

Bolinas Lagoon Restoration Frequently Asked Questions

1. Why does Bolinas Lagoon need help?

In the early 19th century, human land-use changes such as hardening of the shoreline by roads and bulkheads, placement of fill for housing, rerouting and channelization of creeks, isolation of floodplains, and land-use changes in the watershed, began adversely affecting the ecological and physical functions of the lagoon. These impacts resulted in an increased amount of sediment entering the lagoon, which affect natural processes such as water movement and sediment transport. This in turn reduces tidal prism (water exchange in and out of the lagoon's inlet during tides) and degrades wetland habitat, resulting in adverse impacts to the health and stability of the lagoon and the species that depend on it for survival.

2. What is the overall purpose of the Bolinas Lagoon Restoration effort?

To ensure the lagoon thrives naturally as an ecologically healthy tidal estuary. Bolinas Lagoon provides habitat for thousands of resident and migratory birds, a nursery for fish and shellfish, and a place for people to connect with nature. Its wetlands safeguard nearby communities against flooding by absorbing storm surges and high tides, and improve water quality by filtering pollutants before they travel through the greater lagoon and into the ocean. A 2008 partnership between community members, scientists, agencies, and local organizations released the Locally Preferred Plan, outlining 25+ restoration and management recommendations for Bolinas Lagoon and its watershed (<http://farallones.noaa.gov/eco/bolinas/pdf/finalplanoptnov.pdf>). Implementation of LPP projects is at the core of the restoration effort, which seeks to restore, enhance, and promote ecological health, human safety, and recreational value.

3. Who is responsible for managing Bolinas Lagoon?

Many public and private parties contribute to the health of Bolinas Lagoon. Federal and local government agencies include the County of Marin, the Gulf of the Farallones National Marine Sanctuary (GFNMS), Point Reyes National Seashore, and Golden Gate National Recreational Area. The Bolinas Lagoon Advisory Council (BLAC), a council of the Marin County Board of Supervisors including community members and representatives from Audubon Canyon Ranch, Bolinas Rod and Boat Club, College of Marin, Point Blue, and Seadrift Homeowners Association, provide recommendations and feedback on agency management of the lagoon.

4. What has been accomplished so far?

Since the 2008 release of the LPP, state and government agencies, local organizations, and community volunteers have worked to control invasive green crabs in Seadrift Lagoon, eradicate invasive cordgrass (*Spartina*), and restore native plant habitat at Kent Island. Additionally, road repairs along a two mile stretch of Highway 1 along the lagoon's eastern edge provided benefits such as invasive species removal, sediment capture, and reduced toxin run-off. Project partners are also beginning wetland restoration, road redesign, and climate change adaptation measures through implementation of the North End Restoration Project at the Bolinas "Y".

5. How are projects selected?

Marin County's priority projects are selected in combination with recommendations from the Locally Preferred Plan and current scientific research, in discussion with BLAC. Projects with multiple components (i.e. sediment management, upland creek restoration, improved water movement and quality, sea level rise accommodation, habitat restoration, and community interest) that incorporate short-term and long-term adaptive approaches are prioritized. Such projects not only address ecosystem health, recreational use, and road/infrastructure protection, but also future climate change impacts and infrastructure maintenance cost reduction. Additional factors for project selection include but are not limited to potential funding sources, land ownership, environmental review requirements, and project duration.

6. Are the managing agencies planning for climate change, especially sea level rise, to fix the problems of sediment accumulation and tidal prism loss in the lagoon?

Although climate change science will inform project implementation, simply waiting for sea levels to rise is not a long-term management plan for Bolinas Lagoon, nor is it believed that rising seas will solve its ecological and hydrological problems. In fact, predicted future impacts from climate change make planning for restoration projects increasingly more complex and challenging. Recommendation #9 in the Locally Preferred Plan urges the use of climate change science to "develop a

model to reflect the consequences of sea level rise for Bolinas Lagoon” to help “define areas where the lagoon could be allowed to expand and where land acquisitions would benefit both the land owner and the lagoon” (page 32). Inclusion of Bolinas Lagoon in the Our Coast Our Future online tool (www.data.prbo.org/apps/ocof/) and the findings of a July 2013 scientific Design Review Group address this recommendation and helped inform prioritization of the North End Restoration Project, a project that will address sediment accumulation, water movement and impacts from climate change.

7. Why was the North End Restoration Project chosen over Pine Gulch Creek restoration, and what benefits will it provide?

The North End Restoration Project was chosen for several reasons. First, this project will yield the greatest immediate benefit because the road at the Bolinas “Y,” portions of Olema-Bolinas Road, and areas of Highway 1 already cause flooding, and therefore public safety and traffic interruptions during storms. Compounded with future sea level rise, road redesign through this project will create accommodation space to protect access and communities against flooding, and offer wetland habitat and plant and animal species a place to retreat and re-establish. Potential flood plain restoration of Lewis and Wilkins creeks will provide opportunities for sediment capture before entering the lagoon, and opportunities for sediment removal and/or transport at the lagoon level will also benefit ecosystem function. Lastly, this project will help inform the design and scope of forthcoming larger projects such as the privately held Pine Gulch Creek delta, ensuring better efficiency and effectiveness of future projects.

8. Will there ever be dredging in the lagoon similar to the project proposed by the Army Corps of Engineers?

Information suggests that the previous dredging project may not have been effective and that the 1.4 million cubic yards of sediment removal would likely have caused severe impacts to habitat, shoreline structure stability, and species diversity not to mention costly long-term maintenance. Public, scientific, and agency concern over these impacts prompted development of the restoration projects and management recommendations within the Locally Preferred Plan. Several projects within this plan incorporate sediment management opportunities including removal, transport to other areas where sediment may be beneficial (i.e. as a buffer between rising tides/storm surges and Highway 1), and sediment reduction techniques. Unlike the US Army Corps proposal these opportunities address the problem of sedimentation without causing major impacts to the lagoon’s system, and instead support a natural self-sustaining adjustment to changes in sediment dynamics.

9. Why are invasive species projects important for the lagoon’s function when sediment accretion is a larger concern?

Invasive vegetation alters habitat structure, increases sediment buildup, and displaces native plants and the species that depend on them for survival. For example, the hollow tube-like stalk of the invasive *Spartina* (cordgrass) hybrid directs oxygen to the plants roots, allowing it to thrive in nearly any habitat type, especially the sub-tidal habitat and channel edges of Bolinas Lagoon. In these locations invasive *Spartina*, which are more reproductive, taller and thicker than natives, slow water flow which allows sediment to fallout of the water column and build around the plant’s stalk. This elevates the lagoon floor and further increases the capture of sediment. Non-native ice plant on Kent Island is trapping coarse sand-like sediment traveling into the lagoon from the ocean and keeping it from flowing out with the tide. Historically storms would wash over the island releasing captured sediment, but as build up elevates the island it reduces a storm’s ability to top over the island, allowing that captured sediment to remain. Island elevation and sediment capture at the southern inlet-facing side of Kent Island reduces wave and wind energy to the northern portions of the lagoon, which increases fine-grained sediment build up at the deltas and channelized creeks around Pine Gulch Creek and the northern lagoon. Therefore, the removal of invasive species is critical to not only promote native plant abundance and species diversity, but to increase sediment release, slow sediment build up, and aid water movement throughout the lagoon.

10. How do you plan to keep community needs and involvement a priority throughout the restoration process?

Throughout the North End Restoration Project process the lead agency, Marin County, and the county’s managing agency partners, will consult the public in formulating design components, methods, and alternatives. A final proposed project will be analyzed under the requirements of the California Environmental Quality Act (CEQA). Additionally, the managing agencies will continue to organize public community lectures and information exchange forums on topics relevant to the restoration process, write and distribute issues of the electronic *Bolinas Lagoon Bulletin*, coordinate community meetings to educate and inform the public on next steps for the North End project, and offer volunteer opportunities for participating in hands-on restoration work. BLAC will continue to hold semiannual public meetings on the restoration and management of Bolinas Lagoon, host an annual State of the Lagoon town hall meeting, and continue open communication and feedback exchange with its constituents. Community members with questions or concerns about Bolinas Lagoon restoration are encouraged to contact Marin County Bolinas Lagoon Restoration Project Manager Veronica C. Pearson at vpearson@marincounty.org or 415- 473-5086, or the Farallones Marine Sanctuary Association Bolinas Lagoon Restoration Project Coordinator, Kate Bimrose at kbimrose@farallones.org 415-970-5245.