2. BACKGROUND

2.1 Bay-Delta Problems/Objectives

There is a rich history of conflict over resource management in the Bay-Delta system. For decades the region has been the focus of competing interests--economic and ecological, urban and agricultural. These conflicting demands have resulted in several resource threats to the Bay-Delta: the decline of wildlife habitat; the threat of extinction of several native plant and animal species; the collapse of one of the richest commercial fisheries in the nation; the degradation of ~~the~~ Delta water quality; the continued land subsidence on Delta islands; and a Delta levee system faced with a high risk of failure.

At the simplest level, problems occur when there is conflict over the use of resources from the Bay-Delta system. As population increases, California asks more of the system, and there is more conflict. Single-purpose efforts to solve problems often fail to address the conflict. To the extent that these efforts acquire or protect resources for one interest, they may cause impacts on other resources and increase the level of conflict. Major conflicts are summarized below.

- *Fisheries and Water Diversions.* The conflict between fisheries and water diversions results primarily from fish mortality attributable to water diversions. This includes direct loss at pumps, reduced survival when young fish are drawn out of river channels into the Delta, reduced spawning success of adults when migratory cues are altered, and reduced survival associated with inadequate stream flows and reduced Delta outflows. The need to protect species of concern has prompted restrictions on pumping and other regulations **[for retaining fishery flows in the natural system]** ~~that allow sufficient fishery flows to remain in the natural system~~, which restricts the quantity and timing of diversions.

- *Habitat and Land Use.* Habitat to support various life stages of aquatic and terrestrial plants and animals in the Bay Delta has been lost because of conversion of that habitat to agricultural and urban uses. In addition, some habitat has been lost or adversely altered due to construction of flood control facilities and levees needed to protect developed land. Efforts to restore the habitat can also create conflict with existing uses, such as agriculture and levee maintenance.

- *Water Supply Availability and Beneficial Uses.* As water use and competition for water have increased during the past several decades, so has conflict among users. A major part of this conflict is between the volume of instream water needs and out-of-stream water needs, and the timing of those needs within the hydrologic cycle.

place and operating to meet 1995 level of demand. The graph reflects the average annual variability that occurs from year to year. Memorable extremes, such as the drought of 1976-77, are quite apparent.

The demand for water also varies over time. Agricultural demands tend to be higher than average in dry years, because there is less **[precipitation available]** ~~natural soil moisture~~ and plants need more irrigation. In addition, local supplies may be more limited in dry years, which imposes further demands on water imported from elsewhere in the system. Agricultural water demand also varies substantially seasonally; the demand is highest in the summer, when natural flows are lowest.

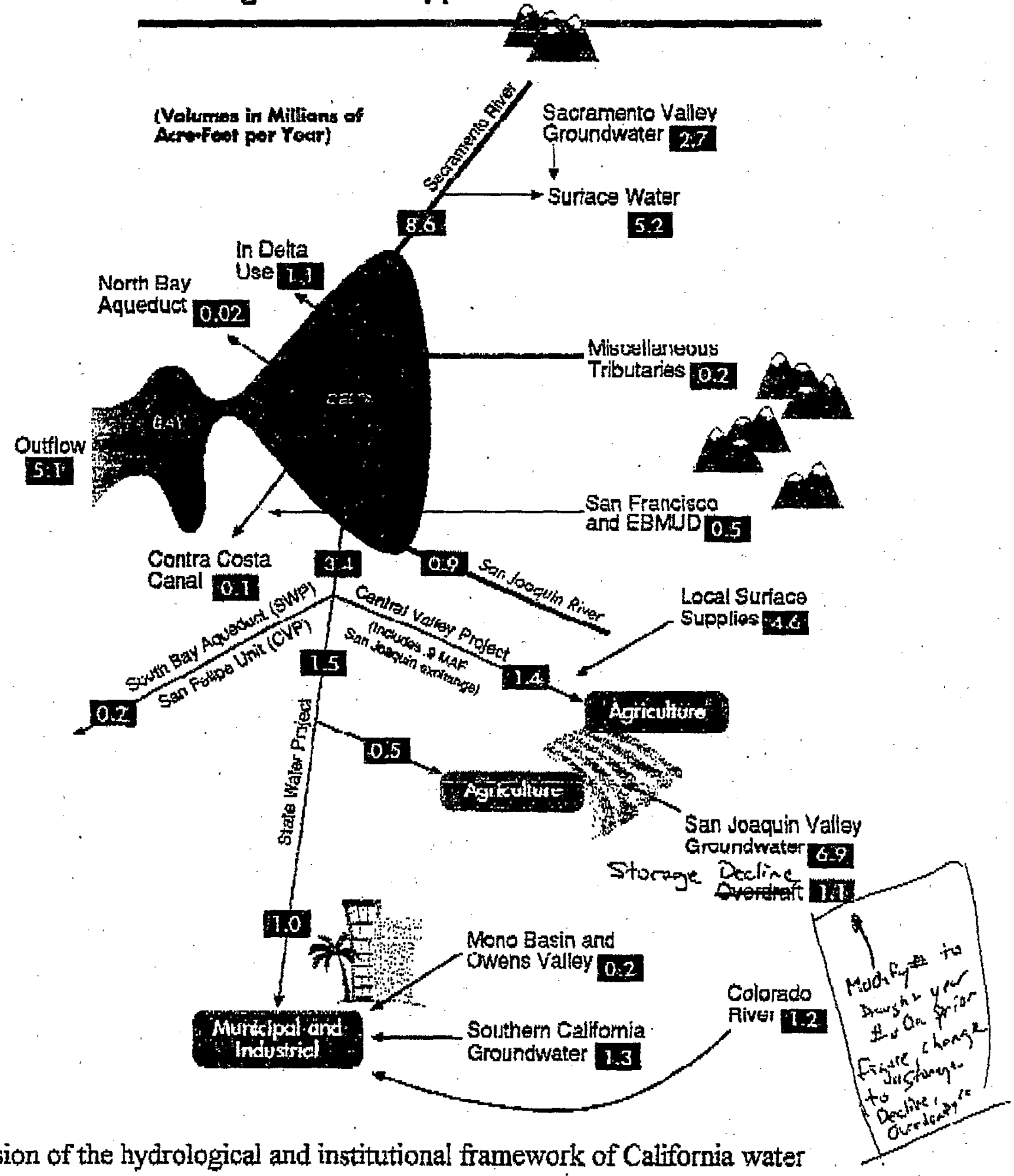
Urban demands for water vary as well. Many urban areas experience substantial seasonal variation in demands for landscaping irrigation. In addition, urban areas dependent on the Bay Delta for some or all of their drinking water supply place a significant premium on the quality of water (in addition to the quantity). In dry years and in dry seasons, increased salinity in the Bay Delta (from both saltwater intrusion and upstream discharges), reduces the usefulness of Bay Delta water to urban users.

The value of water in the ecosystem varies over time. For example, high flows in the early spring have substantial ecosystem benefits, including maintaining river and stream channels and triggering behavioral changes in some species, such as anadromous fish, that have evolved in this variable system. Ecosystem water needs are generally more consistent with the natural seasonal flow pattern than consumptive water demand, but historic changes in the system have resulted in circumstances where existing flows are low during times of high ecosystem need.

Variation in ecosystem demands for water is highlighted in the Figure, below, which illustrates the hypothetical impact of the water diversion system on natural flow patterns.

Water Management in California

Drought Period Supplies 1995-level Demand



Second, the figures show clearly an ongoing problem with groundwater overdraft in the San Joaquin Valley. This is especially true in the dry year scenario, where groundwater pumping has been used to make up for significant shortfalls of imported water. The problem of groundwater overdraft is critical to long term water management in California. Overdraft can cause both land subsidence and **[increases in ground water pumping costs]** ~~the collapse of valuable underground storage capacity~~. In addition, concerns about groundwater depletion and degradation are frequently voiced in the debate over water transfers in the State.

The preceding discussion of the hydrological and institutional framework of California water management is useful in understanding the current conflicts over water resources in the State. In recent years, the water management systems has experienced increasing stress as the regulatory process has started addressing the environmental degradation evident in the Bay Delta system. In effect, these regulatory measures have increased Delta outflow and reduced diversions, forcing consumptive water users to turn to other sources (groundwater pumping, water transfers, etc.) Given that the last several years have generally been wet water years, the impacts of these environmental measures have generally been muted.

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The following figure shows the results of the application of these measures during the 1987-92 drought. The environmental measures were not yet in force during that period. The figure shows that their application would have resulted in decreased deliveries and loss of flexibility. This is an **[already existing]** ~~current~~ matter of concern, one that is not dependent on projected **[increases in future]** water demand.

Defining water supply reliability

CALFED has identified water supply reliability as one of the major problem areas it will address. Unfortunately, this term means different things to different people. Some interpret the term as meaning average water deliveries or average deliveries during dry periods. As shown above, average deliveries don't adequately account for the extreme variation in California hydrology. Further, a focus on dry period deliveries is generally just another way of restating the fact that conflicts over water are most intense during dry periods. Some stakeholders have suggested that the proper measure of water supply reliability is the ability of the system to provide for both a sustainable urban and agricultural economy and a healthy ecosystem.

environmental benefit at later more critical periods

- **Shift high pumping to seasons of high flows**, especially high San Joaquin flows
- **Shift high pumping to seasons of low fish sensitivity.** Current requirements in the WQCP and Biological Opinions require seasonal adjustments in operations, modified by hydrological patterns. Further protection to allow recovery may need to expand on these tools. Seasonal shifts in operation may be most appropriate for conditions that occur predictably or where the times of sensitivity overlap for several species. Examples of such seasonal responses that the DEFT team has considered include: increasing the period of the Vernalis Adaptive Management Program from 31 to 60 days and relaxation of the Export/Inflow ratio to 75% in August and September

Operational changes [*** **to be determined*****] would also include modifying flow volumes, distributions, frequency, and pathways. Flows may be changed by altering inflows, exports, barriers (e.g., Delta Cross Channel, Head of Old River barrier, Montezuma Slough salinity barrier, etc.). Proposed changes include:

- **[***development in progress***]**

Note: Work on water operations is currently under development. The following summarizes an operational scenario for Stage 1

Operational Scenario for Stage 1

An operational scenario may combine the certainty of stricter standards with the flexibility of an environmental water account. Stricter standards are most appropriate for species with predictable times of vulnerability and for which there is a good understanding of their sensitivities. Active management, wherein decisions are made based on real-time data, is most suited for those species whose needs are likely to shift greatly from year to year. Adaptive management is most suited for those species whose sensitivity to entrainment is poorly understood, and an experimental approach can be used to improve understanding. Both active and adaptive management benefit from the flexibility of an environmental water account.

Standards adequate to protect all species that might be at risk in all years are **[likely to be a hydrologically inefficient means for protecting intended fisheries species and are]** certain to have major adverse effects on water project operations, including biologically significant aspects. In addition, the mechanisms behind indirect mortality, the role of export operations on migratory success and indirect mortality, and the importance of these effects on the adult population levels

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of **[Delta fisheries such as]** longfin and delta smelt, are all poorly understood. Adaptive management is the preferred CALFED method for addressing such uncertainty. Adult populations of smelt vary by orders of magnitude from year to year and population sizes of most salmon vary strongly in response to **[factors such as]** hydrological conditions three years earlier. These annual fluctuations in adult population sizes tend to heighten concerns about entrainment effects in years when populations are small. Active management decision-making using an environmental water account can reduce these concerns by emphasizing protection of species in years when their populations are at greatest risk.

Environmental Water Account (EWA)Concept

An environmental water account can provide the flexible ~~but firm~~ basis for active and adaptive management **[that builds on the operational requirements already in place through the Bay-Delta Accord and other measures]**. This flexibility can allow the manager of the EWA to provide more protections for ESA species than strict standards, while water supply and water quality are improved. The EWA is a way to shift from the current project operations in a way to increase biological protection without **[further]** harming water users. An EWA account can have a combination of water and money assets that would allow an EWA manager to reduce direct and indirect morality and enhance the ecosystem. For example, an EWA could be used to reduce exports at critical times that cannot be will defined in advance, by drawing **[water]** out of the account (storage south of the Delta) to make the exporters whole, or use EWA money assets to purchase replacement water. The account could be filled by **[storing surplus flows with unused conveyance capacity,]** purchases, trades, or flexing an environmental standard (at the discretion of the EWA manager). The account could be held in surface reservoirs, groundwater and or option contracts in locations upstream, in-Delta, and /or south of the Delta.

EWA assets grow over time by:

- Refillable, high priority storage
- Water options and purchases
- **[Priority]** Access to facilities for diversion and transport
- Water conservation/reclamation
- Ability to grant variances to export standards
- Contingency fund

Water User assets grow over time by:

- Expanded access to diversion facilities
- Increased storage
- Water transfers
- Water in exchange for mortality reductions

1. ~~**Finalize coordination among agencies or agreement**~~**Complete a decision on** ~~**new entity for implementation of the ERP (yr 1-3)**~~**an overall CALFED management structure.** This decision will reflect the manner in which the overall CALFED program is managed and coordinated. It will also assign responsibilities for each of the program's elements to a new entity, existing entity, or combination of entities. ~~Legislative r~~**[R]ecommendations [for required legislation]** will be made, if necessary.
2. ~~**Refine conservation strategy (yr 1-3); e.g., and develop mechanisms to allow incidental take, where necessary, for those actions identified in the ROD to be completed during Stage 1**~~**Complete a decision on an ERP entity**. Over the past two years, stakeholders have done considerable work on the need for a separate entity to carry out the ERP. A high degree of consensus among stakeholders has been reached on the need for a new organization to carry out the many new ERP tasks. The nature and specifics of an ERP entity will be decided, and legislative recommendations made if necessary.
3. ~~**Recommend legislation, if necessary, to implement new institutional arrangements or facilitate program implementation (yr 2-3)**~~**Complete the Conservation Strategy.** The Strategy will be mitigations and actions for species recovery, and will provide the framework for incidental take associated with Stage I actions. (See Page ___)
4. ~~**Incorporate**~~**Complete the** ~~**final State Board's water rights decision for allocation of responsibility to meet flow requirements for**~~**Agricultural Water** ~~**Quality Control**~~**Use Efficiency Strategic Plan** ~~95-IWR6 (May 1995) in water transfer and operational rules (yrs 1-2)~~. (See Page ___)
5. ~~**Implement**~~**Develop an** ~~**environmental documentation and permit coordination process (yr 1-7)**~~**operational plan for water allocation.** The plan will move beyond the State Board's water rights decision for allocation of responsibility to meet flow requirements for Water Quality Control Plan 95-IWR, and will be consistent with all regulatory requirements.

~~**6.**~~

~~**Assurances in Stage 1 are in many cases provided in**~~**Identify the** ~~**way that actions have been selected and proposed for implementation**~~**first group of Stage I projects, and** ~~**by linkage and integration with other Stage 1 actions**~~**implement an environmental documentation and permit coordination process.** Certain Stage I projects have little controversy associated with them, and could move forward quickly. To enable these projects to move forward with a minimum of delay, a process to streamline or consolidate permitting and CEQA/NEPA requirements will be implemented.

7. **Complete a Programmatic Section 404 Assurance**. This programmatic document will present a clearly-defined 404 process with appropriate decision criteria. (See Page ___)
8. **Complete a recommendation on an Urban Conservation Certification entity, and recommend legislation, if necessary.** A decision will be made on what