

Humboldt Bay Sea Level Rise Regional Planning Feasibility Study



Photo of electrical utility assets and transportation infrastructure that would be potentially impacted by 1 meter of sea level rise inundation in the Mad River Slough Hydrologic Unit. Photo credit to Aldaron Laird.

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Executive Summary

Humboldt County is on the front lines of sea level rise (SLR) in the United States. Critical assets serving day-to-day needs of residents are subject to SLR impacts and dealing with those impacts is complicated because the assets are owned/operated by public and private entities that cross jurisdiction boundaries, property lines and hydrologic boundaries. Also, permitting SLR adaptation projects in these sensitive coastal areas has a complicated regulatory pathway.

Supported by research and local outreach made possible by a Coastal Commission grant, Humboldt County developed this **Humboldt Bay Sea Level Rise Regional Planning Feasibility Study** (“Feasibility Study”) to develop options for sea level rise adaptation planning in the Humboldt Bay region that will foster a cooperative and coordinated regional approach to the identification, funding, and implementation of various sea level rise adaptation options and makes recommendations to move forward in that direction. Task 1 and Task 2 of the Feasibility Study provide these options in the form of a Stakeholder Catalogue and a Research Memo.

The first part of this Feasibility Study – Outreach – summarizes an extensive public engagement effort involving the public and over fifty major stakeholder groups that could potentially be involved in SLR planning efforts for areas of the Humboldt Bay region potentially impacted by 1 meter of sea level rise. This outreach included surveys and interviews documenting current thinking and understanding of local SLR with a goal of identifying which parties should be involved in a regional SLR planning effort and in what capacity. Detailed results are provided in the Stakeholder Catalogue available online at the following link: <https://humboldt.gov/DocumentCenter/View/106574/FINAL-LCP-2019-Stakeholder-Catalogue-March-2022>.

The second part of this Feasibility Study – Research – summarizes potential options for implementing a regional SLR adaptation strategy. It considers four topic areas:

- **Potential Regulatory Frameworks** such as informal collaboratives formed by non-binding agreements with no authority, or a joint powers agency with varying degrees of authority;
- **Cross-jurisdictional Coordination** which describes how regional SLR adaptation could begin coordinating to protect critical transportation infrastructure such as Highway 101, or critical utility infrastructure such as municipal water transmission lines which cross jurisdictional boundaries;
- **Funding Frameworks and Opportunities** describing how SLR adaptation strategies and measures could be funded; and
- **Regulatory and Feasibility Pathways and Barriers** to forming and implementing a regional SLR adaptation strategy.

A long list of options and considerations are evaluated in the full Research Memo available on this web page: <https://humboldt.gov/3261/Regional-Sea-Level-Rise-Planning>

To help guide future discussions, the third part of this Feasibility Study presents pros and cons of different types of collaboration for regional SLR planning along with discussion of the following questions and comments by agency staff:

- What should the regional effort focus on, and which projects should it target?
- What baseline assumptions should be used in measuring SLR?

- Who should be involved? And in what capacity?
- Acknowledgement that staff and other resources to address SLR is limited.
- Concern that jurisdictional autonomy will be affected by the creation of a legally binding regional collaboration framework.
- The current funding focus utilizing Coastal Commission grants to develop consistent LCPs across jurisdictions might not be the most efficient or best approach for regional collaboration.

The final part of this Feasibility Study is a section presenting next steps for implementing regional sea level rise planning. The Feasibility Study concludes that while there is general consensus there should be some level of regional coordination on SLR adaptation, what kind is unclear. Given that regional SLR adaptation is occurring elsewhere in California (San Mateo) this Study concludes it is feasible for local stakeholders to develop a regional plan to adapt to sea level rise around Humboldt Bay. It recommends the elected officials for jurisdictions on Humboldt Bay governing land use (the cities of Arcata and Eureka, the Harbor District, Humboldt County and the California Coastal Commission – the “Core Entities”) move forward with that planning effort by:

1. Forming a working group to help elected and appointed officials establish a decision-making process for collaborating on regional SLR planning through facilitated meetings and workshops;
2. Memorialize the decision-making process in a written agreement such as a Memorandum of Understanding (MOU) that clarifies each member’s roles and responsibilities, tasks and schedule; and
3. Use the decision-making process to initiate regional SLR adaptation planning by creating a regional authority to identify and prioritize cross-jurisdictional SLR adaptation and mitigation projects and then jointly implement one or more high priority projects to protect assets vulnerable to SLR.

The overall goal is to maximize clarity and certainty in regional SLR adaptation planning. Other key recommendations include regular information exchange amongst all the parties and using a cost/benefit analyses in setting priorities.

Acknowledgements

The Humboldt Bay Sea Level Rise Regional Planning Feasibility Study is part of California Climate Investments, a statewide program that puts billions of Cap-and-Trade Dollars to work reducing greenhouse gas (GHG) emissions, strengthening the economy, and improving public health and the environment-particularly in disadvantaged communities.

The Cap-and-Trade program also creates financial incentives for industries to invest in clean technologies and develop innovative ways to reduce pollution. California Climate Investments projects include affordable housing, renewable energy, public transportation, zero-emission vehicles, environmental restoration, more sustainable agriculture, recycling, and much more. At least 35 percent of these investments are located within and benefiting residents of disadvantaged communities, low-income communities, and low-income households across California. For more information, visit the California Climate Investments website at: www.caclimateinvestments.ca.gov.



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I. Introduction

Humboldt County, and Humboldt Bay in particular, is on the front lines of SLR in the United States.¹ This region is experiencing one of the highest rates of relative SLR on the West Coast due to tectonic subsidence in combination with rising ocean waters.² Previous studies provide extensive documentation of the local infrastructure and community assets vulnerable to SLR impacts. Addressing these impacts is complicated by the complex mosaic of local, state, federal, and tribal stakeholders involved in the response due to a long history of diking and land modification around Humboldt Bay.

Addressing SLR impacts is made more complicated because these critical assets which are necessary to support day-to-day functioning of residents: 1) are owned/operated by various public agencies or private property owners that cross local agency jurisdictional boundaries and private property lines, 2) they are located in multiple tidally influenced drainage areas (commonly called “hydrologic units” or “HU’s”) , and 3) permitting SLR adaptation projects around Humboldt Bay involves multiple permitting agencies.

To address these complexities and the growing threat of SLR to the region, Humboldt County developed this **Humboldt Bay Sea Level Rise Regional Planning Feasibility Study** (hereafter referred to as the **Feasibility Study**) to explore and present options for implementing a regional SLR adaptation strategy for Humboldt Bay. The geographical scope of this effort (“project area”) is the lands surrounding Humboldt Bay projected to be impacted by one meter or more of relative SLR using 2017 projections by Patton, et al.³ A majority of the project area immediately surrounding and extending inland from the bay is under Coastal Commission retained permit jurisdiction. Portions of the project area are also governed by the City of Eureka’s and City of Arcata’s Local Coastal Programs (LCPs), and the County’s Humboldt Bay Area Plan (HBAP) which the Coastal Commission uses for guidance for decision-making but is not obligated to follow.

Fast Facts

- **Relative SLR** is the sum of the vertical change based on sea-level rise from increased ocean volume and vertical land-level changes.¹
- **Tectonic subsidence** is the downward change in vertical land-level due to seismic activity as tectonic faults interact with each other. This can make the impact of ocean volume based SLR worse.²
- **Tectonic subsidence in combination with SLR cause the land in and around Humboldt Bay to experience relative SLR greater than most of California.**^{1,2}

¹ Patton, Jason R.; Williams, Todd B.; Anderson, Jeff.; Leroy, Tom H.; Weiss, Kyle.; Burgette, Reed, Southwick, Ed.; Gilkerson, Whelan.; Nelson, Eric.; Stallman, Jay.; Schlosser, Susan.; Hemphill-Haley, Mark.; Sutherland, Diane.; Weldon, Ray., “Tectonic land level changes and their contribution to sea-level rise, Humboldt Bay region, Northern California”. (2017). Local Reports and Publications. 23. <https://digitalcommons.humboldt.edu/hsuslri_local/23/>

² Patton, Jason R.; Williams, Todd B.; Anderson, Jeffrey K.; Hemphill-Haley, Mark.; Burgette, Reed J.; Weldon, Ray II.; McPherson, Robert C.; and Leroy, Thomas H., “20th to 21st Century Relative Sea and Land Level Changes in Northern California: Tectonic Land Level Changes and their Contribution to Sea-Level Rise, Humboldt Bay Region, Northern California” (2023). Local Reports and Publications. 60. <https://digitalcommons.humboldt.edu/hsuslri_local/60/>

³ Laird, Aldaron. “Consolidation of Key Sea Level Rise Vulnerability Information for Humboldt Bay by Hydrologic Unit”. (2020). <https://digitalcommons.humboldt.edu/hsuslri_local/1/>

Studies of regional land subsidence, uplift, and SLR on Humboldt Bay show that all of these factors affect the project area, so this study uses the term “relative SLR” when describing SLR.⁴ The measures needed to protect vulnerable assets are the same whether they are being inundated by SLR or land subsidence and the granularity of shoreline assessment needed to determine which jurisdiction is responsible for permitting priority adaptation projects is beyond the scope of this study.^{5,6,7} This Feasibility Study is a technical resource for future regional coordination efforts and while it includes recommendations of County staff, no formal decisions or commitments have yet been made on the appropriate approach to regional SLR adaptation. That work will be undertaken in a separate effort to be launched later this year.

⁴ Patton, Jason R.; Williams, Todd B.; Anderson, Jeffrey K.; Hemphill-Haley, Mark.; Burgette, Reed J.; Weldon, Ray II.; McPherson, Robert C.; and Leroy, Thomas H., "20th to 21st Century Relative Sea and Land Level Changes in Northern California: Tectonic Land Level Changes and their Contribution to Sea-Level Rise, Humboldt Bay Region, Northern California" (2023). Local Reports and Publications. 60.

<https://digitalcommons.humboldt.edu/hsuslri_local/60>

⁵ Esteban, Miguel & Takagi, Hiroshi & Jameró, Laurice & Chadwick, Christopher & Avelino, John Erick & Mikami, Takahito & Fatma, Dyah & Yamamoto, Lilian & Thao, Nguyen & Onuki, Motoharu & Woodbury, Joel & Valenzuela, Ven Paolo & Crichton, Richard. (2020). Adaptation to sea level rise: Learning from present examples of land subsidence. *Ocean & Coastal Management*. 189. 104852. 10.1016/j.ocecoaman.2019.104852.

⁶ Deverel, S. J., Dore, S., and Schmutte, C., (2020). Solutions for subsidence in the California Delta, USA, an extreme example of organic-soil drainage gone awry, *Proc. IAHS*, 382, 837–842, <<https://doi.org/10.5194/piahs-382-837-2020>>

⁷ Dusterhoff, Scott, Katie McKnight, Letitia Grenier, and Nate Kauffman, e conservation; *Sediment for Survival: A Strategy for the Resilience of Bay Wetlands in the Lower San Francisco Estuary*. (2021).

<https://www.sfei.org/sites/default/files/biblio_files/Sediment%20for%20Survival%20042121%20med%20res.pdf>

II. Key Terms

Coastal professionals: individuals involved in careers related to coastal resource management, conservation, and protection from coastal hazards in Humboldt Bay. This includes “...planners, resource managers, public works engineers, transportation managers, emergency response managers, public health officials, harbor managers, port commissioners, and elected officials, as well as representatives of environmental organizations working on coastal issues, private-sector consultancies, and officials at farm bureaus.”

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue page 3)

Core entities: agencies with land use authority around Humboldt Bay which includes Humboldt County, City of Eureka, City of Arcata, the Harbor District, and the Coastal Commission.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 11)

Critical assets: structures that provide a service that is relied upon for day-to-day functions. Examples include: transportation infrastructure, utility infrastructure, facilities, and evacuation routes.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 12

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Dikes: embankments constructed of earth fill used to block surface flows and hence limit or prevent flooding of the protected area.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 12 or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 17

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Formal Collaboration: for the purpose of this study this term refers to an agreed upon systematic effort between two or more government jurisdictions to work together with others with defined terms of engagement through some level of official documentation such as an MOU or legislation.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo)

Hazard: events or physical circumstances such as flooding or erosion that can result in: the loss or harm to life, damage to property, interruptions of economic activity including losses to agricultural productivity, disruptions of transportation, and/or environmental damage.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 15

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Hydrologic unit (HU): a tidally influenced surface drainage area that shares a common outflow. Six hydrologic units have been identified in Humboldt Bay and are as follows: Mad River Slough, Arcata Bay, Eureka Slough, Eureka Bay, Elk River Slough, and South Bay.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue page 1)

Informal Collaboration: for the purpose of this study, this term refers to an effort involving two or more government jurisdictions that offer reciprocal actions to each other without legal obligation.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo)

Inundation: a term often used synonymously with flooding. “Inundation” may imply a condition where lands are permanently submerged while “flooding” implies a temporary condition.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 14

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Joint Powers Authority (JPA): a formal, legal agreement between two or more existing public agencies that share a common power and want to jointly implement programs, build facilities, or deliver services. Officials from those public agencies formally approve a cooperative arrangement. A member agency agrees to be responsible for delivering a service on behalf of the other member agencies. These agreements are very flexible and can apply to almost any situation that benefits from public agency cooperation.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 50)

Local Coastal Program (LCP): a planning document used by local governments to guide development in the coastal zone consistent with the Coastal Act and in partnership with the Coastal Commission. LCPs essentially contain the ground rules for future development and protection of coastal resources. Each LCP includes a land use plan and measures to implement the plan (such as zoning ordinances).

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 18)

Memorandum of Agreement (MOA): a written agreement that establishes common legal terms where the transfer of funds for service are anticipated and can be enforced in a court of law. Although often used interchangeably with MOU, purpose of an MOA is to write down the parties’ confirmation that they agree to work together, whereas the purpose of an MOU is to outline what the parties understand about the agreement.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 61)

Memorandum of Understanding (MOU): a common-cause written agreement between two or more parties that expresses their aligned will and agreement to proceed with their mutual goals. It expresses a convergence of will between the parties, indicating an intended common line of action, rather than a legal commitment. It is a more formal alternative to a gentlemen’s agreement, but generally lacks the binding power of an MOA or contract, although MOUs can include one or more elements that may render them legally binding.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 61)

Nature-based adaptation solutions: Manmade physical landscape features that use natural ecological systems and processes or mimics characteristics of natural features to provide coastal protection and other ecosystem services.

(For more information see Natural Shoreline Infrastructure in Humboldt Bay for Intertidal Coastal Marsh Restoration and Transportation Corridor Protection (2020-2022) <https://humboldt.gov/2487/Sea-Level-Rise> or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 19 <https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Regional Adaptation Collaborative: a group of public, private, and/or nonprofit entities representing a region and committed to preparing that region for the emerging impacts of climate change, such as rising sea level, extreme storm events, wildfires, heat waves, and droughts.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 46)

Retained Permit Jurisdiction: the area in the coastal zone where the California Coastal Commission “retains” or keeps original permit jurisdiction. It occurs on tidelands, submerged lands, and public trust lands.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo page 19)

Sea Level: the base level of the sea’s surface used for measuring the height of geographical features such as hills and as a barometric standard. Multiple factors can contribute to a change in sea level including the volume of ocean water, lunar tidal influence, and vertical land-level movement.

(For more information see Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 12 <https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Sea Level Rise: the average increase in the water level of the Earth’s oceans.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue page 1 or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 12

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Sea Level Rise Adaptation: efforts to adjust natural or human systems to manage change and minimize the negative consequences of sea level rise and make the most of any potential beneficial opportunities.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue page 1 or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 21

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>)

Special District: a form of local government created by the people of a community to deliver specialized services the local city or county do not provide.

Subsidence: the downward shift of portions of Earth’s surface. Subsidence can be due to natural processes such as plate tectonic movements or break down of organic material in soil. The sinking of land can also result from human activities, such as ground water removal or melting of permafrost.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue page 1 or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 11

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>
or the Cascadia GeoSciences report “Tectonic land level changes and their contribution to sea-level rise, Humboldt Bay region, Northern California” at https://digitalcommons.humboldt.edu/hsuslri_local/23/

Tidelands: the land between mean high tide and mean low tide bordering the Pacific Ocean, or of any harbor, estuary, bay, or inlet. Around Humboldt Bay, a majority of agricultural pasture in the coastal zone is diked former tidelands.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 26

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>

Uplift: is the geologic upward shift of portions of the Earth’s surface and is attributed to plate tectonics. Uplift often reduces relative sea level and tends to promote the seaward migration of coastlines. *(For more information see the Cascadia GeoSciences report “Tectonic land level changes and their contribution to sea-level rise, Humboldt Bay region, Northern California” at https://digitalcommons.humboldt.edu/hsuslri_local/23/)*

Vulnerability: the degree to which a species, habitat, ecosystem, human system, or asset can withstand or recover from a hazardous event such as flooding due to sea level rise.

(For more information see Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue page 1 or Sea Level Rise Adaptation Plan for Humboldt Bay/Eureka Slough Area (2018-2021) page 15

<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>

III. Task 1 Summary – Outreach

Task 1 of the Feasibility Study sought to educate and gather information about public perception of SLR in the project area through community Outreach. The main objectives of this task were to implement an **Outreach Campaign** and to generate a publicly accessible **Stakeholder Catalogue**. Humboldt County continued coordination with relevant stakeholders, the public, and Coastal Commission staff throughout this process, both to inform the research and to keep relevant stakeholders apprised of progress on this work effort.

The **Outreach Campaign** had several avenues to get public feedback from a wide variety of stakeholders. Three separate outreach survey methods gathered public input including one that was published online for the general public, another online survey via email to targeted specific stakeholders including coastal professionals, and a third survey was sent by mail to landowners within the project area. Stakeholder meetings (both targeted interviews and informal discussions) were conducted to understand roles, responsibilities, needs, concerns, and desired project outcomes related to a regional SLR planning effort.

Results from these outreach efforts were captured in the Stakeholder Catalogue. In total, the Outreach Campaign was able to gather:

- **577 online and mail-in survey responses from the general public** (after 984 paper surveys mailed to property owners and 645 views to the survey online)
- **>85 public comments** (paper and online survey combined)
- **107 complete survey responses from Coastal Professionals** (after 297 survey links were emailed out and 33 survey responses were removed for being incomplete)
- **18 key stakeholder groups for targeted interviews** (22 shared themes about SLR regional planning and adaptation were identified to have been explicitly mentioned by two or more stakeholder groups).

The **Stakeholder Catalogue** is a living document that identified major asset owners, managers, and other parties that will or could be implicated in a regional SLR planning effort. Each entity interviewed reported on the assets they own or manage, their authority or area of interest within the project area, and other concerns. This catalogue is useful in identifying overlapping jurisdictional and SLR concerns, a primary issue driving the need to consider a coordinated regional SLR planning effort. Entities surveyed range from those that would be significantly or directly involved in regional SLR planning to those that could be indirectly or tangentially involved.

Over fifty SLR stakeholders are described in the catalogue divided into the following eight categories:

- Tribal Government
- Land Use Authority
- Resource Management/Protection/Regulator
- Shoreline Structure Owner
- Vulnerable Property Owner
- Utility Infrastructure Owner/Service Provider
- Transportation Infrastructure Owner
- Academic/Public Interest Organizations

The catalogue is a starting point and tool to identify which entities should be involved in a regional SLR planning effort and in what capacity. Given the dynamic nature of the subject matter, it is anticipated the catalogue will be updated at least every five years to ensure it remains a relevant and useful tool for regional SLR planning. The entire catalogue is available online at the following link: https://humboldt.gov/DocumentCenter/View/106574/FINAL-LCP_2019_Stakeholder_Catalogue_March_2022

IV. Task 2 Summary – Research

Task 2 of the Feasibility Study seeks to inform stakeholders and document the options available for implementing a Humboldt Bay regional SLR adaptation planning effort. Part of this task was to create a **Research Memo** that detailed research into regional SLR planning and available resources with particular focus in four areas: **1) potential regulatory frameworks, 2) cross-jurisdictional coordination, 3) funding frameworks and opportunities, and 4) regulatory and feasibility pathways and barriers.**

The **Research Memo** is intended to be a living document that compiles information on regional SLR options to inform discussion of expanding existing collaboration in the project area. For the purpose of this study, agencies with land use authority were identified as “core entities” who would determine possible feasibility and funding frameworks and included Humboldt County, City of Eureka, City of Arcata, the Harbor District, and the Coastal Commission. The Research Memo was initially disseminated among “core entities” for feedback and eventually released to the public with the initial draft of this Feasibility Study.

The purpose of the Research Memo was to provide a document that can be used by stakeholders and decision makers for regional collaboration at any time or spatial scale they deem appropriate. Likely more than one regulatory framework or funding option will need to be implemented and the options presented are not necessarily meant as stand-alone strategies for regional collaboration. The below paragraphs describe the various sections of the Research Memo.

Potential regulatory frameworks research involved identifying various types of regulatory frameworks (e.g., a collaborative formed by a non-binding agreement with no authority, a joint powers authority with varying degrees of authority, etc.) that could be potentially suitable for a regional planning effort in the project area. Each option included a brief description of potential strengths and weaknesses.

Two main categories of potential regulatory frameworks were explored in this section: LCP modification options and organizational options. LCP modification options highlighted eight potential ways of bringing consistency between the three existing LCPs being updated in the project area, discussed the idea of the Coastal Commission transferring their retained permit jurisdiction to local agencies, and discussed the creation of a new more encompassing LCP in the project area.

Organizational options examined in this section included a potential regional planning collaborative, Joint Powers Authority (or agency, or agreement, or simply JPA), special districts, and MOU/MOAs. As the Research Memo is meant to be an informational resource, it did not provide analysis of which options were more or less feasible or desirable by stakeholders in the project area. It is likely that the potential options presented in this section is not an exhaustive list of all the options possible, future iterations will continue to expand the discussion.

Cross-jurisdictional coordination research involved identifying assets and locations that present a need or opportunity for cross-jurisdictional coordination in consideration of Hydrologic unit (HU) or jurisdictional boundaries or other geographic features. It explores how LCP authorities and the Coastal Commission could implement the Coastal Act and their respective LCPs to facilitate cross-jurisdictional coordination. This section provided some general information pertaining to the implementation of the Coastal Act/LCPs and related potential approaches to cross-jurisdictional coordination for SLR planning in the project area. The potential approaches identified were further explored and expanded upon in the potential regulatory frameworks section described below.

Funding frameworks and opportunities research identified ways in which SLR adaptation strategies and measures could be funded, including but not limited to identification of how funding could be received (i.e., what entity could apply for and receive funding), funding avenues or sources, and the pros and cons of various approaches. Funding for regional SLR planning could come from one or more federal, state, local, and private funding options. It is likely that some combination of state and federal programs, fees, and/or taxes will be necessary to meet the needs of a collaborative regional planning effort but for the purpose of the Research Memo, these options were grouped by their sources.

This section also included additional federal and state funding options (i.e., grants, legislation currently enacted, and proposed legislation current as of release of the Research Memo), public perception of funding options from surveys and interviews (conducted by both the County and a graduate student at Cal Poly Humboldt formerly known as Humboldt State University), as well as funding considerations and example funding strategies. Due to the dynamic nature of funding opportunities, the potential options presented in this section is likely not an exhaustive list of all the options possible, future iterations will continue to expand the discussion.

Regulatory and feasibility pathways and barriers research identified regulatory and feasibility pathways and barriers to forming and implementing a regional SLR adaptation plan. This section considers a phased adaptation model and nested spatial scale (more often referred to as neighborhood-scale or community scale) implementation model. There is also insight into what coastal professionals perceive as feasibility pathways and barriers from interviews conducted by the same graduate student at Cal Poly Humboldt mentioned in the funding and opportunities section.

A list of sea level rise collaboration examples gathered from the ResilientCA.org Adaptation Clearinghouse Case Studies, the Georgetown Climate Center Adaptation Clearinghouse, and other web locations, was also included at the end of the Research Memo. This Research Memo provides a basis for discussion of a variety of regulatory and funding tools that could be utilized in a regional SLR planning effort. Please refer to the Research Memo itself for further details on Task 2 of the Feasibility Study on this web page: <https://humboldt.gov/3261/Regional-Sea-Level-Rise-Planning>.

V. Task 3a – Planning Framework

Following the outreach and research work in Tasks 1 and 2, staff representing the core entities were asked to provide feedback on the documents and the appropriate path forward. In summary, they were uncomfortable recommending specific frameworks for SLR adaptation. They recognize that without stakeholder buy-in, implementing a formal regulatory framework would not be an appropriate or efficient use of limited resources.

The paragraphs below present potential pros and cons of moving forward with or without formal collaboration to help advance the discussion of how regional SLR planning can be best implemented using the frameworks in the Research Memo as a starting point.

A. Appropriate Approaches

1. Pros and Cons of Regional SLR Planning with Formal Collaboration

Potential Types of Regulatory Frameworks Consistent with Formal Collaboration:

- *Formal Framework Built on an Acceptable Amount of Agreement Created by an Informal Collaboration*
- *Consistent LCPs*
- *Commission Retained Permit Jurisdiction Transferred to Local Agencies*
- *Humboldt Bay LCP*
- *Regional Planning Collaborative*
- *JPA*
- *Special Districts*
- *MOU/MOA*

Pros: One of the major hurdles for many local governments seeking to address SLR is a need for additional data and technical assistance to help inform their adaptation decisions (especially in regard to potential costs, tradeoffs, and economic implications associated with SLR impacts).⁸ Climate adaptation is a fairly new field so the general public's understanding of SLR as it relates to climate change is still limited and there is a small but growing number of individuals experienced in SLR adaptation available locally. Formal collaborative regional planning increases the exchange of information and increases stakeholders' capacity to gather necessary information for the whole region by distributing

Pros at a Glance

- **Formalized Information Sharing**
- **Centralized Source of Information**
- **Regional Voice and Vision**
- **More Funding Options**
- **Greater Chance of Success Getting Coastal Armoring Approved**
- **Strategic and Phased Implementation**
- **Cross-jurisdictional Regional Mitigation**

⁸ Legislative Analyst's Office. (December 2019). Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts. < <https://lao.ca.gov/Publications/Report/4121>>.

the effort needed to gather data or create plans.

If more than one entity is dealing with a particular issue, whether trying to undertake a project, amend a land use policy or regulation, review and permit a project, etc., that agency can share information with the other agency, thereby helping that agency avoid having to “reinvent the wheel” so to speak. This kind of information exchange is possible under an informal collaboration model but is more effective under a formal collaborative effort as it is not instigated on a case-by-case basis by individuals working on SLR but rather a normalized process within formal collaboration proceedings. It also reduces the financial burden for information gathering on individual stakeholders.

To facilitate formal information sharing and to identify sources of data and technical expertise, the Stakeholder Catalogue describes the interests and SLR projects undertaken by local, state, and federal stakeholders in the project area which can provide guidance on what data and technical expertise is already available. In addition to the stakeholders described in the Stakeholder Catalogue, a confidential contact list for coastal professionals was created by Cal Poly Humboldt and the County in order to conduct their targeted survey. This contact list included a list of private sector consultants that have participated in studies concerning land subsidence and/or sea level rise, seven of which participated in the 2021 SLR Coastal Professionals Survey. Keeping such a contact list up to date is beyond the scope of this Feasibility Study but would be a useful resource a formal or informal collaborative effort could maintain.

Cal Poly Humboldt is an important asset for advancing regional understanding of relative SLR conditions and technical expertise. In 2018, Cal Poly Humboldt created the Sea Level Rise Institute (SLRI) in partnership with the Humboldt community. This informal collaborative effort “includes representatives from academic institutions, tribes, government agencies, NGOs, the private sector, and civic and community groups in the region” and has an informally collected Library Database that acts as a publicly accessible repository for reports and publications.^{9,10} This Library Database depends on submissions and can be used to identify data and technical expertise from publicly accessible reports on subsidence, sea level rise, and asset vulnerability.^{11,12,13} While this informally collected repository is extremely useful, due to the voluntary nature of data and report submissions, the resources available are not exhaustive and more resources were needed to compile the Stakeholder Catalogue and Research Memo created for this Feasibility Study.

Having a formal collaboration that deals with the gathering and compilation of the participants SLR information and resources in a centralized location also simplifies outreach and public engagement efforts for everyone involved. As evidenced by the process undertaken to create the Stakeholder Catalogue and Research Memo, valuable information about stakeholders in the project area and SLR regional planning best practices can be very time consuming to locate. A

⁹ Cal Poly Humboldt Sea Level Rise Institute. (2023). About. <<https://humboldtslri.org/>>

¹⁰ Cal Poly Humboldt Sea Level Rise Institute. (2023). Cal Poly Humboldt Digital Commons. <<https://digitalcommons.humboldt.edu/hsuslri/>>

¹¹ Patton, Jason R.; Williams, Todd B.; Anderson, Jeffrey K.; Hemphill-Haley, Mark; Burgette, Reed J.; Weldon, Ray II; McPherson, Robert C.; and Leroy, Thomas H., "20th to 21st Century Relative Sea and Land Level Changes in Northern California: Tectonic Land Level Changes and their Contribution to Sea-Level Rise, Humboldt Bay Region, Northern California" (2023). Local Reports and Publications. 60. <https://digitalcommons.humboldt.edu/hsuslri_local/60>

¹² Laird, Aldaron. Orth-Gordinier, Kristen. “Compilation of Sea Level Rise Documents and References for Humboldt Bay”. (2021). Local Reports and Publications. 35. <https://digitalcommons.humboldt.edu/hsuslri_local/35/>

¹³ Laird, Aldaron. “Consolidation of Key Sea Level Rise Vulnerability Information for Humboldt Bay by Hydrologic Unit”. (2020). Local Reports and Publications. 1. <https://digitalcommons.humboldt.edu/hsuslri_local/1/>

single comprehensive and easily accessible public resource for SLR information building on the efforts of SLRI and other regional stakeholders to compile pertinent SLR information could be important for keeping the public apprised of the hazards of SLR and current adaptation/mitigation strategies. This can be particularly useful for decision makers who are not dedicated to SLR planning, such as city elected officials and their staff, since there is the potential for turnover of city council members and SLR projects can take many years of work to plan and build.¹⁴

Any entity hoping to do regional SLR planning must have public support. Residents and decisionmakers not well acquainted with SLR may not necessarily understand SLR adaptation/mitigation projects or the considerable upfront capital associated with them.¹⁵ Multiple stakeholder voices can help to perform the necessary outreach to educate those not intimately associated with SLR planning. If all stakeholders in the collaborative effort are on the same page, they can give consistent outreach and resources to these elected officials and the public.

A broad regional voice and vision in the project area is useful for another reason: as a rural County with a smaller population than many other coastal areas in California, individual local stakeholder voices are not as loud as a unified front addressing SLR in the region. When looking for funding, having a larger representative voice gives stakeholders in the Humboldt Bay's projected 1m inundation area more even footing with other competing entities that represent more urban and/or larger populations elsewhere along the coast looking for funding. At the very least, local entities will not be competing with each other for the same pots of money to address similar SLR issues.

A formal regional collaborative effort also gives stakeholders in the project area more sway when it comes to calling on state officials and agencies to address the complicated regulatory and jurisdictional issues unique to the region due to the areas historical use of dikes and the existing land use of former tidelands. For instance, Coastal Commission staff have stated that there is a possibility of the Commission giving local governments more flexibility on adaptation approaches that are likely inconsistent with the Coastal Act if there was a coordinated regional plan or strategy (such as coordinating LCP policies) than if each jurisdiction pursued its own plan.¹⁶ Since roughly 75% of the City of Eureka's LCP, City of Arcata's LCP and Humboldt County's HBAP susceptible to 2.0 meters of SLR is under the Commission's coastal development permit jurisdiction, getting the Commissions cooperation on SLR adaptation projects is vital.¹⁷

Coastal Commission staff suggested that if the region were to pursue a regional "phased" and/or "neighborhood-scale" regional plan, adaptation strategies such as hard coastal armoring, which is not likely to be consistent Section 30235 of the Coastal Act, may be appropriate for the short term in small sections. This is especially significant for the Cities of Eureka and Arcata which have already each proposed new SLR LCP policies allowing armoring of certain neighborhoods irrespective of whether the development being protected is an existing structure that predates the Coastal Act.¹⁸ Under Section 30007.5 Coastal Act, in case of conflict occurring between one or more policies of the division, such conflicts will be resolved in a manner which is "on balance the

¹⁴ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California's Ground Zero for Sea Level Rise. <
https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

¹⁵ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California's Ground Zero for Sea Level Rise. <
https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

¹⁶ California Coastal Commission. (October 2022). Coastal Commission Staff Comments on the Humboldt County Draft Research Memo for the Sea Level Rise Regional Planning Feasibility Study.

¹⁷ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue. Page 64.

¹⁸ California Coastal Commission. (October 2022). Coastal Commission Staff Comments on the Humboldt County Draft Research Memo for the Sea Level Rise Regional Planning Feasibility Study.

most protective of significant coastal resources”.¹⁹ For example rather than prohibiting armoring to protect post-Coastal Act infrastructure, a strategy allowing some armoring when coupled with expansion of nearby wetlands may be “on balance the most protective of significant coastal resources”.

Compared to some areas of the County, these two core entities are relatively densely developed. Within a formal collaborative effort, these entities have the potential to have cross-jurisdictional regional mitigation with the County (which is likely to have more areas in their jurisdiction where mitigation, managed retreat of land uses in highly vulnerable urban areas, or nature-based adaptation solutions could be viable).

Linear cross-jurisdictional assets are also able to be more appropriately addressed in a regional approach, especially where impacts to a linear asset are occurring in one jurisdiction that have an effect on another jurisdiction dependent on that same asset. For example, consider water and wastewater pipelines where SLR impacts on a section of pipeline prevent an adjacent jurisdiction from being served by the pipeline. Also consider Highway 101, an asset that benefits all entities in the county. Should any portion of it be removed or rerouted, public transportation inland and on the coast would be greatly affected. A collaboratively created regional strategic and phased implementation adaptation plan would at the very least allow for more creative adaptation options for core entities than if a Core Entity were to pursue it alone.

There is currently one formal regional SLR planning effort in California that may be close to what stakeholders in the project area may want to pursue. San Mateo OneShoreline (officially San Mateo County Flood and Sea Level Rise Resiliency District) was signed into law in 2019 through the expansion of the mission, geographic reach, and governing Board of the 1959 San Mateo County Flood Control District.²⁰ While several of the pros discussed above are important aspects of OneShoreline’s mission and vision, OneShoreline was created for two identified purposes: to provide a “broad and unified vision and voice that would position the new regional agency and its projects to obtain funding and regulatory permits” and to “coordinate the planning and implementation of projects across jurisdictional lines, which enables uniform levels of protection and the sharing of technical information and resources”.²¹ However, it is important to note that this effort does not have the same complex set of cross-jurisdictional issues as the Humboldt Bay and the affected area is located in San Francisco Bay outside the Coastal Zone.

According to a 2021 San Mateo County Civil Grand Jury report on OneShoreline titled, “San Mateo County: California’s Ground Zero For Sea Level Rise”, the regional entity has undertaken this original dual purpose with some level of success.²² According to the report and participant’s responses, OneShoreline successfully lobbied for simplifying the permitting for climate resiliency projects and obtained grants from the state for specific work such as a flood warning system. Their website also states that they have successfully gone through the CEQA certification process, secured environmental permits, secured funding for construction and maintenance, completed land agreements among several jurisdictions and a private landowner to begin

¹⁹ California Coastal Commission. (2022). Public Resources Code Division 20 California Coastal Act. <<https://www.coastal.ca.gov/coastact.pdf>>

²⁰ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo. Page 58.

²¹ San Mateo OneShoreline. (2023). Our History <<https://oneshoreline.org/our-history/>>

²² San Mateo Civil Grand Jury. (2020-21). San Mateo County: California’s Ground Zero for Sea Level Rise. <https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

construction of their Bayfront Canal and Atherton Channel Flood Protection and Ecosystem Restoration Project in 2021.²³

Before OneShoreline, a regional SLR resilience district had not been created before and its creation required State legislation (Assembly Bill 825 – Mullin) to expand the existing mission, geographic reach, and governing Board of San Mateo’s existing Flood Control District to address SLR impacts.²⁴ Prior to the state legislation, San Mateo began its regional coordination efforts in 2016 when the County’s Department of Public Works established a Flood Resilience Program. The Flood Resilience Program developed an MOU signed by San Mateo and seven city jurisdictions to plan for three potential projects. Considering the unprecedented origin story of OneShoreline, the option “formal framework built on an acceptable amount of agreement created by an informal collaboration” was added to the list at the beginning of this section of **Potential Types of Regulatory Frameworks Consistent with Formal Collaboration** sourced from the Research Memo. It is possible stakeholders in the project area may choose to create a new framework for formal collaboration not considered by the Research Memo in a manner similar to the stakeholders of San Mateo County.

²³ San Mateo OneShoreline. (2023). Priorities and Accomplishments. <<https://oneshoreline.org/our-history/>>

²⁴ San Mateo OneShoreline. (2023). Our History <<https://oneshoreline.org/our-history/>>

Cons: Given the complex nature of the regulatory landscape currently in place in and around the project area, compounded by the variety of stakeholders involved, a formal regional SLR collaborative effort is not likely to address all the different priorities of individual stakeholders involved. This can lead to delayed action on projects in the process of being planned or implemented by individual stakeholders. Not only is delayed action more costly in the long run (according to the Pew Foundation, every \$1 invested in disaster mitigation saves \$6 in rebuilding and recovery)²⁵, it can cause discontent among participating stakeholders. If a particular SLR

project or issue prioritized by an individual stakeholder is not prioritized or even addressed by a formal group effort, this could lead to higher overall costs and poses the danger of instigating a complete breakdown in the collaborative effort which would bring stakeholders in Humboldt Bay's projected 1m inundation area back to the starting line for regional SLR adaptation.

A formal collaborative effort also requires a cost for staffing to coordinate and maintain the group resources separate of the already existing funding demands for participating stakeholders, making it the most expensive option for collaboration. Dedicating staff and resources to a formal effort requires accountability to ensure that contributors are achieving returns on that funding. Without a steady funding source to maintain the formal collaboration, the group will be inefficient or possibly even disband. This has already happened in the project area once before with the dissolution of the SLR Working Group funded by a State Coastal Conservancy grant following the end of grant funding in 2015.²⁶

In regard to other examples of regional planning and coordination specific to SLR, the previously mentioned regional entity San Mateo OneShoreline is possibly the only countywide agency dedicated solely to sea level rise and flooding west of the Mississippi.²⁷ This independent government agency was developed and signed into law over the course of 2018-2019 with initial funding coming from contributions allocated by population (broken into 3 tiers) from OneShoreline's 20 participating cities and San Mateo county.²⁸

The 2021 San Mateo County Civil Grand Jury report details how the formal collaborative effort is doing and provided recommendations for moving forward. The grand jury responses by various participants of OneShoreline attached to the report provides some insight into what issues a formal collaborative effort might encounter. Steady funding was one of the points of contention for a majority of the responses. Existing agreements for funding the agency only allotted for three years of contributions from participating stakeholders and many members of OneShoreline objected to committing to further funding without the development of a Flood and Sea Level Rise

Cons at a Glance

- **Differing Priorities**
- **Most Expensive Collaborative Option**
- **Difficulty Finding Long Term Funding for Collaboration**
- **Larger Scale Goals Take Longer Time to Coordinate**
- **More Structural Change**

²⁵ Sea-Level Rise Leadership Team. (February 2022). State Agency Sea-Level Rise Action Plan for California. <https://www.opc.ca.gov/webmaster/_media_library/2022/08/SLR-Action-Plan-2022-508.pdf>.

²⁶ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo. Page 105.

²⁷ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California's Ground Zero for Sea Level Rise. <https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

²⁸ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo. Page 107.

Investment Plan (a key deliverable from the first agreement of funding for the agency) or all participating agencies agreeing to a methodology for implementing a continuing funding source.²⁹

A Flood & Sea Level Rise Investment Plan (Investment Plan) is meant to define the flood, stormwater, and sea level rise projects and priorities for a region through a community and stakeholder engagement process.³⁰ Unlike a Regional SLR Adaptation Plan, an Investment Plan does not necessarily contain an element of detailed design, cost estimating, and prioritization of SLR projects yet. Even without these elements, creating an Investment Plan is a very ambitious deliverable requiring coordination among all participating entities. In fact, despite the Investment Plan being a priority of San Mateo OneShoreline and it being considered a “cornerstone for efforts to secure reliable on-going funding” it has not been completed in the three-year timespan originally anticipated.^{31,32}

This highlights an issue associated with broader scale projects and plans. The larger the scope, the more stakeholders involved and the longer it takes to undertake and implement. A formal regional collaboration should be implemented when the service it delivers can achieve economies of scale, when spillover is big, or when cross-jurisdictional coordination is necessary, among other factors.³³ Determining these values can be difficult and the time it takes to determine these tradeoffs depends on how many entities the regional effort is considering and gathering information from. A meta-analysis by Ansell and Gash of 137 case studies of collaborative governance concluded that the success of collaborative governance depends on “adequate time for the process as well as on trust and interdependence among the participants”.³⁴ Relationship building and consensus for a formal collaborative effort has a higher threshold than is required by informal collaboration.

Additional time needed for earning stakeholder buy-in is not necessarily a con because better collaborative relationships between stakeholders and better representation of stakeholder interests in planning is a pro overall. However, it should still be noted that building this consensus contributes to extended timelines as it requires a higher level of development for approval by participants as shown in the San Mateo OneShoreline example.

In general, formal collaboration means a change in structure for SLR stakeholders. Even if the formal collaborative is the repurposing of an existing organization or governmental entity, as was the case with San Mateo OneShoreline, the expanded services provided will require a shift in status quo for participants involved. A Guide to Successful Local Government Collaboration in America’s Regions (Collaboration Guide) published in 2006 noted that regional collaboration that require the least structural change were likely the most feasible and least controversial option for

²⁹ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California’s Ground Zero for Sea Level Rise. <https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

³⁰ San Mateo Countywide Water Coordination Committee (SMCWCC). (March 15, 2019). Meeting Agenda. <https://ccag.ca.gov/wp-content/uploads/2019/03/WCCAgendaPacket031519_FINAL.pdf>

³¹ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California’s Ground Zero for Sea Level Rise. <https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

³² OneShoreline. (2023) Priorities and Accomplishments. <<https://oneshoreline.org/priorities/>>

³³ HUD User Office of Policy Development and Research. (2015). Strategies for Regional Collaboration. <<https://www.huduser.gov/portal/periodicals/em/fall15/highlight2.html>>

³⁴ HUD User Office of Policy Development and Research. (2015). Strategies for Regional Collaboration. <<https://www.huduser.gov/portal/periodicals/em/fall15/highlight2.html>>

regional collaboration compared to those options that require more structural change and/or may be more difficult to implement.³⁵ It goes so far as to assert that:

“This is the great dilemma of regional approaches to governing. They are almost universally considered the best hope of solving many problems facing communities. But they are the least likely to be embraced.”

One important consideration before committing to a formal collaboration is that once created with legally binding language, it is often hard to reverse the formal collaboration if it proves inefficient, inappropriate, or unserviceable. One example highlighted in the Task 2 Research Memo is the creation of a Geologic Hazard Abatement District (GHAD) by a group of homeowners at Broad Beach in the city of Malibu.³⁶

A GHAD is a public agency formed by communities to provide a management structure and funding source to protect from landslides, erosion, liquefaction, flooding, and other hazards. In Broad Beach, the public agency was created to combat SLR and beach erosion by utilizing beach nourishment. Although a majority of the parcel owners agreed to fund this beach nourishment project, some homeowners objected to the project, which has ultimately stalled the implementation of the project. Now these homeowners are strapped with millions of dollars in legal fees and permitting costs in addition to the potential cost of the project which has now nearly quadrupled in cost and does not seem likely to reach a serviceable agreement with the Coastal Commission any time soon. With the GHAD mired in legal battles, disgruntled residents unable to pay the fees levied by the GHAD to fund the increasing operating costs might be tempted to dissolve the GHAD. This is unfortunately likely to be an equally costly battle as evidenced by the dissolution of the nearby Las Tunas GHAD in the 90's (for more information look up Las Tunas Beach GHAD vs Superior Court [1995]).^{37,38}

³⁵ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America's Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

³⁶ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo. Page 86.

³⁷ Malibu Times. (1999). Council Delivers Death Blow to GHAD. <https://malibutimes.com/article_37fc83f1-426e-54cd-ace9-ec24ecef131b>.

³⁸ Santa Cruz County Grand Jury. (2002-2003). Geological Hazard Abatement Districts Report. <<https://www.co.santa-cruz.ca.us/grandjury/GJ2003/Content/6-2Ghad.htm>>

2. Pros and Cons of Regional SLR Planning with Informal Collaboration

Potential Types of Regulatory Frameworks Consistent with Informal Collaboration:

- *Informally Build an Acceptable Amount of Agreement Amongst Stakeholders for a Future Formal Collaborative Framework*
- *Consistent LCPs*
- *Commission Retained Permit Jurisdiction Transferred to Local Agencies*
- *MOU/MOA*

Pros: As informal cooperation does not require a set level of consensus or agreement among participants and has no legally binding constraints on participant action, it is the easiest form of collaboration to implement. In the Collaboration Guide referenced earlier, informal cooperation was the easiest to implement of 17 options identified due to it requiring the least amount of structural change.³⁹ An informal cooperative effort doesn't necessarily need participants to commit to funding or commit to actions regarding their assets. It also doesn't require all stakeholders to participate. Informal collaboration could be as simple as two entities meeting to exchange information and/or offering reciprocal actions to each other. This also means that local entities retain their autonomy on plans or projects addressing SLR, a factor that can make or break a local entity's support of a collaborative effort.⁴⁰

Pros at a Glance

- **Easiest to Implement**
- **Requires Least Change to Structure**
- **Simple Fiscal and Jurisdictional Needs**
- **Local Entities Autonomy Unaffected**
- **Potentially Efficient Implementation of Existing Projects**
- **Could be Turned into Formal Collaboration**

At present, the stakeholders in the project area do not have a formal collaborative effort for regional SLR planning so stakeholders collaborate on a case-by-case basis. This means that SLR plans or projects that have SLR components do not necessarily have to go through additional rounds of input or modifications to be consistent with regional efforts. Stakeholders in a regional effort that would not necessarily be involved otherwise would not need to spend time or energy to look at projects outside of their jurisdiction. These factors could all contribute to a quicker process for project implementation if jurisdictions have the capacity, funding, and resources to move forward with projects independently.

As previously mentioned, SLRI is an informal platform for regional SLR collaboration facilitated by Cal Poly Humboldt. Another valuable contribution that Cal Poly Humboldt provides for the

³⁹ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America's Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

⁴⁰ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America's Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

advancement of data and technical expertise in the project area is their participation in the Cascadia Coastlines and Peoples Hazards Research Hub (Cascadia CoPes Hub).

While these are both useful resources for decision makers and the public, these informal collaboratives do not have permitting authority or direct involvement in SLR policy development and implementation. These informal collaboratives can partner with core entities in regional planning efforts, work together to secure funding, and provide policy and project guidance, but they have no legal authority.

Utilizing informal collaboration for regional SLR planning does not mean that formal collaboration is off the table. In fact, informal cooperation on intercommunity problem-solving can lead to intercommunity governance. As noted by the Collaboration Guide:

“While there was often a crisis or incident of some sort that may have initiated the conversations, many regional contacts became more formal after years of informal discussions about regional issues and shared problems.”⁴¹

Since informal collaboration has the potential for developing into a more legally binding formal collaborative, the option to “Informally Build An Acceptable Amount Of Agreement Amongst Stakeholders For A Future Formal Collaborative Framework” was added to the list at the beginning of this section of **Potential Types of Regulatory Frameworks Consistent with Informal Collaboration** sourced from the Research Memo. It is entirely possible that stakeholders in the Humboldt Bay projected 1m inundation area might find that an informal collaborative facilitated by an entity, such as Cal Poly Humboldt’s SLRI, which does not necessarily have jurisdictional power might find an agreeable new framework for formal collaboration not considered as of yet by the Research Memo.

⁴¹ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America’s Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

Cons: There are currently few forums in the Humboldt Bay region where local stakeholders can consistently share SLR information and offer technical expertise early on in SLR plans and projects, an issue consistent with many local governments trying to make cross-jurisdictional decision-making.⁴² SLRI does provide a platform but the wide breadth of membership from the community might not be an ideal venue for some core entities to share potential SLR plans or projects, especially if aspects of the project are confidential in nature.

Without a formal coordinated regional effort, Humboldt Bay region SLR plans and projects for adaptation and mitigation may still go forward with piecemealed informal collaboration. Depending on how stakeholders choose to exchange information and plans, this could result in inconsistencies between plans and projects in the region.

For instance, cross-jurisdictional assets might not be prioritized by an individual entity as it would be by a region. This was briefly touched upon in the Pros of Formal Collaboration section using the example of a pipeline or Highway 101. If an individual entity doesn't prioritize an asset, or does not fully realize the impact an asset might have on other stakeholders or jurisdictions, there is the potential of delayed SLR adaptation in areas critical to the region as a whole. An informal collaborative effort also doesn't address or minimize local entity's need for dedicated time or staff to focus on critical SLR planning.⁴³

SLR projects such as levees, sea walls, raising marshes and mudflats, and similar capital projects are expensive and take many years from development to implementation.⁴⁴ The time it takes to implement these projects can be further extended by constrained local entity capacity. Furthermore, it may not even be feasible for one organization to gather the funds in a timely manner to address SLR.

A report by the California Legislative Analyst's Office on how the State can help support local coastal adaptation efforts cited funding limitations as local government's primary barrier to making progress on coastal adaptation efforts.⁴⁵ They asserted that this is largely because local funding

Cons at a Glance

- **Inconsistent Plans or Projects for SLR Adaptation and Mitigation**
- **Potential Delays in SLR Adaptation and Mitigation for the Region as Whole**
- **Doesn't Address Time or Staff Constraints**
- **Regional Entities Competing for the Same Funding Sources**
- **Competing for Same Smaller Pool of Funding**
- **Stakeholders Might Not Understand the Inland Impacts of SLR**
- **Susceptible to Shifts and Changes in Politics, Personnel, and Resources**
- **Hard to Sustain Over Time**

⁴² Legislative Analyst's Office. (December 2019). Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts. < <https://lao.ca.gov/Publications/Report/4121>>.

⁴³ Legislative Analyst's Office. (December 2019). Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts. < <https://lao.ca.gov/Publications/Report/4121>>.

⁴⁴ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California's Ground Zero for Sea Level Rise. < https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

⁴⁵ Legislative Analyst's Office. (December 2019). Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts. < <https://lao.ca.gov/Publications/Report/4121>>.

faces many competing priorities and constraints with only limited amounts of funding for adaptation resulting in a focus on outside funding sources.

As previously mentioned, without formal collaboration, stakeholders looking for outside funding are individually competing for the same limited funding options. Even if a few stakeholders informally coordinate to jointly compete for funding, they are not as competitive to grant funders as a regionwide effort would be when compared to other regions in California with larger populations or urban populations. Competing individually for funds also limits what grant options are available as funding opportunities with larger awards often require a large amount of work to apply and prefer projects that demonstrate a large impact.

Without formal collaboration, the importance and magnitude of impact SLR will have in the Humboldt Bay region may not be properly communicated to the public, local entity staff, and incoming elected officials. Stakeholders, particularly those inland and not directly impacted by SLR, may not fully understand the negative implications of delayed SLR adaptation for critical assets (such as Highway 101 and wastewater infrastructure).⁴⁶ These stakeholders are going to need outreach and consistent messaging to properly comprehend why the Humboldt Bay region is pursuing these expensive SLR adaptation or mitigation measures.

A formal collaborative effort is best poised to provide this kind of consistency as they would not have other priorities or competing considerations. An informal collaboration is not as likely to provide consistent messaging as the focus of informal collaboration is susceptible to changing politics, personnel, and resources. Since there is no formal commitment, participating stakeholders do not have a guiding framework or structure to guide them forward.⁴⁷ This lack of formal structure tends to make informal collaborations hard to sustain. According to the Collaboration Guide:

“Formalizing agreements can help provide validity. A legal entity or inter-local contract also has the benefit of removing daily politics from the program, not threatening individual turf, and preventing ad hoc collaboratives from forming.”⁴⁸

⁴⁶ San Mateo Civil Grand Jury. (2020-21). San Mateo County: California’s Ground Zero for Sea Level Rise. <https://www.sanmateocourt.org/documents/grand_jury/2020/Sea%20Level%20Rise.pdf>

⁴⁷ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America's Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

⁴⁸ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America's Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

B. Collaborative Opportunities and Challenges

During review of the Task 2 Research Memo, staff from each of the Core Entities provided feedback on opportunities and challenges of regional SLR collaborative planning in Humboldt Bay.

Opportunities and Challenges at a Glance

1. Stakeholders have the opportunity to work together to reach an agreement on desired collaboration framework(s) or funding source(s), which focus or projects to target, what baseline assumptions to use for measuring SLR, and who would be involved at what capacity for regional collaboration in Humboldt Bay's projected 1m inundation area.
2. Dedicated staff, staff time focused on SLR, and/or resources to address SLR is limited among stakeholders.
3. There is concern jurisdictional autonomy will be affected by the creation of a legally binding regional collaboration framework.
4. The current funding focus utilizing Coastal Commission grants to develop consistent LCPs across jurisdictions might not be the most efficient or best approach for regional collaboration.

1. Stakeholders have the opportunity to work together to reach an agreement on desired collaboration framework(s) or funding source(s), which focus or projects to target, what baseline assumptions to use for measuring SLR in Humboldt Bay's projected 1m inundation area, and who would be involved at what capacity

Collaboration Frameworks and Funding Sources Analysis and Discussion:

While staff representing the Core Entities agreed that SLR is a time sensitive issue that needs to be addressed soon, they were not able to agree on what option(s) presented in the Research Memo were more or less feasible at this time. They also expressed doubts that the options presented in the Research Memo were representative of all available options. In addition, some Core Entity staff needed additional time to review the Research Memo and give substantive feedback. This highlights a potential constraint on future collaboration as Core Entities already have many existing projects and resource demands in addition to SLR planning, with limited staff to address all of them. More discussion of this can be found below.

All core entities agreed that collaboration at some level is needed. Through this Feasibility Study, stakeholders and decision makers now have the tools and resources to decide who might be involved and how it might be done in the form of the Stakeholder Catalogue and the Research Memo. By gathering feedback on these two Feasibility Study deliverables, the process of determining these details have been initiated and discussion has been generated among Core Entity staff about how collaboration might be accomplished. The recommendations of this

Feasibility Report lay out a roadmap for how the foundation the Stakeholder Catalogue and Research Memo has provided can progress regional SLR collaboration for the project area.

Though achieving consensus among Core Entities would be the most preferable outcome of a SLR collaborative, it will likely be difficult to achieve.⁴⁹ Perhaps more attainable is an effort of the Core Entities work together to reach a point of consent or an operational decision on what a regional SLR collaborative framework or funding framework might look like.⁵⁰ By gaining consent instead of complete consensus, the voices of participating stakeholders are heard but decision making is not stalled or blocked if a minority of participants do not fully agree with the decision making process. Core Entities expressed a need to bring as much certainty to adaptation and development planning as feasible in order for them to be able to assess how or if their specific stakeholder goals and needs can interface with that of a regional effort. More discussion of this can be found below.

To ensure the focus of study is reflective of the stakeholders' desired coordinating body, it is important to have a clear understanding of the goals and objectives of each stakeholder. Core Entities already consult among themselves as projects necessitating cross-jurisdictional coordination arise. Expanding these piecemealed conversations to a regional focus might require dedicated times to meet to discuss their needs and goals and work together to identify strategies to meet those needs and goals.

Relevant Sections of the Task 2 Research Memo:

Discussion of phased implementation on **page 108**

Discussion of nested spatial scale implementation on **page 109**

Discussion of regulatory and feasibility barriers on **page 110**

Framework Focus Analysis and Discussion:

Core Entities will need to decide what the framework should be used for SLR adaptation planning with a clear understanding of the goals and objectives of each participant. Some Core Entity staff had trepidation about creating a new formal body for regional SLR planning. Particularly when the work to be undertaken by such a planning body is undetermined. Identifying a clear project or specific focus could help make SLR adaptation a less nebulous concept to tackle which may lead to more clarity of what level of commitment required.

In general, Coastal Commission staff expressed support for any framework that allows local governments, stakeholders, and relevant local, state, and federal agencies to come together to make decisions about sea level rise planning and adaptation. They did however identify LCP policy coordination relating to sea level rise adaptation across LCP jurisdictions as *“likely to allow local governments to create an adaptation plan or strategy applicable to the entire Humboldt Bay area”*. While some Core Entity staff agreed, others said this might not be the best use of time and energy for a regional effort.

⁴⁹ Sociocracy For All. (2022). Decision-Making Methods: A Comparison. <<https://www.sociocracyforall.org/decision-making-methods-comparison/>>.

⁵⁰ Sociocracy For All. (2022). Decision-Making Methods: A Comparison. <<https://www.sociocracyforall.org/decision-making-methods-comparison/>>.

The following are potential areas of focus for future coordination framework(s) that have been identified by Core Entities at some point during feedback sessions:

- a. Sectors such as transportation, natural resource management, emergency management, and the water sector among others
- b. Infrastructure (such as dike systems, railways, roadways, or wastewater facilities)
- c. Time and spatial scale
 - i. Project by project basis
 - ii. Phased approach
 - iii. Nested spatial scale approach
- d. Funding
- e. Policy
 - i. LCP coordination

Relevant Sections of the Task 2 Research Memo:

Discussion of Cross-jurisdictional Coordination assets on **page 13**

Discussion of phased implementation on **page 108**

Discussion of nested spatial scale implementation on **page 109**

Discussion of regulatory and feasibility barriers on **page 110**

Discussion of Humboldt Bay Coordination and Governance on **page 113**

Target Project Analysis and Discussion:

Multiple Core Entity staff identified SLR adaptation projects for cross coordination as a major influence on what coordination and funding frameworks will be needed and when. Some staff also noted that identifying specific projects or clear goals for collaboration could help make SLR adaptation more manageable than a “large scale only” approach. This is not to say that planning for projects would need to be exclusive. Work to identify projects could happen in parallel with choosing framework options. An example of this approach would be OneShoreline which started their collaboration efforts by having stakeholders sign MOUs to work together on a select few projects.

Not all projects are going to require a regionwide approach, but some of these projects can benefit from a shared cooperative agreement among groups that identifies priority projects or assets. Projects could also potentially benefit from a shared cooperative agreement among stakeholders by allowing them to access additional funds, technical skill, and resources. In the case of projects that don’t require a regionwide approach, a regional framework could potentially slow down projects already planned or reduce the autonomy of individual Core Entities. On the other hand, it was noted by some Coastal Commission staff that regional planning framework could potentially make individual projects not generally favorable to the Coastal Commission more feasible if included and justified within a regionwide context.

Typical SLR adaptation and mitigation projects such as elevating or creating dike systems, fortifying existing infrastructure or buildings, building coastal hard armoring structure such as sea

walls, restoration of modified hydrologic systems to wetland habitat, and managed retreat^{51,52,53} have aspects which may be incongruent with the Coastal Act and challenging to permit.

Identifying feasible and effective adaptation projects utilizing nature-based methods (also known as living shorelines) is challenging due to the complexities and uncertainties associated with modifying natural systems, the need for site-specific design, and the high standard of care for working in environmentally sensitive areas. The County's Public Works department developed a SLR Adaptation Plan for Transportation Infrastructure and other Critical Resources for the Eureka Slough HU, which occupies approximately 3,300 acres, for a total cost of \$480,000.⁵⁴ The scale of the HU allows more detailed consideration of geomorphic conditions and physical processes, which improves the understanding of risks and can inform the design of effective adaptation measures. This plan was intended to support the transition from vulnerability assessment to project identification and planning. The plan included detailed hydraulic analysis, which accounted for wind waves in addition to static water levels, and modeling of various flooding scenarios. The plan identified a range of potential adaptation project concepts including salt marsh creation and restoration along a one-mile segment of the Highway 101 and railroad transportation corridor. This plan was followed by an initial Feasibility Study, completed in 2022 for \$250,000, which developed conceptual designs for salt marsh creation.⁵⁵ In April 2023, the County was awarded a grant of \$750,000 from the Coastal Conservancy to develop 30% engineering design plans and a CEQA document for full project implementation and 65% engineering design plans and permit applications for Phase I of implementation. Completion of this work is expected in 2025. Whether funding for construction will be available, whether permits will be issued, and the timeline for potential implementation are currently unknown. This example gives perspective on the funding and time needed to develop adaptation projects using nature-based methods.

The Eureka Slough SLR Adaptation Plan provides a small-scale potential model of the methods and approach that a regional collaboration could reference for SLR adaptation project identification and prioritization. Although this SLR Adaptation Plan is for a small portion of the Eureka Slough HU, it involved coordination between multiple stakeholders including the Humboldt County Department of Public Works, Humboldt County Association of Governments (HCAOG),

⁵¹ Esteban, Miguel & Takagi, Hiroshi & Jamero, Laurice & Chadwick, Christopher & Avelino, John Erick & Mikami, Takahito & Fatma, Dyah & Yamamoto, Lilian & Thao, Nguyen & Onuki, Motoharu & Woodbury, Joel & Valenzuela, Ven Paolo & Crichton, Richard. (2020). Adaptation to sea level rise: Learning from present examples of land subsidence. *Ocean & Coastal Management*. 189. 104852. 10.1016/j.ocecoaman.2019.104852.

⁵² Deverel, S. J., Dore, S., and Schmutte, C., (2020). Solutions for subsidence in the California Delta, USA, an extreme example of organic-soil drainage gone awry, *Proc. IAHS*, 382, 837–842, <<https://doi.org/10.5194/piahs-382-837-2020>>

⁵³ Dusterhoff, Scott, Katie McKnight, Letitia Grenier, and Nate Kauffman, e conservation; Sediment for Survival: A Strategy for the Resilience of Bay Wetlands in the Lower San Francisco Estuary. (2021). <https://www.sfei.org/sites/default/files/biblio_files/Sediment%20for%20Survival%20042121%20med%20res.pdf>

⁵⁴ GHD. (2021). "Sea Level Rise Adaptation Plan for Transportation Infrastructure and Other Critical Resources in the Eureka Slough Hydrographic Area, Humboldt Bay". <<https://humboldt.gov/DocumentCenter/View/94678/Eureka-Slough-SLR-Adaptation-Plan>>

⁵⁵ Svelha, Jeremy., Vivyan, Brett., Leslie, Brian., Hooloway, Aaron., Duin, Pete., McDonald, Kelsey., Hilton, Andrea., Orth-Gordinier, Kristen., Savic, Una., Sipra, Jane., Rozhon, Genevieve., Meisman, Elizabeth., Anderson, Jeff., Shea, Conor., Daugherty. Summer., Seeman, Hank. (2022). Natural Shoreline Infrastructure in Humboldt Bay for Intertidal Coastal Marsh Restoration and Transportation Corridor Protection: 50% Design Report. < <https://humboldt.gov/DocumentCenter/View/107131/Final-NSI-Report---no-appendices?bidId=>>

City of Eureka, Caltrans District 1, and the Redwood Community Action Agency (RCAA). The study to create the SLR Adaptation Plan was funded by a grant from Caltrans with HCAOG and City of Eureka as sponsors.

This study was able to create a vision statement, list of key assumptions, objectives, technical studies for site specific flood risks, scenario-based planning frameworks, risk assessment, identified project concepts, and preliminary cost analysis. It also incorporated stakeholder outreach which consisted of several informative workshops and targeted outreach to organizations representing transit-dependent community members. Although the project implementation process of the Eureka Slough SLR Adaptation Plan has not begun yet, it has managed to set a good example of relationship building between stakeholders for small scale regional SLR adaptation coordination.

Similarly, a regional effort could create a vision statement for their SLR efforts, list their key assumptions, determine objectives, and perform the various other steps mentioned to identify projects for drafting a SLR adaptation plan. Identifying projects that entities can work on together have the potential to build cohesion and collaboration that would bring people together on a regional basis. Once the projects are identified, they can be prioritized for a variety of factors. The Eureka Slough SLR Adaptation Plan used scenario-based planning and preliminary cost analysis for their project concept prioritization. Some Core Entity staff recommended a cost benefit analysis of SLR adaptation projects to be considered when stakeholders are prioritizing regional goals. Considerations for who is paying, who is benefiting, and how costs are evaluated could be an important factor for regional decision making with limited funding available.

Relevant Sections of the Task 2 Research Memo:

Discussion of Funding for staff capacity and cross coordination on *page 57*

Baseline Assumptions Analysis and Discussion:

Most Core Entity staff agree that there needs to be as much certainty to support sea level rise adaptation and development planning as feasible. There were some aspects of regional SLR planning that Core Entity staff thought some clarification was needed and consensus among stakeholders before moving forward. For instance, in order to create near-, mid-, and long-term plans and determine project prioritization, planners need to decide which SLR projection or timeline they will all be using to make regional SLR adaptation and mitigation decisions.

Although there is significant foundational information regarding HU sea level rise projections and asset vulnerability, there is still some debate about what SLR projections and elevations are currently being used or should be used for planning. In the 2021 Coastal Professional's Survey conducted by the County and Cal Poly Humboldt, less than half (41%) of 105 coastal professionals surveyed said their agency/organization is using a specific timeline and/or projection.⁵⁶ This same survey also showed that almost a third of coastal professionals surveyed either didn't think Humboldt Bay was already being impacted by SLR or didn't know if it was.

For this Feasibility Study, the County used previous assessments prepared by Northern Hydrology and Engineering (NHE) and Aldaron Laird of Trinity and Associates for SLR projections

⁵⁶ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue Appendix ii – SLR Regional Coordination: Coastal Professional Survey Results. Page 12.

released⁵⁷, impacts and inundation areas⁵⁸, and current shoreline conditions on Humboldt Bay.⁵⁹ However, some Core Entity staff described other watershed modeling and SLR projections such as FEMA flood rate maps as examples of alternatives that stakeholders might be using for SLR planning. One Core Entity staff person questioned if the baseline projections used by the County from the various studies conducted in 2014 are accurate with respect to current field measurements for the North Spit tide gauge.

Relevant Sections of the Task 2 Research Memo:

Discussion of Cross-jurisdictional Coordination assets on *page 13*

Collaboration Leadership Analysis and Discussion:

The stakeholders who will be involved in regional SLR coordination have not been fully identified nor their roles and responsibilities. The need for a specific leader at all has been questioned by some Core Entity staff. Some Core Entities thought that the coordinated effort stemming from this Feasibility Study should develop more organically by stakeholders as the framework is designed.

There have been past attempts to informally and formally coordinate as a region to address SLR. Core Entities brought up the Humboldt Bay Sea Level Rise Adaptation Plan as a prime example of what did or did not work for regional collaboration. The two major parts of this plan (funded by the State Coastal Conservancy) consisted of a shoreline inventory, mapping, and sea level rise vulnerability assessment (2010-2013) developed by the Adaptation Planning Working Group (APWG) facilitated by Aldaron Laird and co-led by the County and the Harbor District.

Feedback from some Core Entity staff indicated they felt the functioning of the APWG was negatively affected by the County because the County got ahead of other Core Entities and even tried to take the lead entirely. The working group meetings did not continue after the grant funding ended in 2015 which may reflect this internal tension. For this reason, some Core Entity staff were concerned that a County-led effort might not be the best approach to regional coordination. Future regional collaborative efforts may not be impacted by these same issues because many of the APWG staff are no longer involved in the same roles or agencies.

At present, the County has taken on a lead role in assembling information for regional SLR coordination via this Feasibility Study funded by a grant from the Coastal Commission. Following the Feasibility Study, the County will also be pursuing further regional coordination as part of a new LCP grant with the Coastal Commission. Some Core Entity staff thought the Feasibility Study and the previous informal working group did not account for the timeline for all entities. They further were concerned the new LCP grant would not be as collaborative as they desired if led by the County.

⁵⁷ Gilkerson, Whelan. (2014). "Humboldt Bay Sea Level Rise DEM Development Report". Prepared for the California State Coastal Conservancy and Coastal Ecosystems Institute of Northern California.

<https://digitalcommons.humboldt.edu/hsuslri_local/6>

⁵⁸ Anderson, Jeffrey K. (2014). "Preliminary Data Release for the Humboldt Bay Sea Level Rise Vulnerability Assessment: Humboldt Bay Sea Level Rise Inundation Mapping". Prepared for the California State Coastal Conservancy. <https://digitalcommons.humboldt.edu/hsuslri_local/19>

⁵⁹ Laird, Aldaron, Brian Powell. (2013). Humboldt Bay shoreline inventory, mapping, and sea level rise vulnerability assessment, with an Addendum: Shoreline Vulnerability Ratings. Prepared for the California State Coastal Conservancy. <<http://humboldt-bay.org/sites/humboldt-bay2.org/files/Humboldt%20Bay%20Shoreline%20Inventory%2C%20Mapping%20and%20SLR%20Vulnerability%20Assessment-A.Laird%20%281%29%20-%20Compressed.pdf>>

Other Core Entities thought the collaborative effort to create the vulnerability assessments led by a third-party mediator had potential merit for future collaboration. Where the informal working group was not perceived as equitable collaboration to some Core Entity staff, they said consultant led efforts resulted in more equal coordination among stakeholders and were more reflective of shared timeline. A funding source for a third-party mediator for a planning body was not identified by the Core Entities.

Relevant Sections of the Task 2 Research Memo:

Discussion of the Sea Level Rise Adaptation Planning Working Group **page 106**

Discussion of County led coordination on **page 112**

Discussion of Humboldt Bay Coordination and Governance on **page 113**

Stakeholder Participation Analysis and Discussion:

For the Research Memo, there was a focus on coordination frameworks and collaboration pathways for entities with land jurisdictional authority in HUs of the Humboldt Bay region. However, the question arises of what additional stakeholders should be involved in this collaborative planning process and when they should be engaged. This is a foundational question. The 2022 Humboldt County Civil Grand Jury Report “The Sea Also Rises” (see Appendix A) and the resolutions passed by the County, City of Arcata, City of Eureka, and the Harbor District (see Appendix B – F) identifies these land jurisdiction authorities as members of a Humboldt Bay Sea Level Rise Planning Steering Committee at a minimum.

Depending on if a framework (or frameworks) is agreed upon by members of this steering committee or some other collection of stakeholders, additional stakeholders will likely need to be involved. A majority of Core Entity staff agreed regional coordination should be as inclusive as possible. The Wiyot Tribe, Cal Poly Humboldt, HCAOG, Caltrans, and impacted or potentially impacted owners, for instance, have been identified as potential additions by core entities. In some cases, the planning framework options are dependent on what these additional stakeholders intend to do with assets in the HU.

For example, Caltrans and HCAOGs decisions concerning transportation in each HU would influence a framework focusing on roadways or Hwy 101. As a key line of transportation and communication in and out of the region, limiting their involvement is potentially shortsighted as every other aspect of this effort is likely to be impacted if 101 were to be cut off. Considering the long lead time associated with competitive funding efforts, Caltrans and HCAOG would be valuable stakeholders to involve in adaptation and mitigation efforts.

Furthermore, some of the Core Entities have expressed concern about stakeholders on smaller individual projects changing depending on location and yet not being represented in the regional effort. It was proposed by some Core Entity staff that there be different tiers and/or phases of coordination with different entities involved in different phases.

Relevant Sections of the Task 2 Research Memo:

Discussion of Cross-jurisdictional Coordination entities on **page 11**

2. *Dedicated staff, staff time focused on SLR, and/or resources to address SLR is limited among stakeholders.*

Analysis and Discussion:

Some Core Entity staff consulted for this Feasibility Study expressed the need for more time to contribute meaningful input about potential frameworks and funding options. This mirrors feedback given in interviews conducted during the Outreach portion of the Feasibility Study where personnel constraints and dedicated time constraints were two themes that were explicitly mentioned by 47% and 41% of participating stakeholder groups respectively.⁶⁰ With this in mind, a collaborative effort needs to prove worthy of stakeholder's participation and limited available time. A regional collaborative effort needs to be clear about why stakeholders are there and what value it provides for participation.

Without a focus or an idea of what projects they will be working on, stakeholders being asked to work on a collaborative effort do not know what they are committing their limited staff and time to. Such ambiguity makes Core Entity staff hesitant to move forward as they are unsure of how their representative jurisdictions will be affected. This was evidenced by Core Entity responses to the Grand Jury report where multiple Core Entities said they needed more time to decide and formalize a regional collaboration than the timeline suggested by the Grand Jury.

When Core Entities are not adequately collaborated with or are not given enough time to adequately collaborate, they will not support or participate in a collaborative effort because it is not representative of their interests or input. Some Core Entity staff indicated this might have been a factor in several unsuccessful attempts to coordinate a regional SLR planning effort before. Therefore, for a regional collaborative effort to move forward in the Humboldt Bay region, the timeline for the effort needs to be more reflective of participating stakeholders time and staff capacities. Some Core Entity staff hoped that by highlighting time constraints and proper stakeholder consultation in this Feasibility Study, future collaborative efforts would learn from past timeline issues.

The past Humboldt Bay SLR Working Group was cited as an example of collaboration effort that had potential merit as it exhibited what some Core Entity staff considered good information sharing and good facilitation. This model consisted of quarterly meetings for several years which some Core Entity staff thought was an important element of its success. The consistent and sustained meeting times over an extended period of time allowed for new and creative thinking to develop along a shared timeline that worked for stakeholders with limited time and personnel.

Relevant Sections of the Task 2 Research Memo:

Discussion of Funding for staff capacity and cross coordination on **page 102**

⁶⁰ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 1. Stakeholder Catalogue. Page 15.

3. *There is concern jurisdictional autonomy will be affected by the creation of a legally binding regional collaboration framework.*

Analysis and Discussion:

Some Core Entities were trepidatious of framework options that would create a new entity or a formally binding framework that would potentially affect their autonomy. Autonomy is important to many local governments. In order for a regional collaboration to get power, participating stakeholders often have to cede some amount of power. It is not uncommon for local governments to seek assurance that the formation of a regional collaboration would not result in annexation, dissolution, or any other kind of land or tax grab to their jurisdiction.⁶¹

Reduced autonomy potentially impacts SLR adaptation projects under a single land jurisdiction authority by opening the project up to input and scrutiny from other entities who might not be directly involved. There were questions by some Core Entity staff as to whether opening up SLR adaptation projects or prioritization of assets to other entity's input was appropriate or efficient for SLR planning. There are some decisions already made by Core Entities about managing assets for SLR in the Coastal Zone. A regional effort could potentially delay or derail these decisions.

This caused concern with some Core Entity staff because although the options presented in the Research Memo are simply meant to provide information, many of the options presented were legally binding and could affect local government autonomy. Once a binding agreement has been made, it is difficult to undo and can cause damage to stakeholder relationships. For this reason, most Core Entity staff were not opposed to a MOU and other non-regulatory collaborative framework options due to the nonbinding nature of the commitment.

Relevant Sections of the Task 2 Research Memo:

Discussion of Organizational Options on **page 45**

⁶¹ National League of Cities and the Alliance for Regional Stewardship. (2006). Guide to Successful Local Government Collaboration in America's Regions. <<https://icma.org/documents/guide-successful-local-government-collaboration-americas-regions>>

4. *LCP focus of Commission grants might not be the most efficient or best approach for regional collaboration*

Analysis and Discussion:

The Research Memo goes into detail describing how LCPs might facilitate cross-jurisdictional coordination and framework options. However, some Core Entity staff expressed doubt that LCPs are an appropriate or efficient choice for regional collaboration. LCPs are a way for local governments in partnership with the Coastal Commission to regulate land use within their jurisdiction in accordance with California’s planning and zoning laws, particularly the Coastal Act which was created in 1976. The LCPs for the County and City of Eureka were certified in 1984 while the City of Arcata certified theirs in 1989. Although the Coastal Act was amended in 2022 to “take into account the effects of sea level rise in coastal resources planning and management policies and activities in order to identify, assess, and, to the extent feasible, avoid and mitigate the adverse effects of sea level rise”, local LCPs have not been updated to incorporate considerations for sea level rise impacts.⁶²

Since LCPs are guiding documents for land policy and provide a vision for moving forward with coastal zone planning, this means the established vision for local Coastal Zone land policy in the Humboldt Bay region is not up to date with current SLR science.

As core land jurisdictional authorities update their LCPs to reflect current understanding of SLR and bring them forward to the Coastal Commission, it was proposed in the Research Memo that a regional framework could potentially coordinate to have a common vision or even shared policies. Based on options presented in the Research Memo, Coastal Commission staff identified this potential option as likely to allow local governments to create an adaptation plan or strategy applicable to the entire Humboldt Bay area. In their response to an early draft of the Research Memo, they said:

“This kind of coordinated LCP plan or strategy may give local governments more flexibility on adaptation approaches than if each jurisdiction pursued its own plan. For example, the Cities of Arcata and Eureka have each proposed new sea level rise LCP policies that would allow for the armoring and protection of certain neighborhoods regardless of whether the development protected by armoring is an existing structure that predates the Coastal Act. Such policies are likely inconsistent with Section 30235 of the Coastal Act, which generally only allows armoring in certain limited circumstances, including to protect coastal-dependent uses or structures that lawfully existed when the Coastal Act took effect in 1977 and when such structures are in danger from erosion”.⁶³

Some Core Entity staff suggested that if this was what was chosen as a regional framework approach, LCP modifications for consistency would need to be done early on in framework implementation to increase the efficient exchange of information and collaboration and minimize disruption to planning staff as Core Entities have already been working on LCP updates to incorporate SLR policies. Doubt was expressed about if this was feasible as LCP modifications are already a time intensive process without the added effort of gathering input from other entities to change modifications already in the process of getting certified. Other Core Entity staff

⁶² California Coastal Commission. (August 2022). RE: Response to The Sea Also Rises Humboldt County Civil Grand Jury Report.

⁶³ California Coastal Commission. (August 2022). RE: Response to The Sea Also Rises Humboldt County Civil Grand Jury Report.

suggested that a regional planning effort could focus on preparing an adaptation plan and then modify LCPs to carry out the plan.

Relevant Sections of the Task 2 Research Memo:

Discussion of how LCP's can Facilitate Cross-Jurisdictional Coordination on **page 15**

Discussion of Local Coastal Program Modification Options on **page 18**

VI. Task 3b – Next Steps

The Research Memo offers a wide array of feasible technical options that core entity staff and elected officials can consider for future regional sea level rise planning efforts. Staff from each of the Core Entities expressed support for expanding existing informal collaboration efforts into a coordinated regional effort to address sea level rise impacts, particularly for shared assets that cross jurisdictional boundaries. Feedback sessions identified multiple areas of discussion around a framework for coordination on regional sea level rise planning including how to get started developing and implementing these frameworks, and what core entities are willing to do at the staff level. These points of discussion, in addition to the results of the Feasibility Study's outreach and research, leads to the conclusion that it is feasible for local stakeholders to develop a regional plan to adapt to sea level rise around Humboldt Bay and more work is needed to build enough agreement among stakeholders to reach an operational decision as to what regional planning should look like. Beyond the coastal professional's survey conducted in the Outreach portion of the Feasibility Study, this Study has not tested the political will for what core entity elected officials will do so their preferences are unclear at this time. These suggested next steps reflect the opinion of County of Humboldt Planning and Building Department staff based on outreach, research, and core entity staff feedback and do not necessarily reflect the positions of other Core Entity staff.

Recommendations for next steps:

1. This study recommends Core Entity staff form a working group to help elected and appointed officials establish a decision-making process for collaborating on regional SLR planning through facilitated meetings and workshops;
2. Memorialize the decision-making process in a written agreement such as an Memorandum of Understanding (MOU) that clarifies each member's roles and responsibilities, tasks and schedule; and
3. Use the decision-making process to initiate regional SLR adaptation planning by creating a regional authority to identify and prioritize cross-jurisdictional SLR adaptation and mitigation projects and then jointly implement one or more high priority projects to protect assets vulnerable to SLR.

Discussion:

1. This study recommends Core Entity staff form a working group to help elected and appointed officials establish a decision-making process for collaborating on regional SLR planning through facilitated meetings and workshops.

- a) Feedback from the Core Entity staff documented by this Feasibility Study revealed there was a general consensus that there should be some level of regional coordination but what kind is still unclear. Consensus on desired frameworks, funding sources, and focus for projects or collaboration was not achieved primarily due to the absence of a formal agreement on roles and responsibilities and the lack of a clear mandate from elected leaders. Without core entity buy-in, implementing a formal regulatory framework would not

be an appropriate or efficient use of stakeholders limited resources. More information on this can be found in the section “Collaborative Opportunities and Challenges” beginning on page 27.

- b) Core entity staff expressed support for facilitated meetings and workshops to build consensus on how to move forward as a region. Some core entity staff also expressed interest in cost-sharing expenses for a neutral third-party facilitator to direct that effort. There was also agreement that the core entity staff presently working together on this effort would be an appropriate group to begin that work. Potential facilitators identified by core entity staff include the Humboldt Area Foundation, Cal Poly Humboldt SLRI, or a third-party professional consultant. These facilitated workshops and meetings can use existing decision-making tools or modify existing decision-making tools to select a process for collaboration on regional SLR planning.^{64,65}
- c) It is ultimately up to the political leaders and the Coastal Commission to decide what option or combination of options are best suited for the region’s unique set of circumstances considering the priorities of local jurisdictions. Core entity elected officials will need guidance from the working group to decide via the decision-making process which additional stakeholders should be involved in the regional adaptation planning process and when they should be invited to participate. Core Entity staff recognized the Wiyot Tribe and Caltrans, for instance, are important voices to have at the table when discussing potential frameworks for regional adaptation planning - how should they be involved? All the Core Entities agree that a rigorous public engagement process is needed – what is the right mix of deliberation by the Core Entities and public involvement during development of the regional adaptation strategy?
- d) The “The Sea Also Rises” Report recommends the County, City of Arcata, City of Eureka, and Harbor District create a Steering Committee to guide SLR adaptation planning. Although core entities agreed to participate in this future Steering Committee several questioned whether creating a new regional entity beyond that would be the most effective, efficient, or fair approach to regional collaboration and expressed that they could not commit to cost sharing and/or allocation of staff time for a regional planning effort without more information.
- e) Independent of this Feasibility Study, Core Entities are making good progress in public engagement on SLR planning and adaptation. For instance, on March 28, 2023, the Arcata City Council and Planning Commission convened a special joint study session to discuss SLR issues around Humboldt Bay in a public setting.

2. Memorialize the decision-making process in a written agreement such as a Memorandum of Understanding (MOU) that clarifies each member’s roles and responsibilities, tasks and schedule.

- a) Drafting and memorializing in writing the agreed-upon decision-making process to coordinate our efforts on regional SLR planning through an MOU or equivalent is recommended as it is the simplest and least contentious way to gain stakeholder support and agreement. As outlined in the section “Appropriate Approaches” beginning on page 13, other more formal framework options such as a Joint Powers Authority can be difficult

⁶⁴ Arizona State University. (2015). “The Collaborative Service Delivery Matrix: A Decision Tool to Assist Local Governments”

<https://urbaninnovation.asu.edu/sites/default/files/contemplating_collaboration_decision_tool_final.pdf>

⁶⁵ Arizona State University. (2015). “The Collaborative Service Delivery Arrangements for Local Governments: A Summary of the Research Behind the Decision Matrix Tool”.

<https://urbaninnovation.asu.edu/sites/default/files/collaborative_services_white_paper-final.pdf>

for local jurisdictions to embrace and implement without agreement on focus and baseline assumptions. It also does not allow the consensus-building and stakeholder buy-in necessary to successfully respond to shared problems and regional issues.

- b) The Coastal Commission is an important core entity because they have power over LCP modifications and final permitting authority in areas of state retained jurisdiction. An MOU is one of the few regional planning framework options the Coastal Commission has the ability to enter into, so long as it did not involve anything that isn't already allowable by the Coastal Act (i.e., could not change the standard of review) and the agreement did not encompass a general policy choice or bind the Commission to any specific action.

An agreement between the Coastal Commission and local LCP agencies (which make up a majority of the Core Entities) could serve as a way for the Commission to be more strongly committed to implementing LCP sea level rise policies on Humboldt Bay since the Commission only uses LCPs as guidance when considering authorization of development. At the very least it would be an expression of intent on the part of the Commission.⁶⁶ There is precedent for the Coastal Commission entering into MOUs with other jurisdictions because they have done so in the past with Caltrans, the California States Lands Commission, and the City of San Diego.

- c) An MOU or similar common-cause written agreement between two or more parties expresses their aligned will and agreement to proceed with their mutual goals. The agreement memorializing the Core Entities decision-making process for collaborating on regional SLR planning could outline a regional vision for SLR planning reflecting current information and a set of objectives for approaching regional SLR planning.
- d) An MOU or similar agreement is a starting point for negotiating and maintaining momentum on SLR planning issues, particularly where there is a possibility of staffing changes. A future MOU or other agreement, or series of MOUs/agreements could build on the initial understanding pulling together projects that move forward a regional vision while engaging the appropriate stakeholders as needed.
- e) An MOU or similar agreement is consistent with the Grand Jury Report response resolutions already passed by elected officials for COA, COE, and Harbor District and would officially define the relationship and intended actions among the parties. Clarifying each member's roles and responsibilities, tasks and schedule will provide guidance needed for what the collaboration will be working towards and how it will benefit participating core entities.
- f) An MOU or similar agreement does not generally have the binding power of a legal contract but, should the Core Entity elected officials choose to make it more legally binding, they can add one or more elements that may render it so. It could also provide the groundwork for signing an MOA that forms a more binding cooperative agreement for managing SLR, or for the purpose of implementing a particular SLR adaptation project.
- g) The MOU or similar agreement should bring as much certainty as feasible to regional SLR planning by including regular sustained information exchange.
- h) Core Entities agree that sea level rise will affect the Humboldt Bay region and actions will need to be taken in the near-, mid-, and long-term to protect public health, safety and welfare. Moving forward with regional sea level rise adaptation planning would benefit from agreement among the Core Entities on how baseline sea level elevations are measured, how vertical land movement will be considered, and which SLR projections are

⁶⁶ Humboldt Bay Sea Level Rise Regional Planning Feasibility Study Task 2. Research Memo. Page 65.

used. Regular information exchange on how this data is being utilized in SLR adaptation projects lets everyone involved know what actions are being undertaken by which agencies.

- i) Regular sustained information exchange on a regional scale helps identify what regional SLR adaptation needs are being met and which agency is involved. If a stakeholder is struggling with an SLR planning or adaptation project issue, they can crowdsource support and technical expertise from other stakeholders on a routine basis without the additional burden of seeking out individuals and figuring out scheduling.
- j) Committing to regularly organized informational exchanges provides a time and space dedicated to SLR planning regional planning for Core Entities aside from public facing meetings.

3. Use the decision-making process to create a regional authority to identify and prioritize cross-jurisdictional SLR adaptation and mitigation projects and then jointly implement a high priority project.

- a) While this is the recommendation of County Planning and Building Department staff, other Core Entity staff expressed concern about the role and source of funding for this new regional authority.
- b) The decision-making process can be used to create a clearinghouse of adaptation and mitigation projects for cross-jurisdictional collaboration. Ideally, the end goal of regional planning is to create a regional sea level rise adaptation plan. The identification of potential projects is one of the first steps to accomplishing this.
- c) Who is going to be impacted first? Who is in or out of the planning process according to location? A phased and nested-scale implementation plan can address these concerns by identifying what actions are needed, by who, and when.
- d) A cost/Benefit Analysis of projects proposed can help inform prioritization of projects along with other technical studies of Bay wide elevation studies. This can even provide the basis for a Regional Investment plan.
- e) Cross-jurisdictional SLR adaptation projects may require consistent LCP modifications across jurisdictions. Despite core entity staff hesitancy to support LCP modification consistency (as discussed on page 36), the County considers one or more consistent LCP modifications between the three regional jurisdictions a feasible option for regional SLR planning efforts.
- f) The County intends to move forward with drafting LCP modifications for the HBAP, in communication with the other core entities, that would target consistency with the City of Eureka and City of Arcata LCPs to facilitate and encourage its adoption by the cities as well.

VII. Appendices



A. “The Sea Also Rises” Humboldt County Civil Grand Jury Report



B. Humboldt County Board of Supervisors Grand Jury Report Response



C. City of Arcata Grand Jury Report Response



D. City of Eureka Grand Jury Report Response



E. Harbor District Grand Jury Report Response



F. California Coastal Commission Grand Jury Report Response



**G. Coastal Commission Staff Comments on the Humboldt County Draft Research Memo
for the Sea Level Rise Regional Planning Feasibility Study**



H. Greenway Partners Task 2 Research Memo

