

BOTHIN MARSH OPEN SPACE PRESERVE

EVOLVING SHORELINES

A VISION FOR THE FUTURE AND A PLAN FOR TODAY



The effects of climate change, in particular sea level rise, are upon us. But we can help protect Bothin's marshes, shoreline, and trails if we act now.



WHAT SHOULD BOTHIN'S FUTURE LOOK LIKE?

Bothin Marsh Open Space Preserve's trails, shoreline, plants, and wildlife are already seeing the effects of sea level rise. With water levels expected to increase exponentially, the threats to this treasured community shoreline will also grow.

In 2018, Marin County Parks and the Golden Gate National Parks Conservancy gathered local land management agencies, community groups, and individuals to begin to address both the immediate and long-term effects of sea level rise at Bothin Marsh.

Hundreds of people turned out to kayak, hike, play, and learn. Local experts described how wetlands help reduce flooding and provide important wildlife habitats, and why Bothin's natural processes must be restored to help counter the effects of sea level rise.

In turn, community members shared what is important to them about this unique corner of the bay, and their vision for Bothin's future.

OUR SHARED VISION

The message we received was clear. The Bothin Marsh Open Space Preserve needs to be a place where...

We use innovative approaches to meet the challenges of climate change so that Bothin Marsh can continue to evolve and support all life that depends upon it.

Residents and visitors enjoy year-round recreation and travel using Bothin's trails for carbon-free transportation.

And we embrace our responsibility to take care of our shared open spaces for the benefit of current and future generations.

The following pages reflect what the community shared with us, and their charge that we begin to address the effects of climate change on Bothin Marsh **now**.



Marin County Parks' 106-acre Bothin Marsh Open Space Preserve hosts a unique mix of wetlands and trails that will be severely affected by the 10 inches of sea level rise predicted in the next 10 years.

CHANGE IS HERE

Flooding from sea level rise makes local trails and roads impassable at least 30 times per year. Nearby homes, schools, buildings, and other infrastructure are likewise threatened by waters that will continue to rise.

While climate change projections vary, we expect that Bothin Marsh and the Mill Valley-Sausalito Multiuse Path (Bay Trail) will be severely inundated with 10 inches of sea level rise in 10 years (see map, left).

This amount of sea level rise will regularly flood 90 percent of Bothin's wetlands. Not only will floods be more common, they will also last longer. Storm surges will also become more powerful and damaging.

Under these conditions, important wetland and shoreline habitats will be lost, and with them the flood reduction, water filtration, and carbon storage they provide. The existing Bay Trail will also become unsafe.

But 10 inches is just the start. To help Bothin Marsh continue to evolve with rising tides, we are part of a broad coalition working to determine how to accommodate up to 36 inches of sea level rise. This represents what we believe is achievable in the near future, and how we can help prepare the Preserve for conditions expected by sometime in the middle of the century.

With the need to accommodate so much more water, the Bothin Marsh of the future will look different than it does today. We will work to ensure that its habitats, trails, and special character endure.

Because Bothin Marsh does not exist in isolation, we are also working with local agencies including the Marin County Department of Public Works and the City of Mill Valley. We will ensure what we are planning here is coordinated with what they are doing to address nearby flooding and safety issues.





Current flooding on the Bay Trail at the Bothin Marsh Open Space Preserve will only get worse. To learn more about sea level rise at Bothin and the team working to address these challenges, visit onetam.org/bothinmarsh.



Bothin Marsh Open Space Preserve must remain a place where future generations can enjoy everything it has to offer.

A COMMUNITY RISING TO THE CHALLENGE

Thousands of local residents, regional commuters, and visitors from all over come to Bothin Marsh every day. While what each person values most about their experience here may be different, we believe that every perspective is important to shaping the future of this beloved place.

We took an ambitious, community-driven approach to creating a vision that reflects this belief.

Workshops held in 2018 brought together **24 local agencies and organizations** and 50 individuals to share the latest science on Bothin Marsh and regional climate change predictions. With this as our foundation, we were able to build a common understanding of what the impacts of sea level rise at Bothin Marsh will be, and to begin to develop solutions.

We then shared what we learned with **over 450 people** at community events, and through the “Evolving Shorelines” series, which included kayak and bike tours, volunteer days, a history talk, and a youth scavenger hunt. In turn, community members shared what they value most about the Preserve and what they hope to see here in the future.

This vision therefore reflects the voice of many, and we are committed to continuing to work hand-in-hand with all of you as we move forward together to bring it to life.



Over 450 people shared their vision for Bothin's future with us at a wide range of meetings and events in 2018.



The marsh must continue to act as a critical refuge for plants and animals, including threatened and endangered species.



We need to address the barriers to sediment and water movement at Bothin Marsh.

WHAT DO WE VALUE MOST ABOUT BOTHIN MARSH?

We heard that the Bothin Marsh Open Space Preserve of the future must continue to have...

THRIVING BIOLOGICAL DIVERSITY

The Preserve's 106 acres of open water, mudflats, and tidal marsh are important to the thousands of waterbirds and shorebirds that live here year-round, as well as the 400 migratory bird species that pass through each year.

Threatened and endangered species—including birds like the Ridgway's rail, California black rail, and San Pablo song sparrow, and rare plants like the salt marsh bird's-beak—must be able to survive.

HEALTHY NATURAL PROCESSES

Beneficial sediment and water flow is needed to replenish the Preserve's wetland habitats and shoreline, and allow them to naturally evolve alongside changing conditions.

However, the former railroad levee that the Bay Trail is on disconnects the marsh from essential sediment distributed by the tides. We must also restore the connections between the wetlands and the streams that once sustained them—Coyote Creek and Arroyo Corte Madera del Presidio.

COMMUNITY INNOVATION

Many other places will soon be facing similar levels of sea level rise as Bothin is today.

Easily accessible and highly visible, the Preserve is uniquely positioned to model how novel, nature-based restoration techniques used here can be applied elsewhere.

Together, we can be visionary problem-solvers who lead the way on smart climate change adaptation.

RECREATIONAL OPPORTUNITIES

Easy access to the Preserve's shoreline, trails, and waters puts people in touch with nature and fosters their mental and physical well-being.

Kayakers and birders should be able to continue to join hikers and bikers along this key link to other regional recreational treasures, including the Bay Area Ridge Trail, San Francisco Bay Water Trail, Coastal Trail, and the beauty and inspiration of Mt. Tam's protected open spaces.

AN ACTIVE TRANSPORTATION CORRIDOR

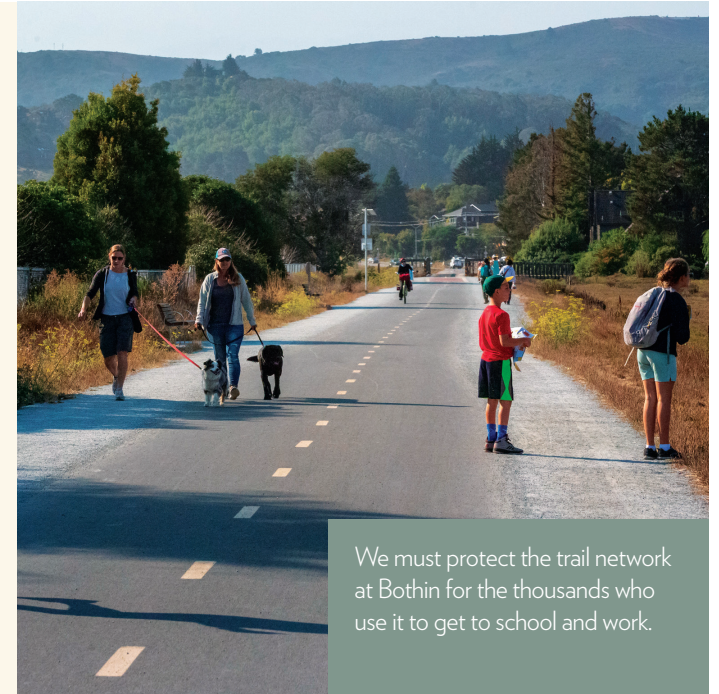
With around 2,000 average daily users, and often more than 5,000 cyclists and pedestrians in a day, Bothin's trails are a critical part of local transportation corridors.

They also provide safe routes to school for approximately 50 percent of Mill Valley Middle School and 20 percent of Tam High students. It will be essential to maintain this piece of our regional trail network in order to stay connected to southern Marin's carbon-free transportation system.

A SENSE OF PLACE

Although the Preserve of the future will be different than what it is today, we can still honor the things that make this place what it is.

Using nature-based techniques, rather than traditional practices such as riprap and seawalls, will help create a resilient natural marsh system while maintaining the shoreline's special character and natural beauty.



We must protect the trail network at Bothin for the thousands who use it to get to school and work.



Recreation along Bothin's trails, shoreline, and waterways is one of the things community members value most.

We are working to develop solutions to sea level rise threats that also benefit Bothin's trails, marsh, shoreline, and wildlife.



THE PATH FORWARD

As we move forward with the community's vision for Bothin's future we must navigate the complexities of how the marsh functions, and the interconnectedness of its natural and built areas.

Although the Bay Trail at Bothin needs repair, there are also fundamental issues with where it sits in the marsh (see map on page 4).

Currently, it crosses the Preserve on an old railroad levee that blocks the flow of sediment from both local creeks and the bay. This sediment is essential for Bothin's wetlands to shift and replenish themselves in response to rising tides.

One option is to repave the Bay Trail and rebuild its bridges where they are now. However, with current flooding on the trail predicted to get much worse, this is a very short-term solution that does nothing to improve the health of the marsh.

Another option is to rehabilitate this highly modified environment to support critical natural processes,

and to re-engineer parts of its transportation and recreation corridors to accommodate future sea level rise. This could include elevating the trail, or relocating it and removing the levee it is now on.

Elevating the Bay Trail would benefit tidal marshes and ensure that the trail is safe, but we need to do more.

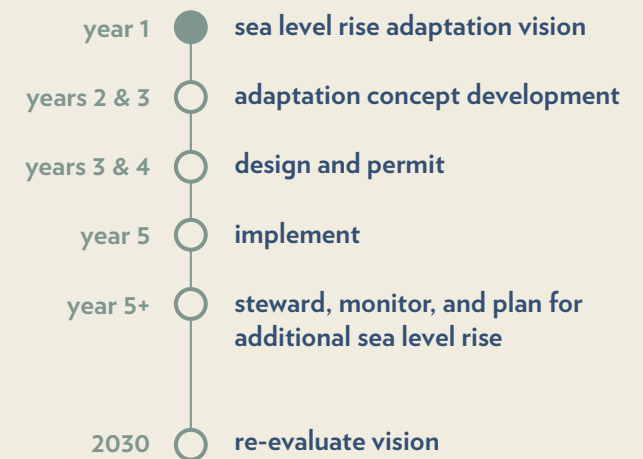
Other historical changes to the Preserve must also be addressed, such as the way its creeks have been channelized and disconnected from the marsh. This more challenging, but longer-term, approach would have much greater ecological benefits.

It will also change the way the Preserve looks today. However, all potential solutions are being developed to maintain the things we heard matter most, including the marsh's ecological health and shoreline access.

The next step is to turn these ideas into conceptual designs that we can continue to explore with you!

Working with the community to create this vision for Bothin's future was an important first step. Now, we need to address the many, complex challenges facing Bothin by developing adaptation alternatives that will:

- **Create a resilient, safe, and well-connected shoreline trail network that is in harmony with the surrounding environment**
- **Remove physical barriers to natural processes**
- **Maintain biodiversity within the marsh**
- **Enhance and expand the distribution, abundance, and quality of high tidal marsh habitat**
- **Create space for different marsh habitats to shift and migrate with sea level rise**
- **Reduce the risk of tidal flooding using nature-based strategies**



With a sea level rise adaptation vision for Bothin Marsh completed, we are now moving towards developing solutions. Eventually we will need to re-evaluate this vision in light of new sea levels and environmental conditions.

HELP ENSURE A BRIGHT FUTURE AT BOTHIN MARSH

The community visioning process we undertook in 2018 was invaluable for shaping our path forward. Now, it is time to make that vision a reality.

To do this, we need to work together. Tell your neighbors, friends, and fellow bikers and hikers about what's happening at Bothin Marsh and why it matters.

Most importantly, stay engaged. We will be seeking your input on project planning currently underway. All voices matter to the future of Bothin Marsh, and we want to hear yours!

Visit onetam.org/bothinmarsh to learn more about the project, give your feedback on future designs, and get the latest on our progress towards Bothin Marsh's bright new future.

All photos by Marin County Parks and the Golden Gate National Parks Conservancy

One Tam is a partnership of the Marin Municipal Water District, National Park Service, California State Parks, Marin County Parks, and the Golden Gate National Parks Conservancy

This project funded by Marin County Parks Open Space and Farmland Measure A

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