

Ecosystem Work Group Progress Report

Delta Vision Blue Ribbon Task Force
28 May 2008

Ecosystem Recommendations Structure

- Five *Desired Ecosystem Characteristics*
 - One or more *Indicators* for each Desired Ecosystem
 - One or more *Performance Targets* for each Indicator
 - Collection of *Strategies* to meet each Performance Target and thus achieve each Desired Ecosystem Characteristics

** Most strategies support multiple Performance Targets and Desired Ecosystem Characteristics

Desired Ecosystem Characteristics

Delta should function as element of a healthy estuary by achieving the following Desired Ecosystem Characteristics:

- 1) Viable populations of native resident and migratory species
- 2) Functional corridors for migratory species
- 3) Diverse mosaics of habitats and ecosystem processes
- 4) Stressors below adverse effects levels
- 5) Provide important human services

Key Strategic Principles

- 1) Ecosystem degradation is due to multiple factors thus we need multi-faceted strategies to remedy
- 2) Increase diversity and variability of the physical environment to support a more diverse and resilient biological community
- 3) Different strategies are generally necessary to meet needs of resident and migratory species
- 4) Inadequate knowledge of water quality impacts drives need for ongoing monitoring and results-based new strategies and actions
- 5) Focus physical habitat restoration around Delta margins and Suisun to improve resiliency in the face of climate change, sea level rise, and other uncontrolled forces

Key Strategic Principles

- 6) Needed protections are generally measured at monthly to seasonal time scales, not days
- 7) Diversions and Withdrawals:
 - a) Reduce overall withdrawals to meet ecosystem needs
 - b) Provide “restored” ecosystem water at times, locations, and quantities aimed to maximize ecosystem benefits
 - c) Locate diversions alongside rather than at the end of waterways and avoid/reduce withdrawals at key fish passage times to reduce entrainment effects
 - d) Separate drinking water supply intakes from ecosystem restoration to reduce water quality conflicts

Science and Adaptive Management

- Question #1: progress toward meeting our targets?
- Question #2: effectiveness of our strategies?
- Question #3: accounting for conditions we cannot control?
- Science-based monitoring and analyses plus research yields the data and understanding necessary to address these questions
- Apply our findings to policies, strategies, actions, goals

Desired Ecosystem Characteristic #1

Viable populations of native resident and migratory species

Indicators:

A) Abundance

Example target: Delta smelt and longfin smelt \geq average value of 1967 to 1983 Fall Mid-Water Trawl
(1996 USFWS Native Fishes Recovery Plan, currently under revision)

B) Distribution

Example target: Delta smelt present in pre-1983 range
(1996 USFWS Native Fishes Recovery Plan, currently under revision)

Desired Ecosystem Characteristic #1

Viable populations of native resident and migratory species

Example strategies:

- Establish 35,000 acres of fall smelt habitat
- Remove trigger for Roe Island requirement
- Restore tidal marsh habitat in Cache Slough complex
- Shift Cache Slough net tidal exchange to greater connectivity to Sacramento River
- Minimize *Corbicula* and *Egeria* establishment in restored marsh

Species,
Human
Benefits



Improved
Functions



Restore
Habitats

+

Restore
Processes

+

Reduce
Stressors

Desired Ecosystem Characteristic #2

Functional corridors for migratory species

Indicators:

A) Migration success

Example target: 95% adult and 50% juvenile survival through the Delta (encompasses targets B&C below)

(recent IEP studies, VAMP, North Delta)

B) Connectivity to upstream and downstream habitats

Example target: No passage delay, blockage, or mortality by physical barriers

C) Environmental water quality and flow

Example target: No passage delay, blockage, or mortality by low DO, high temperatures, contaminants

Desired Ecosystem Characteristic #2

Functional corridors for migratory species

Example strategies:

- Install weirs to improve migration into desirable corridors
- Make flow events coincide with outmigration and maintain flows through delta
- Close gates that divert fish off migratory corridor
- Monitor fish health at suspected toxic sites

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Restore
Habitats

+

Restore
Processes

+

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Desired Ecosystem Characteristic #3

Diverse mosaic of habitats and associated ecosystem processes

Indicators:

A) Quantity

Example target: all suitable Delta lands for tidal marsh over the long term (~80,000 acres) as needed

(Delta land elevations (2007 LiDAR) and tide heights – National Ocean Service, DWR)

B) Quality

Example target: multiple large habitats complexes

C) Distribution

Example target: in Delta and Suisun along multiple gradients of salinity, riverine/tidal, sediment supply

D) Connectivity within and between complexes

Example target: wide areas of land-water interfaces

Desired Ecosystem Characteristic #3

Diverse mosaic of habitats and associated ecosystem processes

Example strategies:

- Restore as much tidal marsh acreage, inundate floodplains in as many years as possible, and restore open water in geographically-linked complexes
- Preserve, enhance adjacent uplands and seasonal wetlands
- Resolve major export effects on net transport (e.g., Barker Slough, South Delta)
- Address flood protection needs
- Control harmful invasive species
- Minimize methyl mercury production

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Reduce
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Desired Ecosystem Characteristic #4

Stressors below levels of adverse effects

Indicators:

A) Magnitude of contaminant effects

Example target: <5% estuarine and anadromous fish show evidence of exposure, no massive fish kills

B) Magnitude of entrainment

Example target: Delta smelt, longfin smelt proportional to preceding FMWT adults

C) Magnitude of current and future harmful invasive species effects

Example targets: short-term: halt *Egeria* expansion
Long-term <50% average 1990-2000 abundance and distribution (*UCD distribution studies*)

Desired Ecosystem Characteristic #4

Stressors below levels of adverse effects

Example strategies:

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Restore
Habitats

+

Restore
Processes

+

Reduce
Stressors

- Reduce exports when smelt are spawning in delta
- Relocate export intakes from smelt habitat
- Limit wastewater discharge toxicity when salmon are migrating
- Improve conjunctive use programs that shift highest exports to wettest periods and lowest exports to driest periods

Desired Ecosystem Characteristic #5

Provide important human services

Indicators:

A) Regulating services

Example target: take maximum advantage of opportunities to provide flood protection benefits alongside ecosystem restoration efforts

B) Cultural services

Example target: double recreational use

Desired Ecosystem Characteristic #5

Provide important human services

Example strategies:

- Integrate floodplain creation and enhancement with local flood protection needs, such as Stone Lakes area
- Restore extensive tidal marsh habitats to improve fishing and hunting opportunities
- Provide flows necessary for salmon migration to improve their abundance for fisheries
- Construct treatment wetlands to remove nutrient loadings from all municipal wastewater facilities within and above Delta

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Improved
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Restore
Habitats

+

Restore
Processes

+

Reduce
Stressors