

Statement of the Natural Heritage Institute

**Before a joint meeting of the
California State Senate Subcommittee on Delta Resources, the Senate
Transportation and Housing Committee, and the Joint Committee on Emergency
Services and Homeland Security
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**Presented by
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The Natural Heritage Institute (NHI) is a non-profit environmental organization dedicated to restoring aquatic ecosystems and the services they provide for humans. NHI has collaborated with a wide array of stakeholders over the last 15 years to protect and restore the Delta ecosystem. We are grateful to Senator Machado and the Committee for taking the time to address the urgent problems facing the Delta.

Dr. Mount's report regarding the probability of catastrophic levee failure in the Delta requires that we envision and plan for the contingency that the Delta does not remain in its present form indefinitely. It does not require that we accept the inevitability of massive levee failure and wholesale landscape change in the Delta. Although it will require a new course of action and entail significant investment, we believe it is possible to manage the risk of Delta failure and transform the Delta into a more sustainable landform over the long-term.

Californians need to consider how much the Delta is worth to us in its current configuration versus a post levee-failure configuration. In its current configuration, the Delta provides numerous ecological, water supply, recreational, economic and agricultural services. If we are unwilling to invest the resources necessary to maintain the Delta's current configuration and the services it provides, we need to consider what services tens of thousands of acres of flooded islands would provide, what problems might arise, and how much it would cost to manage those problems. There is a common misperception that tidal inundation of Delta islands would be an acceptable or even a desirable outcome, leading some to argue that the state should hold back financial aid and just standby and watch as private farmland floods in the wake of levees failures. Nothing could be farther from the truth.

Massive levee failure in the Delta would not only jeopardize the water supply for 20 million people and a multi-billion dollar agricultural economy, but would also jeopardize the other services the Delta provides. Some have argued that risks to the states water supply could be avoided by building a canal around the periphery of the Delta. But what about the other services the Delta provides? What about the regional highways, gas pipelines, power lines, and aqueducts that traverse the Delta? What about the Delta's farmlands and the wintering habitat they provide for vast flocks of waterfowl and shorebirds along the Pacific flyway? What about the people who live and work in the

Delta? How will massive failure of the Delta levees transform the Delta ecosystem? How will conversion of the Delta into a vast open water area impact the ecologically important Suisun marsh and San Francisco Bay?

I can't answer all these questions, but I can tell you that flooded islands are a disaster for native species, boating, and recreation. The two largest flooded islands, Franks Tract and Big Break are now overrun by Brazilian water weed (*Egeria densa*) and other exotic invasive species that have colonized the Delta in recent decades. Marina owners around Franks Tract will tell you that the invasion of *Egeria* is their single biggest problem. Mats of *Egeria* grow so thick during the summer time, that large areas of Franks tract are impassable by boats and remaining beaches and shoreline are inaccessible. Current control measures require widespread application of herbicide, are largely ineffective, and can cost hundreds or thousands of dollars per acre per year.

As Dr. Mount has previously reported, inundation of one or more Delta islands creates a domino effect that increases the vulnerability of adjacent Delta islands to a similar fate. Allowing even one island to fail only increases the magnitude of the problem currently before us. Without preventative actions, it is not difficult to imagine the inundation of 100,000 acres of Delta farmland and the panoply of management problems it will create for the state of California.

The scale and complexity of the Delta problem has defied a solution, but if we focus on the problems and opportunities on a smaller scale, island by island, I believe that it is possible to identify promising solutions to save at least part of the Delta from catastrophic, landscape level change.

The nature and magnitude of the problem varies across the Delta. The northern and southern Delta are less subsided, have less peat soil that is subject to continued subsidence, and are less prone to seismic failure due to their distance from known faults. Notwithstanding Jones Tract, flood-waters from upstream rivers are the primary threat to levees in these parts of the Delta, but the prevalence of mineral soils makes prospect of improving and enlarging existing levees more viable. To reduce the risk of failure from flooding events, the flood bypass system should be expanded, particularly on the San Joaquin River to attenuate peak flood events upstream of the Delta rather than routing the full force of floods towards the Delta's fragile levees.

The central and western Delta islands are a far more challenging problem, but most of these islands are already in public ownership or are controlled by private interests (Delta Wetlands) who would like to sell their land to the state. The islands in this region are deeply subsided and characterized by large areas of organic peat soils that continue to subside at one to two inches per year. Improving the levees will help prevent failure during floods in the near term, but will do little to prevent seismic failure according to a 1999 seismic risk report commissioned by CALFED.

Halting continued subsidence on these islands is the obvious first step. Field experiments by the USGS on Twitchell Island have shown that cultivation of tules not only halts

subsidence, but actually regrows the island surface elevations at up to one inch per year – a net gain of two to three inches per year. Preliminary research with rice cultivation shows that it may also be effective in halting subsidence. Tule and rice cultivation would not be required across the entire islands, but only on the deepest, most rapidly subsiding peat soils and would create excellent habitat for a host of wetland dependent species.

The western Delta islands, particularly Sherman and Jersey Islands, are the most vulnerable to seismic levee failure and would have the greatest salinity intrusion impact on the water supply if they failed. Conversely, long-term restoration of Sherman and Jersey Island to tidal marsh could have enormous ecological benefits due to their proximity to Suisun marsh and the mixing zone where fresh and salt-water meet.

The Natural Heritage Institute (NHI) has developed a long-term restoration plan to rebuild Sherman Island to sea level over the next 50 years and is working with the Iron House Sanitary District, the owner of Jersey Island, to initiate a similar program for the western portion of that island. By focusing on island scale topographic and soil conditions on Sherman and Jersey Island, NHI has been able to identify site-specific opportunities where mineral soils enable the construction of new cross levees to divide the island into smaller, more manageable units where a variety of subsidence reversal strategies could be employed to gradually rebuild the island to sea level over time. Partitioning the island into smaller cells would reduce the seawater intrusion impacts from future levee failure and facilitate emergency response activities. The plan entails utilizing dredged spoils from adjacent Decker Island to strengthen existing levees, build new cross levees, and accelerate subsidence reversal.

Implementing this plan on Sherman Island would significantly reduce the impact of levee failure on water supply in the near term and would restore thousands of acres of seasonal and tidal marsh over the long term. Marshalling the resources and equipment to implement this plan and other similar efforts over a number of years would significantly improve emergency response capability, because it would exercise and maintain the equipment and expertise necessary to respond to a levee failure.

The Sherman Island restoration plan would not necessarily work on other islands due to differences in topography and soils, but there are a host of subsidence reversal and risk reduction tools that should be evaluated for application on other islands. These include:

- Cultivate rice to halt subsidence
- Cultivate tules to reverse subsidence
- Utilize excess rice straw bales to fill subsided areas
- Continuously fill Delta islands with fresh water
- Float or “mud jack” peat soils with a slurry of mud to quickly raise large areas of peat to sea level within existing islands.¹

¹ This occurred accidentally at the Montezuma Wetlands project raising 16 acre area of peat approximately 10 feet. Although more research is needed this strategy, if applied over large islands, could virtually eliminate the risk and consequences of levee failure while creating large areas of wetland habitat. Filling

- Partition islands with cross levees
- Reinforce existing levees to better withstand flood events
- Construct erosion control measures on the interior of levees to prevent wind wave erosion of the interior levee berms in the event of a levee failure.
- Significantly widen existing levees to withstand seismic events
- Stockpile materials for improved emergency response

Planning and implementing these measures on a large scale will take time, but we do not need wait for the next Delta plan before we take action. Several actions should be implemented today to reduce the risk of failure and would make sense under any future plan for the Delta. These included:

- Invest far more dollars in environmentally friendly levee upgrades throughout the Delta.
- Acquire Decker Island and excavate its 20 million cubic yards of material to use on bolstering levees in the western Delta.
- Provide resources for large scale subsidence reversal
- Construct cross levees on Sherman and Jersey Islands as well as other central and western Delta islands with bands of mineral soil.
- Develop a far more detailed emergency response plan that is designed to avoid environmental harmful remedial actions in the event of a crisis.

Most importantly, state leaders must act immediately to protect the Delta from further urban encroachment. Tens of thousands of new homes are planned for lands behind levees all around the periphery of the Delta. The urban encroachment will not only put people in harms way, but will significantly exacerbate the Delta's long list of problems. Bringing hundreds of thousands of new residents to the Delta will complicate the problem in myriad ways that we have not yet even considered. Urbanization will inevitably draw levee maintenance and emergency response resources away from the majority of Delta levees and focus them on levees that protect urban development. Newly enlarged levees around urban developments will push flood waters over older neighboring levees increasing the likelihood of failure on adjacent islands. And finally urbanization of flood prone Delta lands will degrade Delta water quality, reduce water storage in upstream reservoirs, render it more difficult to continue agriculture in the Delta core, destroy habitat, and forever preclude the potential for restoration.

We have two futures before us. If we follow down the path we have been on for decades, we can expect to see a massive, shallow inland bay infested with exotic water weeds and bordered on three sides by hundreds of thousands of tract homes. If we go down a new path, we can recreate the Delta to function over the long term as a vast mosaic of wetlands and agricultural lands that maintain the state water supply system, sustain habitat for hundreds of species, and provide recreation opportunities for the million of people who live within an hours drive of it shores.

islands with water would largely eliminate the risk, but would require expensive reinforcement of the inside berm and would not provide much habitat.