

SOUTHWEST CLIMATE OUTLOOK & ASSESSMENTS

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CLIMAS: Climate Assessment for the Southwest

University of Arizona, Institute of the Environment



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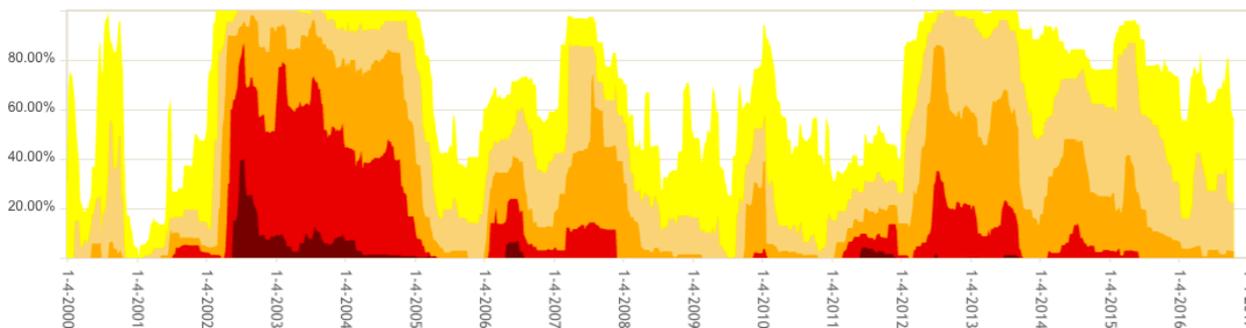
- 1) CLIMAS' research perspective on drought in the SW
- 2) How this has shaped our assessment activities
- 3) How this connects to our outreach activities



Drought in the Desert?

- Key Challenge: Characterizing drought in a region that:
 - Already sees limited precipitation.
 - Has a water system that is generally managed with this climate in mind.
- How to assess and monitor drought related vulnerability in this context?
 - Acute shortage vs. Long term deficit
 - Systems level vulnerability, dependence on built environment and infrastructure, and potential for cascading effects

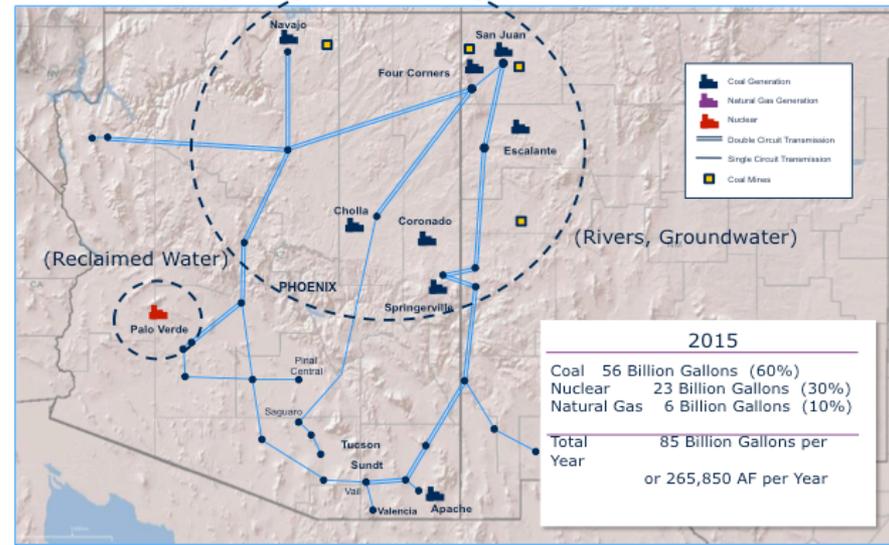
Colorado Basin RFC Percent Area



An Example...

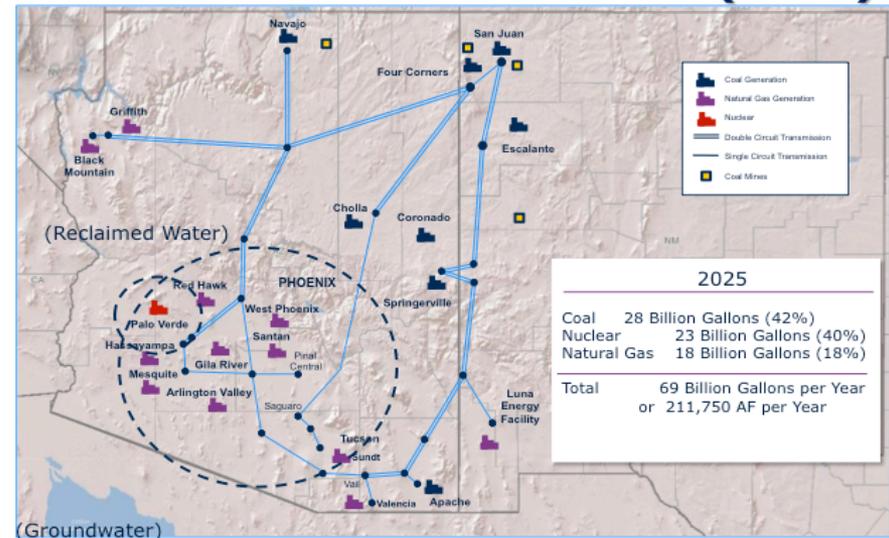
- Energy portfolio of a regional utility
- Water resource demands based for fuel switching
 - Coal vs. natural gas
 - Ground vs. reclaimed water
- Ongoing/Long-term drought in four-corners region vs. water resource competition in southern Arizona.

Power Generation Water Use (2015)



2015 results based AuroraXMP dispatch simulations for the Desert Southwest region.

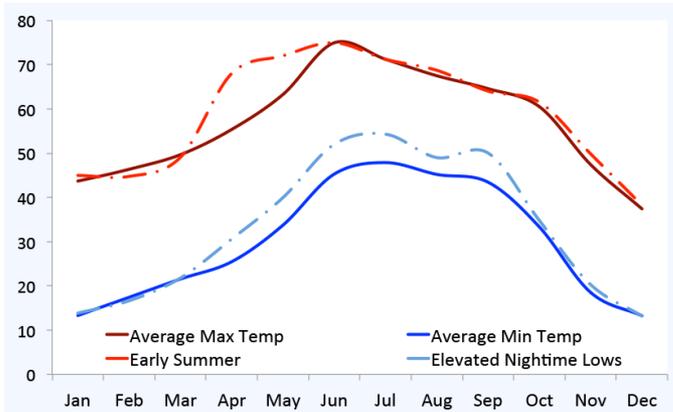
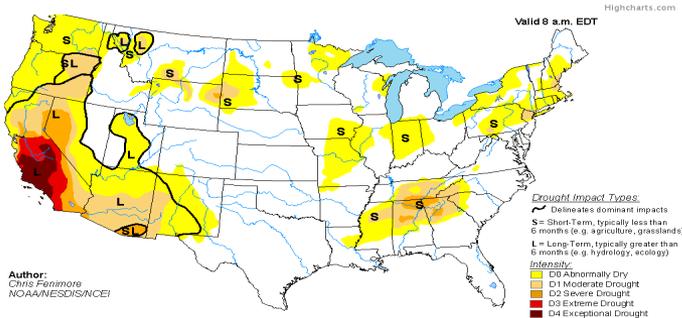
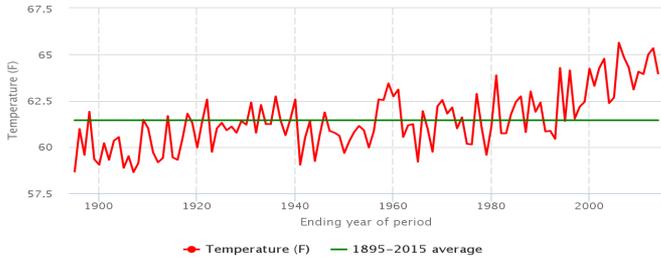
Power Generation Water Use (2025)



2025 results based on AuroraXMP dispatch simulations for the Desert Southwest region assuming potential environmental regulations under Regional Haze and the Clean Power Plan 111(d). Net load forecast assumes current standards for distributed generation and energy efficiency in AZ and NM.

Cascading or Related Effects of Drought

Minimum Temperature for Arizona
3 month period ending in August



- Demographic growth & warming climate – increased competition over dwindling water resources
- Potential drop in hydropower baseload due to extended drought
- Warmer temps - increased demand for electricity - increased water consumption for thermoelectric generation
- Reduction in CAP water supplies for Tucson - more groundwater use – trade-offs in water use

CLIMAS Assessment

- 3 pairs of communities in AZ and NM
 - Tucson/Albuquerque, Yuma/Las-Cruces, Flagstaff/Santa-Fe
- Characterizing short and long term drought and climate vulnerabilities in 6 communities
 - Urban planning, environmental and water resource management, public health, local industry/agriculture, emergency management → role of changing climate
- Documenting potential cascading or related effects that could affect the region, and at what timescale
 - Identifying plans or actions already in place
 - Working with local stakeholders to determine additional research needs/priorities based on regional vulnerabilities

CLIMAS Assessment & Outreach

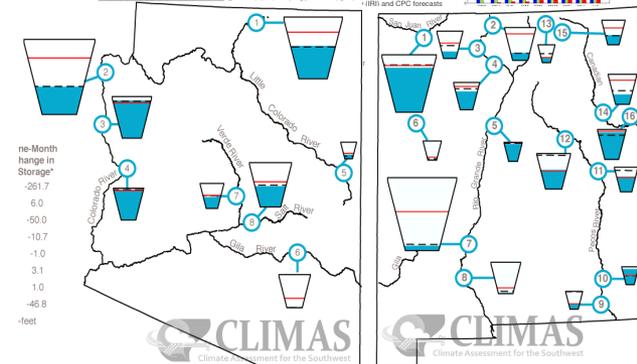
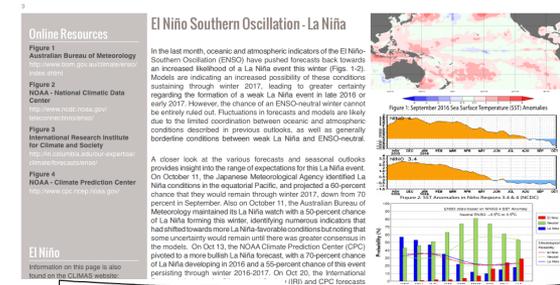
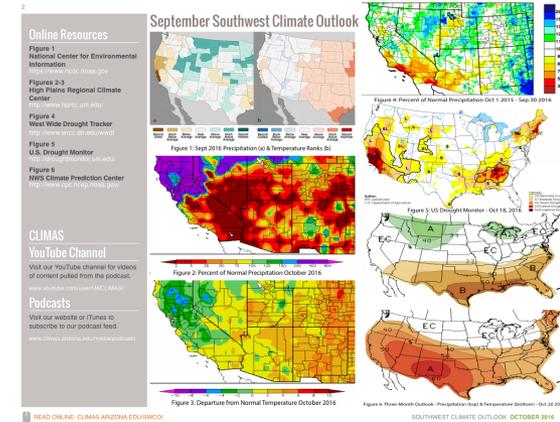
- Assessment to characterize regional vulnerabilities and identify research priorities
- Assessment as network building opportunity
- Identifying stakeholders who are involved in drought/ climate related planning
 - Interest in additional climate/drought information
 - Collaborative research projects on topics of shared interest
 - General public interest → research participants → collaborators
 - Or maybe they run with these ideas themselves...

CLIMAS Outreach

- Translating science/information to the public *and* as a means to engage with regional stakeholders & experts
- Creating multiple avenues to engage diverse audiences,
- General information and targeted materials
 - General SW climate, drought specific, ENSO, etc..
- “Loss leaders” – activities that can build our network and/or lead to partnerships
 - Collaboration with possible stakeholders
 - Building networks and relationships over time

Southwest Climate Outlook: SWCO

- Monthly outlook sent to 1600 person email list comprised of regional stakeholders, researchers, and those interested in SW climate issues
 - Monthly Climate Summary
 - Reservoir Levels (AZ & NM)
 - Short Feature Articles
 - Monsoon Update, Tropical Storm Recap, El Niño Forecast/Tracker
 - CLIMAS News & Updates
- We aggregate this information from multiple sources, and encourage/facilitate borrowing and re-transmission of this information



Podcasts



- Southwest Climate Podcast
 - Extended/informal conversations on recent climate/events
 - Targeted at climate and southwest
- Special Podcast Series
 - 1075' – Lake Mead Series
- Planned Podcast Series
 - Vulnerability (social, economic, etc.)
 - SW Ecological/Climate Impacts



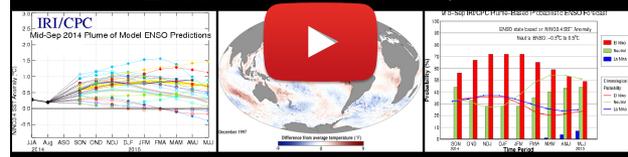
CLIMAS YouTube Channel

CLIMAS: CLIMATE ASSESSMENT FOR THE SOUTHWEST
AUGUST 2014 SW CLIMATE PODCAST
Monsoon and Drought Q&A





CLIMAS: CLIMATE ASSESSMENT FOR THE SOUTHWEST
SEPTEMBER 2014 SW CLIMATE PODCAST
El Niño Models - Q&A





CLIMAS: CLIMATE ASSESSMENT FOR THE SOUTHWEST
SEPTEMBER 2014 SW CLIMATE PODCAST
SW Tropical Storm Climatology





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OCTOBER 2014 SW CLIMATE PODCAST
2014 Monsoon Recap





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SEPTEMBER 2014 SW CLIMATE PODCAST
NORBERT VS. ODILE

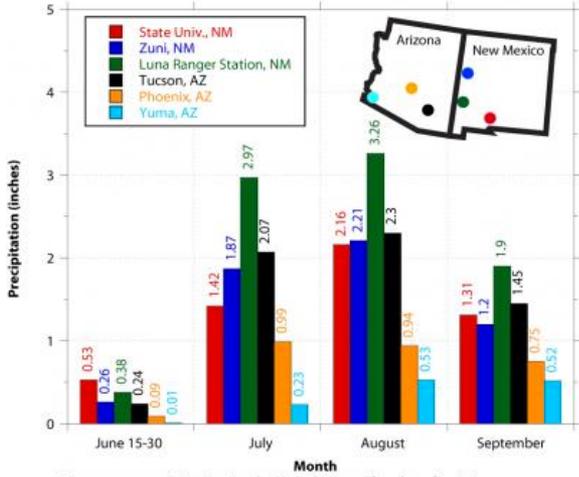




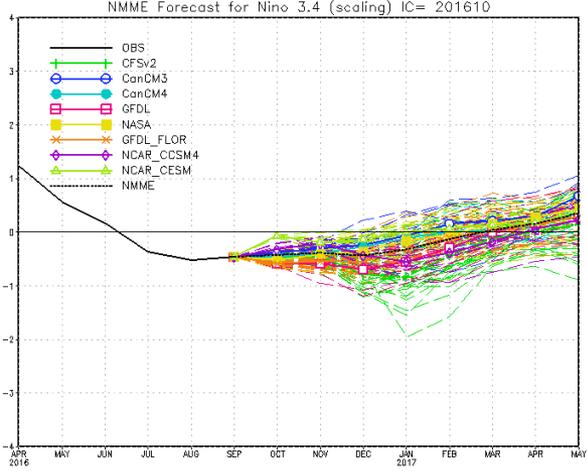
- Short segments from podcasts – edited for concision
- Focus on “evergreen” information or important seasonal events
- Teachable concepts targeted at larger audience than SW climate podcast listeners

Topical "Hubs" (CLIMAS website)

- Aggregated information about seasonal/climate events
 - Anticipating likely/demonstrated demand for these topics
- El Niño (2014-2016)
 - Forecast, outlook and timeline of expected effects
 - Past event analogs
 - Summary/commentary articles
- Monsoon Tracker (Seasonal)
- La Niña (2016?-???)



Monsoon precipitation in the Southwest. The data for Arizona was obtained from the NWS Tucson; New Mexico data was compiled from the Western Regional Climate Center.



Blog: Southwestern Oscillations

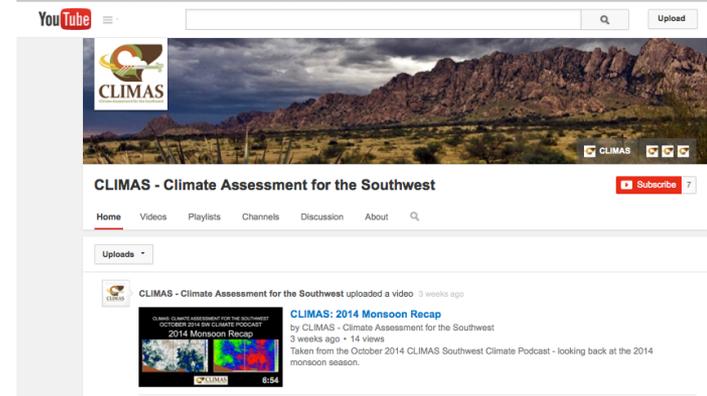
- Expands on SWCO – fast turnaround on timely subjects
 - Tropical storms, monsoon events
 - 1075 and Drought Updates
 - Q/A on trending SW climate topics
- Less formal venue to disseminate research/knowledge
 - Notes from the field
 - Ask an applied climatologist/economist
 - Feature articles/posts



Social Media

- Targeted Engagement
 - Publicize work across multiple networks
 - Interaction with interested (and highly engaged) users (quality vs. quantity)

- Takes time/energy to maintain
 - But gives us a presence in social media spaces where people might look
 - Opens up new connections with individuals and groups

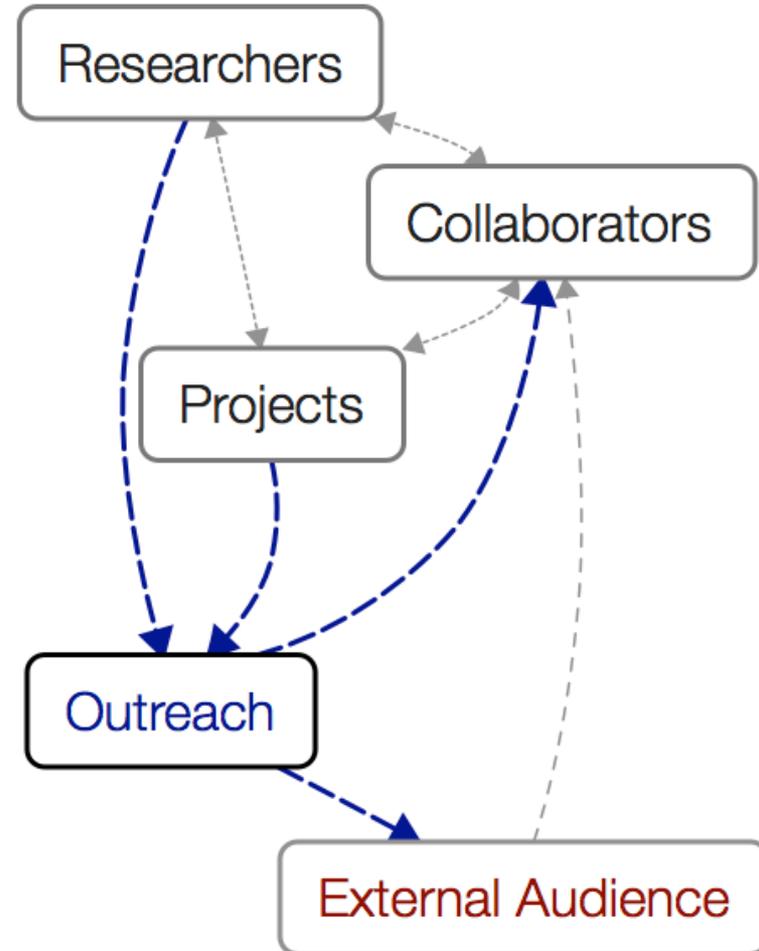


Challenge/Goal: Effective Engagement

- **Challenge: Bridging between various formats**
 - Longer form (academic) approaches (articles, conferences)
 - Faster moving/short form (media, social media, public meetings)
- **Strength: Multiple pathways to engage audiences**
 - Information dissemination, dialogue, collaboration, etc..
- **Goal: Maintain coherent identity and direction**
 - I.e. not simply scattershot info-dump, but a calculated effort

Integrated Approach

- Engagement Framework
 - Unknown → participant → collaborator
 - Can we facilitate and track this conversion?
- Expanding Network of Collaborators
 - Outreach activities to expand reach
 - Research/assessment networking to build network of possible stakeholders/ collaborators
- Emergent research partnerships with stakeholders developed out of outreach *and* assessment activities



QUESTIONS?

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