APPENDIX C

2018 CLIMATE CHANGE REPORT

This appendix includes a summary of recent legislation, a chart showing estimated time lines for projected climate changes and associated effects now and in the coming decades, and a summary discussion of local sea level rise studies. It is prepared in response to the Climate Action Plan (CAP) monitoring and plan update provision to include updated information on climate change and future projections.[1]

CLIMATE CHANGE LEGISLATION

Since the Climate Action Plan (CAP) was adopted in 2012, new climate change legislation has passed. Details below are focused on 2017-18 changes and more information about California climate change laws can be found on the state's California Climate Change webpage.

Federal

Other than the Clean Air Act (CAA), which provides the primary basis for federal regulation of greenhouse gas (GHG) emissions, there is no other federal legislation on climate change. In recent years, there have been notable steps taken by the Trump administration and Congress to scale back or wholly eliminate some federal climate mitigation and adaptation measures.

2016

- The *Paris Agreement* is signed by all members of the United Nations Framework Convention on Climate Change (UNFCCC) except Nicaragua and Syria. It is an agreement dealing with reducing GHG emissions, mitigation, adaptation and finance within the UNFCCC. The agreement went into effect in November 2016.

2017

- President Trump signed an Executive Order that rescinded at least six of the Obama administration's executive orders aimed at curbing climate change and regulating climate emissions and withdrew the U.S. from the *Paris Agreement*. The withdrawal does not go into effect until November 2020.

2018

- Environmental Protection Agency (EPA) Administrator recommends freezing fuel efficiency standards for cars and light-duty trucks at 2020 levels and to eliminate California's power to set its own auto emissions standards.

State

Despite the US withdrawal from the *Paris Agreement*, California continues to be a leader in the fight against climate change. In recent years, the state has passed some of the most ambitious legislation regarding GHG emission reductions, and other countries have begun to turn to California for guidance. In June 2017, Chinese President Xi Jinping met with Governor Jerry Brown, shortly after the US withdrawal from the *Paris Agreement*, to discuss the next steps in fighting climate change. Relevant recent climate change legislation includes:

[1] The CAP requires this update every five years starting in 2015 but due to frequent state of the science updates and climate changes already occurring, Appendix C is updated annually.

2016

- Governor Brown signs three bills related to climate change:
  - Senate Bill (SB) 32, codifying Executive Order B-30-15, requiring the state to slash GHG emissions to 40% below 1990 levels by 2030: 256 MMTCO2e (million metric tons of CO2 equivalent);
  - Assembly Bill (AB) 197, prioritizing direct emission reductions from large stationary sources and mobile sources; and
  - SB 1383, establishing statewide reduction targets for short-lived climate pollutants.[2]

2017

- The California Air Resources Board (CARB) updates the SB 375 GHG emission reduction targets for each metropolitan planning organization (MPO), which will take effect in 2018. Santa Barbara County Association of Governments (SBCAG's) target based on this direction is described below.
- The California Global Warming Solutions Act of 2006 (AB 398) is amended to extend and improve the Cap-and-Trade program through 2030, which enables the state to meet its 2030 emission reduction goals; and AB 617 establishes a program to measure and reduce air pollution from mobile and stationary sources at the neighborhood level in communities most impacted by air pollutants.

2018

- The Safeguarding California Plan: 2018 Update (California's climate adaptation strategy), State of California Sea-Level Rise Guidance 2018 Update, Indicators of Climate Change in California, and California's Fourth Climate Change Assessment reports are released.
- In September 2018, California is held a Global Climate Action Summit to bring leaders and people from around the world together to realize the historic Paris Agreement. In closing remarks at the Summit, Governor Brown Jr. announced that the State of California is teaming up with earth imaging company Planet Labs (Planet) to develop and eventually launch a satellite that will track climate change-causing pollutants with unprecedented precision and help the world dramatically reduce GHG emissions.

Local/Regional

In accordance with AB 32 and SB 375, the 2012 CAP targets a 25% reduction in city-wide 1990 GHG emission levels (estimated at 724,389 MTCO2e) by 2020 and a 30% reduction in 2005 per capita GHG emission levels (estimated at 4.413 MTCO2e) from passenger vehicle and light truck travel by 2020 and 2030.

2010

- CARB sets SBCAG target of 0% change from the year 2005 baseline in GHG emissions by 2020 and 2035.

2017

- CARB's new SBCAG target is a 13% decrease in GHG emissions by 2020 and a 17% reduction by 2035;
- The Regional Transportation Plan and Sustainable Communities Strategy (Fast Forward 2040) was adopted by SBCAG; and

[2] Short-lived climate pollutants are powerful climate forcers that remain in the atmosphere for a much shorter period of time than longer-lived climate pollutants such as CO_2. They include methane, fluorinated gases, and black carbon (soot).

- The City adopts a 100% renewable energy goal by 2030 for both municipal buildings and the community as a whole. It also established a goal of 50% renewable electricity for municipal facilities by 2020.

2018

- The City's Sea Level Rise Adaptation Plan is initiated.

CLIMATE CHANGE EFFECTS

Climate processes are complex, not completely understood, and are not easily forecasted into the future. The timing, pace, and extent of climate change for California and Santa Barbara are uncertain. Research is underway at many institutions and agencies toward "downscaling" global climate model information to local levels. The following chart summarizes available California or Santa Barbara projections, some of which were downscaled to Santa Barbara from the *Santa Barbara Area Coastal Ecosystem Vulnerability Assessment Report* (SBA CEVA, Myers, et. al., 2017). The chart also includes updated climate change effects from the May 2018 *Indicators of Climate Change in California* report (Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, 2018). Emerging climate change issues noted in the report that are relevant to the Santa Barbara area were added to the table.

The initial version of the chart below is Figure ES-2 in the 2012 CAP. CAP Strategy 69 directs updates to projected climate effects time lines be provided in status reports. Projections to the year 2050 were used to correspond to Governor Schwarzenegger's 2005 Executive Order S-3-05 which called for the California Environmental Protection Agency to prepare periodic science reports on the potential impacts of climate change on the California economy.

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
Temperature, rainfall, extreme weather	
Temperature	2040-2069 projection (CA): projected increase in average annual maximum daily temperature: +4.4°F (RCP 4.5[3]), +5.8°F (RCP 8.5[4]); more frequent heat waves. 2050 projection (SB): +3°F temperature increase in Santa Barbara County under RCP 8.5. *Average temperatures In California have risen nearly two degrees Fahrenheit during the second half of the 20th century.The last four years were notably warm, with 2014 being the warmest on record, followed by 2015, 2017, and 2016 (likely to be surpassed in 2018). In 2018, California experienced the hottest July on record and August pushed sea-surface temperatures off the San Diego coast to all-time highs. According to Park Williams of Columbia University "What we're seeing now is the atmosphere doing what it has always done. But it's doing it in a warmer world, so the heat waves occurring today are hotter."* *Of particular concern with temperature rises is how overnight temperatures continue to climb. The years with the top six warmest summertime minimum temperatures in California, defined as June through August, in descending order are 2017, 2015, 2014, 2006, 2016, and 2013. "We are seeing the impacts of climate change now" said Nina*

[3] Representative Concentrations Pathways (RCP) 4.5 is known as a more moderate GHG concentration pathway, a scenario where GHG emissions rise until mid-21st century, and then decline.

[4] RCP 8.5 represents accumulating GHG concentrations under a higher emissions pathway, commonly understood as a business-as-usual (BAU) scenario that would result in atmospheric CO_2 concentrations exceeding 900 parts per million, more than triple the level present in the atmosphere before human emissions began to accumulate.

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
	Oakley, regional climatologist for the Western Regional Climate Center in Reno.
Precipitation	2050 projection (CA): no strong consensus towards California getting wetter or drier; warming air temperatures will lead to drier seasonal conditions; spring snowpack declines substantially. 2050 projection (SB): no consistent trend for Santa Barbara County; fewer but more intense storms, leading to a decrease in the number of wet days per year, an increase in the number of days with extreme precipitation, a shortening of the wet season, and longer dry spells. *According to the California Department of Water Resources, water year 2017 (October 2016 to September 2017) ended the state's 5-year drought with virtually all the state experiencing at least average precipitation, although central California counties, including Santa Barbara, experienced lingering drought impacts. A pattern known as the North American Winter Dipole, or "ridiculously resilient ridge" formed in the winter of 2017-2018, blocking rain-bearing storms from California. In 2018, Santa Barbara County received 54% of "normal water-year" rainfall. Generally, there has been no clear trend in the amount of annual precipitation. Variability in annual precipitation statewide has increased since the early 1980s, showing that dry and wet precipitation extremes have become more frequent.*
Wildfires	2050 projection (CA): greater wildfire risk (warmer, drier conditions). By 2050, 24 more high wildfire potential days per year than in 2000. 2100 projection (CA): Under RCP 8.5, 77% increase in mean area burned (compared to 1961-1990); maximum area burned statewide increase by 178%; extreme wildfires (i.e., fires larger than 24,000 acres) occur 50% more frequently. *The area burned by wildfires across the state is increasing in tandem with rising temperatures. The recent increase in areas burned by wildfires in California is reflected in the fact that five of the largest fire years since 1950 occurred in the last decade. Moreover, 15 of the 20 largest wildfires since 1932 have occurred since 2000, including the Thomas Fire of 2017 at 281,893 acres, which was the largest recorded wildfire in the state's history until the summer of 2018 when it was surpassed by the Mendocino Complex Fire at 459,123 acres. According to Stephen Pyne a professor at Arizona State University who studies the history of United States wildfire management, the rising intensity of wildfires seen over the past few decades is the result of several overlapping trends; climate change has lengthened the fire season, housing sprawl has crept into fire-prone wildland, and fire agencies are struggling to coordinate holistic fire and land management.*
Storm events & flooding	2050 projection (CA): more erratic weather patterns and extreme rainstorm events, with associated storm damage and flooding. 2100 projection (SB): annual runoff and annual peak discharge increases. *According to NOAA, a wintertime La Niña climate pattern was in place for winter 2017/2018 and most of California experienced the driest winter on record until March 2018 that provided a sequence of cold, wet storms across the northern 2/3 of the state. Locally, the 2017 Thomas Fire was followed by intense and concentrated rain on January 9, 2018 (0.54 inches of rain in five minutes) that caused debris flows in Montecito, killing 21 people.* The Montecito debris flows destroyed or damaged over 400

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
	structures. *After January 2018, several storms generated evacuation orders for areas of risk for debris flows but there were no further significant floods or flows.*
Pests & vectors	2050 projection (CA): potential for altered transmission patterns for pests, vectors, and diseases. *Of the 15 mosquito-borne viruses known to occur in California, West Nile Virus (WNV) in particular continues to seriously impact the health of humans, horses, and wild birds throughout the state. First detected in 2003, WNV cases show no clear trend, varying from year to year from 2003 to 2017. In addition to mosquito vectors, climate change may expand the presence of tick-borne pathogens. Furthermore, extreme precipitation events often associated with the El Niño Southern Oscillation (ENSO) are thought to impact hantavirus activity by expanding rodent habitat. Generally, changes in temperature and precipitation seem to be factors in WNV and other vector-borne activity and a changing climate will likely alter the distribution of disease vectors; however, social and environmental drivers also play a stong role in vector-borne disease transmission.*
Atmospheric CO_2 concentrations	2050 projection (CA): ocean acidification affecting sea creatures. This indicator was formerly listed as a water pollution effect but it is now considered a climate change driver. As atmospheric concentrations of CO_2 increase, so do levels in the ocean, leading to ocean acidification. The net result of adding CO_2 to seawater is an increase in hydrogen ions (H+)—which increases seawater acidity and lowers seawater pH—along with decreasing carbonate ion, a fundamental 'building block' for organisms forming shells of calcium carbonate. Continued ocean acidification is likely to affect the ability of some organisms to produce and maintain their shells. *Long-term measurements in California waters are limited, but the values measured offshore at Point Conception are similar to those from monitoring in Hawaii at the same time points. An increase in seawater carbon dioxide levels accompanied by declining pH (a measure of acidity) have been observed at the Hawaii station.*
Air pollution	2050 projection (CA): increased smog production and changes to pollen production; reactive nitrogen deposition affecting plants. A major source of reactive nitrogen is associated with use of fossil fuels for energy. In industrialized areas, reactive nitrogen accumulates in the air, soil, and water. From the atmosphere, it falls to the surface as atmospheric deposition and can decrease or alter biodiversity. *Climate change-related air pollution impacts correlate with periods of extremely high temperatures and drought (e.g., wildfires and dust storms). Atmospheric levels of black carbon, a major short-lived climate pollutant, have decreased dramatically in California since the 1960s, due to emission standards and restrictions on diesel engines and biomass burning. Locally, Santa Barbara County was recently designated nonattainment-transitional for the state 1-hour and 8-hour ozone standard under the*

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
	California Clean Air Act[5]. Although the County now meets the state 1-hour ozone standard, in order to be designated attainment, air quality measurements must show that both the 1-hour and 8-hour standards are not violated for three consecutive years. *According to a report by the National Climate Assessment, longer growing seasons, along with higher temperatures and CO_2 levels, can increase pollen production. Increased pollen production was not included in the May 2018 Indicators of Climate Change in California report.* *Nitrogen deposition has possibly affected southern California's native coastal sage scrub because high levels of nitrogen can convert the shrublands to grasslands dominated by invasive plant species.*
Water pollution	2050 projection (CA): increased risk for pollution of streams (higher temperatures; urban runoff during intense storms). *During the latest drought, rivers in California experienced record-low flow and poor water quality. Locally, ocean water quality was impacted by the Montecito debris flow in January 2018. Goleta Beach, which was the emergency site for mud deposition from the Montecito debris flow, was closed for ocean contact until July 2018 due to bacterial contamination.*
Sea level rise	
Sea level rise *(from year 2000* *See page 3 for discussion of local sea level rise studies and forecasts*	2030 projection (SB): Medium-High Risk Aversion (1-in-200 chance) RCP 8.5 scenario 0.7 feet 2060 projection (SB): Medium-High Risk Aversion RCP 4.5 scenario 2.2 feet; RCP 8.5 scenario 2.5 feet 2100 projections (SB): Medium-High Risk Aversion RCP 4.5 scenario 5.3 feet; RCP 8.5 scenario 6.6 feet *Mean sea level along the CA coast show year-to-year variability, peaking during El Niño years. Recently, even moderate tides and storms have produced extremely high sea-levels. Over the long term, mean sea-levels have been rising. Trends at the Santa Barbara NOAA tide station show an increase of 0.04 inches per year from 1973–2016. A new model estimates that, under mid to high sea-level rise scenarios, 31% to 67% of Southern California beaches may completely erode by 2100 without large-scale human intervention.*
Coastal flooding and inundation (multiple hazards to resemble large [100-year] coastal storm)	2030-2100 projections (SB): increased areas subject to 100-year flooding and inundation; permanent inundation of some low-lying areas; seawater intrusion into groundwater. *Coastal flooding for portions of the City remains a key issue in the 2060–2100 timeframe. Coastal storms in 2016 and 2017 caused minor coastal flooding and damage to piers in the Santa Barbara area, but there has been no permanent inundation.* *Saltwater intrusion into groundwater may increase with sea level rise. Reliance on groundwater increases with drought and groundwater levels have significant dropped throughout the state. Seawater intrusion is known to occur in the City's Storage Unit I Basin; however, the City manages its groundwater resources, including recharging the basin when surface supplies are ample.*

[5] When the 2016 Ozone Plan was adopted by the Air Pollution Control District, the District was still designated as a nonattainment area for the state ozone standard. After the 2016 Plan was adopted, air quality data for the 2016 ozone season indicated that the District's attainment designation is now nonatainment-transitional.

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
Beach erosion	2030-2100 projections (SB): potential erosion or loss of beaches, storm erosion leads to much higher loss, particularly from 2060–2100. *Evidence has shown Central California beaches had the highest percentage of beach erosion in California. During the 2015-2016 El Niño, winter beach erosion was 76% above normal. In Santa Barbara County, Goleta Beach Park experienced the highest erosion rate.* *In 2018, scientists from the U.S. Geological Survey began mapping selected beaches and the adjacent seafloor to better understand long-term coastal changes. This will be the first comprehensive beach and nearshore survey since the Montecito debris flows on January 9, which was the first major sediment input to Santa Barbara beaches since 2005.*
Coastal bluff erosion	2030-2100 projections (SB): increase in existing erosion rate with sea level rise; further increases when accounting for block-type slope failures, threatening coastal bluff-top parks, public access, and private homes. *No known increases in coastal bluff erosion rates to date. In 2018, U.S. Geological Survey scientists combined several computer models to forecast cliff erosion along the Southern California coast. The research showed that for SLR scenarios ranging from 1.5 feet to 6.6 feet by 2100, bluff tops could lose an average of 62 feet to 135 feet by 2100.*
Public services	
Water supply	2030 projection (SB): adequate water supply. 2050, 2100 projections (CA): increased pressures on statewide water supplies due to less rainfall and less water storage as snowpack, with increased irrigation demand and increased population. *Over the past 120 years, California has become increasingly dry. The 2012–2016 drought was the most extreme since records began in 1895. This drought occurred at a time of record warmth—accompanied by record low snowpack, less than 5 percent of average in 2015. In May 2015, the Santa Barbara City Council declared a Stage Three Drought condition, which currently requires a 30% citywide reduction in overall water use, with mandatory regulations on specific water use applications.*
Agriculture and food supply	2050, 2100 projections (CA): alterations in crop yields, growing seasons, pest ranges from changes in temperature, rainfall, extreme weather, and water supply. *Extended period of cold temperatures above freezing and below a threshold temperature is required for fruit and nut trees to become and remain dormant, and subsequently bear fruit. Future trend projections show that continued warming will reduce the accumulated winter chill for the Central Valley. By the middle to the end of the 21st century, it is projected that climatic conditions will no longer support current varieties of some of the main tree crops currently grown in California.* *Temperature is probably the single most important environmental factor influencing insect behavior, distribution, development, survival and reproduction and current warming has already enabled many invasive species worldwide, including insects, to extend their distributions into new areas. In California, new insect species arrive frequently and warmer temperatures can allow such species to thrive where they previously could not survive. A warming climate can also impact livestock directly by causing heat stress and indirectly by affecting vector-borne disease occurrence.*

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
Energy demand	2050, 2100 projections (CA): increased statewide energy demand with population increase, and more demand for cooling, peak summer demand, utilities, water transport, and industries. *Consistent with national trends, in California the energy needed to cool buildings during warm weather—measured by "cooling degree days"—has increased and the energy needed to heat buildings during cold weather—measured by "heating degree days"—has decreased. From 2015 to 2016, statewide electricity consumption grew less than 1% from 2015.*
Biological resources	
Natural habitats and species	2050, 2100 projections (CA): Varied species responses to changes in temperatures, rainfall, weather patterns, extreme events, wildfire, rising sea levels, coastal erosion, and air and water pollution. Individual species may adapt, survive in reduced ranges, migrate, or not survive. A general trend is anticipated for plant and animal species to move northward and upslope. *Climate change impacts on terrestrial, marine and freshwater ecosystems have been observed in California. Examples include: the state's forests have more small trees and fewer large trees; on the western side of the northern Sierra Nevada mountain range, the Ponderosa pine forest has moved upslope*; *across the state, wintering bird species have collectively shifted their range northward and closer to the coast over the past 48 years; during years when sea surface temperatures are unusually warm in their breeding area, there have been fewer California sea lion pup births, higher pup mortality, and poor pup conditions at San Miguel Island; and a nudibranch sea slug has expanded its range northward by 130 miles since the mid-1970s in response to warming ocean conditions.*
Local economies	
Fisheries and tourism	2050, 2100 projections (CA): Marine habitat changes could affect fishing industry. Weather events and coastal erosion could affect tourism. *Climate change is already affecting California fisheries. In recent years, market squid have been moving north, kelp beds have been lost, and shellfish populations compromised. In 2015 and 2016, California's Dungeness and rock crab fisheries experienced unprecedented impacts when a harmful algal bloom prompted closures to protect public health*. *Salmon juvenile survival, and resultant adult abundance, has become more variable, with extreme juvenile mortality events occurring in the last two decades.* *The Thomas Fire and Montecito debris flow and extended closure of Highway 101 heavily impacted outdoor attractions and hotels, in some cases for many weeks. The City's Transient Occupancy Tax (TOT) in December 2017 was 27% below December 2016 collections, largely attributed to the effects of the Thomas Fire and corresponding air quality conditions. On the other hand, TOT was 22% higher in January 2018 than January 2017 due to additional stays from local residents and emergency workers. By May 2018, TOT was likely back to typical levels and was reported 4% higher than in 2017.*
Emerging climate change issues	

Summary of Forecasted Future Climate Change Effects (*2017-18 update*)	
Harmful algal blooms–lakes, rivers, and ocean environments	Increase in incidence, duration, and toxicity (CA) *Warmer water temperatures, drought conditions, increased carbon dioxide, changes in coastal upwelling, and alternating periods of storms and drought are all known to promote harmful algal bloom (HAB) formation. Climate change may be influencing the occurance of HABs in California, but scientists need more data to clarify the relationship. Observations show that unusually warm ocean temperatures contributed to an increase in HABs along the Pacific Coast, including a five-month delay in opening the Dungeness crab fishery in 2015 due to the toxic diatom Pseudo-nitzschia. Observational data has shown an increase in the number of California inland waterbodies affected by HABs between 2016-2017, linked to drought conditions.*

REGIONAL AND LOCAL SEA LEVEL RISE STUDIES

The following summarizes regional and local studies of sea level rise recently completed or underway.

City of Santa Barbara Sea Level Rise Adaptation Plan (in progress)

The SLR Adaptation Plan will assess the City's vulnerabilities to sea and analyze the feasibility, economic impacts, and environmental consequences of various adaptation strategies for the low-lying and coastal bluff areas of the City.

Project Webpage: https://www.santabarbaraca.gov/lcp

Coastal Storm Modeling System for Southern California (CosMos 3.0) (US Geological Survey, 2017)

The model downscales global data to predict future storm-induced coastal flooding and erosion in more localized areas with assumptions of future sea level rise and more extreme storm events. Model results are available on the Our Coast Our Future website.

Project Webpage: http://data.pointblue.org/apps/ocof/cms/

Federal Emergency Management Agency (FEMA) Open Pacific Coast Study (FEMA, 2017)

FEMA has revised coastal flood hazards information to produce updated flood insurance rate maps (FIRMs). FEMA is also working on non-regulatory products that will include consideration of sea level rise.

FEMA Web Site: https://msc.fema.gov/portal

Santa Barbara Area Coastal Ecosystem Vulnerability Assessment (CEVA, 2017) (CA Sea Grant Study; UCSB, Scripps Institute of Oceanography, and US Geological Survey researchers in coordination with cities of Santa Barbara, Goleta, Carpinteria, and County)

The study includes downscaled climate forecasts and assesses future impacts on coastal ecosystems including watersheds, wetlands, and beaches.

Project Webpage: http://www.msi.ucsb.edu/current-projects/santa-barbara-area-coastal-ecosystem-vulnerability-assessment

Santa Barbara County Coastal Resiliency Project (ESA, Revell, 2016)
Modeled sea level rise and other coastal hazards for Santa Barbara County, including the City of Santa Barbara, and assessing vulnerability. City is a partner along with Goleta and Carpinteria.

Project Webpage: http://longrange.sbcountyplanning.org/programs/Coastal%20Resiliency%20Project/coastalresiliency.php

City of Santa Barbara Sea Level Vulnerability Assessment (UCSB Bren School Master's Project group, Denka, Hall, Nicholson, 2015)
Analysis of future inundation, storm surge, and bluff erosion effects on populations, critical infrastructure, recreation and public access, and ecological resources.

Project Brief: http://www.bren.ucsb.edu/research/2015Group_Projects/documents/SeaLevelRiseSB_Brief.pdf

Goleta Slough Area Sea Level Rise and Management Plan (ESA, Revell, 2015)
A multi-agency study identified sea level rise and future effects on water levels and flooding, tides and sediment, water quality, habitats and species, and adaptation options to inform management of the Goleta Slough and environs including Airport.

Project Webpage: http://goletaslough.org/

City of Santa Barbara Sea Level Rise Vulnerability Study (Griggs/Russell, UC Santa Cruz, 2012)
This grant-funded study assessed the likelihood and magnitude of greater future coastal hazards in Santa Barbara, including beach and cliff erosion, storm wave damage, flooding, and inundation, and identified potential adaptation options. (Study included as Appendix B of 2012 Climate Action Plan).

City Website: http://www.santabarbaraca.gov/services/planning/erds/resource/cap.asp

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