Matilija Dam:
Engineering Description of Alternatives

The following presents a summary of the proposed alternatives under consideration as of June 2003. In the text below three areas behind the dam are referred to: Reservoir, Delta and Upstream Channel. "Reservoir" refers generally to that area shown in the attached aerial photos as being under the existing lake. "Delta" refers to that area extending from the upstream end of the lake approximately 1,500 feet upstream. "Upstream Channel" refers to that area extending from the Delta area to the upstream end of post-construction deposition, a distance of roughly 2,400 feet.

Alternative 1: Full Dam Removal/Mechanical Sediment Transport: Dispose Fines, Sell Aggregate

In this alternative, roughly 2.1 million cubic yards of fine sediments are excavated and transported to an offsite disposal area utilizing slurry. Following removal of the fine sediments, the lake will be drained and the dam removed. Of the remaining 3.8 million cubic yards of sediment, 2.6 million cubic yards of sand and gravel will be sold from the site for use as aggregate. Figure 1 presents a schematic diagram showing the primary components of this alternative.

Streamflow Diversion

The Reservoir area will be dredged; diversion in the Delta and Upstream Channel areas will consist of a training dike to route flows away from the north (left) side where aggregate operations will be set up. Flows downstream of the dam will be maintained by releases through the existing outlets. Temporary channel construction following completion of dredging is discussed below.

Structural Removal

The portion of the dam at the left abutment will be demolished early to improve access to Highway 33. Following dredging of the Reservoir area, the remainder of the structure above the original streambed (approximate elevation 975) will be removed. For purposes of this report, the assumed quantity of in-place concrete is 51,100, and the method of dam removal is as described in the Bureau of Reclamation's April 2000 Appraisal Report. This will be done by controlled blasting, in approximately 15-foot vertical increments.

This alternative assumes that concrete from the dam structure deconstruction will be crushed by the contractor at the site, recycled and sold as aggregate. Metal debris will be hauled from the site and salvaged when possible. Non-salvageable items will be landfilled at the Toland Road landfill, 41 miles away, between Santa Paula and Fillmore. The truck route would be Highway 33 to U.S. 101 to Highway 126.

Earthwork/Sediment Removal

During the slurry operation, the site will be stripped of all vegetation. Areas where arundo is removed from will be treated with Rodeo or a similar herbicide. Arundo will be chipped and temporarily stockpiled. Following completion of work at the disposal area, arundo will be spread to dry at that site. Once dried, the arundo can be removed and used as dried mulch.

Two 12-inch cutter head suction dredges working 24 hours a day, 7 days a week will be utilized to slurry the 2.1 million cubic yards of fine sediment in approximately 9 months. Fresh water from Lake Casitas (4,500 acre-feet) would be used for the slurrying media. The slurry would then pass through a stationary screen to eliminate any coarse material and enter a thickener. The thickener would be used to increase the solids concentration of the slurry and recycle water for the dredging operation. A make-up water pump would be required to pump water back to the dredges. The slurry would then be transported by pipeline to a 94-acre disposal site located approximately 3 miles downstream of the dam. A single 400-horsepower pump would be required at the dam to maintain slurry velocity in the pipeline. An 8 mile long fresh water pipeline and pumping system would be needed from Lake Casitas. The fresh water pipeline would be carbon steel and the slurry pipeline would be high density polyethylene (HDPE).

Additionally, a 90,000 gallon water storage tank would be placed at the left abutment to provide surge capacity. The thickener overflow can be fed directly into the storage tank if sufficient elevation difference between the thickener and storage tank is made available.

Fine Sediment Disposal

The upstream limit of the 94-acre disposal site is approximately 0.5 miles downstream of Robles Diversion Dam. The site is on the east side of the river at the base of the bluff adjacent to Rice Road (see Figure 4). Using the identified disposal site, the thickness of the required placement would average approximately 15 feet. Modified horseshoe-shaped containment dikes would be constructed along the north and western limits. The dike would be constructed of sands and gravels native to the disposal site and compacted. Upstream slopes would be 2H:1V; downstream slopes are assumed to be 4H:1V. The heights of the containment dikes are assumed to range between 0 and 30 feet, with an average of approximately 20 feet. Interior dikes would be constructed during slurry placement to enhance stability and separation of the fines from the water. A small channel at the northern limit would be rerouted and drainage off of Rice Road would be modified to route it around the area. Prior to placement the area would be cleared of vegetation to enhance percolation. Additional engineered details (such as collection systems, settlement ponds, observation and pumping wells) could be added to enhance collection of water and return it to Lake Casitas. The upstream end of the disposal area is behind the levee recommended for the Robles area in the downstream flood control protection discussion below. Downstream of the levee, slope protection will consist of willows planted to provide soil stabilization during less common events.

Sale of Coarse Fraction

This alternative assumes that approximately 2.6 million cubic yards of sand and gravel from the Delta and Upstream Channel areas will be sold for use as aggregate and/or fill. It is assumed that the material can be removed within a ten-year period. Project cost savings are realized since the material will be mined and processed at the site and then trucked directly to the user (i.e., there are no project costs for the trucking). It is assumed that an aggregate producer will pay a fee for every cubic yard sold from the site; however, for planning purposes, no credit for that sale has been taken.

It is estimated that approximately 1.2 million cubic yards of material finer than the number 100 sieve (0.115mm) will remain following extraction of marketable aggregate. This residual material

will be stockpiled at the downstream end of the slope protection at an elevation such that it will erode during larger annual storms.

A 60-foot wide channel will be excavated through the Delta and Upstream Channel areas. To protect the sand and gravel from erosion during major events, the left bank will be temporarily armored with slope protection (see Figure 2). A 10-foot wide section of soil cement will be placed on a 3H:1V slope. The height of the soil cement will be 8.5 feet in order to contain a 15-year event. The slope protection would be completely removed and the material recycled at completion of the aggregate operation**.**

Final Clean-up

Following termination of construction activities, including the aggregate mining, all areas will be re-vegetated. Graded areas will be re-vegetated with locally native stock or sterile annual grasses to control erosion. Large rock found in the sediment will be left in the reservoir area to provide a more natural appearance.

Downstream Flood Control Protection

The following table summarizes locations and recommended measures for both this alternative and Alternative 4a.

Location	Alternatives 1 and 4a
Matilija Hot Springs	Purchase and Remove
Camino Cielo Structures (11), Bridge	Purchase and Remove
Camino Cielo Hwy 33 Protection 968' Floodwall	Floodwall 0.1 to 6.6'
Meiners Oaks Robles Levee Floodwall/ Levee	Levee 0.0' to 1.4' Floodwall 1.4' to 12.0' Levee 12.0' to 5.1' Floodproof Robles
Live Oaks Levee/Floodwall	No levee at upstream end. Floodwall 0.0' to 6.8'. Modify Santa Ana Bridge
Casitas Levee/Floodwall/ Levee	Levee 6.7' to 5.5' Floodwall 5.5' to 7.4' Levee 7.4' to 1.2'

Maintenance

No maintenance is assumed other than sediment removal at Robles Diversion Dam. Under existing conditions, an average of 11,200 cubic yards are removed from behind Robles each year. For this alternative and design hydrology, approximately 34,000 cubic yards of sediment would be deposited behind Robles annually. It is assumed the sediment is removed annually and placed in the river downstream of the dam adjacent to the identified disposal area.

Real Estate

The 94-acre disposal site will need to be procured. Right of way for the slurry pipeline of approximately 24 feet will be required. The fresh water pipeline from Lake Casitas to the disposal area would be placed along the existing maintenance road along the CMWD canal from Casitas to

Robles. Special considerations would be required at several crossings. Upstream of the disposal area, the fresh water pipe would utilize the same right of way as that required for the slurry pipe.

As a result of the potential for increased flooding downstream, Matilija Hot Springs and 11 other structures in the flood plain would be purchased and removed. Additional right of way would be required for the new/raised levees and flood walls identified above.

Schedule

Following notice to proceed, 24 months would be required for the slurry operations and the dam removal. Concurrent dredging and removal of the dam may be required. As discussed above, sale of the coarse material is assumed to take approximately ten years; completion of the project, including re-vegetation, is assumed to occur 10 years after notice to proceed.

Alternative 2: Full Dam Removal/Natural Sediment Transport

In this alternative, a quantity of fine sediment is excavated and the dam is fully removed. The remaining sediment is then eroded by storms and naturally transported downstream. In Alternative 2a, the 2.1 million cubic yards in the Reservoir area is excavated and slurried to offsite disposal (see Figures 3 and 4). In Alternative 2b, a quantity of material immediately behind the dam sufficient to allow safe removal of the dam is excavated and stockpiled upstream. All sediment is then eroded by storms and naturally transported downstream. A sediment basin is included in Alternative 2b to reduce impacts to quantity and quality of water diverted to Lake Casitas.

Differences between Alternatives 2a and 2b are summarized below.

Alternative 2a: Slurry "Reservoir Area" Fines Offsite

Streamflow Diversion

In that the excavation of the Reservoir area will be conducted in the wet, no diversion will be made during dredging. Flows downstream of the dam will be maintained by releases through the existing outlets. Following completion of the slurry operation, a pilot channel will be cut through the Delta and Upstream Channel areas. A small cofferdam will be constructed at the upstream extent of the Upstream Channel to direct flows into this channel.

Structural Removal

The dam removal is as discussed in Alternative 1. Concrete rubble (77,000 cubic yards, assuming a bulking factor of 1.5) will be processed after blasting as required for transportation to a commercial concrete recycling plant, assumed to be Hanson Aggregates (approximately 28 miles from Matilija Dam). For estimating purposes, the concrete will be assumed to be processed to a maximum diameter of two feet and all reinforcement, or other embedded metal will be cut flush with the concrete, by torch, as required by the aforementioned recycling plants. The processing of any concrete which remains too large after blasting will be assumed to be performed by a hoe-ram. It should be noted that the contractor may choose to process the material for sale on site. Non-recyclable debris will be sent to Toland Landfill.

Earthwork/Sediment Removal

Arundo will be treated as in Alternative 1. To minimize impacts to the diversion operation at Robles Dam, the fine sediment from the Reservoir will be excavated, transported and permanently placed as discussed in Alternative 1. A high flow sediment by-pass is added to reduce diversion losses. A pilot channel will be cut through the Delta and Upstream Channel areas. A small cofferdam would be constructed to direct flows into this channel.

Final Clean-up

After a large percentage of the Delta and Upstream Channel sediments have eroded, the site will be re-vegetated as in Alternative 1. For this alternative it is assumed that the re-vegetation will be completed 7 years after notice to proceed.

Downstream Flood Control Protection

The following table summarizes locations and recommended measures for Alternatives 2a, 2b, 3a, and 3b.

Location	Alternatives 2a, 2b, 3a, 3b
Matilija Hot Springs	Purchase and Remove
Camino Cielo Structures (11), Bridge	Purchase and Remove
Camino Cielo Hwy 33 Protection 968' Floodwall	Floodwall 4.1 to 10.6'
Meiners Oaks / Robles Levee/Floodwall/ Levee	Levee 0.0' to 6.4' Floodwall 6.4' to 17.0' Levee 17.0' to 10.1' Floodproof Robles
Live Oaks Levee/Floodwall	Levee 5.2' to 4.3' Floodwall 4.3' to 12.8' Modify Santa Ana Bridge
Casitas Levee/Floodwall/ Levee	Levee 12.7' to 11.5'. Floodwall 11.5' to 13.4'. Levee 13.4' to 7.2'.
Canada Larga Levee	Raise levee 3.0'

Maintenance

Under existing conditions, an average of 11,200 cubic yards are removed from behind Robles Diversion Dam each year. For this alternative and design hydrology, approximately 90,000 cubic yards of sediment would be deposited behind Robles the first year. The annual deposition would decrease to 41,000 cubic yards by the end of year 3 and approximately 37,000 cubic yards by year 10. It is assumed the sediment is removed annually and placed in the river downstream of the dam adjacent to the identified disposal area.

Real Estate

For the dam and mechanical sediment removal portions of this alternative, real estate requirements are the same as in Alternative 1, as is the need to purchase and remove Matilija Hot Springs and 11 other structures. This alternative (as well as Alternatives 2b, 3a, and 3c) will require a greater quantity of additional right of way for the new/raised levees and flood walls than will Alternatives 1 and 4.

Schedule

It is estimated that this alternative would require approximately 24 months from notice to proceed to remove the fine sediment and the dam. Removal of the remaining sediments will be variable and dependent upon the hydrology; the final phase, re-vegetation, is assumed to be completed 7 years after notice to proceed.

Alternative 2b: Natural Transport of "Reservoir Fines"

Streamflow Diversion

A pilot channel will be excavated through the Delta and Upstream Channel sediments. Immediately following removal of the dam, a small cofferdam will be constructed in the Delta area. To reduce turbidity during non-storm flows, low flows will be routed through the Reservoir area to downstream of the dam location through a 36-inch corrugated polyethylene pipe. For stability the pipe will be trenched or otherwise anchored. During a storm event which exceeds the capacity of the cofferdam, erosion of the Reservoir area materials will occur and the pipe will be washed away.

Structural Removal

Structural removal is as discussed in Alternative 2a.

Earthwork/Sediment Removal

Arundo will be treated as discussed in Alternative 1. Sediment immediately behind the dam is excavated by two barge-mounted clam shell dredges and stockpiled upstream, within the approximate limits shown in Figure 5. The material would be placed on barges and off-loaded in the Delta area using land-based clamshells. The precise quantity sufficient to allow safe removal of the dam is unknown at this time but, due to the nature of the saturated silts and clays is assumed to be 520,000 cubic yards. Assuming that the dredges are working 20 hours per day, the time required to excavate the sediment is nine months. Following removal of the dam, all sediment is then eroded by storms and natural transported downstream. A high flow sediment by-pass is added at Robles to reduce diversion losses.

Sediment Basin

To reduce the impacts of fine sediment on the diversion canal or quality of the water delivered to Casitas, a 1000 acre-foot sedimentation basin will be constructed on-line with the canal, approximately 1500 feet downstream of Robles. A 5000-foot long embankment, with a maximum height of about 30 feet will be constructed. Intake and outlet structures and an emergency spillway will be built. Due to the capacity, the basin will by categorized as a dam by the California Division of Dam Safety and be subject to the oversight of that agency. The schematic plan, profile and aerial photo are shown on Figure 6.

Conceptually, flows diverted at Robles will fill the basin where the decrease in velocity will result in precipitation of fines. Clean water will be released through the siphon to Casitas Lake. Water quality in the canal after desiltation is expected to be as good or better than what it is under existing conditions.

Final Clean-up

After a large percentage of the Delta and Upstream Channel sediments have eroded, the site will be re-vegetated as in Alternative 1. For this alternative it is assumed that the re-vegetation will be completed 6.5 years after notice to proceed.

Downstream Flood Control Protection

As discussed in Alternative 2a.

Maintenance

For this alternative and design hydrology, approximately 102,000 cubic yards of sediment would be deposited behind Robles the first year. The annual deposition would decrease to 45,000 cubic yards by the end of year 3 and approximately 37,000 cubic yards by year 10. It is assumed the sediment is removed annually and placed in the river downstream of the dam adjacent to the identified disposal area.

Real Estate

Same as Alternative 2a except that only 5 acres would be temporarily required at the disposal area for arundo drying and the 50-acre site for the sediment basin would be acquired.

Schedule

While removal of the sediments will be variable and dependent upon the hydrology, it is estimated that this alternative would require approximately 6.5 years from notice to proceed to completion.

Alternative 3. Incremental Dam Removal/Natural Sediment Transport

Alternative 3 is distinguished from Alternative 2 in that the dam demolition process is conducted in two phases. Interruption of demolition allows eroded reservoir sediments to stabilize downstream of the dam and gives the river an opportunity to adjust to sediment inflows. As formulated in this alternative, the dam would be removed in two phases and impacts from sediment downstream of the dam monitored. The second phase of the dam removal may require an interval of several years to allow erosion of a sufficient quantity of the impounded sediments. In Alternatives 3a and 3b, this interval is assumed to be 2 years in that there is an approximately 50 percent likelihood that the annual storm would occur in this span. In Alternative 3b, as in Alternative 2b, a sediment basin is included to reduce impacts to quantity and quality of water diverted to Lake Casitas.

Differences between Alternatives 3a and 3b are summarized below.

Alternative 3a: Slurry "Reservoir Area" Fines Offsite

Streamflow Diversion

Same as Alternative 2a, except that the pilot channel will be excavated after both removal phases.

Structural Removal

As previously discussed, with the exception that the dam would be removed over a longer time period. In the two increment scenario, all downstream structures, except the outlet works, will be

removed during the first construction season. The outlet works will be closed after each phase of dam excavation and will remain closed until the reservoir drainage is required for the next increment of dam excavation. The entire dam structure above elevation 1000 would be removed in Phase I (the estimated quantity of concrete is 39,100 cubic yards). The remaining 12,000 cubic yards would be removed in Phase II. Materials will be disposed of as discussed in Alternative 2a.

Earthwork/Sediment Removal

Phase I of sediment removal is the same as Alternative 2a. A high flow sediment by-pass is added at Robles to reduce diversion losses. Following a period of storms, assumed to be two years, an additional 25,000 cubic yards will be excavated to allow access to the dam for the second phase of demolition. The material will be stockpiled upstream. This material will be primarily sands and gravels; conventional equipment will be used. Dewatering would be accomplished primarily using sump pumps and the existing outlet.

Final Clean-up

After a large percentage of the Delta and Upstream Channel sediments have eroded, the site will be re-vegetated as in Alternative 1. For this alternative it is assumed that the re-vegetation will occur after 7 years after notice to proceed.

Downstream Flood Control Protection

As discussed in Alternative 2a.

Maintenance

For this alternative and design hydrology, approximately 60,000 cubic yards of sediment would be deposited behind Robles the first year. The annual deposition would decrease to 50,000 cubic yards by the end of year 3 and approximately 37,000 cubic yards by year 10. It is assumed the sediment is removed annually and placed in the river downstream of the dam adjacent to the identified disposal area.

Real Estate

As discussed in Alternative 2a.

Schedule

It is estimated that this alternative would require approximately 18 months from notice to proceed to complete the Phase I removal of the fine sediment and the dam. While removal of the remaining sediments will be variable and dependent upon the hydrology, it is assumed here that Phase II will be initiated two years after completion of Phase I. The final phase, re-vegetation, is assumed to be completed 7 years after notice to proceed.

Alternative 3b: Natural Transport of "Reservoir Fines"

Streamflow Diversion

Following the Phase I dam removal, streamflow diversion will be the same as Alternative 2b. Following the Phase II dam removal, a pilot channel will be excavated through the remaining sediments.

Structural Removal

Same as Alternative 3a except that in Phase I the dam would be lowered only to elevation 1030 and approximately 27,100 cubic yards of concrete removed. In Phase II the dam would be completely removed (an additional 24,000 cubic yards of concrete). Materials will be disposed of as discussed in Alternative 2a.

Earthwork/Sediment Removal

Arundo will be treated as discussed in Alternative 1. In Phase I, approximately 300,000 cubic yards of sediment immediately behind the dam is excavated by a barge-mounted clam shell dredge and stockpiled upstream as discussed in Alternative 2b. A high flow sediment by-pass is added at Robles to reduce diversion losses. In Phase II the 320,000 cubic yards would be excavated utilizing a combination of clamshell excavation from the top of the remaining dam and a truck-mounted dragline on the delta.

Sediment Basin

As discussed in Alternative 2b.

Final Clean-up

At some point, the site will be re-vegetated as in Alternative 1. It is here assumed that re-vegetation will be completed 6.5 years after notice to proceed.

Downstream Flood Control Protection

As discussed in Alternative 2a.

Maintenance

As discussed in Alternative 3a.

Real Estate

As discussed in Alternative 2a except that the site for the sediment basin would be acquired.

Schedule

It is estimated that this alternative would require approximately 18 months from notice to proceed to completion of Phase I. While removal of the remaining sediments will be variable and dependent upon the hydrology, it is assumed here that Phase II will be initiated two years after completion of Phase I. The final phase, re-vegetation, is assumed to be completed 6.5 years after notice to proceed.

Alternative 4: Full Dam Removal/Sediment Stabilization on Site

In this alternative, a channel would be excavated through the sediments upstream of the dam. The excavated materials would be placed on the left side of the channel (looking downstream). In Alternative 4a, these materials would be stabilized and protected in place in one phase. In Alternative 4b, the fine materials in the Reservoir area are excavated and transported to the offsite disposal area utilizing slurry. A pilot channel would then be excavated through the remaining sediments would be allowed to erode naturally, but at a rate controlled so as to minimize downstream impacts.

Alternative 4a: Permanent Stabilization

Streamflow Diversion

During construction, a cofferdam will be constructed upstream of the project area to capture low creek flows and direct them to a 36" corrugated metal pipe which would run on the south side of the project site and discharge back into the stream below the dam.

Structural Removal

Same as Alternative 1, except that the structure could be removed over a longer period of time. This alternative will assume that the concrete and reinforcement will be buried in the fill, though the contractor may select to crush and sell it. Metalwork and other debris will be delivered to Toland Landfill.

Earthwork/Sediment Removal

All arundo will be treated as previously discussed except that construction at the site will preclude utilizing the upstream area for drying. Following chipping the material will be transported to, spread and dried at the same downstream area assumed in other alternatives for sediment stockpiling.

A channel will be excavated along the southern side of the reservoir basin (i.e. right side, looking downstream). The excavated materials will be placed upstream of the dam along the north side of the reservoir basin, adjacent to the channel. The excavated channel will have a similar streambed elevation to the original pre-dam streambed, though it will be slightly straighter and slightly steeper.

The excavated channel will have a base width of 60 feet. The left side slope will be 3H:1V. Throughout the reservoir, slope protection will not be applied to the right bank. As a result of natural erosion processes, it is expected that this will result in a natural appearance. The channel, including slope protection, will be designed to convey the 100-year recurrence level flood, approximately 21,600 ft^3/sec. Slope protection on the north (left) side of the channel will consist of 4 to 5 ton derrick stone, underlain by appropriately graded stone. The slope protection will extend 11 feet above channel invert and 5 feet below the channel invert to prevent undercutting of the slope. In addition, due to the minimal amount of material not excavated in the channel construction, no riprap will be placed in the canyon from the dam to approximately 300 feet upstream. Figure 7 presents a plan view of the components. Figure 8 shows the typical cross-section through the Delta and Upstream Channel areas.

Fine materials immediately upstream of the dam will be excavated at slopes as flat as 10H:1V. It is anticipated that these materials will be excavated using a barge-mounted clamshell and then placed in an upstream area and allowed to drain prior to final placement on the north side of the reservoir. In order to reduce displacement, from the downstream end of the Delta area to the beginning of the canyon (approximately 300 feet upstream of the dam face), coarse materials borrowed from the Upstream Channel area will be placed at the toe of the excavated slope to form a foundation for the slope protection. Figure 9 shows the typical cross-section through the Reservoir area.

A meandering low flow channel will establish itself within the 60 foot wide main channel. The 60 foot dimension may increase as the unprotected south side of the channel may erode. Native vegetation such as willows will be allowed to become established within the channel.

Downstream Flood Control Protection

As discussed in Alternative 1.

Maintenance

As discussed in Alternative 1.

Real Estate

As discussed in Alternative 1, except that there is no requirement for the downstream disposal area for sediment disposal. It is assumed that area will be used for approximately one year for drying of the arundo.

Final Clean-up

As discussed in Alternative 1.

Schedule

The duration of the project is expected to be 3 years.

Alternative 4b: Temporary Stabilization

Streamflow Diversion

In that the excavation of the Reservoir area will be conducted in the wet, no diversion will be made during dredging. Flows downstream of the dam will be maintained by releases through the existing outlets.

Structural Removal

As discussed in Alternative 1.

Earthwork/Sediment Removal

Similar to Alternatives 1, 2a, and 3a, the Reservoir area sediments are slurried to the downstream disposal area. Coincident with the sediment removal, pilot channel is excavated through the Delta and Upstream Channel areas and the left slope is lined with soil cement. The assumed base width and slopes of the channel are 15 feet and 1.5H:1V, respectively. The height of the soil cement slope protection is assumed to be 8 feet. This height is selected so that the average annual storm will result in overtopping of the slope protection and erosion of the sediments. Figures 10 and 11 show the plan components.

Final Clean-up

After a large percentage of the sediments have eroded, the soil cement will be removed and the site will be re-vegetated as in Alternative 1. For this alternative it is assumed that the re-vegetation will occur after 10 years after notice to proceed.

Downstream Flood Control Protection

As discussed in Alternative 2a.

Maintenance

For this preliminary phase, it is assumed that the maintenance at Robles will be the same as Alternative 1. In addition, it is assumed that annual earthwork will be required at the site in order to control the erosion rate. Further analysis and refinement will occur in subsequent a phase.

Real Estate

As discussed in Alternative 2a.

Schedule

It is estimated that this alternative would require approximately 24 months from notice to proceed to complete the removal of Reservoir area sediment and the dam. While removal of the remaining sediments will be variable and dependent upon the hydrology, it is assumed here that the final phase, re-vegetation, will be completed 10 years after notice to proceed.