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# How Fragmentation Drives Dominant Plant Encroachment on a Horizontal Wastewater Treatment Levee

**Abstract:** Urban coastal wetlands protect humans from sea-level rise while providing valuable habitat for wildlife. Degradation and loss of these wetlands directly threatens urban infrastructure such as wastewater treatment facilities. Nature-based adaptive solutions with the combined purposes of bioremediation, coastal defense, and habitat creation are being tested to make communities safer and more resilient. The current research examines a 6-year-old experimental horizontal levee at the Oro Loma Sanitary District in San Lorenzo, California. Using horizontal transects and quadrat sampling, I compare the success of two planting strategies – a wet meadow and a riparian scrub community– on an ecotone slope, and I document effects of fragmentation and dominant plant species on plant diversity and abundance in the wet meadow. Although most planted species survived from 2015/16 to 2020/21, plant diversity decreased over time in both plant communities. Fragmentation was associated with encroachment by invasive nonnative species in the wet meadow, and both fragmentation and the presence of native dominants *Salix lasiolepis* (willow) and *Typha* spp. (cattails) correlated with reduced planted native species diversity and cover in the wet meadow community. In the absence of natural disturbance processes, created wetlands, especially fragmented wetlands with substantial edge, may progress to a successional state dominated by a few species. Future projects might benefit from specifying habitat creation goals in addition to wastewater treatment goals, selecting native plant palettes that inhibit succession or incorporate natural disturbance to break dominance cycles, and planting larger patches with lower edge ratios. *Ms. Fishman received her B.S. in Ecology and Evolutionary Biology from UC Santa Cruz in Santa Cruz, California. She currently works at the Sunol Native Plant Nursery for the San Francisco Public Utilities Commission, growing native plants for the new Alameda Creek Watershed Center and for mitigation purposes. In her free time, she enjoys hiking and plant identification, birdwatching, gardening, and playing music.*

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