 individuals attended the meeting and 46 comment letters were received on the Draft EA. After evaluating the public comments, Reclamation determined that substantial revisions needed to be made to the EA. A Revised Draft EA was prepared and released for public review and comment in April 1998. 25 comment letters were received on the Revised Draft EA. Chapter 5 of the Final EA contains the comment letters on the Revised Draft EA and Reclamation's responses to those comments. A complete description of all public involvement activities is in Chapter 5 of the Final EA.

SUMMARY OF ENVIRONMENTAL IMPACTS

The predicted environmental impacts of the Proposed Alternative are described in Chapter 4 of the Final EA. The environmental analyses focused on impacts on water quality, partnerships, recreation and visual resources, natural and cultural resources and land management. The environmental analyses indicates that the direct, indirect and cumulative impacts would be temporary, short-term and insignificant. The key impacts and related mitigation are summarized in Table 2.2 in Chapter 2 of the Final EA.

MITIGATION MEASURES

The measures described in Chapter 6 of the Final EA would be implemented by Reclamation or other managing or operating agencies or entities to mitigate the environmental impacts of the Proposed Alternative. The implementation and effectiveness of the mitigation measures will be monitored by Reclamation. The monitoring would ensure incorporation of mitigation in all construction contract specifications, where appropriate, or compliance with the mitigation measures by Reclamation or other agency personnel.

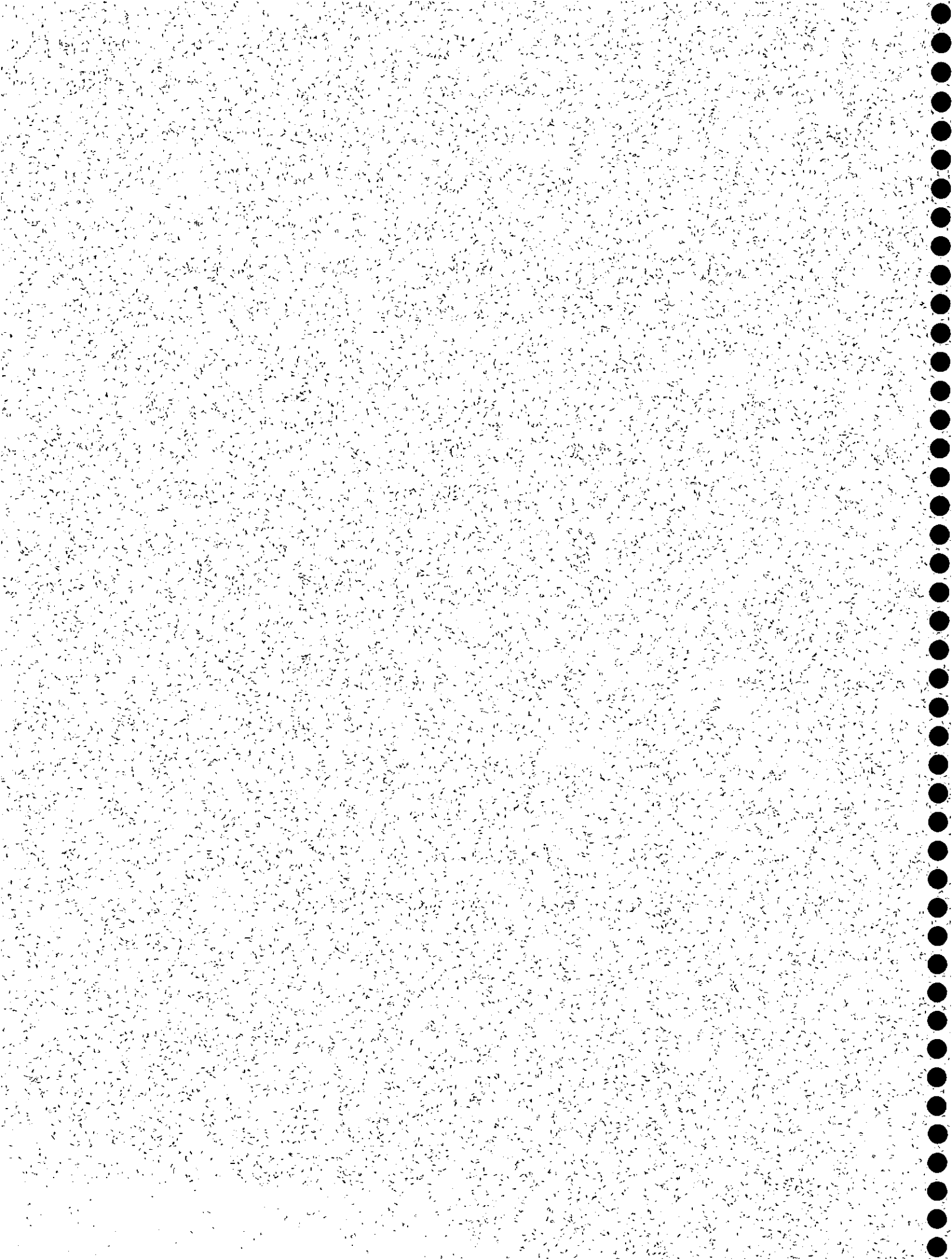


Table of Contents

Chapter 1 Introduction	1-1
INTRODUCTION	1-1
MISSION	1-1
HISTORY	1-2
MANAGING ENTITIES	1-4
PLAN STRUCTURE	1-4
PUBLIC INVOLVEMENT	1-4
Issue 1. Water Quality (Issues 1a—1c)	1-6
Issue 1a. Contamination From Hydrocarbons	1-6
Issue 1b. Dogs and Domestic Livestock Grazing	1-6
Issue 1c. Wetland	1-7
Issue 2. Partnerships (Issue 2a)	1-7
Issue 2a. Local Economy	1-7
Issue 3. Recreation/Visual Resources (Issues 3a—3c)	1-7
Issue 3a. Recreation Opportunities	1-7
Issue 3b. Trails	1-8
Issue 3c. Visual Quality	1-8
Issue 4. Natural and Cultural Resources (Issues 4a—4f)	1-8
Issues 4a, 4b and 4c. Vegetation and Big Game Wildlife Habitat	1-8
Issue 4d. Threatened, Endangered Species and Candidate Species	1-9
Issue 4e. General Wildlife	1-9
Issue 4f. Cultural Resources	1-9
Issue 5. Land Management (Issues 5a and 5b)	1-10
Issue 5a. Vehicular Access	1-10
Issue 5b. Provo (Little) Deer Creek Area And Road	1-10
Chapter 2 Existing Resource Inventory	2-1
INTRODUCTION	2-1
SETTING	2-1
WATER RESOURCES (Issues 1a—1c)	2-2
Water Quality	2-2
Water Pollutant Sources	2-3
Motor Oil Leakage	2-5
Table 2.1 State of Utah Water Quality Standards for Dissolved Metals (mg/l)	2-5

Table 2.2 Deer Creek Reservoir Dissolved Metals (Mg/l) Water Quality Maximum Data since 1980	2-6
Possible Contamination from Used Motor Oil	2-6
Table 2.3 Crank Case Drain Oil Metal Concentrations (Mg/l)	2-6
Table 2.4 Deer Creek Reservoir Motor Drain Oil Metals Absorption Capability	2-7
Possible Contamination from Gasoline	2-7
Table 2.5 Gasoline Compounds Which Have Significance To Water Quality	2-8
Possible Contamination from Erosion	2-10
Possible Contamination from Organic Material	2-11
Possible Contamination from Giardia and Cryptosporidium	2-12
PARTNERSHIPS (Issue 2a)	2-12
Wasatch County Profile	2-12
Wasatch County Estimated Revenue	2-13
Sales Tax	2-13
Table 2.6 Components of Outside Spending in Wasatch County by Deer Creek Visitors	2-13
Figure 2.1 Patterns of Visitor Spending	2-14
Gasoline Tax	2-14
Restaurant Tax	2-15
Transient Room Tax	2-15
Payment in Lieu of Taxes	2-15
Table 2.7 Wasatch County Revenue from Deer Creek by Source	2-15
Wasatch County Costs	2-16
Ambulance Service	2-16
Fire Protection	2-16
Law Enforcement	2-17
Garbage Collection	2-17
Other Costs	2-17
Environmental Justice	2-17
RECREATION AND VISUAL RESOURCES (Issues 3a – 3c)	2-18
Recreation Resources	2-18
Historical State Park Visitation	2-18
Graph 2.1 Annual Visitation 1980-93	2-19
Graph 2.2 Average Monthly Visitation	2-20
Management Area Recreation Resources	2-21
1. Main State Park	2-21
2. Snow's Area	2-22

3. Area Between Snow's and the Rainbow Bay Area	2-23
4. Rainbow Bay Area	2-23
5. Island Bay Area	2-24
6. Wallsburg Area	2-25
7. Charleston Bay Area	2-25
8. West Side Area	2-26
9. Provo (Little) Deer Creek Area	2-26
10. Housing Area	2-27
11. Lower Provo River Area	2-27
12. Dam/Primary Jurisdiction Zone Areas	2-28
Deer Creek Recreation User Profile	2-28
Summary of Findings	2-28
Watercraft Use	2-29
Watercraft Safety	2-30
Table 2.8 Accidents at Deer Creek Reservoir: 1984 to 1994	2-30
VISUAL RESOURCES	2-32
Area Photographs (Pages 2-VR1-VR19)	2-VR1
NATURAL AND CULTURAL RESOURCES (Issues 4a – 4f)	2-33
Soils and Geology	2-33
Vegetation	2-33
Table 2.10 Total Ares by Habitat Type	2-33
Climate	2-34
Threatened and Endangered Plant Species	2-34
Habitat Map	Map 2-1
Wetlands	2-35
Wildlife	2-36
Big Game	2-36
Other Mammals	2-37
Raptors	2-38
Waterbirds and Upland Game Birds	2-38
Other Avifauna	2-39
Reptiles and Amphibians	2-39
Fisheries	2-40
Threatened, Endangered, and Candidate Animal Species	2-41
Range Resources	2-42
Charleston Bay Area	2-43
Deer Creek Sheep Allotment	2-43
USBR-Wallsburg Area	2-44
UDWR-Wallsburg Area	2-44

CULTURAL RESOURCES	2-45
LAND MANAGEMENT (Issues 5a – 5b)	2-46
Travel and Access	2-46
US Highway 189	2-46
State Route 113	2-47
US Highway 40	2-47
State Route 222	2-47
Table 2.11 Annual Average Daily Traffic (AADT) on Approach Roads	2-47
ENDNOTES	2-48

Chapter 3 Management Directives	3-1
INTRODUCTION	3-1
RESOURCE MANAGEMENT GOALS	3-1
Partnerships	3-2
Water Resources	3-3
Recreation and Visual Resources	3-3
Natural and Cultural Resources	3-4
Land Management	3-4
DESIRED FUTURE CONDITION	3-4
MANAGEMENT DIRECTION	3-6
Area Wide Location Map	3-7

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS	3-8
OPERATIONS PARTNERSHIPS	3-8
Project Purposes	3-8
Project Uses and Appurtenances	3-12
FIRE PREVENTION PARTNERSHIPS	3-14
Regulations	3-14
FISH AND WILDLIFE PARTNERSHIPS	3-15
Fish and Wildlife Management	3-15
Wildlife Use	3-15
GENERAL PARTNERSHIPS, PRIVATE, COUNTY, STATE, FEDERAL	3-16
Governmental and Conservation Groups	3-16
Local Communities	3-16
New Partnerships	3-16

Private, State, and Federal Sectors	3-17
INFORMATION MANAGEMENT AND PARTNERSHIPS	3-17
Interpretative Programs	3-17
Interpretive Partnerships	3-18
Signage	3-18
LAW ENFORCEMENT AND SAFETY PARTNERSHIPS	3-19
Appropriate Law Enforcement	3-19
Discharge of Firearms	3-19
Emergency Communications	3-20
Hunting in Developed Areas	3-20
Public Demonstrations	3-20
RECREATION MANAGEMENT PARTNERSHIPS	3-20
Recreation Management	3-20
WATER RESOURCES	3-21
WATER OPERATIONS	3-21
Care, Operation, and Maintenance	3-21
Reservoir Water Level Fluctuations	3-21
Safety and Enforcement	3-21
WATER QUALITY	3-21
Best Management Practices	3-21
Facilities	3-23
Pathogens	3-23
Proposed Highway 189 Improvements	3-23
Water Quality Protection	3-24
WATERSHED PROTECTION	3-25
Watershed Protection	3-25
RECREATION AND VISUAL RESOURCES	3-26
CONCESSIONS/SPECIAL USES	3-26
Applications	3-26
Private Initiatives	3-26
RECREATION DEVELOPMENT	3-27
Construction Priority	3-27
Development Requirements	3-27
Facility Replacement	3-27
Landscaping	3-28
Private Development	3-28
Private Exclusive Facilities	3-28
ROS Classification	3-28
Trails	3-29

RECREATION MANAGEMENT	3-29
Activities	3-29
Health and Safety	3-29
Ice Conditions	3-30
Maintenance in General	3-30
Management by Others	3-30
Management Agreement	3-31
Parking on Beaches	3-31
Pets	3-31
Reservoir Water Quality Maintenance	3-31
Saddle and Pack Animals	3-31
Special Events	3-32
Use Capacity	3-32
Conflicts	3-32
User Fees	3-33
Wakeless Areas/No Ski Zones	3-33
Watercraft Launching	3-33
Watercraft Limit	3-33
Watercraft Refueling	3-34
RECREATION PLANNING	3-34
Inventory System	3-34
Motorized Vehicle Use	3-35
VISUAL ENHANCEMENT	3-35
Development	3-35
VISUAL MANAGEMENT AND DEVELOPMENT	3-36
Development	3-36
Duration of Impact	3-37
Exceptions	3-37
VISUAL PLANNING	3-37
Inventory	3-37
Scenic Byway 189	3-38
VISUAL REHABILITATION	3-38
Rehabilitation	3-38
Priorities	3-38
NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES	3-39
AIR QUALITY	3-39
Air Quality	3-39
CULTURAL/PALEONTOLOGICAL	3-39
Inventories	3-39

Listed Sites	3-39
Management	3-39
Nomination	3-40
GEOLOGY/MINERALS/SOILS	3-41
Appropriate Minerals Management	3-41
Geologic Hazards	3-42
Gravel Pits	3-42
Soil and Moisture Conservation	3-42
Soil Protection	3-43
HABITAT/FISHERIES MANAGEMENT	3-43
Habitat/Fisheries Management	3-43
INTEGRATED PEST MANAGEMENT	3-44
Pest Management	3-44
Weeds/Noxious Weeds	3-44
VEGETATION MANAGEMENT	3-45
Enhance Wildlife Habitat	3-45
Grazing and Browsing Activities	3-45
Implementation Document	3-45
Inventory	3-45
Livestock Grazing	3-46
Preferred Vegetation	3-46
Revegetate Disturbed Areas	3-46
Sensitive Species	3-46
Structural/Non-Structural Range Improvements	3-47
Surface Disturbing Activities	3-47
Threatened and Endangered Species	3-47
Vegetative Condition	3-47
Wetlands and Flood Plains	3-47
LAND MANAGEMENT	3-48
FIRE SUPPRESSION	3-48
Fire Suppression	3-48
LANDS	3-48
Boundary Fences	3-48
Boundary Location	3-48
Domestic Animals and Pets	3-48
Land/Rights-of Way Acquisition	3-49
Land Disposal	3-49
Land Withdrawals	3-49
Non-Recreation Special Use Management	3-50

Off-Site Influences to Recreation Sites	3-50
Pollution Control and Abatement	3-51
Resource Activities	3-51
Utility Lines	3-51
ROADS/TRAILS	3-52
Private Purpose Roads	3-52
Roads Across Private Lands	3-52
Road Maintenance and Use	3-52
Road Rehabilitation	3-53
Special Purpose Roads/Trails	3-53
Specific Purpose Roads	3-53
Trail Maintenance and Use	3-53
TRAVEL/ACCESS	3-54
Automobile/Motorized Vehicle Travel	3-54
Disability Access	3-54
Off-Highway Vehicles	3-54

SPECIFIC AREA MANAGEMENT DIRECTION

MAIN STATE PARK AREA

Main State Park Management Area Map	3-56
Main State Park - Location and Site Plan	3-57
Main State Park - New Campground Site Plan	3-58
Main State Park - Warehouse and Dry Boat Storage Site Plan	3-59
GENERAL MANAGEMENT AND PARTNERSHIPS	3-60
Area Management	3-60
WATER RESOURCES	3-60
Water Development and Conservation	3-60
RECREATION/VISUAL RESOURCES	3-61
Facilities Development	3-61
Landscaping	3-62
Overnight Camping	3-62
Visual Management	3-63
Wakeless/ No Ski Zone	3-63
Watercraft Launching Access	3-63
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-63
Site Rehabilitation	3-63
LANDS	3-64

Roads and Trails	3-64
SNOW'S AREA	
Snow's Management Area Map	3-65
Snow's Site Plan	3-66
GENERAL MANAGEMENT AND PARTNERSHIPS	3-67
Area Management	3-67
WATER RESOURCES	3-67
Water Development and Conservation	3-67
RECREATION/VISUAL RESOURCES	3-68
Appropriate ROS Management	3-68
Facilities Development	3-68
Landscaping	3-69
Overnight Camping	3-69
Visual Management	3-69
Wakeless/No Ski Zone	3-69
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-70
Site Rehabilitation	3-70
LANDS	3-70
Roads and Trails	3-70
AREA BETWEEN SNOW'S AND RAINBOW BAY	
Area Between Snow's and Rainbow Bay Management Area Map	3-71
GENERAL MANAGEMENT AND PARTNERSHIPS	3-72
Area Management	3-72
WATER RESOURCES	3-72
Water Development	3-72
RECREATION/VISUAL RESOURCES	3-73
Appropriate ROS Management	3-73
Natural Area Recreation Management	3-73
Overnight Camping	3-73
Visual Management	3-73
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-74
Site Rehabilitation	3-74
Soil and Water Resource Improvements	3-74
Wildlife Winter Range Protection	3-74
LANDS	3-74
Facilities Development	3-74
Trails	3-75
RAINBOW BAY AREA	
Rainbow Management Area Map	3-76

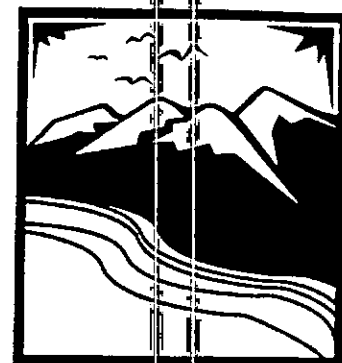
Rainbow Bay Site Plan	3-77
GENERAL MANAGEMENT AND PARTNERSHIPS	3-78
Area Management	3-78
WATER RESOURCES	3-78
Water Development and Conservation	3-78
RECREATION/VISUAL RESOURCES	3-79
Appropriate ROS Management	3-79
Facilities Development	3-80
Landscaping	3-80
Overnight Camping	3-80
Visual Management	3-81
Wakeless Zone	3-81
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-81
Site Rehabilitation	3-81
LANDS	3-81
Roads and Trails	3-81
ISLAND BAY AREA	
Island Bay Management Area Map	3-82
GENERAL MANAGEMENT AND PARTNERSHIPS	3-83
Area Management	3-83
WATER RESOURCES	3-83
Water Development and Conservation	3-83
RECREATION/VISUAL RESOURCES	3-84
Appropriate ROS Management	3-84
Facilities Development	3-84
Landscaping	3-85
Overnight Camping	3-85
Visual Management	3-85
Wakeless Zone	3-85
Watercraft Launching Access	3-86
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-86
Site Rehabilitation	3-86
LANDS	3-86
Roads and Trails	3-86
WALLSBURG AREA	
Wallsburg Management Area Location Map	3-87
GENERAL MANAGEMENT AND PARTNERSHIPS	3-88
Area Management	3-88
WATER RESOURCES	3-88

Watering Facilities	3-88
RECREATION/VISUAL RESOURCES	3-88
Appropriate ROS Management	3-88
Overnight Camping	3-89
Recreation Management	3-89
Visual Management	3-89
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-89
Site Rehabilitation	3-89
Vegetative Improvements	3-89
Wildlife Winter Range Protection	3-90
LANDS	3-90
Facilities Development	3-90
Trails	3-90
Weeds/Noxious Weeds	3-90
CHARLESTON BAY AREA	
Charleston Bay Management Area Location Map	3-91
GENERAL MANAGEMENT AND PARTNERSHIPS	3-92
Area Management	3-92
WATER RESOURCES	3-92
Water Conservation and Development	3-92
RECREATION/VISUAL RESOURCES	3-93
Appropriate ROS Management	3-93
Facilities Development	3-93
Landscaping	3-93
Natural Area Recreation Management	3-93
Overnight Camping	3-94
Visual Management	3-94
Wakeless Management	3-94
Watercraft Launching Access	3-94
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-94
Site Rehabilitation	3-94
Soil and Water Resource Improvements	3-95
Wildlife Winter Range Protection	3-95
Waterfowl Seasonal Avoidance	3-95
LANDS	3-95
Facilities Development	3-95
Trails	3-95
WEST SIDE AREA	
West Side Management Area Location Map	3-96

GENERAL MANAGEMENT AND PARTNERSHIPS	3-97
Area Management	3-97
WATER RESOURCES	3-97
RECREATION/VISUAL RESOURCES	3-97
Appropriate ROS Management	3-97
Facilities Development	3-98
Landscaping	3-98
Overnight Camping	3-98
Visual Management	3-98
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-98
Site Rehabilitation	3-98
Soil and Water Resource Improvements	3-99
Wildlife Winter Range Protection	3-99
LANDS	3-99
Facilities Development	3-99
Trails	3-99
PROVO (LITTLE) DEER CREEK AREA	
Provo (Little) Deer Creek Management Area	3-100
GENERAL MANAGEMENT AND PARTNERSHIPS	3-101
Area Management	3-101
WATER RESOURCES	3-101
Drinking Water	3-101
RECREATION/VISUAL RESOURCES	3-102
Appropriate ROS Management	3-102
Facilities Development	3-102
Landscaping	3-102
Overnight Camping	3-102
Visual Management	3-103
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-103
Site Rehabilitation	3-103
LANDS	3-103
Roads and Trails	3-103
HOUSING AREA	
Housing Management Area Location Map	3-104
GENERAL MANAGEMENT AND PARTNERSHIPS	3-105
Area Management	3-105
WATER RESOURCES	3-105
Water Conservation	3-105
RECREATION/VISUAL RESOURCES	3-105

Appropriate ROS Management	3-105
Facilities Development	3-106
Landscaping	3-106
Visual Management	3-106
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-107
Site Rehabilitation	3-107
LANDS	3-107
Roads and Trails	3-107
LOWER PROVO RIVER AREA	
Lower Provo River Management Area Location Map	3-108
GENERAL MANAGEMENT AND PARTNERSHIPS	3-109
Area Management	3-110
WATER RESOURCES	3-110
Water Conservation and Development	3-110
RECREATION/VISUAL RESOURCES	3-110
Appropriate ROS Management	3-110
Facilities Development	3-110
Landscaping	3-110
Overnight Camping	3-110
Visual Management	3-110
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-111
Site Rehabilitation	3-111
LANDS	3-111
Roads and Trails	3-111
DAM/PRIMARY JURISDICTION ZONE AREAS	
Dam/Primary Jurisdiction Zone Areas Location Map	3-112
GENERAL MANAGEMENT AND PARTNERSHIPS	3-113
Area Management	3-113
WATER RESOURCES	3-113
Water Operations	3-113
RECREATION/VISUAL RESOURCES	3-113
Appropriate ROS Management	3-113
Visual Management	3-114
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-114
Site Rehabilitation	3-114
LANDS	3-114
Roads and Trails	3-114

Chapter 4	4-1
INTRODUCTION	4-1
PLAN REVISION AND AMENDMENT	4-2
PLAN COMPONENTS FOR IMPLEMENTATION	4-2
Table 4.1 Implementation Schedule	4-2
Chapter 5	5-1
LIST OF PREPARERS	5-1
Chapter 6	6-1
GLOSSARY	6-1
REFERENCES	6-13



1

Chapter 1 Introduction	1-1
INTRODUCTION	1-1
MISSION	1-1
HISTORY	1-2
MANAGING ENTITIES	1-4
PLAN STRUCTURE	1-4
PUBLIC INVOLVEMENT	1-4
Issue 1. Water Quality (Issues 1a – 1c)	1-6
Issue 1a. Contamination From Hydrocarbons	1-6
Issue 1b. Dogs and Domestic Livestock Grazing	1-6
Issue 1c. Wetland	1-7
Issue 2. Partnerships (Issue 2a)	1-7
Issue 2a. Local Economy	1-7
Issue 3. Recreation/Visual Resources (Issues 3a – 3c)	1-7
Issue 3a. Recreation Opportunities	1-7
Issue 3b. Trails	1-8
Issue 3c. Visual Quality	1-7
Issue 4. Natural and Cultural Resources (Issues 4a – 4f)	1-8
Issues 4a, 4b and 4c. Vegetation and Big Game Wildlife Habitat	1-8
Issue 4d. Threatened, Endangered Species and Candidate Species	1-9
Issue 4e. General Wildlife	1-9
Issue 4f. Cultural Resources	1-9
Issue 5. Land Management (Issues 5a and 5b)	1-10
Issue 5a. Vehicular Access	1-10
Issue 5b. Provo (Little) Deer Creek Area and Road	1-10

Chapter 1

Introduction

INTRODUCTION

The resource management plan (RMP) for Deer Creek Reservoir, in Wasatch County, Utah provides management direction necessary to protect the rights of involved contracts, legislation, and agencies while identifying and scheduling measures necessary to achieve desired future conditions (DFC) of the resources. Management direction in the form of goals, objectives, standards and guidelines, sets the stage for management actions, activities and uses which affect water, recreation, natural and cultural resources, partnerships and lands operations. Direction is applied plan-wide and to site-specific areas. Site specific areas lend themselves to suitable unique resource management and production. Monitoring and evaluation requirements are intended to assure conformance with requirements, quality and good stewardship.

The 10 to 15 year RMP duration is subject to certain contracts, agreements and to Reclamation instructions and policy. Actions that may take place are identified, but may not be assured, because of specific site conditions, changes in budgets, changes in economic conditions, and changes in laws and regulations.

MISSION

The Bureau of Reclamation (Reclamation) was created within the Department of Interior by the Reclamation Act of 1902. The purpose of the Act was to reclaim the arid west and to provide economic stability in the 17 western states by developing irrigation projects. Over the years, single purpose projects gave way to the development and construction of multipurpose projects.

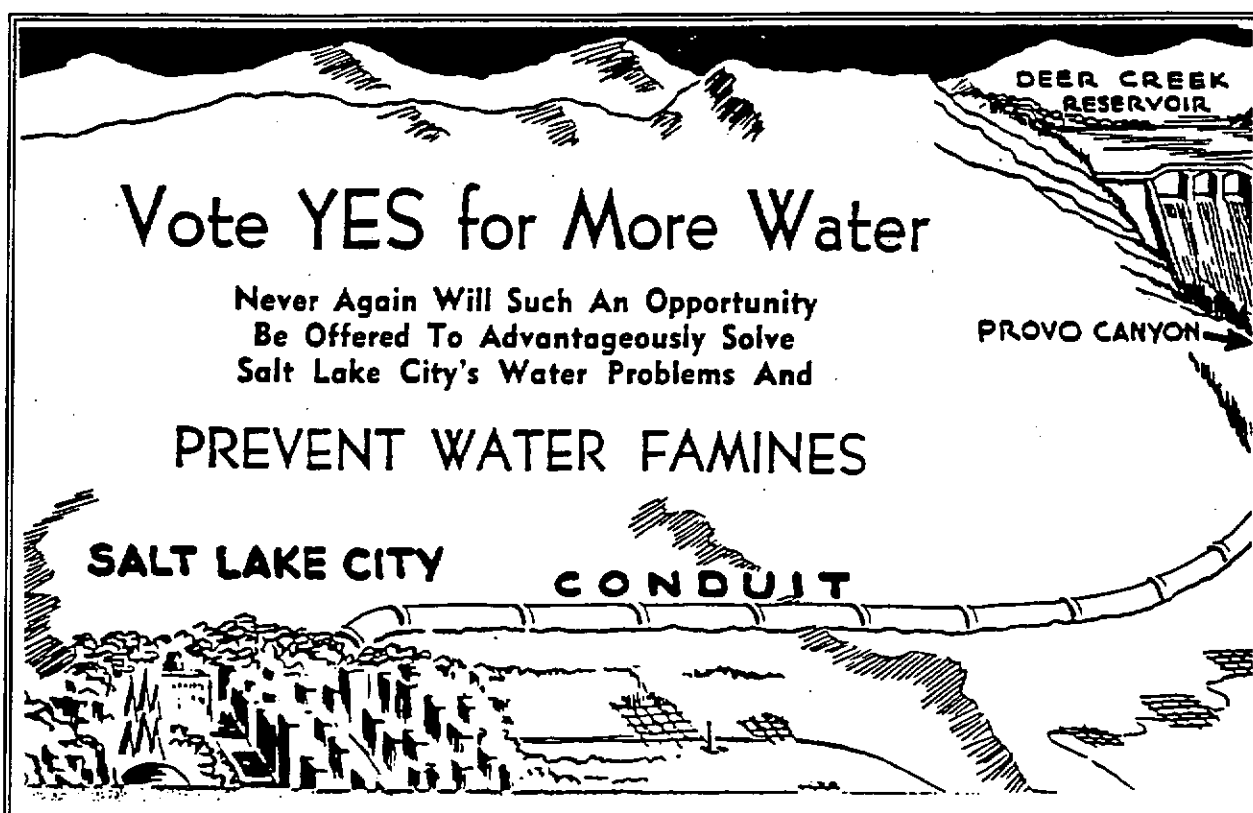
The mission of the Bureau of Reclamation is to manage, develop and protect water and related resources in an environmentally sound manner, in the interest of the American public.

The vision statement of the Upper Colorado Region is to enhance the quality of life through excellence in resource management.

HISTORY

Deer Creek Reservoir is located on the Provo River at the southern end of the Heber Valley and about 16 miles northeast of Provo, Utah. Refer to the Area Wide Location Map and the Specific Area Management Maps in Chapter 3.

Congress authorized construction of Deer Creek Dam in 1933 under the National Recovery Act and it was approved by President Roosevelt in 1935. Lands were acquired and construction of the dam began in 1938. Construction was completed in 1941. The reservoir is the principal feature in the Provo River Project and was constructed by Reclamation for the primary purpose of providing irrigation, municipal, and industrial water directly to Salt Lake and Utah Counties and to Wasatch and Summit counties by exchange.



Photograph 1.1 Solicitation from the late 1930s encouraging development of Deer Creek Reservoir.

The Provo River Water Users Association (PRWUA) was organized to repay the federal government for the construction cost of the project and to operate and maintain the project facilities. The contract entitles the PRWUA to utilize the storage capacity of Deer Creek Reservoir, together with the total yield of storage water therefrom and a permanent right to the exclusive use of the water made available therefrom. PRWUA in turn entered into Subscription Contracts with its shareholders to define the terms of delivery of Deer Creek Reservoir storage water. Under these Subscription Contracts, all releases are made in the amounts and at such times as called for by the shareholders.

The reservoir must be operated to maximize water storage and delivery, because of PRWUA's contractual obligations with Reclamation and PRWUA shareholders. All other uses of the reservoir and/or adjacent lands and facilities, including recreation and wildlife uses, are subject to the fluctuation in the reservoir levels resulting from the storage and release of project waters and other conditions governed by such operation for water supply purposes.

Deer Creek Reservoir receives an average annual runoff volume of about 261,000 acre-feet per year, of which a maximum of 150,000 acre-feet can be stored in the reservoir (Remillard, 1994). The reservoir stores trans-basin diversion water (water which has been imported from areas outside the natural drainage basin). This trans-basin water is brought into the Provo River drainage through:

- The Weber-Provo Diversion Canal near Francis, Utah
- The Duchesne Tunnel
- Diversions from the Strawberry River Drainage into Daniels Creek (Eckhoff, Watson and Preator Engineering, 1991).

These combined waters are discharged from Deer Creek Reservoir into the Provo River. Subsequent diversions from the Provo River deliver water to the Salt Lake Aqueduct which is owned by the Metropolitan Water District of Salt Lake and through the Olmsted Diversion into the Central Utah Water Conservancy District's Water Treatment Plant in Orem (Utah Valley Water Treatment Plan). Deer Creek Reservoir is a major water supplier for approximately 80 percent of Utah's population (Eckhoff, Watson and Preator Engineering, 1991).

The reservoir is about 6 miles in length with a maximum storage surface area of 2,965 acres, a mean depth of 65 feet (maximum depth of 137 feet) and 18 miles of shoreline. Originally 3,145 acres were acquired by Reclamation for reservoir and project purposes. The reservoir is surrounded by public and private owners, such as Wasatch County, the State of Utah, the Town of Charleston, the LDS Church and others.

Under early administration, contracts allowed for recreation use in the project, which was primarily the opportunity to fish. Water-sports were allowed after 1971 when the Utah Department of Natural Resources, Division of Parks and Recreation (State Parks) was delegated the responsibility for recreation administration. At that time the area was opened to a variety of recreation activities. Provisions were also made in the contract to use lands for wildlife purposes.

MANAGING ENTITIES

Through contracts, agreements and memorandums of understandings, administrative authority for certain resources and facilities is shared by Reclamation with the PRWUA, State Parks and the Utah Division of Wildlife Resources (UDWR). Reclamation is the owner of the project. PRWUA administers care, operation, and management of the water related functions. State Parks administers recreation functions in specific areas and UDWR administers fish and wildlife aspects consistent with Utah State Law. Other individuals hold license agreements for various purposes, such as access.

PLAN STRUCTURE

The Resource Management Plan is the selected alternative of the accompanying companion Deer Creek Reservoir Resource Management Plan Final Environmental Assessment (FEA) and is based on the various considerations that have been addressed in the FEA. The planning process and the analysis which were used in developing the RMP, as well as the other alternatives that were considered, are described or referenced in the FEA. The predicted environmental consequences of the RMP and the various alternatives are disclosed in FEA. The Final Environmental Assessment describes the alternatives considered in arriving at the RMP and discloses the environmental consequences of implementing the RMP and the alternatives considered. The Final Environmental Assessment and Finding of No Significant Impact (FONSI) are on file at Reclamation's Provo Area Office.

PUBLIC INVOLVEMENT

In March 1993, Reclamation established a public process for the development of the RMP and compliance with NEPA. The process provided the public

opportunities to express its interests and concerns at the initial stages of plan development.

The public involvement process consisted of several components including initial and follow-up meetings with management agencies, affected jurisdictions, users, and areawide interests, general public scoping including a scoping meeting at Wasatch Middle School in Heber, Utah; a visitor survey; mailings and a public comment meeting.

The Draft Environmental Assessment (DEA) was sent for review and comment to those that had participated at some point during the planning process including agencies, interest groups and individuals. An executive summary of the Draft Environmental Assessment was mailed to a list developed during the process of other interested individuals and agencies. Copies of the mailing list can be found in the Project File. One public meeting was held to review the Draft Environmental Assessment. The meeting was held on July 20, 1995 Deer Creek State Park-Peterson Pavilion.

A list of individuals that participated in the public meetings or provided written or oral comments during the public involvement process and further information on the public process can be found in the FEA.

In response to comments received on the DEA, Reclamation prepared a Revised DEA that included an additional alternative to address the comments received and Reclamation plans for site specific development. The Revised DEA was published for public comment in April 1998.

The Revised Draft Environmental Assessment discussed and evaluated five alternatives; Alternative 1 – Proposed Alternative; Alternative 2; Alternative 3; Alternative 4 – No Action Alternative; and Alternative 5. Reclamation identified Alternative 1 as the proposed alternative in the Draft Environmental Assessment. This alternative (Alternative 1) was retained in the Final Environmental Assessment and is the detailed plan described in this RMP.

The FEA was completed in July 1998. The modifications between the Revised Draft Environmental Assessment and the FEA are discussed in Chapter 5 of the FEA and in the FONSI.

This plan addresses resource management problems and issues identified by Reclamation, affected jurisdictions and the public. The public involvement process identified five issues the resource management plan needed to address.

Issue 1. Water Quality (Issues 1a—1c)

Because it is a culinary water source, protection of Deer Creek Reservoir water quality is necessarily a major resource planning issue. With drinking water treatment standards becoming more stringent and the need to protect human health, increased protection of raw water supplies is essential. The quality of water in the reservoir is the result of practices implemented throughout the entire drainage.

Issue 1a. Contamination From Hydrocarbons

Fuel and oil spill into the reservoir. When the water level at Deer Creek Reservoir is low, recreationists drive their vehicles onto beach areas. There is potential for oil or anti-freeze leakage and fuel spills from watercraft fuel containers. When the water rises, the fluids are washed into the reservoir. These sources of contamination of the reservoir from gasoline, oils and anti-freeze (as examples) could be reduced if vehicles were prohibited below the high-water line.

There is a similar concern with the number of motorized watercraft and refueling practices. It has been suggested that when the reservoir water levels are low there is less dilution of oil and gas pollution from watercraft. This occurrence may contribute to a decline in water quality. Watercraft refueling should be prohibited below the high-water mark and on the water to prevent fuel spills into the reservoir.

Issue 1b. Dogs and Domestic Livestock Grazing

Concern regarding application of more stringent water quality standards was expressed. Specifically, reservoir management practices will have a direct impact on the ability of the drinking water industry to comply with currently proposed drinking water regulations. For example, the proposed Disinfection/Disinfection By-product Rule (D\DBP) and the Enhanced Surface Water Treatment Rule (ESWTR) require specific levels of treatment based on the measured levels of *cryptosporidium parvum* and total organic carbon in the source water.

Dogs are not allowed in the water, but a question has been raised as to the effectiveness of this water quality restriction. Domestic animals are known carriers of *giardia*, *cryptosporidium* and other pathogens that are difficult and expensive to remove in the water treatment process. It is perceived that pets and domestic livestock should be prohibited throughout the plan area. It was also suggested that cattle grazing in the project area may adversely affect water quality.

Issue 1c. Wetland

Wetlands have the ability to filter pollutants. Phosphorus entering Deer Creek Reservoir via irrigation return flows contributes to a decline in water quality. By channeling these flows through the wetlands at Charleston Bay, phosphorus may be filtered out before entering Deer Creek thereby enhancing water quality. There is a question about whether such an enhancement would affect water rights.

Issue 2. Partnerships (Issue 2a)

Issue 2a. Local Economy

Local government is concerned about the costs it bears for providing county services to the Deer Creek Reservoir.

Issue 3. Recreation/Visual Resources (Issues 3a—3c)

3a. Recreation Opportunities

Deer Creek Reservoir, after Lake Powell, Flaming Gorge and Jordanelle, is the most popular reservoir for recreation in Utah. The number of visitors at one time, the size and density of recreation sites, and the behavior of the visitor at Deer Creek all influence the quality of the recreation experience. During peak use periods, the recreation facilities are crowded. There is a variety of activities and user expectations with anglers, power boaters, water skiers, windsurfers, personal watercraft, and non-power boats using the reservoir at the same time. Crowding and competing uses affect the quality of the individual recreational uses and create user conflicts. These activities have raised safety concerns, as well.

The reservoir is unique for its wind resource and is popular with windsurfers. For example, Rockport Reservoir, seems to have more shifty winds which are not strong. Often Deer Creek Reservoir provides the only chance for summertime wind suitable for windsurfing along the Wasatch Front. Wind is typically stronger at the dam, but the island area is also sailable. Beginning windsurfers stay close to shore.

There is a concern about the quality and sufficiency of existing recreation facilities and user services. There are lines to launch watercraft, docks are full and parking limited. During peak use, watercraft loading is hazardous if there is bad weather or an emergency. There is a desire for additional paved boat ramps with parking at Sailboat Beach and Charleston Bay, and for increased camping, picnicking and boating opportunities.

Issue 3b. Trails

There is an interest in hiking and biking opportunities with future linkages to regional trail networks. There are concerns about user safety, sanitation, and land ownership.

Issue 3c. Visual Quality

U.S. Highway 189 is a Scenic Byway and there is heavy recreation use of the reservoir. Visual quality is important to the visitor's viewing experience.

Issue 4. Natural and Cultural Resources (Issues 4a—4f)

Issues 4a, 4b and 4c. Vegetation and Big Game Wildlife Habitat

Vegetation consists of a variety of upland and wetland vegetation communities providing wildlife forage and soil stabilization. Recreational developments, roads and highways and the railroad, creation of the reservoir and other human activities have affected these resources. Additional surface disturbance and recreational developments would further impact vegetation. There is interest in protection of natural areas.

The uplands to the east (Wallsburg Area) of the reservoir provide high-value winter range for deer and elk. Sagebrush and oakbrush communities provide valuable forage and cover for big game. More effort is needed in managing the deer herd around the shores of the reservoir, with special attention given to planting good forage, such as bitterbrush (*Purshia tridentata*) and cliffrose (*Cowania mexicana*). Heber Valley is experiencing wildlife habitat loss.

The proposed realignment of US 189 could be wider and located higher on the hillside than the existing road. The realignment could result in an increase in big game vehicle collisions as the animals move from the slopes to the reservoir during the spring and fall for water. Developing "guzzlers" (water catchment devices) on the uplands could reduce the need for animals to travel across the highway and could reduce the number of collisions. Guzzlers would be a valuable source of water for a variety of wildlife species.

The effects of domestic livestock grazing in natural resources is a concern. A question was raised about the impact that livestock may have on winter habitat for elk on the eastern uplands within the Wallsburg area. There is also a concern that sheep grazing on private lands and wandering onto Reclamation lands on the west side of the reservoir damages the nesting areas of birds and disturbs wildlife.

Issue 4d. Threatened, Endangered Species and Candidate Species

A threatened, endangered or candidate status is assigned to individual species by the USFWS. Species that are in danger of extinction in all or significant portion of their range are designated as endangered. A species that is not currently in danger of extinction but may be in the foreseeable future is classified as threatened. Candidate species are those where there is enough information on biological vulnerability and threats to list as endangered or threatened.

In 1994, the peregrine falcon, bald eagle, June sucker, and Utah valvata snail were identified as endangered species that may occur in the Deer Creek Reservoir Plan Area. Ute Lady's Tresses, a threatened species, may also be found in the vicinity. Any action proposed by the RMP must be analyzed to determine its effect on any listed threatened or endangered species or their critical habitats.

Other species may be in the area that are candidates for listing as threatened or endangered, or state sensitive species. While these species are not listed species, most state agencies manage them with the same protection as listed species. Additionally, golden eagles may nest in the vicinity and are protected under federal law, which requires avoidance of any activity that impacts breeding, nesting or brooding.

Issue 4e. General Wildlife

Numerous kinds of wildlife are found in the project area. Much of the eastern edge of the project area serves as critical winter habitat for elk. The entire western edge of the area and the eastern edge between the dam and the junction of Highways 113 and 189 are considered critical winter range for mule deer. The prevalence of the Sagebrush habitat suggests that the project area could be important lekking habitat for sage grouse. Deer Creek Reservoir provides high quality habitat for water birds due to the prevalence of emergent wetlands on the north end of the reservoir as well as in Wallsburg Bay and the mouth of various small drainages around the reservoir providing important forage and cover sites for waterfowl and wading birds. Protection and management of wildlife habitat, the displacement of wildlife, and the effects of increased recreation development and visitor access are concerns and the establishment of wildlife areas is an issue.

Issue 4f. Cultural Resources

Protection of artifacts and other evidence of habitation by ancient or historic people contribute to the broader understanding of the history and nature of past civilizations and the existence of humankind. A cultural survey has been

conducted in the plan area and more than 25 cultural resource sites have been recorded. Prehistorically, the Deer Creek Reservoir area was probably occupied seasonally and may have served, most importantly, as a corridor for hunting and foraging groups traveling between the Heber Valley and Utah Valley areas. This is borne out by the number of lithic scatters and campsites located in the area.

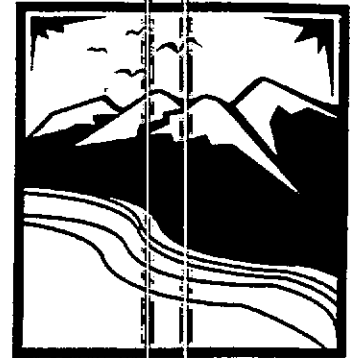
Issue 5. Land Management (Issues 5a and 5b)

Issue 5a. Vehicular Access

Vehicular access off main roads, parking and seasonal road closures are issues. There is a concern that vehicles are disruptive to wildlife.

Issue 5b. Provo (Little) Deer Creek Area And Road

There are differing opinions whether the road along the Provo (Little) Deer Creek should be open to vehicles. Maintenance of the road is a problem and resource damage to the adjacent stream is a concern.



2

Chapter 2 Existing Resource Inventory	2-1
INTRODUCTION	2-1
SETTING	2-1
WATER RESOURCES (Issues 1a – 1c)	2-2
Water Quality	2-2
Water Pollutant Sources	2-3
Motor Oil Leakage	2-5
Table 2.1 State of Utah Water Quality Standards for Dissolved Metals (mg/l)	2-5
Table 2.2 Deer Creek Reservoir Dissolved Metals (Mg/l) Water Quality Maximum Data since 1980	2-6
Possible Contamination from Used Motor Oil	2-6
Table 2.3 Crank Case Drain Oil Metal Concentrations (Mg/l)	2-6
Table 2.4 Deer Creek Reservoir Motor Drain Oil Metals Absorption Capability	2-7
Possible Contamination from Gasoline	2-7
Table 2.5 Gasoline Compounds Which Have Significance To Water Quality	2-8
Possible Contamination from Erosion	2-10
Possible Contamination from Organic Material	2-11
Possible Contamination from Giardia and Cryptosporidium	2-12
PARTNERSHIPS (Issue 2a)	2-12
Wasatch County Profile	2-12
Wasatch County Estimated Revenue	2-13
Sales Tax	2-13
Table 2.6 Components of Outside Spending in Wasatch County by Deer Creek Visitors	2-13
Figure 2.1 Patterns of Visitor Spending	2-14

Gasoline Tax	2-14
Restaurant Tax	2-15
Transient Room Tax	2-15
Payment in Lieu of Taxes	2-15
Table 2.7 Wasatch County Revenue from Deer Creek by Source	2-15
Wasatch County Costs	2-16
Ambulance Service	2-16
Fire Protection	2-16
Law Enforcement	2-17
Garbage Collection	2-17
Other Costs	2-17
Environmental Justice	2-17
RECREATION AND VISUAL RESOURCES (Issues 3a – 3c)	2-18
Recreation Resources	2-18
Historical State Park Visitation	2-18
Graph 2.1 Annual Visitation 1980-93	2-19
Graph 2.2 Average Monthly Visitation	2-20
Management Area Recreation Resources	2-21
1. Main State Park	2-21
2. Snow's Area	2-22
3. Area Between Snow's and the Rainbow Bay Area	2-23
4. Rainbow Bay Area	2-23
5. Island Bay Area	2-24
6. Wallsburg Area	2-25
7. Charleston Bay Area	2-25
8. West Side Area	2-26
9. Provo (Little) Deer Creek Area	2-26
10. Housing Area	2-27
11. Lower Provo River Area	2-27
12. Dam/Primary Jurisdiction Zone Areas	2-28
Deer Creek Recreation User Profile	2-28
Summary of Findings	2-28
Watercraft Use	2-29
Watercraft Safety	2-30
Table 2.8 Accidents at Deer Creek Reservoir: 1984 to 1994	2-30
VISUAL RESOURCES	2-32
Area Photographs (Pages 2-VR1-VR19)	2-VR1
NATURAL AND CULTURAL RESOURCES (Issues 4a – 4f)	2-33
Soils and Geology	2-33
Vegetation	2-33
Table 2.10 Total Ares by Habitat Type	2-33
Climate	2-34
Threatened and Endangered Plant Species	2-34
Habitat Map	Map 2-1
Wetlands	2-35
Wildlife	2-36

Big Game	2-36
Other Mammals	2-37
Raptors	2-38
Waterbirds and Upland Game Birds	2-38
Other Avifauna	2-39
Reptiles and Amphibians	2-39
Fisheries	2-40
Threatened, Endangered, and Candidate Animal Species	2-41
Range Resources	2-42
Charleston Bay Area	2-43
Deer Creek Sheep Allotment	2-43
USBR-Wallsburg Area	2-44
UDWR-Wallsburg Area	2-44
CULTURAL RESOURCES	2-45
LAND MANAGEMENT (Issues 5a – 5b)	2-46
Travel and Access	2-46
US Highway 189	2-46
State Route 113	2-47
US Highway 40	2-47
State Route 222	2-47
Table 2.11 Annual Average Daily Traffic (AADT) on Approach	
Roads	2-47
ENDNOTES	2-48

Chapter 2

Existing Resources Inventory

INTRODUCTION

This chapter contains a description of the physical, biological, and socioeconomic conditions of the plan area at the time the planning process began. It provides a baseline for monitoring the effects on resources and the success of implementation of the RMP. This chapter is derived from Chapter 3 of the 1998 Deer Creek Reservoir Resource Management Plan FEA. Additional information and greater detail is provided in the Appendix of the FEA.

SETTING

Deer Creek Reservoir Plan Area is located within the regional context of the Great Basin and Rocky Mountains with its characteristic basin and range landscape. The reservoir is located in the south west corner of Heber Valley at the top of Provo Canyon. Heber Valley is a rural tourist-based community with three population centers: Heber City, Midway and Charleston. Heber Valley is on the east slope of the Wasatch range with impressive views to the south and west towards Mt. Timpanogas and other ridges which create the main north south spine of the Wasatch Front.

The reservoir is within an hours drive from the Salt Lake and Utah valleys: the two largest population centers in the state. It is directly accessible from US Highway 189 and State Route 113. US 189 intersects with US 40 south of Heber City, Utah providing access for Heber City and Uintah Basin. Star Route 113 provides a scenic access for the many tourist visiting the Park City area. US 40 also provides direct access from the Uintah Basin. State Route 222 intersects with US 189 and provides access to Deer Creek Reservoir from the Town of Wallsburg.

WATER RESOURCES (Issues 1a–1c)

Water Quality

Deer Creek Reservoir has beneficial use designations of:

- 1C, protected for domestic purposes with prior treatment;
- 2A, protected for primary contact recreation such as swimming;
- 2B, protected for boating, water skiing, and similar uses;
- 3A, protected for cold water species of game fish and other cold water aquatic life, including the necessary aquatic organisms in their food chain; and
- 4, protected for agricultural purposes including irrigation of crops and stock watering (Utah Department of Environmental Quality, 1994).

The Provo River and its tributaries have beneficial use designations of 1C, 2B, 3A, and 4.

According to the 1992 Water Quality Implementation Report (Eckhoff, Watson and Preator Engineering, 1992), prepared for the Wasatch County Commission in association with the Jordanelle Technical Advisory Committee, there are serious water quality problems along the Provo River and in Deer Creek Reservoir. Areas of greatest concern for recreation management and users are phosphorus and coliform bacteria concentrations. Phosphorous levels have exceeded both the State of Utah Criteria for Water Uses and the Jordanelle Technical Advisory Committee recommendations and can degrade water quality. Degrading the water quality can impair its use for recreational and aesthetic purposes in some locations at varying times throughout the year. Ammonia, pH, and total suspended solids levels in these waters have also exceeded state standards at times and are considered problematic although of lesser importance than the problems which can result from excess phosphorus and coliform concentrations.

High nutrient loading to Deer Creek Reservoir induces lake eutrophication. Eutrophic (high dissolved nutrient concentration) conditions in lakes promotes the growth of algal blooms with a corresponding loss of dissolved oxygen (anoxic conditions). Anoxic conditions can result in taste and odor problems, and if severe enough can have a direct impact upon fish life. Deer Creek Reservoir experienced anoxic conditions in the lower depths (the hypolimnion) of the reservoir in both 1989 and 1990, resulting in unacceptable taste and odor problems in downstream drinking waters. Phosphorus is believed to be the limiting nutrient for algal

blooms in Deer Creek Reservoir. In 1993, the annual load of total phosphorous in Deer Creek Reservoir was 79,100 pounds or 35,871 kilograms.

A management goal of 0.04 mg/l has been set for the concentration of total phosphorous for waters entering into Deer Creek Reservoir (Eckhoff, Watson and Preator Engineering, 1994) with the objective of restoring Deer Creek Reservoir to a mesotrophic state, a state where nutrient concentrations are in check and the system is generally in overall biological balance.

The 1994 Water Quality Implementation Report (Eckhoff, Watson and Preator Engineering, 1994) analyzes water quality trends for 13 years (1981-1993) and concludes that water quality within the reservoir is improving. The trend of improving water quality is attributed to the Deer Creek Reservoir Restoration Project conducted by Mountainland Association of Governments (Loveless, 1993) and to the past climatic regime which was characterized by below normal amounts of precipitation.

Water Pollutant Sources

The Jordanelle Technical Advisory Committee was formed in 1980 to oversee the efforts to identify pollutant sources in the watershed, to prepare a management plan to manage water quality problems affecting the reservoir, and to restore historic water quality. As a result, much has been done to reduce pollutant loading to Deer Creek Reservoir. Specific projects have included the construction of the Heber Valley Land Application Treatment Plant, the Snake Creek Rural Clean Water Program, Midway Fish Hatchery sediment settling pond, and the

Clean Lakes Phase II project. The Clean Lakes Phase II project:

- identified farming practices and individual operations where sources of phosphorus could be reduced or eliminated
- developed best management practices implementation plans for identified dairies and feedlots
- implemented a public education program
- developed an irrigation water management program, and
- implemented water quality monitoring to determine the effectiveness of the implemented best management practices (Loveless, 1993)

Pollutant sources which affect Deer Creek Reservoir include agriculture, livestock, wildlife, slope and stream erosion, development, and direct human impacts such as litter and other wastes.

Nutrients in livestock manure deposited on beaches and areas directly adjacent to a reservoir can be washed into the reservoir with storm runoff events and with rising lake levels. Wildlife and livestock manure is rich in nutrients including nitrates and phosphates. A 1,000-pound beef cow produces an average of 60 pounds of manure per day, which in turn contains about 0.34 pounds of Nitrogen and 0.11 pounds of Phosphorous (Brodie, 1987). If not managed, these nutrients can be transported by storm runoff events and contribute to reservoir eutrophication.

Dissolved phosphorus that enters ground water is generally quickly absorbed.¹ Therefore, phosphorus from manure deposited in an area that is well-vegetated and without direct runoff to the reservoir will not likely reach the reservoir.

During field work, sheep were observed grazing between the reservoir and the railroad tracks in the West Side Area (Pioneer 1994). The sheep had direct access to the reservoir and there was evidence of erosion on reservoir banks. Sheep grazing impacts to vegetation, and consequent erosion, were also observed in the Scott's Hollow area and adjacent to Decker Creek. Areas with damaged vegetation cover have significantly increased erosion rates (Haan, Barfield and Hayes, 1994), and can increase the total sediment load by more than a factor of 10.

Field observations indicate that areas west of SR-113 have received very little grazing use. It is also believed that cattle are not wintered (for example, hay-fed on frozen ground) on the north side of the reservoir.

Storm water runoff directly into Deer Creek Reservoir is estimated to contribute 2 percent of the total phosphorous load to Deer Creek Reservoir (Eckhoff, Watson and Preator Engineering, 1994, based on storm flush/precipitation relationship from 1984 "State of Utah Deer Creek Reservoir Phase I Clean Lakes Study"). Grazing practices that increase erosion would increase the phosphorous load to the reservoir and would have a detrimental effect on water quality. Existing livestock grazing practices are discussed under Range Resources found on page 2-42.

Water quality planning efforts within Wasatch County have been implemented to control and potentially reverse the historic degradation of water quality. These planning efforts have resulted in the implementation of policies that require proposed developments to satisfy the County that the development will not add to the existing background level of phosphorous during or after construction. Wasatch County has development standards which include best management practices to be used for new developments within the County. Any new facilities

to be constructed at Deer Creek Reservoir would be required to meet these same standards and requirements.

Motor Oil Leakage

Water quality data for Deer Creek Reservoir do not show evidence of contamination by used motor oil that may leak onto beach or parking areas and get washed into the reservoir. A summary of pertinent State of Utah water quality standards is presented in Table 2.1 and a summary of Deer Creek Reservoir water quality data is presented in Table 2.2. None of the reported contaminant concentrations that could be attributable to oil leakage from cars and boats have exceeded water quality standards during the last 15 years.

Table 2.1 State of Utah Water Quality Standards for Dissolved Metals (mg/l)									
Use Standard	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
1C Drinking Water	0.05	1.0	0.01	0.05	NA ⁽¹⁾	0.05	0.002	0.01	0.05
2A Swimming	NA, no standards identified for dissolved metals								
2B Boating	NA, no standards identified for dissolved metals								
3A Aquatic Wildlife 4-day average	0.19	NA	0.0011	0.011 ⁽²⁾	0.012	0.0032	0.00012	0.005	0.0012
3A Aquatic Wildlife 1-hour average	0.36	NA	0.0039	0.016 ⁽²⁾	0.018	0.082	0.0024	0.02	0.0041
4 Agricultural	0.1	NA	0.01	0.10	0.2	0.1	NA	0.05	NA

(1) NA means there is not a standard for this dissolved metal for this use.

(2) Standards listed for Chromium for Aquatic Wildlife are for Hexavalent chromium. Trivalent Chromium has allowable concentrations of 0.21 mg/l and 1.7 mg/l for the four-day average and one-hour average respectively.

Table 2.2 Deer Creek Reservoir Dissolved Metals (Mg/l) Water Quality Maximum Data since 1980									
Storet No. Location	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
591321 Provo River Below Deer Creek	0.002	0.082	0.004	<0.005 ⁽¹⁾	<0.02	<0.003	<0.0002	<0.002	<0.002
591322, 591323, 591324, 591343, & 591345 Deer Creek (5 sites)	<0.005 ⁽¹⁾	0.084	<0.001	<0.005	<0.030	<0.003	<0.0002	<0.001	<0.002

- (1) Where a < (less-than sign) is used, the measured sample concentration did not exceed the detection limit indicated.

Possible Contamination from Used Motor Oil

Sources of contaminants in used motor oils include metals from worn engine surfaces and from oil and gasoline additives. A summary of motor drain oil data provided by Interline Resources Corporation, a Utah oil recycling company, is provided on Table 2.3.

Table 2.3 Crank Case Drain Oil Metal Concentrations (Mg/l)									
	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Mercury	Selenium	Silver
RANGE	<1 to 3	8	<1 to 1	<1 to 24	20 to 53	10 to 756	No Data	No Data	<5
Average of values exceeding detection limit	1.8	8	1	6.8	34.3	74.5	No Data	No Data	none exceeded detection limit

An estimate of the capacity of Deer Creek Reservoir to absorb motor drain oil without exceeding the water quality use standards shown in Table 2.1 can be made by subtracting the maximum concentration reported in Table 2.2 from the most stringent water quality use standard and then multiplying the resulting concentration by the volume of water available for dilution. The average annual

runoff volume for Deer Creek Reservoir is about 261,000 acre-feet per year with a maximum storage of about 150,000 acre-feet. The average minimum storage for the last 25 years has been about 80,000 acre-feet. Using the average minimum storage as the volume available for dilution, a comparison of motor drain oil pollution absorption capability for Deer Creek Reservoir was computed as shown in Table 2.4. Lead has the least absorptive capacity in the Reservoir of any of the other metals evaluated. The 0.2 acre-feet computed oil volume translates to approximately 70,000 gallons:

Table 2.4 Deer Creek Reservoir Motor Drain Oil Metals Absorption Capability								
	Arsenic	Barium	Cadmium	Chromium	Copper	Lead	Selenium	Silver
Limiting Water Quality Use Standard (mg/l)	0.05	1.0	0.011	0.011	0.012	0.0032	0.005	0.0012
Maximum reported concentration (since 1980) (mg/l)	0.002	0.084	0.004	<0.005	<0.02	<0.003	<0.001	<0.002
Difference (mg/l)	0.048	0.916	0.007	0.006 ⁽¹⁾	NA	0.0002 ⁽¹⁾	0.004	NA
Motor Drain Oil Average concentration of values exceeding detection limit (mg/l)	1.8	8	1	6.8	34.3	74.5	NA	<5
Computed Oil Volume that could be absorbed without exceeding metals concentration standards (acre-feet)	2,000	9,000	500	70	NA	0.2	NA	NA

(1) Where measured values are less than the detection limit, the difference is computed using the detection limit.

Possible Contamination from Gasoline

Gasoline spilled from boats has a higher risk of affecting reservoir water quality due to the potential for a spill directly into the water whereas gasoline spilled onto beach areas will have a reduced risk of being incorporated into reservoir water due to evaporation.

Gasoline used as automobile and boat fuel is obtained from the distillation of crude oil and is a complex hydrocarbon mixture made up of from 200 to 1,000 individual short and long chain hydrocarbon compounds. Naturally occurring hydrocarbon compounds are identified and categorized from short chain (light

ends -- low molecular weight) to long chain (heavy ends -- high molecular weight). The notation generally used is C_1 (methane -- a gas) to C_{20+} (eicosane). The type of gasoline generally used as fuel in automobiles and boats contains hydrocarbon chains from C_5 (pentane) to C_{12} (dodecane). Winter mixtures of gasoline are slightly different in their composition and include C_4 (butane) to C_{11} (undecane) or C_{12} .

Due to the large number of constituents in gasoline, the percentage of each is relatively small. Compounds in gasoline which have significance to water quality are shown on Table 2-5.

Table 2.5 Gasoline Compounds Which Have Significance To Water Quality			
Constituent	Proportion of Gasoline by volume	Molecular Weight	Solubility (ppm)
Benzene	1 - 3%	78.11	1,780
Ethylbenzene	1%	106.17	152
Toluene	5 - 10%	92.14	515
Xylene (total)	3%	106.17	170

These compounds are not designated by a specific "C" number, however; they fall within the range noted and they are the major compounds of gasoline.

Benzene has been determined by the U.S. EPA to be a carcinogenic health hazard due to its association with significant increases in cancer among workers and lab rats exposed to this compound over extended periods of time. Based on these concerns and EPA guidelines, the state has set a drinking water standard for benzene of 0.005 ppm (parts per million) (Utah Drinking Water Board, 1993). From the data listed above, it is apparent that benzene is more water soluble than the other compounds shown and it is a light end hydrocarbon meaning that it will readily evaporate. This means that although benzene is more likely to dissolve in water than the other compounds it is also more likely to evaporate.

Ethylbenzene is not classified as a carcinogen but it does have a drinking water standard of 0.7 ppm. This value is more than a factor of 100 higher than that for benzene.

Toluene is the single largest constituent of gasoline. This compound has a water solubility about 1/3 of that for benzene and is second to benzene in molecular weight as well. Toluene has not been identified as a carcinogen but it has caused

considerable health problems. Because of these potential problems, a drinking water standard of 1.0 ppm has been established for this hydrocarbon compound.

Xylene is the final compound listed in the data above. Xylene is a heavier end, long chain, hydrocarbon with a molecular weight equal to that of ethylbenzene (106.17). Health problems have been documented by long term exposure to this hydrocarbon resulting in a drinking water standard of 10.0 ppm. This is the highest drinking water standard for the four compounds listed above.

The amount of gasoline which is incorporated into water due to a spill on the water surface is reduced by evaporation. The rate at which a hydrocarbon will go into solution is not well defined. Several research projects are currently underway in an attempt to answer this question (Buscheck 1995). For a relative answer, the U.S. EPA has published a document that gives a relative ranking for the propensity of a compound to go into solution with water (Environmental Protection Agency, 1991). They rank all volatile-organic-aromatic-hydrocarbons as being moderate to high. Specifically, high water solubility is any value greater than 1,000 ppm, moderate is greater than 1.0 and less than or equal to 1,000 ppm and low is less than or equal to 1.0 (ppm). However, the proportion of gasoline spilled onto the water surface which does not evaporate and is incorporated (dissolved) into the water is not presently available. Conservative estimates of water quality effects can be made by ignoring losses due to evaporation.

Assumptions and Background Information

1. Gasoline spillage from power boat usage is associated with refueling from cans carried on the boat. This spillage could occur at anyplace on the reservoir which is frequented by power boats. The fuel is spilled directly onto the surface of the reservoir.
2. Because the quantity of an individual spill is limited to a maximum of the size of the fuel can involved (likely less than 5 gallons), an individual spill is small.
3. A conservatively high estimate of impact can be achieved by ignoring fuel evaporation losses. Gasoline is lighter than water and any gasoline which does not dissolve into the water will evaporate off the surface. Gasoline evaporation losses from a spill on the surface of the reservoir are believed to be significant and may even represent a majority of the quantity of fuel spilled. At this time the proportion of gasoline which evaporates from a spill onto the surface of the reservoir is not known.
4. Because the volume of gasoline involved in an individual spill is small and a spill may occur at anyplace on the surface of the reservoir which is frequented by boats, complete mixing of the gasoline in the surface layer from multiple spills is a valid assumption.

5. The actual volume of water available for mixing is complex. Average annual flow through the reservoir is reported to be about 261,000 acre-feet. Average minimum carry over storage for the last 25 years has been about 80,000 acre-feet.
6. Reservoir thermal stratification and short circuiting of the reservoir through the old river bed will affect the volume of water available for mixing. However, because the outlet for Deer Creek Reservoir is low (tending to be from the lower strata) and because the surface strata becomes mixed during spring runoff, it is believed that the assumption of 80,000 acre-feet available for mixing is a conservative assumption.
7. None of the proposed alternatives will increase power boat peak usage above present usage.
8. Water quality data records do not show any indication of contamination problems from fuel leakage from power boat usage on the reservoir. Therefore it is believed that the risk of water quality impact from power boat fuel spillage is slight.
9. Because the individual spill volumes are small and take place at random over the surface of the reservoir, and because the concentration of concern is set by the drinking water standard, it is believed that effects on reservoir microbial populations would not be significant.

Benzene has the most stringent drinking water standard, is the most soluble, and makes up a relatively high fraction of the gasoline compound. Using the average minimum Deer Creek Reservoir carry over storage of 80,000 acre-feet, assuming complete mixing and no losses due to evaporation, 130 gallons of benzene would be required to produce a benzene concentration of 0.005 ppm (the maximum allowed contaminant level for benzene in drinking water) in the reservoir. Assuming a proportion of benzene to gasoline of 3 percent (maximum shown on Table 2-5) and no evaporation losses, about 4,350 gallons of gasoline would have to be spilled onto the reservoir water surface during a year to exceed the maximum drinking water contaminant level for benzene.

The above assumptions and reasoning do not hold for a major spill such as an overturned fuel tanker truck. A hazardous materials spill, especially a fuel spill from a tanker truck, could have devastating impact on reservoir water quality. Our opinion is that the risk of water quality impact from a tanker truck spill is greater than the risk to water quality from spills from power boats.

Possible Contamination from Erosion

Driving on beaches can have detrimental effects on reservoir water quality if beach soils are made more vulnerable to erosion from runoff and wave action. Beach erosion can contribute significant amounts of phosphorous to a reservoir.

Where beaches are vegetated, erosion potential is much reduced. Vehicle access to vegetated areas can impact vegetative cover and can increase soil erosion.

Possible Contamination from Organic Material

Decaying organic material, such as fecal matter from animals, in the water produces organic precursors that can react with bromine, iodine, or chlorine to form trihalomethanes (THM). The most common and most abundant trihalomethane is chloroform which is formed after chlorine is added to the water in the water treatment process. Trihalomethanes have been found to be carcinogenic in laboratory animals and the state has currently established 100 micrograms/liter as the maximum contaminant level for THM in drinking water. Water treatment plants that utilize Deer Creek Reservoir as a source are currently meeting this standard which is based on average THM measurements for four consecutive quarters, but some individual samples have approached THM concentration of 100 micrograms/liter. A concern has been raised that THM concentrations might violate stricter THM drinking water standards that may be implemented in the future. Reducing the maximum contaminant level (MCL) from 100 micrograms/liter to 80 micrograms/liter has been proposed and a future MCL of 60 micrograms/liter is being considered.

Measurements of total organic carbon from samples obtained from Deer Creek Reservoir from 1978 to 1992 have varied from 1 to 32 micrograms/liter. Data from the Utah Division of Water Quality indicate that THM concentrations in treated water from Metropolitan Water District of Salt Lake varied from less than 1 microgram/liter to 99 micrograms/liter, with an average THM concentration of about 40 micrograms/liter. THM concentrations in treated water from Salt Lake City Water Department varied from 0 to 87 micrograms/liter, with an average of about 30 micrograms/liter. THM concentrations in treated water from Salt Lake County Water Conservancy District varied from 9 to 99 micrograms/liter, with an average of about 40 micrograms/liter. THM concentrations in treated water from Central Utah Water Conservancy District varied from 0 to 63 micrograms/liter, with an average concentration of about 30 micrograms/liter. Moving averages of THM concentrations in treated water from the Salt Lake Water Conservancy District and the Salt Lake City Water Department indicate that THM concentrations at two of the treatment plants are a concern. If the MCL for THM is lowered to 60 micrograms/liter or less and treatment processes remain the same, treated water from Deer Creek Reservoir will probably violate drinking water standards.

Many sources contributing nutrients to Deer Creek Reservoir also contribute total organic carbon. Principle common sources for both nutrients and organic material include erosion and fecal material. High nutrient concentrations also induce

growth of algae in the reservoir. Algal blooms and eutrophic conditions that are associated with high nutrient concentration produce the organic precursors that eventually react with halogens to form THM.

Possible Contamination from Giardia and Cryptosporidium

The U.S. EPA is proposing to revise the Surface Water Treatment Rule (SWTR) to provide additional protection against pathogens in drinking water. Proposed alternatives under consideration for addition to the SWTR include:

- increased levels of treatment depending upon the density of giardia cysts found in the source water
- specific treatments for cryptosporidium that may also be based on the density of cryptosporidium in the source water

Because higher concentrations of pathogens in the water will result in increased treatment costs and a higher health risk, it is in the best interest of downstream water users to reduce the potential for introducing these pathogens into the reservoir. The principle source of *giardia* and *cryptosporidium* is fecal material.

The Provo River Water Users Association has requested that Reclamation not renew grazing permits for the 1,400 acres of Provo River Project lands adjacent to the reservoir. While the PRWUA recognizes that these lands represent a very small percentage of the lands that drain into the reservoir or that abut the canal they believe both the reservoir and the canal play critical roles in supplying drinking water to Utah and Salt Lake counties. In addition, PRWUA believes that EPA drinking water treatment standards are becoming more stringent, and pathogens carried by livestock such as *giardia* and *cryptosporidium* remain expensive and difficult to remove in the water treatment process (Denos, 1997).

PARTNERSHIPS (Issue 2a)

Wasatch County Profile

Wasatch County is the area that has been designated as being primarily affected by possible changes in management at Deer Creek. While it may be argued that Deer Creek Reservoir's "sphere of influence" may encompass a greater (multi-county) area, it is still apparent that any immediate impacts will first be felt in Wasatch County. Despite the county being a relatively small (772,736 acres) and rural county, Wasatch is located in the midst of several rapidly-growing neighbors, including: Summit County to the north, Salt Lake County to the northwest, and Utah County to the southwest. Wasatch has not yet begun to change as drastically as they have, nor is it projected to do so, but Deer Creek Reservoir may easily be a contributing factor if change is to occur.

For a complete analysis of Wasatch County's demographics, employment, income, and tourism refer to Appendix C of the FEA.

Wasatch County Estimated Revenue

Wasatch County benefits from five types of revenue generated by visitation to Deer Creek Reservoir:

- sales tax revenue
- gasoline tax revenue
- restaurant tax revenue
- transient room tax revenue
- revenue from federal payments in lieu of taxes

Sales Tax

In order to determine the amount of sales tax revenue generated by visitation to Deer Creek Reservoir, it is first necessary to determine the amount of spending taking place in the county by non-county residents who visit the area. Table 2.6 contains the components used to calculate this figure.

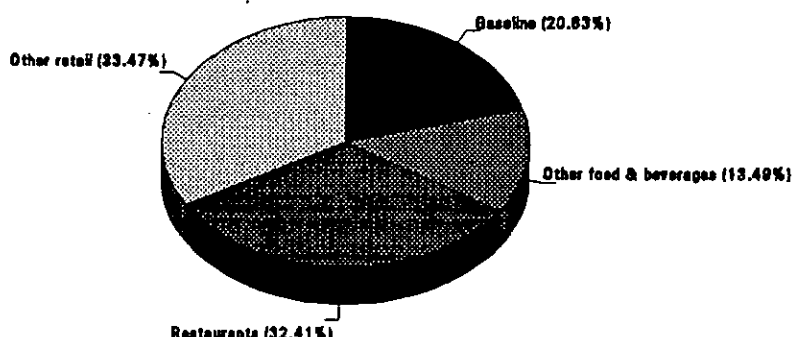
LINE	CATEGORY	SOURCE	AMOUNT
A	1994 Total Visitors	State Parks Monthly Use Reports	208,993
B	Percentage of Visitors from outside Wasatch County	1994 Deer Creek User Survey	89%
C	Total Visitors from outside Wasatch County (A x B)	Bear West Team Calculation	186,004
D	Average Number of People per Party	1994 Deer Creek User Survey	5.7
E	Total Parties from outside Wasatch County (C x D)	Bear West Team Calculation	32,632
F	Average Spending per Party per Visit *	1994 Deer Creek User Survey	\$25.00
G	Total Spending by Parties from outside Wasatch County (E x F)	Bear West Team Calculation	\$815,806

*This amount does not include park entrance or camping fees. Source: Utah Governor's Office of Planning Budget, Demographic and Economic Analysis Section.

The result, shown as Line G in Table 2.6, is \$815,806. To determine the amount of sales tax revenue that Wasatch County receives, several additional calculations are

necessary. Local-option sales tax in Utah is approximately 1 percent and is distributed based on a 50/50 point-of-sale/population formula.

Figure 2.1 Patterns of Visitor Spending



Source: *Utah Summer Visitor Survey Report*, Volume 3, Page 52, 1987.

Because the population of Wasatch County is approximately 0.59 percent of the state total (estimate provided by the U.S. Bureau of the Census), county share of sales tax can be estimated to be approximately 0.5 percent + (0.5 percent x 0.0059), or 0.50295 percent.

Figure 2.1 shows how money spent by visitors is distributed. Because approximately 79.4 percent is spent on items other than gasoline, the county revenue from this percentage can be estimated as: \$3,258 ($\$815,806 \times 0.794 \times 0.0050295$).

Gasoline Tax

Because the remaining 20.6 percent of the total is spent on gasoline, it may be estimated that each party spent roughly \$5.16 ($\25.00×0.206) in this area. Furthermore, if there were 32,632 parties who each spent this amount, then a total of \$163,161 was spent. If each party paid approximately \$1.08 per gallon, then 151,075 gallons were purchased. Finally, since the gas tax is 19 cents per gallon

and Wasatch County receives 23 percent of this amount, total taxes collected equaled \$28,704, and Wasatch County's share came to \$6,602.

Restaurant Tax

In addition to the local-option sales tax, Wasatch County also charges a 1 percent restaurant tax on the sale of all prepared meals. If 32.4 percent of total sales associated with Deer Creek Reservoir were spent on prepared meals, then revenue from this source may be estimated at \$2,643 ($\$815,806 \times 0.324 \times 0.01$).

Transient Room Tax

Wasatch County collects transient room tax from:

- all visitors who camp at the reservoir
- all visitors who either camp or rent a room elsewhere in the county (this tax only applies to hotels, motels and developed campgrounds)

For practical purposes, only the first group is considered although the total would certainly be higher if the second group were also considered. According to reports published by State Parks, Deer Creek State Park collected \$20,686 in revenue from camping fees in FY 1994. Given that Wasatch County receives 3 percent of this amount, the county collected \$621.

Payment in Lieu of Taxes

Wasatch County receives \$278,945 from the federal government as an annual payment in lieu of taxes (PILT) (this figure represents the amount recorded for FY 1993). PILT payments are paid to local governments to compensate them for the property tax that is lost due to federal land ownership. Reclamation lands, however, account for only 3 percent of this payment, resulting in \$8,944 (the other \$270,001 comes from National Forest and BLM lands). This payment goes directly to the county to be used for any governmental purpose.

When totaled, the revenue collected from these five sources (sales, gasoline, restaurant and transient room taxes and PILTs), is estimated to be \$22,068 (see Table 2.7).

Table 2.7 Wasatch County Revenue from Deer Creek by Source (GOPB, 1993)	
SOURCE OF REVENUE	AMOUNT OF REVENUE
Sales Tax	\$3,258
Gasoline Tax	\$6,602

Table 2.7 Wasatch County Revenue from Deer Creek by Source (GOPB, 1993)	
SOURCE OF REVENUE	AMOUNT OF REVENUE
Restaurant Tax	\$2,643
Transient Room Tax from Camping	\$621
Federal Payments in Lieu of Taxes	\$8,944
Total Revenue	\$22,068

Wasatch County Costs

While it is possible to estimate a figure representing Wasatch County's revenue attributable to Deer Creek Reservoir, it is much more difficult to provide a dollar amount that represents the county's costs. There are, however, four specific costs than can be identified. These include:

- ambulance service
- fire protection
- law enforcement
- garbage collection

Ambulance Service

The greatest cost to Wasatch County appears to be ambulance service. It is estimated that an ambulance was required to visit the plan area at least 10 times in 1994, and was sent from either Heber City or Wallsburg, depending on the location of the accident (Giles, 1995). It is impossible to attach a precise dollar value to this service, but when all the expenses involved are considered, the total is potentially quite high.

Fire Protection

Fire protection in Wasatch County is handled by either the Wasatch County Fire Protection Special Service District or Wasatch County, depending if the fire is a structural or a wildland fire. There have been very few fires in the plan area during the last decade that have required county services. Fires that do occur at the reservoir are often small and extinguished by State Parks staff, who have been trained to fight them. To help State Parks with fire protection, Wasatch County allows State Park staff the use of a wildland fire tanker. This has reduced Wasatch County's fire protection costs to the reservoir (Berg, 1995).

Law Enforcement

Law enforcement at the reservoir is also a concern of Wasatch County residents and officials. There has been a history of drug activity at the reservoir, and as a result, officers patrol the area regularly. Any serious crime at Deer Creek must be handled by the Wasatch County Sheriff. The county also provides a search and rescue team to handle occurrences at the reservoir when visitors are reported missing or drowned. The cost of these services can be quite high, as past events have demonstrated.

Garbage Collection

Garbage service at the reservoir is provided by the Wasatch County Solid Waste Special Service District. State Parks pays the District for this service.

Other Costs

Other costs to Wasatch County, either direct or indirect, attributable to Deer Creek Reservoir include the cost associated with planning and zoning processes around Deer Creek. (Mathis, 1995).

ENVIRONMENTAL JUSTICE

The table below displays the Deer Creek Reservoir visitor origins and the population of those communities, the population being served and not served by Deer Creek Reservoir use. No minority or low income populations are being disproportionately affected by implementation of the RMP.

Environmental Justice Review						
I. A. Population Characteristics	Number of People by County July 1, 1994¹					
I. 1. A. Population of "Sphere of Influence" Visitor Origins: Utah (43 percent), Salt Lake (34 percent), Wasatch (11 percent), Summit (5 percent), and Davis (2 percent).²	Utah	Salt Lake	Wasatch	Summit	Davis	Totals
	299,000	792,000	11,800	21,100	212,000	1,335,900

Environmental Justice Review						
B. Minority Population of Entire "Sphere of Influence" ³	20,997	112,962	474	789	16,088	151,310
I. 2. A. Population Currently Served						1,335,900
B. Minority Population Currently Being Served						151,310
I. 3. A. Populations to be Served by the RMP						1,335,900
B. Minority Populations to be served by the RMP						151,310
I. 4. A. Population Not Served						0
B. Minority Population Not Served						0

(1) = 1994 minority populations are estimates

(2) Source: Visitor Survey of Deer Creek Reservoir 1993

(3) includes Black, American Indian, Eskimo, Aleut, Asian, Pacific Islander, and Hispanic Origin
Table Source: 1997 *Economic Report To The Governor*, State of Utah. Governor's Office of Planning and Budget. January 1997

RECREATION AND VISUAL RESOURCES (Issues 3a—3c)

Recreation Resources

This environmental assessment has utilized a system used by the Forest Service and the Bureau of Land Management to assess the recreation resource. The Recreation Opportunity Spectrum (ROS) system arranges recreation opportunities along a spectrum that includes primitive, semi-primitive, roaded natural, rural and urban. For purposes of this analysis, some refinements have been made to the Forest Service ROS primarily in the description of factors affecting classification. Broad mapping displays inconsistencies between physical, social, and managerial considerations. Considerations were refined at site level to address limiting factors. A complete discussion of the recreation resource can be found in Appendix D of the FEA. Also found in Appendix D of the FEA is Map D.1 which displays the broad level ROS classes with inconsistencies.

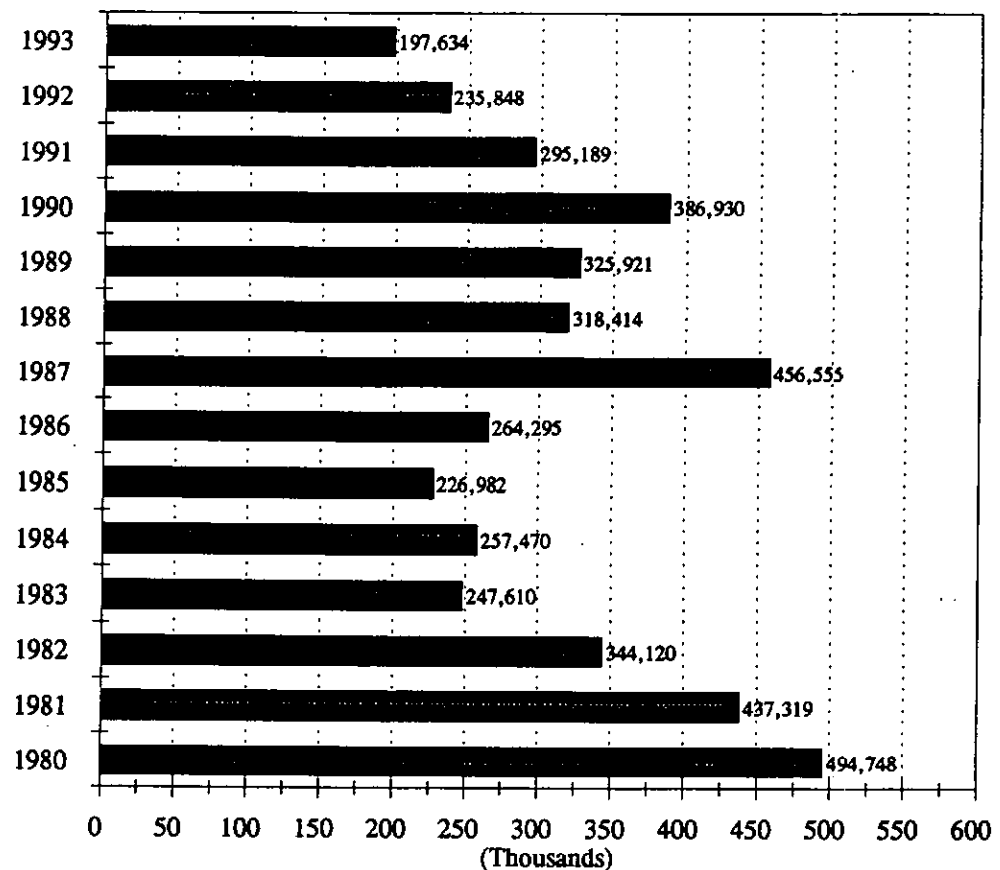
Historical State Park Visitation

The number of visits to Deer Creek Reservoir has varied considerably from year to year: from as high as 494,748 in 1980 to as low as 197,634 in 1993. (Harland, 1994) While this degree of fluctuation may be ascribed to certain factors that have precipitated change, such as: flooding, drought, problems with fish, and the installation of new facilities, it is most likely to be attributed to inconsistency in

reporting methods, as park officials have acknowledged frustrations with previous methods and have consequently experimented with new ones (Utah Department of Natural Resources, 1992).

Attendance at the reservoir peaked during 1980 at approximately 495,000. Since that time, visits have numbered over 400,000 only twice (1981 and 1987) and have averaged roughly 307,000 (see Graph 2.1). In fact, the park has experienced an average decline in visitation of almost seven percent per year (Harland, 1994).

Graph 2.1 Deer Creek State Park Annual Visitation: 1980-93

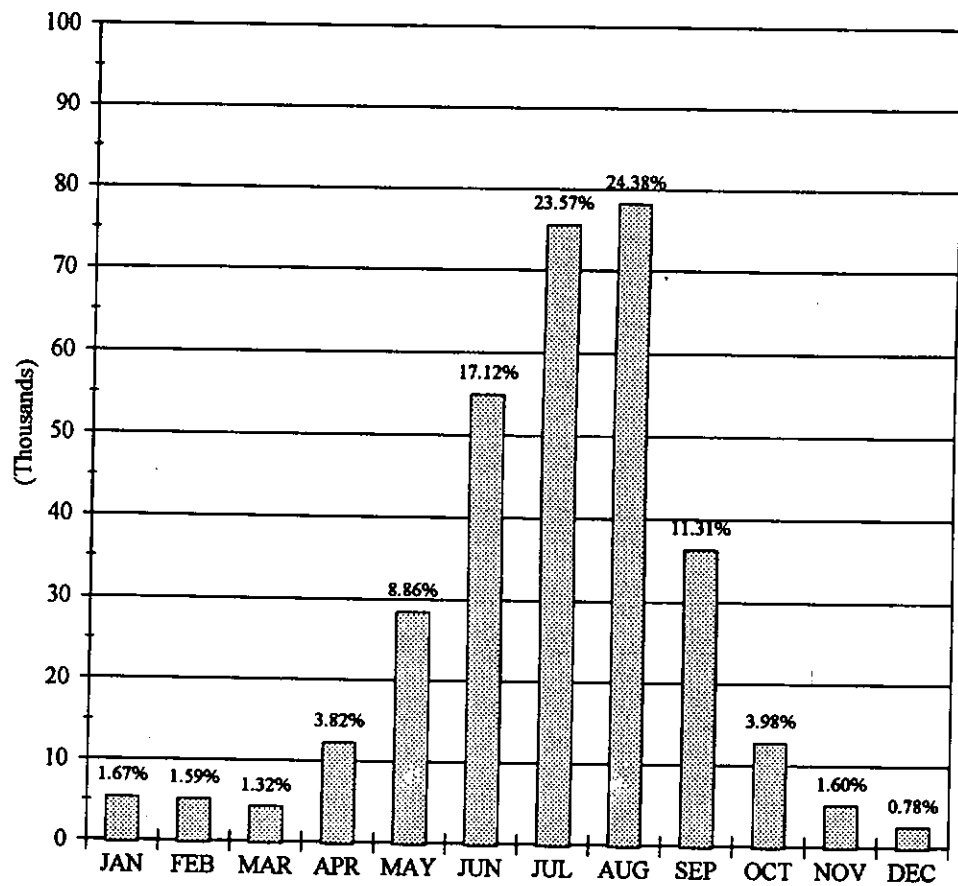


Source: Utah Department of Natural Resources, Parks and Recreation Division

Monthly visitation data is also available from 1980 to the present. The most popular month for visits to the reservoir has been August (24.38 percent of total visits), with July (23.57 percent), June (17.12 percent), and September (11.31

percent) second, third, and fourth. The least popular month for visits has been December (0.78 percent of total visits), with March (1.32 percent), February (1.59 percent), November (1.60 percent), and January (1.67 percent) close behind (see Graph 2.2) (Harland, 1994).

Graph 2.2 Deer Creek State Park Average Monthly Visitation: 1980-93



Source: Utah Department of Natural Resources, Parks & Recreation Division

Management Area Recreation Resources

The Deer Creek Reservoir plan area has been divided into 12 management areas. A map of the location of the management areas can be found in Chapter 3 of this document. A description of each of the 12 areas follows.

1. Main State Park

The area is controlled upon entry and a fee is required for day and overnight use. The developed area facilities are generally adjacent to large open water areas of the reservoir and are extensively used by people engaged in water-based activities such as water-skiing and using personal watercraft. Encounters with others varies depending on the day of the week and time of day the area is being used, but the area has the potential of high use throughout the week with very high use during summer weekends. Main State Park Area is managed for a land-based rural recreation opportunity spectrum experience.

The 64 acres of developed area include the primary transportation and access facilities at the reservoir. Included in the area is a campground with 35 regular sites, 60 overflow sites, 14 picnic sites, plumbed toilet facilities, group pavilion, boat storage, a fish cleaning station, a trailer sanitation station, a paved boat ramp, and a sailboat beach area that includes a group pavilion, 4 small pavilions, restroom and paved parking, a native surface boat ramp. There are 55 boat storage spaces and there are paved roads with parking for 250 vehicles and trailers. Up to 94 acres, of slopes less than 14 percent, are available for expansion. (State Parks, 1983)

The observation day for the boat ramp, parking and off-road vehicle use was Monday, July 25, 1994. This day was a state holiday in Utah to celebrate Pioneer Day, July 24. The weather was clear and there appeared to be a large number of users at the park. Park Ranger Mark Dean said the crowds were comparable to the July 4th weekend and that this was a fairly high usage day. Observations were made during the peak loading and unloading hours at the Main State Park boat ramp. The operation of the boat ramp was based on the number of vehicles waiting to get to the bottom of the ramp to either unload or load their boats. The boat ramp observation data tables can be found in the Project File at Reclamation's Provo Area Office.

At the Main State Park campground, approximately four vehicles and boats could be in the water at the paved ramp at one time. The boat ramps seemed to be operating fairly well with minimal delay between the hours of 7:30 a.m. to noon. They began to back up over the next half hour. From 3 p.m. to 3:45 p.m., the ramps again had minimal delay. From 3:45 p.m. until after 5 p.m., however,

multiple vehicles were backed up. Between 4 p.m. and 5 p.m., the queue was more than 10 vehicles long and the delay per vehicle was from 10 to 15 minutes.

On a peak day between 2 p.m. and 3 p.m., parking observations were made at several locations. In the main parking lot in designated stalls, 49 cars were present, 76 car/trailer combinations were present, and six spaces were vacant. In non-designated areas of the main parking lot, 15 cars and 37 car/trailer combinations were present. In the trailer camping area, 15 of 23 trailer camping stalls were full. There were eight vehicles parked at the tent camping area with seven spaces vacant.

Many vehicles also used the shoulders of the roadway leading from the gated entrance at the Main State Park to the paved ramp. On the north side of the road, four cars and 10 car/trailer combinations were present. On the south side of the road, 12 car/trailer combinations were present. Vegetation is impacted and there is some erosion as a result of vehicles parking in these areas. Paved access into the Main State Park is off of US 189 and will remain the same as the highway is upgraded. This access includes acceleration and deceleration lanes southbound as well as a left-turn entrance lane northbound.

2. *Snow's Area*

The northern side of this area has steep slopes along the shore which limit access. It is used by personal watercraft and others, is generally accessed from the water and is used for dispersed recreation. This area changes dramatically with fluctuations in water level. Due to the size and configuration of the water body in this area, water-based activities that require larger water surfaces are limited.

Snow's has a private concessionaire and has limited services for camping, boating and commercial activities. As the water level fluctuates during the summer season, the area offers very limited access for water-based activities. Other than Highway 189 passing by the area, Snow's is somewhat secluded from the rest of the activities based at the reservoir. The area is managed for a land based urban recreation opportunity spectrum experience.

Facilities include a 60-unit campground, boat moorage and rentals, a gravel boat ramp, a retail store and parking for 250 vehicles. Approximately nine of the 39 acres of slopes less than 14 percent have been developed (State Parks, 1983).

Snow's Area began operating as a marina in the early 1940s, shortly after the completion of Deer Creek Dam. There are three small frame outbuildings located adjacent to the retail store which appear to date to the 1940s. However, according to the current owner and operator of the marina, there are none of the existing

structures on the property date to the early operation of the facility. The existing structures were likely moved to the Snow's area from another location at a later date.

When the reservoirs' water level is low, the area accommodates camping and day-use. When the water level is normal to high, water fills to the entrance off of US Highway 189.

The highway sight distance looking north from Snow's area is poor. The access road into the area is native surface.

3. Area Between Snow's and the Rainbow Bay Area

Most people view this area from the reservoir, as they drive along US Highway 189 or from Heber Valley Historic Railroad. The few informal highway exits provide access to unpaved vehicle trails in this area. The area is used by wintering of elk and deer herds. There are no formal parking areas for wildlife viewing and cars parked along the highway cause traffic hazards for commuters. Hunters have historically used this area and the vehicle trail as entrance points for areas farther to the southeast. The area is managed for a land based semi-primitive recreation opportunity spectrum. There are no facilities in this area except a few non-designated pull-out/parking areas adjacent to US Highway 189.

4. Rainbow Bay Area

The Rainbow Bay area is formed by two land masses that protrude into the water. The area is easily accessed from Highway 189 by two gravel turn-off areas used for parking adjacent to the highway. From these parking areas there is pedestrian-only access to the water, approximately 100 yards away. The area is used for picnicking and waterplay. Often, visitors launch watercraft from other areas and then rendezvous at Rainbow Bay with other members of their party. The area is managed for a land-based rural recreation opportunity spectrum.

Non-designated informal parking that can accommodate more than 100 vehicles is located off the side of US Highway 189. The area is otherwise undeveloped, with the exception of vault toilets. Approximately 64 acres are potentially developable at this location (State Parks, 1983).

There are several pullouts along US-189 used for parking to access Rainbow Bay. They range in size to accommodate from two to approximately 30 vehicles. These pullouts were observed on a peak day to estimate their usage. Throughout the morning hours, usage in these lots was minimal to none. By mid-afternoon, however, usage had increased. At a pullout directly across from Rainbow Bay,

usage increased from six to 28 throughout the day. At a pullout at the southern end of the bay, usage increased from two to 29 throughout the day. These two locations seemed to have the highest usage. Of the observed parking areas, drainage facilities would be most beneficial at the north and south ends of the bay. A list of observed overflow parking areas can be found in the Project File at Reclamation's Provo Area Office.

5. Island Bay Area

Island Bay Area has recently been upgraded. It is controlled upon entry and a fee is required for day use. The area provides picnic sites, beaches, and grass areas. Vehicle access is restricted to the paved parking spaces provided. The area is managed for a land based urban recreation opportunity spectrum experience.

A concessionaire operates the facilities at this location, which include boat moorage, gasoline sales, retail store and restaurant, personal watercraft, fishing and sailboat rentals and windsurfing lessons. The area has approximately 250 parking spaces, a concrete boat ramp, 14 small picnic pavilions and one group pavilion, and flush restrooms. Thirteen of the area's 25 acres of slopes less than 14 percent are currently developed (State Parks, 1983). There is a fenced storage area for boats at the south end of the parking area. The owners of the storage area load the boats on the designated ramp for their customers.

Operation of the ramp was observed on a peak day in 1994. Approximately two vehicles and boats could be in the water at the unpaved ramp at one time. The ramp is not in good condition. One van got stuck in the mud and had to be pushed out. A sport-utility vehicle also got stuck in the mud but was able to rock itself out. The boat ramp had minimal to no delay throughout the observation times (8 a.m. - 11 a.m., 2:30 p.m. - 4:30 p.m.). To address the condition of the ramp, Reclamation and State Parks began construction to harden the ramp in 1997.

In addition to the ramp, several people loaded boats and personal watercraft directly from the beach to the water. There is also a dock used for loading people and goods.

Parking was observed on a peak day between 4 p.m. and 4:30 p.m. Nineteen cars and five car/trailer combinations were present in the north parking lot and there were approximately 80 vacant spaces. In the south parking lot, 20 cars and 26 car/trailer combinations were present with approximately 120 spaces vacant.

There was extensive parking at Island Bay along the beach. Observations were made throughout the day. At approximately 9:30 a.m., eight vehicles were observed parked on the beach. At approximately 11 a.m., 35 vehicles were

observed parked on the beach. By 4 p.m., 165 vehicles were observed parked on the beach. Most vehicles were parked along the east shore.

6. *Wallsburg Area*

The Wallsburg area is similar to the land area between Snow's and Rainbow Bay. Most people view this area from the highway or from Island Bay Area. The area is primarily used for grazing and wildlife winter range. The primary recreational use is wildlife viewing. Island Bay provides a safe parking area for viewing the wintering herds of elk and deer. It is also used as an access point for hunters going into the higher mountain ranges to the south. The area is managed for a land based roaded-natural recreation opportunity spectrum experience.

Along US Highway 189, there are access points available for off-road use. A dirt road across from the Island Bay entrance is blocked with a no trespassing gate. A sign is posted for no fires or camping. Along US 189, little off-road access or use was observed. The only observed access to areas where off-road vehicle impacts were obvious was across from the entrance to the Main State Park. One vehicle was observed using this road during a peak day, July 25, 1994. Disturbed vegetation was observed along this same road. There are no facilities.

7. *Charleston Bay Area*

The small rural town of Charleston is just east of the reservoir. Private land abuts Reclamation's lands along the edge of the water. The surface water in this area has limited access by land and is shallower than the rest of the water body. Motorized water activity is a predominate use due to the proximity of the Island Bay boat launching area.

The Charleston Bay area changes as the seasons and water levels change. The Provo River enters the reservoir in this area. The area has mud flats, riparian vegetation and other wetland elements. Water activities are limited in this area most of the year, but other land-based activities, such as picnicking and nature study are readily accessible. The area is managed for a land-based rural recreation opportunity spectrum experience.

Seven acres of less than 14 percent slopes have been developed at this day-use area (State Parks, 1983). There is a picnic area with tables developed among the trees. Additional facilities include a dirt boat ramp, vault toilets and unpaved parking for approximately 70 vehicles. A fee is required. Access is from State Route 113 via a dirt road.

8. West Side Area

There are several areas along the west side of the reservoir that are undeveloped, but accessible by watercraft or jeep trail. They include Hoovers and Scott's hollows and others. While there are jeep trails, the gates at the top of Scott's Hollow are locked. While these areas offer some opportunity for seclusion, there are frequent sights and sounds of others. The Heber Valley Historic Railroad passes through the area, sometimes four times daily (two trips down and two trips up the canyon). This area is used primarily as a picnicking and rendezvous point for recreational boaters. The water area from Scott's Hollow to Island Bay is one of the most used areas by watercraft, due to its central location on the reservoir. In addition, Wasatch County owns a strip of land (for a future road) along the length of the west side of the reservoir.

The steep shoreline and nearby railway on the west result in watercraft-only access points. The area is managed for a land-based roaded-natural recreation opportunity spectrum experience.

9. Provo (Little) Deer Creek Area

Recreation use in this area is different from most of the areas within the plan area due to the lack of fishing activity. It is not adjacent to the reservoir and the primary recreational activities are picnicking, camping, hiking, off-road motor vehicle use and sightseeing. The area is also connected to Cascade Springs by a four-wheel-drive trail. Much of the use occurs during the day by people who are attracted to the area because of its proximity to Utah Valley and Heber Valley. The area is managed for a land based roaded-natural recreation opportunity spectrum experience. There are no public facilities offered in this area. There are two access points. Access is provided from both Cascade Springs from the west and US Highway 189 from the east.

On Saturday, July 2, 1994, a license plate study was conducted to determine the usage of Provo (Little) Deer Creek Road. One observer was located at the north end of Provo (Little) Deer Creek Road, which connects Charleston to Cascade Springs. The other observer was located at the south end of Provo (Little) Deer Creek Road, which connects the dam to Cascade Springs. The observation time period was from 9 a.m. to 6 p.m. Each observer recorded the license plate, direction of travel and time for each vehicle that passed them.

The intent of this study was to see if vehicles were using the road to travel from the dam to Charleston. Several vehicles were observed entering/exiting through the same entrance point to Provo (Little) Deer Creek Road during the day. Several vehicles were also observed either entering or exiting at an entrance point once during the day. No vehicles were observed traveling from one entrance point to

the other. Therefore, the road is not used significantly, if at all, to travel from the dam to Charleston. The results of the study are found in the Deer Creek RMP Project File, Reclamation's Provo Area Office.

Provo (Little) Deer Creek Road is passable with four-wheel-drive or other off-road vehicles, including mountain bikes. For most of its length, it is not passable with two-wheel-drive vehicles. It is estimated that this road is used for local recreation, and not as a thoroughfare.

10. Housing Area

There are three residential buildings owned by Reclamation that are currently being used. There are no public recreational facilities. Two of the residential structures and 16 other facilities represent the remaining portion of the Deer Creek Dam government construction camp. This location was used as a temporary residential camp and staging area for workers involved in the construction of the dam. Sometime between 1938 and 1940, Civilian Conservation Corps workers constructed a number of facilities at the camp, including buildings, roads and a sprinkling system (Humpherys, 1940). The area is managed for a land based rural recreation opportunity spectrum experience. The access to the housing and Little Deer Creek Road from US Highway 189 will be realigned when the highway is reconstructed.

11. Lower Provo River Area

The area along the Provo River is accessible to automobiles and is used as an informal camping area. It appears heavily used and there is no designation of camping or picnicking sites. It is isolated from the reservoir, but is adjacent to the riparian character of the Provo River as it leaves the reservoir and flows down Provo Canyon.

The character of the area is semi-improved due to heavy use and the graded gravel road. Encounters with other humans will vary depending on the day of the week and time of day the area is being used. Sounds of vehicular traffic are frequent due to the busy nature of the highway.

There is a private campground immediately outside of the plan area that has designated campsites, maintained landscape, controlled access gates, permanent structures and facilities. The near constant vehicular traffic on the nearby highway creates more evidence of human activity. The highway is being redesigned and traffic volumes are anticipated to increase. Redesign may have a greater impact to the area because of increased traffic and major modifications to the landscape with cuts and fills and enlargement of the dam structure. The area is managed for a land based roaded-natural recreation opportunity spectrum experience.

This area is accessed from the highway in several locations. These access points are dirt roads and the area has informal parking.

12. Dam/Primary Jurisdiction Zone Area

There is no public recreation in this area. The area is managed for a land based urban experience.

Deer Creek Recreation User Profile

In July and August 1994 seven survey days, consisting of five week days and two weekend days were selected to conduct a representative sample survey of Deer Creek Reservoir visitors.

Two hundred and ten questionnaires were passed out to visitors coming through the various entrance points to the reservoir. A total of 204 responses was returned and coded in the computer for analysis, a cooperation rate of 97 percent. A copy of the content analysis may be found in the Project File. The analysis of the findings may be found in Appendix E of the FEA and the data summary may be found in the Project File.

Summary of Findings

The majority of visitors to the Deer Creek Reservoir in August 1994 came from five counties: Utah, Salt Lake, Wasatch, Summit, and Davis. When asked how often they visited the reservoir, the respondents indicated an average of 10 times per year. Their usual length of stay at the campground was approximately 1 day, with only 15 percent indicating that they camped overnight (Utah Department of Natural Resources, 1994). This represents a decline from a decade ago.

The preferred activities at the reservoir identified during the survey were boating, waterskiing, and swimming.

Scoping efforts and visitor surveys demonstrate that the following improvements are desired at Deer Creek Reservoir:

- Additional facilities for windsurfers (changing rooms and a "windtalker")²
- Better concessions in both summer and winter months
- Dry storage service for boats
- Enhanced marina services
- Area-specific development (for example at Sailboat Beach, Snow's, Rainbow Bay, Island Bay and Charleston Bay)

The 1990 Utah Household Recreation Survey, conducted in conjunction with the 1992 Utah SCORP (State Comprehensive Outdoor Recreation Plan), indicated that the

following improvements were desired in Wasatch County (only those relevant to Deer Creek Reservoir are listed):

- New walking/hiking areas
- New areas for bicycling
- More camping facilities

The survey also indicated that the following improvements were desired statewide:

- New areas for bicycling
- New walking/hiking areas
- More picnic areas
- More developed campgrounds

While the reservoir was primarily dominated by anglers, it is now dominated by boaters, personal watercraft and water skiers. In 1982, there were 166,799 visitors who came to the reservoir to fish, compared to 33,192 who came to boat and water ski—a ratio of 5 to 1. In 1993, however, there were only 14,527 visitors who came to fish, compared to 78,830 who came to boat and water ski, a ratio of 0.18 to 1. There has also been a significant decline in campers over the last ten years. (Van Genderen, 1994).

Participants in the 1994 survey were asked to identify where they spent the greatest amount of their time. Approximately 28 percent indicated that the Main State Park was their most preferred area, and reported that they liked to relax, have cookouts, camp (in both tents and RVs), water ski, fish from boats, and swim there. The second most preferred area was Island Bay Area (25 percent), where visitors liked to windsurf, boat, water ski, sunbathe and camp in RV's. The area least preferred by respondents was the north end of the reservoir, near Charleston (Utah Department of Natural Resources, 1994).

The most preferred areas to fish at the reservoir were Rainbow Bay on the east side and Scott's Hollow on the west side. Preferred areas for windsurfing were Island Bay, between the Main State Park and Island Bay, and west of Sailboat Beach. Virtually every area at the reservoir was mentioned as a preferred area for camping, swimming, sunbathing, water skiing, and boating (Utah Department of Natural Resources, 1994).

Watercraft Use

Using current information and best professional judgement about current watercraft use at Deer Creek Reservoir, Reclamation has determined the number of watercraft per day to be analyzed for each alternative be based on the existing condition.

Watercraft per day represents a total number of watercraft during a 24 hour period having access to the reservoir. All of the watercraft in the plan area will not be on the reservoir surface at one time and there are various "shifts" during the day when watercraft are active and when certain types of watercraft are actively using the water surface. However for this analysis, the information available for Deer Creek Reservoir is the number of watercraft on any given day.

The number of watercraft arriving in the plan area on one day is often 700. This number is considered to be the maximum for the reservoir which appears to be crowded especially on peak days.

To determine how many surface acres of water are being used per watercraft, the number of watercraft on the reservoir is divided by the total number of surface acres at Deer Creek (3,000). Under existing conditions there are about four (4.3) surface acres per watercraft.

Watercraft Safety

The number of watercraft accidents on Deer Creek Reservoir has been low considering it has consistently been one of the most popular reservoirs in the state. Table 2.8 displays the number of recorded accidents at the reservoir from 1984 to 1994.

Table 2.8 Accidents at Deer Creek Reservoir: 1984 to 1994		
YEAR	NUMBER OF ACCIDENTS	NUMBER OF VISITORS
1984	1	257,470
1985	2	226,982
1986	1	264,295
1987	0	456,555
1988	9	318,414
1989	1	325,921
1990	2	386,930
1991	not available	295,189
1992	6	235,848
1993	2	197,634

Table 2.8 Accidents at Deer Creek Reservoir: 1984 to 1994		
YEAR	NUMBER OF ACCIDENTS	NUMBER OF VISITORS
1994	14	208,993
Total	38	3,174,231
Average	3.8	
	Less 1991 *	2,879,042
	One accident per number of visitors	75,764.26

Source: Utah Department of Natural Resources, Parks & Recreation Division.

*1991 visitor numbers are eliminated because the number of accidents is not available.

As the table demonstrates through 1994, there was an average of 3.8 accidents per year at the reservoir, or approximately one accident for every 75,764 visitors. This is significantly lower than the state average, which was approximately one accident for every 28,900 visitors.³

In 1994, however, there was a large increase in the number of accidents at Deer Creek Reservoir, with the total escalating to a high of 14. This figure represents a ratio of one accident for every 14,928 visitors, putting the reservoir above the state average.

Deer Creek Reservoir has experienced a distinct visitor transformation from in the last decade from anglers to boaters. Because boaters, personal watercraft users and waterskiers require more physical space and move with greater speed, there has been increased conflict between uses and more accidents. The greatest safety concern, however, seems to be with personal watercraft. All of the 14 accidents reported in 1994 involved personal watercraft, and in some cases they involved only personal watercraft (Tripp, 1995).

For Deer Creek Reservoir, this EA considers the "number of watercraft" in regard to safety. The alternatives provide a range of numbers of watercraft allowed at the reservoir in the belief that the number of craft on the reservoir has a relationship to safety, even though it is not the exclusive factor.

VISUAL RESOURCES

The quality of the visual environment has become increasingly important to the public as an important consideration for resource managers. People perceive, process and evaluate their leisure and recreation experience based primarily on what they see. Land use planners, recreation planners and others have developed different methods to help define and manage this important resource. This EA has used the Visual Management System (VMS), developed by the Forest Service (Green, 1980), to evaluate the visual resources for Deer Creek project lands.

The Visual Management System is an acknowledged national process for assessing, evaluating and developing management strategies for the visual environment. Under the VMS system, the visual resource is classified according to how visible the resource is to the viewing public (*distance zones*: primarily foreground and middleground), the quality of landscape (*variety class*: distinctive, common, or minimal) and the level of the public's concern for the scenic or visual quality of an area such as areas viewed from the Scenic Byway US 189, and any other travel routes, use areas, and water bodies (*sensitivity level*). Based on this information, direction for managing the visual resource is provided (*visual quality objectives*: categories that describe varying degrees of acceptable alteration of the natural environment). The elements of the system are explained and mapped for the plan area in Appendix F Map F.1 found in the FEA.

The existing Visual Resource Objectives (Scenic Integrity) for specific areas are displayed on the following photographs.



MAIN STATE PARK AREA

USBR Photograph 5-21-98

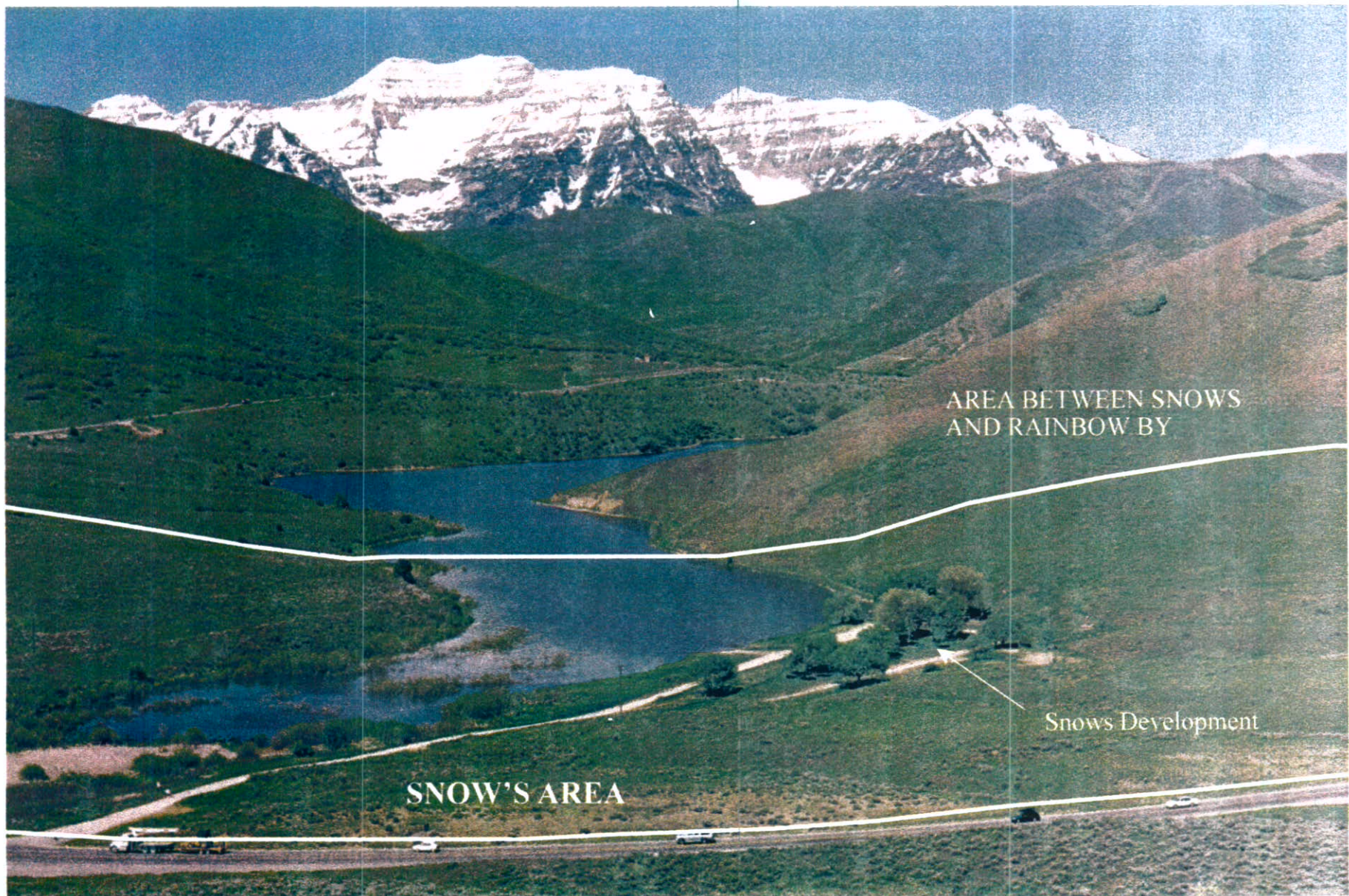
Looking East
Modification VQO; Low Scenic Integrity



MAIN STATE PARK

Looking down the boat ramp
Heavy water craft use

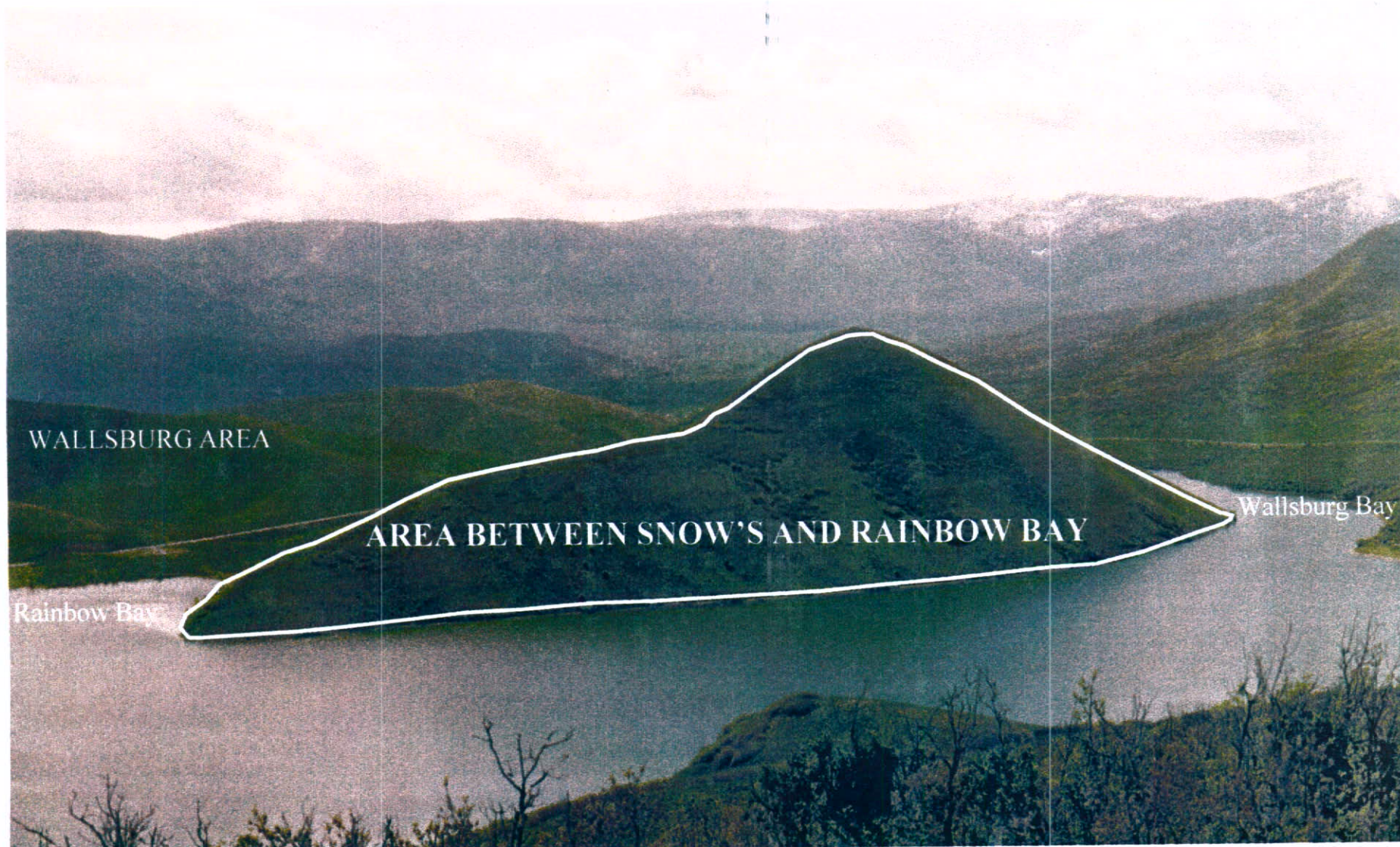
Utah State Parks Photograph 9-5-94



SNOW'S AREA

USBR Photograph 5-21-98

Looking west across US 189 into Wallsburg Bay
Partial Retention VQO; Moderate scenic integrity



AREA BETWEEN SNOW'S AND RAINBOW BAY

USBR Photograph 5-21-98

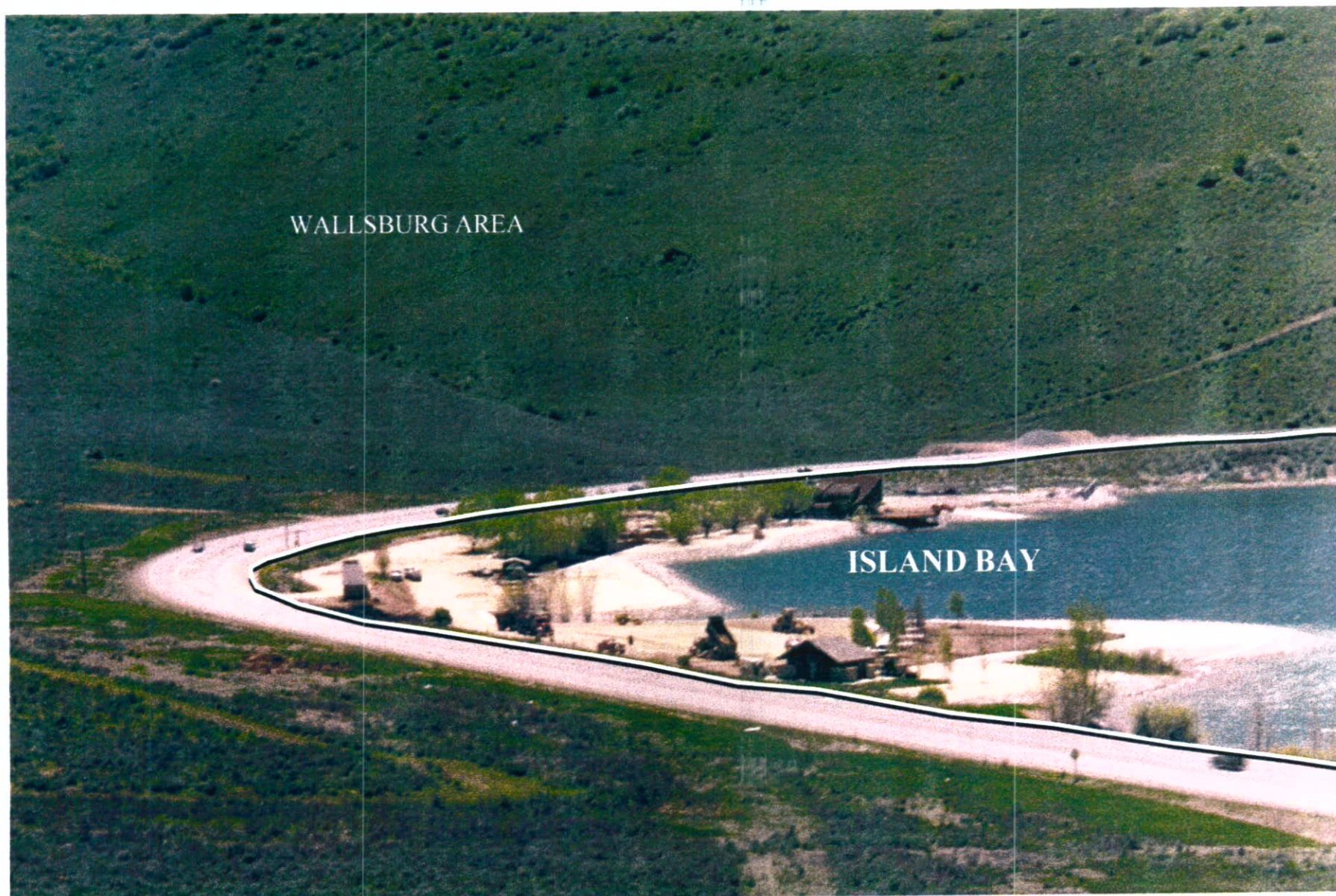
Looking East
Retention VQO; High Scenic Integrity



RAINBOW BAY AREA

USBR Photograph 5-21-98

Looking North
Partial Retention VQO; Moderate Scenic Integrity



ISLAND BAY AREA

USBR Photograph 5-21-98

Looking South
Modification VQO; Low Scenic Integrity



ISLAND BAY

Looking South
Heavy Day-use Recreation

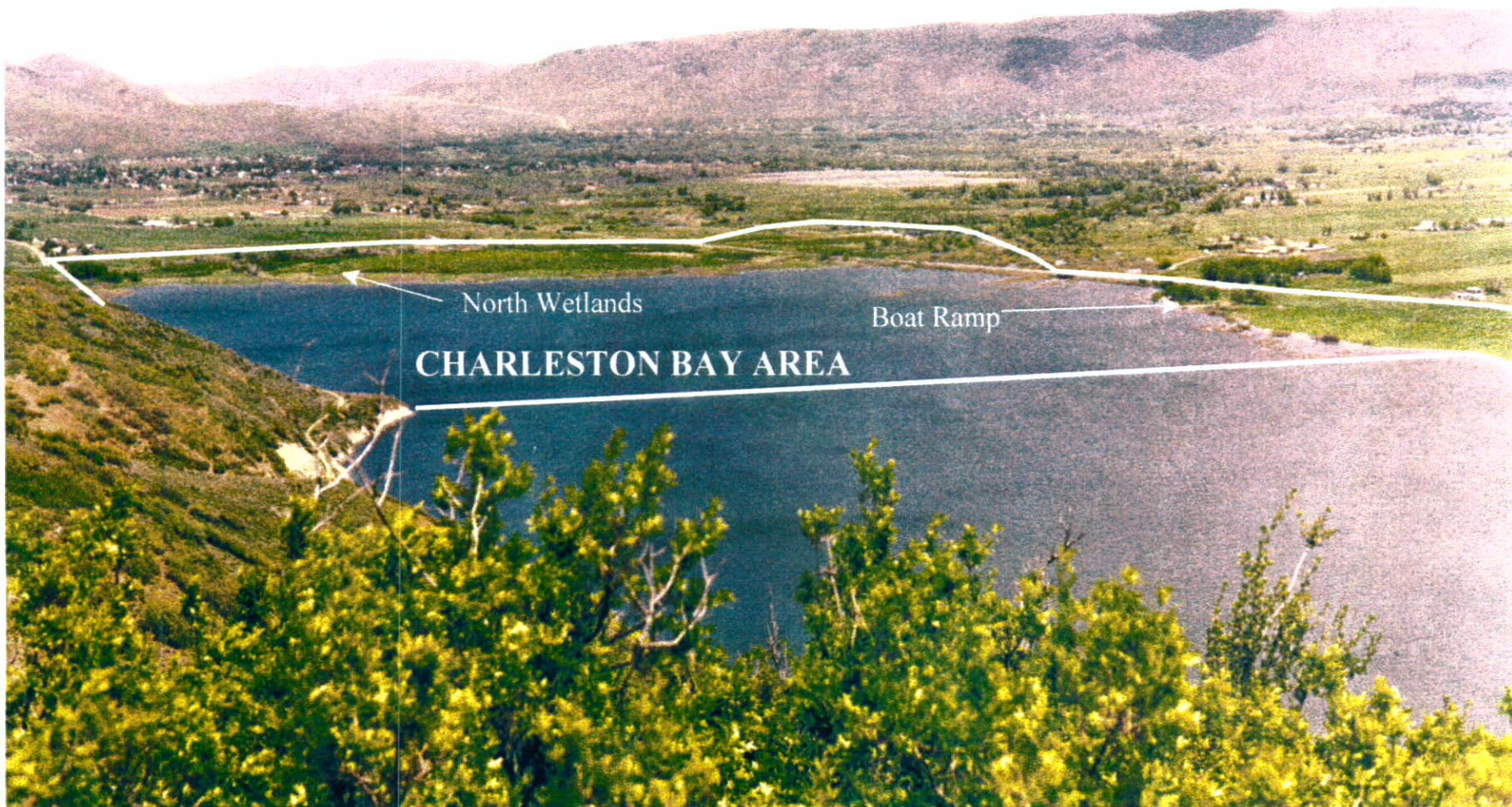
State Parks Photograph pre 1998



WALLSBURG AREA

USBR Photograph 5-21-98

Looking Southeast
Partial Retention VQO; Moderate Scenic Integrity



CHARLESTON BAY AREA

USBR Photograph 5-21-98

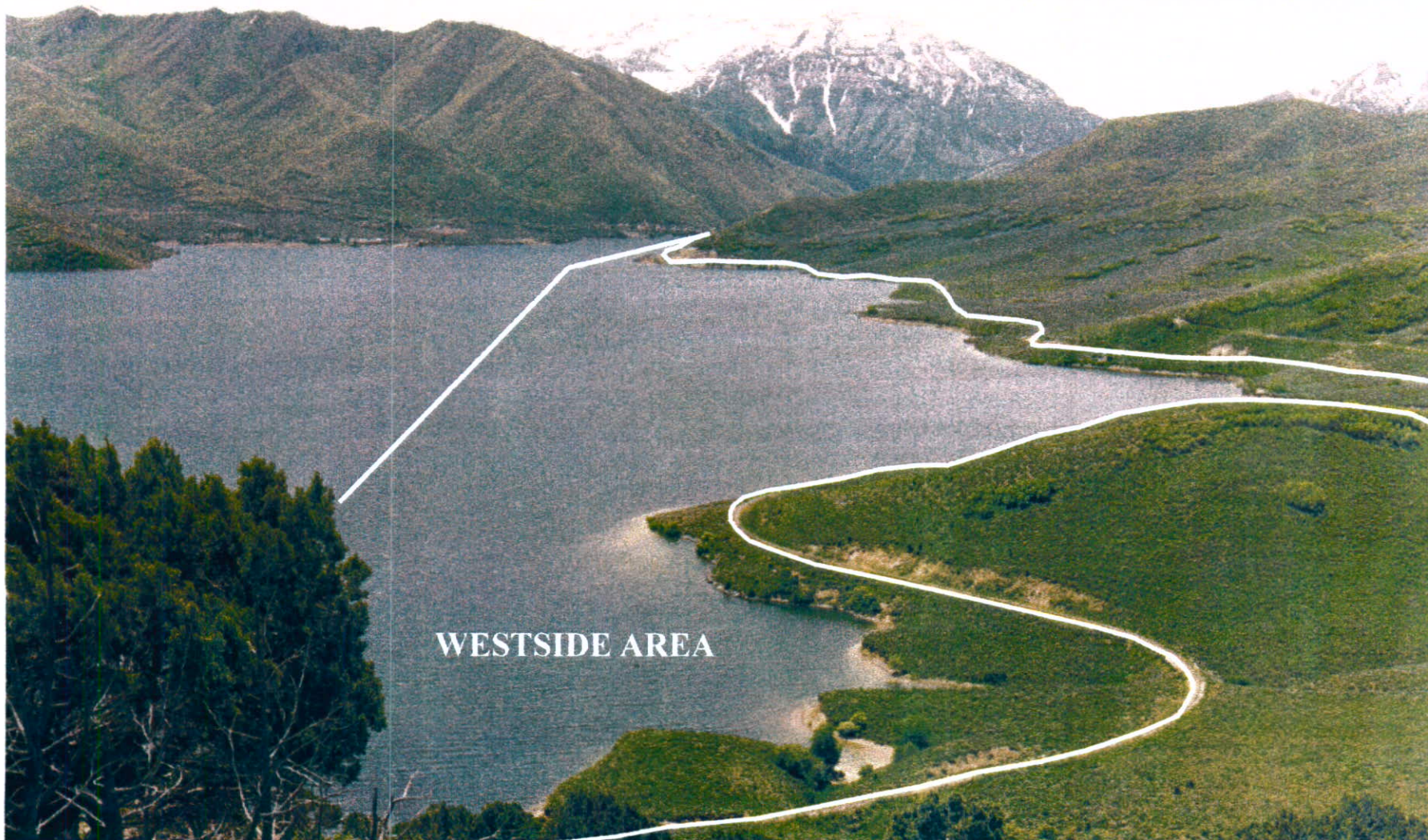
Looking North
Partial Retention VQO; Moderate Scenic Integrity



CHARLESTON BAY WETLANDS

USBR Photograph 5-21-98

Looking North Along the West Side



WEST SIDE AREA

USBR Photograph 5-21-98

Looking down reservoir
Modification VQO; Low Scenic Integrity



WEST SIDE AREA

USBR Photograph 5-21-98

Looking Down Reservoir
Modification VQO; Low Scenic Integrity, Bank Erosion



PROVO (LITTLE) DEER CREEK AREA

USBR Photograph 5-21-98

Looking Down Canyon Across Little Deer Creek
Partial Retention VQO; Moderate Scenic Integrity



PROVO (LITTLE) DEER CREEK AREA

USBR Photograph 5-21-98

Stream at High Water



HOUSING AREA

USBR Photograph 5-21-98

Looking Down Canyon and Easterly
Modification VQO; Low Scenic Integrity



DAM PRIMARY JURISDICTION ZONE

USBR Photograph 5-21-98

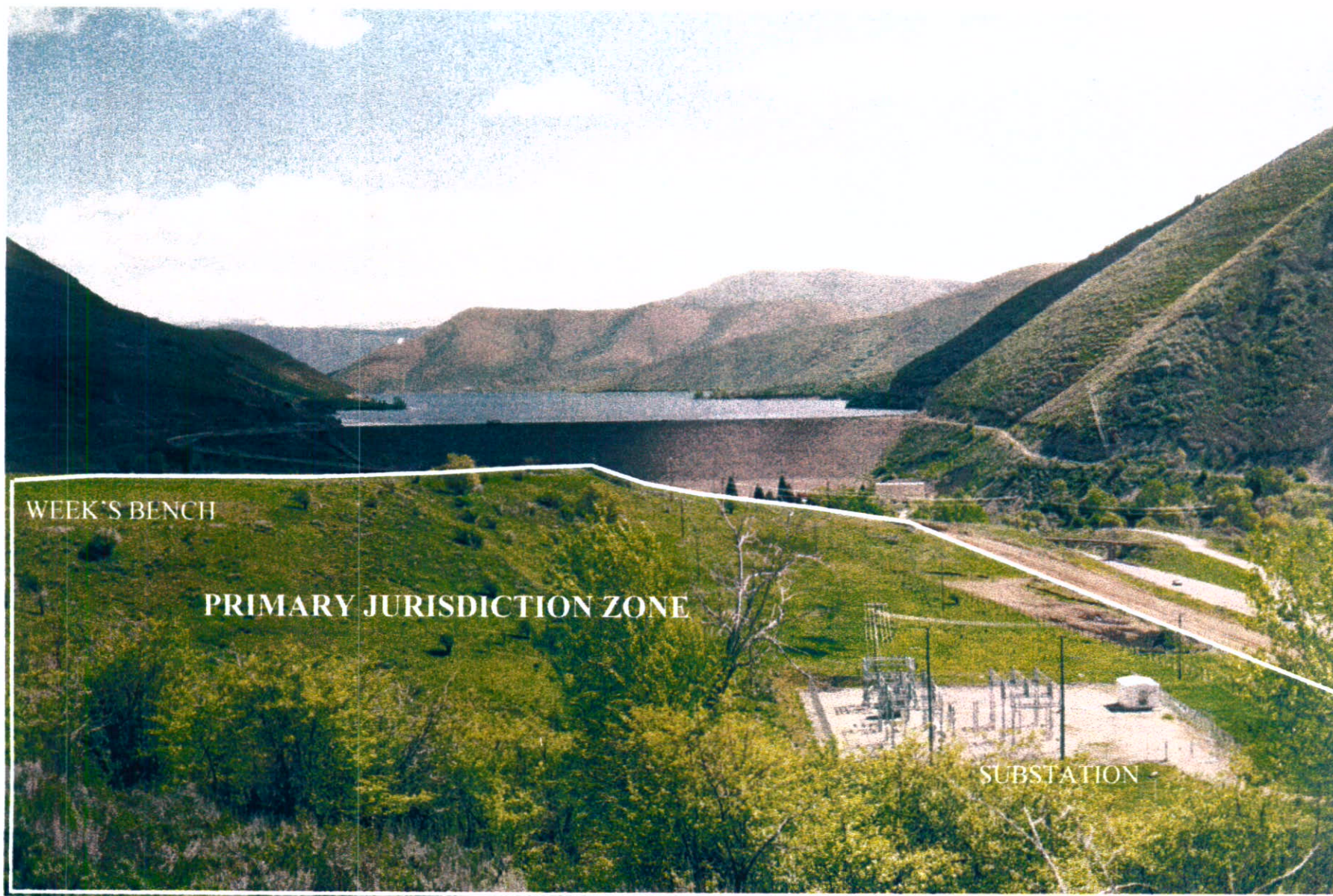
Looking Easterly
Maximum Modification VQO; Very Low Scenic Integrity



DAM PRIMARY JURISDICTION ZONE

USBR Photograph 5-21-98

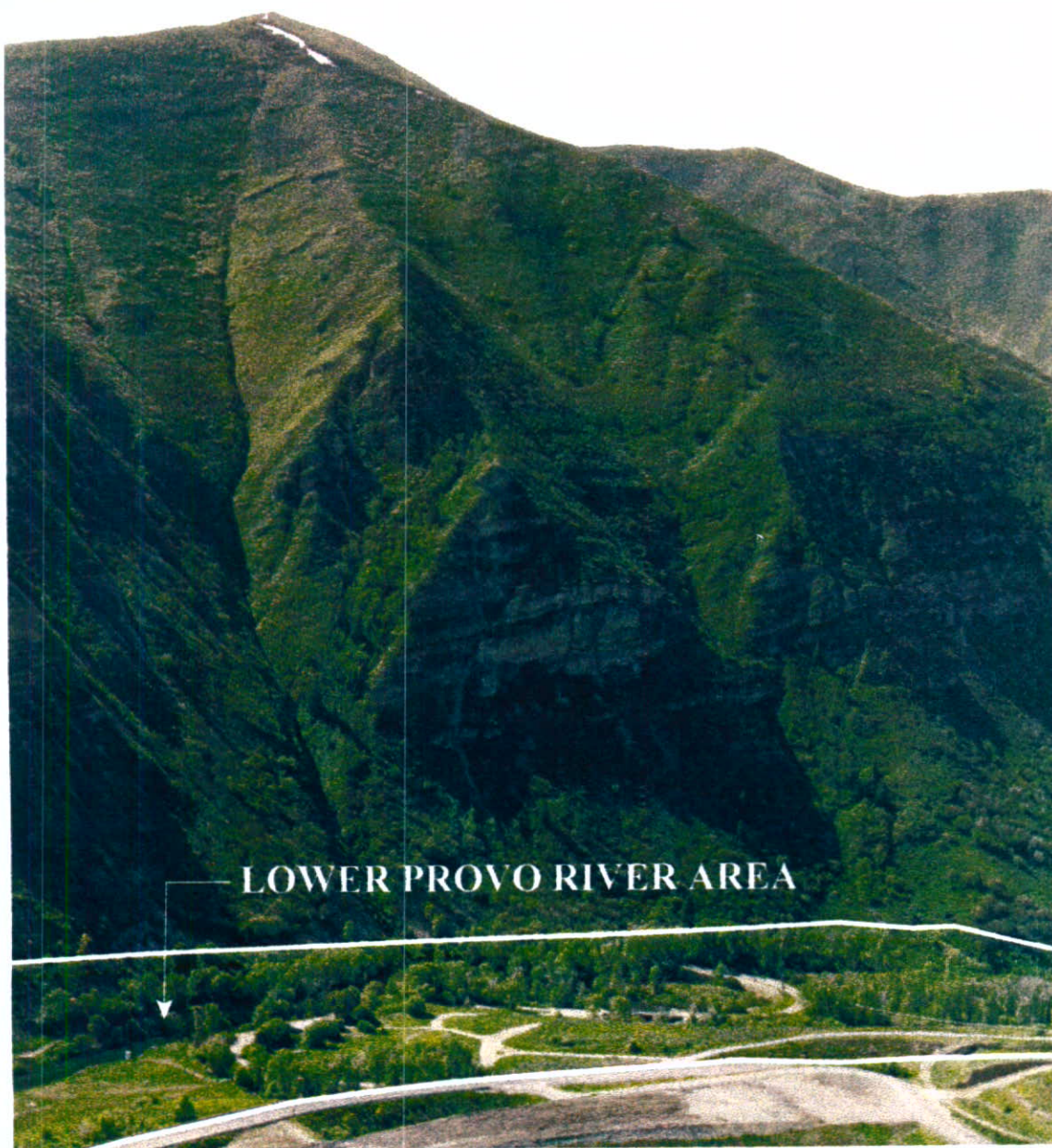
Looking Westerly at Borrow Areas and Wall
Maximum Modification VQO; Very Low Scenic Integrity



PRIMARY JURISDICTION ZONE

USBR Photograph 5-21-98

Looking Up Canyon
Modification VQO; Low Scenic Integrity



LOWER PROVO RIVER AREA

LOWER PROVO RIVER AREA

Looking East
Partial Retention; Moderate
Scenic Integrity

USBR Photograph 5-21-98

NATURAL AND CULTURAL RESOURCES (Issues 4a—4f)

Soils and Geology

Deep soils around Deer Creek Reservoir are derived primarily from mixed sedimentary rocks eroded from the Wasatch Mountains through gravity or deposited by streams (Woodward et al., 1976). Most of the sedimentary rocks are mixed, interlayered, limestones, sandstones and orthoquartzites. Refer to Appendix G of the FEA for a complete discussion of the geology and soils of the area.

Vegetation

Vegetation varies in response to several physical factors present, such as soil depth, soil moisture, temperature, slope aspect and steepness. Vegetation in the plan area contains a variety of upland and wetland vegetation communities. The plan area contains four terrestrial vegetation cover types: Oak and Oak/Maple woodland, Sagebrush, Grassland, and Urban/Unvegetated landscape (see Map 2.1). The classification of these vegetation types was modified from that presented in the U.S. Highway 189 EIS (UDOT, 1988). Table 2.10 displays the total number of acreage by habitat type.

Table 2.10 Total Acres by Habitat Type	
Habitat Type	Acres
Riparian Shrub - Willow	114.13
Riparian Forest - Cottonwood	30.51
Emergent Marsh - Cattail	5.56
Emergent Marsh - Reed Canarygrass/Knotweed/Sedge	42.50
Emergent Marsh - Wet Pasture/Agriculture	103.63
Emergent Marsh - Other	23.05
Deciduous Forest-Oak and Oak/Maple	671.55
Sagebrush	2516.84
Grassland	254.13
Unvegetated Upland/Urban Landscape	146.30
Unconsolidated Bank	48.11

Table 2.10 Total Acres by Habitat Type	
Habitat Type	Acres
Open Water	2,426.60
Total Acreage	6,382.91

A complete discussion of the vegetative types and their condition during the time of the survey and a list of the plant species observed is provided in the FEA in Appendix H.

Climate

The climate of the Heber Valley Area, including Deer Creek Reservoir, is continental. It is characterized by low humidity, abundant sunshine for most of the year except winter and early spring, relatively light precipitation, and wide ranges in annual temperature. A complete discussion of the climate can be found in Appendix I of the FEA.

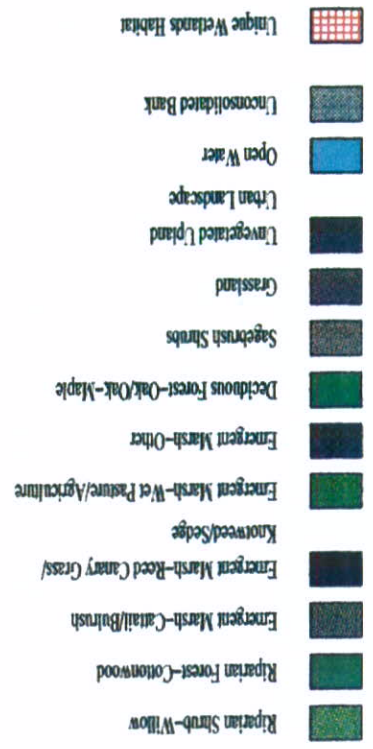
Threatened and Endangered Plant Species

Ute lady's tresses (*Spiranthes diluvialis*)⁴, a federally-listed threatened orchid, is found in riparian and wetland areas of the Provo River corridor (USFWS, 1994). A species that is not currently in danger of extinction but may be in the foreseeable future is classified as threatened.

Ute lady's tresses occurs in seasonally moist soils and wet meadows near springs, lakes, or perennial streams and their associated flood plains below 6,500 feet in elevation in parts of Utah, Colorado, and Nevada. The orchid typically occurs in old stream channel and alluvial terraces, subirrigated meadows, and other sites where the soil is saturated to within 18 inches of the ground surface at least temporarily during the spring or summer growing season. The plant grows primarily in areas where the vegetation is relatively open and not overly dense, overgrown, or overgrazed, although it is found in some heavily disturbed sites such as along old berms, in old gravel mines that are now wetlands, and in grazed pastures. Soils supporting Ute lady's tresses are usually associated with alluvial deposits of silty, gravelly, or cobbly soil, although it may occasionally be found in highly organic soils or peat. Ute lady's tresses seem to prefer well-drained soils with a fairly high moisture content which may have hydric characteristics such as gleying and mottling but are generally not strongly anaerobic. Ute lady's tresses

Habitat Map Deer Creek Project Area Map 2.1

Unique Wetlands Habitat	Unconsolidated Bank
Open Water	Urban Landscape
Unvegetated Upland	Grassland
Sagebrush Shrub	Deciduous Forest-Oak/Oak-Maple
Emergent Marsh-Other	Emergent Marsh-Wet Pasture/Agriculture
Knowweed/Sedge	Emergent Marsh-Reed/Canary Grass
Emergent Marsh-Cattail/Bulrush	Riparian Forest-Cottonwood
Riparian Shrub-Willow	



often occurs in association with other wetland and riparian plant species such as grasses, sedges, rushes, horsetails, and willows, most of which are classified as Facultative Wet or Obligate species indicative of wetlands (USFS, 1992).

Two known populations of Ute lady's tresses are located within the Heber Valley, although both occur a significant distance (approximately 6 miles) north of Deer Creek Reservoir, along old stream channels in the alluvial plain of the Provo River. Because much of the wetland and riparian areas along the Provo River within the plan area were inundated by the original construction of the Deer Creek Dam, there is very little habitat that would currently support populations of Ute lady's tresses. The only potential wetland and riparian habitat remaining within the plan area is in the vicinity of Charleston Bay. Much of this area is both too densely vegetated (particularly with monocultures of reed canarygrass) and too often entirely inundated by standing water to support Ute lady's tresses. However, the Charleston Bay area was inspected during both the vegetation and the wetland surveys completed on the site; no Ute lady's tresses was discovered during any of these surveys (Hansen, 1994). Although previously common along the Provo River corridor, Ute lady's tresses likely does not currently occur within the plan area.

Wetlands

Wetlands observed at Deer Creek Reservoir include both jurisdictional wetlands and non-jurisdictional wetlands as well as jurisdictional waters of the United States. Jurisdictional waters of the United States includes the area defined by the high water line of Deer Creek Reservoir and the actual streams feeding the reservoir.

More than 20 wetland areas were sampled around Deer Creek Reservoir. Cover estimates (a measure of dominance), height, and frequency (a measure of distribution or dispersion) were recorded for each species. Summarized data are found in the project file available from Reclamation's Provo Area Office.

Seven wetland types were identified within the Deer Creek Reservoir Plan Area. Nomenclature for these types is generally consistent with nomenclature used by the Utah Department of Transportation EIS in describing wetland resources along U.S. Highway 189 (UDOT, 1988), however, a few of the types have been combined into single categories as they did not appear to represent unique wetland types. The acreage for each type is shown on page 2-33. Distribution of these wetland types is displayed on Map 2.1, Habitat Map of Deer Creek Reservoir. The wetland types include:

- Riparian Forest – Cottonwood
- Riparian Shrub – Willow

- Emergent Marsh – Cattail/Bulrush
- Emergent Marsh – Reed Canarygrass/Knotweed/Sedge
- Emergent Marsh – Wet Pasture
- Unconsolidated Bank
- Open Water

The full description of each wetland type and their condition at the time of the survey can be found in Appendix J of the FEA.

Wildlife

Introduction

As indicated in the vegetation section above, 11 habitat types occur within the plan area and are utilized by wildlife. Included in these habitat types are individual occurrences of important habitat elements such as rock outcroppings. Wildlife occurring within the plan area are discussed in the following sections: Big game; other mammals; raptors; waterbirds and upland gamebirds; other avifauna; reptiles and amphibians; fish; and threatened, endangered, and candidate species. Field surveys were conducted as part of this planning process, during July and September of 1994. A Habitat Evaluation Procedure (HEP) developed by the U.S. Fish and Wildlife Service (USFWS) in 1976 to provide a standardized, quantitative system for evaluating habitat quality and assessing impacts was conducted for Deer Creek Reservoir. A complete discussion of the HEP can be found in Appendix K of the FEA.

Big Game

Moose, elk, mule deer, black bear, and mountain lion comprise the big game species known to occur in the plan area. Each of these species, except black bear, have been observed within the plan area. Although black bear were not observed on site, black bears occur on a casual or rare basis in the Oak and Oak/Maple type (Smith and Associates, 1987).

Moose are permanent residents on a casual or rare basis in riparian zones within the plan area (Smith and Associates, 1987). During the winter 1995, about a dozen moose were observed in riparian zones from Deer Creek up to Decker Canyon (Jense, 1995).

Much of the eastern edge to the plan area between the Wallsburg Junction and the town of Charleston serves as critical winter habitat for elk. As of June 1993, the Wallsburg Unit of the Heber Wildlife Management Area (adjacent to the project area on the east side of Island Bay) supported up to 300 wintering elk from the Diamond Fork Elk Unit (UDWR, 1993). The Utah Division of Wildlife Resources

has developed a plan to provide high value winter range for deer and elk in the Wallsburg Area. The vegetation habitat types most commonly utilized by elk include Sagebrush and Grassland (Smith and Associates, 1987). Elk also occur, albeit less frequently, in the Oak and Oak Maple habitat type.

In addition, UDWR observed 40-50 elk wintering in the Wasatch Mountain State Park area and another 150 elk in Dutch Hollow during the winter of 1995 (Jense, 1995).

Mule deer are present year round in the plan area. The entire western edge of the area and the eastern edge between the dam and the junction of State Route 113 and Highway 189 are considered winter range for this species (Smith and Associates, 1987). In general, the more severe the winter, the farther deer will come down toward the reservoir from the surrounding mountains. During the winter of 1995, UDWR estimated that between 250 to 1,000 deer and more than 400 elk were present in the Wallsburg Area (Jense, 1995). Adjacent land just east of this Wallsburg Area, the Heber Wildlife Management Area: Wallsburg Unit, is owned and managed by the UDWR for the benefit of big game. The Wallsburg Unit provides 20 to 30 percent of the winter range for the Heber Deer Herd Unit (UDWR, 1993). Vegetation cover types used by the mule deer include Riparian Shrub and Riparian Forest, Oak and Oak/Maple, Sagebrush and Grassland.

Other Mammals

Other mammals and mammal sign observed during field visits to the Deer Creek Reservoir plan area site include yellow-bellied marmot, least chipmunk, golden-mantled ground squirrel, meadow vole, northern pocket gopher, deer mouse, muskrat, porcupine, coyote, and striped skunk. Other state sensitive species with potential to occur within the plan area include the northern flying squirrel (SD), ringtail (SD), and river otter (SP/SD). Smith and Associates (1987) listed the northern flying squirrel as common in riparian habitats. The ringtail, though not observed by Smith and Associates (1987) was listed as an uncommon, year-round resident in their equivalent of the Oak and Oak/Maple habitat. The riparian zone along the Provo River below Deer Creek Dam is considered critical habitat for the river otter, a species that is restricted throughout its range (Smith and Associates, 1987). For a complete list of mammal species with potential to occur in the plan area refer to the FEA, Appendix K, Table K.1.

UDWR sensitive species of Special Concern Classification: SP – any wildlife species that has experienced a substantial decrease in population, distribution and/or habitat availability; SD – a species that occurs in limited areas and/or numbers due to a restricted or specialized habitat; SP/SD – a species with both of the above characteristics.

Raptors

Several species of raptors occur within the area. Raptors observed on-site during July of 1994 include the golden eagle, American kestrel, osprey (SD), red-tailed hawk, sharp-shinned hawk, northern harrier, and turkey vulture (Pioneer, 1994). The majority of these species were observed in flight. The eagle sightings were in the cliff areas just east of the dam and up Deer Creek Canyon. It was in this area that a golden eagle was observed performing an undulating flight pattern associated with territorial display (Pioneer, 1994). The American kestrel was observed throughout the plan area. Five individuals were sighted in four different areas from the riparian zone below the dam to the wetlands on the north end of the reservoir. American kestrels were also observed in the Sagebrush Shrubs habitat type east of Island Bay and in the riparian zone at the Chalet of Wasatch Mountain State Park. In 1995 an osprey nest was located (Utah Natural Heritage Program data) and in 1997, one young fledged successfully from the nest. (USFWS 1998)

Other raptors known to have occurred within the plan area in the past include Swainson's hawk (SP), Cooper's hawk, great horned owl, and short-eared owl (SP) (Smith and Associates, 1987). Other sensitive species identified by UDWR as having potential to occur in the vicinity of Deer Creek Reservoir include the ferruginous hawk (T),⁵ and the northern goshawk (SP). For the scientific names of the above species refer to the FEA, Appendix K, Table K.2.

Waterbirds and Upland Game Birds

Waterbirds include waterfowl, shorebirds, and other wading birds typically associated with wetlands and bodies of surface water. A variety of waterfowl species including Wilson's phalarope, eared grebe, western grebe, Canada goose, mallard, northern pintail, gadwall, northern shoveler, green-winged teal, cinnamon teal, redhead, American coot, California gull, ring-billed gull, and Franklin's gull have been observed within the plan area (Pioneer, 1994). Shorebirds and other wading birds observed on site include American avocet, willet, killdeer, spotted sandpiper, black-necked stilt, white-faced ibis, great blue heron, and sandhill crane. Deer Creek Reservoir provides high quality habitat for waterbirds due to the prevalence of emergent wetlands on the north end of the reservoir as well as in Wallsburg Bay and the mouth of various small drainages around the reservoir. These areas provide important forage and cover sites for waterfowl and wading birds. For scientific names of the above species refer to the FEA, Appendix K, Table K.3.

The only upland game bird observed on-site was the ring-necked pheasant. This individual was utilizing the Sagebrush habitat type just south of Scott's Hollow

where Decker Creek enters the reservoir (Pioneer, 1994). Other upland game birds known to occur in the plan area include gray partridge, sage grouse, mourning dove, and chukar (Smith and Associates, 1987). The ruffed grouse, blue grouse, and California quail are listed as species which may occur in the plan area but have not been observed during more recent surveys. Although not observed during field surveys, the prevalence of the Sagebrush habitat suggests that the plan area could be important lekking habitat for sage grouse (SP/SD). No information is available concerning the presence of mating area sites (leks) within the plan area.

Other Avifauna

A variety of songbirds and similar species associated with terrestrial habitats reside within the plan area. These species include sparrows, warblers, thrushes, vireos, swallows, black birds, woodpeckers, and hummingbirds. Field survey team members directly observed 38 of these species within the plan area (Pioneer, 1994). For a list of these species and other avifauna likely to occur within the plan area refer to the FEA, Appendix K, Table K.4. Other than osprey, the only species of special concern to UDWR that occurs within the plan area is the bobolink (SP/SD). This species was not observed during the 1994 survey nor by Smith and Associates (1987). Nevertheless, a breeding colony has been identified as present within the plan area (UDOT, 1988).

Reptiles and Amphibians

There are 11 species of reptiles and five species of amphibians with potential to occur within the Deer Creek plan area (see FEA, Appendix K, Table K.5). Of these, the Utah mountain king snake and the Utah milk snake are listed as UDWR SP sensitive species. However, neither Smith and Associates (1987) nor the 1994 field survey reported observing these species on site. The Great Basin rattlesnake is the only reptile species that was identified during the field survey within the plan area. This snake was seen on the railroad tracks on the west side of the reservoir adjacent to Oak and Oak/Maple habitat but may occur in any of the upland habitat types. No recent field studies have specifically examined the species composition, distribution, and abundance of reptiles and amphibians at Deer Creek Reservoir.

The only amphibian species of special concern with potential to occur at Deer Creek Reservoir is the spotted frog (*Rana luteiventris*). The spotted frog is a UDWR Conservation Species (CS)⁶. The spotted frog, typically occurs in cool, clear, spring-fed water with an organic substrate and a variety of emergent, floating, and submergent vegetation (Morris and Tanner, 1969 in: Ross et al., 1993). Ross et al. (1993) found a population of spotted frogs on the Provo River near its entrance

to Deer Creek Reservoir. Thus, this species is could occur on the north end of the plan area.

Fisheries

Several species of trout, largemouth bass, yellow perch, and walleye are the common sport fishes present in the reservoir. Green sunfish, Utah chub, and carp are also present. Deer Creek Reservoir is ranked as high priority fish habitat by UDWR. A complete list of fish species occurring in the reservoir is contained in Appendix K, Table K.7 of the FEA.

UDWR stocked Bonneville cutthroat trout (*Oncorhynchus clarki utah*) (CS) in the Provo River upstream from the Olmstead Diversion Dam on November 1, 1993 (USFWS, 1994). As a result, some of these fish may now inhabit a portion of the plan area in the Provo River just downstream of Deer Creek Dam.

Three of the game fish present in the reservoir are known to have breeding populations. These species include yellow perch, largemouth bass, and walleye (Lewellen, 1969, in: Smith and Associates, 1987). Perch spawn in the spring with the most successful spawning occurring when there is an abundance of aquatic vegetation (Sigler and Miller, 1963, in: Smith and Associates, 1987). Largemouth bass reproduce in the spring. This species prefers spawning habitat comprised of clean gravel beds within the reservoir. Growth of largemouth bass tends to be sub-optimal due to the reservoir's cool summer water temperatures (UDWR, 1976; in Smith and Associates, 1987). Walleye spawn in the early spring and migrate up tributary streams or into shallow areas of the reservoir to deposit eggs. Mountain whitefish and brown trout, while present in the reservoir, do not play a significant role in the fishery (Smith and Associates, 1987). These species have been collected primarily in the inlets of the tributaries and are probably not breeding in the reservoir (Smith and Associates, 1987). The principal fishery of Deer Creek Reservoir is rainbow trout. Rainbows are annually stocked as catchables and growth patterns of this species are similar to those in similar waters throughout the state (Smith and Associates, 1987). Rainbow trout do not reproduce in the reservoir.

Nongame fish including carp, Utah chub, and green sunfish reproduce in Deer Creek Reservoir and serve as forage fish for the game species. These species spawn from early spring to midsummer in the shallower portions of the reservoir (Smith and Associates, 1987).

The two main tributaries to Deer Creek Reservoir, the Provo River and Main Creek, are habitat for several game species. The Provo River is considered an important fishery where it enters the reservoir on the north end (Smith and

Associates, 1987). The river contains rainbow, albino rainbow, cutthroat, brown, and brook trout; mottled sculpin; mountain sucker; leatherside chub (UDWR SP); speckled and longnose dace; and redbase shiner. Like Deer Creek Reservoir, the Provo River and Main Creek are considered high priority habitat by UDWR. They contains rainbow, cutthroat, brook, and brown trout, as well as walleye. Nongame fish in Main Creek include leatherside chub, redbase shiner, speckled dace, and longnose dace (Smith and Associates, 1987). Portions of other tributaries contained within the project area boundary include Snake Creek, Daniels Creek, and Decker Creek. Snake Creek merges with the Provo River near the river's entrance to the reservoir. It is considered high priority habitat and contains rainbow, brown, and brook trout; carp; mountain sucker; and mottled sculpin (Smith and Associates, 1987). Daniels and Decker Creeks are not known to contain fish within the stretches contained in the project area. UDWR lists Daniels Creek as limited value habitat and Decker Creek is unranked.

Threatened, Endangered, and Candidate Animal Species

A threatened, endangered or candidate status is assigned to individual species by the USFWS. Species that are in danger of extinction in all or significant portion of their range are designated as endangered. A species that is not currently in danger of extinction but may be in the foreseeable future is classified as threatened. Candidate species are those where there is enough information on biological vulnerability and threats to list as endangered or threatened.

The U.S. Fish and Wildlife Service identified several endangered, threatened and candidate wildlife species with potential to occur in the Deer Creek Reservoir Plan Area (See FEA, Appendix K for letter from USFWS, 1994). The USFWS endangered species with potential to occur in the plan area include the peregrine falcon (*Falco peregrinus*), and the June sucker (*Chasmistes liorus*).⁷ The bald eagle (*Haliaeetus leucocephalus*), a threatened wildlife species has been identified for this area and the USFWS candidate species, the mountain plover (*Charadrius montanus*). The golden eagle, though not covered by the Endangered Species Act, warrants special consideration by virtue of its inclusion in the Eagle Protection Act and the Migratory Bird Treaty Act.

Neither the 1994 field survey nor Smith and Associates (1987) have identified the peregrine falcon in the vicinity of Deer Creek Reservoir. Due to the lack of sightings and of high quality habitat in the plan area, it is thus assumed that this species does not occur in the area.

The June sucker, while not present in Deer Creek Reservoir, may occur downstream in lower portions of the Provo River and in Utah Lake.

Bald eagles, on the other hand, were observed by Smith and Associates (1987) as rare migrants through riparian and agricultural habitat types. Large cottonwoods along the Provo River below the Deer Creek Dam provide potential winter roosting habitat for this species.

A known golden eagle nest occurs just below Deer Creek Dam. Two eagles were observed during the 1994 field survey in Deer Creek Canyon below the dam to the west, one of which was engaged in undulating flight suggesting territorial defense.

The mountain plover breeds in the Western Great Plains and winters in California's Central Valley and south to Southern California and Central Mexico. It is highly unlikely that this species would occur at Deer Creek Reservoir except as a brief visitor during migration.

Range Resources

A major portion of the Reclamation lands surrounding Deer Creek Reservoir are rangelands. Soil types, steepness of slopes, rockiness, and climate make these areas unsuitable for cultivation. The use of these areas for livestock grazing, wildlife, recreation, and watershed contribute to the economy of the area and is a valuable asset to the surrounding communities. The productive soils and high annual rainfall (from 16 to 35 inches) typically produce a high amount of forage for livestock and big-game. Livestock uses primarily consist of grazing by sheep and cattle with sheep grazing being the dominant livestock use.

Differences in soil and climate throughout the site result in different range sites. A group of soils that naturally grow the same climax plant communities comprise a range site. Range sites found in the project area include: Upland Stony Loam; Mountain Stony Loam; Mountain Shallow Loam; Mountain Loam; Mountain Gravelly Loam; and Upland Loam (Grandy and Mason, 1976).

Livestock grazing on or adjacent to Reclamation lands occurs primarily on three areas adjacent to Deer Creek Reservoir. These areas include:

- Charleston Bay Area
- Deer Creek Sheep Allotment (located on the northwest side of the reservoir)
- Wallsburg Area (located next to UDWRs Wallsburg Unit (Wildlife Management Area 16,000 acres))

Following is a discussion of the management practices used in each of these areas, the species of livestock grazed, and the season of use.

Charleston Bay Area

The east side of SR 113 in the Charleston Bay Area has a 40 acre in-holding parcel which is used for hay production only and no grazing of livestock is known to occur. Reclamation has a flood easement for this parcel. Water quality has been a concern for this area in the past due to nutrient fertilization with liquid manure.

On the east and west side of SR 113, land is owned and managed by Reclamation. Historically, the area has been used for both sheep and cattle grazing with no restrictions placed on season of use.

Deer Creek Sheep Allotment

The Deer Creek Sheep Allotment is currently part of the Allotment Management Plan (AMP) for the Pleasant Grove Ranger District, Uinta National Forest and Wasatch Mountain State Park (USFS, 1990). The plan also includes land owned by Deseret Title Holding Corporation. Areas of concern in the AMP for this project include the Soldier Hollow and Scott's Hollow units because they border Reclamation land along the north-western portion of the reservoir and are not separated by fencing. The adjacent lands to the south of the allotment are owned by Deseret Title Holding Corporation and are currently managed by State Parks primarily because fencing does not exist on this area either (or if it does exist, it is in extreme disrepair). Therefore, sheep can access the reservoir directly along the length of the west side of the reservoir.

Since 1990, the Deer Creek Allotment has been managed as a rest rotation grazing system which utilizes a six-unit system which allows two of the six units to be fully rested annually. Sheep are managed with an "open herding style" (herded by shepherd and no use of fencing) to avoid unneeded soil disturbance and forage trampling. "Once-over" grazing is the primary management objective. The grazing prescriptions are designed to meet the resource objectives outlined in the Uinta National Forest and Wasatch State Park management plans. These objectives include:

- Improve livestock grazing management to meet basic physiological requirements of desirable forage species and maintain a stable upward trend in range conditions
- Improve desirable plant species composition and forage production on key areas
- Improve livestock distribution
- Coordinate sheep grazing with wildlife use and recreational activities;
- Improve stream bank stability
- Improve riparian vegetation
- Achieve at least 70 percent or greater total ground cover

- Develop diversified vegetative cover types to benefit key wildlife species
- Provide improved trout spawning and rearing habitat in tributary streams
- Improve permittee maintenance of all range improvements

The permitted use of the allotment is for 1,200 head of sheep with a season of use from June 1 to September 30 each year for a total of 4,800 sheep months. The annual grazing schedule including the season of use by unit is found in USFS (1990). The AMP specifies the proposed range improvements, monitoring, and evaluation. After the 1995 grazing season, the AMP will be evaluated by measuring the success of the management objectives.

USBRs Wallsburg Area

Prior to 1984, the UDWR leased the 1,400 acre Wallsburg Area along the east side of the reservoir (south of US 189 and north of SH 222) and adjacent to the Wallsburg Unit. Since 1984, the grazing rights have been leased by the West Daniels Cattle Association. This has resulted in management problems for the UDWR because no fence exists along the 4.5 mile common boundary. Recently, UDWR has attempted to gain management control of the Wallsburg Area from Reclamation. Currently the West Daniels Cattle Association has an agreement with UDWR on a two year basis to graze the adjacent UDWR Wallsburg Unit in conjunction with the Wallsburg Area.

UDWRs Wallsburg Unit

The UDWR Wallsburg Unit consists of three separate management units. These units consist of the Big Hollow Unit (located east of the main ridge and is north facing, the Wallsburg East Unit, and the Wallsburg West Unit (which contains the Reclamation land). Approximately 5,000 acres are included in the three management units. Current use is rotated in a deferred-rest rotation grazing system between the East and West Wallsburg Units.

The current grazing program offers 200 AUMs (Animal Unit Months—the amount of forage required to sustain a mature cow and her calf for one month) for the approximately two month grazing season (May 15 - June 30). The current grazing scheme is to not graze the Big Hollow pasture because the majority of the unit is summer range and transitional range, not winter range. In addition, the unit has had a history of livestock trespass problems due to the availability of water.

The Utah Division of Wildlife Resources is also concerned about use of the unit in the fall by cattle which are moved off the adjacent lands. The cattle are allowed to drift off the land and are not actively herded which results in a loss of feed available for elk in the winter. The Utah Division of Wildlife Resources feels that

actively herding the livestock off the property would allow more forage to remain for the use of elk in the winter (Fairchild, 1994).

CULTURAL RESOURCES

Forty-four cultural resource sites have been recorded in and near the plan area. These sites include 20 prehistoric, 23 historic and one property containing both a prehistoric and historic component. No paleontological localities are listed as being located within the current plan area.

The prehistoric and historic sites found in the vicinity of the Deer Creek Reservoir suggest the type of occupation expected for these two periods. Prehistorically, the area was probably occupied seasonally and may have served, most importantly, as a corridor for hunting or foraging groups traveling between the Heber Valley and Utah Valley areas. This suggestion is borne out by the large number of small lithic and campsites located in the area. The presence of such small, limited activity areas suggest short term occupation. It is possible, however, that there were larger habitation sites which once existed along the Provo River which are now inundated by Deer Creek Reservoir.

Historically, the area served as an important corridor for travel, not only between the Utah and Heber valleys, but for travel to the Uinta Basin and beyond. It also served, to a limited extent, as an area of occupation and enterprise for dairy farmers. Later, the presence of the Provo River and geologic features in this part of the Provo Canyon presented an ideal location for construction of the Deer Creek Dam and Reservoir.

The Deer Creek Dam Complex including the earthen dam and spillway, the valvehouse/power plant, office building, gate house, chlorination building, two storage buildings and regulating gate, and a chemical treatment building located east of the dam are considered important historical structures. The complex retains integrity of location, design, setting, materials, workmanship, feeling and association and represents an excellent example of a government dam construction project undertaken during the first half of the 20th century. The dam construction represents a good example of rolled earth filled dam, it embodies the distinctive characteristics of 1930s dam construction and, at the time of construction in 1938 was one of the largest earthen filled dams in existence. This site has been recommended to the National Register of Historic Places as an excellent example of a government dam construction project undertaken during the first half of the 20th century.

The four-span timber stringer bridge that crosses the Provo River just below the dam, was constructed in July and August 1938 as part of the dam construction

project. The bridge was built as part of the highway bypass road to divert traffic from the highway alignment of U.S. 189 to a new route along the south side of Provo River Canyon. This allowed traffic to avoid dam construction activities. It functions today for light traffic flow. The bridge has been recommended for listing on the National Register of Historic Places.

A historic culvert is located just below the dam on Provo Deer Creek. This culvert was built in order to provide access to the dam complex from the south passing over Provo Deer Creek. This minor architectural structure has been recommended not eligible to the National Register of Historic Places.

LAND MANAGEMENT (Issues 5a—5b)

Travel and Access

The reservoir is within an hour's drive from the Salt Lake and Utah valleys: the two largest population centers in the state. The reservoir is accessible directly from US Highway 189 and State Route 113. US 189 intersects with US 40 south of Heber City, Utah providing access for Heber City and Uintah Basin. State route 113 provides a scenic access for the many tourist visiting the Park City area. US 40 also provides direct access for Uintah Basin. State Route 222 intersects with US 189 and provides access to Deer Creek Reservoir from the Town of Wallsburg. The Heber Valley Historic Railroad traverses the entire west side of the reservoir. The train often makes four trips daily. Wasatch County owns a strip of land for future road use that parallels the railroad.

US Highway 189

US Highway 189 is the primary access road to the reservoir from Provo and the Utah County Metropolitan Area. US 189 provides the linkage to points east, north and to Salt Lake County. The highway enters Provo Canyon to the east of the city of Orem and follows the canyon bottom for approximately 12 miles before reaching the dam at Deer Creek Reservoir. After crossing the dam at the south end of the reservoir, US 189 roughly contours the east side of the reservoir providing access to the campground below the dam, Main State Park, Wallsburg Bay, Rainbow and Island bays. Table 2.11 shows a summary of traffic counts on Highway 189 between 1987 to 1992.

US 189 in Provo Canyon is in various stages of design and construction. Completion of this project will result in a divided, four-lane highway from the mouth of the canyon to the junction with SR-113 near Charleston. This should provide improved access to Deer Creek Reservoir.

State Route 113

State Route 113 provides access to Deer Creek Reservoir from the town of Midway to the north. South of Midway, this route crosses the Provo River inlet to the reservoir at the Charleston Bridge and provides access to the Charleston Bay. At the south end of the town of Charleston the route intersects US Highway 189. Table 2.11 shows a summary of traffic counts on State Route 113.

US Highway 40

US Route 40 is a major east-west route carrying traffic related to interstate commerce and tourism, as well as, local traffic. Access from Highway 40 to the reservoir is provided by US Highway 189, which intersects US 40 south Heber City. Table 2.11 shows a summary of traffic counts on US Highway 40 at the junction SR-189 in Heber.

State Route 222

State Route 222 intersects with US Route 189 at Wallsburg Junction, and provides access to the reservoir from the Town of Wallsburg to the East. No other large communities lie along this route to the east of Wallsburg. No traffic counts were available for this route.

Table 2.11 Annual Average Daily Traffic (AADT) on Approach Roads(1)

Route	Location	1992	1991	1990	1989	1988	1987
US Highway 189	Wasatch-Utah County Line	4935	4665	4485	4275	4170	4940
US Highway 189	Adjacent to Reservoir	5315	5025	4830	4775	4160	4840
US Highway 189	Junction SR-113 in Charleston	4035	3815	4220	4025	3930	(2)
US Highway 189	Junction SR-40 in Heber	5460	5160	4960	5095	4975	(2)
US Highway 40	Junction SR-189 in Heber	5380	4510	4475	4455	4690	4490
State Route 113	Junction SR-189	1070	1175	1065	1025	950	720
State Route 113	Charleston	1415	1405	1295	1250	1225	990
State Route 113	Midway	1925	1430	1340	1295	1275	1030

Source: Utah Department of Transportation Notes: 1. Some values are estimates. 2.No counts were available for this location.

ENDNOTES

- 1 Phosphate ions are negatively charged and will readily attach to positively charged atoms present in the minerals of the soil followed by precipitation of phosphorus as hydroxyapatite.
- 2 Since Scoping a windtalker has been installed.
- 3 The Division of Parks and Recreation defines an accident as an occurrence resulting in property damage over \$500, a serious medical injury (requiring more than simple first aid), or a fatality. Incidents not meeting at least one of these criteria are not considered to be accidents. For more information, contact Utah State Boating Coordinator, Ted Woolley, (801) 538-7341.
- 4 Spelling of Ute lady's tresses taken from *UTAH Endangered, Threatened, and Sensitive Field Guide*. US Forest Service, National Park Service, Bureau of Land Management, Utah Natural Heritage Program, US Fish and Wildlife, EPA, Navajo Nation, Skull Valley Goshute Tribe. Utah 1991
- 5 (T) refers to the UDWR State Threatened Species which is any species which is likely to become an endangered species within the foreseeable future.
- 6 A UDWR Conservation Species (CS) is any wildlife species, except those species currently listed under the ESA as Threatened or Endangered that meets the state criteria of Endangered, Threatened or Endangered or of Special Concern, but is currently receiving sufficient special management under a Conservation Agreement to preclude its listing above.
- 7 The Utah Valvata Snail is not on the USFWS Endangered list. It is however ranked a UDWR Endangered species. A UDWR Endangered Species are those which are disappearing from Utah or threatened with extinction. (UDWR, 1998)



3

Chapter 3 Management Directives	3-1
INTRODUCTION	3-1
RESOURCE MANAGEMENT GOALS	3-1
Partnerships	3-2
Water Resources	3-3
Recreation and Visual Resources	3-3
Natural and Cultural Resources	3-4
Land Management	3-4
DESIRED FUTURE CONDITION	3-4
MANAGEMENT DIRECTION	3-6
Area Wide Location Map	3-7
 AREA WIDE MANAGEMENT DIRECTION	
PARTNERSHIPS	3-8
OPERATIONS PARTNERSHIPS	3-8
Project Purposes	3-8
Project Uses and Appurtenances	3-12
FIRE PREVENTION PARTNERSHIPS	3-14
Regulations	3-14
FISH AND WILDLIFE PARTNERSHIPS	3-15
Fish and Wildlife Management	3-15
Wildlife Use	3-15
GENERAL PARTNERSHIPS, PRIVATE, COUNTY, STATE, FEDERAL	3-16
Governmental and Conservation Groups	3-16
Local Communities	3-16
New Partnerships	3-16
Private, State, and Federal Sectors	3-17
INFORMATION MANAGEMENT AND PARTNERSHIPS	3-17

Interpretative Programs	3-17
Interpretive Partnerships	3-18
Signage	3-18
LAW ENFORCEMENT AND SAFETY PARTNERSHIPS	3-19
Appropriate Law Enforcement	3-19
Discharge of Firearms	3-19
Emergency Communications	3-20
Hunting in Developed Areas	3-20
Public Demonstrations	3-20
RECREATION MANAGEMENT PARTNERSHIPS	3-20
Recreation Management	3-20
WATER RESOURCES	3-21
WATER OPERATIONS	3-21
Care, Operation, and Maintenance	3-21
Reservoir Water Level Fluctuations	3-21
Safety and Enforcement	3-21
WATER QUALITY	3-21
Best Management Practices	3-21
Facilities	3-23
Pathogens	3-23
Proposed Highway 189 Improvements	3-23
Water Quality Protection	3-24
WATERSHED PROTECTION	3-25
Watershed Protection	3-25
RECREATION AND VISUAL RESOURCES	3-26
CONCESSIONS/SPECIAL USES	3-26
Applications	3-26
Private Initiatives	3-26
RECREATION DEVELOPMENT	3-27
Construction Priority	3-27
Development Requirements	3-27
Facility Replacement	3-27
Landscaping	3-28
Private Development	3-28
Private Exclusive Facilities	3-28
ROS Classification	3-28
Trails	3-29
RECREATION MANAGEMENT	3-29
Activities	3-29
Health and Safety	3-29
Ice Conditions	3-30
Maintenance in General	3-30
Management by Others	3-30
Management Agreement	3-31
Parking on Beaches	3-31
Pets	3-31

Reservoir Water Quality Maintenance	3-31
Saddle and Pack Animals	3-31
Special Events	3-32
Use Capacity	3-32
Conflicts	3-32
User Fees	3-33
Wakeless Areas/No Ski Zones	3-33
Watercraft Launching	3-33
Watercraft Limit	3-33
Watercraft Refueling	3-34
RECREATION PLANNING	3-34
Inventory System	3-34
Motorized Vehicle Use	3-35
VISUAL ENHANCEMENT	3-35
Development	3-35
VISUAL MANAGEMENT AND DEVELOPMENT	3-36
Development	3-36
Duration of Impact	3-37
Exceptions	3-37
VISUAL PLANNING	3-37
Inventory	3-37
Scenic Byway 189	3-38
VISUAL REHABILITATION	3-38
Rehabilitation	3-38
Priorities	3-38
NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES	3-39
AIR QUALITY	3-39
Air Quality	3-39
CULTURAL/PALEONTOLOGICAL	3-39
Inventories	3-39
Listed Sites	3-39
Management	3-39
Nomination	3-40
GEOLOGY/MINERALS/SOILS	3-41
Appropriate Minerals Management	3-41
Geologic Hazards	3-42
Gravel Pits	3-42
Soil and Moisture Conservation	3-42
Soil Protection	3-43
HABITAT/FISHERIES MANAGEMENT	3-43
Habitat/Fisheries Management	3-43
INTEGRATED PEST MANAGEMENT	3-44
Pest Management	3-44
Weeds/Noxious Weeds	3-44
VEGETATION MANAGEMENT	3-45
Enhance Wildlife Habitat	3-45

Grazing and Browsing Activities	3-45
Implementation Document	3-45
Inventory	3-45
Livestock Grazing	3-46
Preferred Vegetation	3-46
Revegetate Disturbed Areas	3-46
Sensitive Species	3-46
Structural/Non-Structural Range Improvements	3-47
Surface Disturbing Activities	3-47
Threatened and Endangered Species	3-47
Vegetative Condition	3-47
Wetlands and Flood Plains	3-47
LAND MANAGEMENT	3-48
FIRE SUPPRESSION	3-48
Fire Suppression	3-48
LANDS	3-48
Boundary Fences	3-48
Boundary Location	3-48
Domestic Animals and Pets	3-48
Land/Rights-of Way Acquisition	3-49
Land Disposal	3-49
Land Withdrawals	3-49
Non-Recreation Special Use Management	3-50
Off-Site Influences to Recreation Sites	3-50
Pollution Control and Abatement	3-51
Resource Activities	3-51
Utility Lines	3-51
ROADS/TRAILS	3-52
Private Purpose Roads	3-52
Roads Across Private Lands	3-52
Road Maintenance and Use	3-52
Road Rehabilitation	3-53
Special Purpose Roads/Trails	3-53
Specific Purpose Roads	3-53
Trail Maintenance and Use	3-53
TRAVEL/ACCESS	3-54
Automobile/Motorized Vehicle Travel	3-54
Disability Access	3-54
Off-Highway Vehicles	3-54

SPECIFIC AREA MANAGEMENT DIRECTION

MAIN STATE PARK AREA

Main State Park Management Area Map	3-56
Main State Park - Location and Site Plan	3-57
Main State Park - New Campground Site Plan	3-58

Main State Park - Warehouse and Dry Boat Storage	
Site Plan	3-59
GENERAL MANAGEMENT AND PARTNERSHIPS	3-60
Area Management	3-60
WATER RESOURCES	3-60
Water Development and Conservation	3-60
RECREATION/VISUAL RESOURCES	3-61
Facilities Development	3-61
Landscaping	3-62
Overnight Camping	3-62
Visual Management	3-63
Wakeless/ No Ski Zone	3-63
Watercraft Launching Access	3-63
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-63
Site Rehabilitation	3-63
LANDS	3-64
Roads and Trails	3-64
SNOW'S AREA	
Snow's Management Area Map	3-65
Snow's Site Plan	3-66
GENERAL MANAGEMENT AND PARTNERSHIPS	3-67
Area Management	3-67
WATER RESOURCES	3-67
Water Development and Conservation	3-67
RECREATION/VISUAL RESOURCES	3-68
Appropriate ROS Management	3-68
Facilities Development	3-68
Landscaping	3-69
Overnight Camping	3-69
Visual Management	3-69
Wakeless/No Ski Zone	3-69
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-70
Site Rehabilitation	3-70
LANDS	3-70
Roads and Trails	3-70
AREA BETWEEN SNOW'S AND RAINBOW BAY	
Area Between Snow's and Rainbow Bay Management Area Map	3-71
GENERAL MANAGEMENT AND PARTNERSHIPS	3-72
Area Management	3-72
WATER RESOURCES	3-72
Water Development	3-72
RECREATION/VISUAL RESOURCES	3-73
Appropriate ROS Management	3-73
Natural Area Recreation Management	3-73
Overnight Camping	3-73
Visual Management	3-73

NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES . . .	3-74
Site Rehabilitation	3-74
Soil and Water Resource Improvements	3-74
Wildlife Winter Range Protection	3-74
LANDS	3-74
Facilities Development	3-74
Trails	3-75
RAINBOW BAY AREA	
Rainbow Management Area Map	3-76
Rainbow Bay Site Plan	3-77
GENERAL MANAGEMENT AND PARTNERSHIPS	3-78
Area Management	3-78
WATER RESOURCES	3-78
Water Development and Conservation	3-78
RECREATION/VISUAL RESOURCES	3-79
Appropriate ROS Management	3-79
Facilities Development	3-80
Landscaping	3-80
Overnight Camping	3-80
Visual Management	3-81
Wakeless Zone	3-81
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES . . .	3-81
Site Rehabilitation	3-81
LANDS	3-81
Roads and Trails	3-81
ISLAND BAY AREA	
Island Bay Management Area Map	3-82
GENERAL MANAGEMENT AND PARTNERSHIPS	3-83
Area Management	3-83
WATER RESOURCES	3-83
Water Development and Conservation	3-83
RECREATION/VISUAL RESOURCES	3-84
Appropriate ROS Management	3-84
Facilities Development	3-84
Landscaping	3-85
Overnight Camping	3-85
Visual Management	3-85
Wakeless Zone	3-85
Watercraft Launching Access	3-86
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES . . .	3-86
Site Rehabilitation	3-86
LANDS	3-86
Roads and Trails	3-86
WALLSBURG AREA	
Wallsburg Management Area Location Map	3-87
GENERAL MANAGEMENT AND PARTNERSHIPS	3-88

Area Management	3-88
WATER RESOURCES	3-88
Watering Facilities	3-88
RECREATION/VISUAL RESOURCES	3-88
Appropriate ROS Management	3-88
Overnight Camping	3-89
Recreation Management	3-89
Visual Management	3-89
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-89
Site Rehabilitation	3-89
Vegetative Improvements	3-89
Wildlife Winter Range Protection	3-90
LANDS	3-90
Facilities Development	3-90
Trails	3-90
Weeds/Noxious Weeds	3-90
CHARLESTON BAY AREA	
Charleston Bay Management Area Location Map	3-91
GENERAL MANAGEMENT AND PARTNERSHIPS	3-92
Area Management	3-92
WATER RESOURCES	3-92
Water Conservation and Development	3-92
RECREATION/VISUAL RESOURCES	3-93
Appropriate ROS Management	3-93
Facilities Development	3-93
Landscaping	3-93
Natural Area Recreation Management	3-93
Overnight Camping	3-94
Visual Management	3-94
Wakeless Management	3-94
Watercraft Launching Access	3-94
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-94
Site Rehabilitation	3-94
Soil and Water Resource Improvements	3-95
Wildlife Winter Range Protection	3-95
Waterfowl Seasonal Avoidance	3-95
LANDS	3-95
Facilities Development	3-95
Trails	3-95
WEST SIDE AREA	
West Side Management Area Location Map	3-96
GENERAL MANAGEMENT AND PARTNERSHIPS	3-97
Area Management	3-97
WATER RESOURCES	3-97
RECREATION/VISUAL RESOURCES	3-97

Appropriate ROS Management	3-97
Facilities Development	3-98
Landscaping	3-98
Overnight Camping	3-98
Visual Management	3-98
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ...	3-98
Site Rehabilitation	3-98
Soil and Water Resource Improvements	3-99
Wildlife Winter Range Protection	3-99
LANDS	3-99
Facilities Development	3-99
Trails	3-99
PROVO (LITTLE) DEER CREEK AREA	
Provo (Little) Deer Creek Management Area	3-100
GENERAL MANAGEMENT AND PARTNERSHIPS	3-101
Area Management	3-101
WATER RESOURCES	3-101
Drinking Water	3-101
RECREATION/VISUAL RESOURCES	3-102
Appropriate ROS Management	3-102
Facilities Development	3-102
Landscaping	3-102
Overnight Camping	3-102
Visual Management	3-103
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-103
Site Rehabilitation	3-103
LANDS	3-103
Roads and Trails	3-103
HOUSING AREA	
Housing Management Area Location Map	3-104
GENERAL MANAGEMENT AND PARTNERSHIPS	3-105
Area Management	3-105
WATER RESOURCES	3-105
Water Conservation	3-105
RECREATION/VISUAL RESOURCES	3-105
Appropriate ROS Management	3-105
Facilities Development	3-106
Landscaping	3-106
Visual Management	3-106
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-107
Site Rehabilitation	3-107
LANDS	3-107
Roads and Trails	3-107
LOWER PROVO RIVER AREA	
Lower Provo River Management Area Location Map	3-108
GENERAL MANAGEMENT AND PARTNERSHIPS	3-109

Area Management	3-110
WATER RESOURCES	3-110
Water Conservation and Development	3-110
RECREATION/VISUAL RESOURCES	3-110
Appropriate ROS Management	3-110
Facilities Development	3-110
Landscaping	3-110
Overnight Camping	3-110
Visual Management	3-110
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-111
Site Rehabilitation	3-111
LANDS	3-111
Roads and Trails	3-111
DAM/PRIMARY JURISDICTION ZONE AREAS	
Dam/Primary Jurisdiction Zone Areas Location Map	3-112
GENERAL MANAGEMENT AND PARTNERSHIPS	3-113
Area Management	3-113
WATER RESOURCES	3-113
Water Operations	3-113
RECREATION/VISUAL RESOURCES	3-113
Appropriate ROS Management	3-113
Visual Management	3-114
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES ..	3-114
Site Rehabilitation	3-114
LANDS	3-114
Roads and Trails	3-114

Chapter 3

Management Directives

INTRODUCTION

This chapter provides long-range management direction for Deer Creek Reservoir and surrounding lands in response to public issues and management concerns. Implementation of the management direction is key to translating the goals, and management direction/requirements stated in the RMP to achieve desired future conditions and results on-the-ground. All uses and activities of the area covered by the RMP including permits, contracts, and other instruments must be consistent with the management requirements in both the:

- Area-Wide Management Direction and
- Specific Area Management Direction.

RESOURCE MANAGEMENT GOALS

The following goals are expressed in general and describe a desired condition to be achieved some time in the future. The management direction, standards and guides that follow in this chapter are the implementation strategies to achieve these goals. The goals are grouped into five areas.

Partnerships

- Maintain and support partnerships and agreements to achieve the goals of the RMP.
- Actively pursue partnerships with parties such as the Provo River Water Users Association, Utah Reclamation and Mitigation Commission, U.S. Fish and Wildlife Service, Utah Division of State Parks and Recreation, Utah Division Wildlife Resources, Utah Department of Transportation, Wasatch County, local communities, Jordanelle Technical Advisory Committee, the Heber Valley Historic Railroad Authority, adjacent landowners and users to facilitate best management of the resources while providing benefits to partners.

- Work with local communities to determine what activities they believe benefit or adversely effect them. Strive to implement projects and programs beneficial to local communities that are also consistent with other goals of the RMP.
- Form partnerships with governmental entities and local conservation groups to provide public awareness of vegetation, water and game and non-game wildlife values in the area.
- Pursue environmental management activities with other private, state and federal agencies to avoid habitat degradation or loss.
- Encourage and establish partnerships to help educate the public on the purposes of the Deer Creek Reservoir, the importance of the watershed and the public's role in maintaining water quality.
- Provide the public with the opportunity to learn about the natural, cultural and historical resources of the area and the need for courtesy and safety.

Water Resources

- Participate in management efforts to maintain the water quality of Deer Creek Reservoir.
- Protect or improve Deer Creek Reservoir water integrity for storage, quality and delivery. The importance of Deer Creek as a headwater of the municipal water supply for the Wasatch Front metropolitan area is recognized.
- Allow uses that maintain federal and state water quality standards or improve the established water quality standards for Deer Creek Reservoir.
- Manage effectively to control sources of pollution.
- Investigate Deer Creek Reservoir wetland to determine if they can be used to reduce non-point source pollution.

Recreation and Visual Resources

- Maintain or improve the quality and diversity of the recreation experience at Deer Creek Reservoir. Provide a variety of recreational opportunities, adequate facilities, and management that maintains or enhances the quality of the recreation experience.
- Provide opportunities and facilities for hiking, biking, camping, fishing, bird watching, and other recreational pursuits.
- Evaluate the environmental impact of recreation activities on Deer Creek Reservoir and surrounding lands. Manage recreation effects at levels that compliment the setting.
- Protect or enhance the visual resource of the area.
- Provide accessible experiences and facilities for persons with disabilities.
- Provide for health and safety of the public.

Natural and Cultural Resources

- Protect resources essential to fish and wildlife habitats and populations.
- Protect sensitive resources and the natural environment.
- Protect threatened and endangered plant and animal species and reduce impacts to sensitive resources.
- Protect fish and wildlife habitat to the extent practicable within the operational constraints of the reservoir.
- Protect or enhance the quality of the fisheries and fish habitat within the framework of existing laws and management authority.
- Protect or enhance existing wetlands.
- Allow wetland investigations to determine if they can be used to reduce non-point source pollution.
- Control erosion where practicable.

- Protect or enhance air quality.
- Protect the cultural and paleontological resources of the area.
- Identify areas and management not suitable for development.
- Implement integrated pest management strategies.

Land Management

- Identify appropriate and compatible land uses that optimize the benefits to the public within the reservoirs' operating criteria.
- Identify areas and management suitable for project purposes, wildlife and natural areas, grazing, recreation, access, roads, trails, utilities and other land uses and activities.
- Close, rehabilitate or discontinue specific uses or facilities where not appropriate.

DESIRED FUTURE CONDITION

This section describes the desired future condition of Deer Creek reservoir and its surrounding lands resulting from implementation of this Resource Management Plan (Alternative 1 described in the accompanying EA).

The clean supply of drinking water for the Wasatch Front communities is protected. Parking on the beaches no longer occurs. The reservoir water level recedes as water is released upon demand. At high water, the reservoir accentuates the beauty of the natural setting. At low water, the un-vegetated shoreline ring and barren beach slopes appear.

Recreation visitor congestion and conflicts on the water and surrounding areas are minimized. Sensitive areas are protected. Parking lots and recreation facilities do not exceed a 300 watercraft per day limit. Sailing and wind surfing opportunities are important factors in the watercraft limit. Parking occurs in developed areas only. Recreation facilities, such as boat ramps, campgrounds, and sanitation facilities, meet visitor needs and protect the environment.

The reservoir's open channel shoreline, continues to appear undisturbed and natural, although campgrounds, marinas, and public access areas are present. Several types of

watercraft use the area simultaneously (ski and fishing boats, sailcraft, and personal watercraft). The main reservoir channel is the site of the greatest number of boater conflicts associated with high/moderate density traffic and diversity of user types. Restricted no-wake zones exist near ramps, marinas, docks, and popular beaches. Boaters likely see and hear other boats.

The narrow Wallsburg Bay continues to display developed shoreline at Snow's and Main State Park, undeveloped elsewhere. Boater conflicts are few, due to no-ski restrictions resulting in light use and in similarity of boat types and use. Boating activities include fishing, relaxing, and other stationary-boat type activities.

The shallow, wakeless Charleston Bay remains undisturbed and natural appearing with some residences visible to the east. Access is from existing primitive launch facilities, not suitable for large boats. Use of the area remains low with few user conflicts, offering the opportunity to avoid pleasure boat traffic, to relax, enjoy the scenery, tranquility, and nature.

Camping and day use facilities at State Park allow recreation use while reducing resource damage. The boat ramp, parking, campgrounds and use areas are upgraded to accommodate recreation use. Comfort stations and shade pavilions are provided.

Snow's Area accommodates group camping use, however, Wallsburg Bay continues to dry late in the season as the reservoir is lowered to meet Wasatch Front water demands.

The area between Rainbow Bay and Snow's remains natural, inhabited by deer and elk which move across, to and from, the Wallsburg Area.

Group day use facilities at Rainbow Bay harbor extensive sights and sounds of people, although automobiles are restricted to developed roads and parking areas. Safety associated with Rainbow Bay parking along US-189 no longer occurs.

Island Bay accommodates urban day use recreation. Motorized land vehicles stay on designated roads and parking areas. Public automobiles no longer drive on beaches or below the high water line. Restrooms meet demands. Wagstaff's Marina supplies basic marina, water recreation and food services in addition to providing for weddings and other services.

The Charleston Bay Area remains natural and complements uses on the Provo River. Motorized vehicles are restricted to designated roads and parking areas. Enhancements for re-channeling irrigation flows for water quality purposes exist.

The Wallsburg Area east of State Highway 189 is managed for wildlife purposes. Public motorized use is restricted or prohibited and limited livestock grazing is permitted.

The narrow West Side land strip is accessed by foot, train and water craft. A trail with interpretative and sanitation facilities may be developed for walking and biking. Scott's Hollow provides a remote setting, moderate level of human contact and the convenience of restrooms.

East of the highway, in the Lower Provo River Area, parking and day use picnicking occurs and complements river access. Indiscriminate camping no longer occurs and natural vegetation and wildlife values are protected.

The Primary Jurisdiction Zones complement dam and power operation needs.







MANAGEMENT DIRECTION

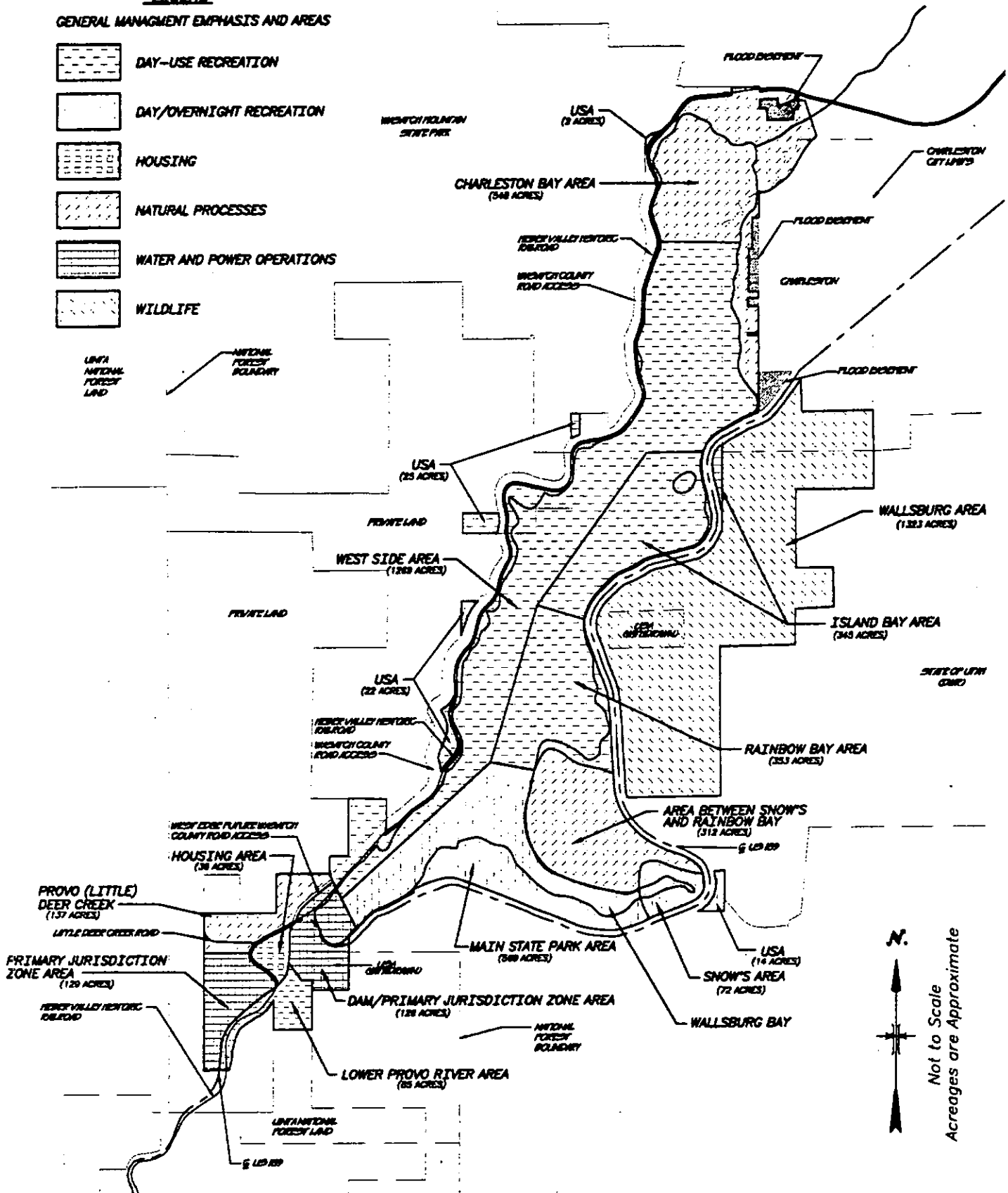
The following section specifies the management directions necessary to accomplish the goals of this Resource Management Plan. Management directions that apply to all management areas are discussed under the Area Wide Management Direction. Management directions specific to an individual management area are discussed under the Specific Area Management Direction. Please reference the table of contents for area and subject.

AREA WIDE LOCATION MAP

LEGEND

GENERAL MANAGEMENT EMPHASIS AND AREAS

-  DAY-USE RECREATION
-  DAY/OVERNIGHT RECREATION
-  HOUSING
-  NATURAL PROCESSES
-  WATER AND POWER OPERATIONS
-  WILDLIFE



Not to Scale
Acreages are Approximate

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION

STANDARD OR GUIDE

MONITORING

CONTACT AND REFERENCE

OPERATIONS PARTNERSHIPS

Project Purposes

Fully protect the purposes for which the Deer Creek project lands were acquired or withdrawn.

PRWUA to care for, operate, and maintain the Deer Creek Reservoir construction works.

Repayment Contract between the US and PRWUA for construction of Deer Creek Division, Contract No. ILR-874, 6/27/36.

Supplemental Contract between the US and PRWUA, Contract No. ILR-874, 7/3/37.

Supplemental Contract between the US and PRWUA authorizing construction, repayment, and O&M of the Deer Creek Division, Contract No. ILR-874, 12/20/46.

Supplemental Contract between the US and PRWUA authorizing construction, repayment, and O&M of Deer Creek Division, Contract No. ILR-874, 2/2/49.

Amendatory Contract among the US and PRWUA amending the Supplemental Contract changing date of payment and rates for use of water, Contract No. ILR-874, 2/19/54.

Evaluate proposed use activities against original purposes, contracts and agreements. Evaluate at the time of activity proposal and document in Reservoir Management Reviews.

USBR, PRWUA, and others.
Documents on file with USBR, Provo Area Office, Provo, Utah.

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	Amendment to Contract No. ILR-874, for Reclamation Reform Act, 4/23/86.		
	<p>Establish and maintain conveyance facilities.</p> <p>Contract between the US, Provo Reservoir Water Users Company, PRWUA, re: the construction of Deer Creek Reservoir, Duchesne Tunnel, and enlargements of Weber-Provo Diversion canal and Provo Reservoir Canal, Contract No. ILR-1182, 10/28/39.</p> <p>Contract between the US, Provo Reservoir Water Users Company, and PRWUA, for rights in the Provo Reservoir Canal, Contract No. ILR-1180, 11/28/39.</p> <p>Contract among US, South Kamas Irrigation Co., Washington Irrigation Co., and PRWUA for carriage of water through Duchesne Tunnel, Contract No. 14-06-400-2077, 10/31/61.</p> <p>Rehabilitation and Betterment Contract between the US and PRWUA, Contract No. 14-06-400-3742, 8/14/64.</p>		Documents on file with USBR, Provo Area Office, Provo, Utah.

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>Generate electric power.</p> <p>Contract between the US and PRWUA, WRWUA, UP&L, and Utah Light and Traction Co., Contract No. ILR-1082, 12/20/38.</p> <p>Contract between the US, PRWUA, WRWUA regarding the construction an maintenance of the Weber Provo Diversion Canal with Echo Reservoir, Contract No. ILR-1083, 12/20/38.</p> <p>Contract for sale of surplus power to Utah Power and Light Co., 4/14/58.</p> <p>Contract for sale of surplus energy between the US and UP&L, 4/15/59.</p> <p>Supplement to Contract 14-06-400-924 for sale of surplus energy to UP&L Co., 7/31/59.</p> <p>Supplemental Contract between the US, PRWUA, and the Metropolitan Water District, Contract No. ILR-874, 11/16/59.</p> <p>Supplemental Contract for sale of surplus energy to UP&L, 8/1/60.</p> <p>Supplemental Contract for sale of surplus energy to UP&L, 7/31/61.</p>		Documents on file with USBR, Provo Area Office, Provo, Utah.

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>Supplemental Contract for sale of surplus energy 1/31/62.</p> <p>Supplemental Contract for sale of surplus energy 7/1/62.</p> <p>Supplemental Contract for sale of surplus energy 1/31/63.</p>		
	<p>Establish and maintain a power plant.</p> <p>Operation and Maintenance Contract between the US and PRWUA regarding the O&M of Deer Creek Power plant, Contract No. 14-06-400-752, 6/20/58.</p> <p>Supplemental Contract between US and PRWUA re: O&M Deer Creek Power Plant, 12/15/67.</p> <p>Supplemental to Contract between US and PRWUA re: O&M of Deer Creek Power plant, 3/30/71.</p>		<p>Documents on file with USBR, Provo Area office, Provo, Utah.</p>
	<p>Operate by the Deer Creek/ Jordanelle Coordinated Operating Agreement.</p> <p>Contract among US, PRWUA, and CUWCD re: Deer Creek/ Jordanelle Operating Agreement, 11/1/94.</p> <p>Contract Replacement Power Contract No. 94-SLC-0259, 6/1/95.</p>		<p>Documents on file with USBR, Provo Area Office, Provo, Utah.</p>

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u>Project Uses and Appurtenances</u></p> <p>Allow partnership management where project purposes and RMP direction can be met.</p>	<p>Provide for communication line crossings where appropriate.</p> <p>50 year License Agreement for a buried cable, Contract No. 3-LM-41-L0200, Active until 2033.</p> <p>50 year License Agreement for a buried cable, Contract No. 5-07-41-L0150, Active until 2034.</p> <p>50 year License Agreement for a buried cable, Contract No. 5-07-41-L0500, Active until 2036.</p> <p>50 year License Agreement for a buried cable, Contract No. 3-LM-41-02590, Active until 2043.</p>	<p>Evaluate activity proposals against project purposes, contracts and agreements. Evaluate at the time of proposal and document in Reservoir Management Reviews.</p>	<p>Documents on file with USBR, Provo Area Office, Provo, Utah.</p>
	<p>Under existing contract agreements provide for grazing use where appropriate. Phase out existing contracts.</p> <p>5 year Grazing Agreement, Contract No. 6-LM-41-06960, Active until 2001.</p> <p>Agreements relating to tracts 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 117, and 118.</p>		<p>Documents on file with USBR, Provo Area Office, Provo, Utah.</p>

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>Provide for highways and access roads as appropriate.</p> <p>50 year License Agreement for widening State Highway 113 near Charleston, Utah, Contract No. 6-07-41-L0140, Active until 2036.</p> <p>50 year License Agreement for an access road, Contract No. 2-LM-41-01350, Active until 2042.</p>		Documents on file with USBR, Provo Area Office, Provo, Utah.
	<p>Provide for power line appurtenances where appropriate.</p> <p>50 year License Agreement for a buried cable, Contract No. 3-LM-41-01850, Active until 2043.</p> <p>50 year License Agreement for a power line, Contract No. 3-LM-41-01670, Active until 2042.</p> <p>50 year License Agreement for a power line to the dam tenders homes, Contract No. 3-LM-41-02670, Active until 2043.</p> <p>50 year License Agreement for a power line, Contract No. 5-07-L0460, Active until 2035.</p> <p>50 year License Agreement for an extension of an underground power line, Contract No. 1-LM-41-00800, Active until 2041.</p>		Documents on file with USBR, Provo Area Office, Provo, Utah.

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>50 year License Agreement for a power line, Contract No. 1-LM-41-00940, Active until 2041.</p> <p>50 year License Agreement for a power line, Contract No. 14-08-400-3527, Active until 2014.</p> <p>50 year License Agreement for an underground power line, Contract No. 5-07-41-L0460, Active until 2023.</p>		

FIRE PREVENTION PARTNERSHIPS

<p><u>Regulations</u></p> <p>Ensure appropriate fire management regulations and procedures are in place and enforced in developed and dispersed areas.</p>	<p>Develop fire prevention programs for the areas.</p> <p>Construct fire breaks and/or manipulate vegetation as necessary to reduce the risk and spread of wildfires.</p> <p>Revegetate burned areas promptly with an appropriate seed mixture to reestablish vegetation and prevent erosion</p> <p>Allow confined fires such as in fireplaces or grills, stoves, or lanterns, unless specially restricted. Post Restrictions.</p> <p>State Parks Regulations: R651-613 and R651-613-1.</p>	<p>Observe fuel conditions and apply appropriate action (by contract/permitted management entity).</p> <p>Monitor burned areas annually for revegetation success (by the contract/permitted entity).</p>	<p>Contract/permitted management entity; Wasatch County Fire Protection Special Service District.</p> <p>Coordinate with Utah State Parks, UDWR, USBR, PRWUA, and other adjacent landowners.</p>
--	---	--	--

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
FISH AND WILDLIFE PARTNERSHIPS			
<p><u><i>Fish and Wildlife Management</i></u></p> <p>Utah Division of Wildlife Resources is the wildlife authority for the State of Utah and is charged with the responsibility to protect, propagate, manage, conserve and distribute protected Wildlife throughout the state.</p>	<p>Management activities are subject to the broad policy-making authority of the Wildlife Board.</p> <p>Activities regulated by UDWR are specified in Title 23 of the Utah Code, or addressed in rules or proclamations as provided by Utah Code.</p> <p>UDWR has primary responsibility for enforcement of fish and wildlife related laws however any peace officer of the state has the same authority to enforce these laws.</p>	<p>Enforce and field review.</p>	<p>UDWR and appropriate law enforcement.</p>
<p><u><i>Wildlife Use</i></u></p> <p>Manage for wildlife use as appropriate.</p>	<p>Repayment Contract between the U.S. and PRWJA for construction of Deer Creek Division, Contract No. ILR-874, 6/27/36.</p> <p>Lease of Land for Wildlife Purposes (1309 acres), Contract No. 14-08-400-339, Not Active (expired December 31, 1983).</p>	<p>Comply with contracts, plans and agreements. Track in Reservoir Management Reviews.</p>	<p>Lease Documents on file with USBR, Provo Area Office, Provo, Utah.</p>

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL PARTNERSHIPS, PRIVATE, COUNTY, STATE, FEDERAL, ETC.			
<u>Governmental and Conservation Groups</u> Form partnerships with governmental entities and local conservation groups to provide public awareness of vegetation, water and game and non-game wildlife values.		Document progress/need in Reservoir Management Reviews.	USBR, Mitigation Commission, State Parks, PRWUA, UDWR, and Wasatch County.
<u>Local Communities</u> Work with local communities to determine what activities they believe benefit or adversely affect them. Strive to implement projects and programs beneficial to local communities that are also consistent with the RMP.		Document progress/need in Reservoir Management Reviews.	USBR, State Parks, PRWUA, UDWR, and Wasatch County.
<u>New Partnerships</u> As appropriate, pursue partnerships with parties such as Provo River Water Users Association, Wasatch County, local communities, Utah Division of State Parks and Recreation, U.S. Fish and Wildlife Service, the Heber Valley Historic Railroad Authority, Utah Department of Transportation, Utah Reclamation Mitigation and Conservation Commission, concessionaires, the Audubon Society and the Utah Division of Wildlife Resources to facilitate best management of the resources while providing benefits to partners.	Structure partnership agreements to attract, encourage, and sustain cooperative and effective management while enhancing visitor services and protecting public resources for areas such as Charleston Bay and Wallsburg.	Document progress/need in Reservoir Management Reviews.	USBR, PRWUA, Wasatch County and others.

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u>Private, State, and Federal Sectors</u></p> <p>Pursue natural resource management activities with other private, state and federal agencies to avoid habitat fragmentation and maximize benefits to the public.</p> <p>Pursue cooperative private/state parks/USBR initiatives and/or concession agreements with private enterprises to achieve needed recreation development.</p> <p>Encourage volunteerism to enhance management.</p>	<p>Invite private, non-profit, church and other organizations to assist with activities such as spring clean-ups, plantings, trail maintenance, resource interpretation and camp hosting.</p>	<p>Report volunteer efforts by State Parks to USBR annually.</p>	<p>Counties, school district, churches, and various organizations.</p>
INFORMATION MANAGEMENT AND PARTNERSHIPS			
<p><u>Interpretative Programs</u></p> <p>Describe, as appropriate, high interest or unique geological, paleontological, biological, archeological, historical features or management concerns for public information and, as appropriate, develop interpretative information for these sites.</p>	<p>Design interpretative service programs where it will help resolve management problems, reduce management costs, obtain visitor feedback, increase public understanding of project management, enhance visitor use, and provide safe use of the area. Program elements should include:</p> <ol style="list-style-type: none"> 1. Facility use guidelines and regulations. 2. Water and land use etiquette and safety regulations. 	<p>Determine visitor profile and interpretative themes/ media in Reservoir Management Reviews.</p>	<p>USBR, State Parks, UDWR and Mitigation Commission.</p>

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<ol style="list-style-type: none"> 3. Project purposes, characteristics, limitations, capacities, and public benefits. 4. Opportunity guides and maps. 5. Reservoir boating and sailing conditions and hazards. 6. Developed and dispersed recreation use regulations. 7. Environmental interpretation and education on water quality and water conservation, wildlife, wetlands, cultural resources, etc. 8. Off highway vehicle access status, guides, and maps. 9. Waste management, fire prevention, sanitation, and use of fuels and chemicals. 		
<u>Interpretive Partnerships</u> Coordinate interpretive efforts with entities such as the Mitigation Commission and the Provo River Restoration Project.			Mitigation Commission and UDWR.
<u>Signage</u> Establish clear, consistent signage to orient the public, and identify available opportunities at use areas and facilities.	Use Upper Colorado Region, Regional Sign Guide. Provide signs at key locations for effective visitor orientation.	Document compliance/needs in Reservoir Management Reviews.	USBR, PRWUA, Utah State Parks, UDWR, UDOT, Wasatch County and others.

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>Post boundary signs at logical locations.</p> <p>Place signs at entrances, boat ramps, picnic areas, and camping areas.</p> <p>Coordinate warning, traffic control, interpretive, and informational signs.</p>		
LAW ENFORCEMENT AND SAFETY PARTNERSHIPS			
<p><u>Appropriate Law Enforcement</u></p> <p>Share/coordinate interagency law enforcement (civil, wildlife resources, and recreation public use regulations) between Wasatch County, UDWR, and Utah State Parks.</p>	<p>Maintain law and order to protect the health and safety of persons using the area.</p> <p>Control litter, discourage vandalism, and perform search and rescue operations as appropriate.</p> <p>Notify the Wasatch County Sheriff, Reclamation and PRWUA immediately, when a death or life threatening situation occurs, of criminal acts, of project structure failures, of resource contamination (oil or chemical spills), or when natural phenomena (landslides and fires) occur.</p>	<p>Report safety hazards and other enforcement difficulties annually to involved entities.</p>	<p>State Parks, UDWR and Wasatch County Sheriff.</p>
<p><u>Discharge of Firearms</u></p> <p>Prohibit discharge of firearms, bow and arrow, or air and gas weapons across, into, or from recreation areas except for authorized hunting seasons and locations.</p>	<p>State Parks Regulation R651-612</p> <p>UDWR Big Game Proclamation.</p> <p>Post entrances and throughout the park as needed.</p>	<p>Enforce.</p>	<p>State Parks.</p>

AREA WIDE MANAGEMENT DIRECTION

PARTNERSHIPS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u><i>Emergency Communications</i></u> Provide emergency communication and coordinate with local law enforcement.		Enforce.	Utah State Parks emergency communication to Wasatch County
<u><i>Hunting in Developed Areas</i></u> Prohibit hunting within developed recreation areas except as designated by State Parks.	Utah State Parks Regulation R651-603-5 UDWR Big Game Proclamation	Enforce.	State Parks.
<u><i>Public Demonstrations</i></u> Authorize public demonstrations or assemblies by permit only.	Determine that an assembly or demonstration will not substantially interfere with general park use in the applicable area. State Park Regulation R651-608.	Enforce.	State Parks.

RECREATION MANAGEMENT PARTNERSHIPS

<u><i>Recreation Management</i></u> Encourage other qualified agencies to assume recreation management responsibilities.	Accommodate public recreation as per public law 89-72 and Title 28 of PL 102-575. Memorandum of Understanding among US, PRWUA and Utah Department of Natural Resources re: Administrative and Development of Deer Creek Reservoir for recreation purposes, 1/4/71, or current contract.	Comply with original contracts and agreements. Evaluate prior to issuance of new agreements.	Document of file with USBR, Provo Area Office, Provo UT. 1992 SCORP.
---	--	--	---

AREA WIDE MANAGEMENT DIRECTION

WATER RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
WATER OPERATIONS			
<u>Care, Operation, and Maintenance</u> Continue administration for construction works and factors affecting water integrity by the PRWUA.	Operate by the: Deer Creek/ Jordanelle Coordinated Operating Agreement, the Annual Operating Plan, the Standing Operating Procedures, the Emergency Action Plan, and the Designer's Operating Criteria.	Review plans and agreements annually or more often as needed.	See partnerships section of Area Wide Management Direction, above. Documents on file with USBR, Provo Area Office, Provo, Utah.
<u>Reservoir Water Level Fluctuations</u> Use the Jordanelle/Deer Creek coordinated water operations agreement to control water operations.	Inform Utah State Parks, USBR, UDWR and USFWS when major/sudden reservoir fluctuations are planned.	Communicate appropriately.	PRWUA
<u>Safety and Enforcement</u> Post and enforce a no fishing zone (including bank fishing) around the 1500 foot water buffer area, upstream from the dam.		Interpret and enforce.	State Parks, UDWR, and Wasatch County Law Enforcement.
WATER QUALITY			
<u>Best Management Practices</u> Implement best management practices relative to water quality in all resource activities.	Comply with the State of Utah drinking water source protection rule.	Observe algae blooms and related fish kills by State Parks, document and report incidences to PRWUA, USBR and UDWR.	State of Utah Water Quality: Utah Division of Health:

AREA WIDE MANAGEMENT DIRECTION

WATER RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>Meet or exceed state and federal water quality standards for drinking, wildlife, esthetic and recreation uses.</p> <p>Prohibit public motorized land vehicles below the high water line.</p> <p>Prohibit refueling of watercraft below the high water mark.</p> <p>Prohibit livestock grazing and domestic animals such as pack and saddle animals, dogs, cats and sheep except east of US-189. East of US-189 limit grazing to reduce wild fire potential and maintain shrub community only, however, further reduce or eliminate grazing as needed to protect water quality.</p> <p>Coordinate with JTAC, PRWUA, and USBR to assure best management practices (such as the 300 foot set back between drain fields and high water mark) are being implemented.</p> <p>Maintain a 1500 foot water buffer upstream from dam.</p> <p>Enhance wetlands for water quality purposes.</p> <p>Implement a public education program to interpret the benefits of water quality and to discourage acts that pollute.</p>		<p>PRWUA</p> <p>Nonpoint source water quality management plan for Utah, JTAC.</p> <p>Utah State Parks and PRWUA</p>

AREA WIDE MANAGEMENT DIRECTION

WATER RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Facilities</u> Construct facilities to meet State of Utah and Wasatch County standards. Protect reservoir water quality from the impact of park development.	Provide adequate restrooms and trash receptacles. Locate them to facilitate public use. Control erosion and pollutant loading at the source. Construct non-eroding conveyance facilities.	Comply with existing standards in facilities development. Inspect fuel storage tanks annually. Document during Reservoir Management Reviews.	State of Utah, USBR and Wasatch County
<u>Pathogens</u> Manage to protect water quality and to reduce the potential for concentrations of pathogens (causing giardia and cryptosporidium) in the water.	Close areas, mitigate effects or restrict use where documentation shows water quality can not be maintained. Prohibit domestic animals (including dogs on beaches, in boats, below the high water mark, and in the water.) Maintain buffer pool 1500 feet upstream from the dam to protect drinking water. Place buoys.	Comply with set standards or procedures. Document compliance in Reservoir Management Reviews or as needed.	PRWUA, JTAC, and USBR.
<u>Proposed Highway 189 Improvements</u> Protect water quality when improving State Highway 189.	Coordinate with UDOT to assure that controls to limit the impacts from highway construction are implemented as part of the design and construction process.	Comply with existing standards in UDOT facility construction and reconstruction.	UDOT.

AREA WIDE MANAGEMENT DIRECTION

WATER RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p>Consider treating storm water runoff that drains into Deer Creek Reservoir through the use of water quality detention basins equipped with oil skimmers for retention of liquids lighter than water.</p> <p>Consider constructing water quality basins which have adequate permanent pool storage to contain hazardous material spills from highway accidents.</p> <p>Consider providing a buffer to assure that vehicles do not accidentally end up in the reservoir and to provide for absorption of hazardous materials prior to entering the reservoir.</p> <p>Where a buffer is impractical, consider a storm drain with water quality basins.</p>		
<u>Water Quality Protection</u> Maintain or improve water quality.	<p>Protect Deer Creek Reservoir for municipal, industrial, and irrigation water purposes. Limit or restrict other uses as necessary to protect water quality.</p> <p>Do not approach or exceed Maximum Contaminate Levels (MCL) established by USEPA Safe Drinking Water Act rules and regulations.</p>	<p>Prescribe and conduct water quality and biological monitoring of the reservoir, its tributaries and releases through JTAC.</p>	<p>Members of JTAC including PRWUA and USBR.</p> <p>PRWUA and USBR.</p>

AREA WIDE MANAGEMENT DIRECTION

WATER RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
WATERSHED PROTECTION			
<u>Watershed Protection</u> Encourage management practices in the reservoir watersheds that maintain or improve reservoir water quality.		Comply with current water quality standards. Document in Reservoir Management Reviews.	USBR, PRWUA, Wasatch County and surrounding property owners.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
CONCESSIONS/SPECIAL USES			
<p><u>Applications</u></p> <p>Act on recreation special use applications according to the following priorities:</p> <ol style="list-style-type: none"> Public service operations catering to the general public. Group type operations. Private type operations. 	<p>An application for permit may be denied if the authorizing officer determines that:</p> <ol style="list-style-type: none"> The proposed use would be inconsistent or incompatible with the purpose(s) for which the lands are managed, or with other uses, or, The proposed use would not be in the public interest, or The applicant is not qualified, or The use would be inconsistent with applicable Federal and State laws, or The applicant does not or cannot demonstrate technical or financial capability. 	<p>Comply with concessions management agreements. Document in Reservoir Management Reviews.</p>	<p>USBR and State Parks.</p>
<p><u>Private Initiatives</u></p> <p>Pursue cooperative Private/USBR initiatives and/or concessionaire agreements with private enterprise to achieve needed recreation development.</p>		<p>Comply with contracts, agreements and existing planning document direction. Document in Recreation Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
Allow the private sector to provide recreation oriented operation/maintenance, administration, and/or vendor services, where appropriate.			
RECREATION DEVELOPMENT			
<p><u>Construction Priority</u></p> <p>Generally place priority for construction/reconstruction on restoration of existing facilities presently below standards.</p>		Assess ranking order. Monitor in Reservoir Management Reviews.	
<p><u>Development Requirements</u></p> <p>Comply with all applicable Federal, State, and local laws, rules, and regulations in the development of facilities, including sanitation facilities.</p> <p>Develop facilities based on compatibility with authorized reservoir project purposes, long-term management and funding capability, management goals and objectives, and environmental protection factors. See Specific Area Management Direction.</p>	Guidelines and principles contained in PL 89-72 as amended by Title 28 102-575 and other laws and agreements as applicable.	Comply in design and construction.	USBR, State Parks, PRWUA and Wasatch County.
<p><u>Facility Replacement</u></p> <p>Replace facilities when rehabilitation costs are 50 percent or more of replacement costs or when existing facilities cease to be compatible with site design or ROS classification.</p>	Refer to specific area management for ROS Classification.	Evaluate facility condition. Document in Reservoir Management Reviews or more often if needed.	State Parks, PRWUA, USBR and Wasatch County.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Landscaping</u> Allow shade tree planting above the reservoir high water mark only.		Document compliance in Reservoir Management Reviews.	USBR, State Parks, PRWUA, and concessionaires.
<u>Private Development</u> Allow Recreation development by non-Federal (including associated third party) partners as approved in writing, by Reclamation, and when consistent with existing agreements and planning documents.		Comply with contracts, agreements, and planning documents. Document in Reservoir Management Reviews.	USBR and State Parks.
<u>Private Exclusive Facilities</u> Do not allow private exclusive recreation use facilities by Reclamation, its managing partners, or private entities. Phase out existing recreation facilities deemed to be exclusive use when lands are needed for greater public purposes.		Enforce.	USBR and State Parks.
<u>ROS Classification</u> Provide facilities appropriate to the ROS Classification. Facilities may include water, power, sanitation, electricity, roads, camp spurs, pavilions. See Specific Area Management Direction.		Comply with contracts, agreements, and planning documents. Document in Reservoir Management Reviews.	USBR and State Parks.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Trails</u> In conjunction with involved jurisdictions, construct a non-motorized pedestrian bike/fishing/access trail system around the reservoir. Exclude a bike/pedestrian trail between the Dam and Main State Park. Include appropriate sanitation stations and trash receptacles. See Specific Area Management Direction.		Comply with contracts, agreements, and planning documents. Document in Reservoir Management Reviews.	USBR, State Parks, Wasatch County and others.
RECREATION MANAGEMENT			
<u>Activities</u> Manage for a year-round spectrum of recreation experiences while meeting the adopted ROS class. See Specific Area Management Direction.	USDA Forest Service ROS System; Chapter 60, Project Planning ROS Users Guide; and Chapter 63, ROS Setting Indicator and Analysis Technique Guidelines.	Determine user profile and preferences at 3 to 5 year intervals (by State Parks). Prepare annual recreation and wildlife summaries (by State Parks) for: Reclamation's "Annual Report," "Federal Recreation Fee Report," and to respond to Congressional and public inquiries.	Utah State Parks, USBR, and UDWR. 1992 SCORP
<u>Health and Safety</u> Ensure appropriate law enforcement, waste, and fire management regulations and facilities are in place and enforced in recreation areas.		Enforce.	State Parks, UDWR, and Wasatch County.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Ice Conditions</u> Post ice conditions during the winter months by State Parks.	Post signs at entrances in winter when safe conditions exist. Use appropriate message. Post signs at entrances when unsafe conditions exist. Use appropriate message. Prohibit highway vehicles on ice.	Comply with State Parks regulations. (PR-96-13)	State Parks and UDWR
<u>Maintenance in General</u> Provide facility maintenance to ensure an acceptable level of public safety, health, sanitation, and to protect natural resources.	Manage by an operation and maintenance plan that prescribes maintenance schedules and tasks.	Perform annual facility condition inventories (by State Parks) and coordinate with USBR on conditions and needs. Document in Reservoir Management Reviews. Presence of trash, litter, damage to structures, erosion, excessive bare ground, and presence of noxious weeds are indicators of maintenance need and Code-a-site category.	State Parks and Wasatch County Solid Waster Special Service District.
<u>Management by Others</u> Encourage other qualified entities to assume recreation management responsibility.		Comply with existing contracts and Recreation Management Memorandum of Agreement.	USBR

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Management Agreement</u> Manage recreation consistent with this Deer Creek Resource Management Plan and Recreation Agreement.	Federal Water Project Recreation Act (Public Law 89-72). Use a Memorandum of Agreement (MOA) as the mechanism to formalize relationships and responsibilities.	Comply with agreements and plans. Document in Reservoir Management Reviews.	Parties to the MOA are: USBR, PRWUA, and Utah State Parks and Recreation.
<u>Parking on Beaches</u> Prohibit public motorized land vehicles from driving or parking on beaches or below the high water mark, except for watercraft launching at approved sites.		Interpret and enforce.	State Parks.
<u>Pets</u> Prohibit domestic animals.		Interpret and enforce.	State Parks.
<u>Reservoir Water Quality Maintenance</u> Restrict or terminate recreation uses that threaten or exceed Maximum Contaminate Levels (MCL) for products, such as volatile and synthetic organic compounds.	USEPA Safe Drinking Water Act rules and regulations.	Prescribe and conduct water quality and biological monitoring of the reservoir, its tributaries and releases through JTAC.	PRWUA, USBR and JTAC.
<u>Saddle and Pack Animals</u> Prohibit the use of saddle and pack animals, except for administrative purposes.		Interpret and enforce.	State Parks.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Special Events</u> Give precedence to normal park activities/operations when scheduling special events.	Review of special events requests by the recreation manager.	Comply before scheduling.	State Parks
<u>Use Capacity</u> Manage recreation use to not exceed design capacity. Limit camping or recreation use as necessary to protect water quality, riparian, aquatic, or other sensitive resources or communities and to maintain the quality of the desired recreation experience. Restrict use in and/or rehabilitate recreation sites where unacceptable environmental damage is occurring. Rehabilitate camp or picnic sites that are in Code-A-Site category "extreme".	USDA Forest Service Research Paper PNW-209, Dated 1976.	Comply with capacity limits and safety. Document in Reservoir Management Reviews or more often as needed.	State Parks and USBR. 1992 SCORP.
<u>User Conflicts</u> Minimize conflicts and promote user safety in waters and lands.	Comply with State Parks and Recreation guidelines.	Interpret and enforce.	State Parks

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>User Fees</u> Charge appropriate user fees based on cost effective year-around service. Pursue possibilities for differential pricing to ease crowding. Provide cost effective service.	On fee title lands, return fees in excess of the administrative, operation, and maintenance, development, and facilities replacement costs to the USBR to be applied against the PRWUA repayment contract. Comply with State Parks and Recreation guidelines.	Monitor compliance annually.	State Parks, Utah State Parks and Recreation Board approved fee structure.
<u>Wakeless Areas/No Ski Zones</u> Enforce wakeless speeds in designated areas. See Specific Area Management Direction for wakeless and no ski zones.	State Boating Act and State Parks and Recreation boating regulations.	Enforce.	State Parks.
<u>Watercraft Launching</u> Restrict watercraft launching that requires motorized tow vehicles to designated boat ramps only. See Specific Area Management Direction.		Assess launching location. Document in Reservoir Management Reviews or more often if needed.	State Parks, PRWUA, and USBR.
<u>Watercraft Limit</u> Limit watercraft on the reservoir to not exceed 300 total craft at one time or not to exceed available parking, whichever is less. Further reduce total craft numbers as necessary to reduce user conflicts and promote health and safety.	<u>Physical/Biological:</u> Protect drinking water quality at the fluctuating reservoir source (which includes all project lands). <u>Managerial:</u> Provide cost-effective recreation administration by managing through the Utah State Boating Act, rather than providing single purpose water use areas for individual recreation activities.	Enforce.	State Parks.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	Social: Provide multi-purpose opportunities with low to moderate potential for conflicts with windcraft use, personal watercraft use, fishing, motor boating and other water related activities.		
<u>Watercraft Refueling</u> Prohibit watercraft refueling on the water to prevent fuel spills into the reservoir.		Enforce. Document during Reservoir Management Reviews.	State Parks and USBR.
RECREATION PLANNING			
<u>Inventory System</u> Distinguish between developed and undeveloped (dispersed) use areas and management. Utilize a Nationally approved Recreation Opportunity Spectrum (ROS) system appropriate to the scale of the project. Inventory the recreation resource and evaluate it as an integrated part of the planning and implementation process at detail ROS mapping scale which address: 1. Physical setting, 2. Social setting, and 3. Managerial setting.	USDA, Forest Service ROS System; Chapter 25, ROS Users Guide. Within the large Roaded Natural (RN) and Rural (R) areas, create the following management subclasses: 1. RN/R - Primitive: primitive, botanical, or other unique ecological areas such as, T/E, wetland. and culturally protected areas. 2. RN/R - Semiprimitive: Wildlife, watershed, and other protected sensitive areas. See Specific Area Management Direction.	Prepare an annual recreation and wildlife summary (by State Parks) for: USBRs "Annual Report", "Federal Recreation Fee Report," and to respond to Congressional and public inquiries.	USBR and State Parks. Inventory map on file at USBR, Provo Area Office.

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Motorized Vehicle Use</u>			
Allow motorized vehicle use where appropriate. Refer to Specific Management Areas.		Review proposals.	USBR, State Parks, and PRWUA.
<u>Visual Enhancement</u>			
<u>Development</u>			
Achieve landscape enhancement through addition, deletion, or alteration of landscape elements. Examples of these include:	USDA, Forest Service Visual Management System, Volume 2, Chapters; 2. Utilities, 3. Range, 4. Roads, 6. Fire, and 8. Recreation	Field inspect.	USBR, State Parks, and others.
1. Addition of vegetation species to introduce unique form, line, color, or texture to existing plant communities.			
2. Vegetation manipulation to open up vistas or screen out undesirable views.			
3. Addition of structures which enhance the natural landscape.			

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
VISUAL MANAGEMENT AND DEVELOPMENT			
<p><u>Development</u></p> <p>Design and implement management activities to blend with or complement the characteristic landscape at the adopted visual quality objective level. See Specific Area Management Direction. The Visual Quality Objectives are:</p> <ol style="list-style-type: none"> <i>Preservation</i>; Generally, ecological changes are the only activities allowed. <i>Retention</i>; Activities not visually evident in the characteristic landscape are allowed. <i>Partial Retention</i>; Activities which are visually subordinate in the characteristic landscape are allowed. <i>Modification</i>; Activities which visually dominate the characteristic landscape in foreground and middle ground are allowed. <i>Maximum Modification</i>; Activities which visually dominate the characteristic landscape in background are allowed. 	<p>The Visual Management System USDA, Forest Service Visual management System, Volume 2, Chapters:</p> <ol style="list-style-type: none"> The Visual Management System Utilities Range Roads Fire Recreation 	<p>Comply with visual condition. Document in Reservoir Management Reviews.</p>	<p>USBR, State Parks, PRWUA, and others.</p>

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE										
<u>Duration of Impact</u> The maximum time limit after construction activities have ceased, for project rehabilitation to meet the adopted VOO is: <table><tr><td>Preservation</td><td>Immediately</td></tr><tr><td>Retention</td><td>2 years</td></tr><tr><td>Partial Retention</td><td>2 years</td></tr><tr><td>Modification</td><td>5 years</td></tr><tr><td>Max. Modification</td><td>5 years</td></tr></table>	Preservation	Immediately	Retention	2 years	Partial Retention	2 years	Modification	5 years	Max. Modification	5 years	USDA, Forest Service Visual Management System, Volume 2, Chapter 1; The Visual Management System	Comply with recovery duration time limit. Document in Reservoir Management Reviews.	USBR.
Preservation	Immediately												
Retention	2 years												
Partial Retention	2 years												
Modification	5 years												
Max. Modification	5 years												
<u>Exceptions</u> The dam and active gravel pits, due to their strong contrasts with the natural appearing environment.		Field inspect.	USBR and PRWUA.										
VISUAL PLANNING													
<u>Inventory</u> Inventory the visual resource and integrate it as part of the planning and implementation process at detail mapping scales which address: <table><tr><td>1.</td><td>Variety Classes; the landscapes visual attractiveness,</td></tr><tr><td>2.</td><td>Sensitivity Levels; the public's visual expectation at various viewing distances and;</td></tr><tr><td>3.</td><td>Visual Quality Objective; the visual prescription for definitive land areas.</td></tr></table>	1.	Variety Classes; the landscapes visual attractiveness,	2.	Sensitivity Levels; the public's visual expectation at various viewing distances and;	3.	Visual Quality Objective; the visual prescription for definitive land areas.	USDA, Forest Service Visual Management System, Volume 2, Chapter 1; The Visual Management System.		USBR. Inventory Map in file at USBR, Provo Area Office.				
1.	Variety Classes; the landscapes visual attractiveness,												
2.	Sensitivity Levels; the public's visual expectation at various viewing distances and;												
3.	Visual Quality Objective; the visual prescription for definitive land areas.												

AREA WIDE MANAGEMENT DIRECTION

RECREATION/VISUAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u>Scenic Byway 189</u></p> <p>Consider Scenic Byway 189 objectives on visual quality.</p>		Comply with RMP adopted VQO's.	USBR.
VISUAL REHABILITATION			
<p><u>Rehabilitation</u></p> <p>Rehabilitate facilities and areas which do not meet the adopted Visual Quality Objectives (VQO). See Specific Area Management Direction.</p>	<p>USDA, Forest Service Visual Management System, Volume 2, Chapters:</p> <p>2. Utilities, 3. Range, 4. Road, 6. Fire</p> <p>8. Recreation</p>	Comply with desired visual condition. Document at project completion and in Reservoir Management Reviews.	USBR.
<p><u>Priorities</u></p> <p>Set rehabilitation priorities for existing conditions as follows:</p> <ol style="list-style-type: none"> 1. Relative importance of the site and amount of deviation from the adopted VQO. Foreground areas have the first priority, middle ground areas have second priority, and background areas have third priority. 2. Length of time it will take natural processes to reduce the visual impacts so that they meet the adopted VQO. 3. Benefits to other resource management objectives gained through rehabilitation. 		Field Inspect	USBR and PRWUA.

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
AIR QUALITY			
<u>Air Quality</u> Meet Federal air quality standards and state air quality regulations during construction and management activities.	Implement methods to control smoke and dust. Obtain agricultural burn permits and do not exceed appropriate clearing indexes where control burning is implemented.	Enforce.	Utah State Department of Environmental Quality.
CULTURAL/PALEONTOLOGICAL			
<u>Inventories</u> Perform class 1, 2, or 3 surveys to determine areas of high and low potential for cultural resources.	36 CFR 800	Perform site-specific (level 3) surveys and consult with SHPO before project approval.	USBR and Utah State Historical Preservation Office
<u>Listed Sites</u> Protect, find an adaptive use for, and or interpret cultural and paleontological resources which are listed on the national Register of Historic Places, The National Register of Historic Landmarks, or may be determined to be eligible for the national registers. Refer to Areawide Information Management Partnership section for further information 18 (A-12)	36 CFR 800	Determine damage/destruction due to unauthorized and uncontrollable natural agents. Document in Reservoir Management Reviews.	USBR and Utah State Historical Preservation Office.
<u>Management</u> Protect and foster public use and enjoyment of cultural and paleontological resources:	Executive Order 11593 43 CFR 3, 7	Determine damage/destruction due to unauthorized and uncontrollable natural agents. Document in Reservoir Management Reviews.	USBR.

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p>A. Conduct appropriate studies to provide information necessary for an adequate review of the effect a proposed undertaking may have on cultural values.</p> <p>B. Give adequate consideration to modifications or alterations to proposed undertakings that could avoid, mitigate, or minimize adverse effects.</p> <p>C. Collect and record information from sites where appropriate.</p> <p>D. Issue antiquities permits to qualifying academic institutions or other approved organizations for the study and research of sites.</p> <p>E. Interpret sites as appropriate, and foster public appreciation of these resources.</p>	36 CFR 800		
<p><u>Nomination</u></p> <p>Nominate or recommend cultural or paleontological sites to the National Register of Historic Places or National Natural Landmarks in the following priority:</p> <p>A. Sites representing multiple themes:</p> <p>B. Sites representing those which are not currently on the National Register within the State; or</p>	<p>36 CFR 60</p> <p>36 CFR 800</p>	Nominate as appropriate. Document in Reservoir Management Reviews.	USBR.

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
C. Sites representing themes which are currently represented by single sites.			
GEOLOGY/MINERALS/SOILS			
<p><u>Appropriate Minerals Management</u></p> <p>Assure that mineral development is permissible and compatible with project purposes and that mineral activities do not adversely affect planned or current uses. USBR owns only surface rights on acquired lands (not mineral rights); except at the dam and power plant, where USBR owns surface and mineral rights.</p>	<p><i>Leasables:</i> Coordinate with BLM, (authority for review and issuance of federal minerals permits). Act of 2-25-90 (30 USC 181 et. Seq.). An Interagency agreement between USBR and BLM, 3-25-1983.</p> <p>Coordinate with Utah Division of Oil, Gas and Mining, (authority for review and issuance of private minerals permits).</p> <p><i>Locatables:</i> Withdrawn lands are withdrawn from minerals entry by: Commissioner's order of 8-22-1952 and PLO-3676, 6-10-1965.</p> <p>Coordinate with the Utah Division of Oil, Gas and Mining, (authority for review and issuance of private minerals permits).</p> <p>Written permission from the State Park for mineral removal is required by: Utah Title 63, Chapter 11.</p>	Assure compliance where Reclamation has control. Document in Reservoir Management Reviews.	USBR, State Parks, and PRWUA

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	<p><i>Salables:</i> Reclamation retains authority for review and issuance of permits. Written permission from State Park's for mineral removal is required by: Utah Title 63, Chapter 11.</p>		
<p><u><i>Geologic Hazards</i></u> Avoid geologic hazards, where possible, during construction and/or in ground disturbing activities.</p>	<p>Analyze site specific geological hazards prior to locating permanent facilities.</p> <p>Refer to generalized hazard maps in analysis when considering ground disturbing activities.</p>	<p>Comply in design and construction.</p>	<p>Utah Geological Survey (UGS) Landslide Information (UGS)</p>
<p><u><i>Gravel Pits</i></u> Continue use of existing gravel pits as necessary for facility maintenance and rehabilitation.</p>	<p>Minimize disturbance from gravel operations to recreation visitors where possible.</p> <p>Return mined out gravel pits to a natural appearing contour, top soil, and revegetate to minimize weed infestation, soil loss and visual effects.</p>	<p>Determine on-site compliance, when project ceases, and document in Reservoir Management Reviews.</p>	<p>USBR</p>
<p><u><i>Soil and Moisture Conservation</i></u> Prepare and execute programs for the conservation of soil and moisture.</p>		<p>Document compliance during Reservoir Management Reviews or more often as needed.</p>	<p>USBR</p>

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u>Soil Protection</u></p> <p>Minimize adverse impacts to the soil resource, including accelerated erosion, compaction, contamination and displacement.</p>	<p>Protect and conserve topsoil when conducting surface disturbing activities.</p> <p>Provide adequate drainage and revegetation on areas disturbed during construction or use activities and stabilize the areas to control soil erosion.</p> <p>Rehabilitate disturbed areas that are eroding excessively and/or contributing significant sediment to the reservoir or streams.</p>	<p>Document compliance at project completion, and during Reservoir Management Reviews.</p>	<p>USBR, State Parks, and PRWUA</p>
HABITAT/FISHERIES MANAGEMENT			
<p><u>Habitat/Fisheries Management</u></p> <p>Enhance habitat quality for a two-storied (rainbow trout/walleye) fishery, that provides year-round recreation for anglers.</p>	<p>Manage toward a catch rate goal of .5 fish per hour of angling and an annual stocking of 40,000 rainbow trout (10-inch minimum).</p> <p>Enforce fishing regulations according to the Utah Fish and Game Code.</p> <p>Construct habitat enhancement structures where compatible with water operations management and safe to the public.</p>	<p>Report unexpected fish kills to UDWR.</p> <p>Prepare annual recreation and wildlife summaries (by State Parks) for: Reclamation's "Annual Report", "Federal Recreation Fee Report", and to respond to Congressional and public inquiries.</p>	<p>UDWR</p>

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	Generally maintain a 50 foot natural area along each side of streams to enhance spawning and vegetation and reduce impacts from development.		
INTEGRATED PEST MANAGEMENT			
<u><i>Pest Management</i></u> Control the spread first and then work on local established populations.	Coordinate with Wasatch County to regulate undesirable or invasive pests.	Conduct annual field inspections of depredations by insects and disease. Document in Reservoir Management Reviews.	USBR, State Parks, PRWUA, Wasatch County Weed Control, permittees, concessionaires, proponents, and others.
<u><i>Weeds/Noxious Weeds</i></u> Control and reduce noxious weeds and poisonous plants, using integrated pest management techniques and strategies; including the use of herbicides, biological control agents, and or mechanical or hand treatments.	Require those authorized to conduct soil disturbing activities, to control noxious and/or invading weeds on the disturbed area during the use or construction period. Coordinate with Wasatch County Weed Control. Apply pesticides only after approval by USBR and in addition, apply restricted use pesticides under the direction of certified applicators. Follow label instructions. To control the spread of squarrose knapweed, consider the need for an herbicide treatment in conjunction with other rehabilitation efforts, following any wildfire.	Conduct annual field inspections.	USBR, State Parks, PRWUA, Wasatch County Weed Control, permittees, concessionaires, proponents, and others. Wasatch County Weed Plan.

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
VEGETATION MANAGEMENT			
<u>Enhance Wildlife Habitat</u> Enhance wildlife habitat through range rehabilitation.	Management practices include spraying, disking, burning, fencing, rest-rotation and developing water guzzlers.	Evaluate habitat condition in project planning and rehabilitation.	USBR and others.
<u>Grazing and Browsing Activities</u> Manage the vegetative resource within its productive capabilities for wildlife in harmony with other resources and activities to provide sustained yield and improvement of the forage resource.	Use interdisciplinary teams to establish proper use criteria.	Monitor grazing and browsing impacts annually and document in Reservoir Management Reviews.	USBR and current administrator.
<u>Implementation Document</u> Develop vegetation and wildlife implementation documents to guide management of the Wallsburg and Charleston Bay Management Areas. See Specific Area Management Direction.	Coordinate with the Utah Division of Wildlife Resource, U.S. Fish and Wildlife Service, PRWUA and USBR.	Comply with implementation document. Document in Reservoir Management Reviews.	USBR and current administrator.
<u>Inventory</u> Coordinate planning efforts using the existing Habitat Evaluation Process inventory.		Evaluate existing inventories in future project planning.	USBR and current administrator.

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Livestock Grazing</u> Prohibit domestic livestock grazing except east of US-189. East of US-189 limit grazing to reduce wild fire potential and maintain shrub community only, however further reduce or eliminate grazing as needed to protect water quality.		Enforce.	USBR and current administrator.
<u>Preferred Vegetation</u> Where possible, maintain preferred vegetation to reduce big game depredation on adjoining agricultural lands.		Analyze vegetation condition. Track in Reservoir Management Reviews.	USBR and current administrator.
<u>Revegetate Disturbed Areas</u> Revegetate disturbed or damaged areas or sites.	Close or restrict roads as needed. Rehabilitate closed roads to approximate original contour, drain, seed and sign. Gate and/or sign restricted roads. Implement a travel and public use strategy to enhance wildlife habitat.	Comply in project planning and during implementation. Document in Reservoir Management Reviews.	USBR and current administrator.
<u>Sensitive Species</u> Manage habitat of sensitive species to keep them from becoming threatened or endangered.	Coordinate with USFWS.	Comply in planning and management. Document in Reservoir Management Reviews.	USBR, UDWR, USFWS and current administrator.

AREA WIDE MANAGEMENT DIRECTION

NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Structural/Non-Structural Range Improvements</u> Provide structural and non-structural range improvements needed to maintain or improve range conditions as specified in the implementation document.	Do not consider ripping or disking vegetation treatments, if visual quality objectives can not be met.	Comply with visual condition.	USBR and current administrator.
<u>Surface Disturbing Activities</u> Minimize surface disturbing activities that alter vegetative cover.	Restrict use or close sites where erosion or environmental damage is occurring.	Document vegetative condition during Reservoir Management Reviews.	USBR, State Parks, and PRWUA.
<u>Threatened and Endangered Species</u> Manage habitat for recovery of endangered and threatened species. Where activities or uses may limit T&E species or their habitats, initiate consultation procedures. Include the results of consultation in determining the viability of the activity or use.	Coordinate with the US Fish and Wildlife Service to provide effective protection and management of threatened and endangered species.	Comply in planning and management. Document in Reservoir Management Reviews.	USBR, USFWS, UDWR, and PRWUA
<u>Vegetative Condition</u> Maintain healthy diverse plant communities.		Comply in the use of treatment methods. Document in Reservoir Management Reviews.	USBR, State Parks, PRWUA and other vegetative managing entities.
<u>Wetlands and Flood Plains</u> Provide effective protection and management of wetlands and flood plains.	Prior to implementation of surface disturbing activity delineate and evaluate riparian and/or wetlands that may be impacted.	Determine if impacts to wetland and if so, obtain U.S. Army Corps of Engineers 404 permit for wetlands disturbance if required.	Executive Orders 11988 and 11990

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
FIRE SUPPRESSION			
<u>Fire Suppression</u> Employ best wildfire prevention techniques. Control wildfires at all intensity levels.		Control. Document in Reservoir Management Reviews or more often if needed.	Specific Area Administrator/Partner under contract.
LANDS			
<u>Boundary Fences</u> Construct fences in conformance with acceptable standards. Afford passage and migration of wildlife where appropriate.	USDI BLM 1995 BLM Fencing Manual Handbook H-1741-1. Contact livestock owners when their animals are in trespass. Take appropriate action.	Inspect fence conditions annually. Identify maintenance and/or repair needs. Document in Reservoir Management Reviews.	Managing entity
<u>Boundary Location</u> Locate, mark, and post land lines according to the following priorities: A. Lines needed to meet planned activities; B. Lines needed to protect lands from encroachment, and C. All other lines.		Report attainment. Document in Reservoir Management Reviews.	USBR
<u>Domestic Animals and Pets</u> Prohibit domestic animals and pets.		Enforce	PRWUA.

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Land/Rights-of Way Acquisition</u> Classify lands or interest in lands for acquisition where lands are valuable for Reclamation purposes according to the following priorities: A. Where lands or rights-of-way are needed to meet project or resource management goals and objectives. B. Lands which provide habitat for threatened and endangered species of animals and plants. C. Lands having historical or cultural resources, outstanding scenic values or critical ecosystems, when these resources are threatened by change of use.		Record in the Resource Information System. Document in Reservoir Management Reviews.	USBR, and PRWUA
<u>Land Disposal</u> Dispose of lands which are found to be no longer needed for project purposes.	Disposal based on Federal Property and Administrative Services Act of 1949 and 41 CFR 101-47	Record in the Resource Information System. Document in Reservoir Management Reviews.	USBR, PRWUA, and State Parks.
<u>Land Withdrawals</u> Retain existing withdrawals needed for project purposes. Relinquish existing withdrawals which are no longer needed for Project Purposes.	Section 204 of the Federal Land Policy and Management Act of 1976 (43 USC 1714). Section 204 of the Federal Land Policy and Management Act of 1976 (43 USC 1714).	Conduct informal withdrawal reviews to evaluate the continuation of USBR withdrawals (20 year intervals generally). Record relinquishments in the Resource Information System. Document in Reservoir Management Reviews.	USBR, BLM, PRWUA, and State Parks.

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u><i>Non-Recreation Special Use Management</i></u></p> <p>Act on special-use applications according to the following priorities.</p> <ol style="list-style-type: none"> Land and use activity request relating to public safety, health and welfare, for example highways, power lines and public service improvements. Land and use activities that benefit only private users, for example, road permits, rights-of-way for power line telephones, and waterlines. 	<p>Section 10 of the Reclamation Project Act of 1939 and 43 CFR 429.</p> <ol style="list-style-type: none"> Discretionary consideration to deny a permit could include the following: <ol style="list-style-type: none"> The proposed use would be inconsistent or incompatible with the purpose(s) for which the lands are managed, or with other uses, or The proposed use would not be in the public interest, or The applicant is not qualified, or Use would be inconsistent with applicable Federal and/or State laws, or The applicant does not or cannot demonstrate technical or financial capability. 	<p>Review special use permits, leases, licenses, easements, applications, amendments, transfers, and administration for compliance.</p>	<p>USBR, State Parks, and PRWUA.</p>
<p><u><i>Off-Site Influences to Recreation Sites</i></u></p> <p>Approve special-use applications for areas adjacent to recreation sites when the proposed use is compatible with project purposes and use of the recreation site.</p>	<p>Section 10 of the Reclamation Project Act of 1939 and 43 CFR 429.</p>	<p>Evaluate recreation setting, experience, and management objectives.</p>	<p>USBR, State Parks, and PRWUA.</p>

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Pollution Control and Abatement</u> Verify that all activities requiring a Spill Prevention Control and Counter Measure Plan are in accordance with Environmental Protection Agency and Corps of Engineers guidelines.	Report oil and chemical spills to the EPA National Response Center in Denver, Colorado; to the Utah Emergency Response Center, SLC; Wasatch County Sheriff, the PRWUA, and/or the USBR as directed by the Emergency Action Plan.	Comply with the Emergency Action Plan.	USBR.
<u>Resource Activities</u> Comply with the intent of project purposes in the design and implementation of resource development activities.	Verify crossing agreements; out grants, unauthorized uses, health and safety hazards, and identify lands not needed for project purposes.	Update Land Use Inventories annually. Document in Reservoir Management Reviews.	USBR, PRWUA, State of Utah Parks and Recreation, UDWR, and others.
<u>Utility Lines</u> Encourage burying utility and lines, except when: A. Recreation and visual quality objectives of the area can be met using an overhead line. B. Burial is not feasible due to soil erosion or geologic hazard or unfavorable geologic conditions. C. Greater long-term site disturbance would result. D. It is not technically feasible, or economically reasonable.		Conduct on-site inspections.	USBR, State Parks, and PRWUA.

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
ROADS/TRAILS			
<u>Private Purpose Roads</u> Put roads under special-use permit or easement that are needed for the benefit of private uses, and are not needed for public travel or administration.	Section 10 of the Reclamation Project Act of 1939 and 43 CFR 429.	Record in the Resource Information System. Document in Reservoir Management Reviews.	USBR, State Parks, and PRWUA.
<u>Roads Across Private Lands</u> Acquire rights-of-way for roads and trails that cross private land, where appropriate.		Record in the Resource Information System. Document in Reservoir Management Reviews.	USBR, State Parks, and PRWUA.
<u>Road Maintenance and Use</u> Pursue agreements with private or public entities to provide on-going maintenance of roads and parking areas. Restrict vehicular traffic to designated improved roads, except for authorized uses. Close roads when unacceptable environmental or road damage is occurring as a result of road use. Maintain structures, bridges, cattle guards, etc., to be structurally sound and safe for use. Coordinate with UDOT to assure safe ingress and egress at SR 189.		Document in Reservoir Management Reviews. Comply with agreements/permits. Document road inspections/ analysis. Document road condition. Conduct on-site inspections.	USBR, State Parks, PRWUA, UDOT and FHA.

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Road Rehabilitation</u> Convert roads not needed for authorized activities, to trails, or rehabilitate the road to approximate predisturbed conditions.		Site Inspections. Document at Reservoir Management Reviews.	USBR, PRWUA, and State Parks.
<u>Special Purpose Roads/Trails</u> Encourage the development of roads and trails when constructed or reconstructed for special purposes to meet existing and potential needs.	Coordinate with UDOT concerning the reconstruction of US 189 to assure safe appropriate access to reservoir lands.	Comply with existing contracts /agreements.	
<u>Specific Purpose Roads</u> Construct or reconstruct local road and trails to provide access for specific resource activities such as campgrounds, trail heads, wildlife management, and leases, with the minimum amount of surface disturbance and fitting the road to the topography. See Specific Area Management Direction.		Comply with existing contracts and agreements.	USBR, State Parks, and PRWUA.
<u>Trail Maintenance and Use</u> Maintain trails for designated uses and close trails to inappropriate uses.		Determine trail condition and travel status. Document in Reservoir Management Reviews.	USBR, State Parks, and PRWUA.

AREA WIDE MANAGEMENT DIRECTION

LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
TRAVEL/ACCESS			
<p><u>Automobile/Motorized Vehicle Travel</u></p> <p>Prohibit public motorized vehicles (intended for land travel) from driving or parking on beaches or below the high water mark.</p> <p>Prohibit vehicles from travel and parking outside areas developed specifically for travel or parking purposes.</p> <p>Close and prohibit recreational parking in existing areas along US-189, when access and parking facilities are developed away from US-189.</p>			
<p><u>Disability Access</u></p> <p>Construct accessible facilities which meet the Americans with Disabilities Act Accessibility Guidelines (ADAAG) and the Uniform Federal Accessibility Standards (UFAS).</p>		<p>Comply with ADAAG and UFAS. Document in Reservoir Management Reviews.</p>	<p>USBR and State Parks.</p>
<p><u>Off-Highway Vehicles</u></p> <p>OHV Use Designations: Close Reclamation lands to off-highway vehicle use, except for areas or trails specifically opened. Classify specific areas or trails as to type of vehicle(s) use.</p>	<p>Where open, comply with Utah State OHV Law Title 41, Section 22.</p>	<p>Evaluate roads, areas and trails as necessary and document in Reservoir Management Reviews.</p>	<p>USBR, PRWUA, State Parks, UDWR.</p>

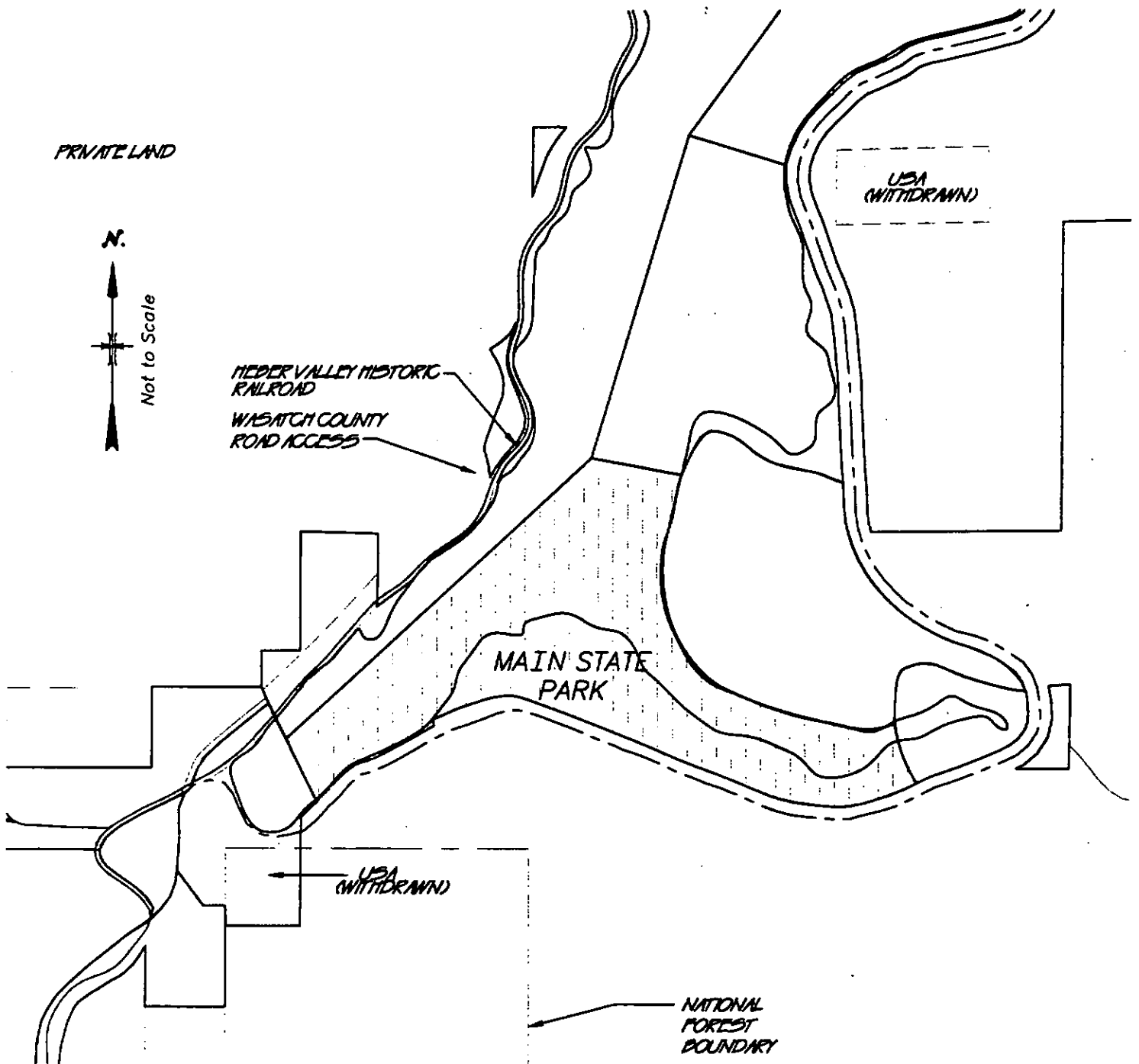
AREA WIDE MANAGEMENT DIRECTION

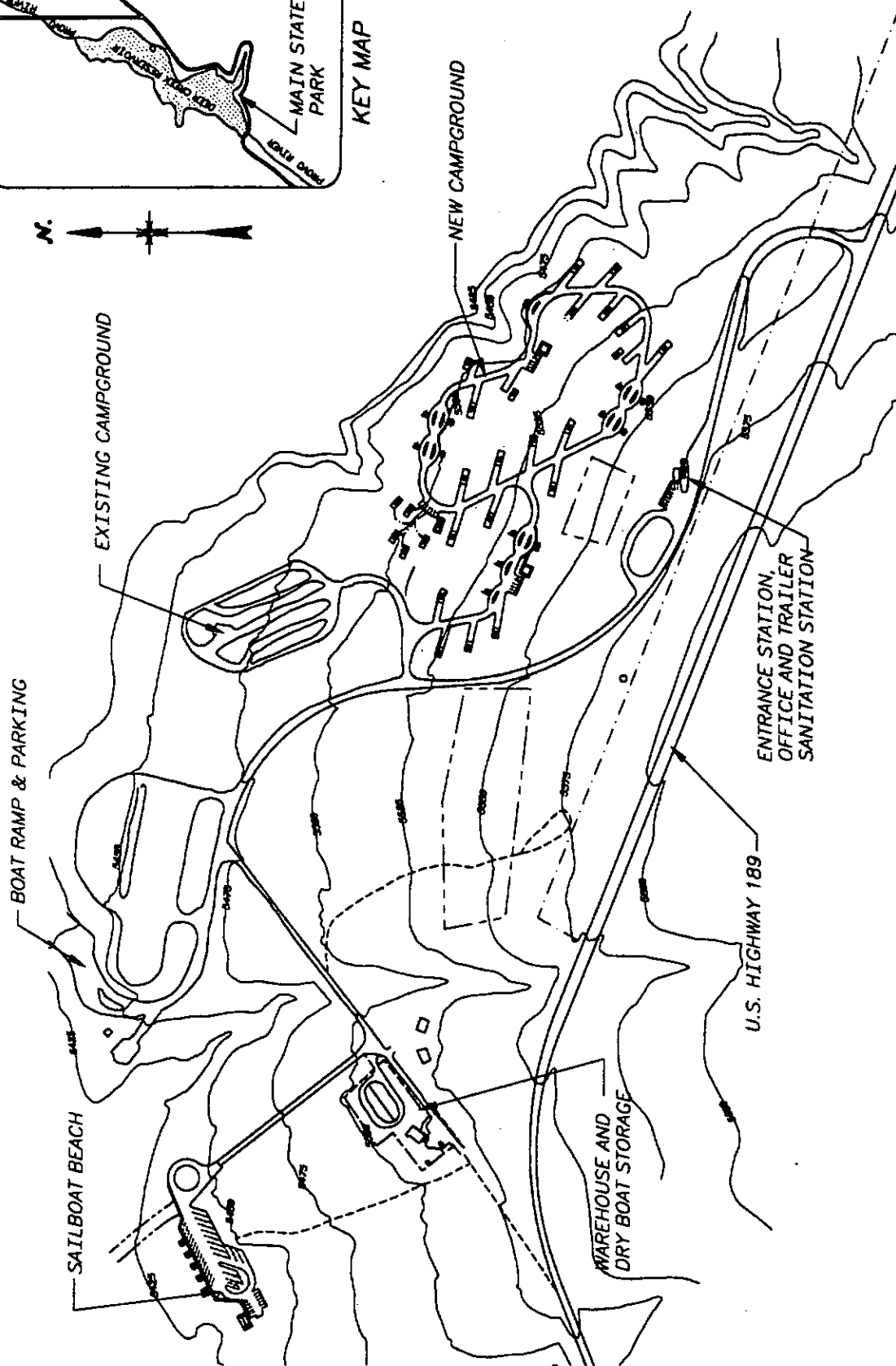
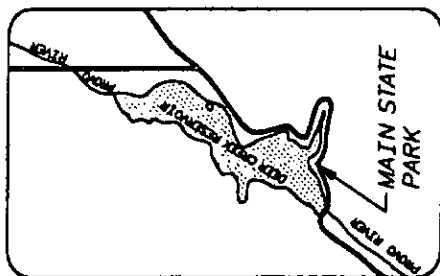
LAND MANAGEMENT

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
Where practicable, regulate OHV use on Reclamation lands consistent with adjoining public and private land use. Accomplish OHV enforcement through Federal, State, and county, or local law enforcement agencies.			

MAIN STATE PARK AREA

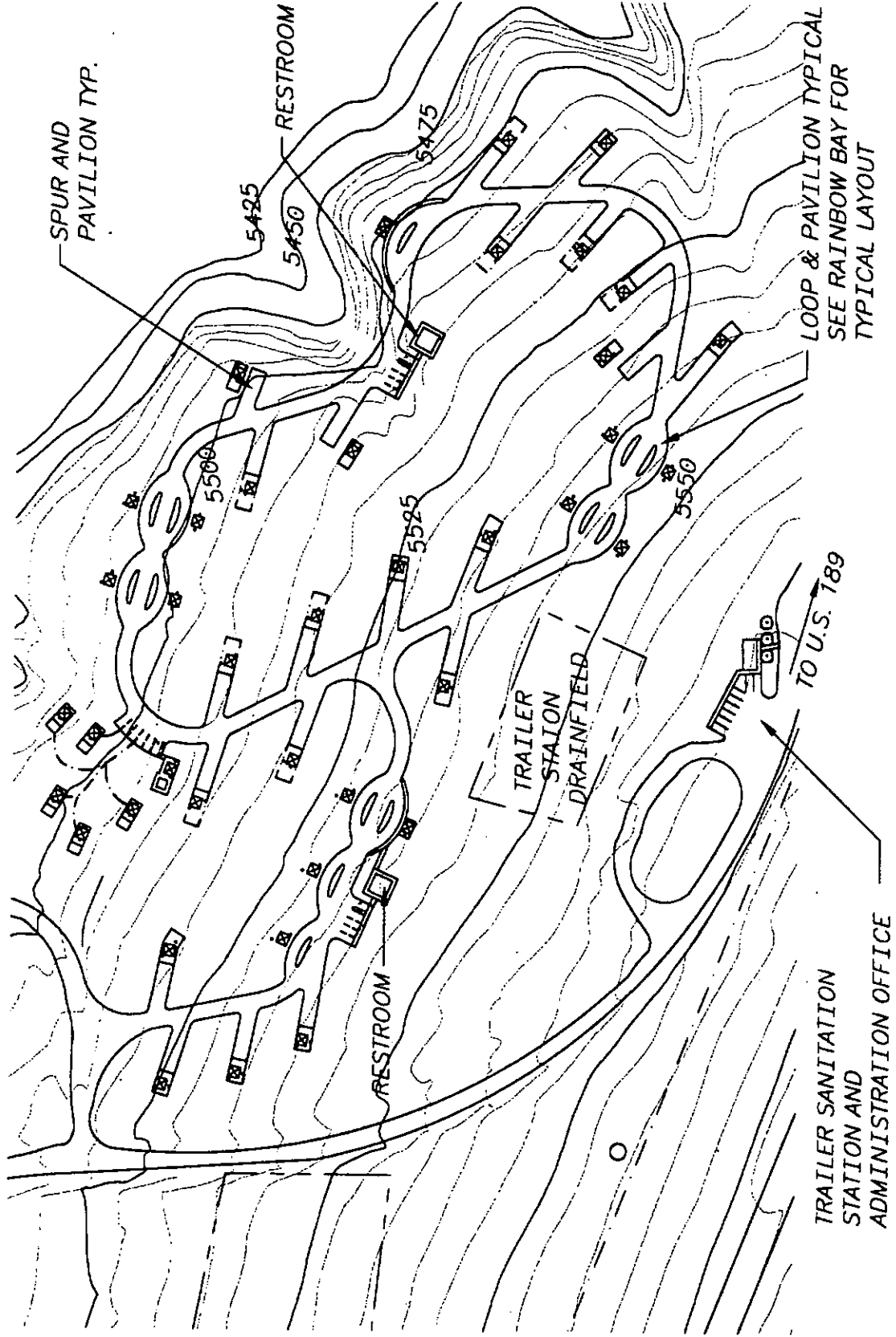
Day and Overnight Recreation Management Emphasis





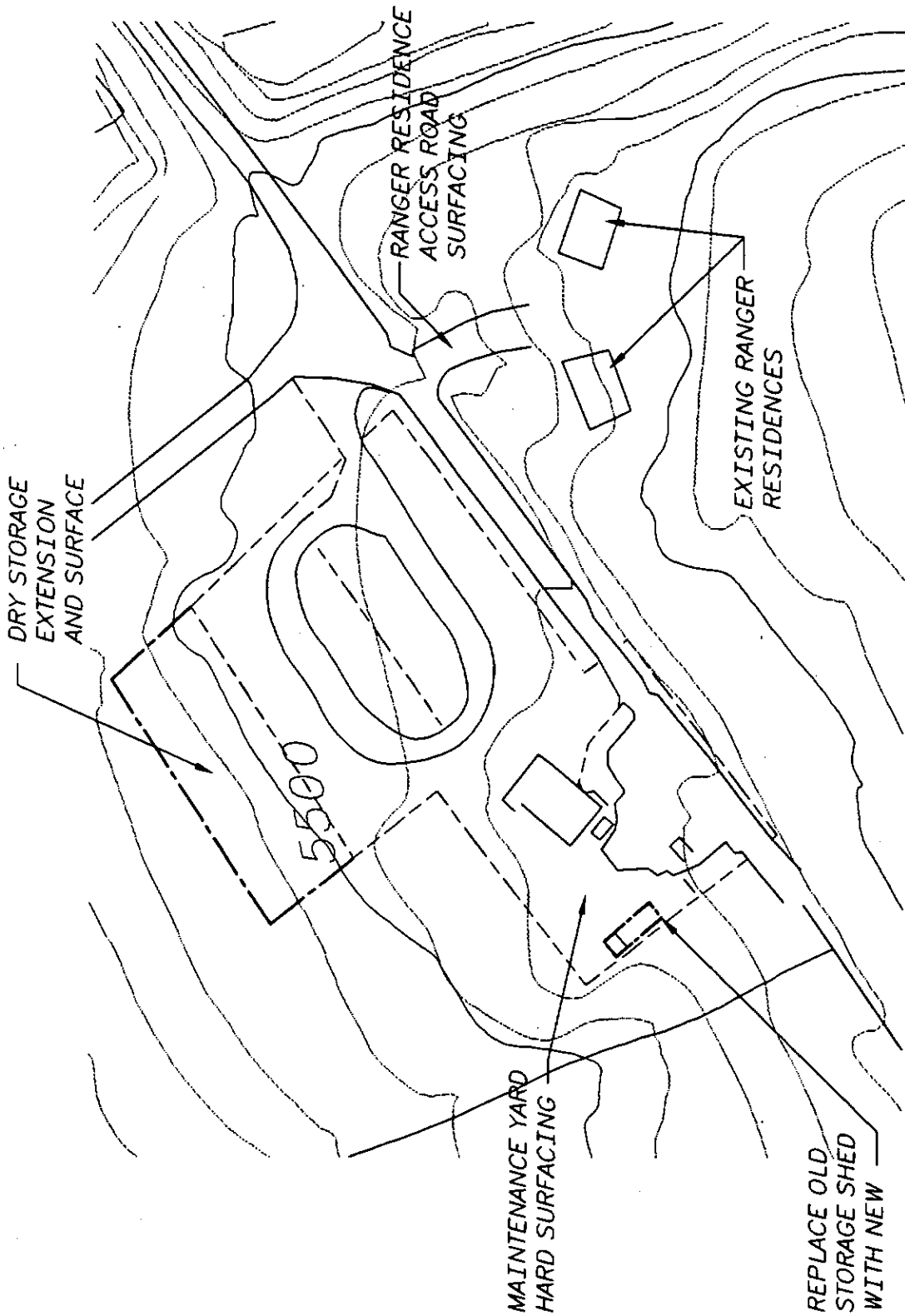
MAIN STATE PARK — LOCATION MAP

SCALE 1" = 500'



MAIN STATE PARK - NEW CAMPGROUND

SCALE 1" = 200'



MAIN STATE PARK - WAREHOUSE AND DRY BOAT STORAGE

SCALE 1" = 100'

SPECIFIC AREA MANAGEMENT DIRECTION

MAIN STATE PARK

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<p><u>Area Management</u></p> <p>Allow uses which protect water quality/ delivery and complement developed recreation objectives.</p> <p>Emphasize recreation management and administration for group and single-family day use, overnight camping, and watercraft access to the reservoir.</p> <p>Strive to operate at a full service level.</p>		<p>Comply with water and related project purposes while managing primarily for land-oriented day and overnight developed recreation use. See monitoring requirements below.</p>	<p>State Parks, PRWUA, and USBR.</p>
WATER RESOURCES			
<p><u>Water Development and Conservation</u></p> <p>Develop/redevelop water and sanitation facilities needed for recreation purposes.</p> <p>Apply water conservation techniques in the development of restrooms, drinking water and irrigation facilities.</p>		<p>Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.</p>	<p>State Parks, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

MAIN STATE PARK

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Manage for a land based urban recreation opportunity spectrum experience (development scale 5) at the existing developed recreation areas. Continue to manage for existing uses, such as fishing, camping, picnicking, and watercraft launching and docking.</p>	<p><u>Urban Recreation Opportunity Spectrum Class and Development Scale 5</u></p> <p>Allow a high degree of site modification. Allow formalized and contemporary architecture. Provide facilities for the comfort and convenience of the users. Facilities may include flush toilets, showers, and electrical hookups. Synthetic materials may be used.</p> <p>Develop formal walks or surfaced trails to minimize impacts to the natural environment. Provide access from US-189.</p> <p>Allow up to 5 or more family units per acre. Allow plant materials foreign to the environment, including mowed lawns and clipped shrubs. Allow formal interpretive services.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>
<p><u>Facilities Development</u></p> <p>Develop appropriate facilities where the present facilities are not meeting the demand and where it meets the highest net public benefit.</p> <p>Provide facilities and access for site protection, efficient maintenance, and user convenience.</p> <p>Generally provide:</p> <ul style="list-style-type: none"> Boat ramp, parking and restroom improvements. 		<p>Comply in planning, design and construction. Conduct reviews. See following concept sketch(s).</p> <p>Assess development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

MAIN STATE PARK

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<ul style="list-style-type: none"> • Boat storage area road base overlay and drainage improvements. • Campground expansion of 50 additional camping units, water, restrooms, roads, trails and showers. • Entrance contact station, office, roads, parking, and vehicle sanitation dump station improvements/upgrades. • Drainfields. • Interpretive displays. • Maintenance building area bituminous paving and drainage improvements. • Sailboat beach roads, parking, trails, water, restrooms, four single family pavilions, and one 50 PAOT group pavilion. • Trail system improvements. 			
<p><u>Landscaping</u></p> <p>Manage vegetation to enhance visual quality and recreation opportunities on existing and proposed sites.</p>		Evaluate vegetation benefits, Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Overnight Camping</u></p> <p>Allow overnight camping.</p>		Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION

MAIN STATE PARK

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Visual Management</u> Manage for a modification visual quality objective as viewed from on-site.	<u>Modification Visual Quality Objective</u> Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Wakeless/ No Ski Zone</u> Create wakeless areas to protect boat ramp, docks, and areas adjacent to beaches. Manage Wallsburg as a no ski zone.		Enforce.	State Parks, PRWUA, and USBR.
<u>Watercraft Launching Access</u> Restrict watercraft launching, requiring motorized tow vehicle assistance to the boat ramps at Main State Park or Sail Boat Beach).		Assess launching locations. Document in Reservoir Management Reviews or more often if needed.	State Parks, PRWUA, and USBR.
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

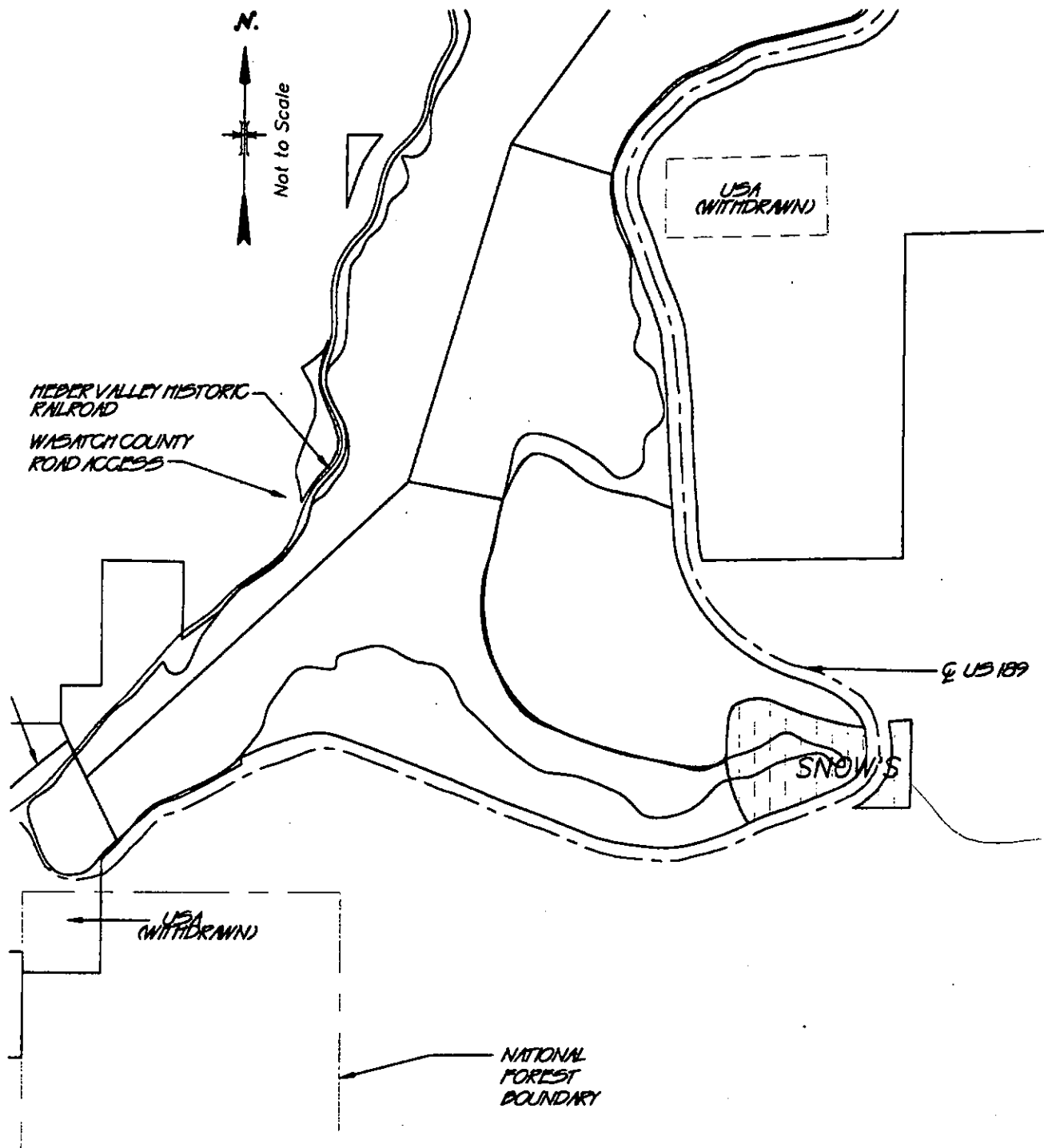
SPECIFIC AREA MANAGEMENT DIRECTION

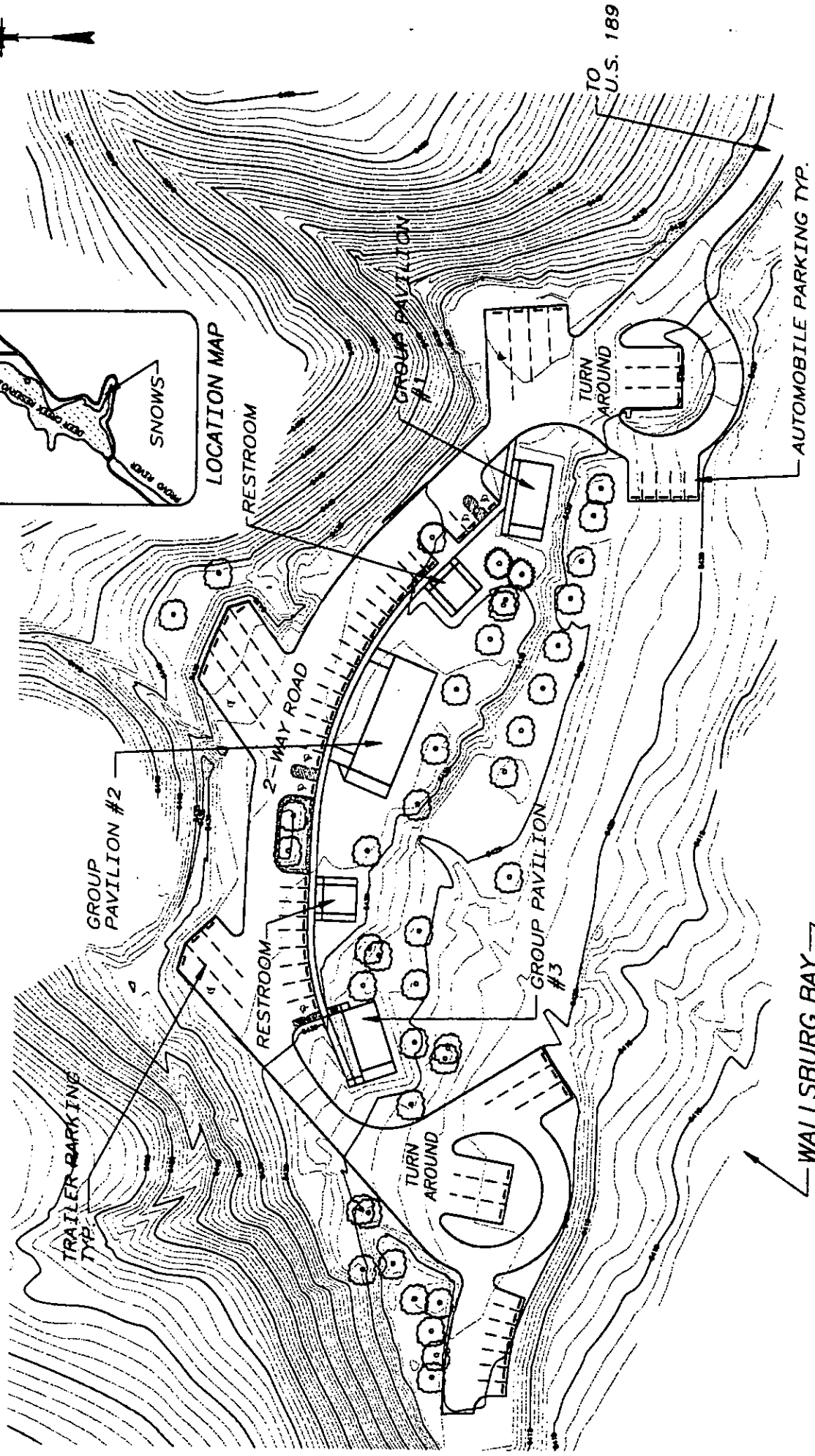
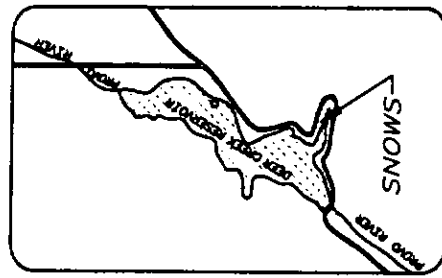
MAIN STATE PARK

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
LANDS			
<p><u>Roads and Trails</u></p> <p>Design, construct, and maintain roads and trails to assure they are compatible with developed recreation site objectives.</p>		<p>Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.</p>	<p>State Parks, PRWUA, and USBR.</p>

SNOW'S AREA

Day and Overnight Recreation Management Emphasis





SNOWS - SITE PLAN
SCALE 1" = 100'

SPECIFIC AREA MANAGEMENT DIRECTION

SNOW'S AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Allow uses which protect reservoir water quality and delivery. When the present concession is no longer in operation, develop and manage for group overnight recreation opportunities Strive to operate at a full service level. Allow other uses that are compatible with group camping recreation objectives.		Comply with water and related project purposes while managing primarily for land-oriented group overnight developed recreation use. See monitoring requirements below.	State Parks, PRWUA, and USBR.
WATER RESOURCES			
<u>Water Development and Conservation</u> Develop/redevelop water and sanitation facilities needed for recreation purposes. Apply water conservation techniques in the development of restrooms, drinking water and irrigation facilities. Schedule irrigation at low water use periods.	Comply with current water quality and sanitation standards and reporting requirements.	Document in Reservoir Management Reviews or more often as needed.	State Parks, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.

SPECIFIC AREA MANAGEMENT DIRECTION

SNOW'S AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Concessions Option: Manage for a land based urban recreation opportunity spectrum experience (development scale 5). Continue to manage for existing day and overnight uses.</p> <p>Group Overnight Camping Option: Manage for a land based urban recreation opportunity experience (development scale 5) in providing group and overnight camping opportunities.</p>	<p><u>Urban ROS Class and Development Scale 5</u></p> <p>Allow a high degree of site modification for group uses. Development may be formalized and architecture may be contemporary. Provide facilities for the comfort and convenience of the users. Facilities may include flush toilets, showers, and electrical hookups. Synthetic materials may be used. Develop formal walks or surfaced trails to minimize impacts to the natural environment. Provide access from US-189. Allow plant materials foreign to the environment, including mowed lawns and clipped shrubs. Allow formal interpretive services.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>
<p><u>Facilities Development</u></p> <p>Develop appropriate recreation facilities for groups where the present facilities are not meeting the demand and where it meets the highest net public benefit.</p> <p>Provide facilities and access for site protection, efficient maintenance, and user convenience.</p>		<p>Comply in planning, design and construction. Conduct reviews. See following concept sketch(s).</p> <p>Assess development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

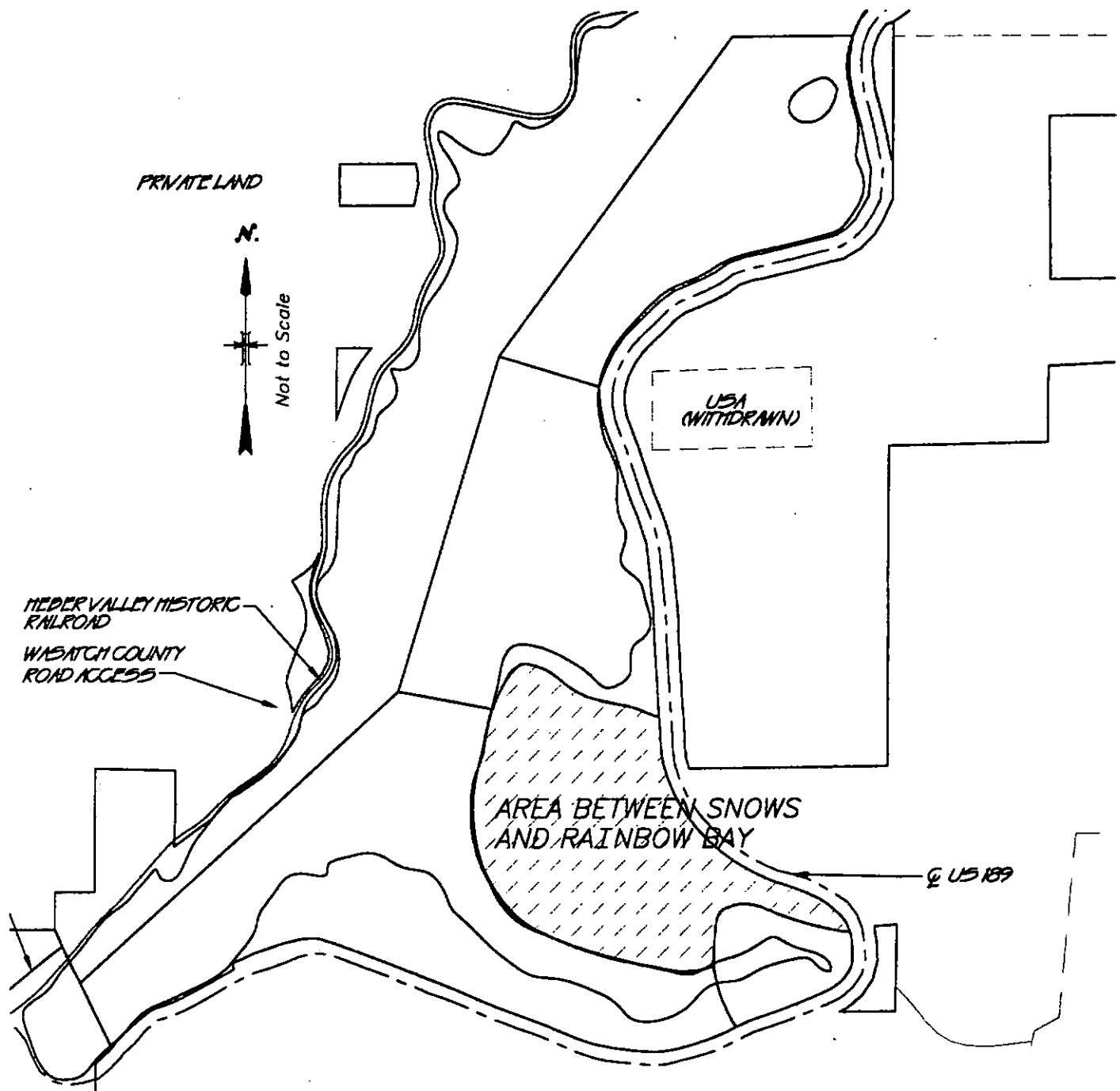
SNOW'S AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p>For non-concession group use, generally provide:</p> <ul style="list-style-type: none"> Three group pavilions: 50 PAOT, 50 PAOT and 80 PAOT (180 PAOT shelter capacity to accommodate all three sites under one shelter). Parking for automobiles and tow vehicles with trailers. Water and restrooms. 			
<p><u>Landscaping</u></p> <p>Manage vegetation to enhance visual quality and accommodate recreation use.</p>		Evaluate vegetation benefits, Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Overnight Camping</u></p> <p>Allow group overnight camping.</p>		Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Visual Management</u></p> <p>Manage for a modification visual quality objective as viewed from on-site.</p>	<p><u>Modification Visual Quality Objective</u></p> <p>Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective.</p>	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Wakeless/No Ski Zone</u></p> <p>Manage Wallisburg Bay as a no ski zone.</p>		Enforce.	State Parks, PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION			
SNOW'S AREA			
MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
LANDS			
<u>Roads and Trails</u> Design, construct, and maintain roads and trails to assure they are compatible with developed recreation sites and use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.

AREA BETWEEN SNOWS AND RAINBOW BAY

Natural Processes Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION			
AREA BETWEEN SNOW'S AND RAINBOW BAY			
MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACTS AND REFERENCES
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Allow uses which protect reservoir water quality/delivery and which are compatible with natural area management objectives. Manage as a natural area above the 5,600 foot contour elevation. Manage for recreation access between the water and the 5,600 foot contour elevation.		Comply with water and related project purposes while managing primarily for land-oriented natural conditions. See monitoring requirements below.	Area Administrator, PRWUA, and USBR
WATER RESOURCES			
<u>Water Development</u> Develop water and/or sanitation facilities to serve adjacent recreation areas where development possibilities are limited in those areas.		Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.	Area administrator, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.

SPECIFIC AREA MANAGEMENT DIRECTION

AREA BETWEEN SNOW'S AND RAINBOW BAY

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACTS AND REFERENCES
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Manage for a land based semi-primitive non-motorized use (development scale 2). Manage use to provide a low incidence of contact with other groups or individuals and to prevent unacceptable changes to the natural resources.</p>	<p><u>Semi-Primitive Non-Motorized ROS Class and Development Scale 2</u></p> <p>Minimize site modifications. Provide improvements for protection of the site rather than comfort of the user. Avoid the use of synthetic materials, where possible. Make visitor controls subtle. Minimize obvious visitor regimentation. Allow motorized land access for administrative purposes. Make interpretive services informal.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>
<p><u>Natural Area Recreation Management</u></p> <p>Allow primitive recreation use for isolation, solitude, and self-reliance, which maintains or protects wildlife values and the natural area character.</p>		<p>Comply with Natural Area Management objectives. Document in Reservoir Management reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>
<p><u>Overnight Camping</u></p> <p>Prohibit overnight camping</p>		<p>Enforce.</p>	<p>Area administrator, PRWUA, and USBR.</p>
<p><u>Visual Management</u></p> <p>Generally, manage for a retention visual quality objective as viewed from vehicles traveling Scenic Byway US-189 and from watercraft on the reservoir.</p>	<p><u>Retention Visual Quality Objective</u></p> <p>Plan development to be unnoticeable to the casual highway and reservoir visitor. Allow up to two years after project completion for revegetation to meet the visual objective of Retention.</p>	<p>Evaluate visual condition. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

AREA BETWEEN SNOW'S AND RAINBOW BAY

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACTS AND REFERENCES
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Close or rest areas and sites that cannot be maintained in code-a-site categories moderate to heavy.	Evaluate site condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
<u>Soil and Water Resource Improvements</u> Rehabilitate soil disturbances caused by human use, to soil loss tolerance levels commensurate with the natural ecological processes of the area.		Evaluate soil conditions. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
<u>Wildlife Winter Range Protection</u> Restrict activities/construction during big game occupancy of winter range (December 1 to April 30). Accommodate big game movement from the Wallsburg Unit (16,000 acres) to the Area between Snow's and Rainbow Bay.		Enforce.	Area administrator, UDWR, PRWUA, and USBR.
LANDS			
<u>Facilities Development</u> Limit/prohibit development, except for trail development. Place trail signs at terminals and trail junctions only. Include only mileage, trail identification, and terminal points.		Assess development scale. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.

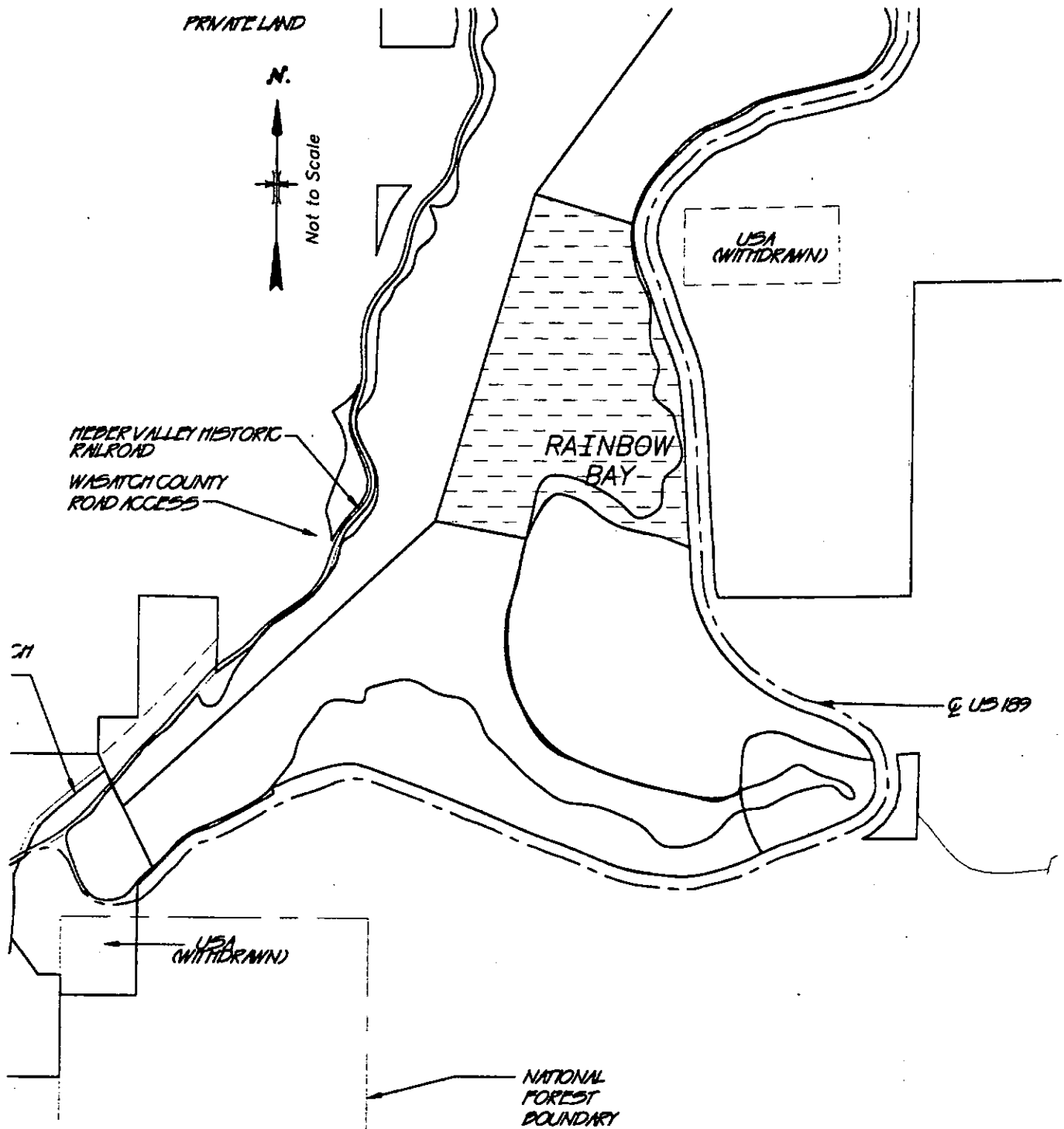
SPECIFIC AREA MANAGEMENT DIRECTION

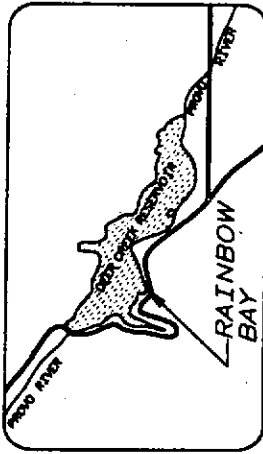
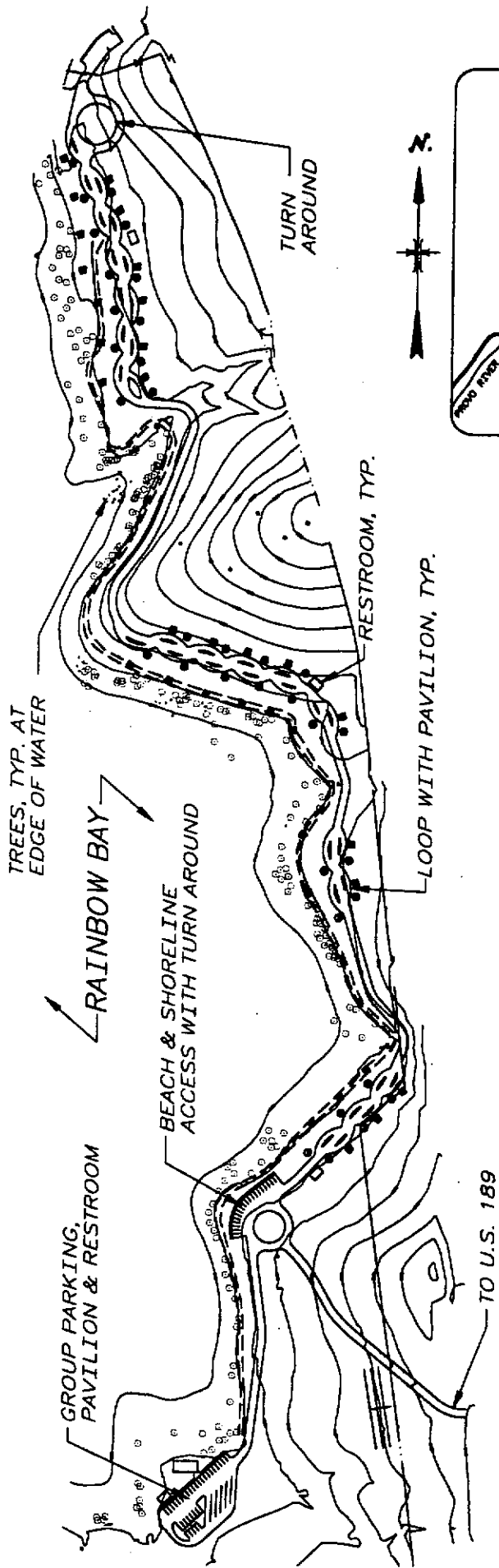
AREA BETWEEN SNOW'S AND RAINBOW BAY

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACTS AND REFERENCES
<p><u>Trails</u></p> <p>Except for a perimeter reservoir trail section through this unit, construct or reconstruct and maintain trails only when needed to meet natural area objectives.</p>		<p>Evaluate trail standard and condition. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>

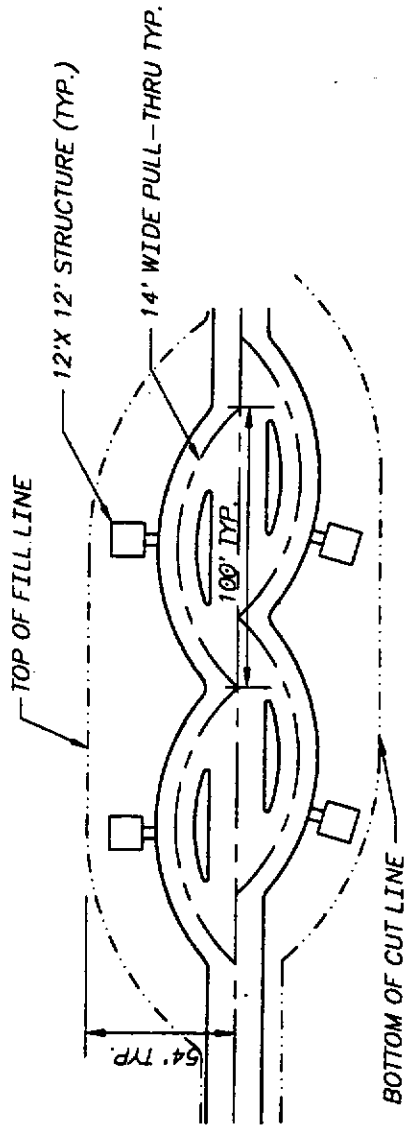
RAINBOW BAY AREA

Day – Use Recreation Management Emphasis





LOCATION MAP



TYPICAL 2-WAY ROAD WITH LOOPS

RAINBOW BAY - SITE PLAN
 SCALE 1" = 400'

SPECIFIC AREA MANAGEMENT DIRECTION

RAINBOW BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<p><u>Area Management</u></p> <p>Allow uses which protect reservoir water quality/delivery and which complement developed day use recreation objectives; single-family and group.</p> <p>Prohibit private concessions, but allow private sector vendor services where appropriate.</p> <p>Strive to operate without an entry/contact building.</p>		<p>Comply with water and related project purposes while managing primarily for land-oriented day-use developed recreation. See monitoring requirements below.</p>	<p>State Parks, PRWUA, and USBR.</p>
WATER RESOURCES			
<p><u>Water Development and Conservation</u></p> <p>Develop water and sanitation facilities needed for recreation purposes.</p> <p>Apply water conservation techniques in the development of restrooms, drinking water and irrigation facilities.</p>		<p>Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.</p>	<p>State Parks, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

RAINBOW BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Manage for a land based urban recreation opportunity experience (development scale 5). Provide group and individual picnic sites and a beach area.</p>	<p><u>Urban ROS Class and Development Scale 5</u></p> <p>Allow highly developed recreation facilities mostly designed for the comfort and convenience of the users. The facilities may include drinking water and flush toilets. Encourage the use of formal walks and surfaced trails, as needed, to protect the natural resources. Provide access to/from US-189. Allow a development density of 5 or more family units per acre and plant materials that may be foreign to the environment. Allow formal and contemporary architecture.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

RAINBOW BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u>Facilities Development</u></p> <p>Develop appropriate recreation facilities where the present facilities are not meeting the demand and where it meets the highest net public benefit.</p> <p>Provide facilities and access for resource protection, efficient maintenance, and user convenience. Generally provide:</p> <ul style="list-style-type: none"> • Natural beach and shoreline areas • Drinking water • 34 gravel pull-through loops and/or spurs with pavilions, tables and restrooms. • One 125 PAOT group pavilion, parking and restrooms. • 25 parking stalls for beach and fishing access with one restroom. 	<p><u>Physical/Biological:</u> Construct gravel surface roads (approximately 3000 linear feet) and spurs north of the beach parking and turn around to protect water quality. Construct a bituminous surface road and turn around with beach parking, and group pavilion parking which use water detention structures to protect water quality.</p> <p><u>Managerial:</u> Provide cost-effective recreation construction on roads, spurs and water quality protection structures.</p> <p><u>Social:</u> Provide for group, beach and single family day use activities, but separate them.</p>	<p>Comply in planning, design and construction. Conduct reviews. See following concept sketch(s).</p> <p>Assess development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>
<p><u>Landscaping</u></p> <p>Manage vegetation to enhance visual quality and wildlife use, and accommodate recreation use.</p>		<p>Evaluate vegetation benefits, Document in Reservoir Management Reviews.</p>	<p>Department of Interior, Secretarial Order No. 3190 State Parks, PRWUA, and USBR.</p>
<p><u>Overnight Camping</u></p> <p>Generally prohibit overnight camping.</p>		<p>Enforce. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>

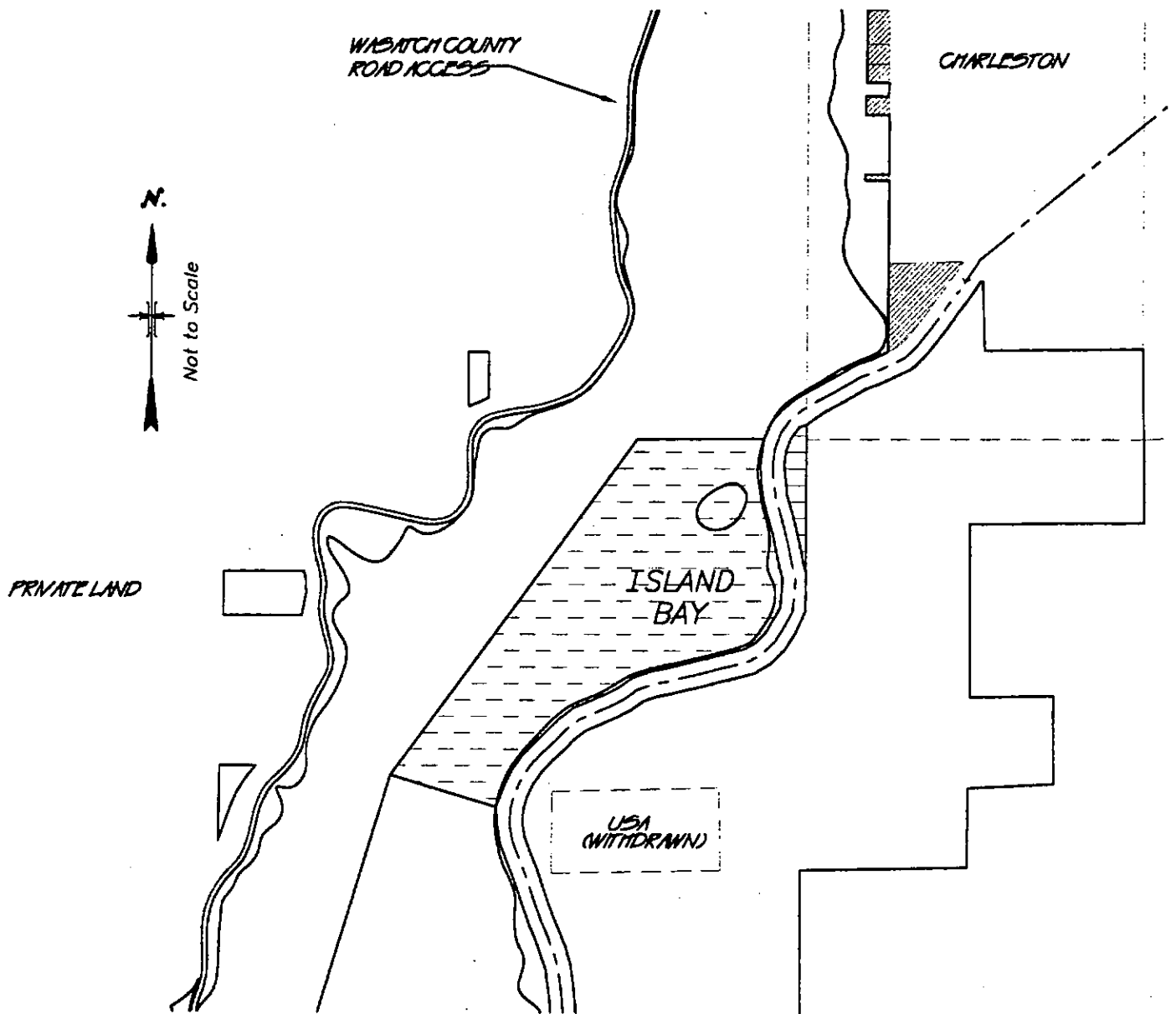
SPECIFIC AREA MANAGEMENT DIRECTION

RAINBOW BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Visual Management</u> Manage for a modification visual quality objective as viewed from on-site.	<u>Modification Visual Quality Objective</u> Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Wakeless Zone</u> Provide a wakeless corridor at Rainbow Bay.		Enforce.	State Parks, PRWUA, and USBR.
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas, including recreation areas, where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
LANDS			
<u>Roads and Trails</u> Design, construct, and maintain roads and trails to be compatible with developed recreation sites and use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.

ISLAND BAY AREA

Day – Use Recreation Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

ISLAND BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<p><u>Area Management</u></p> <p>Allow uses which are compatible with reservoir water quality/delivery and day use developed recreation opportunities.</p> <p>Provide for a beach oriented recreation experience for single family and group use, with watercraft access from a boat ramp.</p> <p>Allow private concessions, that compliment day-use recreation activities.</p> <p>Strive to operate at a full service level.</p>		<p>Comply with water and related project purposes while managing primarily for land-oriented day-use developed recreation. See monitoring requirements below.</p>	<p>State Parks, PRWUA, and USBR.</p>
WATER RESOURCES			
<p><u>Water Development and Conservation</u></p> <p>Develop/redevelop water and sanitation facilities needed for recreation purposes.</p> <p>Apply water conservation techniques in the development of drinking water, restrooms and irrigation facilities.</p>		<p>Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.</p>	<p>State Parks, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.</p>

SPECIFIC AREA MANAGEMENT DIRECTION				
ISLAND BAY AREA				
MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE	
RECREATION/VISUAL RESOURCES				
<u>Appropriate ROS Management</u> Manage for a land based urban recreation opportunity experience (development scale 5). Provide sand beaches, turf, pavilions, concessions, boat ramps.	<u>Urban ROS Class and Development Scale 5</u> Allow highly developed recreation facilities mostly designed for comfort and convenience of the users. Development may be formalized and architecture may be contemporary. The facilities may include drinking water flush toilets and electricity. Allow the use of synthetic materials. Encourage the use of formal walks and surfaced trails to protect natural resources. Provide access from US-189. Allow a development density of 5 or more units per acre and plant materials that are foreign to the natural environment. Allow mowed lawns and clipped shrubs. Encourage interpretive services.	Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.	
<u>Facilities Development</u> Develop appropriate recreation facilities where the present facilities are not meeting the demand and where it meets the highest net public benefit. Provide facilities and access for site protection, efficient maintenance, and user convenience.		Comply in planning, design and construction. Conduct reviews. See following concept sketch(s). Assess development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.	

SPECIFIC AREA MANAGEMENT DIRECTION

ISLAND BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p>Generally provide:</p> <ul style="list-style-type: none"> • Sand beach with erosion protection. • Drinking water. • 15 to 20 pavilions on turf • Concessions operation with boat storage and docks. • Trailer/tow vehicle and single vehicle parking stalls. • One 50 person group pavilion • Restrooms. • Hardened boat ramp. 			
<p><u>Landscaping</u></p> <p>Manage vegetation to enhance visual quality and wildlife use and accommodate recreation use.</p>		Evaluate vegetation benefits, Document in Reservoir Management Reviews.	Department of Interior, Secretarial Order No. 3190 State Parks, PRWUA, and USBR.
<p><u>Overnight Camping</u></p> <p>Prohibit overnight camping.</p>		Enforce. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Visual Management</u></p> <p>Manage for a modification visual quality objective as viewed from on-site.</p>	<p><u>Modification Visual Quality Objective</u></p> <p>Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective.</p>	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Wakeless Zone</u></p> <p>Provide a wakeless corridor parallel with the shoreline.</p>		Enforce.	State Parks, PRWUA, and USBR.

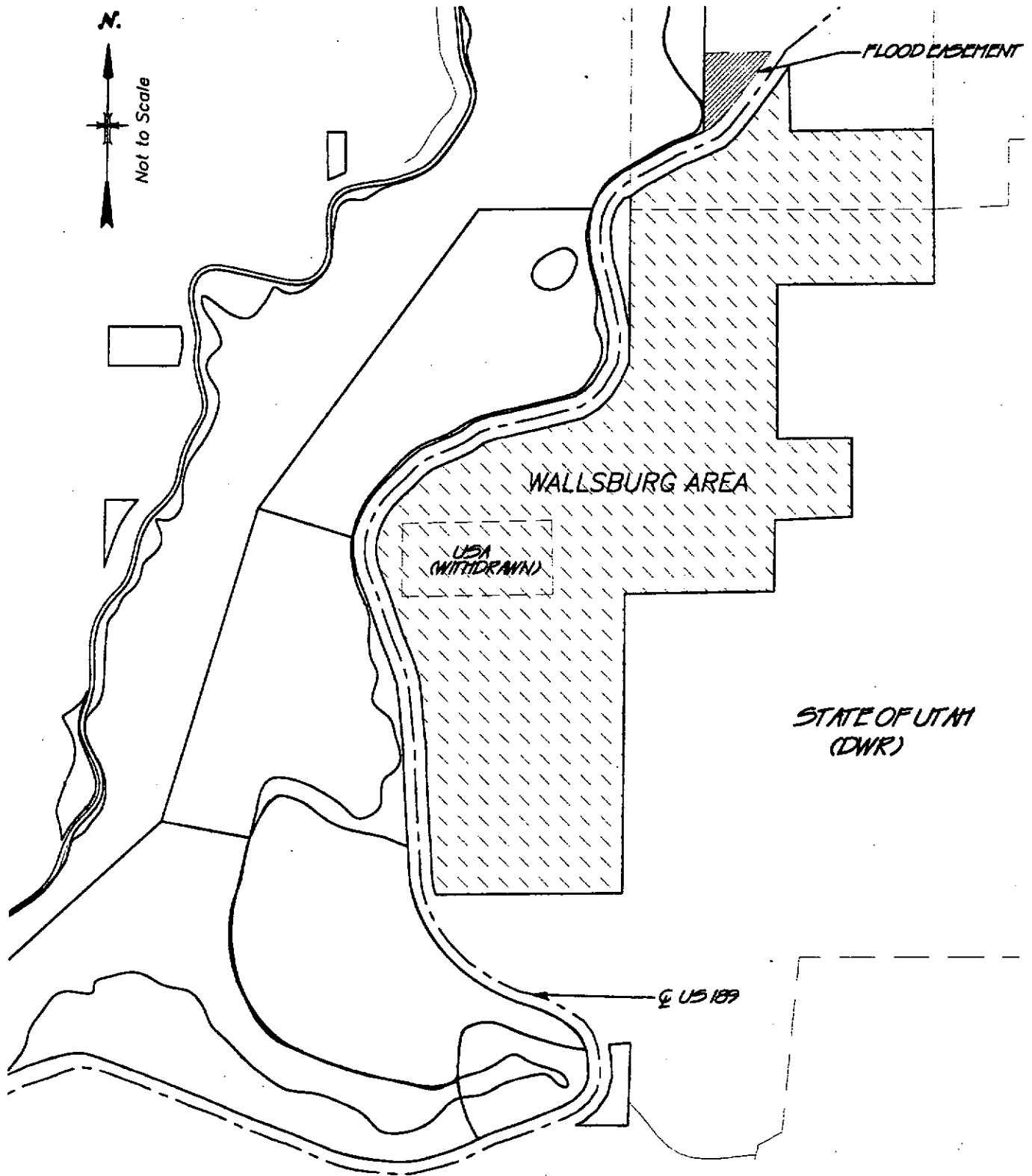
SPECIFIC AREA MANAGEMENT DIRECTION

ISLAND BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Watercraft Launching Access</u> Restrict watercraft launching, requiring motorized tow vehicle assistance, to the boat ramp (south of the existing Wagstaff Concession Building).		Assess launching locations. Document in Reservoir Management Reviews or more often if needed.	State Parks, PRWUA, and USBR.
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
LANDS			
<u>Roads and Trails</u> Design, construct, and maintain roads and trails to assure they are compatible with developed recreation sites and use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.

WALLSBURG AREA

Wildlife Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

WALLSBURG AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Allow uses which protect water quality/delivery and which are compatible with wildlife values. Develop a wildlife implementation document.		Comply with water and related project purposes while managing primarily for wildlife. See monitoring requirements below.	Area administrator, PRWUA, UDWR, USFWS, and USBR.
WATER RESOURCES			
<u>Watering Facilities</u> Develop wildlife watering facilities as needed to accomplish wildlife management needs. Consider water conservation in the design and construction of facilities.		Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.	Area administrator, PRWUA, UDWR, USFWS, USBR, and Federal, State, and Wasatch County water and sanitation entities.
RECREATION/VISUAL RESOURCES			
<u>Appropriate ROS Management</u> Manage for a semi-primitive non-motorized experience (development scale 2). Manage use to provide a low incidence of contact with other groups or individuals and to maintain desired vegetative conditions.	<u>Semi-Primitive Non-Motorized ROS Class and Development Scale 2</u> Minimize site modifications in providing vegetation, water and other improvements. Restrict or prohibit public motorized vehicle use to enhance wildlife. Minimize development of public recreation facilities; provide only wildlife viewing and interpretive opportunities. Allow water and/or sewer facilities, for development associated with recreation facilities located between US-189 and the Reservoir, when other options below the highway are not possible.	Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION

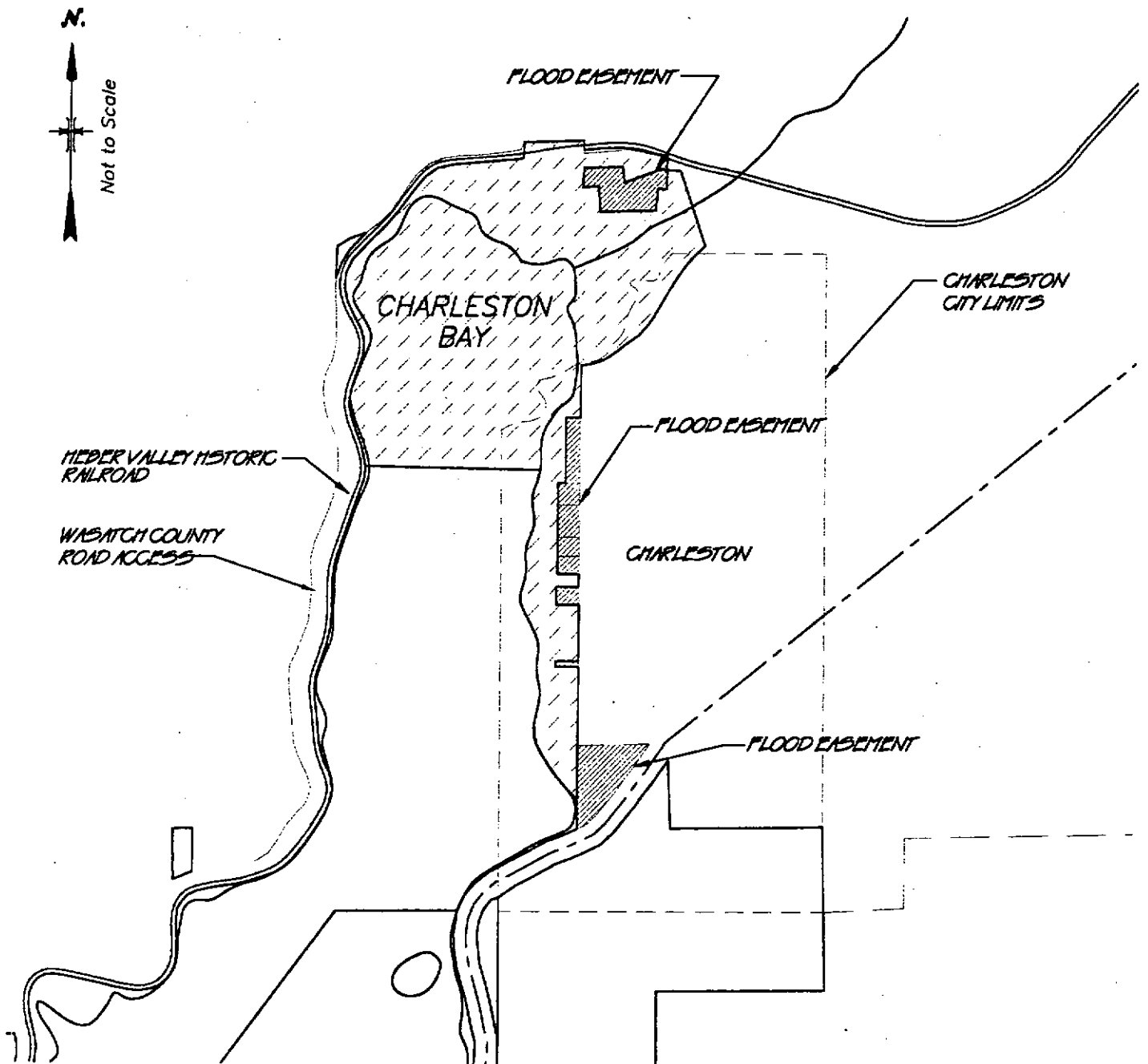
WALLSBURG AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Overnight Camping</u> Prohibit overnight camping.		Enforce. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
<u>Recreation Management</u> Allow primitive recreation use for isolation, and self-reliance, which maintains or enhances wildlife values and provides opportunities for activities such as, study, viewing and hunting.		Evaluate wildlife condition. Document in reservoir management Reviews.	Area administrator, PRWUA, and USBR.
<u>Visual Management</u> Manage for a partial retention visual quality objective as viewed from on-site.	<u>Partial Retention Visual Quality Objective</u> Allow development/activities which appear subordinate to the natural landscape. Allow up to two years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Close and rest areas and sites that cannot be maintained in code-a-site categories moderate to heavy.	Evaluate site condition. Document in Reservoir Management Reviews.	Area administrator, State Parks, PRWUA, and USBR.
<u>Vegetative Improvements</u> Maintain preferred vegetative to enhance wildlife values and to reduce depredation on agricultural lands in the vicinity. Maintain healthy diverse plant communities.		Evaluate vegetative condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION			
WALLSBURG AREA			
MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Wildlife Winter Range Protection</u> Prohibit activities/construction during big game occupancy of winter range (December 1 to April 30).		Enforce. Document in Reservoir Management Reviews.	Area administrator, UDWR, PRWUA, and USBR.
LANDS			
<u>Facilities Development</u> Prohibit development in the area including concessions, except where compatible with wildlife values. Place signs at trail terminals and trail junctions only. Include only mileage, trail identification, and identification of terminal points.		Assess development scale. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
<u>Fire Management</u> Minimize risk of fire spread with application of best management practices.			
<u>Trails</u> Construct, reconstruct and maintain trails only when needed to meet wildlife management objectives.		Evaluate trail standard and condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, State Parks and USBR.
<u>Weeds/Noxious Weeds</u> Develop management direction for potential infestations such as squarrose knapweed. Coordinate treatment with Wasatch County and UDWR.			Wasatch County and UDWR.

CHARLESTON BAY AREA

Natural Processes Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION			
CHARLESTON BAY AREA			
MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Allow uses which protect water quality/delivery and complement natural area objectives. Manage the area as a natural area, except at sportsman and visitor staging areas. Develop a natural area implementation document.		Comply with water and related project purposes while managing primarily for land-oriented natural conditions. See monitoring requirements below.	Area administrator, PRWUA, USBR, Mitigation Commission, USFWS, UDWR and State Parks.
WATER RESOURCES			
<u>Water Conservation and Development</u> Apply water conservation techniques in area activities and development of restrooms and drinking water.		Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.	Area administrator, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.

SPECIFIC AREA MANAGEMENT DIRECTION

CHARLESTON BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Except for roads, parking and visitor and boating access areas, manage for a land based semi-primitive non-motorized use. Manage visitor use to protect or enhance soils, plants, and animals; and to provide a low incidence of contact with other individuals and groups. Interpret natural features where appropriate. Allow for a limited fishing vendor operation.</p>	<p><u>Semi-Primitive Non-Motorized ROS Class and Development Scale 2</u></p> <p>Minimize site modifications. Provide improvements for protection of the site rather than comfort of the user. Use a minimum of public controls and little obvious visitor regimentation. Restrict public motorized access. Provide informal interpretative services.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>
<p><u>Facilities Development</u></p> <p>Develop appropriate recreation facilities where the present facilities are not meeting the demand and where it meets the highest net public benefit; generally boat ramp, trailhead, picnic tables and nature walk.</p>		<p>Comply in planning, design and construction. Conduct reviews. Assess development scale. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, USBR and Mitigation Commission.</p>
<p><u>Landscaping</u></p> <p>Manage vegetation to maintain or enhance natural area and wildlife values.</p>		<p>Evaluate vegetation benefits, Document in Reservoir Management Reviews.</p>	<p>Department of Interior, Secretarial Order No. 3190. Area administrator, UDWR, PRWUA, and USBR.</p>
<p><u>Natural Area Recreation Management</u></p> <p>Manage for primitive recreation uses (for isolation and solitude), which provide opportunities for activities, such as study, scenery viewing, bird watching or other nature and wildlife related activities.</p>		<p>Evaluate recreation condition and Development Scale. Document in reservoir management Reviews.</p>	<p>Area administrator, PRWUA, USBR and Mitigation Commission.</p>

SPECIFIC AREA MANAGEMENT DIRECTION				
CHARLESTON BAY AREA				
MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE	
<u>Overnight Camping</u> Prohibit overnight camping.		Enforce. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.	
<u>Visual Management</u> Manage for a partial retention visual quality objective as viewed from on-site.	<u>Partial Retention Visual Quality Objective</u> Allow development or facilities which appear subordinate to the natural landscape. Allow up to two years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.	
<u>Wakeless Management</u> Manage Charleston Bay wakeless. Restrict activities during sensitive nesting and migration periods.		Enforce.	Area administrator, PRWUA, USBR, USFWS and UDWR.	
<u>Watercraft Launching Access</u> Restrict watercraft launching, requiring motorized tow vehicle assistance, to the existing boat ramp.		Assess launching locations. Document in Reservoir Management Reviews or more often if needed.	Area administrator, PRWUA, and USBR.	
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES				
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Close/rest areas and sites that cannot be maintained in code-a-site categories moderate to heavy.	Evaluate site condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.	

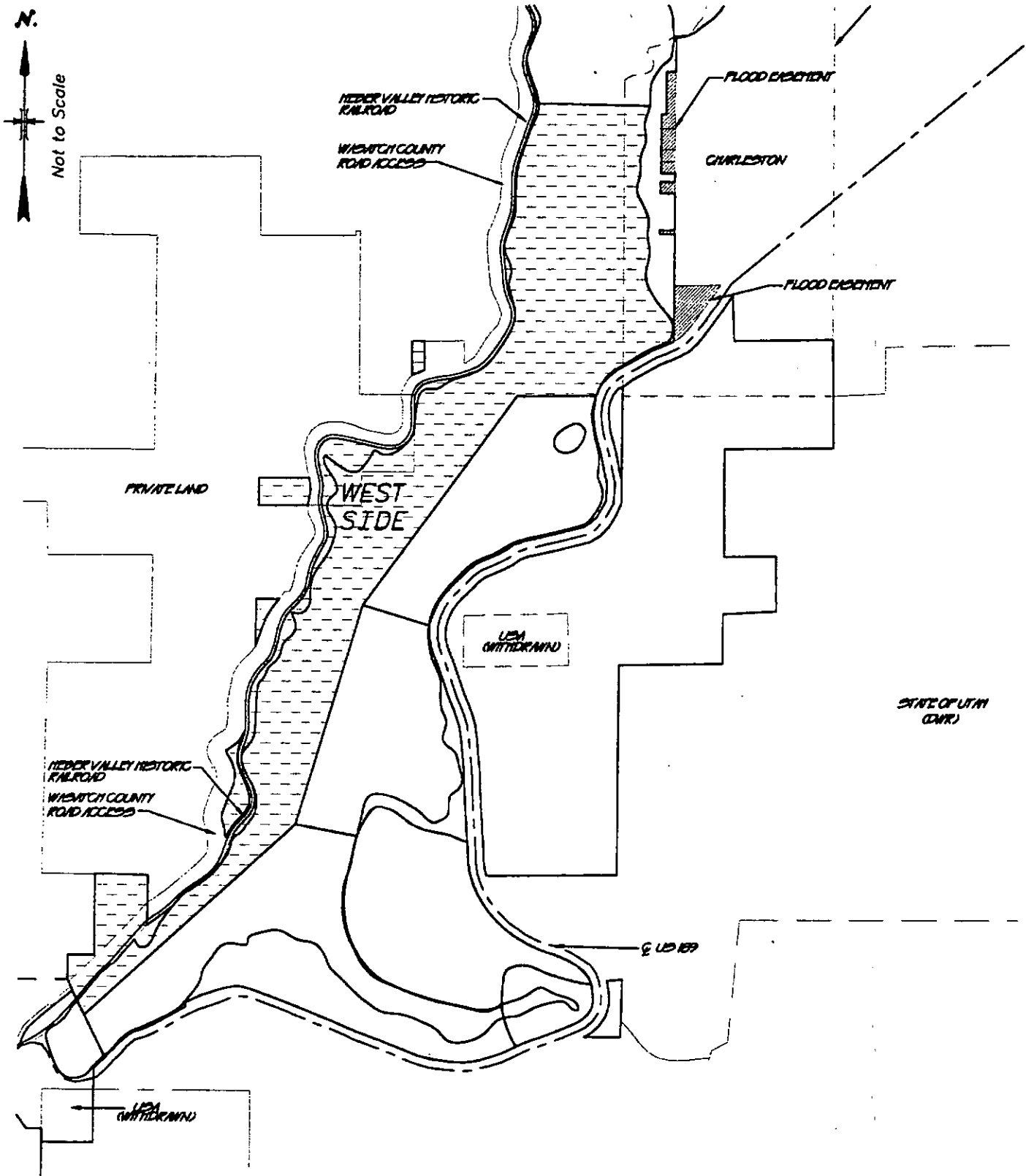
SPECIFIC AREA MANAGEMENT DIRECTION

CHARLESTON BAY AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Soil and Water Resource Improvements</u> Restore soil disturbances caused by human use to soil loss tolerance levels commensurate with the natural ecological processes of the area.		Evaluate soil conditions. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
<u>Wildlife Winter Range Protection</u> Prohibit activities and construction during big game occupancy of winter range (December 1 to April 30).		Enforce. Document in Reservoir Management Reviews.	Area administrator, PRWUA, USBR and UDWR.
<u>Waterfowl Seasonal Avoidance</u> Restrict activities and construction during sensitive nesting and migration periods.		Enforce. Document in Reservoir Management Reviews.	Area administrator, PRWUA, USBR and UDWR.
LANDS			
<u>Facilities Development</u> Prohibit development in the area including concessions, except for trails, the boat ramp area and parking lots needed for staging at trailheads.		Assess development scale. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
<u>Trails</u> Except for the reservoir perimeter trail section through this unit, construct or reconstruct and maintain trails only when needed to meet natural area objectives.		Evaluate trail standard and condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, USBR and Mitigation Commission.

WEST SIDE AREA

Day – Use Recreation Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

WEST SIDE AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<p><u>Area Management</u></p> <p>Allow uses which protect water quality/delivery and which are compatible with developed recreation day-use objectives.</p> <p>Emphasize land management for day-use fishing and picnicking with access by water and by non-motorized trail.</p> <p>Prohibit private concessions and vending.</p> <p>Manage to protect health and safety and reduced service recreation operation levels.</p>		<p>Comply with water and related project purposes while managing primarily for land-oriented day-use developed recreation. See monitoring requirements below.</p>	<p>State Parks, PRWUA, and USBR.</p>
WATER RESOURCES			
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Manage for roaded natural appearing recreation opportunities (development scale 3). Manage to allow moderate contact (sights and sounds) with other individuals or groups.</p>	<p><u>Semi-Primitive Non-Motorized ROS Class and Development Scale 3</u></p> <p>Moderately develop recreation facilities which are compatible with experiencing the sites and sounds of people boating and riding the train or hiking. Develop facilities about equal for protection of the site and comfort of the user. Allow a development density of about 3 family units per acre.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>State Parks, PRWUA, and USBR.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

WEST SIDE AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Facilities Development</u> Develop restroom and picnic facilities at Scott's Hollow.		Assess development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Landscaping</u> Manage vegetation to enhance the natural landscape appearance, wildlife use and recreation opportunity.		Evaluate vegetation benefits. Document in Reservoir Management Reviews.	Department of Interior, Secretarial Order No. 3190. State Parks, UDWR, PRWUA, and USBR.
<u>Overnight Camping</u> Prohibit overnight camping.		Enforce. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Visual Management</u> Manage for a modification visual quality objective as viewed from on-site.	<u>Modification Visual Quality Objective</u> Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Close/rest areas and sites that cannot be maintained in code-a-site categories moderate to heavy.	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

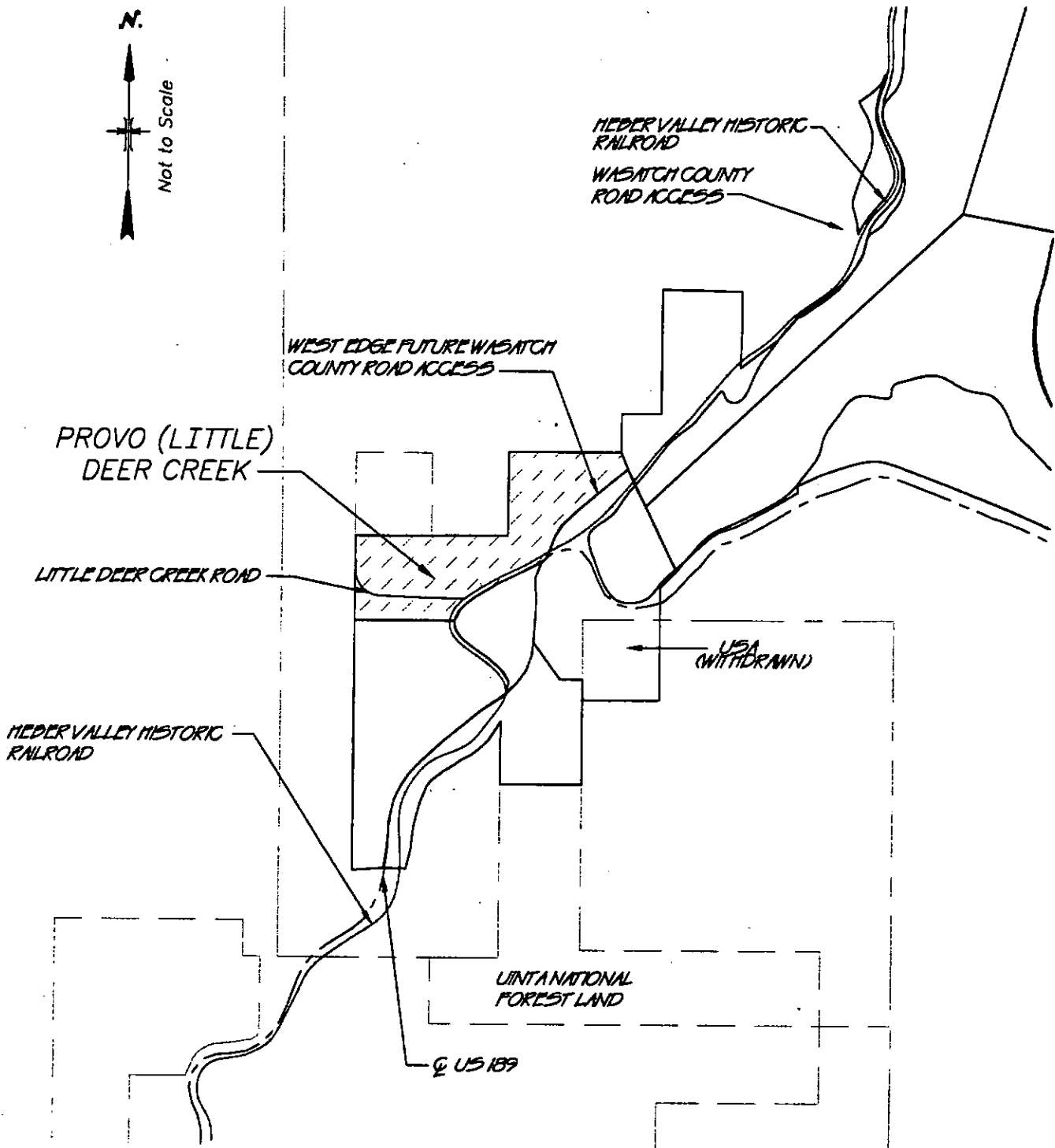
SPECIFIC AREA MANAGEMENT DIRECTION

WEST SIDE AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Soil and Water Resource Improvements</u> Restore soil disturbances caused by human use to soil loss tolerance levels commensurate with the natural ecological processes of the area.		Evaluate soil conditions. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Wildlife Winter Range Protection</u> Restrict activities/construction during big game occupancy of winter range.		Enforce. Document in Reservoir Management Reviews.	State Parks, PRWUA, UDWR, and USBR.
LANDS			
<u>Facilities Development</u> Prohibit development in the area including concessions, except for trail development. Provide trail head facilities for sanitation and parking. Place signs at trail terminals and trail junctions only. Include only mileage, trail identification, and identification of terminal points.		Assess development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Trails</u> Except for the reservoir perimeter trail section through this unit, construct or reconstruct and maintain trails only when needed to meet natural area objectives.		Evaluate trail standard and condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

PROVO (LITTLE) DEER CREEK AREA

Natural Processes Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

PROVO (LITTLE) DEER CREEK AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<p><u>Area Management</u></p> <p>Allow uses which protect water quality/delivery, are compatible with wildlife management associated with maintenance of cottonwood trees, and with associated day use recreation activities.</p> <p>Prohibit concession services.</p> <p>Restrict/prohibit all-terrain motor vehicles unless studies reveal that impacts to the stream and associated resources can be mitigated.</p> <p>Maintain the cottonwood tree community for wildlife purposes.</p>		<p>Comply with water and related project purposes while managing primarily for land-oriented natural conditions. See monitoring requirements below.</p>	<p>Area administrator, PRWUA, and USBR</p>
WATER RESOURCES			
<p><u>Drinking Water</u></p> <p>Provide drinking water when funds are available, otherwise the area should be a dry site.</p>		<p>Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.</p>	<p>Area administrator, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.</p>

SPECIFIC AREA MANAGEMENT DIRECTION

PROVO (LITTLE) DEER CREEK AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
RECREATION/VISUAL RESOURCES			
<p><u>Appropriate ROS Management</u></p> <p>Manage for a roaded natural appearing recreation experience.</p> <p>Restrict motorized vehicle access except to current lease holders.</p> <p>If studies show impacts to the stream and associated natural resources can be mitigated, allow all-terrain vehicles or other motorized vehicles as determined by the study.</p> <p>Provide facilities and access for site protection, efficient maintenance and user convenience.</p>	<p><u>Roaded Natural Appearing ROS Class and Development Scale 3</u></p> <p>Where recreation facilities are placed, allow moderate development: facilities which are about equal for protection of the site and comfort of the users. Allow a development density of about 3 family units per acre.</p>	<p>Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>
<p><u>Facilities Development</u></p> <p>Develop appropriate recreation facilities where the present facilities are not meeting the demand and where it meets the highest net public benefit, generally restrooms and picnic tables.</p>		<p>Comply in planning, design and construction. Conduct reviews.</p> <p>Assess development scale. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>
<p><u>Landscaping</u></p> <p>Manage vegetation to maintain or enhance cottonwood trees, associated with wildlife values.</p>		<p>Evaluate vegetation benefits, Document in Reservoir Management Reviews.</p>	<p>Area administrator, UDWR, PRWUA, and USBR.</p>
<p><u>Overnight Camping</u></p> <p>Prohibit overnight camping.</p>		<p>Enforce. Document in Reservoir Management Reviews.</p>	<p>Area administrator, PRWUA, and USBR.</p>

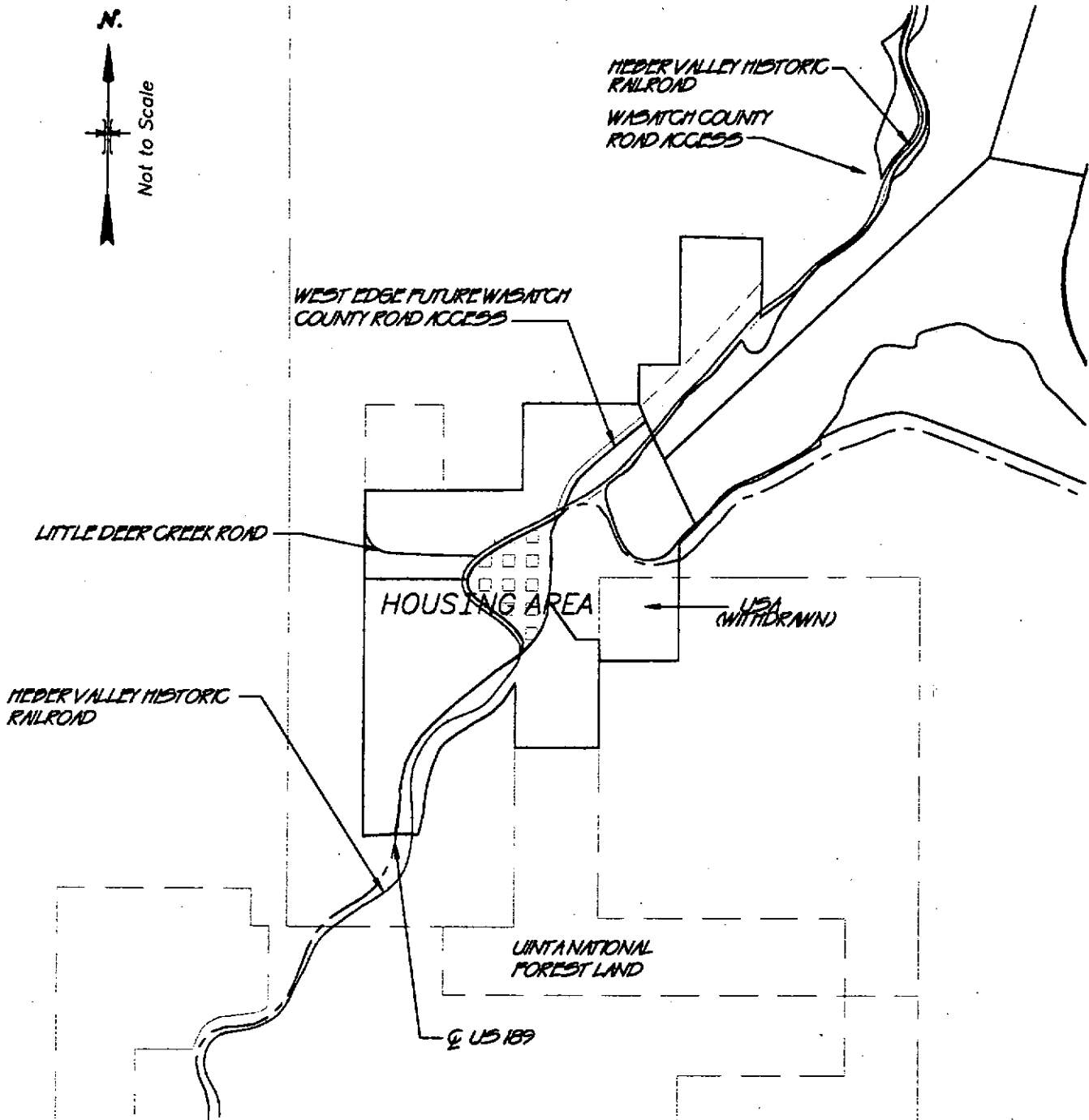
SPECIFIC AREA MANAGEMENT DIRECTION

PROVO (LITTLE) DEER CREEK AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Visual Management</u> Manage for a partial retention visual quality objective as viewed from on-site.	<u>Partial Retention Visual Quality Objective</u> Allow development or facilities which appear subordinate to the natural landscape. Allow up to two years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	Area administrator, PRWUA, and USBR.
LANDS			
<u>Roads and Trails</u> Design, construct, and maintain roads and trails to assure they are compatible with developed recreation sites and use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.

HOUSING AREA

Housing Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

HOUSING AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Allow uses which protect water quality/delivery and which complement recreation manager housing purposes. Retain existing homes as living quarters for recreation managers.		Comply with water and related project purposes while managing primarily for residential living use. See monitoring requirements below.	USBR.
WATER RESOURCES			
<u>Water Conservation</u> Apply water conservation techniques in development and management of the residences and yards. Schedule irrigation at low water use periods where possible.		Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.	State Parks, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.
RECREATION/VISUAL RESOURCES			
<u>Appropriate ROS Management</u> Manage for a rural recreation opportunity experience (development scale 5) in providing a developed housing complex.	<u>Rural ROS Class and Development Scale</u> <u>5</u> Allow highly developed facilities mostly designed for the comfort and convenience of the users. Designs may be formalized and architecture, contemporary. The facilities may include drinking water, flush toilets, showers, laundry facilities and electricity.	Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION

HOUSING AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
	Encourage the use of formal walks and surfaced parking areas. Provide access from US-189. Maintain the existing development density. Allow plant materials foreign to the environment, including lawns and clipped shrubs.		
<u>Facilities Development</u> Maintain and /or develop appropriate housing facilities. Provide facilities and access for site protection, efficient maintenance, and user convenience.		Comply in planning, design and construction. Conduct reviews. Assess development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<u>Landscaping</u> Manage vegetation to enhance living conditions, existing cottonwood trees, and visual quality.		Evaluate vegetation benefits, Document in Reservoir Management Reviews.	State Parks, UDWR, PRWUA, and USBR.
<u>Visual Management</u> Manage for a modification visual quality objective as viewed from on-site.	<u>Modification Visual Quality Objective</u> Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

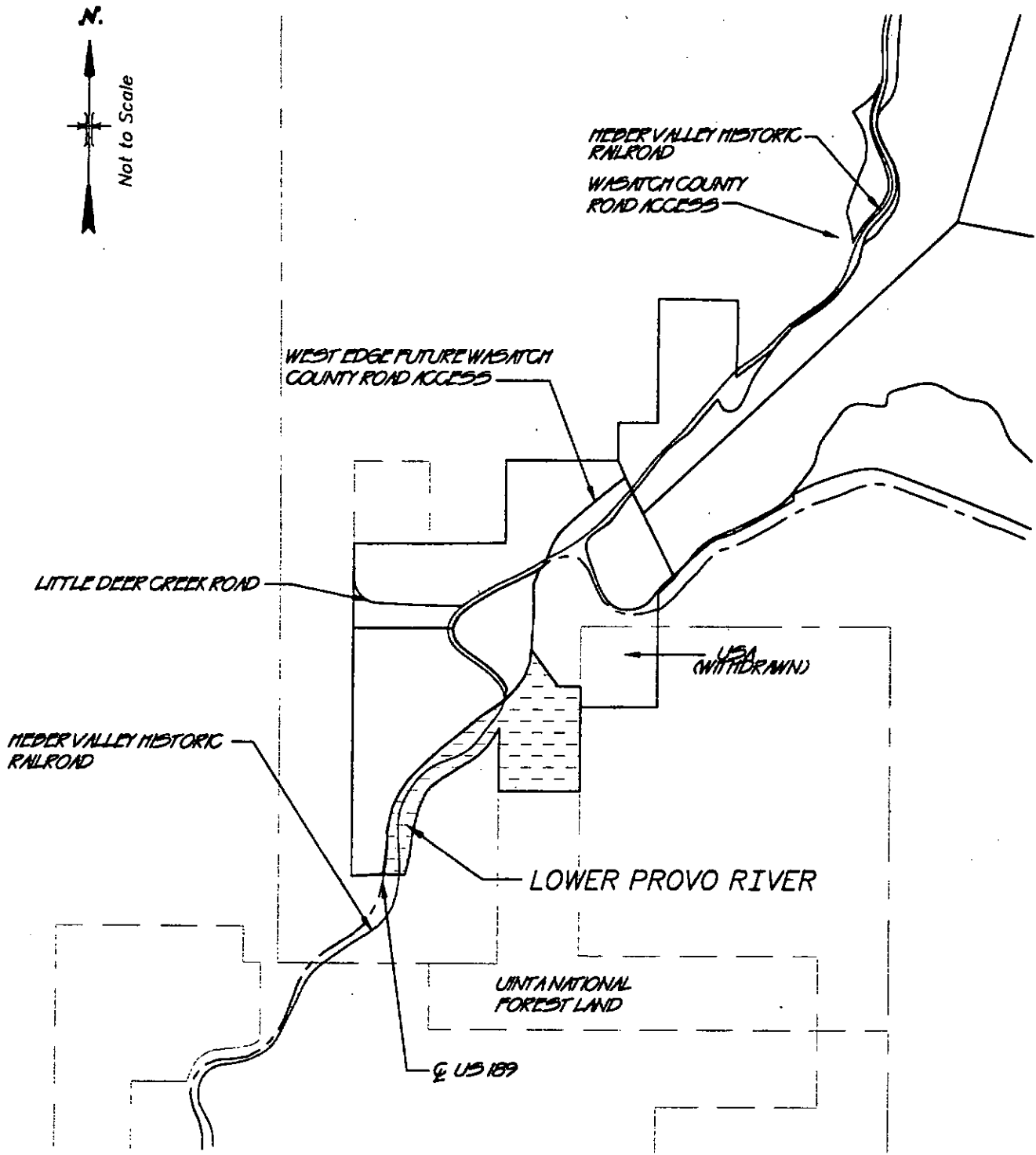
SPECIFIC AREA MANAGEMENT DIRECTION

HOUSING AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
LANDS			
<u>Roads and Trails</u> Design, construct, and maintain roads and trails to assure they are compatible with project and housing area use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.

LOWER PROVO RIVER AREA

Day – Use Recreation Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

LOWER PROVO RIVER AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Allow uses which protect water quality/delivery and complement recreation and natural area objectives. Manage for day-use recreation and river access, while maintaining cottonwood tree community and associated natural values.		Comply with water and related project purposes while managing primarily for day-use developed recreation and natural conditions. See monitoring requirements below.	State Parks, PRWUA, USBR.
WATER RESOURCES			
<u>Water Conservation and Development</u> Apply water conservation techniques in the development and maintenance of restrooms and drinking water.		Comply with current water quality and sanitation standards and reporting requirements. Document in Reservoir Management Reviews or more often as needed.	State Parks, PRWUA, USBR, and Federal, State, and Wasatch County water and sanitation entities.
RECREATION/VISUAL RESOURCES			
<u>Appropriate ROS Management</u> Manage for a roaded natural appearing recreation opportunity experience (development scale 3) in providing restrooms, single family picnicking opportunities, and river access. Prohibit private concessions and vendors.	<u>Roaded Natural Appearing ROS Class and Development Scale 3</u> Provide facilities about equal for protection of site and comfort of users. Hard surface roads and parking. Provide vehicular traffic control. Provide access to area is from US-189. Allow recreation development of about 3 family units per acre. Allow natural appearance plant materials.	Evaluate recreation condition and development scale. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION

LOWER PROVO RIVER AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<p><u>Facilities Development</u></p> <p>Develop appropriate recreation facilities where the present facilities are not meeting the demand and where it meets the highest net public benefit.</p> <p>Provide facilities and access for site protection, efficient maintenance, and user convenience. Generally provide:</p> <ul style="list-style-type: none"> • Fisherman and river access of 10 to 20 vehicles • 10 day-use picnicking sites. • Restrooms 		<p>Comply in planning, design and construction. Conduct reviews.</p> <p>Assess development scale. Document in Reservoir Management Reviews.</p>	State Parks, PRWUA, and USBR.
<p><u>Landscaping</u></p> <p>Manage vegetation to enhance the existing cottonwood trees, natural landscape appearance, and recreation opportunity.</p>		Evaluate vegetation benefits, Document in Reservoir Management Reviews.	State Parks, UDWR, PRWUA, and USBR.
<p><u>Overnight Camping</u></p> <p>Generally prohibit overnight camping.</p>		Enforce. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
<p><u>Visual Management</u></p> <p>Generally manage for a partial retention visual quality objective as viewed from on-site.</p>	<p><u>Partial Retention Visual Quality Objective</u></p> <p>Allow development or facilities which generally appear subordinate to the natural landscape. Allow up to two years after project completion for revegetation to meet this objective.</p>	Evaluate visual condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.

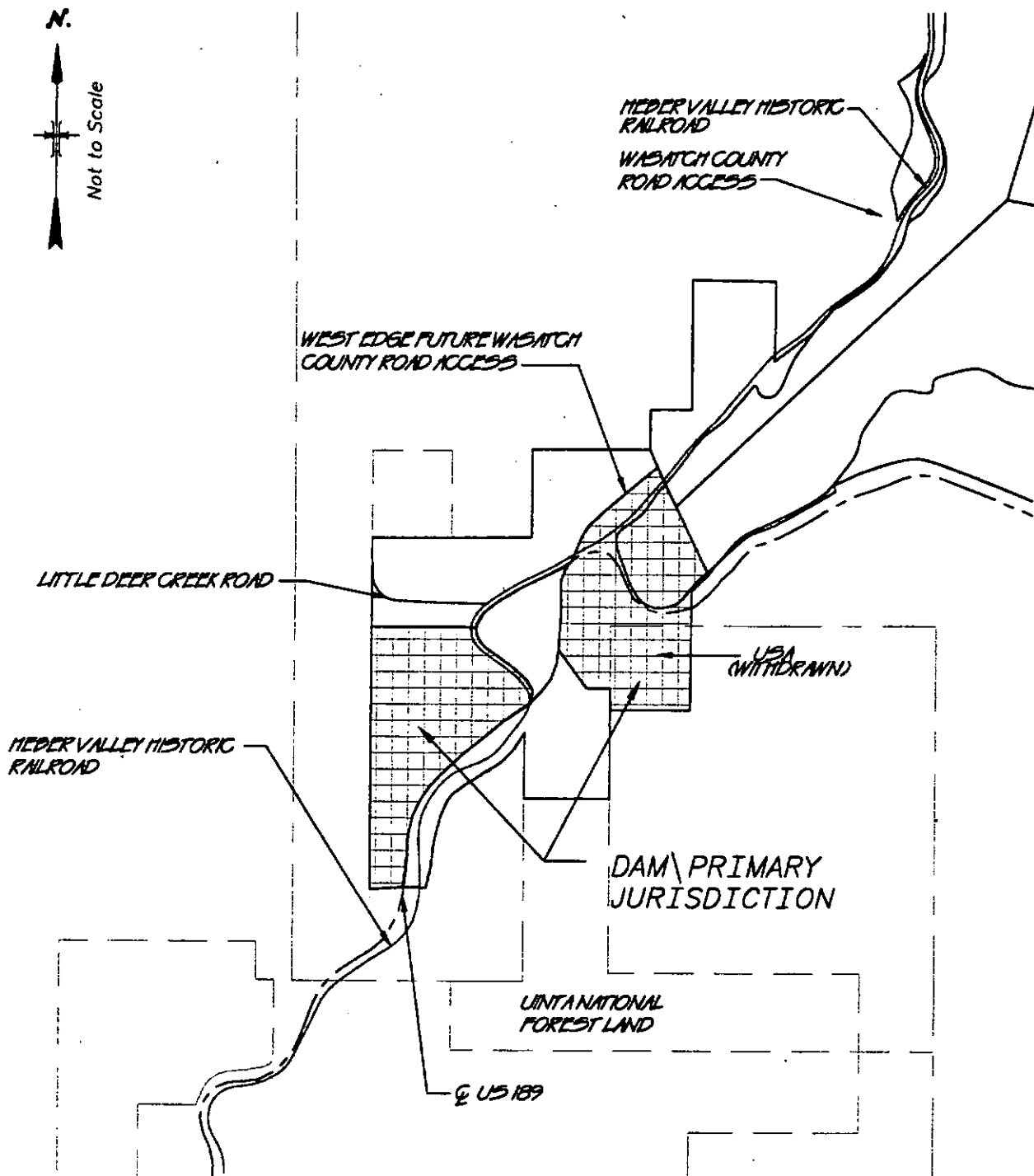
SPECIFIC AREA MANAGEMENT DIRECTION

LOWER PROVO RIVER AREA

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES			
<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Close or rehabilitate sites or areas that cannot be maintained in categories heavy and extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	State Parks, PRWUA, and USBR.
LANDS			
<u>Roads and Trails</u> Design, construct, and maintain roads and trails to assure they are compatible with developed recreation sites and use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.

DAM/PRIMARY JURISDICTION ZONES

Water and Power Operations Management Emphasis



SPECIFIC AREA MANAGEMENT DIRECTION

DAM/PRIMARY JURISDICTION ZONE AREAS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
GENERAL MANAGEMENT AND PARTNERSHIPS			
<u>Area Management</u> Manage to benefit water and power operations and to protect the dam for safety purposes. Restrict use of the area to those permitted by the Provo River Water Users Association and Reclamation. Do not provide public use facilities, except for interpretation, where appropriate. Prohibit fishing, boating, and swimming 1500 feet northeast of the dam to protect water quality and provide for user safety at the outlet structures while easing law enforcement.		Comply and manage specifically for water and related project purposes. See monitoring requirements below.	PRWUA and USBR.
WATER RESOURCES			
<u>Water Operations</u> Operate according to the Deer Creek/Jordanelle Coordinated Operating Agreement (or current coordinated operating agreements).		Review plans and agreements annually or more often if needed.	See Area Wide Management Direction.
RECREATION/VISUAL RESOURCES			
<u>Appropriate ROS Management</u> Prohibit recreation activities.		Enforce.	PRWUA, and USBR.

SPECIFIC AREA MANAGEMENT DIRECTION

DAM/PRIMARY JURISDICTION ZONE AREAS

MANAGEMENT DIRECTION	STANDARD OR GUIDE	MONITORING	CONTACT AND REFERENCE
<u>Visual Management</u> Manage for a modification visual quality objective as viewed from on-site. Manage the dam area for maximum modification visual quality objective.	<u>Modification Visual Quality Objective</u> Allow development or facilities which visually dominate the natural landscape, but harmonize with or complement it. Allow up to five years after project completion for revegetation to meet this objective. The dam and some continuing gravel pit operations are exceptions to the modification visual quality objective.	Evaluate visual condition. Document in Reservoir Management Reviews.	PRWUA, and USBR.

NATURAL/CULTURAL/HISTORIC/PALEONTOLOGIC RESOURCES

<u>Site Rehabilitation</u> Restrict use on and/or rehabilitate areas where unacceptable environmental damage is occurring.	Rehabilitate sites or areas that reach code-a-site category extreme (sites that will continue to deteriorate unless rehabilitation measures are applied).	Evaluate site condition. Document in Reservoir Management Reviews.	PRWUA, and USBR.
---	---	--	------------------

LANDS

<u>Roads and Trails</u> Design, construct, and maintain roads and trails to assure they are compatible with developed recreation sites and use objectives.		Evaluate development standard and condition. Document in Reservoir Management Review or more often if needed.	State Parks, PRWUA, and USBR.
---	--	---	-------------------------------



4

Chapter 4	4-1
INTRODUCTION	4-1
PLAN REVISION AND AMENDMENT	4-2
PLAN COMPONENTS FOR IMPLEMENTATION	4-2
Table 4.1 Implementation Schedule	4-2

Chapter 4

Plan Implementation

INTRODUCTION

During implementation of the RMP, Reclamation and its partners will be guided by existing and future laws, regulations, policies and guidelines. This RMP is designed to supplement, not replace, direction from these sources.

Coordination and cooperation in varying degrees, with administering entities, is necessary for successful implementation of the RMP. Entities include Wasatch County and local governments, the Provo River Water Users Association, Jordanelle Technical Advisory Commission, Utah State Parks and Recreation, Utah Division of Wildlife Resources, US Fish and Wildlife Service, US Army Corps of Engineers, Utah Reclamation and Mitigation Commission, permittees, users, interested publics, and others.

PLAN REVISION AND AMENDMENT

The decision of whether an amendment to the Resource Management Plan is needed, will be determined by Reclamation as issues arise. Factors which could affect a plan revision include:

- Plan implementation that substantially alters the goals of the plan.
- Changes necessitated by changed social, physical, environmental or economic conditions.
- Changes needed to accommodate changed conditions that occur during implementation of the plan.
- Use needing authorization from instruments such as, permits, contracts, and cooperative agreements which is not consistent with the plan.

It is expected that a comprehensive RMP revision would occur within the next 10 to 15 years. Plan monitoring should occur every three to five years or more often as needed.

PLAN COMPONENTS FOR IMPLEMENTATION

Some plan components are scheduled for immediate implementation while others are scheduled for implementation over a period of years. Plan components that do not require new funding are scheduled for immediate implementation. Since this RMP identifies such items as capital and facility improvements for budgeting purposes, improvements that require new appropriations for funds will occur as funds become available.

Table 4.1 Implementation Schedule		
Management Direction (Chapter 3)	Implementation	Target Year
PARTNERSHIPS		
Project Uses and Appurtenances (pages 3-12,3-22)	Eliminate livestock grazing and domestic animals, except east of US-189. East of US-189 limit grazing to reduce wild fire potential and maintain the shrub community only, however, further reduce or eliminate grazing as needed to protect water quality as determined in consultation with affected entities.	1998
Fire Prevention Partnerships (page 3-14)	Develop fire prevention partnerships that define the roles and responsibilities of the partners.	2000
New Partnerships (page 3-16)	Develop and implement partnerships to attract, encourage, and promote best administration of resources and cost effective service benefitting resources and services to recreation, wildlife and natural areas.	1998 and Continuing

Table 4.1 Implementation Schedule		
Management Direction (Chapter 3)	Implementation	Target Year
Interpretive Programs (page 3-17)	Promote interpretative and educational programs to resolve management problems, reduce management costs, obtain visitor feedback, increase public understanding of project management, enhance visitor use and safety.	1998 and Continuing
Signage (page 3-18)	Locate information signs for visitor orientation.	1998 and Continuing
	Post boundary signs at appropriate locations.	2005
Recreation Management (page 3-20)	Develop a new Memorandum of Understanding for recreation management.	1999
WATER RESOURCES		
Best Management Practices (pages 3-12,3-23)	Prohibit motorized land vehicles below the high water line.	1998
	Prohibit refueling of watercraft below the high water line.	1998
	Construct sewer drainfields a minimum of 300 feet from the reservoir high water line.	1998 and Continuing
	Maintain a 1500 foot no fishing, no recreation and water quality protection buffer zone upstream from the dam.	1998
	Prohibit the recreational use of pack and saddle animals on project lands.	1998
Facilities (page 3-23)	Provide restroom facilities at public use areas.	1998 and Continuing

Table 4.1 Implementation Schedule		
Management Direction (Chapter 3)	Implementation	Target Year
Proposed Highway US-189 Improvements (page 3-23)	Coordinate with UDOT to minimize impacts from road and highway construction.	As Project is Proposed
RECREATION/VISUAL RESOURCES		
Trails (page 3-29)	Allow construction of a non-motorized, non-equestrian perimeter trail around the reservoir.	As Project is Proposed
Watercraft Launching (page 3-33)	Restrict watercraft launching on the reservoir to ramps in Charleston Bay, Island Bay, and Main State Park. Create wakeless areas at boat ramps, docks, and beaches.	1998
Watercraft Limit (page 3-33)	Limit watercraft on the reservoir to not exceed 300 total craft at one time or not to exceed available parking, whichever is less. Further reduce total craft numbers as necessary to reduce user conflicts and promote health and safety.	1998
Scenic Byway US-189 (page 3-38)	Consider/follow Scenic Byway objectives on visual quality associated with reservoir management and construction.	As Projects are Proposed
Main State Park Area Management (page 3-60)	Manage for developed overnight recreation use subject to protecting water quality.	1998
Main State Park Facilities Development (page 3-61-62)	Construct/rehabilitate recreation facilities at Main State Park.	2000
Main State Park Wakeless/ No Ski Zone (page 3-63)	Manage Wallsburg Bay as a no ski zone.	1998

Table 4.1 Implementation Schedule		
Management Direction (Chapter 3)	Implementation	Target Year
<i>Snow's Area</i> Management (page 3-67)	Manage for developed group overnight recreation use subject to protecting water quality.	2000
<i>Snow's Area</i> Facilities Development (page 3-68,3-69)	Construct group overnight recreation facilities at Snow's Area.	2000
<i>Snow's Area</i> Wakeless/ No Ski Zone (page 3-69)	Manage Wallsburg Bay as a no ski zone.	1998
<i>Rainbow Bay Area</i> Management (page 3-78)	Manage for developed day use recreation subject to protecting water quality.	2000
<i>Rainbow Bay</i> Facilities Development (page 3-80)	Construct day use recreation facilities at Rainbow Bay.	2000
<i>Rainbow Bay</i> Wakeless Zone (page 3-81)	Manage a wakeless corridor along the east shore at Rainbow Bay.	1998
<i>Island Bay Area</i> Management (page 3-83)	Manage for developed day use recreation subject to protecting water quality.	1998
<i>Island Bay</i> Facilities Development (page 3-84)	Complete recreation facility improvements currently under reconstruction at Island Bay.	1998
<i>Island Bay</i> Wakeless Zone (page 3-85)	Manage a wakeless corridor along the east shore at Island Bay.	1998

Table 4.1 Implementation Schedule		
Management Direction (Chapter 3)	Implementation	Target Year
<i>West Side Area Management</i> (page 3-97)	Manage for developed day use recreation subject to protecting water quality.	1998
<i>West Side Area Facilities Development</i> (page 3-98)	Develop restroom/waste and picnic facilities at Scott's Hollow when needed.	As Need Occurs
<i>Provo (Little) Deer Creek Area Management</i> (page 3-101)	Manage for, wildlife, natural vegetation values and dispersed day use recreation, subject to protecting water quality.	1998
<i>Provo (Little) Deer Creek Area Facilities Development</i> (page 3-102)	Develop restroom/waste and picnic facilities at Provo (Little) Deer Creek Area, when needed.	As Need Occurs
<i>Housing Area Management</i> (page 3-105)	Develop agreement for State Parks to use homes.	1998
<i>Lower Provo River Area Management</i> (page 3-109)	Manage for natural vegetation values, dispersed day use recreation and river access subject to protecting water quality.	1998
<i>Lower Provo River Facilities Development</i> (page 3-110)	Develop Restroom/waste and Picnic facilities at the Lower Provo River Area.	As Need Occurs
NATURAL/CULTURAL/PALEONTOLOGICAL RESOURCES		
<i>Habitat/Fisheries Management</i> (page 3-43)	Enhance habitat quality for a two-storied (rainbow trout/walleye) fishery, that provides year-round recreation for anglers.	1998
	Manage toward a catch rate goal of 0.5 fish per hour of angling and an annual stocking rate of 40,000 rainbow trout (10 inch minimum).	1998

Table 4.1 Implementation Schedule		
Management Direction (Chapter 3)	Implementation	Target Year
Pest Management (page 3-44)	Coordinate with Wasatch County pest control to regulate undesirable or invasive pests through Integrated Pest Management.	1998
<i>Area Between Snow's and Rainbow Bay Area</i> Management (page 3-72, 3-74)	Manage as a natural area with a wildlife migration corridor to the Wallsburg Area.	1998
<i>Wallsburg Area</i> Management (page 3-88)	Manage Wallsburg Area for wildlife values.	1998
	Develop a Wildlife Implementation Document for the Wallsburg Area.	2005
<i>Charleston Bay Area</i> Management (page 3-92)	Manage Charleston Bay as a natural area.	1998
	Develop a natural area Implementation Document for the Charleston Bay Area.	2005
<i>Charleston Bay</i> Wakeless Management (page 3-94)	Manage Charleston Bay wakeless.	1998
LAND MANAGEMENT RESOURCES		
Boundary Fences (page 3-48)	Construct appropriate fences.	2006 and Continuing
Boundary Location (page 3-48)	Locate, mark and post land lines.	2005 and Continuing
<i>Dam/Primary Jurisdiction Areas</i> Management (page 3-113)	Manage to protect facilities and maintain project purposes.	1998 and Continuing
<i>Dam/Primary Jurisdiction Areas</i> Site Rehabilitation (page 3-114)	Restrict use on and/or rehabilitate areas of unacceptable environmental damage.	2000 and Continuing



5

Chapter 5	5.1
LIST OF PREPARERS	5.1

Chapter 5

List of Preparers

THE BEAR WEST CONSULTING TEAM

U.S. Bureau of Reclamation Project Manager and Contract Officer	Jim Jensen, U.S. Bureau of Reclamation, Provo Area Office
U.S. Bureau of Reclamation Environmental Specialists	Dan Fritz and Kerry Schwartz, U.S. Bureau of Reclamation, Provo Area Office
U.S. Bureau of Reclamation Mapping	Mike McMillan, U. S. Bureau of Reclamation, Provo Area Office
U.S. Bureau of Reclamation Document Preparation	Kerri Reed, U.S. Bureau of Reclamation, Provo Area Office
Bear West Consulting Team Project Management and Document Preparation	Emilie Charles, Project Manager, Dennis Earhart (1996-1998), and Joan Degiorgio, Project Manager (1992-1995), <i>Bear West Company</i>
Water Quality, Supply and Rights	Greg Poole, <i>Hansen, Allen and Luce</i>
Wetland Vegetation	Dennis Hansen, <i>Applied Ecological Services</i>
Recreation, Visual Quality and Mapping	Jan Striefel and Dave Price, <i>Landmark Design</i>
Transportation	Dean Bressler, Dara Ratliff and Trent Thatcher, <i>Centennial Engineering, Inc.</i>
Socioeconomic	Natalie Gochmour, Pam Perlich, Kevin Weight and Susan Rutherford, <i>Governor's Office of Planning and Budget</i>
Wildlife, Fisheries and Range Resource	Scott Evans, Spencer Martin, Eve Davies and Will Pitt, <i>Pioneer Environmental Services</i>

Cultural Resources	Mike Polk, Sherri L. Murray and Heather Weymouth, <i>Sagebrush Archaeological Consultants</i>
Mapping	Dave Vaughn and Matt Peters, <i>Utah Automated Geographic Reference Center</i>



6

Chapter 6	6.1
GLOSSARY	6-1
REFERENCES	6-13

Chapter 6

Glossary and Bibliography

GLOSSARY

/	Per
<	Less-than sign
%	Percent
AADT	Annual Average Daily Traffic. The total volume of traffic for the year divided by the number of days in the year.
Acre-feet	A measure of water quantity one acre of water one foot deep or 325,851 gallons.
ADT	Average Daily Traffic. The total volume during a given time period, in whole days greater than one day and less than one year, divided by the number of days in that time period.
Affected Environment	Parts of the environment that would be effected by a change in operation of management.
Algae	Simple plants containing chlorophyll; most live submerged in water.
Algal blooms	Rapid and flourishing growth algae.
Alternatives	Different way of addressing the issues and management activities adressed in the RMP. These serve to provide the decision maker and the public a clear basis for choices among the options.
AMP	Allotment Management Plan
Anoxic Water	Water which has been depleted of oxygen and is deadly to fish.

Animal Unit Month (AUM)	The amount of feed or forage necessary to sustain one cow or its equivalent for one month.
Aspect	Direction of slope.
Avifauna	The bird species associated with a given area.
Baseline	The beginning measuring point.
BLM	Bureau of Land Management
Browse	(1) Tender parts of woody vegetation that are eaten as food by animals. (2) To consume. Browsing is distinct from grazing because it refers to eating woody material, whereas grazing is usually restricted to nonwoody plants.
CS	UDWR conservation Species
C₁	Methane, a gas
C₄	Butane
C₅	Pentane
C₁₁	Undecane
C₁₂	Dodecane
C₂₀₊	Eicosane
Candidate species	Animal or plant species that are being considered for federal designation as either threatened or endangered.
cfs	Cubic feet per second; a measure of streamflow volume. One cubic foot is 7.48 gallons. A flow of 1 cfs produces 448.8 gallons per minute.
Character type	Large physiographic area of land that has common characteristics of landforms, rock formations, water forms and vegetative patterns.
Coffer dam	A watertight enclosure from which water is pumped to expose the bottom of a body of water and permit construction.

Council of Environmental Quality (CEQ) Regulations	The Council of Environmental Quality is an advisory council to the President of the United States established by the National Environmental Policy Act of 1969. The CEQ regulations are those that implement the National Environmental Policy Act.
Cryptosporidium	A microscopic intestinal parasite commonly found in the feces of mammals. Infection with this parasite can be fatal for people with compromised immune systems.
Cumulative effect	The effects on the environment that result from the incremental impact of an action combined with the effects of past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions.
Decadent	Of an age past maturity and approaching mortality.
Demographics	The statistical characteristics of a human population.
Developed recreation	Recreation that requires facilities, resulting in the concentrated use of an area, such as campgrounds.
Digitized	Data entered and plotted on a computer system, in this case by the Utah Automated Geographic Reference Center.
Direct effect	Impacts that would occur as a direct result of an activity.
Dispersed recreation	Recreation use that requires few, if any, improvements and may occur over a wide area.
Drawdown	Lowering of the reservoir's water level; process of depleting reservoir.
Emergent	Vegetation that is rooted below the water surface and extends above the surface.
Endangered Species	Species that are in danger of extinction in all or a significant portion of their range. Secretary of Interior makes the determination.

Environmental Impact Statement (EIS)	A document that discusses the likely significant effects of a proposal, methods to lessen the significance of the impacts, and alternatives. This document is required by the National Environmental Policy Act.
EPA	Environmental Protection Agency
Erosion	The wearing away of the land surface by running water, wind, ice or other geologic agents, or resulting from human or animal activities.
Eutrophication	Increase of mineral and organic nutrient in a body of water that depletes dissolved oxygen and may result in the suffocation of fish.
Flood plain	A nearly level plain of sand, silt or clay that borders a stream and is subject to flooding unless protected artificially.
Forage	All food available for grazing animals.
Forb	Any herbaceous (non-woody) plant having broad leaves and therefore excluding grasses and grasslike plants. Herbaceous plants form the lowest layer of vegetation in most plant communities.
Game species	Huntable wildlife.
Giardia	A microscopic intestinal parasite similar to cryptosporidium, commonly found in the feces of mammals. Symptoms in humans include diarrhea, excessive bloating and fatigue.
GOPB	Governor's Office of Planning and Budget
GPM	Gallons per minute
Grazing	The act of animals feeding on fresh grass and herbaceous plants.
Guzzlers	Water catchment devices used by wildlife.
Habitat	Place or type of site in which an animal or plant naturally or normally occurs.

Halogens	The group of nonmetallic elements consisting of chlorine, bromine, fluorine, iodine, and astatine.
Habitat Suitability Index (HSI)	A mathematical procedure for evaluating a particular habitat. A value (ranging from 0.0 to 1.0) is assigned on the basis of available food and cover requirements of a species.
Habitat Unit (HU)	A mathematical procedure for evaluating habitats. It is derived by multiplying the habitat suitability index by the number of acres available with that HSI. Habitat units are used for assigning the relative value of habitat to different species.
Herbaceous	Resembling an herb, a green, leafy plant that does not produce persistent woody tissue.
Herbicide	Any substance used to kill an unwanted plant.
Hydric	Hydric soils are saturated, flooded or ponded for a period during the growing season sufficient to develop anaerobic conditions favoring hydrophytic vegetation.
Hydrophytic	Vegetation or plants that tolerate and thrive in wet soils.
Indicator species	A species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Their population changes are believed to indicate effects of management activities on a number of other species or water quality.
Indirect impact	Foreseeable impacts that may occur later in time or not at the specific location of the activity.
Interdisciplinary meetings	Gatherings of a group selected to work within the NEPA process in scoping, analysis and document preparation. The purpose of the meetings is to integrate the collective knowledge of the physical, biological, economic and social sciences and the environmental design arts into the environmental analysis process. Interaction within the group often provides insight that otherwise would not be apparent.

JTAC	Jordanelle Reservoir Water Quality Technical Advisory Committee.
Jurisdictional wetlands	Jurisdictional wetlands are defined as those seasonally or permanently wet areas that come under the domain or authority of the USACE for purposes of regulatory permitting on the basis of meeting wetland criteria as described in the 1987 Federal Manual.
Leks	A common area used for display and courtship by some animals, usually birds, during the mating season. Males congregate in this small area and display themselves to attract mates.
Loam	Soil material that is 7 percent to 27 percent clay particles, 28 percent to 50 percent silt particles, and less than 52 percent sand particles.
MCL	Maximum contaminant level
Maximum Modification	Visual Quality Objective indicating that human activities would dominate the natural landscape and may not blend with it when viewed from up to 5 miles away.
mg/l	Micrograms per liter – Equivalent of one part per million.
Mitigation	Avoiding or minimizing impacts by limiting the degree or magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitating or restoring the affected environment; reducing or eliminating the impact by preservation and maintenance operations during the life of the action.
Mitigation Commission	Utah Reclamation Mitigation and Conservation Commission
Modification	A Visual Quality Objective indicating human activity may dominate the natural landscape, but should still blend with it.

National Environmental Policy Act (NEPA)	The National Environmental Policy Act (NEPA) is the basic national charter for protection of the environment. There are two main objectives of NEPA: (1) to ensure that agencies consider every significant aspect of the environmental impact of a proposed action, and (2) to inform the public of potential impacts to the human environment and involve it in the NEPA decision-making process.
Non-jurisdictional wetlands	Wetlands that do not fall under the jurisdiction of the USACE on the basis of meeting wetland criteria as described in the 1987 Federal Manual.
OHV (Off-highway vehicle)	Utah State law defines an OHV as any snowmobile, all-terrain type I vehicle, all-terrain type II vehicle, or motorcycle.
PAOT	An acronym for "people at one time" per acre.
Partial retention	A Visual Quality Objective indicating that human activities would appear subordinate to the natural environment, and should blend with it.
Per capita income	The total income of a group divided by the number of people in the group.
pH	A measure of the relative concentration of hydrogen ions in a solution; this value indicates the acidity of alkalinity of the solution.
PILT	Payment in lieu of taxes (PILT) are made to local governments to compensate them for the property tax that is lost due to federal land ownership.
Point of diversion	The place where a water right or use is actually taken from the stream, its tributaries or other sources.
ppm	Parts per million
Preservation	A Visual Quality Objective allowing ecological changes only.
Prey	An animal or animals taken as food by another animal.
PRWUA	Provo River Water Users Association

Raptors	Birds of prey such as, hawks, eagles, owls, falcons, harriers, kites.
Recreation Opportunity Spectrum (ROS)	A land classification system developed by the Forest Service that categorizes lands into six classes. The classes range on a continuum from primitive to urban and vary in their setting and type of recreation available.
Relicts	A species of an earlier time surviving in an environment that has undergone considerable change.
Retention	A Visual Quality Objective indicating that human activities are not evident to the casual visitor.
Riparian	Land areas adjacent to streams or lakes that are usually only seasonally flooded. Unlike seeps, bogs or marshes they are not constantly wet, but are dependent on the soil moisture from the stream or lake for maintaining the vegetation is usually composed of trees and shrubs.
RMP	Resource Management Plan
"Roaded Natural"	A classification of the Recreation Opportunity Spectrum (ROS) characterized by predominantly natural-appearing environments with moderate sights and sounds of man. Interaction between users may be low to moderate, but with strong evidence of other users.
ROW	Rights-of-way
Runoff	The precipitation discharge in stream channels from a drainage area. The water that flows off the land surface without sinking is called surface runoff; that which enters the ground before reaching surface streams is called ground-water runoff.
Rural	A classification of the Recreation Opportunity Spectrum (ROS) characterizing an area where the landscape has been considerably altered by the works of man with prevalent sights and sounds of man. Interaction between users may be high.

SCS	United States Department of Agriculture Soil Conservation Service.
SP, SD, SP/SD	UDWR sensitive species classification: SP=any wildlife species that has experienced a substantial decrease in population, distribution and/or habitat availability; SD=occurs in limited areas and/or numbers due to a restricted or specialized habitat; SP/SD= a species with both of the above characteristics.
Semiprimitive	A classification of the Recreation Opportunity Spectrum (ROS) characterized by a predominantly natural-appearing environment with minimal sights and sounds of man. There is a low concentration of users but often evidence of use.
Sensitive species	A plant or animal species, subspecies or variety for which a Federal agency has determined there is a concern for the species viability, as evidenced by a significant current or predicted downward trend in the population or habitat.
Sensitivity level	Level of concern by user of visual quality.
spp.	An abbreviation for the plural of species.
Spillway	Overflow channel of the dam
State Parks	Utah Division of Parks and Recreation
STORET	The name of the State of Utah Division of Water Quality system for storing the resulting data generated from the analysis of water samples.
SWTR	Surface Water Treatment Rule
T	Threatened
Terrestrial	Living or growing on land.

Texture	Refers to the nature of materials used for exteriors of buildings and facilities and their visual relationship to the surrounding environment. For instance, naturally colored wood, log or natural stone facing and cedar shake roofing materials would be more likely to blend in with the naturally occurring textures of a forested setting than would smooth or shiny surfaces.
THM	Trihalomethanes
Threatened Species	A species that is not currently in danger of extinction, but is likely to in the foreseeable future. This status is determined by the Secretary of Interior.
Trip	A single or one-direction vehicle movement with either the origin or destination (exiting or entering) inside the study area.
UDOT	Utah Department of Transportation.
Urban	A classification of the Recreation Opportunity spectrum (ROS) characterized by an area of urbanized environment with dominant structures and extensive sites and sounds of man. Interaction between users is high.
UDWR	Utah Division of Wildlife Resources
Unique Wetland Habitat	Areas that should be protected to guarantee the survival of rarer species of plant and wildlife habitat.
USACE	United States Army Corps of Engineers
USBR	United States Bureau of Reclamation
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Services
Variety Class	A particular level of visual variety or diversity of landscape character.
Viewshed	A landscape unit seen from a key viewing area.

Visual Resource	The composite of basic terrain, geologic features, water features, vegetative patterns and land-use effects that typify a land unit and influence the visual appeal the unit may have for visitors.
Visual Quality Objectives (VQO)	A code that refers to a desired visual development level for a specific area. The code indicates the degree to which activities are noticeable in the natural environment, for example, whether human activities will dominate, be subordinate or be evident in the natural environment.
Water Rights	A legal right to take water and put it to use.
Wetland	Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas.

BIBLIOGRAPHY

- Aikens, Melvin C. and David B. Madsen 1986. Prehistory of the Eastern Area. In: *Handbook of North American Indians*, vol. 11, pp.149-60, edited by Warren L. D'Azevedo. Smithsonian Institution, Washington, D.C.
- Andrews, T.1992. *Colorado Lynx Survey*. Report to the Colorado Division of Wildlife, Glenwood Springs, CO.
- Anonymous n.d.*Heber Creeper: Scenic Steam Railway*. Pamphlet on file at Weber County Library, Ogden, Utah.
- Armstrong, Ellis L. 1986 Ellis L. Armstrong, Oral History Interview, April 7, 1986, Salt Lake City, Utah. Interviewed by: Dr. Michael C. Robinson. Public Works Historical Society. On file at Utah State University Library, Special Collections, Logan, Utah.
- Bear West 1994. *Rail-with-Trail Feasibility Study from Charleston Siding to Vivian Park*. Prepared for the State of Utah, Division of Parks and Recreation.
- Bear West. 1994. *Deer Creek Reservoir Resource Management Plan, Phase One Report*. Prepared for the U.S. Department of Interior, Bureau of Reclamation, Provo Area Office
- Bear West. 1994. "Content Analysis of Deer Creek Survey Written Comments." Memorandum. Prepared for the U.S. Department of Interior, Bureau of Reclamation, Provo Area Office.
- Benton, R. 1994. Biologist, U.S. Department of the Interior Fish and Wildlife Service. *Personal communication* with Spencer Martin of Pioneer Environmental Services, Inc., regarding the distribution and habitat characteristics of the spotted bat in Utah. October 28.
- Berg, Kent. 1995. Wasatch County Public Works Director. *Personal Communication*.
- Bousfield, Ken. 1995. *Personal Communication*.
- Brodie, H.L. and V. Allen Bandel.1987. *Manure Testing Fact Sheet*. Cooperative Extension Service, University of Maryland.

- Burt, W.H., and R.P. Grossenheider. 1980. *A Field Guide to Mammals, North America North of Mexico*. Boston: Houghton-Mifflin Company.
- Buscheck, Tim. 1995. Chevron Research and Technology Company. *Personal Communication*.
- Call, M.W. 1978. *Nesting Habitats and Surveying Techniques for Common Western Raptors*. U.S. Department of the Interior, Bureau of Land Management, Denver Service Center. Technical Note TN-316. 115pp.
- Callaway, Donald G., Joel C. Janetski and Omer C. Stewart 1986 Ute. In: *Handbook of North American Indians*, vol. 11, pp. 149-160, edited by Warren L. D'Azevedo. Smithsonian Institution, Washington, D.C.
- Chatwin, Shirley 1978 Charleston Town Faced Controversial Issue of Saving Old Town Hall. *Wasatch Wave*, Heber City. Clippings on file at the Utah State Historic Preservation Office, Salt Lake City.
- Chronic, Halka. 1990. *Roadside Geology of Utah*. Missoula, Montana: Mountain Press Publishing Company.
- Clarke, A.H., J.J. Clarke, and P. Hovingh. 1991. *Final Report: Status Survey of Selected Land and Freshwater Gastropods in Utah*. Contract No. 14-16-0006-89-021 (Revised). Prepared for the U.S. Fish and Wildlife Service. Ecosearch, Inc. Portland, TX.
- Cowardin, L., V. Carter, F. Golet, and E. LaRoe. 1979. *Classification of Wetlands and Deepwater Habitats of the United States*. U.S. Department of Interior, U.S. Fish and Wildlife Service, Rep. No. FWS/OBS-79/31, Washington, D.C.
- Donaldson, Walter K. 1989. *Synopsis of Water Quality Issues at Scofield Reservoir*. Utah Division of Wildlife Resources.
- Duffin, Patrick 1987 *Cultural Resources Inventory of the Binggeli Borrow Pit Expansion*, Wasatch County, Utah. Office of Public Archaeology, Brigham Young University, Provo.
- Eckhoff, Watson and Preator Engineering. 1994. *1994 Water Quality Implementation Report - Deer Creek and Jordanelle Reservoirs Water Quality Management Plan for the 1993 Water Year*. Prepared for the Wasatch County Commission, in association with the Jordanelle Technical Advisory Committee.

- Eckhoff, Watson and Preator Engineering. 1991. *1991 Water Quality Implementation Report, Deer Creek and Jordanelle Reservoirs, Water Quality Management Plan for 1989 & 1990 Water Years*. Prepared for Wasatch County Commission and Jordanelle Technical Advisory Committee.
- Eckhoff, Watson and Preator Engineering. 1992. *1992 Water Quality Implementation Report - Deer Creek and Jordanelle Reservoirs Water Quality Management Plan for the 1991 Water Year*. Prepared for the Wasatch County Commission, in association with the Jordanelle Technical Advisory Committee.
- EDAW, Inc. 1994. *Comparative Design Standards and Vessel Capacities*. Siting: George E. Fogg, 1990, Park Planning Guidelines; Bureau of Reclamation, Anderson Ranch Reservoir, 1978; Chatfield, Cherry Creek and Carter Lake Vessel Capacity Control Program, 1993; Vallecito Reservoir Resource Management Plan, 1994.
- Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss.
- Environmental Protection Agency. 1991. *Subsurface Remediation Guidance Tables 1, 2, & 3*. EPA/540/2-90/011a & b, U.S. Government Printing Office.
- Fairchild, John. 1994. Wildlife Biologist, Utah Division of Wildlife Resources, Springville, Utah. *Personal communication* with Scott Evans of Pioneer Environmental Services, Inc. Logan, Utah. October 25.
- Fjeldsted, Boyd L. 1994. "Personal Income in Utah Counties: 1992." *Utah Economic and Business Review* 54 (September): 12.
- Ford, Harold 1994 *Personal communication*. [*Personal Communication* between Harold Ford, Deer Creek Reservoir Power Plant Supervisor, and Heather Weymouth and Michael R. Polk of Sagebrush during October]. Notes on file at Sagebrush Archaeological Consultants, L.L.C., Ogden, Utah.
- Forman, Richard and Godron, Michel. 1986. *Landscape Ecology*. New York: John Wiley and Sons.
- Fuller, Craig Woods 1973 *Development of Irrigation in Wasatch County*. Master's Thesis, Department of History, Utah State University, Logan.
- Giles, Robert. 1995. *Personal Communication re Wasatch County Hospital*.

- Gochmour, Natalie. 1992. "Federal Land Payments in Utah." *Utah Economic and Business Review*, 52 (September): 2.
- Grandy, D.C. and L.R. Mason. 1976. *Range Management*. Pages 61-76 in Woodward, L.; E.H. Jensen; and J.L. Harvey. *Soil Survey of the Heber Valley Area, Utah*. United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with Utah Agricultural Experiment Station.
- Green, Joslyn, ed. 1980. *Visual Resource Management Program*. Washington, D.C., U.S. Government Printing Office.
- Haan, C. T., B.J. Barfield, and J.C. Hayes. 1994. *Design Hydrology and Sedimentology for Small Catchments*, Academic Press, New York.
- Hansen, D.J. 1994. President, Applied Ecological Services, Salt Lake City, Utah. *Personal Communication* with Eve Davies, Pioneer Environmental Services, Logan, Utah. 24 October 1994.
- Harland, Jim. Utah Department of Natural Resources. Division of Parks and Recreation. Planning Section. Comprehensive Planner. Information packet containing historic visitation data for Utah State Parks. February 1994.
- Harris, C. W. and Dines, N.T. 1988. *Timesaver Standards for Landscape Architects*. New York: McGraw Hill.
- Hayward, C.L., C. Cottam, A.M. Woodbury, and H.H. Frost. 1976. *Birds of Utah*. Great Basin Naturalist Memoirs No. 1.
- Heber City n.d. *A Profile of Wasatch County*. Pamphlet on file at Weber County Library, Ogden, Utah.
- Heizer, Robert and Martin A. Baumhoff 1970 *Big Game Hunters in the Great Basin: A Critical Review of the Evidence*. Contributions of the University of California Archaeological Research Facility 7, University of California, Berkeley.
- Hendee, John C., et al. 1976. *Code-A-Site: A System for Inventory of Dispersed Recreation Sites in Roaded Areas, Back Country, and Wilderness*. Portland, Oregon: Pacific Northwest Forest and Range Experiment Station.

- Hof, Marilyn, Team Captain. 1993. "VERP Process Modes and Detailed Task and Product Descriptions Steps 2, 3, 4, and 5 Arches National Park." National Park Service.
- Hull, Frank W. and Craig W. Fuller 1976 *A Survey of Archeological and Historical Resources Within the Bonneville Unit of the Central Utah Project: Deer Creek Dam Enlargement*. U.S. National Park Service and University of Utah.
- Humpherys, T.H. 1940 State of Utah Twenty-second Biennial Report of the State Engineer to the Governor of Utah. For the Biennium July 1, 1938 to June 30, 1940. Salt Lake City, Utah.
- Janetski, Joel C. 1991 *The Ute of Utah Lake*. University of Utah Anthropological Papers No. 116, Salt Lake City.
- Jennings, Jesse D. 1978 *Prehistory of Utah and the Eastern Great Basin*. University of Utah Anthropological Papers 98, Salt Lake City.
- Jense, Grant. 1995. Big Game Biologist, Utah Division of Wildlife Resources, *Personal Communication with Pioneer Environmental Services*.
- Johnsgard, P.A. 1981. *The Plovers, Sandpipers and Snipes of the World*. Lincoln: University of Nebraska Press.
- Knowlton, Ezra C.n.d. *History of Highway Development in Utah*. Utah State Department of Highways, Salt Lake City.
- Landmark Design, Inc. 1993. *Flaming Gorge Recreation Area Feasibility Study*. Ashley National Forest and Project Flaming Gorge Coalition.
- Larson, E.O. 1937 *Project History, Deer Creek Division, Provo River Project, Utah, From Beginning to December 31, 1937*. Bureau of Reclamation, Provo River Projects Office, Provo, Utah.
- 1938 *Project History, Provo River Project, Utah, Volume II*. Bureau of Reclamation, Provo River Project Office, Provo, Utah.
- 1940 *Project History, Provo River Project, Utah, Volume IV* Bureau of Reclamation, Provo River Project Office, Provo, Utah.
- 1942 *Final Earthwork Report, Deer Creek Dam, Provo River Project, Utah*. U.S. Department of Interior, Bureau of Reclamation, Provo River Project Office, Provo.

- LeChevallier, Mark W., and William D. Norton. 1995. *Giardia and Cryptosporidium in Raw and Finished Water*. American Water Works Association Journal. (September) : 54-68.
- Lewis, John B. 1993. "Steps in Preparing A General Management Plan." Integrated Public Lands Management. Columbia University Press.
- Lindsay, La Mar 1976 *Unusual or Enigmatic Stone Artifacts: Pots, Pipes, Points, and Pendants from Utah*. Antiquities Section Selected Papers 2 (8), Utah Division of State History, Salt Lake City.
- Litton, R. Burton, Jr. 1984. *Visual Vulnerability of the Landscape: Control of Visual Quality*. Berkeley, CA: Forest Service, United States Department of Agriculture.
- Loveless, Ray. 1993. *Deer Creek Reservoir Restoration*. Mountainland Association of Governments.
- Madsen, David B. 1982 Get it Where the Gettin's Good: A Variable Model of Great Basin Subsistence and Settlement Based on Data From the Eastern Great Basin. In: *Man and Environment in the Great Basin*. Edited by David B. Madsen and James F. O'Connell. Society for American Archaeology, SAA Papers No. 2, Washington, D.C.
- Marwitt, John P. 1986 Fremont Cultures. In: *Handbook of North American Indians, Volume 11: Great Basin*, pp. 161-172, edited by Warren L. D'Azevedo. Smithsonian Institution, Washington D.C.
- Mathis, Bob. 1995. Wasatch County Planner, *Personal Communication*.
- McGuire, John R., Chief. 1974. *National Forest Landscape Management, Volume 2, Chapter 1*. Washington D.C.: U.S. Government Printing Office.
- Miller, David E. 198 The Fur Trade and the Mountain Men. In: *Utah's History*, pp. 53-69, edited by Richard Poll. Utah State University Press, Logan.
- Mortimer, James, Editor 1963 How Beautiful Upon the Mountains: A Centennial History of Wasatch County. Daughters of Utah Pioneers, Wasatch County Chapter.
- Mountainland Association of Governments. 1977. *Areawide Water Quality Management Plan for Summit, Utah and Wasatch Counties*.

- Nielson, Asa 1987 *A Cultural Resources Inventory of the UP&L Wallsburg Junction Cable, Wasatch County, Utah*. AK Nielson Associates, Salt Lake City.
- Nielson, Joyce, Anne Nordstrom, and Jeremy Pratt. 1991. *The Recreation Use Capacity of the Green River Corridor Below Flaming Gorge Dam*. Sonoma, CA: Institute for Human Ecology.
- Norman, V. Garth and David B. Merrill 1983 *Cultural Resources Survey of a Portion of the Deer Creek Reservoir Area, Provo River Project*. MESA CRM paper no. 11. MESA, Orem, Utah.
- Palmer, R.S. 1988. *Handbook of North American Birds, Volume 4: Diurnal Raptors*. New Haven: Yale University Press.
- Peterson, R.T. 1990. *A Field Guide to Western Birds*. Boston: Houghton-Mifflin.
- Peterson, Charles S. 1984 *Utah: A History*. W.W. Norton and Company, Inc., New York.
- Pioneer Environmental Services, Inc. 1994. "Raptor Survey of the Deer Creek Reservoir Project Area." Unpublished Technical Report.
- Poulson, Richard 1994 *Personal communication*. (Telephone conversation between Mr. Richard Poulson, Provo River Water Users Association, and Heather M. Weymouth of Sagebrush Archaeological Consultants on September 20, 1994 concerning his knowledge of the Deer Creek Government Camp.) Notes on file at Sagebrush, Ogden, Utah.
- Reed, Porter B. Jr. 1988. *National List of Plant Species That Occur in Wetlands: 1988 Utah*. Biological Report NERC-88/18.44, May 1988. National Wetlands Inventory, U.S. Fish and Wildlife Service, U. S. Department of the Interior.
- ReMillard, M.D., L.R. Herbert, G. A. Birdwell, and T.K. Lockner. 1994. *Water Resources Data, Utah, Water Year 1993*. U.S. Geological Survey Water Data Report UT-93-1.
- Richardson, E.A. 1976. *Climate*. Pages 119-122 in: Woodward, L., E.H. Jensen, and J.L. Harvey. *Soil Survey of the Heber Valley Area, Utah*. United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with Utah Agricultural Experiment Station.

- Robertson, F. Dale, Chief. 1993. *Landscape Aesthetics: A Handbook for Scenery Management*. Washington, D.C.: U.S. Department of Agriculture.
- Ross, D.A., D.L. Shirley, P.A. White, L.D. Lentsch. 1993. *Distribution of the Spotted Frog Along the Wasatch Front in Utah, 1991-1992*. Report to the U.S. Fish and Wildlife Service. Publication Number 93-4.
- Roylance, Ward J. 1982 *Utah, a Guide to the State*. Utah: A Guide to the State Foundation, Salt Lake City, Utah.
- Schroedl, Alan 1976 *The Archaic of the Northern Colorado Plateau*. PhD. Dissertation, Department of Anthropology, University of Utah, Salt Lake City.
- Shapiro and Associates, Inc. 1989. *Aesthetics Technical Report, Utah Valley to Heber Valley, U.S. Highway 189*. Utah Department of Transportation.
- Smith, H. D., and Associates. 1987. *Faunal Resources Technical Report: U.S. Highway 189, Utah Valley to Heber Valley, Utah and Wasatch Counties, Utah*.
- Spanos, Mike 1995. Wasatch County Sheriff. *Personal Communication*.
- Steward, Julian 1938 *Basin-Plateau Aboriginal Sociopolitical Groups*. Bureau of American Ethnology Bulletin 120. Washington, D.C. (Reprinted: University of Utah Press, Salt Lake City, 1970). 197 Aboriginal and Historical Groups of the Ute Indians of Utah. In: *Ute Indians I*, pp. 25-103, edited by David A. Horr. Garland Publishing, New York and London.
- SWCA, INC Environmental Consultants. 1995. *Trail Concept and Cost Estimate Proposed Utah Division of Parks and Recreation Trail from Deer Creek Reservoir Dam to Wasatch Mountain State Park Wasatch County, Utah*. Prepared for the State of Utah, Division of Parks and Recreation.
- Thompson, George A. 1982 *Some Dreams Die: Utah's Ghost Towns and Lost Treasures*. Dream Garden Press, Salt Lake City.
- Tripp, Shon 1995. Supervisor Deer Creek State Park. *Personal Communication*.
- United States Department of Interior, Bureau of Reclamation (USBR) 1937 *Property Title for property purchased from Julius Anderson*. Record on file Real Estate Section, Bureau of Reclamation, Salt Lake City.

- United States Department of Commerce, Bureau of the Census. 1992. *Journey to Work Data for Utah Counties, 1990*. Washington DC: United States Government Printing Office.
- United States Department of Agriculture. 1994. *1994 Utah Department of Agriculture Annual Report and Agricultural Statistics*. Prepared by the Utah Division of the National Agricultural Statistics Service, in cooperation with the Utah State Department of Agriculture.
- United States Department of Agriculture, Forest Service. 1990. *Allotment Management Plan: Deer Creek and Snake Creek Sheep Allotments*. Pleasant Grove Ranger District, Uinta National Forest and Wasatch Mountain State Park.
- United States Department of Agriculture, Forest Service. 1991. *Capital Investment Process for Recreation, Facilities and FA&O*. Southwest Region.
- United States Department of Agriculture, Forest Service. 1993. *Landscape Aesthetics: A Handbook for Scenery Management*. Washington, D.C.
- United States Department of the Interior, National Park Service. 1987. *The Carrying Capacity of Lake Powell*. Rocky Mountain Regional Office.
- United States Department of the Interior, Bureau of Reclamation, Bear West Company. 1994. *Deer Creek Reservoir Resource Management Plan, Phase One Report*. Provo, Utah.
- United States Department of Interior, Fish and Wildlife Service. 1980. *Selected Vertebrate Endangered Species of the Seacoast of the United States*. USDI Fish and Wildlife Service. FWS/OBS-80/01.
- United States Department of Interior, Fish and Wildlife Service. 1980. *Habitat Evaluation Procedures (HEP)*. USDI Fish and Wildlife Service, Division of Ecological Services. ESM 102.
- United States Department of Agriculture, Forest Service. *ROS User's Guide*.
- United States Department of the Interior, Bureau of Reclamation. 1983-1992. *Recreation and Wildlife Summary Recreation Data*.
- United States Department of Agriculture, Forest Service. 1992. *Decision Notice, Pineview Reservoir Management Revision*. Ogden Ranger District, Wasatch-Cache National Forest, Weber County, Utah.

- United States Department of Interior, Bureau of Reclamation. 1991. *Cascade Reservoir Resource Management Plan*. Central Snake Projects Office.
- United States Department of Agriculture, Forest Service. 1987. *Project Planning ROS User's Guide*. Washington, D.C.
- United States Department of Agriculture, Forest Service. 1973. *National Forest Landscape Management, Volume I*. Washington, D.C.
- United States Department of Agriculture, Forest Service. 1990. *ROS Primer and Field Guide*, Washington, D.C.
- United States Department of Agriculture, Forest Service. 1990. *Allotment Management Plan: Deer Creek and Snake Creek Sheep Allotments*. Pleasant Grove Ranger District, Uinta National Forest and Wasatch Mountain State Park. April 23.
- Urban Drainage and Flood Control District. 1992.
- Utah Division of Wildlife Resources. 1993. "Heber Wildlife Management Area - Wallsburg Unit Management Plan (Phase I)." Springville, Utah. June 23.
- Utah Department of Community and Economic Development. 1993. *Utah Directory of Business and Industry, 1993-1994*. Prepared by Utah Department of Employment Security for the Business and Economic Development Division.
- Utah Department of Natural Resources, Division of Parks and Recreation. 1994. "Data Summary of 1994 Deer Creek Reservoir User Survey."
- Utah Department of Natural Resources. 1992. 1992 *Utah SCORP: Utah's State Comprehensive Outdoor Recreation Plan*. Prepared by the Parks and Recreation Division.
- Utah Drinking Water Board. 1993. *State of Utah Rules for Public Drinking Water Systems - Part I Rules for Administration of Systems*.
- Utah Department of Environmental Quality, Division of Water Quality. 1994. *Standards of Quality for Waters of the State*. R317-2, Utah Administrative Code.

- Utah Governor's Office of Planning and Budget. 1994. *State of Utah: Economic and Demographic Projections, 1994*. Prepared by the Demographic and Economic Analysis Section.
- Utah Governor's Office of Planning and Budget. 1991. *1990 Census Brief: Minorities of Utah*. Prepared by the Demographic and Economic Analysis Section.
- Utah Department of Natural Resources. 1994. *Utah State Parks!: Discover the Diversity*. Prepared by the Division of Parks and Recreation.
- Utah Drinking Water Board. 1993. *State of Utah Rules for Public Drinking Water Systems - Part I Rules for Administration of Systems*.
- Utah Governor's Office of Planning and Budget. 1993. *1990 Census Brief: Age Distribution in Utah*. Prepared by the Demographic and Economic Analysis Section.
- Utah Governor's Office of Planning and Budget. 1994. *1993 Utah Economic and Demographic Profiles*. Prepared by the Demographic and Economic Analysis Section.
- Utah Department of Transportation. 1988. *Draft Supplemental Environmental Impact Statement: U.S. Highway 189, Utah Valley to Heber Valley, Utah and Wasatch Counties, Utah*. U.S. Department of Transportation, Federal Highway Administration.
- Utah Department of Natural Resources. 1983. *Deer Creek State Park General Management Plan*. Prepared by the Division of Parks and Recreation.
- Utah Department of Community and Economic Development. 1994. *1993 Economic and Tourism Profiles for Utah Counties*. Prepared by Randy Rogers in Cooperation with the Utah Travel Council.
- Utah Reclamation Mitigation and Conservation Commission. 1997. *Provo River Restoration Project Final Environmental Impact Statement*. Salt Lake City, Utah
- Utah State Historical Society 1988 *Beehive History No. 14: Utah's Counties*. Utah State Historical Society, Salt Lake City.

Utah State Bureau of Statistics (USBS) 1915 Facts and Figures Pertaining to Utah: Second Report of the State Bureau of Immigration, Labor and Statistics for the Years 1913-1914. Arrow Press, Salt Lake City.

Utah State University. 1970. *Deer Creek Recreation Master Plan Study*. Department of Landscape Architecture & Environmental Planning Graduate Omni Studio-601.

Van Genderen, Chas. Utah Department of Natural Resources. Division of Parks and Recreation. Planning Section. Associate Planner. Information packet containing 1990 *Utah Household Recreation Survey* results for Wasatch County. October 1994.

Vincent, K. F. 1994 Personal communication. (Telephone conversation between Mr. K.F. Vincent, long-time Heber Valley resident, and Heather M. Weymouth of Sagebrush Archaeological Consultants on October 18, 1994 concerning his knowledge of the North family milkbarn remnant.) Notes on file at Sagebrush, Ogden, Utah.

Wasatch County Assessor

n.d.a [Building card OCH-0014-0-005-044 for the property at 3128 South 3600 West, Charleston, Utah.] Wasatch County Assessor's Office, Heber City, Utah.

n.d.b [Building card OCH-0013-0-004-044 for the property at 3188 South 3600 West, Charleston, Utah.] Wasatch County Assessor's Office, Heber City, Utah.

n.d.c [Building card OCH-0012-0-004-044 for the property at 3270 South 3600 West, Charleston, Utah.] Wasatch County Assessor's Office, Heber City, Utah.

n.d.d [Building card OCH-0121-0-022-044 for the property at 3610 South 3600 West, Charleston, Utah.] Wasatch County Assessor's Office, Heber City, Utah.

Welsh, Randy. 1993. *Carrying Capacity Review and Determination for Pineview Reservoir*, Ogden Ranger District, Wasatch-Cache National Forest, Weber County, Utah.

Welsh, et al. 1987. *A Utah Flora, Great Basin Naturalist Memoir No. 9*. Provo: Brigham Young University Press.

Weston, J.B. 1969. "Nesting Ecology of the Ferruginous Hawk *Buteo regalis*." *Brigham Young University Science Bulletin Biological Series* 10(4): 25-36.

- Whitaker, J.O. 1980. *The Audubon Society Field Guide to North American Mammals*. New York: Alfred A. Knopf.
- Wilde, James D. and Lorna Beth Billat 1988 *A Cultural Resource Inventory of the Proposed SR-193 Upgrade and realignment in Provo Canyon, from Olmstead to Heber City, Utah and Wasatch Counties, Utah*. Museum of Peoples and Cultures Technical Series No. 80-49, Office of Public Archaeology, Brigham Young University, Provo.
- Woodward, L., E.H. Jensen, and J.L. Harvey. 1976. *Soil Survey of the Heber Valley Area, Utah*. United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with Utah Agricultural Experiment Station.
- Works Progress Administration 1941 *Utah, a Guide to the State*. Hastings House, Publishers, New York.
- Zier, Christian J. 1984 *A Class II Cultural Resource Inventory of the U.S. Army Dugway Proving Ground, West-Central, Utah*. Metcalf-Zier Archaeologists, Inc., Eagle, Colorado.