BDCP
BAY DELTA CONSERVATION PLAN

Delta Science Program Independent Science Review

Bay Delta Conservation Plan Adaptive Management, Monitoring, and Research

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Bay Delta Conservation Plan

- Plan to meet requirements of Endangered Species Act (federal) and Natural Community Conservation Planning Act (state)
- About 60 covered species, including 11 fish; about 14 natural communities
- Covered activities (water facilities and operations; conservation actions)
- Conservation Strategy

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Conservation Strategy

- Biological goals and objectives
- Conservation Measures
  - Water facilities and operations
  - Habitat protection and restoration
  - Other ecosystem stressors
- Adaptive management, monitoring, and research

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Adaptive Management, Monitoring & Research

- Monitoring to set baseline, confirm plan implementation, assess conservation measure effectiveness, and track trends
- Research to address key uncertainties that limit our ability to understand Delta ecosystems
- Adaptive management to improve conservation strategy by refining conservation measures, developing new ones, and identifying/tracking new key uncertainties

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BDCP and Delta Science Program

- BDCP draws on existing and ongoing monitoring via IEP and many other sources
- DSP and BDCP will work together where their needs overlap
- BDCP is focused on addressing regulatory issues related to ESA and NCCPA authorizations
- DSP will have access to BDCP data and studies

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Monitoring

- **Compliance monitoring** determines whether BDCP is being implemented as intended
- **Effectiveness monitoring** determines whether the conservation measures are working as intended, and whether the covered species and natural communities are benefiting from them
- **Trend monitoring** identifies baseline condition and tracks changes over time

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Compliance Monitoring Examples

- CM1: Construction: Show compliance with fish screen design criteria
- CM15: Document predator control actions including techniques, locations, and frequency
- CM2: Operation: Document that flow in Tule Canal/Toe Drain meets operational requirements
- CM7: Document restoration of riparian habitat in GIS database. Map habitat restored for each covered species.

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Effectiveness Monitoring Examples

- Measure levels of dissolved oxygen in the river within the 7.5 mile low DO area of the Stockton Deep Water Shipping Channel.
- Perform plankton surveys using consistent sampling strategy to assess productivity of phytoplankton, zooplankton, and invertebrates that provide important foraging resources for covered fish species.

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Trend Monitoring Examples

- At 5-year intervals following completion of projects restoring riparian or channel margin areas, perform field surveys to assess use of that habitat by juvenile salmonids of covered species.
- Use project GIS system to track landscape continuity metrics for land units in the reserve system, both for BDCP and for BDCP in combination with neighboring conservation plans. Document progress towards attainment of these objectives in annual reports.

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Research Action Example 1

Key Uncertainty: How do Plan operations affect upstream migration of anadromous covered fishes?

- Determine if increased Yolo Bypass inundation attracts more upstream migrating adult fish away from the Sacramento River and into the Bypass
- Determine if there is increased straying of Sacramento River-origin adult fish, or improved homing of San Joaquin River-origin adult fish, as a result of reduced Sacramento River flows
- Determine if covered fish species are caught during predator removal efforts and if so, assess ways to reduce such bycatch

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Research Action Example 2

Key Uncertainty: Is it feasible to design tidal restoration sites to achieve tidal flow velocities that preclude rooting by invasive vascular plants?

- Empirical and lab studies to determine flow constraints on rooting of principal Delta aquatic weed species
- Model studies to assess velocity field for candidate restoration site designs
- Field tests at restoration sites

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Adaptive Management Program

- Purpose: Address uncertainty via institutional learning
- Regulatory: Adaptive management required by both ESA and NCCPA
- Monitoring: Track achievement or remedy non-achievement of biological goals and objectives
- Research: Resolve key uncertainties that impede an effective conservation strategy

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Developing the AM Plan

- Cites "first principles" of AM, e.g. Holling 1978 and more recent theory
- Based on 2007 and 2009 Science Advisors Reports
- Consistent with Delta Plan (draft 5, chapter 2) approach

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Draft Section Outline

- Introduction (Framework)
- Adaptive Management
- Monitoring and Research
- Data Management and Reporting
- Appendix listing monitoring and research actions

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Draft Framework Outline

- Regulatory Context
- Goals, Purpose, Scope
- Roles of AM, Monitoring, and Research
- Integration with existing data and programs
- Roles and Responsibilities

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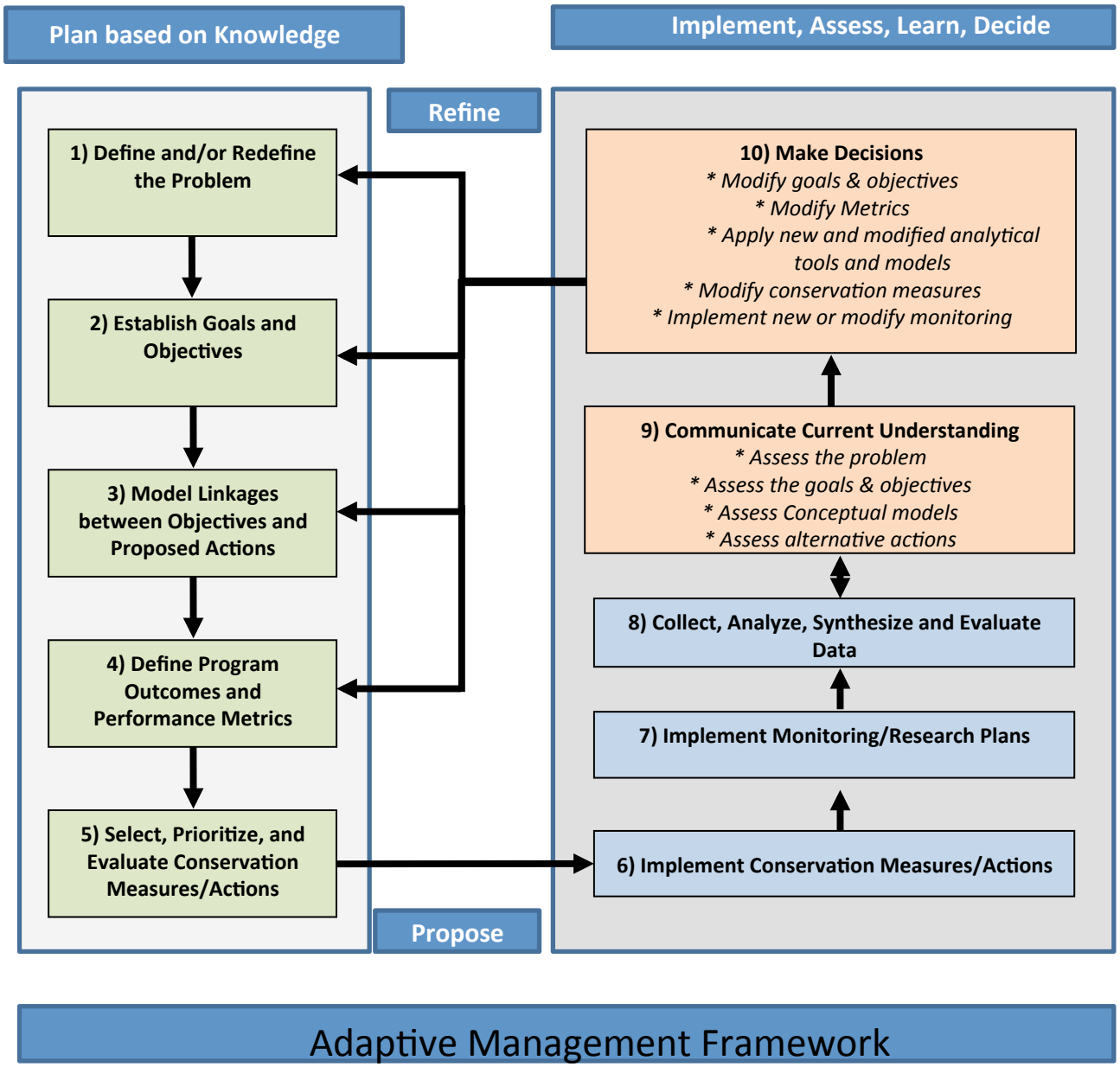
Adaptive Management Process

- See attached Figure 3.6-1
- Process conforms to relevant adaptive management theory and to processes advocated by Science Advisors and DSP



Graphics/... BDCP Other Chapters (4-5-12) AB

Figure 3.6-1
Key Components of an Adaptive Management Framework in Relation to the BDCP

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More Changes to the Draft Plan

- Clearer statements of AM program governance, process, and structure
- Development of adaptive limits to water operations
- More specific and complete lists of monitoring and research actions
- More actions with defined thresholds for AM intervention

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Changes Not Detailed In The Plan

- Program initiation / Workplan development
- Selection/development of monitoring protocols
- Initial research actions
- Data structures development and implementation
- Coordination (DSP, IEP, neighboring plans, etc.)

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Issues Under Discussion 1

- Should the Fish & Wildlife Agencies be full partners in implementation, or have the more typical strictly oversight role?
- Should the Fish & Wildlife Agencies be members of the Implementation Board or a separate permitting oversight entity?
- What level of review and approval should the Fish & Wildlife Agencies have over implementation planning documents?

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Issues Under Discussion 2

- Who will have the final authority for adaptive management decisions? For real-time water operations?
- How should dispute resolution be conducted?
- Should there be thresholds for adaptive management review and decision-making based on performance measures?
- What is the appropriate relationship between the BDCP science and monitoring programs within the IEP and DSP?

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Schedule

mid-May:	Distribute revised Section 3.6 (Adaptive Management, Monitoring, and Research) to agency reviewers
late June:	Public draft BDCP distribution