The Little Egbert Multi-Benefit Project; Restoring Tidal Habitat and Building Resilience in the Northern Bay-Delta, California - Jeremy Thomas

The Little Egbert Multi-Benefit Project (LEMBP) is a large-scale estuarine habitat restoration, flood management, and climate adaptation project in the northern California Sacramento-San Joaquin Delta. Historically, the project site was composed of seasonal and tidal marsh, emergent wetland, and riparian forest habitat. It was reclaimed for agricultural production, and currently is cultivated for row crops and alfalfa. It is below sea-level and protected by a restricted-height levee that is designed to overtop during high water events to reduce pressure on upstream levees. Sea-level rise and climate change are expected to reduce the effectiveness of these aging levees. The LEMBP would restore approximately 3,000 acres of habitat, while allowing increased flood conveyance at the southern end of the Yolo Bypass and providing enhanced outdoor recreation, education, and open space opportunities. This presentation will provide an overview of the project, describe preliminary design approaches highlighting the use of natural and nature-based features to restore habitats and adapt to projected increases in sea-level and flood flows, and describe opportunities and challenges for project implementation in the context of the overall ecosystem, flood, and water management strategies being advanced by the State of California.

Climate Resilient Habitat Improvement and Mosquito Source Reduction in a San Francisco Estuary Tidal Marsh - Andrea L Jones

The Sonoma Creek Marsh Enhancement Project was designed to improve tidal exchange and habitat function within a 300-acre tidal marsh at the mouth of Sonoma Creek within the San Pablo Bay National Wildlife Refuge (San Francisco Estuary, California). The Marsh, a "centennial" tidal marsh formed over 100 years on accumulated Sierra Nevada hydraulic mining sediments, lacked tidal channels and habitat complexity characteristic of ancient San Francisco Estuary marshes and routinely ponded and trapped water in the marsh interior between levees following spring tides and storm events. This led to high mosquito production and reduced marsh vegetation, impacting habitat for state and federally-listed marsh-dependent species including California Ridgway's Rail and Salt Marsh Harvest Mouse and many species of fish and waterbirds. Without enhancement, centennial marshes may continue to degrade over time, a process that is likely to accelerate with sea level rise. The Project, implemented by the Refuge in collaboration with Audubon and Marin-Sonoma Mosquito and Vector Control District, involved constructing a large channel (5,700 ft) and several side channels, connecting the flooded central basin with tidal action in Sonoma Creek. Excavation spoils were used to create marsh mounds, high marsh "lifts", and a habitat transition ramp. Post construction, the site has experienced a dramatic reduction in mosquito production, revegetation of nearly 100% of the central basin "dead zone", and an increase in wildlife use. This project serves as a demonstration for future beneficial reuse of dredge spoil and for addressing similar problems at centennial tidal marshes throughout the Estuary.

Understanding the Economics and Scale of Opportunity: Restoring California's Marine and Coastal Habitats - Bryan DeAngelis

California has over 5,000km of coastline, but represents only a fraction of investments into sub and intertidal coastal and marine restoration. Significant losses of critical coastal and marine habitats such as kelp, eelgrass and native oysters have occurred over the centuries due to human activities and the impacts of a changing climate. To understand the scale of the restoration opportunity, the level of investment required and the potential return on those investments we estimated the potential restorable acreage of kelp forests, native oysters and eelgrass beds in California using best available science and expert input. We then used input-output analysis to estimate the economic contribution of restoring up to a combined total of 32,000 potentially restorable acres of these habitats along California's coastline by 2050. This included scenario analyses comparing the economic contributions of restoring 100 percent of the potential acres, 50 percent of potential acres restored, and continuing the current rate of restoration efforts (i.e., "business-as-usual"). California can achieve 50 percent of the restoration goal by investing $117M every year through 2050 in marine restoration, and 100 percent of the goal by investing $232M. Such investments would benefit the California economy by supporting $1.97 in economic activity for every $1 invested to restore these habitats. The ripple effects of such spending would also support 1,300–2,600 total jobs every year. Such an investment in rebuilding resilience into marine habitats will help California mitigate the impacts of a changing climate, improve biodiversity, and generate jobs and revenue for coastal communities.

Evaluating dunes as nature-based solutions with the California Dune Science Network - Jenna Wisniewski

Increased winter wave action and storm events in recent years have amplified concerns for sandy beach ecosystems and coastal communities. California's dune systems have high potential to act as a natural buffer to coastal flooding and climate change impacts, increasing coastal resilience and protecting infrastructure. The California Dune Science Network was established to build expertise in coastal dune restoration efforts statewide by collectively learning from experimental approaches, evaluating science-based indicators of coastal resilience, and synthesizing lessons learned and best management practices. In 2023, the Network received a California Climate Action Seed Grant to evaluate the functionality of dunes as nature-based solutions (NbS) to climate change impacts. The grant is in partnership with 17 collaborators and end-users.

This presentation will provide details on the Network's current activities and results including :1) the development of the first comprehensive state-wide dune inventory detailing the extent of current dunes and historical presence; 2) observations conducted at 26 pilot sites (11 in disadvantaged communities) to advance understanding of adaptive management approaches including dune engineering, restoration, and monitoring methodology; and 3) the development of indicators and frameworks for assessing site suitability, as well as coastal dune vulnerability and resilience. The project outcomes are intended to inform other Nbs dune projects and state guidance for dune monitoring, implementation, and adaptive management.

Little Egbert Multi-Benefit Project - Kiernan Kelty

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