New Jersey Wetland Restoration Threatened by Weather, Erosion and Human Impacts

Repairs to Dikes and Drainage Systems Provide Protection from Flooding

CHALLENGE

### Dikes and Drainage Systems in Disrepair Drives Fear of Flooding

In the late 1990s, upland dikes and drainage systems were installed as a part of the Estuary Enhancement Program (EEP). The program, to help restore part of the Delaware Estuary, aimed to refortify impacted wetlands and offset ecological impacts from nuclear programs. The EEP has restored, enhanced, and/or preserved more than 20,000 acres of salt marsh and adjacent uplands.

Over the years, vandalism, intense weather, natural erosion, and human impacts left sections of the dikes and drainage systems in disrepair. The client was concerned that sections of the dikes might fail, leading to flooding of surrounding neighborhoods. They also wanted to proactively repair certain sections to give wetland plants an opportunity to grow, which would further protect the surrounding area from erosion.

SOLUTION

Extensive, Meticulous Repairs Required

The scope of work included repairing the engineered grates and drainage systems built into engineered upland dikes, and to repair the dikes themselves to prevent flooding and further erosion. Necessary repairs to drainage systems included fabrication and special ordering of flap water gates, installation of new fiberglass grates, replacing keyed locks, and careful reinforcement of eroded concrete headwalls which housed the drainage systems. Repairs to the dikes included surveyed installation and grading of approximately 750 tons of sandy fill and crushed shell to reform approximately 3,000 linear feet of the most highly eroded sections of the larger network of trails and upland dikes, installation of biodegradable coir logs, seeding, and installation of 25,000 square feet of erosion control fabric.

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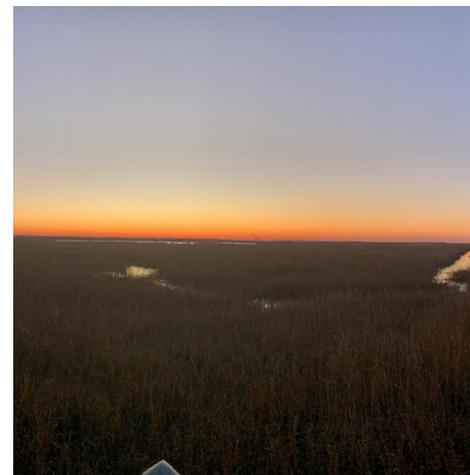
PROJECT EXECUTION

Access, Erosion, and Crumbling Concrete Presented Challenges

The width of the dikes presented the main bottleneck for productivity. Much of the wall was no wider than ten feet, so only one truck, skid steer, or terramac could move along the dikes at a time. There was even less space to work where portions of the improved wetlands had eroded out into the marsh. Because of these access issue, repairs would be a slow and calculated process; based on that reality, the Cascade team projected an accurate schedule to completion. Meanwhile, the initial scope was expanded by almost two times the original length of the dikes, and the team repaired all the damage within this area.

Repairs to the drainage systems were difficult because fabrication of the outdated flood/flap gates took time, and some of the gates could not be securely installed to the crumbling concrete headwalls. The Cascade team completed two-thirds of the planned drainage repairs and avoided destroying the headwalls by attempting to complete the full scope. During installation of materials and fill, the field team was upfront with the client about the right approach to avoid creating more problems, erosion, or damage.

CONCLUSION

Estuary Enhancement Program Restored to Improve Function and Prevent Flooding

The Cascade team successfully repaired the dikes and drainage structures to the extent possible and moved fill into damaged areas along the dikes prior to installing additional erosion controls. Project issues did extended the schedule but the team met the new deadline and as requested by the client, completed the work before winter conditions set in.

The team took into account the environmental considerations needed to work near and in wetlands and marshes and were committed to preserving the ecological balance while executing the essential repairs. This collaboration showcases Cascade's capabilities in infrastructure repair, and the result is greater protection from flooding for the surrounding neighborhoods and the fragile wetlands ecosystem.