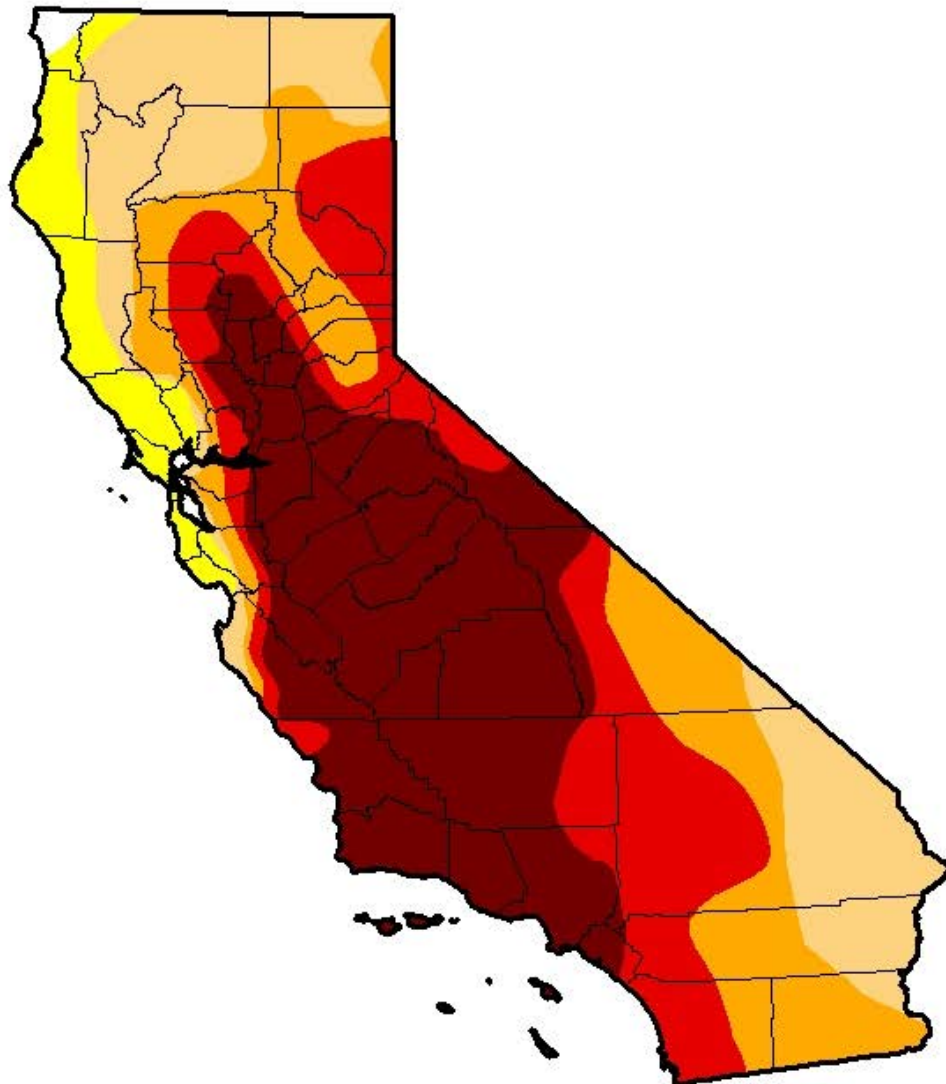


Wicked

*Solutions to Wicked Problems
at Massive Scales:
California Water Crisis*

U.S. Drought Monitor California

March 15, 2016
(Released Thursday, Mar. 17, 2016)
Valid 8 a.m. EDT



Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.43	99.57	93.28	73.64	55.31	34.74
Last Week <i>3/8/2016</i>	0.43	99.57	97.49	83.16	60.86	38.48
3 Months Ago <i>12/15/2015</i>	0.14	99.86	97.33	90.63	69.09	44.84
Start of Calendar Year <i>12/29/2015</i>	0.00	100.00	97.33	87.55	69.07	44.84
Start of Water Year <i>9/29/2015</i>	0.14	99.86	97.33	92.36	71.08	46.00
One Year Ago <i>3/17/2015</i>	0.16	99.84	98.11	93.44	67.46	39.92

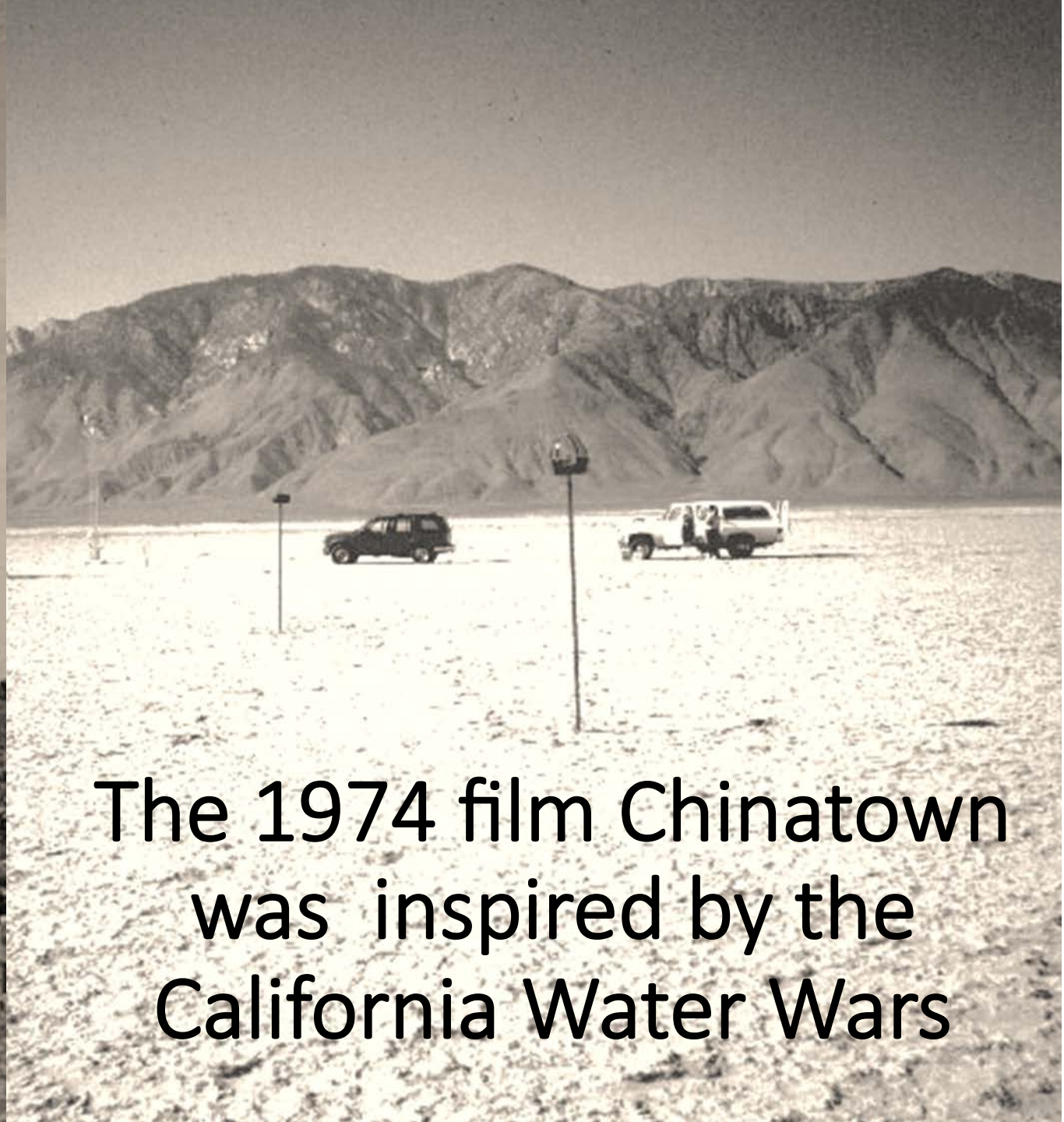
Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:
Richard Heim
NCEI/NOAA





The 1974 film Chinatown
was inspired by the
California Water Wars

A System in Crisis

Reduced Prosperity for Future Generations



- Greater Drought Impacts - Unreliable Water Supplies
- Increasing Flood Risk
- Groundwater Depletion and Subsidence
- Degraded Water Quality
- Declining Environmental Conditions
- Aging Infrastructure

Low water level at Folsom Lake (January 2014)

What is the
Wicked Problem?

There is no shortage of water, water plans, or even funding - so much as there is a consensus about how to move forward.

Paul Massera, Manager
California Water Plan
Update 2013

One Approach

California Water Plan

Wicked Problems

1. Incomplete or contradictory knowledge
2. Number of people and opinions involved
3. Large economic burden
4. Interconnected nature of these problems with other problems

Poverty, sustainability, equality, health & wellness, and WATER

- Offloaded to policy makers
- Sometimes treated as too cumbersome to handle en masse
- Plague and touch each and every one of us

Can't Be Solved – Just Mitigated

Process of design - intellectual approach that emphasizes:

- Empathy
- Abductive reasoning
- Rapid prototyping



Horst Rittel

**"Dilemmas in
a General
Theory of
Planning."**

Policy

Sciences,

1973: 155-169

1. Wicked problems have no definitive formulation.

“The problem of poverty in Texas is grossly similar but discretely different from poverty in Nairobi, so no practical characteristics describe “poverty.”

2. It's hard, maybe impossible, to measure or claim success with wicked problems because they bleed into one another.

“Unlike the boundaries of traditional design (system) problems that can be articulated or defined.”

3. Solutions to wicked problems can be only good or bad, not true or false. There is no idealized end state to arrive at.

“Approaches to wicked problems should be tractable ways to improve a situation rather than solve it.”

4. There is no template to follow when tackling a wicked problem, although history may provide a guide.

“Teams that approach wicked problems must literally make things up as they go along.”

5. There is always more than one explanation for a wicked problem

“Appropriateness of the explanation depending greatly on the individual perspective of the designer.”

6. Every wicked problem is a symptom of another problem.

“The interconnected quality of socio-economic political systems illustrates how, for example, a change in education will cause new behavior in nutrition.”

7. No mitigation strategy for a wicked problem has a definitive scientific test

“Humans invented wicked problems and science exists to understand natural phenomena.”

8. Offering a solution to a wicked problem frequently is a one shot design effort

“Significant intervention changes the system enough to minimize the ability for trial and error.”

9. Every wicked problem is unique.

10. Designers attempting to address a wicked problem must be fully responsible for their actions.

**Not all hard-to-solve
problems are wicked, only
those with an indeterminate
scope and scale.**

How does the theory of
Wicked Problems apply to
Thinking about Solving
Water Problems?

In California -

- **Water managers have significant impacts on infrastructure and governance**
- Water managers CAN help play a central role in mitigating the negative consequences of wicked problems –
 - Establish new cultural Norms
 - Communicating that mitigation is not an easy, quick, or solitary exercise

California Water Plan

An approach to Wicked Problems

Demands interdisciplinary collaboration and perseverance.

- Knowledge of science, economics, statistics, technology, medicine, politics, and more
- Place based and content based

New Kinds of Reasoning

- Deductive reasoning [moves from the general rule to the specific application]
- Inductive reasoning [moves from the specific to the general]
- **Abductive reasoning: taking your best shot**
 - Begins with an incomplete set of observations and proceeds to the likeliest possible explanation
 - Does what's best with the information at hand, which often is incomplete.

Applications of Systems Theories

- What do systems produce?
- Are we making system changes or responding to an external cause?

Problem Solving

- Address solution proposing
- Desired state
- Balancing & reconciling trade offs
- Self Interest

New Work

- Changing the Questions
- Managing Uncertainty
- Creating Resilience
- Driving to the Desired Future

Working Collaboratively

- Myths
- Successes

Getting it Done

- Think globally act locally
- Hold the space for anxiety

Questions?

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