

Table 1. Habitat Restoration Alternatives Matrix

Alternative Number	Alternative Designation	Alternative Summary	Acreage		Restoration Design Features							Corps Criteria			
					A Limited Sediment Import (using clean and local sediment)	B Blocking Borrow Ditches at Breach Locations	C Excavating Historic Slough Channels and Creating Berms	D Breaching Levees at Historic Slough Channels	E Phasing of Breaches within Ponds	F Phasing of Breaches Within Pond System	G Coordination with FWS to provide deep-water habitat in Napa-Sonoma Marshes	Effectiveness: Achieves opportunities and alleviates problems; achieves desired output.	Efficiency: Most cost-effective means of alleviating problems and realizing opportunities; benefits must outweigh the costs.	Acceptability: Acceptance by state and local entities, as well as public; compatibility with laws, regs, and public policies.	Completeness: Accounts for necessary investments; includes all required measures to achieve desired outputs.
	No Project Alternative	Maintain and manage ponds in their existing configuration. Increase water flow into individual ponds, if possible, to minimize short-term habitat damage. Repair levees as feasible.	Full Tidal Existing sloughs and accreted marsh and Pond 2A: 3,220 acres	Managed Tidal and Non-Tidal Managed Pond Habitat (Ponds 1, 1A, 2, 3, 4, 5, 6, 6A, 7, 7A, 8): 6,610 acres	no	no	no	no	no	no	no	- Not effective. Will result in increased salt contents in ponds over time, leading to long-term habitat degradation. Potential for catastrophic brine or bittern spill.	- Long-term maintenance of levees and on-going pumping of water will be costly in the long term.	- Not acceptable to regulatory or resource agencies, or local public.	0 Low to moderate capital costs, significant long-term maintenance costs.
1	Mix of Managed Ponds and Tidal Habitats: Breach Ponds 3-5 in phased approach and add some design features. Use adaptive management to determine future of Ponds 6/6A. Manage existing high quality habitat (Ponds 1, 1A, 2, 2A). Reduce salinities and manage depths of Ponds 7, 7A, and 8 to improve habitat values.	Open Ponds 3-5 to the tidal prism in an orderly manner depending on accretion rates and sediment budget. Design features used as needed for improved accretion rates and habitat evolution. Pond 3 is opened to tidal action first. Keep Ponds 1, 1A, 2, and 2A as they are, with levee repair and water control improvements as needed. Keep Ponds 7, 7A, and 8 as managed ponds after reducing salinities, with levee repair and water control improvements as needed. Ponds 6/6A are managed as ponds during restoration of Ponds 3 through 5. Ponds 6/6A are maintained as ponds for 10 to 20 years (to allow significant habitat development to occur in Ponds 3, 4, and 5 and to determine availability of alternative open water habitat for waterfowl and shorebirds). Alternative 2A ultimately creates tidal marsh in Ponds 6/6A, Alternative 2B retains them as managed ponds (dependent upon success of Ponds 3, 4, and 5, availability of other waterfowl and shorebird habitat, and funds available for operations and maintenance).	New Tidal Marsh, Mudflat, Slough, Open Water (Ponds 3, 4, 5): 3,045 acres. Existing Tidal Marsh and Slough Habitat (incl. Pond 2A): 3,220 acres	Managed Pond Habitat (Ponds 1, 1A, 2, 7, 7A, 8): 2,357 acres Adaptive Management Approach either pond (Alt 1B) or tidal marsh (Alt 1A) habitat (Ponds 6/6A): 1,209	possible	yes	possible	possible	possible	yes	yes	+ Provides a diversity of habitats and allows for adaptive management.	0 Efficient means of achieving habitat objectives. Long term O&M required for managed ponds (maintenance of levees and water control structures). Extensive long term O&M required if 6 and 6A are kept as ponds as the levees are difficult to access.	+ Provides mosaic of habitats and accounts for erosion of existing habitat as new habitat is created. Results in the loss of some open water habitat.	+ Complete alternative. Efficient use of site and investments. Requires investments in levee repair and water control structure repair or replacement.
2	Tidal Habitats Emphasis, with Reconfigured Levees: Breach Ponds 3-5, east half of 2, and 6/6A in phased approach and add some design features. Manage existing high quality habitat (Ponds 1, 1A, west half of 2, 2A). Manage depths of Ponds 6, 6A, 7, 7A, and 8 to improve habitat values.	Open Ponds 3, 4, 5, 6, 6A, and east half of 2 to the tidal prism in an orderly manner depending on accretion rates and sediment budget. Design features used as needed for improved accretion rates and habitat evolution. Pond 3 is opened to tidal action first. Ponds 6/6A are maintained as ponds until significant habitat development occurs in Ponds 3, 4, 5, and east half of 2. Keep Ponds 1, 1A, west half of 2, and 2A as they are, with levee repair and water control improvements as needed. New levee built in middle of Pond 2. Keep Ponds 7, 7A, and 8 as managed ponds after reducing salinities, with levee repair and water control improvements as needed.	New Tidal Marsh, Mudflat, Slough, Open Water (Ponds 3, 4, 5, 6, 6A, half of 2): c. 4,644.5 acres Existing Tidal Marsh and Slough Habitat (incl. Pond 2A): 3,220 acres	Managed Pond Habitat (Ponds 1, 1A, half of 2, 7, 7A, 8): c. 1,966.5 acres	possible	yes	possible	possible	possible	yes	yes	+ Provides a diversity of habitats, with a focus on tidal marsh.	0 Efficient means of achieving habitat objectives. Slightly higher initial cost than Alt. 2 due to additional levee. Long term O&M required, but less than Alt. 2 or 4, due to less ponds to manage.	0 Provides mosaic of habitats and accounts for erosion of existing habitat as new habitat is created. Results in extensive loss of open water habitat.	0 Complete alternative. Efficient use of site and investments. Requires large investments in a new levee, along with levee repair, and water control structure repair or replacement.
3	Managed Pond Emphasis: Breach Ponds 3 and 4 in phased approach; add some design features if needed. Manage existing high quality habitat (Ponds 1, 1A, 2, 2A). Manage depths of Ponds 5, 6, 6A, 7, 7A, and 8 to provide pond habitat.	Open Ponds 3 and 4 to the tidal prism in an orderly way depending on accretion rates and sediment budget. Design features used as needed for improved accretion rates and habitat evolution. Pond 3 is opened to tidal action before Pond 4. Keep Ponds 1, 1A, 2, and 2A as they are, with levee repair and water control improvements as needed. Keep Ponds 5, 6, 6A, 7, 7A, and 8 as managed ponds, with salinity reduction, levee repair, and water control improvements as needed.	New Tidal Marsh, Mudflat, Slough, Open Water (Ponds 3 and 4): 2,274 acres. Existing Tidal Marsh and Slough Habitat (incl. Pond 2A): 3,220 acres	Managed Pond Habitat (Ponds 1, 1A, 2, 5, 7, 7A, 8): 4,337 acres	possible	yes	possible	possible	possible	yes	yes	+ Provides a diversity of habitats, with a focus on managed ponds.	- Efficient means of achieving habitat objectives. Extensive long term O&M required due to number of managed ponds and access difficulties for Ponds 5, 6, and 6A.	+ Provides mosaic of habitats and accounts for erosion of existing habitat as new habitat is created. Results in least amount of tidal marsh habitat.	0 Complete alternative. Requires large investments in levee repair and water control structure repair or replacement.