LAKE NIGHTHORSE
RECREATION MASTER PLAN

DURANGO, COLORADO

FINAL DRAFT - MAY 2011

Prepared for the Animas-La Plata Water Conservancy District by DHM Design

Acknowledgements

Animas-La Plata Water Conservancy District Board
Robert Wolff, President
Joseph Colgan, Vice-President
Gene Bradley, Secretary/Treasurer
Kenneth Beegles
Tom Brossia
Lee Campbell
Ronald Gillen
J. Pat Greer
Dan Huntington
Stephen Krest
Tom Hartnett
Deems Taylor
Jon T. (Ted) Vickers

Bruce Whitehead, Executive Director
Jane Maxton, Office Manager

Funding provided by the following:
Animas-La Plata Water Conservancy District
Southwestern Water Conservation District
Southwest Basin Roundtable
Colorado Water Conservation Board

Planning Consultants
DHM Design Corporation
RPI Consulting
FeeneyArchitect

Facilitator
Joy Lujan, National Park Service, Rivers, Trails and Conservation Assistance Program
Marsha Porter-Norton

Bureau of Reclamation
Kathleen Ozga – Lands and Recreation Group Chief
Mark Chiarito – Resource Management Specialist
Joe Tuomey - Archaeologist
Rob Waldman – Environmental and Planning Group Chief
Molly Thrash – Environmental Protection Specialist
Ruth Rydiger – Information Technology Specialist
Pat Page – Deputy Construction Engineer
Barry Longwell – Construction Engineer
Tyler Artichoker – Civil Engineer
Fred Liljegren – Outdoor Recreation Planner

Animas La-Plata Operations, Maintenance, and Replacement Association
Russell Howard, General Manager

Ute Mountain Ute Indian Tribe
Southern Ute Indian Tribe
Colorado Water Resources and Power Development Authority
Navajo Nation
San Juan Water Commission
La Plata Conservancy District

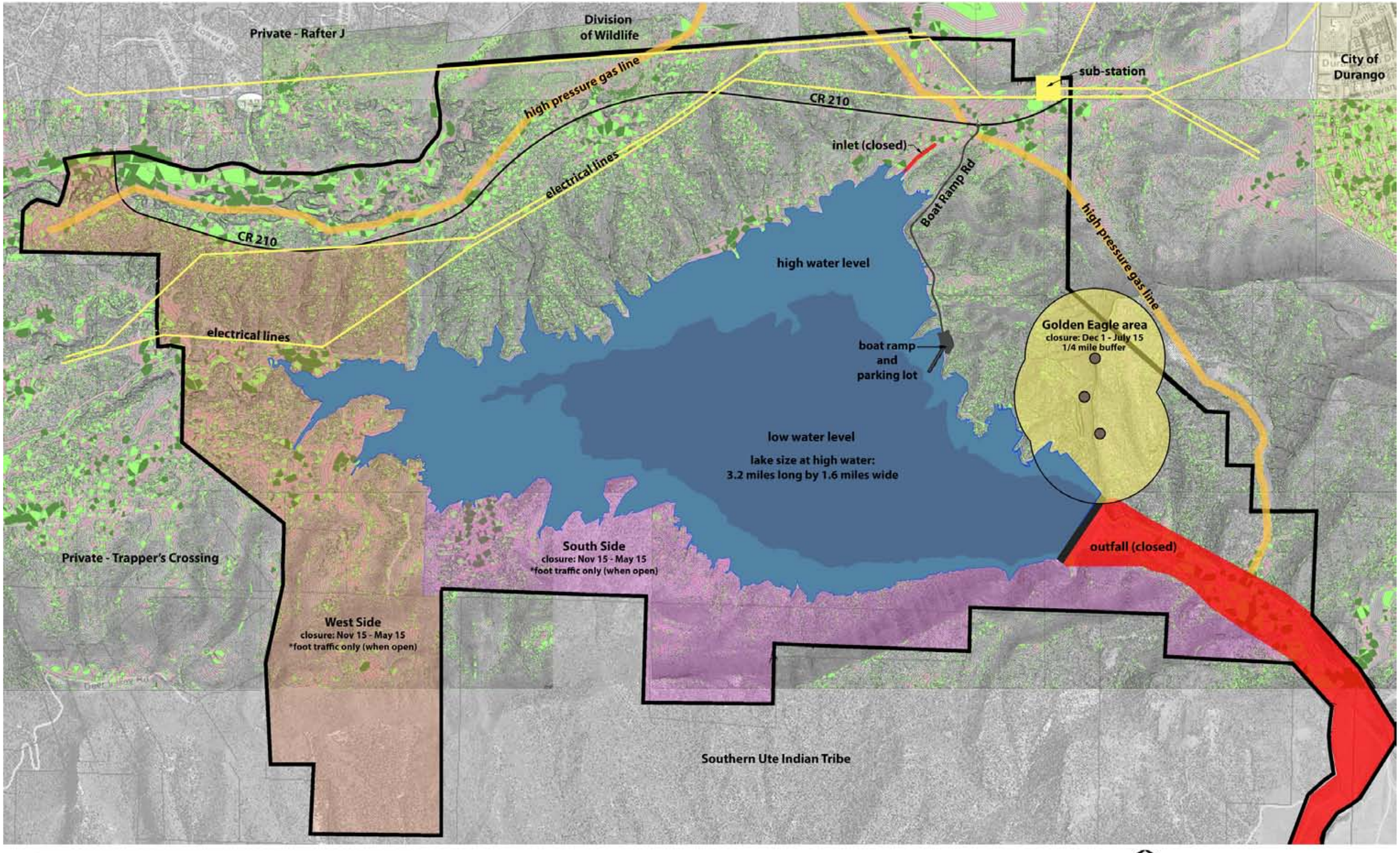
This plan was prepared in coordination with the 2000 ALP Final Supplemental Environmental Impact Statement (FSEIS) constraints and will continue to be reviewed for NEPA compliance.

Cover photo courtesy of Hal Lott

Table of Contents

Section 1: Introduction

Lake Nighthorse was recently constructed by the Bureau of Reclamation (USBR) as part of the Animas La Plata project. The lake began to be filled in the spring of 2009 and is expected to fill to capacity in the summer of 2011, however, completion of project construction is scheduled for 2012. The lake surface will be approximately 1,500 acres at maximum elevation and 750 acres at minimum elevation, and the reservoir area includes a total of approximately 5,500 acres. The minimum pool elevation is 6,800 feet and the high pool is 6,882 feet. While not visible from state highways, the reservoir site is only two miles from downtown Durango and is poised to provide a significant recreational amenity to the area.



Slope Analysis	Closure	Utilities
0-5%	West Side closure	electrical lines
5%-10%	South Side closure	high pressure gas lines
10%-20%	Eagle nest closure	
20% and up	permanent closure	

0 300 1200
150 600
SCALE IN FEET

1.1 Introduction

This plan describes a future vision for the lake and surrounding area that aims to maximize benefits to the community while protecting and enhancing natural resources. The balancing of activities and protections will be achieved through thoughtful planning of proposed improvements, along with regulations and policies for the management. The preparation of this plan was done as a highly inclusive and collaborative process that involved comprehensive review and input from agencies, local municipalities, interest groups and citizens. It reflects shared solutions that were assembled with consensus building workshops. The focus of this plan is on capital improvements. Management is a critical next step necessary for the operation and maintenance of the lake requiring additional documentation beyond the scope of this master plan.

Three overarching themes that emerged through the public process were the desire to preserve the outstanding natural scenic qualities of the site, the importance of protection to area wildlife, and the desire to gain public access to the lake and surrounding area.

The improvements proposed in this plan are significantly scaled back from the full potential allowable under the 2000 Final Supplemental Environmental Impact Statement (FSEIS). A smaller scaled project reduces the magnitude of financing necessary to achieve public access to the park at an earlier date. Once the park is operating, potential internal revenues may contribute to expanding the proposed improvements. The improvements are also described in a way that anticipates that user days will increase over time, matching the costs of facilities and management with gradually expanding use.

1.2 Purpose of the Plan

The purpose of the Lake Nighthorse Recreation Master Plan (plan) is to describe the overall concept for physical facilities along with recreation management strategies, regulations and policies that would provide public access to the site. The proposed facilities are described at a master planning level that suggests the program list of facilities and activities, locations for facilities, general physical parameters, design character and potential phasing. Cost estimates are included for budgeting both installation and ongoing management. Phasing is suggested to address sequential requirements and priorities, while allowing for flexibility to respond to various potential funding opportunities. Detailed design of individual improvements is not included and would be completed during the subsequent phases. Implementation of the improvements described within this plan requires continued planning, permitting, preparation of construction documents, and funding. The formation of a recreation management strategy is critical to providing public access.

1.3 History of Recreation Funding

As part of a settlement which set the final size/capacity for the reservoir in 2000, funding for recreation was removed from the Bureau of Reclamation (USBR) project with the assumption that improvements would be completed by Colorado State Parks. The Colorado State Parks agency is currently facing budget challenges and has ranked funding for Lake Nighthorse below several other potential state projects.

The Colorado Ute Settlement Act Amendments of 2000 (2000 Amendments), Section 302(a)(1)(A)(i)(IV) of Public Law 106-554 states "…the Secretary…acting through the Bureau of Reclamation, is specifically authorized to – (i)complete construction of, and operate and maintain a reservoir…which facilities shall – (IV) include those recreation facilities determined to be appropriate by agreement between the State of Colorado and the Secretary that shall address the payment of any of the costs of such facilities by the State…". The 2000 ALP Final Supplemental Environmental Impact Statement (FSEIS) describes a proposed recreation development plan in cooperation with the State of Colorado (State). As specified by the Assistant Secretary of Water and Science in 2003, the United States would build the major project features and the State or its citizens would be responsible to develop and manage recreation at the reservoir. Accordingly, the ALP construction cost estimate did not include recreation development and the Department of Interior did not want project construction funds diverted for this purpose at that time. In May 2008, due to lack of funding, Colorado State Parks formally declined development and management of recreation at Lake Nighthorse, and agreed to allow Reclamation to seek other non-federal partners. In addition, the State gave USBR a $3,000,000 grant for construction of a boat ramp. The State's estimate for recreation development was $20,000,000 to $30,000,000.

ALPWCD Role in Pursuit of a Recreation Master Plan

Recognizing the significant potential of the reservoir as an outstanding recreation amenity, the Animas-La Plata Water Conservancy District (ALPWCD) Board contracted this recreation plan and management strategies to direct the design of facilities and management of recreation.

1.4 Significance to the Community

The location of the new reservoir combined with the scenic natural setting presents a tremendous opportunity for an outstanding new public amenity. With an already impressive list of surrounding public destinations, the reservoir further strengthens the cumulative draw to this area and branding of Durango. The reservoir is easily accessed from residential and employment centers, offering the opportunity for convenient visits after work or on a lunch hour. Visitors will extend their trips to add activities at the reservoir, expanding their menu of activities and outdoor experiences possible in the area. This activity will further support the local tourist economy.

The benefits of reservoir recreation have been documented through extensive surveys and studies. Lake Nighthorse offers the potential to provide recreational benefits, ecological protections and enhancements, and economic benefits.

Research supports that access to open space and natural areas contributes to physical and mental health and sense of well being. Children who participate in outdoor activities gain documented health benefits as well as higher rates of involvement with environmental stewardship as adults. Lake Nighthorse offers convenient access to scenic areas, a wide range of active and passive water and land based recreation activities, opportunities for learning about natural sciences, and benefits from outdoor leisure and fitness activities. Primary activities anticipated for Lake Nighthorse include fishing, boating, picnicking, swimming, camping and trail use.

A managed plan provides the opportunity to balance use with protection of habitat. The construction of the reservoir has changed the landscape and set into motion complex and dynamic changes that affect both local and regional ecosystems. As a significantly sized water body, the lake adds aquatic and bird habitat and changes the surrounding soil moisture levels. The lake fringe will adjust to host wet meadow and wetland vegetation. The lake and associated fringe may attract both resident and migrating waterfowl.

Land based wildlife are affected in multiple ways. The reservoir and higher intensity use areas reduce the roaming area compared to the previous land uses. The lake itself offers wildlife access to a water source. The western and southern areas include seasonal closures protecting critical calving and migration seasons. Adjacencies with surrounding properties are planned to allow for movement. The plan describes clustering and management strategies intended to protect movement corridors and limit unintended attraction of wildlife.

The economic benefits to the region include attracting increased tourism, increased reservoir related activities, related business opportunities and real estate values. The economic benefits will be seasonal, create new jobs, and contribute to county and city taxes collected through sales and lodging tax collections.

1.5 Site Analysis

Adjacent Properties

The property is adjacent to Colorado Division of Wildlife property to the north and east, Bodo Industrial Park to the east (beyond the natural ridgeline and Carbon Mountain), the Southern Ute Indian Reservation to the south, and private residential subdivisions to the north and west.

Natural Setting and Wildlife

The surrounding landscape includes rolling topography, scenic ridgelines and extensive pinion – juniper forest. Additionally, ecotomes include mountain shrub communities, ponderosa pine meadows, sagebrush sierra, mountain shrub communities, and some riparian vegetation along drainage corridors. Golden eagle nests are located on Carbon Mountain, east of the reservoir. The site also provides winter habitat and calving areas to deer and elk on the west and south sides of the lake. Those areas will be closed to the public from November 15 to May 15 annually. The Colorado Division of Wildlife will be responsible for management of the fishery including stocking. The USBR is considering allowing the land north of CR 210 to be managed by CDOW.

Access
The area below the dam, the outfall, will be permanently closed to the public as well as the inlet, the location where the water enters the lake. Above ground electrical lines as well as a high pressure gas line bisect the site on the north. One primary vehicular access point is proposed. A boat ramp, access road, and a handicapped accessible restroom have already been constructed. County Road 210 has been rebuilt crossing the north side of the site, providing access from the City of Durango to Wildcat Canyon Road. County Road 211 still exists and dead-ends into the property on the west side and may provide a location for trail access from the west side. This point is not recommended for boating or camping access.

1.6 Process
Market Study
A Market Study was completed in the spring of 2010 prior to preparation of this plan. The Market Study estimates the potential market for recreation, responding to the characteristics of the region. This study examines recreation demand along with competing regional attractions. The total number of estimated annual user days summarized by the market study is 163,000. This report provides a basic estimate of use that helps shape the type and size of facilities possible. The market study also provides prediction of potential user fees and the contribution of special events to raise revenues.

Economic Impact Study
The Economic Impact Study, prepared subsequent to the Market Study estimates the potential effects of recreation outings on the La Plata County economy. The study details types of anticipated spending for locals and visitors, the relative impact of spending on the larger economy, potential jobs created and sales and lodging tax potential. Additionally, the regional economic activity projected is over $8 million in annual spending. The net positive gain from the reservoir as a public amenity is estimated to provide approximately 4% of the overall summer tourist jobs.

Data Gathering and Analysis
GIS and CAD mapping supplied by the USBR provided the basis for a site analysis that explored the existing conditions for suitability to host potential recreation facilities. Additionally, information included in the FSEIS and other related reports and plans provided guidance on wildlife, and cultural resources. The site analysis also examined access, utilities, adjacent land uses, regional vegetation patterns, views and trail networks.

Public Process and Input
The public input process is described within this plan and provided essential input on the overall vision for the site, types of uses, key concerns and regulations, and physical qualities of the proposed facilities.

1.7 Goals and Objectives
Based on information gathering from the public and stakeholders, the following goals and objectives have been established.

Goal: Environmentally Compatible
Objective 1: Water quality is one of the highest priorities and will be addressed in all recreation improvements.
Objective 2: Wildlife is of large value to the area and the Colorado Division of Wildlife will be included throughout the process.
Objective 3: There are many cultural resources sites throughout the property and recreation will need to work around them, mitigating any potential impacts per State Historic Preservation Office (SHPO) and the USBR.
Objective 4: Future improvements must be coordinate closely with the Bureau of Reclamation and other agencies to meet the appropriate objectives of the FSEIS and utilize agency resources for a successful plan.
Objective 5: Invasive species are of high concern and must be addressed.

Goal: Publicly Acceptable
Objective 1: Obtain broad public input engaging a full range of stakeholders.
Objective 2: Share the lake and surrounding land, allowing a range of activities for everyone.
Objective 3: Provide the opportunity for participation in a wide range of activities.
Objective 4: Protect the quality of each different experience.
Objective 5: Preserve the outstanding natural scenic and environmental qualities of the site by matching the potential use types and design of improvement.
Objective 6: The lake will be safe for all who use it.

Goal: Economically Viable
Objective 1: Achieve an economically responsible and cash positive facility.
Objective 2: Acknowledge funding sources for development and management of recreation at Lake Nighthorse.

Goal: Technically Feasible
Objective 1: Coordinate the involvement of available agencies and organizations to support construction and management of the park.
Objective 2: Design facilities to minimize potential impacts.
Objective 3: Design improvements to be durable, long lasting, low maintenance.
Objective 4: Use sustainable design techniques and practices.

1.8 Roles and Responsibilities
Bureau of Reclamation
The Bureau of Reclamation (USBR) is responsible for management and oversight of USBR facilities, lands and water at Lake Nighthorse. The USBR oversees such areas as environmental and cultural resource compliance, recreation, land management, minerals, operation and maintenance of the dam and reservoir, water management, public safety and security. The development and management of Lake Nighthorse, including the recreation master plan, is subject to the laws of the United States, and applicable federal, state and local orders, rules, and regulations.

Animas – La Plata Operation, Maintenance and Replacement Association
Pursuant to Contract No. 10-WC-40-370 with USBR, the Animas – La Plata Operation, Maintenance and Replacement Association (Association) is responsible for the operation, maintenance and replacement work for Ridges Basin Dam, Durango Pumping Plant, Ridges Basin Inlet Conduit, and appurtenant works. The Association is not responsible for recreation facilities at Lake Nighthorse, County Road 210, natural gas pipelines, electric power lines, and other facilities as agreed between USBR and the Association.

Non-Federal Recreation Manager
Pursuant to a long-term contract with the USBR, the non-federal recreation manager will be responsible for the development, management, operation and maintenance of recreation facilities and public use on USBR lands at Lake Nighthorse.

Weed Management
The USBR has prepared a comprehensive Integrated Vegetation Management Plan (IVMP) to be implemented over a multi-year period to achieve a level of minimum maintenance for long-term weed management. The IVMP includes all USBR lands at Lake Nighthorse and will eventually include a division of responsibilities between the Association and the non-federal recreation manager for continuation of an effective weed control program. The USBR, the Association, and the non-federal recreation manager will comply with all provisions of federal and state pesticide laws and regulations, including restrictions for certain pesticide uses and use patterns. All pesticide uses by the Association and the non-federal recreation manager will be submitted to the USBR for review and approval.

Fire Management
Fire management on USBR lands at Lake Nighthorse will be pursuant to the Memorandum of Understanding (MOU) between the USBR and the Bureau of Indian Affairs – Southern Ute Agency and Ute Mountain Ute Agency (BIA), Contract No. 05-LMOU-048-0001. The MOU provides for inclusion of USBR lands at Lake Nighthorse in the Colorado BIA/USBR

Fire Planning Unit and Fire Management Plan, and will facilitate prompt and effective action in wildland fire control and management. The MOU also addresses other fire-related activities such as mechanical fuel treatment, prescribed fire, and post-fire emergency stabilization and rehabilitation. The USBR, the Association, and the non-federal recreation manager shall take all reasonable precautions and cooperate in the prevention, control, and suppression of fire on USBR lands at Lake Nighthorse.

Cultural Resources Management

The USBR is responsible to identify and protect historical, archaeological, architectural, scientific, and paleontological resources on all USBR lands at Lake Nighthorse. In the event of discovery of cultural resources during the development, operation and maintenance of USBR facilities, lands and water at Lake Nighthorse, the activity will cease and the USBR Archaeologist will be notified immediately. The preservation laws direct all federal agencies to inventory and evaluate cultural resources on lands they administer and to nominate to the National Register of Historic Places those sites meeting the criteria of the National Register (36 CFR 60). Federal agencies are directed to exercise prudent and responsible management of all cultural resources.

Trout Stocking

Pursuant to the 2000 FSEIS, the USBR will annually stock Lake Nighthorse with trout for a recreational fishery. The annual stocking will be coordinated between the USBR, the U.S. Fish and Wildlife Service, the Colorado Division of Wildlife, the Southern Ute Indian Tribe, the non-federal recreation manager, and the Association.

Water Quality Monitoring

Pursuant to the 2000 FSEIS, the USBR will develop and implement a monitoring program for bioaccumulation of trace elements in fish at Lake Nighthorse. The monitoring program will be initiated two years after completion of filling the reservoir and will continue four consecutive years. In 2012, subject to completion of filling the reservoir, the USBR will begin the monitoring program in cooperation with the U.S. Fish and Wildlife Service, the Colorado Division of Wildlife, the Southern Ute Indian Tribe, the non-federal recreation manager, and the Association.

Fencing

The USBR will provide initial construction of boundary, facility, safety and security fence on USBR lands at Lake Nighthorse. Fence maintenance will eventually include a division of responsibilities between the Association and the non-federal recreation manager.

Erosion Control

The USBR is responsible to control erosion on USBR lands at Lake Nighthorse in accordance with the Clean Water Act, best management practices, etc.

Off-Road Vehicle Use

Title 43 CFR Part 420 established USBR lands to be CLOSED to off-road vehicle (ORV) use unless designated OPEN. ORV use on USBR lands at Lake Nighthorse is CLOSED and all motorized vehicles will be required to stay on designated roads.

Boat Ramp and Parking Lot

Restrooms - Vault Toliets

Water Quality Treatment for Parking Lot Runoff

Boat Ramp

Boat Ramp Road

Outfall - where water enters the Lake

photos taken in the fall of 2010


Lake at La Plata West outtake - looking toward Dam (east)

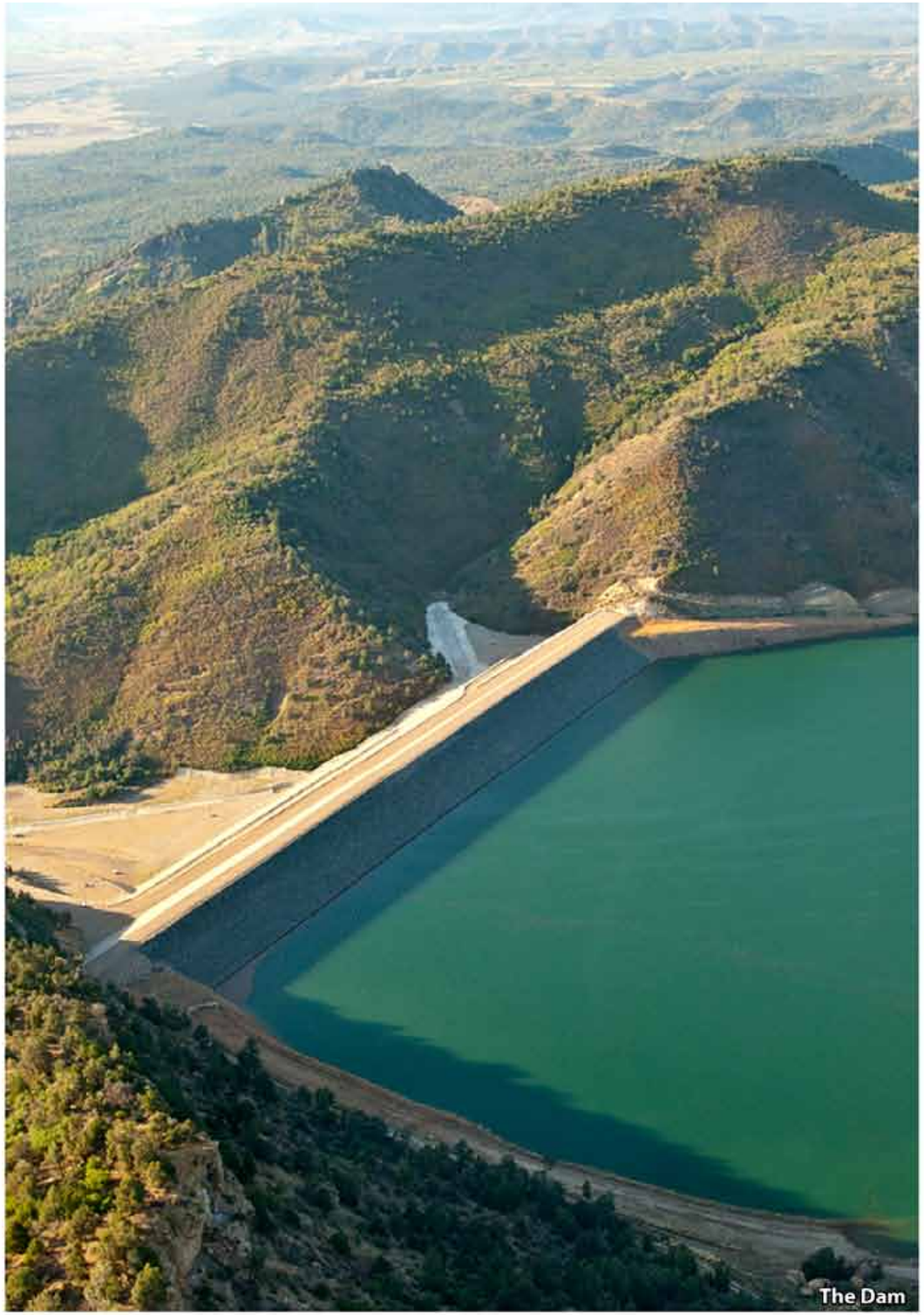

North of CR 210 at Wild Cat


Old County Road (now underwater)


South of CR 210


North of CR 210

photos taken in the fall of 2010


The Dam


Looking towards the La Platas


Boat ramp and parking lot


East side of the lake


Lake's relation to City of Durango

photos by Hal Lott, Fall 2010

Lake Nighthorse Recreation Master Plan

Through a collaborative planning process, Durango-area residents have developed recommendations for a recreation master plan for Lake Nighthorse. DHM Design in Durango has been working to compile a draft recreation plan based on community-created recommendations and the 2000 Environmental Impact Statement for the Animas-La Plata Project.

Please join us in the next step of the public process to review the draft plan on April 11, 2011.

Open Houses

November 10, 2010
11:00 am - 2:00 pm
La Plata County Fairgrounds Pine Rm.
and
November 11, 2010
5:00-8:00 pm
Three Springs
175 Mercado Suite 117

Get information!
Ask questions!
Talk to people associated with the project!

Public Forum

November 16, 2010
5:00-8:00 pm
Needham Elementary School
2425 W. 3rd Ave.

Publicly share your ideas and concerns. Help the planning team understand your perspective.

You can also contribute your ideas online at www.lakenighthorse.com

Issue Workshops

Developing Shared Solutions to Water & Shoreline Recreation
December 7, 2010
4:00-8:00 pm
Durango Community Recreation Center

Developing Shared Solutions to Land-Based Recreation
December 8, 2010
4:00-8:00 pm
Durango Community Recreation Center

Work with people with varying perspectives to develop recreation alternatives that address community ideas, issues, & concerns.

Design Workshop

Design Workshop
January 11, 2011
8:00 am - 5:00 pm
January 12, 2011

Public Open House
8:00 am - 3:00 pm
to review results of workshop
January 12 at 6:00 pm
La Plata County Fairgrounds

Work with designers, resource experts, and community members to create design concepts that integrate the public's preferred recreation options into a plan.

Draft Plan Review

April 11, 2011
Presentation
6:00 - 7:00 pm
Public Open House
7:00 - 8:30 pm
Needham Elementary School
2425 W. 3rd Ave.

- Review draft recreation plan.
- Learn what the community recommendations are and how design elements fit into the landscape.
- Ask questions and comment on the draft plan.
- Discuss process for final plan.

Public Process So Far

Visit:
www.lakenighthorse.com
to view the draft plan in advance of the April 11th meeting.

The January 10th and 11th Design Workshop included over 80 participates throughout two days

2.1 Overview of the Public Process

An inclusive, collaborative public process was integral in setting the direction for a draft master plan for Lake Nighthorse based on community recommendations and previous environmental commitments. The formal public process began in early November, 2010. The process was intended to give information, collect input, build understanding between various interest groups, and create an environment for finding shared solutions and recommendations for recreation. The process consisted of four main steps:

- Open Houses
- Public Forum
- Issue Workshops
- Design Workshop

From the beginning of this public conversation, it was clear that there is a wide spectrum of passionate views about what recreation at Lake Nighthorse should consist of. On one end of the spectrum was the sentiment that all user-types should be able to use this public resource – including a full menu of motorized uses. On the other side were the opinions that the lake should be preserved solely for wildlife and no motorized uses should be allowed. Most people we heard from favored recreation that included some level of motorized use. Ultimately, the community agreed to move beyond the fight over whether there should be motorized use to explore ways to share the lake.

Getting the Word Out

In an effort to make the public process known to as many people as possible, a series of ads ran in local newspapers and on radio stations. E-mail announcements were sent to those who contacted the planning team or provided their contact information as well as to groups who might have an interest in the process. Additionally, posters, comment cards and a website provided the public process calendar.

Open Houses

The first formal step in the public process was a set of two public open houses. The intent was to provide basic information, answer questions and to provide a common baseline of factual information and a foundation upon which to proceed with the public process. Early steps in the process helped people understand facts and history about the project including decisions and commitments that were already in place.

The Public Forum

In addition to expressing their concerns about recreation via comment cards, web comments, direct phone calls, and e-mails, a public forum was hosted in late November during which people were able to express their ideas and concerns to the planning group as well as to other community members. Group understanding of the nature of people's ideas and concerns was necessary in order to move forward collaboratively.

A keypad poll was conducted during the public forum. It was meant to take the pulse of the community and to understand some basic questions the planning team had about the public desires related to recreation at Lake Nighthorse. The questions and answers can be found in the Appendix.

The outcome of the public forum was a list of public desires both for and against motorized uses. The meeting also began to uncover the underlying concerns behind the positions people were taking on potential recreational uses. Among the concerns identified were noise, user safety, invasive species, visitor experience, wildlife, wakes, water quality and vandalism.

One agreement came out of the meeting: "We agree to work together to explore shared uses."

Issues Workshops

In December, two 4-hour-long meetings were held. One was intended to explore the issue of water-based recreation at Lake Nighthorse and the other focused on land-based uses. By this point in the process, it was clear that not only did the community not speak with one voice on the topic of recreation at Lake Nighthorse, but that there was a very broad spectrum of desired uses and experiences. The issues workshops continued to build understanding among community members about each other's interests and concerns. A full range of perspectives was present, represented, heard, acknowledged, debated and addressed.

At the beginning of the discussion, one question was presented to the group: "Will you agree to share the lake?" The group agreed that they would share.

Water-based recreation was the primary topic of discussion. During the meeting, participants were asked to identify what kind of experience they wanted to have at the reservoir. Based on the kinds of experiences people wanted to have at the lake, participants broke into groups with other people who wanted a similar experience. Those groups then worked to develop a description of what their desired experience would be like. Each group then presented their descriptions to the larger group.

Despite their differences, each description included some common elements:

- Swimming
- Fishing
- Desire for Safety
- Water Quality
- No Gas Sold on the Lake
- Noise Control
- Sensitivity to the Environment
- Preserve Wildlife Habitat
- Build Restrooms near the Shore
- Some Level of Motorized Use
- Allow Sailboats
- Water Access Point other than the Boat Ramp
- Scuba as a desirable activity

After the various desired experiences were presented, the groups were mixed up and re-formed to include representatives from each of the desired experiences types. People were asked to keep in mind the full array of desired experiences but to focus on one particular experience and to explore whether and how that desired experience could maintain its character while addressing the interests and desires of people with different perspectives. The groups explored a variety of design and regulatory possibilities to accomplish their objectives. Conversation in those groups was robust and productive and explored factual potential impacts of various uses and strategies to address those impacts.

Design Workshop

Recommendations and ideas for potential shared use solutions that were developed in the issues workshops were carried over to a 2-day design workshop in early January where participants worked in diverse groups to further develop recommendations for recreation. Participants chose which group they wanted to work with and a full range of perspectives was represented on each work team.

Participants worked in teams on six different issues:

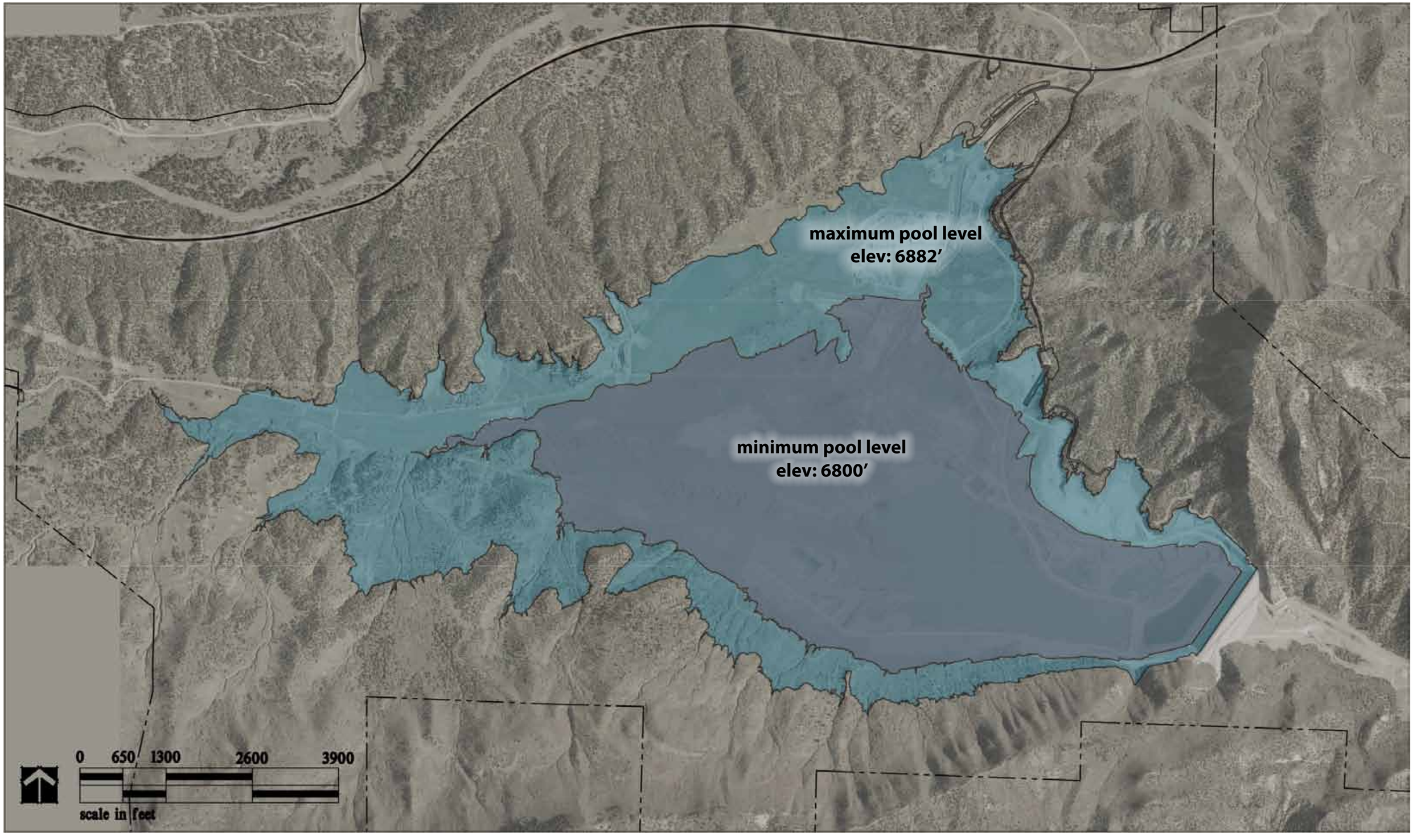
1. Water-based Recreation
2. Trails
3. Camping
4. Shoreline Recreation
5. Education and Interpretation
6. Financing and Management of Recreation

A variety of resource experts were on hand to assist the groups as they worked to explore opportunities and develop recommendations. By the end of day two, as a result of many hours of discussion and negotiation, participants had developed a set of recommendations for recreation in all six categories.

A public meeting was held the evening of the second day, reporting out the progress of the teams.

Public Open House

The draft plan was presented on April 11 along with an update on capitol improvements and management costs. Additionally, the results of a sound study were presented by Hankard Environmental (see Appendix). Modifications to the plan based on the Open House input were completed in April 2011. Subsequent sections of the plan describe the proposed facilities, regulations and design consideration proposed.


maximum pool level
elev: 6882′
minimum pool level
elev: 6800′
0 650 1300 2600 3900
scale in feet

3.1 Closures

Seasonal

The water will be open to boating from May 15 to November 15. There would be a potential to open the lake earlier depending on the status of the wildlife. An early opening could potentially occur between April 1 and May 14 and would need to be approved by the Colorado Division of Wildlife (CDOW) on an annual basis. The lake would be closed to all boating recreation (motorized and non-motorized) from November 16 to May 14, with the exception of the early opening in the Spring approved by the CDOW annually. These closure times correspond with the wildlife land closures on the west and south sides of the property and reduce inspection requirements for invasive species protection.

Daily

Visitors shall not operate a boat on the lake from sunset to sunrise.

3.2 Aquatic Invasive Species

Refer to Colorado Department of Natural Resources, Aquatic Nuisance Species (ANS) Watercraft Inspection Handbook

What are Aquatic Invasive Species?

Aquatic invasive species (AIS) and aquatic nuisance species (ANS) are also called non-native species, exotic species, non-indigenous species, weeds or pests. ANS can be plants or animals. Invasive aquatic plants are introduced plants that have adapted to living in, on, or next to water, and that can grow either submerged or partially submerged in water. Invasive aquatic animals require a watery habitat, but do not necessarily have to live entirely in water.

Why Should We be Concerned?

Zebra and quagga mussels pose a great ecological and financial threat to the state. The invasion of these mussels can affect every Coloradoan in some way. The impacts could be devastating:

- They grow and reproduce quickly.
- They clog water infrastructure, impacting water supply and quality.
- They have significant ecological impact.
- They have recreational impacts.
- They have significant economic impact.
- They are very difficult to kill.
- They spread quickly to other water bodies.

Drying Times for Watercraft Coming from Infested Waters.

If a boat coming from out of state or from zebra or quagga mussel infested waters is planning to launch, the general recommendation is to keep the boat out of water and let it dry for a minimum of 30 days after cleaning all equipment and draining all possible sources of standing water. However, such drying times may be reduced depending on local temperature and relative humidity.

In general, zebra and quagga mussels can survive longer out of water if local conditions are cold and humid than if conditions are hot and dry. The 100th Meridian Initiative has developed a Quarantine Estimator for Zebra-Mussel Contaminated Boats that estimates recommended drying times based on average humidity and temperature zones in the 48 contiguous United States. To use this tool, refer to their website: http://100thmeridian.org/emersion.asp.

Standard Procedure Outlined in the ANS Watercraft Inspection Handbook:

Education - Boaters must be educated about the importance of controlling zebra and quagga mussels and other ANS. Boaters must realize that ANS are spread by their actions (or inactions). They must understand that they have a lot to lose, in terms of access and recreational opportunities, if they do not help in this effort.

A monitoring program will need to be established to detect the presence of AIS and ANS as well as the associated requirements for inspection and decontamination. A program should be established with the City of Durango to educate the public on the risk of introducing ANS to the Animas River. If ANS are introduced to the Animas River, there will be no way to protect Lake Nighthorse from becoming affected. At the minimum the City of Durango should posts signs at all river put-ins about the potential risk and what to do if your raft or kayak has been in infested waters.
The primary education message is Clean/Drain/Dry:

- Clean—Remove all plants, animals, and mud. Thoroughly wash everything.
- Drain—Drain every space or item that can hold water.
- Dry—Allow time for your boat to completely dry before launching in other waters.

Standard Inspection - This inspection procedure applies to all boats before entering the water. The procedure should take about two to three minutes.

High Risk Inspection - This protocol is used on boats found to have a combination of high risk factors including: use out of state, use in infested waters, complex boat structure, or standing water. This is intended to be a very thorough inspection that may take 10–30 minutes depending on the type or size of the boat.

Decontaminate - If evidence of mussels is found or other ANS or have reasonable belief that the boat may have ANS, the boat must be decontaminated. Standard decontamination procedures include hot water high pressure decontamination system (>140ºF, minimum 250 psi) to decontaminate the boat, motor, trailer, personal gear, and other equipment. The engine, motor, and bilge must be flushed with hot water for at least 3 to 5 minutes. Live wells and other compartments with standing water must be flushed with hot water (>140ºF) as well.

Clean, Drain, Dry Checks - This is a quick procedure for checking boats leaving the water. This one minute inspection ensures that contact has been made with the boater before he/she leaves the boat ramp and verifies that the boat is clean and drained prior to leaving. Make sure the owner pulls all plugs and live wells are empty.

Wire Seal System - Colorado will use a Watercraft Inspection/Decontamination (WID) wire seal that will be placed between the boat and the trailer to document inspections and decontaminations. The State only authorizes green seals to document proper inspection and decontamination procedures.

Other Methods used in the State of Colorado:

CDOW provides inspection, training, and other support to many lakes and reservoirs thoughout the State and may provide a partnership for managing an inspection and decontamination station. No formal agreement has been reached at this time.

Permitting - Many lakes around the State use a permitting system whether it be annual or daily pass. Standley Lake in Westminister, CO, which is 1200 surface acres, keeps the number of boat permits controlled so the water quality is not adversely affected. They allow 600 boat permits each year. Boulder Reservoir, which is 850 surface acres, on the other hand, limits the boats to 20 per day.

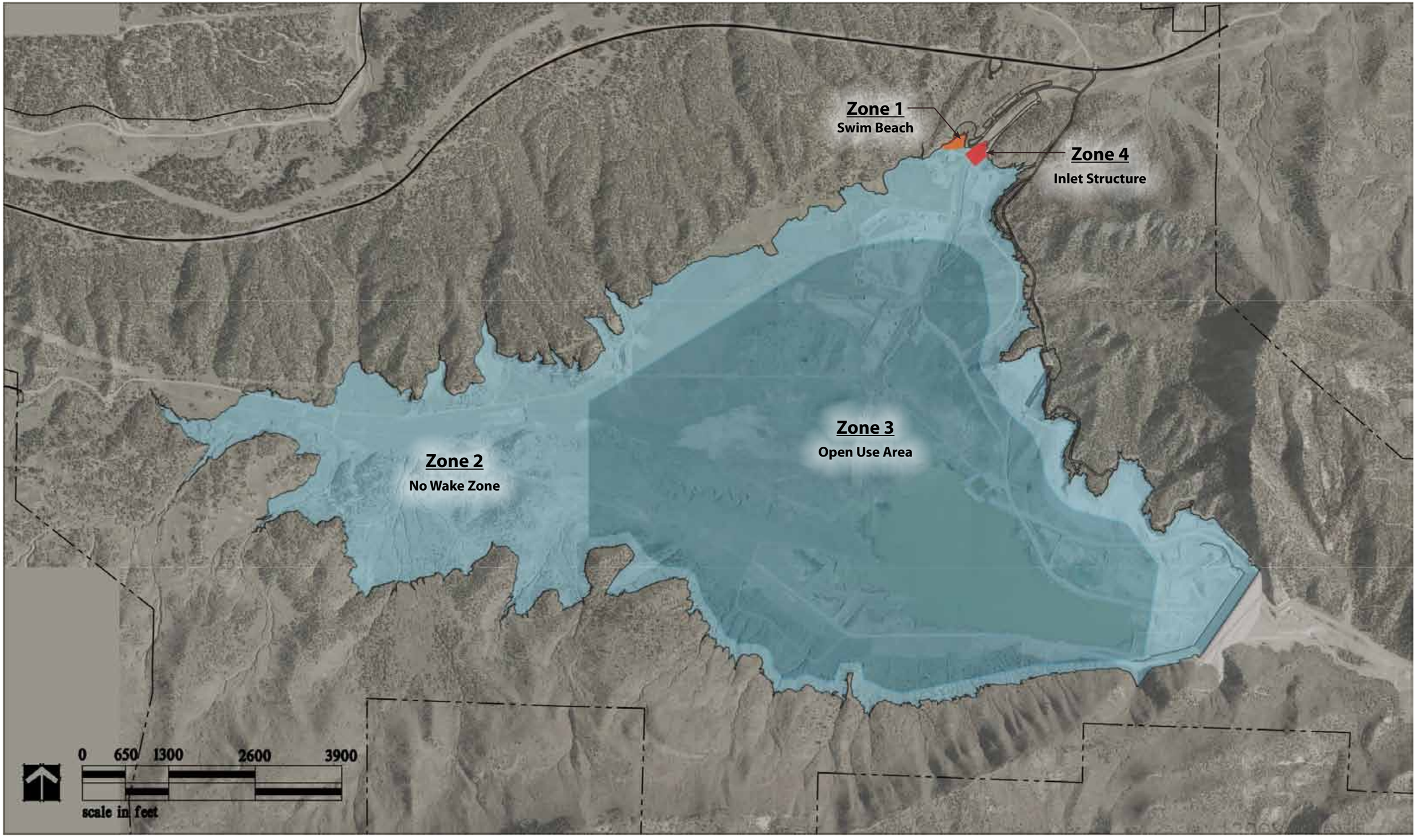
Inspect all Watercraft - Many lakes now inspect all boats including hand-launched craft. Even though these hand-launched crafts have a very low biological risk, there is still some level of concern. If boats are very dirty, they would be required to be cleaned prior to launching.

Quarantine Period - Some lakes require boats to be quarantined for a specific length of time. All boats are decontaminated with a hot water wash and then the quarantine period starts. To confirm that the boats have not entered another body of water during the quarantine period, the green wire seal system is used.

Regulations directly from 2011 Colorado Land and Water Regulations

1. All boats and other floating devices of any kind, including their contents, motors, trailers and other associated equipment are subject to inspection in accordance with inspection procedures established by the CDOW prior to launch onto, operation on or departure from any CDOW controlled waters or boat staging areas.

2. Any non-native or exotic plant material and any aquatic wildlife species listed in CDOW of Wildlife regulation #012-C, 2 CCR 406-0, (collectively referred to herein as "aquatic nuisance species") found during an inspection shall be removed and properly disposed of in accordance with removal and disposal procedures established by the CDOW before said boat or other floating device will be allowed to launch onto, operate on or depart from any CDOW controlled waters or boat staging areas.


Zone 1
Swim Beach
Zone 4
Inlet Structure
Zone 3
Open Use Area
Zone 2
No Wake Zone
0 650 1300 2600 3900
scale in feet

3. Compliance with the above ANS inspection and removal and disposal requirements is an express condition of operation of any boat or other floating device on CDOW controlled waters. Any person who refuses to permit inspection of the boat or other floating device, including contents, motor, trailer, and other associated equipment or to complete any required removal and disposal of aquatic nuisance species shall be prohibited from launching onto or operating the boat or other floating device on any CDOW controlled water. Further, the boat or other floating device of any person that refuses to allow inspection or to complete any required removal and disposal of aquatic nuisance species prior to departure from any CDOW controlled water or boat staging area is subject to quarantine until compliance with said aquatic nuisance species inspection and removal and disposal requirements is completed.

4. Any person operating a boat or other floating device may be ordered to remove the boat or device from any CDOW controlled water by any authorized agent of the CDOW if the agent reasonably believes the boat or other floating device was not properly inspected prior to launch or may otherwise contain aquatic nuisance species. Once removed from the water, the boat or other floating device, including contents, motor, trailer and associated equipment shall be subject to inspection for, and the removal and disposal of, aquatic nuisance species.

5. It is unlawful for any person to, or attempt to, launch onto, operate on or remove from any CDOW controlled water or boat staging area any boat or other floating device without first submitting the same, including contents, motors, trailers and other associated equipment to an inspection for aquatic nuisance species, and completing said inspection, if such an inspection is requested by any authorized agent of the CDOW or required by any sign posted by the CDOW. Further, it is unlawful for any person to fail to complete the removal and disposal of aquatic nuisance species if such removal and disposal is requested by an authorized agent of the CDOW or required by any sign posted by the CDOW.

6. It is unlawful for any person to, or attempt to, launch onto, operate on or remove from any CDOW controlled water or boat staging area any boat or other floating device if the boat or other floating device, including contents, motors, trailers, or other associated equipment, contains any aquatic nuisance species.

3.3 Noise Concerns Related to Watercraft

Throughout the public process, it was clear that noise created from recreation on the lake was a main concern of neighbors as well as County citizens. Noise is also a concern with the wildlife that resides on the property. A noise model was completed by Hankard Environmental, acoustics and vibration consultants from Littleton, Colorado. See report for Hankard in the Appendix.

Muffling and Sound Level directly from 2011 Colorado Land and Water Regulations

1. It is unlawful to use a boat propelled in whole or in part by gasoline or naphtha unless the boat is provided with a stock factory muffler underwater or other device capable of adequately muffling the sounds of the exhaust of the engine. The phrase "adequate muffling" means that the motor's exhaust at all times is so muffled or suppressed as not to create excessive noise.

2. No person shall operate a boat upon waters of this State under any condition or in any manner that the boat emits a sound level in excess of 86 decibels on "A" weighted scale when measured from a distance of 50 feet or more from the boat. The operator of such boat may be ordered off the water upon failure to submit to sound level testing procedures.

3. No person shall operate a boat upon waters of this State under any condition or in any manner that the boat emits a sound level in excess of 55 decibels on "A" weighted scale when measured at the neighboring residential development from the boat.

3.4 Zoning the Lake

The term "wake" means a movement of the water created by a boat underway, great enough to disturb a boat at rest, but under no circumstances shall a boat underway exceed five (5) miles per hour while in a posted wakeless area. The term "above a wakeless speed" means operating a boat at such a speed as to create a wake. No person shall operate any boat in such a manner as to create a wake, when such waters or parts thereof are posted by signs or marked by buoys prohibiting a wake.

Zone 1: Swimming/Beach Area

1. No boat of any kind within the buoy of swimming area

Zone 2: No Wake Area

1. 5 mph speed limit
2. A minimum of 150' off shoreline
3. 600' from shoreline in specific areas (see map on page 16)

Zone 3: Open Use Area

1. 40 mph per State Park Regulations

Zone 4: Closed Areas

1. Inlet (see map on page 16)
2. Dam

Wakeless at Low Water

When the lake is at minimum pool (750 surface acres), the entire lake will be zoned as wakeless.

Buoys directly from 2011 Colorado Land and Water Regulations

1. Any of the waters of this State limited to a specific use shall be marked by buoys which utilize the following uniform marking system.
    a. Regulatory Symbols- International orange on a white background.
    b. An orange cross within an orange diamond (on end) means: "Boats Keep Out."
    c. An orange circle means: "Controlled Area."
    d. An orange diamond (on end) without a cross means: "Danger."
    e. An orange square or rectangle is informational. Descriptive wording within or accompanying the symbols shall be black.
    f. When the symbols are displayed on a buoy, an orange band should encircle the buoy near the water line and near the top.

2. No person shall operate a boat in an area which has been marked by the use of buoys as a bathing, swimming, scuba or otherwise access prohibited area. Every person operating a boat in an area which has been marked by the use of buoys as a controlled area shall comply with the restrictions and requirements indicated on the buoys. The provisions of this regulation shall not apply to patrol boats or emergency boats or in any emergency situation.

3.5 Breakwater

A breakwater structure is designed to absorb the energy of the waves that hit it. This is done either by using mass (e.g. with caissons) or by using a revetment slope (e.g. with rock or concrete armour units). Breakwaters may be either fixed or floating: the choice depends on normal water depth and tidal range.

A breakwater structure may be needed at Lake Nighthorse in the future near the swimming area and/or the boat ramp. The need for a breakwater structure will be evaluated in the future once the lake is open for recreation.

3.6 Water Recreation Regulations

All boating will follow the Colorado Boating Statutes and Regulations.

Personal Watercraft (Jet Skis) Will Not be Allowed on the Lake.

"Personal Watercraft" means a motorboat that uses an inboard motor powering a water jet pump as its primary source

of motive power and is designed to be operated by a person sitting, standing, or kneeling on the boat, rather than the conventional manner of sitting or standing inside the boat. “Personal watercraft” includes a motorboat known as a “specialty prop-craft,” which is similar in appearance to a personal watercraft but powered by an outboard or motor driven propeller.

House Boats and Cabin Cruisers will not be Allowed on the Lake.
House boats and Cabin Cruisers have the highest risk of carrying invasive species.

Open-Air Exhausted Boats will not be Allowed on the Lake.

Safe Speed directly from 2011 Colorado Land and Water Regulations
No boat shall, under any condition or in any manner, exceed forty (40) miles per hour in open use area and 5 miles per hour in wakeless area, except for patrol boats operating in emergencies.

Every boat shall at all times proceed at a safe speed so that proper and effective action can be taken to avoid collision and so that the boat may be stopped within a distance appropriate to the prevailing circumstances and conditions.

In determining a safe speed the following factors shall be among those taken into account by all boats.

a. The state of visibility.
b. The traffic density including concentration of fishing boats or any other boats.
c. The maneuverability of the boat with special reference to stopping distance and turning ability in the prevailing conditions.
d. The state of wind, sea, and current, and the proximity of navigational hazards.
e. The draft in relation to the available depth of water.

A flat wake speed, not exceeding 5 m.p.h., is required while in areas posted with a “No Wake” buoy or within 200 feet of a swimmer or a downed water-skier.

A boater must be at a flat wake speed within 100 feet of a diver-down flag. In addition to the flat wake restriction, a **boat may not approach a diver-down flag closer than 100 feet.**

No Fueling will be Allowed on the Lake.
Fueling on the lake can lead to gasoline spills which affects the water quality of the Lake. Any allowed fueling must be done on land at least 150 feet away from the water’s edge.

Scuba
Every person in the water, outside a designated swimming area, using an underwater breathing device often known as scuba gear, shall display a diver’s flag, having one diagonal white stripe on a red background and capable of being identified at a distance of not less than 100 yards. Such flag shall be placed at or near the point of submergence, and shall constitute a warning that a diver is submerged and may be within a radius of 100 feet from such a flag. Boats shall keep a distance of 100 feet from the diver’s flag. Scuba divers shall keep a distance of 100 feet from dam outlet structures.

Water Skiing
Water skiing will only be allowed on the open use area of the lake (see map on page 16).

Operator
No person shall operate a boat on any waters for towing any person on water skis, aquaplanes, surfboards, inner tubes, or any similar devices, unless in such boat is a person, in addition to the operator, in a position to observe the progress of the person being towed and capable of relaying messages to the operator.

Whenever a water skier, surfboarder, or person engaged in a similar activity or associated equipment is down in the water, the operator or observer of the tow boat shall display in a clearly visible manner an orange or red flag of a size not less than 12 inches square. When the towed person is actively being towed and is not down in the water, and the associated equipment has been retrieved, the flag shall not be displayed.

Lifejackets
Any person on water skis, aquaplanes, surfboards, inner tubes, or similar devices, while being pulled or towed by a boat, shall wear a flotation device.

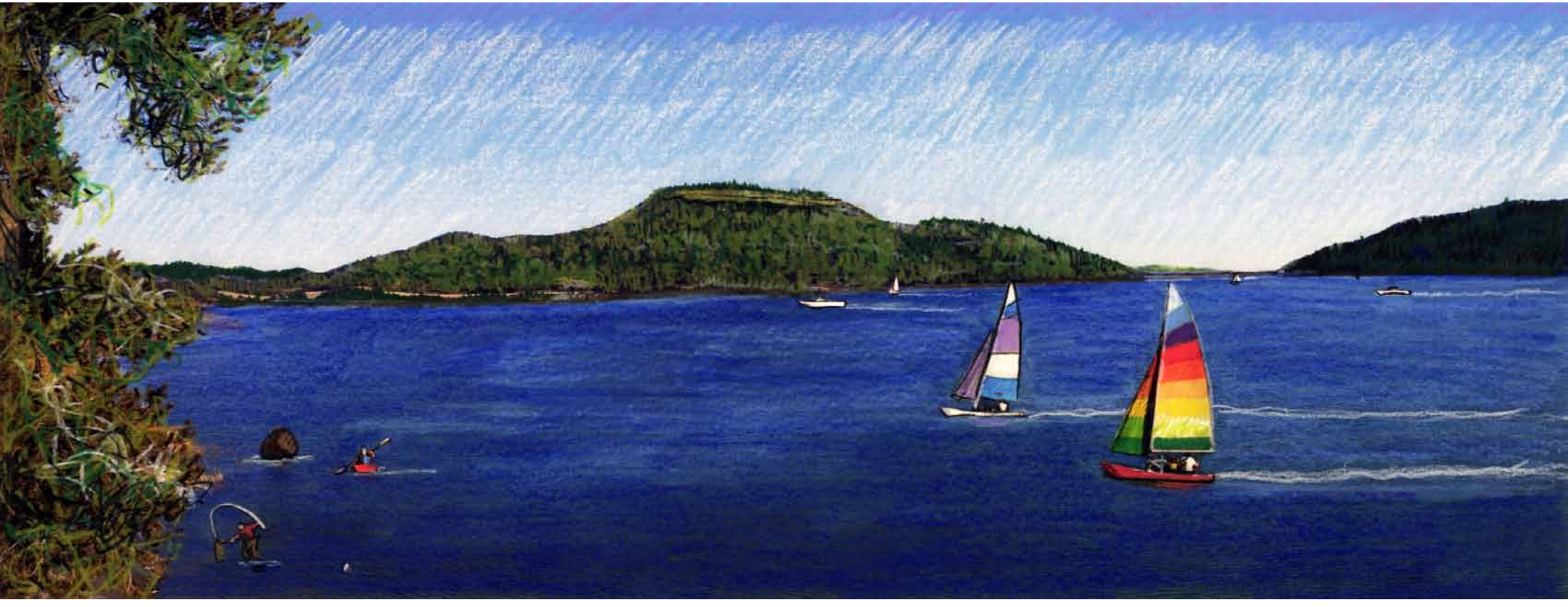
Time and Place
All motorized boats in designated water ski areas shall travel in a counter clockwise direction, except in picking up a downed skier the tow boat shall encircle the skier in such a manner as to keep him in view of the driver of the boat at all times.

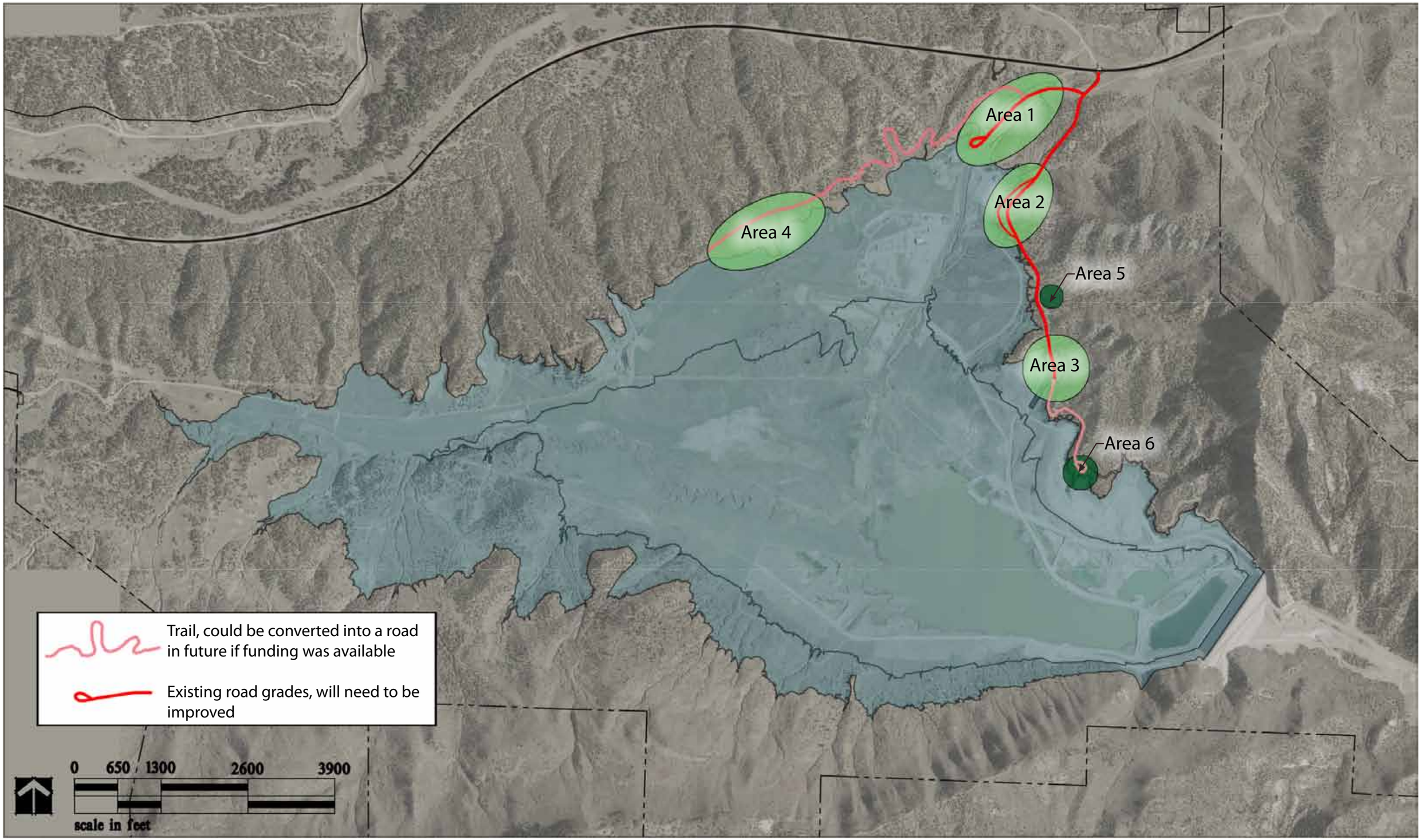
Boating is permitted only between sunrise and sunset (daylight hours).

Wakeless days could be a possibility based on the discretion of the future Recreation Manager.

No person may operate a boat towing a person or persons on water skis, a surfboard or similar device in any areas posted or within 500 feet of entrances, swimming beaches and mooring areas, or within 100 feet of any person swimming, fishing or diving.

Water Quality
See Section 9.1 Water Quality Regulations and Standards




Area 1
Area 2
Area 3
Area 4
Area 5
Area 6
Trail, could be converted into a road in future if funding was available
Existing road grades, will need to be improved
0
650
1300
2600
3900
scale in feet

4.1 Design Guidelines for Shoreline Development

1. Before construction begins, install Best Management Practices (BMPs) to prevent erosion per State requirements, see Section 9.
2. Development should be carefully designed to prevent future water quality issues through sedimentation and erosion.
3. Stormwater runoff must be addressed in any disturbed areas including parking lots. See Section 9 for water quality treatment types.
4. All parking lots and roads must be set back a minimum of 150 feet from water and provide treatment of run-off.
5. All lights to be dark sky compliant and preferably solar powered.
6. All roads to be gravel initially.
7. All structures must compliment the existing landscape.
8. All new landscape should be native vegetation.
9. Parking lots to be tucked into the existing landforms, avoid the visual impact of large, sprawling parking lots.

4.2 Program Elements for Shoreline Development

Area 1: Swim Beach Area

- Family beach with buoys closed to boats
- 209 space parking lot, expandable to 100 additional spaces
- 1 large picnic shelter for groups
- 4 smaller picnic shelters
- Free standing grills
- Trash receptacles
- Bike racks
- A minimum of 300 feet, no wake zone
- Restrooms
- Water platform (16'x16')
- Non-motorized craft launch area
- Trailhead for hikers and bikers
- ADA accessible trail connecting to Area 4. This trail could be converted to a road in the future if funding was available.
- Buffering will be needed to deter the public from accessing the inlet structure

Area 2: Picnic and Fishing Area

- ADA trail
- ADA fishing piers
- Viewpoint on point
- 5 picnic sites
- Restrooms
- 50 parking spaces

Area 3: Boat Ramp Area

- Courtesy dock
- Day use slips with permits for campers, 5 day permit in 30 days
- 30 trailer parking spaces
- 20 car spaces
- ADA accessible restrooms

Area 4: Open Meadow Day Use Area

- ADA accessible trail access, may need a trail bridge over existing drainages
- Picnic space with water access
- 150'x 150' non-motorized launch
- 500' feet no wake zone

Area 5: Boat Ramp Overflow Area (future)

- 100 additional parking spaces

Area 6: Day Use Area South of the Boat Ramp (future)

- Spur off existing road to dam, this road would need to be improved to meet County Road standards.
- Wind sports/non-motorized launch area
- 300 feet no wake zone
- 15 car parking lot
- Scuba trail
- Floating dock (20'x30') potentially built by divers
- Restrooms
- 2 picnic shelters
- Trail access to the water

4.3 Regulations and Management Considerations

All activity will follow the Colorado Land and Water Regulations.

Swim Beach

It shall be prohibited for any person to build or tend any kind of fire on any swim beach.

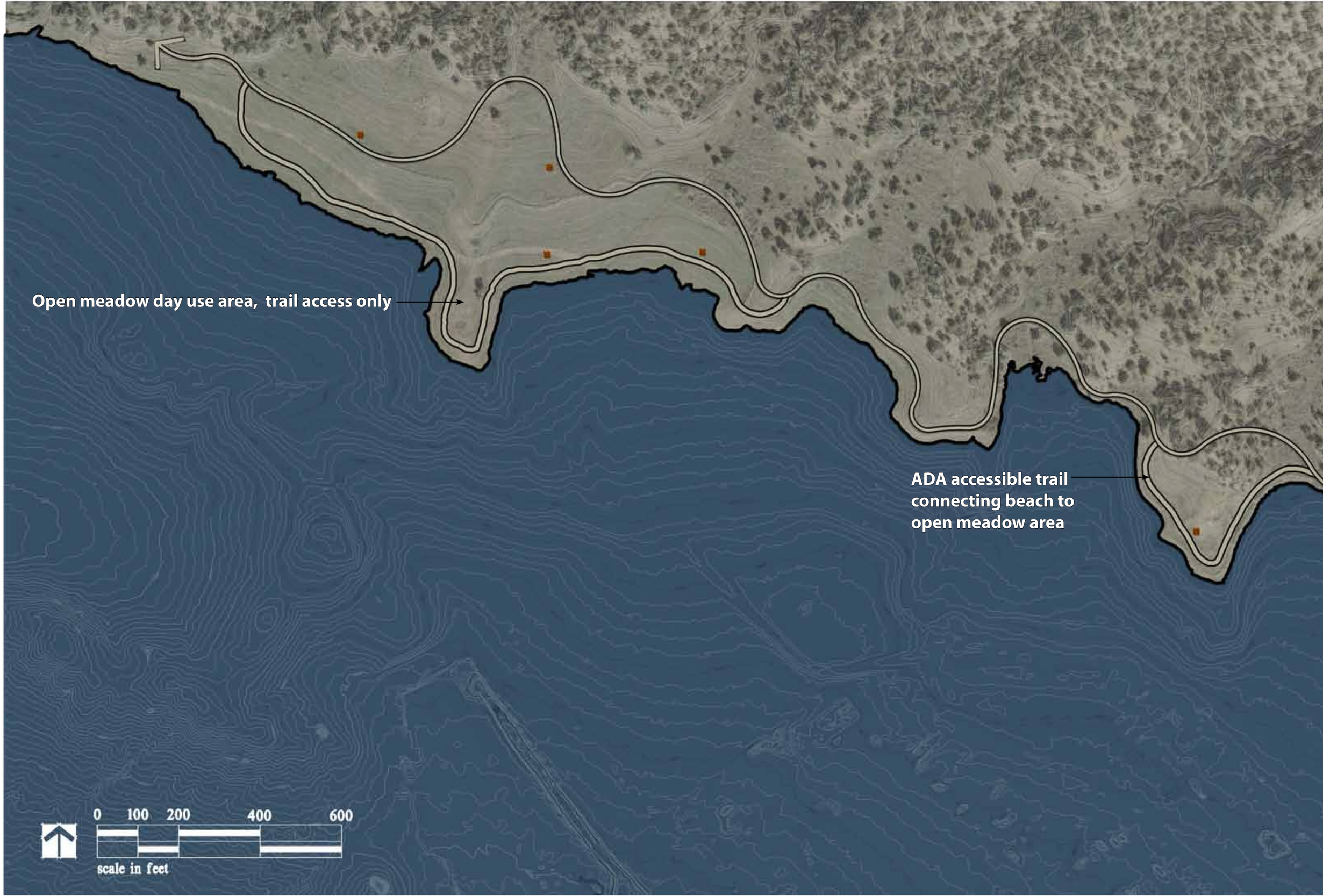
It shall be prohibited for any person to fish from any swim beach.

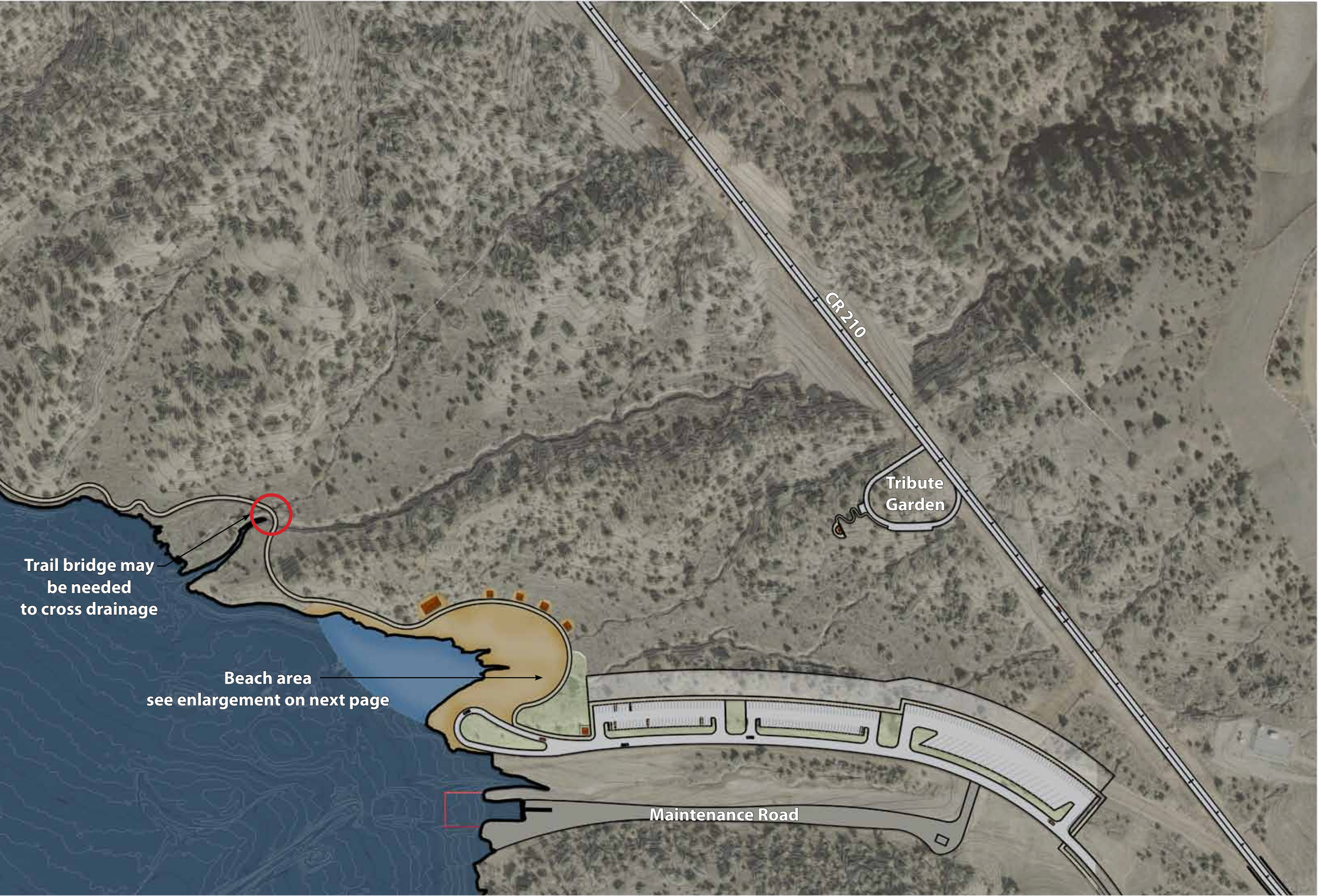
It shall be prohibited for any person to allow any child under the age of 12 years to be on a swim beach unless accompanied by an adult.

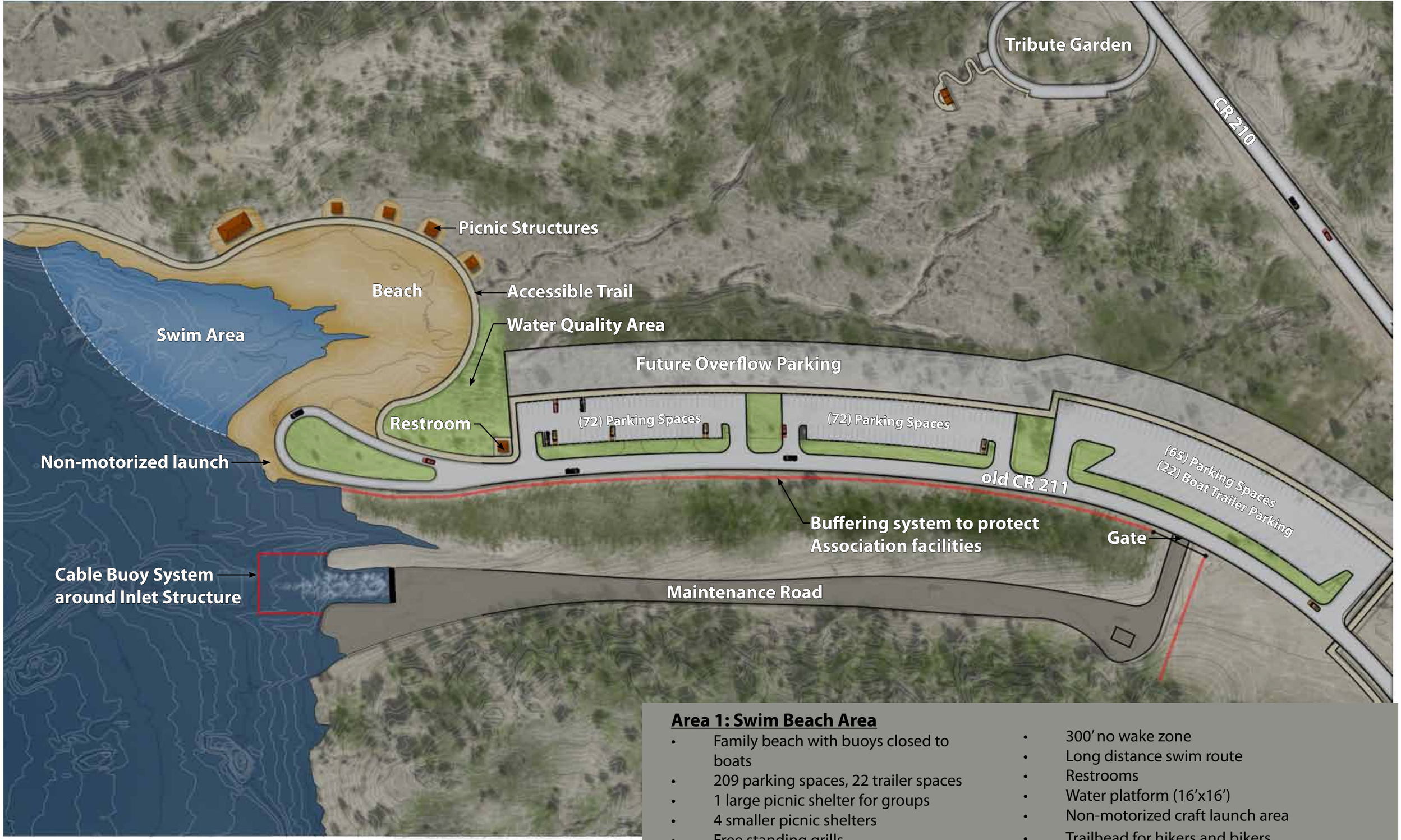
No dogs will be allowed to swim in the designated swim beach area.

Water Quality

See Section 9.1 Water Quality Regulations and Standards.


Open meadow day use area, trail access only
ADA accessible trail connecting beach to open meadow area
0 100 200 400 600
scale in feet


CR 210
Tribute Garden
Trail bridge may be needed to cross drainage
Beach area
see enlargement on next page
Maintenance Road



Area 1: Swim Beach Area

- Family beach with buoys closed to boats
- 209 parking spaces, 22 trailer spaces
- 1 large picnic shelter for groups
- 4 smaller picnic shelters
- Free standing grills
- Trash receptacles
- Bike racks
- 300' no wake zone
- Long distance swim route
- Restrooms
- Water platform (16'x16')
- Non-motorized craft launch area
- Trailhead for hikers and bikers

Concept Sketch of the Swim Beach Area

Area 2: Picnic and Fishing Area

- ADA accessible trail
- ADA accessible fishing access
- Viewpoint on point
- 5 picnic sites
- Restrooms
- 50 parking spaces

Boat Ramp Road

Accessible trail and fishing access

Picnic structure

Lower Road with diagonal parking

Water quality treatment

Restrooms

0 35 70 140 280

scale in feet

Area 6: Day Use Area south of the Boat Ramp (future)

- Spur off existing road to dam
- Wind Sports/Non-Motorized launch area
- 300' no wake zone
- 15 car parking lot
- 150'x 150' clear zone for kite surfing
- Scuba trail, floating dock (20'x 30')
- 1 Restroom Building
- 2 picnic shelters
- Trail access to the water

Note: Parking in this area may be expanded with additional earthwork and site walls. The access road follows the alignment of an existing road, however it would require improvements to meet the minimum standards for public use.


Parking Lot, including
30 boat trailer spaces
25 car parking spaces
Accessible Restroom
(40) permitted boat slips
Courtesy Dock
existing boat ramp
Area 3: Boat Ramp at high water
• Courtesy dock
• Day use slips with permits for campers, 5 day permit in 30 days
• 30 trailer parking spaces
• ADA accessible restroom
0 50 100 200 300
scale in feet

Parking Lot, including
30 boat trailer spaces
25 car parking spaces

Accessible Restroom

existing boat ramp

Access docks at low water

(40) permitted boat slips

Courtesy Dock

Area 3: Boat Ramp at low water

- Courtesy dock
- Day use slips with permits for campers, 5 day permit in 30 days
- 30 trailer parking spaces
- ADA accessible restroom

0 50 100 200 300

scale in feet

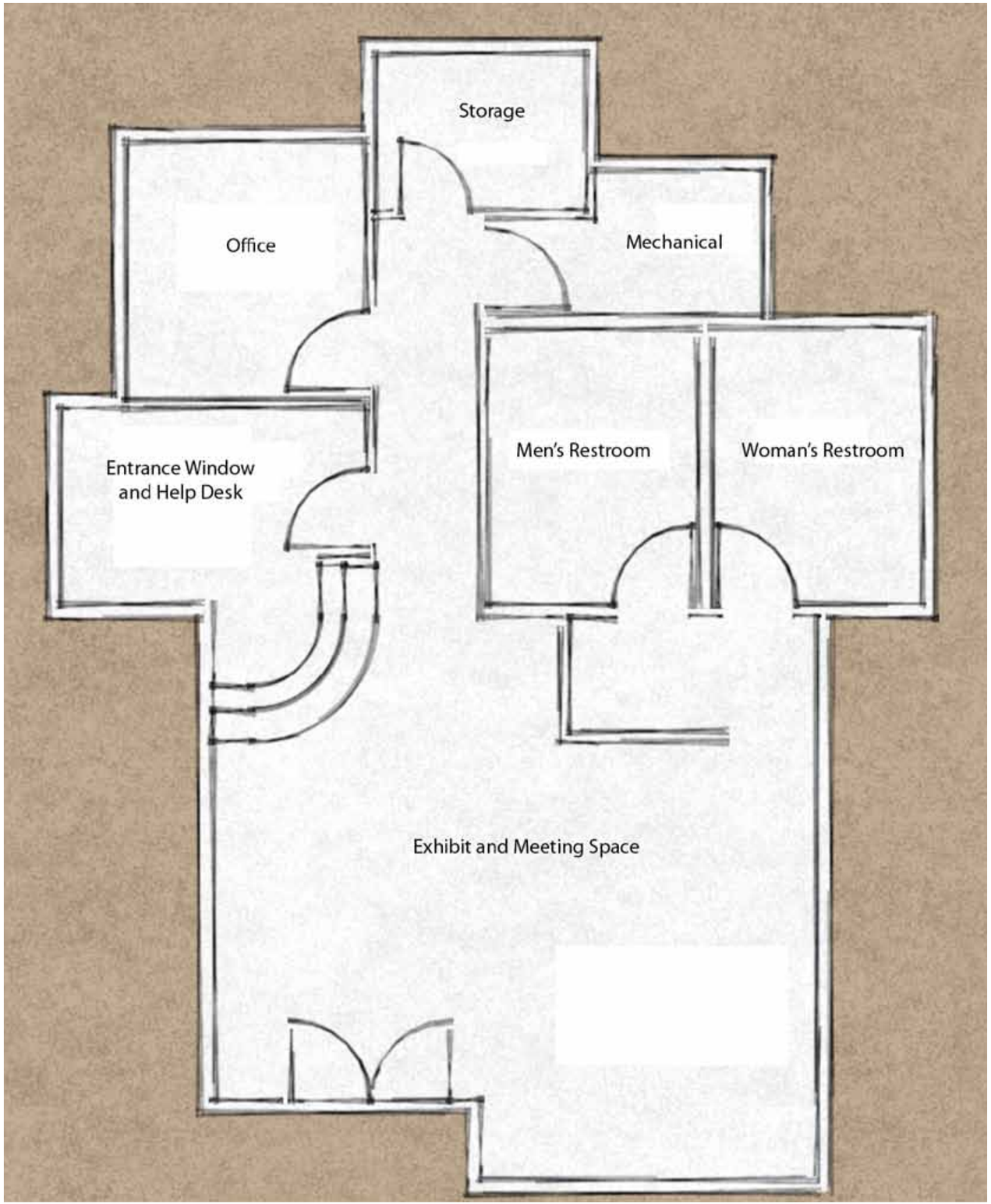
Section 5: Entrance Station and Other Structures

An administration building would also serve as an entry station and visitor center would be located off of CR 210 and would act as the primary access point into the park. This facility would provide multiple functions serving both the park staff and visitors. Phasing for this facility may include expansion and/or temporary trailers to expand function as the lake development grows and funding is obtained.

Entrance Station - West Elevation

Entrance Station - North Elevation

Entrance Station - South Elevation



5.1 Design Guidelines for Structures

1. All structures must compliment the existing landscape, for instance, do not use bright colors or reflective materials.
2. Sustainable building method should be used when appropriate. These include renewable energy, local building materials, efficient heating systems, and low flow water fixtures.
3. Use natural materials such as rough sandstone blocks. Additional materials that would fit into the site would include concrete block (smooth face or split face), weathering steel, rough sawn wood, and rammed earth.
4. Use fire resistant materials.
5. Use low maintenance and vandal proof materials.
6. Utilities should be underground.
7. For parking lot guidelines, see Section 4.1.
8. Utility locations must be verified (including the gas and water pipe line) before the a entrance station is constructed.

5.2 Program Elements for Entrance Station Area

The Entrance Station would include:

- 15 parking spaces
- Restrooms
- Exhibit/meeting space for interpretation displays
- Entrance window
- Help desk
- Office
- Storage room
- Utilities including water, sewer, and electrical

Invasive Species Inspection Area would include:

- Stacking space for vehicles with trailers
- Separate areas for inspections and decontamination
- Access to hot water
- Refer to section 3.2 for procedural requirements at Lake Nighthorse

Fish Cleaning Station would include:

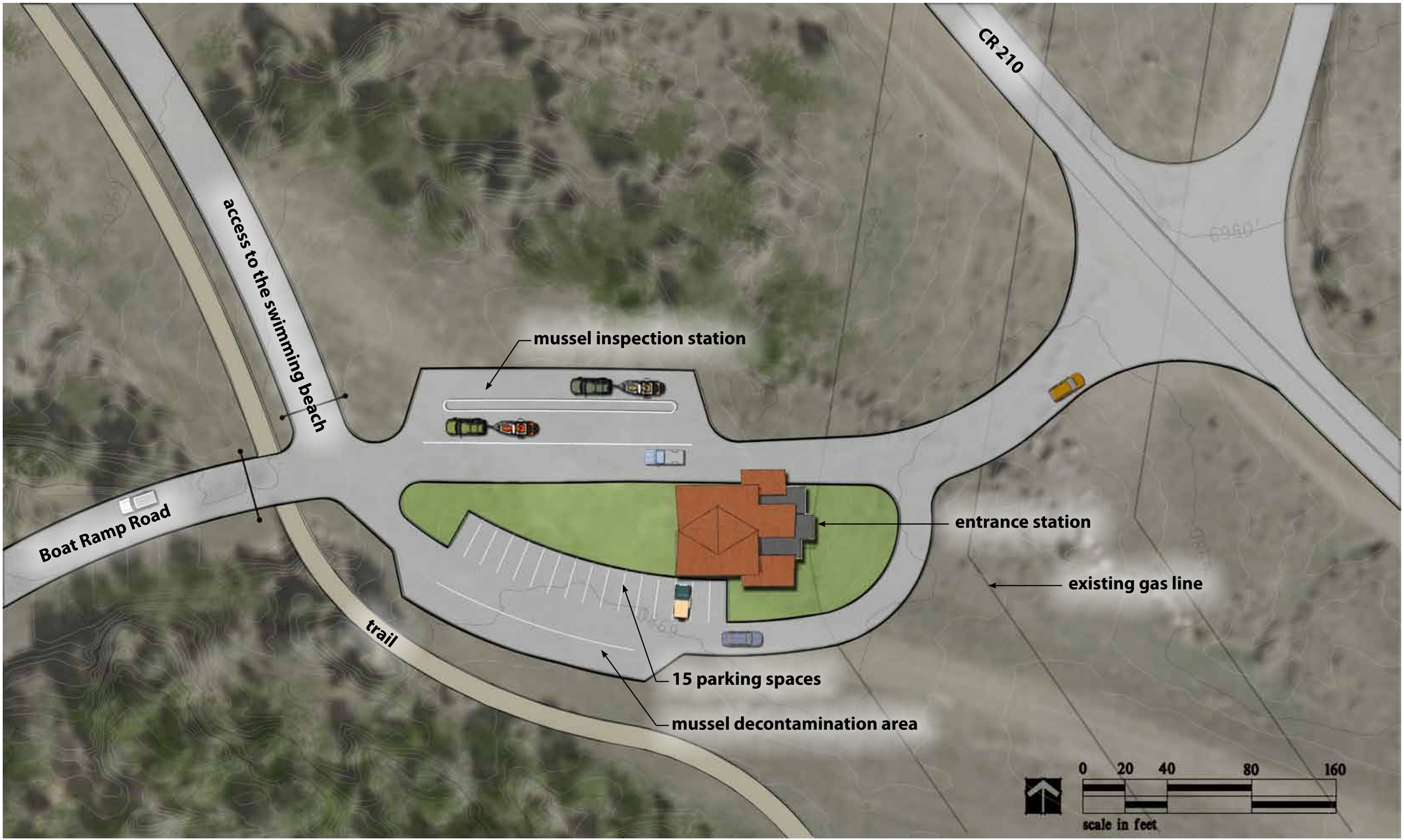
- Contained waste system that would either be pumped out or tied into a sewer system.

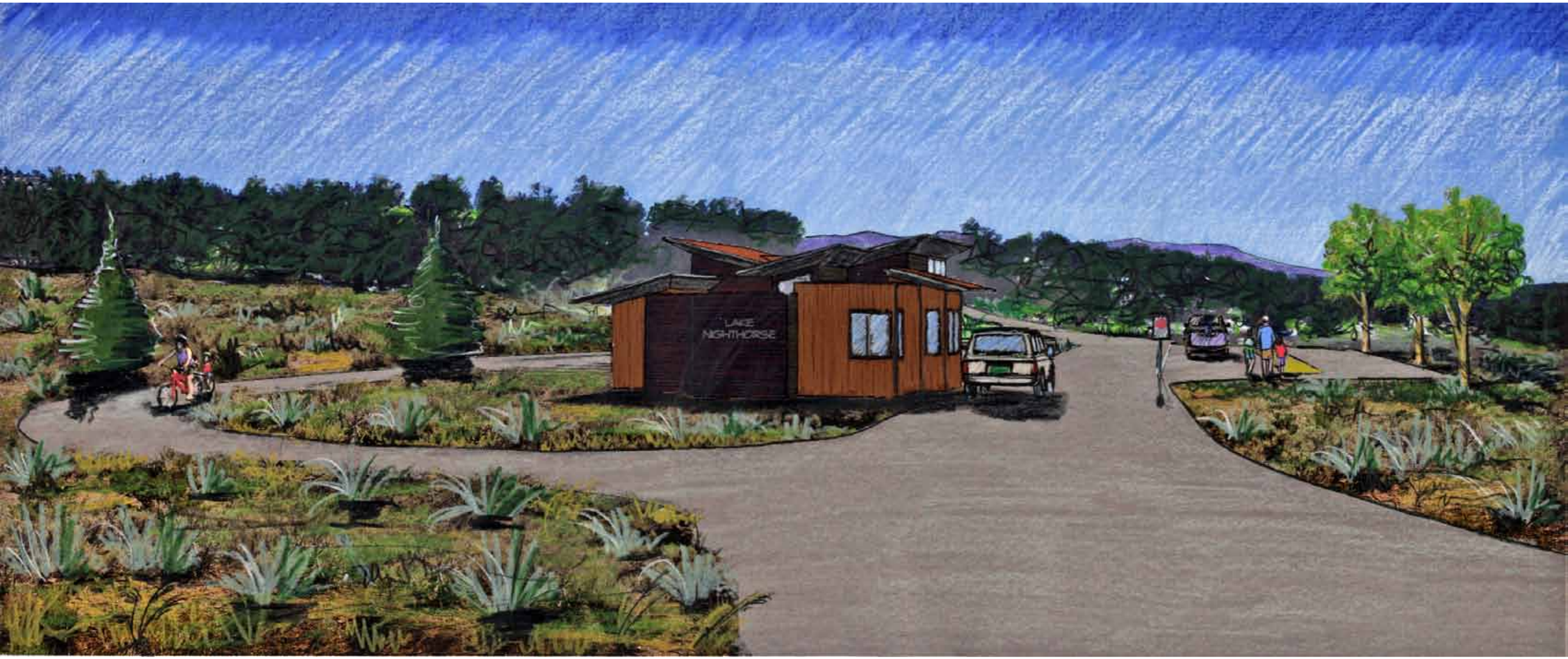
The goal of a fish cleaning station would be two-fold. It would reduce the attraction for wildlife to the fish waste and also avoid the fish waste from entering the lake. Fish waste can contain pollutants that would adversely affect the water quality of the lake.

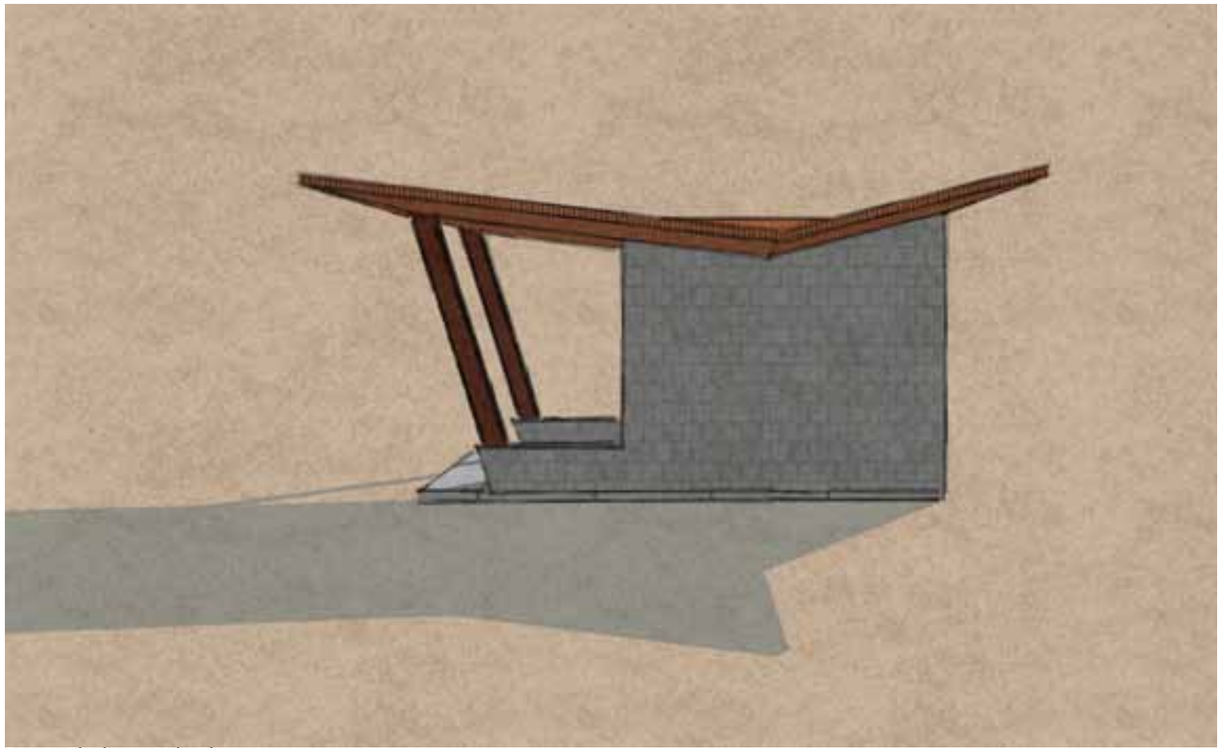
Additional structures may be needed in the future including administrative space near the marina and maintenance storage. A boat house for kayaks, canoes, and other boats would support clubs and programs near the reservoir. A boat house is not included in the cost estimate.

5.3 Regulations and Management Considerations

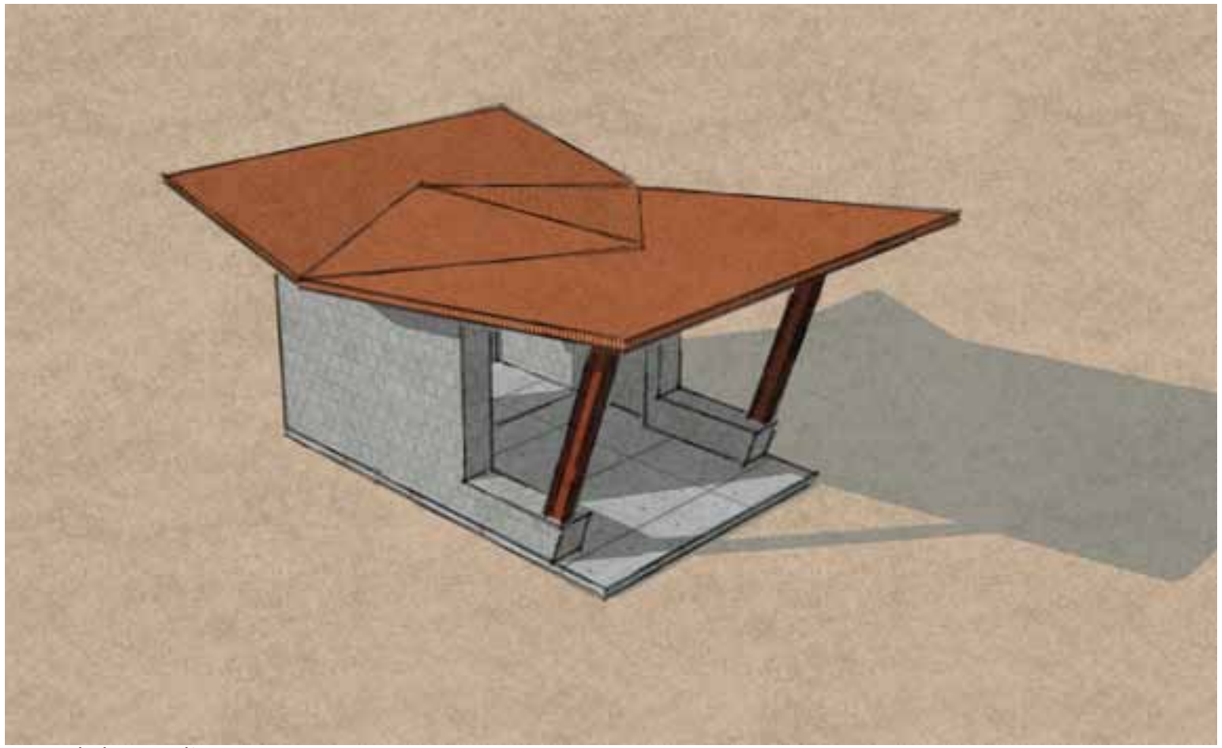
To get the lake open as quickly as possible, a trailer could be utilized as a temporary entrance station.


CR 210
access to the swimming beach
mussel inspection station
Boat Ramp Road
trail
entrance station
existing gas line
15 parking spaces
mussel decontamination area
0 20 40 80 160
scale in feet

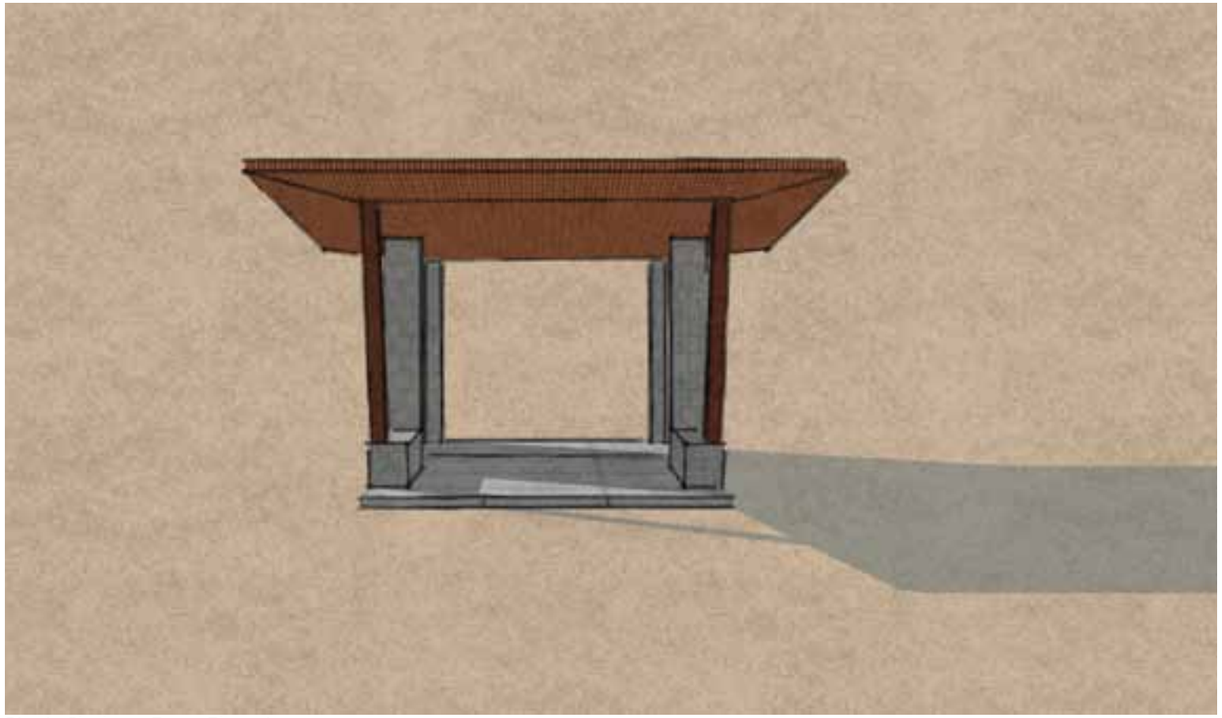

LAKE
NIGHTHORSE



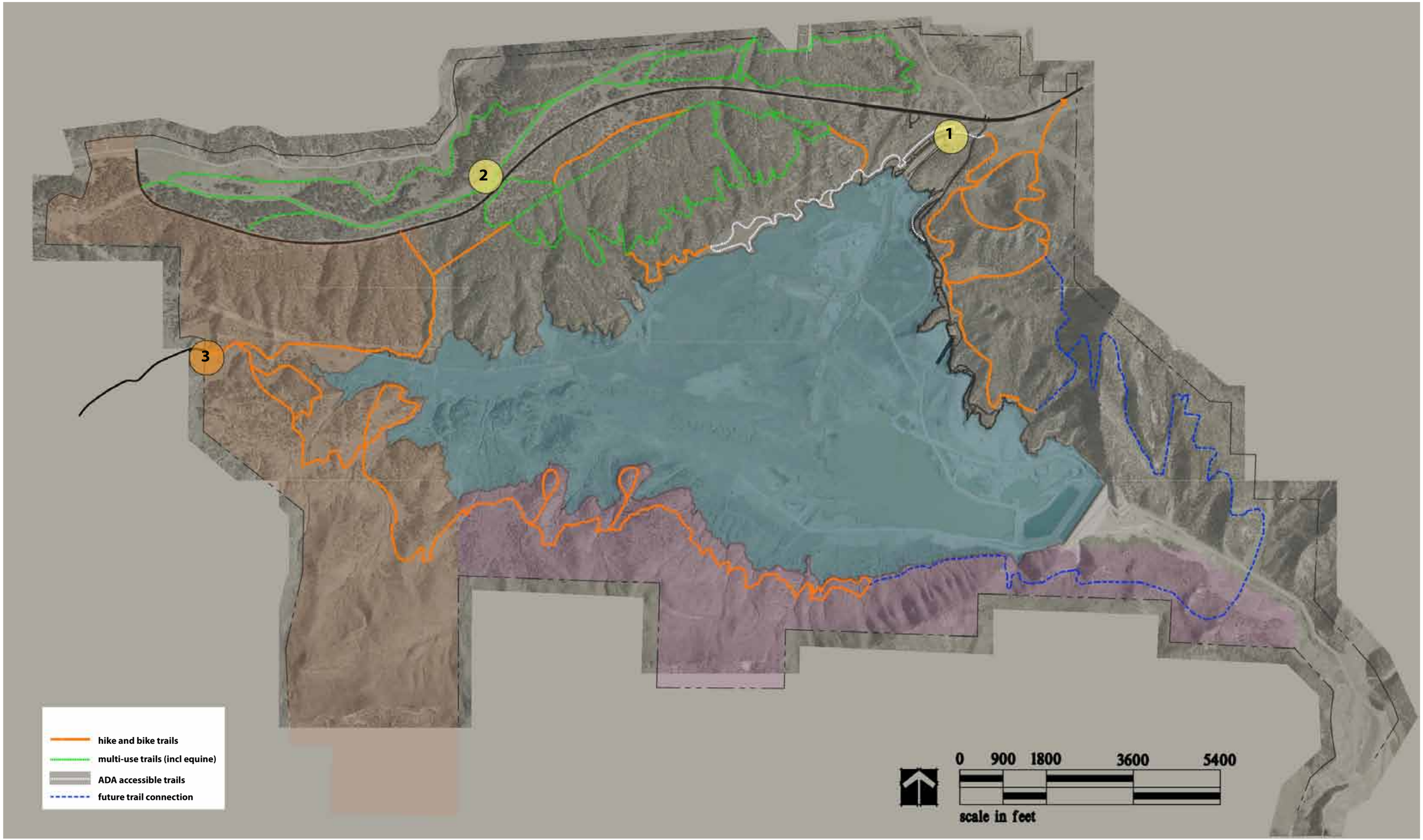
Picnic Shelter - Side Elevation



Picnic Shelter - Bird's Eye View



Picnic Shelter - Front Elevation


1
2
3
hike and bike trails
multi-use trails (incl equine)
ADA accessible trails
future trail connection
0 900 1800 3600 5400
scale in feet

6.1 Design Guidelines for Trails

1. Before trail construction begins, install Best Management Practices (BMPs) to prevent erosion.
2. Trails should be carefully designed to prevent future water quality issues through sedimentation and erosion.
3. Trail construction to be completed during dry parts of the years when soil moisture is at its lowest.
4. Trail drainage will carry water across the trail, under the trail, or will be intercepted before it hits the trail in a swale.
5. Stabilize all disturbed slopes with vegetation after trail construction.
6. Always attempt to maintain natural drainages.
7. Most trails should be designed to be multiple-use trails (hike, bike, equestrian).
8. Trail along south side of reservoir hiking only.
9. Multiple-use on east side to include cross-country skiing use in winter.
10. Trails on north side of CR 210 to be along utility corridors creating looped trails.
11. Incorporate old ranch and service roads into trail network where feasible.
12. Look for opportunities to link Lake Nighthorse trails to other outside trail systems. (La Posta Rd., Animas Airpark, Centennial Plaza area, Bodo Park).
13. All trail locations subject to working around cultural and natural resource site restrictions.
14. Outside entity to work on getting access from Southern Utes to have hiking trail along south ridgeline on their land.
15. Need to provide wheelchair accessible trail segments from trailheads as much as topography allows.
16. Dogs would need to be kept on 6 foot maximum leash.
17. Minimize social trails with signage and fencing.
18. Detailed signage and wayfinding system.
19. Coordinate with Trails 2000 about trail design and construction.

Trail Classes

There are five Trail Classes (per the US Forest Service), ranging from the least developed to the most developed:

Trail Class 1 Attributes: Minimally Developed
Structures minimal to nonexistent.
Drainage typically provided without structures.
Natural fords.
Typically no bridges.

Trail Class 2 Attributes: Moderately Developed
Tread continuous and discernible, but narrow and rough.
Single lane, with minor allowances constructed for passing.
Typically native materials.

Trail Class 3 Attributes: Developed
Tread continuous and obvious.
Single lane, with allowances constructed for passing where required by traffic volume in places where there is no reasonable opportunity to pass.
Native or imported materials.

Trail Class 4 Attributes: Highly Developed
Tread wide and relatively smooth, with few irregularities.
Single lane, with allowances constructed for passing where required by traffic volume in places where there is no reasonable opportunity to pass.
Double lane where traffic volume is high and passing is frequent.
Native or imported materials.
May be hardened.

Trail Class 5 Attributes: Fully Developed
Tread wide, firm, stable, and generally uniform.
Single lane, with frequent turnouts where traffic volume is low to moderate.
Double lane where traffic volume is moderate to high.
Commonly hardened with concrete or other imported material.

Drainage Design for Trails

All trails must drain correctly and not adversely affect water quality in the lake. Stormwater must be carried across the trail, under the trail, or will be intercepted before it hits the trail in a swale. If water is being diverted directly towards the lake, a vegetated buffer will need to be planted. Potential drainage methods are as follows:

Out-sloping and In-sloping - This method consists of cross-sloping the trail at a 1-2% slope. Out-sloping is where the trail is sloped with the existing hillside and in-sloping is sloping the trail back against the natural hillside.

Swales - A swale is a depression across a slope that can be as deep or shallow as needed to handle the amount of runoff. Swales can run parallel to a trail.

Water Bars - Water bars are angled across the trail to divert runoff. They can be constructed with rock or log barriers across the trail or could be a small channel. Typically, the greater slope of the trail, the greater need for water bars across it. Water bars should be installed at a 30-45 degree angle perpendicular from the direction of the trail. They should extend at least 1 foot on either side of the trail. When using peeled logs, use at least 10" inch diameter logs and secured in place with boulders.

Reverse Grade - Reverse grades are short dips and rises in the trail to allow water to drain off surface.

Culverts - Culverts are a pipe placed under a trail to allow drainage to cross under the trail. Culverts need to be sized for the potential maximum flow and sloped 6% to avoid silt build-up within the pipe. A culvert should be used where a trail crosses an existing drainage.

Fencing, Railing, and Curbs - Social trailing has the potential to damage buffer vegetation and cause erosion. Cable railing, fencing, and curbing can be used to direct pedestrian access to designated paths. As visitation increases, high use trails and paths should be considered for transition to a hardened surface, such as soil cement or concrete.

6.2 Program Elements for Trails

Build two trailheads and possibly one in the future providing access from County Road 211.

Trailhead 1: Swim Beach

- 209 shared use parking spaces

Trailhead 2: Off of County Road 210

- 25 cars plus 15 trailers
- Restroom
- Horse grooming station is meant to allow horse owners to groom their horse prior to riding it on public lands to remove the potential of spreading noxious weeds. It is a volunteer program that promotes good stewardship of the land.

Trailhead 3: West boundary off of County Road 211 (future)

- 10 hiker/biker car parking at property boundary
- Bikes are only allowed on the old CR 211 within the west wildlife area.
- Trailhead will need to be coordinated with USBR, La Plata County, Recreation Manager, and the surrounding neighbors.

Trail Types:

Green: Multiple use trail (5' wide) that will include all uses (hike, bike, and equestrian). 13.4 miles
Orange: Single track trail that will allow hiking and biking. 15.2 miles, some areas will be subject to wildlife closure from May 15 to November 15 due to an agreement with the CDOW.
White: ADA accessible trail, a minimum of 5' wide. 2.4 miles
Blue: Future trail to complete a loop around the lake. Coordination will be needed between the USBR, Association, and future recreation manager to design a safe route across the outfall.

Design Parameters (FSH 2309.18, Section 23.13, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent[1]. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use BICYCLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	Single Lane	6" – 12"	12" – 24"	18" – 36"	24" – 48"	36" – 60"
	Double Lane	36" – 48"	36" – 48"	36" – 48"	48" – 84"	72" – 120"
	Structures (Minimum Width)	18"	18"	36"	48"	60"
Design Surface[2]	Type	Native, ungraded May be continuously rough Sections of soft or unstable tread on grades < 5% may be common and continuous	Native, with limited grading May be continuously rough Sections of soft or unstable tread on grades < 5% may be common	Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough Sections of soft or unstable tread on grades < 5% may be present, but not common	Native, with improved sections of borrow or imported materials and routine grading Stable, with minor roughness	Likely imported material and routine grading Uniform, firm, and stable
	Protrusions	≤ 24" Likely common and continuous	≤ 6" May be common and continuous	≤ 3" May be common, but not continuous	≤ 3" Uncommon and not continuous	No protrusions
	Obstacles (Maximum Height)	24"	12"	10"	8"	No obstacles
Design Grade [2]	Target Grade	5% – 20%	5% – 12%	3% – 10%	2% – 8%	2% – 5%
	Short Pitch Maximum	30% 50% on downhill segments only	25% 35% on downhill segments only	15%	10%	8%
	Maximum Pitch Density	20% – 30% of trail	10% – 30% of trail	10% – 20% of trail	5% – 10% of trail	0% – 5% of trail
Design Cross Slope	Target Cross Slope	5% – 10%	5% – 8%	3% – 8%	3% – 5%	2% – 3%
	Maximum Cross Slope	10%	10%	8%	5%	5%
Design Clearing	Height	6'	6' – 8'	8'	8' - 9'	8' - 9'
	Width	24" – 36" Some vegetation may encroach into clearing area	36" – 48" Some light vegetation may encroach into clearing area	60" – 72"	72" – 96"	72" – 96"
	Shoulder Clearance	0' – 12"	6" – 12"	6" – 12"	6" – 18"	12" – 18"
Design Turn	Radius	2' – 3'	3' – 6'	4' – 8'	8' – 10'	8' - 12'

[1] For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Design Parameters (FSH 2309.18, Section 23.11, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent[1]. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use HIKER/PEDESTRIAN		Trail Class 1	Trail Class 2	Trail Class 3 [2]	Trail Class 4 [2]	Trail Class 5 [2]
Design Tread Width	Wilderness (Single Lane)	0" – 12"	6" – 18"	12" – 24" Exception: may be 36" – 48" at steep side slopes	18" – 24" Exception: may be 36" – 48" at steep side slopes	Not applicable
	Non-Wilderness (Single Lane)	0" – 12"	6" – 18"	18" – 36"	24" – 60"	36" – 72"
	Non-Wilderness (Double Lane)	36"	36"	36" – 60"	48" – 72"	72" – 120"
	Structures (Minimum Width)	18"	18"	18"	36"	36"
Design Surface[3]	Type	Native, ungraded May be continuously rough	Native, limited grading May be continuously rough	Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough	Native with improved sections of borrow or imported material, and routine grading Minor roughness	Likely imported material, and routine grading Uniform, firm, and stable
	Protrusions	≤ 24" Likely common and continuous	≤ 6" May be common and continuous	≤ 3" May be common, not continuous	≤ 3 " Uncommon, not continuous	No protrusions
	Obstacles (Maximum Height)	24"	14"	10"	8"	No obstacles
Design Grade [3]	Target Grade	5% – 25%	5% – 18%	3% – 12%	2% – 10%	2% – 5%
	Short Pitch Maximum	40%	35%	25%	15%	5% FSTAG: 5% – 12%[2]
	Maximum Pitch Density	20% – 40% of trail	20% – 30% of trail	10% – 20% of trail	5% – 20% of trail	0% – 5% of trail
Design Cross Slope	Target Cross Slope	Natural side slope	5% – 20%	5% – 10%	3% – 7%	2% – 3% (or crowned)
	Maximum Cross Slope	Natural side slope	25%	15%	10%	3%
Design Clearing	Height	6'	6' – 7'	7' – 8'	8' – 10'	8' – 10'
	Width	≥ 24" Some vegetation may encroach into clearing area	24" – 48" Some light vegetation may encroach into clearing area	36" – 60"	48" – 72"	60" – 72"
	Shoulder Clearance	3" – 6"	6" – 12"	12" – 18"	12" – 18"	12" – 24"
Design Turn	Radius	No minimum	2' – 3'	3' – 6'	4' – 8'	6' – 8'

[1] For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

[2] Trail Classes 3, 4, and 5, in particular, have the potential to provide accessible passage. If assessing or designing trails for accessibility, refer to the Forest Service Trail Accessibility Guidelines (FSTAG) for more specific technical provisions and tolerances (FSM 2350).

[3] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Design Parameters (FSH 2309.18, Section 23.12, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent[1]. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use: PACK AND SADDLE		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Tread Width	Wilderness (Single Lane)	Typically not designed or actively managed for equestrians, although use may be allowed	12" – 18" May be up to 48" along steep side slopes 48" – 60" or greater along precipices	18" – 24" May be up to 48" along steep side slopes 48" – 60" or greater along precipices	24" May be up to 48" along steep side slopes 48" – 60" or greater along precipices	Typically not designed or actively managed for equestrians, although use may be allowed
	Non-Wilderness (Single Lane)		12" – 24" May be up to 48" along steep side slopes 48" – 60" or greater along precipices	18" – 48" 48" – 60" or greater along precipices	24" – 96" 48" – 60" or greater along precipices	
	Non-Wilderness (Double Lane)		60"	60" – 84"	84" – 120"	
	Structures (Minimum Width)		Other than -bridges: 36" Bridges without handrails: 60" Bridges with handrails: 84" clear width	Other than bridges: 36" Bridges without handrails: 60" Bridges with handrails: 84" clear width	Other than bridges: 36" Bridges without handrails: 60" Bridges with handrails: 84" clear width	
Design Surface[2]	Type		Native, with limited grading May be frequently rough	Native, with some on-site borrow or imported material where needed for stabilization and occasional grading Intermittently rough	Native, with improved sections of borrow or imported material and routine grading Minor roughness	
	Protrusions		≤ 6" May be common and continuous	≤ 3" May be common, not continuous	≤ 3" Uncommon, not continuous	
	Obstacles (Maximum Height)		12"	6"	3"	
Design Grade[2]	Target Grade		5% – 20%	3% – 12%	2% – 10%	
	Short Pitch Maximum		30%	20%	15%	
	Maximum Pitch Density		15% – 20% of trail	5% – 15% of trail	5% – 10% of trail	
Design Cross Slope	Target Cross Slope		5% – 10%	3% – 5%	0% – 5%	
	Maximum Cross Slope		10%	8%	5%	
Design Clearing	Height		8' – 10'	10'	10' – 12'	
	Width		72" Some light vegetation may encroach into clearing area	72" – 96"	96"	
	Shoulder Clearance		6" – 12" Pack clearance: 36" x 36"	12" – 18" Pack clearance: 36" x 36"	12" – 18" Pack clearance: 36" x 36"	
Design Turn	Radius		4' – 5'	5' – 8'	6' – 10'	

[1] For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

[2] The determination of trail-specific Design Grade, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential, and other factors contributing to surface stability and overall sustainability of the trail.

Design Parameters (FSH 2309.18, Section 23.31, Exhibit 01)

Design Parameters are technical guidelines for the survey, design, construction, maintenance, and assessment of National Forest System trails, based on their Designed Use and Trail Class and consistent with their management intent[1]. Local deviations from any Design Parameter may be established based on trail-specific conditions, topography, or other factors, provided that the deviations are consistent with the general intent of the applicable Trail Class.

Designed Use: CROSS-COUNTRY SKI		Trail Class 1	Trail Class 2	Trail Class 3	Trail Class 4	Trail Class 5
Design Groomed Width	Single Lane	Typically not designed or actively managed for cross-country skiing, allow use may be allowed	2' – 4' Typically not groomed	6' – 8' Or width of grooming equipment	8'– 10" Or width of grooming equipment)	Typically not designed or actively managed for cross-country skiing, allow use may be allowed
	Double Lane		6' – 8'	8' – 12'	12' – 16'	
	Structures (Minimum Width)		36"	36"	36"	
Design Grooming and Surface[2]	Type		Generally no machine grooming	May receive occasional machine grooming for snow compaction and track setting	Regular machine grooming for snow compaction and track setting	
	Protrusions		No protrusions	No protrusions	No protrusions	
	Obstacles (Maximum Height)		12" Uncommon	8" Uncommon (no obstacles if machine groomed)	No obstacles	
Design Grade[2]	Target Grade		5% – 15%	2% – 10%	0% – 8%	
	Short Pitch Maximum		25%	20%	12%	
	Maximum Pitch Density		10% – 20% of trail	5% – 15% of trail	0% – 10% of trail	
Design Cross Slope	Target Cross Slope		0% – 10%	0% – 5%	0% – 5%	
	Maximum Cross Slope (For up to 50')		20%	15%	10%	
Design Clearing	Height (Above normal maximum snow level)		6' – 8'	8' Or height of grooming equipment	8' – 10'	
	Width		24" – 60" Light vegetation may encroach into clearing area	72" – 120"' Light vegetation may encroach into clearing area	96"' – 168" Widen clearing at turns or if increased sight distance needed	
	Shoulder Clearance		0" – 6"	0" – 12"	0" – 24"	
Design Turn	Radius		8' – 10'	15' – 20' Or to accommodate grooming equipment	≥ 25'	

[1] For definitions of Design Parameter attributes (e.g., Design Tread Width and Short Pitch Maximum) see FSH 2309.18, section 05.

[2] The determination of trail-specific Design Grades, Design Surface, and other Design Parameters should be based upon soils, hydrological conditions, use levels, erosion potential and other factors contributing to surface stability and overall sustainability of the trail.

6.3 Regulations and Management Considerations

Trails to be closed during the wet portions of the year.

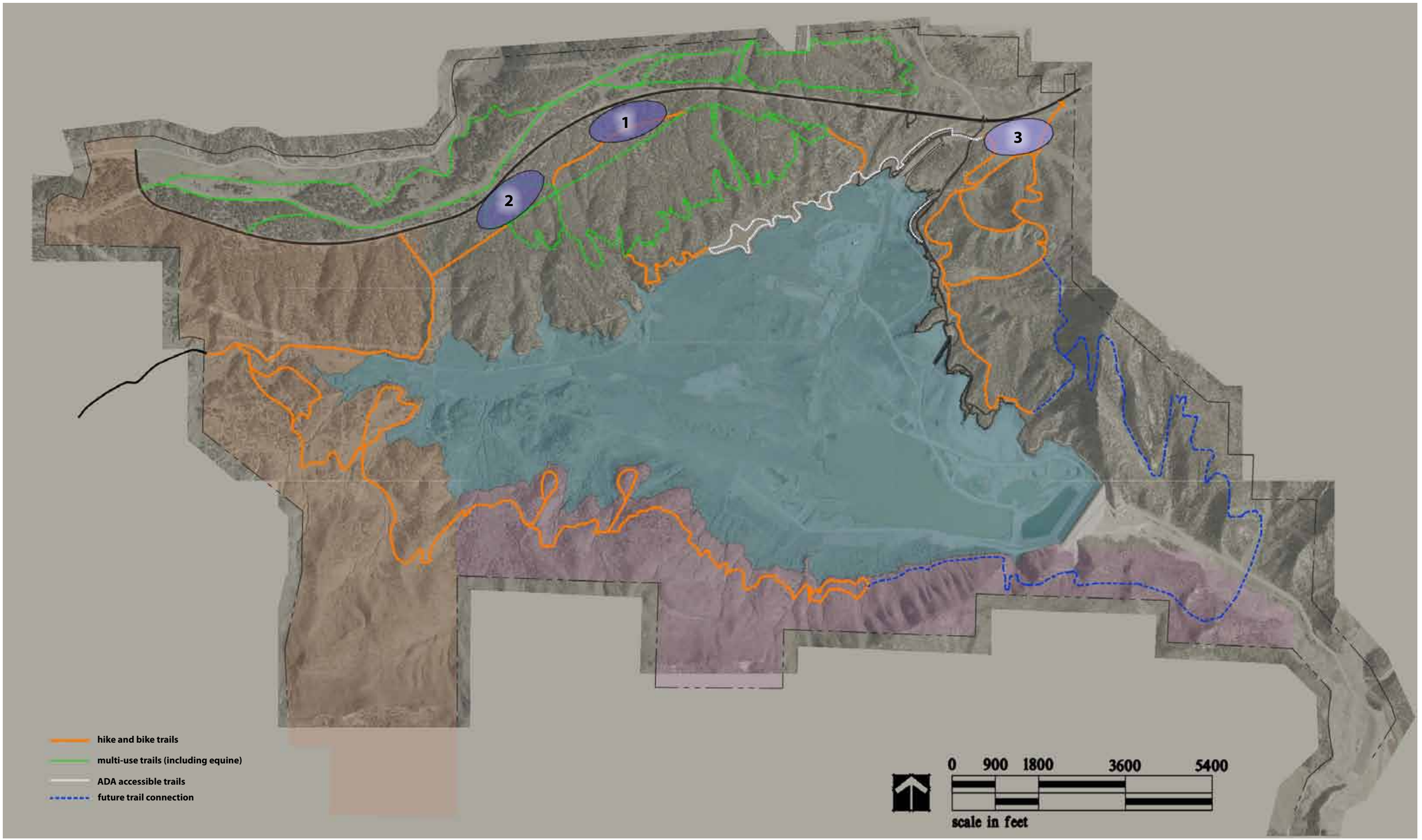
Weed Management for Horses

Colorado is a part of the Regional Weed Free Forage program through the Department of Agriculture. The purpose of the Certified Weed Free Forage program is to inspect forage or mulch before it is harvested to verify that there are no propagative plant parts of noxious weeds. The use of certified weed free forage and mulch is intended to reduce the spread of noxious weeds on public lands or other areas where forage or mulch is used. Legislation authorizing the Colorado Department of Agriculture to create a Weed Free Forage Certification program and perform requested inspections was adopted by the Colorado General Assembly in 1993 (Title 35, Article 27.5 Colorado Revised Statutes, 1997 Supp., Weed Free Forage Crop Certification Act.) The Bureau of Reclamation requires the use of regional weed free forage on all of the land.

Several potential locations were explored for providing campgrounds with the general criteria as follows.

- Adequate space and gentle grades for accommodating phases of 25-75 camp sites within each campground.
- Consideration of potential visual impacts caused by the campground and desire for an attractive natural campground setting.
- Access to facilities and trails.
- Consideration of potential cultural resource impacts.

The steep topography surrounding the reservoir limits the potential sites, especially sites closer to the reservoir. Areas one and two are most preferable. These sites would be located within ponderosa pine meadows and have ample space for expansion. Grading would be minimal. Site 3 is closer to the boating facilities, however, faces challenges from poor soil conditions, utility easements, visual impacts, and existing cultural resources. It is expected that camping would be provided in phases relative to available funding and management potential. A variety of camping configurations is described including RV, trailer, tent spaces, group sites and walk-in tent sites.


1
2
3
hike and bike trails
multi-use trails (including equine)
ADA accessible trails
future trail connection
0 900 1800 3600 5400
scale in feet

7.1 Design Guidelines for Campgrounds

1. All campgrounds should initially be built very simple with no utilities and gravel roads. In the future when funds are available and utilities may be easier to access, the campgrounds could be improved.
2. Campgrounds will have single loops.
3. Campgrounds should be designed to fit into the natural landscape, that includes tucking sites into trees and working with the existing topography.
4. Campgrounds should be of lower density with at least 100' between sites.
5. Electric utilities should be supplied where possible to limit generators subject to noise limits.
6. Supply water for drinking (tank, well, or public).
7. Defensible space management for larger area and higher use.
8. No beetle fuel signage.
9. Accommodate reservations.
10. Install underground utilities where possible.
11. Preserve visual quality.
12. Aim to buffer and screen County Road 210.
13. Wildlife resistant trash receptacles.
14. No dump station, utilize the facilities within the City limits.

7.2 Program Elements for Campgrounds

Area 1: Ponderosa Meadow

CR 210 access
40-50 sites
80'-100' minimum between sites
3 comfort stations (vault toilets)
4 picnic shelters
gravel roads
no utilities

Area 2: Ponderosa Meadow Location 2

CR 210 access
40-50 sites
80'-100' minimum between sites
3 comfort stations (vault toilets)
4 picnic shelters

Area 3: Off Boat Ramp Road Entry (future)

20-30 sites
Utilities (water, electric, septic)
1 comfort station
Needs further study for site compatibility

7.3 Regulations and Management Considerations

All activity will follow the Colorado Land and Water Regulations.

Camping is contingent on a study of carrying capacity and impacts to overall visitor experience, wildlife, adjacent neighbors, scenic quality, and no water quality impacts.

24 hours, 7 days a week managing and patrol with a host at each campground.

Noise limits compatible with City regulations.

Quiet hours would be from 10 pm to 6 am.

High level of maintenance and cleanliness which would help with quick repairs.

It shall be prohibited to camp or to park a motor vehicle, trailer or camper with the intention (or for the purpose) of camping other than on areas designated for camping or to leave a set-up camp, motor vehicle, trailer or camper unattended for more than twenty-four (24) hours, unless otherwise posted. No person may camp or park a motor vehicle, trailer or camper for more than fourteen (14) days in any forty-five (45) day period, except that extensions totaling no more than a maximum of fourteen (14) additional days may be permitted.

Littering

It shall be prohibited to leave any residentially or commercially generated garbage or trash or any other litter generated outside the area.

Fires

Wood will be provided for sale which would restrict collecting.

Fire hazard mitigation and management plans must be in place.

It shall be prohibited to build or tend fires outside of grills or fire rings.

It shall be prohibited to allow a fire to burn in a careless manner, to leave any fire unattended, or to fail to completely extinguish any fire.

It shall be prohibited to discharge or use fireworks of any kind or nature within the area.

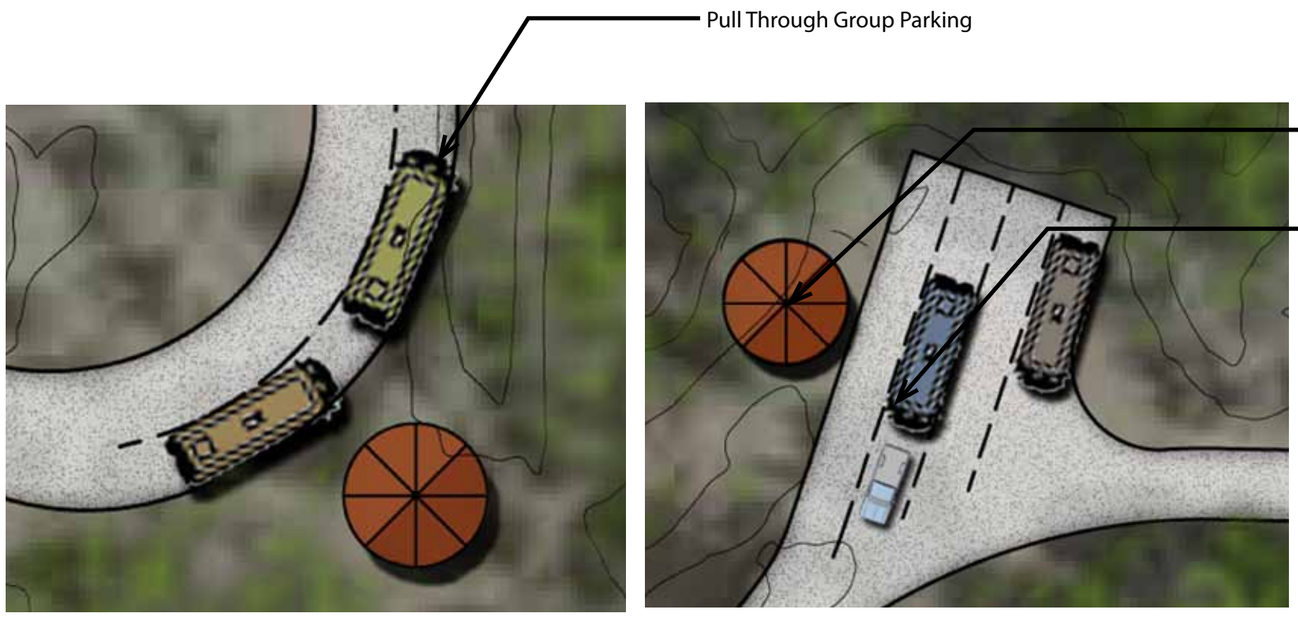
Education

Public education will be key to a successful campground.

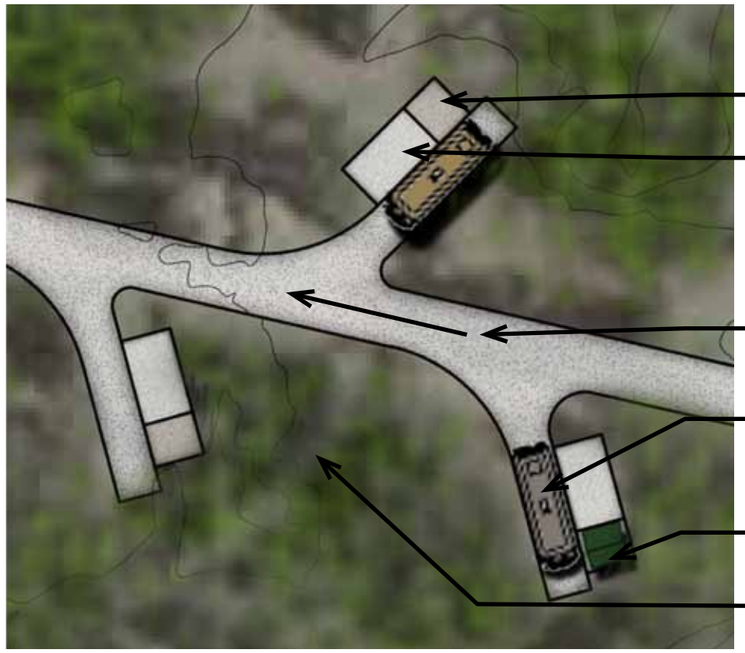
Education topics could include camp fire risks, camping in areas with wildlife, and the risk of invasive species.


CR 210
80'-100'
between campsites
open meadow
group camp site, typ

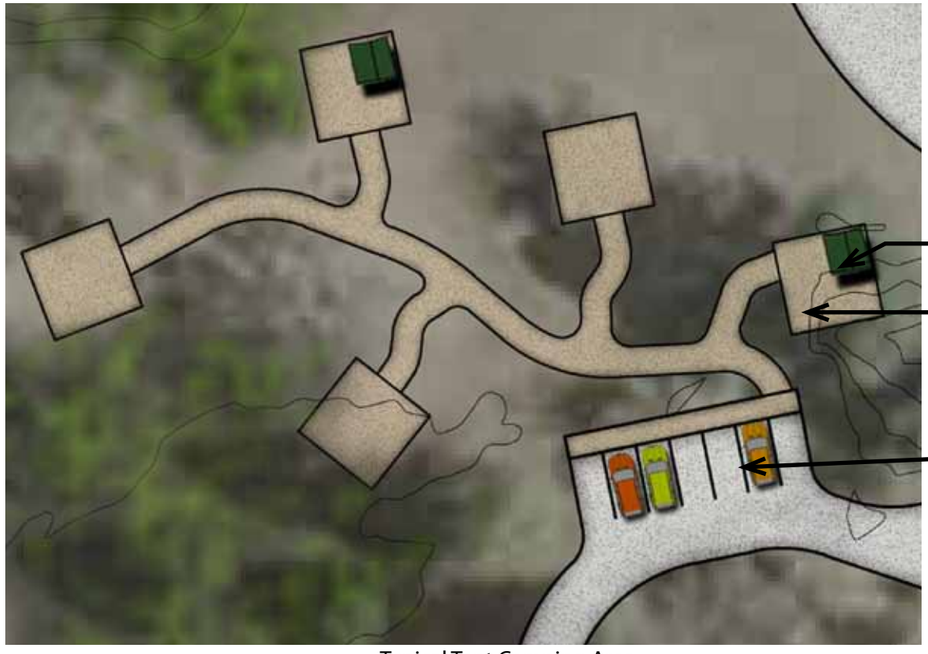
Typical Comfort Station and Associated Parking



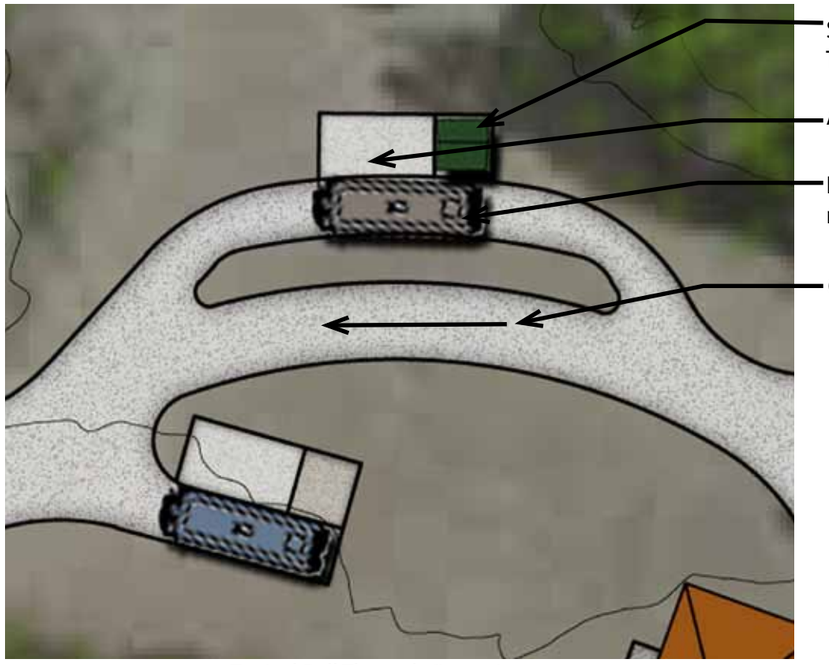
Typical Group RV Campsite



Typical Back-In Campsite



Typical Tent Camping Area



Typical Pull Through Campsite

Section 8: Interpretation and Education

The area that is now occupied by Lake Nighthorse has a complex and important history both locally and regionally. The valley that is now the reservoir served as a main east-west travel route through the area with users as far back as the ancestral Puebloans. This route is commonly referred to as the 'Old Spanish Trail' or 'Ute Trail.' There were many culturally significant sites that range from pre-historic Indian settlements to 20th century ranches. There is not a shortage of human history to explore on this site. There are intriguing subjects to explore in the natural setting as well. The existing dryland ecosystems and their transition to a water based ecosystem will provide for an interesting study.

How can these stories be told and linked together? This section will explore the subjects that have been suggested for interpretation on the site. An introductory list of potential educational partners for the project has also been established. There can and should be a myriad of educational opportunities created through interpretation of history and exploration of nature at Lake Nighthorse. At the two-day workshops in January of 2011 the following goal was established:

"To provide education and interpretation of the past, present and future of Ridges Basin and how these uses relate to the community."

The goal is simple but the extended message is that the natural and cultural world are related throughout time and the knowledge gained from this site can be used to improve quality of life. Interpretation and education are a very important part of making Lake Nighthorse an experience the community can enjoy.

The map above illustrates the variant routes that developed as merchants developed their trade with the Rocky Mountain and Mojave Desert peoples, and the rancheros of coastal California. In 2002, the Old Spanish Trail received designation as a National Historic Trail and today it is widely known as the longest, most arduous and crookedest pack mule route in America. *Courtesy of Old Spanish Trail Association.*

8.1 Interpretation Topics

Human Cultures

Many different people have used this site for many different reasons throughout history. These cultures include ancestral Puebloans, Southern Ute Indian Tribe, Ute Mountain Ute Tribe. There has been extensive documentation completed by archaeologists including a 16 volume report by SWCA Environmental Consultants. These resources should be reviewed and used when designing interpretive displays for the project. The tribes that are associated with this area should also be consulted with in developing the interpretation plan and individual signs or displays that discuss their history. One example of a potential subject for interpretation would be the Southern Ute Indian Tribe's tradition of red willow gathering.

Another possibility would be to interpret one of the significant archaeological sites. This brings up questions about how to show visitors the site and still protect the resource and are there any sites easily accessible or visible. If this option is pursued, the Bureau of Reclamation archaeologist would need to be consulted to determine if there are viable sites for this purpose and what the process would be for opening this up to interpretation. Consulting with staff at Mesa Verde and the Anasazi Heritage Musuem on best practices for interpreting an archaeological site in the field would also be suggested.

An effort to educate the public about cultural resource sites will need to be established. With the lake becoming open to the public, there will be the potential for people to come across a cultural resource site or an artifact. The public must understand the preferred procedure to take in this kind of event. This effort will be further developed in the NEPA review process. A memo of understanding with the State Historic Preservation Office is also being pursued by USBR for mitigation of potential impacts caused by recreation improvements.

Historic Trails

Old Spanish Trail, Ute Trail, Ancestral Puebloan Trail or any other names it is referred to, the historic path though the Lake Nighthorse site is very significant. Many famous expeditions and explorers passed through this route including the Dominguez-Escalante of 1776 and John C. Fremont and Kit Carson.

"For traveling Mexican caravans between 1829 and 1848, the Old Spanish National Historic Trail was known as the shortest path to riches between Los Angeles and Santa Fe. It was a trail of commercial opportunity and western adventure as well as slave trading, horse thieving and raids. The Old Spanish Trail route was established along a loose network of Indian footpaths that crossed the wide expanse of the Colorado Plateau and the Mojave Desert. With time, this newly established trade corridor attracted frontiersmen and U.S. military expeditions."
Courtesy of Old Spanish Trail Association.

This trail could be interpreted in many ways on the site. Signage that provides a vantage point where the whole route can be seen would be suggested. Because most of the trail is now underwater, some creative options might be employed. Buoys could be set so that the route can be viewed along the water surface. These buoys might in turn have interpretive/educational information on them that could be viewed by boaters. Another possibility is to provide underwater markers of the trail that can be found by scuba divers. This historic transportation corridor is a prime element to interpret because it linked the area that is now Durango to the outside world geographically and culturally for a long period of time.

Environment

This subject could cover a range of topics from the impacts of human use on the site to sustainable design, Best Management Practices, and stewardship of the site into the future. A prime example of this would be a discussion of invasive mussels, how they are impacting water bodies throughout the country, and preventative measures being taken at Lake Nighthorse. There could be a display installed at the entry station where mussel inspection will occur so that boaters and all users can understand the background and importance of the inspection.

Reinforce the Leave No Trace principles:

- -Plan ahead and prepare.
- -Travel and camp on durable surfaces.
- -Dispose of waste properly.
- -Leave what you find.
- -Minimize campfire impacts.
- -Respect wildlife.
- -Be considerate of other visitors.

Wildlife, Biology and Ecology

The natural inhabitants of this site can provide many interpretive/educational subjects. The systems that connect the plant and animal life on this site and how the site adapts from being a dryland ecosystem to a water based ecosystem will be great materials to interpret.

History of the Animas-La Plata Project

The reservoir/dam project has been a topic of debate in the area for the last five decades. The project and process have created a history of their own. Now that the reservoir is built and will be a piece of the community, it could be an interesting subject to educate visitors about.
" The Animas-La Plata Project (ALP), located in La Plata and Montezuma Counties in southwestern Colorado and in San Juan County in northwestern New Mexico, was authorized by the Colorado River Basin Project Act of September 30, 1968 (Public Law 84-485). It provided for a multi-purpose project primarily for irrigation and municipal and industrial uses.

Although scheduled for construction in the early 1980s, discussions were initiated to achieve a negotiated settlement of water right claims of the Southern Ute Indian and Ute Mountain Ute Tribes in southwest Colorado. The Colorado Ute Tribes and other parties subsequently signed the Final Settlement Agreement on December 10, 1986. The Colorado Ute Indian Water Rights Settlement Act of 1988 (P.L. 100-585) (Settlement Act) provided language to implement the Final Settlement Agreement and supplemented the authorization of the ALP. The Settlement Act allowed for future development of the region and at the same time protected existing water uses." *Courtesy of the Bureau of Reclamation website usbr.gov project description.*

Civil Engineering

Lake Nighthorse is not traditional in the sense that it does not dam a river, instead water has been pumped from the river up an elevation of 6,882 feet to fill up a valley that has been dammed. An extensive pump house facility and impressive civil engineering were used in the creation of the reservoir. Many people are interested in the engineering side of this project and this is a potential subject to interpret.

Agricultural History

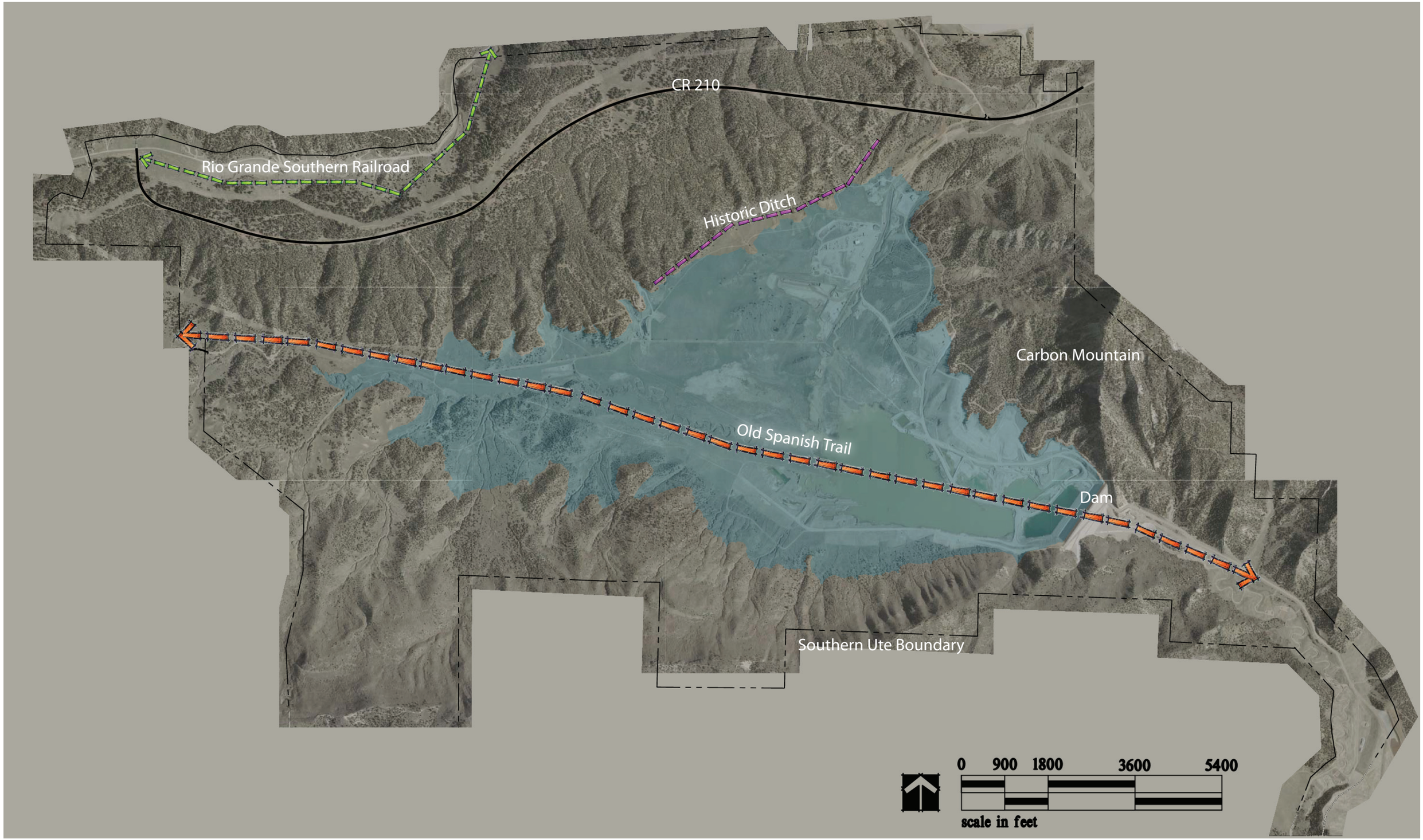
This area was an open fertile valley used to grow crops and to graze livestock from ancestral Puebloan people to the Bodo family.

Railroad

The Rio Grande Southern railroad was another mode of transportation that passed through the site and helped the area grow commercially. This route is along the north side of the site and could be incorporated as part of an interpretive trail.

Also developed in the workshop is a list of potential education partners:

- Southern Ute Indian Tribe
- Ute Mountain Ute Tribe
- Navajo Nation
- Durango Nature Studies
- Animas High School
- Mountain Middle School
- Durango 9R School District
- Ignacio Schools
- Bayfield Schools
- Cortez Schools
- Pagosa Springs Schools
- Ft. Lewis College
- Discovery Museum
- San Juan Mountain Association
- Crow Canyon Archaeological Center
- Silverton Schools
- Boy and Girl Scouts
- Boys and Girls Club
- Scuba Club



Existing Historic Feature at Ridges Basin

8.2 Funding and Implementation

Interpretation and education are very important to how Lake Nighthorse is connected to the community. For any recreation project that is completed at the reservoir there should be capitol budget included for interpretive design and installations. For example, if a permanent entrance station is built, part of the program should include space for interpretive displays. The interpretive design/installations should be integral to all other projects being completed. There may be other funding sources or volunteer efforts that can get the interpretive program kicked-off quickly. These include potential grants being sought in cooperation with Ft. Lewis College or potential funding from the Old Spanish Trails Association or other groups that may have a stake in education visitors. There may be other resources available locally from the college or museums, such as displays used previously that are now in storage.

If funding becomes available, it would be beneficial to create an interpretive master plan. There are so many subjects and ideas that a master plan would help to distill the information into a cohesive document that covers the entire site. A graphic sign style should be adopted and used throughout the project. Another benefit of an interpretive master plan is that budgets can be developed that assist in fund raising and grant writing.

8.3 Potential Locations

Based on input from the workshop, diagrams have been created as a starting point for potential locations. See map, page 60. Some of the activity areas would be prime for interpretive displays such as the overlook at County Road 210 and the shoreline recreation area near the swim beach. A majority of the interpretive installations should be accessible to all visitors. Creating loop trails that meet ADA guidelines would be a great amenity for Lake Nighthorse. Old ditches may provide great areas for recreational trails; some of these ditches are classified as an archaeological site and would need to be mitigated by installing interpretive signs.

Archaeological Sites/Cultural Resources

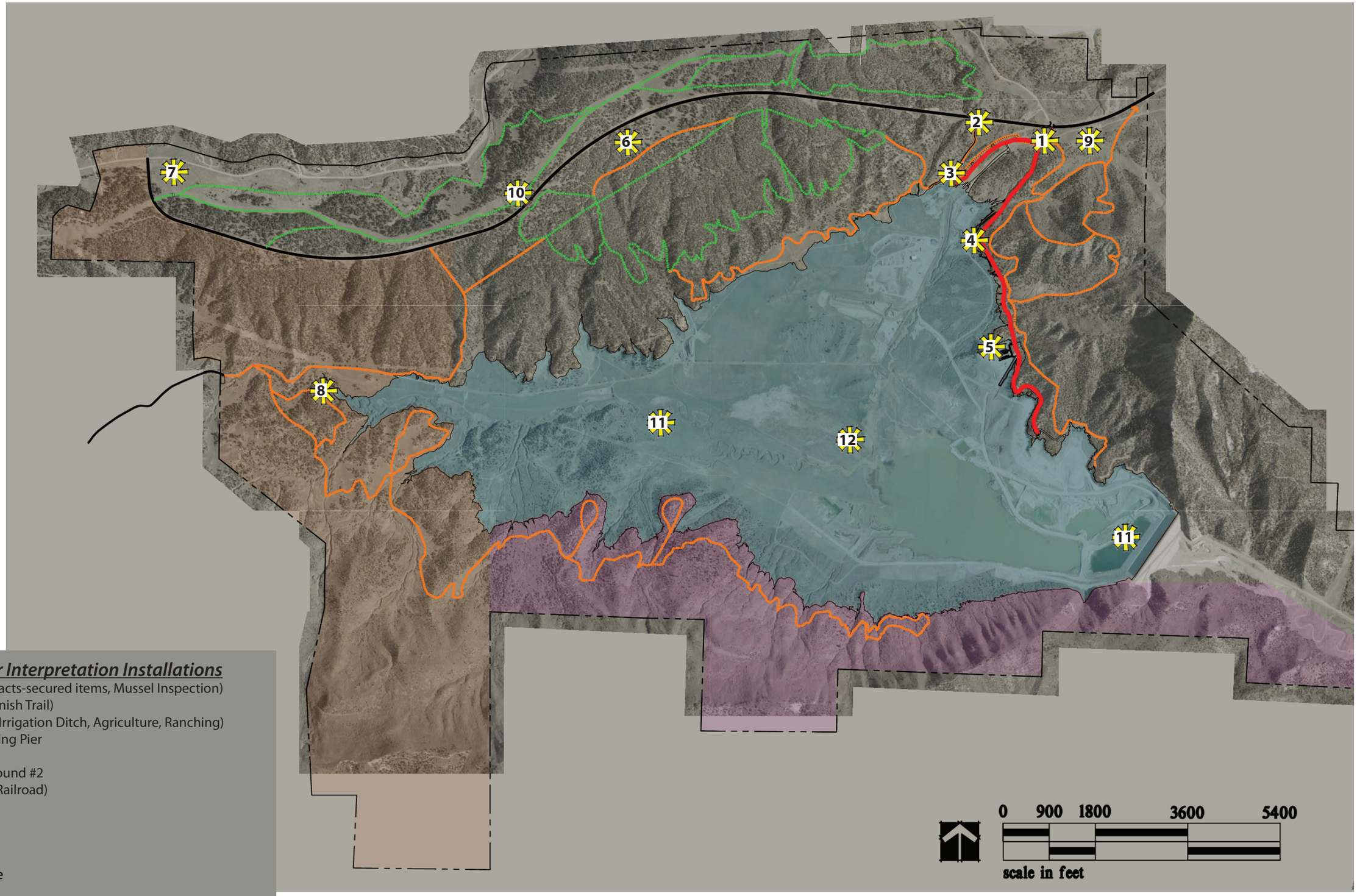
Any impact to archaeological sites could cause major costs for excavation, curation, and mitigation. The first priority for the sites at Lake Nighthorse would be avoidance. Any interpretive element that talks about cultural resources and history needs to also discuss protection. The Archaeological Resources Protection Act of 1979 should be referenced and repeated throughout Lake Nighthorse.

"This statute (16 U.S.C. 470aa-470mm; Public Law 96-95 and amendments to it) was enacted to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archaeological community, and private individuals (Sec. 2(4)(b)). The reasons behind enactment include recognition that archaeological resources are an irreplaceable part of America's heritage and that they were endangered increasingly because of the escalating commercial value of a small portion of the contents of archeological sites."

8.4 Technology

Interpretation and education should not be limited to physical installations. Technology has been developed in the form of downloadable applications for interpretation in national parks. This could be a great resource for interpretation of the trails as visitors take longer hikes at Lake Nighthorse. Incorporating more in-depth information about the site on the Lake Nighthorse website is also encouraged. There is only a limited amount of space on signs and this would provide additional information for people who want to learn more.

photo courtesy of SWCA



Potential Location for Interpretation Installations

1. Entry/Visitor's Center (Artifacts-secured items, Mussel Inspection)
2. Existing Overlook (Old Spanish Trail)
3. Swim Beach Activity Area (Irrigation Ditch, Agriculture, Ranching)
4. Shoreline Access-ADA Fishing Pier
5. Overlook at Boat Ramp
6. Accessible Trail at Campground #2
7. Equestrian Trailhead (RGS Railroad)
8. Trailhead
9. Campground #1
10. Campground #3
11. Buouys
12. Underwater Scuba Course

Section 9: Water Quality

The water quality at Lake Nighthorse could be impacted by many factors extending well beyond the lake property. Outside of recreation impacts, water quality in Lake Nighthorse will depend on factors affecting the Animas River upstream of the intake along with potential sedimentation and nutrient loading from tributary drainages. The lake ecosystem will adjust to the new reservoir conditions and undergo seasonal succession patterns. The early years of the reservoir may include temporary changes to the water chemistry relative to the submersion of the soils and associated vegetation changes. Over time, the ecological system will be dynamic, responding to variations in climate, fish populations, temperature, nutrient loading in the larger surrounding drainages, impacts from forest fires, and other factors. Maintaining high water quality affects the level and cost of treatment for drinking water as well as protecting aquatic habitat. These changing conditions also affect the water color, turbidity and odor.

The proposed facilities, activities, regulations and guidelines described throughout this master plan will have an overarching mandate to protect water quality. Replacement of natural vegetated, pervious surface with hardened, impervious surfaces such as parking lots, roadways and trails increases the rate of runoff and has the potential to introduce contaminates (grit, sediment, hydrocarbons, magnesium chloride, pet waste, etc.) into the drainage system.

This water quality section provides additional emphasis guiding the future phases of design and management for recreation related improvements and activities. Stormwater management is a critical aspect that can be addressed during design to direct drainage from paved areas through surface routes that slow velocities, filter and remove contaminants, and use vegetated buffers to uptake nutrients beyond naturally occurring levels.

9.1 Stormwater Runoff into Lakes

From Urban Storm Drainage Criteria Manual, Volume – 3 Best Management Practices (Manual)

Stormwater runoff into lakes can have some unique effects. These include:

1. Lakes respond more to the mass of a constituent and flow volume. The response time to storm events is measured in days or weeks unlike streams which show effects within hours or days.

2. A notable visible impact of stormwater on lakes consists of floating refuse and shore damage.

3. A significant water quality impact on lakes that is related to stormwater runoff is nutrient enrichment. This can result in the undesirable growth of algae and aquatic plants.

4. Lakes do not flush contaminants as quickly as streams, and act as sinks for nutrients, metals, and sediments. This means that lakes can take longer to recover if contaminated.

9.2 Types of Pollutants

From Urban Storm Drainage Criteria Manual, Volume – 3 Best Management Practices (Manual)

Sediment/Total Suspended Solids
Sources: Construction sites, urban/agricultural runoff, atmospheric deposition, natural tributary drainage.
Effects: Habitat changes, stream turbidity, recreation and aesthetic loss, contaminant transport, bank erosion.

Nutrients (Phosphorous/Nitrogen)
Sources: Lawn/agricultural runoff, septic fields, atmospheric deposition, erosion.
Effects: Algae blooms, ammonia toxicity, nitrate toxicity.

Toxic Pollutants (Heavy Metals/Hydro-Carbons)
Sources: Urban/agricultural runoff, pesticides/herbicides, underground storage tanks, hazardous waste sites, illegal disposals, industrial discharges.
Effects: Toxicity to humans and aquatic life, bioaccumulation in the food chain.

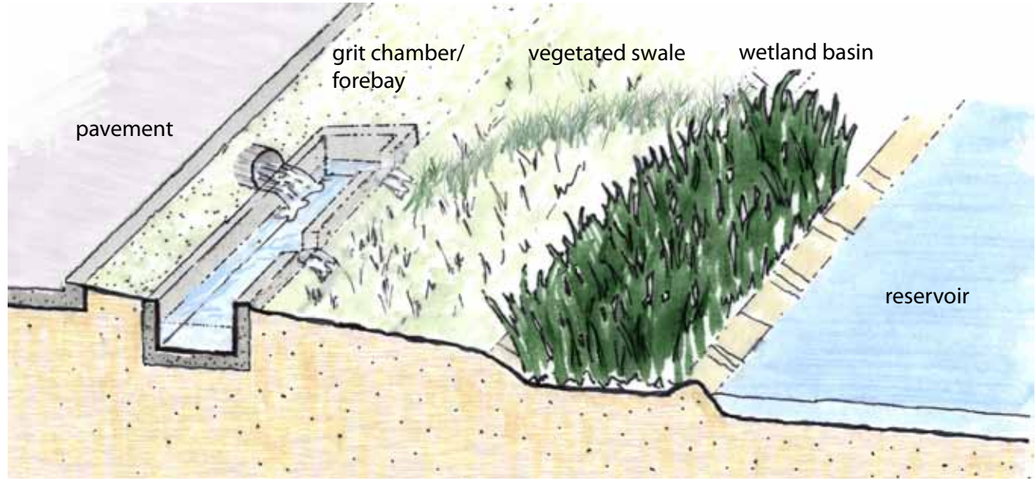
Salts (Magnesium Chloride)
Sources: Urban runoff snowmelt.
Effects: Contamination of drinking water, harmful to salt intolerant plants.

9.3 The Four Basic Pollutant Removal Methods

From Urban Storm Drainage Criteria Manual, Volume – 3 Best Management Practices (Manual)

Sedimentation
Particulate matter is, in part, settled out of runoff. Smaller particles under 60 microns in size (fine silts and clays) (Stahre and Urbonas, 1990) can account for approximately 80 percent of the metals in stormwater attached or adsorbed along with other contaminants and can require long periods of time to settle out of suspension. Fortunately, extended detention allows smaller particles to agglomerate into larger ones (Randall et al, 1982), and for some of the dissolved and liquid state pollutants to adsorb to suspended particles, thus removing a larger proportion of them through sedimentation. Sedimentation is the primary pollutant removal mechanism for most structural BMPs.

Filtering
Particulates are removed, in part, from water by filtration. Filtration removes particles by attachment to small-diameter collectors such as sand and vegetation.



The diagram illustrates the concept of a "treatment train" where a series of surface basins target the removal of runoff pollutants. The grit chamber targets sediment and gravel within a basin that is easily accessed for maintenance and removal of materials. The subsequent vegetated treatment areas remove finer particles and uptake nutrients such as phosphorous and nitrogen that occur naturally, but cause water quality issues when present in high amounts.

The image to the left is a hardened forebay that collects sediment and the image to the right is a series of ponds that filters containments. Both images are from the Highpoint development near Denver International Airport.

Infiltration
Pollutant loads in surface runoff are removed or reduced as surface runoff infiltrates or percolates into the ground. Particulates are removed at the ground surface by filtration, while soluble constituents can be absorbed into the soil, at least in part, as the runoff percolates into the ground. Site-specific soil characteristics, such as permeability, cation exchange potential, and depth to groundwater or bedrock limit the number of sites where this mechanism can be used effectively.

Biological Uptake
Plants and microbes require soluble and dissolved constituents such as nutrients and minerals for growth. These constituents are ingested or taken up from the water column and concentrated through bacterial action, phytoplankton growth, and other bio-chemical processes. In some instances, plants could be harvested to remove the constituents permanently. In addition, certain biological activities can reduce toxicity of some pollutants and/or possible adverse effects on higher aquatic species. (Hartigan, 1989). The utilization of plants also helps enhance the riparian vegetation and creates habitat for wildlife.

9.4 Best Management Practices During Construction

Refer to the Urban Storm Drainage Criteria Manual, Volume – 3 Best Management Practices (Manual)

Future phases of work must meet the State of Colorado storm water management permitting requirements, www.cdphe.state.co.us.

Temporary Seeding - Plant fast growing grasses to temporarily stabilize soils with an approved seed mix.

Permanent Seeding - Plant grass, trees, and shrubs to permanently stabilize soil with an approved seed mix.

Mulching - Place hay, grass, woodchips, straw, or gravel on the surface to cover and retain moisture in the soil.

Earth Dike - Construct a mound of stabilized soil to divert surface runoff volumes from disturbed areas or into sediment basins or traps.

Silt Fence - Construct posts with a filter fabric media to remove sediment from stormwater volumes flowing through the fence. Silt fences will need to be maintained on a weekly basis.

Sediment Trap - Excavate a pond area or construct earthen embankments to allow for settling of sediment from stormwater volumes. Sediment traps will need to be maintained on a weekly basis.

Sediment Basin - Construct a pond with a controlled water release structure to allow for settling of sediment from stormwater volumes. Sediment basins will need to be maintained on a weekly basis.

Vehicle Tracking - Temporarily place free draining gravel material to allow truck access with minimal soil displacement.

9.5 Best Management Practices after Construction

Refer to the Urban Storm Drainage Criteria Manual, Volume – 3 Best Management Practices (Manual) and "Limiting Impact of Recreation on Water Quality - Shoreland BMP's" from the University of Minnesota.

Grass Buffer - Sheet draining impervious areas over uniformly graded and densely vegetated areas of grass slows down runoff and encourages filtration, infiltration, and settling to reduce runoff pollutants.

Grass Swale - Densely vegetated drainageway with low pitched side slopes that collects and slowly conveys runoff. Design of shallow longitudinal slope and cross-section size forces the flow to be slow and shallow, thereby facilitating sedimentation while limiting erosion.

Porous Gravel Pavement - Porous pavement consists of a porous pavement layer that is underlain by gravel and sand layers in most cases. This BMP is intended to be used in parking lots and in low traffic areas to accommodate vehicles while facilitating stormwater infiltration near its source.

Porous Landscape Detention - Porous landscape detention consists of a low lying vegetated area underlain by a sand bed with an under drain. A shallow surcharge zone exists above the porous landscape detention for temporary storage.

Extended Detention Basin - An extended detention basin is appropriate for larger sites and is designed to totally empty out sometime after stormwater runoff ends. The extended detention basin uses a much smaller outlet than a flood control detention basin, which extends the emptying time for the more frequently occurring runoff events to facilitate pollutant removal.

Sand Filter Extended Detention Basin - A sand filter extended detention basin consists of a sand bed and underdrain system. Above the vegetated sand bed is an extended detention basin sized to capture the runoff. A sand filter extended detention basin provides pollutant removal through settling and filtering and is generally suited to offline, onsite configurations where there is no base flow and the sediment load is relatively low. It should not be put into use until the upstream catchment has been fully stabilized.

Constructed Wetland Basin - A constructed wetland basin is appropriate for large catchments and is a shallow retention pond which requires a perennial supply of water to permit the growth of rushes, willows, cattails, and reeds. It treats runoff by slowing it down to allow time for settling and biological uptake. Constructed wetlands differ from "natural" wetlands as they are artificial and are built to enhance stormwater quality.

A gravel filter strip that collects sediment from the roadway.

Constructed Wetland Channel - Constructed wetland-bottomed channels take advantage of dense natural vegetation (rushes, willows, cattails, and reeds) to slow down runoff and allow time for settling out sediment and biological uptake. It is another form of a sedimentation facility and a treatment plant.

9.6 Design Guidelines and Recommendations for Water Quality

Incorporate Best Management Practices in design and construction wherever possible and appropriate. Refer to 9.4 and 9.5 of this chapter for further information.

Preserve/Restore Vegetation

Native vegetation is a huge factor in preventing erosion on a site. Site design should be sensitive to preserving native vegetation when possible. In areas that are disturbed, revegetation efforts shall occur soon after the construction project is complete. Native revegetation can take up to 3-5 years to become established. During this period weed control shall be a yearly maintenance item in these areas.

Managing Vegetation/Weed Control

Soil and rock in the shoreland area have characteristics that influence the type and amount of natural aquatic and upland vegetation and ground water in your area. Vegetation physically slows runoff, enhances infiltration of runoff, and takes up nutrients dissolved in runoff and ground water. Fish, ducks, and other life depend on vegetation for food, spawning, and shelter. In addition, aquatic vegetation protects the shoreline by dampening wave action. Weed control should be completed by mechanical methods. If a herbicide is recommended by a weed control contractor as the best means for control, it shall need to be approved by the local DOW. Only certain products have been deemed safe for use near bodies of water.

Natural Tributary Drainages

The existing drainages that feed into the lake are composed of very erodible soils and have little vegetative cover. These drainages should be improved through the use of check structures and bioengineering techniques that can assist in slowing the water down and revegetation. This can reduce the amount of sediment that is deposited into the lake. The techniques used should be very low maintenance and cause minimal disturbance to existing vegetation. Native cottonwoods, willows, and other riparian plants and grasses should be incorporated.

Beaches and Swimming (also see Section 4)
The location described in the plan meets the general physical recommended for a beach:

- Have a gentle slope of less than 10:1, or 10 feet horizontal distance per each foot of vertical drop.
- Be located where the bottom is firm, with less than 6 inches of muck or silt, and no springs or flowing water.
- Be located in an area with minimal wave action.
- Be located away from areas of significant fish or wildlife habitat.
- A beach sand blanket may consist of washed sand ranging in grain size from very fine sand to "pea-gravel." With a larger grain, the pea gravel will form a good base. Sand should be supplemented annually as needed.
- Provide restrooms convenient to beach users. Insist that swimmers leave the water to use the bathroom.
- Install signage to remind users of water quality regulations and guidelines.
- Provide signage and receptacles requiring proper disposal of pet waste.

Camping (also see Section 7)
Campgrounds are sited to maintain separation from the lake. Camping is a recreational activity that takes people away from regular habits for cleanup, washing, and waste disposal. Some practices that will help minimize impact on the environment are listed below:

- Require restrooms provided; bacteria and viruses in human waste can transmit disease.
- Properly dispose of all garbage, including litter found. Campgrounds should provide and maintain adequate trash receptacles.
- Never dispose of fish guts or other waste in the water, even if it is "biodegradable"; it attracts pests and can add nutrients to the water.
- Never wash in the lake; wash dishes, hair, clothes, and yourself at least 150 feet from the water's edge; always use biodegradable soap.
- Stormwater runoff from campgrounds should be treated with BMPs to remove pollutants from vehicles and pavement, and slow runoff velocities.

Buildings (also see Section 5)
In developing a site plan or planning a waterfront structure, property owners should:

- Minimize shoreline alteration and use adequate erosion control methods.
- Design the structure to reduce its visibility from the water.
- Locate boat houses where the water depth is sufficient to launch the boat.
- Store gasoline, oil, and other potentially hazardous materials away from the water in a building with a solid floor; store emergency clean-up materials with the chemicals.
- Direct roof and pavement runoff through BMPs, slope paved areas to increase distance drainage must travel to reach the reservoir.

Docks, Decks, and Accesses
Docks, boat ramps, and decks offer ways to reach and enjoy the waterfront. If not properly constructed and maintained, they may cause water quality problems. Follow these BMPs:

- Use naturally resistant wood (cedar, tamarack, redwood), metal, or plastic instead of treated wood because the chemicals used to treat the wood may cause water quality problems.
- Construct all docks to allow free flow of water beneath them to prevent erosion and sedimentation along the shore.
- Construct the smallest possible dock to meet needs.
- Never apply wood preservatives or paint to decks or docks while they are in or over the water.
- Follow shoreline ordinances when building decks near the shoreline; some setback requirements apply to decks to help protect water quality and minimize visual impact to other water users.
- Minimize the amount of ground surface covered with decks and patios to avoid increasing runoff and erosion.
- Eliminate paths to the waterfront that cut directly up and down slopes or over bluffs because they decrease stability of the shoreline and increase erosion; replace with stairways/ramps when necessary.

Trails (also see Section 6)
Trail users such as mountain bikers, hikers, and equestrians, can have an effect on bodies of water by increasing erosion, turbidity, and sedimentation. Follow these BMPs to minimize the impact of trail recreation on water quality:

- Use USFS Trail Standards
- Stay on well-maintained trails. Minimize social trails and erosion.
- Construct crossings over streams and wetlands to avoid damaging the bottom and banks.
- Define edges, provide hardened areas at high use locations.
- Apply barriers, railings and fences with sensitivity to views.
- Use water bars where needed.
- ATV's will not be allowed on trails per USBR Standards.
- Develop a weed management plan specifically for equine use.
- Develop a clear signage and wayfinding system.
- Stay away from sensitive areas during spring melt when the ground is thawing and very susceptible to rutting and erosion.
- Observe dates and time periods designed to regulate trail recreation during muddy seasons.

Parking lots
Parking lot design should consider impacts to site drainage. Parking lots should disperse drainage verses concentrating it by sheet draining into adjacent vegetated swales and directing drainage to lengthen drainage routes. Consider designing outlaying areas that are less frequently used be constructed with porous surfaces, including gravel and reinforced vegetated surfaces such as Invisible Structures, or equivalent materials. Water quality treatment BMPs that are constructed adjacent to parking lots should consider ease of maintenance for regular sediment removal using standard equipment.

9.7 Case Studies
Standley Lake
Standley Lake stores the City of Westminster's drinking water supply and is approximately 1200 surface acres. The lake is regularly monitored for BTEX at the boat ramp and only sees a minor increase in hydrocarbons after a busy holiday weekend. The detection is gone within 24 hours and still much lower than EPA drinking water standards. Standley Lake only sells 600 boat permits annually and this helps control the water quality.

Boulder Reservoir
Boulder Reservoir stores the City of Boulder's drinking water and is approximately 850 surface acres. The City manages the reservoir and is currently reworking their Master Plan. Boulder Reservoir limits boats on a daily basis. The lake is also regularly monitored for BTEX at the boat ramp and similar results have been found like at Standley Lake.

9.8 Water Quality Regulations and Standards
Regulations
EPA Clean Water Act
State of Colorado Water Quality Control Act

Resources
EPA Programs and Guidelines
LID - Low Impact Development, Sustainable Design and Water Quality
UDFCD - Urban Drainage and Flood Control District Manual, water quality and flood control management to protect people, property, and the environment.
Clean Marinas Colorado Program

Water Quality Monitoring

USBR will monitor the water quality of the Lake for the first 4 years after construction is complete. This will allow for a baseline to compare future monitoring. All future monitoring should be coordinated with USBR as well as Animas-La Plata Operations, Maintenance and Replacement Association.

BTEX should be monitored on a regular basis. BTEX is an acronym that stands for benzene, toluene, ethylbenzene, and xylenes, these compounds are some of the volatile organic compounds (VOCs) found in petroleum derivatives such as petrol (gasoline).

Grand County has an extensive water quality monitoring program looking at Grand Lake and Shadow Mountain Reservoir. Grand County Water Information Network (GCWIN) has partnered with many local, state and national organizations and agencies to compile an extensive database of water quality information. They have 5 different monitoring programs that include lake clarity, stream temperature, algae toxins, healthy headwaters, and west slope temperature and specific conductivity. GCWIN has many seasonal volunteers from the area to take water quality samples in 49 different location weekly. For more information go to www.gcwin.org.

Boating Regulation Related to Water Quality

No boat shall be so equipped as to permit discharge from or through its marine toilet, or in any other manner, any sewage at any time into these waters, nor shall any container of sewage be placed, left, discharged or caused to be placed, left, or discharged in or near any of these waters by any person at any time whether or not they are the owner, operator, guest or occupant of a boat. Pumping stations for emptying sewage from holding tanks are located at Santa Rita Park in the City of Durango.

All boats will be inspected for invasive species such as Zebra and Quagga mussels and aquatic plants. The mussel inspection station shall be equipped with the latest technology and located away from the lake near County Road 210. A permitting plan could be adopted to assist with regulating boats before they enter the lake. The inspection program will be extensive and will include quarantine, hot water washing, and education. See Section 3 for more information.

It is prohibited for any person to place or dump at any time into these waters any organic substance, wood by product, garbage, or any substance deleterious to fish or wildlife.

Regulate boat speeds to 5 mph in shallow water to minimize turbidity.

In the future, if BTEX is detected on a regular basis consider regulating carbureted and electronic-injection two-stroke engines. These engines were manufactured before 1999. Direct injection two stroke engines built after 1999 are considered to have clean emissions and will be allowed on the Lake.

Prohibit personal watercraft (see Section 3).

Other regulations that can be put into place include restricting the number of boats on the lake at one time and restricting the number of permits annually.

Clean Marinas Colorado

All boating facilities should take part in the Clean Marinas Colorado Program. www.coloradomarinas.org

The Clean Marina Initiative is a voluntary, incentive-based program promoted by the National Oceanic and Atmospheric Administration (NOAA) and others that encourages marina operators and recreational boaters to protect [boating] water quality by engaging in environmentally sound operating and maintenance procedures. While Clean Marina Programs vary from state to state, all programs offer information, guidance, and technical assistance to marina operators, local governments, and recreational boaters on Best Management Practices (BMPs) that can be used to prevent or reduce pollution. Marinas that participate in the Clean Marina Program are recognized for their environmental stewardship.

The Program provides separate recommendations for both marinas and boaters, covering all boating-related activities, including these specific topics:

- Emergencies
- Petroleum Containment
- Topside Boat Maintenance and Cleaning Underwater Boat Hull Cleaning
- Marina Operations
- Marina Debris
- Boat Sewage Discharge Solid Waste
- Liquid Waste
- Fish Waste
- Hazardous Materials
- Stormwater Runoff

Boating Best Management Practices

Many recreational activities involve the use of motorized watercraft. The following BMPs will help minimize potential damage:

-Avoid spilling gas, oil, or other chemicals; never pour over the water during fueling or boat maintenance; do not "top-off" fuel tanks; no fueling on or near the water.
-Install fuel storage tanks far away from the waterfront.
-Properly store and dispose of all wastewater, both greywater (from sinks) and human waste, while boating or fishing.
-Adjust your speed to reduce the wake and consequent wave action that can damage the shoreline; observe surface water use guidelines, including "no-wake" and low speed zones.
-Inspect boats and trailers to avoid moving non-native plants or animals from one water body to another.

Fishing Regulation Related to Water Quality

Dispose of fish remains properly at the fish cleaning station. Never dump fish remains back into the lake. Waste at fish cleaning stations should be placed in bear-proof receptacles. Fish cleaning stations should be maintained regularly to reduce smells that might attract wildlife.

Allow certified bait only.

Colorado Division of Wildlife should monitor and enforce fishing regulations.

Fish responsibly; it is illegal to deposit fish entrails or parts into public waters or onto lake or stream shores.

Left: Roof run-off is directed off the roof and into native vegetation.
Right: Stormwater from a parking lot is filtered through native vegetation at Ignacio Public Library. The design provides for water quality as well as providing stormwater that sustains the vegetation.

Swim Beach Regulation Related to Water Quality

Water Quality testing will be necessary to conform to the EPA's Clean Water Act. Testing for E. Coli and other pollutants for both swimmer safety and the overall water quality of the Lake.

All restroom waste will be contained by a concrete vault or other means. Restrooms will be maintained regularly and should not be allowed to leach into the ground.

Use of soap or shampoo will not be allowed in the lake water.

Stormwater Runoff Regulation

All development will be required to treat stormwater run-off both during construction and permanently, including quality and quantity. The quantity will be based off of the pre-development run-off amounts. All development will follow the Urban Storm Drainage Criteria Manual, Volume – 3 Best Management Practices (Manual).

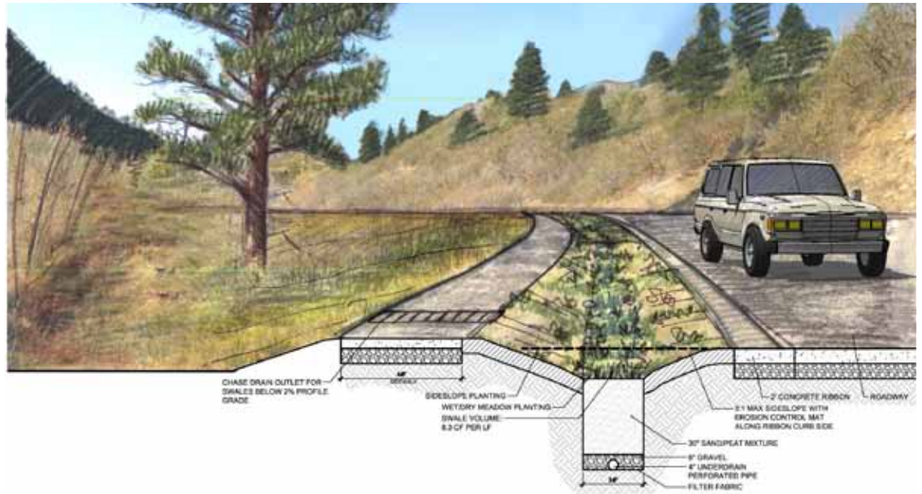
Minimize stormwater run-off through efficient design.

- -Minimize impervious surfaces (paved areas).
- -Preserve natural vegetation.
- -Capture stormwater on-site.
- -Maximize use of pervious surfacing materials that promote infiltration.
- -Mimic natural hydrology.
- -Incorporate bioswales and detention/water quality basins at roadways and parking lots.
- -Minimize erosion.
- -Manage stormwater through features that are easy to maintain.

Prohibit vehicles and boats from washing and performing maintenance working within the site.

At Invasive Species Inspection Station, infected water shall be contained in a vault and disposed of properly.

Store materials and equipment on site to respond to potential spills.



Bioswales along roadways assist in cleaning pollutants from stormwater runoff.

A stormwater detention pond at Jenny Adair Park shows how a functional water quality feature can also be an attractive amenity.

9.9 Recommended Seed Mix

Common Name & Variety	Scientific Name	Growth Season	PLS lbs/acre
Indian Ricegrass 'Paloma'	*Achnatherum hymenoides*	Cool	3.00
Blue Grama 'Hachita'	*Bouteloua gracilis*	Warm	2.00
Sideoats Grama 'Vaughn'	*Bouteloua curtipendula*	Warm	4.00
Alkali Sacaton	*Sporobolus airoides*	Warm	0.20
Slender Wheatgrass 'Sodar'	*Elymus trachycaulus*	Cool	3.00
Bottlebrush Squirreltail	*Elymus elymoides*	Cool	2.00
Sheep Fescue	*Festuca ovine*	Cool	2.00
Needle and Thread	*Hesperostipa comata*	Cool	4.00
Blue Flax	*Linum lewisii*	Warm	4.00
Prairie Aster	*Aster tanacetifolius*	Warm	3.00
Sand Dropseed	*Sporobolus cryptandrus*	Warm	0.10
	Total PLS per Acre		**27.30 ***

*Rates provided are for drill seeding. Broadcast or Hydroseed rates must be at 1.5 times the drill seed rate.

Preserving native vegetative cover will reduce stormwater impacts to the site. An example of the pinion, juniper, and sagebrush shrubland ecosystems at Lake Nighthorse.

Section 10: Finance and Management

This section of the plan is an overview of costs for developing and maintaining facilities at Lake Nighthorse and potential management and funding options for covering those costs. The development and operation of recreational facilities at Lake Nighthorse will require one time facility investments and will generate ongoing operations and maintenance expenses.

10.1 Development Phasing and Associated Costs

Capital Cost

Capital costs are investments to create new facilities or expand/improve existing facilities. Capital improvements already completed include a boat ramp, road to the boat ramp, parking lot, and vault restroom.

Capital improvements for Lake Nighthorse are anticipated to be phased over time in response to increasing visitation, potential funding availability and increasing income potential. (see full capital cost estimates in Appendix)

The costs estimate addresses the highest priority improvements totaling $5.6 million. Future improvements beyond this amount shall follow the design intent of this master plan and may include the following:

- Additional picnic pavilions, shade shelters
- Additional site furnishings including benches and bike racks
- Upgrades to ADA trails potentially including concrete pavement
- Upgrade of roads and parking pavement
- Additional trailer parking including rental spaces
- Boat house near swim beach area
- Other small scale auxiliary structures
- Rustic outdoor amphitheater
- Cultural center
- Recreation improvements near campgrounds such as horse shoe pits or volleyball
- Playgrounds
- Additional trail head improvements
- Interpretive signage
- Habitat improvements
- Additional fishing piers

Operations and Maintenance

Operations and maintenance (O&M) costs are ongoing costs associated with running the facilities. For example, an entrance station requires an employee to collect entrance fees, a park director will need an office to oversee park operations, and campgrounds require employees to clean up after visitors. Operations costs include salaries and benefits, office supplies, marketing costs, and utilities. Maintenance costs are expenses associated with preserving and repairing the capital facilities. Occasionally, parking lots need to be restriped, picnic tables need to be repainted and trails need clearing.

Phase 1 Development

(see Appendix for full spreadsheets)

Capital cost for development: $249,000
Annual operations and maintenance cost: $40,200
Anticipated operations and maintenance cash flow with a 10% surplus
Serves 10% of the estimated market (15,000 user days)

Phase 1 amenities include:

- Temporary entrance station (if funds became available earlier, install permanent structure)
- Temporary ANS inspection station (if funds became available earlier, install permanent structure)
- Build road to access water (old CR 211 alignment) with gravel surfacing
- Build 100 parking spaces at the swim beach area, also used for trail access and non-motorized launch area.
- Courtesy Dock
- Trails, highest priority being the ADA accessible trails

Phase 2 Development

(see Appendix for full spreadsheets)

Capital cost for development:$1.45 million
Annual operations and maintenance cost: $100,600 (additive, includes Phase 1 and 2)
Anticipated operations and maintenance cash flow with a 10% surplus
Serves 24% of the estimated market (37,000 user days)

Phase 2 amenities include:

- Permanent entrance station
- Permanent ANS inspection station
- Swim Beach (picnic shelters and tables could be pushed back a phase)
- Road, parking, and trail at fishing/picnic area (picnic shelters and tables could be pushed back a phase)
- Trailhead on north side of CR 210
- Trail development continued

Phase 3 Development

(see Appendix for full spreadsheets)

Capital cost for development: $1.4 million
Annual operations and maintenance cost: $167,300 (additive, includes Phase 1, 2 and 3)
Anticipated operations and maintenance cash flow with a 10% surplus
Serves 34% of the estimated market (52,000 user days)

Phase 3 amenities include:

- Campground 1 (40-50 sites)
- Add additional picnic shelters and tables at shoreline development areas if left out of phase 2
- Trail development continued
- 20 slips for campers

Phase 4 Development

(see Appendix for full spreadsheets)

Capital cost for development: $1.4 million
Annual operations and maintenance cost: $212,700
Anticipated operations and maintenance cash flow with a 10% surplus
Serves 44% of the estimated market (68,000 user days)

Phase 4 amenities include:

- Campground 2 (40-50 sites)
- Trail development continued
- 20 slips for campers

Phase 5 Development (will need additional feasibility studies)

(see Appendix for full spreadsheets)

Capital cost for development: $1.1 million
Annual operations and maintenance cost: $265,000 (additive, includes Phase 1, 2, 3, 4 and 5)
Anticipated operations and maintenance cash flow with a 10% surplus
Serves 51% of the estimated market (80,000 user days)

Phase 5 amenities include:

- Trailhead on west side of park off of CR 211
- Campground 3 (20-30 sites) includes utilities

- Day use area south of boat ramp
- Add utilities to Campgrounds 1 and 2
- Trail to connect loop across outfall
- Overflow boat ramp parking

Grand Total: Phase 1 through 5
(see Appendix for full spreadsheets)

Overall capital cost for development: $5.6 million
Annual operations and maintenance cost: $265,000

Revenue generators include swim beach, boat ramp, and slips

Subsidized uses include RV camping and trails

Estimated Break Even with Capital Financing:
Phases 1&2: 43% of estimated market, 66,000 user days
Phases 1 through 3: 64% of estimated market, 100,000 user days
Phases 1 through 5: 99% of estimated market, 154,000 user days

10.2 Management Scenarios

The management and finance group at the Lake Nighthorse design workshop held January 11th and 12th, 2011, contributed ideas for funding and management options listed in this section of the plan. Management principles discussed by the group include:

- Fee-based recreation area- revenue streams will be dependent on entrance fees, season passes, volunteer passes and other user based revenues.
- Management should pursue subsidies and grants for operations or capital costs; revenue streams should not be limited to entrance fees.
- The facility's cash-flow should be viewed as a whole so that revenues derived from one activity can be used to pay for other activities.
- Low impact commercial activities should be allowed. Boat rentals, scuba lessons (including trailer parking), rescue classes, children's day camps are acceptable, but large events such as music festivals and tournaments should be reviewed on a case by case basis.
- Capital improvements should be implemented in phases. The lake does not have to be fully-developed to be open for recreational use.

The management and finance group identified three potential management schemes for recreational facilities at Lake Nighthorse: formation of a Lake Nighthorse Management Authority, formation of a special recreation district, and reformation of the Animas-La Plata Water Conservancy District (ALPWCD). The group then identified the pros and cons of each option.

Lake Nighthorse Management Authority

The formation of an authority occurs when two governmental or quasi-governmental agencies agree to fund and manage the authority. The ALPWCD board could partner with the City of Durango to establish a recreation management authority. The formation of an authority is relatively uncomplicated while authorities share the same powers as other governing bodies except the ability to levy taxes. The disadvantages of a management authority is that they lack authority to levy taxes so revenues can be unstable.

Recreation Special District

The formation of a special district would create a new management agency with taxing authority and the ability to manage a range of recreation facilities in the county. The ability to levy taxes would provide a stable and predictable funding mechanism for recreation management. Costs could be spread out over a large population resulting in relatively low taxes. The formation of a special district must be approved by local voters, taking at least three years.

Reformation of ALPWCD

The third option involves reforming the Animas-La Plata Water Conservancy District to include a recreation management component. Unlike a countywide district, this would focus funding and management efforts solely on recreation at the lake. An organizational structure already in place is an advantage plus the district could provide stable funding mechanisms and management oversight. This management scenario would consolidate water and recreation management under one entity. The reformation of ALPWCD is possible but it would be costly and take a long time.

10.3 Potential Funding Sources

Funding and partnership opportunities

Local Governments- City of Durango and La Plata County

Trails 2000 - volunteer assistance

State and Federal appropriations

Bonds supported by mill levy would require a governmental body

Great Outdoors Colorado (GOCO) — Grant Funding from GOCO applies a portion of the state lottery funds to preserve, protect, enhance and manage Colorado's park, wildlife, river, trails and open space heritage. The Legacy Grant in particular has the potential to provide capital improvement funding extending over several phases to help purchase, develop and manage improvements described in this plan. Refer to www.goco.org for descriptions of grant programs, applications, and schedules. Trail funding from GOCO often comes through the State Trails program that also distributes funds from the U.S. Land and Water Conservation Fund and other sources. http://www.goco.org/

Colorado State Parks Colorado State Trails Grant Program, http://parks.state.co.us/Trails/Grants/Pages/Grants.aspx

Paul S. Sarbanes Transit in Parks Program (5320). This program is administered through the BLM and provides substantial planning and construction assistance targeting projects that provide the opportunity for alternative transportation linking communities to public lands. http://www.fta.dot.gov/funding/grants, www.westerntransportationinstitute.org

EPA restoration and watershed targeted funding sources offer grants, low interest loans, and potential partnering with American Recovery and Reinvestment Act (ARRA) funding for projects that improve water quality.
ARRA website: (www.recovery.org) www.epa.gov/otaq

EPA Clean Water State Revolving Fund, http://water.epa.gov/grants_funding

EPA Five-Star Restoration Program, http://www.epa.gov/owow/wetlands/restore/5star/

EPA Targeted Watersheds Grant Program, http://water.epa.gov/grants_funding/

Natural Resources Conservation Service (NRCS) is a federal agency administered though the U.S. Department of Agriculture. The NRCS assists landowners through conservation planning and assistance designed to benefit the soil, water, air, plants, and animals that result in productive lands and healthy ecosystems. Grants are available to assist with projects that offset impacts to the water quality and soils. Improvements that target selenium levels have particular potential to obtain grant funding. National: www.nrcs.usda.gov
NRCS Colorado Environmental Quality Incentive Program (EQIP): http://www.co.nrcs.usda.gov/programs/eqip/eqip.html

Federal Transportation Enhancement and Air Quality Improvement funding.

Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Division which applies the moneys levied in fines to non-compliant parties who fail to meet stormwater discharge and pollution standards to water quality and stream restoration projects in the area of the violation.

Water Quality Control Commission 319 Funding, http://www.npscolorado.com/319guide.htm

Colorado State Conservation Board Salinity Basin States Parallel Program, under the State Department of Agriculture, aimed at rural communities, http://www.colorado.gov/cs/

Contributions and in-kind services including Colorado Division of Wildlife programs such as: "Fishing is Fun"; "Watchable Wildlife"; and conservation land acquisition. The USFWS program has provided assistance in Western Colorado particularly targeting restoration of cottonwood and willow regeneration to support shrinking migrating bird habitat. The following links target migrating birds and native fish programs:

Fish and Wildlife Service North American Wetlands Conservation Act Standard Grant Program
http://www.fws.gov/birdhabitat/grants/NAWCA/Standard

Fish and Wildlife Service North American Wetlands Conservation Act Small Grant Program
http://www.fws.gov/birdhabitat/grants/NAWCA/Small

US Forest Service Bring Back the Natives Grant Program, http://www.fs.fed.us/biology/fish/bring.html

Trout unlimited, http://www.tu.org

Colorado State Forest Service, http://csfs.colostate.edu

Energy impact funds might be another source. This source has been recently suspended this year, but may provide funds to rural communities again in the future.

The likely major private sector sources include:

Private donations including individuals, philanthropic foundations and corporate donors.

In-kind contributions of volunteer labor resources.

Others including service clubs, youth groups, recreational groups and fraternal organizations.

Small activity-based grants from interest groups such as SCUBA, trails, equine, etc.

Private grants- BP, Gates Foundation, etc.

National 4-H council's Community Tree Planting Grant Program will provide community action grants in the amounts of $200 - $1,000 to stimulate community tree planting and/or reforestation projects with creative youth lead projects.
www.fourhcouncil.edu/programs

The National Tree Trust has tree seedling planting grants with the help of volunteers.
(800) 846-8733 or www.nationaltreetrust.org

Kodak American Greenways Award Program: www.kodak.com

Conservation Fund: www.conservationfund.org

National Geographic Society: www.nationalgeographic.com

Arbor Day Foundation: http://nationaltreetrust.org

National Fish and Wildlife Foundation: http://www.nfwf.org

The Conservation Fund: http://www.conservationfund.org

The Tree Council: http://www.treecouncil.org

The Colorado Watershed Assembly has a Grant Funding Opportunities: http://www.coloradowater.org/fundingsources

Appendix

Comments from the Website

Please allow no motorized use. Alternatively, please limit motorboats to electric engines under 10 hp. Especially please do not permit jet skis- they are the annoying mosquitoes of the human aquatic environment.

Please have multiple small beach areas to access the lake for swimming. Thanks for all your hard work!

The natural habitat of the area supports quiet, non-motorized use of the lake. If motorized use is permitted, please consider allocating certain days (preferably on an equal basis, such as even/odd calendar days) for alternating motorized vs. non motorized use of the lake. Thanks.

It would be wonderful to have the lake non motorized. It is so beautiful up there, to enjoy it in silence would be heaven! Thank you.

The varied terrain north of 210 to Wildcat Canyon Road offers perfect opportunity for horseback riding without access to the lake. The existing trails and deer paths can easily and economically be marked for riding and would be a wonderful and inexpensive use of great country.

I agree with those posted here; no motorized use, except for trolling motors. I do think this lake is in a perfect spot for sail boats, Hobi Cats, etc. It would be nice for the sailors to have a place to go! (No; I don't sail.) Also, horse trails (without lake access) would be lovely. The views here are wonderful. The quieter you keep it, the less it will intrude with nature and wildlife around it.

It would be a shame to leave this amenity closed due to a lack of funding available for a large scale recreation plan. Please develop a phased plan that allows for recreational use without the full slate of amenities. A parking area, some signage and a trail system would be a good low budget start for day use. Trails 2000 is an excellent organization to get involved in the process for the trail portion.

Please NO motorized boats except electric under 10cc. Please limit campgrounds to areas where the noise can't be heard from nearby subdivisions. Local residents should not have to hear any human noise from the lake area.

Please keep LNH Reservoir in keeping with the intent of Mr. Bodo who originally designated the area as a wildlife preserve … low impact, low voltage motors if any, hiking/horse/bike trails, small swim beach for the kids. The less the better.

First, Thank you for listening to the public. Non motorized is the only way to go. A nice swimming beach, maybe with even a lifeguard for the kids. Walking and biking trails would also be really nice. I think day use is best with no overnight camping. There are too many houses nearby where noise might be a problem. The area is beautiful and close. Lets make it a place where people can go for a little peace a quiet.

I think a multi-use (hike, horse, bike) trail all the way around the lake would be fantastic.

Please emphasize non-motorized use and control the location and intensity of mechanized uses. So much of the area is undeveloped and could remain a jewel of unaltered habitat. Roads into the area should be kept to a minimum. Parking could be located at access points along existing roadways and not on roads into the area. The impressive pre-historic and historic resources should be carefully preserved through the development of an interpretive plan and by avoiding locating fragile or sensitive sites near developed trails or travel ways. Interpretation should be a first priority so users can learn about and thus have greater appreciation and respect for the natural and cultural history of the area. It would be great to see development only at the edges of the property, leaving much of the interior for untrammeled exploration and enjoyment. Thank you.

A close-in, non-alpine lake and surrounding area that is quiet and natural will be a tremendous resource for our area. And the beauty of this is not necessary to pay large costs for management, development and infrastructure. Swimming, sailing, hiking, small boat fishing can be done with minimal expense and offer a great alternative to other state "parks" which are expensive to manage and maintain. We have a model locally with our trail system which takes advantage of what is already hear, costs very little, takes advantage of local community volunteers and resources and helps make the Durango area a very special place. As has been said, this is also consistent with the intents of the Bodo family and the historic use of the area.

As a secondary issue, it does not make any sense to me that the area north of CR 210 is blocked for current use. This is a large open area that has been used by the public for many years and seems to be a political prisoner to this entire process.

Most importantly, noise should be kept to a minimum both on the lake and in the surrounding area, which already is used by hikers. That would mean no motorboats on the lake, both for the sake of humans enjoying the place and wildlife. For the sake of wildlife and beauty, I would like to see parts of the shoreline left without any developed trail access. All facilities should be kept low budget and occupy as little of the area as possible.

Thank you for considering non-motorized designation. It seems to be the most sensible use of this lake. Would you also consider numerous lake side accessible car camping spots for windsurfers and sailors?

For all of you boat haters, you need to think about the revenue that boaters bring to the table! Fisherman/boaters pay millions of dollars every year that goes toward habitat improvement projects, park improvements and much more. Boaters have as much rights as everyone else. Without motorized boats there will not be enough money for improvements therefore usage will be low, and the habitat will suffer. Stop thinking about yourselves and look at the whole picture, sportsman do more for habitat and wildlife than any other group, without boaters this lake has no chance of becoming a valued recreational area.

Given that this area was previously a wildlife refuge, the lowest impact level of use should be authorized. A non-motorized trail system, swimming beach and non-motorized boating should be the only uses authorized. Lake Nighthorse is a mere puddle in size compared to other local reservoirs, and these are under utilized as it is. Residents of the area should not be subjected to the noise and increased traffic associated with motorized use.

Please consider having an access area that allows for swimming.

I would also support the request for a non-motorized designation as many area reservoirs contain motorized recreation and many subsequent opportunities for that type of recreation in the local area. In keeping with this designation, I would also ask you to consider the development of non-motorized trails around the lake in addition to camping and access points for non-motorized boating. This approach may also help to reduce costs in terms of infrastructure development.
Thanks!

Am so happy to see this lake filling. Many of us have been working for years to get this lake built, the appropriate aquatic species introduced, and to see the boat ramp finally being covered with water is a dream. I look forward to the day I can back my boat down the ramp, launch into the clear water, start the engine and take my family on a boat ride and take them fishing. There are so many wonderful wilderness lakes with trails to ride horses around, lakes to canoe around, and now we have to opportunity to have a lake that can truly be multiuse, multipurpose and an economic treasure to the community. Thank you for keeping this lake motorized.

I, too, am very excited at the prospect of a nice lake just 5 minutes from my house. It wouldn't be fair to exclude a specific group from using this fine body of water. ALL interests should be accommodated. Since the motorized and non-motorized users cannot see eye-to-eye, and certainly don't want to share the lake with each other, I think a compromise is in order. For example, maybe the motorized users could be on the water on EVEN days, and the non-motorized users could have the ODD days. That way, the two groups will never intersect, and conflicts can be kept at bay. This would be a simple solution, and each could enjoy the lake in their own way. If motorized boats are banned, what a shame that will be for the $3 million dollar boat ramp that already exists.

From administrator: Just to clarify to size of surrounded reservoirs, here are the facts:
Lake Nighthorse: 1500 max surface acres
Vallecito Lake: 2720 max surface acres
Lemon Reservoir: 622 max surface acres
Navajo: 15,610 max surface acres
Electra Lake: 800 max surface acres

An important issue that has to be addressed — before any decision is made on whether the lake allows motorized or non-motorized boats — is the potential for quagga (and other exotic aquatic species) introductions to the new reservoir. Preliminary assessments by the Bureau of Reclamation (unpublished report) and others, indicates that Lake Nighthorse has the water

chemistry conditions that would support the quagga mussel (high calcium content and thermal conditions). Across the West quagga mussel are invading lakes and reservoirs leading to considerable concern and cost related to maintenance of water distribution and hydropower systems. The question the public and the water district should be asking is "who will pay the high costs of maintenance when the quagga mussel invades the new reservoir". Will the Water District pass this increased cost on to the public – the answer to that should be self-evident. Do they have some other plan in mind as to how to pay for the costs? Pass it on to the people who buy the water? Charge the Tribe? Get the Bureau to pony up the costs? Should the public at large pay for this increased cost or should the people who cause the problem pay? Should there be a large assessment made on every trailer boat that cannot prove it has been certified quagga clean? Should this assessment (say $100 per trailered boat per visit) be set aside immediately in a separate fund that pays for a mandatory cleaning station and for future maintenance costs at the dam? To date, the leading cause of quagga infestation comes from the transfer from an infected body of water (Powell, Mead, etc.). Without adequate control (i.e. guards and washing stations) it is only a matter of time before Nighthorse becomes infected. Once into a body of water, there is no way to manage the infestation. With the current County, State and Federal budgets being as depleted as they are, it would seem that the cautionary principle should be administered and motorized/trailered boats not be allowed on the reservoir until adequate precautions and controls are implemented. As a La Plata County homeowner and one who has already been assessed considerable financial costs associated with building the reservoir, I do not want to see my water assessments rise further until the future costs are laid out for all to see and discuss.

It would be a shame to close another body of water to boating. It is done all over the state. License money comes from all people that fish, not just those that walk in felt bottom boots down streams and glide in a canoe. Bass fishing and Walleye fishing is huge in the state and is rather overlooked on the large scale. Speaking to mussel invasion, if it was going to happen on the scale it has happened out west and in the east it would have already. All this talk about these mussels seems IMO and research to lack a few basic elements. A look at calcium supplies, cold weather sustainability, and lack of micro nutrients in the water. Look at the areas that have been greatly affected and read about the former water qualities, the native plankton etc and draw your own conclusions. The bottom line is if they are going to take hold they will whether its from migratory birds, kayaks, stream runoff, boating contact, etc, etc, etc. The funny thing in my research is people look at the doomsday effects but seem to bypass the good that many of these malevolent exotics have done for some bodies of water. Take Erie for example. I have yet to see any damage in an environment such as Colorado caused by these mussels. In fact there seems to be more issue with damage caused by low water levels than anything. Lastly I have yet to see any other groups step up the way that the TBF and Bass clubs have to promote events such as CAST "Catch a Special Thrill" and Fort Carsons kids day. These events cast a positive light on the sport as well as help the community. These efforts are helping direct the future of outdoor activities and can spark lifelong interests for many of the children and families involved. Take a minute and think about the positive effects boating and recreational fishing can have on the area.

A tremendous amount of revenue is brought in by boaters and fisherman. It would be a shame to miss out on that or refuse it completely. If it can't be used by everybody, then it shouldn't be used by anybody.

Anglers in Bass boats need to be able to fish this lake. Their contribution to the economy is huge.

I am an avid, (obsessed is a better word) fisherman and I would like to toss my angler's vote in for NO OUTBOARD MOTORS. As anyone who has spent a large amount of time on any body of water permitting speedboats and jet skis knows, speedboat traffic is a hazard, it is loud, and it is smelly. I think if speedboats are permitted, they should be required to stay under twenty MPH, and use four stroke engines. This eliminates the danger of collisions, and reduces noise and pollution greatly. California has similar regulations on many of its heavy use urban reservoirs. I would also like to see the lake be open 24 hours, as night fishing is a special treat.

I really like the idea of a non-motorized recreational area or at the very least limiting the size of motors and prohibiting jet skis. The possibility of a quiet, peaceful lake environment will do a lot for the Durango Area.

Excellent response, Mr. Wegner, and you're absolutely right. If Lake Nighthorse is to allow motorized boating, there will have to be a full-time employee or two trained to assess and decontaminate possible infected boats prior to launching. And, assuming there is only ONE launch ramp and boat access point, it would be easy to monitor. It would also be easy to close the launch ramp after hours to ensure that Lake Nighthorse stays mussel-free. I also wanted to clear up common misconception in your post. Lake Powell DOES NOT have mussels. Unfortunately, Lake Mead does, and currently spends $2.7 million each year to deal with the problem. http://www.nps.gov/glca/parknews/zebramussel1.htm
http://www.oldwestnewwest.com/20100824434/national-state-parks/other-nps/lake-powell-declared-free-of-zebra-quagga-mussels.html
I agree with the statements regarding either no motorized boats, or at least nothing bigger than a 10 horse trolling motor. As Durango continues to grow, you may also need to limit daily use to a certain number of boaters. Thanks for allowing input

Contrary to Mr. Wegner's post, Lake Powell is not infested with quagga or zebra mussels. The controls and programs set up by the USBR, the NPS and agencies from AZ and UT have protected this vast reservoir. These programs would be an excellent model for an infestation program at Lake Nighthorse Recreation Area.

I would like to see this area remain a quiet place for recreation for the residents of Durango and the surrounding area, and a safe haven for wildlife. Please consider a non motorized designation for the lake as well as for any trail system surrounding the lake. Water and noise pollution from gas motors should be a serious consideration. In keeping with the original land use intent of the Bodo family, please consider horse and hiker access, which is currently off limits for that use.

It would be wonderful to have mountain bike trails around the Lake. Also, let's limit motorized water craft to less than 10HP and either electric or 4 stroke motors (less polluting) only. Should be a great addition to our area!

There is nothing wrong with electric motors. My old metal fishing canoe has an electric motor and is much quieter than my kayak. Electric motors can propel a small boat swiftly and with no wake. They can be charged with a small solar panel. This will be a fine lake for small fishing boats with trolling motors.

Recreation planning must take known Golden Eagle nests into consideration to assure adequate buffers between recreational activities and nesting sites particularly during the nesting season from December 15 to July 15. This means no surface occupancy or human encroachment within CDOW recommended buffer guidelines (1/2 mile during nesting season). Educational awareness of raptor intolerance to human encroachment near nesting sites needs to be disseminated at the site. I strongly support non-motorized activities with the exception of electric motors. Based on likely strong opposition from the speedboat and jet ski community, a schedule for motorized and non-motorized use seem inevitable. Perhaps August & Sept must be sacrificed to motorized traffic for the sake of compromise.

As residents of Rafter J we ask that you please take into consideration nearby neighborhoods with respect to noise pollution and increased wildfire risk during the recreation planning process. Either non-motorized use or low HP motors on the lake would limit noise impacts to our properties and there should be no motorized trail use due to the proximity of homes in the area. Recreation development should also consider the increased risk of wildfire due to human activities at the lake and manage that accordingly. The area is thick with underbrush and flammable vegetation and an unattended campfire could spread into adjacent neighborhoods or Bodo in a blink of an eye. We are looking forward to having a nice recreation area near our homes but ask that the lake and associated facilities be a good neighbor and respect our properties as well.

There are a lot of families around here who would enjoy bringing kids to swim and fish in the lake without being overwhelmed with noise and waves. I think this lake is too close to Durango for motorized boats other than electric. The next best thing would be a no wake rule like Jackson Gulch. Having jet skis, ski boats and all the stuff like Navajo would make it Lake Night-mare!

i would like to stand in favour of no motorized use for the new rec area. there are plenty of other opportunities locally and given the wildlife corridor trying to keep impact at a minimum would be preferable
thanks

I am in FAVOR of motorized boats on the lake. I don't think the boats would be a bad thing or a big deal. Also I don't think it's fair for people to try and stop general use of a lake, just because they don't like the way it sounds or what they think it might disrupt. There could be some sort of time split or speed restrictions. Eliminating boats is going to limit funds for improvements in the future, and not just fish stocking, but facilities for shore use. I know the jet-skis can be annoying but you can't have everything.

First off, I would like to strongly agree with Kim Hall's Nov 10th posting that the area north of CR 210 should be reopened to the public. This could be an easy first step to take to allow us to access the numerous hiking trails in the area.

Although I am in favor in keeping the area quiet and as natural as possible, I think this can still be achieved while including boating and fishing. My understanding is that the $3M boat ramp was installed with the caveat that motorized boating be included. It would be a shame to have to pay back the $3M through usage fees. Does anyone know if electric motors would meet

the "motorized" requirement?

If gas engines are a must, please consider quiet hours. Maybe 7am to 8pm with trolling motors allowed outside of that window?

Having a trail around the perimeter with mountain biking on the north side would be wonderful. Any chance of mountain bike access on the west and south sides outside of the Nov 15 to May 15 closure?

I think having one or two developed campgrounds on the north shoreline would be good. Although I hate to say it, I think camping within 100' of the shoreline should be restricted to campgrounds to preserve the environment. Having other access points along the lake that can be driven to should be considered. Maybe a couple of picnic / day use areas off of CR 210. I would assume that the old CR 211 would be a viable access point on the west side? Maybe a couple of more access points from that side?

The grant does currently stipulate that gasoline-powered boats must be allowed but the size of the engines is negotiable. Also, there is a possibility of trails in the closure areas in the summer months. Those areas are closed in the winter and spring due to elk wintering grounds.

The Bureau should be mindful of its obligations under the Fish and Wildlife Coordination Act and Executive Order 13443 to provide for public hunting opportunities where feasible. This is particularly important given the loss in such opportunities which accompanied the conversion of the Bodo State Wildlife area to Lake Nighthorse.

I'm sorry to have missed tonight's public forum. As someone who hopes to use the lake mostly to sail, kayak and picnic, the ideas I would like to see considered include:
A phased approach so the area can be opened soon for uses that do not require much infrastructure.
A no-wake and low horsepower rule to accommodate fishermen but minimize noise and shore erosion.
Wheelchair accessible trails in several locations.
Raft/kayak launching sites in several locations separate from the trailer/boat ramp.
A trail all the way around the lake.
Eventually a sailboat parking or storage area where boats could be stored with their masts up, and no powerlines between the storage area and the launch ramp.

If in the great shortsightedness there is a restriction on HP for gas motors on the lake. There should be a clear and firm stipulation that fishing boats equipped with both Gas and Electric motors still be allowed on the lake. It would be a shame for me to show up with a 250 outboard and an electric motor and be told i cant come on the lake because my boat is equipped with the proper gas motor. Allow me to simply use my electric motor. And maybe run the outboard at no higher than 35MPH…As an FYI those that think there should be low speed limits on lakes for large power boats…Low speeds cause much more wave action than boats at full throttle. Its simple physics of the amount of mass moving within the water rather than on the waters surface (aka "on plane"). Also why not develop a WARM WATER SELF SUSTAINING stocking plan? Panfish, Pike, Bass, Walleye…these species if properly regulated will self sustain and reduce the need for the CDOW to throw away money on stocker trout on a yearly basis. If you can have someone on duty enforcing motor sizes, zebra mussel checks, fire watches, speed checks, noise level checks, etc… etc…someone can be there enforcing legal put and take fishing from the res.And remember…appealing to bass and walleye anglers just might get you help from the vast resources they have access too. The general populous has no idea just how much funding is available from sources like the Colorado Bass Federation.

If motorized usage is not permitted then all funding coming from motor based taxes and fees, including the majority of Wallop/ Breax taxation and boat registration fees, should also be excluded from this project. I should not have to pay these fees for restricted areas that are off-limits to my boat. Allow motorized boat usage.

Gasoline powered boats should be kept under 200hp, houseboats under 32 feet, and jet ski's be limited to under 50 at any one time on the lake. The boatramp should be closed sun-down to sun-up & have a 30 min. limit to allow launching & landing with the associated food/beverage coolers, fishing supplies, water toys, animals, people & fuel necessary for an outing. Navigational bouys should include lights and be placed at high-traffic locations on the lake to keep boat traffic organized, especially for water skiing! Road access for those without a boat should be expanded to encircle the lake for equal access for all. And lastly trash bins should be located every 200 ft. along the shoreline to help keep the lake clean.

Please allow at least some area for non-motorized rowing competitions. This would require an area about 1.5 mile long and about 100 yards wide that can be closed off at least part of the time.

While I prefer a ban of all motorized boats on this lake, I would nevertheless support crafts limited to trolling motors for those who want to fish. In light of safety concerns, I hope there will be a separate beach / launch area restricted for use by kiteboarders and windsurfers. I would also like to suggest we have a chance to re-name this lake using public consensus if that is possible.

As a avid bass fisherman, I will tell you where I sit before I tell you where I stand. As a past president of a bass club and a life long resident of Colorado I am in favor of more lakes and reservoirs supporting warm water species. Limiting opportunities for activities such as bass fishing is, in my opinion, short sighted and narrow minded. Multiple uses of this reservoir will allow for maximum funding under both federal and state programs. It will provide the use of a natural resource by all…not just a selected few.

I cannot tell you what the economic impact would be by limiting this resource to non-motorized use only; however, I can tell you that many enjoy water sports or activities that involve the use of motorized boats and to prohibit them will have a definite economic impact.
Use of the great outdoors by all has played a huge part in the growth and development of the Durango area. Please don't shut the door to many who enjoy motorized water activities.

Thank you for setting up the site for letting the general public express our 2 cents.
The lake should be open for motorized recreation. The no wake suggestions are not well thought out especially by those who are advocating sail boats. I my many years on the water, I have seen some big wakes behind some relatively small sailboats. The limiting of horsepower restrictions are again not well thought out. The small outboard motors are less efficient that the larger motors. A speed limit can be set, but with the size of this reservoir, I think it unnecessary. Like Vallecito, you will not see the cigar boats and such, as the size of the lake and the shallow areas will make it undesirable.
If I understand correctly, this recreation master plan needs to be designed with intent of getting a recreation manager on board. Trails and beaches are great amenities, but are holes to sink money into without any return on investment. It will be hard, if not impossible to get a manager on board with that alone. My suggestion is to build a master plan that will allow 40 to 60 developed campsites near the launch ramp. Build clusters of under developed (dispersed) campsites around the lake. Take a look how popular Junction Creek campground is, this site could easily have that many users. Have a restroom facility near each of these under developed clusters, and some form of hardened surface for tents. Develop a trail network, both natural surface and hardened surface to allow for multiple trail users. The talk of a beach could be very misguided. The shallow waters that would be appropriate for beaches, I believe with a constant water level, we will see an abundance of aquatic vegetation. There should be a facility built and fees collected from every user entering the area. Different fees for different activities. Bikes and pedestrians will have a very minimal fee, where boaters will be a slightly higher fee, and camping would require the highest fee. There needs to be a boat inspection station built. Every type of water craft entering the area should be inspected. It has been shown the spread of invasive species can happen with any type of craft, and some birds. A marina should be built into the master plan along with loading and unloading docks. I would go so far as to build in the ability to construct some type of eating established with a water front view. This lake and surrounding area could provide another great feature for the Durango area if done correctly. The economic help this lake could provide would be realized in fuel sales, hotel reservations, restaurant seating, water craft repairs and countless other ways that tourism is needed.
Again, thank you for setting up the site for voices to be heard.

I support non-motorized use of the lake, both winter and summer. While I agree that a trophy warm water fishery can be an economic asset to a community, by supporting tournaments. It has been demonstrated in other states that if the fishery is truly exceptional, tournaments can still be held with no motor or electric motor restrictions and still provide the an economic benefit to the area. But at this time I do not believe there is any plan for a warm water fishery, due to the possibility of accidental escapes to the Animas. Also hunting should be allowed. While high power rifle hunts may not be appropriate, Archery only and shotguns for turkeys and warterfowl are certainly shown to be safe and compatible with the activities suggested for this area. With the proximity to large tracts of DOW land, it would be a great opportunity to allow hunting as part of the multi use plan. Lastly a cross-country ski trail system should be considered on the north side in the higher elevations. The terrain is superb for a rolling world class trail system that is easily accessible from Durango. This too could provide economic benefit to the community as a destination trail system. It would get tremendous use by the local Nordic teams as well. Keep in mind that special considerations need to be taken while designing a ski trail so that it has safe run-outs and minimizes solar exposure. It's not as simple as creating a trail system and allowing skiing – it needs to be purposely designed to accommodate things like grooming equipment. Thanks

for listening.

I have enjoyed reading your comments, ideas, and potential options regarding recreation at our new "reservoir". I intend to submit my own, and I would like to disclaim that my discourse is in reply to comments only. I applaud all that have voiced on this topic. "In wildness is the preservation of the world" (Thoreau). The motorized debate should end by following the rules/ regulations that govern many State Wildlife Areas administered by DOW. No whitewater wake. Its a speed over erosion issue, besides wave action promotes nutrient loading, cycling, and deposition. Ridges Basin is full of wildlife. Can the same be said for any other high use mountain biking area? No bike trails. Why additional foot trails? Trodding on game trails is ill advised if you're concerned with disturbing the critters. Ridges Basin is a rangeland at serious risk. Noxious/invasive weeds comprise most of the herbaceous canopy cover. Are the horse enthusiasts content with feeding only certified weed free hay and are they willing to treat their pastures too? Elk/mule deer do calve/fawn and winter in RB, but many reside the year round. Human activity above "high water line" should not be allowed on the southern boundary. Allowing camping of any sort is more ridiculous, than the motorized debate. The San Juan Public Lands (FS/BLM) cover more than 2 million acres of free public land for us to enjoy. Step back from recreation planning, consider conservation first. Support and money is needed to facilitate reclamation and restoration first, recreation later. P.F.F.

Recreation on and off the lake needs to be open to all user groups. Certain areas of the water can be restricted to wakeless or motorless for the fishing and human powered craft user groups. Possibly the areas close to subdivisions that have sound concerns. Likely the West end of the lake. This is also the shallow water area better suited for that type of boating. Noise and speed restrictions should be in place for motor boats. Wakeless areas should be near the boat ramp and recreation developed areas.
All user groups need to be open to use and enjoy this wonderful recreation area. It's not right to limit it to a select few and shut out the rest. The concerns people have can and will be mitigated, but we all need to work together so it can be enjoyed by all.

To all the people that are against motorized use at the lake: Why are you not attending the meetings? Your presence would be so helpful in reaching a solution. Please, I beg you to come to the design workshops! It is not too late to be heard. Lets not wait to complain after the decision is made to allow large motor boats on the lake. Please please please!

I am firmly against any hunting whatsoever on these lands. Allowing other uses precludes any hunting for safety concerns. The elk and deer that winter in the valleys surrounding the lake seem to have to problems maintaining their numbers without overpopulating. It would be nice to have a place to go that you didn't have to worry about being shot while enjoying wildlife and the scenery. I also would like to see wakeless boating on the lake.

Please no motorized use on the lake. There are plenty of other options for motorized use, and the reservoir is small. If any boats then self propelled.
Mixed use of trails-hike/mountain bike/horse would be my vote. Please consider separate trails for bikes and horses, as they don't mix well even with all parties being considerate.

I agree with the posts which support the use of motorize vehicles on the lake. I have thought about this topic and I can see both sides of the issue however I believe that allowing all taxpayers access to the lake is the best option. Tax payers who enjoy boating and tax payers who do not should all be able to enjoy the lake as both groups will pay taxes to develop the recreational area. I believe that the use of no wake zones would be useful in areas where safety or erosion are of concern. I also believe that both hunting and fishing should be allowed under the auspices of the DOW. Thank you for considering my view.

The Lake will be an excellent place to hold triathlons. Therefore, I hope swimming and planning for such special events will be included in the Master Rec plan. Actually right now a triathlon could be held at the Lake using the boat ramp as swim access. There is an active triathlon public in Durango and the surrounding region. CR 210 could be used for biking and running and hopefully future trails would allow biking and running. Trails constructed will hopefully have some linking to other trails in the area.

It's a small lake with shallow water on one end and the layout of the lake doesn't lend itself to large numbers of boats or boats/ jet skis/water skiers running at high speeds. It's near residential areas whose residents deserve quiet; it's near town and more noise just won't be helpful. Noise should be managed to the lowest possible levels. Non motorized boats/crafts should be allowed; boats with small electric trolling motors (5 – 10 HP) should be allowed; boat rentals with 10 – 20 HP outboards might work and should be considered. Jet Skis and water skiing should not be allowed under any circumstances. The lake is too small and both activities simply require speed and produce noise. Winter sports should be encouraged: Snow shoeing and cross country skiing. Hiking should be permitted on designated trails and light camping should be considered. No RV's. No horses, no motorized bikes, no mountain bikes. All tear up trails.

I believe this lake is large enough for motorized boats but should be classified as a no wake lake. You could easily get from one end to the other in under an hour. You will be able to reach your favorite fishing hole or swimming area and still have plenty of time to take in those activities. The no wake requirement would allow for minimal disturbance to wildlife and everyone else on or around the lake. The lake should be open 24 hours a day for those that like to fish at night or for those that or able to spend the night on their boat.

Those of you who are also for a low impact, non-motorized or possibly only electric trolling motors, (this was group E on the meetings of Dec 7 and a few of us are meeting in the downstairs room at Durango Coffee Company at 5:30 pm – 8pm on Tues Dec 14. The purpose is to draft a single page statement of position and operating proposal for Lake Nighthorse

I support Motor-less boating and no hunting with bike/hike/SKI trails.
VERY limited camping permits by Lottery drawing only.

If it is to be a recreation area, lets not make it into a city park! -Boat access YES, motors YES, jet skiis NO.
-Trails YES- non-motorized travel: horses, hiking and bikes.
-Hunting YES- archery for big game, archery and shotgun for birds YES. Let's not waste a great opportunity for the community by limiting the access to the point that no one uses it.

The following comment is submitted on behalf of the Five Rivers Chapter of Trout Unlimited. We believe it is imperative that the Recreation Master Plan for Lake Nighthorse not create the possibility of introducing invasive species into the Animas River, affect the water quality of the river or adversely impact its flows. Specifically, the Master Plan for use of the lake must protect the Animas River from introduction of fish species that are not already present in the river, from mollusks, such as Zebra and Quagga Mussels, and from parasites and diseases such as "Whirling Disease". To that end, the Master Plan must identify an entity that will be responsible for ensuring the protection of the Animas River in connection with the use of the lake and the entity that will be financially liable for the remediation of the Animas River as a result of failure to protect it.

I agree with Chris and Julia — let's NOT make it a city park! I support motorized boat access and hiking, biking and horse trails. This is a great recreational resource close to town and I really think we can and should make the most of it. I also hope that swimming will be part of the plan, as well as limited camping.

Really, the committee for 'water recreation' was intentionally made lopsided in favor of motorized use of the lake. OK I accept that, but for them to recommend no restriction on H.P rating, size of boat and no recommended speed limit is irresponsible and disingenuous at best. Then when asked why, I was told by someone on the committee , oh 'we don't need that we can police ourself'. Really, you had your chance for that but chose not to have any rules governing, size, speed , number of boats, horsepower, but apparently there is some unwritten code that powerboater adhere too that we are unaware of. Sad but it will probable take a serious accident to get some restrictions in place.

Hi what theme are you using on this site? I love it

I would like to see a SAFE access point for dogs to enter the water. By that I mean – I would like to be assured that entry will not result in a dog getting tangled in submerged trees, getting caught among hidden boulders, etc. This area could be cordoned off so they do not interfere with the human beach area, wildlife, and horse trails. If we are truly a "dog-loving" town we could certainly have another dog safe area for them to socialize and play water sports. Why – we could even encourage some dog folk to add a dog dock jump. This is a fantastic sport for dogs but it needs to be in a water safe area. I know that some people say that a dog can enter the water at any point, but that is as foolish for dogs as it would be for people. But at least people can make an informed choice on their own behavior. I have spoken to several people about this issue and all are in favor of a safe water sport area for dogs. I have encouraged them to speak up! And I hope they do.

For all of your non-motorized/electric only/wakeless crowd: Do you use Pastorius Reservoir? How about Mancos State Park, Jackson Lake Wildlife Area near Farmington. How about Haviland or Electra Lakes? My point is that there are several of these types of lakes that are around, and yet you claim that you need yet another one. Yes, Nighthorse is close (and so is Pastorius), but

that doesn't mean it should be limited to your preferred type of use.
Take a look at Narraguinnep Reservoir near Delores/Cortez. This body of water is 566 acres, quite a bit smaller than the maximum surface area of Lake Nighthorse. It is even smaller than what the low pool level of Nighthorse will be (750 acres). Narraguinep allows the use of powerboats, water skiing, and wakeboarding, you don't hear of accidents happening. People who have powerboats aren't these crazy yahoos that you make them out to be. They are careful and considerate of each other. Nobody wants to ruin their day at the lake by being careless.
As a wakeboarder, I would like to be able to run down the road after a hard day's work, and get some riding in. Limiting powerboats to only during the week, or every other day would be feasible. On the weekends, many of us power boaters will choose to head to the bigger lakes anyway. We don't need some fancy marina. A primitive launch like Narraguinnep or McPhee has would be plenty. I would even support a usage fee, annual or daily, for powerboats to fund the mussel-inspections. I also support certain areas to be designated as permanent wakeless/motorless areas, giving swimmers, canoe users, and the like a calm area to enjoy.
A another point is speaking from my hunting background. To the person who stated this area should be a No Hunting area because wintering populations of deer an elk are having "problems maintaining their numbers". You need to check your facts. Deer and elk populations are on the rise. We have some of the healthiest herd numbers in history. In actuality, the CDOW is increasing the number of available hunting tags in order to try and reduce the population. Herds are not declining!
Don't believe me? Read the report posted on the Colorado Division of Wildlife's site: http://wildlife.state.co.us/NR/rdonlyres/2876137E-32D6-4A92-AEC4-64A7C142D0AA/0/2010BigGameForecast.pdf
These increasing numbers are a result of sportsmen and women spending their money on tags, firearms, etc. which helps to fund wildlife conservation projects…but that is a whole different story!
As a wintering area for wildlife, you won't have to worry about being shot, because, as with Perins Peak State Wildlife Area, the area should be closed to everyone….viewers and hunters alike. (Even though hunters most likely wouldn't be in the area, because the hunting seasons are pretty much wrapped up for the year by the time the animals make their way down to the lower elevations, like this, for the winter.
I feel that an archery and muzzle loader season could be justified for the Lake Nighthorse area. Although I would like to see the use of high power rifles, restricting their use could be a way to meet the anti hunters half way. If you want to use a rifle, go directly across the road, where it is permitted to do so in the Bodo State Wildlife area.
As Chris and Julia stated, do not make this a City Park type of area. It should be a recreation area for all to enjoy.

You all wanted this multi-million dollar problem. The NATIVE Durangoans didn't want anything to do with this idiotic plan. Now you all are complaining because it should be open to motorized vehicles? Really people this is suppose to be a PUBLIC lake. That means that it is open to ANYONE that wants to use it ANYWAY they see fit. If they want to bring a 90hp motorized boat on it to zoom across the lake in 2 minutes then let it be. If you didn't want it motorized you should have left the valley the way it was. You took away a great area to ride, hike, run cattle and picnic, so now reap the consequences. You all are turning Durango into California. Stop!! There are plenty of lakes in the area that offer non-motorized use. Go to Durango Lake or Havlin lake if you don't want to see someone with a motor on their boat.

I feel we need quiet, peaceful places to recreate and with the small size and acoustic challanges of this lakes location a 15 horse power limite should be placed on all small powered boats.

As a neighbor of the lake, I am worried about the noise at night if there is motorized use. I can clearly hear the train whistle up in Rafter J sub-division. The high frequency of a boat motor will surely be audible day and night and night and day. Personally, I don't want that. However, the discussion needs to be had on the following issues:

Are there hours operation being considered? Its a small lake. Is there a limit on boats in the water at any one time? If there is regulation, who is going to enforce it? If motorized use is the final decision, there needs to be rules and enforcement.

Finally, the wildlife here on the edge of Town is impacted enough already and I do not support motorized use for this reason above all else. Is there an impact study to habitat? There needs to be an effort to pay the pro-motorized group back who put up the cash for the improvements.

Comments received on postcards

Kayaking, canoes, beach swimming, picnic, sailing, horseback riding, hiking.
No motors larger than trolling, no motorcycles, no jet skis, no alcohol, a limit on how many are on the lake at one time.

Kayaks, canoes, beach swimming, hiking, biking, picnic, horseback riding, duck hunting, sailing.
No motors larger than trolling, no jet skis, no alcohol, no motorcycles.

What a marvelous opportunity to create new recreational venues for the Durango community. My hope, though, is that it is done so that the serenity of natures' preserve are maintained. I'm not completely opposed to motorized boats, but suggest that they be limited to electric only. How sweet it would be, though, to have a body of water that would be human & wind powered only!

Think out of the box! Honor Bodo's wildlife refuge desires, honor native Americans and their heritage, honor Coloradans by showing once again we DO have different values. Have you seen trash reports from Lake Powell? Honor the land and wildlife. Consider expense of policing motors and lake culture. NO MOTORIZED!

Non-motorized recreation as a priority. Regional tourism, wildlife habitat, cross country skiing opportunities.
Resource damage, user conflicts, over development. Accommodate to many uses.

Please no motorized or only electric motors. Yes to hiking, bikes (no motorcycles), horses, sailing, rowing. Many trails. A campground would be nice & quiet. Cross country skiing is good!
No jet skis. Please keep noise level from motors down!

Dive site for scuba recreation & training.

Horse trails & general planning.

No motor or electric motor/no wake only. No ATV's. Horseback, bikes OK. Fundraiser to pay back $3million so don't have to have motorboats.
Trash, noise, loosing the "natural" feel to the area. No night lighting. Operate dawn to dusk only.

Recreation for all. Swim beach for kids, camping area for tent camping as well as trailers, allow motorized boats—can set a limit of how many boats at a time. Noise concerns of residents—they knew the lake was coming & it boosted their value, now they don't want anyone to use it. Mountain bike trails. Access to camp at lake (like San Bitto Point (?) was) for limited campers. Will be limited to certain groups—we all paid for this as taxpayers.

Definitely would like to enjoy motorized boats & fishing.
My concerns are that it will be so "pristine" that it won't be accessible to all taxpayers. At the same time, I really don't want to see the lake trashed. It is so beautiful.

Would like to see boating of all types, courtesy docks, handicap fishing access, variety of fish species.
Small group of vocal folks, who do not live around the area, preventing motorized activities. The recreation project will need money to be built and maintained. The best source of monies is by development of boating activities. Please follow through on motorized boats, and creating great fishing opportunity. Thanks.

Fishing for warm water species, gas powered boating (wakeless or under certain speeds) ok & preferred.
Turning the facility into another bike and hiking area, those activities negatively impact wildlife much more than boats and fishing.

Decent hiking trails, no wake or HP restrictions if motorized is allowed, primitive camping.
Light & Horse pollution, motorized crowding out ___? I think non-motorized boats and users can coexist, but there should be restrictions on motor size, water skiing and jet skis. I'd like to see a canoe, kayak, and stand-up paddle board rental operation.

Allow boats with motors.
Safety of non-motorized boats in the daily winds.

YES to swimming beach, hiking, mountain biking, quiet motors, camping.
Can't stand jet skis, loud motors stink and destroy our calm. Camping can be costly to develop, maybe the sites could be created with just outhouses & trash pick-up (hot showers can wait). We can see the dam (we live up on Florida Mesa) and there are

REALLY BRIGHT LIGHTS shining over our way. When will these lights be dimmed?---Please.

I'm shocked at the max. and minimum lake surface levels -89' that's a lot of drop every year, and not appropriate for a sport fishery. If motorized water craft are permitted, then no wake-type requirements should be implemented. Organized camp sites, have swimming beach, group sites w/ a variety of activities, e.g. volleyball, horseshoes, etc. Hiking trails, limited to non-motorized transportation.

Motorized boats – YES! Duck hunting – YES! Big game and turkey hunting – YES! Warm water fishing – YES! Full use will provide significantly greater positive economic impact and make the lake more viable for a recreation operator.

Under 10 HP electric boats only – non motorized on west 1/3 of lake. Limit drive in access to reservoir to cut down on camping in non-campgrounds, fire pits & trash. No hunting, I think it will be too popular of an area for hunting to be safe. No ATVs, dirt bikes & jet skis. Beach area would be nice, long hiking trails (10 miles w/ loops)

Unrestricted motorized recreation is a must. The economic benefit from motorized recreation would be a welcome boost to Durango. Would like to see large-mouth bass stocked in lake.
The non-motorized talk is ludicrous. There are over 1.1 million acres in the surrounding San Juans for non-boating/motorize activities. Motorized boating – Yes. Motorized trails – Yes. Horseback riding - Yes. Multiple use – YES. Non-motorized – NO! Hunting – Yes.

The Bodo family donated this area as an area for wildlife. The Division of Wildlife managed it that way for many years. It has since become a dumping ground for uranium tailings, been flooded for a reservoir and had a high use county road built through the middle of it. Now we are discussing how to best provide recreational facilities that will please the most people. Please – return control to the Colorado Division of Wildlife—keep impacts to animals to a minimum. If you must recreationalize this gem of an area, limit high use of access to the immediate area of the lake. Please keep this former state wildlife area as the Bodos intended, as the Dow managed it, and as the wildlife deserves it.

Cross county skiing. Walking trails with dogs permitted. Swim beach. Horse trail access to lake as well as surrounding area. Picnicing. Kayaking.
Conflicting interests of water activities with motorized versus non-motorized watercraft. Limiting numbers of visitors so the experience is pleasant and not hectic/crowded. It is a beautiful setting very accessible to the City of Durango. I'm glad the area is closed now so unregulated use can't damage area before it can be developed and protected in a good way to preserve the natural beauty and wildlife. Whether it is a day use area or not is an area of concern with size being relatively small. Limited primitive camping would be nice. Maybe walk-in sites would be best. With the special wildlife using the area, some viewing spots would be nice. I am in favor of development aimed at keeping the area as natural as possible for more kinds of recreation that is appropriate to the natural features. I would not want to see a lot of paved roads, RV full hook-up or other development found in city parks. No skate park or basketball or soccer fields, please!

Multi-use. Guide by FSEIS commitments. Too many restrictions will be placed on recreation that is won't be economically feasible for someone/entity to manage. Subdivisions surrounding reservoir will dictate level of rec. development. This is a public use area. Other concerns (with process) – only passionate people come out to these meetings. Most get passionate about opposing something (versus supporting something.) This could result in skewing results based on passion. Let the BOR's EIS commitments be the guiding principles – let manager decide what he/she can make work financially.

Would like motorized boating, waterskiing, fishing. Motorized boating has been a planned use on the reservoir for many years. With only 30 trailer spaces, unlimited boating is not an issue. I support a ban on very noisy jet boats. However, I strongly support other motorized boating. I would like to be able to bring my grandkids boating, riding water toys, and waterskiing. Since this project has been planned since the 1970's, neighbors who have moved in since then should have known and expected motorized boating.

Priorities- wildlife, water quality, limit motorization (15 HP); Concerns- noise, pollution, degradation of property, cost of upkeep. I would like to see a limit on motorized boats- trolling motors, fishing skiffs only-15hp. I would like to see camping limited to a small number of sites, ie 30-40.

Keep it simple, kid and family friendly, minimize commercial aspects, no motorized vehicles. No gas motorboats, have some overnight camping sites but no more than 3 nights at one time. Minimize any water pollution, if possible can part of the neighboring area be used as a lab for K-12 students?

Bass fishing, hunting, boating (motor). Concerned about having speed restrictions.

That the reservoir remains a quiet, motorless body of water. Concerns- That collecting input from local citizens is merely a formality. That in reality plans have already been made to include extensive motor boat use and commercial operations at or near the campgrounds. I'm also concerned about the minimal, if any, efforts made to mitigate habitat loss for countless wildlife species that once thrived in what is now water. I would also be so pleased to see the area named Bodo Reservoir, calling it a lake promotes geologic misunderstanding.

Priorities- low cost, low impact, low noise, low pollution. Concerns- water quality, erosion, wildlife impacts.

Duck hunting, fishing, camping. I am rural on the general classification. Concerns: excess noise, no power boat group, I want no jet skis. For noise and safety concerns best compromise to allow fishing boats (including big bass boats) is speed or low (not no wake). DOW should manage all wildlife lane and water in consort with the rec. manager. That means, as in state wildlife area, that hunting of fowls, elk, deer and turkey. I lean toward wilderness/rural for different areas of the property. I am a close neighbor.

Old public comments prior to November 16, 2010 (mostly from Herald)

Everyone should be able to enjoy the facilities and trails, motorized and non-motorized alike.

Make the Lake a no wake lake

There should be motors allowed…this is an environmental travesty to begin with, not allowing boats is a dumb idea

Please allow no motorized use. Alternatively, please limit motor boats to electric engines under 10 hp. Especially, please do not permit jet skis.

Please have multiple small beach access areas for swimming

The natural habitat of the area supports quiet, non-motorized use of the lake. If motorized is permitted, please consider allocating certain days for alternating motorized vs non-motorized use.

It would be wonderful to have the lake non-motorized…to enjoy the silence would be heaven

The varied terrain north of 210 to Wildcat Canyon Rd offers perfect opportunity for horseback riding without access to the lake. Existing trails and deer paths can easily and economically be marked for riding and would be a wonderful and inexpensive use of great country

A multi-use (hike, horse, bike) trail all the way around the lake would be fantastic

No motorized use except for trolling motors. This lake is a perfect spot for sailboats, Hobi Cats, etc. Also, horse trails (without lake access), would be lovely. The quieter you keep it, the less it will intrude on wildlife and nature

Please develop a phased plan that allows for recreational use without a full slate of amenities. A parking area, some signage, and a trail system would be a good low budget start for day use.

Please no motorized boats except electric under 10 cc. Please limit campgrounds to areas where the noise can't be heard from nearby subdivisions. Local residents should not have to hear any human noise from the lake area.

Please keep LNH Reservoir in keeping with the intent of Mr. Bodo who originally designated the area as a wildlife preserve…low impact, low voltage motors if any, hiking/horse/bike trails, small swim beach for the kids. The less the better.

Non-motorized is the only way to go. A nice swimming beach, maybe even with a lifeguard for the kids. Walking and biking trails would also be really nice. Day use is the best with no overnight camping. Let's make it a place where people can go for a little peace and quiet.

I strongly support non-motorized recreation at the lake in ALL aspects, eg the trails and not just the lake itself

We can save both money and what has always made Ridges Basin a treasure through 2 stipulations on any LN rec plan: minimal building and non-motorized uses.

I think we need to keep things basic here. Take a look at how things were done at Vallecito 30-40 yrs ago. Do we really need to spend $25 million? I think if we keep simple fire rings, small grills, use a small amount of gravel and keep the area in as natural state as possible.

Motorized recreation is being crammed down our throats thanks to a $3 million boat ramp

Am I one of an apparent minority who wants motorized boat use on the new reservoir in addition to being able to ride my motorcycle on the trails, ride my mountain bike on the trails, and hike the trails with my dogs. This is public land and I would like to have my multi-use rights just like any other tax-payer.

Motorized boating is one of the larger revenue sources available for the new lake…and would be a good boost for the local area economy too. This is a multi-use resource which costs us taxpayers a great deal to build. We need to look at a proper mix that will see good payback on that investment. It has the potential to be a great fishing, picnicking, hiking, and all around recreational asset to the Durango populace.

There has got to be a sweet spot that will allow access and provide basic facilities but not turn it into Disneyland.

I don't see any reason the lake cant be used and enjoyed by all. Perhaps there could be a large area designated as a no-wake zone where non-motorized users as well as swimmers can enjoy themselves without having to worry about boats speeding by. There should be plenty of room for all.

Please ensure…to genuinely consider ways to keep the lake open for multi-use and justify the existence of the ramp. Multi-use recreation…would leave the area around Ridges Bain in its most useful state to the largest number of taxpayers possible.

Please emphasize non-motorized use and control the location and intensity of mechanized uses. Roads in the area should be kept to a minimum. Parking could be located at access points along existing roadways and not on roads into the area. Pre-historic and historic resources should be carefully preserved through the development of an interpretive plan.

Kayaking, canoes, beach swimming, picnic, sailing, horseback riding, hiking.

No motors larger than trolling, no motorcycles, no jet skis, no alcohol, a limit on how many are on the lake at one time.

Kayaks, canoes, beach swimming, hiking, biking, picnic, horseback riding, duck hunting, sailing.

No motors larger than trolling, no jet skis, no alcohol, no motorcycles.

What a marvelous opportunity to create new recreational venues for the Durango community. My hope, though, is that it is done so that the serenity of natures' preserve are maintained. I'm not completely opposed to motorized boats, but suggest that they be limited to electric only. How sweet it would be, though, to have a body of water that would be human & wind powered only!

Think out of the box! Honor Bodo's wildlife refuge desires, honor native Americans and their heritage, honor Coloradans by showing once again we DO have different values. Have you seen trash reports from Lake Powell? Honor the land and wildlife. Consider expense of policing motors and lake culture. NO MOTORIZED!

Non-motorized recreation as a priority. Regional tourism, wildlife habitat, cross country skiing opportunities.

Resource damage, user conflicts, overdevelopment. Accommodate to many uses.

Please no motorized or only electric motors. Yes to hiking, bikes (no motorcycles), horses, sailing, rowing. Many trails. A campground would be nice & quiet. Cross country skiing is good!

No jet skis. Please keep noise level from motors down!

Dive site for scuba recreation & training.

Horse trails & general planning.

No motor or electric motor/no wake only. No ATV's. Horseback, bikes OK. Fundraiser to pay back $3million so don't have to have motorboats.

Trash, noise, loosing the "natural" feel to the area. No night lighting. Operate dawn to dusk only.

Recreation for all. Swim beach for kids, camping area for tent camping as well as trailers, allow motorized boats—can set a limit of how many boats at a time. Noise concerns of residents—they knew the lake was coming & it boosted their value, now they don't want anyone to use it. Mountain bike trails. Access to camp at lake (like San Bitto Point (?) was) for limited campers.

Will be limited to certain groups—we all paid for this as taxpayers.

Definitely would like to enjoy motorized boats & fishing.

My concerns are that it will be so "pristine" that it won't be accessible to all taxpayers. At the same time, I really don't want to see the lake trashed. It is so beautiful.

Would like to see boating of all types, courtesy docks, handicap fishing access, variety of fish species.

Small group of vocal folks, who do not live around the area, preventing motorized activities. The recreation project will need money to be built and maintained. The best source of monies is by development of boating activities. Please follow through on motorized boats, and creating great fishing opportunity. Thanks.

Fishing for warm water species, gas powered boating (wakeless or under certain speeds) ok & preferred.

Turning the facility into another bike and hiking area, those activities negatively impact wildlife much more than boats and fishing.

Decent hiking trails, no wake or HP restrictions if motorized is allowed, primitive camping.

Light & Horse pollution, motorized crowding out ___? I think non-motorized boats and users can coexist, but there should be restrictions on motor size, water skiing and jet skis. I'd like to see a canoe, kayak, and stand-up paddle board rental operation.

Allow boats with motors.

Safety of non-motorized boats in the daily winds.

YES to swimming beach, hiking, mountain biking, quiet motors, camping.

Can't stand jet skis, loud motors stink and destroy our calm. Camping can be costly to develop, maybe the sites could be created with just outhouses & trash pick-up (hot showers can wait). We can see the dam (we live up on Florida Mesa) and there are REALLY BRIGHT LIGHTS shining over our way. When will these lights be dimmed?---Please.

I'm shocked at the max. and minimum lake surface levels -89' that's a lot of drop every year, and not appropriate for a sport

fishery. If motorized water craft are permitted, then no wake-type requirements should be implemented. Organized camp sites, have swimming beach, group sites w/ a variety of activities, e.g. volleyball, horseshoes, etc. Hiking trails, limited to non-motorized transportation.

Motorized boats – YES! Duck hunting – YES! Big game and turkey hunting – YES! Warm water fishing – YES! Full use will provide significantly greater positive economic impact and make the lake more viable for a recreation operator.

Under 10 HP electric boats only – non motorized on west 1/3 of lake. Limit drive in access to reservoir to cut down on camping in non-campgrounds, fire pits & trash. No hunting, I think it will be too popular of an area for hunting to be safe. No ATVs, dirt bikes & jet skis. Beach area would be nice, long hiking trails (10 miles w/ loops)

Unrestricted motorized recreation is a must. The economic benefit from motorized recreation would be a welcome boost to Durango. Would like to see large-mouth bass stocked in lake.

The non-motorized talk is ludicrous. There are over 1.1 million acreas in the surrounding San Juans for non-boating/motorize activities. Motorized boating – Yes. Motorized trails – Yes. Horseback riding - Yes. Multiple use – YES. Non-motorized – NO! Hunting – Yes.

The Bodo family donated this area as an area for wildlife. The Division of Wildlife managed it that way for many years. It has since become a dumping ground for uranium tailings, been flooded for a reservoir and had a high use county road built through the middle of it. Now we are discussing how to best provide recreational facilities that will please the most people. Please – return control to the Colorado Division of Wildlife—keep impacts to animals to a minimum. If you must recreationalize this gem of an area, limit high use of access to the immediate area of the lake. Please keep this former state wildlife area as the Bodos intended, as the Dow managed it, and as the wildlife deserves it.

Cross county skiing. Walking trails with dogs permitted. Swim beach. Horse trail access to lake as well as surrounding area. Picnicing. Kayaking.

Conflicting interests of water activities with motorized versus non-motorized watercraft. Limiting numbers of visitors so the experience is pleasant and not hectic/crowded. It is a beautiful setting very accessible to the City of Durango. I'm glad the area is closed now so unregulated use can't damage area before it can be developed and protected in a good way to preserve the natural beauty and wildlife. Whether it is a day use area or not is an area of concern with size being relatively small. Limited primitive camping would be nice. Maybe walk-in sites would be best. With the special wildlife using the area, some viewing spots would be nice. I am in favor of development aimed at keeping the area as natural as possible for more kinds of recreation that is appropriate to the natural features. I would not want to see a lot of paved roads, RV full hook-up or other development found in city parks. No skate park or basketball or soccer fields, please!

Public Comments from direct emails

In response to an earlier email, you asked that I email you my ideas. I have been horseback riding that area since 1994 and am pretty familiar with all its possibilities. It would be very easy to lay out riding trails in the area north of 210 which does not have any lake access. There are many trails already in place, as well as deer trails that can be converted. All it would take would be some riders, some red ribbon marking trails and we'd have a pretty good idea of what to do.
I shoudn't think it would take a lot of money to do horse trails. I am a member of Backcountry Horsemen which specializes in repairing and building trails. I am sure they would help with trail crews. The existing trails have always been shared by hikers and horseback riders (all two of us). Of course, it would be nice to ride around the lake and have access to the south side of 210, but to me the main issue is to get trails for horses approved as soon and with as much ease as possible.
We prefer a "quite" lake with only electric motors and no other motors allowed
Consider economic alternatives be allowed such as:
1. farmed aquaculure venture/s that enhance sustainability, local food source availability, and increased economy through employment and commerce
2. allow consideration for a destination adventure Indian village such as what might be envisioned by Disney or Universal Studios which would include Tepees, discoveries, general life as it once was and now through nature discoveries
3. film studios and sites to attract the film industry

I will not be able to attend tonight due to prior obligations and am guilty of not staying up to speed to date on the meetings and such. This is mostly due to the fact that I thought motorized boats for water sports and bass boat type fishing would be allowed and now I am hearing differently. I would like to request that you present this letter at tonights meeting.

My points are as follows;

1) Boat Ramp
The $3 million boat ramp installation was/ is contingent on motorized boat use. It was certainly not intended to only launch small horse power boats that can be launched from a gravel ramp or the beach, a $3million ramp is certainly not required for this, its intent was to launch larger motorized vessel.

2) Boat size and horse power
In board Boats up to 19 feet with 250 horse power and out boards up to 150 horse power should be allowed. (These horse powers equate to 1/3 the speed if in an automobile or 40 MPS max). This is simple to monitor and is done at lakes throughout the united states and locally. Both the length and horsepower are obvious and clearly marked on all models falling within these parameters except Inboard motor boats which will need to get a horse power certification from a local authorized marine service center on a Colorado state approved form. (there has to be a limit of some sort for many obvious reason)
The mussel inspectors can review such documentation prior to launch, they have the time and are capable.

Characteristics of these boat types are as follows;
-The Horse power and length parameters above significantly limit the number of boat models that will fall within them while allowing a boat that can perform all water sports with the least impact.
-Boats are not like cars where there is 100's of models in this category, it is limited
-These are the Smallest entry level size and Horse power boats made that cover skiing, all water sports, and bass boat style fishing.
-These are not the big wave makers with the booming tower speakers, cabin cruisers, or jet type cigarette type boats .
-These models do not go in excess of 40 Miles per hour, even less at this altitude
-These boats make the smallest wakes, and average 3 to 6 occupants
-They are nimble and can turn on a dime, they are literally used on ponds in many areas for water sports and fishing

By allowing these boats and all the smaller vessels discussed to date you are granting access to all possible water sort uses on the lake, not a limited scope of users. All this while maintaining a level of control in terms of wake sizes, boat noise, speed, and such.

3) Adjacent land owners concerns
To say you have an inherent property right to not hear boat noise on a lake, from your patio, is like saying you don't want to hear air plane noise in the sky, vehicle noise on the road or future roads that are built, the moo of a distant cow or the rumble of a farmers tractor.

You can certainly try and buy these rights through land acquisition but they are by no means inherent nor guaranteed.

IF you own land around the lake and you don't want to hear or see boats then you should be happy to know that your property value will increase based on the permittance of these type of boats, allowing you to sell your home in a down market for a profit in many cases. (look at historical value increase near any US lake, especially in the west where water is limited)

How can one argue that the lake shall only be used to suit their needs is preposterous, especially when the list of benefits provided to them significantly outweighs the cons; water for fire helicopters which would have limited the burn several years ago, recreation, cooler and moister air, views, increased property value, new safe road to town.

This lake has been in the works through 2 generations of local and out of area attorneys, if you were concerned that only your uses were seen as valid you had the right to sell your property, as the writing was on the wall for years.

With the length and horse power limitations put in place the lake can be enjoyed by all user types safely and collectively.

1 – Location, location, location – What, generally, would the character of a lake adopt when it is less than 5 minutes from a city/ town?

2 - Is it possible to maintain a primitive type of lake when it is less than 5 minutes from a town on a paved road? We have been to primitive lakes in Colorado. First you drive, then you might take a 4WD road, and you ultimately end up hiking in to the lake – and back out.

3 – We would like to add another descriptor to your list of publicly acceptable, technically feasible, environmentally responsible, and economically viable: realistic. Is it realistic to expect a primitive environment to be maintained when the lake is close to a bunch of people? Do we essentially set up the Bureau of Reclamation for failure because the expectation is unrealistic? Again, surely this must have been tried someplace – and there must be some data.

4 – A primitive area with no restroom facilities flies in the face of preserving water quality. Is that a true statement?

5 – Someone suggested last night that the fishing wouldn't be good there for many many years. Is that true? If we wanted to create a very productive and enjoyable fishing experience for people, how would we manage the initial years of the lake? Would we delay opening it for a year or two while the fish population grows? Or will it take as long as 10 years to expect to be able to fish?

I am not in favor of limits to boat size or horse power instead think that you can limit noise, speed, hours of operation, areas of use, etc. How is anyone going to look at my in board boat and know my horse power.

Will water skiing be proposed. I think this can work like at Electra lake and many other lakes around the country that put a limit on boat length and horse power in two categories.
Inboard motor ski boats-19' limit w/ 300 horse power limit (this is a very small inboard boat that holds the dirver, one spotter, and one passenger. They are a flat bottom boat that create less wake then much smaller boats. (the true horse power raring at this altitude would fall in the 240 range if the boat was rated at 300 hp at sea level)
Outboard motor boats with 175 horse power limit and 19 feet in length.
These two distinctions rule out all bigger larger wave making craft and would limit the lake to these smaller craft. None of the tower/ wake board boats that make the big waves and have the load speakers would fall into these categories so that would not be an issue.

This would preserve the shore line, small craft and fisherman enjoyment while allowing water skiing

This can all be handled at the check in gate
Joy, i cannot make it on Dec 7 or 8, but wanted to emphasize the concerns of the Ute Mountain Ute Tribe (and other participants). As you may know, but I am sure the community does not know, this reservoir is probably the only BOR domestic water use facility built by the federal government.
Virtually all BOR reservoirs were constructed to provide water for irrigation and secondarily for domestic purposes. Virtually all Corps of Engineers reservoirs were built for flood control purposes and other purposes secondarily. Nighthorse was built to settle longstanding Tribal winters rights and to secondarily to provide domestic water for serveral nearby entities. What this means is that preservation of drinking water standards is priority number one. What this also means is that preservation of a full reservoir--while desirable of course--is not established as an operation mandate. In other words, recreation must give way to these water quality and water quantity matters. I IMAGINE THAT AT BEST 5% OF THE DURANGO COMMUNITY UNDERSTANDS THIS.....SO JOB NO. 1 FOR YOU (as unpleasant as it maybe) IS TO GET THESE MATTERS OUT ON THE TABLE. They won't eliminate water recreation but they are likely to require limitations on such activities.

I was not able to make it to the open house last evening.

I have been from the beginning an E group person. I was and still am opposed to motorized boating on the lake.

The group I was in Tuesday and Wednesday had a large majority of boaters. Basically I felt that boaters got everything they wanted up to and including "wake boats" and other "ballast" boats which pose the highest risk for invasive species. Because the the boaters did not wish to exclude any type of boat they even accepted houseboats.

My argument from the beginning of this process has been that "no motor boats" does not eliminate any persons in the sharing the lake it only eliminates certain types of activity. Clearly we are far beyond no motorized boating. I have known that since 2008 when it was made known that the Wallop Breaux money had been accepted. I have argued from an extreme position in hope of somehow limiting the impact of boaters on the lake.

The only remaining possibilities that I see are limiting the speed of boats. I have proposed a 15 mile per hour speed limit. Of course in the group discussion that was shouted down. There are lakes in Colorado that do have speed limits, for example on Chambers Lake the speed limit is 10 mph. With just a little research I was able to find that both Douglas Reservoir and Monument Lake are both "no wake". Dillon Reservoir has a 30 mph speed limit.

One of the pages of info I gave you yesterday indicated various speeds required for water skiing and etc. A thirty mph speed limit is adequate for all but barefoot water skiing.

The desires of motor boaters is based on selfish interests. The impacts from motor boating effect everyone on or near the lake. Primarily I am concerned with the impact on the wildlife on and around the lake. Because boaters want no limitations imposed on them they will have a maximum impact.

Accepting that there will be motor boats allowed on the lake, there are still ways to reduce the impact and a moderate speed limit is one. Fifteen mile per hour limit would lessen the noise as well as the wake effect produced by motor boats. Keep in mind that water skiing even barefoot skiing is an activity. Limiting the speed in no way excludes people it only limits activities like for example barefoot water skiing. 15 mph in no way hampers the opportunity for fishing.

As for invasive species like the zebra muscle, allowing ballast boats and houseboats on Lake Nighthorse greatly increase our risk.

Fewer than 5% of the residents of LaPlata County have registered the ownership of a boat. The 95% of us who do not own boats certainly have varying views on how the lake should be used. I simply do not feel that 5% should be allowed to dictate to the majority.

The elk and deer and all the wildlife in Ridges Basin should be given the greatest consideration.

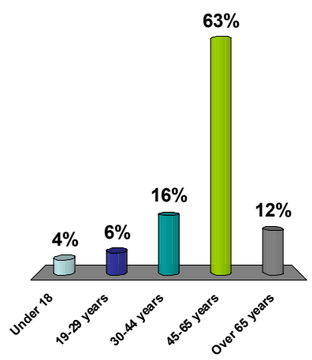
Finally I have one comment with regard to hunting on or around the lake. The noise and safety concerns should far out weigh the interests of hunters. A 12 gauge shotgun produces a 156 db(A) noise. This far exceeds the 86 db(A) noise levels of modern outboard motors.

Key Pad Polling

Lake Nighthorse Master Plan
Nov. 16, 2010

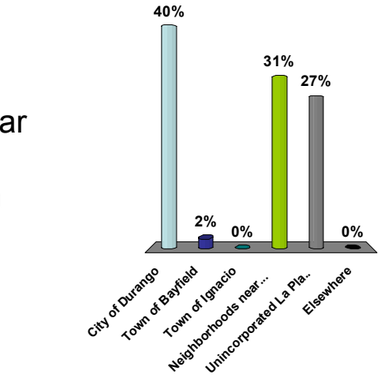
1. What is your age

1. Under 18
2. 19-29 years
3. 30-44 years
4. 45-65 years
5. Over 65 years



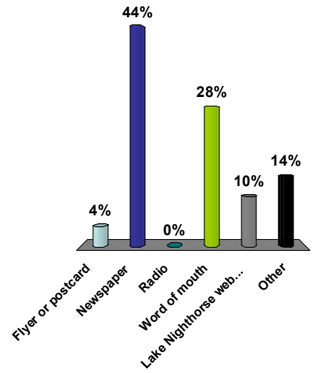
2. Where do you live?

1. City of Durango
2. Town of Bayfield
3. Town of Ignacio
4. Neighborhoods near Lake Nighthorse
5. Unincorporated La Plata County
6. Elsewhere



3. How did you learn out about this event?

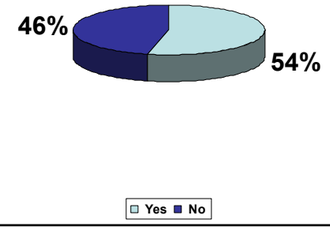
1. Flyer or postcard
2. Newspaper
3. Radio
4. Word of mouth
5. Lake Nighthorse website
6. Other



4. Have you participated in any of the previous meetings on Lake Nighthorse recreation?

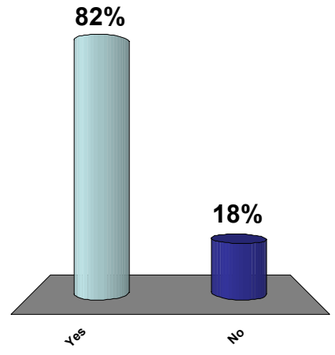
- •March 2009 recreation meeting
- •Open houses last week.

1. Yes
2. No



6. Have you viewed Lake Nighthorse since it has been filling?

1. Yes
2. No



5. What kinds of recreation do you participate in (pick up to 10)?

84%	1.	Use trails: walking, running, biking
16%	2.	Use trails: equestrian
60%	3.	Fishing
62%	4.	Nature observation/study
65%	5.	Swimming/wading/diving
69%	6.	Paddling/rowing/sailing
35%	7.	Motorized boating, water-skiing/riding
13%	8.	Off highway vehicles (OHV)
65%	9.	Camping
64%	10.	Social gathering/picnics

7. What activities would you like to do at Lake Nighthorse (Top 3)?

70%	1.	Use trails: walking, running, biking
4%	2.	Use trails: equestrian
45%	3.	Fishing
27%	4.	Nature observation/study
34%	5.	Swimming/wading/diving
45%	6.	Paddling/rowing/sailing
25%	7.	Motorized boating, water-skiing/riding
0%	8.	Drive/ride off highway vehicles (OHV)
20%	9.	Camping
13%	10.	Social gathering/picnics

8. What facilities would you like to see provided? (Top 3)

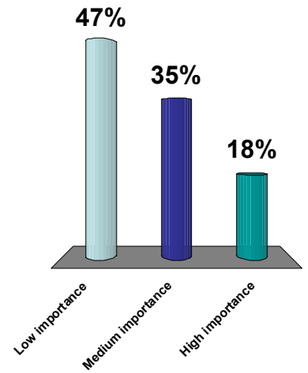
25%	1. Boat ramp/vehicle access to shore
52%	2. Swim beach
32%	3. Campgrounds
59%	4. Trails: hiking/running, biking
4%	5. Trails: equestrian
0%	6. Off-highway vehicle area (OHV)
32%	7. Shore fishing access
18%	8. Marina/mooring balls/boat slips
41%	9. Picnic Areas
9%	10. None

9. Up to 3 concerns you have about recreation at Lake Nighthorse:

55%	1. Noise
29%	2. Over-crowding
42%	3. Compatibility among lake activities
11%	4. Compatibility among land activities
15%	5. On-water safety
45%	6. Impacts on wildlife/aquatic habitat
22%	7. Risk to water quality
7%	8. Visual impacts
44%	9. Litter, vandalism, crime, fires
7%	10. No concerns

10. Rate the importance of economic benefits to the region as an objective for the Lake Nighthorse recreation master plan?

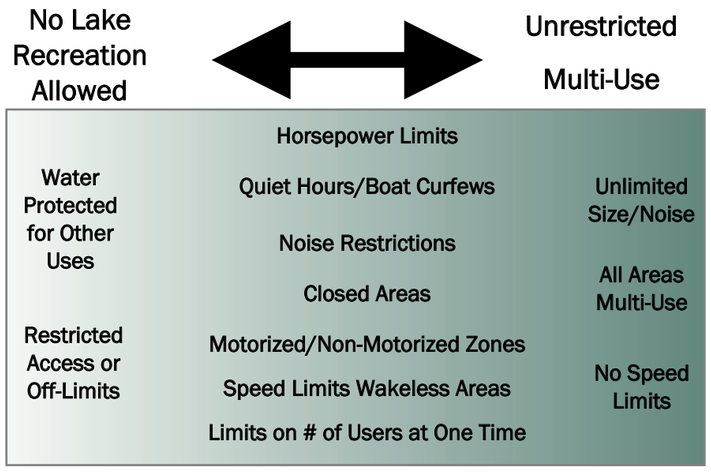
1. Low importance
2. Medium importance
3. High importance



11. Do you think organized and/or commercial recreation would be appropriate? (Up to 3)

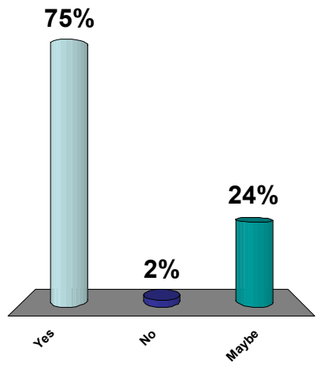
39%	1. Recreation program use
43%	2. Recreation instruction/outdoor education
4%	3. Outfitting/guided activities
18%	4. Competitions/events
16%	5. Club use
12%	6. Boat/scuba/equipment rental
18%	7. Nordic ski trails/equipment rental
39%	8. Any of the above (1-7)
10%	9. Other organized/commercial recreation
12%	10. No organized/commercial recreation

Water Recreation Opportunity Spectrum



12. Are you willing to explore solutions for shared use of the Lake?

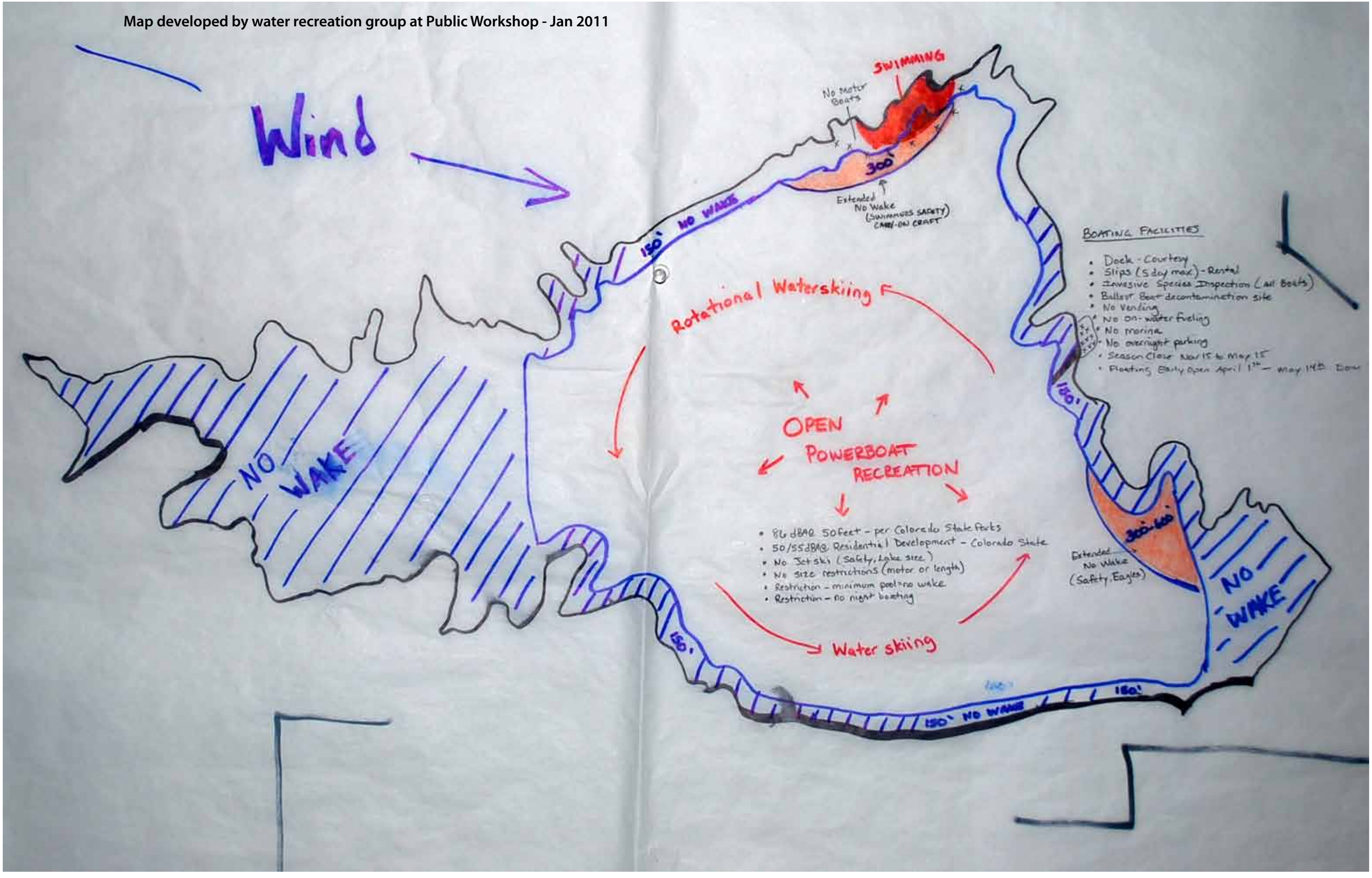
1. Yes
2. No
3. Maybe



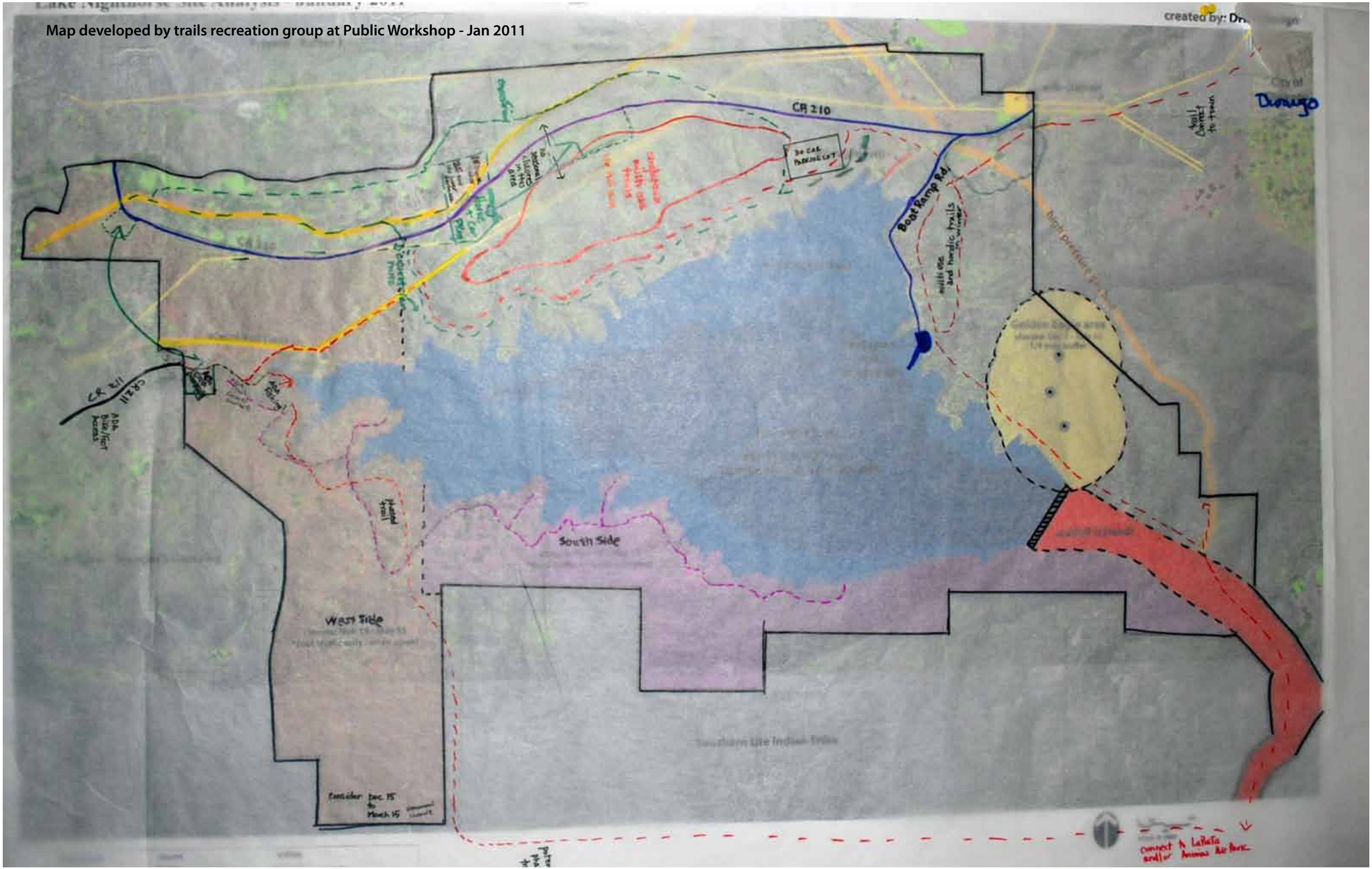
13. What management approaches are you willing to explore to find shared lake use solutions? (Top 3)

33%	1. Motorized/non-motorized zones
40%	2. Noise restrictions
44%	3. Speed limits/wakeless areas
12%	4. Off-limits closures
27%	5. Boating curfews/quiet hours (daily)
15%	6. Motorized/non-motorized use schedule
19%	7. Limits on number of users at one time
31%	8. All of the above (1-7)
6%	9. Unlimited/unrestricted use
6%	10. No recreation use allowed

Map developed by water recreation group at Public Workshop - Jan 2011



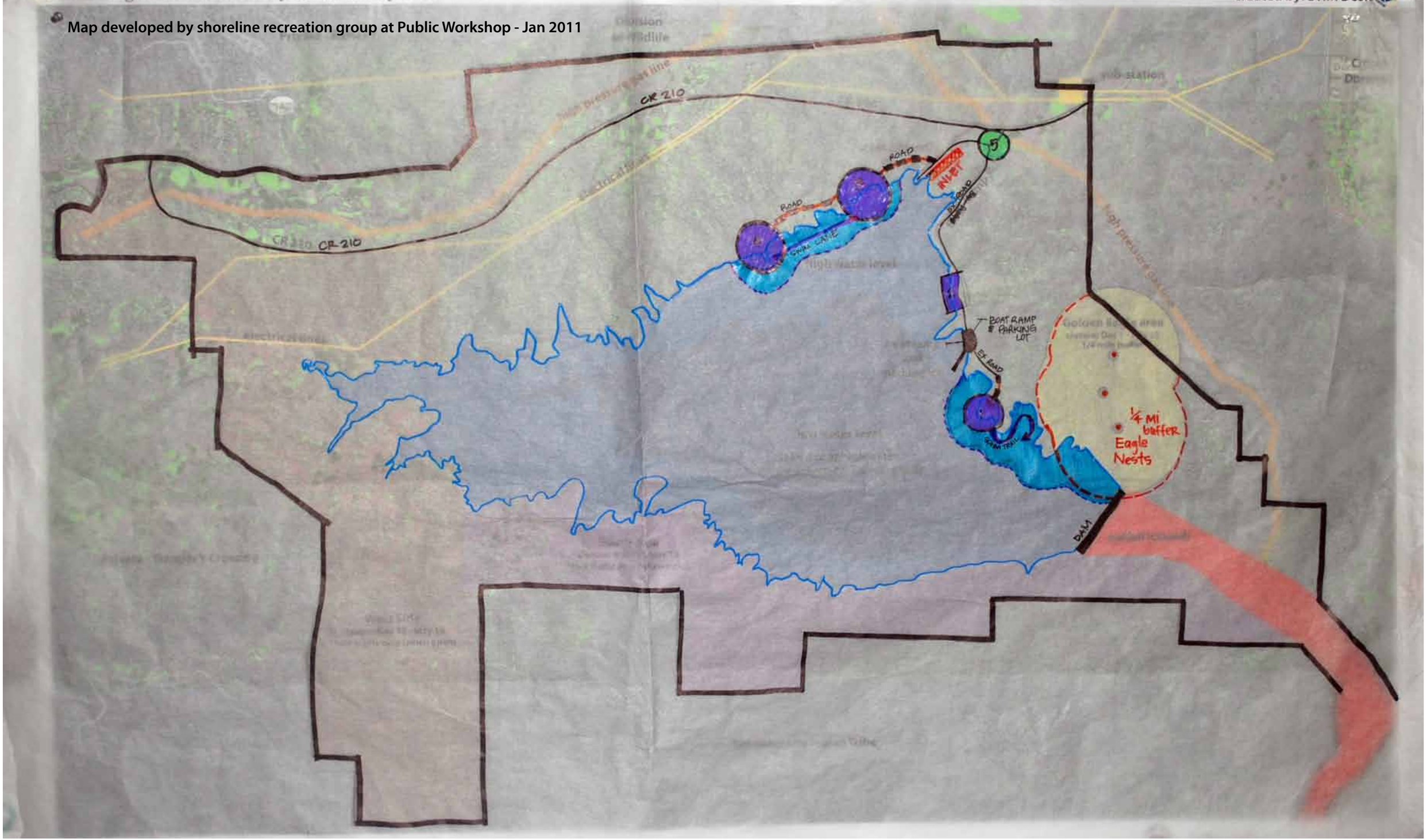
Map developed by trails recreation group at Public Workshop - Jan 2011

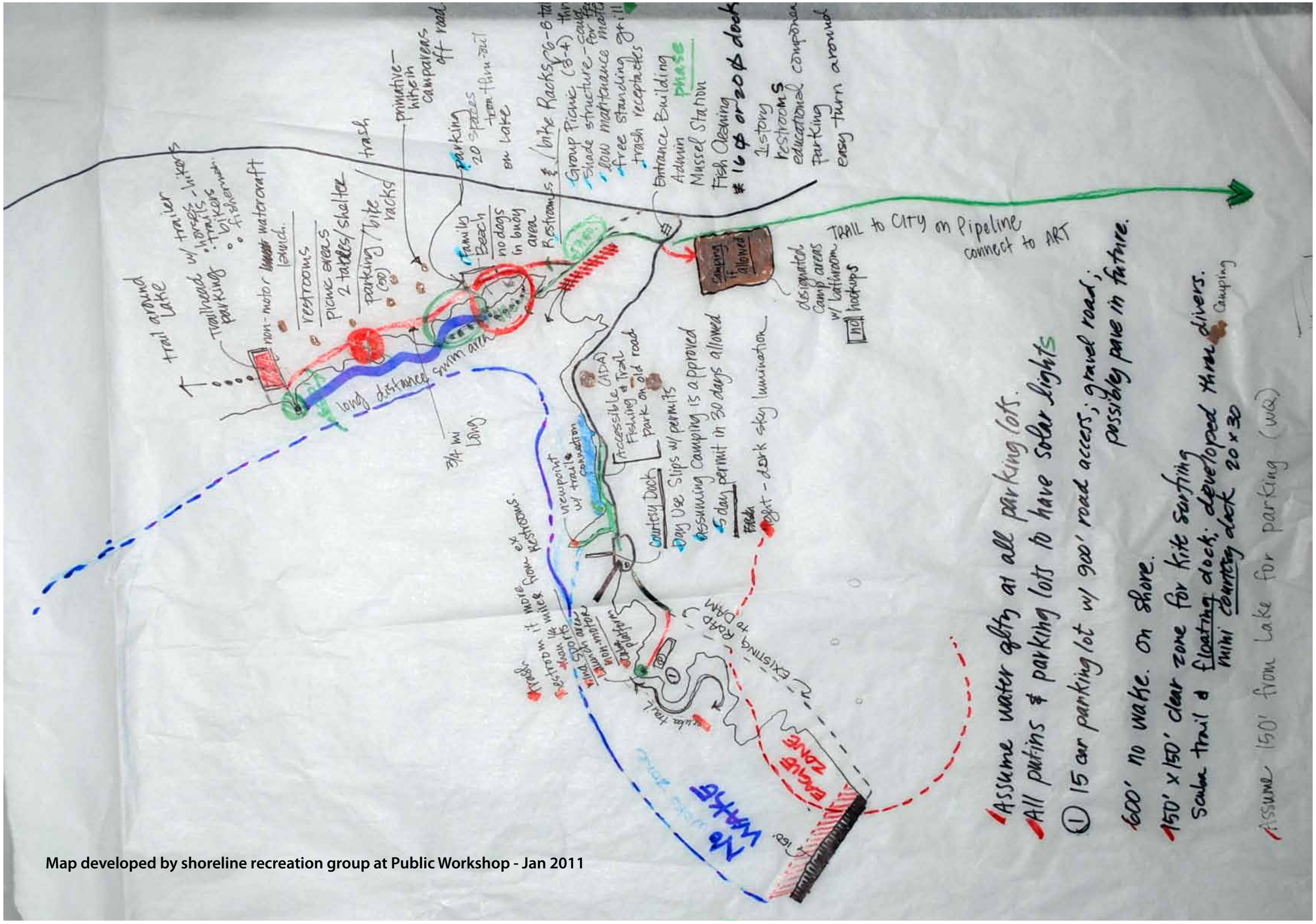


Lake Nighthorse Site Analysis - January 2011

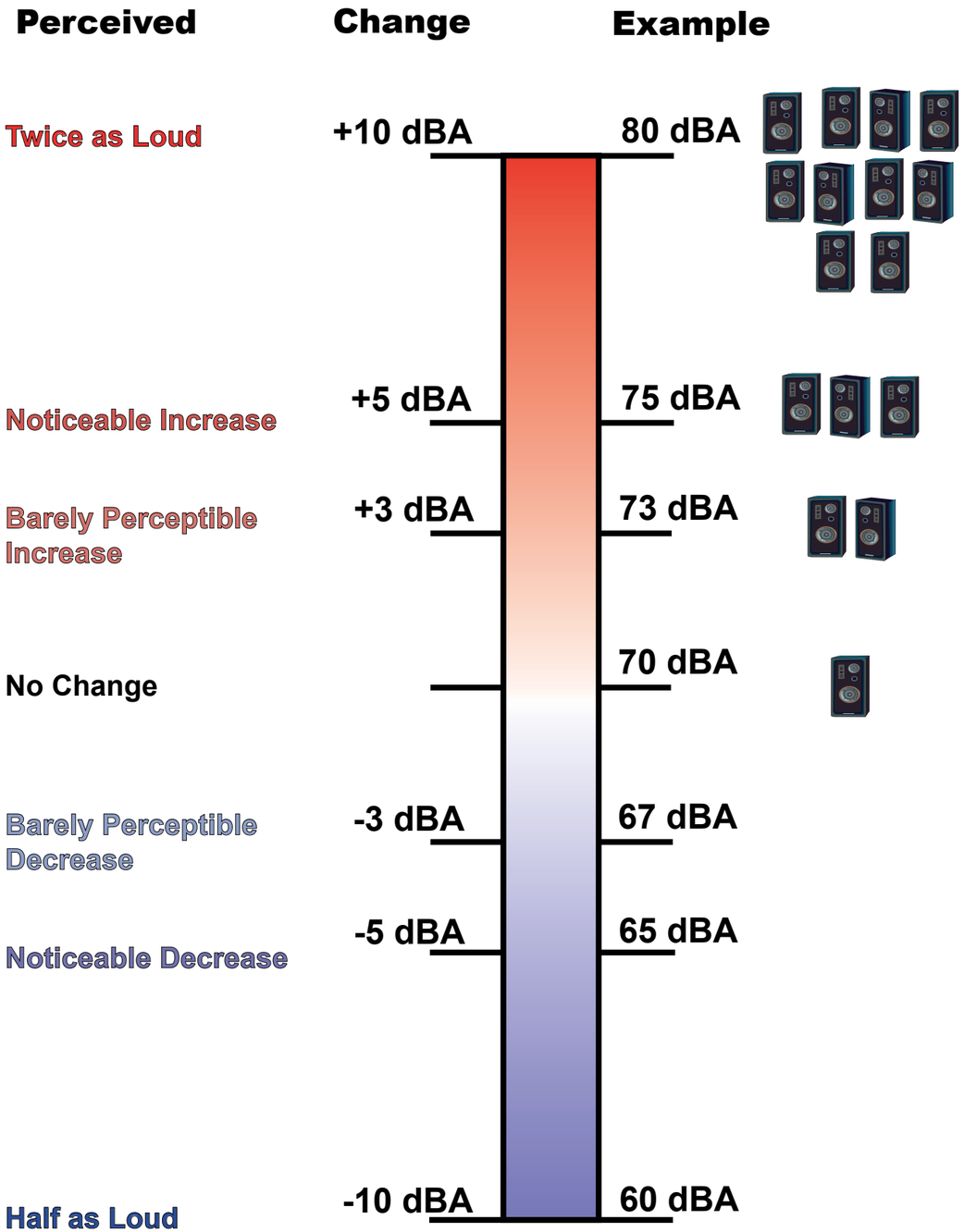
created by: DHM Desi

Map developed by shoreline recreation group at Public Workshop - Jan 2011





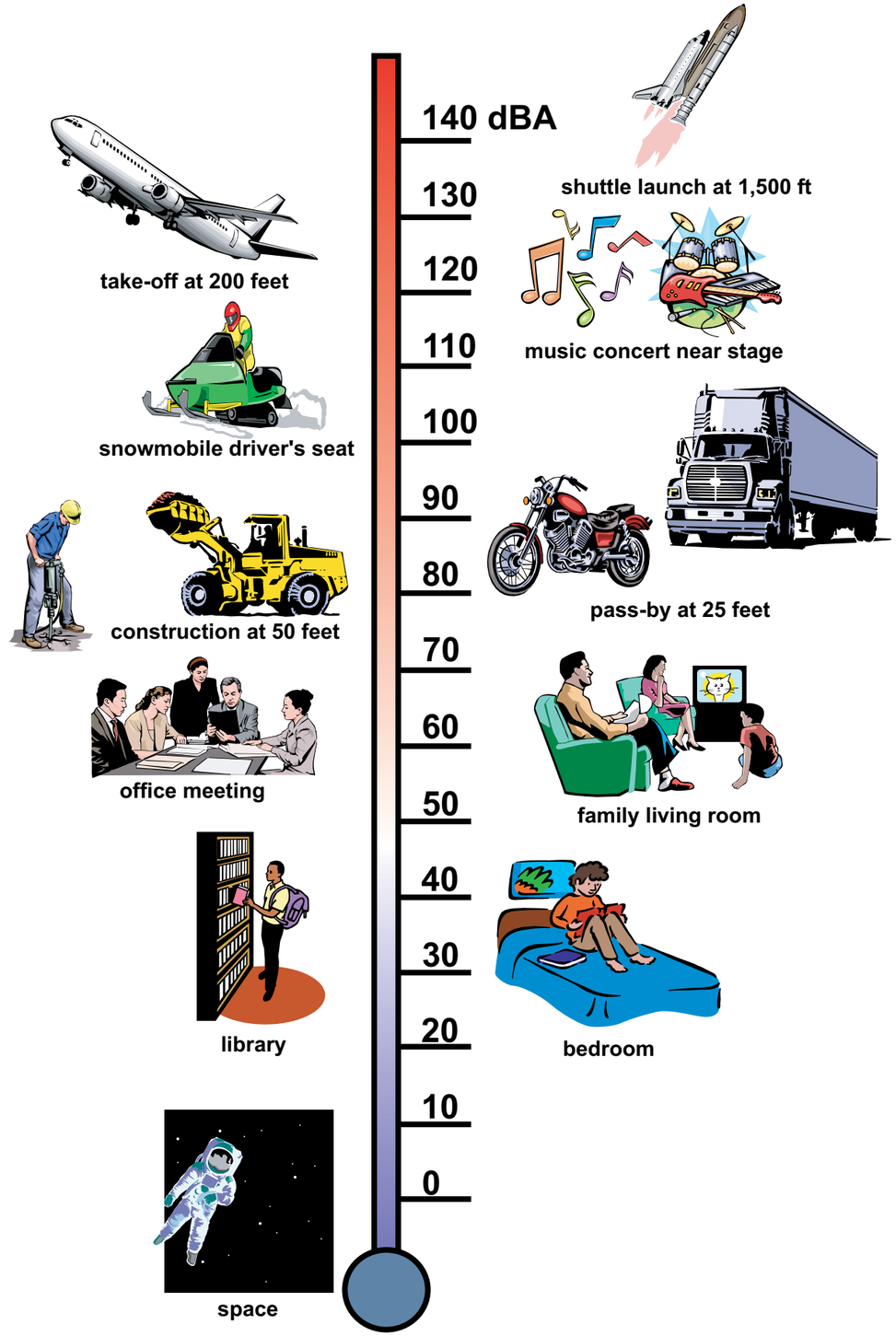
Map developed by shoreline recreation group at Public Workshop - Jan 2011



NOISE LEVEL DIFFERENCE AND PERCEPTION

SOURCE: HANKARD ENVIRONMENTAL INC. - OCTOBER 2006

HANKARD ENVIRONMENTAL
ACOUSTICS AND VIBRATION CONSULTING



SOUND PRESSURE LEVELS

SOURCE: HANKARD ENVIRONMENTAL INC. - OCTOBER 2006

HANKARD ENVIRONMENTAL
ACOUSTICS AND VIBRATION CONSULTING

HANKARD ENVIRONMENTAL
ACOUSTICS AND VIBRATION CONSULTING

ACOUSTICAL ANALYSIS RESULTS

TO:	**Ann Christensen** – *DHM Design*	**DATE:**	April 26, 2011
FROM:	Jeff Cerjan – *Hankard Environmental*	**PROJECT:**	Lake Nighthorse Reservoir
SUBJECT:	Watercraft Noise Analysis and Contours		
CC:	Mike Hankard – *Hankard Environmental*		

This memorandum describes the results of a noise analysis that Hankard Environmental conducted for the Lake Nighthorse Reservoir Project, which is located approximately two miles southwest of Durango, Colorado. For our analysis we created an acoustical model of watercraft operating on the reservoir, and then used the model to predict the resulting noise levels at locations around the reservoir. We predicted noise levels for what is believed to be 'maximum' and 'minimum' boating scenarios, based on input from the project team. The results of our analysis consist of noise level contours overlaid onto an aerial photograph of the area. This information was provided to help the residents living near the reservoir understand the impact of noise from watercraft (i.e. ski boats, bass boats, but not personal watercraft) and was presented at the Public Open House on April 11, 2011 along with the Draft Recreation Master Plan. The following provides technical information regarding our analysis methodology, the acoustical model employed, and the results of the noise level predictions.

Methodology

The intent of this analysis was to predict how noise from watercraft would propagate from Lake Nighthorse out into the surrounding area for two boating scenarios. All boats were modeled using the maximum permissible noise level for watercraft (86 dBA L_{max} at 50 feet, which is the maximum permissible level for Colorado State Parks as well as several other state parks regulations across the country including Kansas, Nevada, Arizona, Oklahoma, Mississippi, Alabama, North Carolina, Iowa, and Missouri). Such a regulation would typically disallow any boats with above-water exhausts without substantial silencing/mufflers. The first boating scenario consists of one boat on the lake at the western-most location just outside the proposed no wake area (150 feet from shoreline, 600 feet from shoreline in specific areas, plus entire western portion of lake). The second scenario consists of ten boats scattered across the lake. Note that boats will need to be traveling at high speed in order to produce 86 dBA at 50 feet. Thus, additional boats could be on the lake at idle or operating at substantially quieter noise levels (~73 dBA at 50 feet) and not affect the resulting noise level predictions.

Acoustical Model

Noise levels were predicted using SoundPLAN v7.0, which uses ISO 9613-2 outdoor acoustical propagation equations. This model predicts 'downwind' noise levels in all directions. The noise emission factors for boats (octave-band sound level spectrum) were obtained from *Technical Report on Noise: Personal Watercraft and Boating Activities at Glen Canyon National Recreation Area*, HMMH Report No. 295860.370, October 2002, National Park Service. This spectrum was adjusted so that its overall level was 86 dBA at 50 feet. Note that the boat noise pass-bys at a distance of 50 feet measured as a part of this study ranged from about 77 to 84 dBA. The sound pressure level spectrum was converted to a sound power level spectrum and modeled in SoundPLAN as a point source with uniform propagation (no directivity). Noise from boats was assumed to emanate from a point located 1.6 feet above the water surface. Table 1 provides the sound power level input spectrum. The water surface was modeled as completely reflective (0.0) and the surrounding lands were modeled as partially absorptive (0.6).

TABLE 1

Sound Power Level Spectrum for Motorboat (equivalent to sound pressure level of 86 dBA at 50 feet) dB

Octave Band Center Frequency (Hertz)								*Overall*
63	***125***	***250***	***500***	***1000***	***2000***	***4000***	***8000***	***(dBA)***
105	108	123	113	111	108	105	101	118

Results of Predictions

The predicted noise levels for the one-boat and ten-boat scenarios are shown as noise level contours over scaled aerial photographs of the site in Figures 1 and 2, respectively. For the one boat scenario, the predicted noise level at the nearest residence is approximately 30 dBA, and that level increases to 37 dBA for the ten boat scenario. Per Colorado State Statute 25-12, the maximum permissible noise level is 55 dBA during the daytime hours and 50 dBA during the nighttime hours. The predicted noise levels from both scenarios are well below both of these limits.

When assessing the audibility of the boats within a residential area, one needs to consider the ambient (background) noise level. Generally, a source of noise such as boats will be audible when its noise level is equivalent to or even as much as 10 dB quieter than the existing ambient level. For this project, existing ambient noise levels were not measured, but considering the rural nature of the area and the nearest primary roadways (County Road 210 and Wildcat Canyon Road), background levels are likely in the 30 to 40 dBA range during the daytime at the homes nearest to the reservoir. Thus, during calm or downwind conditions, boat noise will be audible at some residences. Note that a review of meteorological data for Durango, Colorado (1992 to 2002) shows that the prevailing winds during the summer months are from the north. Thus, during such winds, the boat noise should not be as audible at the residences to the north.

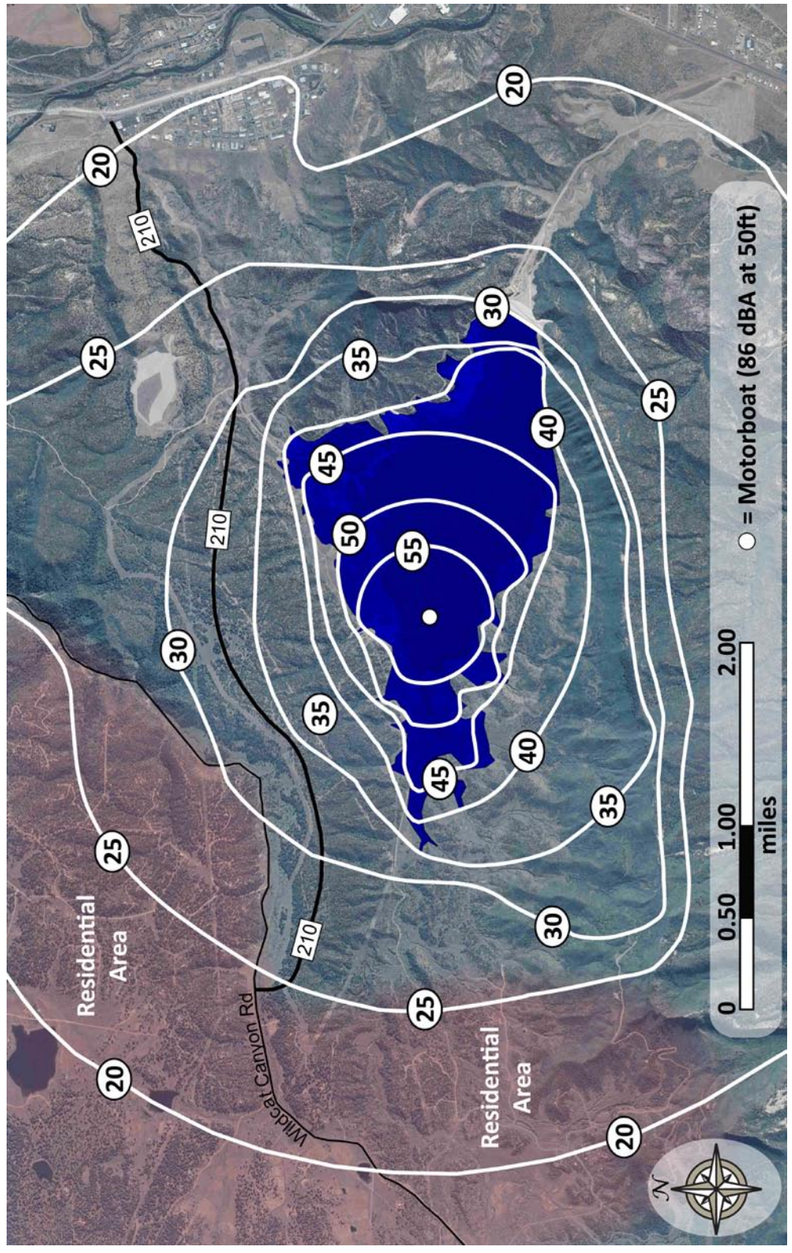


Figure 1 – Lake Nighthorse - One Boat - Predicted Noise Level Contours (dBA)

LAKE NIGHTHORSE RESERVOIR
WATERCRAFT NOISE ANALYSIS AND CONTOURS
HANKARD ENVIRONMENTAL INC.

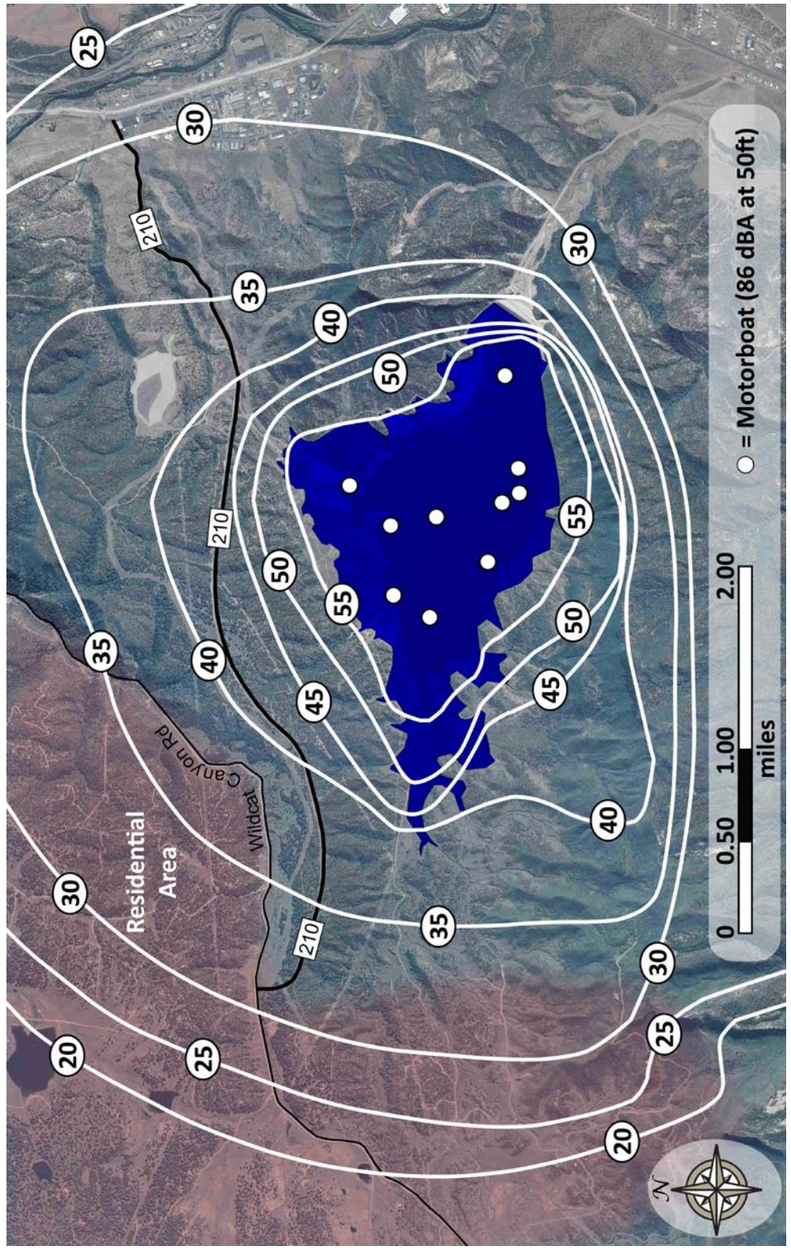
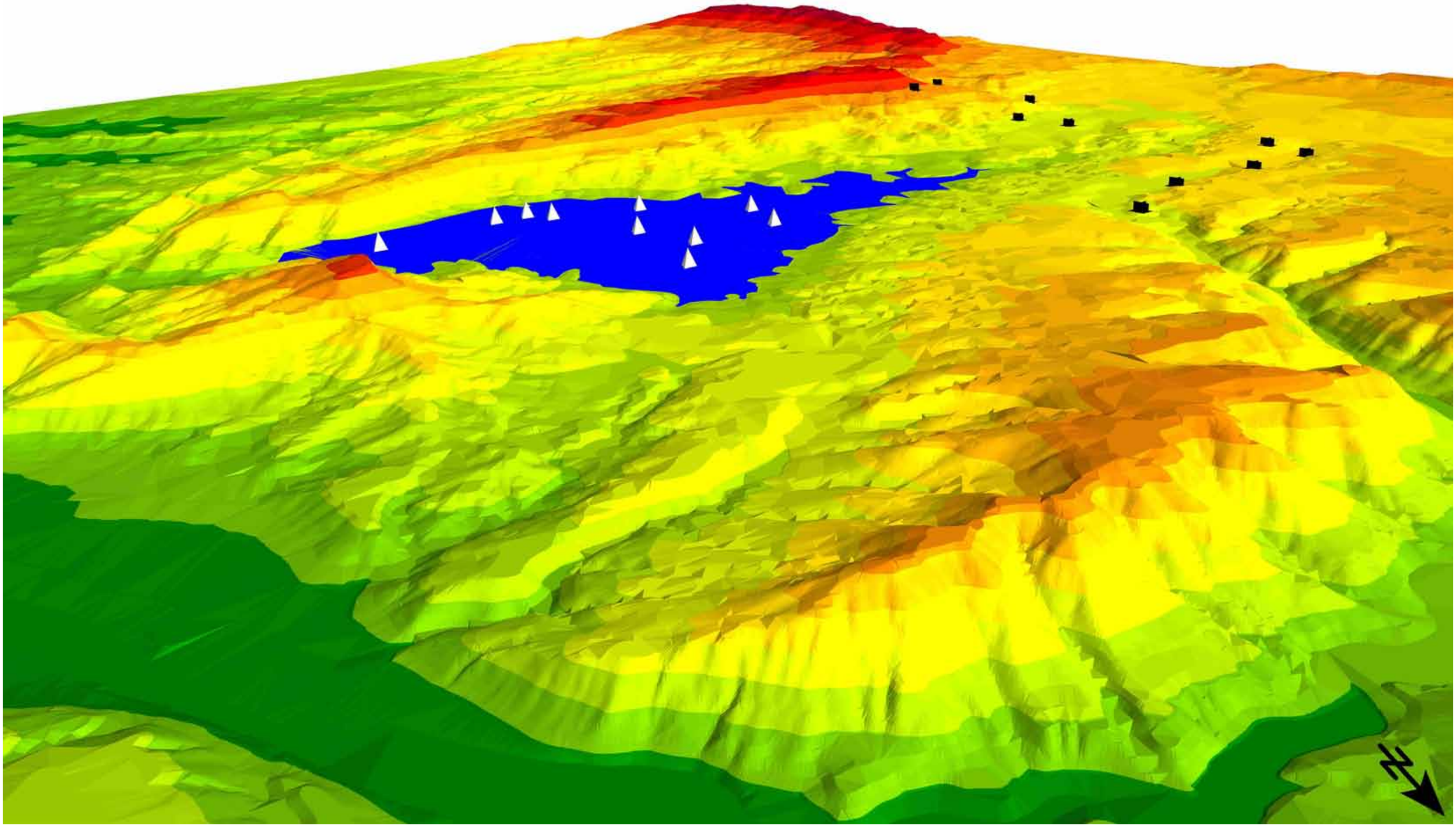
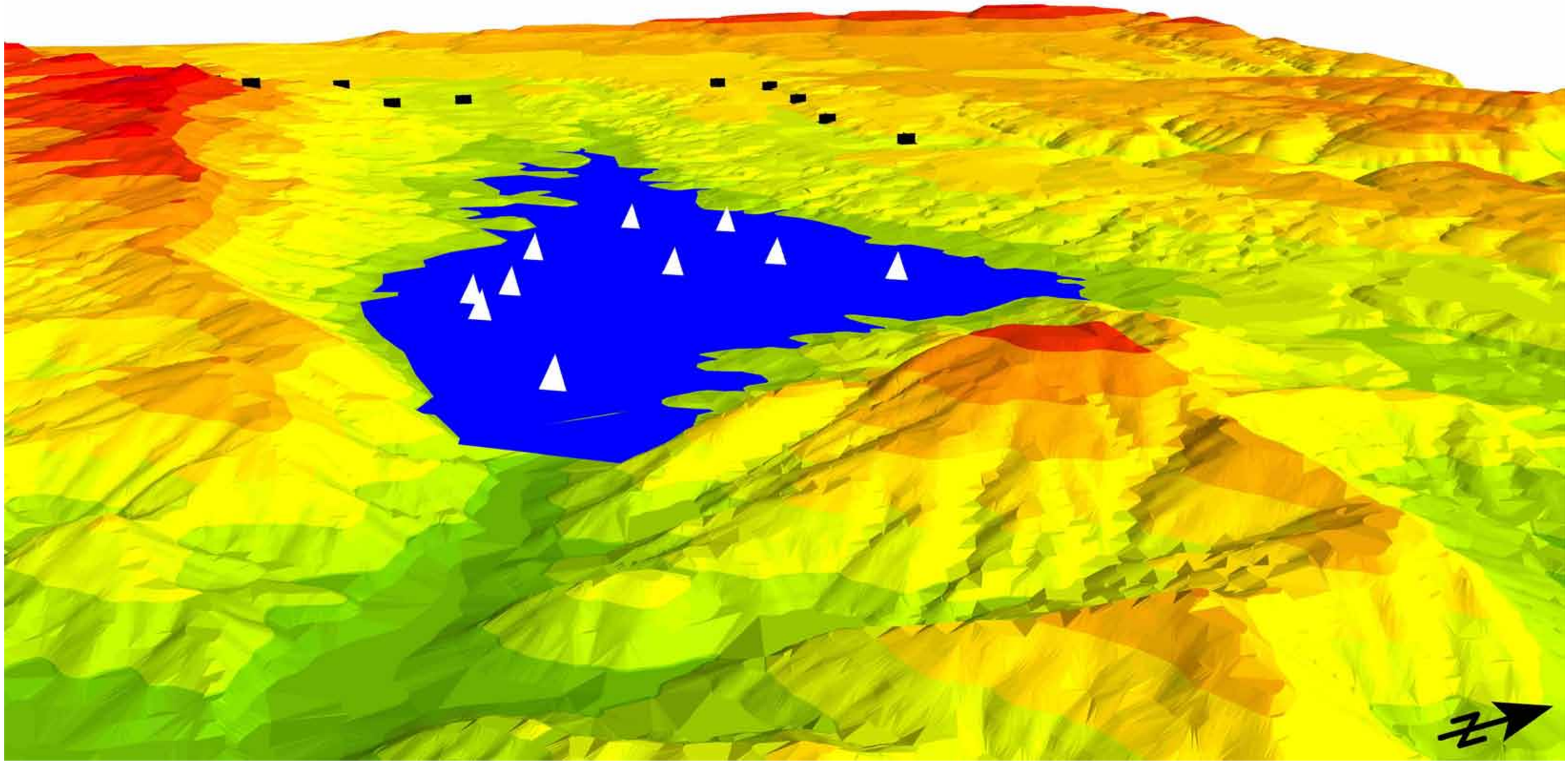
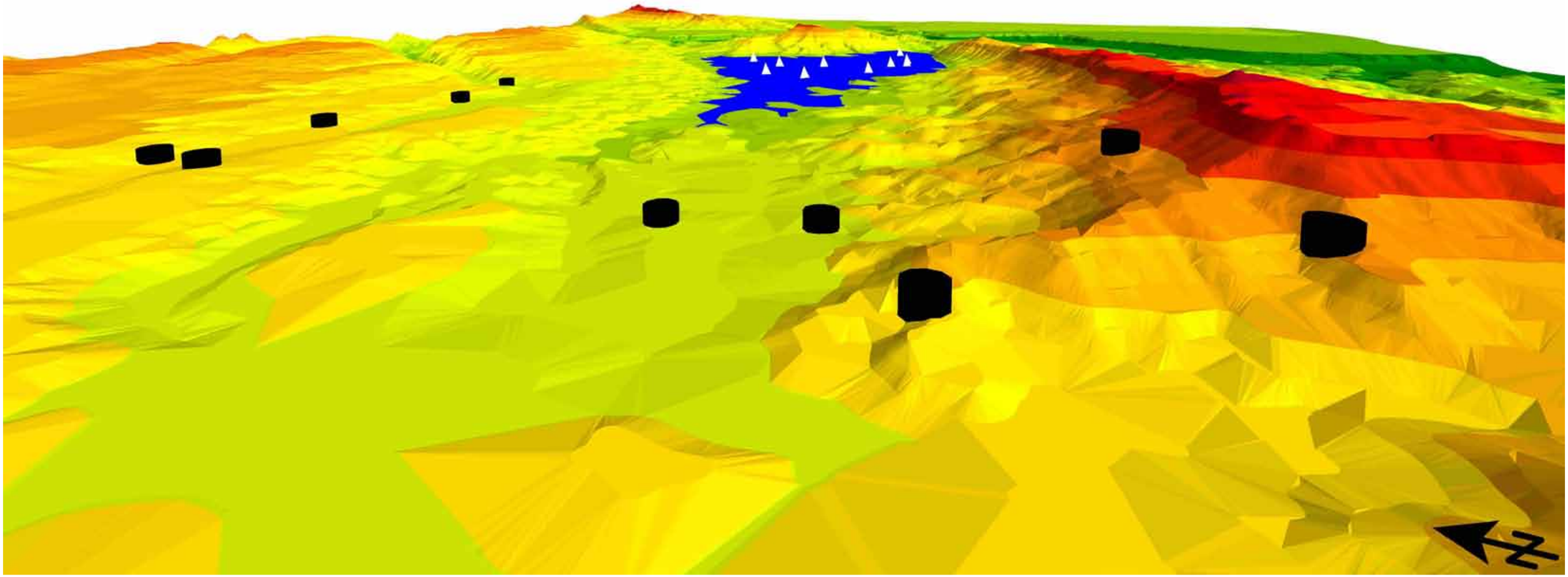


Figure 2 – Lake Nighthorse - Ten Boats - Predicted Noise Level Contours (dBA)







OUTDOOR RECREATION supplied by USBR
Unit Cost Estimating Guide

Description	Unit	Cost/Unit
Trail System		
Cleared Earth Path	Square Feet	$0.87
3" Gravel Path	Square Feet	$1.07
2" Asphalt Path	Square Feet	$2.00
4" Concrete Path	Square Feet	$4.86
Road System		
Dirt Road	Square Feet	$0.76
6" Gravel Road	Square Feet	$2.18
3" Asphalt Road	Square Feet	$3.56
Campsites		
Typical Gravel Spur (Single)	Each	$2,920.00
Add Asphalt to a Gravel Single Spur	Each	$960.00
Add a 20 ft x 20 ft ADA Tent Pad	Each	$1,400.00
Typical Hard Surface Spur (Single)	Each	$5,810.00
Typical Hard Surface Spur (Single) with Full Hookups	Each	$11,960.00
Typical Hard Surface Spur (Double)	Each	$7,590.00
Typical Hard Surface Spur (Double) with Full Hookups	Each	$14,020.00
Typical Gravel Walk in Site with Firering	Each	$1,820.00
Typical Gravel Walk in Site with Grill	Each	$1,730.00
Steel Shelters - 12x12 to 14x14 - Square Foot Price	Square Feet	$56.00
Steel Shelters - 16x16 and Larger - Square Foot Price	Square Feet	$45.00
Day Use Areas		
Table and Grill	Each	$980.00
Typical Gravel Site with Grill - Remote Location	Each	$1,730.00
Typical Gravel Site with Grill	Each	$1,200.00
Typical Asphalt Paved Site with Grill	Each	$1,480.00
Typical Concrete Paved Site with Grill	Each	$1,910.00
Table and Firering	Each	$1,070.00
Typical Gravel Site with Firering	Each	$1,290.00
Typical Asphalt Paved Site with Firering	Each	$1,570.00
Typical Concrete Paved Site with Firering	Each	$2,000.00
ADA Asphalt Paved Site with Grill	Each	$1,710.00
ADA Concrete Paved Site with Grill	Each	$2,340.00
ADA Asphalt Paved Site with Firering	Each	$1,800.00
ADA Concrete Paved Site with Firering	Each	$2,440.00
Group Area (Asphalt)	Square Feet	$10.63
Group Area (Concrete)	Square Feet	$12.31
6" Gravel Parking	Square Feet	$2.57
3" Asphalt Parking	Square Feet	$3.76
Steel Shelters - 12x12 to 14x14 - Square Foot Price	Square Feet	$56.00
Steel Shelters - 16x16 and Larger - Square Foot Price	Square Feet	$45.00
Electrical General		
Small Transformer (15 kva)	Each	$2,511.00
Medium Transformer (30 kva)	Each	$3,868.00
Large Transformer (75 kva)	Each	$6,289.00
Electrical Service to Pedestals	Feet	$39.00
Restroom Buildings		
Single Vault Toilet	Each	$14,580.00
Double Vault Toilet	Each	$26,110.00
Double Vault Toilet with Chase	Each	$27,680.00
Flush Restroom Building	Square Feet	$164.00
Flush Restroom Building with Showers	Square Feet	$169.00
Laundromat added to Flush Restroom Building	Square Feet	$197.00
Other Buildings		
Consessions Building	Square Feet	$145.00
Cabin with no utilities no basement	Square Feet	$42.32
Cabin with full utilities no basement	Square Feet	$92.95
Maintenance Building	Square Feet	$144.00
Administration Office	Square Feet	$217.00
Ranger House (Garage)	Square Feet	$139.00
Assist. Ranger House (No Garage)	Square Feet	$122.00
Storage Garages/Buildings	Square Feet	$54.00
Water System		
100,000 Gallon Steel Ground Level Water Tank	Each	$208,000.00
250,000 Gallon Steel Ground Level Water Tank	Each	$228,000.00
50,000 Gallon Elevated Water Tank	Each	$260,000.00
100,000 Gallon Elevated Water Tank	Each	$363,000.00
250,000 Gallon Elevated Water Tank	Each	$504,000.00
8" Waterline	Feet	$27.84
6" Waterline	Feet	$24.92
4" Waterline	Feet	$16.29
2" Waterline	Feet	$10.36
1" Waterline	Feet	$6.80
Fire Hydrant	Each	$3,160.00
Water Well	Each	$40,921.05
Chlorination Structure	Each	$45,684.21
Waste Water Disposal		
Two Lane Dump Station	Each	$47,840.00
Four Lane Dump Station	Each	$93,610.00
Sewer Collection Pipes	Feet	$15.58
Septic Tank and Drainfield	Each	$21,200.00
Sewer Pump Station	Each	$52,631.58
Boat Ramps		
Gravel Boat Ramp	Square Feet	$4.87
Asphalt Paved Boat Ramp	Square Feet	$6.28
Concrete Boat Ramp	Square Feet	$9.44
Fences		
Chain Link Fence 6 Feet High	Feet	$34.21
Wire Fence 4 Feet High	Feet	$6.05
Other Items		
OHV Trailhead Parking	Square Feet	$2.00
OHV Trailhead Parking - Pavement Add On	Square Feet	$3.31
Landscaped Area Sports Fields	Square Feet	$1.85

LAKE NIGHTHORSE (DURANGO, COLORADO)

LIFE CYCLE COST ANALYSIS FOR PHASE 1

		PROJECT LIFE	30	**PROPOSED NEW FACILITIES**															
		INTEREST RATE		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%		
I.	**CAPITAL EXPENDITURES**	**ECONOMIC LIFE**		30	30	30	30	30	30	30	30	30	30	30	30	30	30		
	ITEM DESCRIPTION	UNIT PRICE	UNIT	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3		TOTAL
1	Entance Station	$217.00	s.f.															$	-
2	Road Gravel	$2.18	s.f.	27,600															60,168
3	Parking	$2.18	s.f.	3,000	20,000														50,140
4	Waterline 4 in	$16.29	l.f.																-
5	Small Transformer	$2,511.00	ea	1															2,511
6	Sewerline	$15.58	l.f.																-
7	Inspection Station (Truck & Sprayer)	$50,000.00	ea																-
8	Sand	$30.00	c.y.																-
9	Large Picinic Shelter	$45.00	s.f.																-
10	Small Picinic Shelter	$56.00	s.f.																-
11	Picinic Tables	$652.00	ea																-
12	Grills	$275.00	ea																-
13	Shelter Concrete Pads	$4.86	sf																-
14	ADA Walks (Concrete)	$4.86	sf																-
15	Bike Racks	$300.00	ea																-
16	Double Vault Toilet	$26,110.00	ea																-
17	Landscaping	$0.70	s.f.																-
18	Bouy	$50.00	s.f.																-
19	Gravel Trail	$1.07	s.f.		54,500														58,315
20	Gravel Pads	$1.07	s.f.																-
21	Fish Cleaning Station	$26,000.00	ea																-
22	Slip/ Courtesey Dock	$5,000.00	ea				1												5,000
23	Dirt Trail	$0.87	sf																-
24	Single Vault Toilet	$14,580.00	ea																-
25	Gate	$1,200.00	ea																-
26	Horse Loading Facil	$10,000.00	ea																-
27	Campsite (primitive)	$2,900.00	ea																-
28	Fee/Signage	$5,000.00	ea																-
29	Campsite (improved)	$5,810.00	ea																-
30	Power Pedastel	$1,980.00	ea																-
31	Waterline 2in	$10.36	lf																-
32	Hydrant	$450.00																	-
33	Septic System	$21,200.00	ea																-
																			-
																			-
																			-
																			-
	SUBTOTAL			$ 69,219	$ 101,915	$ -	$ 5,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	176,134
	Mobilization		5%	3,461	5,096	-	250	-	-	-	-	-	-	-	-	-	-	-	8,807
	Unlisted Items		10%	6,922	10,192	-	500	-	-	-	-	-	-	-	-	-	-	-	17,613
	CONTRACT COST			$ 79,602	$ 117,202	$ -	$ 5,750	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	202,554
	Contingencies		10%	7,960	11,720	-	575	-	-	-	-	-	-	-	-	-	-	-	20,255
	FIELD COST			$ 87,600	$ 128,900	$ -	$ 6,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	222,800
	Design		6%	5,256	7,734	-	378	-	-	-	-	-	-	-	-	-	-	-	13,368
	Construction Oversight		6%	5,256	7,734	-	378	-	-	-	-	-	-	-	-	-	-	-	13,368
	TOTAL INITIAL COST			$ 98,000	$ 144,000	$ -	$ 7,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	249,000
	PRESENT VALUE OF TOTAL CAPITAL EXPENDITURES			$ 98,000	$ 144,000	$ -	$ 7,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	249,000

II. OPERATING COSTS		Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities		1			1											
Operating days per year		180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Estimated Seasonal Hours		1440	0	0	360	0	0	0	0	0	0	0	0	0	0	
Hourly Rate		$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	
Total Seasonal Wages		$ 21,600	$ -	$ -	$ 5,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,000
Benefits	7.5%	1,600	-	-	400	-	-	-	-	-	-	-	-	-	-	2,000
Total Incremental Labor		$ 23,200	$ -	$ -	$ 5,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 29,000
Operating Supplies/Maintenance		500	500	500	500	500	1,000	15,000	2,000	200	200	200	1,000	1,000	1,000	24,100
Utilities		900													5,600	6,500
Marketing Costs																-
Other Costs																-
Overhead	30.0%	7,400	200	200	1,900	200	300	4,500	600	100	100	100	300	300	2,000	18,200
Total Incremental Costs		$ 32,000	$ -	$ -	$ 8,200	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 40,200

III. REVENUE	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities	1	0	0	1	0	0	0	0	0	0	0	0	0	0	
Days used per year	180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Fee per use	$0.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$5.00	$5.00	$5.00	
Number of Fees per facility per day	0	3667	3638.5	3933	3638.5	0	0	0	0	0	0	0	0	0	14877
Total Incremental Revenue	$ -	$ 11,001	$ 10,916	$ 11,799	$ 10,916	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 44,631
	0														

IV. INVESTMENT ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Net Cash Flow	$ (32,000)	$ 11,001	$ 10,916	$ 3,599	$ 10,916	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,431
Present Value of Total Capital Expenditures	98,000	144,000	-	7,000	-	-	-	-	-	-	-	-	-	-	249,000
Pay Back (years)	-3	13	0	2	0	0	0	0	0	0	0	0	0	0	56
Return on Investment (ROI)	-32.65%	7.64%	0.00%	51.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.78%
Internal Rate of Return (IRR)	-32.65%	6.48%	0.00%	51.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-3.65%
Net Present Value (NPV)	$ (651,000)	$ 46,000	$ 189,000	$ 55,000	$ 189,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ (172,000)

V. BREAK-EVEN ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Break-Even Revenue	$ 37,667	$ 8,328	$ -	$ 8,605	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 54,600
Break-Even Days used per year per facility	0	0	0	1	0	0	0	0	0	0	0	0	0	0	
Break-Even Fee	$0.00	$0.00	$0.00	$0.01	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Break-Even Daily Usage	0.0	0.0	0.0	15.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

LAKE NIGHTHORSE (DURANGO, COLORADO)
LIFE CYCLE COST ANALYSIS FOR PHASE 2

		PROJECT LIFE	30	**PROPOSED NEW FACILITIES**															
		INTEREST RATE		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%		
I.	**CAPITAL EXPENDITURES**	**ECONOMIC LIFE**		30	30	30	30	30	30	30	30	30	30	30	30	30	30		
	ITEM DESCRIPTION	UNIT PRICE	UNIT	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3		TOTAL
1	Entance Station	$217.00	s.f.	1,200		0												$	260,400
2	Road Gravel	$2.18	s.f.	0	56,000	16,100													157,178
3	Parking	$2.18	s.f.	0	52,400	10,000													136,032
4	Waterline 4 in	$16.29	l.f.	1,000															16,290
5	Small Transformer	$2,511.00	ea	0															-
6	Sewerline	$15.58	l.f.	300															4,674
7	Inspection Station (Truck & Sprayer)	$50,000.00	ea	1															50,000
8	Sand	$30.00	c.y.		2,000														60,000
9	Large Picinic Shelter	$45.00	s.f.																-
10	Small Picinic Shelter	$56.00	s.f.																-
11	Picinic Tables	$652.00	ea																-
12	Grills	$275.00	ea																-
13	Shelter Concrete Pads	$4.86	sf																-
14	ADA Walks (Concrete)	$4.86	sf																-
15	Bike Racks	$300.00	ea		5														1,500
16	Double Vault Toilet	$26,110.00	ea		6	1													182,770
17	Landscaping	$0.70	s.f.																-
18	Bouy	$50.00	s.f.		400	0													20,000
19	Gravel Trail	$1.07	s.f.			5,700													6,099
20	Gravel Pads	$1.07	s.f.																-
21	Fish Cleaning Station	$26,000.00	ea	1															26,000
22	Slip/ Courtesey Dock	$5,000.00	ea																-
23	Dirt Trail	$0.87	sf						109,170										94,978
24	Single Vault Toilet	$14,580.00	ea																-
25	Gate	$1,200.00	ea																-
26	Horse Loading Facil	$10,000.00	ea																-
27	Campsite (primitive)	$2,900.00	ea																-
28	Fee/Signage	$5,000.00	ea																-
29	Campsite (improved)	$5,810.00	ea																-
30	Power Pedastel	$1,980.00	ea																-
31	Waterline 2in	$10.36	lf																-
32	Hydrant	$450.00																	-
33	Septic System	$21,200.00	ea	1															21,200
																			-
																			-
																			-
																			-
	SUBTOTAL			$ 378,564	$ 474,472	$ 89,107	$ -	$ -	$ 94,978	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$	1,037,121
	Mobilization		5%	18,928	23,724	4,455	-	-	4,749	-	-	-	-	-	-	-	-		51,856
	Unlisted Items		10%	37,856	47,447	8,911	-	-	9,498	-	-	-	-	-	-	-	-		103,712
	CONTRACT COST			$ 435,349	$ 545,643	$ 102,473	$ -	$ -	$ 109,225	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$	1,192,689
	Contingencies		10%	43,535	54,564	10,247	-	-	10,922	-	-	-	-	-	-	-	-		119,269
	FIELD COST			$ 478,900	$ 600,200	$ 112,700	$ -	$ -	$ 120,100	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$	1,311,900
	Design		6%	28,734	36,012	6,762	-	-	7,206	-	-	-	-	-	-	-	-		78,714
	Construction Oversight		6%	28,734	36,012	6,762	-	-	7,206	-	-	-	-	-	-	-	-		78,714
	TOTAL INITIAL COST			$ 536,000	$ 672,000	$ 126,000	$ -	$ -	$ 135,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$	1,469,000
	PRESENT VALUE OF TOTAL CAPITAL EXPENDITURES			$ 536,000	$ 672,000	$ 126,000	$ -	$ -	$ 135,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$	1,469,000

II. OPERATING COSTS		Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities		1	1	1	1		1									
Operating days per year		180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Estimated Seasonal Hours		2880	600	720	360	0	0	0	0	0	0	0	0	0	0	
Hourly Rate		$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	
Total Seasonal Wages		$ 43,200	$ 9,000	$ 10,800	$ 5,400	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 68,400
Benefits	7.5%	3,200	700	800	400	-	-	-	-	-	-	-	-	-	-	5,100
Total Incremental Labor		$ 46,400	$ 9,700	$ 11,600	$ 5,800	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 73,500
Operating Supplies/Maintenance		500	500	500	500	500	1,000	15,000	2,000	200	200	200	1,000	1,000	1,000	24,100
Utilities		900													5,600	6,500
Marketing Costs																-
Other Costs																-
Overhead	30.0%	14,300	3,100	3,600	1,900	200	300	4,500	600	100	100	100	300	300	2,000	31,400
Total Incremental Costs		$ 62,100	$ 13,300	$ 15,700	$ 8,200	$ -	$ 1,300	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 100,600

III. REVENUE	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities	1	1	1	1	0	1	0	0	0	0	0	0	0	0	
Days used per year	180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Fee per use	$0.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$5.00	$5.00	$5.00	
Number of Fees per facility per day	0	14148	6894	7452	6894	659.934	659.9934	659.999934	0	0	0	0	0	0	37368
Total Incremental Revenue	$ -	$ 42,444	$ 20,682	$ 22,356	$ 20,682	$ 1,980	$ 1,980	$ 1,980	$ -	$ -	$ -	$ -	$ -	$ -	$ 112,104
	0														

IV. INVESTMENT ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Net Cash Flow	$ (62,100)	$ 29,144	$ 4,982	$ 14,156	$ 20,682	$ 680	$ 1,980	$ 1,980	$ -	$ -	$ -	$ -	$ -	$ -	$ 11,504
Present Value of Total Capital Expenditures	536,000	672,000	126,000	-	-	135,000	-	-	-	-	-	-	-	-	1,469,000
Pay Back (years)	-9	23	25	0	0	199	0	0	0	0	0	0	0	0	128
Return on Investment (ROI)	-11.59%	4.34%	3.95%	0.00%	0.00%	0.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.78%
Internal Rate of Return (IRR)	-11.59%	1.79%	1.14%	0.00%	0.00%	-9.48%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-7.60%
Net Present Value (NPV)	$ (1,610,000)	$ (168,000)	$ (40,000)	$ 245,000	$ 358,000	$ (123,000)	$ 34,000	$ 34,000	$ -	$ -	$ -	$ -	$ -	$ -	$ (1,270,000)

V. BREAK-EVEN ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Break-Even Revenue	$ 93,097	$ 52,162	$ 22,987	$ 8,200	$ -	$ 9,107	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 185,552
Break-Even Days used per year per facility	0	1	1	0	0	5	0	0	0	0	0	0	0	0	
Break-Even Fee	$0.00	$0.04	$0.02	$0.01	$0.00	$0.08	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	
Break-Even Daily Usage	0.0	173.9	42.6	15.2	0.0	16.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	

LAKE NIGHTHORSE (DURANGO, COLORADO)
LIFE CYCLE COST ANALYSIS FOR PHASE 3

PROJECT LIFE 30 — **PROPOSED NEW FACILITIES**

INTEREST RATE 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0% 4.0%

I. CAPITAL EXPENDITURES **ECONOMIC LIFE** 30 30 30 30 30 30 30 30 30 30 30 30 30 30

	ITEM DESCRIPTION	UNIT PRICE	UNIT	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
1	Entance Station	$217.00	s.f.															$ -
2	Road Gravel	$2.18	s.f.												91,000			198,380
3	Parking	$2.18	s.f.															-
4	Waterline 4 in	$16.29	l.f.															-
5	Small Transformer	$2,511.00	ea															-
6	Sewerline	$15.58	l.f.															-
7	Inspection Station (Truck & Sprayer)	$50,000.00	ea															-
8	Sand	$30.00	c.y.															-
9	Large Picinic Shelter	$45.00	s.f.		500													22,500
10	Small Picinic Shelter	$56.00	s.f.		800	1,000		1,000							800			201,600
11	Picinic Tables	$652.00	ea		12	10		10							8			26,080
12	Grills	$275.00	ea		5													1,375
13	Shelter Concrete Pads	$4.86	sf		1,300													6,318
14	ADA Walks (Concrete)	$4.86	sf															-
15	Bike Racks	$300.00	ea															-
16	Double Vault Toilet	$26,110.00	ea					1							3			104,440
17	Landscaping	$0.70	s.f.		50,000	10,000												42,000
18	Bouy	$50.00	s.f.															-
19	Gravel Trail	$1.07	s.f.															-
20	Gravel Pads	$1.07	s.f.			1,000		1,000							800			2,996
21	Fish Cleaning Station	$26,000.00	ea															-
22	Slip/ Courtesey Dock	$5,000.00	ea				20											100,000
23	Dirt Trail	$0.87	sf							131,559								114,456
24	Single Vault Toilet	$14,580.00	ea															-
25	Gate	$1,200.00	ea												2			2,400
26	Horse Loading Facil	$10,000.00	ea															-
27	Campsite (primitive)	$2,900.00	ea												50			145,000
28	Fee/Signage	$5,000.00	ea												1			5,000
29	Campsite (improved)	$5,810.00	ea															-
30	Power Pedastel	$1,980.00	ea															-
31	Waterline 2in	$10.36	lf															-
32	Hydrant	$450.00																-
33	Septic System	$21,200.00	ea															-
																		-
																		-
																		-
																		-
	SUBTOTAL			$ -	$ 117,817	$ 70,590	$ 100,000	$ 89,700	$ -	$ 114,456	$ -	$ -	$ -	$ -	$ 479,982	$ -	$ -	$ 972,545
	Mobilization		5%	-	5,891	3,530	5,000	4,485	-	5,723	-	-	-	-	23,999	-	-	48,627
	Unlisted Items		10%	-	11,782	7,059	10,000	8,970	-	11,446	-	-	-	-	47,998	-	-	97,255
	CONTRACT COST			$ -	$ 135,490	$ 81,179	$ 115,000	$ 103,155	$ -	$ 131,625	$ -	$ -	$ -	$ -	$ 551,979	$ -	$ -	$ 1,118,427
	Contingencies		10%	-	13,549	8,118	11,500	10,316	-	13,162	-	-	-	-	55,198	-	-	111,843
	FIELD COST			$ -	$ 149,000	$ 89,300	$ 126,500	$ 113,500	$ -	$ 144,800	$ -	$ -	$ -	$ -	$ 607,200	$ -	$ -	$ 1,230,300
	Design		6%	-	8,940	5,358	7,590	6,810	-	8,688	-	-	-	-	36,432	-	-	73,818
	Construction Oversight		6%	-	8,940	5,358	7,590	6,810	-	8,688	-	-	-	-	36,432	-	-	73,818
	TOTAL INITIAL COST			$ -	$ 167,000	$ 100,000	$ 142,000	$ 127,000	$ -	$ 162,000	$ -	$ -	$ -	$ -	$ 680,000	$ -	$ -	$ 1,378,000
	PRESENT VALUE OF TOTAL CAPITAL EXPENDITURES			$ -	$ 167,000	$ 100,000	$ 142,000	$ 127,000	$ -	$ 162,000	$ -	$ -	$ -	$ -	$ 680,000	$ -	$ -	$ 1,378,000

II. OPERATING COSTS		Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities		1	1	1	1	1	1	1					1			
Operating days per year		180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Estimated Seasonal Hours		2880	600	720	360	360	0	0	0	0	0	0	1800	0	0	
Hourly Rate		$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	
Total Seasonal Wages		$ 43,200	$ 9,000	$ 10,800	$ 5,400	$ 5,400	$ -	$ -	$ -	$ -	$ -	$ -	$ 27,000	$ -	$ -	$ 100,800
Benefits	7.5%	3,200	700	800	400	400	-	-	-	-	-	-	2,000	-	-	7,500
Total Incremental Labor		$ 46,400	$ 9,700	$ 11,600	$ 5,800	$ 5,800	$ -	$ -	$ -	$ -	$ -	$ -	$ 29,000	$ -	$ -	$ 108,300
Operating Supplies/Maintenance		500	500	500	500	500	1,000	15,000	2,000	200	200	200	1,000	1,000	1,000	24,100
Utilities		900													5,600	6,500
Marketing Costs																-
Other Costs																-
Overhead	30.0%	14,300	3,100	3,600	1,900	1,900	300	4,500	600	100	100	100	9,000	300	2,000	41,800
Total Incremental Costs		$ 62,100	$ 13,300	$ 15,700	$ 8,200	$ 8,200	$ 1,300	$ 19,500	$ -	$ -	$ -	$ -	$ 39,000	$ -	$ -	$ 167,300

III. REVENUE	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities	1	1	1	1	1	1	1	0	0	0	0	1	0	0	
Days used per year	180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Fee per use	$0.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$5.00	$5.00	$5.00	
Number of Fees per facility per day	0	14934	7277	7866	7277	696.597	696.6597	696.666597	0	0	0	13110	0	0	52554
Total Incremental Revenue	$ -	$ 44,802	$ 21,831	$ 23,598	$ 21,831	$ 2,090	$ 2,090	$ 2,090	$ -	$ -	$ -	$ 65,550	$ -	$ -	$ 183,882
	0														

IV. INVESTMENT ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Net Cash Flow	$ (62,100)	$ 31,502	$ 6,131	$ 15,398	$ 13,631	$ 790	$ (17,410)	$ 2,090	$ -	$ -	$ -	$ 26,550	$ -	$ -	$ 16,582
Present Value of Total Capital Expenditures	-	167,000	100,000	142,000	127,000	-	162,000	-	-	-	-	680,000	-	-	1,378,000
Pay Back (years)	0	5	16	9	9	0	-9	0	0	0	0	26	0	0	83
Return on Investment (ROI)	0.00%	18.86%	6.13%	10.84%	10.73%	0.00%	-10.75%	0.00%	0.00%	0.00%	0.00%	3.90%	0.00%	0.00%	1.20%
Internal Rate of Return (IRR)	0.00%	18.86%	4.49%	10.27%	10.14%	0.00%	-10.75%	0.00%	0.00%	0.00%	0.00%	1.05%	0.00%	0.00%	-5.62%
Net Present Value (NPV)	$ (1,074,000)	$ 378,000	$ 6,000	$ 124,000	$ 109,000	$ 14,000	$ (463,000)	$ 36,000	$ -	$ -	$ -	$ (221,000)	$ -	$ -	$ (1,091,000)

V. BREAK-EVEN ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Break-Even Revenue	$ 62,100	$ 22,958	$ 21,483	$ 16,412	$ 15,544	$ 1,300	$ 28,868	$ -	$ -	$ -	$ -	$ 78,324	$ -	$ -	$ 246,990
Break-Even Days used per year per facility	0	1	1	1	1	1	14	0	0	0	0	1	0	0	
Break-Even Fee	$0.00	$0.02	$0.02	$0.01	$0.01	$0.01	$0.23	$0.00	$0.00	$0.00	$0.00	$0.03	$0.00	$0.00	
Break-Even Daily Usage	0.0	76.5	39.8	30.4	28.8	2.4	53.5	0.0	0.0	0.0	0.0	87.0	0.0	0.0	

LAKE NIGHTHORSE (DURANGO, COLORADO)
LIFE CYCLE COST ANALYSIS FOR PHASE 4

	PROJECT LIFE	30	**PROPOSED NEW FACILITIES**															
	INTEREST RATE		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%			
I. CAPITAL EXPENDITURES	**ECONOMIC LIFE**		30	30	30	30	30	30	30	30	30	30	30	30	30	30		
ITEM DESCRIPTION	UNIT PRICE	UNIT	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3		TOTAL
1 Entance Station	$217.00	s.f.															$	-
2 Road Gravel	$2.18	s.f.													91,000			198,380
3 Parking	$2.18	s.f.								25,000								54,500
4 Waterline 4 in	$16.29	l.f.																-
5 Small Transformer	$2,511.00	ea																-
6 Sewerline	$15.58	l.f.																-
7 Inspection Station (Truck & Sprayer)	$50,000.00	ea																-
8 Sand	$30.00	c.y.																-
9 Large Picinic Shelter	$45.00	s.f.																-
10 Small Picinic Shelter	$56.00	s.f.													800			44,800
11 Picinic Tables	$652.00	ea													8			5,216
12 Grills	$275.00	ea																-
13 Shelter Concrete Pads	$4.86	sf																-
14 ADA Walks (Concrete)	$4.86	sf																-
15 Bike Racks	$300.00	ea																-
16 Double Vault Toilet	$26,110.00	ea													3			78,330
17 Landscaping	$0.70	s.f.																-
18 Bouy	$50.00	s.f.																-
19 Gravel Trail	$1.07	s.f.																-
20 Gravel Pads	$1.07	s.f.													800			856
21 Fish Cleaning Station	$26,000.00	ea																-
22 Slip/ Courtesey Dock	$5,000.00	ea			19													95,000
23 Dirt Trail	$0.87	sf								355,000								308,850
24 Single Vault Toilet	$14,580.00	ea								1								14,580
25 Gate	$1,200.00	ea													2			2,400
26 Horse Loading Facil	$10,000.00	ea								1								10,000
27 Campsite (primitive)	$2,900.00	ea													50			145,000
28 Fee/Signage	$5,000.00	ea													1			5,000
29 Campsite (improved)	$5,810.00	ea																-
30 Power Pedastel	$1,980.00	ea																-
31 Waterline 2in	$10.36	lf																-
32 Hydrant	$450.00																	-
33 Septic System	$21,200.00	ea																-
																		-
																		-
																		-
																		-
SUBTOTAL			$ -	$ -	$ -	$ 95,000	$ -	$ -	$ -	$ 387,930	$ -	$ -	$ -	$ -	$ 479,982	$ -	$	962,912
Mobilization		5%	-	-	-	4,750	-	-	-	19,397	-	-	-	-	23,999	-		48,146
Unlisted Items		10%	-	-	-	9,500	-	-	-	38,793	-	-	-	-	47,998	-		96,291
CONTRACT COST			$ -	$ -	$ -	$ 109,250	$ -	$ -	$ -	$ 446,120	$ -	$ -	$ -	$ -	$ 551,979	$ -	$	1,107,349
Contingencies		10%	-	-	-	10,925	-	-	-	44,612	-	-	-	-	55,198	-		110,735
FIELD COST			$ -	$ -	$ -	$ 120,200	$ -	$ -	$ -	$ 490,700	$ -	$ -	$ -	$ -	$ 607,200	$ -	$	1,218,100
Design		6%	-	-	-	7,212	-	-	-	29,442	-	-	-	-	36,432	-		73,086
Construction Oversight		6%	-	-	-	7,212	-	-	-	29,442	-	-	-	-	36,432	-		73,086
TOTAL INITIAL COST			$ -	$ -	$ -	$ 135,000	$ -	$ -	$ -	$ 550,000	$ -	$ -	$ -	$ -	$ 680,000	$ -	$	1,365,000
PRESENT VALUE OF TOTAL CAPITAL EXPENDITURES			$ -	$ -	$ -	$ 135,000	$ -	$ -	$ -	$ 550,000	$ -	$ -	$ -	$ -	$ 680,000	$ -	$	1,365,000

II. OPERATING COSTS		Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities		1	1	1	1	1	1	1	1				1	1		
Operating days per year		180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Estimated Seasonal Hours		2880	600	720	360	360	0	0	180	0	0	0	1800	1800	0	
Hourly Rate		$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	
Total Seasonal Wages		$ 43,200	$ 9,000	$ 10,800	$ 5,400	$ 5,400	$ -	$ -	$ 2,700	$ -	$ -	$ -	$ 27,000	$ 27,000	$ -	$ 130,500
Benefits	7.5%	3,200	700	800	400	400	-	-	200	-	-	-	2,000	2,000	-	9,700
Total Incremental Labor		$ 46,400	$ 9,700	$ 11,600	$ 5,800	$ 5,800	$ -	$ -	$ 2,900	$ -	$ -	$ -	$ 29,000	$ 29,000	$ -	$ 140,200
Operating Supplies/Maintenance		500	500	500	500	500	1,000	15,000	2,000	200	200	200	1,000	1,000	1,000	24,100
Utilities		900													5,600	6,500
Marketing Costs																-
Other Costs																-
Overhead	30.0%	14,300	3,100	3,600	1,900	1,900	300	4,500	1,500	100	100	100	9,000	9,000	2,000	51,400
Total Incremental Costs		$ 62,100	$ 13,300	$ 15,700	$ 8,200	$ 8,200	$ 1,300	$ 19,500	$ 6,400	$ -	$ -	$ -	$ 39,000	$ 39,000	$ -	$ 212,700

III. REVENUE	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities	1	1	1	1	1	1	1	1	0	0	0	1	1	0	
Days used per year	180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Fee per use	$0.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$5.00	$5.00	$5.00	
Number of Fees per facility per day	0	19257	9383.5	10143	9383.5	898.2435	898.32435	898.3332435	0	0	0	8452.5	8452.5	0	67767
Total Incremental Revenue	$ -	$ 57,771	$ 28,151	$ 30,429	$ 28,151	$ 2,695	$ 2,695	$ 2,695	$ -	$ -	$ -	$ 42,263	$ 42,263	$ -	$ 237,111
	0														

IV. INVESTMENT ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Net Cash Flow	$ (62,100)	$ 44,471	$ 12,451	$ 22,229	$ 19,951	$ 1,395	$ (16,805)	$ (3,705)	$ -	$ -	$ -	$ 3,263	$ 3,263	$ -	$ 24,411
Present Value of Total Capital Expenditures	-	-	-	135,000	-	-	-	550,000	-	-	-	-	680,000	-	1,365,000
Pay Back (years)	0	0	0	6	0	0	0	-148	0	0	0	0	208	0	56
Return on Investment (ROI)	0.00%	0.00%	0.00%	16.47%	0.00%	0.00%	0.00%	-0.67%	0.00%	0.00%	0.00%	0.00%	0.48%	0.00%	1.79%
Internal Rate of Return (IRR)	0.00%	0.00%	0.00%	16.47%	0.00%	0.00%	0.00%	-0.67%	0.00%	0.00%	0.00%	0.00%	-9.67%	0.00%	-3.62%
Net Present Value (NPV)	$ (1,074,000)	$ 769,000	$ 215,000	$ 249,000	$ 345,000	$ 24,000	$ (291,000)	$ (614,000)	$ -	$ -	$ -	$ 56,000	$ (624,000)	$ -	$ (945,000)

V. BREAK-EVEN ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Break-Even Revenue	$ 62,100	$ 13,300	$ 15,700	$ 16,007	$ 8,200	$ 1,300	$ 19,500	$ 38,207	$ -	$ -	$ -	$ 39,000	$ 78,324	$ -	$ 291,638
Break-Even Days used per year per facility	0	0	1	1	0	0	7	14	0	0	0	1	2	0	
Break-Even Fee	$0.00	$0.01	$0.01	$0.01	$0.00	$0.01	$0.12	$0.24	$0.00	$0.00	$0.00	$0.03	$0.05	$0.00	
Break-Even Daily Usage	0.0	44.3	29.1	29.6	15.2	2.4	36.1	70.8	0.0	0.0	0.0	43.3	87.0	0.0	

LAKE NIGHTHORSE (DURANGO, COLORADO)
LIFE CYCLE COST ANALYSIS FOR PHASE 5

	PROJECT LIFE	30	**PROPOSED NEW FACILITIES**																
	INTEREST RATE		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%			
I. CAPITAL EXPENDITURES	**ECONOMIC LIFE**		30	30	30	30	30	30	30	30	30	30	30	30	30	30			
ITEM DESCRIPTION	UNIT PRICE	UNIT	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3		TOTAL	
1 Entance Station	$217.00	s.f.															$	-	
2 Road Gravel	$2.18	s.f.										135,360						295,085	
3 Parking	$2.18	s.f.									10,000	3,000	9,000					47,960	
4 Waterline 4 in	$16.29	l.f.														10,000		162,900	
5 Small Transformer	$2,511.00	ea																-	
6 Sewerline	$15.58	l.f.														300		4,674	
7 Inspection Station (Truck & Sprayer)	$50,000.00	ea																-	
8 Sand	$30.00	c.y.																-	
9 Large Picinic Shelter	$45.00	s.f.																-	
10 Small Picinic Shelter	$56.00	s.f.										400						22,400	
11 Picinic Tables	$652.00	ea										4						2,608	
12 Grills	$275.00	ea																-	
13 Shelter Concrete Pads	$4.86	sf																-	
14 ADA Walks (Concrete)	$4.86	sf																-	
15 Bike Racks	$300.00	ea																-	
16 Double Vault Toilet	$26,110.00	ea														1		26,110	
17 Landscaping	$0.70	s.f.																-	
18 Bouy	$50.00	s.f.																-	
19 Gravel Trail	$1.07	s.f.										1,200						1,284	
20 Gravel Pads	$1.07	s.f.										400						428	
21 Fish Cleaning Station	$26,000.00	ea																-	
22 Slip/ Courtesey Dock	$5,000.00	ea																-	
23 Dirt Trail	$0.87	sf																-	
24 Single Vault Toilet	$14,580.00	ea									1	1						29,160	
25 Gate	$1,200.00	ea									1							1,200	
26 Horse Loading Facil	$10,000.00	ea																-	
27 Campsite (primitive)	$2,900.00	ea																-	
28 Fee/Signage	$5,000.00	ea																-	
29 Campsite (improved)	$5,810.00	ea														25		145,250	
30 Power Pedastel	$1,980.00	ea														25		49,500	
31 Waterline 2in	$10.36	lf														1,250		12,950	
32 Hydrant	$450.00															25		11,250	
33 Septic System	$21,200.00	ea																-	
																		-	
																		-	
																		-	
																		-	
SUBTOTAL			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	37,580	$ 342,925	$ 19,620	$ -	$ -	$ 412,634	$	812,759
Mobilization		5%	-	-	-	-	-	-	-	-	-	1,879	17,146	981	-	-	20,632		40,638
Unlisted Items		10%	-	-	-	-	-	-	-	-	-	3,758	34,292	1,962	-	-	41,263		81,276
CONTRACT COST			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	43,217	$ 394,364	$ 22,563	$ -	$ -	$ 474,529	$	934,673
Contingencies		10%	-	-	-	-	-	-	-	-	-	4,322	39,436	2,256	-	-	47,453		93,467
FIELD COST			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	47,500	$ 433,800	$ 24,800	$ -	$ -	$ 522,000	$	1,028,100
Design		6%	-	-	-	-	-	-	-	-	-	2,850	26,028	1,488	-	-	31,320		61,686
Construction Oversight		6%	-	-	-	-	-	-	-	-	-	2,850	26,028	1,488	-	-	31,320		61,686
TOTAL INITIAL COST			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	53,000	$ 486,000	$ 28,000	$ -	$ -	$ 585,000	$	1,152,000
PRESENT VALUE OF TOTAL CAPITAL EXPENDITURES			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	53,000	$ 486,000	$ 28,000	$ -	$ -	$ 585,000	$	1,152,000

II. OPERATING COSTS		Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities		1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Operating days per year		180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Estimated Seasonal Hours		2880	600	720	360	360	0	0	180	180	45	0	1800	1800	1800	
Hourly Rate		$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	$15.00	
Total Seasonal Wages		$ 43,200	$ 9,000	$ 10,800	$ 5,400	$ 5,400	$ -	$ -	$ 2,700	$ 2,700	$ 675	$ -	$ 27,000	$ 27,000	$ 27,000	$ 160,875
Benefits	7.5%	3,200	700	800	400	400	-	-	200	200	100	-	2,000	2,000	2,000	12,000
Total Incremental Labor		$ 46,400	$ 9,700	$ 11,600	$ 5,800	$ 5,800	$ -	$ -	$ 2,900	$ 2,900	$ 775	$ -	$ 29,000	$ 29,000	$ 29,000	$ 172,875
Operating Supplies/Maintenance		500	500	500	500	500	1,000	15,000	2,000	200	200	200	1,000	1,000	1,000	24,100
Utilities		900													5,600	6,500
Marketing Costs																-
Other Costs																-
Overhead	30.0%	14,300	3,100	3,600	1,900	1,900	300	4,500	1,500	900	300	100	9,000	9,000	10,700	61,100
Total Incremental Costs		$ 62,100	$ 13,300	$ 15,700	$ 8,200	$ 8,200	$ 1,300	$ 19,500	$ 6,400	$ 4,000	$ 1,275	$ 300	$ 39,000	$ 39,000	$ 46,300	$ 264,575

III. REVENUE	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Number of Facilities	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
Days used per year	180	100	180	180	180	180	180	180	180	180	180	180	180	180	
Fee per use	$0.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$3.00	$5.00	$5.00	$5.00	
Number of Fees per facility per day	0	20043	9766.5	10557	9766.5	934.9065	934.99065	934.9999065	0	0	0	8797.5	8797.5	8619	79152
Total Incremental Revenue	$ -	$ 60,129	$ 29,300	$ 31,671	$ 29,300	$ 2,805	$ 2,805	$ 2,805	$ -	$ -	$ -	$ 43,988	$ 43,988	$ 43,095	$ 289,884
	0														

IV. INVESTMENT ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Net Cash Flow	$ (62,100)	$ 46,829	$ 13,600	$ 23,471	$ 21,100	$ 1,505	$ (16,695)	$ (3,595)	$ (4,000)	$ (1,275)	$ (300)	$ 4,988	$ 4,988	$ (3,205)	$ 25,309
Present Value of Total Capital Expenditures	-	-	-	-	-	-	-	-	53,000	486,000	28,000	-	-	585,000	1,152,000
Pay Back (years)	0	0	0	0	0	0	0	0	-13	-381	-93	0	0	-183	46
Return on Investment (ROI)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-7.55%	-0.26%	-1.07%	0.00%	0.00%	-0.55%	2.20%
Internal Rate of Return (IRR)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-7.55%	-0.26%	-1.07%	0.00%	0.00%	-0.55%	-2.50%
Net Present Value (NPV)	$ (1,074,000)	$ 810,000	$ 235,000	$ 406,000	$ 365,000	$ 26,000	$ (289,000)	$ (62,000)	$ (122,000)	$ (508,000)	$ (33,000)	$ 86,000	$ 86,000	$ (681,000)	$ (755,000)

V. BREAK-EVEN ANALYSIS	Entrance/Contact	Swim Beach	Picnic/Fishing Area	Boat Ramp	Day Use Area 2	Foot Trail	Single Track	Multi Use/Equestrian	County Trail Head	Day Use Area 3	Overflow Ramp Parking	Campground 1	Campground 2	Campground 3	TOTAL
Break-Even Revenue	$ 62,100	$ 13,300	$ 15,700	$ 8,200	$ 8,200	$ 1,300	$ 19,500	$ 6,400	$ 7,065	$ 29,380	$ 1,919	$ 39,000	$ 39,000	$ 65,800	$ 316,865
Break-Even Days used per year per facility	0	0	1	0	0	0	7	2	0	0	0	1	1	2	
Break-Even Fee	$0.00	$0.01	$0.01	$0.00	$0.00	$0.01	$0.12	$0.04	$0.00	$0.00	$0.00	$0.02	$0.02	$0.04	
Break-Even Daily Usage	0.0	44.3	29.1	15.2	15.2	2.4	36.1	11.9	13.1	54.4	3.6	43.3	43.3	73.1	