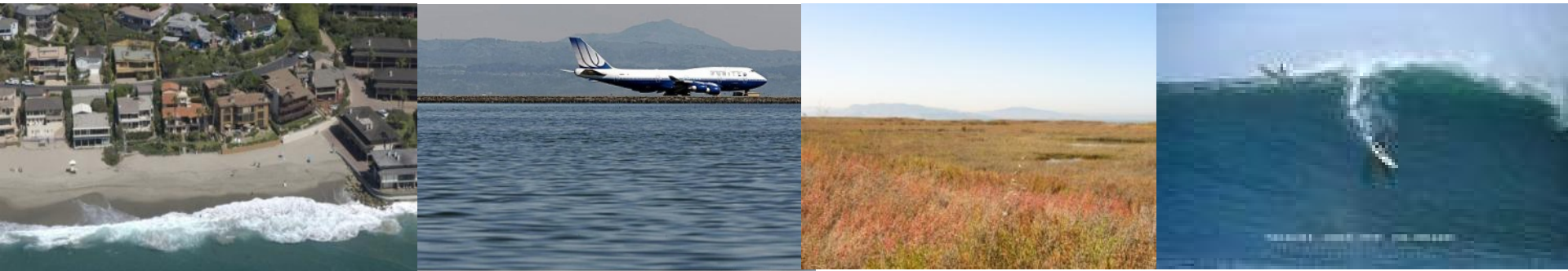


Climate Change, Sea-Level Rise, and the California Economy

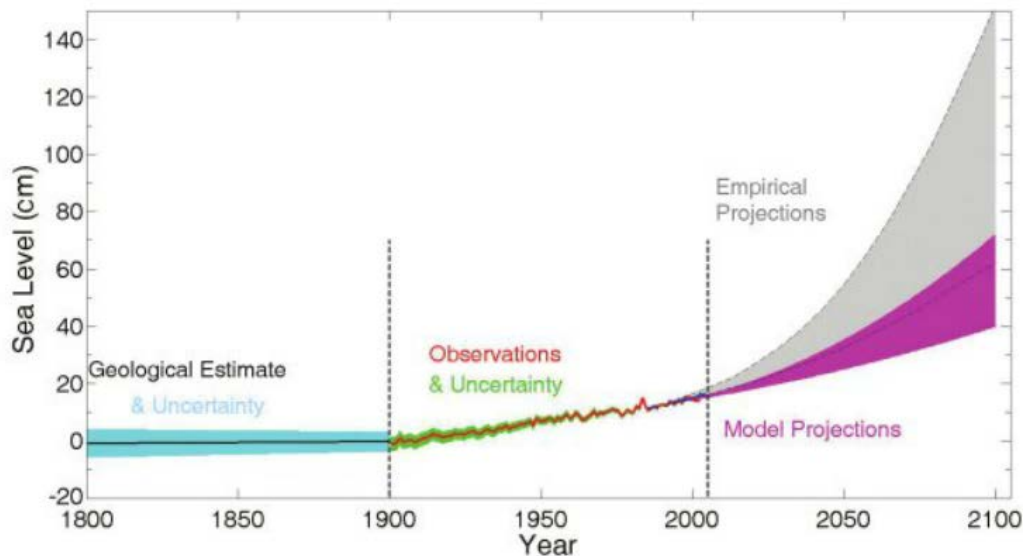


Michael Macor / The Chronicle

Dr. Peter H. Gleick
California Legislative Hearing
May 15, 2013

Testimony Outline

- What is at Risk in California?
- What Economic Impacts are Expected?
- What Don't We Know Yet?
- How to Respond?

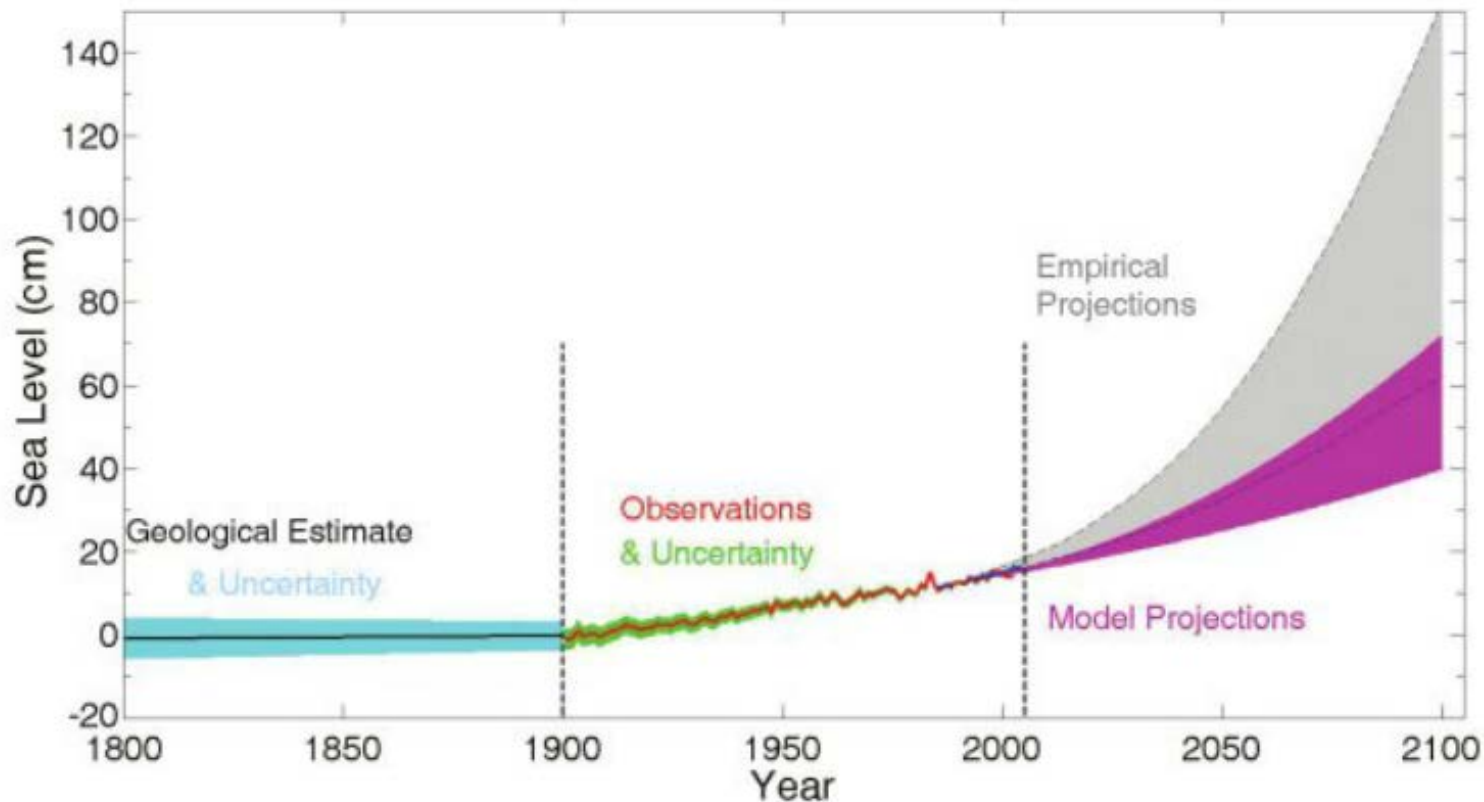


Conclusions

- Climate change will inevitably change the character of the California coast ***at very high economic cost.***
- We can expect increased flooding and erosion.
- Large populations and extensive infrastructure will be at risk.
- We must begin adaptation planning now.

Scenarios of Sea-Level Rise

- By Executive Order, all California agencies involved in construction and land use planning must take SLR into account



What is at Risk?

People

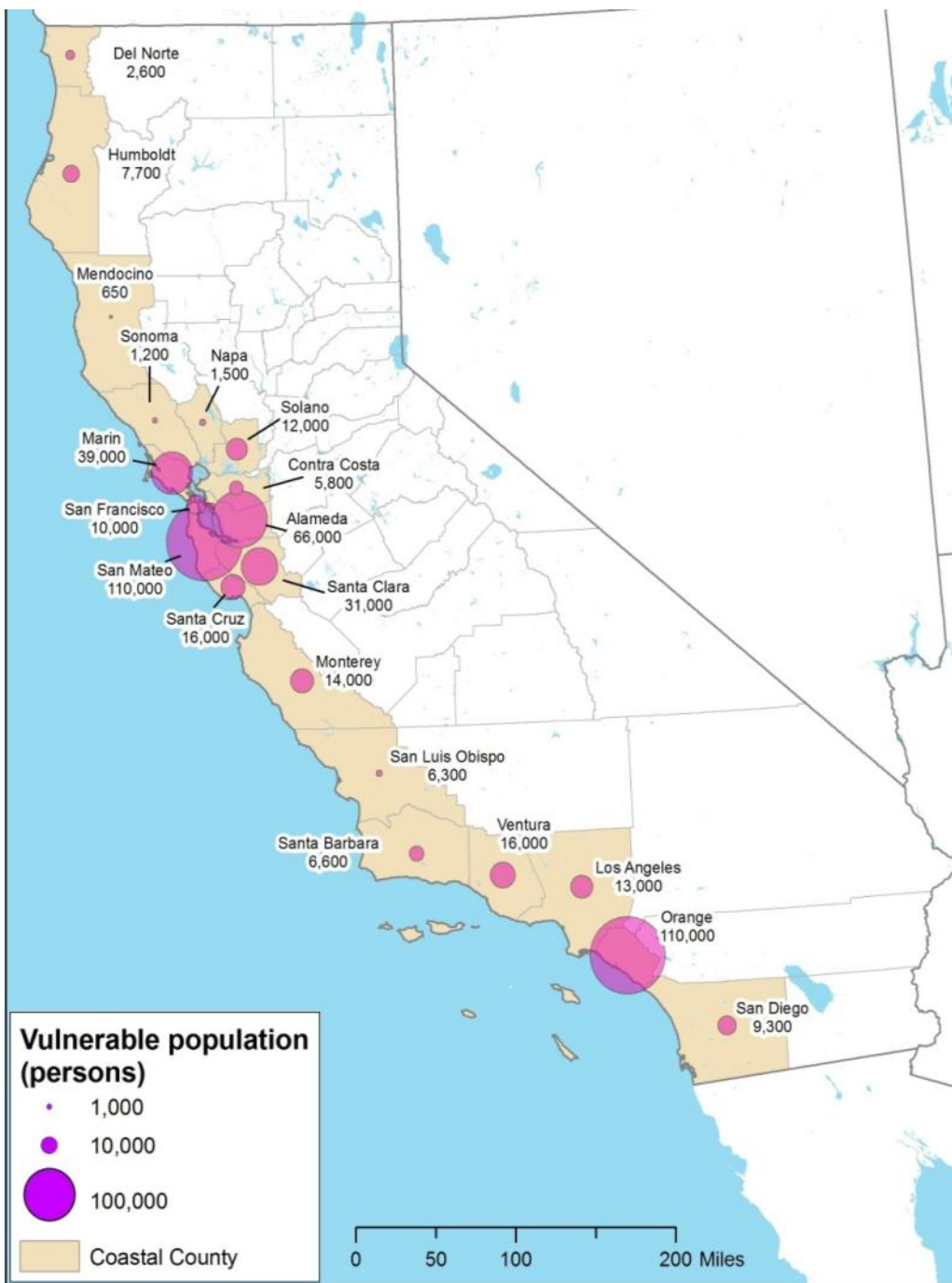
Property

Ecosystems

Our Functioning Economy

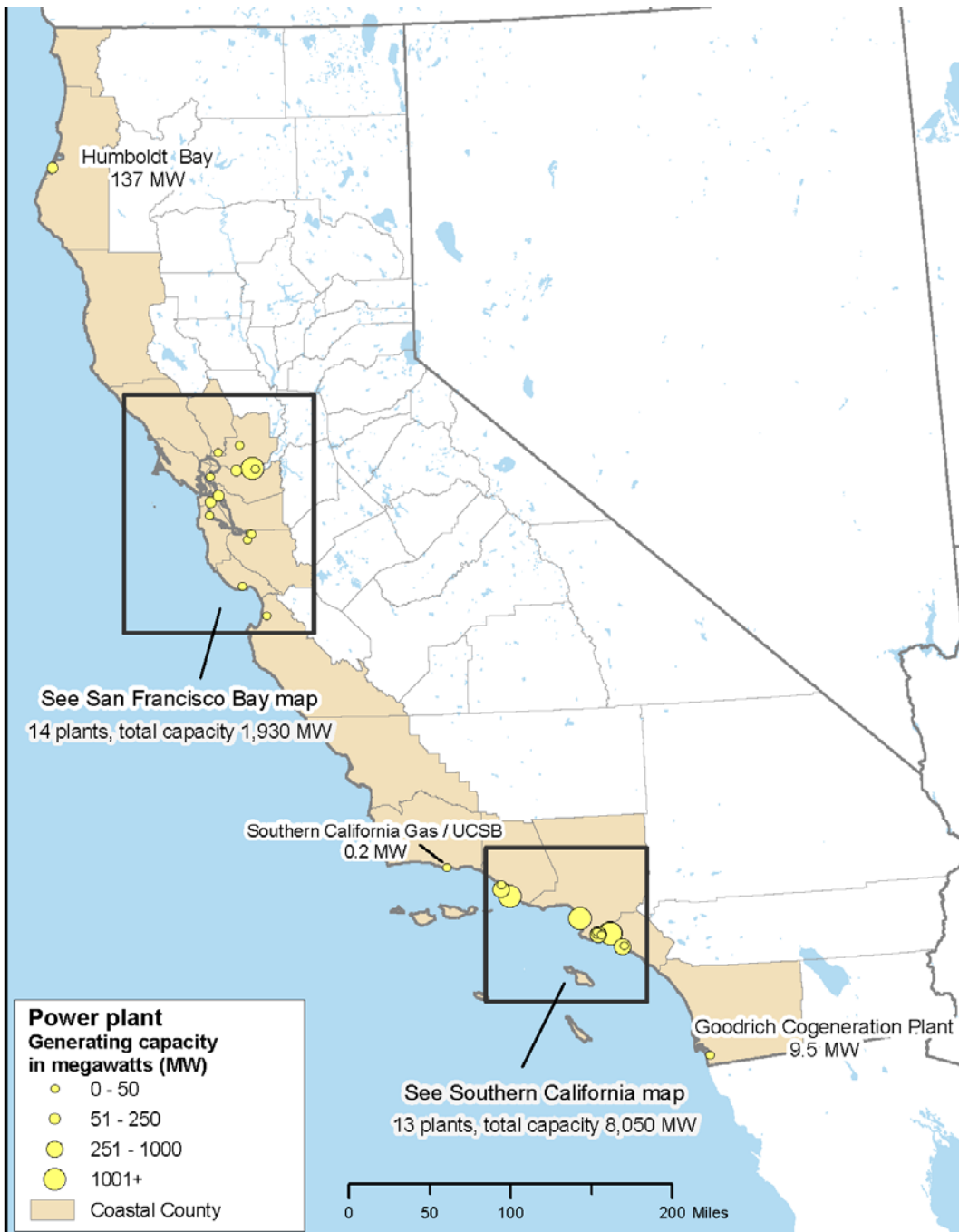
Populations at Risk

- 480,000 people
- 300,000 workers
- Large numbers of low-income people and communities of color



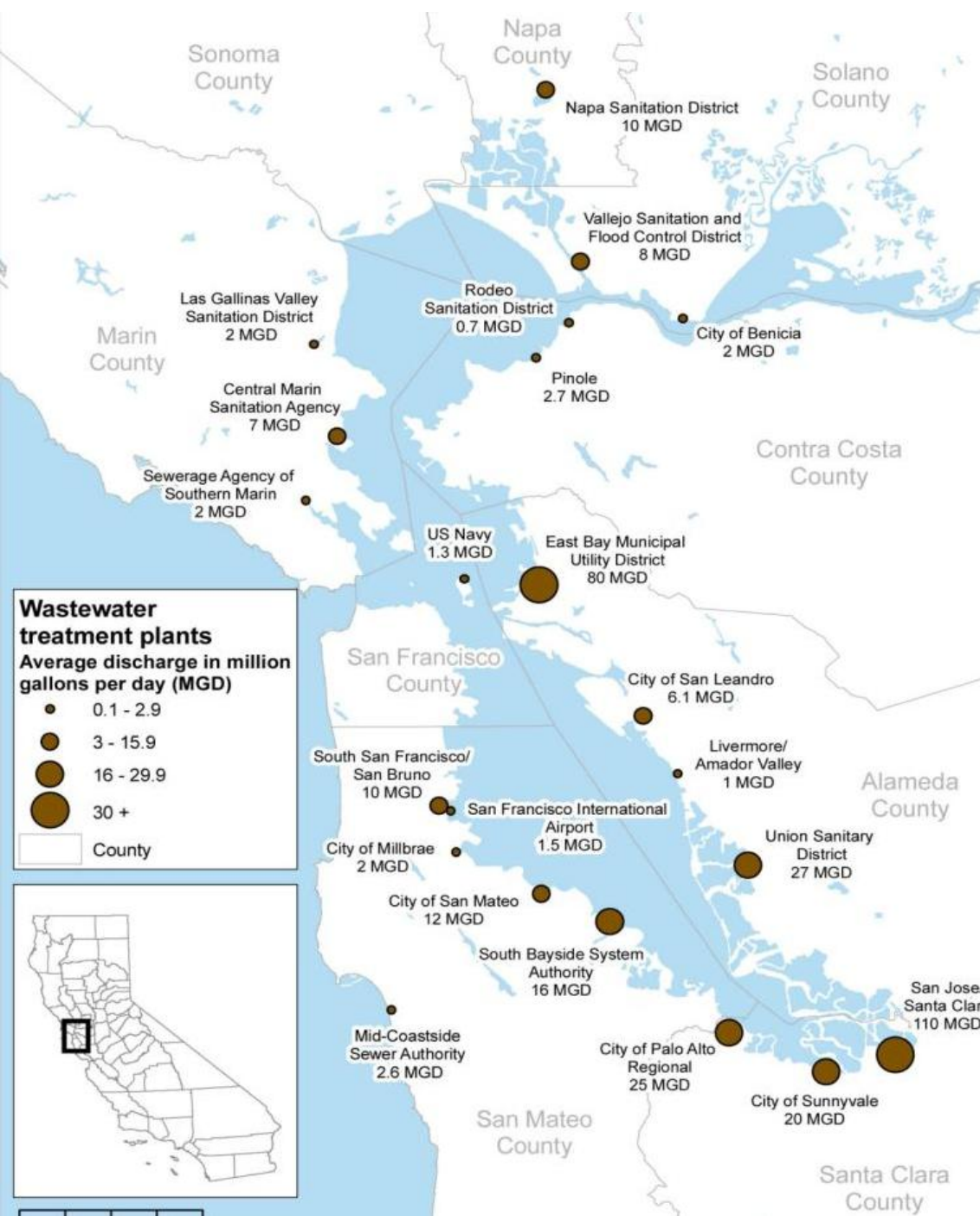
Power Plants at Risk

- 30 coastal power plants
- Generating capacity of 10,000 MW



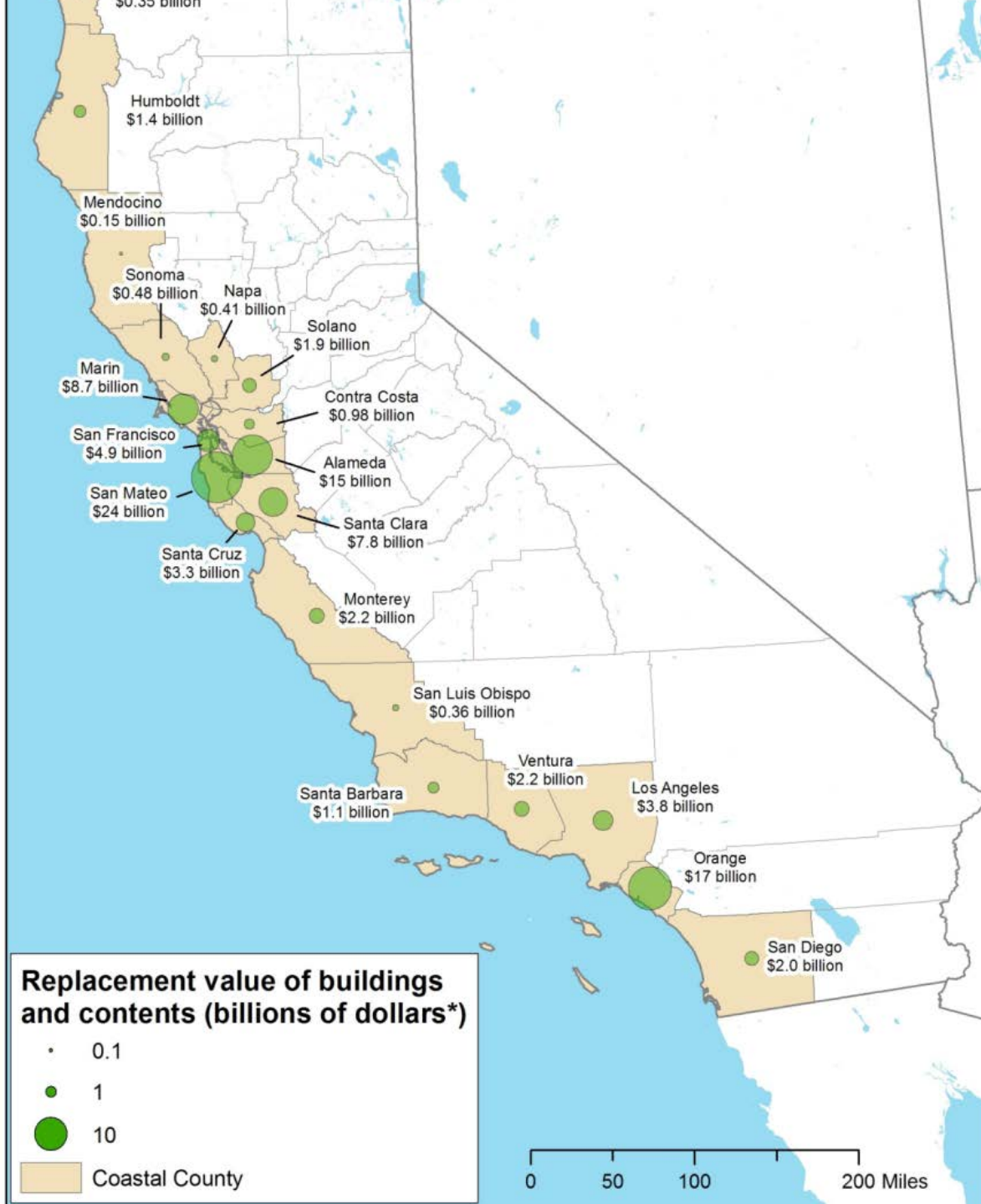
Wastewater Treatment Plants at Risk

- 22 wastewater treatment plants
- Capacity of 325 million gallons per day

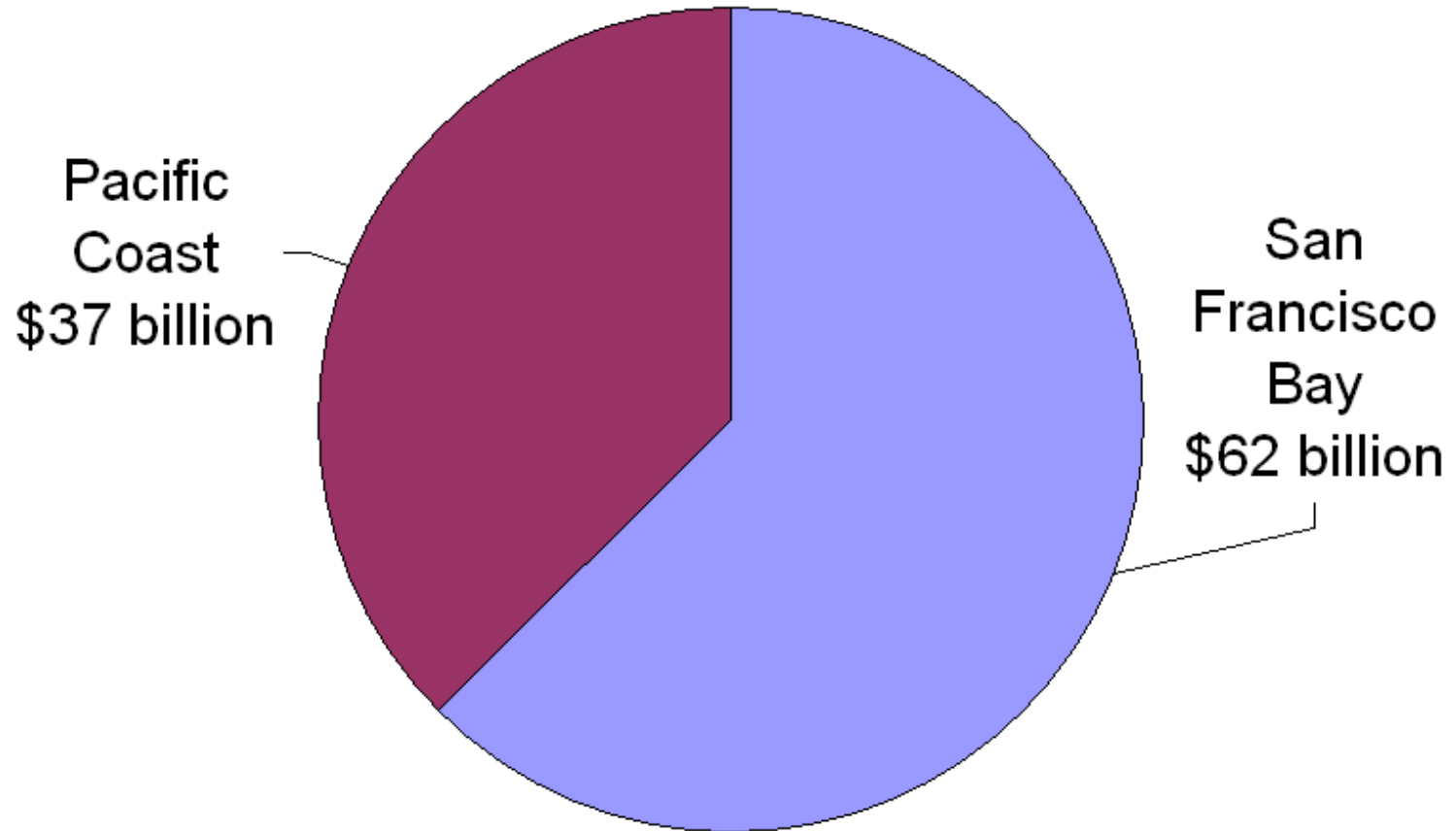


Property at Risk

- \$100 billion dollars at *current* value and level of development.
- *Only* buildings and contents.

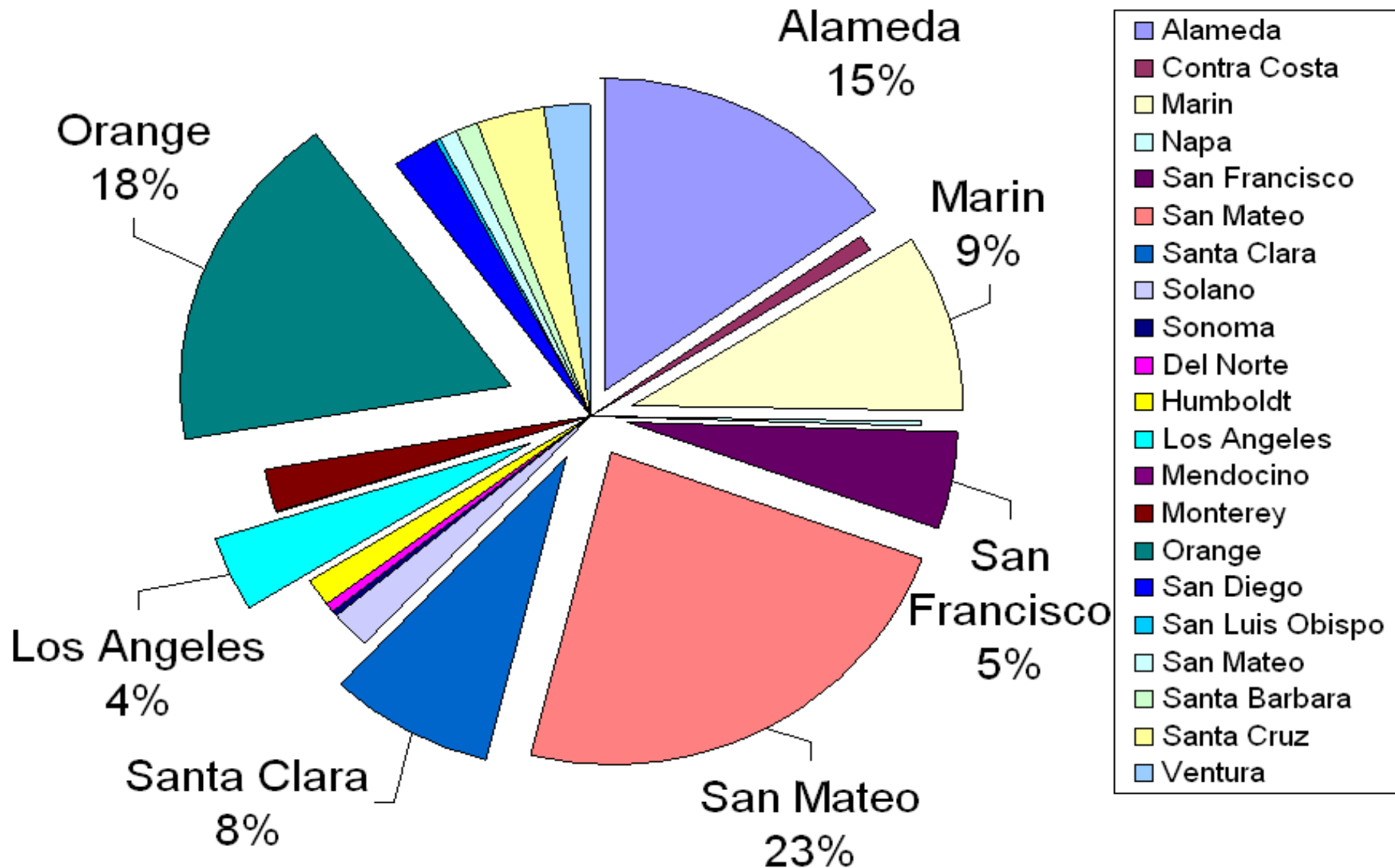


Value at Risk

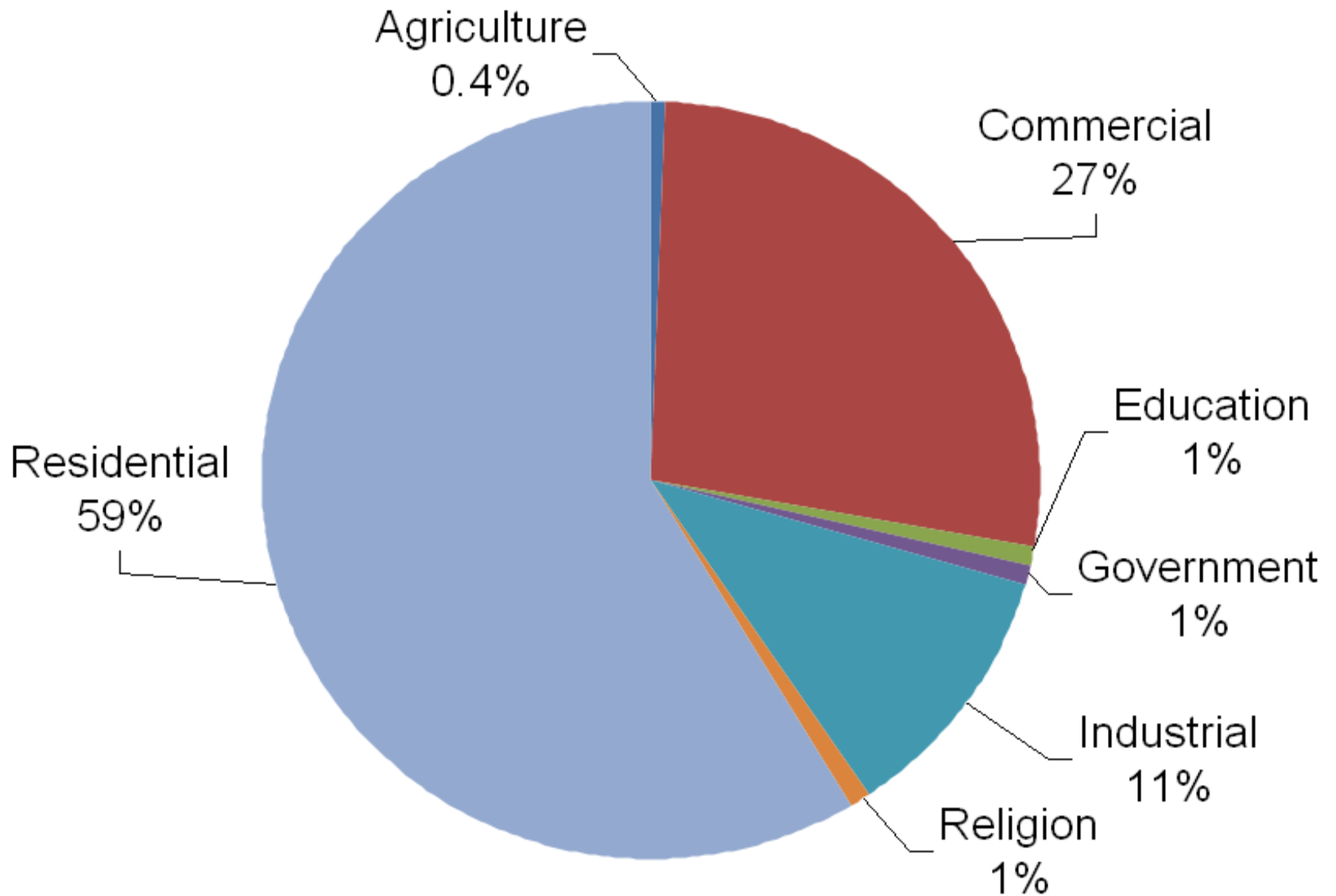


Value of building and contents; year 2000 dollars.

Value of Property at Risk, by County



Value of Property at Risk, 2000





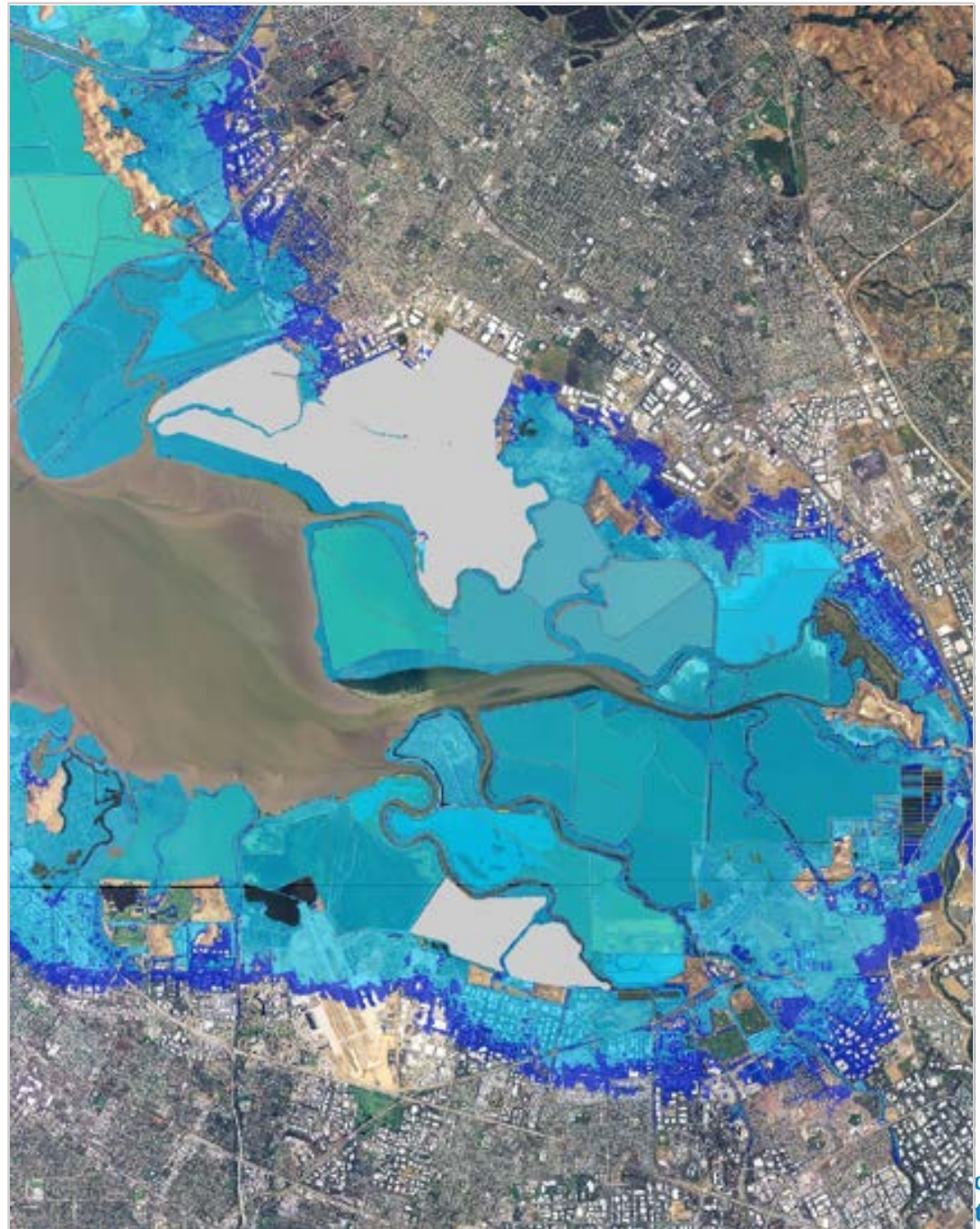
Other Infrastructure at Risk

- Roadways: 3,500 miles
- Railroads: 280 miles
- Schools: 140
- Police/fire stations: 34
- Healthcare facilities: 55
- Parks, airports, ports, bridge access, and more...



Silicon Valley

-  Sixteen Inch Sea Level Rise and
-  Fifty-five Inch Sea Level Rise

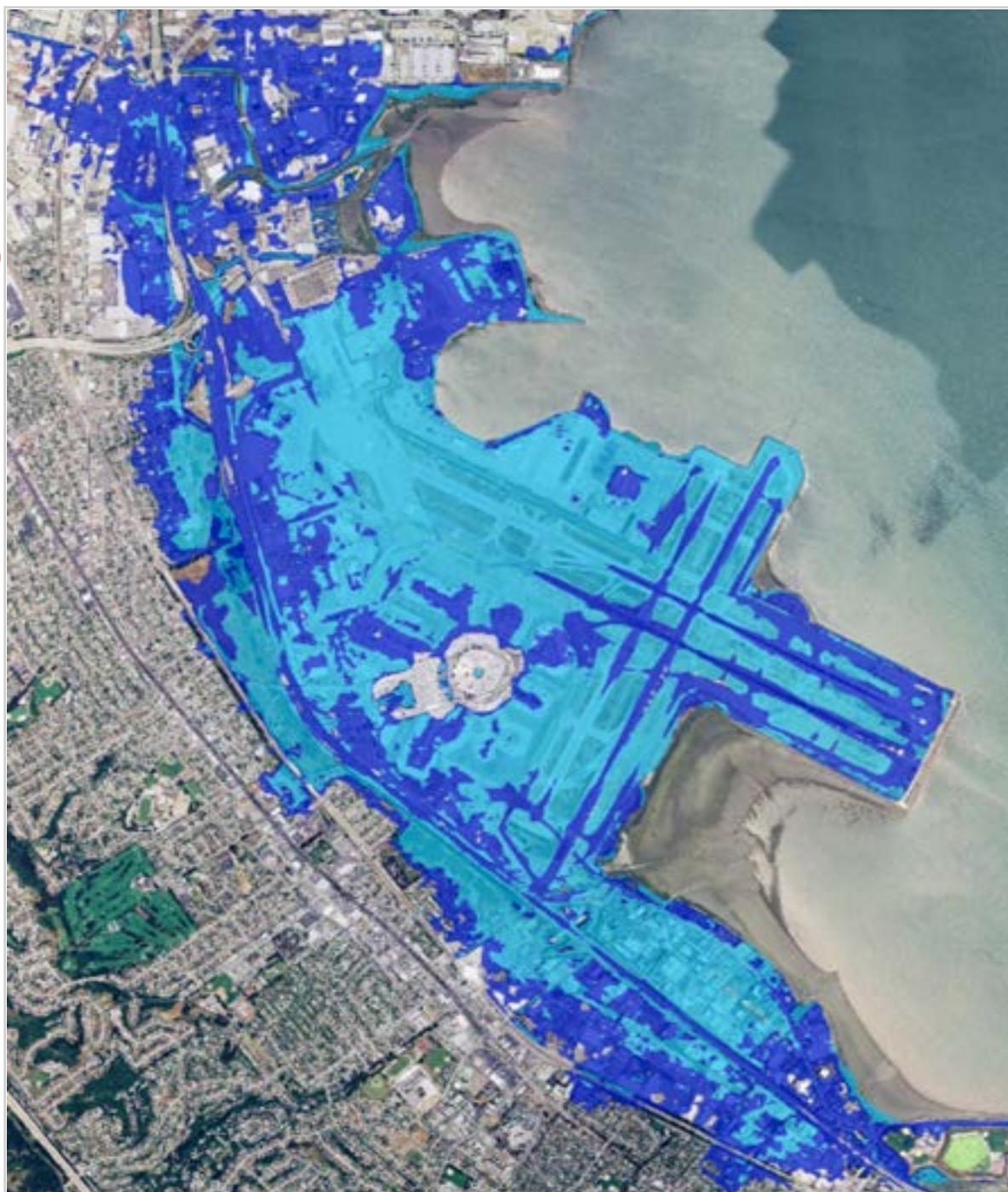




Airports





Michael Macor / The Chronicle

San Francisco International Airport



 Sixteen Inch Sea Level Rise
and
 Fifty-five Inch Sea Level Rise

Oakland International Airport

-  Sixteen Inch Sea Level Rise and
-  Fifty-five Inch Sea Level Rise



Wetlands and Sea Level Rise

- Some wetlands may become permanently lost if sea levels rise faster than they can respond.
- California has already lost 96% of its wetlands, at a great cost to the state.
- Wetlands provide:
 - flood protection
 - water quality improvement
 - wildlife habitat
 - recreation
 - carbon sequestration

Image courtesy of BCDC



California Faces Vast (*and largely unmeasured*) Economic Risks

- Value of lives?
- Partial value of property and contents.
- Cost of rebuilding or retreat?
- Lost work days?
- Partial cost of new or upgraded coastal protection.
- Value of lost ecosystem services?

**>\$100 Billion
(today)**

**>\$14 Billion
(today) plus
\$1.4
Billion/year**

What Do We Do?

All Future Coastal Development Must be Designed for Rising Sea Levels



Climate-Proof “No Regrets” Design

Coastal Armoring or Retreat: Tradeoffs



Coastal Armoring versus Retreat

Removal of Shoreline armoring is possible in some cases and the coast can be restored.



2002

Source: California Coastal Records Project



2005

Don't Build in Floodzones? Better Land Use Planning.



Save Remaining Coastal Wetlands

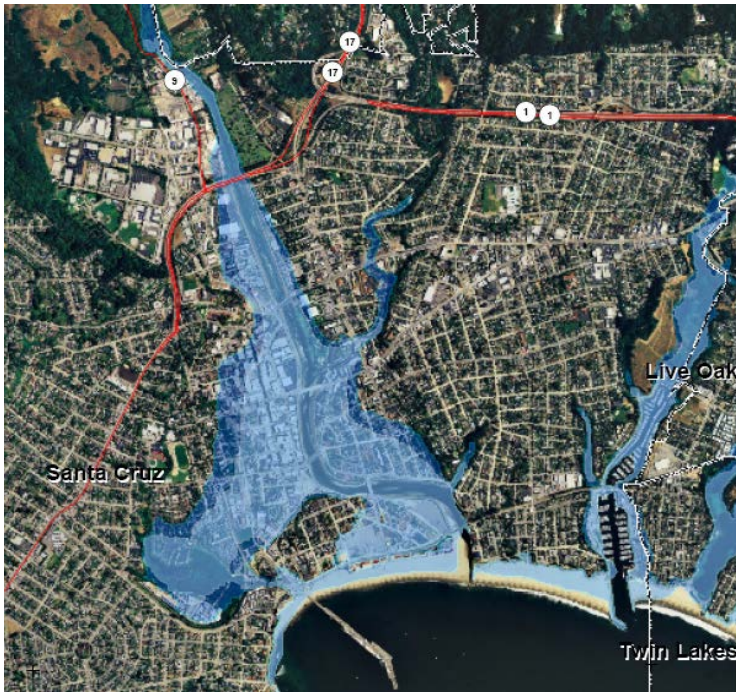


Policy and Management Recommendations

- Integrate climate change and sea-level rise into *all* coastal design.
- Limit new development in high-risk areas.
- Protect wetlands.
- Measure the social and environmental costs of adaptation strategies.
- Modernize flood insurance maps and programs.

Policy and Management Recommendations

- Disasters planning must take into account those who are most vulnerable: the elderly, poor, communities of color
- Communities most vulnerable to harm must be meaningfully involved in developing preparation and adaptation strategies.



For the full report, PDFs of inundation maps, and an interactive Google map of sea-level rise impacts, go to **www.pacinst.org**.

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