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July 26, 2022

Board of Supervisors
County of Ventura
800 South Victoria Avenue
Ventura, CA 93009

Subject: Provide Direction to the Public Works Agency for Infrastructure Planning Design as it Relates to Climate Change and Sea Level Rise; All Supervisorial Districts.

Recommendations:

Provide Direction to the Public Works Agency for Infrastructure Planning Design as it Relates to Climate Change and Sea Level Rise

Fiscal/Mandates Impact

The recommendation above will have no additional fiscal impact.

Executive Summary

Ventura County is generally a mild, Mediterranean climate, but residents are susceptible to natural disasters, and many have already lived through some form of flooding, wildfire, landslide, heat wave or drought. Within the last five years wildfires ravaged entire neighborhoods, and crippling drought has taxed local water supplies and ecosystems. As the climate continues to shift towards more extreme events, the Public Works Agency (PWA) is looking towards policy updates and revised design guidelines related to climate change, specifically changing rainfall and coastal flood threats. The primary mission of PWA is to deliver public works services that enhance and protect the community; thus, PWA has taken an active role in understanding and planning for climate change issues. Recent Ventura County climate-related policy updates include the 2040 General Plan and Climate Action Plan, and there are ongoing updates to the Local Coastal Program and Multi-Jurisdictional Hazard Mitigation Plan.



Discussion

The planet's climate is constantly changing and has undergone several major shifts over the geologic time scale. However, regional climate is defined as the average weather pattern over a 30-year timeframe and has historically been considered to vary within a consistent range of fixed values. In recent decades climate scientists have collected and analyzed immense amounts of data that show increased fluctuations outside the expected historic norm for temperature, rainfall, sea level, and wildfire frequency. These variations are collectively referred to as climate change and the cumulative effects have the potential to impact PWA infrastructure and operations.

The magnitude and timeline for these changes are unknown because of the inherent uncertainty of the contributing factors - including socioeconomic, political, technological, and meteorological. To some degree, the uncertainty has been grouped together into what is known as representative concentration pathways (RCP's) which describe the various future emission scenarios and associated climate severity. PWA must understand the regional response to each RCP to appropriately design for changing future conditions like unprecedented rainfall intensity on a recently burned watershed, or the outcome of rising sea levels and larger coastal storms on gravity-based drainage systems.

Historically, PWA infrastructure projects have been built using design standards based on analysis of recorded climate data, but as current and future climate conditions diverge from historic norms, PWA must prepare to adapt. Availability of local data is imperative to understand local effects of climate change. PWA owns and operates 90 rain gauges and 30 stream gauges that can help track changing hydrologic patterns like rainfall distribution and intensity. Data informs policy and PWA abides by California Environmental Quality Act (CEQA) guidelines for climate change and will also incorporate upcoming local policy updates.

Your Board adopted the 2040 General Plan and Climate Action Plan in September 2020, which includes specific policies aimed at addressing climate change impacts across the county and a wide variety of programs and policies. Specifically, there are new policies aimed at mitigating wildfire risk, building drought resilience, protecting against flood damage considering changing rainfall trends, and protecting against sea level rise. Many of these climate policies are intended to allow implementation flexibility to account for uncertainty, so PWA will continue to research and implement climate change adaptation strategies and guidelines based on technical understanding of the best available data and consistent with the latest federal guidance. PWA will apply these guidelines to the rehabilitation of facilities and construction of new capital improvement projects. As PWA navigates the uncertainties of future climate conditions, it is important to reflect on the many collaborative partnerships through local, state, and federal stakeholders and regulators.



Climate Science and Ventura County

Ventura County residents are currently exposed to various hazards including flooding from rivers, ocean waves, and tides, landslides and debris flows, multi-year droughts, and wildfires. These hazards are increasing in severity and frequency due to climate change. For example, the current rate of sea level rise is 0.06 in/year based on the National Oceanic and Atmospheric Administration's (NOAA) tide gauge data in Santa Monica. At that rate, ocean levels in Ventura County would increase by about 3 inches by the year 2070 which is within the design parameters of most coastal infrastructure; however, climate scientists expect that the historic rate of sea level rise will accelerate resulting in increased risk exposure to life and property leading to significant economic toll. See Exhibit 1 for additional information. Due to the magnitude of potential disruption, climate research is a top national priority and there are a wide range of Federal design guidelines and prediction tools for flood frequency, fire hazard abatement, and sea-level rise planning and adaptation.

NOAA published a report in 2017 that provided six mean sea level rise scenarios ranging from low to extreme and the United State Army Corps of Engineers (USACE) developed a Sea Level Change calculator that generates low, intermediate, or high sea level rise projections. Exhibit 1 includes a comparison graph of all these scenarios. A study published in 2020 for the Naval Base Ventura County, Point Mugu used the USACE high sea level rise scenario to develop its adaptation vision for the base. It is important to keep in mind that climate science is constantly improving, so the best guidance today will be routinely updated and revised. Specifically, NOAA published an update to the 2017 report in 2022 that narrows the predicted scenarios (eliminates the 'extreme' predictions) and lowers the predicted long term Southern California sea level rise.

There is significant uncertainty in both climate prediction science and defining how the collective human response will affect global climate processes. This uncertainty is reflected in the wide range of climate predictions seen both from NOAA and USACE, but despite the uncertainty, climate models are extremely useful as a planning tool for PWA. Climate predictions bookend the spectrum of uncertainty and allow PWA to survey the range of outcomes and deploy the best available information.

PWA looks to Federal Emergency Agency (FEMA), NOAA, United States Geological Survey (USGS) and USACE for the latest guidance on climate science and its application to civil works. However, every project has a unique and varied funding source and partnership opportunities with government and citizen stakeholders. For example, use of federal money often requires the use of specific federally recognized research and methodologies. To that end, PWA will continue to collaborate with federal, state, and non-government partners to implement projects that will improve the lives and safety of Ventura County residents.



Public Works Agency's Adaptive Approach to Coastal Climate Risk

PWA operates and maintains a variety of coastal infrastructure including: flood control facilities and pump stations; County roads and bridges; and sewer lines. All are subject to the damaging impact of coastal climate changes in precipitation and sea level rise.

The impact of climate change on the hydrologic cycle has been uncertain even though scientists have a 'medium high' confidence that in southern California, the intensity of heavy precipitation events will increase, and the frequency of drought will increase as well. Local hydrologic records do not exhibit a trend that would render PWA's current infrastructure design standards invalid. The PWA will continue to monitor the impact of climate change on the local hydrologic cycle and keep the Board of Supervisors updated in a timely manner.

The effects of sea level rise will impact coastal infrastructure in different ways. The principal concern for PWA is that elevated sea levels could compromise design flow capacities of flood control facilities exacerbating riverine flooding in coastal areas. It also could create inundation effects on a few significant county roads and bridges that are part of the regional road network. To mitigate the negative impacts of sea level rise, PWA has devoted, and will continue to devote, resources to the following:

1. Review and revise, as needed, agencywide policies, project planning procedures, design standards, construction methods, and maintenance approaches to ensure new infrastructure in coastal areas will be compatible with future sea level rise.
2. Review and rehabilitate existing infrastructure of which the safety and/or performance might be compromised due to sea level rise.
3. Continue to strengthen floodplain management to ensure new and substantial developments in coastal areas are adaptive to future sea level rise conditions.
4. Continue to strengthen collaborations with Federal and State agencies on climate change initiatives and actively seek varied grant funding opportunities to rehabilitate coastal infrastructure such as Ventura River Levee (VR-1).
5. Expand local data collection. To acquire data on local sea level rise and climate change, PWA installed a new rain and tide gauge at the outlet of Arundell Barranca in the Ventura Harbor.

PWA's planning and design strategy includes two time-based components. From the present to 2050, PWA plans to analyze model and data specifically for NOAA's 2022 'Intermediate' prediction on existing level of service of coastal infrastructure, and for new or replacement infrastructure, with adaptive management contingency plans for 'high' model predictions. And for period 2050 to 2100, PWA plans to routinely analyze model and data refinements to determine climate change and sea level impacts to build resilient infrastructure.

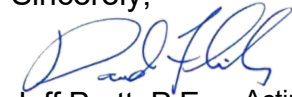


Individual departments within PWA have capital improvement programs to maintain, repair, rehabilitate, and replace aging infrastructure to provide continued service to the public. With your Board approval, the strategy outlined above will be used to design the capital projects that will be influenced by sea level rise and coastal flooding. As PWA continues to monitor climate change data, we will adapt this strategy.

This item has been reviewed by the County Executive Office, the Auditor-Controller's Office, and County Counsel.

If you have any questions concerning this item, please contact the undersigned at (805) 654-2073.

Sincerely,



Jeff Pratt, P.E. Acting
Director

Attachment:

Exhibit 1 – Presentation on the Public Works Agency's Infrastructure Planning Design Approach related to Climate Change and Sea Level Rise

