

Rationale



Rationale for the Selected Alternative

1.1 Define the GSL flood plain for planning purposes.

The 4217 elevation is based upon the most recent historic high lake level of approximately 4212, with the addition of three feet for wind tide and two feet for wave action. DNR believes it is reasonable to assume that the lake will again reach 4212 during the lifetime of most facilities located near the lake. The practical reality regarding flood plain management is that DNR's influence beyond the meander line is limited to the power of persuasion. DNR's power of persuasion may have been enhanced by the availability of state funds to help local government recover after the 1980s flooding. Planning and zoning are a function of local government, not state government. Development above the surveyed meander line will continue to be controlled through local planning and zoning functions irrespective of what DNR calls the flood plain.

1.2 Develop strategies to deal with a fluctuating lake level.

The basic premise is that lake level is far more a function of climate and precipitation than any human influences. Upstream diversions, inter-basin water transfers, and WDPP have some effect on lake level, but are not effective lake control measures. Understanding and accepting that lake level fluctuations will occur, that there is little anyone can do to limit fluctuations, and that shoreline habitat has and will continue to change in response to changing lake levels, DNR will respond to lake level fluctuations.

Four-foot zones were used in the 1995 plan to characterize potential flood damage and to describe the relative amount of time the lake is at a certain level. Given the extent of annual fluctuations, DNR sees no particular advantage in using a different elevation zone classification. Other entities may take into account DNR actions when planning their actions.

1.3 Determine the policy for WDPP operation.

The 1995 plan recommended the WDPP begin operation when the GSL elevation exceeds 4205. In 1995, the feasibility of extending the inlet channel and other related modifications was studied. Costs were estimated. In the absence of an emergency, DNR was discouraged from pursuing funding for modifications to the WDPP. Also, institutional factors such as those related to Hill AFB Bombing and Gunnery Range discouraged implementation of the 1995 plan recommendation.

The GSL CMP has re-addressed the WDPP and has recommended to extend the inlet canal and resolve the return brine channel with Hill AFB, but start pumping at 4208. The relatively quick recovery of habitat and the renewal of vegetation after the high water years brought about an increased appreciation for lake level fluctuations.

DNR has consulted lake industries, UDOT, UPRR, and has estimated the differences in damages between not pumping, beginning to pump at 4205 and 4208. The cumulative damage numbers are in thousands.

Lake Elevation	Current Situation	Alt. A	Alt. B	Alt. C
4205	\$8,438	\$8,438	\$8,438	\$8,438
4208	\$51,731	\$46,281	\$51,731	\$22,338
4210	\$63,756	\$55,341	\$64,256	\$30,948
4212	\$95,056	\$91,976	\$223,306	\$62,293

Economically, it is recognized that alternative C minimizes the damage and cost to GSL industry and other structures and facilities around the lake. The reduction in damages is greater by beginning pumping at 4205 than waiting until 4208. However, GSL is a physical system composed of many natural features to be taken into account under the Public Trust Doctrine. Economics alone can not be the deciding factor regarding WDPP operation. Pumping through a full cycle is paramount because it minimizes the deposition of salt on the west desert. The costs of modifying the WDPP to operate at 4205, the increased difficulties of returning minerals from the West Desert Pond if pumping were to begin at 4205, the institutional factors, and operating time considerations (less than 10 percent of the time for 4208) provide the rationale for selecting 4208. The selected alternative takes into account the lake’s natural features and best corroborates a balanced approach to GSL management.

1.4 Declining flows at Locomotive Springs WMA.

No continuous, representative discharge records exist for the springs. This data will be collected to determine if the flow to the springs is actually declining due to human interference. It would not be prudent to plunge into a “solution” to the issue of spring flow without a good

understanding of how the flow system functions. Water supplying the springs is thought to originate in the alluvial aquifers of the Holbrook-Snowville flow system to the north, or the deep regional carbonate aquifer which underlies western Utah and eastern Nevada, or a combination of the two. Studies to determine how much water each system contributes are essential to determine if a problem exists and to craft an effective mitigation and/or remediation plan. To be valid, these studies require the cooperation, or at least the acquiescence, of the State of Idaho. DWRi has sent two letters to the State of Idaho on this matter, neither of which has received a response.

1.5 Administration of water rights and supply in the GSL drainage basin.

Many of the drainage basins tributary to the lake are closed or restricted for new appropriations of water. As a result, the acquisition of water rights to supplement activities in and around the lake will proceed on a willing seller/willing buyer basis. Planning activities dealing with water rights above the lake’s meander line are beyond the scope and authority of this planning effort.

1.6 Determine state policy regarding creating large freshwater embayments like Lake Wasatch, Lake Davis, and other inter-island diking proposals.

Inter-island diking and freshwater embayment proposals have been funded and studied to varying degrees over the years. None of the proposals have been implemented due to the lack of political and financial support. DNR does not support the proposals because of extensive impacts on sovereign land, lake resources and risk associated with geologic hazards. The locations of the proposed projects are on lands the legislature has authorized DWR use for wildlife purposes. The likelihood that impounded water will be suitable for its intended use is questionable. DEQ/DWQ agrees with this assessment. There is a variety of other reasons mentioned in the Draft CMP (pages 39-40). The selected alternative does not permanently preclude developments of this kind, but it requires a plan amendment before projects can be approved. The amendment process ensures extensive public review of proposals.

2.1 Identify the salinity management regime for GSL.

DNR acknowledges the effect human-made structures have on GSL. Evaporation ponds can increase salinity to the point that shoreline habitat is lost. Causeways affect the interchange of brines: (1) Farmington Bay is less saline than it would be under natural conditions for a given lake level; (2) the north arm (Gunnison Bay) is more saline and the south arm (Gilbert Bay) less saline than they would be under natural conditions for a given lake level. The WDPP deposited a substantial volume of salt on the west desert, thereby affecting the salt balance in the lake. Bird refuge and Wildlife Management Area (WMA) dikes

impound fresh water and prevent lake water from reaching what would be natural shoreline areas. In actively managed areas, such as solar ponds and WMAs, the desired effect is achieved by influencing salinity. All of these effects are acceptable in the context of public trust management and multiple-use framework for GSL as long as sustainability is not jeopardized and there is no substantial impairment of protected public use.

Much of the sustainability question is a social, economic and political matter and deals with the acceptability of varying degrees to which natural systems are impacted. But there must be a standard that constrains the range of social and political decision-making. The measure of sustainability DNR chooses to use, and against which future management actions will be evaluated, is the degree to which uses protected under the Public Trust Doctrine are judged to be impaired or enhanced. This is against a backdrop of preservation of most of GSL as a natural body of saline water. A natural body of saline water is defined as water with salinity (average of the entire water column) within the range of salinity variation over the last 150 years. This is the lake's historical range.

In choosing among alternatives, the fundamental concern is not the particular economic impact to a specific industry, company or activity. It is not the relative advantage of companies competing with each other. It is not to afford relief to south arm industries at the expense of north arm industries, nor to protect any special advantage of north arm industries against the complaints of south arm industries. The fundamental parameter is the public interest. The public interest is statewide, and in some respects the lake

serves national and international interests. Protection of the lake's ecology will serve the public interest.

The trend for salinity in the south arm of the lake is heading outside the historical range. This is a consequence of human disruption in the form of the northern railroad causeway and WDPP. In DNR's judgement, salinity levels outside historical variation behind project-specific dikes and impoundments are acceptable because the change in salinity is the desired effect. The south arm, however, is too much of the lake to allow it to exceed historical salinity variation. Salinity in Farmington and Bear River bays can be addressed in WMA plans.

DNR has concluded that the permeability of the northern railroad causeway has decreased. (See Draft CMP Appendix I.) Prior to the 1980s high lake level, the causeway fill provided 70 percent of the brine interchange, the culverts 30 percent. Compaction of the fill, introduction of organic and inorganic fine material over time and the addition of fill required to keep the causeway above rising water in the 1980s has significantly decreased permeability. Removal of some 600 million tons of salt from GSL by WDPP has contributed to the south arm salinity concern. U.S. Geological Survey (USGS) and DWRe modeling (See Draft CMP Appendix H.) shows that approximately 80 percent of the salinity difference between the 1980s to the present is attributable to decreased permeability of the causeway. The remaining 20 percent of the difference is attributable to WDPP. But whatever the cause, something must be done to address decreasing south arm salinity.

The salinity concern may be alleviated to some degree by operating WDPP through a full cycle to return some of the salt deposited in the west desert, but in the absence of a flooding emergency, WDPP modification, startup and operational costs are prohibitive. The most cost effective, long-term remedy is causeway modification to increase the exchange of brine. To compensate for the loss of salt to the West Pond and decreased causeway permeability, the causeway breach will be deepened about four feet to its original design depth of about 4195, or perhaps a little deeper. Structural integrity of the bridge will not be affected by this excavation. The culverts will be kept clean by the railroad. The effect of the causeway modification on south arm salinity will be monitored. The potential for additional openings in the causeway will be studied in the event DNR determines that open culverts and a deepened breach are not sufficient to keep south arm salinity within its historical range.

As noted in the ecosystem section of the Draft CMP, lack of full scientific certainty should not be used as a reason not to initiate measures to prevent environmental degradation. A precautionary approach is prudent. Implementation of the selected alternative may be the first or final step in addressing salinity. The continuing studies under DWR's Great Salt Lake Ecosystem Project (GSLEP) and a few years of monitoring the effect of breach modification will help determine if additional measures are needed to reach the desired historic salinity levels.

2.2 Account for the locations and quantities of salts in the GSL system. In light of lake salinity issues and disputes over ownership of salt in the

lake system, it is important to know the locations and amounts of GSL salts. An accounting of all salts in the lake system can serve as a baseline for future studies. The selected alternative does not set the stage for assessing royalties on waste salts.

3.1 Develop a strategy to ensure water quality protection for the GSL ecosystem.

Existing water quality narrative standards for discharges to the lake and permits are determined on a case-by-case basis. The general policy is stated as follows "to the extent feasible, no pollutants should be delivered to the lake in amounts that result in concentrations great than those already present in the lake." This policy may not prevent gradual water quality degradation over time. Because GSL is a terminal basin, pollutants to the lake will gradually increase this baseline condition over time. Salinity, temperature, lake currents, contaminants in lake sediments and many other factors play a role in altering the chemical nature and the physical conditions that might increase heavy metals bioavailability. Impacts resulting from non-point source and point source pollutants on wildlife could impair management objectives.

DNR and cooperators will monitor water quality to ensure protection of public trust resources through improved coordination with DWQ. Limited financial resources will be focused on improving knowledge of lake chemistry and ecology to better understand lake processes and to better determine appropriate effluent limits. This will help identify serious problems.

Nutrient loading in GSL wetlands and dynamics in the open water are not well understood. Coordination will help identify management objectives to investigate nutrients and other potential water quality problems, help in developing studies and in determining management response.

3.2 Determine GSL wetland policy.

Federal regulations provide for the bulk of wetland protection measures and are generally adequate. Actions in non-jurisdictional wetlands and actions such as excavation, grazing, burning and chemical application that are not covered by federal regulation may affect important wetland resources. DNR will take advantage of the opportunity to consider these actions in a policy framework to allow an added measure of protection.

4.1 Protect public trust resources (relates to air quality impacts).

Improved coordination is needed to improve the assessment of impacts to public trust resources and for remedial response. Air quality is also important in regard to resource protection and other multiple-use management objectives. Air quality degradation could alter resource allocation decisions in the future (where and how particular activities are allowed) and impact existing resources and activities such as recreation and viewshed values.

5.1 Identify strategies to preserve and maintain habitat and wildlife on GSL in order to preserve the integrity of this ecosystem.

The GSL wildlife values have been maintained previously because the lake and surrounding marshes have been inaccessible to people or undesirable for

recreation activities relative to other areas of Utah. People see the lake every day but rarely, and in some cases never, go there. Industrial development has had a substantial impact on the lake. Creation of dikes to impound brines in large shallow basins has substantially reduced wildlife values on significant acreage. The lack of knowledge about the wildlife values lost, and lack of appreciation for those losses because they occurred in areas seldom visited by people, are reasons for the occurrences. DNR believes a greater effort is needed to understand the wildlife functions within the ecosystem and manage to protect the existing values, mitigate the losses when practicable, and extend greater protection than has occurred historically.

6.1 Determine the appropriate mix of sovereign land classifications.

Under the selected alternative, mineral lease zones, reinforced wildlife considerations, and the diking policy, multiple use can be accommodated without significant impairment of protected public uses. Sovereign land classifications are very similar to those in the 1995 plan.

With exception of existing mineral leases in Bear River Bay, a zone managed by the DPR around Antelope Island and a stretch of beach area from old Saltair to Black Rock, sovereign land in the east side of the lake is managed for resource preservation (this includes WMAs). As private land development moves closer to the lake, sovereign land habitat increases in importance. The proposed classification protects habitat and vistas on the east side.

While little development on the west shore is expected, it is available for development uses. This is where potential conflicts with wildlife and viewshed are fewer. The significant exception is resource preservation zones in the north part of the north arm, and around Hat, Gunnison and Dolphin islands, which are the relatively more important wildlife use areas on the west side. The Rozel Point and West Rozel oil fields are managed for development, as are shoreline areas suitable for brine shrimp harbors.

Much of the lake is classified as open for consideration of any use, but developments in open water areas are not expected. By protecting the more important wildlife areas, protecting existing mineral leases, allowing for development of known mineral resources, and allowing for intensive recreation development somewhere along the south shore, a reasonable mix of sovereign land classifications is provided.

6.2 Consider geologic hazards in all sovereign land use decisions.

Statute requires that DFFSL disclose any known geologic hazard affecting leased property. UGS routinely identifies geologic hazards through the RDCC process when UGS is apprised of proposed state actions submitted to RDCC by DFFSL. DFFSL routinely passes on the information to lessees. There is little if any follow up. Under the selected alternative DFFSL will follow up by requiring a site-specific analysis of potential hazards and consulting with UGS regarding the adequacy of proposed mitigation. This is a logical result of the requirement to disclose hazards. It makes little sense to

disclose known hazards but then require nothing further. The selected alternative ensures full consideration of geologic hazards.

6.3 Bear River Migratory Bird Refuge expansion.

Expansion of BRMBR is consistent with wildlife use for specific, legislatively-designated sovereign land. The conflict lies in regulation of hunting and application of other state laws. Sovereign land technically open to hunting under state law may be closed to hunting by BRMBR, and hunting may be governed by BRMBR under federal regulation. Most of the refuge below the meander line is sovereign land and is subject to state law. It is appropriate for DFFSL, as trustee, and DWR, as the state wildlife authority, to be involved in resource management decisions. DNR is working with USFWS on issues relating to management of lands below meander.

6.4 GSL diking policy.

Given the increased appreciation for habitat-related beneficial effects of fluctuating lake levels, the objective is to ensure that on-site and off-site impacts will be taken into account when diking activity is planned. The policy will apply in-house as well, for example state WMA dikes.

7.1 Review the Mineral Leasing Plan zones.

The 1996 MLP was prepared under existing rule with associated public review and comment. The MLP precludes new leasing of the east side of the lake. This restriction was based on the importance of recreation and wildlife values and low mineral potential in the area. An exception was

made for salt leasing potential (suitable ponding site) at the south end of the lake. This area is available for salt leasing under special stipulations. With known oil fields and potential ponding sites available for leasing, important recreation and wildlife areas not available for leasing, and operational constraints over much of the rest of the lake, legislative policy to encourage the use of appropriate areas for extraction of brine, minerals, chemicals, and petrochemicals is implemented.

7.2 Review Mineral Leasing Plan policies.

Implementation of MLP policies has resulted in the desired effect. The nomination process works well for identifying special concerns, determining lease stipulations in response to those concerns, and making the stipulations known at the time the lease is offered for competitive bid. Acreage under lease in important wildlife areas has been reduced.

8.1 Provide additional recreational opportunities in response to specific demands or needs, consistent with the protection of trust resources.

This issue deals exclusively with recreational boating and the facilities to accommodate this use. The Great Salt Lake Marina and Antelope Island Marina currently provide access to the lake. DNR anticipates no further public investment in marina facilities. DNR will encourage private investment to provide additional marina facilities, if needed. The lessee of the Black Rock commercial marina is willing to open that facility, when built, to recreational use if requested by DPR.

8.2 Navigability on GSL.

Limited recreational and commercial boating access into the north arm from the south arm is available through the northern railroad causeway breach near Lakeside. Any effort to breach the northern railroad causeway to facilitate full navigational access between the south and north arms would be very costly. Full navigational access can be accomplished in one of two ways: 1) breach the causeway and construct a bridge that will accommodate high vessel passage; or 2) breach the causeway and abandon railroad traffic across it. Any breach in the causeway designed to fully accommodate navigational access without disrupting railroad traffic will need to occur in water depths sufficient for deep keel boat passage. The bridge system spanning the breach must not only allow railroad traffic across the causeway, but also have sufficient height or mobility to allow passage of sailboats with tall masts. The geology of the lake bed in the deeper waters is such that engineering and constructing a bridge will be extremely expensive, if not impossible. The second scenario for full navigational access circumvents the geologic and engineering impediments associated with constructing a bridge, but requires the railroad to abandon the causeway and reroute the displaced train traffic. This alternative is obviously very damaging and costly to the railroad and those who use rail transport.

Although the causeway acts to restrict, through size limitation, the number of vessels capable of navigating into the north arm, sensitive ecological interests are buffered by the reduced access. The small islands located in the north arm

provide critical habitat and nesting grounds for American white pelicans and other shorebirds. Gunnison Island hosts one of the three largest nesting colonies of American white pelicans in North America. The pelicans and other shorebirds rely heavily upon the habitat provided on these isolated islands during the annual nesting season, and even minimal human presence has shown to disrupt them to the point that they move off the island to less productive habitat.

9.1 Develop opportunities on sovereign land for off-highway vehicles.

A public planning process conducted by the ad hoc West Box Elder Access Team under the auspices of Box Elder County identified sovereign land in T11N, R11W as suitable for OHV use. This is consistent with OHV designations for adjacent upland. Some DNR divisions and federal agencies participated on the team. Box Elder County passed the ordinance to implement the access team's recommendation. DNR will open lands as identified in the access management plan. This is not an irreversible or irretrievable commitment of resources. Monitoring and enforcement are part of OHV management in the area. If monitoring shows unacceptable resource damage, OHV use on this sovereign land may be modified or terminated. The Box Elder plan addressed OHV problems related to resource damage on public and private land at Monument Point and Salt Wells areas. Opening sovereign land in T11N, R11E, as part of a multi-jurisdictional plan, is a reasonable tradeoff against the difficult enforcement problems on sovereign

land elsewhere in west Box Elder County.

9.2 Improve recreational opportunities and access.

The specified locations are not exclusive. They are locations which, based on existing visitation, scoping comments or expressions of interest at public meetings are viable access points. There are potential constraints or conflicts to be resolved for some locations. The selected alternative is an expression of DNR's interest in pursuing additional opportunities.

9.3 Improve education and interpretation opportunities.

The specified locations and potential cooperators are not exclusive. Selected locations are based on existing visitation, scoping comments or expressions of interest at public meetings, are viable interpretation and education opportunities. There are potential constraints or conflicts to be resolved for some locations. The selected alternative is an expression of interest in pursuing these opportunities.

9.4 Hunting conflicts on sovereign land.

The selected alternative will clarify where waterfowl hunting will be allowed near Antelope Island. Working with the Utah Air Boat Association and other publics, a 100-yard buffer was determined to be an acceptable buffer to reduce conflicts near developed areas on the island. The posting of no hunting areas around the GSLM has addressed conflicts there.

10.1 Identify an acceptable mix of DNR's statutory requirements in regard to commercial and industrial use of the lake's resources.

Under the selected sovereign land classifications, mineral lease zones, reinforced wildlife considerations and the diking policy, DNR believes GSL is large enough to accommodate the legislative policy regarding specified multiple uses without substantial impairment of protected public uses. No new commercial or industrial use of GSL and its resources is anticipated, nor is there reason to expect that existing commercial and industrial uses cannot operate within the constraints of sovereign land classifications and mineral lease zones. If a proposed new use cannot be accommodated under existing classifications or zones, a plan amendment will be considered. If an amendment is proposed, it will include an offsetting change in classification or zone. The offset will be based on factors including acreage, function and public trust value. Under this amendment approach, adequate mitigation is ensured until a new planning cycle is completed.

10.2 Open specific areas of the lake for commercial harbors for the brine shrimp industry.

At a public meeting on June 16, 1995, DNR's brine shrimp task force announced that no new exclusive special use leases for harbors will be issued and that the AIM will be available for commercial use until it becomes incompatible with recreational use or adequate alternative facilities are available. These policies remain in effect.

The south arm sites were identified by the task force as dispersed strategic locations where water depth is suitable, access is reasonably available and conflicts with public trust resources are relatively minimal. The north arm sites are locations where harbors already exist. Additional harbor development at these locations should not result in significant adverse effects. The intent of the harbor policy is to eliminate access to the lake as a competitive factor in the brine shrimp industry and to encourage its members to work together on harbor construction in order to concentrate development and confine impacts from harbor construction to a few strategic locations.

10.3 Establish policy regarding unauthorized construction below meander line for the development of harbors, ramps or other structures.

DNR will link penalties for violations of one DNR agency's statutes and rules to the full range of permits and licenses issued by all DNR agencies. This will further enhance DNR law enforcement on the lake. Rather than each division separately imposing sanctions for violations, all permits and licenses issued by DNR agencies may be subject to suspension, termination or other action.

11.1 Allow grazing on sovereign lands to the extent that it is consistent with public trust responsibilities.

The majority of sovereign land grazing potential on the lake is on lands within the 39 townships specified in Section 23-21-5. Several existing permits allow cancellation, after notice, if DWR decides grazing impacts are causing unacceptable adverse effects on nesting habitat or other wildlife values. Existing

permits contain a provision allowing for cancellation if the land is committed to a higher and better use. Since DWR is better prepared to determine impacts to wildlife values and has a greater on-the-ground presence than DFFSL, it makes sense to transfer administration of grazing permits on 23-21-5 lands to DWR.

12.1 Designate roads, causeways and utility corridors.

Use of existing corridors for transportation and utilities will minimize impacts because there will be no new ground disturbance. The two railroad causeways provide east-west corridors and are important transportation links. A utility, railroad and highway "corridor" already exists east of the lake. The Davis County Causeway provides access to AISP. DNR does not support the AISP southern causeway as a public transportation corridor because the approach to the causeway traverses private property and important south shore wildlife habitat. As discussed in the AISP Resource Management Plan public transportation over the causeway would result in access management problems for the park. DNR will maintain a right of administrative and emergency access over the causeway.

13.1 Identify the meander line on the ground for law enforcement purposes.

This reflects the current law enforcement approach, with addition of linking DNR-issued permits and using orthophoto mapping technology to identify the meander line. Orthophoto maps will be a useful guide to the general location of meander for law enforcement purposes, but it is likely

that actual surveys will be needed on a case-by-case basis when serious disputes arise regarding meander location.

14.1 Improve search and rescue access and operations.

All search and rescue efforts are the responsibility of county sheriffs' offices. Due to the location of AIM and GSLM facilities and the availability of DPR resources, the majority of search and rescue efforts will involve DPR. The five counties around the lake have an Operational Preplan for GSL rescues. It is an inter-local agreement that coordinates resources and representatives directed by a council. One council recommendation is to acquire better vessels for rescue purposes. Utility of the boat ramp at the Little Valley harbor is limited by water depth. Improvements would include dredging near the ramp area.

15.1 GSL and its surrounding wetlands have been nominated for a Ramsar designation.

DNR encourages interested persons to assist in investigating resource management implications of Ramsar designation. Preliminary indications are that existing Ramsar designations in the U.S. are typically sites that focus on wildlife and habitat protection where Ramsar designation nicely complements the dedicated use of resources. The extent to which a variety of uses under

the Public Trust Doctrine and the legislature's multiple-use mandate can be accommodated under Ramsar designation is not certain. The reasoning some advocates offer that Ramsar heightens appreciation for wetland values and provides protection but does not effect management requires more investigation. Ramsar designation appears to have been used to stop some developments. The requirement to report to an international organization on management actions if GSL were to become a Ramsar site is somewhat an affront to state sovereignty. The selected alternative does not preclude designation; it ensures full assessment of management implications.

16.1 Protect open space and critical lands near the lake.

DNR supports preserving open space and critical lands and will look at acquiring property or conservation easements on a case-by-case basis consistent with DNR policy.

16.2 Protect the viewshed or the visual aesthetics of GSL.

Lake users value the viewshed and aesthetics of GSL. DNR will develop a VRM plan. This could include removal of existing visual barriers and placing restrictions on future barriers. It could also address viewshed mitigation strategies as part of the permit approval process.