

Construction

- 1. What is the total amount of agricultural land in the Delta that will be impacted by construction, including disposal of dirt and material, irrespective of any comparison to the 1982 Peripheral Canal plan?**

A total of approximately 6,600 acres of agricultural land would be impacted by construction for the proposed Bay Delta Conservation Plan (BDCP) water delivery facility described by the preferred Alternative 4. This includes the tunnel material sites. Of this total, at least 1,300 acres would be temporarily affected. For comparison purposes, the 1982 Peripheral Canal plan estimated impacts of approximately 6,600 acres of agricultural land in the Delta, but did not quantify the acreages needed to accommodate the conveyance material. The amount of agricultural land impacted represents 0.8% of total land in the study area (comprised primarily of the Delta, Suisun Marsh, and Yolo Bypass) and 1.1% of total agricultural land. Of the 6,600 acres anticipated to be impacted, approximately 6,300 acres are designated as Important Farmland, while the remaining 300 acres are identified as grazing lands.

- 2. How long will construction take, and how will construction activities impact residents, farming, fisheries, recreation, and other economic activities? What provisions are being made for negative impacts?**

Construction of the proposed BDCP water delivery facilities would be sequenced over approximately 10 years. Construction of individual components (e.g. intakes, tunnels) would range from one to six years. Temporary construction-related impacts include noise, visual, and transportation, among others. The construction-related impacts are disclosed in individual resource area chapters in the Draft Environmental Impact Report/Environmental Impact Statement (EIR/EIS). All impacts would be minimized and mitigated to the degree feasible and are described in the individual resource chapters and in the Environmental Commitments detailed in Chapter 3, Appendix 3B.

- 3. How many seismic faults will the proposed tunnels cross? At what depth?**

The San Andreas fault system dominates the seismicity of the San Francisco and Bay Delta region, and it comprises several major faults including the San Andreas, Hayward–Rodgers Creek, Calaveras, Concord–Green Valley, and Greenville faults, as well as many inactive faults. In addition to these major faults, many other named and unnamed regional faults accommodate relative motion. The Delta and Suisun Marsh are in the eastern portion of the greater San

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Francisco Bay region, one of the most seismically active areas in the United States.

State of California mapping shows that the only faults in the BDCP Plan Area capable of surface rupture (i.e., "Alquist-Priolo" faults) are the Green Valley and Cordelia faults. Both faults cross the western corner of the Suisun Marsh Restoration Opportunity Area (ROA).

In addition to the active and inactive faults in the Plan Area that have a surface expression (i.e., a lineament), the Delta is underlain by blind thrusts that are considered active or potentially active, but they are not expected to rupture to the ground surface. Blind thrust fault ruptures generally terminate before they reach the surface. They may produce ground manifestations (i.e., below ground shear zone and/or ground surface bulging) during breaking, but in most cases, no clear surface ruptures.

The tunnel and other water conveyance facilities would be constructed to withstand seismic ground shaking and surface deformation. The Conceptual Engineering Reports for conveyance alignments and construction assumptions, appendix 3, provides details related to facility seismic design criteria.

Figure 9-5 in Chapter 9, *Geology and Seismicity*, of the EIR/EIS depicts the active faults and historical seismicity in the region of the proposed project.

Operation

- 4. Please explain how gravity will function to move water through the tunnels without intermediate pumps. What amount of drop (per foot, and total over the 30 miles) will be needed for the gravity feed, and what energy will be required to retrieve water from the lower depth at the south end of the tunnels and lift it into the canals? What is the altitude above sea level for tunnel entrances and for canals?**

The energy loss due to friction through a 40-foot diameter tunnel flowing at 4,500 cubic feet per second (cfs) is about 0.4 ft per mile of tunnel, for a total of about 12 feet over the 30-mile length of the main tunnels. As long as the water surface in the intermediate forebay is at least 12-15 feet higher than the water surface elevation in Clifton Court Forebay, water will flow by gravity and no additional energy will be needed to lift the water from the tunnels into the Forebay. The existing pumps at Banks and Jones Pumping Plants will continue to

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lift water into their respective canals from the Forebay with no need for additional pumps.

5. What provisions are proposed for maintaining these tunnels over the life of the project?

The California Department of Water Resources (DWR) has been conducting monitoring and maintenance of existing State Water Project (SWP) facilities and has robust protocols for ensuring safety and durability of the water infrastructure it manages. For the BDCP, DWR is proposing that the tunnels be visually inspected either by personnel or by remotely operated vehicle with camera every 5 years. Instrumentation would also be installed along the length of the tunnels to monitor condition of the facility and differential movement.

6. Explain south-of-Delta storage: Where will the project store the extra water that comes in wet years? That is, to what extent is optimum use of this new conveyance dependent on storage projects that have not yet been approved or funded?

The BDCP does not propose any new south Delta storage facilities as part of project implementation. The BDCP also does not call for any more water diversions than is authorized by state and federal law, but it does propose to make water deliveries when the water is available, depending on variety of operational considerations, including time of year, Delta water levels, and needs for fish.

With existing Delta regulatory constraints, the existing SWP and Central Valley Project (CVP) storage south of the Delta is not used to full capacity every year (e.g. San Luis Reservoir). In addition, there are a number of other ways water can be stored south of delta for use. For example, local projects already exist for storage through groundwater banking programs.

The California Natural Resources Agency, California Environmental Protection Agency and the California Department of Food and Agriculture recently released a draft Water Action Plan to identify actions to implement water policy in California. Aimed at providing the foundation for sustainable water resource management, specific actions include expanding water storage capacity.

7. If adaptive management is unsuccessful and species are not recovering, at what point will the fisheries agencies suspend the “take” permits, and what is the plan for export water deliveries if that occurs?

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The BDCP conservation measures include actions to improve flow conditions, increase aquatic food production, restore habitat for covered species, and reduce the adverse effects of many biological and physical stressors on those species. The BDCP also recognizes the considerable uncertainty that exists regarding the understanding of the Delta ecosystem and the likely outcomes of implementing the conservation measures. As a component of the conservation strategy, the adaptive management and monitoring program has been designed to use new information and insight gained during the course of BDCP implementation to develop and potentially implement alternative strategies to achieve the biological goals and objectives. It is possible that some of the conservation measures will not achieve their expected outcomes, while others will produce better results than expected. The adaptive management process describes how changes to the conservation measures may be made in order to improve the effectiveness of the BDCP over time. The Adaptive Management Team will have the primary responsibility for administration of the adaptive management and monitoring program, and will have the primary responsibility for the development of performance measures, effectiveness monitoring and research plans; soliciting independent scientific review; and developing proposals to modify a conservation measure. The recommendations of the Adaptive Management Team will help ensure that the BDCP is implemented according to the conservation measures, “take” permit criteria, and consistent with the Endangered Species Act (ESA) and the Natural Community Conservation Planning Act (NCCPA).

Suspension or revocation of the “take” permits, or portions of permits is possible if the plan is not being properly implemented. Proper implementation means that the conservation measures are being accomplished on a timeline intended under the plan. It also means that the adaptive management program is being followed as the plan intends. If conservation measures are not being implemented as the plan requires, and corrections are not being made to ensure proper implementation, the permitting agencies may have grounds to suspend or revoke the take permits.

In addition, the permitting agencies have the ability to suspend or revoke the permits for a particular covered species where continuation of a permitted activity would jeopardize the continued existence of that species and the impact of the permitted activity on the species has not been remedied in a timely manner.

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Deliveries

- 8. What are the anticipated deliveries to State and Federal project contractors in wet, average, and dry years? How many acre-feet are expected to be pumped through the South Delta pumps during those same wet, average, and dry years? How do those amounts compare to average deliveries during the 1990s and 2000s? Please provide spreadsheets.**

The BDCP would provide an average of 4.7 to 5.6 million acre-feet of water supply in a year (one acre-foot is about as much water as two California households use each year). This “Early Long Term” estimate is for the year 2025 and is about the same amount of water exported through the Delta right now. Water operations would vary depending on the hydrologic conditions (e.g., water year type, actual Sacramento River flows, fish presence), but would always include a required level of Sacramento River flow passing the intakes before water could be diverted. Under all conditions, operational criteria require gradual ramping up of diversions and do not interfere with major river flows. Analysis of the water supply reliability benefits and estimated annual water deliveries of BDCP are included in Chapter 9. The full range of operational criteria by water year type can be found in Chapter 3: Conservation Strategy, Section 3.4 and the corresponding appendices/tables of the public Draft BDCP. In addition, BDCP Chapter 5 and associated tables provide a comparison of alternatives and anticipated water deliveries.

- 9. In addition to “anticipated” water deliveries, what will be the maximum delivery possible if the tunnels are built to the maximum size (15,000 cfs capacity)?**

The BDCP water delivery system is not being built to divert 15,000 cfs. The maximum delivery possible through the new conveyance facilities is 9,000 cfs, as described in the proposed preferred project Alternative 4 in the draft EIR/EIS. Alternative 4 is a “dual conveyance” alternative that includes continuing some deliveries from existing pumping plants in the south Delta, however the maximum deliveries from the dual conveyance system is limited to permitted capacity. The full range of alternatives and their water delivery capacities can be found in the EIR/EIS Chapter 3 (Description of Alternatives).

Water use

- 10. BDCP is not promising additional water to project supporters, but only reliability of supply. Please explain what percentages of this finite supply of**

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export water are currently being used for the following purposes, and whether those relative percentages are anticipated to change: agriculture, urban uses, steam extraction of oil, and fracking.

Seventy percent of SWP water diverted from the Delta is used for urban water districts, and 30 percent is used for agriculture. Conversely, 20 percent of CVP Delta deliveries are used for urban water districts, and 80 percent is used for agriculture. DWR does not monitor whether any SWP water supplies are used for hydraulic fracturing (“fracking”) or oil production, but according to an estimate by the California Department of Conservation, statewide only 270 acre-feet is used annually in California for fracking. It is not clear whether that water comes from the SWP, CVP, or other sources.

11. What do you expect the final cost of water to the contractors will be? What are the current ranges of prices south of the Delta for agricultural water, urban water, and water for oil extraction and/or fracking?

The construction of the water delivery facilities is estimated to cost \$16 billion (in undiscounted 2012 dollars), an amount that would be paid for by the state and federal water contractors who rely on Delta exports. The range of costs for water vary widely among contractors south of the Delta. Costs depend on the source of water, transport facilities, energy requirements, among other factors. For the agricultural customers of the CVP, prices range from \$100 per acre-foot to more than \$400 per acre-foot. The Metropolitan Water District of Southern California, which buys water from the SWP, estimates that the cost of the BDCP would translate into about \$5.00 extra per household, per month in its service area. The final cost of water from the new conveyance facilities would be determined by numerous factors. A number of these significant factors, such as the project yield and allocation of costs, have yet to be determined.

As stated previously, DWR does not monitor whether any SWP and CVP water supplies are used for fracking or oil production.

Species and habitat restoration

12. What is the timetable for restoration? How will you know that the BDCP’s habitat conservation plan is moving forward successfully?

Habitat restoration will occur over the first 40 years of the 50-year permit term and will be sequenced according to a detailed schedule. The BDCP has requirements to complete certain amounts of restoration in 5-year increments, as well as to stay in “rough proportionality” between impacts to each natural

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community and the required conservation for that natural community. The 5-year requirements for restoration were designed to ensure the plan will meet this rough proportionality standard.

Conservation measures that address water operations and other stressors will be implemented beginning soon after the take permit is issued. Construction of the proposed conveyance facilities would begin approximately two years after permit issuance and continue for an estimated 9 to 10 years. Operations could begin as early as year 11. Habitat implementation timelines can be found in BDCP Chapter 6: Plan Implementation.

The success of the BDCP conservation measures is guided by more than 200 biological goals and objectives, which will be carefully monitored and adjusted, as necessary, through the Adaptive Management program.

13. In regard to the statement that the tunnels are necessary to protect fish runs, how will the fish screens on the North Delta tunnel intakes differ from the ones on the South Delta pumps? Are these new screens in use anywhere else? What is their success rate? Who is engineering and testing them?

DWR is developing the designs for the north Delta intakes and fish screens in consultation with state and federal fish and wildlife agencies. Similar to the intake and fish screen used for the Glenn-Colusa Irrigation District intake channel (3,000 cfs) and the Red Bluff Diversion Dam intake (2,500 cfs), the BDCP intakes (3,000 cfs) will be designed as physical barriers to meet modern fish-screening standards mandated by the fisheries agencies.

The current location of the south Delta screens and pumps create a cul-de-sac-like arrangement where fish become easy prey for other fish and birds. In addition, the SWP south Delta screens divert fish to a fish holding facility where they have to be transported by truck and released in another part of the Delta. This induces a great deal of stress on the fish species. The north Delta screens will allow fish to simply pass by and continue on their migratory journey, eliminating the need for holding tanks or fish-hauling trucks. DWR will, however, periodically assess whether any feasible screening options develop in the future.

14. Should the South Delta pumps, which will continue to be operated 51% of the time, including during dry years, have new screens? If not, why not?

The BDCP intends to move the primary point of diversion to the north Delta to restore more natural flows and reduce reliance on the south Delta facilities.

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The existing south delta SWP and CVP facilities cannot be easily modernized. DWR conducted numerous studies that determined new south Delta screens could be more harmful primarily due to their location at the end of dead-end channels, which presents limitations on operations and means that fish collection and trucking will always be necessary. In addition, the dead-end nature of the south Delta intake facilities would cause fish to accumulate in front of the screens and be subject to further predation.

15. Why is no nonstructural alternative for achieving habitat and species restoration being considered?

Over the last two decades a number of options have been presented, some structural, some non-structural. The growing consensus is that a structural change is required in order to make real strides towards water supply reliability and ecosystem restoration.

The existing operation of the SWP/CVP pumps in the southern Delta can cause or increase a reversal in river flows, potentially altering salmon migratory patterns and contributing to the decline of sensitive fish species such as the delta smelt. By relocating the main point of water diversion to the north and establishing new operating criteria to improve water volume, timing, turbidity, and salinity, along with other conservation measures, the BDCP would improve native fish migratory patterns and habitat conditions and allow for greater operational flexibility.

To meet the BDCP's co-equal goals of ecosystem restoration and water supply reliability, BDCP's Conservation Measure 1 seeks to modernize the Delta's water facilities and establish operational criteria to balance the needs of the ecosystem with the water supply needs of California. However, the EIR/EIS does include a full evaluation of a No Action/No Project Alternative.

16. In the October 1 presentation, we were told that the current approach will be getting away from the single species approach to system recovery. Which species may be detrimentally affected by this approach? Will one or more single species be allowed to fail? Which ones? How will that decision be made? Explain how this is allowable under a permitted habitat conservation plan.

The BDCP reflects a significant departure from past management of at-risk Delta species and natural communities, by addressing ecological functions and

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processes at a broad landscape scale while also focusing on discrete components. Past regulatory approaches have relied almost exclusively on iterative adjustments to the operations of the SWP and the CVP, including those reflected in recent biological opinions (BiOps) issued by the U.S. Fish and Wildlife Service (USFWS) (2008) and the National Marine Fisheries Service (NMFS) (2004, 2009). The BDCP proposes fundamental, systemic, long-term physical changes to the Delta, including substantial alterations to water conveyance infrastructure and water management regimes; extensive restoration of natural communities, and measures specifically designed to offset ecological stressors on covered species. These ecosystem-wide changes are intended to not only enhance ecological productivity (structure and function) but also conserve natural communities and the native species that depend upon them.

The BDCP operational criteria of CM1 are meant to be protective for all covered species and, combined with the other 21 conservation measures, contribute to their conservation. Many of the criteria were developed using current understanding of species' needs. Combined with restoration of habitats, reduced illegal harvest, improved passage, and reduced entrainment, the BDCP conserves these species in the Plan Area. Other factors, not limited to but especially climate change effects will be very challenging for all covered fish species. The BDCP does as much as possible to provide a buffer for these effects.

Financing

17. According to BDCP literature, two water bonds are anticipated, one in 2014 to pay for restoration and at least one more within 50 years for additional work. What is the back-up plan if voters do not approve these bonds? Under what circumstances would conveyance construction begin before restoration funding is secured?

Full funding for habitat restoration is not required before the water conveyance facility can be built and operated. Habitat restoration will occur over the first 40 years of the 50-year permit term. The plan has requirements to complete certain amounts of restoration in 5-year increments, as well as to stay in "rough proportionality" between impacts to each natural community and the required conservation for that natural community. The 5-year requirements for restoration were designed to ensure the plan will meet this rough proportionality standard. So the important metric for restoration is achieving these 5-year targets.

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Funding for the first 10 years of restoration can come from a variety of sources, including the participating state and federal water contractors, federal appropriations, state and federal grants, and the water bond. If the water bond doesn't pass in the first 10 years of the plan, restoration would still occur using other funding sources. Funding from the water bonds is needed to complete restoration by year 40, but they are not needed right away for the plan to be successful.

18. Please distinguish clearly between mitigation and restoration. Exactly what does each involve? Please be specific about what features of the restoration necessary for this project to be permitted are considered by BDCP to be public benefits rather than measures required by the permits being sought. Please explain exactly what the BDCP expects to identify as public benefits that will be paid under the 2014 water bond.

BDCP is required to mitigate the impacts to covered species from its covered actions to comply with section 10 of the federal ESA and provide for the conservation and management of the covered species under the state NCCPA. The BDCP conservation strategy is designed to meet both laws. The BDCP Chapter 8 identifies the funding for BDCP from the participating state and federal contractors and from other sources, such as State Water Bonds and Federal funds (See BDCP Chapter 8, Tables 8-37 to 8-41). Mitigation required to offset the direct and indirect effects of construction activities and operation of the water facility will be funded by state and federal water contractors. The state and federal water contractors will also share in the costs required for the conservation and management of the covered species. For the purposes of the cost estimate, the costs considered as mitigation for the impacts of facility construction and conservation are listed in the BDCP Chapter 8, Table 8-41 along with the rationale for each mitigation calculation. This Table provides estimates of funding provided by state and federal water contractors for their proportion of restoration based on mitigation for construction of certain covered activities and conservation.

The conservation measures, or portions of conservation measures, funded by public state and federal sources are tied to the statewide public benefits of BDCP. Many of these statewide public benefits are described and quantified in the *Draft Statewide Economic Impact Report* available on the BDCP website.

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The 2014 Water Bond is projected to fund \$1.5 billion of BDCP costs, or 6.1% of the total costs. The 2014 water bond would fund portions of the following categories of BDCP actions: habitat restoration, habitat protection, habitat enhancement and management, species and ecosystem monitoring and research, and program administration. These actions have a wide variety of public benefits that are described in the *Draft Statewide Economic Impact Report*, including benefits to ecosystem services, recreation, greenhouse gas emissions, and others (See BDCP Chapter 8, section 8.3.5.1 and Table 8-46).

19. Please provide evidence that irrigators in the southern San Joaquin Valley are willing and able to pay for the water they will receive. Please explain whether and how the situation changes if farmers grow annual crops of lower dollar value that are resilient to annual changes in water supply rather than high value permanent crops that depend on inflexible water supplies.

Agricultural interests in the Central Valley are pursuing the BDCP because they believe it has the means to provide them with the highest level of water reliability at the best possible price. Irrigators will know for certain whether or not the BDCP is a wise investment once the planning process is complete, and they can conduct a full business case assessment. That final determination will be based on the yield, reliability and regulatory assurances that make up the selected alternative. Yield and reliability will significantly determine the cost of water associated with the conveyance facility and will be considered in light of existing project yield and reliability deficiencies.

Similarly, annual crop choices are very dynamic. Irrigators make crop choices based on market conditions, water availability and a variety of other factors. Annual crops play an essential role in providing irrigators with the flexibility to respond to water shortages to manage permanent crops as necessary. While annual crop patterns play an essential role in providing irrigators with the flexibility to respond to water shortages (in that lands can be fallowed to shore up the reliability of supplies for permanent crops as the need arises), this flexibility comes at a cost to both consumers and producers.

Supply/watershed issues

20. To what extent does the success of this habitat conservation plan depend on reoperation of upstream dams, especially on the Sacramento River?

The BDCP Delta operations do not require the reoperation of Shasta, Trinity, Folsom or any San Joaquin River tributary dams. All of the existing reservoir

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operation criteria are met with the same frequency as conditions without the BDCP. However, some changes in the seasonal release patterns at Oroville would occur under the BDCP, primarily related to increased spring releases and reduced summer releases. However, this change in reservoir storage release patterns does not affect long-term storage and as with the other reservoirs, does not conflict with existing applicable operational criteria.

21. Given that the greatest loss of the snowpack resulting from climate change occurs in the watershed of the Feather River, how will Oroville Dam be operated differently to keep water in the river?

Although the changes in upstream flow and temperature resulting from BDCP are limited, the BDCP would affect Lake Oroville reservoir levels at certain times of year in order to provide flows beneficial to fish.

Due to changes in the seasonal timing of releases from Oroville Dam, the Feather River will have lower flows and higher temperatures in summer months of wetter years. These changes and the related effects on fish are described in Appendix 5.C, Flow, Passage, Salinity and Turbidity, Section 5.C.6.2. In addition, higher releases from Oroville are made in the spring, increasing Feather River spring flows, as described in Section 5.5.8.1.4, *Increased Spawning Flows*. The summer flows are reduced to ensure that there are no changes in end of September storage to protect the cold-water pool that helps sustain salmon.

To address broader scale impacts of climate beyond BDCP, DWR and Reclamation are looking at long-term strategies to respond to climate change system-wide.

Water quality

22. What is the timetable for the State Water Resources Control board to place and enforce limits on water that can be exported from the Delta so that outflows and water quality will be preserved? Please describe the future condition of the Bay Delta Estuary in the event that limits are not placed on the amount of water that can be exported from the Delta.

A myriad of restrictions on how much water can be exported from the Delta already exist, and in no foreseeable circumstances will exports from the Delta be unlimited. The State Water Resources Control Board (SWRCB) may place and enforce limits on water rights under its control at any time through a water rights hearing process. Bay-Delta water quality standards that are protective of the estuary exist today, and the SWRCB is currently undergoing a periodic review

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of the standards. The schedule for the current periodic review can be found on the SWRCB website

(http://www.waterboards.ca.gov/waterrights/water_issues/programs/bay_delta/). The SWRCB is expected to implement most new water quality standards through a water rights hearing, which will not be completed for several years.

Current export limitations and operational criteria for the State Water Project and Central Valley Project can be found in the SWRCB Water Rights Decision 1641, commonly referred to as D-1641, with additional limitations described in the Federal Endangered Species Biological Opinions and take permits.

DWR intends that the BDCP would be implemented to manage flows through the Delta to improve the health of the ecosystem while providing reliable statewide water supplies. In addition, before constructing any new SWP Delta conveyance facility, DWR and the Bureau of Reclamation would need to obtain approval from the SWRCB to divert water at any proposed north delta intakes. The SWRCB would hold a water rights hearing to look at impacts of such a diversion on water rights holders.

Governance

23. Chapter 7 of the draft includes a number of 'groups' which must be consulted and reach concurrence. This process does not appear to be nimble enough to deal with any emergency situation. Who has the ultimate authority to 'pull the plug' in response to 'changed circumstances'?

The Adaptive Management Team will have primary responsibility for administration of the adaptive management and monitoring program, and will have primary responsibility for the development of performance measures, effectiveness monitoring and research plans; soliciting independent scientific review; and developing proposals to modify a conservation measure. In the event that consensus is not reached, the matter will be elevated to the Authorized Entity Group and the Permit Oversight Group for resolution. If concurrence is not achieved, the dispute will be elevated subject to the dispute review process explained in Chapter 7, Section 7.1.7, *Elevation and Review of Implementation Decisions*. In addition, section 6.4.2 of BDCP Chapter 3.6 (*Adaptive Management*) describes the process for developing remedial actions to be taken in response to certain changed circumstances.