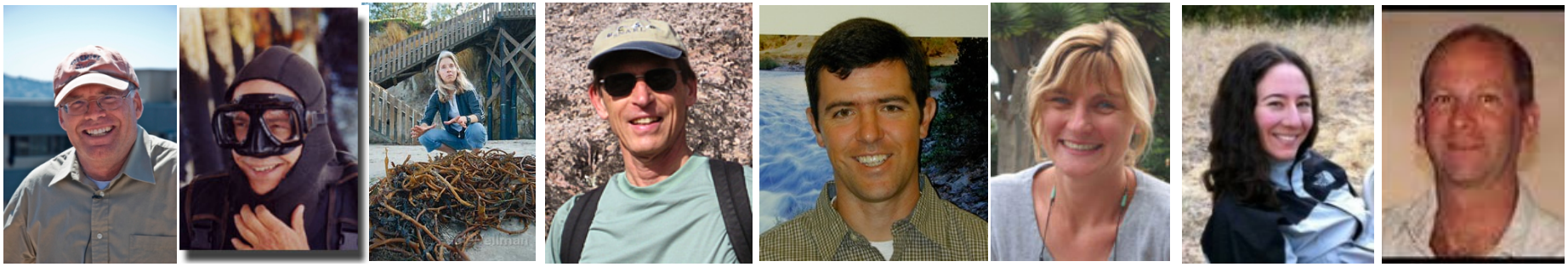
SBA CEVA

→ Santa Barbara Area Coastal Ecosystem Vulnerability Assessment

- Funders:
  - NOAA Climate Program Office
  - Sea Grant (National Office)
- Objective: To provide a vulnerability assessment focused on coastal ecosystems for the Santa Barbara area

Research Team

- Scripps/RISA
  - Dan Cayan
  - Sam Iacobelis
- California Sea Grant
  - Monique Myers
  - Carey Batha
- UCSB Coastal LTER
  - Jenny Dugan
  - Mark Page
  - John Melack
- USGS
  - Patrick Barnard



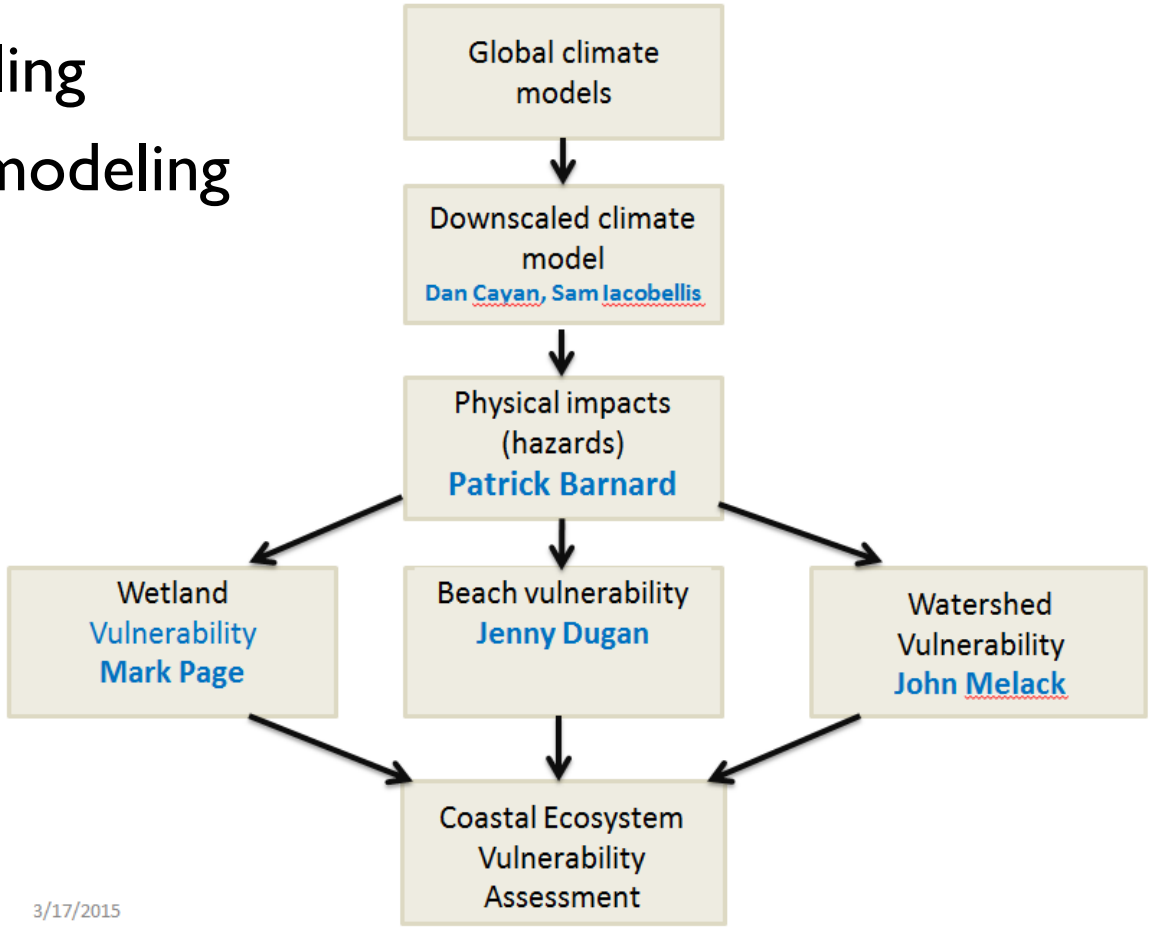
Community Partners

- City of Carpinteria
  - Jackie Campbell
- City of Goleta
  - Anne Wells
- City of Santa Barbara
  - Rosie Dyste
  - Debra Andaloro
  - John Ledbetter (retired)
- County of Santa Barbara
  - Heather Allen

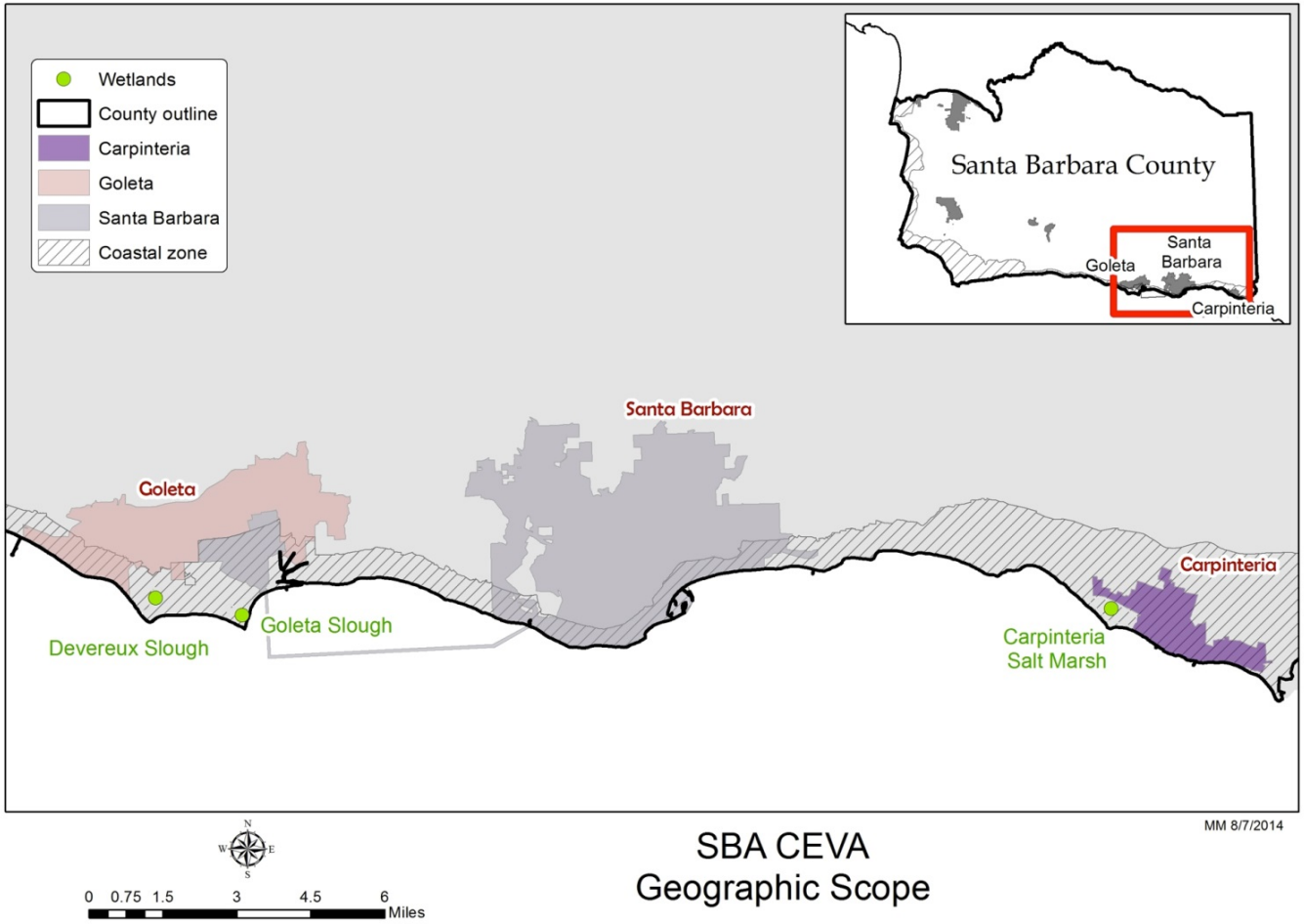
Process

- Climate downscaling
- CoSMoS hazard modeling

- Vulnerability of
  - Beaches
  - Wetlands
  - Watersheds



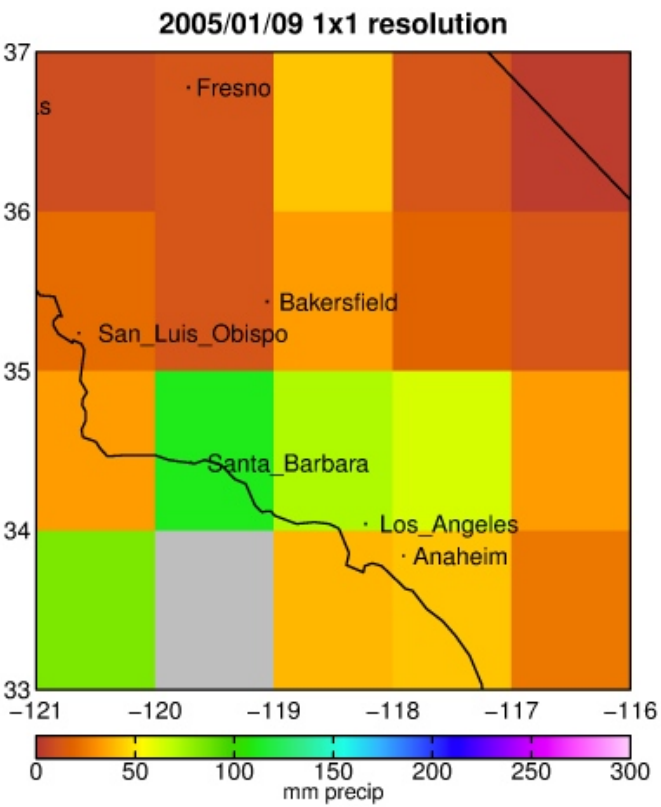
Geographic scope



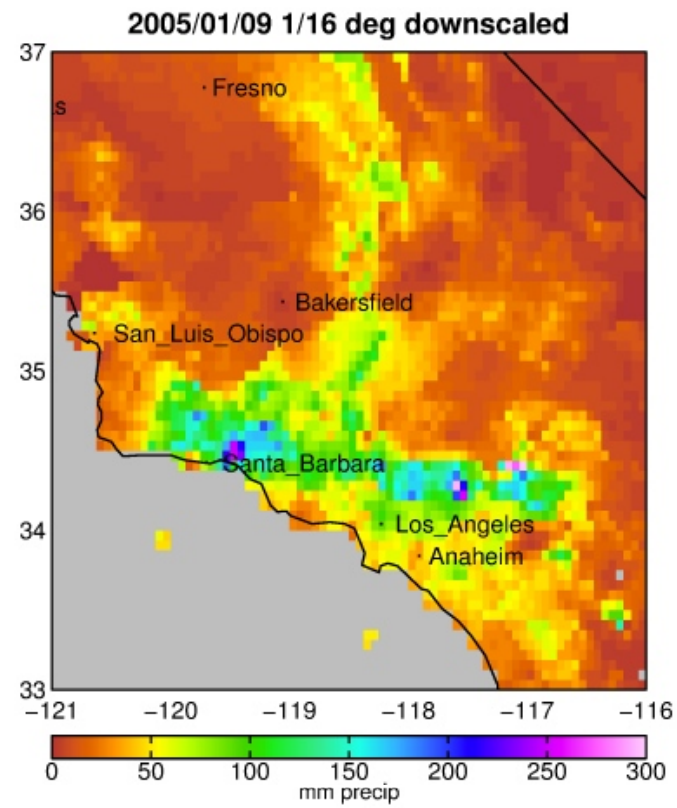
SBA CEVA
Geographic Scope

Climate downscaling

- Methodology: Statistical downscaling of GCMs
- Products: Hourly precipitation and temperature data



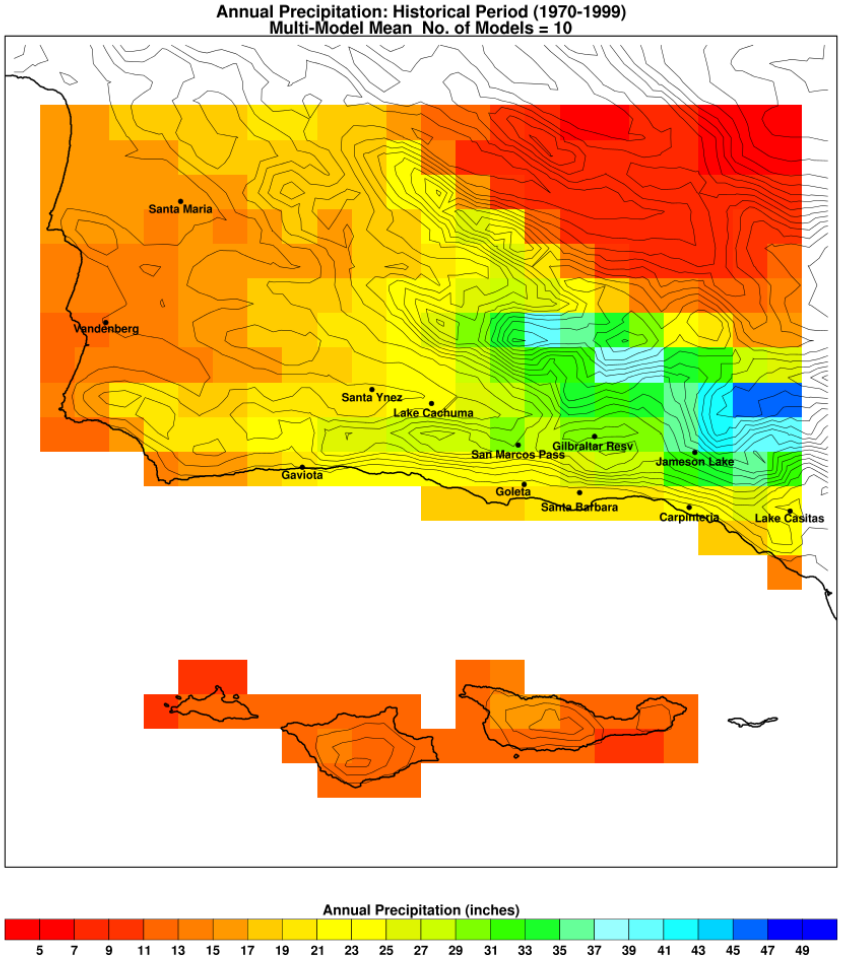
Downscaled to 6-km grid



Downscaling Resolves Regional Precipitation Features

Climate downscaling

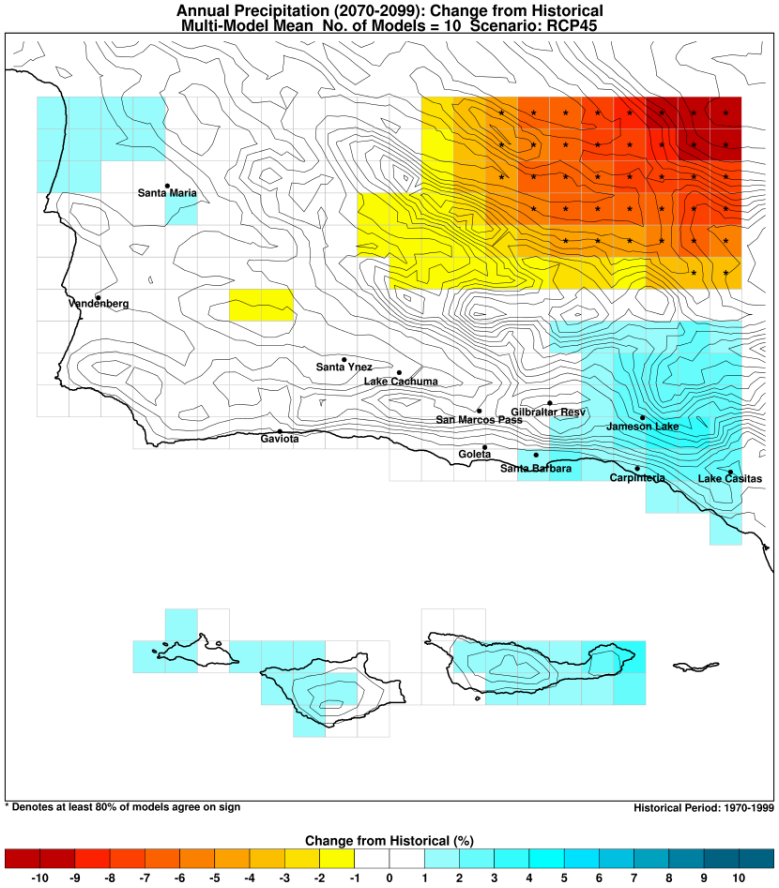
Annual **Precipitation**: 1970-1999



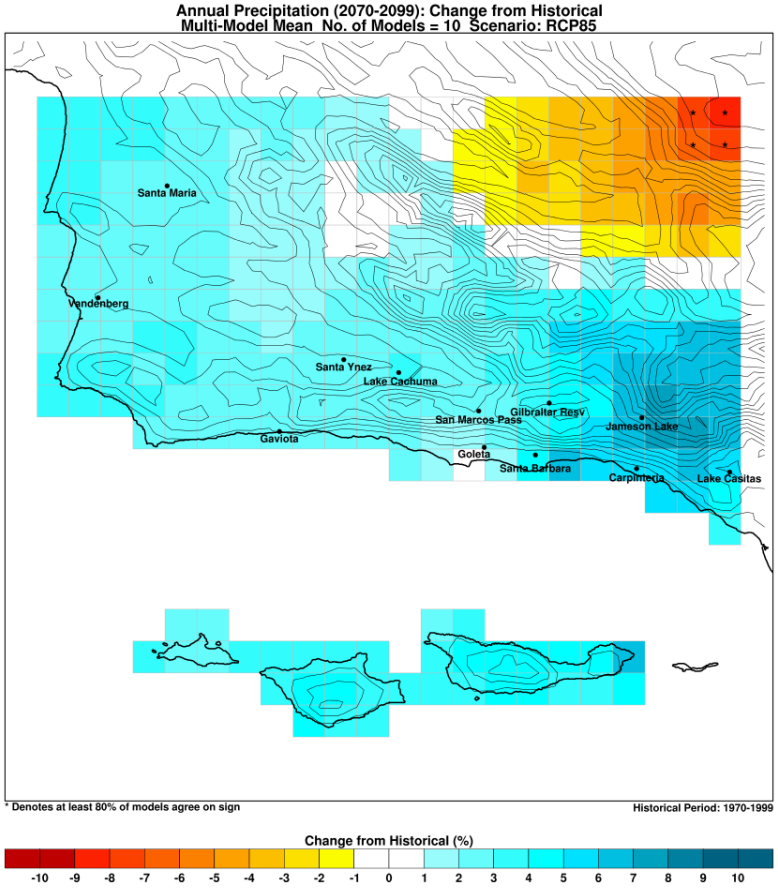
Climate downscaling

Precipitation:
Projected Period (2070-2099) – Historical Period

RCP45

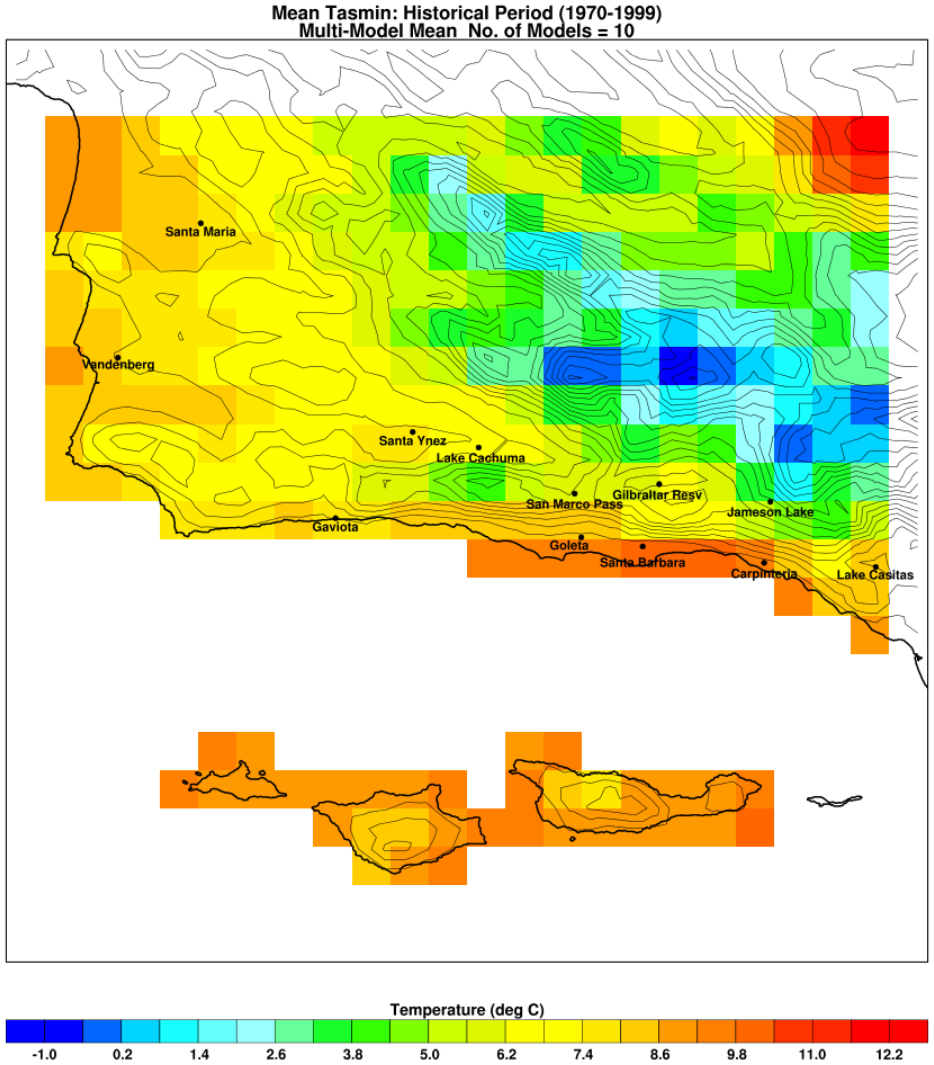


RCP85



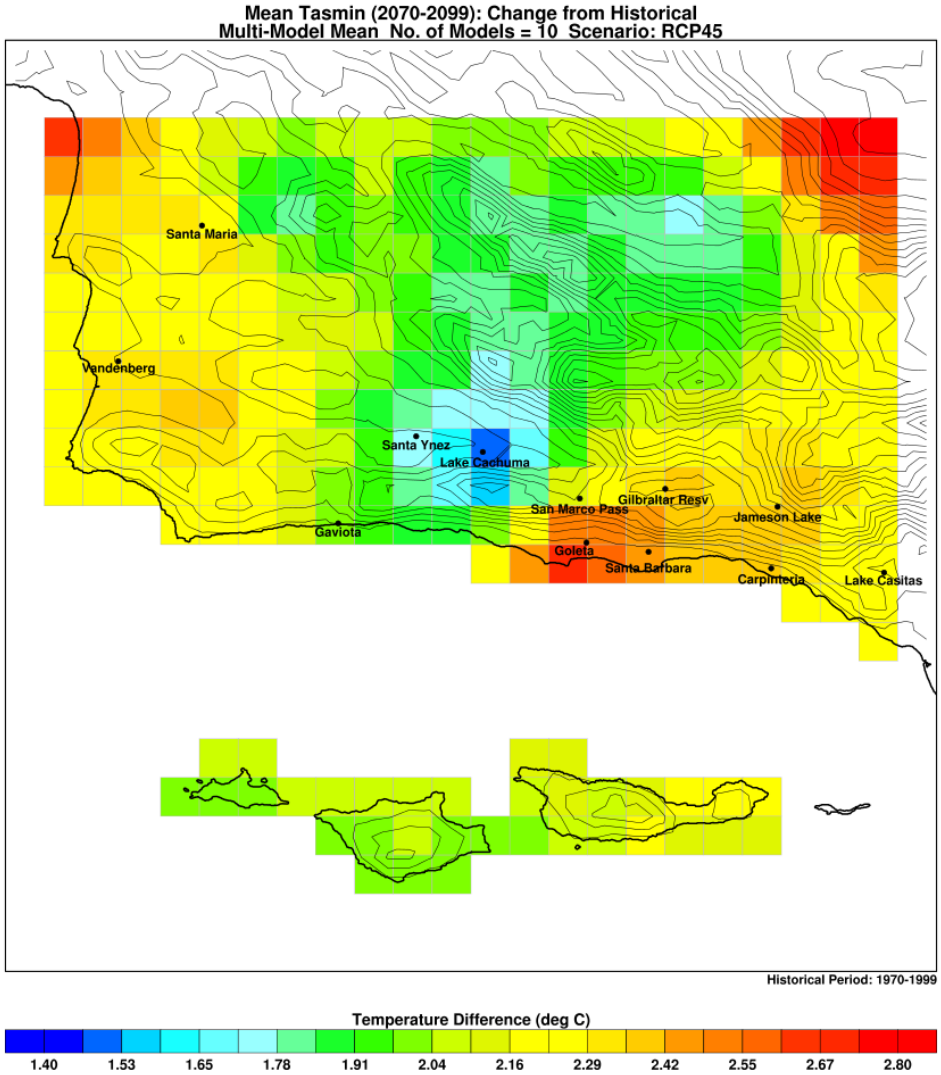
Climate downscaling

Daily T_{MIN} **(low temperature)**:
Historical Period 1970-1999



Climate downscaling

Daily T_{MIN}: Projected Period – Historical Period

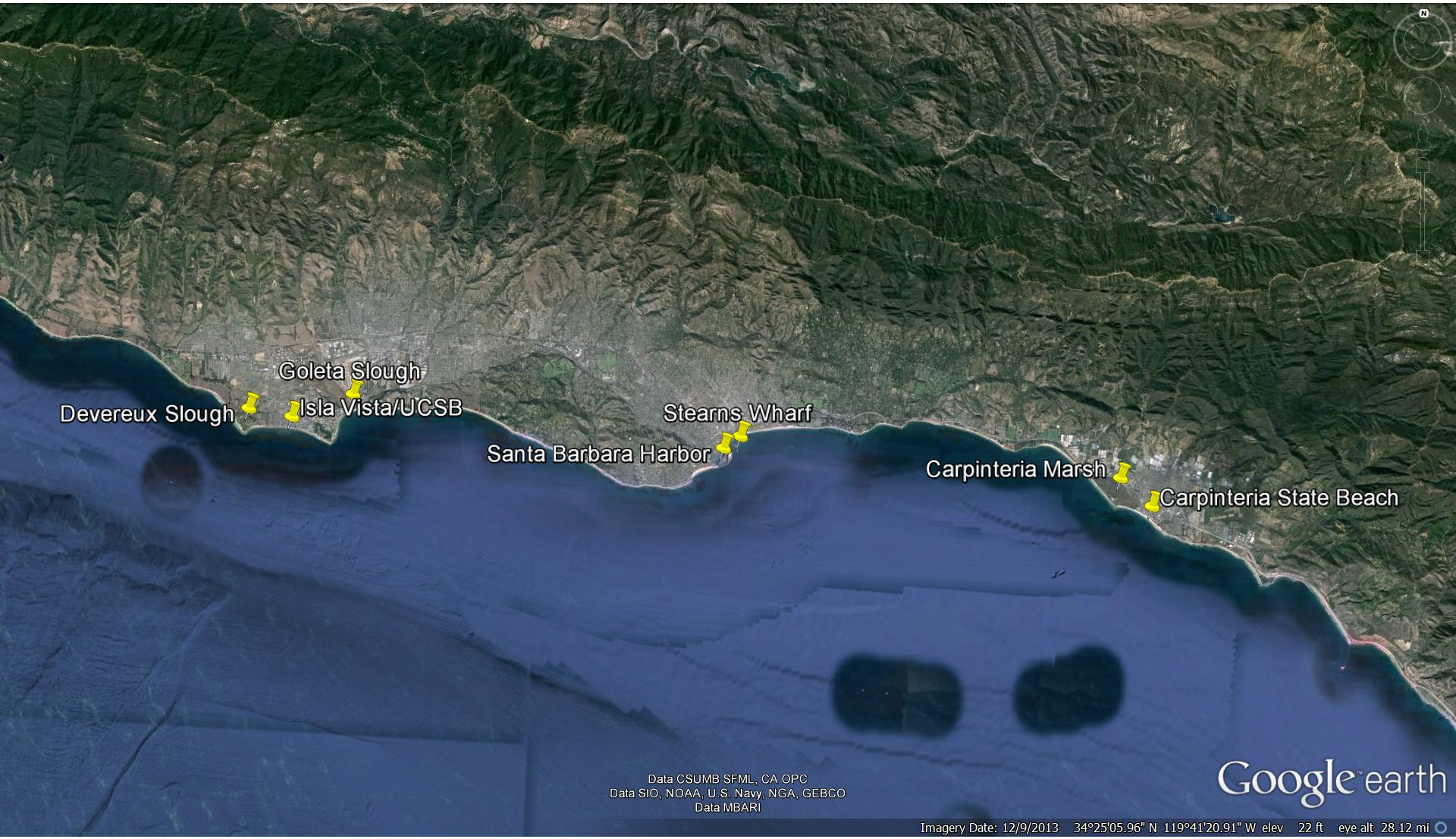


CoSMoS

CoSMoS 3.0

- Physics-based numerical modeling system for assessing coastal hazards on West Coast
- Long-term coastal change
- Downscaled winds for local seas and surge
- Discharge from rivers for event response and sediment supply
- Scenarios and products designed to directly support LCP updates AND new Coastal Commission SLR guidance
- Directly supporting SB CEVA Project

Santa Barbara Focus Areas



Beaches

Credits: Dave Hubbard, Alan Pitcairn, Wikipedia Commons, Callie Bowdish

Beaches

Current elevation range of habitat "bands": lower, mid, and upper beach biota

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Sea level rise and shoreline change (CoSMos)

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Position of future habitat bands

Wetlands

Biodiversity

Endangered plants & animals

Nursery habitat

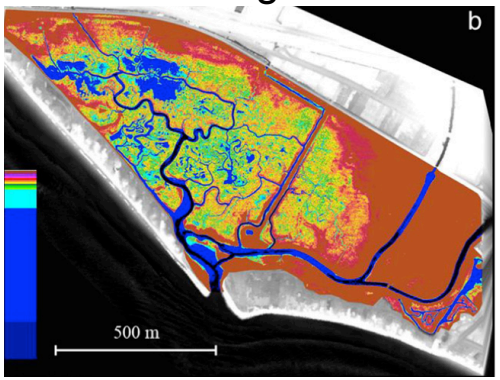
Socio-economic value

Food chain support

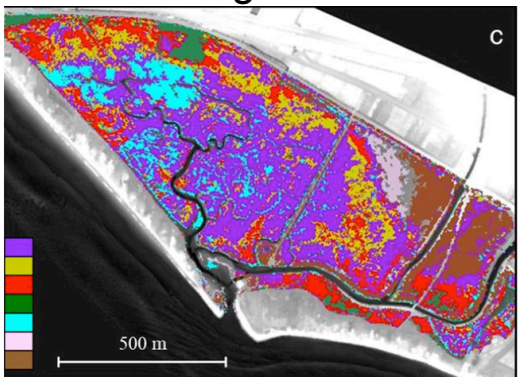
Wetlands

- Three locations
  - Carpinteria Salt Marsh
  - Goleta Slough
  - Devereux Slough

Inundation regime



Habitat & Vegetation Mix



Credit: Sadro et al. 2007

Attach inundation frequencies to habitat types: subtidal, mudflat, low march, mid marsh, high marsh, uplands.

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Sea level rise and accretion scenarios

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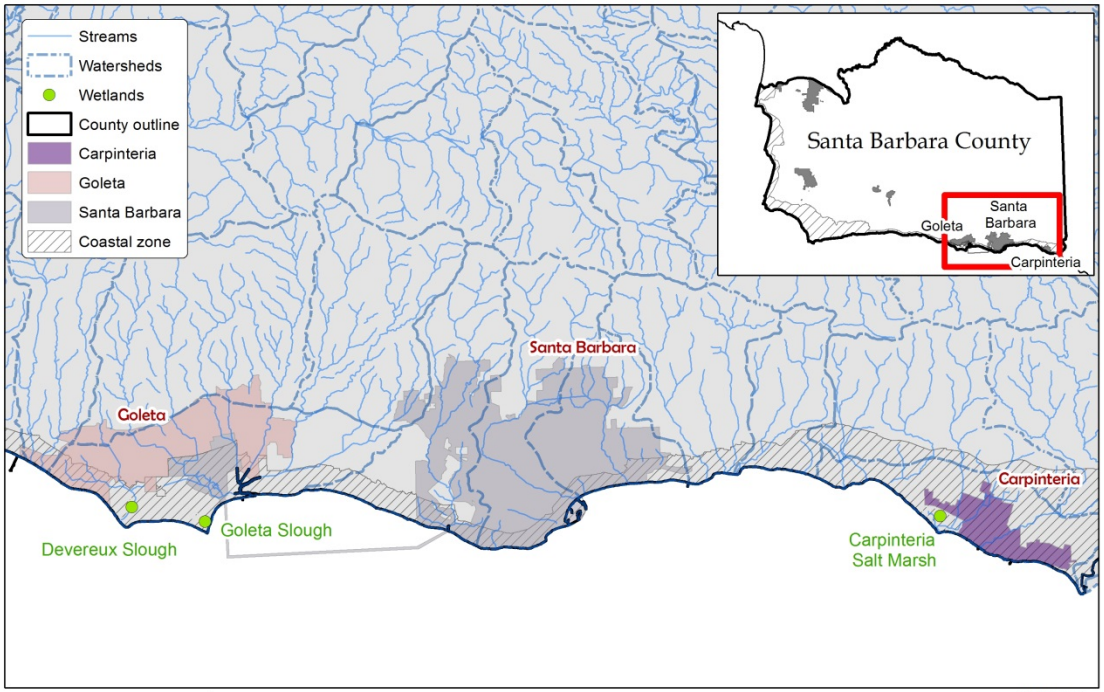
Future habitat distribution

Goleta Slough Vulnerability Assessment

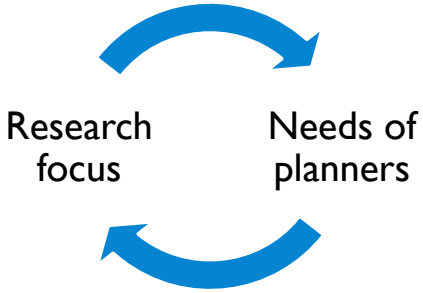
Watersheds

Hourly precipitation forecast → Future creek discharge → Flood management / Sediment & sand delivery to coast



Coordination

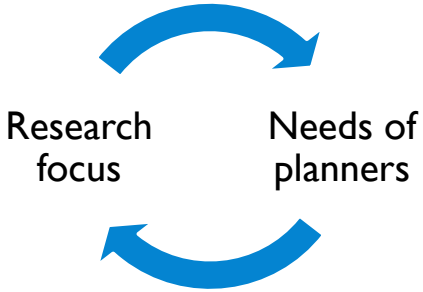
- Review of Draft LCP policies
- Review City of Santa Barbara's habitat maps
- Identifying specific focus areas for the report
  - Pilot project ideas
  - Specific locations: e.g. access points to Carp Salt Marsh, etc.
  - Specific policies: e.g. dune policies in Goleta's CAP



Example: Carpinteria

Lessons Learned

- Flexibility is important
- Coordinating timelines is important
- Create opportunities for reciprocal exchange of information between parties involved



Contributors:

Funders: