Overview and Summary of Salton Sea Restoration Project Draft EIS/EIR

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Introduction

During the past eighteen months, the U.S. Department of the Interior, working in partnership with the Salton Sea Authority and many other federal, state, tribal, local and academic entities, has conducted environmental, feasibility, and scientific studies in preparation of a Draft Environmental Impact Statement/Environmental Impact Report (DEIS/EIR) on the Salton Sea in California. This overview, intended to compliment the Draft EIS/EIR being transmitted to Congress and released to the public, provides a general summary of the preliminary findings of the studies as well as offers comments on potential future actions for restoration.

Transmittal of this document and the Draft EIS/EIR, along with its accompanying Strategic Science Plan and the Bureau of Reclamation's Alternatives Appraisal Report, constitutes the Secretary's submission of recommendations and the results of the study as described in the Salton Sea Reclamation Act of 1998 (P.L. 105-372), Section 101(b)(1)(B).

In December 1997, Secretary of the Interior Bruce Babbitt visited the Salton Sea to consult with state, local, tribal, and Congressional officials about addressing the challenges presented by degrading conditions at the Salton Sea. Finding a consensus to improve the health of the Sea among these parties, Secretary Babbitt proposed that the parties: (1) create a joint governmental coordinating mechanism to focus the efforts of the various governmental entities; and (2) undertake an environmental review process under NEPA and CEQA to identify and evaluate specific options for addressing the health of the Sea.

In the months following the intergovernmental consultation at the Sea, the California congressional delegation worked closely with the Department of the Interior, the Salton Sea Authority, the Torres Martinez Indian Tribe, and the State of California to craft legislation that would establish parameters and set an expedited schedule for this review process. Ultimately, Congress passed and the President signed into law the Salton Sea Reclamation Act of 1998 (1998 Act) which established and defined the environmental review and alternatives analysis process which has been ongoing for the past eighteen months. Eighteen months is a truly ambitious timeline to attempt to gain an adequate understanding of such a unique and complex ecosystem. Both the Administration and Congress agreed, however, that acting quickly to evaluate and assess the health of the Sea would be critical to the effectiveness of any future restoration effort at the Salton Sea.

Partners, Roles, and Process

Preparation of the DEIS/EIR has been co-led by the U.S. Department of the Interior/Bureau of Reclamation and the Salton Sea Authority. (The Salton Sea Authority in California is comprised of the Coachella Valley Water District, the

Imperial Irrigation District, the County of Riverside and the County of Imperial, and includes ex-officio representation by the Torres Martinez Desert Cahuilla Tribe and State and federal agencies.) As Secretary Babbitt proposed at the Sea in late 1997, this work has been guided and supported by two entities created for this effort: (1) the Salton Sea Research Management Committee and (2) the Salton Sea Science Subcommittee.

The Research Management Committee is comprised of five members representing the Secretary of the Interior, the Governor of California, the Salton Sea Authority, the Torres Martinez Desert Cahuilla Indian Tribe, and the California Water Resources Center. The Research Management Committee has served the role of providing policy guidance, assisting in directing research priorities, and identifying resources necessary to carry out studies and prepare the DEIS/EIR.

The Science Subcommittee was created to provide scientific evaluations and recommendations required to guide the NEPA/CEQA process to sound conclusions regarding potential alternative actions for mitigating the degradation of the Salton Sea ecosystem and restoring recreational, wildlife, and economic values. The Science Subcommittee's membership comprises primarily science and engineering representatives from a wide range of federal, state, tribal, local, environmental, and academic entities with an interest in the Sea. Regularly held meetings of the Science Subcommittee have been open to the public to allow for general access to the process. In addition, a number of public workshops targeting varying interests and focusing on specific issues have been held to further encourage public involvement.

Public comment also has a statutory role in crafting an Environmental Impact Statement. Simultaneous to the transmittal of the DEIS/EIR to Congress, the Draft shall be made available for public input during a comment period of at least 90 days. Public input, along with detailed engineering analysis of the alternatives, will aid in further refining the Draft.

The Torres Martinez Desert Cahuilla Tribe has played a unique role in informing our analysis. The Tribe has continuously occupied the region for hundreds of years and maintains a unique connection with the cultural and natural history of the region. The Tribe administers thousands of acres which include wetlands, critical habitat, lake shore and lands underlying the Sea. Economic development, recreational initiatives and comprehensive environmental programs make the Tribe a significant and unique partner in the restoration of the Salton Sea.

Restoration of the Salton Sea has inherent international implications that involve Mexico as an important partner. Given factors such as international migratory bird treaties, consideration of pumpout options that contemplate outfall in Mexico, the international aspects of the New and Alamo Rivers, and other facets of restoration, Mexico has had an important role in the current process and must continue to be actively included in the formal comment process and any subsequent implementation process. Mexican representatives from SEMARNAP and CILA (along with U.S. representatives from the International Boundaries and Water Commission) were invited to participate through the Science Subcommittee. Increased involvement from Mexican officials will be important to future Salton Sea restoration activities

and processes.

Background and the Importance of the Salton Sea

The Salton Sea, spanning Riverside and Imperial Counties in Southern California, is a uniquely troubled yet valuable natural resource to humans, to wildlife, and to the agriculture industry. Throughout geologic time, dating as far back as 1.6 million years ago, the "Salton Trough" has periodically been flooded creating bodies of water, and in turn evaporated due to lack of a consistent inflow source. Rising and receding water levels were common in this prehistoric "Lake Cahuilla" due to periodic flooding and the meandering channel of the Colorado River. Inflows to the Trough would cease for extended periods, at times leading to complete evaporation of the lake, with the most recent complete evaporation of Lake Cahuilla probably taking place about 300 to 500 years ago. However, as recently as the 1800s, a number of smaller and more short-lived lakes were witnessed in the Trough a different times. The current Sea was created between 1905 - 1907 when a private irrigation dike was breached by flood waters allowing the entire flow of the Colorado River to flow into the Trough for approximately 18 months. But the current Salton Sea is not just another phase in the cycle of flooding and evaporating in the Trough; rather, as the Strategic Science Plan explains, the Sea today is the product of more permanent inflow sources, the expanded presence of humans, and Colorado River flood control dams. Presently, the Sea has become a critical and incomparable wildlife resource, a valuable recreational resource, and an important element of the regional agricultural industry.

The Salton Sea is an incredibly rich and biodiverse natural resource. The Sea is an extremely productive fishery -- perhaps the most productive in the world. This ecosystem also supports some 400 species of birds; only the Gulf Coast of Texas hosts more species of birds in the United States. Three endangered species -- the Desert Pupfish, the Yuma Clapper Rail, and the California Brown Pelican -- also inhabit the Sea. The Salton Sea hosts such a complex ecosystem that during the past 18 months during which studies were ongoing, 200 new species, never known to exist at the Sea, were identified. The Sea is perhaps most important to a large segment of the migratory birds of the Pacific flyway. Since the creation of the Salton Sea, significant losses have occurred in interior wetlands that might otherwise have provided alternative sites for migratory birds. In California in particular, about 95 percent of interior wetlands have been lost, leaving the Salton Sea as the sole remaining location for many species based on food availability and travel distances between stopover points. In this regard, preserving a healthy Salton Sea is critical to local, regional, and international migratory bird conservation, and to global biodiversity in general.

The Salton Sea also offers a bounty of recreational opportunities. Recreational use at the Sea traditionally has included hunting, sportfishing, boating, birdwatching, and photography. As recently as 1985, visitors to the Salton Sea annually exceeded those at Yosemite National Park. Even with the troubled state of the Sea, more than 250,000 people visited the Salton Sea Recreation Area between 1997 and 1998. These figures are not entirely surprising given that approximately 6% of the U.S. population lives within driving distance of the Salton Sea. The potential economic values of a healthy Sea that draws recreational visitors to the Sea and surrounding communities

and the region clearly are significant.

Agriculture makes up a major portion of the economic base in Imperial County and eastern Riverside County which, in turn, are important producers of vegetables and other produce to the entire nation, particularly in winter. Agriculture in the region is a $1 billion a year industry and provides one in three jobs to the local residents. Adequate drainage is an important element of this agricultural economy, and the Sea historically has provided, and continues to provide, an important repository for such drainage. This agricultural drainage water represents a major source of inflow to the Sea.

It is important that restoration efforts recognize that inflows into the Salton Sea through agricultural drainage water are likely to decrease over time concurrent with the phase-in of new water conservation practices in the Imperial Valley. The DEIS/EIR process to date has considered this likelihood (as the 1998 Act directed) by contemplating various inflow levels as low as 800,000 acre-feet/year. In addition, the Department considers this conservation to be extraordinarily important, particularly as pertains to the necessity that the State of California reduce its reliance on the Colorado River to a level that is consistent with the "Law of the River."

It also is important to note that the Salton Sea is an important component of a large and complex ecosystem. The New River, for example, which flows north into the Salton Sea from Mexico, is a stressed river system that has been the subject of significant clean up initiatives by the U.S. Environmental Protection Agency, the U.S. Bureau of Reclamation, and others. Likewise, because the Salton Sea is maintained by Colorado River flows, it is part of a larger Colorado River ecosystem which includes the Colorado River Delta. Restoration efforts to date have been and should continue to be crafted and guided with this recognition of the Sea as part of a larger ecosystem.

Balancing the values of recreation, agriculture, and wildlife, the Salton Sea is truly a contemporary ecological challenge. Particularly in the West, the future surely will offer many challenges in terms of balancing social, economic, and environmental values in the face of limited water availability. Working to ensure biodiversity while maintaining recreation and economic opportunities will have practical applications well into the 21st century as demand grows on limited water supplies. In this way, the Salton Sea represents a unique proving ground such that the lessons learned here likely will be translatable to a variety of future issues and other environments.

Scientific Studies to Date and the Need for Ongoing Science

The Science Subcommittee (SSC) was created to provide a sound scientific foundation upon which management decisions can be based in considering alternatives for achieving restoration project goals. The creation of this Science Subcommittee and its work parallel to the options evaluation process represents a new and innovative means of breathing real-time science into an EIS/EIR evaluation process. Further science is undoubtedly needed, however, the alternatives and options discussed in the DEIS/EIR are better refined due to the input of the Science Subcommittee into the evaluation process.

Specifically, the Science Subcommittee undertook four primary charges; the

SSC: (i) evaluated existing information on the Sea to determine what already was known, what needed to be verified, and what critical data gaps existed; (ii) initiated focused investigations to describe the current "State of the Sea"; (iii) initiated focused investigations to gain information needed to address major remediation issues; and (iv) developed a strategy for providing effective long-term scientific support for restoration and future management of the Sea. To these ends, the Science Subcommittee identified needs and made recommendations that resulted in contracting for over $5 million in studies which have contributed to refining the alternatives discussed in the DEIS/EIR. In addition, the studies will provide the foundation for establishing baseline data for the Sea, against which restoration efforts can be measured and redirected as necessary.

Determining the "State of the Sea" is of critical importance to any successful restoration project as accurate baseline data will serve, through adaptive management, to guide project goals and measure the effectiveness of remediation efforts in terms of restoring and protecting the ecosystem. The Science Subcommittee's assessment examines and describes the fishery, birds, water quality, critical habitat, vegetation, and contaminant loads among other things, and provides the most comprehensive understanding of the Sea to date.

A number of studies have been undertaken in developing the State of the Sea which have provided a wide range of results. Studies identified as necessary by the Science Subcommittee and subsequently conducted include evaluations of: (1) physical limnology (water and sediment chemistry); (2) biological limnology (algae, invertebrates and plankton i.e., food web components); (3) sediment characteristics and contaminant levels; (4) fish populations (including the endangered desert pupfish); (5) bird populations; (6) vegetation delineation; and (7) algal toxins and biological pathogens in the waters and sediments of the Sea. In turn, for each of these evaluation areas, synthesis documents were developed and provided to inform the project evaluation process. Of particular note, these investigations were conducted in such a manner as to provide preliminary findings on a real-time basis in order to assist in guiding project evaluation, rather than providing a final report on findings well after the investigations were completed, as is typical in studies of this nature.

After evaluating existing data and identifying gaps therein, the Science Subcommittee made recommendations to award contracts for a number of focused scientific investigations to describe the current state of key components of the ecosystem, as well as four studies of fish and avian mortality. (Studies were funded through the Salton Sea Authority by a research grant from the U.S. Environmental Protection Agency.) In addition, eight issue-specific documents were prepared by the Science Subcommittee to address issues that arose through the project evaluation process. The combination of these investigations and numerous meetings involving scientific evaluations of various aspects of the Sea provides the most comprehensive evaluation of the Salton Sea to date. The value of these investigations became self-evident as many of the findings differed from commonly held perceptions and existing conventional wisdom about the Sea. Through these studies, the Science Subcommittee injected current scientific information into the project evaluation process, replacing conjecture and data gaps that previously existed.

The investigations requested by the Science Subcommittee resulted in a variety of findings relevant to restoration, many of them unexpected. Key findings are highlighted below:

* The Salton Sea is alive and vibrant in terms of biological complexity rather than nearly dead - more than 200 species (mostly microscopic) not previously known to exist at the Sea have been identified.

* Fish populations, thought to be very depressed, are actually abundant; in fact, the Salton Sea may be the most productive fishery in the world.

* Pesticides, presumed to be a major problem within the Sea, are not; most pesticide levels in the sediments and waters of the Sea were found to be at below detectable levels of the analytical methods used.

* Though algal toxins have long been thought to be a major cause of fish and bird mortality at the Sea, investigations failed to reveal any evidence of algal toxins causing either fish or bird kills.

* Extensive data has been gathered on fish populations and bird use of the Sea broken down by species, geographic location and time of year; this data will be important to identifying habitat areas that must be protected in the restoration process.

* The distribution of sediments was mapped by particle size and contaminant levels in those sediments evaluated. Findings were notably different than anticipated. Contaminant levels in general were minimal relative to hazard assessments except for a limited number of hot spots. In addition, the deposition of different types of sediments (clays, sand, slit) did not confirm expectations. These sediment findings are important relative to potential dredging activities and use of sediments as construction materials, evaluation of hazards associated with sediments that may become exposed due to receding water levels, and for evaluating the consequences of sediment redistribution that might occur as a result of changes in circulation patterns of the Sea due to constructed impoundments and other features of any restoration project.

* Contrary to perceptions and claims that the Sea is highly contaminated with enteric forms of bacteria and other microorganisms capable of causing human disease, findings have been primarily restricted to bacteria of the genera Aeromonas and Vibrio. These bacteria are primarily optimistic invaders that have no major human health significance.

Although the Science Subcommittee's assessment of the Sea is comprehensive relative to previously existing data, it is basic in terms of what will be necessary to gain a full understanding of the Salton Sea ecosystem. In addition to providing adaptive management to restoration efforts, additional science is underway and necessary in order to address the environmental factors contributing to the causes of disease and die offs among the Sea's wildlife. Given the present basic understanding of the Salton Sea ecosystem, science can only address the symptoms of disease, thus being primarily

reactive. With a fuller understanding of the ecosystem, science will be able to address the causes of disease, and thus proactively provide preventive medicine. Without additional and ongoing science, a permanent solution to wildlife mortality will not be possible.

The Science Subcommittee has prepared a "Strategic Science Plan" (SSP) as an accompanying document to the DEIS/EIR which addresses many of these issues in detail. The SSP provides background and historical information on the Sea and the region, highlights the activities and accomplishments of the Science Subcommittee, and lays the conceptual framework for establishing a continuing Salton Sea science effort linked to restoration of the Sea.

Specifically, the SSP provides recommendations for the development, function, and oversight of a pragmatic science effort to support long-term management actions for restoring the Salton Sea. The SSP makes four primary recommendations for future science activities:

1. Establish a dedicated science office to serve as an interface with restoration efforts.
2. Provide timely, objective scientific evaluation and technical assistance to management of restoration.
3. Establish a long-term database program for supporting investigations and management actions.
4. Establish a steady and reliable funding base for supporting the science office and science needs associated with restoration.

Each of these proposals are discussed in detail the Strategic Science Plan (a companion document to the DEIS/EIR). Given the complexity of the Salton Sea ecosystem and the clear need for further science to better understand and address the challenges presently degrading the ecosystem, the recommendations for ongoing science contained in the SSP will be an integral component of any restoration effort.

Current Status of the Sea and the Need for Action

The Salton Sea ecosystem is highly complex and faces many stressors including nutrient loading, increasing salinity, oxygen depletion, temperature fluctuations and others. These water quality issues taken individually are problematic at a minimum, but in combination, they threaten the ability of the Salton Sea to sustain its fishery, and thus the fish-eating birds of the Sea. Expected reductions in inflows into the Sea in the future will complicate the challenge.

The most visible and perhaps best known malady at the Salton Sea involves wildlife die offs. The massive fish and bird kills that have plagued the Sea obviously signal trouble for the future of the wildlife, but they also bring a host of unpleasant sights, odors, and other side effects to the Sea and the surrounding area. Preventing such wildlife die offs in the future will inevitably mean improving water quality, which is of obvious importance to the fish and ultimately the birds. Of course, addressing water quality alone will not save the Sea, but salinity, specifically, presents the most immediate water quality threat to the wildlife at the Sea. If rising salinity levels are not addressed and addressed soon, the sport fishery cannot survive, nor can the birds that

depend on the fish as food, thus rendering (for those species) other stressors moot. In turn, these losses will negatively impact recreational uses of the Sea, as well as economic returns from those activities.

At present, the Salton Sea's salinity measures about 44,000 mg/L, as compared to 35,000 mg/L for ocean water. Because the Sea has no natural outlet, the only way for water to escape is through evaporation (leaving salts behind in the Sea) which further increases salinity levels. To put this in perspective, by virtue of the salinity content of inflows and the effects of evaporation, the equivalent of a trainload of salt one mile long pours into the Salton Sea every day. It cannot be predicted for certain, but science suggests that once the sea crosses the 50,000 mg/L level, the ecosystem will begin to collapse beyond repair. Logically, a reduction in inflows to the Sea would accelerate this process. Salinity reduction must be part of a larger scientifically-based solution that has the benefit of a fuller understanding of the Salton Sea ecosystem, but salinity presently is the most pressing danger facing the Salton Sea.

It is important to note that the ills of the Sea become more difficult to correct the longer they are left unchecked. Much as paying down an interest-accruing loan begins with the bulk of the early payments servicing interest rather than principal, the longer remediation action for the Sea is delayed, the more difficult and expensive it will be just to return the Sea to a state that can sustain project goals, let alone maintain it as such. Stabilizing the salinity at the Sea at an acceptable level will be one ultimate goal of any restoration effort; however, before salinity can be stabilized at an acceptable level, the amount of salinity must be reduced, and the longer action is delayed, the greater the needed reduction will be.

Even if action were decided upon today, given administrative, budgetary, and logistical constraints, it would likely be eight or ten years before any appreciable results could be realized. The problems at the Sea are worsening, the stress on the ecosystem is increasing, and the window for taking action to save the Sea is closing.

Public Scoping and Criteria for Evaluating Alternatives

The eighteen-month DEIS/EIR effort began with an extensive public scoping process. Two sets of public workshops were held in several locations over a period of several months through which extensive public input was sought and was received. Five goals for the project were established and refined during this period:

1. maintain the Sea as a repository for agricultural drainage;
2. provide a safe, productive environment at the Sea for resident and migratory birds and endangered species;
3. restore recreational uses at the Sea;
4. maintain a viable sport fishery at the Sea; and
5. identify opportunities for economic development around the Sea.

Notably, these goals parallel very closely those set forth in the 1998 Act. The act also included objectives for stabilizing the surface elevation and for reducing and stabilizing the salinity of the Sea. Salinity and elevation control objectives and other specific objectives were developed and refined with the

help of the Science Subcommittee. These objectives and goals are discussed in detail in the DEIS/EIR. Ultimately, it is these goals and objectives that will be used to determine the effectiveness of any actions that are undertaken to improve and sustain the Salton Sea.

Alternatives to address the Sea's salinity and elevation problems have been considered and proposed for over four decades. During this time, several reports have been compiled by the Bureau of Reclamation, the State of California and various local agencies. Many alternatives examined in those reports as well as others were considered during the public scoping phase of the current effort. However, a comprehensive approach to restoration was sought, as many stakeholders expressed skepticism towards the traditional focus on salinity and elevation alone, particularly with regard to wildlife resources. Of the scores of alternatives proposed over the years, thirty-nine alternatives were carried forward for analysis in a pre-appraisal report. Alternatives included evaporation ponds, enhanced evaporation systems, pump-in and pump-out options, and water quality treatment alternatives.

To narrow the range of alternatives to a reasonable number for consideration in the EIS/EIR and to measure and rate potential alternatives consistently, an evaluation criteria process was established and employed. Evaluation criteria and elimination criteria were weighted by a group of local, state and federal stakeholders in a consensus process. The criteria and their weightings were presented to the public during a series of public workshops. The resulting evaluation criteria, in their weighted order, are:

Agricultural Interests
Wildlife
Elevation
Disposal
Water Quality, Salinity
Water Quality, Other
Operations, Maintenance, Energy & Replacement Costs (OME&R)
Finance Costs
Location
Construction Costs
Sport Fishery
Recreation
Economic Development
Intergovernmental Cooperation
Land
Time to Solution
Time to Construction
Partners
Water Removal
Benefits and Impacts

Additionally, alternatives which relied upon unproven technologies or that did not adequately address project goals were eliminated from consideration, consistent with the 1998 Act. Alternatives which showed promise in addressing some objectives but not salinity and elevation were considered in greater detail as a part of an alternatives enhancement process (discussed below).

Each remaining alternative was rated against each evaluation criterion. The

ratings were multiplied by the relative "weight" of the evaluation criterion and summed. Six alternatives rose to the top of the analysis. Further engineering and cost analysis refined the six alternatives, resulting in the five phase one alternatives considered in the DEIS/EIR. Other alternatives which showed promise were considered as part of Phase Two, long-term restoration actions, and included in a more generic fashion in the DEIS/EIR.

A multi-agency task force was established to address objectives not fully satisfied by the major engineering alternatives. Objectives such as implementing and maintaining clean shorelines and reducing the occurrence of large-scale fish die-offs were not adequately addressed by the major engineering alternatives. The Alternatives Enhancement Task Force considered projects and programs that were submitted, and developed a few additional projects and programs to address these issues. Several of these projects and programs are reflected in the DEIS/EIR, generally referred to as Common Actions.

The resulting actions were compiled into a series of composite alternatives. The alternatives share all of the Common Actions, such as shoreline clean-up, fish harvesting, the North Wetland Habitat, a wildlife disease program, and improved recreational facilities. The major difference among the alternatives is how they address salinity and elevation objectives. Additionally, there are three "no action" scenarios, reflecting possible inflow scenarios over time. One no action scenario assumes that the current inflow into the Sea remains the same over time, at approximately 1.36 million acre-feet per year. Another no action scenario assumes an approximately 300,000-acre foot reduction in inflows to the Sea, and the last no action scenario responds to a level required to be considered in the legislation resulting from a 563,000-acre foot reduction in inflow.

Even after the official public scoping process, during the first few months of the 18- month period, public input was actively sought. Additional workshops were held throughout the process, and workshop agendas generally paralleled development of the DEIS/EIR, from goal and objective setting, to evaluation criteria development and alternative identification, to application of the evaluation criteria and refinement of the alternatives, and lastly to presentation of alternatives considered in the DEIS/EIR. In addition to the extensive public workshop program, newsletters were periodically prepared and distributed to every interested party who attended workshops and registered. Special workshops were held with members of the environmental community. On several occasions, workshops were co-sponsored with the Audubon Society and involved several other environmental non-governmental organizations. Additional public workshops/hearings will be held as the formal Draft EIS/EIR review process begins.

Through this extensive public outreach process, the above-described criteria for evaluating alternatives were developed, ultimately resulting in the alternatives for action considered in the DEIS/EIR.

Alternatives for Restoration

Over the past eighteen months, many potential restoration alternatives have been explored and considered. Through public scoping, general engineering and feasibility analyses, consideration of input from the Science

Subcommittee, and considerations of economic practicality (as directed by the 1998 Act), a number of alternatives have been eliminated while several others have been brought forward for further consideration in the DEIS/EIR.

Under the expedited eighteen month process, it proved neither possible nor prudent to identify a clear and decisive final solution for the Salton Sea. The Sea is a truly massive body of water: with 365 square miles of surface area and approximately 7.5 million acre feet or 2.445 trillion gallons of water, it is roughly twice the size of Lake Tahoe. Given the complexity of the Salton Sea ecosystem, the physical environment, and the sheer volume of the Sea, addressing the serious water quality problems at the Sea is an engineering and scientific challenge of historic proportions with enormous cost and feasibility considerations. Considering these complex and interrelated challenges, a phased approach to restoration as contemplated in the DEIS/EIR, that allows further science to inform the process and guide restoration, will likely yield the highest possible degree of success.

The DEIS/EIR provides the framework for a phased or staged approach to restoration, using a combination of alternatives. The phased approach to restoration is premised on the notion that certain components of restoration can be more readily implemented presently while others may require further scientific or engineering analysis. In addition, a successful and enduring Phase One project could preclude the need for a Phase Two project. To this end, the DEIS/EIR espouses a suite of common actions followed by a two phase approach: (i) common actions that can be begun almost immediately (as soon as funding is available), and that will complement any future projects; (ii) Phase One or "medium-term" restoration projects designed to reduce and stabilize salinity for at least 30 years; and if necessary, (iii) Phase Two or "long- term" restoration projects that involve supplementing inflows to the Sea, creating displacement structures for elevation control, stabilizing the salinity level for 100 years or more, and/or more substantial and longer lasting export options.

The first step involves actions, described in the DEIS/EIR as "Common Actions," that generally can be taken without further significant delay. These actions would be complementary to any restoration alternative selected and include: improving recreational facilities; implementing a shoreline cleanup program; undertaking an integrated wildlife disease program; implementing a fish harvesting program to reduce internal nutrient loading and fish population density; and instituting a long-term science program which will serve to provide a more complete understanding of the ecosystem and will provide benchmarks to guide and evaluate the effectiveness of restoration actions.

Phase One alternatives are medium-term actions aimed primarily at reducing and stabilizing salinity levels and would have an effective life of at least 30 years. However, it is worth noting that Phase One alternatives may have a life well beyond the 30 year target and as such, could potentially render construction of a Phase Two project unnecessary. Alternatives in Phase One include: (1) construction of an Enhanced Evaporation System (EES) project, a system that sprays a fine mist of water into the air to accelerate evaporation and create a saline precipitate; (2) construction of one or more evaporation ponds that would concentrate salts within their boundaries to reduce salinity in the Sea (and also could potentially serve as a displacement mechanism to control the Sea's elevation); and (3) a combination of an EES system with evaporation ponds. The DEIS/EIR contemplates various locations for these

alternatives including within the current boundaries of the Sea, at the Salton Sea Test Base property on the southwest shore, and north of Bombay Beach on the eastern shore. Phase One alternatives could be permitted, constructed, and operational within approximately 8 - 10 years and would cost between $305 - $543 million with annual operating costs ranging from $1.7 to $22.8 million.

Phase Two alternatives, if necessary, would consist of major construction projects designed to further enhance salinity control, control elevation, supplement inflow, and/or create outflow. Because future inflows to the Sea may potentially be reduced, the DEIS/EIR contemplates alternatives under three possible inflow scenarios: the present level of 1.363 million acre feet per year (maf/yr), a reduction of 300,000 acre feet to 1.063 maf/yr, and a bottom level of 0.8 maf/yr. While these levels obviously do not reflect the universe of possible inflows, the range provides a useful perspective through which to consider restoration alternatives. Phase Two alternatives include: (1) identification of a reliable source of lower-salinity water and construction of an importation system to dilute the Sea's water; (2) construction of an export system to compensate for the Sea's lack of outflow; (3) construction of expanded capacity for salinity reduction mechanisms employed under Phase One; and (4) construction of displacement structures to control elevation (note: it is possible, depending on reductions in inflows to the Sea and the rate at which they occur, that a displacement structure could be necessary late in Phase One). These long-term projects would become more necessary as inflows to the Sea are reduced over time and would have an effective life of no less than 70 - 100 years. Phase Two project alternatives would require a significant amount of time to design and construct and have wide range of estimated construction costs, varying from as low as $73 million, all the way up to $2.8 billion.

As a footnote, it should be recognized that on-going science efforts could identify restoration project needs that have not been uncovered or discussed in the DEIS/EIR, thus creating the need for additional restoration alternatives. Science must be allowed to continue to shape and inform the process through adaptive management, and as such, restoration projects must be somewhat flexible to allow for periodic "course corrections" provided by science.

Conclusions and Recommendations

The DEIS/EIR does not specify a preferred alternative. Rather, it sets forth a menu of restoration options in various combinations. Public comment and further engineering analysis will aid in further narrowing the field of alternatives. In addition, the Department believes that some comments and recommendations based on existing information are appropriate at this time.

First, the Department recognizes the Sea as an important natural resource with great value for wildlife, recreation and agriculture. As such, the Department recommends, at a basic level, that the Salton Sea should be saved; a no action alternative is not acceptable.

As discussed in this document and in the DEIS/EIR, there are some restoration elements that will complement any ultimate restoration project. The Department recommends that these common actions (recreational facilities enhancements, shoreline cleanup program, integrated wildlife

disease program, fish harvesting program, and long-term scientific monitoring and management program) be undertaken as soon as practical. While they alone cannot cure the ills of the Sea, these actions are important first steps to returning the Sea to a healthy state and a more desirable resource.

To aid in the selection of a medium-term project, the Department recommends that pilot projects to assess the effectiveness and practicality of Phase One alternatives be undertaken with all due haste. The Department further recommends that as soon as results are available from the pilot studies, a Phase One project should be implemented to begin to address the key water quality parameter that poses the most significant threat to the Sea: salinity. Time is of the essence for the Salton Sea, and given estimates for startup for such a project, unnecessarily delaying action will not only make restoration more difficult, but could allow major aspects of the ecosystem to collapse.

The DEIS/EIR requests comment on the potential use of flood flows from the Colorado River as available to supplement inflows to the Sea. The Department has potential concerns about this notion insofar as it may implicate Colorado River management issues that are of special interest to the Basin States, Mexico, and other stakeholders. We actively invite comment on this concept; the Department is not taking a position that favors this potential alternative.

The DEIS/EIR lays the framework for a phased approach to restoration and the Department endorses this notion for a number of reasons. Salinity will cause the collapse of the Sea's fishery (and kill fish-eating birds that depend on the fishery) if it is not addressed in the very near future whereas supplemental inflows and elevation control only become necessary in the future if and when inflows decline. For this reason, a phased approach makes practical sense. Secondly, it is important to recognize that any project(s) undertaken to remediate the Salton Sea will require significant monetary commitments from all involved, keeping in mind the respective capabilities and limitations of all parties. Funding restoration projects in phases over time equates to a kind of payment plan that makes fiscal sense. Thirdly, an engineering project of this extraordinary magnitude over such a long period of time will be well served by a phased approach that can be adapted to fit the changing needs of the Sea. It is impractical at best to accurately predict at this juncture what the state of the Sea will be in 30 or 50 years; a phased approach to restoration provides a much more realistic means of addressing the future needs of the Salton Sea.

Finally, the need for continued scientific monitoring and study bears reiterating. While the scientific examination during the past 18 months has provided the most comprehensive assessment of the Sea to date, perhaps the most important understanding that has come from this work is that we do not yet fully understand the ecosystem at the Salton Sea. Until and unless more comprehensive knowledge of the Sea's ecosystem is attained, we can never truly restore the Sea to the levels identified in the project goals. Moreover, without ongoing science and monitoring, the effectiveness of any future restoration project cannot be accurately gauged. The work of the Science Subcommittee during the past 18 months is invaluable to the restoration process, but it is only a beginning and continued science is essential to finish what has been started. The creation of a dedicated science office to foster this effort, as discussed in the Strategic Science Plan, is

recommended to continue the scientific work.

In summary, restoration of the Salton Sea is an extremely complex challenge that will require a long-term understanding of the problems facing the Sea, and a dedicated but flexible approach. Continued partnerships and collaboration between science and project management, and among federal, state, tribal, and local government entities and others, as well as continued support from Congress, will be essential for restoration of the Salton Sea to succeed.