# Adapting to Rising Tides East Contra Costa County

## DRAFT Issue Statements

September 25, 2019

**Instructions:**

The following are draft Issue Statements for the project area, organized by sector. Issue statements synthesize existing conditions, vulnerabilities, and consequences for project assets. Adaptation responses are developed in response to Issue Statements, so they should represent the depth and breadth of vulnerabilities and consequences present in the project area.

In the time allotted, review the sectors that you are most interested in and knowledgeable about. Determine if you think these are the biggest risks each asset faces. In the space below each Issue Statement, provide comments or edits. At the end of each section, we have also provided space for new Issue Statements you think may be missing for the asset sector.

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## SECTOR: AGRICULTURE AND NATURAL AREAS

### 1. Wetland Habitats

Wetland habitats within the project area are vital both for their habitat value for important wildlife, and the ecosystem services, including flood abetment, which they provide human communities. Sea level rise alters hydrology and salinity conditions, which can have extensive impacts on all wetland habitats. Tidal wetlands will not persist unless higher elevation migration space is made available and restoration projects move forward with sufficient lead time to overcome regulatory hurdles. Managed wetlands are particularly vulnerable to levee failure or damage to pumping equipment from flooding by saltwater, which will require dedicated funding to accommodate. All wetland types are sensitive to changes in water salinity that will result from sea level rise. Altered salinity can change plant communities, which has trickle up effects for the other organisms using the habitat.

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### 2. Agricultural Lands

Agricultural lands in the project area are most at risk from levee failure, which would result in the immediate flooding of a large proportion of agricultural land leading to substantial economic losses for the region. In future scenarios, where large storms co-occur with sea level rise, flooding can occur in the absence of levee failure. In these instances, agricultural lands are at additional risk if technology is not in place to pump out flood waters and systems are lacking for amending agricultural lands impacted by saline water.

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**New Agriculture and Natural Lands Issue Statement**

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## SECTOR: TRANSPORTATION

### 1. Freight and Passenger Rail

Given the interconnected nature of rail and lack of redundancy, a disruption of any segment of rail, either within or beyond the project area, could have significant impacts. Rail lines in the project area are critical to moving agricultural, automotive, chemical, industrial, and other goods from the region's seaports to local and national markets and are integral to inter-city passenger rail service. In addition, in many locations the rail line serves as the first line of defense against inland flooding. Collaboration between private rail owners (Union Pacific and Burlington Northern Santa Fe), local agencies that own or manage adjacent lands, and those that rely on rail either for providing service or for flood protection, will be necessary to find and implement appropriate, multi-benefit solutions to address flood risks.

### 2. Roadways

Many local roads flood, putting communities at risk of being isolated from critical services, blocking evacuation routes, or disrupting access to homes or businesses. Short term closures of the roadway network could have significant social and economic costs as there is limited redundancy for car or bus commuters in the project area, especially those that live in fairly isolated communities, and alternative routes that do exist may not be able to accommodate the same capacity. Residents without access to a vehicle may be most vulnerable since rerouted buses would result in delays that could impact their ability to get to work, especially if they connect to other transit modes such as the intra-regional BART system.

### 3. Ports

Sea level rise and storm events will affect seaport operations by limiting access to and from seaports. Temporary or permanent disruption of local access roads and rail lines would disrupt seaport operations. In particular, loss of rail service, which moves bulk materials and automobiles, would have significant impacts on the local and regional economy, as these goods may not be easily moved by truck.

**New Transportation Issue Statement**

SECTOR: PEOPLE

### 1. Social Vulnerability Ranks and Characteristics

Individuals, households and neighborhoods in East Contra Costa County have characteristics that could affect their ability to prepare for, respond to, and recover from a flood event. These characteristics include low-income households, individuals with low educational attainment, people of color, renters, mobile home occupants, and households without a vehicle. In addition, across the project area most residents are housing and transportation cost burdened.

**New People Issue Statement**

## SECTOR: PARKS AND RECREATION

### 1. Shoreline Parks

EBRPD shoreline parks face flooding, groundwater infiltration, erosion, habitat shifts from one habitat to another, and habitat loss and degradation from sea level rise and future flooding. These regional shoreline parks contain important marsh habitat, unique historical resources, and large-scale recreation assets including trails, fishing and wildlife viewing. Sea level rise and future flooding will not only affect parks and shoreline habitat but will also affect inland areas in places where EBRPD provides the official or de facto shoreline protection. EBRPD will need to protect its park and recreation areas as well as work with the inland neighbors that its shoreline parks protect from flooding, such as transportation authorities, cities, and private landowners.

### 2. Wildlife Refugees and Ecological Reserves

Of the various habitats found in the protected lands within the Project Area, the most exposed are those containing wetlands. Though only small areas of other protected lands are impacted by flooding, these areas (ex: coastal dunes) are habitats for several federally endangered species, which will not persist unless land managers fold sea level rise adaptation into their endangered species management plans. For the deeply impacted wetland refuges, sea level rise alters hydrology and salinity conditions, which can have extensive impacts on all wetland habitats. Wetlands will not persist unless higher elevation migration space is made available and restoration projects move forward with sufficient lead time to overcome regulatory hurdles. Managed wetlands are particularly vulnerable to levee failure or damage to pumping equipment from

flooding by saltwater, which will require dedicated funding to accommodate. Wetlands are sensitive to changes in water salinity that will result from sea level rise. Altered salinity can change plant communities, which has trickle up effects for the other organisms using the habitat.

### 3. Marinas

Marinas are vulnerable to sea level rise and storm event flooding because of their shoreline location and sensitive onshore equipment. Although boats and docks are able to accommodate changes in water levels, onshore facilities are not waterproofed and often contain hazardous materials like fuel, wastewater, and motor oil. Marinas provide water-oriented recreation and housing and are not easily relocated within the region.

4. Water Trail and Fishing Piers

The Water Trail and fishing piers are valuable recreation assets which will be exposed to sea level rise and storm event flooding due to their shoreline location. Although docks and some types of boat launches are able to accommodate changes in water levels, they rely on local roads to give the community access to these assets. The Water Trail relies on connectivity in its function as a regional network, so even small sections of damage can disrupt the use of large segments. In addition, the Water Bay Trail is managed and funded by many different agencies, so adaptation will require extensive coordination to maintain trail alignments and connectivity.

**New Parks and Recreation Issue Statement**

## SECTOR: CRITICAL FACILITIES AND SERVICES

### 1. Solid Waste Disposal Sites

Increased flooding, groundwater levels, or tidal, wind and wave energy could have significant consequences on landfill waste containment systems, potentially impacting public health and nearby ecosystems if contaminants are released. Current RWQCB long-term flood protection requirements are one opportunity for landfills to identify and address increased flood risks due to sea level rise. However, this approach is geared towards site-specific actions, and may not suffice in locations where landscape-scale responses are warranted. Landfills within the 100-year floodplain are required by the EPA to be designed to withstand hydrostatic and hydrodynamic forces associated with the 100-year flood. However, with sea level rise plus a 100-year storm event, facilities may experience higher hydrostatic and hydrodynamic forces and expose landfills outside of the current 100-year flood area. Higher water tables could threaten containment vessels by exerting additional hydrostatic pressure. Furthermore, saltwater can permeate clay liners that are impervious to freshwater. As a result, the risk of wastes leaching through the liners would increase. Existing EPA regulations do not address changing water tables.

### 2. Emergency Response Facilities

Fire stations and law enforcement facilities in the project area that are exposed to flooding are vulnerable because their buildings have at-grade openings and were not built to withstand flooding. In addition, emergency response services rely on roads that could be flooded and power supplies that could be disrupted. Ensuring that emergency and disaster response services are not interrupted will require actions to improve the

individual facilities and coordination with city, county, and state transportation agencies to ensure road access and utility services are maintained.

### 3. Healthcare Facilities

Healthcare facilities need to ensure continuity and quality of care for community members, and rely on outside infrastructure, staff, and services to function. Individuals with ongoing medical needs are more likely to be vulnerable in a disaster event, and may require specialized care, equipment or supplies. While none of the healthcare facilities are exposed, access to these services may be impacted, meaning patients may need to have shelter in place or be evacuated in an emergency. A major concern in Contra Costa County, particularly in areas with limited public health care facilities options, is that community members may be unable to access health care if their neighborhoods are cut off from the rest of the county.

### 4. Faith-Based Organizations

Faith-based organizations provide community services, such as emergency shelter, food, and clothing for those in need. They also can act as congregating places during emergencies and offer ways to distribute information to the community. While the organizations analyzed in this project were not exposed, access may be impaired, and other buildings not analyzed may be impacted by flooding. This could harm the ability of a community to respond to and recover from flooding.

## 5. K-12 Schools

Schools are vulnerable to sea level rise and storm event impacts because of their physical construction and function. School buildings are not typically constructed to resist flooding; for example, they may have at-grade entrances and critical equipment either at or below grade that cannot get wet. In addition, because there are young children, and possibly limited mobility or special education students on campus, schools are especially difficult to evacuate in the event of an emergency. Even schools that are not directly impacted by flooding may be vulnerable to disruptions in transit, road networks, utilities, or other services.

**New Critical Facilities and Services Issue Statement**

## SECTOR: ENERGY AND FUEL SUPPLY

### 1. Pipelines

Buried pipelines are directly and indirectly sensitive to a higher groundwater table and salinity intrusion. Exposure to saltwater can corrode pipelines that are not protected as specified in federal and state regulations. Rising groundwater levels could increase earthquake liquefaction potential leading to additional damage during a seismic event. In the event of flooding, pipelines that are not weighted or anchored may float and become exposed, particularly during prolonged flooding and in marshy or sandy soils. Erosion during storm events could also expose and damage pipelines. Damage to pipelines could result in service disruptions as well as threats to public safety and the environment in the event of an explosion or release of hazardous contents.

### 2. Power Distribution

Substations provide electricity through a networked grid; if one substation is damaged or disrupted there could be downstream (cascading) consequences even though there is some redundancy within the overall grid. Electricity is critical during an emergency. In addition to enabling communications, electricity is needed to run pumps (stormwater, flood control, wastewater) and maintain emergency response centers and facilities.

### 3. Power Generation

Power in the project area is provided mainly by PG&E, which has a network of power plants. Having a network of power plants provides a more resilient system. However, ensuring uninterrupted electricity requires protecting the entire network, including transmission lines and substations connecting the power that is generated to customers. A shutdown of generation plants would impact the power grid and would be economically costly to repair and bring back on line.

### 4. Oil and Gas Production Fields

Due to the large area of the oil and gas production fields, disruption to this industry due to flooding could cause negative economic impacts in the region. Equipment may be destroyed from water damage or corrosion from saltwater exposure. This could lead to potential for spills of extracted products. Finally, the continued extraction may cause further land subsidence, exacerbating flooding.

**New Energy and Fuel Supply Issue Statement**

## SECTOR: POTABLE WATER

### 1. Water Supply

CCWD and has built redundancy in its water distribution infrastructure and has emergency storage to ensure customers will continue to be served in the event of a hazard event such as an earthquake or extreme coastal storm. However, the greatest potential impact of sea level rise on CCWD water service is not due to vulnerable infrastructure assets in the project area but the impacts of salinity on Delta water quality, which could affect CCWD, local water suppliers in the Delta, the State Water Project, and the Central Valley Project.

### 2. Water Treatment Facilities

Water treatment plants are vulnerable to sea level rise due to their location along the shore of the Delta. While levees may protect some plants, sea level rise may cause increased hydrostatic pressure and can cause levee failure, leading to inundation of the plants. Equipment may be destroyed from water damage or corrosion from saltwater exposure. Disruption to water treatment would cause severe impacts to communities, businesses and emergency services. Water is essential for hospitals, industries, businesses, and homes to function properly and may put vulnerable communities at risk. Finally, flooding of access roads or power outages may cause disruption to the facility.

### 3. Water Conveyance

Important conveyance structures pass through the Project Area, including EBMUD's Mokelumne Aqueduct and CCWD's Los Vaqueros Pipeline. Both of these conveyance structures are buried pipelines and could experience buoyancy problems due to rising groundwater and possible corrosion due to saline water intrusion into groundwater. Additionally, areas along or downstream of CCWD's Contra Costa Canal are susceptible to flooding if there was a levee failure. CCWD supplies a large portion of the County with raw and treated water and the Mokelumne Canal is the sole water supply for 1.4 million people in the East Bay.

### 4. Pumps, Diversions and Intakes

Drinking water intakes and pump stations are affected by sea level rise. Water intakes are protected by levees, but sea level rise could cause increased hydrostatic pressure, leading to potential levee failure. Flooding of access roads could block access to these facilities. Additionally, flooding could cause electrical equipment to lose function due to water or saltwater damage. Failure of these pumping facilities would mean a failure of the water system on a whole, with impacts to the economy and wellbeing of people.

**5. Mutual Water Companies**

Many mutual water companies use groundwater pumped from wells. With sea level rise, the tidal saline influence may rise further up into the Delta and impact the water quality of groundwater. These same water quality concerns could also occur for surface water sources. This would impact the water supply of many small communities within the Delta.

**6. Water Rights**

Some water rights are based on riparian (shoreline) rights. Sea level rise may change riparian locations due to the changing shoreline. This could cause future uncertainties in riparian water rights and would need to involve the State of California to decide how these rights should be dealt with on a state, regional, and local level. Additionally, existing locations of riparian and appropriative water rights may become unusable in the future due to increasing saline conditions from tidal influences of the Bay that may reach further upstream into the Delta from sea level rise.

### 7. Salinity Barrier Islands

These Delta islands are important for protecting the state's water supply by preventing tidally-influenced saltwater from going further up the Delta. Levees protecting the islands could fail due to increasing hydrostatic pressure from sea level rise. Failure of the levees that protect the islands would inundate the islands with floodwater and compromise their function as salinity barriers, putting a large majority of the state's water supply at risk from degrading water quality.

**New Potable Water Issue Statement**

## SECTOR: FLOOD CONTROL AND STORMWATER

### 1. Creeks

Sea level rise coupled with ongoing sediment accumulation in low-gradient tidal creeks and channels will reduce the amount of flood protection in the project area by reducing the capacity of creeks to hold large volumes of stormwater. Funding is severely limited, and in some locations limited budgets mean that maintenance or improvement activities are difficult to fund. To better understand the risks to the flood management system, watershed-scale hydraulic models are needed, and it is critical that planners work with flood managers to better understand the vulnerability of nearby homes, businesses, utilities, and community facilities. With this information, the county and cities can engage stakeholders in long-range planning and develop funding strategies to implement projects that improve resilience to sea level rise, while providing other community and environmental benefits.

**New Flood Control and Stormwater Issue Statement**

# SECTOR: WASTEWATER TREATMENT FACILITIES

## 1. Wastewater

Wastewater treatment plants are large, expensive and complex, and are interconnected with collection, conveyance and discharge systems. As there is little to no redundancy within these systems, and because they rely on roads, power, materials and supplies from off-site, they are highly vulnerable to sea level rise and storm events. Flooding could result in significant wastewater service disruptions. Additionally, the combination of existing infrastructure problems and limited funding may prevent some agencies in East Contra Costa County from planning and implementing adaptation responses to address the challenges of sea level rise.

**New Wastewater Treatment Facilities Issue Statement**

## SECTOR: BUSINESS AND INDUSTRY

### 1. Commercial Land Use

Access to commercial facilities may be disrupted due to a flood event, which can have far-reaching consequences on local communities, including workers being unable to report to work, and necessary goods and services becoming unavailable to community members. Most commercial buildings are not designed to withstand flooding, and even those not directly at risk will be vulnerable if roads that provide access are flooded, or if power, water or wastewater services are disrupted. Even temporary closure of commercial uses can have significant social and economic impacts on neighborhoods and communities and can impede a speedy recovery after a flood event.

### 2. Industrial Land Use

Heavy industry on the waterfront is at risk. Heavy industry uses may include metalworking, chemical or petroleum product processing and refining, heavy equipment operation and similar activities. Property owners and site operators may not be aware of the flood risk they may face in the future and may not have facilities or site operations that can be made resilient to flooding either on- or off-site. Contaminant mobilization is a huge risk for flood exposure. Flooding of these areas will also have negative impacts to the economy.

### 3. Hazardous Materials Sites

Flooding of hazardous materials sites could result in a release of materials stored onsite and could cause significant impacts to public health and the environment. Facilities may be particularly vulnerable if hazardous materials are stored at- or below-grade, are improperly contained, or if there is not enough time to safely shut down operations in advance of a storm event. Managers and owners of sites not currently in the floodplain may not be aware of the flood risks, and therefore may not be planning, preparing or operating in a manner to reduce the impacts of flooding should they occur.

**New Business and Industry Issue Statement**

## SECTOR: COMMUNITY FEEDBACK

### 1. Community Feedback

Community feedback led to the identification of many assets that were not identified in municipal or county datasets. Not having a complete and up-to-date data set of important community assets leads to a huge vulnerability for planners and reveals the need for community engagement and updated GIS data sets.

**New Community Feedback Issue Statement**

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