Flexibility for the Future:
How Can and Should the Bureau of Reclamation
React to Changing Demands for Water?

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I suspect that they put me on at this early hour in hopes that I would say something radical and wake everybody up. I'm happy to oblige. Secretary Babbitt has not been particularly aggressive about reorganizations in the Interior Department, but he's getting frisky as he draws near the end of his tenure, and he will shortly announce that he's merging the Bureau of Reclamation with the Fish & Wildlife Service, to form the Bureau of Fish & Wildlife Reclamation, or Buffwer (BFWR).

Actually, I've come here with, to some, a much more radical notion: The Bureau of Reclamation is demonstrating the ability -- as a matter of both law and policy -- to adjust to modern societal demands for water management. Over the last 20 years, we've seen that the Bureau is not a dinosaur, stuck in the New Deal image of reclaiming with irrigation every irrigable acre in the West. That it knows how to do more than pour concrete and divert water. That in fact the Bureau's facilities are serving as a flexible tool, contributing to a range of solutions for water conflicts.

This change proves once again that trend is not destiny. I was reminded of this recently when I learned there were 48 professional Elvis impersonators when "the King" died in 1977. By 1996 there were 7328 Elvis impersonators. If that trend continues, in the year 2012 one out of every four Americans will be an Elvis impersonator. I'm sure you join me in the wish that it won't happen.

Across the West population and economic growth, with the change in demographics and values that accompanies it, has placed enormous pressure on existing patterns of water use. This has been marked, first and foremost, by an increasing hydraulic pressure by urban and environmental interests for more water, which is typically being met by a modest reduction in the share of water allocated to agricultural uses. There is also the continuing need, which is not being met as fast as we would like, to resolve Indian water rights claims. And there are other garden variety conflicts among existing users. All of these things, which are at least as much the result of local forces as of mandates from Washington, have compelled reevaluation of water management practices. These things have been obvious to everyone in this room for at least a decade.

All water interests have had to respond, and all have been learning from experience. Cities that once opposed water metering with nearly religious fervor have realized that monitoring and charging for water use is a responsible way to keep up with increasing water demand. Ditto for

low flush toilets and waste water reclamation. Irrigators have found that lining canals and other conservation and efficiency practices can leave them with more water to use or sell. Environmentalists and Indians have learned that negotiating is often at least as fruitful as litigating, that consensual water management changes (even including spending some money - albeit usually federal money - buying water or water conservation measures) may achieve more real gains for the environment and for reservations than court victories.

These efforts, while laudable, are not very effective if pursued piecemeal. In most of the river basins of the West, we are finding that basin-wide approaches are necessary if we are to meet changing water needs, resolve Indian claims, and halt or reverse ecosystem destruction. Stressed river systems need help from every sector. Many people – including many in this room - - have devoted hundreds or even thousands of hours to solving these problems. As has been much discussed at this conference, they are beginning to find solutions for several river basins.

A recurring theme amidst these changes is that the Bureau of Reclamation usually needs to be involved as a constructive player. There are several reasons for this:

First, the Bureau operates a plumbing system that is often a key ingredient to making all this work. And it's not just the titan storage facilities like Shasta and Hoover, for the Bureau's smaller projects and its distribution facilities are often key components. It's hard to conceive of changing river management on many of these rivers without the Bureau's active participation.

Second, Reclamation project water is not always fully allocated. This may be hard to imagine for folks in California, where the Central Valley Project cannot satisfy all the demands put upon it because there's not enough water. Westwide, however, storage in Bureau reservoirs contains some unallocated water, and even where it is under contract it is not always used by the contractors. This makes it potentially available for other uses.

Third, there is the perception (and some evidence) that some Reclamation project water is used inefficently, either for low-value crops or in inefficient delivery and application systems. Burec project water is usually quite cheap compared to other sources for a variety of reasons, including subsidies - as a cursory comparison of the CVP water rates to State Water Project water rates reveals. There is, as a result, much interest in conservation or transfer of reclamation project water to more efficient ends.

Even though it is clear that the Bureau of Reclamation often needs to participate in water management reform discussions, it is not always clear what the Bureau's role should be. What we have learned from our experience thus far is that there is no single solution or single role for the Bureau to play. The Bureau's authorities and its contractual commitments vary significantly from project to project, and the array of existing and potential water users vary significantly from basin to basin.

But recent history shows that the Bureau can find ways to assist with creative solutions when they are worked out through stakeholder discussions. Working with local and regional interests, the Bureau is usually able to find the flexibility to move water around, promote and facilitate conservation and exchanges, assist new users, and meet changing demands.

It is only when solutions and consensus are not found at the local level that the Bureau finds itself in the default position of having to make top-down water management decisions driven by statutory mandates. Or, what is usually worse, the courts drive the results, in ways that people can't easily predict.

Let me say a few words about that. One of the questions we often get asked in my Office is, "what is Burec's discretion in operating this or that facility or project?" Conceptually, the issue is simply described: How much of the historic pattern of project operation is rooted in law and contract, and impervious to change, and how much of it is subject to alteration as a matter of policy or in response to other laws?

As anyone with passing familiarity with Reclamation projects knows all too well, answering such questions can be fiendishly complex. For the answers require peeling away layers and layers of "law" - layers that have accreted over time and built up in ways that are not always reconcilable with each other. There are the statutes -- general federal reclamation programmatic statutes like the 1902 Act and the 1939 Act; and project specific statutes (and even unit-specific statutes; e.g., the CVP has several different statutes that apply to some or all of the project). Then there are contracts -- repayment or water service -- under which water is actually delivered. Sometimes there are regulations, either generic or project-specific, to be considered. Interstate compacts and agreements, and international treaties, occasionally come into play. Then there are general federal regulatory statutes like the Clean Water Act, NEPA, and the ESA, each of which may impact reclamation project water management from the outside, as it were, and each of which has been talked about here. Last, but not least, there is state law, incorporated into this mix by section 8 of the 1902 Act, as interpreted in cases like California v. United States, and given flesh by state water appropriation permits, state statutes and regulations.

I'd much rather not put the long-suffering lawyers in my office through the torture of trying to answer such questions. Not only are peeling the layers of the onion hazardous to your health, but it's usually just damned hard to answer questions in the abstract. The answers often depend on the details and circumstances.

At least equally important is the fact that the question of Bureau "discretion" may be largely irrelevant to what most water interests and users want, which is to operate their projects in compliance with the law, and especially environmental laws like the Endangered Species Act. In the ESA context, for example, "discretion," or more precisely, the lack of it, may buy Burec project water users some relief in connection with its section 7 consultation requirements (which come into play mainly where federal actions that involve some discretion are proposed). But the Bureau's lack of discretion (if it genuinely does not have any) does not buy water users immunity

from the broad "take" proscriptions of section 9. That section, as most of you know, is enforceable both civilly and criminally by the United States, and is also enforceable civilly by private citizen suits.

So for our lawyers to wrestle incessantly with the "discretion" issue usually puts them in the awkward position of not being in a position to give helpful advice to the Bureau or project water beneficiaries.

By contrast, it is much easier for us to be helpful where the Bureau and other interests on a river come to us and say, "here are some ideas for what may make good water management sense (efficient, equitable, environmentally sound) to address this particular problem. We want you to help us identify possible legal problems each may pose, and help us work through whether the Bureau can operate its facilities in such a way to make one or more of these ideas happen." Then we can answer questions usefully, not abstractly, where it's practically always easier to reach an acceptable and workable result.

Furthermore, it's almost always easier -- if there's not a complete consensus among all the interests to a solution that makes sense from a water management standpoint -- to persuade the courts to defer to an arrangement that has at least a substantial buy-in from most stakeholders. And that is doubly true if the solution needs appropriations or other help from the Congress.

The Bureau of Reclamation is not the force driving water policy in the river basins of the West. It responds today, as the rivers themselves respond, to the decisions and needs of all with an interest in water use. The forces of change come from shifting economies, demographics, and values, from environmental laws that are the product of such changes, and from the persistence of unsatisfied water rights claims of Indian communities. These pressures -- finding advocates in the business community, among Indian Tribes, recreationists, and environmentalists, as well as the more traditional water using communities, are reshaping the modern West.

A useful way of thinking about this is that these pressures are reshaping the modern West, and altering the Bureau's role, like the forces of plate tectonics. Like their geological counterparts acting on geological fault lines, these changes place stress on the management of our river basins.

In some cases, we can point to successful solutions that have allowed the tectonic plates to slide past each other with only minor tremors. In other cases, where the plates lock up and admit no compromise or adjustment, we see major earthquakes disrupting the management of river basins. Like these major geological events, such sudden shifts can have unpredictable consequences for individual water users. Sometimes, after some experience with the effects of such head-on collisions, the parties conclude that negotiation and compromise might be the better course. The solutions developed from lower-stress approaches generally are preferable, putting the Bureau in a better position to assist with changing water demands.

Let me quickly describe some illustrations of this. One example of a river basin where water management has moved along with, so far, tremors that don't exceed 5 or 6 on the Richter scale, is in the Columbia and Snake River basins. Although the litigation and debate over how best to restore the Columbia/Snake salmon runs has been intense, so far actual water management has proceeded year to year without a major shift of tectonic forces.

The Bureau's participation in salmon conservation efforts furnishes a noteworthy example. Because the Bureau owns upstream reservoirs in the system, above the remaining salmon spawning reaches, it has been called upon since the early 1990s to provide flows for downstream salmon migration in a quantity of up to 427,000 AF per year.

Now there's a real potential conflict brewing here – Idaho water law doesn't generally allow transfers of water rights for instream flow uses. But the use of this water has in fact been facilitated from year to year by the state legislature's passage of special legislation to allow the acquisition of water for the salmon.

Obviously, the conflict over salmon conservation, Indian rights, and other uses in the Columbia/Snake Basin has the potential to produce a significant seismic event. If the state legislature did not accommodate these water transfers, the Bureau and local water users would be caught between the Endangered Species Act and Idaho state water law, with results no one can safely predict.

But so far, interests in the region have recognized the benefits from avoiding this lock-up of tectonic plates, where only a major rupture (a basin-wide court injunction or other earthquake that turns everything over) could provide relief. Working with the Bureau and other federal agencies, these interests were able to recommend legislation that would allow the Bureau to secure and deliver the water for salmon flows through 1999. The state legislature accepted these recommendations.

Long-term salmon recovery measures have yet to be determined. With the expiration of Idaho's interim authority at the end of 1999, and with Idaho and everyone else waiting to hear, analyze and debate federal recovery proposals, including those for flow augmentation, the Bureau once again finds itself at the center of seeking to broker a mutually agreeable solution that can address immediate and long-term concerns. Whether and how such a solution can be reached remains to be seen. I hope it can. Participants can draw on nearly a decade of experience in the basin that shows the Bureau's resources and legal authorities can provide significant flexibility to implement collaborative decisions.

Another basin worth mentioning is the Truckee-Carson in Nevada, which Bob Pelcyger will talk about shortly. There has long been litigation over the Newlands Project operation, but the level escalated seriously in the 1970s and 1980s, as the Pyramid Lake Tribe and environmental advocates raised new issues over the destruction of wetlands and fisheries in the Truckee and Carson basins. As a result of this litigation, Reclamation made major changes in the management

of its facilities to improve conditions for wetlands and wildlife, and it appeared the Bureau's management was doomed to be forever guided by one judicial decree after another.

A little over a decade ago most of the interests in this area realized they were destroying themselves with conflict. Eventually, after much intense negotiation, they proposed the Truckee-Carson-Pyramid Lake Water Rights Settlement Act, which Congress adopted in 1990 to provide a framework for water acquisition for wetlands in the Lahontan Valley. Although this legislation was enacted without the support of the principal local irrigation district, it proved to be a major step toward cooperative solutions for the Truckee-Carson. We hope continuing discussion will further diffuse the stresses in the region.

Don't get me wrong; there is still enough litigation to keep plenty of lawyers busy, but the strong tremors that have shaken this region for decades may be reduced to an occasional aftershock as more progressive management takes hold.

My discussion of the plate tectonics of water management could not be complete without mentioning the Central Valley. As you all know, California's major fault line in water management lies a bit east of the San Andreas, in the Sacramento-San Joaquin Valley. For the past several decades, competing interests have laid claim to the run-off from the Sierra stored by the Bureau of Reclamation in the Central Valley Project. Beginning in the early 1970s, the Valley has quaked with lawsuits and legislation designed to push the balance in favor of irrigators, urban interests, fishermen, or the environment. NEPA, the Clean Water Act, the Endangered Species Act, and various counterpart state laws have all been used as levers to increase pressure on opposing sides.

All these forces converge on the Bureau of Reclamation's operating decisions for the Central Valley Project, and in 1992, produced the water management equivalent of the San Francisco earthquake of 1906 -- the Central Valley Project Improvement Act. Although the stories about that bill vary depending on the whose telling them, it all started with an effort to reach compromise among the major players, but ended with a legislative solution that gave more to environmental and urban interests than to agriculture. The opposing forces locked up against each other. The pressures continue to build until the gridlock was broken by the CVPIA earthquake. As always in such a lockup, the outcome was unpredictable. The fate of the CVPIA was not settled until the last possible moment, when President Bush decided to sign rather than veto the bill, despite an enormous lobbying effort from valley agricultural interests.

The change in the landscape after the CVPIA earthquake relieved some of the pressure and made it easier for opposing interests to work with one another, though it has scarcely ended debates. But we've seen the CALFED process converted from a discussion group of federal agencies involved in San Francisco Bay water issues to a joint federal-state initiative to resolve water supply and water quality issues throughout the Central Valley for the next 30 years. Every interest in the state is participating in these discussions. We've seen water put back into the San Joaquin River below Friant Dam for the first time in 50 years, with local support. We're seeing

major efforts to restore riparian areas on the Sacramento, with local support. While the Bureau is a player in such things, often a key player, it is the willingness to work together that creates the solution the Bureau can assist with implementing.

Let me close my brief Western tour by mentioning a couple of other river basins with pending conflicts where the outcome is still in doubt, but where I continue to hope for a regional consensus to emerge.

The first is the Central Arizona Project. Ongoing intensive discussions hold much promise for a win-win outcome that would both settle most of the remaining Indian claims in Arizona and resolve massive litigation between the U.S. and the local water users over CAP repayment terms. But significant obstacles remain, and the parties vacillate between optimism and pessimism on a deally - even hourly- basis. You'll hear more about that shortly from Deputy Secretary Hayes.

The other river basin is the Middle Rio Grande in New Mexico, where there has been a major controversy for years over how to provide sufficient water to sustain an endangered fish, the silvery minnow, which was discussed by Gary O'Dea yesterday afternoon. There the potential for a lockup of opposing forces still looms large, and the conflict has moved to the courthouse, as numerous lawsuits are now on file involving the Bureau of Reclamation, the Corps of Engineers, the Fish and Wildlife Service, the Middle Rio Grande Conservancy District, the City of Albuquerque, the State and environmentalists.

In the last few weeks, all the major interests in the basin signed an MOU agreeing to work together to try to develop a habitat conservation plan for the silvery minnow under the Endangered Species Act. Although HCPs have not been a common mechanism for resolving water conflicts, an HCP here could provide the framework for a negotiated solution, and perhaps a new direction for the Bureau's role in water management in the Middle Rio Grande. Disputes over the extent of the Bureau's authorities and legal discretion would likely become moot, if the parties can agree as to the Bureau's role as part of an integrated solution.

Secretary Babbitt recently introduced for public discussion an idea for an "action-forcing" mechanism to ensure that all federal dams and water projects - and not just Burec projects - are periodically adjusted to keep pace with changing values. Borrowing from the practice with respect to non-federal hydropower facilities -- which every few decades undergo complete review through the FERC relicensing process -- the Secretary suggested there should be, periodically, a full-scale review of the operations, benefits and environmental impacts of federal dams. That idea has considerable appeal, because solutions to some of the site-specific examples I've mentioned here might have been facilitated and hastened by such a review.

Let me suggest a couple of other processes that hold some promise as vehicles for this inexorable process of change and accommodation. One is ESA habitat conservation or recovery plans. This technique was pioneered successfully in the Upper Colorado basin, and is now underway on the lower Colorado and, we hope, in the Rio Grande. HCPs and recovery plans

provide a structure for stakeholder involvement and collaboration and offer the hope of some predictability and stability. The second process is one that has been a major vehicle for change in the Truckee/Carson/Pyramid Lake area: the OCAP, or operating criteria and procedures, which are basically a project-specific set of operating regulations, adopting through rulemaking. OCAPs also provide a structure for the process of consultation and collaboration, and the rules themselves provide a measure of predictability and stability. We're involved in a similar effort on the Klamath.

As all these things illustrate, as stresses on water supply operations increase, some move toward more regularized operating criteria is probably inevitable - witness also the current efforts to come up with "surplus criteria" for the operation of Lake Mead.

Despite the enormity of the changes I've described, some people still see the Bureau of Reclamation as an agency which can't change, which is rooted in the past and bound by archaic laws and practices. They see the complex web of state and federal water laws as an elaborate snare that reduces the Bureau's flexibility and prevents it from meeting modern water demands. These people are wrong.

While those strictures do influence the Bureau's ability to change, in no place I know have they actually stymied all efforts to accommodate change. Instead, Reclamation projects in the west have grappled with changing water management imperatives with considerable - indeed with remarkable - success. The work is not finished, but those who look at Reclamation projects as incapable of change, with or without major surgery on reclamation project statutes or contracts, had better look again.

The fact is that the Bureau of Reclamation has been changing almost from the moment the Reclamation program was established in 1902. The size of Reclamation farms changed; the length of repayment periods changed, Bureau facilities have been authorized to carry non-project water, and, most important for today, project purposes gradually evolved from a simple focus on irrigation to a broad array of purposes - municipal, industrial, Indian, hydropower, fish and wildlife and recreation. Apart from these programmatic changes, individual project authorizations have also been modified, sometimes dramatically, and new regulatory laws have been laid over project operations.

From the long sweep of history, what is happening now is the Bureau is simply continuing to change, to find the tools to meet the different needs of a new era. Such changes are most successful when the basin interests help the Bureau to learn how it can help meet the needs of water users and ecosystems in each river basin. As has been pointed out many times, each Bureau project and each river basin is unique. The solutions for accommodating their needs are likewise unique. But they are generally better reached through a process of negotiation and compromise than through contentious litigation, where one interest or another tries to shoehorn Bureau operations into meeting the needs of just one user or another. That, I think, is the most valuable lesson of the last several years.

RECORD OF DECISION

OPERATION OF GLEN CANYON DAM

Final Environmental Impact Statement

October 1996

Approved

Date OCT 08 1996

Commissioner, U.S. Bureau of Reclamation

Date OCT 09 1996

Secretary of the Interior

RECORD OF DECISION

OPERATION OF GLEN CANYON DAM
FINAL ENVIRONMENTAL IMPACT STATEMENT

I. INTRODUCTION

This record of decision (ROD) of the Department of the Interior, Bureau of Reclamation (Reclamation), documents the selection of operating criteria for Glen Canyon Dam, as analyzed in the final Environmental Impact Statement (EIS), dated March 21, 1995 (FES 95-8). The EIS on the operation of Glen Canyon Dam was prepared with an unprecedented amount of scientific research, public involvement, and stakeholder cooperation.

Scientific evidence gathered during Phase I of the Glen Canyon Environmental Studies (GCES) indicated that significant impacts on downstream resources were occurring due to the operation of Glen Canyon Dam. These findings led to a July 1989 decision by the Secretary of the Interior for Reclamation to prepare an EIS to reevaluate dam operations. The purpose of the reevaluation was to determine specific options that could be implemented to minimize, consistent with law, adverse impacts on the downstream environment and cultural resources, as well as Native American interests in Glen and Grand Canyons. Analysis of an array of reasonable alternatives was needed to allow the Secretary to balance competing interests and to meet statutory responsibilities for protecting downstream resources and producing hydropower, and to protect affected Native American interests.

In addition, the Grand Canyon Protection Act of 1992 was enacted on October 30, 1992. Section 1802 (a) of the Act requires the Secretary to operate Glen Canyon Dam:

> "...in such a manner as to protect, mitigate adverse impacts to, and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use."

Alternatives considered include the No Action Alternative as well as eight operational alternatives that provide various degrees of protection for downstream resources and hydropower production.

II. DECISION

The Secretary's decision is to implement the Modified Low Fluctuating Flow Alternative (the preferred alternative) as described in the final EIS on the Operation of Glen Canyon Dam with a minor change in the timing of beach/habitat building flows (described below). This alternative was selected because it will reduce daily flow fluctuations well below the no action levels (historic pattern of releases) and will provide high steady releases of short duration which will protect or enhance downstream resources while allowing limited flexibility for power operations.

The Modified Low Fluctuating Flow Alternative incorporates beach/habitat-building flows which are scheduled high releases of short duration designed to rebuild high elevation sandbars, deposit nutrients, restore backwater channels, and provide some of the dynamics of a natural system. In the final EIS, it was assumed that these flows would occur in the spring when the reservoir is low, with a frequency of 1 in 5 years.

The Basin States expressed concern over the beach/habitat-building flows described in the final EIS because of the timing of power plant by-passes. We have accomodated their concerns, while maintaining the objectives of the beach/habitat-building flows. Instead of conducting these flows in years in which Lake Powell storage is low on January 1, they will be accomplished by utilizing reservoir releases in excess of power plant capacity required for dam safety purposes. Such releases are consistent with the 1956 Colorado River Storage Project Act, the 1968 Colorado River Basin Project Act, and the 1992 Grand Canyon Protection Act.

Both the Colorado River Management Work Group and the Transition Work Group, which participated in the development of the Annual Operating Plan and the EIS, respectively, support this change as it conforms unambiguously with each member's understanding of the Law of the River. These groups include representatives of virtually all stakeholders in this process.

The upramp rate and maximum flow criteria were also modified between the draft and final EIS. The upramp rate was increased from 2,500 cubic feet per second per hour to 4,000 cubic feet per second per hour, and the maximum allowable release was increased from 20,000 to 25,000 cubic feet per second. We made these modifications to enhance power production flexibility, as suggested by comments received. These modifications were controversial among certain interest groups because of concerns regarding potential impacts on resources in the Colorado River and the Grand Canyon. However, our analysis indicates that there would be no significant differences in impacts associated with these changes ("Assessment of Changes to the Glen Canyon Dam EIS Preferred Alternative from Draft to Final EIS", October 1995).

The 4,000 cubic feet per second per hour upramp rate limit will be implemented with the understanding that results from the monitoring program will be carefully considered. If impacts differing from those described in the final EIS are identified, a new ramp rate criterion will be considered by the Adaptive Management Work Group and a recommendation for action forwarded to the Secretary.

The maximum flow criterion of 25,000 cubic feet per second will be implemented with the understanding that actual maximum daily releases would only occasionally exceed 20,000 cubic feet per second during a minimum release year of 8.23 million acre-feet. This is because the maximum allowable daily change constraint overrides the maximum allowable release and because monthly release volumes are lower during minimum release years. If impacts differing from those described in the final EIS are identified through the Adaptive Management Program, the maximum flow restriction will be reviewed by the Adaptive Management Work Group and a recommendation for action will be forwarded to the Secretary.

III. DESCRIPTION OF ALTERNATIVES

Nine alternative methods of operating Glen Canyon Dam (including the No Action Alternative) were presented in the final EIS. The eight action alternatives were designed to provide a reasonable range of alternatives with respect to operation of the dam. One alternative would allow unrestricted fluctuations in flow (within the physical constraints of the power plant) to maximize power production, four would impose varying restrictions on fluctuations, and three others would provide steady flows on a monthly, seasonal, or annual basis. The names of the alternatives reflect the various operational regimes. In addition, the restricted fluctuating flow and steady flow alternatives each include seven elements which are common to all of them. These common elements are: 1) Adaptive Management, 2) Monitoring and Protecting Cultural Resources, 3) Flood Frequency Reduction Measures, 4) Beach/Habitat-Building Flows, 5) New Population of Humpback Chub, 6) Further Study of Selective Withdrawal, and 7) Emergency Exception Criteria. A detailed description of the alternatives and common elements can be found in Chapter 2 of the final EIS. A brief description of the alternatives is given below.

UNRESTRICTED FLUCTUATING FLOWS

No Action: Maintain the historic pattern of fluctuating releases up to 31,500 cubic feet per second and provide a baseline for impact comparison.

Maximum Power plant Capacity: Permit use of full power plant capacity up to 33,200 cubic feet per second.

RESTRICTED FLUCTUATING FLOWS

High: Slightly reduce daily fluctuations from historic levels.

Moderate: Moderately reduce daily fluctuations from historic levels; includes habitat maintenance flows.

Modified Low (Preferred Alternative): Substantially reduce daily fluctuations from historic levels; includes habitat maintenance flows.

Interim Low: Substantially reduce daily fluctuations from historic levels; same as interim operations except for addition of common elements.

STEADY FLOWS

Existing Monthly Volume: Provide steady flows that use historic monthly release strategies.

Seasonally Adjusted: Provide steady flows on a seasonal or monthly basis; includes habitat maintenance flows.

Year-Round: Provide steady flows throughout the year.

Table 1 shows the specific operational criteria for each of the alternatives.

IV. SIGNIFICANT ISSUES AND ALTERNATIVES

The Glen Canyon Dam EIS scoping process was initiated in early 1990 and the public was invited to comment on the appropriate scope of the EIS. More than 17,000 comments were received during the scoping period, reflecting the national attention and intense interest in the EIS.

As a result of the analysis of the oral and written scoping comments, the following were determined to be resources or issues of public concern: beaches, endangered species, ecosystem integrity, fish, power costs, power production, sediment, water conservation, rafting/boating, air quality, the Grand Canyon wilderness, and a category designated as "other" for remaining concerns. Comments regarding interests and values were categorized as: expressions about the Grand Canyon, economics, nonquantifiable values, nature versus human use, and the complexity of Glen Canyon Dam issues.

The EIS team consolidated and refined the public issues of concern, identifying the significant resources and associated issues to be analyzed in detail. These resources include: water, sediment, fish, vegetation, wildlife and habitat, endangered and other special status species, cultural resources, air quality, recreation, hydropower, and non-use value.

Further meetings were held with representatives from the cooperating agencies and public interest groups who provided comments on the criteria for development of reasonable alternatives for the EIS. The public also had an opportunity to comment on the preliminary selection of alternatives at public meetings and through mailings. The final selection of alternatives took into consideration the public's views.

V. COMMENTS RECEIVED ON THE FINAL EIS

Many comments and recommendations on the final EIS were received in the form of pre-printed postcards and letters that addressed essentially the same issues. The comments are summarized below along with Reclamation's responses.

COMMENT: Maintain Draft EIS flows. Modifying the upramp rate and maximum flows

Table 1.—Operating limits of alternatives identified for detailed analysis

	Unrestricted Fluctuating Flows		Restricted Fluctuating Flows				Steady Flows		
	No Action	Maximum Powerplant Capacity	High	Moderate	Modified Low	Interim Low	Existing Monthly Volume	Seasonally Adjusted	Year-Round
Minimum releases (cfs)[1]	1,000 Labor Day–Easter [2]3,000 Easter–Labor Day	1,000 Labor Day–Easter [2]3,000 Easter–Labor Day	3,000 5,000 8,000 depending on monthly volume, firm load, and market conditions	5,000	8,000 between 7 a.m. and 7 p.m. 5,000 at night	8,000 between 7 a.m. and 7 p.m. 5,000 at night	8,000	[2]8,000 Oct–Nov 8,500 Dec 11,000 Jan–Mar 12,500 Apr 18,000 May–Jun 12,500 Jul 9,000 Aug–Sep	Yearly volume prorated[4]
Maximum releases (cfs)[5]	31,500	33,200	31,500	31,500 (may be exceeded during habitat maintenance flows)	25,000 (exceeded during habitat maintenance flows)	20,000	Monthly volumes prorated	18,000 (exceeded during habitat maintenance flows)	Yearly volume prorated[4]
Allowable daily flow fluctuations (cfs/24 hours)	30,500 Labor Day–Easter 28,500 Easter–Labor Day	32,200 Labor Day–Easter 30,200 Easter–Labor Day	15,000 to 22,000	±45% of mean flow for the month not to exceed ±6,000	[6]5,000 6,000 or 8,000	[6]5,000 6,000 or 8,000	[7]±1,000	[7]±1,000	[7]±1,000
Ramp rates (cfs/hour)	Unrestricted	Unrestricted	Unrestricted up 5,000 or 4,000 down	4,000 up 2,500 down	4,000 up 1,500 down	2,500 up 1,500 down	2,000 cfs/day between months	2,000 cfs/day between months	2,000 cfs/day between months
Common elements	None	None	Adaptive management (including long-term monitoring and research) Monitoring and protecting cultural resources Flood frequency reduction measures Beach/habitat-building flows New population of humpback chub Further study of selective withdrawal Emergency exception criteria						

[1] In high volume release months, the allowable daily change would require higher minimum flows (cfs).
[2] Releases each weekday during recreation season (Easter to Labor Day) would average not less than 8,000 cfs for the period from 8 a.m. to midnight.
[3] Based on an 8.23-million-acre-foot (maf) year; in higher release years, additional water would be added equally to each month, subject to an 18,000-cfs maximum.
[4] For an 8.23-maf year, steady flow would be about 11,400 cfs.
[5] Maximums represent normal or routine limits and may necessarily be exceeded during high water years.
[6] Daily fluctuation limit of 5,000 cfs for monthly release volumes less than 600,000 acre-feet; 6,000 cfs for monthly release volumes of 600,000 to 800,000 acre-feet; and 8,000 cfs for monthly volumes over 800,000 acre-feet.
[7] Adjustments would allow for small power system load changes.

between the draft and final EIS has neither been open for public review nor subjected to serious scientific scrutiny. These changes should have been addressed in the draft EIS and made available for public comment at that time. Credible proof, based on the testing of a specific scientific hypothesis, that alterations in operating procedures at Glen Canyon Dam follow the spirit and intent of the Grand Canyon Protection Act needs to be provided. The burden of proof that there will be no impact on downstream resources rests with those proposing changes.

RESPONSE: The modification of the preferred alternative, which incorporated changes in the upramp rate and maximum flows, was made after extensive public discussion. The new preferred alternative was discussed as an agenda item during the May, June, August, and November 1994 public meetings of the Cooperating Agencies who assisted in the development of the EIS. A wide range of public interest groups received advance mailings and agendas and were represented at the public meetings. The environmental groups attending these meetings included: America Outdoors, American Rivers, Desert Flycasters, Environmental Defense Fund, Friends of the River, Grand Canyon River Guides, Grand Canyon Trust, Sierra Club, and Trout Unlimited. Meeting logs indicate that representatives from at least some of these groups attended all but the May meeting. In addition, approximately 16,000 citizens received periodic newsletters throughout the EIS process. This included a newsletter outlining the proposed changes issued several months prior to the final EIS. The environmental groups mentioned above were included on the newsletter mailing list.

Reclamation's research and analysis has been thorough with regards to changes in flows and ramping rates and potential impacts upon downstream resources. A complete range of research flows was conducted from June 1990 to July 1991. These included high and low fluctuating flows with fast and slow up and down ramp rates. Glen Canyon Environmental Studies Phase II identified cause and effect relationships between downramp rates and adverse impacts to canyon resources. However, no cause and effect relationships between upramp rates and adverse impacts to canyon resources were identified. The draft EIS, (a public document peer reviewed by GCES and the EIS Cooperating Agencies) states that upramp rates have not been linked to sandbar erosion (page 95) and that "Rapid increases in river stage would have little or no effect on sandbars." (page 190).

With respect to potential impacts occurring with the change in flows, it should be noted that sand in the Grand Canyon is transported almost exclusively by river flows. The amount of sand transported increases exponentially with increases in river flow. Maintaining sandbars over the long term depends on the amount of sand supplied by tributaries, monthly release volumes, range of flow fluctuations, and the frequency and distribution of flood flows. Conversely, occasional flows between 20,000 and 25,000 cubic feet per second may cause minor beach building, and may provide water to riparian vegetation.

As part of the EIS, the effects of each alternative on long-term sand storage in Marble Canyon (river miles 0 to 61) were analyzed. The Marble Canyon reach was chosen for analysis because it is more sensitive to impacts from dam operations than downstream reaches. For each fluctuating flow alternative, the analysis used 20 years of hourly flow modeled by Spreck Rosekrans of the Environmental Defense Fund and 85 different hydrologic scenarios (each representing 50 years of

monthly flow data). This analysis was documented in the draft EIS on page 182, and Appendix D, pages 4-5. The analyses relating to the probability of net gain in riverbed sand for each alternative is documented in the draft EIS on pages 54-55, 184, 187, and 194.

Specific peer reviewed studies relating to the above analyses are listed in Attachment 1.

COMMENT: Do not change the upramp rate and maximum flow criteria at the same time. While acknowledging Reclamation's good efforts to identify and establish optimum operating criteria for all users of Glen Canyon Dam, changing two flow criteria (upramp rate and maximum flow criterion of preferred alternative) does not make prudent scientific sense. It will not result in reliable data. Not enough information is at hand to predict the outcome of these proposals.

RESPONSE: Viewed from the purely scientific viewpoint, it would be preferable to change variables one at a time in a controlled experiment. However, many uncontrolled variables already exist, and from a resource management standpoint the interest lies in measuring the possible resource impact, if any, which might result from jointly changing both criteria. The best available information suggests that the long-term impact of changing both criteria at once will be difficult, if not impossible to detect.

Even though both parameters would change, for 8 months of an 8.23 million acre foot year (minimum release year), only the upramp rate will be used. The ability to operationally exceed 20,000 cubic feet per second only exists in months in which releases are in excess of 900,000 acre feet. In a minimum release year, flows above 20,000 cubic feet per second will most likely occur in December, January, July, and August. Evaluation of the upramp rates can be initiated immediately with the evaluation of the increase in maximum flow relegated to the months with the highest volumes. New upramp and maximum flow criteria would be recommended through the Adaptive Management Program should monitoring results indicate that either of these criteria are resulting in adverse impacts to the natural, cultural, or recreational (human safety) resources of the Grand Canyon differing from those shown in the final EIS.

COMMENT: "Habitat/Beach Building Floods" designed to redeposit sediment and reshape the river's topography much like the Canyon's historic floods should be conducted. An experimental release based on this premise is critical to restore some of the river's historic dynamics; without it, any flow regime will result in continued loss of beach and backwater habitat. This "spike" should be assessed and implemented for the spring of 1996, subject to a critical evaluation of its flow size, timing, impact on fisheries, and completion of a comprehensive monitoring plan. Recent side-canyon floods underscore the need for restoring natural processes.

RESPONSE: Reclamation and the Cooperating Agencies continue to support this concept. The preferred alternative supports such a flow regime. A test flow was conducted this spring. The results of this flow are currently being analyzed. We expect to conduct more of these flows in the future.

COMMENT: Endorse the Fish & Wildlife Service's Biological Opinion and implement

experimental steady flows to benefit native fishes, subject to the results of a risk/benefit analysis now in progress.

RESPONSE: The preferred alternative provides for experimental steady flows through the Adaptive Management Program for the reasons put forth in the Biological Opinion.

COMMENT: Fund and implement immediately an Adaptive Management Program. This is the appropriate forum to address important issues. It is imperative that resource management rely on good science to monitor, and respond to possible adverse effects resulting from changes in dam operations.

RESPONSE: The preferred alternative provides for implementation of an Adaptive Management Program.

COMMENT: Interior Secretary Babbitt should issue a Record of Decision by December 31, 1995, and conduct an efficient and timely audit by the General Accounting Office as mandated by the Grand Canyon Protection Act.

RESPONSE: In compliance with the Grand Canyon Protection Act, Interior Secretary Babbitt could not issue the Record of Decision until considering the findings of the General Accounting Office. Those findings were issued on October 2, 1996.

OTHER COMMENTS: Another set of comments were received from municipalities and other power user groups. These letters made up about 3 percent of the total received and were essentially identical in content. Although the authors were not totally in agreement with the preferred alternative because of the reduction in peaking power, they believe it is a workable compromise. These letters characterized the final EIS as ". . .a model for resolving complex environmental issues among divergent interests." They also urged the government to protect the integrity of the process, resist efforts to overturn the FEIS, and allow the scientists' assessment to stand, in as much as the Adaptive Management Process will give Reclamation an opportunity to evaluate the effects of operational changes over time and make modifications according to scientific findings.

RESPONSE: While the preferred alternative may not satisfy all interests, Reclamation believes it is a workable compromise and meets the two criteria set out in the EIS for the reoperation of the dam, namely restoring downstream resources and maintaining hydropower capability and flexibility.

A letter of comment from the Environmental Protection Agency (EPA) indicates that EPA's comments on the draft EIS were adequately addressed in the final EIS. It also expresses their support for the preferred alternative.

Samples of the comment letters and cards, and a copy of EPA's comment letter are included as Attachment 2.

Record of Decision

Animas-La Plata Project/Colorado Ute Indian Water Rights Settlement
Final Supplemental Environmental Impact Statement
July 2000

SEP 25 2000

APPROVED:

Commissioner, U.S. Bureau of Reclamation

Deputy Commissioner, Bureau of Indian Affairs

Secretary of the Interior

Record of Decision

Animas-La Plata Project/Colorado Ute Indian Water Rights Settlement

United States Department of the Interior
Bureau of Reclamation

I. Introduction

In 1988, Congress enacted the Colorado Ute Indian Water Rights Settlement Act of 1988 (1988 Settlement). In committing the United States to this settlement, Congress agreed that resolution of the Colorado Ute Tribes' water rights claims would be accomplished by building a large water project to supply water to the Colorado Ute Tribes–the Animas-La Plata Project (ALP). In addition to satisfying the Tribal water needs to effectuate a settlement, however, the original ALP was sized to provide a significant new water supply for agricultural and municipal use.

The 1988 Settlement has not been implemented. Specifically, the original project was not constructed because this Department, and many other parties, raised serious concerns regarding the environmental consequences of building the project. These consequences included a large diversion from the Animas River which would violate Endangered Species Act (ESA) requirements and water quality impacts associated with a major new non-Indian irrigation project in the Four Corners region.

Although the original ALP raised serious environmental issues, the Department of the Interior has recognized the imperative of fulfilling the water rights of the Southern Ute Indian and Ute Mountain Ute Tribes. The United States has a trust responsibility to seek final resolution of the tribal water rights. In addition, failure to resolve the Colorado Ute Tribe's water rights has the potential to destabilize the exercise of water rights by junior, non-Indian water rights holders in Colorado and New Mexico.

Accordingly, in 1998, the Department recommended construction of a substantially scaled-down ALP that was designed to satisfy the Colorado Ute Tribes' water rights. The proposal down-sized the project to comply with ESA requirements. It excluded non-Indian irrigation systems to address water quality concerns. In addition, the Department called for the completion of a supplemental environmental review of the smaller ALP along with potential non-structural alternatives that were being proposed to implement the Colorado Ute Tribes' water rights settlement. This review would ensure full compliance with the National Environmental Policy Act (NEPA) and provide decision-makers a sound basis for making a final decision.

The supplemental environmental review has been completed. The Department is now prepared to issue a Record of Decision (ROD) in this matter, and it is doing so through this document. As explained in detail below, the Department is selecting Refined Alternative 4 (RA4), which is the

environmentally preferred alternative, to implement the 1988 Settlement. It primarily consists of a down-sized project that focuses on providing the Colorado Ute Tribes an assured water supply. Because the Department's selection will provide benefits to the Colorado Ute Tribes which are not identical to those envisioned in the 1988 Settlement, this ROD, in and of itself, does not allow for implementation of activities specific to RA4. Congressional authorization is needed to achieve final implementation of the 1988 Settlement.

This ROD does, however, provide the Department's confirmation that the Administration proposal, as modified, is the best means to finalize the settlement. It should also be noted that the cost of RA4 would be significantly less than the cost associated with the original settlement. By executing this ROD, the Department adopts the reasoning and analysis contained in the July 2000 Final Supplemental Environmental Impact Statement (FSEIS). Nonetheless, until such time as authorization is provided or other statutory guidance is forthcoming, the Department will not commence any significant activities (e.g. construction) in furtherance of RA4.

The components of RA4 are as follows:

Structural

- Off-stream reservoir of 120,000 acre-feet total capacity (including a conservation pool of approximately 30,000 af) at Ridges Basin
- 280 cfs pumping plant
- a pipeline from the pumping plant to the reservoir
- a pipeline to transport M&I water to the Shiprock area for the benefit of the Navajo Nation

Non-structural

- $40,000,000 acquisition fund for the Southern Ute Indian and Ute Mountain Ute Tribes to purchase existing water rights on a willing buyer/willing seller basis or to engage in other resource development activity

The Department's selection of RA4 as the recommended course of action is in accord with the Department's policy "to recognize and fulfill its legal obligations to identify, protect, and conserve the trust resources of federally recognized Indian tribes and tribal members." (512 DM 2). The Colorado Ute Tribes, who participated in the development of the FSEIS and were consulted with on an ongoing basis during its development, have strongly endorsed RA4 as their preferred course to resolve the remaining issues associated with the 1988 Settlement.

The following sections provide additional information concerning the rationale for this decision, including the analysis performed; critical issues which were considered; and commitments which are hereby made in association with the chosen alternative should Congress authorize its implementation.

II. Background & Associated Issues

As noted earlier, the Colorado Ute Indian Water Rights Settlement Act of 1988 (Public Law 100-585) relied, in part, on construction of ALP, a Bureau of Reclamation project authorized by the Colorado River Basin Project Act (P.L. 84-485) as a participating project of the Colorado River Storage Project Act (P.L. 90-537). Since its authorization, several studies have been conducted regarding ALP. The results of these studies are summarized in the following documents: the 1979 Definite Plan Report; a 1980 Final Environmental Statement; the 1992 Draft Supplement to the Final Environmental Statement; and the 1996 Final Supplement to the Final Environmental Statement (FSFES).

In August 1998, after a decade of controversy over ALP had resulted in the 1988 Settlement remaining unimplemented, the Secretary presented an Administration proposal to implement the 1988 Settlement Act. The proposal limited ALP depletions to an average of 57,100 acre feet per year and limited the project to only a municipal and industrial water supply for the Colorado Ute Tribes, the Navajo Nation, and local non-Indian entities. The proposal also contemplated a water acquisition fund to provide the Colorado Ute Tribes with the opportunity to purchase additional water rights necessary to secure the quantities provided in the 1988 Settlement.

RA4, which is a slightly modified version of the Administration proposal, would finalize implementation of the 1988 Settlement and avoid the extensive litigation sure to occur over tribal water rights claims. RA4 does, however, modify the terms of the settlement as originally agreed. The Colorado Ute Tribes' support is therefore necessary. Accordingly, the ability of each alternative to work in a settlement context is an additional factor reviewed as part of the NEPA analysis and this ROD. In addition, because RA4 is intended to resolve Indian reserved water rights claims, traditional cost-benefit analyses do not apply because it would not account for the primary benefits of an Indian water rights settlement which include avoiding direct and indirect litigation costs and resolving claims which might be associated with failure to protect tribal trust resources. Moreover, a significant federal investment to develop tribal resources is consistent with the federal trust responsibility to the Southern Ute Indian and Ute Mountain Ute Tribes. Finally, and perhaps most important, this ROD addresses an existing settlement Congress committed significant resources to secure. RA4, with projected new costs of $ 278 million, would preserve the settlement with a significantly down-sized project that is less than half the cost associated with the ALP concept incorporated into the original settlement (estimated at approximately $ 700 million).

In addition to viewing the analysis and making a final decision from the perspective of an Indian water rights settlement, the FSEIS evaluates items not ordinarily found in Bureau of Reclamation NEPA documents. As several commenters noted, the FSEIS bases part of its analysis on non-binding water use scenarios. These scenarios, developed in conjunction with the Colorado Ute Tribes, allowed the Department to fulfill the requirements of NEPA by providing a context for analyzing water uses from the modified ALP which is based on the best available information. This approach also respects the Colorado Ute Tribes' sovereignty and protects their ability to allocate water in accordance with future needs consistent with federal law. The FSEIS also provides directions and commitments for future NEPA compliance once actions in furtherance of end uses are undertaken.

III. Scope of Analysis

A plan of approach was developed that described how the NEPA process was to proceed (refer to Attachment I in Volume 2 of the FSEIS for more information). All alternatives underwent an initial threshold assessment to identify those that were capable of meeting the project's purpose and need. All alternatives initially appeared to have the potential to meet the project purpose and need, and they were evaluated against the following criteria: (1) an evaluation of environmental impacts; (2) an evaluation of the degree to which an alternative met the purpose and need and contained the elements necessary to secure an Indian water rights settlement; and (3) an evaluation of the technical and economic merits.

A. Alternatives Analyzed

Building on the identification of a range of future water uses and an evaluation of potential water sources in the region, alternatives were identified that had the ability, in whole or in part, to provide water to the Colorado Ute Tribes in fulfillment of the 1988 Settlement. These alternatives included the alternatives evaluated in the 1996 FSFES, those identified by Reclamation in the January 1999 Notice of Intent, alternatives suggested during February 1999 scoping meetings, and a combination of the structural and non-structural components of all of these alternatives. The alternatives were:

- Alternative 1 - Administration Proposal, consisting of a structural element (Ridges Basin Reservoir with a 90,000 af capacity) and a non-structural element (purchasing water rights for 13,000 af of depletion).

- Alternative 2 - Administration Proposal with conservation pool added, increasing the overall reservoir size to approximately 120,000 af.

- Alternative 3 - Administration Proposal with San Juan River Basin Recovery Implementation Program Element added.

Alternative 4 - Administration Proposal with San Juan River Basin Recovery Implementation Program and conservation pool added.

Alternative 5 - Animas-La Plata Reconciliation Plan [Romer-Schoettler structural alternative as represented by the legislation introduced during the 105th Congress (S.1771 & H.R. 3478)]

Alternative 6 - Animas River Citizen's Coalition Conceptual Alternative (Romer-Schoettler non-structural alternative; provides Colorado Ute Tribes water only; purchase water and lands in/near reservations; expansion of existing projects)

Alternative 7 - 1996 FSFES Recommended Plan (Multipurpose project; phased construction to reflect federal vs. non-federal responsibility; staged construction of Phase 1 to reflect 57,100 af ESA depletion limitation; 274,000 af Ridges Basin Reservoir; initially sized Durango Pumping Plant at 70 cfs; miscellaneous conveyance and delivery facilities)

Alternative 8 - Administration Proposal with alternative water supply for non-Colorado Ute Tribe entities (i.e., Navajo Nation, Animas-La Plata Water Conservancy District, and San Juan Water Commission); (water conservation; use of existing Federal facilities; separate reservoir)

Alternative 9 - Citizens' Progressive Alliance Alternative (instream leasing coupled with other non-structural alternatives)

Alternative 10 - No Action Alternative

B. Alternatives Evaluation Process

Existing base resources and information about each of the alternatives were evaluated to determine if sufficient information (e.g., baseline information, data and analyses, previous NEPA documents, proponent information, agency baseline data, and other third-party studies) was available to provide adequate analysis of the alternatives. On the basis of this data adequacy review, probable major issues that would have to be resolved during the preparation of the FSEIS were identified, the adequacy of the information to resolve these issues was evaluated, and recommendations for additional data gathering were made. Additional data were gathered as necessary so that a comparable level of analysis could be made for each of the 10 alternatives. Potential mitigation measures also were identified.

Environmental Impacts

The following resource areas were analyzed in terms of potential environmental impacts associated with the development and construction of the structural and non-structural components of each of the alternatives:

Agriculture	Air Quality	Aquatic (streams)
Aquatic (reservoirs)	Archeology	Cultural/Paleontology
Ethnography	Geology/Soils	Hazardous Materials
Land Use	Limnology	Noise
Public Services	Recreation	Safety
Socioeconomics	Threatened/Endangered Species	Transportation
Vegetation	Visual/Aesthetics	Wetlands
Water Quality	Water Resources/Hydrology	Wildlife
Indian Trust Assets	Environmental Justice	Public Services and Utilities

Purpose and Need

The purpose and need statement published in the January 4, 1999 Federal Register reflects the Department's prioritization of the Indian water rights settlement purposes of ALP. Thus, the purpose and need of ALP under this NEPA review is:

> ". . . to implement the [1988 Colorado Ute Indian Water Rights] Settlement Act by providing the Ute Colorado Ute Tribes an assured long-term water supply and water acquisition fund in order to satisfy the Colorado Ute Tribes' senior water rights claims as quantified in the Settlement Act, and to provide for identified M&I water needs in the project area."

In order to determine if a particular alternative is a viable means to implement the 1988 Settlement, the alternative was evaluated in light of several factors needing to be addressed in order to resolve the Colorado Ute Tribes' water rights claims. These factors are:

- Does the alternative provide sufficient benefits to the Colorado Ute Tribes to warrant an agreement among the United States, the Colorado Ute Tribes, the State, and a majority of parties to the adjudication, that waives the Colorado Ute Tribes' reserved water rights claims;

- Does the alternative provide a defined and reasonable time frame by which the Colorado Ute Tribes will, in fact, secure those benefits specified in the settlement agreement;

- Does the alternative have sufficient support to facilitate the entry of a final decree which recognizes the Colorado Ute Tribes' rights to water as identified in the settlement;

- Are the benefits in the alternative likely to be secured which is a prerequisite to the waiver of water rights claims by the Colorado Ute Tribes and the United States becoming effective.

The Department developed the analysis necessary to answer the above questions of the 10 alternatives by looking to the purpose and need factors published in the January 4, 1999 Notice of Intent. The purpose and need factors are:

- Yield - Does the alternative provide enough "wet" water to satisfy the Colorado Ute Tribes' water rights? While the ultimate volume of water might be negotiable, there must be some access to an assured water supply.

- Reliability - Is the water supply contemplated by the alternative reliable? Is the reliability consistent with a water right with an 1868 priority (the date of the Colorado Ute Tribes' reserved right)?

- Location - Is the water supply contemplated by the alternative reasonably available for use by the Colorado Ute Tribes?

- Practicability - Is the development of water technically feasible? Are there impediments which make the alternative impracticable?

Technical and Economic Factors

Technical and economic factors included impacts on Indian trust assets (ITAs), feasibility, development costs, annual operation and maintenance costs, public safety and impacts to ongoing operations.

C. Alternatives Selected for Further Refinement

An analysis of the alternatives based on the above described environmental impacts, purpose and need, and technical and economic factors, determined Alternatives 4 and 6 to warrant further refinement. These two alternatives approached the implementation of the 1988 Settlement from significantly different perspectives with Alternative 4 containing both structural and non-structural elements while Alternative 6 contained mostly non-structural elements.

Alternative 4 was chosen for further evaluation because it was determined to meet both the project purpose and need and endangered fish requirements in a manner not resulting in significant environmental water quality concerns. Despite concerns about its ability to meet project purpose and need, Alternative 6 also was selected for a more in-depth evaluation. The analysis showed that Alternative 6 would have difficulty in developing a water supply with a firm yield; that the priority date associated with water obtained under Alternative 6 would most likely not be considered a senior right with regards to other users; that the amount of time involved in securing water through Alternative 6 raised issues as to whether the Colorado Ute Tribes would ever receive all the water contemplated under the original settlement; and that the Colorado Ute Tribes would not support Alternative 6 as a settlement of their water rights claims.

Alternatives 4 & 6 were renamed as "refined alternatives" to reflect additions and changes made to the alternatives based on suggested changes received during public scoping, including the addition of the Navajo Nation Municipal Pipeline. Other modifications were made to the two alternatives to reduce projected impacts.

The Navajo Nation requested that a water conveyance pipeline be included as a structural component of the ALP Project, to upgrade the service now being provided for seven Navajo Nation chapters in the Farmington-Shiprock area, and to replace a deteriorating 30-year old pipeline now in place. Three alternatives were evaluated to fulfill this request: (1) replace the existing pipeline with a new, larger pipeline; (2) make improvements to the existing pipeline, but divide into two separate sections with the western section being supplied water from the San Juan River at Shiprock and treated through an upgraded water treatment facility there; and (3) make use of the existing Navajo Indian Irrigation Project system and construct a new surface water reservoir, new pipelines, and ancillary facilities to serve the seven Navajo Nation chapters.

D. Clean Water Act Compliance

The Bureau of Reclamation (Reclamation) is complying with the Clean Water Act (CWA) under the provisions of section 404(r) of the Act. Under this section, Reclamation prepared an analysis of wetlands impacts under the guidance of Section 404(b)(1) of the CWA and has forwarded the FSEIS, including the requisite analysis under the guidelines, to Congress. The 404(b)(1) analysis ensures substantial compliance with standard permitting requirements.

RA4 and RA6 were both evaluated under the 404(b)(1) guidelines. The analysis showed that RA 6 presented potentially significant environmental impacts to wetlands and endangered species habitat. This included both the non-structural components involving leaving water on the land but implementing water conservation measures, and the non-structural component of taking the water off the land for M&I use elsewhere. Both would result in the loss of a significant quantity of wetlands. The Fish and Wildlife Service, in its Planning Aid Memorandum of

July 28, 1999, stated that: "In comparison to Ridges Basin, impacts within the Pine River drainage (where the majority of land would be purchased under RA6) would present impacts of far greater magnitude, due to differences in diversity of habitats of the two locations. The Pine River Valley possesses a far greater diversity of vegetation and therefore has a higher wildlife value, than Ridges Basin." With this in mind, RA6 was modified to ameliorate environmental impacts and to broaden the functions it would provide. Even with these refinements, several concerns arose about the practicability of RA6, in the areas of: (1) socioeconomic issues; (2) changes in water use; (3) timing; and (4) Indian Trust Assets. It was determined that RA 4 would have less risk/uncertainty in providing settlement benefits and fewer overall impacts to wetlands and endangered species (southwestern willow flycatcher habitat) than RA6. Therefore, RA4 was determined to be the least environmentally damaging practical alternative under the 404(b)(1) guidelines.

In its letter of June 23, 2000, the Environmental Protection Agency informed the Department that the 404(b)(1) analysis was consistent with the 404(b)(1) guidelines and that it accepted the Department's determination that RA4 was the least environmentally damaging alternative under the Clean Water Act. EPA also concurred that RA4 should not result in significant water quality degradation.

E. Endangered Species Act Compliance

Reclamation entered into consultation with the Fish and Wildlife Service on the proposed agency action of implementing RA4. In its Biological Opinion for the project, the Fish and Wildlife Service concurred in all the findings contained in Reclamation's Biological Assessment and included conservation measures which Reclamation has adopted. The Biological Opinion concluded:

> "After reviewing the current status of the Colorado pikeminnow, razorback sucker, and bald eagle, the environmental baseline of the action area, the effects of the proposed action and the cumulative effects, it is the Service's biological opinion that the Animas-La Plata Project, as described in the Biological Opinion, is not likely to jeopardize the continued existence of the Colorado pikeminnow or razorback sucker, and the proposed project is not likely to destroy or adversely modify designated critical habitat. The Service also concludes that the proposed project is not likely to jeopardize the continued existence of the bald eagle. This conclusion is based on the description of the proposed action contained in this biological opinion, with full implementation of the conservation measures."

Agreed to conservation measures are included as Appendix 1 to this ROD.

F. National Register of Historic Places and Native American Graves Protection and Repatriation Act (NAGPRA) Plan

The FSEIS attaches an amended programmatic agreement which sets forth the procedures to be followed to ensure compliance with the historic preservation laws. Also included is a plan which addresses the treatment of human remains, sacred objects, and objects of cultural patrimony discovered as a result of the Project activity. This plan ensures that the Department is in compliance with the provisions of NAGPRA.

G. Department's Indian Trust Responsibility

The primary goal of the recommended federal action is to implement the Colorado Ute Indian Water Rights Final Settlement Agreement by providing the Colorado Ute Tribes with benefits consistent with those contemplated under the 1988 Settlement. RA4 would achieve this goal. RA4 was also developed to minimize the impacts of the original ALP on the other tribes in the San Juan Basin and to provide some much-needed certainty upon which to base future water planning and development in the basin. The Department believes that the principles outlined in RA4 (a smaller reservoir limited to 57,100 af of depletions that can be operated consistent with the San Juan River Basin Recovery Implementation Program (SJRBRIP)) are beneficial to the Navajo Nation and Jicarilla Apache Tribe. RA4 would preserve the 1988 Settlement and avoid the prospect of the Colorado Ute Tribes asserting water rights in court that may eventually conflict with those of the Navajo Nation and the Jicarilla Apache Tribe. RA4 would also effect a downsizing of the original ALP which avoids a future conflict between the downstream tribes and beneficiaries of the larger project. The original ALP envisioned 149,000 acre feet of depletion from the San Juan Basin. Although this amount of depletion has not received ESA section 7 clearance, it is evident that the larger the depletion for ALP the less water there will be available under section 7 for other Indian water projects that have a federal nexus. RA4 also provides a water supply and delivery system for the benefit of the Navajo Nation.

There is, however, a potentially negative effect which RA4 may have on Indian trust assets in the San Juan basin. Due to endangered species concerns and other complexities associated with the "Law of the Colorado River," developing a water supply for the Colorado Ute Tribes may presently limit the amount of water available for use by the other tribes. This is a significant concern to the Department and one sought to be addressed by the commitments discussed below. As discussed in the FSEIS, though, it is somewhat premature to conclude that development of a down-sized ALP will preclude further federally-related water development in the San Juan basin. The most critical factor at this time is the habitat needs of endangered species in the basin. Those needs are constantly being reviewed and will certainly be evaluated in light of any future water development proposals as part of the ESA consultation process. It is possible that Reclamation, working with other relevant agencies, could develop measures, including specific water management strategies, which would allow further tribal water development to move forward.

Both the Navajo Nation and Jicarilla Apache Tribe concur that resolving the 1988 Settlement through RA4 is in their best long-term interests and have clearly set forth that position in an August 24, 2000 joint letter (including the Southern Ute Indian and Ute Mountain Ute Tribes) to the Department. In light of the benefits of RA4, the commitments discussed below, and the shared position of the four San Juan River basin tribes, the Department maintains its selection of RA4 as the best alternative to finalize the 1988 Settlement.

IV. Environmentally Preferred Alternative

Both RA4 and RA6 were evaluated again in each environmental impact area and a finding of either "Significant," "Potentially Significant," or "Less than Significant" was made (see FSEIS table 3.21-1 summarizing significance criteria). Under each of these areas, when mitigation is added, RA4 did not have any impacts that were considered "significant" except for cultural resources and those impacts will be addressed through the Historic Preservation Management Plan (see Technical Appendix 8). This finding, in conjunction with the finding that RA4 is the least damaging most practicable alternative under the 404(b)(1) of the Clean Water Act (see below), makes RA4 the environmentally preferred alternative.

V. Indian Water Rights Settlement

RA4 would allow the United States to resolve the remaining Colorado Ute water rights claims consistent with the 1988 Settlement but in a much more environmentally responsible manner. RA4 is strongly supported by the Southern Ute Indian and Ute Mountain Ute Tribes. Specifically, RA4 facilitates the following results which are a prerequisite to finalizing the settlement:

- Agreement by the Colorado Ute Tribes, the United States, the State of Colorado and other significant parties to the adjudication that a small offstream reservoir designed to allow an average annual 57,100 acre-feet of depletion, which provides each tribe 19,980 acre-feet per year depletion in conjunction with a water acquisition fund, is sufficient to warrant a waiver of the remaining Colorado Ute Tribes' reserved water rights claims;

- A defined and reasonable time frame under which the Colorado Ute Tribes can secure these benefits as construction of the project is scheduled to take 7 years from the time it is commenced, provided availability of appropriations. The water acquisition trust fund will be available to the Tribe within a similar time-frame. The Department is committed to seeking the necessary appropriations to meet the 7 year time-frame;

- The parties, through agreement on RA4, could secure an amended final decree from the Colorado District Court, Water Division No. 7 which would recognize the Colorado Ute Tribes right to water and associated benefits under this alternative;

- Waiver of reserved water rights claims by the Colorado Ute Tribes and the United States, as trustee, once RA4 is implemented.

As stated earlier, the Department cannot commence full implementation of RA4 absent legislation amending the 1988 Settlement Act. Once authorized, the Department will work with the Colorado Ute Tribes and other affected interests to finalize a settlement which is consistent with RA4. This activity will include securing an amended decree; developing the necessary repayment agreements;[1] and proceeding with project construction.

VI. Implementing the Decision and Environmental Commitments

A. Environmental Commitments

The Department has used all practical means to avoid impacts or minimize environmental harm that could occur due to implementation of RA4. These mitigation measures are discussed in chapters 3 & 4 of the FSEIS and the Department commits to implementing these measures in chapter 5. These commitments are included as Appendix 2 to this ROD.

B. Commitments Specific to Indian Trust Assets/Environmental Justice

Water development in the San Juan River basin is an extremely complicated matter. It involves endangered species issues; the rights of several Indian tribes; and the "Law of the Colorado River." As noted earlier, there is concern that RA4 could negatively affect the water supply presently available for the Navajo Nation and Jicarilla Apache Tribe. The Department believes that a multi-faceted approach to water supply issues in the San Juan Basin with an emphasis on recovery of the species along with enhanced water management will assist in minimizing obstacles to future tribal water development. Accordingly, the Department will engage in the following:

- Continue active participation in the San Juan River Basin Recovery Implementation Program to promote the dual goals of recovery of endangered species and water development in the basin. The SJRBRIP is key to facilitating additional water development by the Navajo Nation and the Jicarilla Apache Tribe. Reclamation's participation includes:

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[1]The FSEIS also includes a preliminary cost allocation which assigns project construction and annual operation and maintenance costs to the entities that will be receiving benefits from the implementation of RA4 (see Appendix L in the FSEIS). This proposed cost allocation is based on current Administration policy and does not have the force of law absent express Congressional approval. If there is no express Congressional action turning Administration policy into law, cost allocations will be controlled by the original project authorization - the Colorado River Storage Project Act.

- Providing substantial technical support in the development and refinement of a comprehensive hydrology model to allow realistic, supportable projections of future water uses in the basin;

- Continue to optimize the operating rules for Navajo Dam to provide more efficient fulfillment of the flow recommendations necessary for endangered species recovery;

- Implement an adaptive management program associated with the operation of Navajo Reservoir to evaluate biologic responses to a normative hydrograph

- Operate the Durango Pumping Plant to limit pumping during dry years, allowing more water to be available in Navajo Reservoir to meet project demands.

- Reclamation will work with the Navajo Nation and the Jicarilla Apache Tribe to combine resources in evaluating options for proceeding with the Navajo-Gallup Project, the Navajo River Water Development Plan, and restoration of the Hogback Project to minimize the likelihood that any single Tribe bears a disproportionate burden for the conservation of listed species under the ESA.

- Facilitate discussions among the parties with interests in the San Juan River Basin. Interested parties will include, but not be limited to, the Colorado Ute Tribes, Navajo Nation, Jicarilla Apache Tribe, the Fish & Wildlife Service, and private parties with existing contracts from Navajo Reservoir. Discussions will aim to develop options for obtaining adequate water for the Navajo Nation and Jicarilla Apache Tribe future needs.

- Reclamation will initiate an independent review of the hydrologic model to ensure its accuracy and value as a tool in future water planning activities.

- Reclamation, through its Native American Affairs and technical assistance programs, will work with the Jicarilla Apache Tribe to facilitate its ability to independently utilize the San Juan River basin hydrologic model to ensure more effective participation in the SJRBRIP and other appropriate uses.

- Through its appraisal investigation of the Navajo-Gallup Project, Reclamation will evaluate:

  - An alternate project design that would take water from the San Juan River below its confluence with the Animas River which may increase the potential yield for the project while protecting flows for endangered fish. In this case, releases from Navajo

Dam would be supplemental to river flows, leveraging the limited storage volume available and making use of times when there are flows in excess of fish needs in the river.

- Modifying the Navajo-Gallup Project to reduce demands.

- Ascertain the Navajo Nation's willingness to consider utilizing a portion of the NIIP allocation to meet needs for the Navajo-Gallup Project.

- Reclamation will consult with the Navajo Nation and the Jicarilla Apache Tribe on the implementation of the above mitigation measures and will commence consultation early in the implementation process.

- To avoid potentially significant impacts to residences, school, and a cemetery along the recommended route of the Navajo Nation Municipal Pipeline, the pipeline corridor would be routed to minimize, and to the maximum extent possible, prevent disturbance or relocation of residences. If residences are required to be relocated, the residents and the Navajo Nation will be compensated. Project planners would work to avoid disturbances to the cemetery. Consultation would take place with the Navajo Nation Historic Preservation Department and representatives from affected Navajo Nation chapters prior to disturbing any human remains or funerary objects. Additional mitigation measures would be used to minimize noise and vibration impacts. Construction activities would be scheduled during daytime hours when within 0.25 mile of a residence and would be scheduled during non-school hours when feasible.

In addition to the foregoing, Reclamation should evaluate how shortage criteria might apply consistent with applicable law to assess whether additional water development is feasible given existing ESA flow requirements and actual water use in the basin.

C. Coordination Committees

The Department will establish special committees, made up of representatives from each project participant, to 1) keep project participants informed and solicit input on Project facility design and construction; and 2) address operation and maintenance issues once the Project is transferred from construction to operation status. The latter committee will address a number of subjects, including equitable allocation of operation and maintenance costs; approval of major maintenance activities; coordination of project operations among users of Project water; and compliance with the provisions of all existing water compacts.

Appendices

1. Summary of Conservation Measures Recommended in the Biological Opinion
2. Summary of Environmental Commitments in FSEIS

APPENDIX 1

June 19, 2000 Final Biological Opinion Conservation Measures

Record of Decision
Animas-La Plata Project/Colorado Ute Indian Water Rights Settlement

Conservation measures are actions that the Reclamation agrees to implement to further the recovery of the species under review. The beneficial effects of conservation measures were taken into consideration for determining both jeopardy and incidental take analyses and all hydrology analyses considered in the Biological Opinion assume implementation of these conservation measures, including the reoperation of Navajo Dam. Reclamation agrees that failure to implement the conservation measures will be grounds for reinitiation of consultation.

The following are the conservation measures recommended in the Biological Opinion. More expanded descriptions can be found in the Biological Opinion in Volume 2 of the FSEIS.

1. Operate Navajo Reservoir to mimic the natural hydrograph of the San Juan River to benefit endangered species and their critical habitat.

2. Reclamation will be responsible for maintaining the hydrology model and its data used to simulate flows in the San Juan River and the effects of water development in the basin.

3. A Memorandum of Understanding (MOU) and Supplemental Agreement to protect the releases for endangered fishes made from the Navajo Reservoir to and through the endangered fish habitat of the San Juan River to Lake Powell was signed in October 1991. This MOU remains in effect.

4. The Durango Pumping Plant will be operated in a manner that insures that its operation do not interfere with meeting the target flows recommended for the San Juan River.

5. Reclamation will implement all actions necessary to prevent escapement of nonnative fishes from Ridges Basin Reservoir in any water leaving the reservoir.

6. Reclamation will develop and implement a monitoring program for potential adverse bioaccumulation of trace elements in bald eagle food items in Ridges Basin Reservoir.

7. Reclamation will incorporate bypass flows into ALP operations to promote natural recruitment of cottonwood tress along the Animas River.

8. All electrical transmission lines associated with the project will be designed to avoid injury to raptors, including bald eagles.

APPENDIX 2
Environmental Commitments

Record of Decision
Animas-La Plata Project/Colorado Ute Indian Water Rights Settlement

This appendix summarizes the environmental commitments that have been made by Interior or Reclamation during the development of Refined Alternative 4 (Reclamation's Preferred Alternative). Reclamation would share responsibility for implementing measures that would avoid or reduce potential environmental impacts of the ALP Project. This responsibility would be shared with other federal agencies, the Colorado Ute Tribes, and other ALP Project beneficiaries, as well as third-party entities which could include Colorado and New Mexico state agencies, local governments, and private developers.

Commitments for pre-construction activities would generally be completed by Reclamation or by contractors during the final design process and prior to construction activities. Wildlife, wetland, cultural resources and other mitigation would be completed by Reclamation as described in the following paragraphs. Some commitments, such as monitoring or additional studies, would continue beyond completion of construction of structural facilities.

The non-structural component of the RA4 (i.e., the $40 million water acquisition fund) would be administered by Interior through the Bureau of Indian Affairs (BIA). It was assumed that the use of this fund would be for acquisition of irrigated agricultural lands and that these lands would remain in irrigated production. In the event that the Colorado Ute Tribes were to elect to fund alternative activities with the water acquisition fund or were to apply for water rights transfers, it would be the responsibility of the water acquisition fund's administering agency to determine appropriate environmental protection measures. It is possible that additional NEPA compliance may be required for such alternative uses.

The use of ALP Project water by either the Colorado Ute Tribes or other ALP Project beneficiaries would result in environmental impacts that would require the implementation of avoidance design specifications and mitigation measures. To the extent that Reclamation can require developers of ALP Project water end uses to implement environmental protection elements into design, Reclamation commits to requiring certain measures as discussed in the following sections. However, all compliance responsibilities and costs associated with end use development would be the responsibility of the third-party developers. As discussed previously, additional NEPA compliance would likely be required for the development of end use facilities to occur. At such time, the lead agency would be responsible for identifying additional environmental commitments specific to the proposed end uses.

The commitments in this chapter summarize commitments made during the planning process and incorporated into ALP Project plan as discussed in Chapter 2 of this Final Supplemental Environmental Impact State (FSEIS), and mitigation measures proposed in Chapters 3 and 4 to

reduce or avoid impacts that would otherwise occur as a result of the implementation of the Refined Alternative 4 (RA4). These commitments supersede commitments made by Reclamation in previous ALP Project National Environmental Policy Act (NEPA) documents.

General

1. Reclamation will prepare and implement an Environmental Commitment Plan for the project to document and track the completion of the environmental commitments.

Water Resources and Hydrology

1. Develop an operations plan for the Ridges Basin Pumping Plant that will schedule pumping from the Animas River in a manner to limit impacts to non-Colorado Ute Tribal entities' ability to obtain water from the San Juan River. Reclamation will work with all appropriate state and federal agencies to pursue a method to protect ALP Project water return flows in the La Plata River drainage as a water supply for endangered fish.

2. Design and develop Ridges Basin Reservoir with a minimum pool of 30,000 af.

Water Quality

1. Develop and implement a program to reduce, minimize or eliminate temporary, short-term increases in suspended sediment loading or other water quality constituents, potentially caused by project construction, through the incorporation of permits, Best Management Practices (BMPs), and sediment control structures. Reclamation will develop and implement a program designed to reduce, minimize or eliminate the temporary, short-term increases in suspended sediment loading that may potentially occur during construction of the non-binding end uses and water conveyance systems through requiring developers and construction contractors to incorporate BMPs and sediment control devices.

2. Develop, with the Southern Ute Indian Tribe and the States of Colorado and New Mexico, and implement a program to monitor water quality in the Animas River from the Durango Pumping Plant to the confluence with the San Juan River for five years after the Durango Pumping Plant begins operation. The program will be developed to monitor compliance with Tribal and state water quality standards and criteria. The plan should include: objectives, quality assurance and control plans, and noncompliance measures.

Vegetation

1. Ensure that construction contractors limit ground disturbance to the smallest feasible areas, and will ensure that construction contractors implement BMPs, along with the planting or re- seeding disturbed areas using native plant species to assist in the re-establishment of native vegetation. Where feasible, directional borings will be used for river pipeline crossings.

2. Compensate the loss of approximately 1,645 acres of upland vegetation resulting from the construction of the Ridges Basin Reservoir, the Durango Pumping Plant, and other features as part of the wildlife mitigation plan. The compensation will be part of the total estimated 2,700-2,900 acres of wildlife habitat to be acquired and enhanced to compensate the loss of wildlife habitat in Ridges Basin. The mitigation land acquisition will be completed prior to initiation of ground-breaking construction activities at the reservoir and pumping plant sites. Reclamation will attempt to acquire large contiguous acreage and will attempt to acquire these lands first in the river basins that will be affected by the ALP Project, and then outside of those basins, with the final decision made in consultation with state and federal wildlife agencies.

3. Compensate the loss of 134 acres of wetland/riparian habitat at a mitigation ratio sufficient to replace or exceed the habitat value of wetland/riparian habitat lost. Reclamation will replace lost wetland/riparian areas at a planned ratio of 1.5:1, thus creating approximately 200 acres of replacement wetlands. Mitigation will involve a program of land acquisition, wetland development, and long-term management. To the extent possible, this program will be integrated into the wildlife habitat mitigation program to expand benefits and provide large blocks of contiguous wildlife habitat. It is assumed 600 acres will be necessary for the wetland program. Because of limited water supplies for new wetland creation in the region, restoration of degraded wetlands will be an important component of any wetland plan. As with wildlife habitat mitigation, the La Plata River Basin will be given first priority for wetland development. Lands for wetland mitigation will be acquired prior to initiation of construction of Ridges Basin Dam and overall wetland mitigation physical features will be at least 95 percent completed prior to beginning reservoir filling.

4. Monitor the Animas River riparian corridor to help determine any effects of the pumping regime on these downstream resources. The monitoring will also include Basin Creek wetlands. Reclamation will also limit ground disturbing activities due to construction of the NNMP and other pipelines and will replace in a 2:1 ratio, riparian trees (cottonwoods) lost due to construction.

5. Require that development of non-binding end uses avoids or minimizes construction impacts to wetland and riparian vegetation located within corridor alignments of the non-binding water conveyance pipelines. Reclamation will require that construction zones be kept to the minimum size needed to meet project objectives. If avoidance is not possible, a riparian/wetland mitigation and monitoring plan will be developed to compensate for the loss of vegetation cover.

Wildlife

1. Mitigate the direct and indirect loss of approximately 2,700-2,900 acres of wildlife habitat through the purchase, enhancement, and management of approximately 2,700-2,900 acres of suitable land. The actual amount of land that will be acquired to obtain this level of mitigation will depend on the potential wildlife value of the lands acquired. All reasonable attempts will be made to acquire interests in lands on a willing seller basis, using fee simple purchases,

conservation easements, purchase options, or life estates, to name a few. However, this does not preclude the use of other authorities available to acquire such land interests. Priority will be given to lands in the La Plata River drainage, as well as in the vicinity of Ridges Basin, to provide replacement habitat for displaced deer, elk, and other wildlife that utilize Ridges Basin and adjacent areas that will be affected. Large, contiguous parcels will be given priority to create unfragmented habitat and to facilitate management. Lands will be managed for wildlife and other uses will not be allowed if it is determined that they will interfere with the wildlife habitat benefits. Acquisition, enhancement, and management plans will be coordinated with the U.S. Fish and Wildlife Service (Service), Colorado Division of Wildlife (CDOW), and possibly the Southern Ute Indian Tribe. Wildlife mitigation land will be acquired prior to award of the contract for construction of Ridges Basin Dam, and development will occur concurrently with the construction of the dam.

2. Develop construction specifications to include noise, traffic, and human use restrictions to minimize disturbance to wildlife near the construction zone of Ridges Basin. The Carbon Mountain gas pipeline route, which could significantly impact golden eagle nesting, will not be considered. Reclamation will make efforts to avoid construction during the May-July period in the vicinity of elk calving areas to minimize impacts to elk.

3. Ensure that recreational facilities and the new alignment for County Road (CR) 211 are sited or restricted in such a way to minimize the disruption of deer and elk habitat utilization and behavior.

4. Designs of road crossings, particularly in the vicinity of Wildcat Creek, will contain special provisions to minimize wetland/riparian resources.

5. Recreation facilities will not be permitted on the west or south sides of the reservoir to reduce impacts to big game migration corridors. Trails will be restricted to foot traffic. Wildlife-related activities will be encouraged. Future use of Reclamation lands for cabin sites or similar uses will not be allowed.

6. Sufficient land will be acquired at the time reservoir right-of-way is acquired at the upper (western) end of the reservoir (at least one-quarter mile) and along the southern shore to maintain a wildlife migration corridor around the reservoir and to winter ranges to the south.

7. Collaborate with raptor specialists from the Service and CDOW on road realignment and construction activities at Ridges Basin Dam to identify and implement measures minimizing effects on existing golden eagles and their nests on Carbon Mountain. All reasonable means to preclude human activity on Carbon Mountain will be pursued. All power lines will be designed raptor-proof. Reclamation will require that a 0.25-mile buffer around the existing golden eagle nests be identified and that all reasonable measures are pursued to preclude human activity on Carbon Mountain during the nesting period of golden eagles (December 1 through July 15).

Aquatic Resources

1. Provide for a more detailed evaluation of Ridges Basin Reservoir's expected limnological conditions to better determine whether or not there is justification to provide appropriate facilities to deliver water into the reservoir at an elevation below the thermocline. This could lessen the likelihood of periodically having reservoir water temperatures becoming too warm to support trout and could increase oxygen levels in the reservoir. The evaluation will be completed in coordination with the Service as part of the design data collection activities.

2. Reclamation will develop and implement a monitoring program at Ridges Basin Reservoir to determine the extent of bioaccumulation of trace elements in fish within the reservoir. The reservoir basin's vegetation will be largely cleared in order to reduce the magnitude of productivity and reduction potential. This, in turn, will limit mercury becoming methylated, the form in which it is available to bioaccumulate within the food chain. Trout will be the only fish stocked. Trout are not at the top of the fish food chain; therefore, they will not be expected to accumulate significant levels of bioaccumulated trace elements. The program will last two consecutive years and be initiated two years after the reservoir is filled. If significant bioaccumulation effects are identified, Reclamation will work with the appropriate local, state or federal agencies to either minimize the impact or otherwise offer protection to potentially impacted fish and wildlife species and to possibly post human fish consumption advisories at the reservoir.

3. To minimize downstream stranding of fish due to the operation of the Durango Pumping Plant, changes in the pumping will be staged in the following manner: An increase in pumping not to exceed 50 cfs per hour (hr) stage decrease and a decrease in pumping not to exceed 100 cfs/hr (stage increase) when natural river flows are above 500 cfs. At lower flow, these ramping rates could substantially change river stage. Therefore, when river flows are at or below 500 cfs, increases in pumping will not exceed 25 cfs/hr and decreases in pumping will not exceed 50 cfs/hr. Seasonal bypass flows will be met (ranging from 125 - 225 cfs).

4. Monitoring studies of project-affected waters on the Animas River will be implemented both prior to and continuing for at least four years after project operations begin (project pumping). These studies will be designed to better define the native fishery, to include better understanding apparent problems with native sucker recruitment, and to monitor trout populations. If it is concluded that the operation of the project is having significant adverse impacts to the downstream aquatic ecosystem, Reclamation will make every reasonable effort to modify project operations to either reduce or eliminate these impacts. The potential impact to native fishes in the Animas River, especially the effects of chronic habitat reduction, may not be directly mitigatable on the Animas River. Investigations should be initiated to determine whether or not fish barriers exist, whether small fish/young-of-the-year fish are significantly lost through entrainment in canals, and whether any significant loss to the trout fishery occurs. The monitoring program will be initiated in 2000 that will incorporate these additional elements into a monitoring study currently being conducted on the Animas River. A firm recommendation for mitigation due to the

effects on native fishes will be made by no later than 2005, at least two years prior to project pumping from the Animas River. Once this mitigation recommendation is approved and agreed to by the Service, CDOW, New Mexico Department of Game and Fish (NMDGF), and perhaps the Southern Ute Indian Tribe, its implementation will immediately begin.

5. Screen or implement other physical structures to prevent live fish from being released from Ridges Basin Reservoir. The reservoir outlet system will be designed and fitted with devices to eliminate survival of fish escaping the reservoir. Reclamation will monitor escapement from the reservoir and Basin Creek.

6. Provide for the acquisition and stocking of wild strains of trout annually in the Animas River within the boundaries of the Southern Ute Indian Reservation to compensate for fish loss due to the reduction in usable trout habitat. Individual stocks of trout will be marked in such a manner that age groups could be monitored over time. This monitoring plan will be developed in consultation with the Service, CDOW, NMDGF, and the Tribe. The relative success of this effort will be assessed after four years. If it is deemed a success—that is, if the trout biomass within the stocked reaches of the river is elevated to a point of supporting a recreational fishery—the stocking program will continue. For the acquisition of trout stock, Reclamation will consider the development of a new hatchery in cooperation with the Southern Ute Indian Tribe and others. This same hatchery could very well be utilized for providing for fish stocking for Ridges Basin Reservoir.

7. Provide stocking of trout in Ridges Basin Reservoir to provide a recreational fishery. The source of fish could be from an existing Colorado River Storage Project CRSP) hatchery facility or from the acquisition and/or construction of a new hatchery facility.

8. Acquire at least two new public access points on the Animas River for fishing and other recreational use.

Special Status Species

1. Implement conservation measures found in the latest Biological Opinion on the project (see Appendix 1 for complete list). These measures address the Colorado pikeminnow and razorback sucker that are found in the San Juan River and the bald eagle that is found throughout the project area. The conservation measures include Reclamation's commitment to operate Navajo Reservoir and the Durango Pumping Plant to mimic the natural hydrograph of the San Juan River to benefit the endangered fish and their habitat. Also, Ridges Basin outlet facilities will be designed to prevent escapement of nonnative fish, that might compete with native fish, into the Animas or other area waterways.

2. Develop and implement a monitoring program for potential adverse bioaccumulation of trace elements in bald eagle food items in Ridges Basin Reservoir. If the program identifies a problem

with trace elements, Reclamation will develop and implement an action plan to minimize impacts to bald eagles. Bypass flows compatible with the endangered fish recovery efforts will be incorporated into the project plan to promote natural recruitment of cottonwood trees.

3. Electrical transmission lines associated with the project will be designed to avoid injury to raptors, including bald eagles.

Geology and Soils

1. Reduce or eliminate the potential for earthquake damage to the Ridges Basin Dam site through specific design specifications. Dam specifications will require design performance to withstand a minimum credible earthquake for seismic sources in the vicinity of Ridges Basin Dam site.

2. Develop and implement a controlled program for filling Ridges Basin Reservoir to reduce the potential for induced seismic impacts.

3. Develop and implement a facilities operation program that includes monitoring the reservoir shoreline and slopes for landslide and slumping. Reclamation will also provide for public notification and control public access in areas where high landslide and slumping potential exists.

4. Develop an engineered process plan to limit, control, and manage dam site methane gas releases during construction. Reclamation will also monitor the area for methane gas releases during operations.

5. Investigate the potential of gas release due to man-made intrusions within Ridges Basin and the proposed dam site. Specifically, construction investigations will study the integrity of abandoned exploration wells and the Gates Coal Mine.

6. Mandate that construction contractors use and implement measures contained in erosion control guidelines and BMPs to control soil erosion from construction areas.

7. Develop and implement a program to control reservoir filling and drawdown at rates sufficient to reduce significant erosion and sedimentation potential.

Cultural and Paleontologic Resources

1. Ensure compliance with historic/archaeological treatment measures and disseminate results pursuant to the Programmatic Agreement executed to meet Section 106 requirements.

2. Ensure compliance with mitigation measures developed in accordance with the Native American Graves Protection and Repatriation Act (NAGPRA) and Executive Order 13007.

3. Ensure that areas to be disturbed are field surveyed prior to construction disturbance and will ensure that construction monitoring is conducted where deemed appropriate.

4. Ensure that periodic shoreline monitoring is conducted as part of the facilities operations plan.

Agriculture

1. Location, design, and construction timing of the NNMP would protect agricultural lands.

Recreation

1. Pursue pumping regimes that reduce adverse flow effects on boating opportunities within the Animas River when possible.

2. Alter Durango Pumping Plant pumping regimes during periods of competitive events.

3. Acquire or provide funding (not to exceed $500,000) for the acquisition of public access at a minimum of two points on the Animas River between the High Bridge and Basin Creek to reduce effects to anglers on the Animas River.

Socioeconomics

No environmental commitments are made for socioeconomic resources.

Land Use

No environmental commitments are made for land use resources.

Hazardous Materials

1. Ensure that the Durango Pumping Plant is designed to minimize the disturbance of contaminated materials. Reclamation will also ensure that procedures will be developed for radiological monitoring of excavated soils and groundwater encountered and that remedial procedures are planned in advance to counteract the potential for human exposure and for the prevention of contaminated groundwater release from the construction site.

2. Ensure that all federal and state requirements pertaining to the management and handling of hazardous materials, mixed wastes and radioactive waste are followed and will include those requirements within construction contract language inclusive of construction safety and environmental compliance.

3. Require that construction specifications for Ridges Basin Dam and Reservoir, the Ridges Basin Inlet Conduit, road relocation, and related work prohibit contractors from disturbing the disposal cell. Reclamation will take steps to ensure that the disposal cell has appropriate signage to make the public aware of its presence and any personal hazards that it could present.

4. Confer with DOE and their Long-Term Surveillance and Maintenance Program to understand the current operational scheme and parameters for the Bodo Canyon disposal cell. As well, Reclamation will reactivate sampling and monitoring of wells DH-228 and DH-229 for indicator parameters including but not limited to Molybdenum, Selenium, and Uranium.

5. Require that preconstruction surveys are conducted for non-binding water end use facilities and conveyance system development and adherence to hazardous material standards relating to such construction.

Transportation

1. Conduct a transportation survey prior to construction of Ridges Basin Dam and Reservoir and will implement methods to reduce traffic-related impacts.

2. Ensure to maintain CR 211 roadway, shoulder, drainage, and roadside to standards adequate to avoid noticeable degradation.

3. Require third-party developers of recreation facilities at Ridges Basin Reservoir to conduct traffic engineering impacts analysis studies and to mitigate recreation facility impacts according to state and county standards. Associated costs will be the responsibility of the developing entity.

Air Quality

1. Require that construction contractors implement measures to control fugitive dust and exhaust emissions during construction.

2. Require third-party developers to implement measures to control fugitive dust and other emissions during construction and operation of non-binding end uses.

Noise

1. Require that the Durango Pumping Plant construction contractor restrict operation of heavy equipment during the nighttime hours.

2. Ensure that construction contractors provide blasting notification to residents, sound pre-blast alarms, and follow the construction safety plan. Construction and operation of the Durango Pumping Plant will be carried out to reduce noise impacts. Noise reduction will be provided in the

form of sound insulation within the pumping plant and vegetation screening designed as part of site landscaping. Ridges Basin specifications will provide for noise control, particularly relating to golden eagle nesting.

3. Ensure that construction contractors schedule construction activities to avoid or minimize loud activities in the vicinity of golden eagle nesting areas during the nesting season and that nesting areas are "off limits" to construction forces and visitors.

4. Require that third-party developers of recreation facilities at Ridges Basin Reservoir incorporate in a recreation development/management plan the requirement to prohibit particularly loud forms of watercraft and to include signing to advise people of eagle nesting sensitivity to human presence and noise.

5. Ensure that developers and contractors associated with construction and operation of the non-binding end uses incorporate methods to minimize noise disturbances.

Public Health and Safety

1. Ensure that public access to structural component construction areas will be controlled by signage and by fencing around construction areas.

2. Ensure that contractors configure haul routes and access roads to prevent or discourage public vehicular entry, including placement of signs warning against entry.

3. Ensure that all the potentially affected gas companies will be contacted prior to construction crossings of gas pipelines which will be precisely located and appropriately marked in the field and on the specifications.

4. Ensure that public access to end use and delivery system construction areas is controlled by signage and by fencing around construction areas.

5. Investigate the potential for gas release due to man-made intrusions, prior to construction, and will monitor excavations for the presence of coal bed methane gas.

6. Control public access to operation areas that could pose a threat to public safety.

7. Ensure that recreation area planning, final design of facilities, and reservoir access points are developed to promote safety and use of accident management techniques.

Public Services and Utilities

1. Ensure that construction contractors adequately secure and patrol their work sites and will coordinate with city or county law enforcement agencies.

2. Ensure that contractors will mark the locations of existing buried utilities and develop a notification system for coordination with affected utilities during construction.

Visual Resources

1. Ensure that as part of construction design, the Durango Pumping Plant blends into the natural landform and that, following construction, the site is adequately revegetated.

2. Ensure that the design of structural facilities incorporates, to the extent practicable, non-intrusive design elements and that restoration of disturbed areas be conducted.

Indian Trust Assets and Environmental Justice

1. Support the modification of the Settlement Agreement, through legislated amendments to the Settlement Act, to recognize the new limits placed on the use and amount of water provided to the Colorado Ute Tribes and establishment of the water acquisition fund.

2. Continue active participation in the San Juan River Basin Recovery Implementation Program to promote the dual goals of recovery of endangered species and proceed with water development in the basin. The SJRBRIP is key to facilitating additional water development by the Navajo Nation and the Jicarilla Apache Tribe. Reclamation's participation includes:

- Provide substantial technical support in the development and refinement of a comprehensive hydrology model to allow realistic, supportable projections of future water uses in the basin;

- Continue to optimize the operating rules for Navajo Dam to provide more efficient fulfillment of the flow recommendations necessary for endangered species recovery;

- Implement an adaptive management program associated with the operation of Navajo Reservoir to evaluate biologic responses to normative hydrograph

2. Operate the Durango Pumping Plant to limit pumping during dry years, allowing more water to be available in Navajo Reservoir to meet project demands.

3. Work with the Navajo Nation and the Jicarilla Apache Tribe to combine resources in evaluating options for proceeding with the navajo-Gallup Project, the Navajo River Water Development Plan, and restoration of the Hogback Project to try and minimize the likelihood that any single Tribe bears a disproportionate burden for the conservation of listed species under the ESA.

4. Facilitate discussions among the parties with interests in the San Juan River Basin. Interested parties will include, but not be limited to, the Colorado Ute Tribes, Navajo Nation, Jicarilla Apache Tribe, the Service, and private parties with existing contracts from Navajo Reservoir. Discussions will aim to develop options for obtaining adequate water for the Navajo Nation and Jicarilla Apache Tribe future needs..

5. Initiate an independent review of the hydrologic model to ensure its accuracy and value as a tool in future water planning activities.

6. Work with the Jicarilla Apache Tribe to facilitate its ability to independently utilize the San Juan River basin hydrologic model to ensure more effective participation in the SJRBRIP and other appropriate uses.

7. Through the appraisal investigation of the Navajo-Gallup Project, evaluate:

- An alternate project design that would take water from the San Juan River below its confluence with the Animas River may increase the potential yield for the project while protecting flows for endangered fish. In this case, releases from Navajo Dam would be supplemental to river flows, leveraging the limited storage volume available and making use of times when there are flows in excess of fish needs in the river.

- Modifying the Navajo-Gallup Project to reduce demands.

- Utilizing a portion of the NIIP allocation to meet needs for the Navajo-Gallup Project.

8. Consult with the Navajo Nation and the Jicarilla Apache Tribe on the implementation of the above mitigation measures and will commence consultation early in the implementation process.

9. To avoid potentially significant impacts to residences, school, and cemetery along the recommended route of the Navajo Nation Municipal Pipeline, the pipeline corridor would be routed to minimize, and to the maximum extent possible, prevent disturbance or relocation of residences. If residences are required to be relocated, the residents and the Navajo Nation will be compensated. Project planners would work to avoid disturbances to the cemetery. Consultation

would take place with the Navajo Nation Historic Preservation Department and representatives from affected Navajo Nation chapters prior to disturbing any human remains or funerary objects. Additional mitigation measures would be used to minimize noise and vibration impacts. Construction activities would be scheduled during daytime hours when within 0.25 mile of a residence and would be scheduled during non-school hours when feasible.

RECORD OF DECISION

for the

FINAL ENVIRONMENTAL IMPACT STATEMENT

REPAYMENT AND LONG-TERM WATER SERVICE CONTRACT RENEWALS

in the

Republican River Basin
Nebraska and Kansas

July 2000

Approved

Regional Director
Bureau of Reclamation, Great Plains Region

July 22, 2000
Date

SUMMARY OF ACTION

The Bureau of Reclamation (Reclamation) has completed a final environmental impact statement (EIS) on proposed repayment and long-term water service contract renewals in the Republican River Basin (Basin) in Nebraska and Kansas. The final EIS was prepared in cooperation with the Corps of Engineers (Corps), Fish and Wildlife Service (FWS), Environmental Protection Agency, Natural Resources Conservation Service, Nebraska Game and Parks Commission, Nebraska Natural Resource Commission, Nebraska Department of Water Resources, Kansas Department of Wildlife and Parks, Kansas Division of Water Resources, Kansas Water Office, Almena Irrigation District No. 5, Bostwick Irrigation District in Nebraska, Frenchman-Cambridge Irrigation District, Frenchman Valley Irrigation District, and Kansas-Bostwick Irrigation District No. 2. The proposed action is to renew a 40-year water service contract with the Frenchman Valley Irrigation District and to convert from long-term water service to repayment contracts for the Bostwick Irrigation District in Nebraska, Kansas Bostwick Irrigation District No. 2, Frenchman-Cambridge Irrigation District, and Almena Irrigation District No. 5. Under each contract, water service will be provided for agricultural irrigation uses in accordance with Reclamation law and policy. In addition, each contract includes provisions which will increase operational efficiency, protect environmental resources, and meet applicable Reclamation water conservation guidelines.

This Record of Decision (ROD) documents Reclamation's decision to approve and execute long-term water service and repayment contracts within the Basin. This ROD has been prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality's (CEQ) NEPA implementing regulations (40 CFR 1500-1508), and Reclamation's NEPA Handbook. The decision made herein is based on the information and analysis contained within the final EIS for Repayment and Long-term Water Service Contract Renewal, Republican River Basin, published on June 19, 2000, and on the results of consultation and coordination with public agencies, tribes, irrigation districts, special interest groups, and individuals. Reclamation has considered all comments received on the proposed contracts in developing this ROD. This action exercises the provisions of the 1939 Reclamation Project Act, as amended on July 2, 1956 (70 Stat. 483), which provides contractors a first right to renew long-term water service contracts or to convert to a repayment contract.

RECLAMATION'S DECISION

The decision being made is to implement the Negotiated Alternative (Reclamation's Preferred Alternative) as described in the final EIS. This alternative incorporates features that were negotiated between Reclamation and the Basin irrigation districts during contract renewal negotiation meetings. This alternative includes new minimum pool elevations at

Hugh Butler and Swanson lakes to provide reservoir recreation and fisheries benefits. In addition, it maintains an average Basin-wide increase of 5% in improved water delivery efficiency and 5% in improved on-farm irrigation efficiency. Individual delivery efficiency improvements to the districts' canal systems would vary between 2% and 12%. Conserved water would be used to reduce existing irrigation shortages.

This alternative provides for continued irrigation with specified water conservation goals and practices to be outlined in each irrigation district's operating plan. Minimum pool elevations at Hugh Butler (2561.0' mean sea level, or msl), Swanson (2725.0' msl), and Harlan County lakes would be established. A shutoff elevation for Harlan County Lake will be estimated each January and reviewed and established each June using the procedure developed jointly by Reclamation and the Corps. Depending upon hydrologic conditions, the minimum elevation at Harlan County Lake will vary between 1927.0' msl and 1934.0' msl. Minimum pool elevations were established as the current top of the inactive pool at Lovewell and Enders reservoirs and at Harry Strunk and Keith Sebelius lakes. The annual shutoff elevation for Keith Sebelius Lake will be established according to the District Operating Plan attached to the contract with the Almena Irrigation District No. 5. Depending upon hydrologic conditions, the shutoff elevation at Keith Sebelius Lake will vary between 2296.5' msl and 2280.4' msl.

The irrigation districts have agreed to provide in-kind service assistance, either by providing labor or by providing equipment and an operator, on reservoir projects such as boat ramps and shoreline protection. The assistance to be provided includes the following (shown in days per year):

Irrigation District	Man Days	Machine/Operator Days
Frenchman Valley	10	3
Frenchman-Cambridge	30	8
Kansas-Bostwick	20	4
Bostwick in Nebraska	10	2
Almena	7	3

When compared to existing conditions, the Negotiated Alternative would result in an average annual irrigation diversion shortage of about 40% Basin-wide. Shortages for the irrigation districts would vary annually depending upon the storage water available in Basin reservoirs.

The Negotiated Alternative will be implemented by approving and executing long-term water service and repayment contracts within the Basin, including appropriate environmental provisions which have been negotiated with, agreed to by, and made a part of the contracts

to be executed with affected irrigation districts. In addition, other environmental commitments will be implemented by Reclamation as described in the **ENVIRONMENTAL COMMITMENTS** section of this ROD.

ALTERNATIVES CONSIDERED IN THE FINAL EIS

Reclamation carefully considered public comments, NEPA implementing regulations, and Reclamation law in determining the range of contract renewal alternatives to be addressed in the final EIS. The contract renewal process involved a variety of interested and affected parties with diverse views about contract renewal as well as the federal irrigation projects within the Basin. Reclamation and the Corps analyzed 56 operational scenarios for managing water resources in the federal reservoirs within the Basin. Computer model outputs were used to evaluate these scenarios against established criteria to determine which should be dismissed as unreasonable or duplicative, and which should be retained for further evaluation. This analysis eliminated 40 scenarios from further consideration. The remaining 16 scenarios were evaluated in further detail resulting in elimination, combination, or retention. Five alternatives with varying objectives, including no action and a preferred alternative, were considered in the draft EIS. The negotiating parties used the variation contained in these alternatives to frame the negotiations and provide options for developing mutually-agreeable contracts. The final EIS contains the original five alternatives and the Negotiated Alternative (Reclamation's Preferred Alternative), described in the preceding section (**RECLAMATION'S DECISION**).

The other five alternatives considered in detail are summarized below.

No Action Alternative

This alternative maintains the status quo and represents the projected future condition with no change in the current operation of the reservoirs in the Basin. Harlan County Lake would continue to provide 150,000 acre-feet (ac-ft) of conservation storage for exclusive irrigation use. Other reservoirs in the Basin would continue to have their entire conservation pools available for irrigation. Long-term water service contracts would be renewed with no change in previous terms and conditions. This alternative provides a reasonably foreseeable future against which the action alternatives were compared.

When compared to existing conditions, the No Action Alternative would result in an average annual Basin-wide irrigation diversion shortage of approximately 49%.

Irrigation Alternative

This alternative would benefit agricultural irrigation by lowering the bottom of the Harlan County Lake conservation storage pool to a minimum elevation of 1927.0' msl from the

current 1932.4' msl. Total conservation storage available for irrigation from Harlan County Lake would increase from 150,000 ac-ft to 194,000 ac-ft. This alternative, like no action, would provide no Basin-wide instream flow release, would not establish minimum pool elevations for fisheries and recreation, would provide no Basin-wide improvement in system efficiency, and would have no operation criteria to maintain reservoir riparian vegetation.

When compared to existing conditions, the Irrigation Alternative would result in an average annual Basin-wide irrigation diversion shortage of approximately 48%.

Recreation/Riparian Alternative

This alternative would insure limited boating access at all reservoirs, except Lovewell Reservoir, by providing reservoir surface elevations high enough to allow access to at least one boat ramp through August. Access would be provided by maintaining reservoir surface elevations at least two feet higher than the bottom of the lowest boat ramp. This alternative would insure at least one boat ramp is available throughout the irrigation season. Minimum reservoir surface elevations necessary to maintain boating access would also maintain reservoir riparian vegetation and improve fish and wildlife habitat. The identified reservoir surface elevations are higher than the top of the present inactive pool and are similar to those suggested by Nebraska and Kansas state fish, wildlife, and recreation management agencies to support reservoir fisheries. During the months of March through June, Lovewell Reservoir and Harry Strunk Lake would maintain higher surface elevations, when possible, to support and enhance reservoir riparian vegetation. This alternative also provides minimum flows of 125 cubic feet per second (cfs) in April and 62 cfs in May, as measured at the Cambridge Diversion Dam, to maintain riverine riparian vegetation and improve fish and wildlife habitat.

This alternative provides for continued irrigation with no Basin-wide improvement in system efficiency and higher minimum pool elevations at Swanson Lake, Hugh Butler Lake, Harry Strunk Lake, and Lovewell Reservoir to benefit fish and wildlife, recreation, and reservoir riparian vegetation.

When compared to existing conditions, the Recreation/Riparian Alternative would result in an average annual Basin-wide irrigation diversion shortage of approximately 53%.

Multi-Use Alternative

This alternative would attempt to balance multiple-use needs at federally-developed reservoirs in the Basin. It provides for State agency-recommended minimum pool elevations at selected reservoirs to benefit reservoir fisheries and recreation and provides incidental benefits in the form of reduced reservoir shoreline erosion by maintaining reservoir riparian

vegetation. In addition, this alternative provides for an average Basin-wide increase of 5% in improved water delivery efficiency and 5% in improved on-farm irrigation efficiency. Individual delivery efficiency improvements to the irrigation districts' canal systems would vary between 2% and 12%. Conserved water would be used to reduce existing irrigation shortages.

This alternative would provide for continued irrigation with specified water conservation practices, increased minimum pool elevations for fisheries at Swanson and Keith Sebelius lakes and increased minimum pool elevations for boating access at Harry Strunk and Hugh Butler lakes. Minimum pool elevations at Enders Reservoir and at Harlan County Lake would remain as in the No Action Alternative.

When compared to existing conditions, the Multi-Use Alternative would result in an average annual Basin-wide irrigation diversion shortage of approximately 50%.

Conservation Alternative

The Conservation Alternative would provide for improved delivery and on-farm efficiencies and involves modifying the operation of Harlan County Lake to lower the minimum pool elevation to 1927.0 msl for irrigation. Water from Harlan County Lake would be used to the fullest extent possible for equitable diversions of water for irrigation districts operating downstream of Harlan County Lake. This alternative provides for an average Basin-wide increase of 5% in improved water delivery efficiency and 5% in improved on-farm irrigation efficiency. Individual delivery efficiency improvements to the irrigation districts' canal systems would vary between 2% and 12%. Conserved water would be used to reduce existing irrigation shortages.

When compared to existing conditions, the Conservation Alternative would result in an average annual Basin-wide irrigation diversion shortage of approximately 48%.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

The NEPA defines the environmentally preferable alternative as "*. . . the alternative that will promote the national environmental policy as expressed in NEPA. Ordinarily, this means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources.*" It is implicit in NEPA that the environmentally preferable alternative be reasonable and feasible to implement.

Given the array of alternatives considered in the final EIS, the Recreation/Riparian Alternative is the environmentally preferable alternative. By maintaining reservoir surface

elevations high enough throughout the irrigation season to allow use of at least one boat ramp at each reservoir, reservoir riparian vegetation and fish and wildlife would benefit more than with the other alternatives. Reservoir surface elevations would be maintained at higher levels at Lovewell Reservoir and Harry Strunk Lake from March through June specifically to maintain reservoir riparian vegetation. Minimum pool elevations above the inactive pool would be established at all reservoirs to support reservoir fisheries. This alternative also provides minimum flows in the Republican River passing the Cambridge Diversion Dam to maintain riverine riparian vegetation and improve fish and wildlife habitat.

BASIS FOR DECISION

Public input assisted Reclamation in developing a list of resource management scenarios which represented the first step in developing alternatives to be examined in detail in the draft EIS. The major areas of public concern included the Resource Management Assessment/NEPA process; economic benefits/impacts to irrigation, balanced/competing uses; cost of water and who pays; conservation/farming practices, contract terms, relationship of ground water to surface water; operations, wildlife/fish, recreation, and compact issues.

Reclamation carefully considered the environmental impacts of contract renewal-related activities during contract negotiations. The proposed contracts were negotiated by Reclamation to avoid or minimize significant environmental impacts and to improve environmental conditions related to continued operations of the irrigation districts. In selecting the Negotiated Alternative as its preferred alternative, Reclamation recognizes that the Basin is a water-short basin; that the affected districts are predicted to have a 50% water supply under currently projected future conditions; and that implementation of the Negotiated Alternative avoids unnecessary increases in water shortages to the irrigation districts. Furthermore, the Negotiated Alternative is consistent with federal and state laws and policies, including state water laws. The Negotiated Alternative recognizes the irrigation districts' right to renew their contracts and other rights associated with the use of water. Finally, while the Negotiated Alternative is not considered the environmentally preferable alternative, the irrigation districts have agreed to perform water conservation activities which will provide environmental benefits.

WATER CONSERVATION AND ENVIRONMENTAL COMMITMENTS AND MONITORING

The following measures will be implemented as integral parts of the decision made herein to provide water conservation and other environmental benefits.

Irrigation Districts' Commitments:

1. The districts will establish a revolving water conservation fund to be utilized for annual costs associated with the water conservation program activities. These funds may be fully utilized on an annual basis or accumulated to allow the irrigation districts to perform water conservation projects that would not otherwise be within the irrigation districts' financial capability should such projects have to be funded through collections or charges during any one-year period. These funds may be utilized in combination with Reclamation or other cost-share assistance that may be available to the irrigation districts for water conservation activities.

2. The districts will continue, when permitted, the practice of seasoning canals with stream flows or flood waters to reduce canal losses and control the growth of vegetation. Diversion of natural flows to season canals will not be initiated without Reclamation's concurrence and may not be permitted during those times that the resulting reduction in natural flows would impact the filling of downstream reservoirs.

3. The districts will continue to provide assistance to irrigators who upgrade on-farm irrigation facilities by improving turnout locations, installing meters, assisting with buried pipe projects to allow the use of gated pipe and center pivots, and implementing new technologies.

4. The districts will continue to work with Reclamation on evaluating computer software and other new technologies that would improve water scheduling and accounting.

5. The districts will continue and/or improve existing policies and practices that further the goals of water conservation; provide educational opportunities for irrigation district employees, such as canal operations training, water scheduling, water use seminars, etc.; and work with irrigators through educational-type demonstrations or projects that measure on-farm efficiencies and crop water requirements in terms of the type of irrigation methods employed by individual irrigators.

6. The districts have agreed to specific commitments to improve delivery and on-farm efficiencies, and to provide for proper accounting of all water deliveries and operational waste, as defined in each district's operating plan. Prior to March 1 of each year, each district and Reclamation will meet to assess the past year's water supply and delivery records and accounting, and to evaluate the upcoming irrigation season. Through the use of these records and other available data, Reclamation will assess the delivery efficiency and on-farm efficiency improvements resulting from implementation of water conservation commitments. The improvements will be measured against pre-plan water use data. On that basis, it is the

general goal of the districts to increase the delivery efficiency of the districts by an average of 5% and on-farm efficiencies by an average of 5%. If the improvements are not expected to result in the planned individual or cumulative increase in efficiencies during the first ten year period of implementation as determined by Reclamation, additional water conservation measures will be identified, by mutual agreement of the parties, to be undertaken to ensure the planned increase in efficiency is realized during the succeeding five- year period.

7. Prior to July 1 of each year, the irrigation districts will provide Reclamation an annual report of water conservation activities/accomplishments for the prior year, a statement of water conservation funds collected and expended, and water conservation fund balance as of the end of the prior calendar year.

8. Prior to July 1 of each year, the irrigation districts will provide the United States an annual report of environmental activities/accomplishments for the prior year.

9. The districts will install or create better screening devices to prevent the passage of fish, crayfish, etc., into turnouts and lateral systems.

10. The districts will establish policies to preserve lake levels.

11. In addition to accepting changes in operation, the irrigation districts will cooperate with Reclamation and others in improving fish and wildlife habitat and recreation on Reclamation lands. If requested, the irrigation districts will annually furnish labor at project-related fish and wildlife and recreational areas, provided the work is coordinated through Reclamation and scheduled during the non-irrigation season at least one month in advance. In lieu of labor, the irrigation districts will furnish a district-owned machine and operator. It is further provided that the irrigation districts, if requested, may provide more labor and/or more machine and operator days during one calendar year than the annual commitment (shown below), and that any labor and/or machine and operator days furnished in excess of the annual commitment will apply as a credit to the succeeding years' commitment(s).

Irrigation District	Man Days	Machine/Operator Days
Frenchman Valley	10	3
Frenchman-Cambridge	30	8
Kansas-Bostwick	20	4
Bostwick in Nebraska	10	2
Almena	7	3

Reclamation's Commitments:

1. Reclamation will determine the significance of selenium concentration levels for fish and wildlife resources in the Basin. This commitment will be implemented through an adaptive management process with a phased implementation of studies designed to provide information on reproductive impairment. The process and studies will be guided by detailed management objectives and hypotheses developed from acquired data.

Phase I will involve studies to determine if reproductive impairment is occurring in selected fish and wildlife populations within the Basin. Reclamation is currently working with other agencies to develop a study plan to evaluate the reproductive health of indicator fish and bird species within the Basin. This plan will include both field and laboratory components and is scheduled for completion in 2000 and implementation in 2001.

The study plan will incorporate current scientific knowledge of selenium-fish and wildlife relationships, and will be peer reviewed. Phase I studies will likely take 2-3 years to complete. At the end of Phase I studies, Reclamation will determine whether reproductive impairment has occurred.

The subsequent direction of the process depends on the decision at the end of Phase I. If data indicate no reproductive impairment has occurred, then the adaptive management process would be concluded. However, if impairment has occurred, further studies would be required. Sequentially, the studies would likely evaluate:

- the role Reclamation facilities (i.e., project water) play in impairment;
- feasible mitigation measures that could be implemented, their costs, degree of selenium reduction, and benefits/costs;
- implementation of mitigation measures; and
- monitoring.

The exact detail and direction of studies following Phase I would be based on information gained. The adaptive management process provides a structured approach to dealing with the uncertainties that currently surround selenium and its possible effects to fish and wildlife in the Basin. The irrigation districts agree to cooperate with the United States in implementing the adaptive management process. Such cooperation could include, but is not limited to, maintenance of the outfall drains to allow free flow/discharge of drainage water to

BUREAU OF RECLAMATION

RECORD OF DECISION

COLUMBIA RIVER SYSTEM OPERATION REVIEW
SELECTION OF A SYSTEM OPERATION STRATEGY

BUREAU OF RECLAMATION
PACIFIC NORTHWEST REGION

U.S. DEPARTMENT OF THE INTERIOR

COLUMBIA RIVER SYSTEM OPERATION REVIEW
SELECTION OF A SYSTEM OPERATION STRATEGY

I. INTRODUCTION

This record documents the decision of the Bureau of Reclamation (Reclamation) to implement existing and modified plans related to reservoir regulation and project operation for Hungry Horse and Grand Coulee projects. Reclamation selects the System Operation Strategy (SOS) Preferred Alternative (PA) as described in the Columbia River System Operation Review (SOR) Final Environmental Impact Statement, November 1995.

II. DECISION STATEMENT

This records adopts, incorporates and reaffirms the "Record of Decision (ROD) Implementing Actions Pursuant to Biological Opinions of March 1995" signed by the Pacific Northwest Regional Director on March 10, 1995 which is designated herein as the PA and is the best overall operating strategy for the Columbia River system. The previous ROD documents Reclamation's decision to implement measures in the Biological Opinion on "Reinitiation of Consultation 1994-1998 Operation of the Federal Columbia River Power System and Juvenile Fish Transportation Program in 1995 and Future Years" issued by the National Marine fisheries Service (NMFS) on March 2, 1995 on Snake River spring, summer and fall chinook and Snake River sockeye salmon; and the United States Fish and Wildlife Service (USFWS) Biological Opinion on four Snake River snails and the Kootenai River white sturgeon dated March 1, 1995. Moreover, Reclamation has been operating its projects in accordance with that ROD and those Biological Opinions, and as required, will continue to coordinate the projects in the future with NMFS and USFWS to meet the adaptive management approach to Federal Columbia River Power System

(FCRPS) reservoir operations that is contemplated within the operational flexibility of the PA.

Selection of the PA is determined to be the best operating strategy since it has been approved by NMFS and USFWS as meeting the biological needs of the endangered species, has proven to be a workable strategy given Reclamation's experience past short term operation, and after analysis, proven to best meet the other multiple use requirements of the system.

III. BACKGROUND

A. Purpose and Need

Reclamation, the Corps, and the U.S. Department of Energy's Bonneville Power Administration (BPA) are responsible for management of the Federal Columbia River Power System. Multiple uses of the system, including but not limited to flood control, power, navigation, irrigation, and municipal and industrial uses as well as natural resource management have evolved largely from dam development. Today, these river uses are increasingly competing for limited water resources in the Columbia River Basin. Often, they conflict with each other. To date, meeting these demands has been guided somewhat independently by those sharing responsibility for management of the system. The Federal agencies responsible for river management decided to use the pending expiration of several long-term agreements involving power production as an opportunity to review future operations of the Columbia River system and river use issues. Because of renewal of the agreements and after years of trying to accommodate growing multiple-use demands on the system, the three agencies decided that it was time for a "top-to-bottom" review in order to assure the best possible operation and management of the system within the constraints of the systems' required multiple uses and the biological needs of the endangered species. The result of that decision was the System Operation Review. The review is the environmental analysis required by the National Environmental Policy Act (NEPA) to consider changes in Columbia River system operations and the effect of those changes on users of the system and the environment..

The SOR began in 1990 with a focus on all river and reservoir uses for the FCRPS. The Endangered Species Act (ESA) began to

influence the formulation of alternatives in November 1991 when the first of three Snake River salmon species was listed as threatened or endangered. The SOR then began to focus on the role system operations could play in salmon recovery while meeting other project purposes.

There were four actions intended from the SOR: (1) develop and implement a coordinated system operating strategy for managing the multiple uses of the FCRPS while meeting the biological needs of the ESA; (2) provide interested parties a long-term role in system planning and operation through a Columbia River Regional Forum; (3) renegotiate and renew the Pacific Northwest Coordination Agreement (PNCA); and (4) renew current agreements or develop new Canadian Entitlement Allocation Agreements (CEAA).

This ROD applies solely to the first of these actions: selection of a system operation strategy. Separate RODs are being prepared for the PNCA and CEAA. No action is likely for the Regional Forum because that need is being met through other regional activities such as the Technical Management Team; the ESA Implementation Team and the Northwest Power Planning Council's Fish and Wildlife Program amendment process.

The SOR EIS assessed operations at the 14 Federal dams in the Columbia River basin in the United States. Reclamation operates two of those -- Grand Coulee and Hungry Horse dams. These projects play a prominent role in the coordinated operation of the Columbia River system because of their size and location. Their 8 million acre-feet of storage is about half of the federally-controlled storage in the FCRPS. They are keystones in the system operation for hydropower, flood control, and irrigation.

B. Scope and Process

The first step of the review was to establish the scope of the study. After public meetings in 14 cities in the region during August 1990 and consultation with numerous local, state, and Federal agencies, the three lead agencies were better able to define the geographic scope of the study and the process.

Scope: The specific scope of the SOR encompasses 14 Federal dams on the Columbia and lower Snake Rivers that have major influenced

on multiple-purpose system operation and for which power production is coordinated under the PNCA. These include five storage dams: Hungry Horse and Grand Coulee (Reclamation) and Libby, Albeni Falls, and Dworshak (Corps); and nine downstream run-of-river projects: Chief Joseph, Lower Granite, Little Goose, Lower Monumental, Ice Harbor, McNary, John Day, The Dalles, and Bonneville (all Corps). The SOR Scoping Document presented the scope of the study and analytical methods was issued in may 1991.

Process: Pilot studies of four river uses were conducted simultaneously with development of the Scoping Document. From July 1991 to August 1992, work groups representing 10 key river uses developed and screened 90 initial system operating alternatives. Ten candidate strategies were then formulated for public review. Following public comment in September 1992, seven strategies were developed for full scale analysis in the EIS which took place from September 1992 to January 1994. A Draft EIS was issued in July 1994 and following public comment, the Final EIS was issued in January 1996.

Ten interagency work groups were assigned one river use or resource: flood control, navigation, anadromous fish, resident fish, wildlife, power, recreation, irrigation, water quality, and cultural resources. These work groups provided a forum for experts and other interested parties to work together on analysis for a specific river use. Key objectives were to share ideas and information, provide the best available science and reach consensus.
Overseeing the work groups was the Analysis Management Group; an interagency coordination group consisting of project managers, the 10 resource work group leaders and other representatives from the lead agencies. Other groups that reported to the Analysis Management Group were the Economic Analysis Group; the River Operation Simulation Experts; PNCA Alternatives Analysis Group; NEPA Action Group; Public Involvement Group; Forum Alternatives Work Group; and contractors.

After analyzing information from scoping, the SOR followed a three-phase decision process for developing a system operation strategy: 1) pilot or test analysis; 2) public participation in the work groups and the beginning of the screening phase; and 3) full scale analysis of the candidate strategies. Further

information about this process is in Section V. Alternatives Considered.

IV. PUBLIC INVOLVEMENT

The three SOR agencies held numerous public meetings across the Pacific Northwest at different points in the review to involve the public and listen to their views:

- In 1990, about 800 people attended 14 scoping meetings to explain the SOR and gather comments on the scope of the study. These meetings were held in Seattle, Spokane, Kennewick and Grand Coulee, Washington; Sandpoint, Boise, Idaho Falls, and Orofino, Idaho; Libby, Eureka, Missoula, and Kalispell, Montana; and Pendleton and Portland, Oregon.

- From November 1991 through January 1992, roundtable meetings were held to provide the public an opportunity to preview and comment on the preliminary alternatives developed by the SOR work groups. these meetings were held in Sandpoint and Orofino, Idaho; Kalispell and Libby Montana; and Kennewick, Grand Coulee and Seattle, Washington. About 300 people attended these meetings.

- In September 1992, about 500 people attended 14 mid-point meetings to learn about and comment on the strategies being considered. In the fall of 1994, over 500 people turned out to comment on the Draft EIS at nine public meetings around the region. The locations were nearly the same as for the scoping meetings.

- In September and October, 1994, a series of nine public hearings was held on the Draft EIS. Approximately 500 people attended these hearings in Boise, Lewiston, and Sandpoint, Idaho; Kalispell and Libby, Montana; Grand Coulee, Pasco, and Seattle, Washington; and Portland, Oregon. In all, the agencies received written or verbal comment from over 360 people during the public review process of the Draft EIS. All comments received full consideration.

Members of the public served on SOR work groups and helped prepare technical appendices. Others followed work group

activities by mail, without direct involvement. There were hundreds of people who participate on an ad hoc basis through letters, telephone and meeting attendance.

The Final EIS consists of the Main Report (450 pages), the Summary and 20 technical appendices that analyze river use areas: River Operation Simulation; Air Quality; Anadromous Fish and Juvenile Fish Transportation; Cultural Resources; Flood Control; Irrigation/Municipal and Industrial Water Supply; Land Use and Development; Navigation; Power; Recreation; Resident Fish; Soils, Geology, and Groundwater; Water Quality; Wildlife; Economic and Social Impacts; CEAA; Columbia River Regional Forum; PNCA, USFWS Coordination Act Report; and Comments and Responses. The SOR team also compiled a variety of publications to educate the public about the Columbia River and its system operations. A newsletter was mailed to over 5,000 homes and businesses regularly during the six-year life of the SOR to inform people about new developments in the study and to present river management information.

V. ALTERNATIVES CONSIDERED

More than 90 approaches to river system operations were initially considered. Many were proposed by citizens and organizations, others were suggested by SOR work groups and the project managers. Computer models simulated implementation of all 90 alternatives so that the environmental and social effects and impacts on power generation, natural and cultural resources, and all other river activities could be assessed and compared.

As a result of screening by SOR work groups and public review of the results, many of the initial alternatives were redesigned, combined or deemed unworkable because these alternatives did not meet the system's multiple use requirements while accommodating the biological needs of the endangered species. Seven System Operation Strategies (SOS) were then chosen and analyzed in detail. Various options within these seven strategies were considered, so that a total of 21 alternatives were examined for the Draft EIS.

The Draft EIS alternatives were further modified following comments from Tribes, State and Federal agencies, industry, environmental organizations, and individuals. Six of the 21

alternatives in the Draft EIS were carried into the analysis for the Final EIS without modification (SOSs 1a, 2c, 5b, 6b, and 6d). Four alternatives in the Draft EIS were modified following public comment and again considered in the Final EIS (SOSs 4c, 9a, 9b, and 9c). Three new alternatives were identified and evaluated in the Final EIS in response to public comment (SOSs 5c and PA) or as a result of recommendations from the 1994-98 Biological Opinion issued by NMFS (SOS 2d). Several Draft EIS alternatives were eliminated as unreasonable based upon additional analysis results and consideration of public comment (SOSs 2a, 2b, 3a, 3b, 4a, 4b, 5a, 6a, and 6c). The Final EIS Main Report describes the evolution of the alternatives on pages 4-4 and 4-5.

The following System Operating Strategies received detailed consideration in the Final EIS since Reclamation determined that these strategies were the best suited to meeting the multiple use needs of the system and the requirements of the endangered species. See attached Exhibit A for a comparison of the following strategies and associated river uses. The numbering is not consecutive due to adjustments made in the list of alternatives considered between the Draft and Final EISs.

SOS 1a - Pre-Salmon Summit Operation: This strategy simulates the way the system was operated from 1983 through the 1990-91, prior to the listing of salmon species under the ESA. Elements of an alternative recommended by the Columbia River Alliance, Recover 1, were included.

SOS 1b - Optimum Load-Following Operation: This option maximizes system benefits for the traditional uses of the system, power generation, flood control, and navigation. It simulates the way the system was operated prior to the Northwest Power Planning and Conservation Act of 1980.

SOS 2c - Current Operation/No Action: This alternative calls for operations consistent with the Corps of Engineers' 1993 Supplemental EIS. It is similar to how the system was operated in 1992-93, after three salmon species were listed under the ESA.

SOS 2d - 1994-98 Biological Opinion: This alternative represents the operation that would have occurred had the recommendations resulting from the ESA consultation completed in 1994 been

implemented. It is closest to the way the system was being run. just after the analysis in the Draft EIS was completed.

SOS 4c - Stable Storage Project Operation with Modified Grand Coulee Flood Control: This alternative specifies monthly elevation targets to be used year-round to improve conditions at the major Federal storage projects for recreation and resident fish and wildlife. In response to public comments, this alternative includes minimum elevation levels, known as Integrated Rule Curves (IRCs) for Libby and Hungry Horse Reservoirs.

SOS 5b - Natural River Operation: This alternative specifies that the four lower Snake River projects would be drawn down to near riverbed levels for four and one-half months during the spring/summer salmon migration period. Construction of new low-level outlets would be required to allow water to bypass the dam, powerhouse, and spillway.

SOS 5c - Permanent Natural River Operation: This alternative specifies that the four lower Snake River projects would be drawn down to near riverbed levels year-round.

SOS 6b - Fixed Drawdown Operation: This alternative specifies that the four lower Snake River projects would be drawn down to near spillway crest for four and one-half months during the spring/summer salmon migration period.

SOS 6d - Lower Granite Drawdown: This strategy would draw down Lower Granite to near spillway crest for four and one-half months.

SOS 9a - Detailed Fishery Operating Plan (DFOP): This operation was recommended by the region's fish agencies and tribes. It establishes flow targets at Lower Granite and The Dalles, draws down the lower Snake River projects to near spillway crest for four and one-half months, specifies spill levels at run-of-river projects, and eliminates fish transportation.

SOS 9b - Adaptive Management: This modification of DFOP establishes flow targets at McNary and Lower Granite, specifies maximum water releases from upstream projects, draws down lower Snake River projects to minimum operating pool, draws down John

Day to minimum irrigation pool, and specifies spill levels at run-of-river projects.

SOS 9c - Balanced Impacts Operation: This strategy was originally recommended by the State of Idaho, which subsequently withdrew its support. It draws down the four lower Snake River projects to near spillway crest for about two months during the spring salmon migration period. It also includes flow augmentation at 1994-98 Biological Opinion levels, IRCs at Libby and Hungry Horse, and a higher winter operating elevation at Albeni Falls.

SOS Preferred Alternative: This strategy adopts operations recommended in the NMFS and USFWS Biological Opinions issued in March of 1995. Its intent is to support the recovery of ESA-listed fish by storing water in reservoirs during the fall and winter to meet spring and summer flow targets. Maximum summer draft limits at Libby, Hungry Horse, and Dworshak are used to minimize detrimental effects on other natural resources, provide flood protection, and produce a reasonable amount of power generation.

One additional alternative was considered that was identified late in the analysis process for the Final EIS. While the agencies could not incorporate the results of this additional analysis in the comparative analysis in the Final EIS, the effects of the alternative were described in Chapter 4 of the Final EIS Main Report. This alternative was suggested by the Confederated Tribes of the Umatilla Indian Reservation. It was similar to SOS 9a above with higher flow targets during the spring and summer, drawdown to natural river levels, higher spill levels, and reduced flood control storage space during the winter to allow for higher spring and summer flows. This alternative was designated as SOS 9d.

Exhibit A, "How the Strategies Would Affect River Uses: summarizes the environmental effects for the alternatives by category. In addition to the effects on each major river use, the overall economic impact is shown as well.

VI. ESA SECTION 7 CONSULTATION

Because of the listed species within the Columbia River system, fourteen system operation strategies from the SOR Draft EIS were

provided to NMFS and USFWS in the 1995 supplemental Biological Assessment as part of the reinitiation of consultation on the 1994-1998 proposed operations. As a result of this consultation, NMFS and USFWS issued separate Biological Opinions which addressed the effects of the FCRPS operation upon listed species within their jurisdictions.

The USFWS adopted the non-jeopardy Biological Opinion dated July 27, 1994 on the bald eagle, Lake Roosevelt (Grand Coulee project) population, and concurred that the action is not likely to adversely affect the endangered gray wolf, threatened grizzly bear, and endangered peregrine falcon. The USFWS also issued a non-jeopardy Biological Opinion for Snake River snails.

In their March 2, 1995 Biological Opinion, NMFS recommended a Reasonable and Prudent Alternative (RPA) and concluded that the RPA does not jeopardize the continued existence of the spring/summer and fall Chinook, and does not reduce appreciably the likelihood of survival and recovery of the Snake River sockeye salmon.

Reclamation continues to coordinate with NMFS and USFWS on operations. Under adaptive management, operations are adjusted in-season as well as year-to-year as scientific information is further collected and evaluated.

The following ESA-established regional forums facilitate making operational recommendations:

- The Technical Management Team (TMT) makes recommendations to Reclamation and the Corps on weekly management of river operations related to flows, spill, and transport.

- The Implementation Team (IT) coordinates activities of federal, state, and tribal sovereigns for implementation of regional plans to restore anadromous fish and addresses weekly issues raised by the TMT.

- The Executive Committee oversees implementation activities and if the IT cannot resolve an issue, makes final recommendation to Reclamation and the Corps on operation changes.

All forums consist of representation from Federal, state, tribal, and regional agencies. Additionally, all forums are public and provide opportunity for non-members to participate.

In July, 1996, NMFS proposed several Snake River and Columbia River basin steelhead stocks for listing as threatened and endangered. Reclamation will coordinate with NMFS on the proposed listings and may modify the selected SOS after evaluating effects on these proposed stocks and considering recommendations of the TMT.

VII. SYSTEM OPERATION STRATEGY (SOS) AND SELECTION OF THE PREFERRED ALTERNATIVE (PA)

The SOS PA in the SOR Final Environment Impact Statement (FEIS) represents the operation recommenced by NMFS and USFWS in their Biological Opinions issued on issued on March 2, 1995 and March 1, 1995, respectively. SOS PA was selected as the best alternative because it supports recovery of ESA-listed species as outlined in these Biological Opinions, specifically the Reasonable and Prudent Alternative and the Incidental Take Statement, by limiting water releases during the fall and winter in an attempt to provide water supplies for spring and summer fish target flows.

Since environmental protection for anadromous fish and other listed species became the focus of this analysis, the selected strategy is an environmentally preferable alternative. It favors ESA-listed species as a matter of compliance with law and policy. It is focused on the protection of anadromous fish at the expense of other species, primarily resident fish and wildlife. It is possible to design additional environmentally preferable alternatives by choosing different combinations of operating measures that reflect other tradeoffs among river uses and resources. For example, second environmentally preferable alternative could be designed which would contain elements from several SOSs considered in the Final EIS.

The system will be operated to achieve flood control elevations by April 15 each year and to meet demands for irrigation supplies, power production and recreation. Storage water from Grand Coulee and Hungry Horse will also be used for flow

augmentation for fish recovery. Moreover, the selected PA adopts the adaptive management approach of the RPAs. Under this approach, operations may be modified in-season for actual hydrologic and fish migration conditions and year-to-year based upon new scientific information or to support studies for long-term system configuration changes as provided within the PA's flexibility.

The TMT will make in-season recommendations to Reclamation based on runoff conditions, fish migration and other factors. Reclamation will continue to participate in various regional forums, such as the IT and Executive Committee, where system operations are proposed and discussed. Reclamation will also continue to coordinate with NMFS, USFWS, the Corps, BPA, the Northwest Power Planning Council (NPPC), states, and Tribes on newly proposed reservoir operations. In coordination with these groups, Reclamation may need to change operations for flood control, emergencies, approved research, or other project uses which is provided within the PA's flexibility. Reclamation will rely upon existing authority and information in the SOR FEIS to evaluate and implement such new operations, and to adjust the SOS in coordination with NMFS and USFWS and others.

In summary, under the selected system operation, Reclamation will operate Hungry Horse and Grand Coulee projects in the FCRPS to:

- continue to provide irrigation water supplies to meet contractual arrangements; provide fish and wildlife enhancement; provide recreation opportunities; provide hydro power production; and meet other authorized target objectives.

- provide additional flow augmentation in the Columbia and Snake Rivers and manage these flows during the fish migration season to optimize anadromous fish survival.

- manage reservoir elevations within Grand Coulee and Hungry Horse to maximum summer draft limits to the extent possible to minimize detrimental effects on resident fish, wildlife, cultural resources and recreational facilities.

- meet flood control requirements at Grand Coulee and Hungry Horse to reduce mainstem and tributary flood damage.

- manage system inflows and releases during the fall and winter so that reservoir elevations at Grand Coulee and Hungry Horse meet flood control levels in April as determined by that year's runoff probability.

- release stored water from Grand Coulee and Hungry Horse during the migration season in a manner that strives toward meeting specified flow targets measured at McNary Dam, recognizing that these targets are not achievable in many years.

Reclamation will coordinate with the other Federal, state, and tribal representatives in the TMT process and consider TMT recommendations in making final decisions on the operation of Reclamation projects. Operations may be modified on a case-by-case basis if recommended by the TMT.

VIII. MITIGATION FOR PREFERRED ALTERNATIVE

A major issue in selecting the PA was to provide for Snake River salmon recovery. Events such as ESA listings and corresponding Biological Opinions dramatically impacted FCRPS operations. Improving conditions for listed anadromous fish was a main (is the) objective of the selected SOS, however, in selection of the preferred alternative, Reclamation employed all practicable means to avoid environmental impacts from its implementation. However, under the preferred alternative, there will be some level of adverse environmental impact at Reclamation projects in the following areas:

Cultural Resources: Fluctuating water levels and associated shoreline erosion have the potential to adversely affect significant cultural resources at all Federal reservoirs in the FCRPS.

The National Historic Preservation Act (NHPA) requires Federal agencies to take into account adverse impacts and formulate plans to address them. The SOR agencies are currently finalizing a Programmatic Agreement with the Advisory Council on Historic Preservation (Council), the appropriate State Historic Preservation Officers, affected agencies, and affected Federally-recognized Tribes. The Programmatic Agreement will address the requirement of Section 106 of the NPA to consult with the Council

on the effects of the undertaking on historic properties. Government-to-government consultations with affected Tribes on the Programmatic Agreement and its implementation are ongoing.

Pursuant to the Programmatic Agreement, Reclamation will develop individual Historic Preservation Management Plans (HPMP) for each reservoir which will identify significant cultural resources, the approaches to resource protection, preservation and treatment, the framework for research designs for data recovery where data recovery is the preferred treatment, plans for site monitoring, plans for public education and interpretation of cultural materials, and plans for the long-term curation of recovered artifacts and information. The HPMP will also address issues required by other relevant legislation, including the Archeological Resources Protection Act and the Native American Graves Protection and Repatriation Act. The HPMPs will be developed with input from and through consultation with affected Tribes and other affected or interested parties.

Wildlife: At Grand Coulee, emergent, submerged and riparian areas around Lake Roosevelt could experience negative impacts from rapid withdrawal of water from those habitats. Direct effects from impacts to habitat could include increased vulnerability to predation, increased energy expenditure and potential for physiological stresses. Species likely to be impacted include great blue heron, colonial and bank-nesting birds, Canada geese, mallard, deer, beaver, and otter. Additional information is necessary to determine full impacts to wildlife at Lake Roosevelt. Mitigation measures will need to include surveys and inventories of existing wildlife populations and habitat suitability.

IX. CONTINUING ACTIONS

In addition to selection of the SOS PA in this ROD, Reclamation is involved in other actions which may impact or require modification to operations in the future.

Cultural Resources

As previously described, the three SOR agencies are currently finalizing a Programmatic Agreement with all interested and affected parties to address long-term protection and preservation

of significant cultural resources that are or may be adversely affected by FCRPS operations. Actions and activities called for in the final Programmatic Agreement will be carried out over a multiple-year period. The processes to implement the terms of the Programmatic Agreement at specific reservoirs or larger subareas of the project area will be defined in specific agreements with affected Tribes and other affected parties.

Regional Coordination

Organizations and coordination mechanisms referenced in the Biological Opinions which have been established to provide scientific information related to dam and reservoir operations and/or ecosystem management in the Columbia River Basin include the Salmon Recovery Implementation Team, the Independent Scientific Advisory Board, the Technical Management Team, and Memoranda of Agreement/Understanding signed by various Federal officials. Reclamation will continue to participate in these processes through appropriate coordination, consultation, or decision making.

Recovery Plan

The NMFS is preparing a Recovery Plan for endangered Snake River salmon stocks. Reclamation will cooperate with NMFS in development of the Recovery Plan. The NMFS Biological Opinion states that the Recovery Plan will be the best evidence of the amount of improvement required in each life stage and the measures likely to accomplish that improvement. Consistency with the Recovery Plan will be considered in jeopardy determinations. Reclamation recognizes that the system operation strategy described in this ROD may change as a result of the NMFS Recovery Plan for salmon.

X. APPROVED:

I hereby approve the PA as the selected operating strategy for the Bureau of Reclamation.

Issued in Boise, Idaho on February 7, 1997.

John W. Keys III
Regional Director, Pacific Northwest Region
Bureau of Reclamation

How the Strategies Would Affect River Uses

	SOS 1	SOS 2	SOS 4	SOS 5	SOS 6	SOS 9	PA
Anadadromous Fish	Moderate passage survival and adult escapement; slight differences from existing conditions	Survival rates in the middle range of all alternatives; with transport, juvenile survival is high	Survival about the same as SOS 2	Highest in-river survival for Snake River stocks; for other stocks, similar to existing conditions	In-river survival for Snake River stocks varies greatly depending on assumptions	Some of the highest and lowest in-river survival depending on SOS option and stock	In-river survival for Snake River stocks similar to SOS 2; in-river survival for other stocks in the mid to upper range
Resident Fish	Variable conditions among reservoirs and species; pool fluctuations and failure to refill impair productivity	Variable conditions among reservoirs and species; pool fluctuations and failure to refill impact productivity	Best SOS for resident fish; improved productivity at storage projects	Generally poor ; some reservoirs have improved conditions under SOS 3c	Impacts generally the same as SOS 5, but not as severe; conditions worse at Lower Granite and John Day	Some of the best and worst impacts of all SOSs; 9a is generally worse, 9b is good, 9c is mixed	Conditions better at Lake Roosevelt, Hungry Horse, Lower Granite, and John Day; worse at Dworshak, sturgeon improved
Wildlife	Resources largely unchanged from current conditions; continuation of downward trends	Long-term downward trends to resources; slight impacts at John Day due to lower reservoir levels	Moderate to significant increases in wildlife habitat at Lake Pend Oreille, Libby, Hungry Horse, and Grand Coulee	Severe reductions in wildlife habitat at lower Snake and John Day projects	Wildlife habitat impacts similar to SOS 5; 6d limits impacts to Lower Granite	Significant impacts to John Day under 9a and 9c; 9b similar to SOS 4 with no benefit at Libby and Hungry Horse	Impacts at John Day similar to SOS 5b; stable levels allow some restoration of habitat; some impacts at Grand Coulee
Power	Energy production and load shaping maximized; 0.6-1.1% rate decrease	Annual generation costs the lowest of all SOSs except SOS 1; up to 0.4% rate increase	Flows and generation needs mismatched; 1.3% rate increase	Eliminates system load shaping capability; reduces average annual energy generation; 2.3-2.8% rate increase	Generation effects similar to SOS 5; generation costs slightly more than SOS 2c; 0.3-0.9% rate increase	Hydropower generation reduced due to high spill and drawdowns; 2.5-4.0% rate increase	Increased water storage in fall and winter and increased spill mismatches flow and generation needs; 2.0% rate increase
Flood Control	Flooding risk unchanged from current conditions	Flooding risk unchanged from current conditions; expected annual average flood damage costs are $3.3 million	Increased risk at Bonners Ferry, the upper Columbia, and Clearwater reaches; average annual flood damage costs increase $0.4 million over SOS 2c	Flood risk in all areas similar to SOS 2	Flood risk in all areas similar to SOS 2	Highest flood risk primarily in upper Columbia; average annual flood damage ranges from $0.03 to $0.5 million more than SOS 2c	Upper Columbia flood damages increase $0.2 million over SOS 2c
Navigation	Normal conditions for shallow draft navigation and reduced costs for Dworshak log transport; net decrease $0.1 million compared to SOS 2a	Shorter Dworshak log transport operating season; total annual cost for navigation is $414.4 million	Longer Dworshak log transport operating season; net decrease $0.2 million compared to SOS 2c	No shallow draft navigation on the lower Snake River for 7 months or permanently; net increase $14 to $38 million compared to SOS 2c	No shallow draft navigation on the lower Snake River or Lower Granite for 6 months; net increase $2 to $12 million compared to SOS 2c	No shallow draft navigation on the lower Snake for 3 or 6 months; net increase up to $12 million compared to SOS 2c	Normal operations for navigation; shorter Dworshak log transport season; net increase $0.1 million compared to SOS 2c
Irrigation, Municipal and Industrial Water Supply	Minor increase in pumping costs at Grand Coulee of $9,000 over SOS 2c	All irrigation needs served	Minor decrease in pumping costs at Grand Coulee of $18,400 over SOS 2c	Drawdowns at John Day and Ice Harbor require pump modifications and increase pumping costs by about $3.3-4.5 million	Drawdowns at John Day and Ice Harbor require pump modifications and increase pumping costs by about $1.4-2.6 million	Similar impacts to SOS 6 at Ice Harbor and John Day; minor increase in pumping costs at Grand Coulee up to $34,900	Minor savings in pumping costs at Grand Coulee;$1.5 million increase at John Day, $4.3 million increase for Mid
Cultural Resources	Ongoing shoreline erosion and exposure at same rate as current conditions	Ongoing shoreline erosion and exposure at same rate as current conditions	High rates of shoreline erosion at storage projects; decrease in exposure due to high pools	Dramatic increase in exposure at lower Snake River projects; less shoreline erosion at these projects	Similar to SOS 5 but less dramatic	Increased shoreline erosion and exposure due to drawdowns; increased bank sloughing due to flow augmentation	Little overall change from current conditions; site exposure increases at Dworshak and John Day
Recreation	Annual benefits could increase up to $7.9 million under SOS 1b	Annual average recreation benefit is $315 million	Annual benefits could increase $4.2 million	Annual benefits could decrease between $66 and $90 million	Annual benefits could decrease up to $40 million	Annual benefits could decrease $35 to $92 million depending on option	Annual benefits decrease by $26 million
Water Quality	Slight decrease in water temperature but increase in total dissolved gas in lower Snake River	Similar to SOS 1 but slight increase in water temperature; decrease in total dissolved gas	Similar to SOS 2 with slightly lower dissolved gas in lower Columbia	Maximum silt concentrations; nearly all excessive dissolved gas eliminated in lower Snake	Major sediment transport similar to SOS 5; dissolved gas and water temperature similar to SOS 2	Highest impacts due to water temperature and total dissolved gas supersaturation	Similar to SOS 2 except high total dissolved gas in the lower Columbia
Change in Total Annual System Costs*	-$42 to +$80 million	$29 million, but SOS 2c equals 0 (no action alt.)	$81 million	$266 to $336 million	$72 to $145 million	$231 to $400 million	$164 million

*Includes capital expenditures to modify existing dams

EXHIBIT A

file
NAVAJO

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE BUREAU OF RECLAMATION
AND
THE NAVAJO NATION

NAVAJO NATION
DEPARTMENT OF WATER RESOURCES

JULY 17, 2000

RESOLUTION OF THE INTERGOVERNMENTAL RELATIONS COMMITTEE OF THE NAVAJO NATION COUNCIL

Approving the Memorandum of Understanding Between the Navajo Nation and the U.S. Bureau of Reclamation

WHEREAS:

1. Pursuant to 2 N.N.C. §821, the Intergovernmental Relations Committee was established as a standing committee of the Navajo Nation Council; and

2. Pursuant to 2 N.N.C. §824 (B) (6), the Intergovernmental Relations Committee of the Navajo Nation Council is empowered to authorize, approve and accept agreements, including contracts and grants, between the Navajo Nation and any federal, state or regional authority upon the recommendation of the oversight standing committee; and

3. Pursuant to the Navajo Nation Water Code, 22 N.N.C. §1101, the water resources of the Navajo Nation are essential to provide a permanent homeland for the Navajo People; and protection of such water resources is essential in order to protect the health, the welfare and the economic security of the citizens of the Navajo Nation; and

4. The Department of Water Resources has determined that the overall interests of the Navajo Nation can best be served through this Memorandum of Understanding (MOU); and

5. By Resolution RCJN-101-00, the Resources Committee of the Navajo Nation Council recommended the approval of this MOU as being in the best interests of the people of the Navajo Nation.

NOW THEREFORE BE IT RESOLVED THAT:

1. The Intergovernmental Relations Committee of the Navajo Nation Council approves the Memorandum of Understanding, attached hereto as Exhibit A, between the Navajo Nation and Reclamation to support the Nation's efforts to implement the current water development strategy as articulated in the Executive Summary of the Water Resources Management and Development Strategy for the Navajo Nation; included as Attachment A to Exhibit A.

2. The Intergovernmental Relations Committee of the Navajo Nation Council further authorizes the President of the Navajo Nation to sign the Memorandum of Understanding, together with any other documents necessary for the Navajo Nation to fully participate in the studies authorized by the MOU.

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE BUREAU OF RECLAMATION
AND
THE NAVAJO NATION

1. PURPOSE AND OBJECTIVE

The objective of this Memorandum of Understanding (MOU) is to establish the foundation for a long-term partnership between the Navajo Nation (Nation) and the United States Bureau of Reclamation (Reclamation) in support of the Nation's efforts to develop its water resources. The Nation's current water development strategy is articulated in the *Water Resource Management and Development Strategy for the Navajo Nation (Strategy)* dated March, 2000. The Nation, in its strategy, contemplates (1) the preparation of a reservation-wide needs assessment(s); (2) the establishment of a water resource task force to facilitate project implementation; (3) the development of several regional water supply projects; and (4) the construction or rehabilitation of local water supply and distribution systems. The Executive Summary of the *Strategy* is attached hereto as Attachment A.

2. BACKGROUND

The Navajo Reservation was created in 1868 pursuant to a treaty between the Navajo Nation and United States governments. It is the largest reservation within the United States and has been expanded, spanning three states (Arizona, New Mexico, and Utah) covering 27,000 square miles. The Navajo Nation is divided into 110 Chapters (i.e. local governments) and has a population of approximately 172,000. The lack of a sustainable water supply adversely effects the health, economic well being and culture of the Navajo people.

Reclamation is a federal agency within the Department of the Interior whose mission is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public. Pursuant to its Strategic Plan, "Reclamation will assist Indian Tribes with development and management of their water resources to promote and contribute to their economic self-sufficiency, improved standard of living, improved public health, and to the sustainability of ecosystems dependent on these water resources." In carrying out its mission, Reclamation fosters and promotes conservation, efficient water use, and responsible management of water and related natural resources, within state law, through active partnerships with other federal, state, tribal and local entities.

4. RECLAMATION AUTHORITIES

Reclamation is providing assistance to the Navajo Nation related to its water development programs, pursuant to the existing authorities listed in Attachment B of this MOU, administered in both the Upper Colorado Region and Lower Colorado Region including, but not limited to, water supply appraisal studies, water management and conservation initiatives, water treatment and reuse opportunities, drought relief and drought contingency planning.

In addition to the studies and initiatives provided for in Reclamation's general authorities, Reclamation is studying the Navajo-Gallup Water Supply Project (P.L. 92-199, an authorized Feasibility Study, December 15, 1971), the Farmington to Shiprock pipeline (currently proposed for authorization as part of H.R. 3112 and S.2508, amending the Colorado Ute Settlement Act of 1988) and smaller prospective projects such as the Navajo Mountain domestic water supply project and the Ganado Irrigation Water Conservation Project. These projects, as well as others, may require additional Congressional authority to move forward to the next appropriate level.

This MOU shall not alter the statutory authorities and other legal responsibilities of the Department of Interior, Reclamation, or the Navajo Nation.

5. DUTIES AND RESPONSIBILITIES OF THE PARTIES

A. BUREAU OF RECLAMATION

In response to the Navajo Nation's request for Reclamation to broaden its role in assisting the Nation in the development, protection, and management of the waters of the Navajo Nation, Reclamation agrees, pursuant to existing or new authorities, applicable policies and subject to available appropriations, to do the following:

Provide single points of contact for both the Upper Colorado and Lower Colorado Regions to coordinate Navajo Nation/Reclamation programs, projects and budget formulation within their respective regions.

- Provide technical assistance to the Navajo Nation related to the Nation's implementation of its water development plans and strategies.
- Submit requests to the Secretary of the Interior through the Reclamation budget formulation process to study and plan new Reservation water conveyance and storage infrastructure and to study and plan the rehabilitation of existing water resources infrastructure.
- Assist the Nation in developing or rehabilitating water resource infrastructure under the authority and funding of other federal agencies when requested to do so by that agency or under Reclamation authorities and funding as authorized.

DRAFT

Attachment A

EXECUTIVE SUMMARY
OF
THE WATER RESOURCE DEVELOPMENT STRATEGY
FOR THE NAVAJO NATION

[redacted]

The Navajo Nation has severe water infrastructure deficiencies that negatively impact the health and welfare of the Navajo people and suppress the economy. Given the limited tribal resources, federal budgets and authorizations, the water resource problems will become increasingly acute over the next several years, intensifying the poor socio-economic conditions on the Reservation. The goal of this document is to describe the existing water resource supply and infrastructure and to develop technical and fiscal strategies for addressing the problems identified. Specifically, this document:

9. Provides an overview of existing water supplies and how they are managed.
10. Identifies water use and water demand on the Navajo Nation.
11. Presents a general list of water infrastructure deficiencies.
12. Proposes a long-term water resource development strategy for the Navajo Nation.
13. Presents a Plan of Action for implementing the *Strategy*.

BACKGROUND

The Navajo Reservation is the largest reservation in the United States, covering over 27,000 square miles, an area larger than the state of West Virginia. Geographically, the Reservation lies in the Four Corners region, with portions of the Reservation in Arizona, New Mexico and Utah (see Figure 1-A). The on-reservation population of approximately 172,000 is expected to increase to nearly 500,000 by the year 2040. Economic conditions on the Reservation are in a desperate state. With more than 50 percent of the population living below the federal poverty levels, the poverty rate on the Navajo Reservation is among the worst in the United States.

The total domestic water consumption on the Reservation is currently estimated to be about 12,000 acre-feet annually. Per capita water use on the Reservation-wide ranges between 10 to 100 gallons per day depending upon the availability and accessibility of the water supply. By comparison, average per capita use for neighboring non-Indian communities in Arizona is 206 gallons per day. Assuming the on-reservation water users achieve parity with the non-Indian communities in the region (per capita use of 160 gallons per day), the on-reservation municipal water demand is projected to exceed 88,000 acre-feet by the year 2040.

Over 40 percent of the Navajo population is without the basic convenience of running tap water in their homes, and are forced to haul water long distances, to provide water for their families. Economically, this translates to a water cost that is among the most expensive in the United States for a sector of the population that is among the poorest. Additionally, these same water haulers often rely on non-potable water sources such as stock tanks for potable purposes. Those that do have running water depend on public water supply systems that are deteriorating and lack adequate revenues to maintain the systems. Many of these existing water systems have surpassed the maximum sustainable withdrawal capacity of their source aquifer, have poor water quality, and are susceptible to drought.

The lack of a reliable and affordable potable water supply throughout the Reservation stifles economic growth and contributes substantially to a high incidence of disease and infection attributable to waterborne contaminants. This chronic condition places large economic burdens on federal programs that treat diseases and illnesses that otherwise could be prevented if adequate safe water supplies were made available. In a report to Congress by the Comptroller General, it was noted that Reservation families living in homes with unsatisfactory environmental conditions (e.g. inadequate drinking water) placed four times the demand on Indian Health Service (IHS) primary health care systems as those with satisfactory conditions.

The Navajo Nation is committed to improving the standard of living on the Reservation. The fundamental first step in improving the socio-economic conditions is stimulating economic development, which will in turn, reduce demands on federal programs. Recognizing that the supply of water as integral to human health and safety, and economic development, the Navajo Nation has placed one of its higbest priorities on developing a reliable water supply. Accordingly, the Navajo Nation has drafted the water resource development strategy discussed below.

WATER RESOURCE STRATEGY

The *Water Resource Development Strategy for the Navajo Nation* contemplates:

- Preparation of a Reservation-wide needs assessment and project prioritization.
- Establishment of a water resource task force to facilitate implementation through project coordination and organization of the technical and fiscal resources of the Navajo Nation and Federal agencies.
- Development of regional water supply projects.
- Construction / rehabilitation of local water supply and distribution systems.

- Three Canyon diversions and conveyance
- Western Navajo Pipeline
- Ganado Groundwater Development
- Navajo-Gallup Pipeline
- Farmington to Shiprock Pipeline
- Central San Juan River Pipeline

These projects are discussed in greater detail in the *Water Resource Development Strategy for the Navajo Nation*.

Local Delivery/ Distribution Systems

The proposed regional water supply projects would convey domestic water supplies to approximately 65 of the 110 chapters on the Reservation, and will provide capacity to serve domestic water to over 80% of the projected population of 500,000 by the year 2040. However, without additional local infrastructure, there will be inadequate conveyance and treatment systems to deliver potable water from the regional systems to the water user. Additionally, even with the regional systems and associated local distribution systems fully in place, approximately 40 percent of the chapters will rely on alternative water supply sources and facilities. For those systems that currently exist, many require rehabilitation. In many cases, new distribution systems will need to be considered. For cases where distribution systems are determined to be economically infeasible, community wells need to be upgraded and or constructed to improve safe access for water haulers. Rehabilitation and development of, local agricultural irrigation and livestock water systems is also an important component of the overall *Strategy* on the Reservation that must be more fully evaluated.

FUNDING

The Navajo Nation will prioritize its resources, as available, to share in the cost of this initiative. The Navajo Nation will commit resources such as staff, equipment and materials where possible. However, developing the essential water infrastructure will require large capital investments well beyond the current economic means of the Tribe. Funding shortfalls will be pursued through other avenues including:

- Navajo Water Rights Settlements
- Existing Federal Authorities and Annual Appropriations
- New Federal Authorities
- Federal Discretionary Funds
- Federal Grant Programs
- Federal Loan Programs
- State, Municipal, and Private Resources

Attachment B

RECLAMATION AUTHORITIES

Reclamation, pursuant to its enabling legislation, may only expend federal appropriations on those activities for which Congress has provided or granted specific authorization. Beginning with the Reclamation Act of 1902, Congress has granted Reclamation a number of general authorities that enable it to provide technical services to water users. These services are generally limited to non-construction activities. For activities outside of the general, existing authorities, including, but not limited to, feasibility studies and construction projects, Congress must grant Reclamation specific authority before it may expend Federal funds on those initiatives. The following is a listing of (1) existing general authorities under which Reclamation currently works; and (2) project specific authorities under which Reclamation is currently working but for which Reclamation may require new, follow on authorities to continue to the next step.

EXISTING AUTHORITIES

Reclamation is currently providing assistance to the Navajo Nation under a multitude of authorized programs administered in both the Upper Colorado Region and Lower Colorado Region. These programs include, but are not limited to water supply appraisal studies, water management and conservation, water treatment and reuse, drought relief, and drought contingency planning. All of these initiatives fall under one or more of the following existing Reclamation authorizations:

Reclamation Act of 1902; June 17, 1902 and acts amendatory thereof or supplementary to
P.L. 90-537 Colorado River Basin Project Act; September 30, 1968; as amended (12/20/82)
P.L. 98-569 Colorado River Basin Salinity Control Act, as amended; October 30, 1984
P.L. 335 Rehabilitation and Betterment Act; October 7, 1949
P.L. 98-404 Reclamation Safety of Dams Act, as amended; August 28, 1984.
P.L. 102-575 Title XVI Reclamation Wastewater and Groundwater Study and Facilities Act; October 30,1992.
P.L. 102-250 Reclamation States Emergency Drought Relief Act of 1991
P.L. 97-293 Title II, Reclamation Reform Act; October 12, 1982
P.L. 100-707 Robert T. Stafford Disaster Relief and Emergency Assistance Act, Executive Order 12148 Federal Emergency Management; July 20, 1979
P.L. 260 Reclamation Project Act of 1939; August 4, 1939
P.L. 84-984 Small Loan Reclamation Projects Act of 1956; August 5, 1956
P.L. 89-72 Federal Water Project Recreation Act of 1965; July 9, 1965
P.L. 102-575 Reclamation Recreation Management Act, Title XXVIII; October 30, 1992
P.L. Reclamation Recycling and Water Conservation Act; October 9, 1998

MEMORANDUM OF UNDERSTANDING
BETWEEN
THE BUREAU OF RECLAMATION
AND
THE NAVAJO NATION

SIGNATURE PAGE

The Navajo Nation

President, The Navajo Nation — Date: 7-17-00

Bureau of Reclamation

Commissioner, The Bureau of Reclamation — Date: 7/17/00