

WORKSHOP SUMMARY

APPENDIX E



Powerpoint Presentations

Page Intentionally Blank



Welcome

Incorporating Climate Change Adaptation into Detachment Fallbrook's INRMP

Workshop August 28th & 29th, 2013

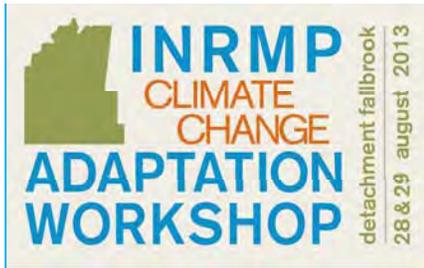
Dawn M. Lawson - SPAWAR SSC Pacific

Christy Wolf - Detachment Fallbrook



Introductions





DoD Inst. 4715.03

INRMP Guidance

c. All DoD Components shall, in a regionally consistent manner, and to the extent practicable and using the best science available, utilize existing tools to **assess the potential impacts of climate change** to natural resources on DoD installations, identify significant natural resources...



Purpose

- Workshop
- Develop process to incorporate climate change adaptation into INRMPs using Detachment Fallbrook as a case study.
- Modeled after workshops put on by the Southwest Climate Change Initiative in 2009.

Why Detachment Fallbrook as a Case Study

- Well developed natural resources program
- High biodiversity –
 - requires balancing trade-offs among conservation targets
- Multiple threats from global change
- Simplified operational environment



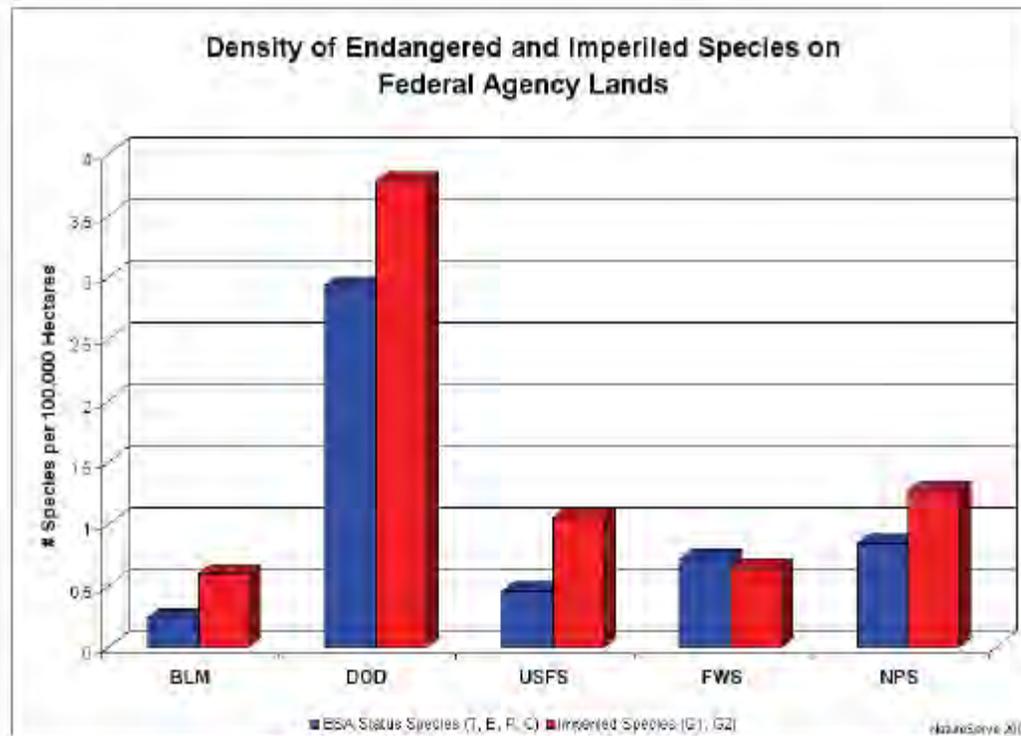
The Stakes Are High



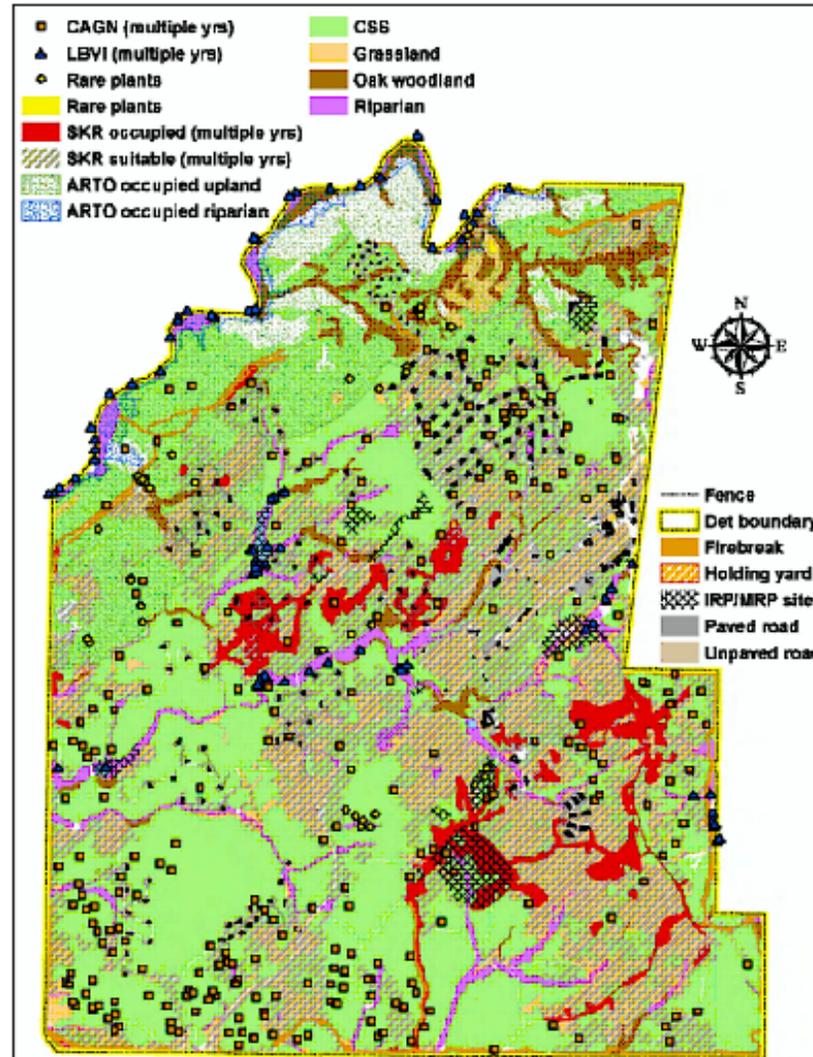
- Military Readiness, Ecosystem Services, Biodiversity, Threatened and Endangered Species



DoD has the highest density of listed species



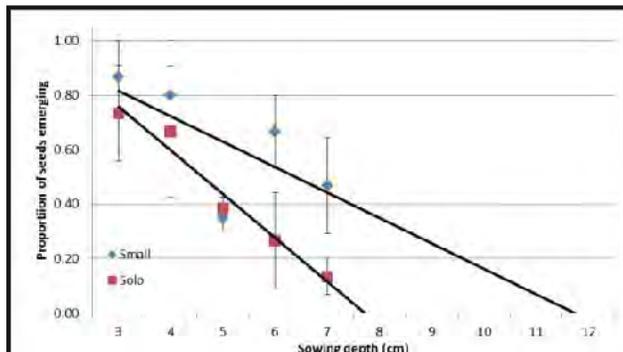
Avoiding Impacts is Often not an Option



- This sets us up for a collision where we can't avoid effects as species and populations are sliding down the viability slope.



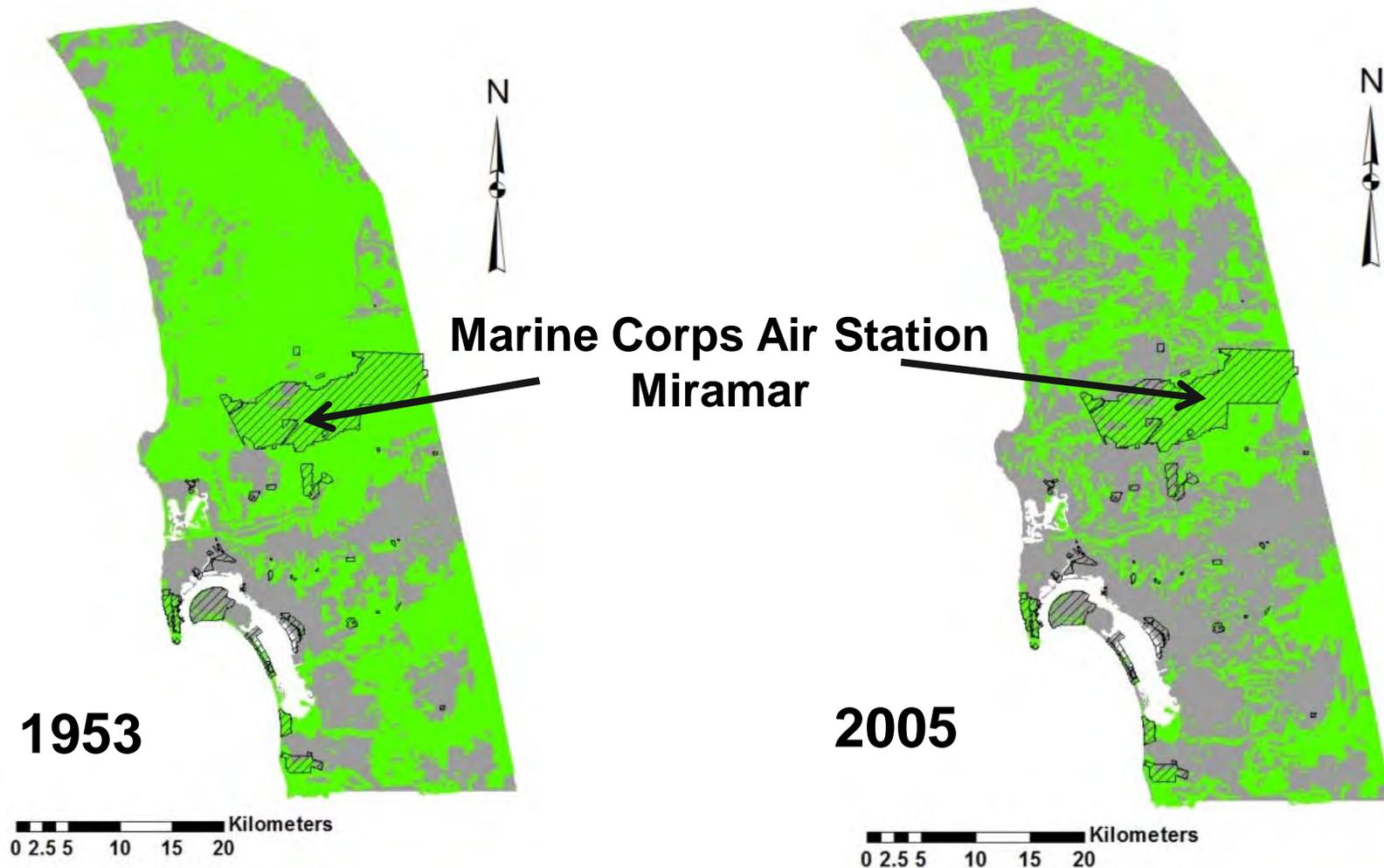
■ Monitoring and Adaptive Management are sometimes the only control we have.



Climate Change Must be Considered in the Context of other Threats



Habitat Loss Western San Diego County

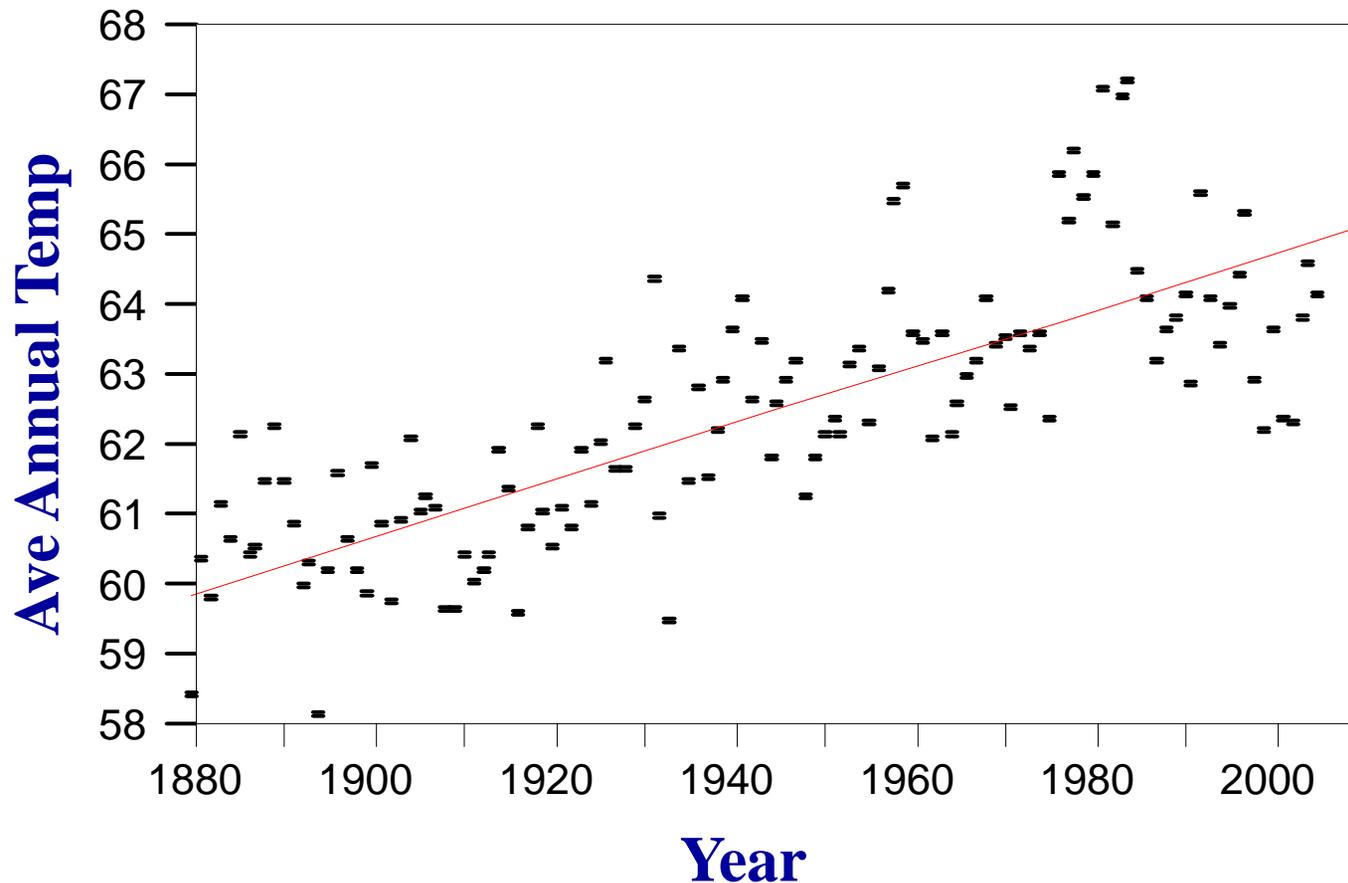


Managers Already Have Their Plates Full



ILLUSTRATION: IRON IMAGES/CORBIS

Climate Change is Here



Lindbergh Field

Uncertainty



- Things will be different – in ways that might be difficult to anticipate
 - conservation priorities likely to shift
- After careful consideration there might not be a clear choice among alternatives.

Doing nothing is also a choice subject to uncertainty

Detachment Fallbrook Integrated Natural Resources Management Overview



U.S. Navy photo by MC1 Eli J. Medellin

Christy M. Wolf
Conservation Program Manager
NAVWPNSTA Seal Beach Detachment Fallbrook



INRMP Climate Change Adaptation Workshop
28-29 August 2013

Det Fallbrook: Military Mission

Support Pacific Fleet's combat readiness and sustainability, as a detachment of NAVWPNSTA Seal Beach, providing major ordnance storage, maintenance, production, and distribution facilities for the western United States.

- **Primary West Coast ammunition supply point for amphibious warfare ships**
- **Primary West Coast provider of air launched missiles for Pacific Fleet**
- **Only West Coast air launched missile maintenance activity**
- **Only secure ordnance safe haven south of Seal Beach**
- **MCAS Camp Pendleton ordnance support**
- **Home of Expeditionary Systems Evaluation Division**

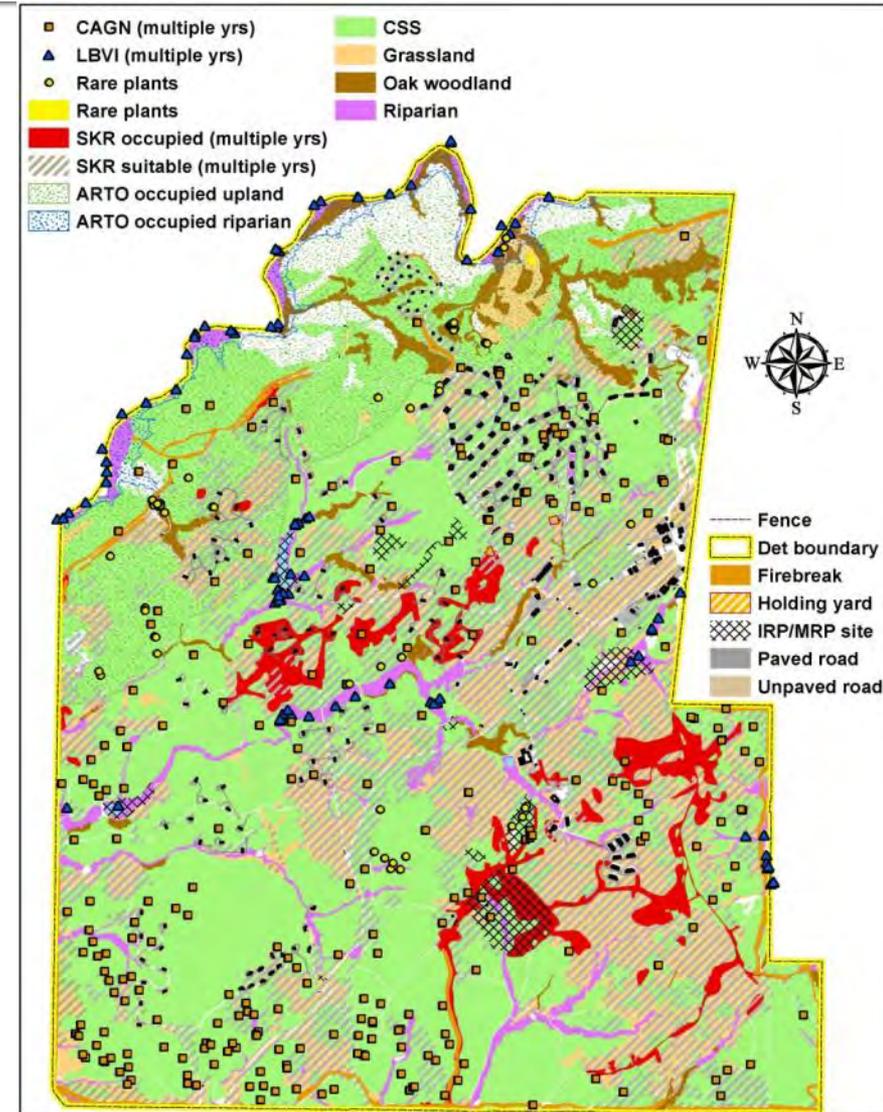


Det Fallbrook: Mission Drivers & Land Use

- **Safety/ Security**
 - Explosives Safety Regs, ESQD Arcs (~ 80% of base)
 - Physical Security Regs, Controlled Access
- **Infrastructure (~ 5% developed)**
 - Magazines, buildings, holding yards
 - Roads, fences, utilities
- **Fire Protection**
 - Clear zones, firebreaks
 - Cattle Grazing
- **Installation Restoration/ Munitions Response Program Sites**
- **Pre-Military (1942) Land Use**
 - Pre-Historic Cultural Resources Sites
 - Ranchero Period: Dry Land Farming, Livestock Grazing
- **Virtually No Active Training, No Public Access, No Recreation**

Det Fallbrook: Natural Resources Setting

- **8,852 ac, 95% undeveloped**
 - 5,400 ac (61%) CSS
 - 1,800 ac (20%) grassland
 - 370 ac (4%) riparian/wetlands
- **5 Federally listed T&E spp**
- **No designated CH**
- **> 200 Special Status Spp** (~ 200 migratory birds, 1 CA listed, 28 Fed & 21 CA Spp of Special Concern)
- **Regional connectivity**; wildlife movement corridors, habitat linkages



Det Fallbrook: Natural Resources Management

INRMP Overarching Goals

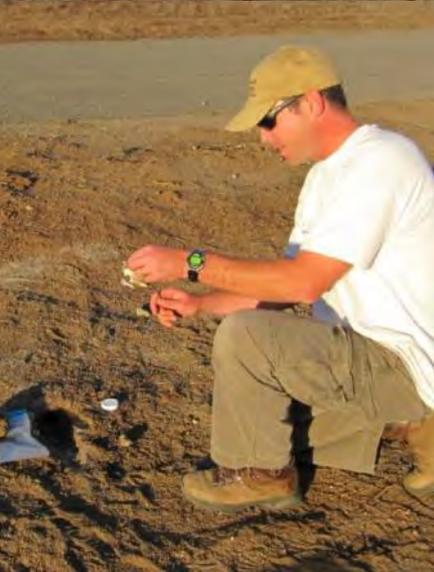
- **Mission Sustainability: No Net Loss**
- **Environmental Compliance**
- **Manage, Protect, Enhance Sensitive Populations and Resources**
 - **Ecosystem-based**
 - **Adaptive Management**
- **Partner with Others, Contribute to Regional Conservation and Research**
- **Foster Stewardship Ethic through Education and Outreach**

Det Fallbrook: Natural Resources Management



Mission/Project Support

- Project Reviews
- Avoidance/Minimization
- Permitting, USFWS consultations



Det Fallbrook: Natural Resources Management

Federally Listed Threatened (FT) & Endangered (FE) Species



Coastal California Gnatcatcher (FT)
(*Polioptila californica californica*)

- Avoidance/Minimization
- Surveys/Monitoring
- Habitat Enhancement
- Habitat Mapping



Southwestern Willow Flycatcher (FE)
(*Empidonax traillii extimus*)



Arroyo Toad (FE)
(*Anaxyrus californicus*)



Stephens' Kangaroo Rat (FE)
(*Dipodomys stephensi*)



Least Bell's Vireo (FE)
(*Vireo bellii pusillus*)

Potential Addition: So. California Steelhead (*Oncorhynchus mykiss*), FE, species confirmed upstream in Santa Margarita River

Existing - Tradeoffs and Goal Conflicts Between Listed Species



+



=



Det Fallbrook: Natural Resources Management



Fire Management

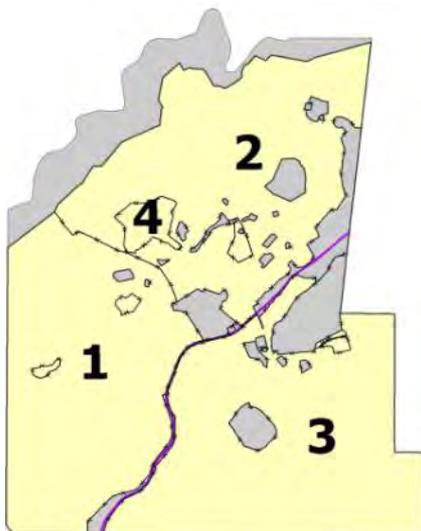
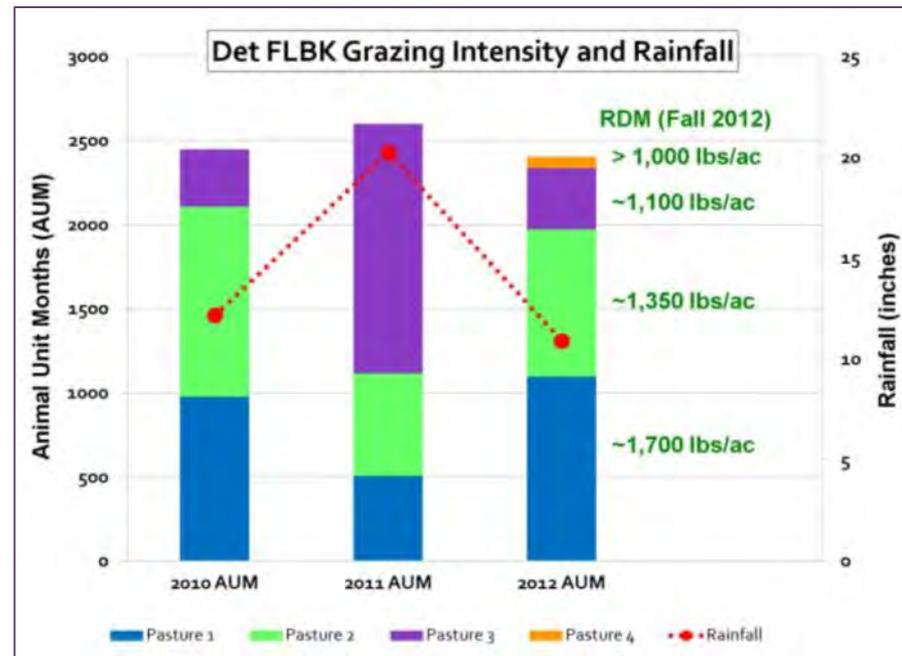
- FMP BO (# FWS-SD-3506.3)



Det Fallbrook: Natural Resources Management



Range Management



Det Fallbrook: Natural Resources Management



Invasive Exotics Control



Det Fallbrook: Natural Resources Management

Non-T&E Flora and Fauna Surveys and Management



Det Fallbrook: Natural Resources Management



Regional
Partnering



Det Fallbrook: Natural Resources Management



Education/Outreach



Det Fallbrook: Natural Resources Management

Project - Abbrev Title	EPR	Contract #	eProjects WOB	FY \$	Completed Actions/Notes	Next Action (CLOSE OUT NOTES)	POP Date	# Days to POP	IPT POC	Comments
2010 B366 Demo: SKR w/area transfer	Facilities Funded	?	805473	FY08	Deleted when moved	All deliverables received/accepted.	Deleted	n/a	SMB	Last eProjects note: 4/11/08, "Final was received September 2008. Cost complete and we are waiting for the
2010 B366 Demo: SKR live trap & hold	Facil Fund									eProjects note: 8/29/11, "Final d Jan. 8, 2011. Voucher number 19EIM." Under "Financial Informa
ARTO Upland St	pre-f									9/11: "Financial Information" (PA 1,784.93) is closed, but still says "
CAGN Survey on Ammo Rd	pre-f									9/11: "Financial Information" app "closed" for contract, but still says "
LITEM 2008	AG									1/11: Case transcripts email verify contract has been paid in full accord
2007 Station- wide SKR & CAGN habitat	?									2/11: REL confirmed via email the ement of all invoices; TDI confirm all that all accounts were properly y down eProjects have financial ormation total of \$164,985.08 for direct??
CAGN Annual 20	0035									eProject financial info. Still says pen". Not clear to me that project ally validated as final payment re
CAGN Annual 20	0035									
CAGN Annual 20	0035									
Goatsgrass Fencing	0035									
SKR plot monitoring contours	pre-f									
Pasture 3 Water	0035									
Firebreak Monitoring	0035									
Weed Mgmt 2011 (Goatsgrass)	0035									estimated CCD because I didn't see Project Order allowed crossover of f
Biomonitor: Facilities	Facilities	NE2473-	ICT	FY11	Deleted when moved	eProjects "Financial Information"	Deleted	n/a	Rob Lovich	is in-house \$ for SPAWAR to support

Behind-the-Scenes

- Contract Management
- Budget Planning/Execution
- INRMP Annual Metrics
- GIS/Data Management
- Security/Safety Requirements
- Animal Control
- Collateral Duties

Implementation Challenges

- **Staffing limitations**
 - 1 NR mgr & 1 support contractor on site
 - Collateral duties beyond NR management
 - Current implementation is challenged
- **Subject matter expertise**
 - Difficult to be SME for all NR issues within areas of responsibility
 - Climate change science is a complex, growing field
- **Limited funding/resources**
- **Regulatory compliance often necessitates narrow resource focus**
- **Immediate issues demand attention**



Integrated Natural Resources Management Plan Development on Navy Installations in Southern California



Identifying Military Stakeholders & Their Mission

- ☎ **Naval Fleet Operations and Support**
- ☎ **Submarine Warfare and Training**
- ☎ **Aircraft Operations and Training**
- ☎ **Naval Special Warfare (SEALS)**
- ☎ **Tactical Range Training and Testing**
- ☎ **Amphibious Assault Operations**
- ☎ **Ordnance Storage, Transportation, and Demolition**
- ☎ **Ground Combat Training Exercises**
- ☎ **Military Construction**
- ☎ **Fuel Storage and Transport**
- ☎ **Space Surveillance Systems**
- ☎ **Research and Development**
- ☎ **Physical Conditioning**
- ☎ **Facilities Planning and Maintenance**
- ☎ **Quality of Life (Housing & MWR)**



👉 13 Navy INRMPs in Southern California 👉

Identifying Non-Military INRMP Stakeholders



- Ⓜ U.S. Fish and Wildlife Service
- Ⓜ National Marine Fisheries Service
- Ⓜ National Park Service
- Ⓜ U.S. Army Corps of Engineers
- Ⓜ California Department of Fish and Game
- Ⓜ Local Native American Tribes
- Ⓜ Local Government Planning Boards
- Ⓜ Local Educational Institutions
- Ⓜ Local Environmental Groups
- Ⓜ Neighboring Communities and Landowners
- Ⓜ Agricultural Outlease Lessees
- Ⓜ Recreational Groups
- Ⓜ Ecosystem, Plant, & Animal Species Experts

Natural Resources Management Issues



Fish and Wildlife Management

- ✓ Rare, Threatened, and Endangered Species
- ✓ Marine Resources
- ✓ Migratory Birds
- ✓ Game and Non-Game Species
- ✓ Bird Aircraft Strike Hazards (BASH)



Land Management

- ▣ Vegetation Management
- ▣ Wetlands Management
- ▣ Soil Conservation
- ▣ Fire Management
- ▣ Agricultural Outleasings
- ▣ Control of Noxious Weeds
- ▣ Landscaping



Outdoor Recreation Management

- ✓ Recreational Hunting and Fishing

Forest Management

- ✓ No Trees !



Endangered Species Management

🦅 Endangered Species

- 14 Plants
- 16 Animals



🦅 Threatened Species

- 2 Plants
- 5 Animals



🦅 Proposed Species

- 1 Plant
- 2 Animals



🦅 Critical Habitat

- 6 Designations
- 3 Proposed Designations

Multiple Species Conservation Planning

- ❖ City of San Diego conservation plan (MSCP) based on state-wide habitat conservation plan (NCCP).**
- ❖ Ecosystem based conservation plan covering 93 federal and state listed species as well as declining habitats and species of local and regional concern.**
- ❖ Other local community conservation planning efforts throughout the county of San Diego**
- ❖ Local conservation planning has resulted in resource agency and public perception of plan development, implementation, and land acquisition.**

A Case Study: San Clemente Island INRMP

Working Group (WG) Established



Mission Statement: The San Clemente Island Integrated Natural Resource Management Plan Working Group will develop an implementable plan to achieve the long-term ecosystem health of all Island natural resources consistent with the operational requirements of the Pacific Fleet's training mission.

- WG includes USFWS, CDFG, Operators, Catalina Conservancy, NPS, and Commanding Officer. Groups invited included NMFS, SDNHM, and Audubon Society.
- Brings together key stakeholders to make cooperative decisions about goals, objectives, and strategies.
- Brings a sense of shared ownership in the process and product.
- Assists in proactive land management.
- WG Chair, the Commanding Officer, provides long-term vision for success.

SCI INRMP continued

Goals and Objectives

Goal 1: Increase self-sustaining populations, with resilience in communities and processes to respond to perturbation.

Goal 2: Identify those parts of the ecosystem that are not functioning.

Goal 3: Lose no native species and allow no more non-natives (aliens). Maintain full suite of species with an emphasis on the endemics.

Goal 4: The INRMP needs to include all of the available information (pieces) ensuring there are no extra components while maintaining a normal range of variation and biological responses.

Goal 5: The INRMP needs to ensure that the military mission is considered a component of the ecosystem and that there are minimal impacts to this mission.

Goal 6: The INRMP must encompass all present and future requirements of Pacific Fleet.

Goal 7: Identify and prioritize surveys, projects and programs that need to occur over the five-year life of the INRMP.

Goal 8: Develop a conceptual model of how the ecosystem is working with operations.

Goal 9: Maintain the full suite of endemics and communities.

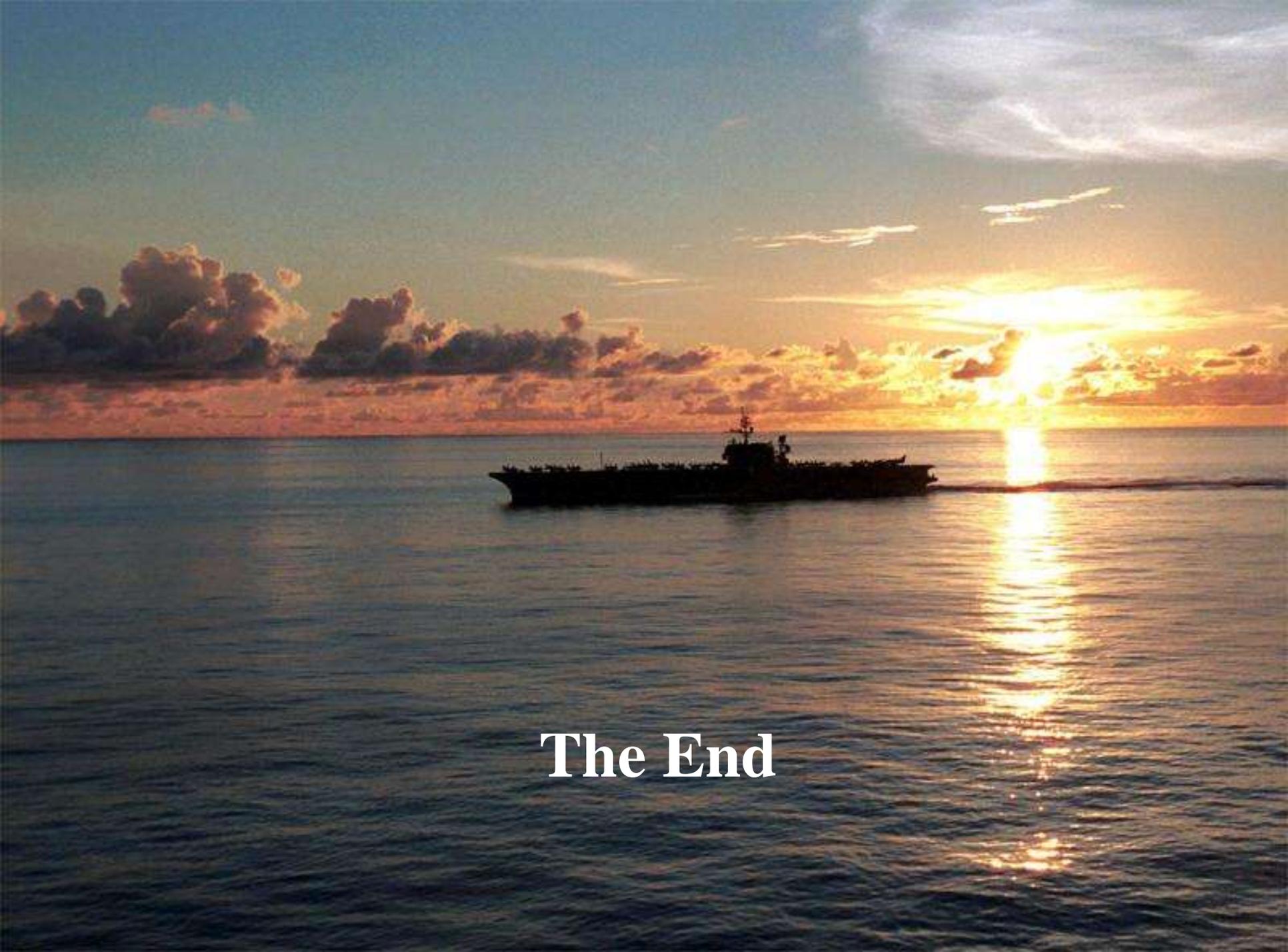


Where We Go From Here...

- ❑ **Development of objectives and timeframes**
 - **Funding issues – implementation of the plan based on manpower and funding constraints**

- ❑ **Coordination with military stakeholders, resource agencies, and the public.**

- ❑ **Public involvement – review the of draft INRMP after initial review by the military and resource agencies.**
 - **mail copies to interested parties**
 - **copies of INRMP in local libraries**
 - **advertise in local newspapers**
 - **providing INRMP on installation web page**



The End

Planning for climate change on top of already high climate variability

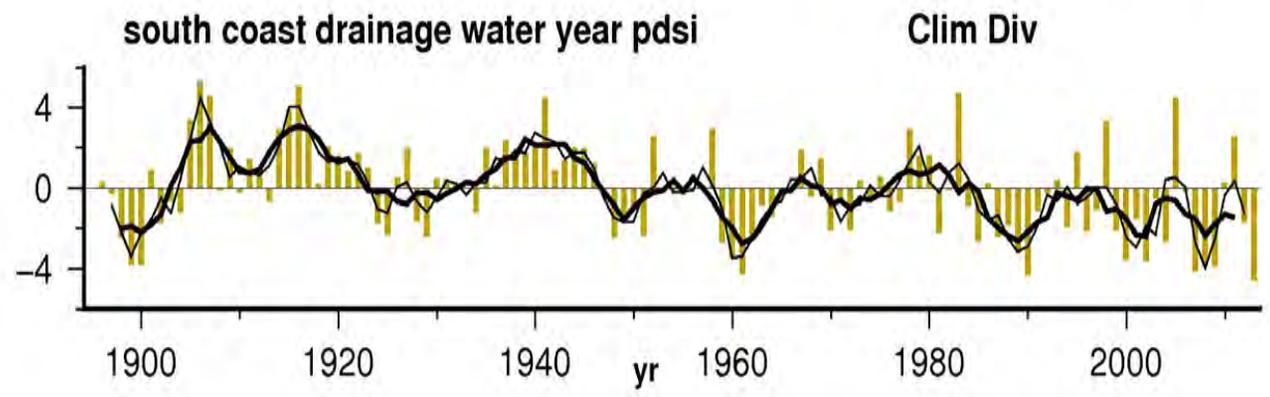
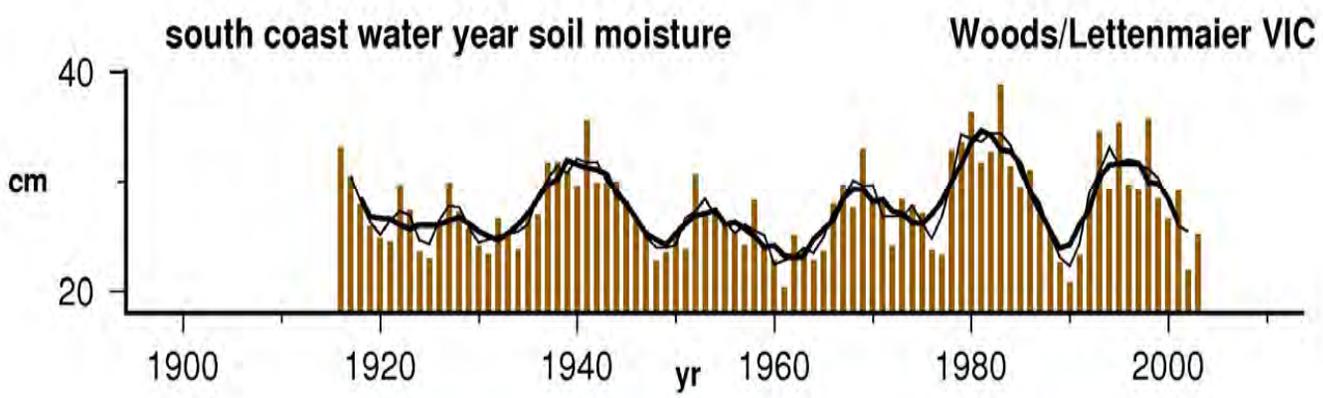
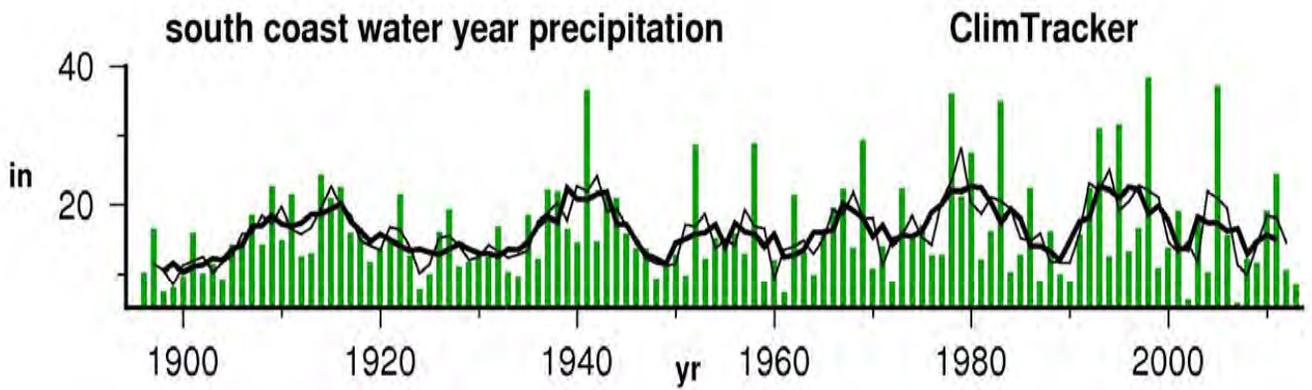
Dan Cayan

Scripps Institution of Oceanography, UC San Diego
USGS Water Resources Discipline

much support from Mary Tyree, Guido Franco and other colleagues

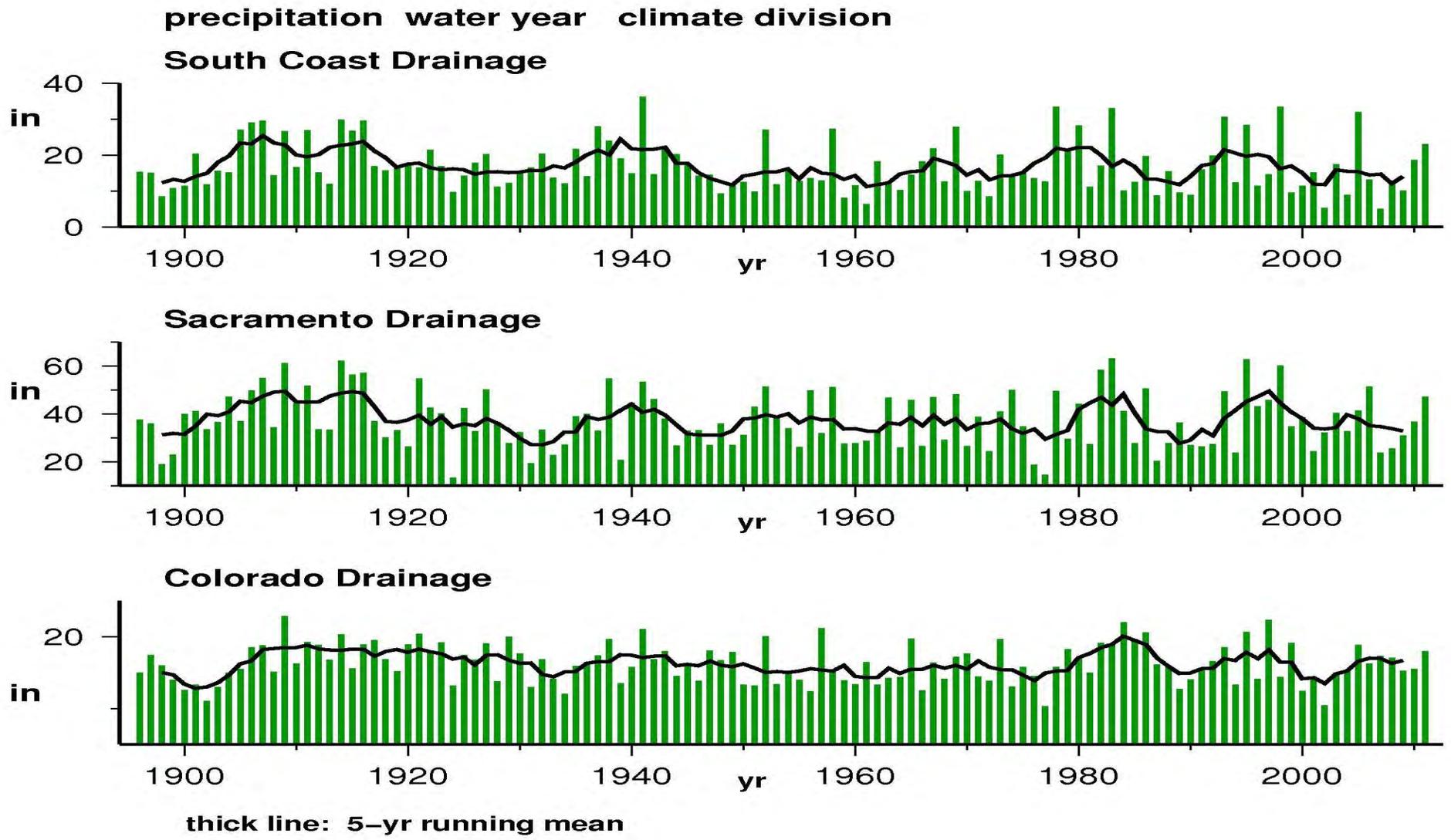
Sponsors:

California Energy Commission
NOAA RISA program
California DWR, DOE, NSF



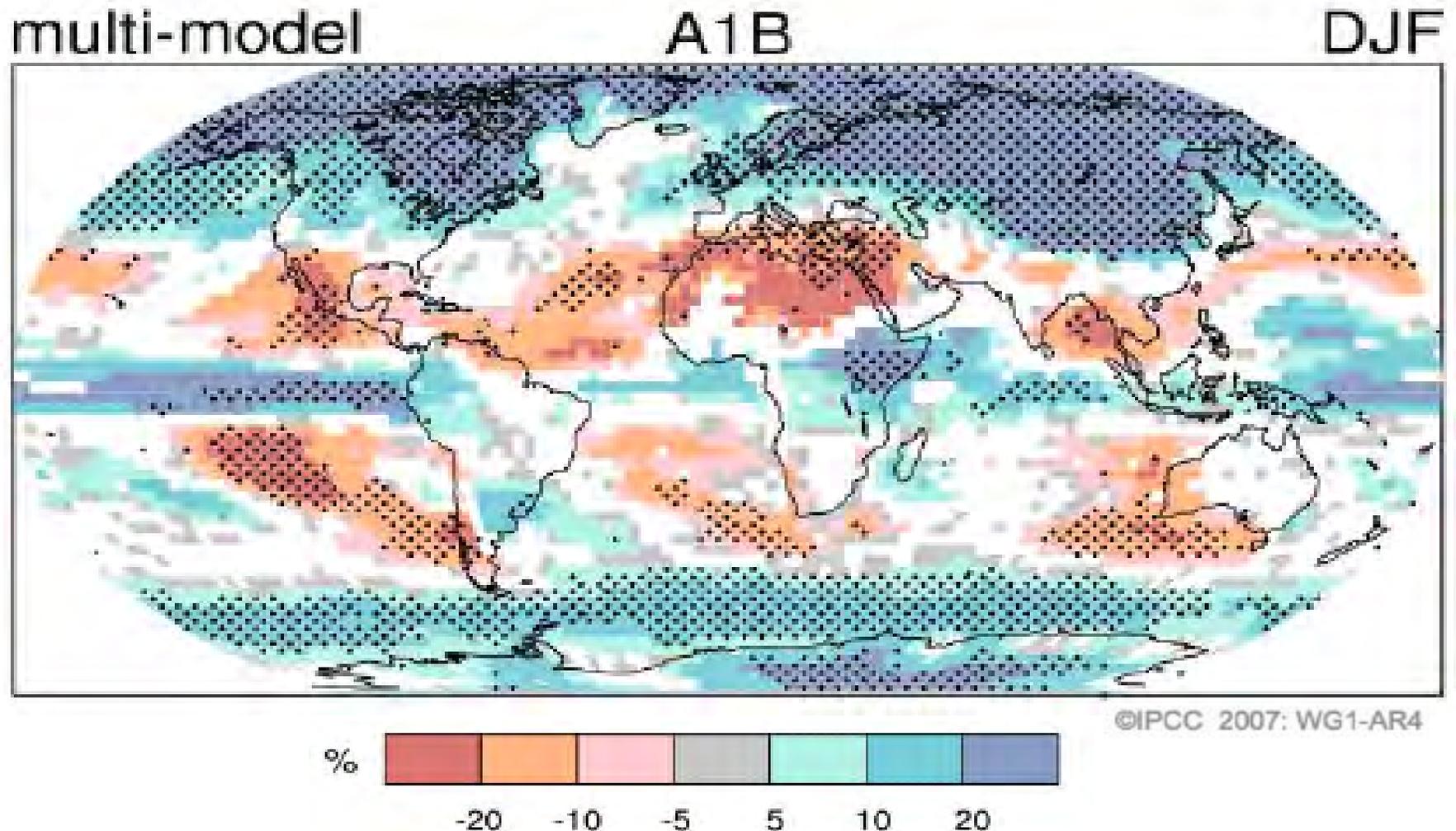
Great year-to-year variability in San Diego precipitation

Ranges from ~33% to 280% of average



and, when Southern California is dry--
 Northern California is often dry
 and the Colorado River drainage is sometimes dry

Projected patterns of precipitation changes 2090-2099 versus 1980-1999



*Globally, dry regions become drier
including the Southwest United States!*

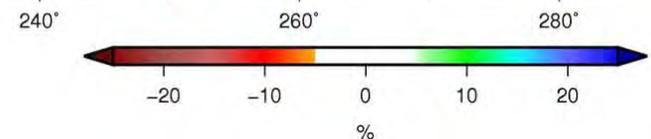
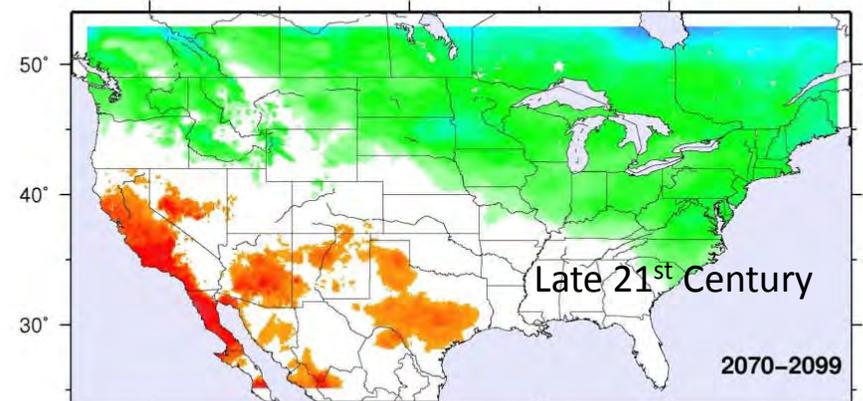
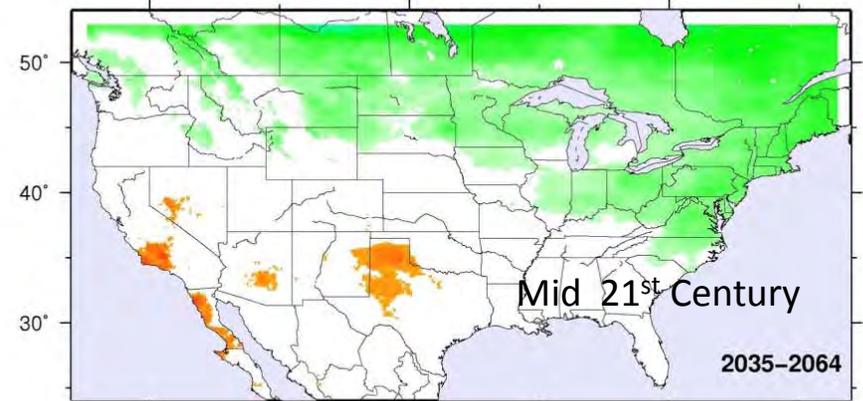
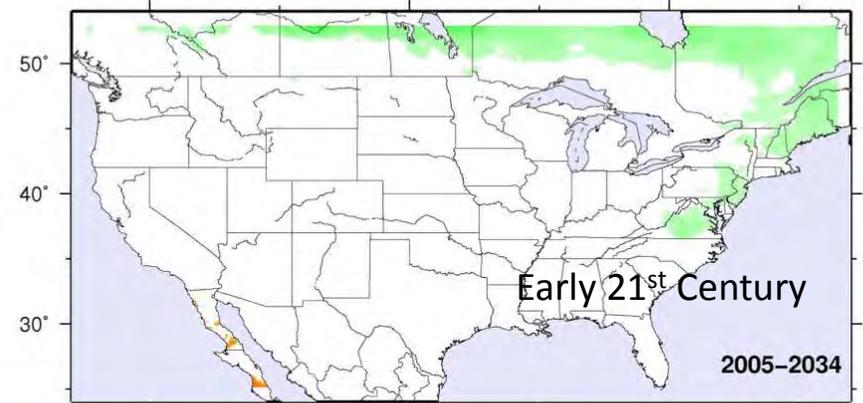
Projected Precipitation Change

Incrementally drier Southwest,
especially Southern California
develops over the 21st Century.

Drying becomes greater
as climate becomes warmer

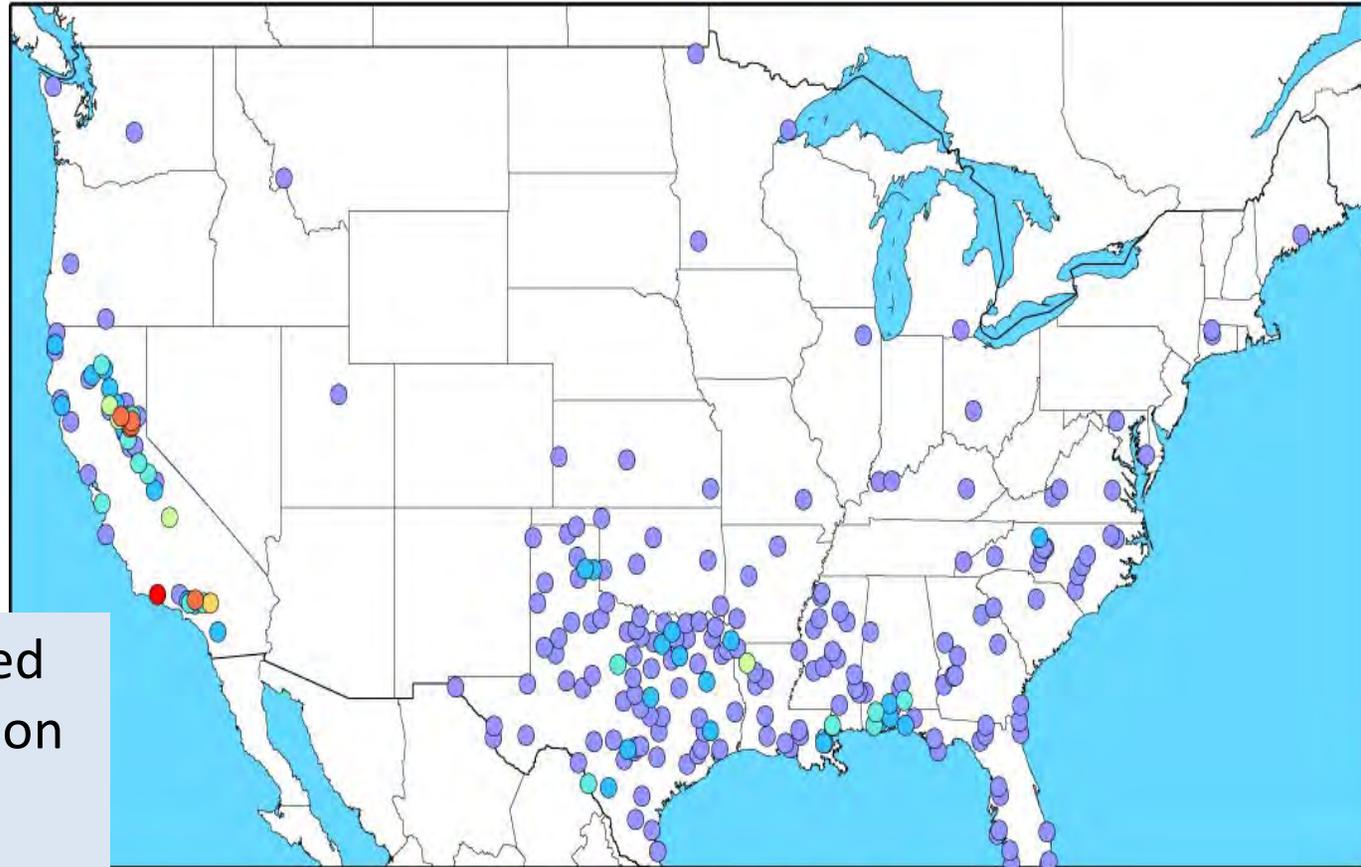
from 48 climate model simulations
downscaled to 12km using BCSD

median precip percent of historical (water yr precip) 1961–1990
BCSD 16 SRESA2 + 16 SRESB1 + 16 SRESA1B



High variability of weather and short term climate will continue

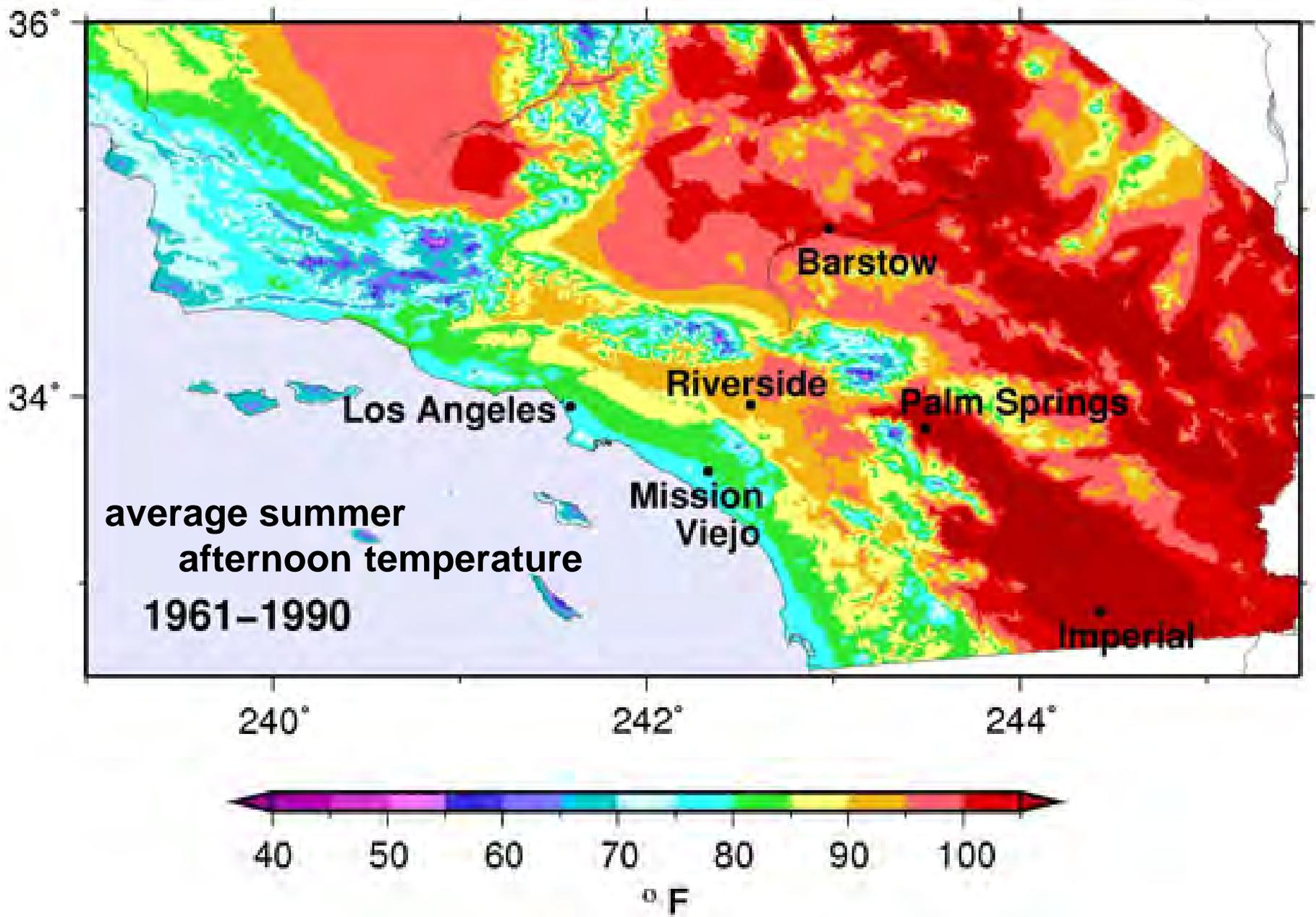
California records some of Nation's heaviest 3-day rainfall

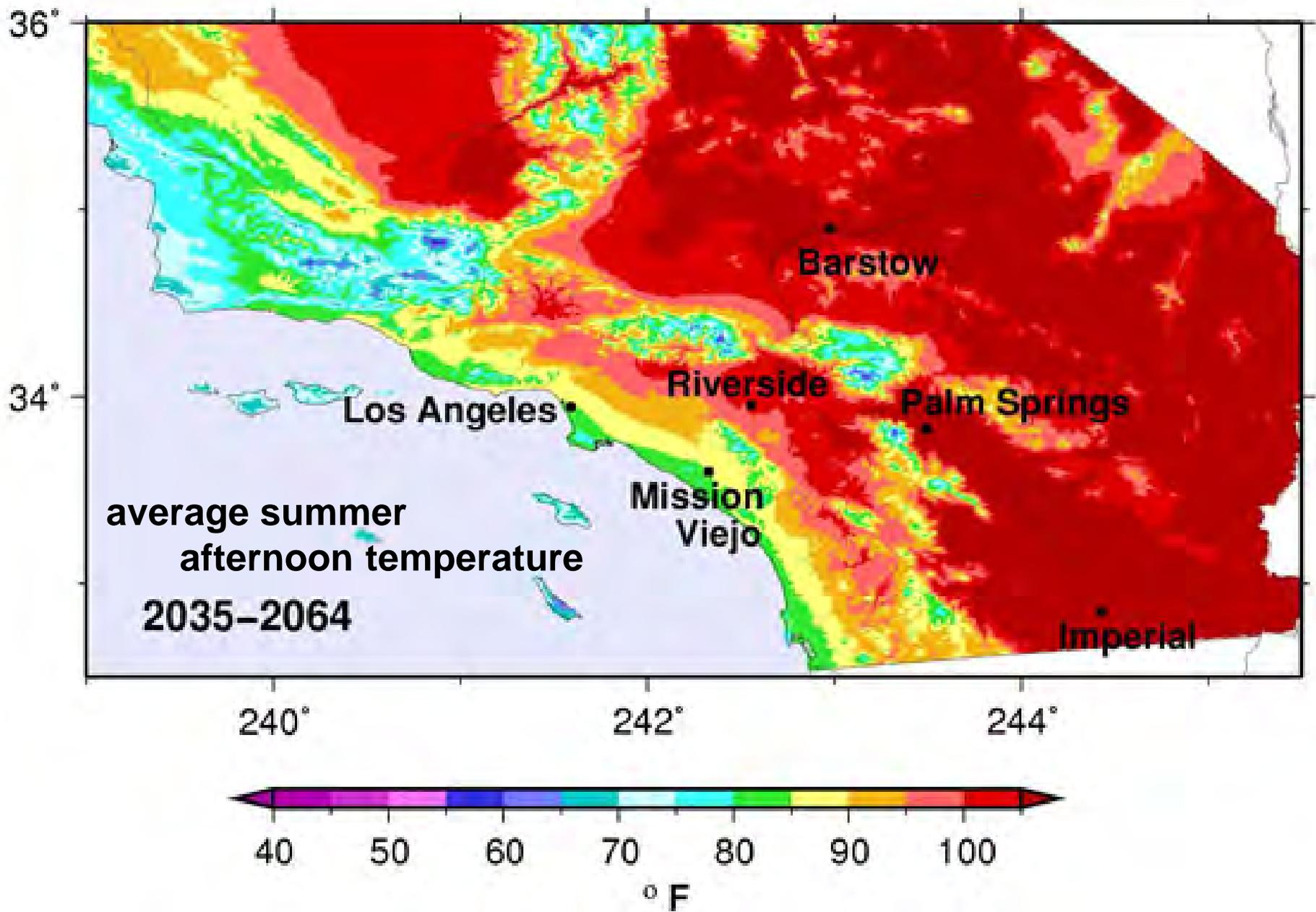


Locations that have recorded the highest 3-day precipitation amounts

Numbers of non-overlapping 3-day precipitation totals at COOP weather stations that exceeded 40 cm (15.75") from 1950-2008.

1 2 3 4 5 6 7
NUMBER OF 3-DAY EPISODES



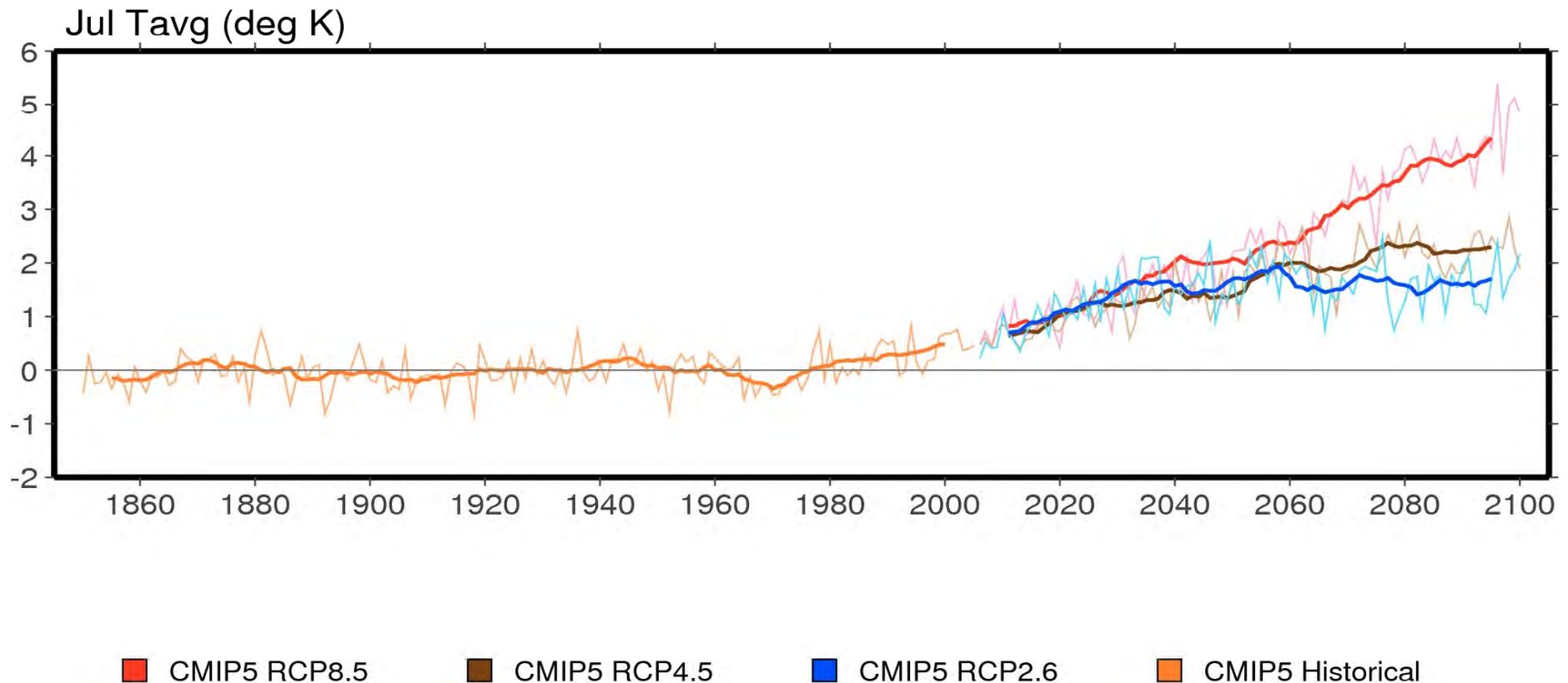


GFDL A2 1km downscaled to 1km
Hugo Hidalgo Tapash Das Mike Dettinger

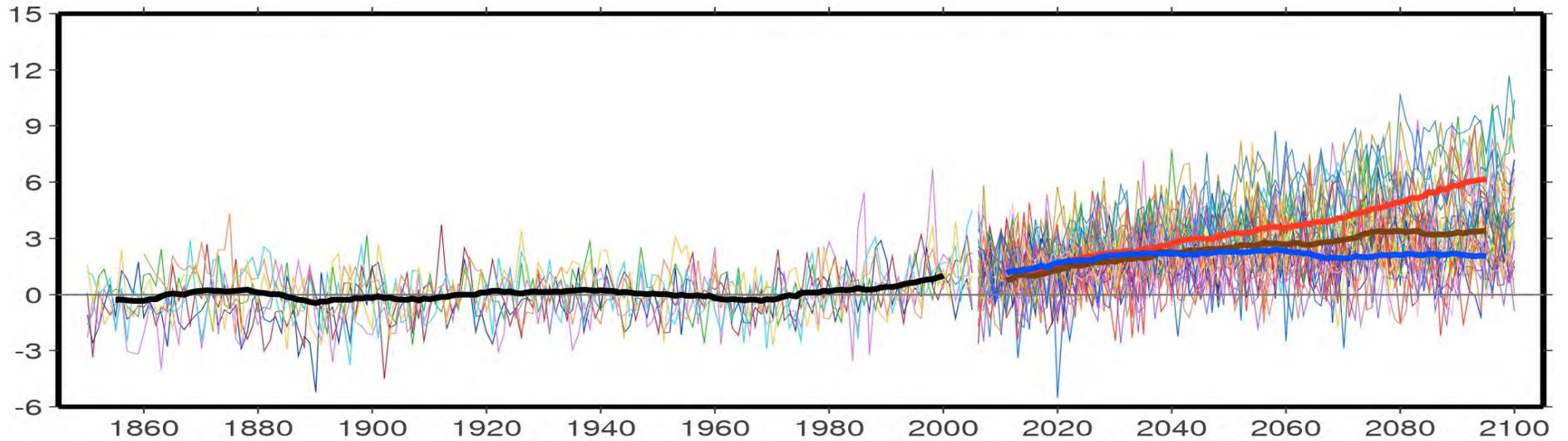
Projected Climate Warming through the 21st Century

- *because of greenhouse gas build-up we are committed and are already warming*
- *amount of warming in future decades depends on greenhouse gas emissions*

CMIP5 (14 models), simulation medians, San Diego, CA
(1961-1990 Historical Mean Removed)



CMIP5 simulations, Jul tempDM (deg K), Sacramento, CA (1961-1990 Historical Mean Removed)



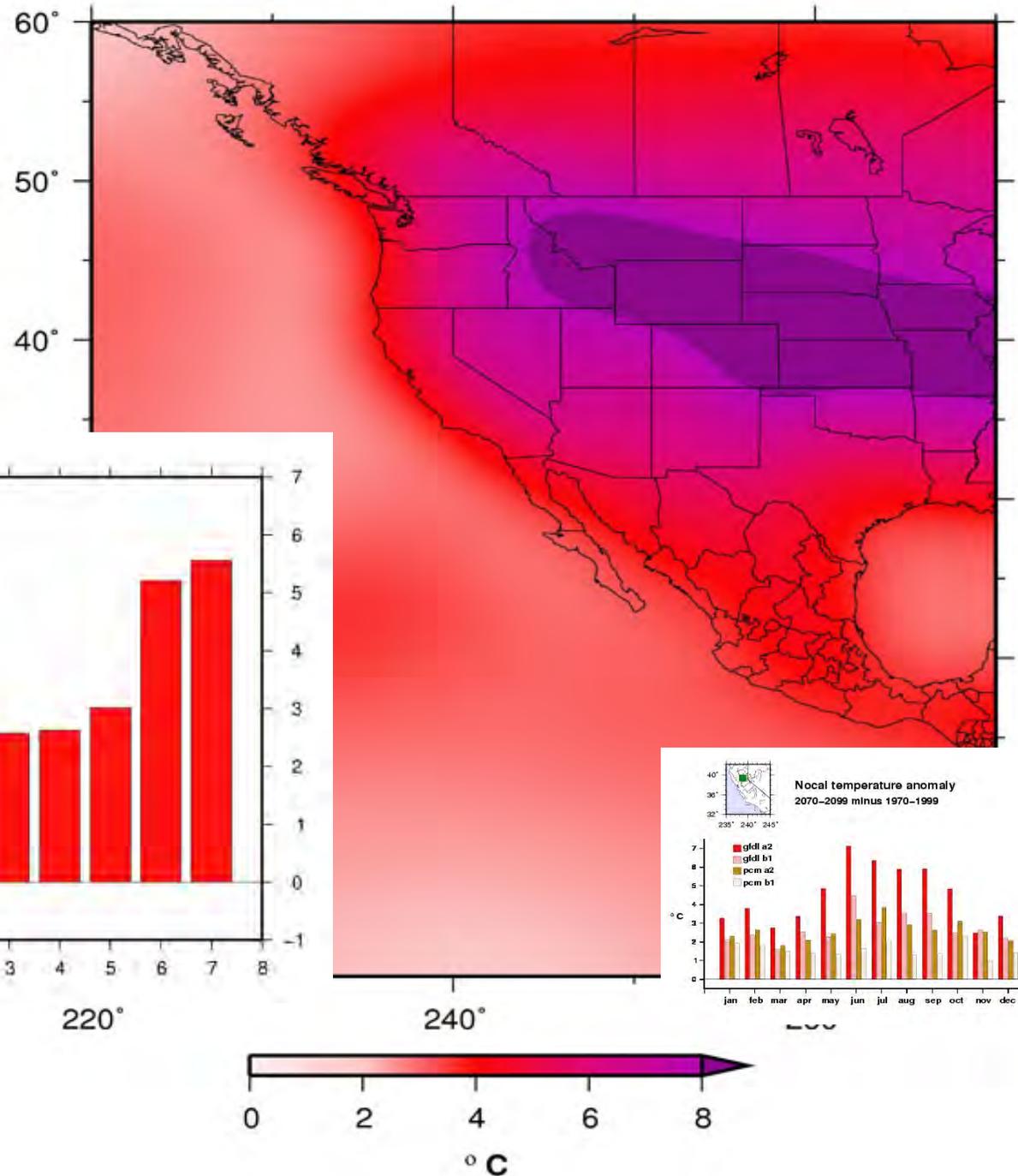
- RCP8.5 (2006-2100)
- RCP4.5 (2006-2100)
- RCP2.6 (2006-2100)
- Historical (1850-2005)
- NCARCCSM4-r1
- CANESM2-r1
- CNRMCM5-r1
- HADGEM2ES-r1
- INMCM4-r1
- IPSLCM5A-r2
- NORES1M-r1
- CSIROMK36-r1
- MRICGCM3-r1
- GFDLCM3-r1
- GISSE2R-r1
- MIROC5-r1
- MIROCESM-r1
- MPIESMLR-r1

(solid line = 11-yr smoothed median of simulation)

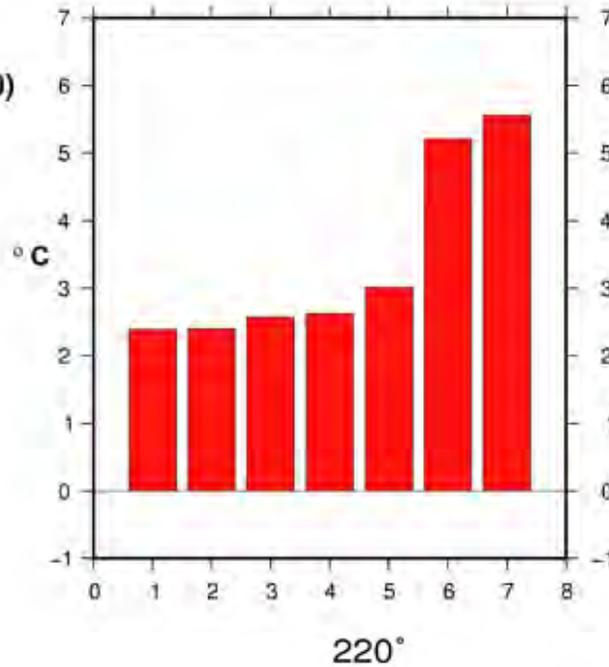
Climate models project ocean warming by end of century of 1.5-2.C greater warming on land than oceans would amplify thermal gradient across California coast-interior

Some models produce accentuated summer land warming.

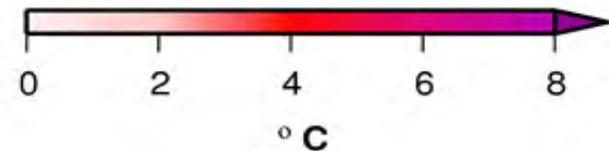
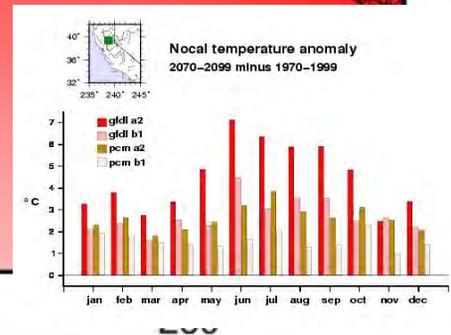
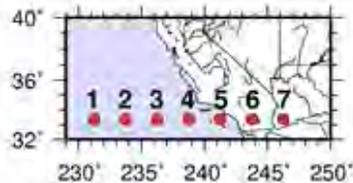
GFDL CM2.1 Jun-Aug air temp change 2070-2099 minus 1961-1990



sfc air temp difference (2070-2099 minus 1961-1990) sresa2 gfdl cm2.1 jja



southern calif transect

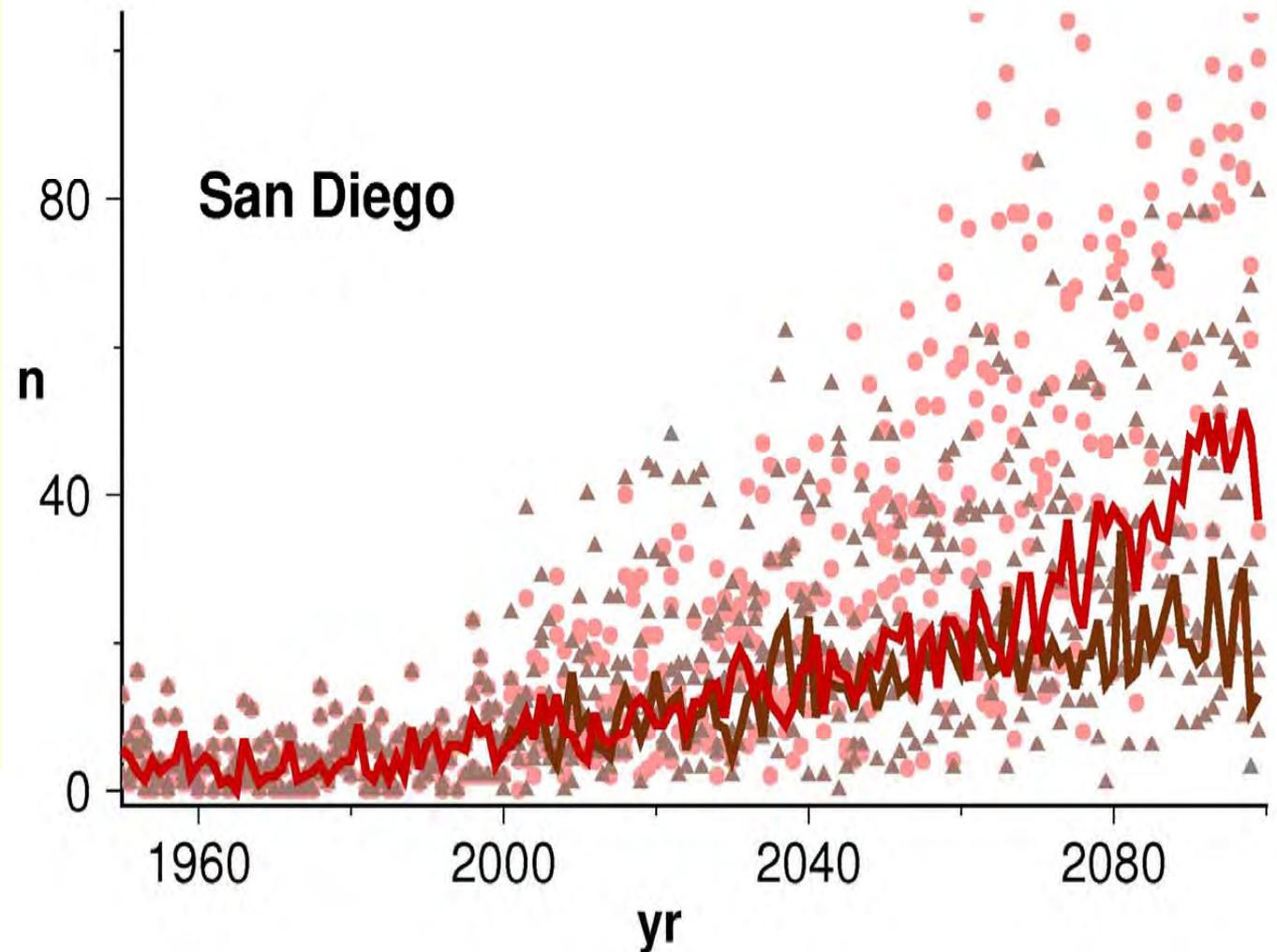


Heat Waves

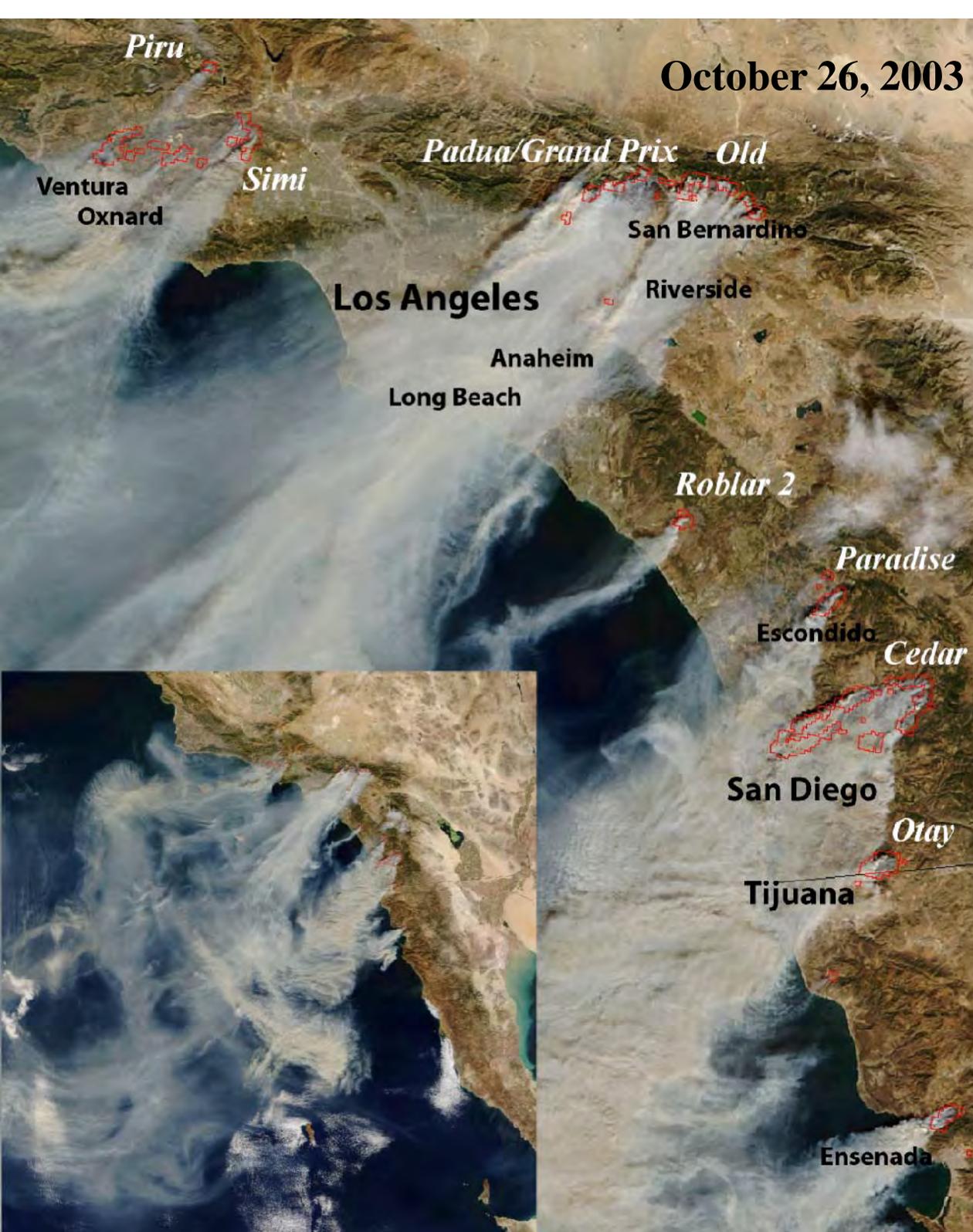
Projected in San Diego

SRES A2 and SRES B1 GHG
Emissions Scenarios

Number of Days (n), April–
October, When Maximum
Temperature (Tmax) Exceeds
the 98th Percentile Historical
(1961–1990) Level of 82° F at
San Diego from Four BCCA
Downscaled GCMs. Brown
carrots and red dots shown for
B1 and A2 emission scenarios,
respectively. Thick brown (B1)
and red (A2) lines show median
value from the four simulations.



April through October number of days above the historical (1961-1990) 98th percentile maximum temperature for 4 global climate models (cnrmcm3, ncarccsm3, gfdlcm2.1, ncarpcm1) from BCCA downscaling for sresa2 (red) and sresb1 (brown). Heavy lines indicate median number of days (per year). 98th percentile values range from 81.7 °F to 82.9 °F.



dry fuels
+ low humidity + winds
makes extreme fire danger

October 2003: Major Santa ana conditions

13 major fires in CA& Mex.

> 300K hectares (750K acres)

24 lives lost

239 injured

4866 structures lost

> \$2 billion in insured losses

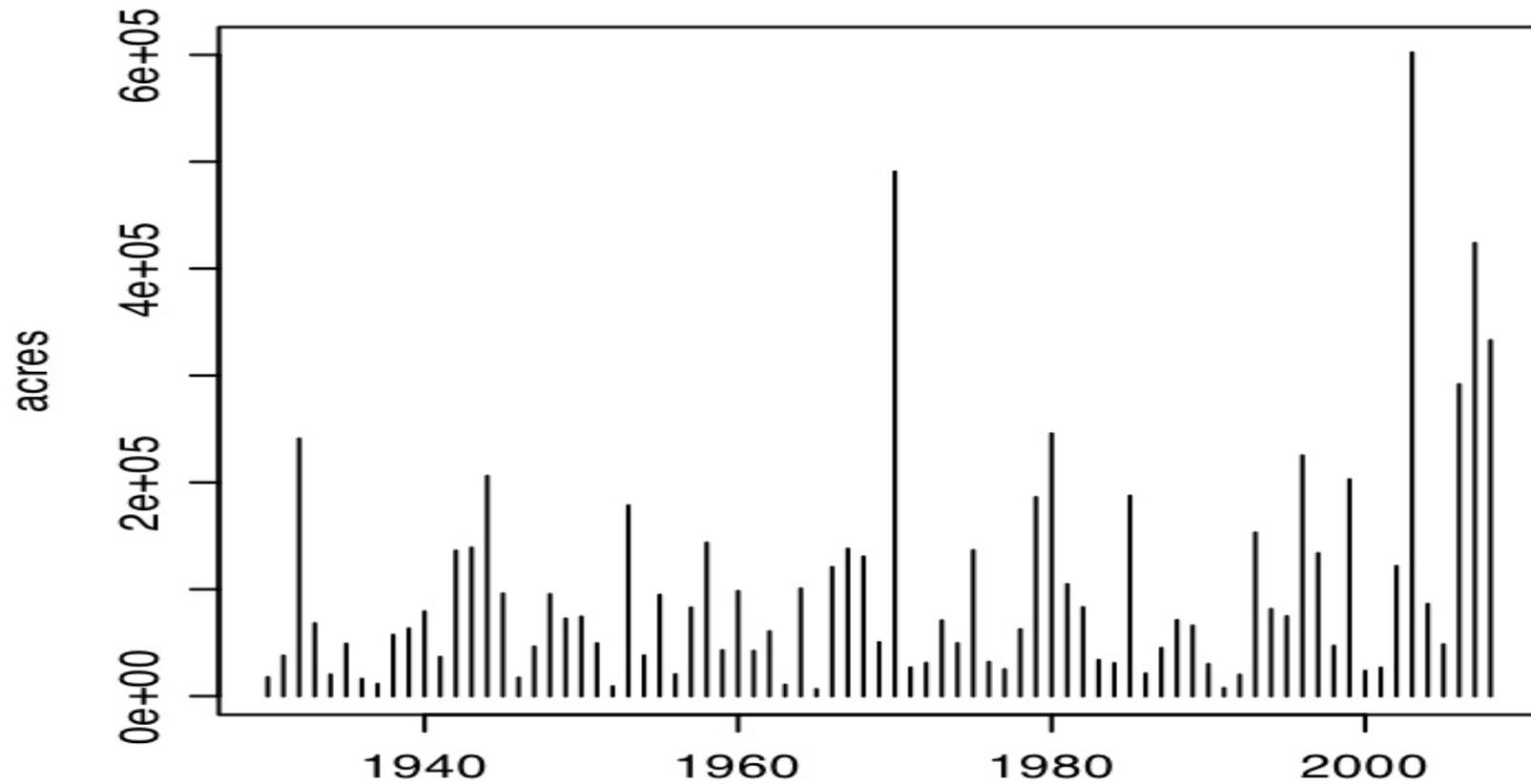
\$176 million in disaster relief

\$116 million in suppression costs

Largest fire (Cedar) and largest fire siege in California history

Increased SoCal fires since 2000-- a temporary rise or a trend?

Four Forests, RRU, LAC, ORC, SBC



California's Sierra Nevada snowpack How long will it remain?



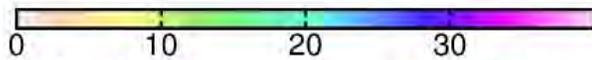
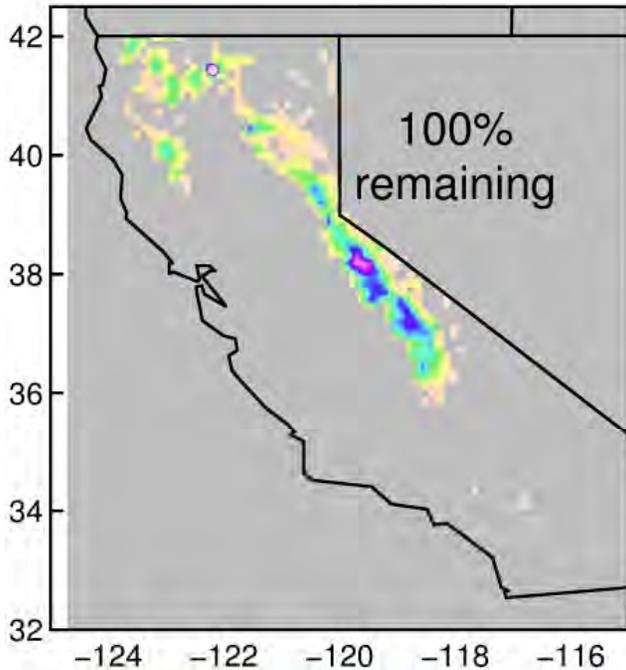
Sponsored by
California Energy Commission
National Science Foundation
Biological Service
US Department of Energy

*Douglas Alden
Scripps Institution of Oceanography
Installing met station, Lee Vining, CA*

Substantial Decline of California Spring SnowPack from Projected Climate Warming

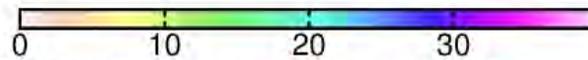
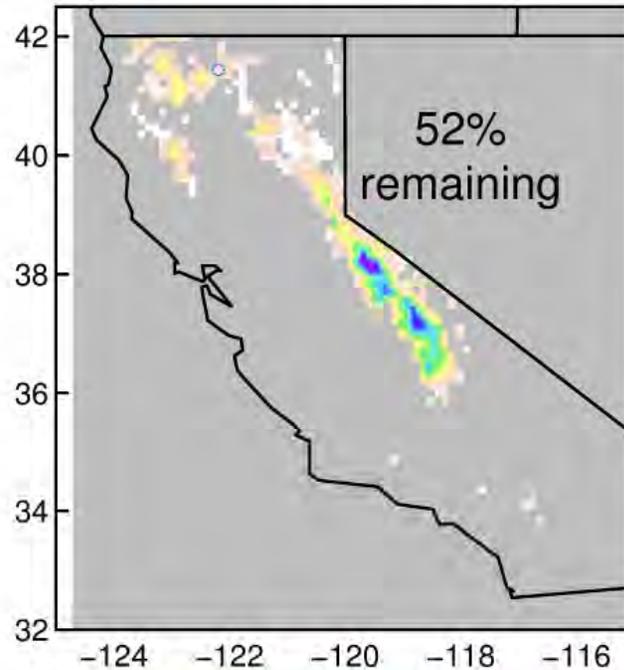
high or even higher losses by end of 21st Century depending on how much warming

Historical (1961–1990)



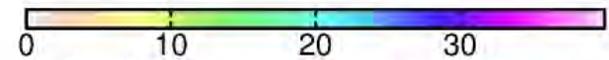
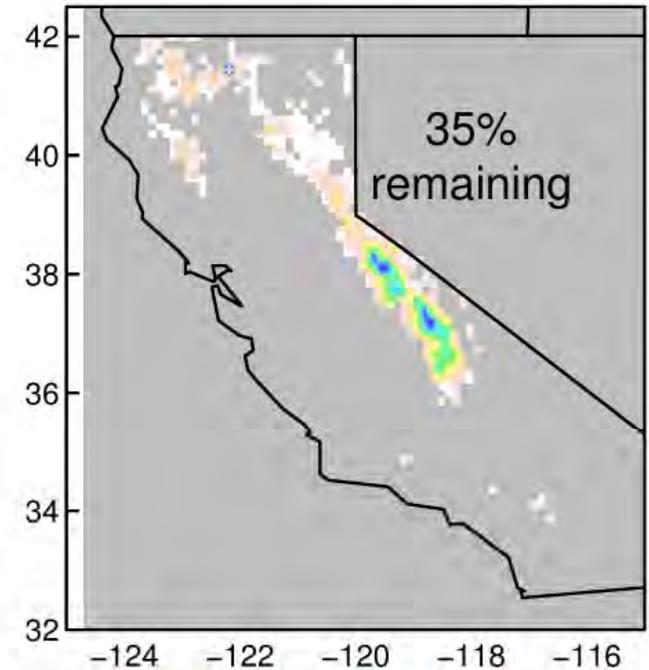
April 1 snow water content (in)

Lower warming range (2070–2099)



April 1 snow water content (in)

Higher warming range (2070–2099)



April 1 snow water content (in)

/net/puddle/data/cmip5_BCCA_and_VICed/west_us_BCCA_2012-06-10/plot_future_change_SWE_Apr1_v2.R Fri Dec 14 14:46:43 2012

David Pierce/Dan Cayan Dec 2012
to appear in California Water Plan Update
See also Pierce and Cayan 2013 J Climate

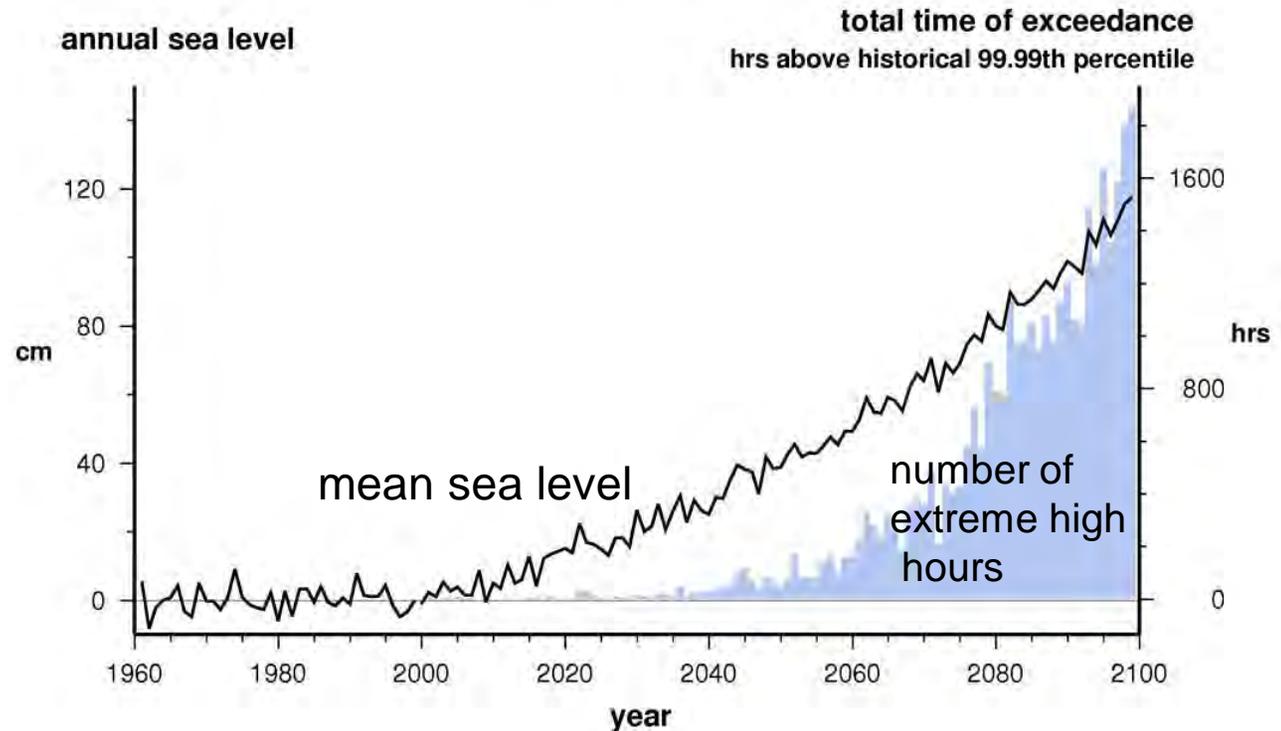
The *pace* of climate change is projected to be rapid

INCREASING SEA LEVEL EXTREMES

As mean sea level rises the frequency and magnitude of extremes would increase markedly. Under plausible rates of sea level rise, an event which in present day occurs less than once per year occurs scores of times per year by mid 21st Century and becomes commonplace by end of 21st Century.

Importantly the duration of extremes becomes longer, so exposure to waves is considerably greater.

San Francisco near Golden Gate
NOAA observations and
NCAR PCM1 SRES B1 using Vermeer and Rahmstorf global SLR scheme (2009)

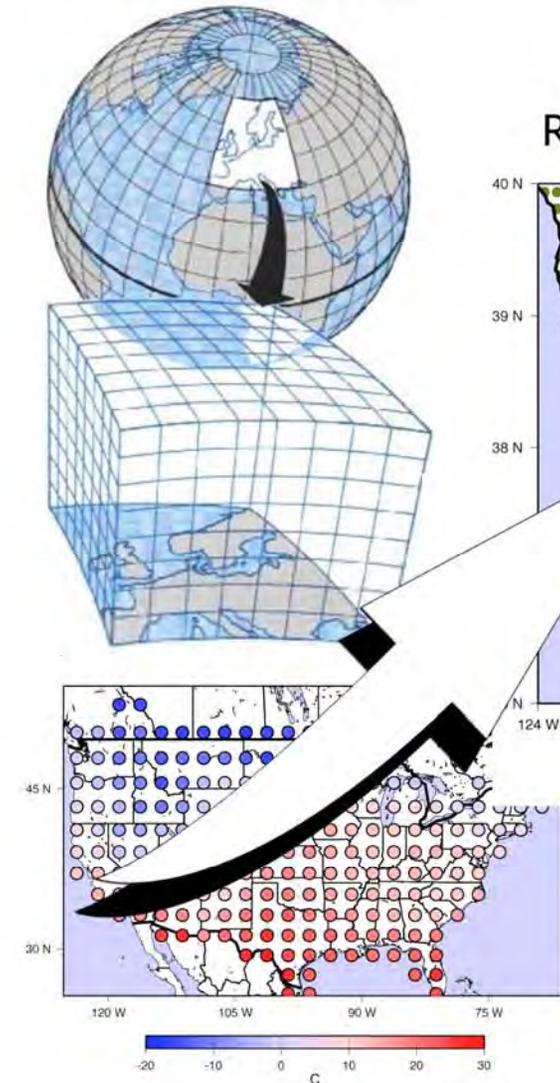


historical 1970–2000 avg annual sea level (cm): -0.54
historical 1970–2000 avg hrs above 99.99th percentile: 0.71

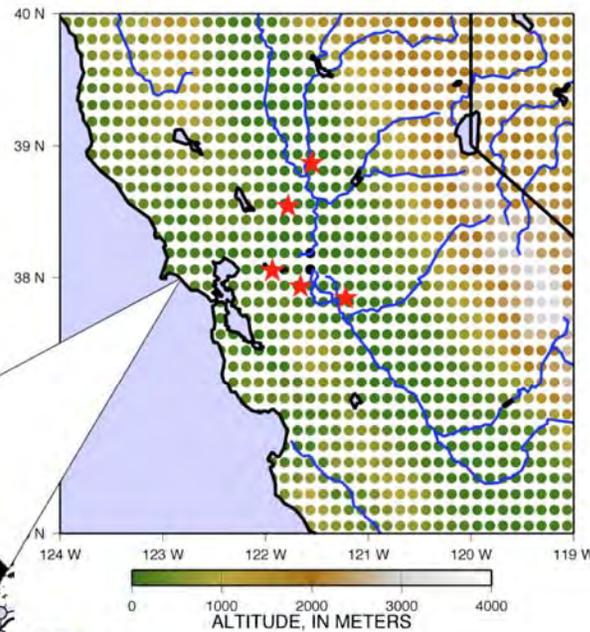
historical 1961–1990 99.99th percentile: 1.394m
NCAR PCM1 1961–1990 99.99th percentile: 1.413m

global model to regional model downscaling

Global Climate Model



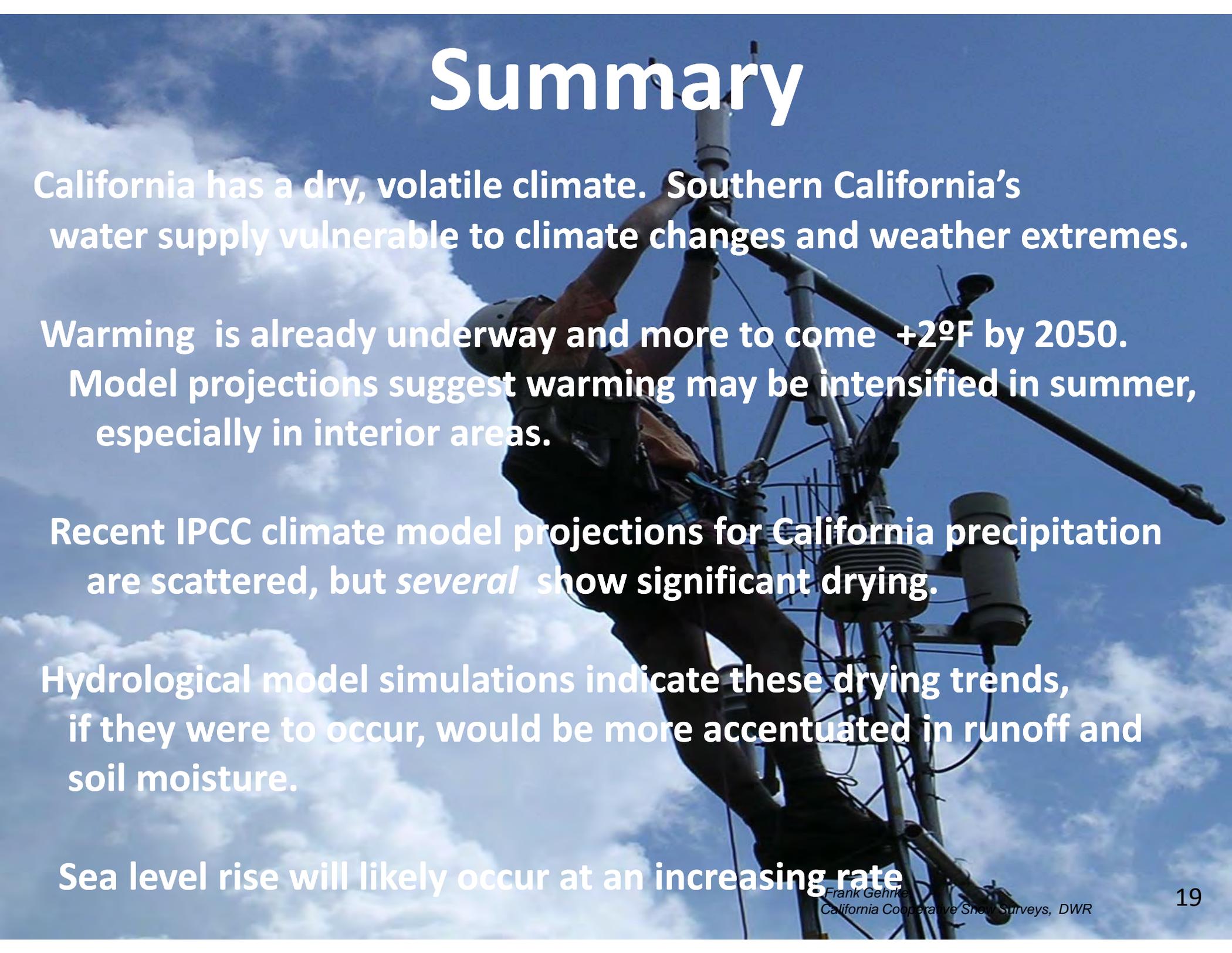
Regional Climate Model



GCMs ~150km
downscaled to
Regional models ~ 12km

Figure 1: insert stuff here

Summary



California has a dry, volatile climate. Southern California's water supply vulnerable to climate changes and weather extremes.

Warming is already underway and more to come +2°F by 2050. Model projections suggest warming may be intensified in summer, especially in interior areas.

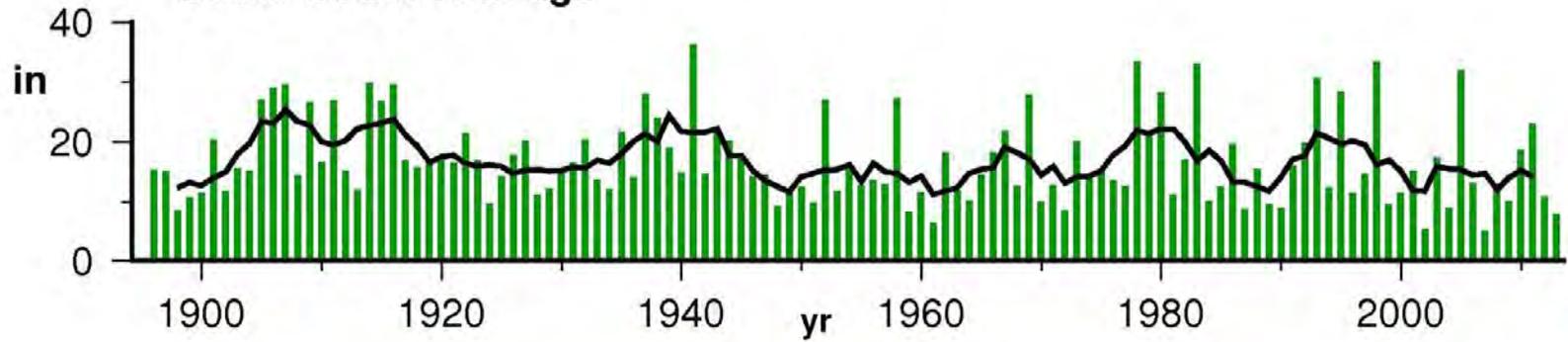
Recent IPCC climate model projections for California precipitation are scattered, but *several* show significant drying.

Hydrological model simulations indicate these drying trends, if they were to occur, would be more accentuated in runoff and soil moisture.

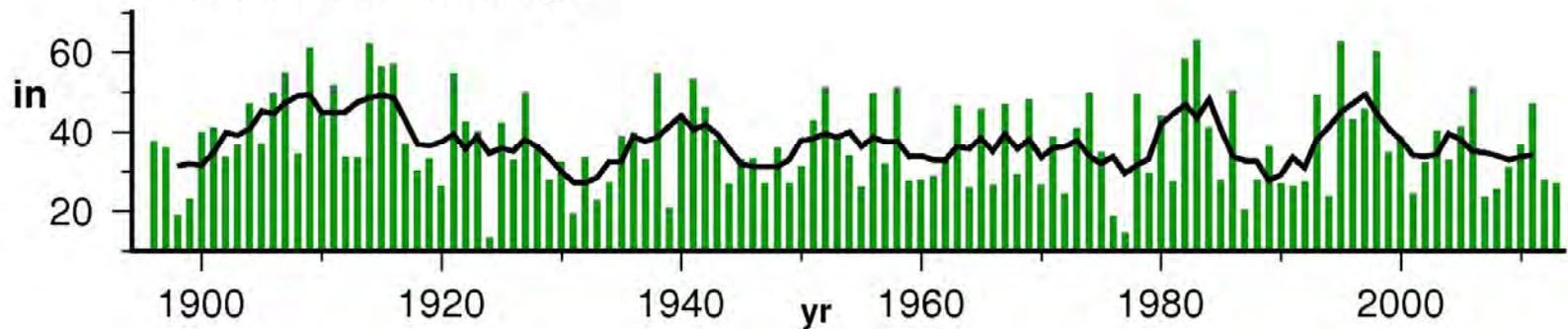
Sea level rise will likely occur at an increasing rate

precipitation water year climate division

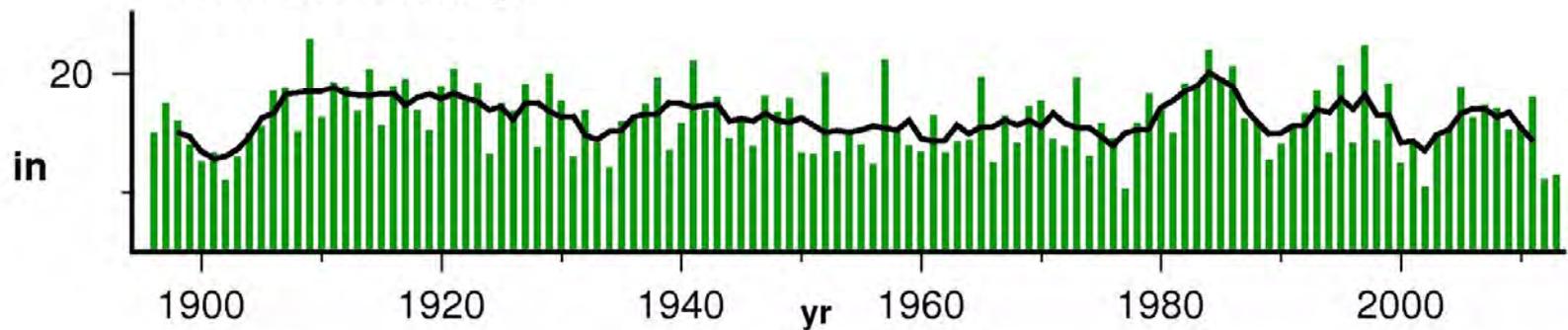
South Coast Drainage



Sacramento Drainage



Colorado Drainage



thick line: 5-yr running mean

global climate models have been downscaled across California

limited number of climate measures

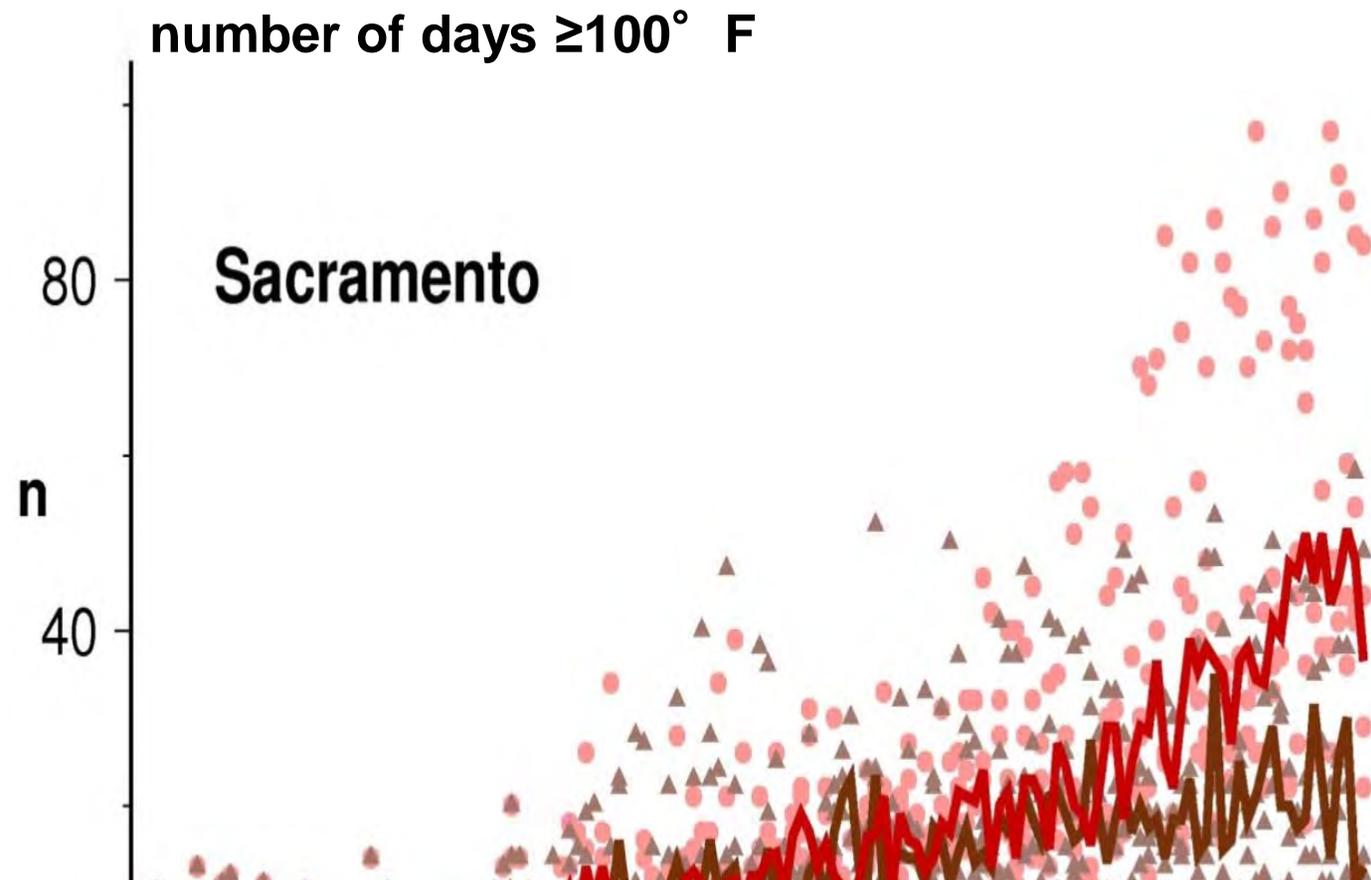
- * having and sustaining local observational datasets is valuable
- * understanding vulnerabilities is crucial

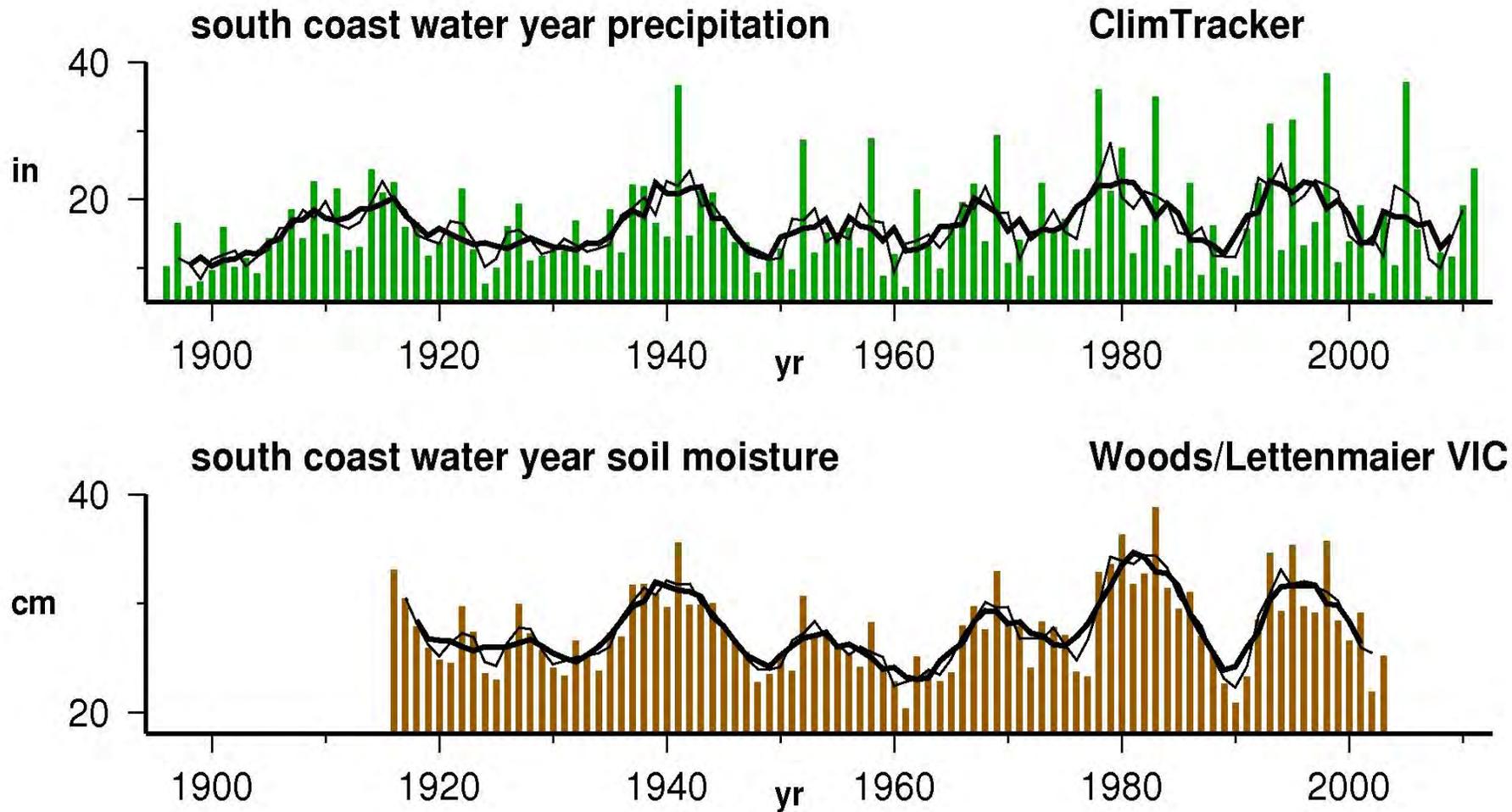
Heat Waves

Projected in Sacramento,
SRES A2 and SRES B1 GHG
Emissions Scenarios

Number of Days (n), April–
October, When Maximum
Temperature (Tmax) Exceeds
the 98th Percentile Historical
(1961–1990) Level of 38°C
(100.4°F) at Sacramento from
Four BCCA Downscaled GCMs.

Brown carrots and red dots
shown for B1 and A2 emission
scenarios, respectively. Thick
brown (B1) and red (A2) lines
show median value from the four
simulations.



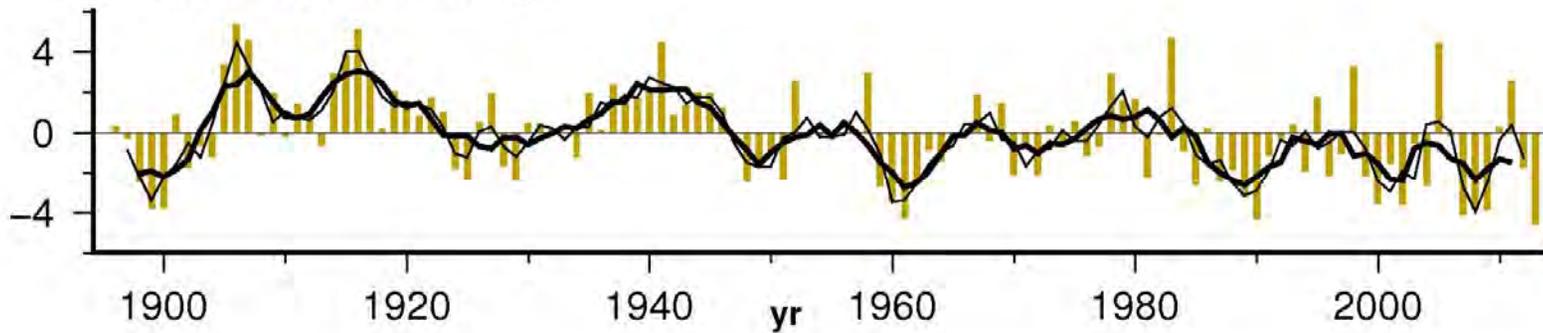


Great year-to-year variability in San Diego precipitation

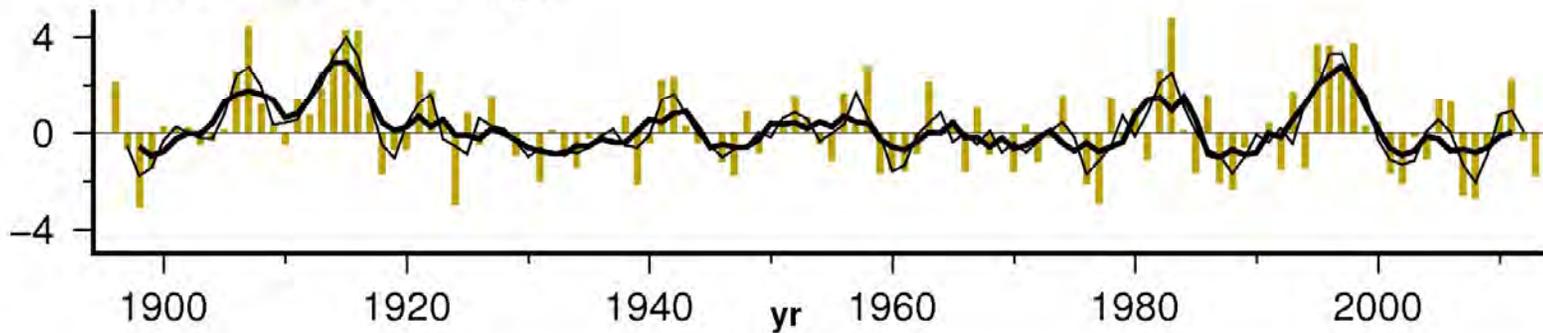
Ranges from ~33% to 280% of average

PDSI water year climate division

South Coast Drainage



Sacramento Drainage



Colorado Drainage

