7-2018

Humboldt County Humboldt Bay Area Plan - Sea Level Rise Policy Background Study

Humboldt County

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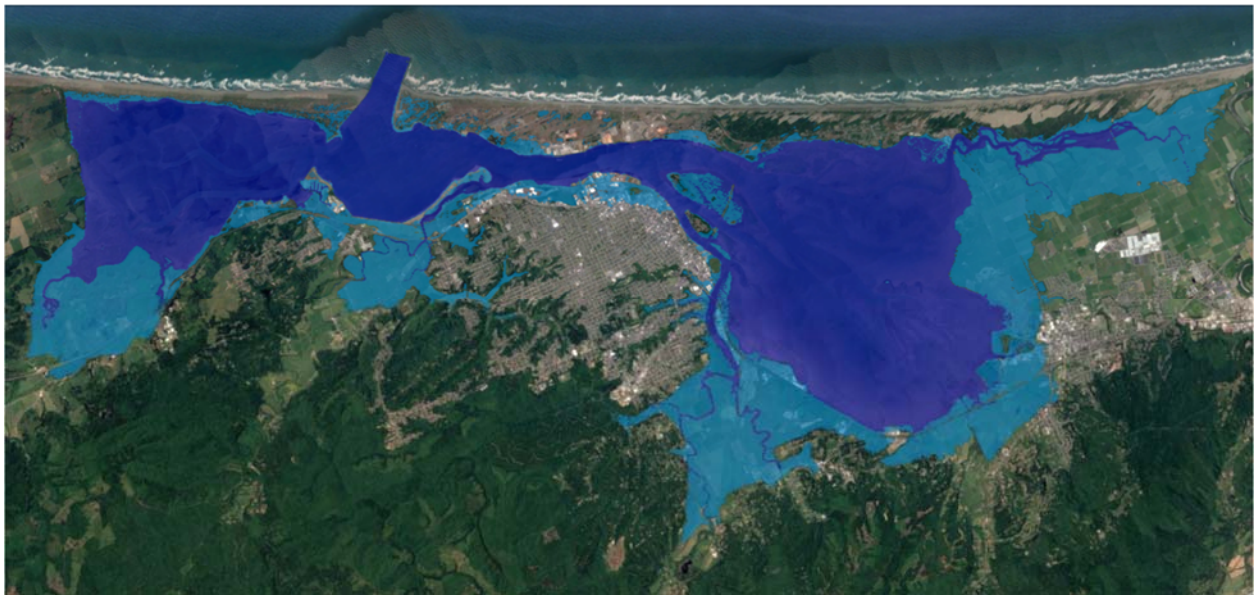

Projected Sea Level Rise Inundation Zone (Stillwater) on Humboldt Bay
for Mean Monthly Maximum Tide with 3.3 feet (1.0 meter) of Sea Level Rise

Sea Level Rise
Policy Background Study

July 2018

Introduction

The Humboldt Bay region of Humboldt County has the highest concentration of people, development, and coastal agriculture on the North Coast of California. Humboldt Bay is the second largest estuary and bay in California. The Bay is surrounded by 102 miles of shoreline and several critical regional assets (port/harbor and coastal-dependent infrastructure, U.S. Highway 101, Humboldt Bay Power Plant and spent nuclear fuel storage facility, two municipal wastewater treatment plants, and miles of various types of utility infrastructure), and several cities and communities that are exposed to sea-level rise.

With three feet of sea level rise, roughly 35 miles of barrier shoreline (58% of the artificial shoreline) could be overtopped. King tides could reach that level as early as 2050, based on current high projections for sea level rise. In addition, approximately 10,000 acres of agricultural land; Highways 101 and 255; municipal water and wastewater lines; electrical distribution infrastructure, gas lines, and optical fiber communications lines; and the communities of King Salmon, Fields Landing and Fairhaven, could all become tidally inundated if tidal waters on Humboldt Bay rise three feet.

The unincorporated portion (85%) of the Humboldt Bay region is located within the Humboldt Bay Area Plan (HBAP) planning area. The HBAP is one of six coastal plans that comprise the County's Local Coastal Program. The County prepared a sea level rise vulnerability assessment for the HBAP planning area (Laird 2018). The information and findings of the vulnerability assessment form the basis for the County's sea level rise adaptation policy background study provided herein. The vulnerability assessment, using the best available science, provides information regarding how and when sea level rise projections were made, and what areas and assets (shoreline, land uses, transportation, utilities, and coastal resources) are at risk from sea level rise.

This background study presents local adaptation policies and strategies consistent with the guiding principles recommended by the Coastal Commission (2015) that the County may consider when updating its HBAP. The policies presented here are not the only policies that may be considered, and also may ultimately not be the policies that are adopted, but instead represent a first step in the development and adoption of sea level rise adaptation measures. The County anticipates the need for a mix of protection, accommodation, and retreat strategies, and hybrids thereof, in order to provide protection from sea level rise impacts while also providing the flexibility necessary to address a variety of situations in the most feasible and least environmentally damaging manner possible.

This policy background study summarizes relative sea level rise projections for Humboldt Bay and describes a proposed sea level rise overlay zone (SLRZ) for areas

inundated by three feet of sea level rise[1]. It describes assets located within this proposed overlay zone and discusses options for the County's general policy approach that could be applied within the SLRZ. The primary goal is to protect existing development in the SLRZ through maintenance or enhancement of existing shoreline protection, or construction of new shoreline structures.

This policy background study discusses the policy challenges posed by the significant extent of Coastal Commission retained permit jurisdiction (where the Commission has sole permit authority) within the HBAP and SLRZ. In these areas of retained jurisdiction, the County has limited capacity to implement the HBAP and necessary sea level rise resiliency measures. This study also discusses the adaptation challenges due to the lack of ownership of protective shoreline structures and at risk critical assets.

The policy options in this background study would apply until sea level rise reaches three feet. This planning horizon is based on the assumption that with three feet of sea level rise, the lands within the HBAP area protected by dikes (primarily transitional agricultural land) will be compromised by ground water or other sea level rise impacts to the extent that their value would no longer warrant the extraordinary expense of further enhancement of the dikes to increase protection from sea level rise.

However, there may be circumstances that could change this planning horizon. For example, should there be a significant flood event that deposits a substantial amount of sediment on the lands behind the dikes along Humboldt Bay, the impacts of sea level rise, such as groundwater rising to the surface of the diked former tidelands/agricultural wetlands, may be lessened. As time passes and the progress of sea level rise is monitored, this planning horizon as well as the sea level rise policies may need to change in response to changing conditions.

Goal Option 1: Coastal hazards are minimized and existing development is protected from sea level rise inundation for as long as feasible.

Policy Option 1.1: Use relative sea level rise projections based on the best available science to develop adaptation strategies

Policy Option 1.2: Plan for highest inundation levels reflected in the sea level rise projections for the planning period.

[1] Three feet of inundation was selected for the SLRZ because inundation beyond that level is expected to overwhelm the existing shoreline protection around the bay.

Discussion

Relative sea level rise is the combination of regional sea level measured by a tide gauge and vertical land motion trends of the land upon which the gauge is situated. According to Cascadia GeoSciences, since 1977 Humboldt Bay has been subsiding -0.09 inches/yr. and its average rate of relative sea level rise is 0.18 inches/year (18 inches per century), which is greater than anywhere else in California or the Pacific Northwest (Patton 2017). A dataset of relative sea level rise projections has been prepared for Humboldt Bay's North Spit tide gauge from 2000 to 2100, including low, projected, and high greenhouse gas emission scenarios (Figure 1, NHE 2014). While the Coastal Commission's Policy Guidance (2015) recommends assessing impacts from sea level rise for the years 2030, 2050, and 2100, the County also assessed potential impacts for current conditions and 2070.

According to the HBAP Sea Level Rise Vulnerability Assessment (Laird 2018), the shoreline's vulnerability tipping point is between two and three feet of sea level rise, which are the approximate high projections for 2050 and 2070 respectively. Under present shoreline conditions, 59% (33 miles) of barrier-like shoreline structures (dikes, railroad and road grades) on Humboldt Bay could be breached or be overtopped by approximately three feet of sea level rise, placing thousands of acres and critical regional assets at risk. This policy background study focuses on two to three feet of sea level rise which is currently projected to occur as soon as 2050 (two feet) and 2070 (three feet). King tides are expected to flood these areas as early as 2030.

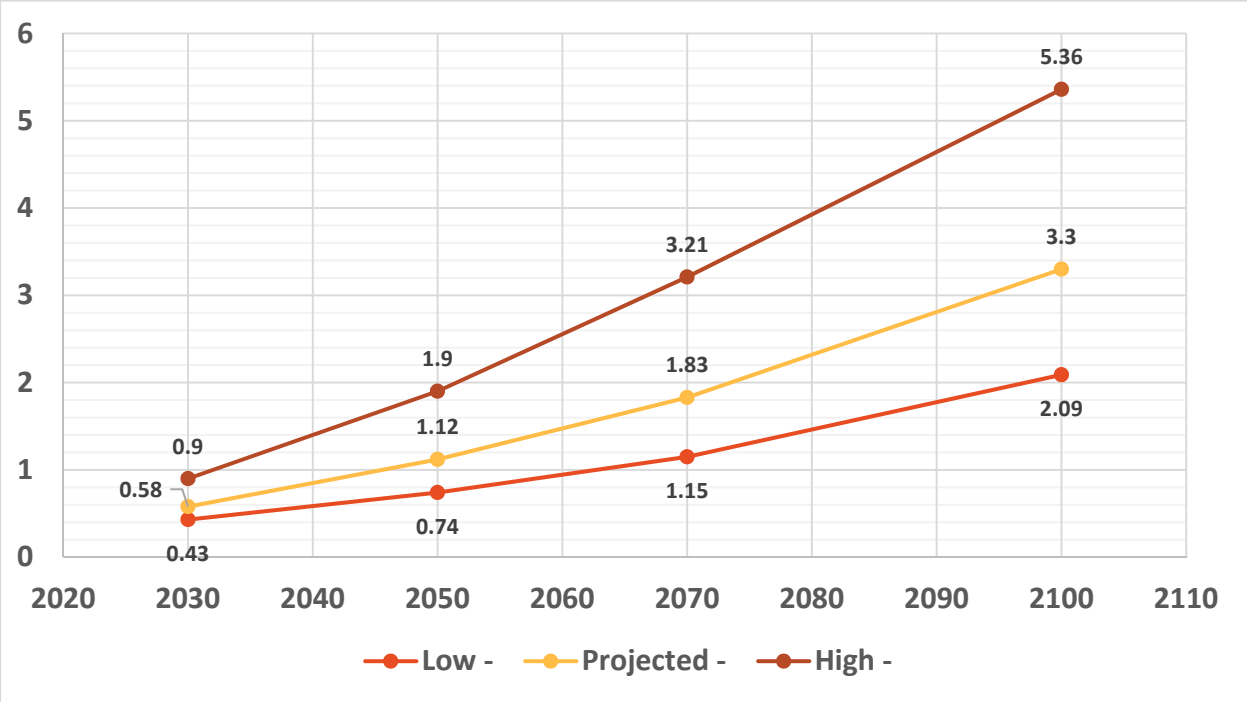

Figure 1. Relative sea level rise projections for four planning horizons (2030, 2050, 2070, and 2100), including low, projected, and high greenhouse gas emission scenarios (NHE 2014).

Policy Option 1.3: Establish a sea level rise overlay zone for areas subject to inundation from sea level rise.

Discussion

Hydrodynamic modeling and inundation vulnerability mapping prepared for Humboldt Bay by Northern Hydrology & Engineering (NHE) depicts areas that are potentially vulnerable to tidal inundation assuming shoreline structures (dikes, road grades, railroad grades, or other barrier shoreline structure) are absent or not functioning, by specific water elevations: MMMW (7.7 ft.), mean annual maximum water (MAMW) (8.8 ft.), MMMW+0.5-meter (M) (9.3 ft.), MMMW+1.0 M (11.0 ft.), and MMMW+1.5 M (12.6 ft.) (NHE 2015). Not all of the recommended sea level rise planning horizons and their high projections coincide exactly with the water elevations listed above that are represented in the inundation maps prepared by NHE (Table 1), but the high projections of approximately two and three feet for 2050 and 2070 are represented by the 0.5 and 1.0 meter inundation maps.

Table 1. Relationship between sea level rise planning horizons, high sea level rise projections, NAVD 88 elevations at the North Spit gauge for these high projections, the corresponding NHE inundation maps used to depict areas that are potentially vulnerable, and the NAVD 88 elevation for these maps.

SLR Planning Horizon	High Projection NHE 2014	North Spit Elevation NAVD 88	Corresponding NHE 2015 Map	North Spit Elevation NAVD 88
2030	0.9 ft.	8.6 ft.	MAMW (1.1 ft.)	8.8 ft.
2050	1.9 ft.	9.6 ft.	0.5 M (1.6 ft.)	9.3 ft.
2070	3.2 ft.	10.9 ft.	1.0 M (3.3 ft.)	11.0 ft.
2100	5.4 ft.	13.1 ft.	1.5 M (4.9 ft.)	12.6 ft.

The NHE inundation maps of Humboldt Bay are the best maps available and are used as the basis for identifying areas and critical assets that are potentially vulnerable to sea level rise and quantifying impacts for purposes of the HBAP vulnerability assessment (Figure 2). For example, they are used to depict the extent of tidal inundation from sea level rise absent the effects of protective barrier-like structures such as dikes and road grades, commonly referred to as a “bathtub model,” and also do not take into account the action of wind and waves. The integrity of the entire protective shoreline in a common hydrologic unit needs to be maintained to prevent inundation of the low-lying areas behind the shoreline, not just the shoreline in front of an asset. A single breach

would cause the inundation of the entire hydrologic unit and all assets residing behind that common shoreline.

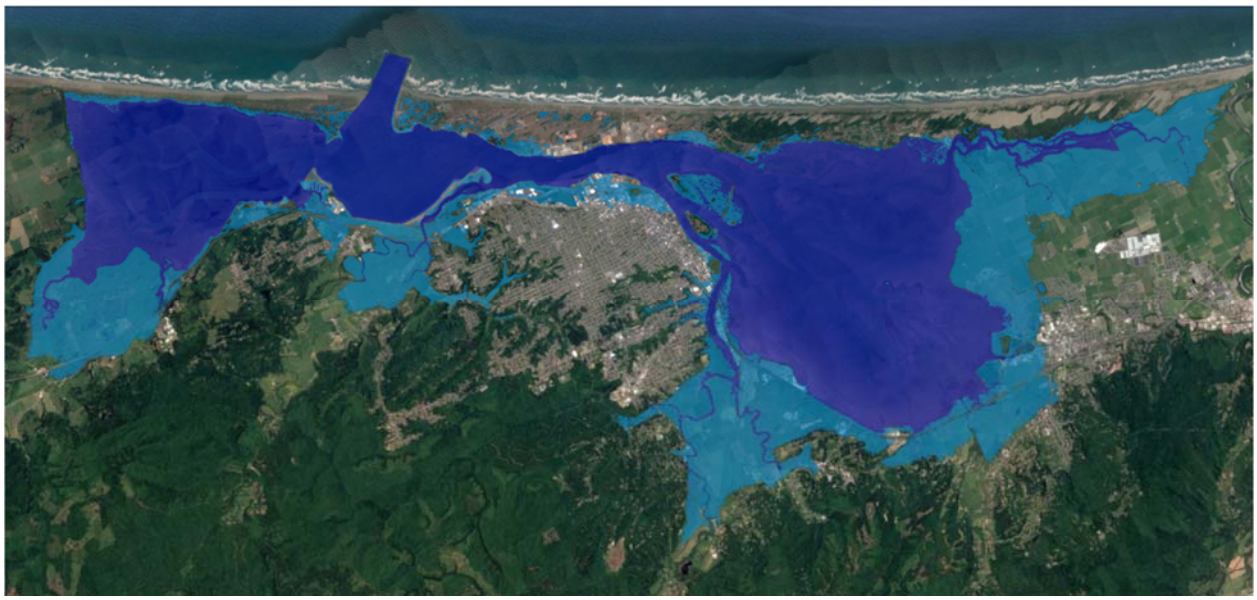

Figure 2. Projected Sea Level Rise Inundation Zone (Stillwater) on Humboldt Bay for Mean Monthly Maximum Tide with 3.3 feet (1.0 meters) of Sea Level Rise.

The current mean annual maximum tide (MAMW) of 8.8 ft., what we call king tides, would become our daily high tide with three feet of sea level rise. The following table describes the areas in the HBAP that would become tidally inundated with three feet of sea level rise, assuming the overtopping of existing shoreline barrier structures, as provided in the HBAP Vulnerability Assessment and excerpted from Table 3 below:

Table 2. Percent of HBAP planning area inundated by king tides with 3 feet of sea level rise

Land Use	Percent of HBAP
Agriculture	62%
Industrial/commercial	32%
Coastal dependent industrial	29%
Public facility	17%
Residential	11%

Three feet of sea level rise would also tidally inundate important public facilities including all the following:

- the only access road to King Salmon,
- Humboldt Bay Generating Station and the interim spent nuclear fuel storage site.
- Highway 101 as it traverses South Bay, Elk River Slough, and Arcata Bay
- Highway 255 on the Mad River Bottom.
- approximately 12 miles of railroad and the current and future sections of the Humboldt Bay Trail within the HBAP planning area
- approximately 9.6 miles of municipal water transmission lines,
- the Truesdale pump station, seven wastewater lift stations, and 10.5 miles of sewer lines
- 30 electrical transmission towers and 113 transmission poles
- sections of the South and North Jetties (867 ft. and 1,214 ft. respectively)
- 3 of the 10 bulk cargo/commercial docks
- 52 Wiyot cultural sites (four additional sites would be impacted from bluff erosion and retreat).

A sea level rise overlay zone (SLRZ) could be established for the area that could potentially be inundated by three feet (1.0 M) of sea level rise, which would reach an elevation of 11.0 feet (NAVD 88) at the North Spit tide gauge, based on a three-dimensional model that propagates that elevation throughout the perimeter of Humboldt Bay as depicted by the 1.0-meter inundation map (Figure 2). Polices could be developed to minimize sea level rise hazards and maximize agency coordination and public participation, with some policies applying only within the sea level rise overlay zone, while others would apply throughout the HBAP planning area. Examples of policies that would be specific to the sea level rise overlay zone could include policies restricting the type or location of development, or policies requiring real estate disclosures. Examples of policies that could apply throughout the HBAP planning area could include policies encouraging enhancement of existing shoreline structures to protect existing development, or coordination of sea level rise planning and decision making with other agencies with land use jurisdiction within the coastal zone, including local agencies as well as the Coastal Commission.

HBAP policies that address sea level rise can be used to direct future development and limit redevelopment of existing developments. However, the County's adaptive capacity to implement specific sea level rise resiliency measures is limited due to the lack of County jurisdictional control over, and/or ownership of, protective shoreline structures and at risk critical assets. Protective shoreline structures are often located on private property. Critical assets such as highways and utility infrastructure are owned by agencies other than the County and along with dikes, can cross jurisdictional boundaries. The jurisdictional challenges become even more difficult given that the majority of the HBAP planning area is located within the Coastal Commission's retained

permit jurisdiction, leaving the ultimate decision regarding implementation of sea level rise resiliency measures in hands of the Coastal Commission using the County's HBAP policy only as guidance. Further discussion on this topic is provided below under Policy 4.1.

Policy Option 1.4: Repair, maintain and enhance existing shoreline structures within the SLRZ that protect existing development and resources from tidal inundation.

Policy Option 1.5: Allow construction of new shoreline structures within the SLRZ that will protect existing development and resources from tidal inundation.

Policy Option 1.6: Pursue programmatic permits for dike repair, maintenance, enhancement and construction with the County, Coastal Commission and other permitting agencies, including the Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Wildlife, State Lands Commission and Humboldt Bar Harbor Recreation and Conservation District.

Policy Option 1.7: Secure funding for assisting with the repair, maintenance and enhancement of dikes from federal and state funding sources and through local measures such as a Flood Control District or formation of a Special District.

Discussion

Today, there are approximately 56 miles of shoreline on Humboldt Bay that form a barrier protecting nearly 10,000 acres of low-lying areas from tidal inundation (Figure 2). With three feet of sea level rise, roughly 33 miles of barrier shoreline (59% of the artificial shoreline) could be overtopped. King tides could reach that level as early as 2050, based on current high projections for sea level rise.

With three feet of sea level rise, all the major sloughs (Mad River, Eureka/Freshwater, and Elk River) on Humboldt Bay are likely to overtop their banks up river or inland of existing shoreline structures, by going around the terminus of existing dikes and tidally inundating the lands and critical assets down slope. Extending and raising the existing

diked shoreline would be necessary if the down slope lands and assets are to be protected as sea levels rise and tidal influence migrates inland.

By design, shoreline structures can be made to withstand coastal hazards such as erosion and tidal inundation. With appropriate design, maintenance, and enhancement, shoreline structures can continue to function even when exposed to some degree of sea level rise. There is no one entity responsible for maintaining the artificial shoreline, and there are 170 individual parcels that make up the diked shoreline on Humboldt Bay. Assets and land uses in a common hydrologic unit are all very susceptible if a shoreline breach were to occur on just one of these 170 parcels.

Figure 2. Dike overtopped during a king tide tidally inundating low-lying lands on South Bay.

While in the long term retreat will likely be the only option when sea level rise exceeds three feet, the County desires to repair, maintain, and where necessary enhance, existing shoreline protection where feasible, and/or construct new shoreline structures in the SLRZ in order to maintain existing land uses and development in the short term where necessary for the protection of the public health, safety and welfare.

Pursuant to Coastal Act Section 30241, agriculture is a priority use, and mandates that the maximum amount of prime agricultural land shall be protected and maintained.

Coastal Act Section 30240 requires that environmentally sensitive habitat areas (ESHA), which would include wetlands, shall be protected against any significant disruption of habitat values. A significant amount of diked shoreline is located on, and/or protects, transitional agricultural lands, also called agricultural wetlands, and also protects regionally critical infrastructure located within or inland of these agricultural wetlands, as discussed in the County's HBAP 2018 vulnerability assessment. Thus, consistent with the Coastal Act, the diked shoreline serves to protect agricultural operations as well as the wetland qualities of these transitional agricultural lands, including those that support wildlife and protect water quality.

The 2018 vulnerability assessment states that the HBAP covers approximately 21,315 acres of unincorporated area in and around Humboldt Bay, excluding areas of the Bay below MHHW, with approximately 10,680 acres or roughly 50% of the HBAP land area planned Agriculture Exclusive (AE). These lands generally consist of agricultural wetlands that are primarily diked former tidelands, and some alluvial river bottom land, that generally support livestock grazing or raising livestock feed. These lands also support wildlife, including Aleutian geese. Agricultural lands have been, and remain an, important and integral part of Humboldt County's economy, visual, open space and wildlife landscape, and cultural fabric.

The vulnerability assessment states that agricultural lands are strongly associated with barrier type shorelines, which are elevated structures such as dikes, and railroad and road grades, that prevent tidal inundation of low-lying areas behind the shoreline. Earthen dikes are the most common shoreline structure on Humboldt Bay. As shown in Table 17 below, excerpted from the vulnerability assessment, with 0.9 feet of sea level rise (high projection for 2030), which we experience today with a king tide, 56% of the agricultural lands around Humboldt Bay could be inundated if there were a breach of one or more barrier shorelines. As Table 17 shows, there are other land use types that could also be negatively impacted that support other Coastal Act priority uses that are also critical to our local economy, and residential uses including disadvantaged communities.

As documented in the vulnerability assessment, with 0.9 feet of sea level rise (high projection for 2030), MAMW (king tides) would increase on average from 8.8 ft. to 9.7 ft., two feet higher than our current MMMW of 7.7 ft. Currently, there are approximately 0.8 miles of dikes vulnerable to MMMW of 7.7 ft. With 0.9 ft. of sea level rise, the length of dikes vulnerable to MMMW could increase to 3.3 miles (8% of the total existing dike length), and the length of dikes vulnerable to MAMW (king tides) could increase to up to 11.4 miles. Therefore, just 0.9 ft. of sea level rise that could possibly occur by 2030 could increase the length of diked shorelines vulnerable to king tides from 3.3 miles to 11.4 miles, a 245% increase. This would, in turn place roughly 6,000 acres of agricultural lands (56% of HBAP agricultural lands), as well as critical infrastructure, at risk from tidal inundation or temporary flooding.

Table 3. HBAP land use types, acres of each land use type in the HBAP, percentage of the total HBAP area the use occupies, and percentage of the HBAP land use acreage (see Table 13) that could be tidally inundated by 0.9 (MAMW), 1.6 ft. (0.5 M), 3.3 ft. (1.0 M), and 4.9 ft. (1.5 M) of sea level rise by land use type.

Land Use	HBAP Acres	% of HBAP	0.9 Ft.	1.6 Ft.	3.3 Ft.	4.9 Ft.
Agriculture	10,680	50%	56%	58%	62%	66%
Natural Resources	4,740	22%	13%	14%	19%	26%
Residential	2,741	13%	8%	9%	11%	13%
Coastal Dependent Industrial	968	5%	8%	12%	29%	41%
Industrial/Commercial	656	3%	23%	25%	32%	38%
Public	693	3%	11%	12%	17%	21%
Commercial Recreation	408	2%	19%	21%	25%	36%
Total	**20,886**	**98%**	**7,182**	**7,525**	**8,557**	**9,507**

HBAP Section 3.30.B.2. Allowable Uses in Transitional Agricultural Lands, as certified by the Coastal Commission, currently allows the following: "Diking and filing for new development within transitional agricultural lands shall be limited to the principal uses in the Agriculture Exclusive (AE) land use designation, including construction of spillways and modification or repair of existing dikes threatened by erosion; . . ." This section goes on to state that "dredging in transitional agricultural lands shall be limited to incidental public service purposes and to maintenance and repair of existing tidegates, floodgates, dikes, levees, and other drainage works, including replacement of drainage works damaged by flood or tidal surges and, for wetland restoration. Thus, it was originally envisioned that agricultural wetlands could be maintained as such by constructing, repairing and maintaining dikes, which could reasonably be seen to require fill of agricultural wetlands.

Despite the inclusion of this language in the HBAP that would appear to allow wetland fill for dike enhancement/modification, experience has shown that the Coastal Commission has not allowed the filling of agricultural wetlands for the modification of dikes (an increase in the height of a dike will generally require a widening of the base of the dike, and thus would require wetland fill) strictly for flood control, since this type of wetland fill is not allowed pursuant to Coastal Act Section 30233. Below are some approaches that could be considered to facilitate the repair, maintenance, enhancement or construction of dikes in consideration of sea level rise over the coming decades.

- Wetland fill for dike enhancement or construction as restoration. One approach to the wetland fill/sea level rise issue would be for the Coastal Commission to allow wetland fill for dike enhancement or construction as "restoration" for protection against sea level rise of agricultural lands that function as freshwater wetlands. Wetland fill for the modification of a dike has been allowed by the Coastal Commission when found to be for wetland restoration purposes, one of several permitted wetland fill types. In light of the threat of saltwater inundation to over 50 percent of the agricultural lands in the HBAP with just 0.9 ft. of sea level rise, and considering that existing dikes currently protect these agricultural/freshwater wetlands from tidal inundation, it is reasonable to expect that construction of shoreline protection that requires wetland fill in the SLRZ should be allowed by the Coastal Act as a restoration activity due to the agricultural/freshwater wetland protection provided by existing dikes.

- Wetland fill for dike enhancement or construction using Coastal Act conflict resolution. Ideally, dike enhancement (an increase in height with an accompanying increase in width) or new dike construction to protect agricultural lands from sea level rise impacts should be allowed without having to be justified as a restoration project. This would involve a change in the way the Coastal Commission interprets their wetland fill policies, or would involve changes in the wetland fill policies themselves. The Coastal Commission could choose to support policies that allow wetland fill for the enhancement of an existing dike or construction of a new dike for the purpose of protecting agricultural lands, including agricultural wetlands, from sea level rise impacts without requiring the dike enhancement to be part of a restoration project. This could be done using the Coastal Commission's conflict resolution authority, thereby allowing the Commission to certify HBAP policies that would allow wetland fill for dike enhancement by balancing the impacts associated with filling wetlands for dikes (loss of minor amounts of wetland) with the impacts of not constructing or enhancing dikes, impacts that would include the loss of a significant amount of agricultural lands (a Coastal Act priority use), loss of a significant amount of freshwater wetland and other ESHA, and the loss of critical community infrastructure. Other factors to consider in the conflict resolution discussion are that coastal agriculture represents a significant and important part of the North Coast economy and cultural fabric. Also, dikes were historically placed to keep the sea out of areas they were meant to protect, and thus raising these dikes will allow the continuation of historic land uses, primarily agriculture.

- Dike enhancement as repair and maintenance. On Humboldt Bay, the era of dike building spanned the 1890s through 1930s, and generally relied on a floating dredge for dike construction. Farmers and ranchers built earthen dikes, often at the boundary between mudflat and salt marsh. By excavating a ditch to float a dredge, the bay mud was side cast to drain and build up a berm, eventually forming a dike. With the installation of tide gates and a few winters of rainfall, the salt from the

former salt marsh soil behind the dike flushed, enabling agricultural practices to ensue. This type of land reclamation occurred in each of Humboldt Bay's six major hydrologic units: Arcata Bay, Eureka Bay, South Bay, Mad River, Eureka Sough, and Elk River Slough. The result is a long history of agricultural use in the diked former tidelands that contributes significantly to Humboldt County's economy and cultural fabric.

Section 30610(d) of the Coastal Act states that repair or maintenance activities that do not result in an addition to, or enlargement or expansion of, the object of those repair or maintenance activities are authorized without a coastal development permit, with the provision that a permit is required for certain extraordinary methods of repair and maintenance that involve a risk of substantial adverse environmental impact. California Code of Regulations Title 14, Division 5.5, Chapter 6, Subchapter 7, Section 13252 lists the repair and maintenance activities that require a permit for purposes of Coastal Act Section 30610(d).

(a) For purposes of Public Resources Code Section 30610(d), the following extraordinary methods of repair and maintenance shall require a coastal development permit because they involve a risk of substantial adverse environmental impact:

(1) Any method of repair or maintenance of a seawall revetment, bluff retaining wall, breakwater, groin, culvert, outfall, or similar shoreline work that involves:

(A) Repair or maintenance involving substantial alteration of the foundation of the protective work including pilings and other surface or subsurface structures;

(B) The placement, whether temporary or permanent, of rip-rap, artificial berms of sand or other beach materials, or any other forms of solid materials, on a beach or in coastal waters, streams, wetlands, estuaries and lakes or on a shoreline protective work except for agricultural dikes within enclosed bays or estuaries;

(C) The replacement of 20 percent or more of the materials of an existing structure with materials of a different kind; or

(D) The presence, whether temporary or permanent, of mechanized construction equipment or construction materials on any sand area, bluff, or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams.

(2) Any method of routine maintenance dredging that involves:

(A) The dredging of 100,000 cubic yards or more within a twelve (12) month period;

(B) The placement of dredged spoils of any quantity within an environmentally sensitive habitat area, on any sand area, within 50 feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams; or

(C) The removal, sale, or disposal of dredged spoils of any quantity that would be suitable for beach nourishment in an area the commission has declared by resolution to have a critically short sand supply that must be maintained for protection of structures, coastal access or public recreational use.

(3) Any repair or maintenance to facilities or structures or work located in an environmentally sensitive habitat area, any sand area, within 50 feet of the edge of a coastal bluff or environmentally sensitive habitat area, or within 20 feet of coastal waters or streams that include:

(A) The placement or removal, whether temporary or permanent, of rip-rap, rocks, sand or other beach materials or any other forms of solid materials;

(B) The presence, whether temporary or permanent, of mechanized equipment or construction materials.

Section 13252(a)(1)(B) plainly excepts the repair and maintenance of agricultural dikes within enclosed bays or estuaries from the need for a coastal development permit. Yet, Section 13252(a)(1)(D) requires a permit if there is a presence of mechanized equipment or construction materials in an environmentally sensitive habitat area, sand area, bluff, or within 20 feet of coastal waters. Sections 13252(a)(3)(A) and (B) require a permit for the repair and maintenance of facilities or structures or work within an environmentally sensitive habitat area, sand area, within 50 feet of a coastal bluff or environmentally sensitive habitat area, or within 20 feet of coastal waters, that includes the placement of solid materials and the presence of mechanized equipment or construction materials.

The Coastal Commission routinely relies on sections other than 13252(a)(1)(B) to require permits for the repair and maintenance of agricultural dikes, a practice which appears to be inconsistent with the intent of the exception from permit requirements for these activities. The sections the Coastal Commission relies on are those that require a permit for work where mechanized equipment or construction materials will be within 20 feet of coastal waters, or in or near and environmentally sensitive habitat area, circumstances that are unavoidable for Humboldt Bay agricultural dikes

since the majority of the these dikes are located in agricultural wetlands within 20 feet of coastal waters.

However, it is not feasible to repair Humboldt Bay's agricultural dikes without mechanized equipment, construction materials, and placement of material occurring within 20 feet of coastal waters and in agricultural wetlands. The manner in which the Commission has been permitting repair and maintenance activities for agricultural dikes ignores the exception from permit requirements for such activities. It is inconsistent that the regulations would allow repair and maintenance of agricultural dikes without a permit, and at the same time place restrictions that prevent this exception from ever being used.

Clearly, by the plain language of this exception, the intent is to allow agricultural landowners to protect and maintain their agricultural lands by repairing and maintaining their dikes without having to obtain permits for this work. The conflicts contained within Section 13252 should be remedied in the short term by the Commission relying on the plain language and clear intent of Section 13252(a)(1)(B), and in the long term by amending the language to remove the obvious conflicts.

The purpose of these historic dikes was, and continues to be, to keep sea water out of the area behind the dike. They were not built to any specified elevation, but were built to an elevation that would serve their purpose of keeping sea water on the bay side of the dike at any particular location. Decades of dike erosion and subsidence have compromised the ability of the dikes to serve their purpose. The Coastal Commission could take an approach that the specific elevation and width of a dike is not what should be considered when determining what constitutes repair and maintenance of a dike, but rather the purpose of the dike could be the basis for a repair and maintenance determination.

This would mean that a dike could be enlarged in both height and width to withstand rising seas, and to address subsidence, without the enlargement being considered an addition, enlargement or expansion of the dike because the historic purpose and need for the dike is not changing. The enlargement of the dikes is needed to maintain current conditions in the transitional agricultural lands (agricultural uses, freshwater wetland function, and the location of public infrastructure) as a matter of maintaining the public health, safety and welfare. This would then allow the enlargement of a dike to be considered as a repair and maintenance project pursuant to the Coastal Act, thereby allowing the wetland fill required for the enlargement.

In many cases, repair and maintenance projects can be authorized without a coastal development permit as discussed above. However, repair and maintenance projects that involve a risk of substantial adverse environmental impact do require a coastal

development permit. If the premise is accepted that enlargement of a dike qualifies as repair and maintenance, then even if a coastal development permit is required by the Coastal Commission, the scope of permit review would be reduced, and may allow wetland fill for the dike expansion. This may not avoid mitigation for impacts to sensitive habitat that may have developed on and around the dike over the years, but it would at least allow the dike enhancement to move forward as an allowable wetland fill.

- Coastal Act Amendment. The Commission could go a step further and amend the Coastal Act to allow wetland fill for sea level rise protection outright, with the Commission's implementing regulations specifying the circumstances under which such fill could occur.

- Mitigation for wetland fill. Assuming wetland fill associated with construction of necessary shoreline protection is allowed in the SLRZ, consideration should be given to mitigation for such fill. No mitigation for the loss of wetland area should be required for activities deemed to be repair and maintenance that do not increase the original footprint (i.e. the wetland fill area) of the dike. These wetlands are presumed to have been legally filled previously, and should be allowed to be refilled to repair and maintain existing.

  For wetland fill associated with dike enhancement or new dike construction, from the County's perspective, this fill could be found to be self-mitigating where the fill will protect agricultural lands and/or freshwater wetlands including agricultural wetlands, as well as other types of wetlands or ESHA. Without the wetland fill for construction of shoreline protection, the agricultural freshwater wetlands and other ESHA will be lost immediately or over time due to inundation by saltwater from sea level rise. The loss of a relatively small area of wetland necessary for construction of shoreline protection in the SLRZ to save a relatively large area of transitional agricultural wetland should not require any additional mitigation. With so much area threatened without providing some protection, even in the short term, mitigation costs could be significant and finding areas for mitigation difficult, particularly because of sea level rise. Further, if sea levels continue to rise, at some point the dikes will be overtopped, and the area consisting of dikes that required the wetland fill will eventually be reclaimed.

- Programmatic dike repair, maintenance and/or enhancement permit. Another approach to permitting enhancement of existing shoreline protection in the SLRZ could include joint approval by the Coastal Commission and the County of a programmatic permit for dike repair, maintenance, and modification/enhancement, including an allowance for wetland fill necessary for construction of the shoreline protection. This could be done based on the restoration approach, the repair and maintenance approach, or based on the approach of wetland fill for sea level rise protection being an allowable fill.

There are 170 individual parcels containing 41 miles of dikes around Humboldt Bay, with no one entity responsible for maintaining this artificial shoreline. The owners of these parcels generally do not have the knowledge or expertise, and likely may not have the financial ability, to proceed through a costly and lengthy design and permitting process on top of the high costs to actually complete the work to repair, maintain or enhance their dikes. While simple straightforward repair and maintenance projects may be permitted more easily and quickly, dike enhancement will ultimately be required in the short term to allow longer term adaptation strategies to be identified and implemented.

The development of one or more County/Coastal Commission programmatic permits that would allow for dike repair, maintenance and modification would reduce landowner costs and timeline for project design and permitting. This type of permit could function much like Army Corps of Engineers Regional General Permits, such as Regional General Permit #6 which was issued to the Sonoma County Resource Conservation District for maintenance and repair of levees. The permit could apply to a specific geographic location, and could contain parameters with which the project most comport, and conditions that must be complied with.

There are options that could be explored regarding how such a permit might be issued. The dikes are located primarily if not completely within Coastal Commission retained jurisdiction, but the hope would be that the County would be party to at least the development of the permit. Once developed, the permit could then be issued to an agency such as a Humboldt Bay joint powers authority (see discussion under Policy Option 4.1), a Dike Reclamation District (see discussion below) the Humboldt County Resource Conservation District, the Humboldt County Flood Control District or Planning and Building Department, or the Humboldt Bay Harbor District, and that agency would have the authority to authorize work under the permit. Another option would be for the Coastal Commission to develop the programmatic permit(s) and then require landowners to seek authorization from them to conduct work under the permit.

Obtaining a coastal development permit is just one of many permits that would be required to conduct dike repair, maintenance, enhancement or construction of new dike. Other permitting agencies could include the U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, California Department of Fish and Wildlife, the North Coast Regional Water Quality Control Board, the State Lands Commission, and the Humboldt Bay Harbor District. Development of a programmatic permit should include any agency with permitting authority. If the permit can be developed with the concerns of the various agencies addressed, perhaps each agency could also adopt a programmatic permit to help streamline the permitting process. At the very least, if the programmatic permit is developed to address other agency concerns, it will facilitate an easier permit process through the other permitting agencies.

- Special District. With 41 miles of dikes traversing 170 individual parcels and no centralized dike management authority, it could be difficult to effectively address sea level rise impacts. Effective management for protection of critical assets would require maintenance of the entire length of shoreline within each Humboldt Bay diked hydrologic sub-unit, as a breach at any location within a sub-unit can impact the entire sub-unit. The formation of a Special District for dike repair and maintenance could provide the necessary oversight to help insure the comprehensive management of our dike system. The district would be a cross-jurisdictional entity, which would help provide consistent management of dikes by sub-unit. Such a district would be a prime recipient of the programmatic permit discussed above.

  A Special District for dike repair and maintenance could also function as an implementing agency for carrying out specific dike repair, maintenance, enhancement and new construction projects. As provided in the HBAP Diked Shoreline Sea Level Rise Adaptation Feasibility Study, the cost of rebuilding a dike can start at over $1 million per mile and can go well over $2 million per mile, depending on a wide variety of circumstances. The dikes certainly protect the agricultural lands of private property owners, but by protecting these lands, they are also protecting critical infrastructure and a critical part of our economy important to the entire community. The amount of funding required, who will pay for the necessary work and what that amount will be are issues that would need to be identified when looking at funding options

- Coastal Act policy 30235. Another Coastal Act policy that is germane to the issues in the SLRZ is Section 30235, which allows construction that alters natural shorelines only when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion. With forecasted impacts of sea level rise that can result in catastrophic impacts to the Humboldt Bay region, including loss of agricultural lands, wetlands and other ESHA, critical infrastructure, homes and businesses, the construction of dikes and other protective structures in the SLRZ will be necessary that may at times be far from “existing development”, but that will ultimately protect that existing development.

Protection of agricultural lands themselves would not normally be allowed by this policy as they are not generally considered to be developed, yet these lands hold significant value to the Humboldt Bay region for a number of reasons, as discussed above. The Coastal Commission is encouraged to find a way to have the agricultural lands be considered a form of existing development in the SLRZ to qualify them under Section 30235 of the Coastal Act. The Commission could also reexamine their interpretation of this policy when it comes to the distance between the shoreline protective structure and the development it is designed to protect.

Regardless of the approach taken, it is essential to provide a streamlined pathway forward for protection of our agricultural lands for preservation of agricultural uses as well as freshwater wetland ESHA, and protection of critical infrastructure often protected by the same dikes that are protecting freshwater ESHA and agricultural lands.

Policy Option 1.8: Encourage construction of protective shoreline structures with living shoreline component to protect existing assets and coastal resources, and minimize the need for shoreline fortifications.

Discussion

Enhancing existing protective shoreline structures or constructing new protective structures, could benefit from including a living shoreline where feasible, such as a salt marsh plain fronting the protective structures to minimize the need for shoreline armament. Salt marsh plains naturally attenuate wave actions and provide excellent intertidal habitat and a less environmentally damaging alternative to placing rock rip rap to minimize shoreline erosion.

Policy Option 1.9: Explore and allow where feasible the use of dredge spoils or other suitable material to be placed within diked former tidelands to increase their elevation in order to protect them against sea level rise, preserve their wetland and agricultural values, and protect critical infrastructure assets.

Discussion

Humboldt Bay's diked former tidelands, or seasonal freshwater wetlands, are a valuable community and coastal resource. These lands are generally considered to be environmentally sensitive habitat areas (ESHA) by the Coastal Commission due to their wetland and wildlife value, and are consequently protected under the Coastal Act. In addition, agriculture is considered a priority use pursuant to the Coastal Act as demonstrated by a number of policies: the Coastal Act directs that the maximum amount of prime agricultural land shall be maintained in agricultural production to assure the protection of an area's agricultural economy; discourages the conversion of agricultural lands to other uses; does not require public access for new development if agriculture would be affected; and prioritizes visitor-serving commercial recreational facilities over private residential, general industrial and commercial development, but not over agriculture, to list a few.

There are approximately 10,680 acres of agricultural land comprised of diked former tidelands and alluvial river bottom land located in the HBAP planning area. These lands

are generally used for livestock grazing or raising feed. They are also used by migratory birds, shore birds, as well as other wildlife, and thus provide valuable wildlife habitat. With 1 meter of sea level rise, 62% of the HBAP agricultural land will be inundated.

Diked former tidelands are often lower in elevation than the salt marsh on the bay side of the dikes that separate them from the bay. Salt marsh forms near the mean high water elevation of 5.8 feet, and can extend up to the mean monthly maximum water elevation of 7.7 feet. Soil compaction of the diked former tidelands due to the oxidation of organic material from the former salt marsh soils, results in elevations that are 1 to 3 feet lower than mean high water. Without daily inundation, sediment accretion no longer occurs to help maintain soil elevations. These lands become more susceptible to the impacts of sea level rise, including ground water intrusion, tidal inundation, and poor drainage, as time goes on. Because of their low elevation, it is likely that these lands will not be “restored” to their original salt marsh habitat, but will instead be converted to open water and mudflat.

When faced with rising sea levels, raising the level of the diked former tidelands would protect and restore freshwater wetland function and habitat, protect against the loss of the agricultural lands surrounding Humboldt Bay, and protect critical infrastructure located in or beyond the diked former tidelands. While the number of acres of diked former tidelands would likely preclude filling of all these lands to protect against sea level rise impacts, there may discrete areas where this could be a viable sea level rise adaptation measure. This protection may only last for a number of decades, but it would provide the community the time necessary to adjust to the ultimate loss of these lands to the sea.

The filling of wetland is not currently allowed by the Coastal Act for the purpose of sea level rise protection, but is allowed for restoration purposes. Without raising the elevation of the diked former tidelands, their conversion to open water and mud flat is the likely outcome due to their low elevation. Filling of the diked former tidelands will serve the purpose of protecting and restoring the valuable freshwater wetland habitat these lands provide, and will also preserve agricultural lands, all of which is consistent with the Coastal Act. Therefore, filling diked former tidelands to raise their elevation to preserving their wetland qualities should be an allowable fill.

Policy Option 1.10: Encourage increasing drainage capacity of diked former tidelands to reduce stormwater flooding.

Discussion

Rising sea levels will raise the elevation of low tides and increase the time that existing tide gates, which are generally constructed at mean low or mean lower low tide elevations, remain closed. Stormwater runoff traversing low-lying areas can become impounded behind barrier like shoreline structures (dikes, railroad and road grades) that

drain through tide gates. The duration of flooding of diked former tidelands will increase as sea level rises unless drainage capacity is increased by expanding existing tide gates and constructing additional tide gates to compensate for the expected loss in drainage capacity.

Policy Option 1.11: Explore the potential for "letting water in" rather than attempting to "defeat it" where possible as a means of living with sea level rise

Cities such as Rotterdam, already facing significant impacts from rising seas, are taking steps to address climate change and sea level rise. An article in the New York Times (https://www.nytimes.com/interactive/2017/06/15/world/europe/climate-change-rotterdam.html) states the following regarding the Dutch and their approach to sea level rise:

> From a Dutch mind-set, climate change is not a hypothetical or a drag on the economy, but an opportunity. While the Trump administration withdraws from the Paris accord, the Dutch are pioneering a singular way forward.
>
> It is, in essence, to let water in, where possible, not hope to subdue Mother Nature: to live with the water, rather than struggle to defeat it. The Dutch devise lakes, garages, parks and plazas that are a boon to daily life but also double as enormous reservoirs for when the seas and rivers spill over. You may wish to pretend that rising seas are a hoax perpetrated by scientists and a gullible news media. Or you can build barriers galore. But in the end, neither will provide adequate defense, the Dutch say.
>
> And what holds true for managing climate change applies to the social fabric, too. Environmental and social resilience should go hand in hand, officials here believe, improving neighborhoods, spreading equity and taming water during catastrophes. Climate adaptation, if addressed head-on and properly, ought to yield a stronger, richer state.

The County intends to explore how this approach, letting water in where possible as opposed to attempting to subdue it, might work in the Humboldt Bay area. For example, are there discrete areas of agricultural land or areas within a threatened community where water can be allowed to overtop dikes and be temporarily stored to avoid impacting the entire hydrologic unit, and that could provide other public benefits when not being utilized for floodwater storage? At some point, barriers will not work to address sea level rise, leaving only the option of retreat without an alternative solution. However, if ways can be found to let water in and live with rising seas, some areas of our community may be allowed to thrive into the future in-place, despite sea level rise.

Policy Option 1.12: Restrict allowable land uses and developments that require protection from sea level rise impacts within the SLRZ.

Two to three feet of sea level rise is currently projected to occur as soon as 2050 (two feet) and 2070 (three feet), and possibly as early as 2030 and 2050 if annual maximum water elevations, commonly referred to as king tides, are considered. The SLRZ would cover that portion of the HBAP that could be potentially impacted by 3 ft. (1M) of sea level rise.

Restrictions in the kinds of land uses and development within the SLRZ could take various forms, and could be provided through several policies. The most restrictive approach would involve prohibiting new development. A less restrictive approach is to prohibit certain types of new development within the zone based on its location within the zone. A more adaptive approach would be to allow development based on a site-specific sea level rise hazard analysis that would consider factors such as existing site conditions (elevation, groundwater elevation, access, etc.), shoreline conditions, projected sea level rise elevations, and development type, which would ultimately help determine if a particular development would be allowed. Site conditions in a certain area together with projected sea level rise and the type of proposed development, that would include consideration of the life of a structure together with the timeline for site-specific sea level rise impacts, could allow for more or less rigorous sea level rise hazard analysis. As time progresses and patterns begin to develop in terms of what types of development can be supported in the SLRZ, future steps could involve changes in land use and zoning in response to sea level rise.

Policy Option 1.13: Limit improvements to existing development in the SLRZ to repair and maintenance and avoid expanding or extending the life of a structure.

This policy could incorporate a range of approaches. Expansions, additions, or significant renovations to structures within the SLRZ could be prohibited altogether, or could be allowed based on a site-specific sea level rise hazard analysis that would include consideration of the life of a structure together with the timeline for site-specific sea level rise impacts. As with the preceding policy, different locations could require more or less rigorous analysis, as could the type of or expansion, addition or renovation proposed.

Policy Option 1.14: Explore the relocation potential for land uses and assets within the SLRZ, with the ultimate goal of creating a resiliency plan to address identified relocations.

Policy Option 1.15: Explore the use of a Transfer of Development Rights Program to facilitate relocation of assets and uses to areas outside the SLRZ.

As discussed in the County's Environmental Screening document for sea level rise impacts within the HBAP area, relocation of assets and uses is a monumental challenge and may face insurmountable hurdles. There are assets that will be impacted, such as the fertile agricultural bottomlands, which simply cannot be replaced. The relocation of assets that can be moved, and the financial, cultural, and environmental implications of such relocations, if even feasible, are unknown at this time. The County intends to continue to explore adaptation strategies that can be implemented in preparation for possible future conditions when inundation as a result of sea level rise displaces assets and uses inland.

Goal Option 2. High degree of public awareness of sea level rise impacts that are considered in future investments

Policy Option 2.1: Require real estate disclosures to prospective buyers prior to closing of escrow of permit conditions and vulnerabilities of property and structures related sea level rise within the sea level rise overlay zone

Discussion

This policy would apply throughout the SLRZ. It would serve to not only notify buyers of a property of the potential for sea level rise impacts to the property they are purchasing, but it would also alert buyers to the fact that they are in an area that is associated with potentially restrictive requirements to address sea level rise impacts for both new and existing development.

Policy Option 2.2: The County shall consider acquiring properties within the sea level rise overlay zone that are in tax default are to be sold.

Discussion

In order to avoid properties being purchased by a private buyer who will eventually be faced with owning a property that is no longer viable for a home, business, etc., the County will prepare and implement a program outlining when and how the County may purchase such properties as a public benefit. Such a program would result in the avoidance of the financial hardship a future owner would face once the property

becomes significantly impacted by sea level rise, and place such properties in the public domain. In some cases, the acquisition of tax default land could be used for floodwater storage as part of the "letting water in" adaptation approach. Care must be taken to avoid any potential conflict of interest in such purchases, since the County would be both the seller and the buyer of such properties.

Goal Option 3: Public Access Recreation, and Sensitive Coastal Resources are protected with sea level rise

Policy Option 3.1: Retain, protect, and where feasible expand public access to Humboldt Bay.

Discussion

This policy would ensure public access points to the shoreline and waters of Humboldt Bay continue to function as the sea level rises. Regarding sensitive resources, policies in the second goal listed above will help protect existing environmentally sensitive habitat areas that reside on or inland of diked former tidelands.

Goal Option 4: Maximize Agency Coordination and Public Participation

Policy Option 4.1: Coordinate planning and regulatory decision making with other Local Coastal Program jurisdictions, the Humboldt Bay Harbor, Conservation and Recreation District, and the Coastal Commission.

The County is collaborating with the cities of Arcata and Eureka, the Humboldt Bay Harbor District, and the Coastal Commission, to determine how best to regionally address sea level rise impacts on Humboldt Bay. The collaborating agencies are those with coastal land use jurisdiction on the bay. The cities and county have Local Coastal Plans (LCPs) that govern land use in the coastal zone. The Harbor District has regulatory jurisdiction over Humboldt Bay tide and submerged lands shoreward to the mean higher high water elevation as provided by the State Lands Commission, and as implemented through the Humboldt Bay Management Plan and the District's permitting program. The Coastal Commission has the ultimate authority for approving LCPs, and retains permitting authority for coastal development permits for tidelands, submerged lands and public trust lands within all the above named jurisdictions. The area of Coastal Commission retained jurisdiction on Humboldt Bay is significant.

Considering the cross-jurisdictional assets that could be impacted by sea level rise, and considering that actions one jurisdiction takes to protect or not protect a particular area or asset against sea level rise has the potential to impact an adjoining jurisdiction, coordination of sea level rise adaptation policies and implementation measures for the Humboldt Bay region is essential. Consideration could be given to facilitating collaboration amongst the above named agencies in a number of ways.

The formation of a coastal jurisdiction collaborative comprised of staff from each of the collaborating agencies would be one possible approach to regional sea level rise management. A collaborative would provide a forum where coastal jurisdictions could discuss coordination of policies, implementation of adaptation strategies, and other sea level rise related issues, and provide guidance and recommendations to their respective legislative bodies that would represent a regional approach to addressing sea level rise on Humboldt Bay. A collaborative would be formed by a non-binding agreement, and would have no authority to act on any substantive recommendations they make; that authority would remain with the legislative bodies of the member jurisdictions.

A more formal and powerful collaborative could be formed by these same coastal jurisdictions agreeing to exercise joint powers to facilitate regional management of sea level rise on Humboldt Bay. As described in the *Governments Working Together – A Citizen's Guide to Joint Powers Agreements, August 2007*, published by the California State Legislature, Senate Local Government Committee, "joint powers are exercised when the public officials of two or more agencies agree to create another legal entity or establish a joint approach to work on a common problem, fund a project, or act as a representative body for a specific activity."

There are generally two ways to exercise joint powers – to jointly exercise common powers through a contract or joint powers agreement, or to form a separate legal entity with independent legal rights. A joint powers agreement is a formal, legal agreement between two or more public agencies that share a common power and want to jointly implement programs, build facilities, or deliver services. A joint powers agency is a new separate government organization created by a joint powers agreement between member agencies.

Another way to facilitate regional sea level rise management could be the development of a suite of sea level rise adaptation policies that could be adopted as part of all local jurisdictions LCP's and also by the Harbor District. At a minimum, these policies would be those that would address sea level rise impacts and adaptation strategies as they relate to cross-jurisdictional assets, and actions with cross-jurisdictional impacts. Since the Coastal Commission's retained permit jurisdiction comprises a significant portion of the local jurisdiction's LCPs, ideally the Coastal Commission would also adopt these same policies in a manner that would require the Coastal Commission to actually follow the policies when issuing coastal development permits, rather than simply considering them as guidance. Each LCP jurisdiction could also adopt their own policies that would

address sea level rise adaptation for those assets, and those actions with impacts, that reside solely within a particular jurisdiction. This approach could also form the basis for an above described collaborative or JPA.

The issue of cross-jurisdictional assets and impacts associated with sea level rise raises especially significant concerns in regard the Coastal Commission and their retained jurisdiction around Humboldt Bay. The Coastal Commission retains the authority to issue coastal development permits pursuant to the Coastal Act for tidelands, submerged lands and public trust lands. In the case of the HBAP planning area, the Commission retains permit jurisdiction on approximately 6,825 acres, or approximately 75% of the 9,135 acres that are vulnerable to tidal inundation by 3.3 ft. (1.0 M) of sea level rise (SLRZ). The Coastal Commission relies on Chapter 3 of the Coastal Act as the standard of review for issuing coastal development permits within their retained jurisdiction, and uses local jurisdiction LCPs for guidance only. This means that despite the fact that the County's LCP extends into Coastal Commission jurisdiction, and despite the fact that the Commission is required to certify and has certified the County's LCP, the Commission is not required to use the County's LCP they certified as being consistent with the Coastal Act, as the standard of review for issuance of coastal development permits.

While this circumstance has always presented land use planning challenges for the County and other local LCP jurisdictions, it presents particularly concerning and difficult challenges when trying to plan for sea level rise, especially since the majority of the HBAP area that is vulnerable to sea level rise (75%) is located in state retained jurisdiction. This creates a situation where, despite the County providing a comprehensive plan for addressing sea level rise and its impacts, there is no guarantee that plan can or will be implemented given that the Coastal Commission does not have to follow the County's LCP. This impacts not only land use planning for the HBAP planning area and greater coastal zone, but it also impacts land use planning for inland areas.

To illustrate the problem posed by the Coastal Commission not being legally bound by local jurisdiction certified LCPs, consider the fact that the entire Humboldt Bay shoreline is located in state jurisdiction. This means that any shoreline protection that the County plans for in the HBAP will be located in state jurisdiction. Even if the HBAP includes policies that provide for the enhancement of shoreline protection to protect certain land uses, development, communities, and critical infrastructure, the Coastal Commission does not have to comply with those policies, and can deny any permits required to carry out the County's LCP policies. In fact, the Coastal Commission has no policies to follow when it comes to sea level rise or land use planning, as the Commission bases findings for approving coastal development permits on Chapter 3 of the Coastal Act. The fact that the Coastal Commission does not have to comply with the County's LCP when considering permits, particularly as they may relate to sea level rise, not only directly impacts the lands that are the subject of a particular permit, but will indirectly impact

coastal and inland lands and land use planning. If the County cannot implement their LCP policies, for example, cannot maintain a certain amount of agricultural land by implementing protections as may be prescribed in the HBAP, the loss of these coastal agricultural lands to inundation will have countywide impacts when considering the County's comprehensive land use planning approach.

This situation leaves the County with significant uncertainty as to what the Coastal Commission will or will not allow in terms of sea level rise adaptation policies and strategies, and thus raises significant hurdles to comprehensive land use planning for the County. A relatively simple solution would be for the Coastal Commission to use the County's and other local jurisdiction's LCPs as the standard for review for coastal development permits in state retained jurisdiction, particularly in regard to sea level rise, thereby enabling a comprehensive approach to addressing sea level rise on Humboldt Bay. This is one possible way to address the challenge for the County, other local jurisdictions, and the Coastal Commission to integrate the application of their authorities pursuant to the Coastal Act to effectively and efficiently address the impacts of sea level rise on coastal resources and developments in the SLRZ.

Policy Option 4.2: Maximize public participation in sea level rise adaptation planning process.

Discussion

The County will be developing focused adaptation strategies to address sea level rise for some of the County's most vulnerable areas – the economically disadvantaged communities of King Salmon, Fields Landing, and Fairhaven/Finn Town. The County proposes to use its HBAP sea level rise vulnerability assessment to explore adaptation options with members of these communities to protect vulnerable assets from, and help them adapt to, the impacts of sea level rise, by evaluating the timing and viability of the most appropriate options through stakeholder engagement and feasibility analysis.

The County also intends to collaborate with other entities in the Humboldt Bay region to engage, inform and educate the general public on the challenges that sea level rise creates for our region.