



6. Discussion and Rating of Issues

The discussion of major issues and sub-issues is summarized in the matrix tables, numbered 6.1 through 6.18. The matrices include a rating for each issue or sub-issue and each reservoir option. The ratings and weighting of issues were performed as described in Section 5. The following four major issues represent 64 percent of the total weighting of all issues.

Recreation issues (Tables 6.1 and 6.2) are related to the surface area of water available in the lake for water-based activities, such as boating and swimming, and to the amount of suitable land area around the lake available for land-based activities, such as camping, picnicking, hiking, etc. The two types of use are related because many of the people who come to the LPSRA for boating or swimming also camp and participate in other activities on land. An important factor regarding land use is that the larger reservoir options will submerge larger portions of the limited land area with a relatively mild slope. If the reservoir is enlarged and therefore becomes bounded by steep, mountainous terrain, the recreation area would reach the point having a very small amount of land suitable for access, parking, camping, beaches, and other activities. The inclusion of the northeast dam for the enlarged reservoir options will affect recreation by reducing the reservoir surface area, eliminating a large area of relatively shallow water and retaining the availability of land areas that are currently used for land-based activities.

The Environmental issue (Tables 6.3 and 6.4) includes several sub-issues. A major sub-issue is the preservation of habitat for threatened and endangered species. In particular, the Stephens' kangaroo rat is known to inhabit hundreds of acres, especially to the northeast of the as-designed reservoir. Enlarging the reservoir could submerge over 2000 acres of this habitat. In addition to compromising complex management agreements, this would require that a mitigation area with suitable habitat at least equal in size to that submerged be provided. It has not been determined whether the appropriate type and size of land is available for purchase at an acceptable price as part of the project. A partial mitigation is suggested and was evaluated in the issue rating procedures. This consists of a dam at the northeast end of the as-designed lake to protect a portion of the most valuable habitat from inundation. This could save about 44 percent of the incremental inundation otherwise part of the 1640 ft. elevation reservoir, up to about 63 percent for the 1814 ft. elevation reservoir. This is an expensive mitigation measure, but provides an alternative to what could otherwise be a fatal flaw for development of the larger reservoirs. Other environmental issues include riparian areas that are home to least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*), wetlands, cultural sites, and other issues. There are also serious environmental issues surrounding the permanent lowering of the reservoir that are noted in the Environmental matrix tables.

The issue of Construction Magnitude (Table 6.16) is determined by how much construction is involved in each option, primarily related to the volume of the dams



required to provide a higher reservoir level and greater reservoir volume. Additional construction elements are involved in the options of raising the dam, such as outlet modification and new spillway construction, but they are expected to be relative small efforts in comparison to the dam construction. The largest dam was given a rating of -5 and the others rated in approximate proportion to the construction magnitude required. The dam volumes and other elements of the reservoir options are tabulated in Table 3.1.

The issue of Water Storage (Table 6.18) represents the value of gained or lost water supply storage to the MWD system. Hence, the benefit has been rated approximately in proportion to the added storage compared to the as-designed condition, from $+5$ for the 1,000,000 AF reservoir and proportionately less for the others with increased capacity. Those with reduced capacity receive a negative rating in proportion to the reservoir volume lost.

Other issues are deemed less serious but still provide either obstacles or enhancements. In general, any change to a long-established condition is more likely than not to require an effort and cost to effect the change.

The results of the rating analysis are provided in the Summary Matrix, Table 6.19. This shows that the most highly rated option is the as-designed condition with the reservoir level at elevation 1588 ft. and a reservoir volume of 127,000 AF. This, by definition, has a rating of 0. The second highest rating is -0.18 for the reservoir level of 1640 ft. and a volume of 247,000 AF. The third highest rating is -0.39 for the reservoir level of 1706 ft. and a volume of 500,000 AF. A larger jump occurs to the fourth rated option, with a continuing decrease to the lowest rating of -1.62 for the recreation-only reservoir with a volume of 40,000 AF.



Table 6.1 Study Matrix of Recreation Issues, Sheet 1 of 2

Reservoir Options	Nominal Capacity (acre-feet)	Recreation Issues					
		Boating	Vessel Fishing	Shore Fishing	Swimming	Camping	Waterfowl Hunting
		Full service boating opportunities including passive and active (water sports including body contact) type boating. Includes sailing, kayaking, water skiing and PWC use.	Fishing associated with vessels	Fishing from land/ shorelines	Swimming includes designated swim areas with lifeguards and sandy buoyed off areas of the lake	Camping includes tent, vehicular, and equestrian. Camping includes full service hook up facilities with electrical and sewer	Hunting from designated water locations
Empty Reservoir	0	Boating is eliminated.	Fishing is eliminated.	Fishing is eliminated.	Swimming is eliminated.	Camping opportunities are increased but unattractive with no water features or other attractants	Waterfowl hunting is eliminated.
Lower Reservoir	40,000	Boating is limited to approximately 20-25% of existing carrying capacity due to limited launch facilities and safety constraints	Fishing is diminished due to lower vessel carrying capacity and lower quality fish habitat.	Fishing is diminished due to lower surface area and lower quality fish habitat.	Swimming opportunities diminished by facility location, quality, and unattractive water features. Opportunities will be limited during peak visitation periods and water quality episodes.	Camping opportunities are maintained but affected by lower boating capacity and unattractive water features.	Waterfowl hunting is not allowed due to safety, low water level and conflicting use reasons.
Reservoir Elev. 1563 ft	72,000	Boating is limited to approximately 50-60% of existing carrying capacity due to limited launch facilities and safety constraints	Fishing is diminished due to lower vessel carrying capacity and lower quality fish habitat.	Fishing is diminished due to lower surface area and lower quality fish habitat.	Swimming opportunities affected by facility location, quality, and unattractive water features. Opportunities will be limited during peak visitation periods and water quality episodes.	Camping opportunities are maintained but affected by lower boating capacity and unattractive water features.	Waterfowl hunting is not allowed due to safety, low water level and conflicting use reasons.
Reservoir Elev. 1588 ft	126,841	Boating is available at full carrying capacity. Opportunities limited during peak visitation periods due to demand. Boating is diminished or eliminated during dam repair.	Fishing is maintained at historic levels. Fishing is diminished or eliminated during dam repair.	Fishing is maintained at historic levels. Fishing is diminished or eliminated during dam repair.	Swimming is maintained at historic levels. Swimming is diminished or eliminated during dam repair.	Camping is maintained at historic levels. Potentially diminished by dam repair.	Waterfowl hunting is maintained at historic levels. Potentially diminished by dam repair.
Reservoir Elev. 1640 ft	257,000	Increased carrying capacity due to larger lake surface, new launch facilities and Boat Day Use shoreline area opportunities. Boating is diminished or eliminated during dam construction.	Fishing opportunities increase. Fishery improves. Fishing is diminished or eliminated during dam construction.	Fishing opportunities increase. Fishery improves. Fishing is diminished or eliminated during dam construction.	Swimming opportunities increase due to more water surface and shoreline. Water volume improves water quality issue related to swimming. Potentially diminished or eliminated during dam construction.	Camping is reduced slightly from existing levels. Opportunities exist for relocation of existing facilities. Some sites become waterfront locations. Potentially diminished or eliminated during dam construction.	Waterfowl hunting potentially improves due to larger lake surface and shallow water areas. Carrying capacity increases opportunity. Potentially diminished or eliminated during dam construction.
Reservoir Elev. 1706 ft	500,000	Increased carrying capacity due to larger lake surface but limited opportunities for launch facilities and Boat Day Use shoreline areas due to steep topography. Boating is diminished or eliminated during dam construction.	Fishing opportunities limited due to facility development and launch ramp potential. Fishery improved significantly. Potentially diminished or eliminated during dam construction.	Fishing opportunities limited due to access and limited facility development potential. Fishery improved significantly. Potentially diminished or eliminated during dam construction.	Swimming opportunities reduced due to steep shoreline topography. Limited due to access and limited facility development potential. Water volume improves water quality issue related to swimming. Potentially diminished or eliminated during dam construction.	Camping opportunities are eliminated due to high water level and limited facility development potential. Potentially diminished or eliminated during dam construction.	Waterfowl hunting opportunities are reduced due to steep shoreline topography and lack of shallow water areas. Potentially diminished or eliminated during dam construction.
Reservoir Elev. 1752 ft	700,000	Boating opportunities extremely limited due to limited facility development launch ramp potential and Boat Day Use shoreline areas. Carrying capacity increased. Potentially diminished or eliminated during dam construction.	Fishing opportunities limited due to limited facility development and launch ramp potential. Fishery improved significantly. Potentially diminished or eliminated during dam construction.	Fishing opportunities extremely limited due to access and limited facility development potential. Fishery is improved significantly. Potentially diminished or eliminated during dam construction.	Swimming opportunities are extremely reduced due to access, steep shoreline and limited facility development potential. Potentially diminished or eliminated during dam construction.	Camping opportunities are eliminated due to high water level and limited facility development potential. Potentially diminished or eliminated during dam construction.	Waterfowl hunting opportunities are extremely limited due to steep shoreline topography and lack of shallow water areas. Potentially diminished or eliminated during dam construction.
Reservoir Elev. 1814 ft	1,000,000	Boating opportunities extremely limited due to access and limited facility development launch ramp potential and Boat Day Use shoreline areas. Carrying capacity increased. Potentially diminished or eliminated during dam construction.	Fishing opportunities extremely limited due to limited facility development and launch ramp potential. Fishery improved significantly. Potentially diminished or eliminated during dam construction.	Fishing opportunities extremely limited due to access and limited facility development potential. Fishery is improved significantly. Potentially diminished or eliminated during dam construction.	Swimming opportunities are extremely reduced due to access, steep shoreline and limited facility development potential. Potentially diminished or eliminated during dam construction.	Camping opportunities are eliminated due to high water level and limited facility development potential. Potentially diminished or eliminated during dam construction.	Waterfowl hunting opportunities are extremely limited due to steep shoreline topography and lack of shallow water areas. Potentially diminished or eliminated during dam construction.



Table 6.1 Study Matrix of Recreation Issues, Sheet 2 of 2

Reservoir Options	Capacity (acre-feet)	Recreation Issues					
		Upland Game Hunting	Hiking	Biking	Rock Climbing	Equestrian	Nature Experience
		Hunting of terrestrial species	Includes paved and non paved routes and off trail opportunities	Includes paved bicycle routes and non paved routes	Technical rock climbing in designated areas	Equestrian use includes trail use and camping facilities	Bird watching, wildflower viewing, photography, etc.
Empty Reservoir	0	Upland game hunting opportunities potentially increase.	Hiking opportunities are increased but unattractive with no water features or other attractants	Biking opportunities are increased but unattractive with no water features or other attractants	Rock Climbing remains unchanged.	Equestrian opportunities are increased but may be affected by lack of water features or other attractants.	Nature experience opportunities are diminished by lack of water features or other attractants
Lower Reservoir	40,000	Upland game hunting is not affected.	Hiking opportunities are increased but potentially affected by unattractive water features.	Biking opportunities are increased but potentially affected by unattractive water features.	Rock Climbing remains unchanged.	Equestrian opportunities are increased but potentially affected by unattractive water features.	Nature experience opportunities are diminished by reduced water features or other attractants.
Reservoir Elev. 1563 ft	72,000	Upland game hunting is not affected.	Hiking opportunities are maintained at historic levels, but potentially affected by unattractive water features.	Biking opportunities are maintained at historic levels, but potentially affected by unattractive water features.	Rock Climbing remains unchanged.	Equestrian opportunities are maintained at historic levels, but potentially affected by unattractive water features.	Nature experience opportunities are diminished by reduced water features or other attractants.
Reservoir Elev. 1588 ft	126,841	Upland game hunting is maintained at historic levels. Potentially diminished by dam repair.	Hiking is maintained at historic levels. Potentially diminished by dam repair.	Biking is maintained at historic levels. Potentially diminished by dam repair.	Rock Climbing remains unchanged. Potentially diminished by dam repair or eliminated if site used for borrow material.	Equestrian opportunities are maintained at historic levels. Potentially diminished by dam repair.	Nature experience opportunities are maintained at historic levels. Potentially diminished by dam repair.
Reservoir Elev. 1640 ft	257,000	Upland game hunting is reduced due to high water level. Potentially diminished or eliminated during dam construction.	Hiking opportunities decrease due to higher water level. Potentially diminished or eliminated during dam construction.	Biking opportunities decrease due to higher water level. Potentially diminished or eliminated during dam construction.	Rock climbing access potentially eliminated by high water level. May be accessed by water only. Potentially diminished or eliminated during dam construction or eliminated if site used for borrow material.	Equestrian opportunities decrease due to higher water level. Potentially diminished or eliminated during dam construction.	Nature experience opportunities decrease due to higher water level. However water based activities may increase and improve. Potentially diminished or eliminated during dam construction.
Reservoir Elev. 1706 ft	500,000	Upland game hunting is eliminated due to high water level. Potentially diminished or eliminated during dam construction.	Hiking opportunities are limited due to access and limited facility development potential. Potentially diminished or eliminated during dam construction.	Biking opportunities are significantly limited due to access, high water level, steep topography and limited facility development potential. Potentially diminished or eliminated during dam construction.	Rock climbing is eliminated due to high water level. Potentially diminished by dam construction or eliminated if site used for borrow material.	Equestrian opportunities are significantly limited due to access and high water level. Potentially diminished or eliminated during dam construction	Nature experience opportunities are limited due to access and high water level. Potentially diminished or eliminated during dam construction
Reservoir Elev. 1752 ft	700,000	Upland game hunting is eliminated due to high water level. Potentially diminished or eliminated during dam construction.	Hiking opportunities are extremely limited due to access and limited facility development potential. Potentially diminished or eliminated during dam construction.	Biking opportunities are extremely limited due to access, high water level, steep topography and limited facility development potential. Potentially diminished or eliminated during dam construction.	Rock climbing is eliminated due to high water level. Potentially diminished by dam construction or eliminated if site used for borrow material.	Equestrian opportunities are eliminated due to high water level. Potentially diminished or eliminated during dam construction	Nature experience opportunities are extremely limited due to access and high water level. Potentially diminished or eliminated during dam construction.
Reservoir Elev. 1814 ft	1,000,000	Upland game hunting is eliminated due to high water level. Potentially diminished or eliminated during dam construction.	Hiking opportunities are extremely limited due to access and limited facility development potential. Potentially diminished or eliminated during dam construction.	Biking opportunities are eliminated due to access, high water level, steep topography and limited facility development potential. Potentially diminished or eliminated during dam construction.	Rock climbing is eliminated due to high water level. Potentially diminished by dam construction or eliminated if site used for borrow material.	Equestrian opportunities are eliminated due to high water level. Potentially diminished or eliminated during dam construction	Nature experience opportunities are extremely limited due to access and high water level. Potentially diminished or eliminated during dam construction.



Table 6.2 Valuation Matrix of Recreation Issues

Options	Nominal Capacity (acre-feet)	RECREATION ISSUES												Total Weighted Valuation
		Boating	Vessel Fishing	Shore Fishing	Swimming	Camping	Waterfowl Hunting	Upland Game Hunting	Hiking	Biking	Rock Climbing	Equestrian	Nature Experience	
		Weight Factor (%)												
		30	5	5	35	20	1	0.5	0.5	1	0.5	0.5	1	
Empty Reservoir	0	-5.0	-5.0	-5.0	-5.0	-2.0	-5.0	1.0	-2.0	-2.0	0.0	-2.0	-2.0	-4.3
Lower Reservoir	40,000	-5.0	-4.0	-3.0	-4.0	-1.0	-5.0	0.0	-1.0	-1.0	0.0	-1.0	-1.0	-3.5
Reservoir Elev. 1563 ft	72,000	-3.0	-2.0	-2.0	-2.0	0.0	-3.0	0.0	0.0	0.0	0.0	0.0	-1.0	-1.8
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	1.0	1.0	2.0	1.0	2.0	-1.0	0.0	-1.0	-1.0	-3.0	-1.0	0.0	1.2
Reservoir Elev. 1706 ft	500,000	2.0	2.0	2.0	-2.0	-3.0	-2.0	-1.0	-3.0	-3.0	-5.0	-3.0	-1.0	-0.6
Reservoir Elev. 1752 ft	700,000	0.0	1.0	-2.0	-5.0	-5.0	-4.0	-1.0	-3.0	-3.0	-5.0	-3.0	-1.0	-2.9
Reservoir Elev. 1814 ft	1,000,000	-3.0	1.0	-3.0	-5.0	-5.0	-4.0	-1.0	-3.0	-3.0	-5.0	-3.0	-1.0	-3.9

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.3 Study Matrix of Environmental Issues, Sheet 1 of 2

Options	Nominal Capacity (acre-feet)	Environmental Issues					
		Stevens K-Rat ¹	T&E Birdlife ¹	T&E Vegetation	MSHCP Upland Species ²	MSHCP Riparian Species ²	Fisheries
Empty Reservoir	0	Opportunity for habitat restoration; could substantially increase size of preserve but success uncertain. Clay & other compounds in sediment could affect success.	Permanent loss of riparian habitat. Take of species will require ITPs from FWS, DFG. Finding mitigation site would be difficult and successful establishment of new riparian habitat uncertain.		Successful habitat restoration would benefit upland species, but success uncertain.	Permanent loss of riparian habitat significant. Would impact numerous species protected under MSHCP. Locating suitable mitigation land difficult. Could possibly jeopardize State and Federal permits issued for this plan.	No water no fish.
Lower Reservoir	40,000	Opportunity for habitat restoration; could increase size of preserve but success uncertain. Clay & other compounds in sediment could affect success.	Temporary loss of riparian habitat until reestablished along new shoreline. Take of species. ITP from FWS, DFG. Newly established riparian vegetation less acreage because of smaller shoreline. Additional mitigation may be required.		Successful habitat restoration would benefit upland species, but success uncertain.	Temporary loss of riparian habitat would impact numerous species protected under MSHCP, but not likely to jeopardize State and Federal permits issued for this plan. Mitigation required.	Significant reductions in fish population.
Reservoir Elev. 1563 ft	72,000	Minor habitat restoration opportunity. Success uncertain.	Temporary loss of riparian habitat until reestablished along new shores. Take of species will require an ITP from FWS, DFG.		Successful restoration would provide minor benefit to upland species, but success uncertain.	Temporary loss of riparian habitat would impact numerous species protected under MSHCP, but not likely to jeopardize State and Federal permits issued for this plan. Mitigation required.	Reduced fish population by an estimated 50%.
Reservoir Elev. 1588 ft	126,841						
Reservoir Elev. 1640 ft	257,000	Inundate some of SKR core preserve. Take of species will require ITPs from FWS, DFG. Locating suitable mitigation land could be difficult.	Permanent loss of riparian habitat due to inundation. Steeper topography along shoreline will likely prevent reestablished along new shoreline. Take of species will require ITPs from FWS, DFG. Finding a mitigation site would be difficult and successful establishment of new riparian habitat uncertain.		Loss of some SKR core preserve and variety of upland species protected under MSHCP. With mitigation not likely to jeopardize state and federal permits issued for this plan.	Permanent loss of riparian habitat significant. Locating suitable mitigation land difficult. Could jeopardize State and Federal permits issued for this plan. Strong opposition from environmental community likely.	More water more fish.
Reservoir Elev. 1706 ft	500,000	Inundate greater portion of SKR core preserve as well as isolate a small area of preserve at base of existing dam. Take of species will require ITPs from DFG, FWS. Locating suitable mitigation land could be difficult.	Permanent loss of riparian habitat due to inundation. Steeper topography along shoreline will prevent reestablished along new shoreline. Take of species will require ITPs from FWS, DFG. Finding a mitigation site would be difficult and successful establishment of new riparian habitat uncertain.		Loss of some SKR core preserve and variety of upland species protected under MSHCP. With mitigation not likely to jeopardize state and federal permits issued for this plan.	Permanent loss of riparian habitat significant. Locating suitable mitigation land difficult. Could jeopardize State and Federal permits issued for this plan. Strong opposition from environmental community likely.	Increase in fish population.
Reservoir Elev. 1752 ft	700,000	Inundate increasingly greater portion of SKR core preserve as well as isolate a small area of preserve at base of existing dam. Take of species will require ITPs from DFG, FWS. Locating suitable mitigation land could be difficult.	Permanent loss of riparian habitat due to inundation. Steeper topography along shoreline will likely prevent reestablished along new shoreline. Take of species will require ITPs from FWS, DFG. Finding a mitigation site would be difficult and successful establishment of new riparian habitat uncertain.		Loss of some SKR core preserve and variety of upland species protected under MSHCP. With mitigation not likely to jeopardize state and federal permits issued for this plan.	Permanent loss of riparian habitat significant. Locating suitable mitigation land difficult. Could jeopardize State and Federal permits issued for this plan. Strong opposition from environmental community and likely.	Increase in fish population.
Reservoir Elev. 1814 ft	1,000,000	Inundate increasingly greater portion of SKR core preserve as well as isolate a small area of preserve at base of existing dam. Take of species will require ITPs from DFG, FWS. Locating suitable mitigation land could be difficult. Strong opposition from environmental community likely.	Permanent loss of riparian habitat due to inundation. Steeper topography along shoreline will likely prevent reestablished along new shoreline. Take of species will require ITPs from FWS, DFG. Finding a mitigation site would be difficult and successful establishment of new riparian habitat uncertain. Strong opposition from environmental community likely.		Loss of some SKR core preserve and variety of upland species protected under MSHCP. With mitigation not likely to jeopardize state and federal permits issued for this plan.	Permanent loss of riparian habitat significant. Locating suitable mitigation land difficult. Could jeopardize State and Federal permits issued for this plan. Strong opposition from environmental community likely.	Increase in fish population. Increase in deeper areas will benefit trout.

1. Assumes northeast dam constructed for all alternatives that increase reservoir capacity.
 2. Refers to Least Bell's vireo (state and federal endangered) and southwestern willow flycatcher (state and federal endangered). Also potential habitat for the federal threatened California coastal gnatcatcher (*Poliopitila californica californica*). Gnatcatcher surveys planned for spring 2006.
 3. No reports of T&E plant species. Two CNPS list 4 species reported from within State Park boundaries. Botanical surveys recommended for any alternative that would increase reservoir elevation above 1588 feet.
 4. Wetland (willow) vegetation present at toe of dam due to seepage from dam. Riparian vegetation around lake may meet Corps definition as wetland, but field delineation needed. Few isolated springs may also delineate out as wetland.
 5. According to Carl Denim, Project Manager at the Regional Water Quality Control Board, Marina Tank site is in remediation now. Anticipate clean up being completed in 2-3 years (pers.comm. 13 April 2006). This is in conflict with State Park. DFG knowledge of site, which is that clean up efforts are complete. Assuming remediation is in process, impacts could be avoided if Lake Perris project proceeds after clean up is complete.
 6. Research is currently taking place to determine the number of known sites that may be impacted by wave action at the specific proposed elevations. Significant portions of the current recreation area were not surveyed prior to construction; therefore additional cultural resources may be present. This particularly true of historic resources that were often overlooked in the early 1970s.



Table 6.3 Study Matrix of Environmental Issues, Sheet 2 of 2

Options	Capacity (acre-feet)	Environmental Issues					
		Wetlands ³	Haz.Waste Sites ⁴	Borrow Areas & Quarries	Cultural & Archeology ⁵	Constr. Activ. & Res'v. Acces	Utility Relocation
Empty Reservoir	0	Loss of wetlands along toe of dam. Other potential wetland loss. Mitigation required. Finding suitable location could be difficult.	Removal of spillway may impact Haz Waste site. Could delay dam work until after Haz Waste clean up complete	Removal of spillway would require disposal site. Potential for environmental issues.	Two previously recorded sites in the reservoir pool that have been perpetually inundated would be exposed, thereby increasing the possibility of looting/vandalism. Possible wave damage of sires at shore elevation. Not all of the reservoir area was surveyed prior to construction so additional unrecorded sites may be present.	Some level of construction related disturbance expected. Park could likely remain open.	No utility relocation anticipated.
Lower Reservoir	40,000	Seismic repair will result in loss of wetland at toe of dam. Other potential wetland loss, but probably not as extensive as draining reservoir. Mitigation required. Locating suitable site could be difficult.	Seismic repair may impact Haz Waste site.	Material source likely to be located onsite and offsite. Significant amount of material required for repair. Potential environmental issues likely.	Two previously recorded sites that have been perpetually inundated would be exposed, thereby increasing the possibility of looting/vandalism. Possible wave damage of sites at shore elevation. Not all of the reservoir area was surveyed prior to construction so additional unrecorded sites may be present.	Construction related disturbance expected. Park could likely remain open.	No utility relocation anticipated.
Reservoir Elev. 1563 ft	72,000	Seismic repair will result in loss of wetlands along toe of dam. Mitigation required. Locating suitable site could be difficult.	Seismic repair needed. Ground disturbance would impact Haz Waste site.	Material source likely to be located on site and offsite. Significant amount of material required for seismic repair. Potential environmental issues likely.	Two previously recorded sites that have been perpetually inundated would be exposed, thereby increasing the possibility of looting/vandalism. Possible wave damage of sites at shore elevation. Not all of the reservoir area was surveyed prior to construction so additional unrecorded sites may be present.	Construction related disturbance expected. Park could likely remain open.	No utility relocation required.
Reservoir Elev. 1588 ft	126,841	Seismic repair will result in loss of wetlands along toe of dam. Mitigation required. Locating suitable site could be difficult.	Seismic repair needed. Ground disturbance would impact Haz Waste site.	Material source likely to be located on site and offsite. Significant amount of material required for seismic repair. Potential environmental issues likely.	No archaeological sites are located at the normal full elevation; therefore resources are not eroded by wave wash from boat wakes or wind, nor are people drawn to sites along the shore.		
Reservoir Elev. 1640 ft	257,000	Seismic repair will result in loss of wetlands along toe of dam. Mitigation required. Locating suitable site could be difficult.	Ground disturbance would impact Haz Waste site.	Very significant amount of material required for enlarged structure. Material source likely to be located on site and offsite. Potential environmental issues likely.	Approx. 6 previously recorded sites would be inundated or impacted by wave action with construction of the NE dam. New recreation facilities would likely effect an additional number of sites, as would dam and side dam construction. Not all of the upland area above the reservoir, nor the inundated portion of the reservoir, was surveyed prior to construction so additional unrecorded sites may be present.	Significant Construction related disturbance such as noise, pollution, access control. LPRA likely to be closed for duration of construction.	Any increased water level above 1640' requires same level of effort for utility relocation.
Reservoir Elev. 1706 ft	500,000	Enlarging footprint of dam, seismic repair will result in loss of wetlands along toe of dam. Increased water elevation will inundate potential seasonal wetlands (e.g. springs). Mitigation required. Locating suitable site could be difficult.	Ground disturbance would impact Haz Waste site.	Very significant amount of material required for enlarged structure. Material source likely to be located on site and offsite. Potential environmental issues likely.	Approx. 8 previously recorded sites would be inundated or impacted by wave action. New recreation facilities would likely affect an additional number of sites. Not all of the upland area above the reservoir or the inundated portion of the reservoir, was surveyed prior to construction so additional unrecorded sites may be present.	Increasingly significant construction disturbance. Likely for LPRA to be closed for duration of construction.	Any increased water level above 1640' requires same level of effort for utility relocation
Reservoir Elev. 1752 ft	700,000	Enlarging footprint of dam, seismic repair will result in loss of wetlands along toe of dam. Increased water elevation will inundate potential seasonal wetlands (e.g. springs). Mitigation required. Locating suitable site could be difficult.	Ground disturbance would impact Haz Waste site.	Very significant amount of material required for enlarged structure. Material source likely to be located on site and offsite. Potential environmental issues likely.	Approx. 8 previously recorded sites would be inundated or impacted by wave action. New recreation facilities would likely affect an additional number of sites. Not all of the upland area above the reservoir or the inundated portion of the reservoir, was surveyed prior to construction so additional unrecorded sites may be present.	Increasingly significant construction disturbance. LPRA to be closed for duration of construction.	Any increased water level above 1640' requires same level of effort for utility relocation
Reservoir Elev. 1814 ft	1,000,000	Enlarging footprint of dam, seismic repair will result in loss of wetlands along toe of dam. Increased water elevation will inundate potential seasonal wetlands (e.g. springs). Mitigation required. Locating suitable site could be difficult.	Ground disturbance would impact Haz Waste site.	Very significant amount of material required for enlarged structure. Material source likely to be located offsite. Potential environmental issues likely.	Approx. 15 previously recorded sites within the basin would be inundated or impacted by wave action. New recreation facilities would likely affect an additional number of sites. Not all of the upland area above the reservoir or the inundated portion of the reservoir was surveyed prior to construction so additional unrecorded sites may be present.	Increasingly significant construction disturbance. LPRA to be closed for duration of construction.	Any increased water level above 1640' requires same level of effort for utility relocation.

1. Assumes northeast dam constructed for all alternatives that increase reservoir capacity.
 2. Refers to Least Bell's vireo (state and federal endangered) and southwestern willow flycatcher (state and federal endangered). Also potential habitat for the federal threatened California coastal gnatcatcher (Polioptila californica californica). Gnatcatcher surveys planned for spring 2006.
 3. No reports of T&E plant species. Two CNPS list 4 species reported from within State Park boundaries. Botanical surveys recommended for any alternative that would increase reservoir elevation above 1588 feet.
 4. Wetland (willow) vegetation present at toe of dam due to seepage from dam. Riparian vegetation around lake may meet Corps definition as wetland, but field delineation needed. Few isolated springs may also delineate out as wetland.
 5. According to Carl Denim, Project Manager at the Regional Water Quality Control Broad, Marina Tank site is in remediation now. Anticipate clean up being completed in 2-3 years (pers.com. 13 April 2006). This is in conflict with State Park, DFG knowledge of site, which is that clean up efforts are complete. Assuming remediation is in process, impacts could be avoided if Lake Perris project proceeds after clean up is complete.
 6. Research is currently taking place to determine the number of known sites that may be impacted by wave action at the specific proposed elevations. Significant portions of the current recreation area were not surveyed prior to construction; therefore additional cultural resources may be present. This particularly true of historic resources that were often overlooked in the early 1970s.



Table 6.4 Valuation Matrix of Environmental Issues

Options	Nominal Capacity (acre-feet)	ENVIRONMENTAL ISSUES												Total Weighted Valuation
		Stevens K-Rat	T&E Birdlife	T&E Vegetation	MSHCP Upland Spp.	MSHCP Riparian Spp.	Fisheries	Wetlands	Haz.Waste Sites	Borrow Areas & Quarries	Cultural & Archeology	Constr. Activ. & Res'v. Acces	Utility Relocation	
		Weight Factor (%)												
		12	12	0	9	9	5	11	7	10	11	9	5	
Empty Reservoir	0	1.0	-5.0	0.0	1.0	-5.0	-5.0	-5.0	-1.0	-3.0	-2.0	-2.0	0.0	-2.4
Lower Reservoir	40,000	1.0	-4.0	0.0	1.0	-3.5	-5.0	-4.0	-5.0	-4.0	-2.0	-3.0	0.0	-2.5
Reservoir Elev. 1563 ft	72,000	0.5	-4.0	0.0	0.5	-3.0	-4.0	-4.0	-5.0	-5.0	-1.0	-3.0	0.0	-2.5
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	-4.0	-5.0	0.0	-4.0	-5.0	3.0	-4.0	-5.0	-5.0	-2.0	-4.0	-5.0	-3.9
Reservoir Elev. 1706 ft	500,000	-4.0	-5.0	0.0	-4.0	-5.0	3.0	-5.0	-5.0	-5.0	-3.0	-5.0	-5.0	-4.2
Reservoir Elev. 1752 ft	700,000	-5.0	-5.0	0.0	-5.0	-5.0	4.0	-5.0	-5.0	-5.0	-3.0	-5.0	-5.0	-4.3
Reservoir Elev. 1814 ft	1,000,000	-5.0	-5.0	0.0	-5.0	-5.0	5.0	-5.0	-5.0	-5.0	-4.0	-5.0	-5.0	-4.4

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.5 Valuation Matrix of Property Issues

Options	Nominal Capacity (acre-feet)	Comments on Property Acquisition potential	PROPERTY ISSUES						Total Weighted Valuation
			Limits of Present Adaptable Ownership	Acquisition Limits	Compatibility with Adjacent Areas	Utility Relocations	Mitigation and MSHCP Impacts	Existing Land Transfer Agreement Impacts	
			Weight Factor (%)						
			10	5	10	5	35	35	
Empty Reservoir	0	Possible acquisition of land for any alternative water storage requirement (new reservoir site). Possible land to mitigate loss of habitat.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lower Reservoir	40,000	Possible acquisition of land for any alternative water storage requirement (new reservoir site). Possible land to mitigate loss of habitat.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1563 ft	72,000	No requirement at this current finished reservoir level	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1588 ft	126,841	Possible land purchases to mitigate loss of habitat if the reservoir is brought back to its existing capacity at El. 1588 feet. This acquisition accounts for likely new habitat that will be established at the current drawdown level and lost again during construction and re-filling to bring the water levels back to operating capacity.	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	Expansion of would result in possible mitigation for replacement land for lost recreational and business activities and habitat in borrow areas, construction staging areas, habitat areas, fish and game areas, etc. Land needed would involve both temporary and permanent relocations. Land or property rights that provide permission for borrow and stage areas	0.0	0.0	0.0	-1.0	-2.0	-4.0	-2.2
Reservoir Elev. 1706 ft	500,000	Expansion of would result in possible mitigation for replacement land for lost activities or habitat in borrow areas, construction staging areas, habitat areas, fish and game areas, etc. Would involve both temporary and permanent relocations. Land or rights for permission for borrow and stage areas	-1.0	-1.0	-1.0	-2.0	-3.0	-4.0	-2.8
Reservoir Elev. 1752 ft	700,000	Expansion of would result in possible mitigation for replacement land for lost activities or habitat in borrow areas, construction staging areas, habitat areas, fish and game areas, etc. Would involve both temporary and permanent relocations. Land or rights for permission to build and use borrow and stage areas	-2.0	-2.0	-1.0	-2.0	-4.0	-5.0	-3.7
Reservoir Elev. 1814 ft	1,000,000	Additional on-site buffer property will be needed around the finished reservoir. Temporary and/or permanent relocation of various recreational activities. Possible replacement of habitat preserves at a minimum 1:1 ratio. Temporary and/or permanent relocation of homes, businesses, roadways, and utilities at new dam locations.	-3.0	-3.0	-1.0	-2.0	-5.0	-5.0	-4.2

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.6 Study Matrix of Operations Issues, Sheet 1 of 2

Options	Capacity (acre-feet)	Comments	Hydraulic Structure Requirements and Considerations		
			Existing Inlet	New Selective withdrawal Outlet	Lake Perris Bypass and Pump-back
Empty Reservoir	0	Not required.	Not required. The bottom outfall basin structure may be removed, but the vent structure No.1 with a summit invert elevation of 1,698 ft will remain open because of the falling-grade design of the SAVPL. An overflow basin may be required as the vent structure will serve as a surge tank in the pump-back mode of operation from LVPL.	Not required and the existing outlet needs to be removed.	Will remain as required. Because of the presence of downsurge in the discharge line, air chambers may be added to restore a full pump-back capacity from Lakeview Pipeline to Mills treatment plant. Current capacity is about 120 cfs.
Lower Reservoir	40,000	The SAVPL inlet will be operated only to provide make-up water for evaporative losses and maintain a maximum water level for recreation purposes.	Will remain as required to provide the make-up water for evaporative losses.	Not required and the existing outlet will remain for emergency drawdown.	Will remain as required. Because of the presence of downsurge in the discharge line, air chambers may be added to restore a full pump-back capacity from Lakeview Pipeline to Mills treatment plant. Current capacity is about 120 cfs.
Reservoir Elev. 1563 ft	72,000	The SAVPL inlet will be operated mostly to provide make-up water for evaporative losses and maintain an optimal water level for recreation purposes. Project water in and out of reservoir would be limited due to the poor water quality.	Will remain as required.	Not required and the existing outlet will remain adequate for original design purposes.	Will remain as required. Because of the presence of downsurge in the discharge line, air chambers may be added to restore a full pump-back capacity from Lakeview Pipeline to Mills treatment plant. Current capacity is about 120 cfs.
Reservoir Elev. 1588 ft	126,841	The SAVPL is operated by gravity to feed Mills treatment plant via Box Springs Feeder, to fill Lake Perris thru an inlet pipeline, and to supply Lakeview Pipeline thru Lake Perris by-pass. Project water in and out of reservoir would be limited to about 50,000 - 60,000 acre-ft per year due to the poor water quality and recreation requirements. A pump-back facility is used to mainly provide the emergency water to Mills treatment plant when SAVPL, north of the Box Springs Feeder turnout, is outaged.	Will remain as required.	Not required and the existing outlet will remain adequate for original design purposes.	Will remain as required. Because of the presence of downsurge in the discharge line, air chambers may be added to restore a full pump-back capacity from Lakeview Pipeline to Mills treatment plant. Current capacity is about 120 cfs.
Reservoir Elev. 1640 ft	257,000	The SAVPL will continue operating by gravity to feed Mills treatment plant, to fill Lake Perris, and to supply Lakeview Pipeline thru Lake Perris by-pass. With a larger storage capacity and a new selective-withdrawal outlet tower, seasonal usage of project water in and out of reservoir could be increased to more than 100,000 - 150,000 acre-ft per year due to a better water quality. The pump-back facility is still required to provide the emergency water to Mills treatment plant when SAVPL, north of the Box Springs Feeder turnout, is outaged.	Will remain as required.	Required to allow selective withdrawal of good-quality water for the full-depth of the reservoir. It would have a similar design configuration as the I/O Tower for the DVR, with an estimated height of about 182 feet.	Will remain as required. Because of the presence of downsurge in the discharge line, air chambers may be added to restore a full pump-back capacity from Lakeview Pipeline to Mills treatment plant. Current capacity is about 120 cfs.
Reservoir Elev. 1706 ft	500,000	With a much-expanded storage, together with an IF inlet, a CRA pumping facility and a larger selective-withdrawal outlet tower, Lake Perris can be operated in conjunction with DVL to provide not only the reliability but the flexibility in meeting MWD's emergency and drought needs as well as a firm supply of water for the Southland in the next 30 years. For example, the 632,000 acre-ft emergency and carryover storage allocated in the DVL can be transferred to and shared with an expanded Lake Perris to enhance the seasonal recreation and to optimize the efficient use of pumping energy. The Lake Perris By-Pass and pump-back facility would be redundant and can be abolished if the operation is perfectly integrated with the DVL. These benefits would be increased in direct proportion to the expanded capacity of Lake Perris.	Will remain as required.	Required to allow selective withdrawal of good-quality water for the full-depth of the reservoir. It would have a similar design configuration as the I/O Tower for the DVR, with an estimated height of about 248 feet.	May be abolished if the normal operating range of the reservoir level could be maintained higher than Mills treatment plant's influent channel HGL of 1,670 ft to allow adequate feeding by gravity and the new selective withdrawal outlet tower will provide good-quality water to both Mills treatment plant and Lakeview Pipeline.
Reservoir Elev. 1752 ft	700,000	With a much-expanded storage, together with an IF inlet, a CRA pumping facility and a larger selective-withdrawal outlet tower, Lake Perris can be operated in conjunction with DVL to provide not only the reliability but the flexibility in meeting MWD's emergency and drought needs as well as a firm supply of water for the Southland in the next 30 years. For example, the 632,000 acre-ft emergency and carryover storage allocated in the DVL can be transferred to and shared with an expanded Lake Perris to enhance the seasonal recreation and to optimize the efficient use of pumping energy. The Lake Perris By-Pass and pump-back facility would be redundant and can be abolished if the operation is perfectly integrated with the DVL. These benefits would be increased in direct proportion to the expanded capacity of Lake Perris.	Will remain as required.	Required to allow selective withdrawal of good-quality water for the full-depth of the reservoir. It would have a similar design configuration as the I/O Tower for the DVR, with an estimated height of about 294 feet.	May be abolished if the normal operating range of the reservoir level could be maintained higher than Mills treatment plant's influent channel HGL of 1,670 ft to allow adequate feeding by gravity and the new selective withdrawal outlet tower will provide good-quality water to both Mills treatment plant and Lakeview Pipeline.
Reservoir Elev. 1814 ft	1,000,000	With a much-expanded storage, together with an IF inlet, a CRA pumping facility and a larger selective-withdrawal outlet tower, Lake Perris can be operated in conjunction with DVL to provide not only the reliability but the flexibility in meeting MWD's emergency and drought needs as well as a firm supply of water for the Southland in the next 30 years. For example, the 632,000 acre-ft emergency and carryover storage allocated in the DVL can be transferred to and shared with an expanded Lake Perris to enhance the seasonal recreation and to optimize the efficient use of pumping energy. The Lake Perris By-Pass and pump-back facility would be redundant and can be abolished if the operation is perfectly integrated with the DVL. These benefits would be increased in direct proportion to the expanded capacity of Lake Perris.	Will remain as required. However, the last 7-mile section of the 10-foot-inside-diameter SAVPL has a tested design HGL of only 1,785 ft because of the falling-grade design. To avoid overstressed, this section of the SAVPL must be either strengthened (and upgraded to above 1,814 ft) or isolated from the reservoir when reservoir level is above 1,785 ft.	Required to allow selective withdrawal of good-quality water for the full-depth of the reservoir. It would have a similar design configuration as the I/O Tower for the DVR, with an estimated height of about 356 feet.	May be abolished if the normal operating range of the reservoir level could be maintained higher than Mills treatment plant's influent channel HGL of 1,670 ft to allow adequate feeding by gravity and the new selective withdrawal outlet tower will provide good-quality water to both Mills treatment plant and Lakeview Pipeline.



Table 6.6 Study Matrix of Operations Issues, Sheet 2 of 2

Options	Nominal Capacity (acre-feet)	Hydraulic Structure Requirements and Considerations		
		Emergency Drawdown	New Inland Feeder Inlet	New CRA Pumping Facility
Empty Reservoir	0	Not required.	Not required.	Not required.
Lower Reservoir	40,000	An estimated minimum release capacity requirement would be about 420 cfs.	Not required.	Not required.
Reservoir Elev. 1563 ft	72,000	An estimated minimum release capacity requirement would be about 780 cfs.	Not required.	Not required.
Reservoir Elev. 1588 ft	126,841	An estimated minimum release capacity requirement would be about 1310 cfs.	Not required.	Not required.
Reservoir Elev. 1640 ft	257,000	An estimated minimum release capacity requirement would be about 1710 cfs.	Required to possibly double or triple the existing filling capacity (560 cfs) of SAVPL. The facility, connecting to the Inland Feeder next to the east end of Lake Perris, would have a similar arrangement as the Secondary Inlet of DVL with due considerations given to the economics, optimal flow available at DC Afterbay, and the topo control elevation of a required overflow summit.	Required to fill the reservoir with CRA water in addition to the SWP feed by gravity. The facility would have a similar arrangement as Wadsworth pumping plant for DVL. CRA is a closed conduit with open-channel flow, which tends to be unstable when closing to the full depth. Pumping forebay must be adequate to minimize hydraulic transients in CRA. If the land space is restricted for the forebay requirement, joint use of the Retention Basin at IF Pressure Control Facility could be an economical option.
Reservoir Elev. 1706 ft	500,000	An estimated minimum release capacity requirement would be about 4050 cfs.	Required to possibly double or triple the existing filling capacity (560 cfs) of SAVPL. The facility, connecting to the Inland Feeder next to the east end of Lake Perris, would have a similar arrangement as the Secondary Inlet of DVL with due considerations given to the economics, optimal flow available at DC Afterbay, and the topo control elevation of a required overflow summit.	Required to fill the reservoir with CRA water in addition to the SWP feed by gravity. The facility would have a similar arrangement as Wadsworth pumping plant for DVL. CRA is a closed conduit with open-channel flow, which tends to be unstable when closing to the full depth. Pumping forebay must be adequate to minimize hydraulic transients in CRA. If the land space is restricted for the forebay requirement, joint use of the Retention Basin at IF Pressure Control Facility could be an economical option.
Reservoir Elev. 1752 ft	700,000	An estimated minimum release capacity requirement would be about 5780 cfs.	Required to possibly double or triple the existing filling capacity (560 cfs) of SAVPL. The facility, connecting to the Inland Feeder next to the east end of Lake Perris, would have a similar arrangement as the Secondary Inlet of DVL with due considerations given to the economics, optimal flow available at DC Afterbay, and the topo control elevation of a required overflow summit.	Required to fill the reservoir with CRA water in addition to the SWP feed by gravity. The facility would have a similar arrangement as Wadsworth pumping plant for DVL. CRA is a closed conduit with open-channel flow, which tends to be unstable when closing to the full depth. Pumping forebay must be adequate to minimize hydraulic transients in CRA. If the land space is restricted for the forebay requirement, joint use of the Retention Basin at IF Pressure Control Facility could be an economical option.
Reservoir Elev. 1814 ft	1,000,000	An estimated minimum release capacity requirement would be about 9030 cfs.	Required to possibly double or triple the existing filling capacity (560 cfs) of SAVPL. The facility, connecting to the Inland Feeder next to the east end of Lake Perris, would have a similar arrangement as the Secondary Inlet of DVL with due considerations given to the economics, optimal flow available at DC Afterbay, and the topo control elevation of a required overflow summit.	Required to fill the reservoir with CRA water in addition to the SWP feed by gravity. The facility would have a similar arrangement as Wadsworth pumping plant for DVL. CRA is a closed conduit with open-channel flow, which tends to be unstable when closing to the full depth. Pumping forebay must be adequate to minimize hydraulic transients in CRA. If the land space is restricted for the forebay requirement, joint use of the Retention Basin at IF Pressure Control Facility could be an economical option.



Table 6.7 Valuation Matrix of Operations Issues

Options	Nominal Capacity (acre-feet)	OPERATION ISSUES												Total Weighted Valuation
		Reservoir Fluctuations (Regulatory)	Back-up to Mills T. P.	Distribution System Flexibility	Lk.Perris Bypass Power Generation	Existing Inlet**	Emergency Drawdown	New Selective withdrawal Outlet	New Inland Feeder Inlet	New CRA Pumping/Generating Facility***	Water Supply Reliability	Dam Monitoring and Surveillance	Inter-Agency Operations	
		Weight Factor (%)												
		5	12	15	4	4	5	10	15	5	15	5	5	100%
Empty Reservoir	0	-5.0	-5.0	-5.0	3.0	0.0	0.0	0.0	0.0	0.0	-5.0	0.0	-5.0	-2.5
Lower Reservoir	40,000	-5.0	-5.0	-5.0	5.0	0.0	0.0	0.0	0.0	0.0	-5.0	0.0	-5.0	-2.4
Reservoir Elev. 1563 ft	72,000	-4.0	-4.0	-4.0	4.0	0.0	0.0	0.0	0.0	0.0	-5.0	0.0	-2.0	-2.0
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	4.0	4.0	4.0	-1.0	0.0	0.0	2.0	2.0	1.0	5.0	-2.0	0.0	2.4
Reservoir Elev. 1706 ft	500,000	5.0	5.0	5.0	-5.0	-4.0	-1.0	2.0	5.0	5.0	5.0	-3.0	-1.0	2.9
Reservoir Elev. 1752 ft	700,000	5.0	5.0	5.0	-5.0	-4.0	-5.0	2.0	5.0	5.0	5.0	-4.0	-1.0	2.7
Reservoir Elev. 1814 ft	1,000,000	5.0	5.0	5.0	-5.0	-5.0	-5.0	2.0	5.0	5.0	5.0	-5.0	-1.0	2.6

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.

**At 1 MAF, need to reinforce 7 miles of SAVP pipe.

***Benefit may be at higher elevation (500 TAF or greater)--generation only, pumping is questionable.



Table 6.8 Study Matrix of Regional Socio-Economic Issues

Options	Nominal Capacity (acre-feet)	Regional Socio-Economic Issues				
		Site Businesses	Surrounding Businesses	Local Residents	Local Political Jurisdictions	Environmental Justice
Empty Reservoir	0	Marina business at Park disappears because no boating.	Significant reduction in business because non-local attendance at Park reduced because of no water-based activities. This includes motels, restaurants, grocery stores and gas stations. Businesses may suffer somewhat from less reliable water supply.	Visits by local residents at Park significantly reduced because of no water-based activities. Also, reduced livability satisfaction because recreational opportunities reduced even if seldom used.. Immediately local residents benefit from reduced street traffic. Residents may suffer somewhat from less reliable water supply.	Negative effect on town of Perris and Riverside County because sales taxes reduced from reduced attendance at Park. Possible benefit from reduced law enforcement and other services. Government offices may suffer somewhat from less reliable water supply.	Drastic reduction in availability of quality recreational opportunities at low cost (picnicking, swimming, boating, hiking, camping, nature enjoyment) for low-income and/or non-english speaking people.
Lower Reservoir	40,000	Marina business at Park significantly reduced because less boating on reservoir with slightly more than 50 percent of the as-designed size.	Significant reduction in business because non-local attendance at Park reduced because of considerably less boating opportunities. This includes motels, restaurants, grocery stores and gas stations. Businesses may suffer somewhat from less reliable water supply and possible reduction in water quality.	Visits by local residents at Park reduced because of considerably reduced boating and other recreational opportunities. Also, reduced livability satisfaction because recreational opportunities reduced even if seldom used.. Immediately local residents benefit from reduced street traffic. Residents may suffer somewhat from less reliable water supply and possible reduction in water quality.	Negative effect on town of Perris and Riverside County because sales taxes reduced from reduced attendance at Park. Possible benefit from reduced law enforcement and other services. Government offices may suffer somewhat from less reliable water supply and possible reduction in water quality.	Some reduction in availability of quality recreational opportunities at low cost (picnicking, swimming, boating, hiking, camping, nature enjoyment) for low-income and/or non-english speaking people.
Reservoir Elev. 1563 ft	72,000	Marina business at Park somewhat reduced because less boating on reservoir with 82 percent of the as-designed size.	Significant reduction in business because non-local attendance at Park reduced because of less boating opportunities. This includes motels, restaurants, grocery stores and gas stations. Slightly less reliable water supply and possible reduction in water quality.	Visits by local residents at Park reduced because of reduced boating and other recreational opportunities. Livability satisfaction because of nearby recreational opportunities, even if seldom used.. Immediately local residents benefit somewhat from reduced street traffic. Slightly less reliable water supply and possible reduction in water quality.	Some negative effect on town of Perris and Riverside County because sales taxes reduced from reduced attendance at Park. Possible benefit from reduced law enforcement and other services. Slightly less reliable water supply and possible reduction in water quality.	Minor reduction in availability of quality recreational opportunities at low cost (picnicking, swimming, boating, hiking, camping, nature enjoyment) for low-income and/or non-english speaking people.
Reservoir Elev. 1588 ft	126,841	No long -term change. Business significantly decreased during remediation construction	No long -term change. Business significantly decreased during remediation construction	No long -term change except added safety of dam. Business significantly decreased during remediation construction	No long -term change. Reduction in Park use and some negative impacts during remediation construction	No long -term change. Recreational opportunities reduced during remediation construction
Reservoir Elev. 1640 ft	257,000	Marina business at Park increased because more boating on reservoir with about 40 percent increase from the as-designed size. Concession stands operate with more business because attendance increased.	Significant increase in business because non-local attendance at Park increases because of more boating and other recreational opportunities. This includes motels, restaurants, grocery stores and gas stations. Slightly more reliable water supply and possible improvement in water quality.	Visits by local residents at Park increase because of increased boating and other recreational opportunities. Livability satisfaction because of nearby recreational opportunities, even if seldom used.. Immediately local residents lose somewhat from increased street traffic. Slightly more reliable water supply and possible improvement in water quality. Impacts during construction addressed elsewhere.	Some positive effect on town of Perris and Riverside County because sales taxes increase from increased attendance at Park. Possible additional cost from increased law enforcement and other services. Slightly more reliable water supply and possible improvement in water quality.	Increase in boating, but negligible change in availability of quality recreational opportunities at low cost (picnicking, swimming, hiking, camping, nature enjoyment) for low-income and/or non-english speaking people. Recreational opportunities reduced during enlargement construction
Reservoir Elev. 1706 ft	500,000	Marina business at Park significantly increased because more boating on reservoir with about 80 percent increase from the as-designed size. Concession stands operate with more business because attendance increased.	Significant increase in business because non-local boating attendance at Park increases because of more boating opportunities. This includes motels, restaurants, grocery stores and gas stations. More reliable water supply and possible improvement in water quality. Non-boating attendance will decrease because of limited facilities.	Visits by local residents at Park increase for boating only. A decrease in attendance will result from limited non-boating opportunities. Livability satisfaction because of nearby recreational opportunities, even if seldom used, little changed.. Immediately local residents gain from decreased street traffic. More reliable water supply and possible improvement in water quality. Impacts during construction addressed elsewhere.	Negative effect on town of Perris and Riverside County because sales taxes decrease from decreased attendance at Park. Possible reduced cost from decreased law enforcement and other services. More reliable water supply and possible improvement in water quality.	Increase in boating, but significant reduction in availability of quality recreational opportunities at low cost (picnicking, swimming, hiking, camping) for low-income and/or non-english speaking people. Recreational opportunities reduced during enlargement construction
Reservoir Elev. 1752 ft	700,000	Marina business at Park significantly increased because more boating on reservoir with about 98 percent increase from the as-designed size. Concession stands operate with more business because attendance increased.	Some increase in business because non-local boating attendance at Park increases because of more boating opportunities. This includes motels, restaurants, grocery stores and gas stations. More reliable water supply and possible improvement in water quality. Non-boating attendance will decrease because of limited facilities.	Visits by local residents at Park may increase for boating only. A decrease in attendance will result from limited non-boating opportunities. Livability satisfaction because of nearby recreational opportunities, even if seldom used, little changed.. Immediately local residents gain from decreased street traffic. More reliable water supply and possible improvement in water quality. Impacts during construction addressed elsewhere.	Negative effect on town of Perris and Riverside County because sales taxes decrease from decreased attendance at Park. Possible reduced cost from decreased law enforcement and other services. More reliable water supply and possible improvement in water quality.	Increase in boating, but significant reduction in availability of quality recreational opportunities at low cost (picnicking, swimming, hiking, camping) for low-income and/or non-english speaking people. Recreational opportunities reduced during enlargement construction
Reservoir Elev. 1814 ft	1,000,000	Marina business at Park significantly increased because more boating on reservoir with about 118 percent increase from the as-designed size. Concession stands operate with more business because attendance increased.	Decrease in business because non-local attendance at Park decreases because of very limited recreational opportunities, including boating, with lack of suitable surrounding land and difficult access. More reliable water supply and possible improvement in water quality.	A decrease in attendance by local residents will result from limited recreational opportunities, including boating, with lack of suitable surrounding land and difficult access. Livability satisfaction because of nearby recreational opportunities, even if seldom used, may decrease.. Immediately local residents gain from decreased street traffic. More reliable water supply and improvement in water quality. Impacts during construction addressed elsewhere.	Negative effect on town of Perris and Riverside County because sales taxes decrease from decreased attendance at Park. Possible reduced cost from decreased law enforcement and other services. More reliable water supply and possible improvement in water quality.	Increase in boating, but probable drastic reduction in availability of quality recreational opportunities at low cost (picnicking, swimming, hiking, camping) for low-income and/or non-english speaking people. Recreational opportunities reduced during enlargement construction



Table 6.9 Valuation Matrix of Operations Issues

Options	Nominal Capacity (acre-feet)	REGIONAL SOCIO-ECONOMIC ISSUES					Total Weighted Valuation
		Site Businesses	Surrounding Businesses	Local Residents	Local Political Jurisdictions	Environmental Justice	
		Weight Factor (%)					
		5	30	25	20	20	
Empty Reservoir	0	-5.0	-5.0	-4.0	-5.0	-4.0	-4.6
Lower Reservoir	40,000	-3.0	-3.0	-2.0	-3.0	-3.0	-2.8
Reservoir Elev. 1563 ft	72,000	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	1.0	1.0	1.0	1.0	1.0	1.0
Reservoir Elev. 1706 ft	500,000	2.0	2.0	2.0	2.0	1.0	1.8
Reservoir Elev. 1752 ft	700,000	3.0	3.0	3.0	3.0	0.0	2.4
Reservoir Elev. 1814 ft	1,000,000	3.0	2.0	2.0	2.0	-1.0	1.5

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.10 Valuation Matrix of Water Quality Issues

Options	Nominal Capacity (acre-feet)	Comments on Water Quality	WATER QUALITY ISSUES										Total Weighted Valuation	
			Algae Blooms	Recreational Use Impacts on Water Quality	Taste & Odors	Algal Toxin Producing Blooms	Pathogens	Anoxia ***	TOC	TDS	New Selective Withdrawal Outlet****	Operational (Lake Turnover)		
			Weight Factor (%)											
			10	10	15	8	12	15	10	5	10	5	100%	
Empty Reservoir	0	Because there is no water, there is no water quality impact.	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lower Reservoir	40,000	MWD would be involved only from an operational reliability perspective and/or flowing a minimal amount of water through the reservoir. The minimal amount of water withdrawn would be poor quality water because of the high level of recreation and the limited volume of water.	-5.0	-5.0	-5.0	-5.0	-5.0	-4.0	-4.0	-5.0	-5.0	-5.0	-5.0	-4.8
Reservoir Elev. 1563 ft	72,000	Because there is a lower volume of water relative to the base case, there is less water to absorb the impact of recreation. Additionally, there are more nutrient-rich sediments exposed to sunlight resulting in a high probability of algae problems.	-3.0	-2.0	-3.0	-3.0	-3.0	-3.0	-2.0	-3.0	-3.0	-3.0	-3.0	-2.8
Reservoir Elev. 1588 ft	126,841	BASE CASE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	Overall, water quality improves with depth and volume. There is more flexibility to absorb the impacts of concerns.	2.0	1.0	1.0	1.0	1.0	0.0	1.0	1.0	2.0	-1.0	1.0	1.0
Reservoir Elev. 1706 ft	500,000	Overall, water quality improves with depth and volume. There is more flexibility to absorb the impacts of concerns. At 500 TAF we assume that there are significant infrastructure improvements resulting in minimum TDS build-up as a result of evaporation therefore maximizing dilution.	3.0	2.0	3.0	3.0	2.0	1.0	2.0	5.0	4.0	4.0	4.0	2.6
Reservoir Elev. 1752 ft	700,000	Overall, water quality improves with depth and volume. There is more flexibility to absorb the impacts of concerns. Residence time increases with depth and TDS is expected to increase relative to the 500 TAF case as the surface area increases. On average about 6.7 feet of water evaporates off the lake each year.	5.0	3.0	5.0	5.0	4.0	3.0	3.0	4.0	5.0	5.0	5.0	4.1
Reservoir Elev. 1814 ft	1,000,000	Overall, water quality improves with depth and volume. There is more flexibility to absorb the impacts of concerns. Residence time increases with depth and TDS is expected to increase relative to the 500 TAF case as the surface area increases. On average about 6.7 feet of water evaporates off the lake each year.	5.0	5.0	5.0	5.0	5.0	4.0	4.0	3.0	5.0	5.0	5.0	4.7

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.

** Recreational Use Only--Withdrawal only for Power Plant tripping to protect the San Diego Canal (Ops reliability)

*** Assumes going forward with water quality projects.

**** At 500 TAF or greater, generation facility in place, therefore all water run through the lake.

***** Replace existing outlet tower.



Table 6.11 Valuation Matrix of Operations Issues

Options	Nominal Capacity (acre-feet)	Comments on Seepage & Groundwater	Seepage & Groundwater Evaluation Number	Total Weighted Valuation
			Weight Factor (%)	100%
			100	
Empty Reservoir	0	The presence of water supply wells and wetlands immediately downstream of the dam is resulting from the seepage thru the dam and its foundation. The natural groundwater recharge in the Perris Valley including the surrounding mountains and abutment areas may not be sustainable for such sources of water without Perris Dam. A reliable firm water supply would require a municipal system, either publicly or privately owned, which can be financed by a bond issue, direct taxation, special assessments, water-rate payments and sale.	1.00	1.00
Lower Reservoir	40,000	A reduced reservoir will reduce the current high-rate seepage thru the dam and its foundation. If the reduced seepage would not jeopardize the dam safety and can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00
Reservoir Elev. 1563 ft	72,000	A reduced reservoir will reduce the current high-rate seepage thru the dam and its foundation. If the reduced seepage would not jeopardize the dam safety and can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00
Reservoir Elev. 1588 ft	126,841	Any requirements to cut off or restrain the seepage flows and to control seepage forces would reduce the current high-rate seepage thru the dam and its foundation. If the reduced seepage would not jeopardize the dam safety and can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00
Reservoir Elev. 1640 ft	257,000	An enlarged reservoir may require improved methods to reduce the seepage flows and to control seepage forces, which could minimize the seepage thru the dam and its foundation because of the high-degree concerns over dam safety. If the much-reduced seepage can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00
Reservoir Elev. 1706 ft	500,000	An enlarged reservoir may require improved methods to reduce the seepage flows and to control seepage forces, which could minimize the seepage thru the dam and its foundation because of the high-degree concerns over dam safety. If the much-reduced seepage can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00
Reservoir Elev. 1752 ft	700,000	An enlarged reservoir may require improved methods to reduce the seepage flows and to control seepage forces, which could minimize the seepage thru the dam and its foundation because of the high-degree concerns over dam safety. If the much-reduced seepage can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00
Reservoir Elev. 1814 ft	1,000,000	An enlarged reservoir may require improved methods to reduce the seepage flows and to control seepage forces, which could minimize the seepage thru the dam and its foundation because of the high-degree concerns over dam safety. If the much-reduced seepage can continue supply the wells and wetlands downstream, no mitigative measure is required. Otherwise, a municipal system or a controlled release facility, similar to the design at Lake Skinner, may be provided to recharge the wells and wetlands if legally obligated. The cost of such release facility would be relatively small and somewhat invariant with the reservoir level.	0.00	0.00

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.

**Seepage control will be a part of the planned construction for all of the dam modifications.



Table 6.12 Study Matrix of Dam Risk and Safety Issues

Reservoir Options	DAM RISK AND SAFETY ISSUES			
	Embankment Stability	Adequate Outlet Works Capacity	Adequate Spillway Capacity	Downstream Safety
All Options	<p>The embankment for any option, except the empty reservoir option, will need to be adequate under static, rapid drawdown, and seismic conditions. The dam will be reliable and safe with any option; however, the risk of post-earthquake damage to the tower increases as the dam height increases. Also, as the reservoir capacity increases, saddle dams are required to impound additional water; new inundation areas are created. For these reasons, negative impacts were assigned to the enlarged reservoir options.</p>	<p>The existing outlet works capacity is adequate to safely drain 10% of the reservoir head at normal reservoir elevation (Elev. 1588). The outlet works would need to be adequate to safely drain the reservoir for any option, except the empty reservoir option; however, the risk of damage to the tower and not being able to operate mechanical systems increases as the height of the tower increases. Therefore, negative impacts were assigned to the enlarged reservoir options.</p>	<p>The existing spillway is adequate to safely pass the PMF. Runoff from the small watershed area contributes minimal inflow into the reservoir. A spillway for each of the alternatives, excluding the empty reservoir option, would need to be adequate to pass the PMF as well as any pumped inflow from the Santa Ana Pipeline or other sources. The spillway will be designed according to DSOD standards and will be adequate. The rating is 0.0 for each alternative because the reliability and safety of the structure will not be a factor.</p>	<p>Downstream drainage facilities will need to be constructed to safely transport discharge flows from the emergency outlet works, except for the empty reservoir option. Discharge flows will need to range from 400 – 9000 cfs in order to satisfy drawdown requirements (10% of the reservoir head in less than 10 days). As the dam height and storage capacity increase so do the discharge flows and channel size to accommodate these flows which means a higher risk to the public. There would need to be facilities and procedures developed to ensure that the public is not within the channel when releases are made. Negative impacts were assigned to the enlarged reservoir options.</p>



Table 6.13 Valuation Matrix of Dam Risk and Safety Issues

Options	Nominal Capacity (acre-feet)	DAM RISK AND SAFETY ISSUES				Total Weighted Valuation
		Embankment Stability	Adequate Outlet Works Capacity	Adequate Spillway Capacity	Downstream Hazards	
		Weight Factor (%)				
		60	10	10	20	
Empty Reservoir	0	0.0	0.0	0.0	0.0	0.0
Lower Reservoir	40,000	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1563 ft	72,000	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	-1.0	-1.0	0.0	-1.0	-0.9
Reservoir Elev. 1706 ft	500,000	-2.0	-2.0	0.0	-2.0	-1.8
Reservoir Elev. 1752 ft	700,000	-3.0	-3.0	0.0	-3.0	-2.7
Reservoir Elev. 1814 ft	1,000,000	-4.0	-4.0	0.0	-4.0	-3.6

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.14 Valuation Matrix of Permitting Issues

Options	Nominal Capacity (acre-feet)	PERMITTING ISSUES											Total Weighted Valuation 100%	
		EIR/EIS	DSOD Permit	DFG 1602 Agreement	DFG 2081 Agreement T&E	USFWS Incidental Take T&E	National Historic Preservation Act	USACOE 404 Permit	SWRCB 401 Water Quality Cert	SWRCB Const & Storm Water	AQMD fugitive & Stationary Sources	DHS Water Treatment Plant Permit		
		Weight Factor (%)												
		15	5	5	20	20	5	10	5	5	5	5		
Empty Reservoir	0	-5.0	-5.0	-5.0	0.0	-5.0	-2.0	0.0	0.0	0.0	0.0	-1.0	0.0	-2.4
Lower Reservoir	40,000	-5.0	-5.0	-5.0	0.0	-5.0	-1.0	0.0	0.0	0.0	0.0	-1.0	-1.0	-2.4
Reservoir Elev. 1563 ft	72,000	-5.0	-5.0	-5.0	0.0	0.0	-1.0	-5.0	-5.0	0.0	0.0	0.0	0.0	-2.1
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	-5.0	-5.0	-5.0	-5.0	-5.0	-4.0	-4.0	-4.0	-4.0	-4.0	-5.0	-1.0	-4.6
Reservoir Elev. 1706 ft	500,000	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-1.0	-4.8
Reservoir Elev. 1752 ft	700,000	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-1.0	-4.8
Reservoir Elev. 1814 ft	1,000,000	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-5.0	-1.0	-4.8

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.

ASSUMPTIONS AND CRITERIA FOR PERMITTING MATRIX, LAKE PERRIS RESERVOIR ALTERNATIVES RECON

1. Only negative integers and zero were used since not requiring a permit was deemed to be equal regardless of the alternative reservoir configuration.
2. The EIR/EIS and state and federal endangered species permitting process were estimated to be the most complex and complicated permits in terms of time required and difficulty to resolve.
3. In general the smaller reservoir options were deemed to have the least oppressive permitting requirements.
4. Rankings were based upon the need for a particular permit and the estimated difficulty of acquiring that permit, not upon the environmental impact that the permit process was established for nor the relative cost of permit acquisition.



Table 6.15 Valuation Matrix of Legal/Agreement Issues

Options	Nominal Capacity (acre-feet)	Comments	Legal / Agreement Evaluation Number	Total Weighted Valuation
			Weight Factor (%)	100%
			100	
Empty Reservoir	0	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00
Lower Reservoir	40,000	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00
Reservoir Elev. 1563 ft	72,000	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00
Reservoir Elev. 1588 ft	126,841	Existing agreements would apply for continued historical usage of the reservoir.	0.00	0.00
Reservoir Elev. 1640 ft	257,000	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00
Reservoir Elev. 1706 ft	500,000	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00
Reservoir Elev. 1752 ft	700,000	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00
Reservoir Elev. 1814 ft	1,000,000	Change of reservoir use would require that agreements among State agencies and departments and SWC be reviewed and modified.	-2.00	-2.00

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.16 Valuation Matrix of Construction Magnitude Issues

Options	Nominal Capacity (acre-feet)	Comments on Construction Magnitude	Construction Magnitude Evaluation Number	Total Weighted Valuation
			Weight Factor (%)	100%
			100	
Empty Reservoir	0	Construction will be minimal, consisting of filling the reservoir bottom with earth to provide a channel to the outlet works in order to avoid a stagnant pool of water that cannot drain.	0.50	0.50
Lower Reservoir	40,000	Construction will be minimal. The existing dam will stay in place but may require some remediation to assure seismic deformations within conservatively safe limits. The outlet works tower will be strengthened to withstand the design earthquake. The required minimum emergency drawdown release can be passed into the MWD delivery system. The inlet will be moved to the east end of the reservoir.	0.50	0.50
Reservoir Elev. 1563 ft	72,000	The dam must be modified to remove the weak foundation material. Construction will be essentially the same as for the as-designed option (reservoir at el. 1588 ft.), using the same methodology as proposed for that option. A seepage cutoff will not be necessary. The outlet works tower will be strengthened to withstand the design earthquake. The required minimum emergency drawdown release can be passed into the MWD delivery system. The inlet will be moved to the east end of the reservoir.	0.00	0.00
Reservoir Elev. 1588 ft	126,841	The dam must be modified to remove the weak foundation material. Construction will consist of removing a portion of the downstream slope of the dam to access the weak material, excavating and removing the inadequate foundation material, re-filling with good material and replacing the downstream slope with some additional berm in the weak area. The reservoir will be lowered to allow construction of a slurry seepage cutoff wall under the upstream portion of the core. The outlet works tower will be strengthened to withstand the design earthquake. Most of the required minimum emergency drawdown release can be passed into the MWD delivery system, but some additional outlet capacity and improvement of the emergency release discharge channel will be required for about 200 cfs. The inlet will be moved to the east end of the reservoir.	0.00	0.00
Reservoir Elev. 1640 ft	257,000	The dam must be modified to remove the weak foundation material and to add earthen material to enlarge the dam and raise its crest elevation to 1652 ft. Remediation for the foundation will be essentially the same as for the as-designed option (reservoir at el. 1588 ft.), using the same methodology as proposed for that option. The added height will be achieved by lowering the reservoir level, removing the upstream portion of the dam to the core, thickening the core, replacing and adding to the upstream face and adding to the downstream portion to achieve the new crest elevation with the same downstream slope of 1:3. A cutoff wall will be constructed near the upstream area of the core where it ties into the foundation. A new outlet works tower will be constructed for the higher reservoir elevation. About 40 percent of the required emergency drawdown release can be passed into the MWD delivery system; an emergency release facility and an improved discharge channel will be constructed to accommodate the remainder (1500 cfs). The inlet will be moved to the east end of the reservoir. A new pumping plant will be required to fill the reservoir from the CRA.	-0.50	-0.50
Reservoir Elev. 1706 ft	500,000	The dam must be modified to remove the weak foundation material and to add earthen material to enlarge the dam and raise its crest elevation to 1764 ft. Remediation for the foundation will be essentially the same as for the as-designed option (reservoir at el. 1588 ft.), using the same methodology as proposed for that option. The added height will be achieved by lowering the reservoir level, removing the upstream portion of the dam to the core, thickening the core, replacing and adding to the upstream face and adding to the downstream portion to achieve the new crest elevation with the same downstream slope of 1:3. A cutoff wall will be constructed near the upstream area of the core where it ties into the foundation. A new outlet works tower will be constructed for the higher reservoir elevation. About one fifth of the required emergency drawdown release can be passed into the MWD delivery system; an emergency release facility and an improved discharge channel will be constructed to accommodate the remainder (3600 cfs). The inlet will be moved to the east end of the reservoir. A new pumping plant will be required to fill the reservoir from the CRA.	-1.50	-1.50
Reservoir Elev. 1752 ft	700,000	The dam must be modified to remove the weak foundation material and to add earthen material to enlarge the dam and raise its crest elevation to 1764 ft. Remediation for the foundation will be essentially the same as for the as-designed option (reservoir at el. 1588 ft.), using the same methodology as proposed for that option. The added height will be achieved by lowering the reservoir level, removing the upstream portion of the dam to the core, thickening the core, replacing and adding to the upstream face and adding to the downstream portion to achieve the new crest elevation with the same downstream slope of 1:3. A cutoff wall will be constructed near the upstream area of the core where it ties into the foundation. A new outlet works tower will be constructed for the higher reservoir elevation. About one sixth of the required emergency drawdown release can be passed into the MWD delivery system; an emergency release facility and an improved discharge channel will be constructed to accommodate the remainder (5000 cfs). The inlet will be moved to the east end of the reservoir. A new pumping plant will be required to fill the reservoir from the CRA.	-3.00	-3.00
Reservoir Elev. 1814 ft	1,000,000	The dam must be modified to remove the weak foundation material and to add earthen material to enlarge the dam and raise its crest elevation to 1826 ft. Remediation for the foundation will be essentially the same as for the as-designed option (reservoir at el. 1588 ft.), using the same methodology as proposed for that option. The added height will be achieved by lowering the reservoir level, removing the upstream portion of the dam to the core, thickening the core, replacing and adding to the upstream face and adding to the downstream portion to achieve the new crest elevation with the same downstream slope of 1:3. A cutoff wall will be constructed near the upstream area of the core where it ties into the foundation. A new outlet works tower will be constructed for the higher reservoir elevation. About one eighth of the required emergency drawdown release can be passed into the MWD delivery system; an emergency release facility and an improved discharge channel will be constructed to accommodate the remainder (7400 cfs). The inlet will be moved to the east end of the reservoir. A new pumping plant will be required to fill the reservoir from the CRA.	-5.00	-5.00

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.17 Valuation Matrix of Schedule Issues

Options	Nominal Capacity (acre-feet)	Comments on Schedule	Schedule Evaluation Number	Total Weighted Valuation
			Weight Factor (%)	100%
			100	
Empty Reservoir	0	There will be very little construction involved in this option. The lake will be drained over a period of several months, using the existing discharge facilities to pass water into the MWD system as it can be used effectively. The lowest part of the reservoir may be of such poor quality as to require discharge into the drainage channel. Construction of a channel to the outlet works is expected to be necessary after the reservoir has been drained and allowed to dry. The operating facilities and equipment will be decommissioned. It may be deemed preferable to remove the outlet works tower, and some of the equipment may be salvageable, including the hydroelectric and pumping facilities. Recreational facilities will be changed to accommodate the changed usage of the Park. The time required for planning, design, permits and approvals may be in the order of three years. The total time for construction activities is not expected to exceed one year.	-1.00	-1.00
Lower Reservoir	40,000	There will be hardly any construction involved in this option. The lake will be drawn down over a period of a few months, using the existing discharge facilities to pass water into the MWD system as it can be used effectively. The operating facilities and equipment except for the outlet works will be decommissioned. Some of the equipment may be salvageable, including the hydroelectric and pumping facilities. The recreational facilities will be modified to accommodate the lower reservoir level. The time required for planning, design, permits and approvals may be in the order of three years. The total time for construction activities is not expected to exceed one year.	-1.00	-1.00
Reservoir Elev. 1563 ft	72,000	Construction activities will be related to modifying recreational facilities to accommodate the present temporary reduced reservoir level on a permanent basis. The time required for planning, design, permits and approvals may be in the order of one to one and one half years. The total time for construction activities is not expected to exceed one year.	1.00	1.00
Reservoir Elev. 1588 ft	126,841	Construction will include only remediation and improvements to return the dam, lake and Park to the as-designed condition. This will include removal of a downstream portion of the dam and the weak foundation material and replacement of material to a safe design condition. The outlet tower will be strengthened, and the inlet facilities will be moved to the east end of the reservoir. Recreational facilities will be returned to their original state. The time required for planning, design, permits and approvals may be in the order of one to one and one half years. The total time for construction activities is not expected to exceed two years.	0.00	0.00
Reservoir Elev. 1640 ft	257,000	This option entails enlargement of the dam to create a larger reservoir. Construction will include adding to the dam to increase the height, remediation of the foundation material, construction of a seepage cutoff wall, strengthening of the outlet tower, moving the inlet facilities and modifying recreational facilities for the higher reservoir level. The time required for planning, design, permits and approvals may be in the order of three years. The total time for construction activities is not expected to exceed two years.	-2.00	-2.00
Reservoir Elev. 1706 ft	500,000	This option entails enlargement of the dam to create a larger reservoir. Construction will include adding to the dam to increase the height, remediation of the foundation material, construction of a seepage cutoff wall, strengthening of the outlet tower, moving the inlet facilities and modifying recreational facilities for the higher reservoir level. The time required for planning, design, permits and approvals may be in the order of three years. The total time for construction activities is not expected to exceed three years.	-2.50	-2.50
Reservoir Elev. 1752 ft	700,000	This option entails enlargement of the dam to create a larger reservoir. Construction will include adding to the dam to increase the height, remediation of the foundation material, construction of a seepage cutoff wall, strengthening of the outlet tower, moving the inlet facilities and modifying recreational facilities for the higher reservoir level. The time required for planning, design, permits and approvals may be in the order of three years. The total time for construction activities is not expected to exceed 4 years.	-3.50	-3.50
Reservoir Elev. 1814 ft	1,000,000	This option entails enlargement of the dam to create a larger reservoir. Construction will include adding to the dam to increase the height, remediation of the foundation material, construction of a seepage cutoff wall, strengthening of the outlet tower, moving the inlet facilities and modifying recreational facilities for the higher reservoir level. The time required for planning, design, permits and approvals may be in the order of three years. The total time for construction activities is not expected to exceed 6 years.	-5.00	-5.00

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.



Table 6.18 Valuation Matrix of Water Storage Issues

Options	Nominal Capacity (acre-feet)	Comments on Water Storage	Water Storage Evaluation Number	Total Weighted Valuation
			Weight Factor (%)	100%
			100	
Empty Reservoir	0	No water supply from reservoir.	-2.00	-2.00
Lower Reservoir	40,000	No water supply from reservoir.	-2.00	-2.00
Reservoir Elev. 1563 ft	72,000	Reduced amount of available storage volume limits ability to support system storage and supply.	-1.00	-1.00
Reservoir Elev. 1588 ft	126,841	Water supply remains as historically supported.	0.00	0.00
Reservoir Elev. 1640 ft	257,000	Increased amount of available storage volume provides additional storage and supply. The results of a MWD study documents in a memorandum** that Metropolitan could use between 690 TAF and 890 TAF of surface storage at the 50 percent exceedance level over the study period (2015-2050) above and beyond the historical storage level at Lake Perris at Elevation 1588'.	2.00	2.00
Reservoir Elev. 1706 ft	500,000	Increased amount of available storage volume provides additional storage and supply. The results of a MWD study documents in a memorandum** that Metropolitan could use between 690 TAF and 890 TAF of surface storage at the 50 percent exceedance level over the study period (2015-2050) above and beyond the historical storage level at Lake Perris at Elevation 1588'.	3.00	3.00
Reservoir Elev. 1752 ft	700,000	Increased amount of available storage volume provides additional storage and supply. The results of a MWD study documents in a memorandum** that Metropolitan could use between 690 TAF and 890 TAF of surface storage at the 50 percent exceedance level over the study period (2015-2050) above and beyond the historical storage level at Lake Perris at Elevation 1588'.	4.00	4.00
Reservoir Elev. 1814 ft	1,000,000	Increased amount of available storage volume provides additional storage and supply. The results of a MWD study documents in a memorandum** that Metropolitan could use between 690 TAF and 890 TAF of surface storage at the 50 percent exceedance level over the study period (2015-2050) above and beyond the historical storage level at Lake Perris at Elevation 1588'.	5.00	5.00

*Screening evaluation numbers range from -5 to +5 based upon seriousness of negative or positive impacts compared to the option of reservoir at El. 1588 feet.

** Reservoir Reconnaissance Study MWD memorandum dated July 28, 2005 from Mr. Robert Harding to Mr. Brian Folsom (included in the Appendix).



Table 6.19 Lake Perris Reconnaissance Study – Summary Matrix

Options	Nominal Capacity (acre-feet)	Issues													Total Valuation
		Recreation	Environmental	Property	Operations	Regional Socio-economic	Water Quality	Seepage/ Groundwater	Reliability/ Safety	Permitting	Legal/ Agreements	Construction Magnitude	Schedule	Water Storage	
Empty Reservoir	0	-4.3	-2.4	0.0	-2.5	-4.6	2.0	1.0	0.0	-2.4	-2.0	0.5	-1.0	-2.0	-17.6
Lower Reservoir	40,000	-3.5	-2.5	0.0	-2.4	-2.8	-4.8	0.0	0.0	-2.4	-2.0	0.5	-1.0	-2.0	-20.8
Reservoir Elev. 1563 ft	72,000	-1.8	-2.5	0.0	-2.0	-1.0	-2.8	0.0	0.0	-2.1	-2.0	0.0	1.0	-1.0	-13.2
Reservoir Elev. 1588 ft	126,841	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Reservoir Elev. 1640 ft	257,000	1.2	-3.9	-2.2	2.4	1.0	1.0	0.0	-0.9	-4.6	-2.0	-0.5	-2.0	2.0	-10.4
Reservoir Elev. 1706 ft	500,000	-0.6	-4.2	-2.8	2.9	1.8	2.6	0.0	-1.8	-4.8	-2.0	-1.5	-2.5	3.0	-12.8
Reservoir Elev. 1752 ft	700,000	-2.9	-4.3	-3.7	2.7	2.4	4.1	0.0	-2.7	-4.8	-2.0	-3.0	-3.5	4.0	-17.7
Reservoir Elev. 1814 ft	1,000,000	-3.9	-4.4	-4.2	2.6	1.5	4.7	0.0	-3.6	-4.8	-2.0	-5.0	-5.0	5.0	-24.1

Options	Nominal Capacity (acre-feet)	Issues													Total Weighted Valuation
		Recreation	Environmental	Property	Operations	Regional Socio-economic	Water Quality	Seepage/ Groundwater	Reliability/ Safety	Permitting	Legal/ Agreements	Construction Magnitude	Schedule	Water Storage	
		Weight Factor (%)													
		12	12	5	5	4	5	4	5	2	2	20	4	20	100%
Empty Reservoir	0	-0.51	-0.29	0.00	-0.12	-0.18	0.10	0.04	0.00	-0.05	-0.04	0.10	-0.04	-0.40	-1.39
Lower Reservoir	40,000	-0.42	-0.30	0.00	-0.12	-0.11	-0.24	0.00	0.00	-0.05	-0.04	0.10	-0.04	-0.40	-1.62
Reservoir Elev. 1563 ft	72,000	-0.22	-0.30	0.00	-0.10	-0.04	-0.14	0.00	0.00	-0.04	-0.04	0.00	0.04	-0.20	-1.04
Reservoir Elev. 1588 ft	126,841	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Reservoir Elev. 1640 ft	257,000	0.14	-0.46	-0.11	0.12	0.04	0.05	0.00	-0.05	-0.09	-0.04	-0.10	-0.08	0.40	-0.18
Reservoir Elev. 1706 ft	500,000	-0.07	-0.50	-0.14	0.15	0.07	0.13	0.00	-0.09	-0.10	-0.04	-0.30	-0.10	0.60	-0.39
Reservoir Elev. 1752 ft	700,000	-0.35	-0.52	-0.18	0.13	0.10	0.21	0.00	-0.14	-0.10	-0.04	-0.60	-0.14	0.80	-0.83
Reservoir Elev. 1814 ft	1,000,000	-0.47	-0.53	-0.21	0.13	0.06	0.23	0.00	-0.18	-0.10	-0.04	-1.00	-0.20	1.00	-1.30