

# Pivot Points: Moving Nature-Based Solutions for Water Quality Improvement and Shoreline Adaptation from Planning to Action

PROJECT COORDINATES: 37.66212477820967, -122.14761109868024

## PROJECT PHOTO:



Diagram credit: Angela Stiegler

## **PROJECT SUMMARY:**

The San Francisco Estuary faces complex challenges for communities and nature, including the critical needs to improve water quality while also protecting shoreline habitats, infrastructure, and communities from sea level rise. Nature-based solutions (NBS) provide a toolkit of approaches to address these challenges, yet they are often challenging to implement. There is a critical need to build an enabling environment for NBS, also known in the scientific research on this topic as an “innovation ecosystem.” Building an innovation ecosystem for NBS requires integrating disparate interests to support NBS projects, developing local and regional champions, and making sure these experiences are shared across geographic space and sectors to accelerate the pace and scale of NBS deployment.

NBS in the Bay Area have reached a pivot point, where we must deliberately build the innovation ecosystem for these projects to be integrated into mainstream practice, or they will be dismissed as too risky and complicated. *Pivot Points: Moving Nature-Based Solutions for Water Quality Improvement and Shoreline Adaptation from Planning to Action* will tip the regional balance in favor of NBS implementation by focusing on both the technical nuts-and-bolts of NBS, including design and permitting, while also charting a path for multi-jurisdictional NBS governance, community-engaged planning, and robust technology transfer.

This project will advance nature-based solutions (NBS) that can meet urgent needs for shoreline resilience while improving San Francisco Bay’s water quality, with a specific focus on the Hayward shoreline. This project fills important gaps in moving NBS from planning to implementation, including addressing permitting, arrangements for long-term governance and management, and technology transfer. Additionally, the project will take stock of current opportunities for NBS and engage policymakers to increase the pace and scale of regional NBS implementation. The project tackles priorities identified in the San Francisco Estuary Comprehensive Conservation and Management Plan (the 2022 Estuary Blueprint), EPA’s Strategic Plan, and local planning documents like the Hayward Area Shoreline Planning Agency Shoreline Master Plan.

Specific components of the project include:

- 1.) Developing an implementation strategy for the Hayward Area Shoreline Planning Agency’s (HASPA) Shoreline Adaptation Master Plan (‘Master Plan’) and strengthening HASPA’s capacity for governance of the NBS projects in the Master Plan in the long-term.
- 2.) Getting the First Mile Horizontal Levee to a shovel-ready state through design, permitting, and community engagement.
- 3.) Building institutional support and facilitating technology transfer for NBS through regional convenings and outreach to elected officials.
- 4.) Creating an NBS ‘State of Play’ report that leverages the work of a broad range of stakeholders to describe the status of NBS in the SF Bay, identify key challenges and opportunities, and develop design guidelines for horizontal levees.

## **PROJECT GOALS:**

The Pivot Points proposal has four main objectives:

1. Chart a path for NBS implementation, permitting, and governance in the Hayward Area Shoreline Planning Agency (HASPA) area.

2. Implement the First Mile Horizontal Levee, a key NBS element of the Hayward Regional Shoreline Adaptation Master Plan (“Master Plan”).
3. Foster an enabling environment more broadly for NBS in the Bay Area through technology transfer and stakeholder engagement.
4. Develop a regional NBS implementation strategy, the NBS State of Play.

## **DELIVERABLES / WORK PRODUCTS:**

### ***Task 1 – HASPA Shoreline Master Plan Implementation***

The HASPA Master Plan offers a vision for a resilient future shoreline, through 25 capital projects that provide NBS. If these projects are all implemented, they will result in 830 acres of tidal marsh restored, 120 acres of muted tidal marsh habitat restored, 6,400 linear feet of ecotone levee built for transitional habitat creation and flood protection, 8,400 linear feet of horizontal levee built (includes a wastewater treatment element, along with transitional habitat creation and flood protection), up to 3 million cubic feet of stormwater retained per storm, 12.6 million gallons per day of wastewater effluent polished through an engineered treatment marsh, and 35,000 linear feet of new, renovated, and/or adapted Bay Trail. However, the plan does not lay out clear pathways for implementation of NBS projects within it. While HASPA, created as a Joint Powers Authority of the East Bay Regional Park District, the City of Hayward and the Hayward Area Park and Recreation District in 1970 to “coordinate agency planning activities and adopt and carry out policies for the improvement of the Hayward Shoreline for future generations,” stands as a model for collaborative governance, the challenges presented by climate change require HASPA’s Board of Trustees and its agency stakeholders to work even more closely together and to balance difficult tradeoffs in decision-making, particularly in initiating a given NBS project. However, HASPA needs administrative support to pursue its future expansion to include other Shoreline agencies.

#### ***1.1 HASPA Implementation Strategic Planning***

East Bay Regional Park District (EBRPD), one of the HASPA Trustees, and the current managing agency, will lead the development of the HASPA Implementation Strategy, which will answer critical questions about the order in which NBS projects within the Master Plan will be advanced, which agency will champion each one, how the risks and responsibilities associated with each project can be shared among HASPA members, and which funding opportunities should be pursued. The Implementation Strategy will evaluate all the projects in the Master Plan, using efficient and expedient pathways to allow for permitting, funding, and governance.

Output: Hayward Shoreline Master Plan Implementation Strategy

#### ***1.2 HASPA Governance Evaluation and Vision***

One of the goals of HASPA is to implement the projects in the Master Plan, and new governance strategies are needed to continue the growth of the HASPA Board of Trustees and to encourage participation by local Shoreline agencies not already represented on the Board or in the Technical Advisory Committee. EBRPD will lead an assessment of the HASPA JPA to elucidate how best to support long-term governance and maintenance of the Master Plan projects and identify what planning or strategic support is needed to initiate, build and maintain the NBS projects in the Master Plan. A new HASPA Joint Powers Authority Agreement is currently

being negotiated, with the aim of adding two new agency Trustees to the Board, making it timely for HASPA to consider how to potentially expand with additional agency stakeholders, to implement the future vision in the Master Plan. The intention is that an updated HASPA JPA agreement will consider the differing sizes and impacts of Trustee agencies and support their collective interest in preserving the Hayward Shoreline from the effects of climate change, and to provide flexibility for the direction HASPA takes in the future. Whether HASPA, its Trustee agencies, or some other entity will pursue the NBS projects in the Master Plan is a question to be answered in this assessment, which will have implications for how other SF Bay OLU and other similar sub-regional scale efforts consider governance when working collaboratively to implement SLR adaptation projects.

Output: HASPA JPA Governance Assessment

### ***Task 2 – Implement the First Mile Horizontal Levee***

*The First Mile Horizontal Levee project will provide water quality and habitat-related benefits, as well as enhance flood protection to inland communities. The proposed work will bring the First Mile project to a shovel-ready state in terms of design, permits, and community engagement.*

#### *2.1 First Mile Horizontal Levee Design (60% and 100%) and Permitting*

Previous funding from the EPA Water Quality Improvement Fund initiated early design of the First Mile. The initial Design Decisions Memo is complete. The First Mile 60% Design will incorporate insights from the community engagement process. The First Mile 100% Design will incorporate any changes flagged during the permitting process. Ongoing discussions with the BRRIT have helped to elucidate the permitting pathways for this innovative project. A QAPP will also be completed (if needed) for any data collection done during the design and permitting process. Funding for permitting will include the necessary scientific studies, meetings with regulators, and preparation of permit applications. The project is expected to require permits and/or approvals from the US Army Corps of Engineers, US Fish and Wildlife Service, NOAA Fisheries, California Department of Fish and Wildlife, Regional Water Quality Control Board, and Bay Conservation and Development Commission.

#### Outputs:

- *60% design*
- *100% design*
- *Necessary permit applications*

#### *2.2 First Mile Community Engagement*

The First Mile project team will develop an outreach plan and engage with local community members and organizations to understand the range of perspectives, concerns, and priorities that will guide the project design.

Output: First Mile community engagement report

### ***Task 3 – Build Institutional Support and Facilitate Technology Transfer***

This task will facilitate peer-to-peer learning and broader implementation of NBS across the region. Funding will support critical conversations to build support, catalyze policy, boost public funding, and accelerate

implementation of NBS. The Bay Area Clean Water Agencies (BACWA) will conduct regional studies on nutrient dynamics and modeling, paired with an evaluation of where to feasibly site NBS for water quality improvement. BACWA's role helps integrate NBS into the wastewater community and ensures that NBS lessons learned by one agency are shared among wastewater practitioners regionally.

### *3.1 Transforming Shorelines Collaborative*

The Transforming Shorelines Collaborative (TSC), facilitated by San Francisco Estuary Partnership (SFEP), was established in 2020 to support broad engagement, peer-to-peer learning, and address barriers to implementation of NBS. Topics have included the Palo Alto Horizontal Levee, use of reverse osmosis concentrate in NBS projects, and the San Leandro Treatment Wetland project. Funded previously by the EPA Water Quality Improvement Fund, this task extends the TSC through the span of this project. The TSC has a proven record of advancing innovative concepts and creating collaborative forums to address challenging topics on NBS.

Outputs: *Summaries from at least 6 Transforming Shorelines Collaborative meetings*

### *3.2 Bay Area One Water Network*

The Bay Area One Water Network (BAOWN) works for equitable, safe, and resilient urban water systems by sharing information, building collaborative capacity, and advancing the thinking about sustainable water system opportunities in the San Francisco Bay Area. The BAOWN, facilitated by SFEP in partnership with Stanford, UC Berkeley, BACWA, Valley Water, and the SF Bay Regional Water Quality Control Board ("Water Board"), will conduct a regional convening of water system managers with planners, regulators, scientists, and policymakers, to understand water system options in their ecological context and identify opportunities for nature-based solutions to upcoming water systems challenges like nutrient loads from wastewater effluent and stormwater to the Bay. A synthesis report from the convening will build a strategic roadmap for the Bay Area One Water Network to support resilient water systems that employ nature-based elements, such as engineered treatment wetlands, managed aquifer recharge, and stormwater capture and re-use.

Outputs:

- *BAOWN convening agenda*
- *Synthesis report*
- *BAOWN informational website*

### *3.3 Outreach to Elected Officials and Policymakers*

Save The Bay will create opportunities for outreach and engagement efforts to local and regional elected officials and other policymakers to build champions for NBS within the Hayward shoreline area and beyond. They will plan and conduct site tours of the Hayward Shoreline Master Plan components and other nearby NBS projects including restoration at Eden Landing, and lead outreach and education meetings to build understanding and leadership throughout the region. They will also plan and host convenings for elected officials and other policymakers to elucidate opportunities and challenges for NBS, identify needed policy improvements and innovation opportunities, and highlight successful models and lessons learned, including relevant outputs from NBS State of Play, Transforming Shorelines Collaborative and Bay Area One Water

Network. Save The Bay will also provide support for community partners and constituency representatives to participate in tours and individual meetings with leaders. They will enlist community partners to meet with and provide information to policymakers, including state and federal agency and elected officials on key topics including accessing existing funding for NBS and related infrastructure implementation, sharing successful funding models, and augmenting existing funding sources or establishing expanded public funding.

To seize imminent opportunities for outreach and education that builds champions for NBS, and to initiate contacts with key policymakers toward the completion of project outputs, Save The Bay will conduct the following activities before the award start date.

Communication and reconnaissance with:

- City of San Leandro officials and community organizations in the Hayward shoreline area regarding municipal funding and policy improvements to support NBS
- Policymakers regarding status of state funding for NBS
- Federal policymakers regarding agencies' support for San Francisco Bay NBS

Outputs:

- *10 - 15 leader tours, briefings, meetings or convenings annually, focused on building NBS champions among elected officials around the Bay Area, including in the Hayward shoreline area and in other geographies with existing or proposed NBS projects*
- *10-12 partner meetings, convenings, briefings, or tours annually, focused on key regional policymakers positioned to advance NBS funding and regulatory priorities*
- *10 outreach meetings for NBS State of Play data collection and report dissemination*

#### **Task 4 – NBS State of Play**

Taking the lessons learned from the HASPA and First Mile efforts, as well as technology transfer and stakeholder engagement conducted by partners, the NBS State of Play will delineate the information, policies, funding, and partnerships that chart a path forward for NBS regionally in alignment with regional planning initiatives.

##### **4.1 NBS State of Play Report and Website**

The NBS State of Play Report is a highly collaborative effort, led by SFEP. The Bay Area Regional Collaborative (BARC) will lead engagement with regional government stakeholders. BACWA will provide input on multi-benefit NBS projects under consideration by wastewater agencies around the Bay, building on their Regional Evaluation of Potential Nutrient Discharge Reduction by Natural Systems. The Water Board will be a thought partner for evaluating regulatory processes, science needs, and efficiencies to support NBS implementation. SFEP staff will write a synthesis State of Play report. After the State of Play report is complete, Save The Bay will assist with dissemination of the report to recruit and support champions, including to local and state elected officials, agency leadership and key staff from cities in the 9 Bay Area counties, especially shoreline jurisdictions and county boards of supervisors, community-based organizations and local environmental justice and equity CBOs, business and planning associations, and organized labor associations. To ensure broad

dissemination of report findings, SFEP staff will develop a communications plan for the State of Play Report and will feature the findings on an interactive website.

The NBS State of Play will also include the development of design guidelines for ecotone and horizontal levee projects along the shoreline. Due to the innovative nature of NBS projects, design guidelines do not exist for these types of projects in the San Francisco Bay. SFEP and BCDC will co-lead this effort and convene a stakeholder advisory group, including representatives from the Bay Restoration Regulatory Integration Team (BRRIT) and project implementers. These guidelines will be non-regulatory and provided to potential project proponents to inform future projects.

Outputs:

- NBS State of Play report
- NBS State of Play website
- Horizontal levee design guidelines
- NBS State of Play communications plan

*4.2 NBS Regional Map*

The San Francisco Estuary Institute (SFEI) will create a regional NBS map that highlights important case studies from around the San Francisco Bay Area.

Output:

- NBS regional map

*4.3 Stakeholder Engagement*

The Bay Area Climate Adaptation Network (BayCAN) will lead engagement for local government stakeholders, ensuring that their ideas, questions, and priorities are integrated into the NBS State of Play report.

Output:

- NBS regional convening for local governments

***Task 5 – Project Management***

This task includes managing subawards, contracting and procurement, processing invoices, budget tracking and grant reporting.

Outputs:

- Quarterly and final reports to EPA
- Invoicing
- Subcontracts with project partners

**MATCH SOURCES:**

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- \$2,400,000 – BACWA funds for modeling nutrient dynamics in SF Bay, including on how NBS may provide reductions in nutrient loading, on planning for the next nutrient watershed permit, and on conducting a regional analysis of NBS siting for water quality improvement.
- \$1,462,739 – Save The Bay funds for volunteer hours for 3,660 volunteers over 3 years for revegetation of horizontal levees and marsh transition zones at the Ravenswood salt ponds and other Bay Area sites with the San Jose Conservation Corps and area residents.
- \$454,000 – In-kind support from EBRPD for their work on the HASPA Implementation Plan and Governance Assessment.
- \$67,131 – In-kind support from City of Hayward for their work on the HASPA Implementation Plan and Governance Assessment.
- \$135,000 – In-kind support from EBDA for work on the First Mile Horizontal Levee.
- \$5,000 – In-kind support for the Bay Area One Water Network from Richard Luthy at Stanford
- \$1,000 – In-kind support for the Bay Area One Water Network from David Sedlak at the Berkeley Water Center.

Total Matching funds: \$4,524,870

**WORKPLAN TABLE**

| TASK  | OUTPUT/DELIVERABLES  | TIMELINE | LEAD  | REQUEST     | MATCH       |
|---|--|----------|-------|-------------|-------------|
| Task 1 – HASPA Shoreline Master Plan Implementation                     |  |          |       |             |             |
| 1.1 HASPA Shoreline Implementation Plan                                 | Hayward Shoreline Master Plan Implementation Strategy  | Q1-11    | EBRPD | \$457,577   | \$454,000   |
| 1.2 HASPA JPA Governance Evaluation                                     | HASPA JPA Governance Assessment  | Q1-9     | EBPRD | \$207,577   | \$67,131    |
| Task 2 – Implementation of the First Mile Horizontal Levee              |  |          |       |             |             |
| 1.1 First Mile Design and Permitting                                    | <ul style="list-style-type: none"> <li>• 60% design</li> <li>• 100% design</li> <li>• Necessary permit applications</li> <li>• QAPP (if needed)</li> </ul> | Q1-15    | EBDA  | \$1,398,704 | \$135,000   |
| 1.2 First Mile Community Engagement                                     | <ul style="list-style-type: none"> <li>• First Mile community engagement report</li> <li>• QAPP (if needed)</li> </ul>                                     | Q1-4     | EBDA  | \$173,704   |             |
| Task 3 – Build Institutional Support and Facilitate Technology Transfer |  |          |       |             |             |
| 3.1 Transforming  | Summaries from at least 6  | Q5-15    | SFEP  | \$164,165   | \$2,400,000 |



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| TASK  | OUTPUT/DELIVERABLES   | TIMELINE | LEAD         | REQUEST  | MATCH       |
|---|---|----------|--------------|--|-------------|
| Shorelines Collaborative                            | <i>Transforming Shorelines Collaborative meetings</i>   |          |              |  |             |
| 3.2 Bay Area One Water Network                      | <ul style="list-style-type: none"> <li>• BAOWN convening agenda</li> <li>• Synthesis report</li> <li>• BAOWN informational website</li> </ul>   | Q2-15    | SFEP         | \$183,750  | \$6,000     |
| 3.3 Outreach to Policy-Makers and Elected Officials | <ul style="list-style-type: none"> <li>• 10 - 15 leader tours, briefings, meetings or convenings annually, focused on building NBS champions among elected officials</li> <li>• 10-12 partner meetings, convenings, briefings, or tours annually, focused on key policymakers positioned to advance NBS funding and regulatory priorities</li> <li>• 10 outreach meetings for NBS State of Play data collection and report dissemination</li> </ul> | Q1-15    | Save The Bay | \$787,063 (of which we expect to bill \$10,923 as pre-award costs) |             |
| Task 4 – NBS State of Play                          |   |          |              |  |             |
| 4.1 Develop NBS State of Play Report and Website    | <ul style="list-style-type: none"> <li>• NBS State of Play report</li> <li>• NBS State of Play website</li> <li>• NBS State of Play communications plan</li> <li>• Horizontal levee design guidelines</li> </ul>  | Q1-15    | SFEP         | \$531,760  | \$1,462,739 |
| 4.2 State of Play Regional Map                      | <ul style="list-style-type: none"> <li>• NBS regional map</li> </ul>  | Q1 - 10  | SFEI         | \$50,000   |             |
| 4.3 Stakeholder Engagement                          | <ul style="list-style-type: none"> <li>• Regional convening on NBS</li> </ul>   | Q1-8     | BayCAN       | \$10,000   |             |
| Task 5: Project Management                          |   |          |              |  |             |

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| TASK   | OUTPUT/DELIVERABLES   | TIMELINE | LEAD           | REQUEST     | MATCH       |
|--|---|----------|----------------|-------------|-------------|
| Invoicing, Contract Management and Reporting | <ul style="list-style-type: none"> <li>• Quarterly and final reports to EPA</li> <li>• Invoicing</li> <li>• Subcontracts with project partners</li> </ul> | On-going | SFEP           | \$560,568   |             |
|  |   |          | GRANT<br>TOTAL | \$4,524,870 | \$4,524,870 |

**OUTPUTS AND OUTCOMES:**

| Outputs  | Short Term Outcomes: 1-5 years   | Long Term Outcomes: 5-20+ years   |
|--|--|---|
| <p><i>Hayward Shoreline Master Plan Implementation Strategy</i></p> <p><i>HASPA JPA Governance Assessment</i></p> <p><i>First Mile horizontal levee:</i></p> <ul style="list-style-type: none"> <li>• 60% design (including cost assessment, permitting strategy, and required technical studies)</li> <li>• 100% design</li> <li>• Permit applications</li> <li>• Community engagement report</li> </ul> <p><i>Meeting summaries from at least 6 Transforming Shorelines Collaborative meetings</i></p> <p><i>Bay Area One Water Network:</i></p> <ul style="list-style-type: none"> <li>• Convening agenda</li> <li>• Strategic roadmap</li> <li>• Informational website</li> </ul> <p><i>10 - 15 leader tours, briefings, meetings, or convenings annually focused on developing NBS champions</i></p> <p><i>10 - 12 leader briefings, meetings, or convenings annually focused on sustained NBS funding and regulatory priorities</i></p> <p><i>10 outreach meetings for NBS State of Play data collection and report dissemination</i></p> <p><i>NBS State of Play report, communications plan, and website</i></p> <p><i>NBS regional map</i></p> <p><i>Horizontal Levee design guidelines</i></p> | <p>First Mile Horizontal Levee shovel ready</p> <p>5.6 acres of riparian / wet meadow habitat created</p> <p>10-20 additional acres of tidal wetland habitat restored</p> <p>3-5 acres of habitat enhancement to existing wetland</p> <p>Reduce nitrogen loads to San Francisco Bay by ~7,200 kg/year</p> <p>1 mile of shoreline protection from sea level rise</p> <p>50 community members empowered to participate in the First Mile planning process</p> <p>Expanded public funding and financing for shoreline NBS implementation for HASPA Master Plan and First Mile project components</p> <p>Up to 5 on the ground projects accelerated through State of Play report</p> <p>3-5 identified regional elected officials cultivated and providing energetic leadership to advance implementation and funding of shoreline NBS projects</p> <p>3 projects advanced through the HASPA Master Plan (First Mile, Hayward Marsh, and Hayward Horizontal Levee)</p> | <p>6,400 linear feet of ecotone levee built for transitional habitat creation and flood protection</p> <p>8,400 linear feet of horizontal levee built (includes a wastewater treatment element, along with transitional habitat creation and flood protection)</p> <p>830 acres of tidal marsh restored</p> <p>120 acres of muted tidal marsh habitat restored</p> <p>Up to 3 million cubic feet of stormwater retained per storm</p> <p>12.6 million gallons per day of wastewater effluent polished through an engineered treatment marsh</p> <p>35,000 linear feet of new, renovated, and/or adapted Bay Trail</p> <p>Sustained state and federal funding for accelerated implementation of shoreline NBS</p> <p>Adopted local and regional sea level rise and flood resilience plans that maximize use of NBS and multi-benefit solutions, including tidal marsh and transition-zone revegetation</p> |

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| <b>Outputs</b>   | <b>Short Term Outcomes: 1-5 years</b>                                      | <b>Long Term Outcomes: 5-20+ years</b>   |
|--|--|--|
| <p><i>Quarterly and final reports, invoicing, management, subcontracts with project partners</i></p> | <p>250 stakeholders convened through the BAOWN, TSC, and State of Play</p> | <p>and green stormwater infrastructure to reduce flood impacts on people and wildlife.</p> |