Ecological Principles to Guide Delta Vision

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Principle 1. The physical environment (hydrology, climate, chemistry, landforms) of the Delta establishes the template within which the ecosystem mosaic is formed.

Main Policy Implication: Necessary physical structures and processes must be in place to sustain desired species and ecosystems in the Delta.

Principle 2: The natural environment of delta/estuaries is dynamic and variable and the organisms that live there are adapted to that variability.

Main Policy Implication: Management of the Delta/estuary needs to incorporate enough of the natural variability of estuaries to provide the necessary environmental template for native species.

Principle 3: Climate and weather are primary drivers of the physical environment of the Delta/estuary, and climate is becoming warmer, drier, and more variable.

Main Policy Implication: Management of the Delta/estuary will need to be robust to change and uncertainty and designed to respond to conditions that may change rapidly.

Principle 4: Individual species have particular tolerances for temperature, salinity, etc., that have changed in the past and will continue to change in the future to the point that they exceed some species tolerances.

Main Policy Implication: Loss of some species may be inevitable. Creative forms of biodiversity conservation, such as establishment of refuge populations may be appropriate for some species.

Principle 5: Humans and human created landscape units are integral to the ecosystem mosaic of the Delta and have profound influence on the overall ecosystem dynamics.

Main Policy Implication: Management of human activity and uses of the landscape and water is integral to successful management and conservation of desired species, ecosystem types and biodiversity.

Principle 6: Green plant production drives ecological production in the Delta. Local plant production is the most important food source in the estuary but aquatic plant production is unusually low.

Main Policy Implication: Existing levels of primary production in the delta/estuary must be maintained and increased if possible.

Principle 7: There are various pathways through which green plant production can sustain the food web. In the aquatic ecosystems of the Delta, an inefficient path through microbes the the most common path.

Main Policy Implication: Management of natural communities should emphasize ways to enhance the more efficient, direct pathway for energy transfer in the aquatic community.

Principle 8: “Keystone” species in an ecosystem have effects that cascade through the food web and determine structure. Humans often act as a keystone species.

Main Policy Implication: Management policies affect many aspects of an ecosystem and need to be framed in terms of of their consequences for the ecosystem as a whole.

Principle 9: The dynamics of individual species is determined by the balance of births and deaths.

Main Policy Implication: Multifactorial, ecosystem-based approaches to species conservation are more likely to be successful than approaches that address single high profile "causes".

Principle 10: The estuary/delta is a mosaic of terrestrial and aquatic ecosystems that interact in important ways.

Main Policy Implication: Management policies need to be informed by a landscape perspective that recognizes the interrelationship among patterns of land and water use, patch size, location, connectivity, and species success.

Principle 11: Invasive species are capable of disrupting ecosystem processes and can have serious negative effects on native species.

Main Policy Implication: An aggressive, multibarrier approach is needed to address the serious and growing problem of invasive species in the ecosystem.

Principle 12: Ecosystems are complex, dynamic, and self-organizing. The Bay-Delta ecosystem is human dominated and any sustainable vision needs to incorporate both its human and the non-human dimensions.

Main Policy Implication: Governance for the Bay-Delta should be based on the concept of ecosystem-based management (EBM), a concept that integrates society, economy and the environment.