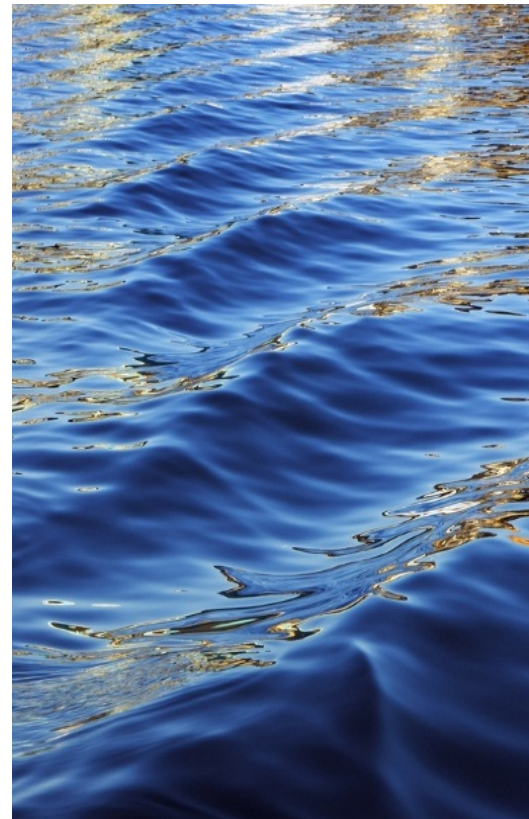




Los Angeles Regional Water Board Climate Change Strategy

Stakeholder Workshop

*CA Regional Water Quality Control Board
Los Angeles Region
August 8, 2017*





Climate Change in the Southwest



Expected Impacts

Temperatures

- by 2050, annual average temperatures rise by 4-5 °F
- by 2050, 2-6 times more “extreme heat days”
- drought periods increasingly harmful
- by 2050, annual acreage burned increase by 20-30 %

Precipitation

- small changes to mean precipitation
- more extreme precipitations events

Snowpack

- 30% less snowfall in Los Angeles area mountains
- seasonal melting 16 days earlier



Expected Impacts

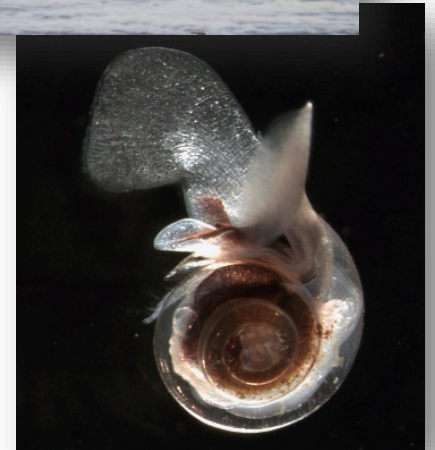
Sea Level Rise

- by 2050 : 0.7 – 1.2 ft ;
- by 2100 : 1.1 – 3.6 ft ;
- possibly 10 ft if taking into account Antarctic ice sheet instability
- More extreme high-sea-level events



Ocean Acidification

- By 2100, acidity rise by 150% vs preindustrial times
- Effect on fisheries, food supply, and general ocean ecology





Impacts on Water Quality and Beneficial Uses



Effects of increased temperature/drought/fire on water quality

↑ Water temperature

- ↓ Oxygen
- ↑ Toxicity
- ↑ Algae
- ↑ HAB

↓ Stream Flow

- ↑ Pollutant concentrations

↓ Groundwater recharge and groundwater levels

- ↑ Pollutant concentrations

↑ Sedimentation

↑ Erosion of stream banks



Effects of storms/inundation on water quality

Sewer overflow

Disruption of facilities' operations
e.g., POTWs

Increased pollutant load in the
stormwater system

Increased sedimentation

Erosion of stream banks, levees,
estuaries...



Effects of Sea Level Rise on water quality

Disruption of facilities' operations

↑ Estuary salinity

Loss of wetland habitat

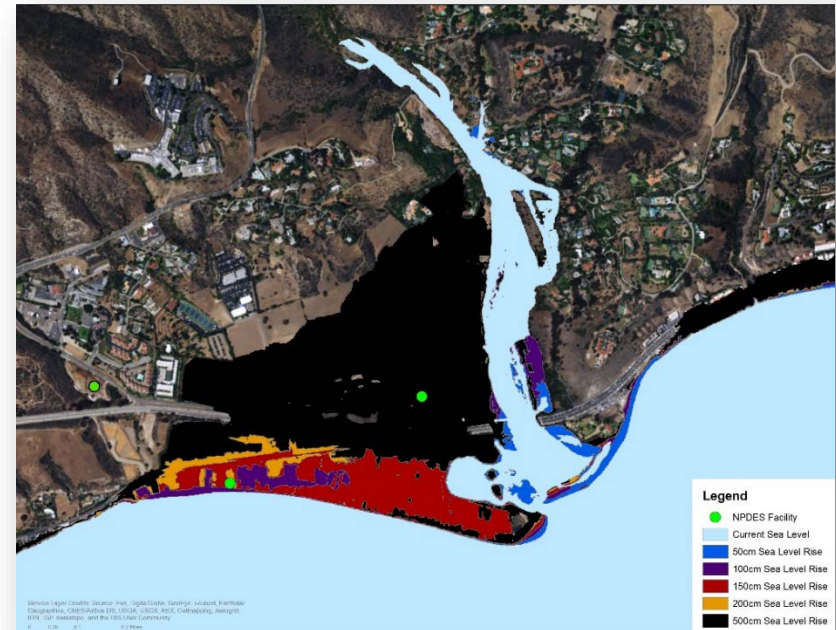
Loss of beaches

Increased sedimentation

Increased erosion

Sea water Intrusion

- Exacerbated by over pumping during drought



(CoSMoS model, USGS)

Effects of adaptation efforts on water quality

Water conservation efforts

- E.g., ↑ pollutant in waste water

Efforts to increase water supply

- Recycled water use: ↑ CECs
- Brine produced by desalination

Efforts to protect infrastructure

- E.g., seawalls





Regulatory Response

State of California Response to Climate Change

Mitigation

- **Assembly Bill No. 32 (2006)**

Requires all agencies to implement strategies to reduce GHG

Adaptation

- **Safeguarding California**

Communicate current and needed actions state government should take to build climate change resiliency

- **Executive Order B-30-15 (2015)**

State agencies should take climate change into account in their planning and investment decisions, guided 4 principles:

- Prioritize actions that build climate preparedness and reduce greenhouse gas emissions;
- Take flexible and adaptive approaches to prepare for uncertain climate impacts;
- Protect the state's most vulnerable populations
- Prioritize natural infrastructure

State Water Board Climate Change Resolution (March 7, 2017)

Direction to Divisions, Coordination with Regions

- **Reduce Greenhouse Gas Emissions**
 - Short lived climate pollutants, water and energy efficiency, renewable energy, recycling, storm water
- **Improve Ecosystem Resilience**
- **Respond to Climate Change Impacts**
 - Drinking water, ground and surface water storage, wildfires, permit and regulatory changes
- **Modeling and Analysis**
- **Funding**
- **Outreach**

STATE WATER RESOURCES CONTROL BOARD RESOLUTION NO. 2017-0012

COMPREHENSIVE RESPONSE TO CLIMATE CHANGE

WHEREAS:

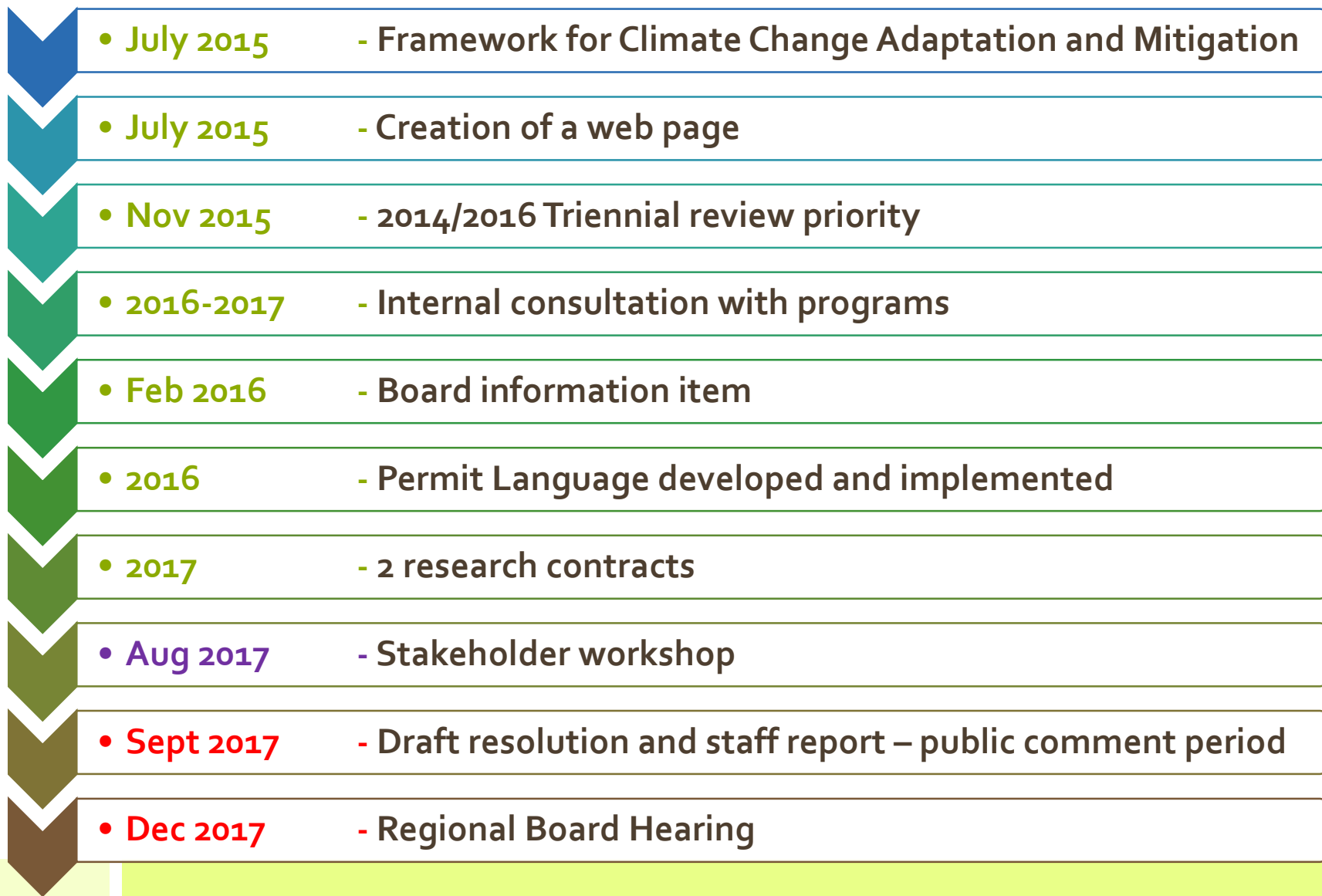
1. Sharp rises in the atmospheric concentration of greenhouse gases over the last century and a half, due to human activity, have led to an increase in global average temperature, and associated climate change.
2. Climate change is affecting and will affect different regions in different ways. Current and future impacts include increasing frequency of extreme weather events, prolonged fire seasons with larger and more intense fires, increased tree mortality, heat waves, sea-level rise and storm surges. Changes in hydrology include declining snowpack and more frequent and longer droughts, more frequent and more severe flooding, changes in the timing and volume of peak runoff, and consequent impacts on water quality and water availability. Vulnerabilities of water resources include, but are not limited to, changes to water supplies, subsidence, increased amounts of water pollution, erosion, flooding, and related risks to water and wastewater infrastructure and operations, degradation of watersheds, alteration of aquatic ecosystems and loss of habitat, multiple impacts in coastal areas, and ocean acidification.

Examples of water quality impacts include, but are not limited to: dry periods and drought lowering stream flow and reducing dilution of pollutant discharges, harmful algal blooms due to a combination of warm waters, reduced ability of warm water to hold dissolved oxygen, and nutrient pollution, more erosion and sedimentation caused by intense rainfall events, especially following wildfire, and increased velocity of stream flow, potential sewer overflows due to more intense precipitation and increased storm water runoff, rising sea levels inundating lowlands, displacing wetlands, and altering tidal ranges, and increasing areas subject to saltwater intrusion into groundwater, and water pollution and increased absorption of carbon dioxide creating coastal zone "hotspots" of acidification and hypoxia.

3. The risks of abrupt or irreversible changes increase as the magnitude of the warming increases. The [Intergovernmental Panel on Climate Change](#) in its [Fifth Assessment Report](#) indicates that limiting global average temperature increase to below 2 degrees Celsius is necessary in order to minimize the most catastrophic climate disruptions. The [California Climate Change Assessments](#) have provided a strong foundation of research addressing the impacts of climate change on the state, as well as potential response strategies.
4. Mitigation, in the context of climate change, refers to actions taken to reduce concentration of greenhouse gases in the atmosphere. The most effective way to reduce greenhouse gas concentrations in the atmosphere is to reduce emission sources.

Regional Water Board Climate Change Strategy

Evolution of Regional Implementation



Regional Water Board Climate Change Strategy

Overarching Goals



Improve ecosystem resilience



Preserve coastal and inland infrastructure from failing



Promote groundwater recharge and water recycling



Promote a sustainable watershed approach



Expand monitoring and research to track the effects of climate change and effectiveness of mitigation measures



Protect vulnerable communities



Regional Water Board Climate Change Strategy

Programmatic Approach

Programs

- Basin Planning
- TMDL
- Non Point Sources
- Dredge and fill (401)
- Stormwater permitting
- Municipal permitting
- Groundwater permitting
- Remediation
- UST
- Landfills

Considerations

- Potential impacts
- Potential adaptation/mitigation measures
- Research and monitoring needs
- Areas of potential collaboration
- Nexus with Environmental Justice

Regional Water Board Climate Change Strategy

Programmatic Approach

Potential impacts (examples)

- New impairments (303(d) listings)
- Beneficial uses at risk
- Increased requests for sea walls, beach nourishment projects
- Disruption of permitted facilities operations
 - Incapacity to treat stormwater / wastewater
 - Alteration of treatment efficiency in remediation sites
- Impact on the effectiveness of implementation measures (e.g., stormwater bioretention BMPs)

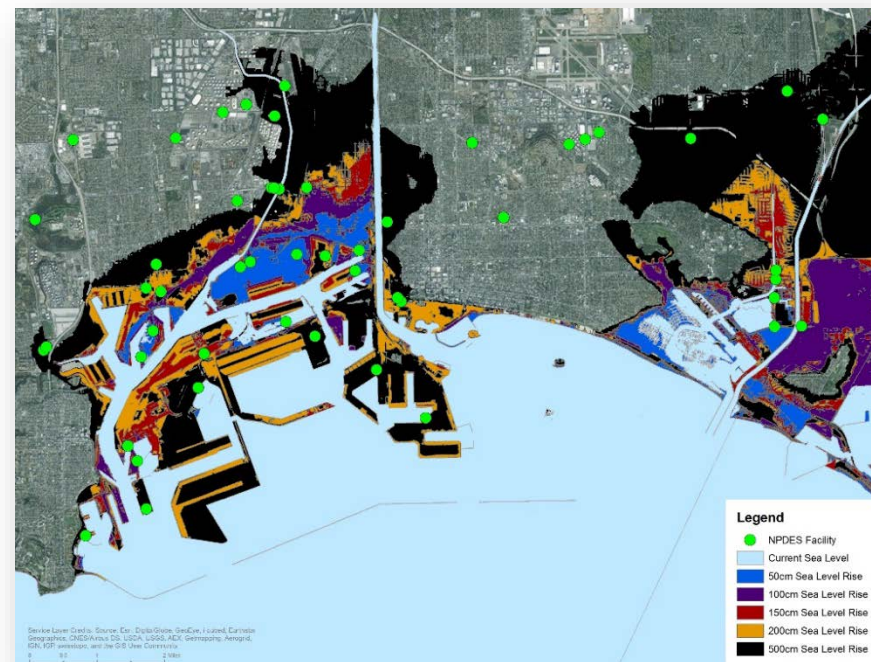


Regional Water Board Climate Change Strategy

Programmatic Approach

Potential adaptation/mitigation measures (examples)

- Assess BUs and WQOs levels of vulnerability
- Mapping of facilities at risk
- Permit language
 - Permit Provisions already in some WDRs:
 - Climate Change Effects Vulnerability Assessment and Mitigation Plan (Climate Change Plan) :
 - Assessment of short and long term vulnerabilities
 - Plans to mitigate vulnerabilities
- Develop monitoring/research strategy



(CoSMoS model, USGS)

Regional Water Board Climate Change Strategy

Programmatic Approach

Research and monitoring needs (examples)

Contracts underway:

- Future precipitation and stream temperatures in Los Angeles and Ventura Counties (UCLA)
- Potential hydrologic changes to streams and associated ecological vulnerability in the Regional Water Board region associated with drought and long-term climate changes (SCCWRP)



Regional Water Board Climate Change Strategy

Programmatic Approach

Areas of potential collaboration /coordination (examples)

- State Water Board's Division of Water Rights - flow-related issues
- California Coastal Commission and California State Lands Commission - 401 permits
- Department of Water Resources (DWR) – groundwater monitoring and quality data
- Air Resources Board – Short-Lived Climate Pollutant Reduction Strategy
- CAL FIRE – support resiliency



Regional Water Board Climate Change Strategy

Programmatic Approach

Climate Change & Vulnerable Communities

- Economic instability and poor infrastructure
- Linguistic isolation
- Accessibility to critical services
- Heat island effect
- Health complications
- Proximity to environmental hazards
- Access to water and food
- Loss of coastal assets





Contact

Céline Gallon

Phone: 213.576.6784

Email: celine.gallon@waterboards.ca.gov

LA Regional Water Board Climate Change website

http://www.waterboards.ca.gov/losangeles/water_issues/programs/climate_change/index.shtml





Breakout Groups

- *Ecology/Habitat*
- *Stormwater*
- *Infrastructure*
- *Groundwater*



Questions to Consider:

- How is climate change affecting facilities, the regulatory environment, and our water resources and associated beneficial uses?
 - How could the LA Water Board take these issues into consideration?
 - How can the LA Water Board take into account environmental justice when dealing with these issues?
- 