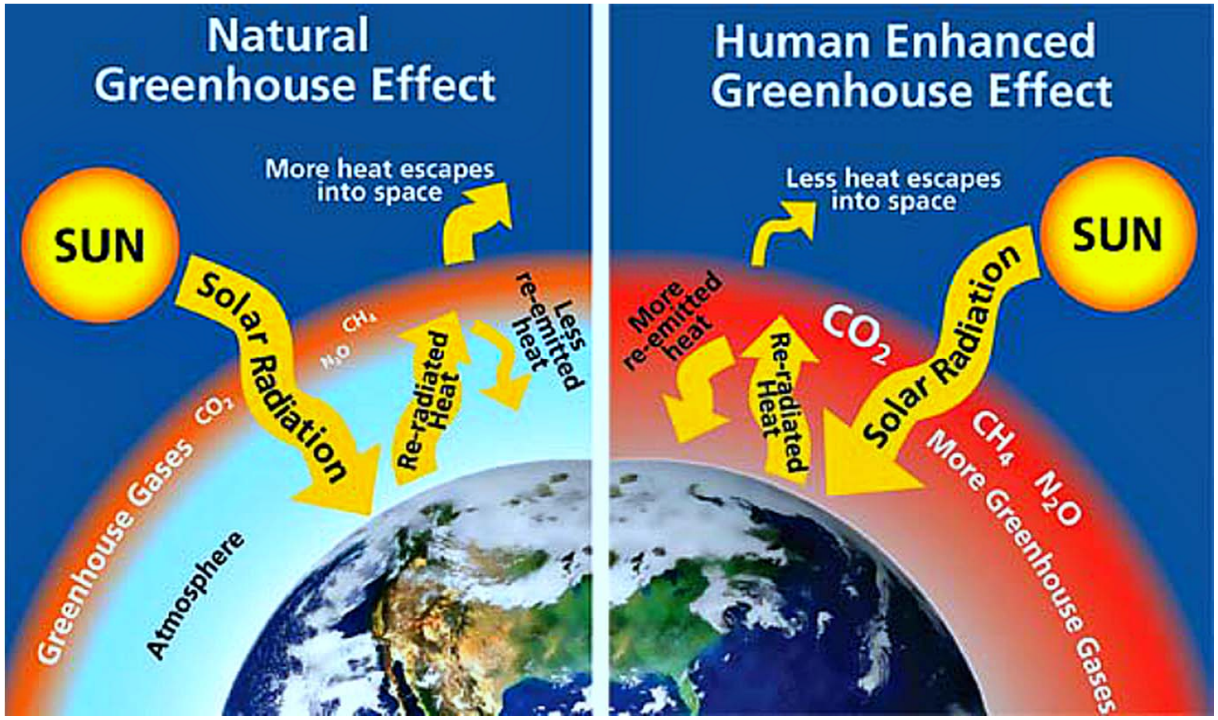
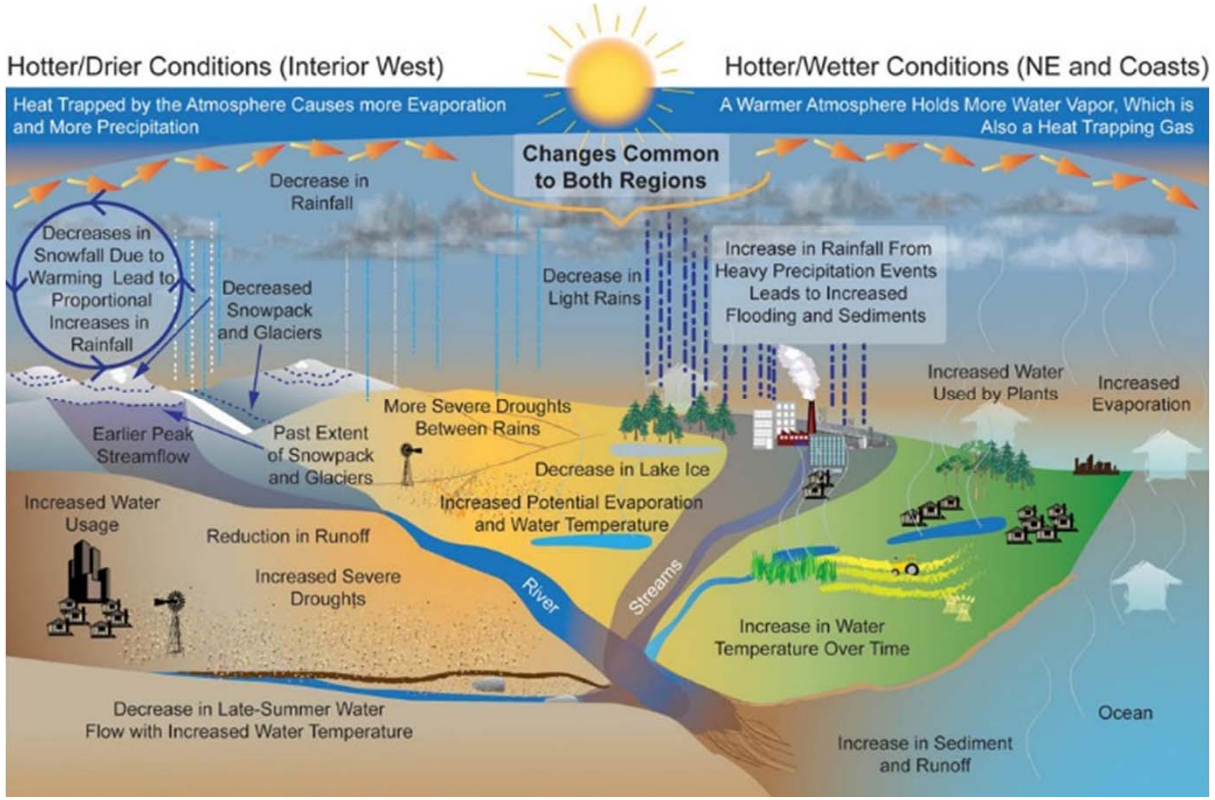
Climate Change & Sea-Level Rise 101

- PREVENTION FIRST
- September 27, 2016
- Patrick Mulcahy
- Division of Environmental Planning and Management
- California State Lands Commission

The Greenhouse Effect



Natural Feedback



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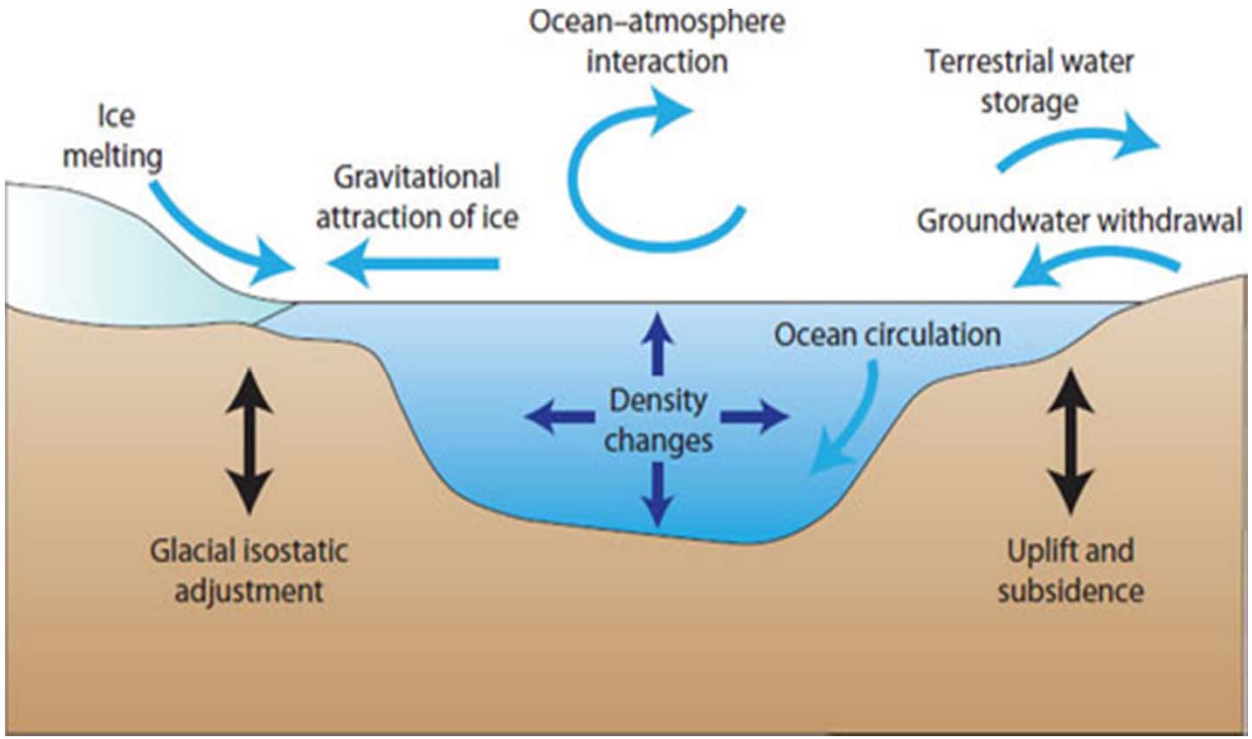
Sea-Level Rise



Other Coastal Processes

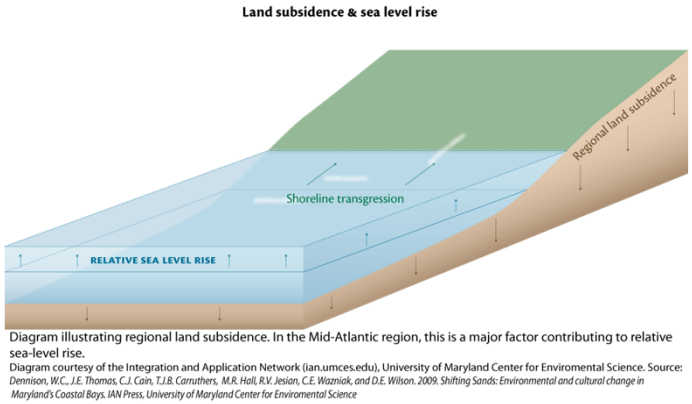


Diagram illustrating regional land subsidence. In the Mid-Atlantic region, this is a major factor contributing to relative sea-level rise.
Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Enviromental Science. Source: *Dennison, W.C., J.E. Thomas, C.J. Cain, T.J.B. Carruthers, M.R. Hall, R.V. Jesien, C.E. Wazniak, and D.E. Wilson. 2009. Shifting Sands: Environmental and cultural change in Maryland's Coastal Bays. IAN Press, University of Maryland Center for Enviromental Science*

Land Subsidence and Uplift

More Frequent and Intense Storms

Erosion

Ecosystem Effects

- Increased habitat alteration and loss
- Ecosystems “move” poleward
- Localized extinctions

Societal Effects

- Public Health
- Water Supply
- Agriculture & Aquaculture
- Insurance

- Increased air pollution
- Increased disease transmission
  - Mosquitos
  - Unclean water
- Mental health

Societal Effects

- Public Health
- Water Supply
- Agriculture & Aquaculture
- Insurance

- Impacted water quality
- Saltwater intrusion
- Exposure and contamination
- Increased freshwater demand

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Societal Effects

- Public Health
- Water Supply
- Agriculture & Aquaculture
- Insurance

- Increased drought
- Reduced yields
- More weeds and pests
- Ocean acidification

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Societal Effects

- Public Health
- Water Supply
- Agriculture & Aquaculture
- Insurance

- More frequent storms and flooding
- Larger impacted areas

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There's Hope!

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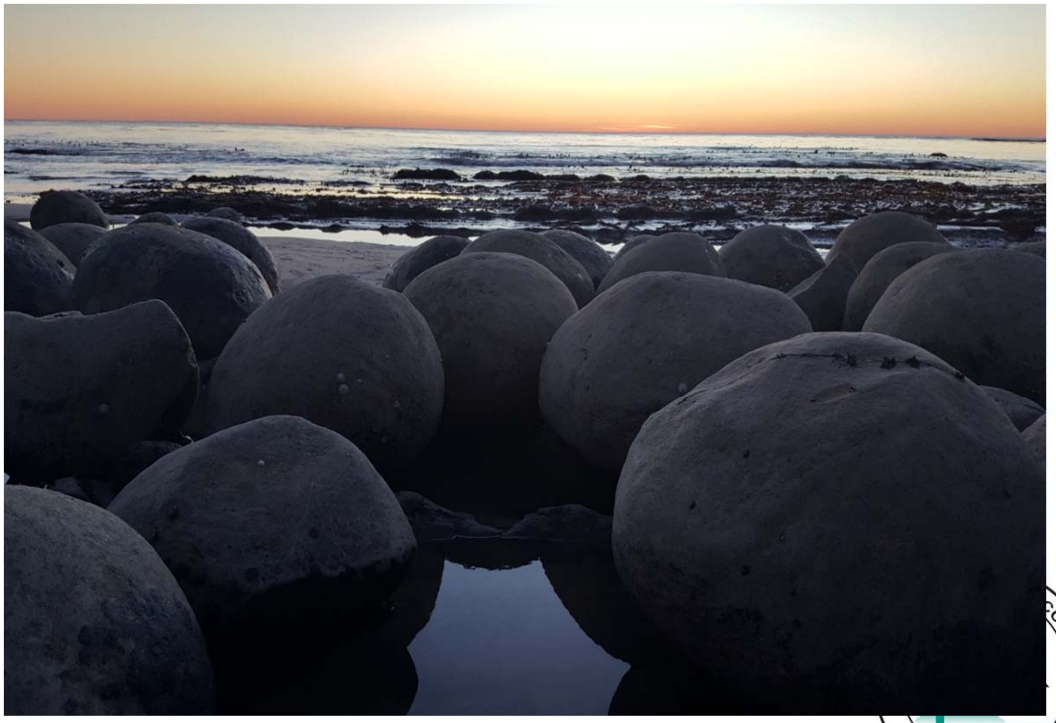
The State Lands Commission's Role

- Strategic Plan
- Working with Grantees and Lessees
- Innovative Partnerships



Thank You!

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Image Credits

- The Greenhouse Effect: http://imgarcade.com/1/greenhouse-effect-diagram/
- Natural Feedback: https://www3.epa.gov/climatechange/images/impacts-adaptation/WaterCycleChanges.jpg
- Sea-Level Rise: Process of Sea Level Rise: Milne, G.A., W.R. Gehrels, C.W. Hughes, and M.E. Tamisiea, 2009, Identifying the causes of sea-level change, *Nature Geoscience*, **2**, 471-478.
- Other Coastal Processes:
  - Dennison, W.C., J.E. Thomas, C.J. Cain, T.J.B. Carruthers, M.R. Hall, R.V. Jesian, C.E. Wazniak, and D.E. Wilson. 2009. Shifting Sands: Environmental and cultural change in Maryland's Coastal Bays. IAN Press, University of Maryland Center for Enviornmental Science.
  - http://mediad.publicbroadcasting.net/p/kcbx/files/201512/ventura_pier.jpeg
  - http://activerain.com/blogsview/1125451/erosion-control-on-carlsbad-s-terramar-beach---controversial--you-bet-
- Ecosystem Effects: http://news.nationalgeographic.com/2015/10/151028-joshua-tree-climate-change-mojave-desert/
- Public Health: http://media4.s-nbcnews.com/i/newscms/2014_25/522486/140620-la-air-pollution-jsw-431p_b227d2c47d80568a8688071c2f95bf18.jpg
- Water Supply: https://earth.stanford.edu/sites/default/files/styles/stanfordhomepage-full/public/FL_Los-Banos_Reservoir-7426_0.jpg?itok=E8NoGSjA
- Agriculture & Aquaculture: http://news.discovery.com/earth/oceans/ocean-acidification-causing-pacific-oyster-die-off-141216.htm
- Insurance: http://framework.latimes.com/2012/10/29/hurricane-sandy/#/26
- There's Hope:
  - Paris Agreement: http://www.techtimes.com/articles/146120/20160401/us-china-commit-to-sign-paris-climate-deal-on-earth-day.htm
  - Renewables: http://oag.ca.gov/environment/green-energy/renewable
  - Electric Car: https://finance.yahoo.com/news/more-half-california-drivers-considering-211842591.html
  - Education/Awareness: http://coolcalifornia.org/article/getting-kids-involved