



Climate Safe Infrastructure Working Group

Meeting #2

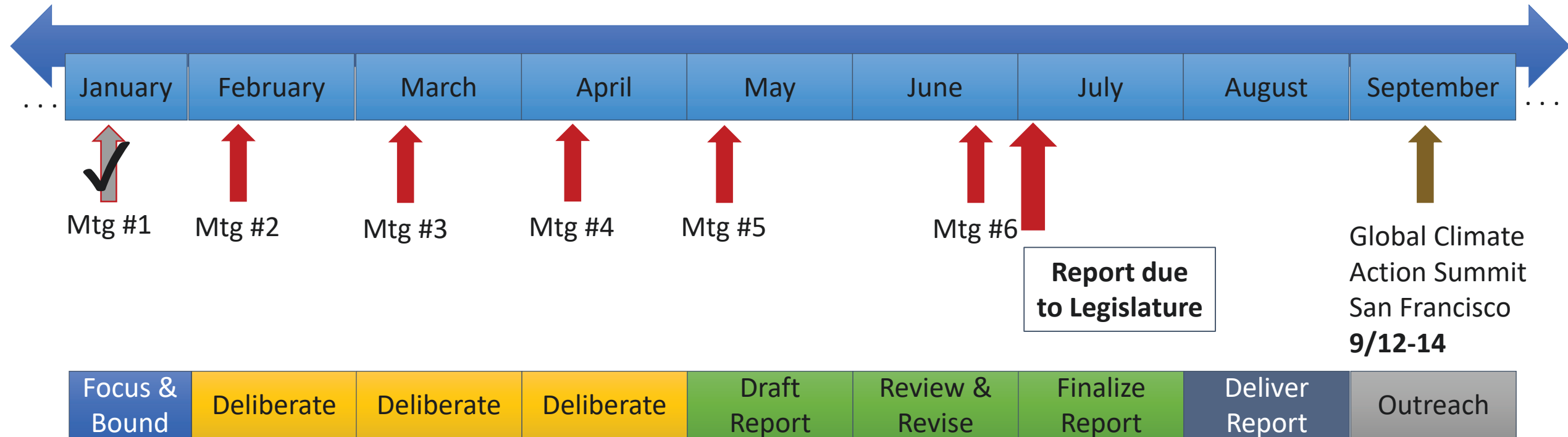
Los Angeles City Hall
200 N. Spring Street, Room 1050
Los Angeles, CA 90012

Monday, February 12, 2018
10am – 4pm

Agenda

Time	Agenda Item
10:00-10:15am	Welcome, Review of Mtg. #1, Charge for Mtg. #2
10:15-11:30am	Identification & prioritization of climate-sensitive infrastructure
11:30-12:00	Agree on definitions
12:00-12:30	Regional Example: Build Forward Los Angeles
12:30-1:30	Lunch
1:30-2:30	Identification of infrastructure standards
2:30-3:30	Identification of climate science needs
3:30-4:00	Outlook and trajectory to Mtg. #3
4:00	Adjourn

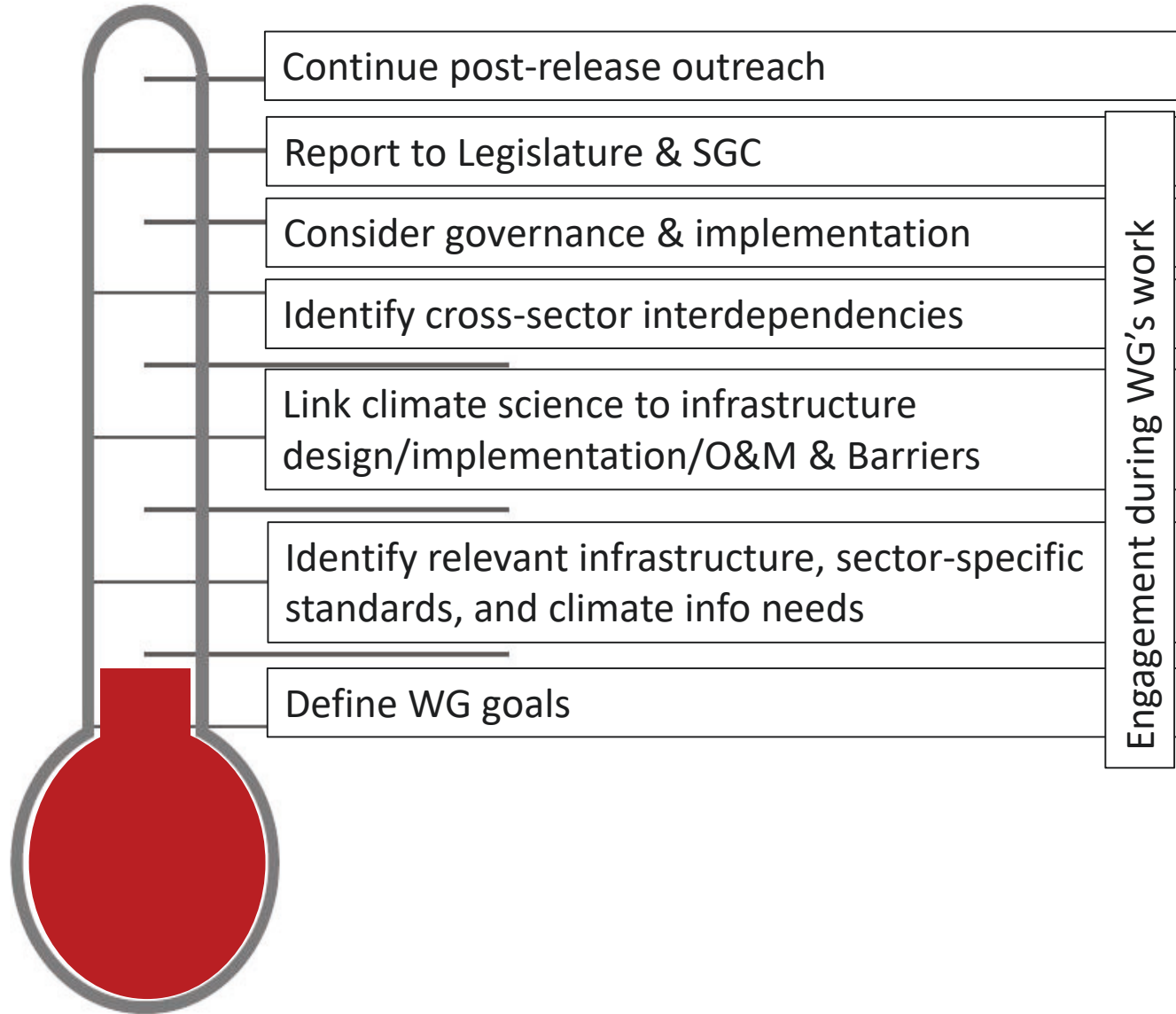
Project Timeline



Meeting Dates, Locations, Topics & Tasks

Mtg	Dates	Locations	Topics and Tasks
1	1/18	Sacramento	Determine project goals; WG structure and process
2	2/12	Los Angeles	Identify relevant infrastructure, sector-specific infrastructure standards, climate-sensitivity, information needs
3	3/13	Bay Area	Linking forward-looking climate science and impacts information with standards, codes, certifications throughout infrastructure design/implementation/maintenance cycle
4	4/11	Sacramento	Sector-specific design standards and cross-sector interdependencies
5	5/9	San Diego	Governance of setting/changing design standards; non-standard strategies to ensure climate-safe infrastructure; deliberation of draft report; agree on refinement needs
6	6/20	Sacramento	Agree on final report revisions; delivery and outreach/promotion; project debrief

Measuring progress



Co-Development of Project Goals & Objectives



Photos: Susi Moser, CSIWG members clustering goals at Meeting #1



Synthesis of Goals Identified in Meeting #1

Overarching Goals (with numerous sub-objectives each)

Orient toward longer-term outcomes (Vision, indications of success)

Produce a set of outputs by July 1

Provide clear policy guidance for near-term and longer-term decisions

Address key issues for science & the science-practice interface

Focus on engagement during and after the life of the Working Group

Embody a set of principles and values throughout the Working Group's work

The Arc of Our Work

- Goal setting
- Rules of engagement

- **Identify, prioritize climate-sensitive infrastructure;**
- **Agree on definitions**
- **Prioritize relevant standards, codes, guidelines;**
- **Identify information needs**

- Connect engineers' information needs with climate science;
- Identify barriers to information use
- Work through concrete examples

- Refine information needs when considering cross-sector interdependencies
- Refine prioritization
- Consider comprehensive approaches to climate-safe infrastructure

Meeting 1

Meeting 2

Meeting 3

Meeting 4



Charge for Meeting #2:

- **Task 1:** Identify types of climate-sensitive infrastructure
- **Task 2:** Begin exploring questions of prioritization of updating infrastructure design guidelines and standards
- **Task 3:** Agree on definitions for resilience and climate-safe infrastructure in sector-specific and holistic ways
- **Task 4:** Identify opportunities for ensuring that infrastructure is rendered or built in resilient, climate-safe ways
- **Task 5:** Identify climate information needs for use in infrastructure planning and engineering

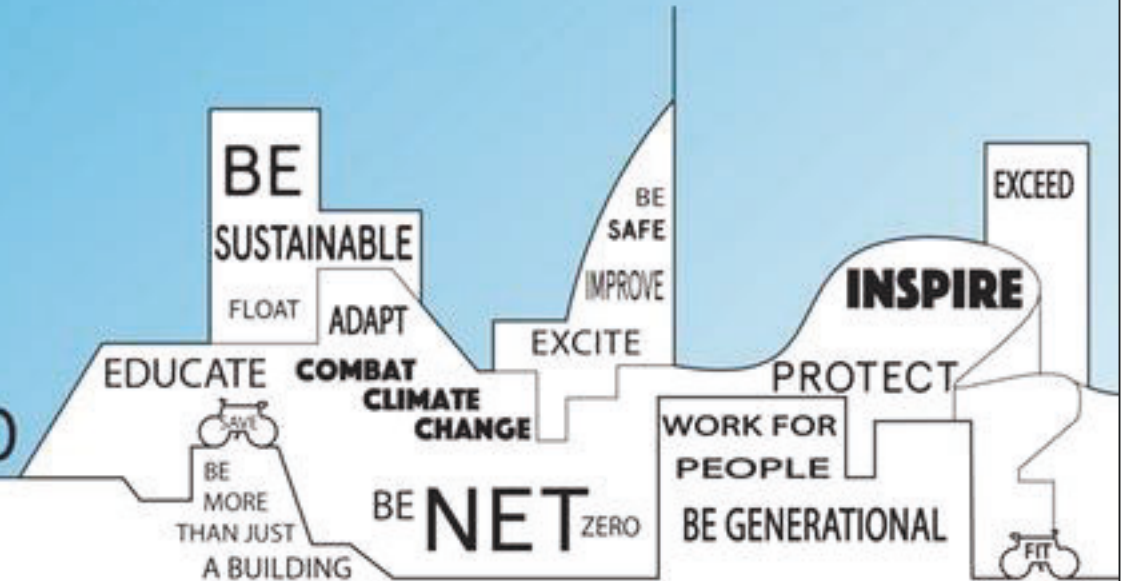


Regional Example

- Sabrina Bornstein, Deputy Chief Resilience Officer | City of Los Angeles
- Matt Barnard, Principal | Degenkolb Engineers

IN THE FUTURE, I WANT BUILDINGS TO

Building
Forward
LA



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Agree on Definitions

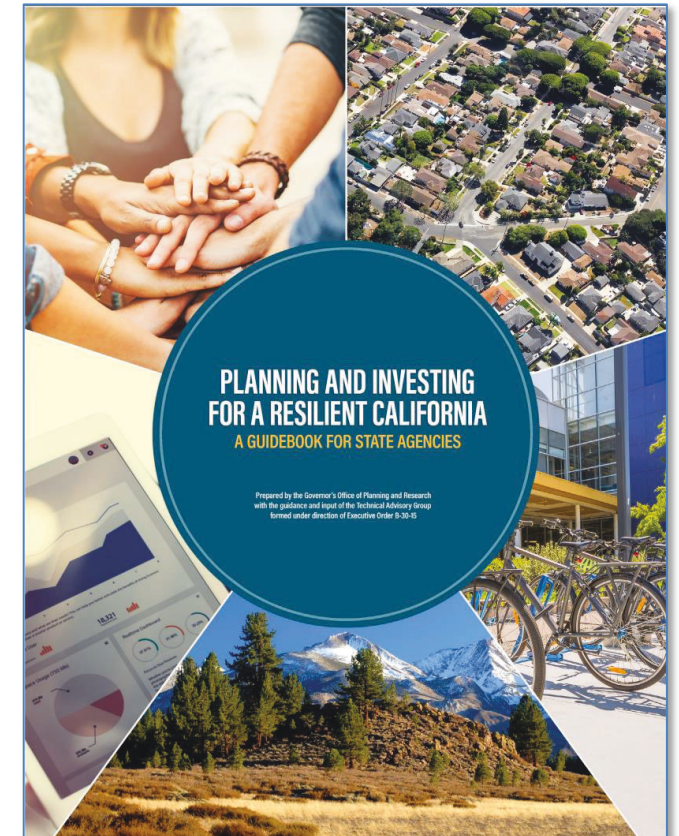
- (Critical) Infrastructure
- Resilience
- Climate-Safe



Resilient CA Guidance: “Infrastructure”

Assets that support the functioning of society or whose operation and maintenance are necessary for the public’s health, safety, and welfare. These assets can be natural or man-made, as well as physical or virtual, and can be held publicly or privately.

The benefits from these assets are generally available to a large portion of the population, because they are held in public trust, or because their adoption is so widespread that social processes have become reliant on them.



http://opr.ca.gov/docs/20171117-Building_a_Resilient_CA.pdf

ASCE: “Critical Infrastructure”

Critical infrastructure includes systems, facilities, and assets so vital that their destruction or incapacitation would have a debilitating impact on national security, the economy or public health, safety, and welfare.

Critical infrastructure may cross political boundaries and may be built (such as structural, energy, water, transportation, and communication systems), natural (such as surface or ground water resources), or virtual (such as cyber, electronic data, and information systems).

Identify Climate-Sensitive Infrastructure by Sector

Infrastructure type	Existing condition / status	Exposure to existing climate stresses	Perceived/expected changes in climate stressors
E.g., Transportation – Culvert Design	205,000 culverts on State Hwys, 65% in Good Condition, 23% in Fair Condition, and 12% in Poor Condition	Exposed to scour from coastal storms; potential for tidal flooding...	E.g., Increased exposure to coastal storms, erosion and rising seas...

Small Group Work:

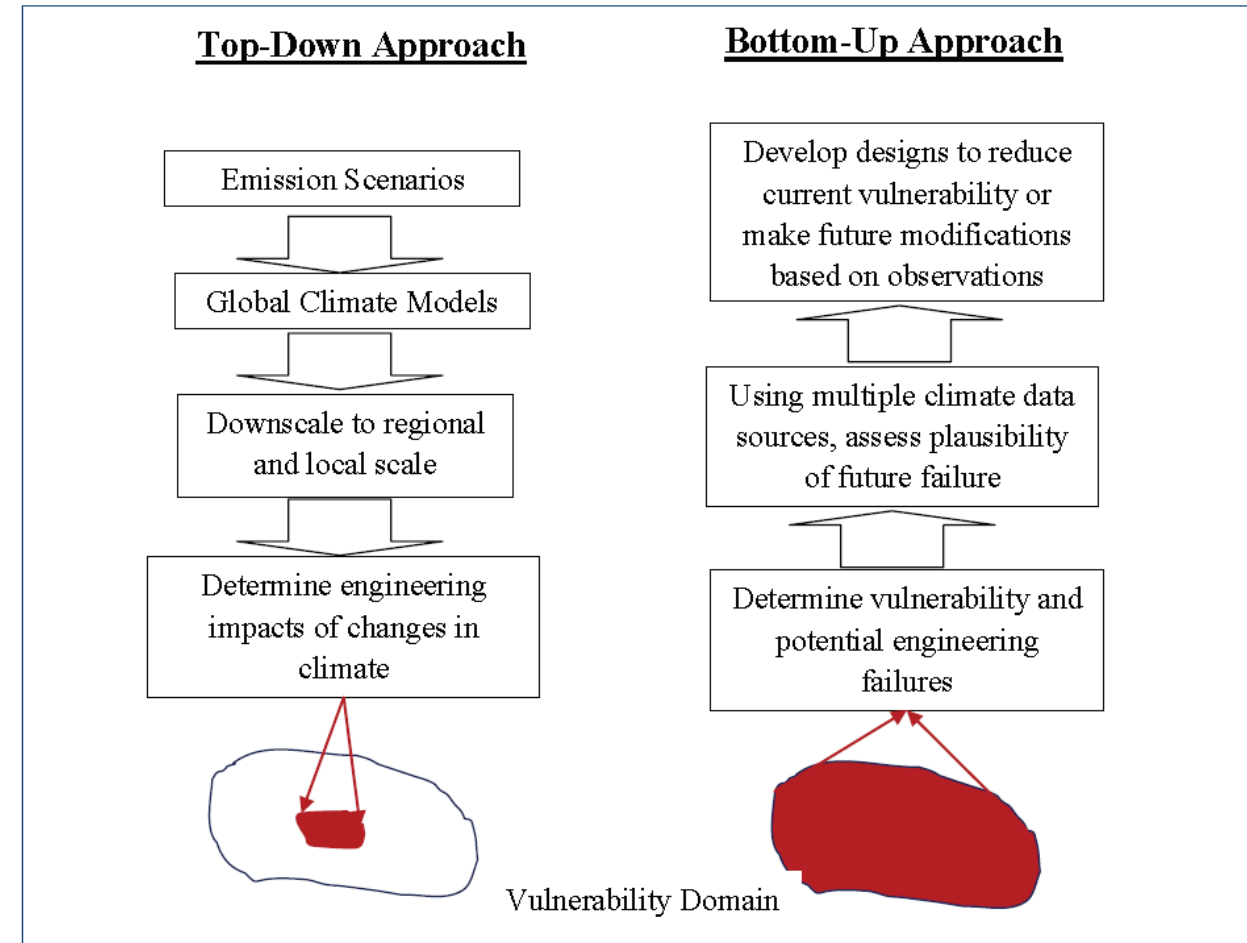
- Group up into sectors (water, transportation, energy, buildings)
- Develop draft master list of infrastructure by sector
- Discuss current exposure and expected changes
- Report back to group

Opportunity for Public Comment



Prioritization: Initial Considerations

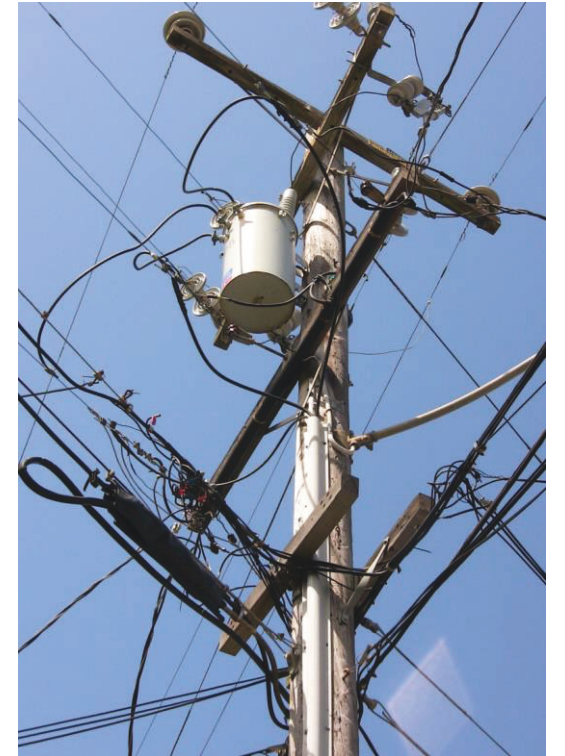
- Need/state of good repair/status according to "deferred maintenance" list
- Exposure or vulnerability to climate change risks
- Capacity to fund
- Social equity
- Importance to local community/regional/state functioning (i.e., economics)
- Others?



(ASCE 2015, p.21)

Which Infrastructure Do We Prioritize?

- What are the criteria for prioritizing infrastructure? Why?
 - Sector-specific
 - Holistic/system-wide
- What is most important to focus on? Why?
 - Sector-specific
 - Holistic /system-wide



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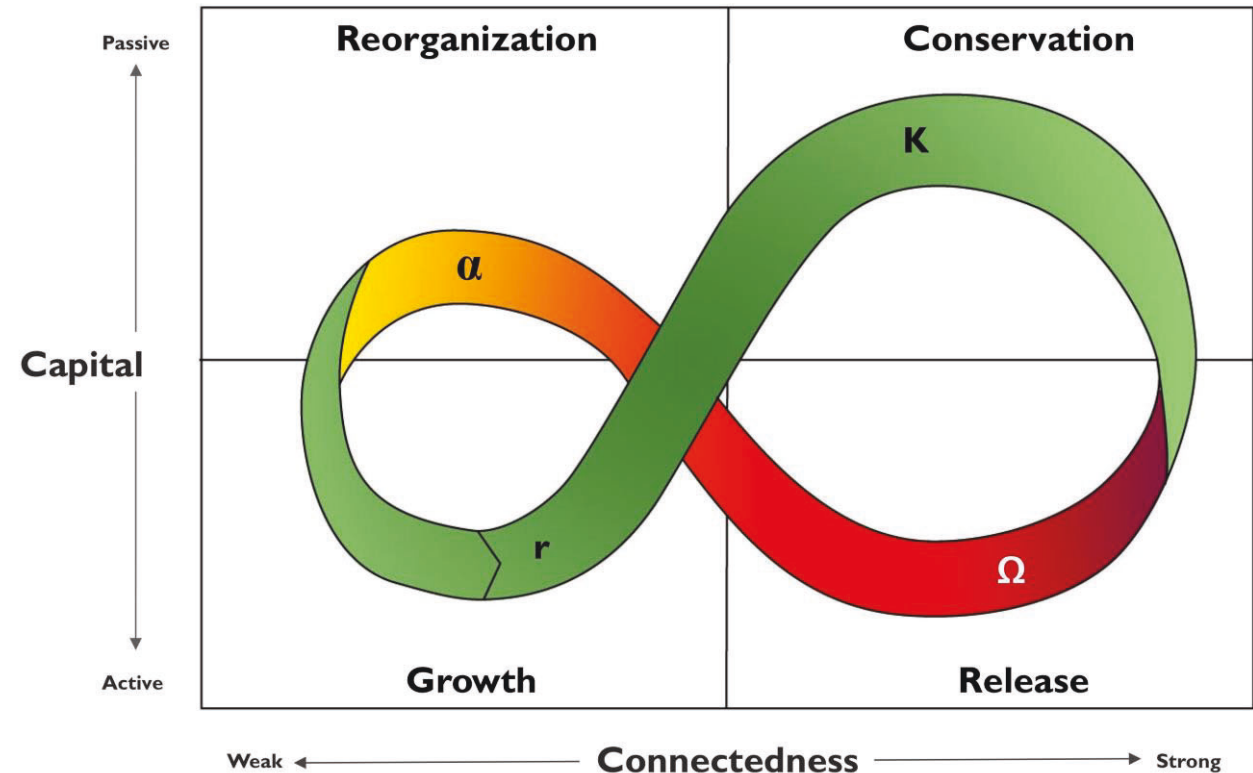
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Ecological Resilience

The amount of disturbance that an ecosystem can withstand without changing self-organized relationships, processes and structures (i.e. alternative stable states).

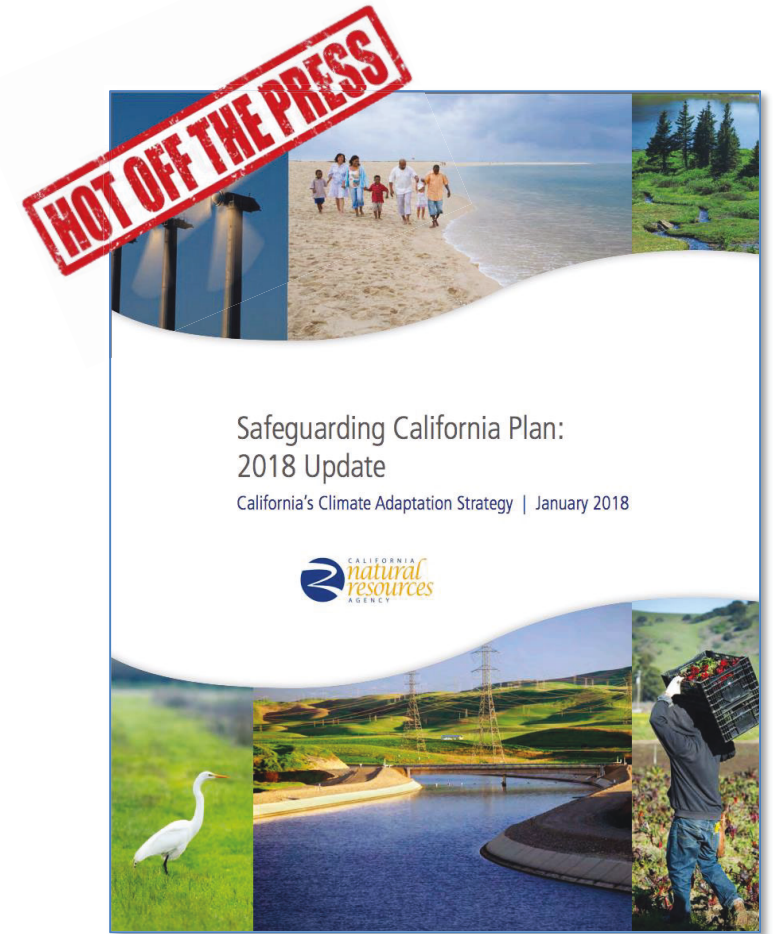
(Gunderson, 2000, based on C.S. Holling)



Safeguarding California (2018): “Resilience”

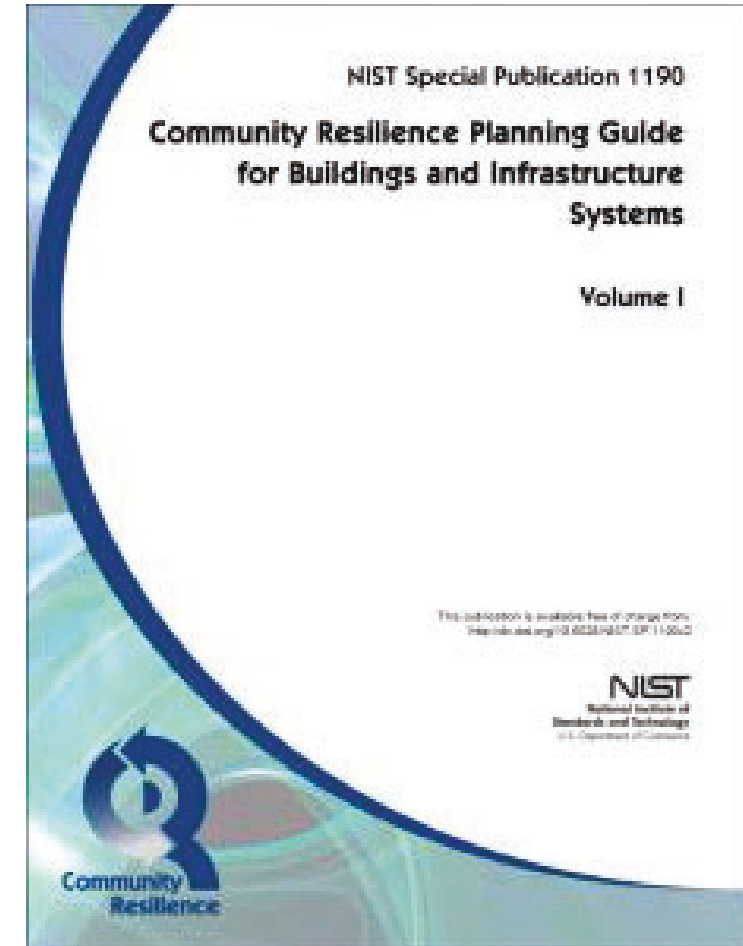
Resilience is the capacity of any entity – an individual, a community, an organization, or a natural system – to prepare for disruptions, to recover from shocks and stresses, and to adapt and grow from a disruptive experience

Definition also used in OPC’s Sea Level Rise Policy Guidance (Draft, 2018)



NIST: “Community Resilience”

Community resilience is the ability to prepare for anticipated hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.



American Association of State Highway and Transportation Officials

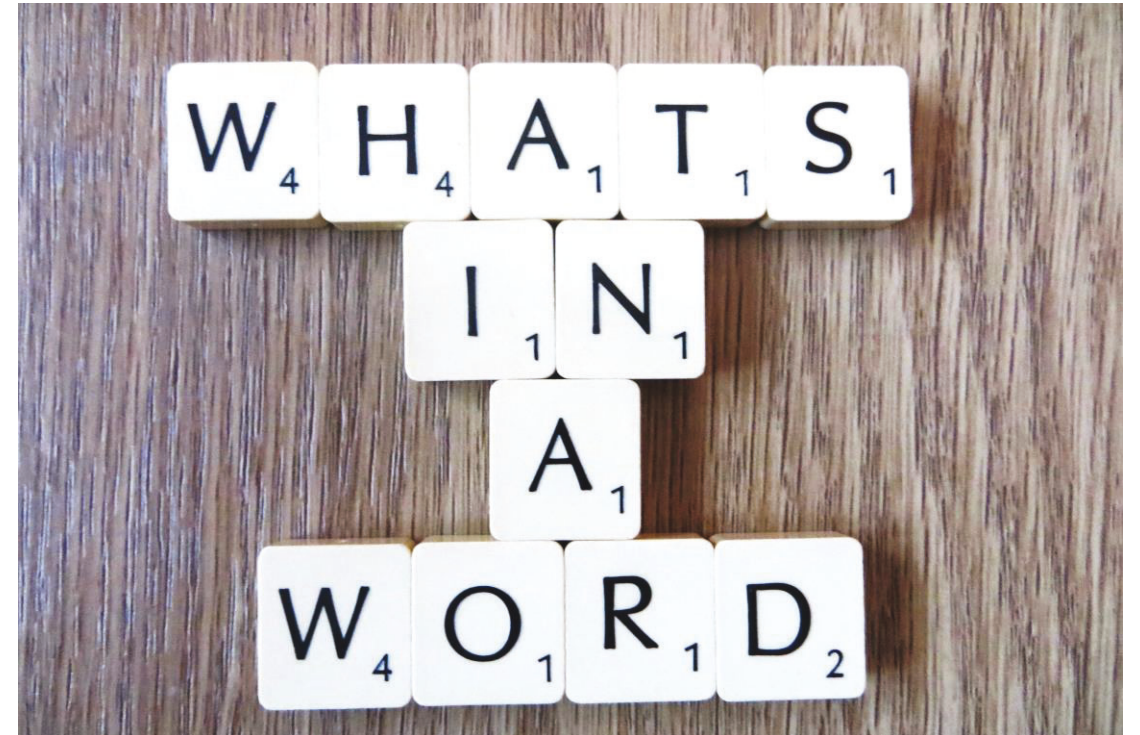
The ability to prepare and plan for, absorb, recover from, or more successfully adapt to adverse event.



http://www.dot.ca.gov/transplanning/ocp/docs/D4_Caltrans_Vulnerability_Assessment_v49.pdf

Agree on Definitions

- (Critical) Infrastructure
- Resilience
- Climate-Safe



Climate-Safe Infrastructure

All people and communities respond to changing average conditions, shocks, and stresses in a manner that minimizes risks to public health, safety, and economic disruption and maximizes equity and protection of the most vulnerable.

Natural systems adjust and maintain functioning ecosystems in the face of change.

Infrastructure and built systems withstand changing conditions and shocks, including changes in climate, while continuing to provide essential services.

Government managers take climate change adaptation into account in all aspects of their work.*

- Can “safety” be defined within any one sector?
- Or does it need to be holistically climate-safe?
- How do you know it’s actually safe?

Adaptive, Resilient & Climate-Safe?

Small Group Discussion

- Are existing definitions of resilience good enough?
- What are essential elements of climate-safety you want to see included in the WG's definition?



Report Back & Discussion



Opportunity for Public Comment



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Building Forward Los Angeles



Sabrina Bornstein

Deputy Chief Resilience Officer
Office of Mayor Eric Garcetti
City of Los Angeles



Matt Barnard

Principal
Degenkolb Engineers





LUNCH @ Señor Fish
155 S. Main St, LA 90012
12:30 – 1:30pm

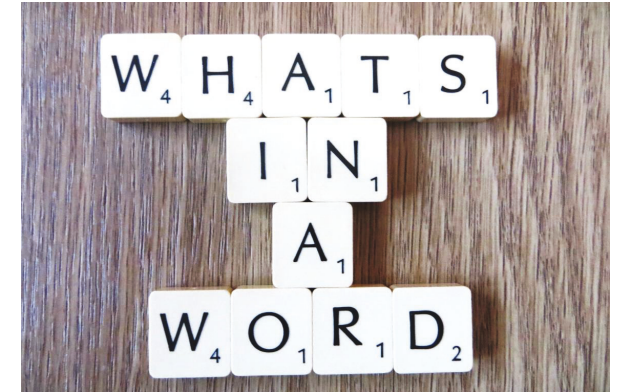
- Mull over definitions, infrastructure types identified & how to Prioritize
- What can we learn From BFLA

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Agreed Definitions

- (Critical) Infrastructure
 - [to fill in following discussion]
- Resilience
 - [to fill in following discussion]
- Climate-Safe
 - [to fill in following discussion]



Identifying Infrastructure Standards & Guidelines

Sector-specific
infrastructure
regulations,
standards/codes and/or
guidelines

Caltrans Highway Design
Manual (HDM), FHWA
Hydraulic Design of
Highway Culverts (HDS-
5), FHWA Urban Drainage
Design Manual (HEC-
22)...

Small Group Work:

- Discuss guidelines, procedures, standards, codes for existing/replaced/new/green infrastructure throughout the infrastructure planning and building process
- To what extent are existing guidelines sufficient to create resilient/climate safe infrastructure / communities?
- Which need to change to support building climate-safe, adaptive, resilient infrastructure systems?

Report Back & Discussion



Making Infrastructure Climate-Safe

- Existing infrastructure retrofits
- Replacing damaged infrastructure
- Building new infrastructure
- Green infrastructure

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Identifying Information Needs

Information used in current planning, design, decision-making	Forward-looking information needs
NOAA Atlas 14 precipitation data (based on historical rainfall data), land use (based on stable historical conditions), Material selection, return frequency, Design Life	How fast SLR will impact culvert; rates of coastal erosion; change in return interval of storms, temperature and precipitation increases over regions of State for various lifecycles of culverts...

Small Group Work:

- Identify current info used
- Identify forward-looking info needs
- Focus on the standards and guidelines previously prioritized
 - Existing infrastructure retrofits
 - Replacing damaged infrastructure
 - Building new infrastructure
 - Green infrastructure

Report Back & Discussion

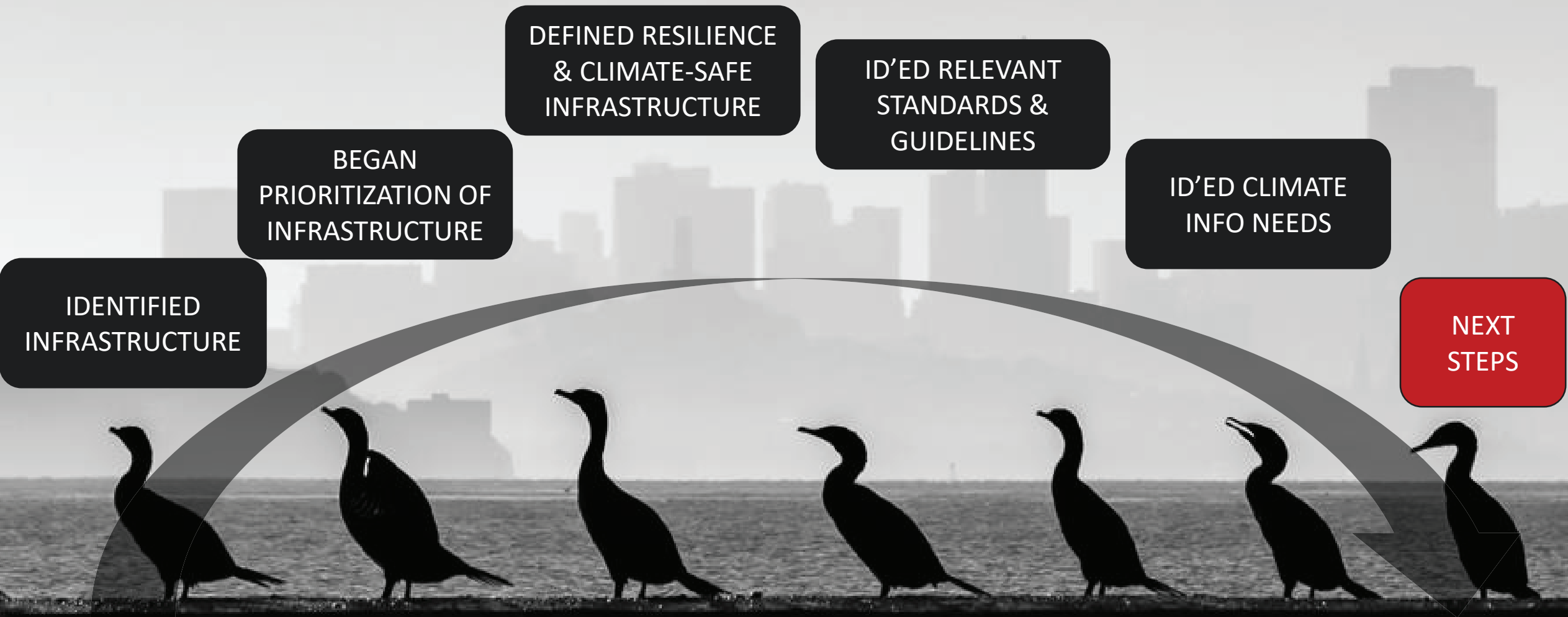


Useful examples to work through
in meeting #3?

Opportunity for Public Comment



Review of the Day



Next Webinar – 2/22 at 12pm – 1pm PST

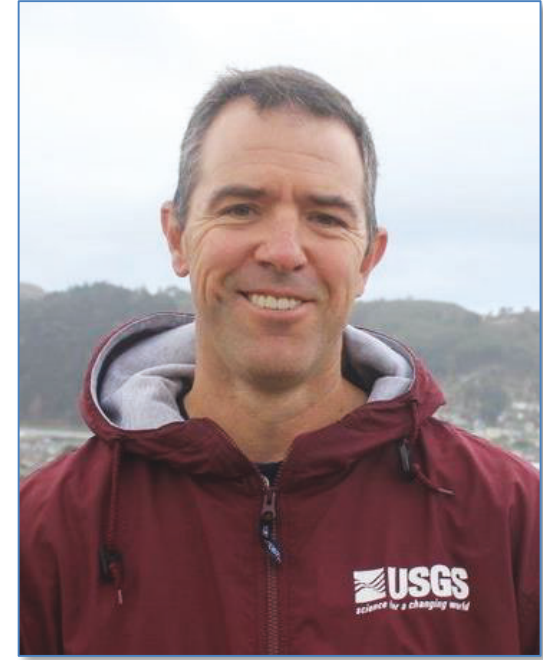
Forward-Looking Climate Science for Use in Infrastructure Engineering: Possibilities and Limits



Dan Cayan, Ph.D.
CSIWG Member



Claudia Tiebaldi, Ph.D.
NCAR



Patrick Barnard, Ph.D.
USGS

Next Steps

We Will

- Continue webinar series
- Prepare meeting summary notes
- Prepare Meeting #3 (San Francisco)
- [to be added over the course of the CSIWG meeting]
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-

You Will

- Make travel arrangements for SF meeting
- Prepare for next meeting; homework to be sent
- [to be added over the course of the CSIWG meeting]
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Be in touch!

- To sign up to the Climate-Safe Infrastructure listserve...
- To stay up to date on CSIWG developments...
- To ask questions or send comments...

Email: Elea Becker-Lowe at Elea.Beckerlowe@resources.ca.gov or at climatesafeinfrastructure@resources.ca.gov

... and she will direct the inquiry accordingly.



Meeting #2 of the Climate-Safe Infrastructure Working Group • Los Angeles • February 12, 2018

*Toward
Climate-
Safe
Infrastructure*



Thank you!