Freshwater Science to Inform State Water Policy

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State Water Resources Control Board
Society for Freshwater Science, California Chapter
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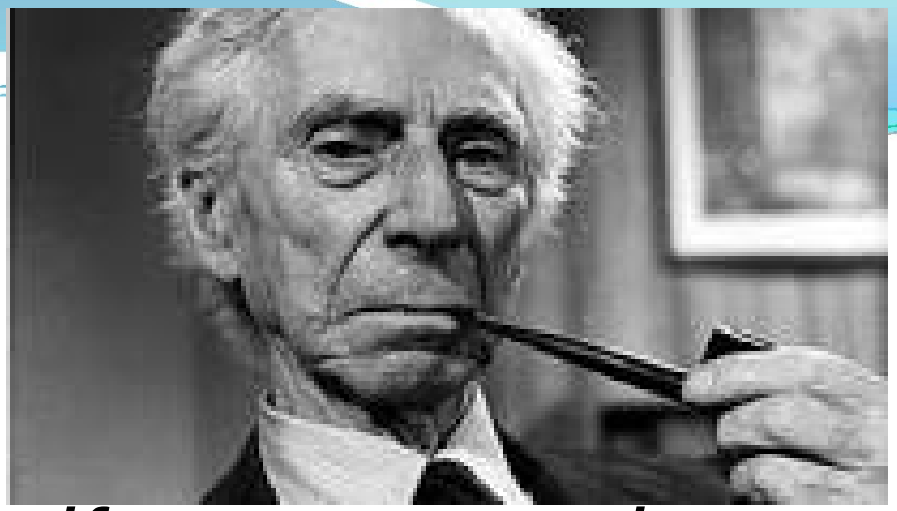


Science, by itself, cannot supply us with an ethic.

It can show us how to achieve a given end, and it may show us that some ends cannot be achieved.

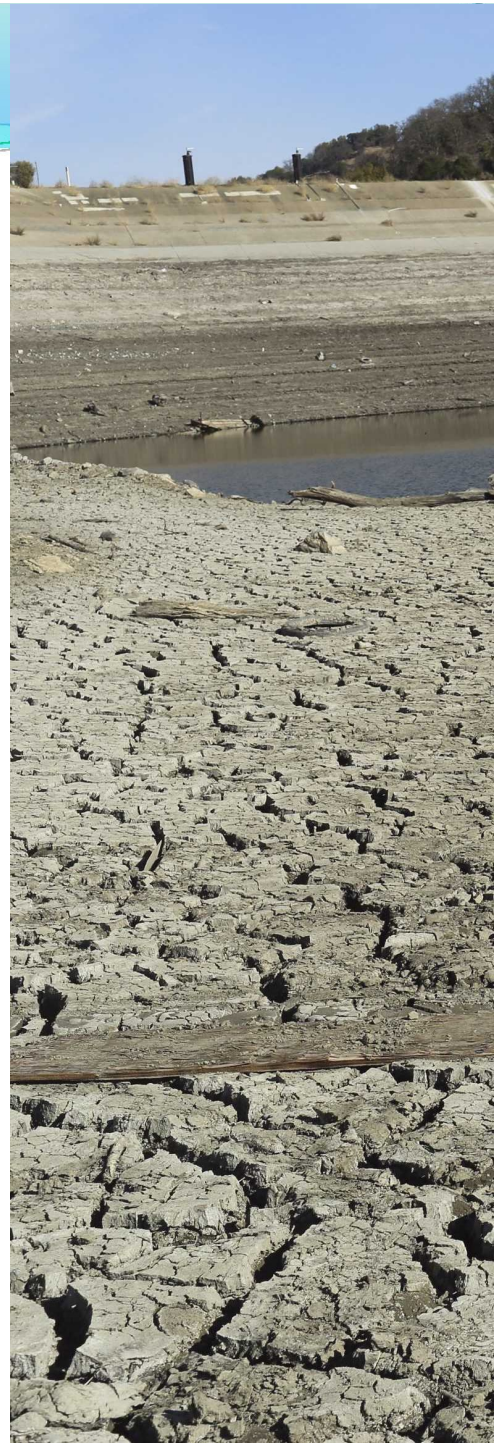
But among ends that can be achieved our choice must be decided by other than purely scientific considerations.

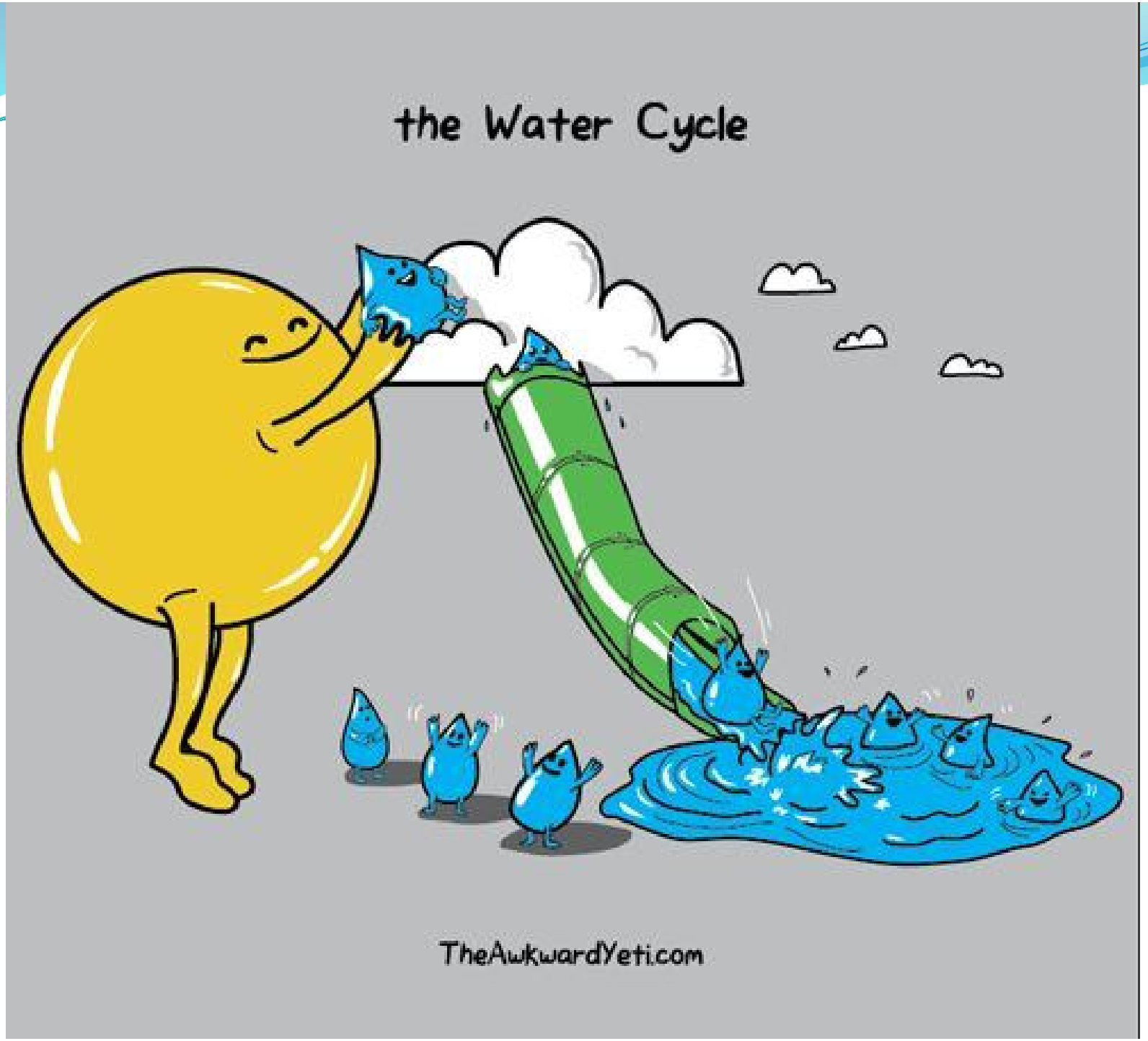
-Bertrand Russell (1950)

The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

- Clean Water Act Section 101(a)

As Drought Conditions persist, The scarcity of water creates more heat, and more conflicts that must be resolved through decision-making and problem solving.




the Water Cycle
TheAwkwardYeti.com

Science, based on facts and reproducible results, can shed ***light*** for decision-making on water resources, ...

...and reduce *heat*.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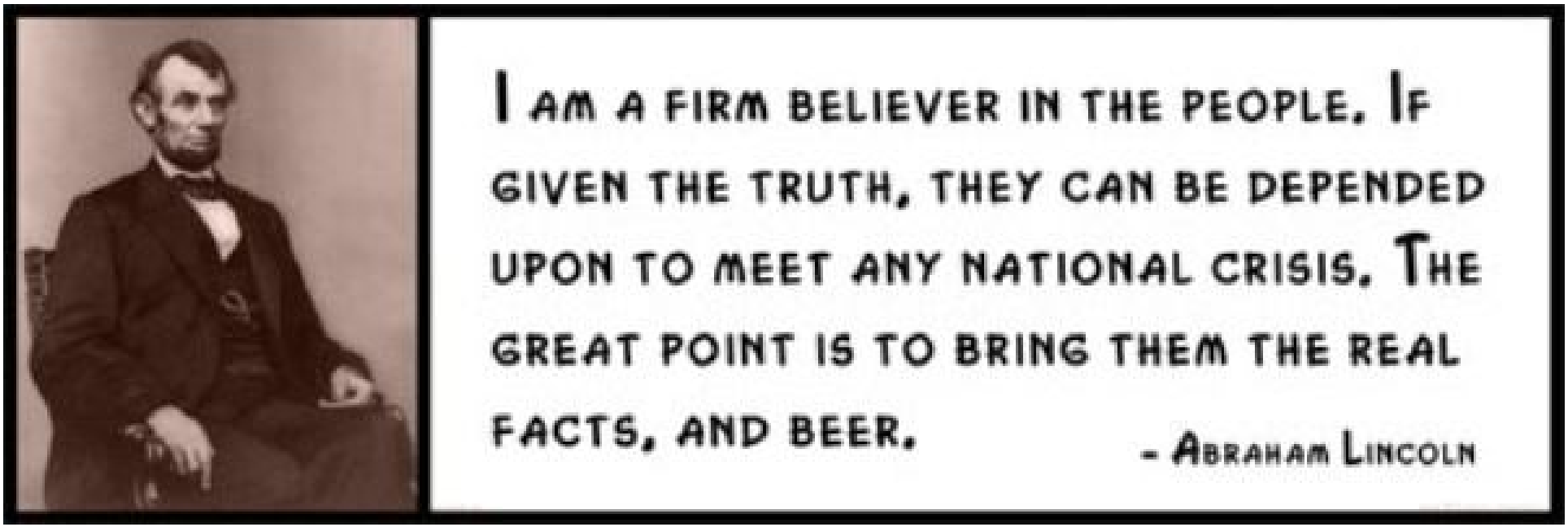
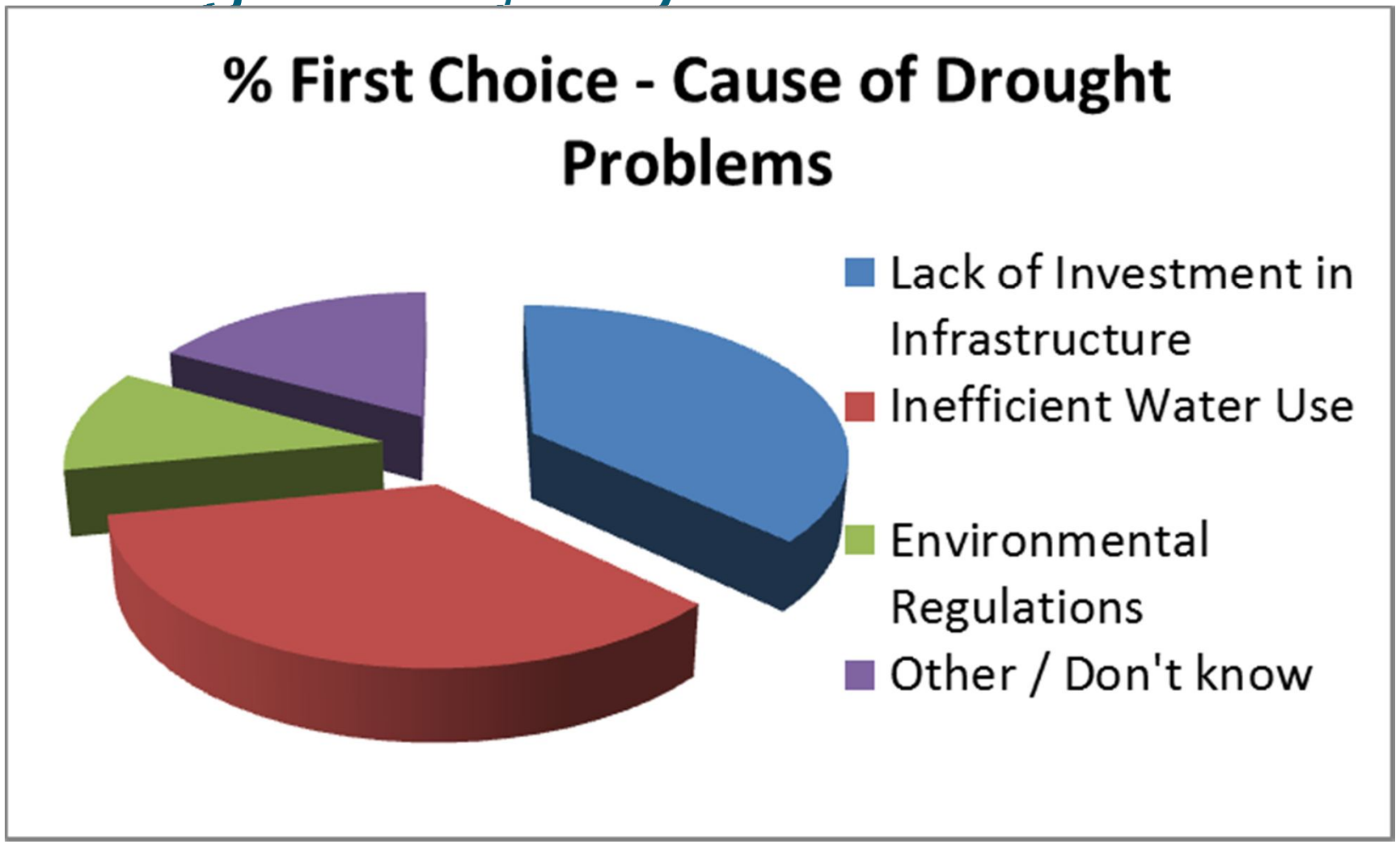

I am a firm believer in the people. If given the truth, they can be depended upon to meet any national crisis. The great point is to bring them the real facts, and beer.
- Abraham Lincoln

California Water Foundation Drought Poll, July 2015

- 1,000 California voters
- Public concern about the drought is extremely high
- CO-EQUAL CONCERNS: Overwhelming majority think drought's effect on agriculture (81%) and environment (85%) are ***very serious***
- WILLINGNESS TO PAY: 4 out of 5 voters say they prefer investment in infrastructure over lower water rates.
  - 55% say they are willing to pay a fee on their monthly water bill **"to address the impacts of droughts and improve local, regional, and state water supply and water quality"**

California Water Foundation Drought Poll, July 2015



State Water Board Policies: Science Panels and Peer Review

- Ocean Plan Desalination Policy – May 6, 2015
  - Three Scientific Panels
- Nitrate Monitoring and Management in Agriculture
  - Expert Panel
- Bay Delta Water Quality Control Plan
  - Delta Science Panel
- Peer Review Process for Amendments to Basin Plans and Statewide Plans
- Many other examples

Recent Decisions using Freshwater Science - Bioassessment

- Garcia River Sediment TMDL (Region 1) – Numeric Target and Causal Assessment
- Napa River and Sonoma Creek not impaired for nutrients (Region 2) (algal bioassessment)
- Squaw Creek Sediment TMDL (Region 6) – Numeric Target
- 401 Water Quality Certification Monitoring Requirements for State Route 76 (Region 9) – Project and Mitigation Monitoring

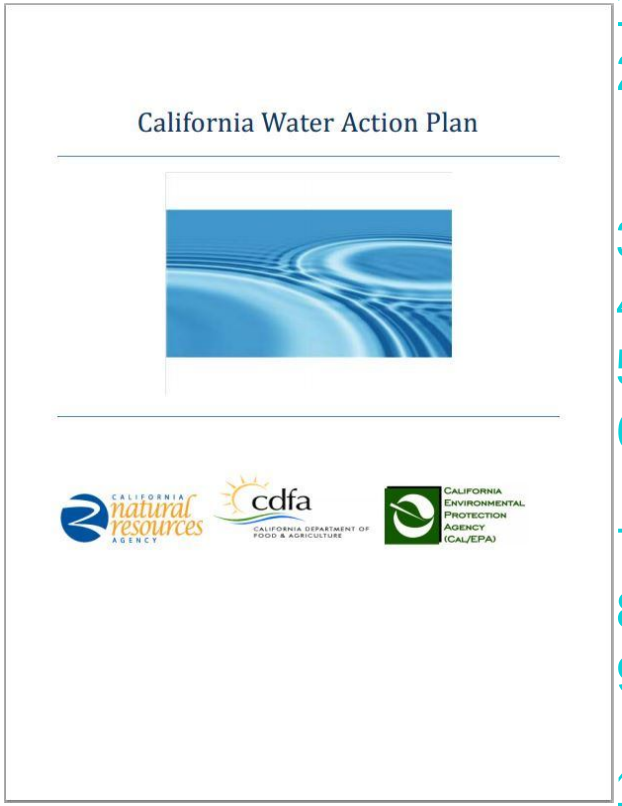
Recent Decisions using Freshwater Science – Bioassessment (cont.)

- San Diego River Causal Assessment (Region 9)
- Region 4 placed several waterbodies on the 303(d) list as impaired based on bioassessment data
- Stormwater Monitoring Program (Regions 2, 4, 8, 9)

Upcoming Water Board Activities

- California Water Action Plan
  - Action No, 3: Achieve the Co-Equal Goals for the Delta
  - Action No. 4: Protect and Restore Important Ecosystems
- Bio-Integrity Plan
  - California Stream Condition Index (CSCI = O/E)
- Wetlands Policy
  - WRAMP, CRAM
- Phase 4 of the Bay Delta Water Quality Control Plan

California Water Action Plan



1. Make Conservation a California Way of Life
2. Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
3. Achieve the Co-Equal Goals for the Delta
4. Protect and Restore Important Ecosystems
5. Manage and Prepare for Dry Periods
6. Expand Water Storage Capacity and Improve Groundwater Management
7. Provide Safe Water for All Communities
8. Increase Flood Protection
9. Increase Operational and Regulatory Efficiency
10. Identify Sustainable and Integrated Financing Opportunities

Action No. 3 – Achieve the Co-Equal Goals for the Delta

- Restore Delta Aquatic and Intertidal Habitat
- Implement Near-Term Delta Improvement Projects
- Maintain Important Infrastructure (e.g., Levees)
- Bay Delta Water Quality Control Plan (State Board)

Need Freshwater Scientists to Document Project Effectiveness and inform Adaptive Management

Need Freshwater Scientists to Advise State Board on Flow Criteria in Bay Delta Plan

Action No. 4 – Protect and Restore Important Ecosystems

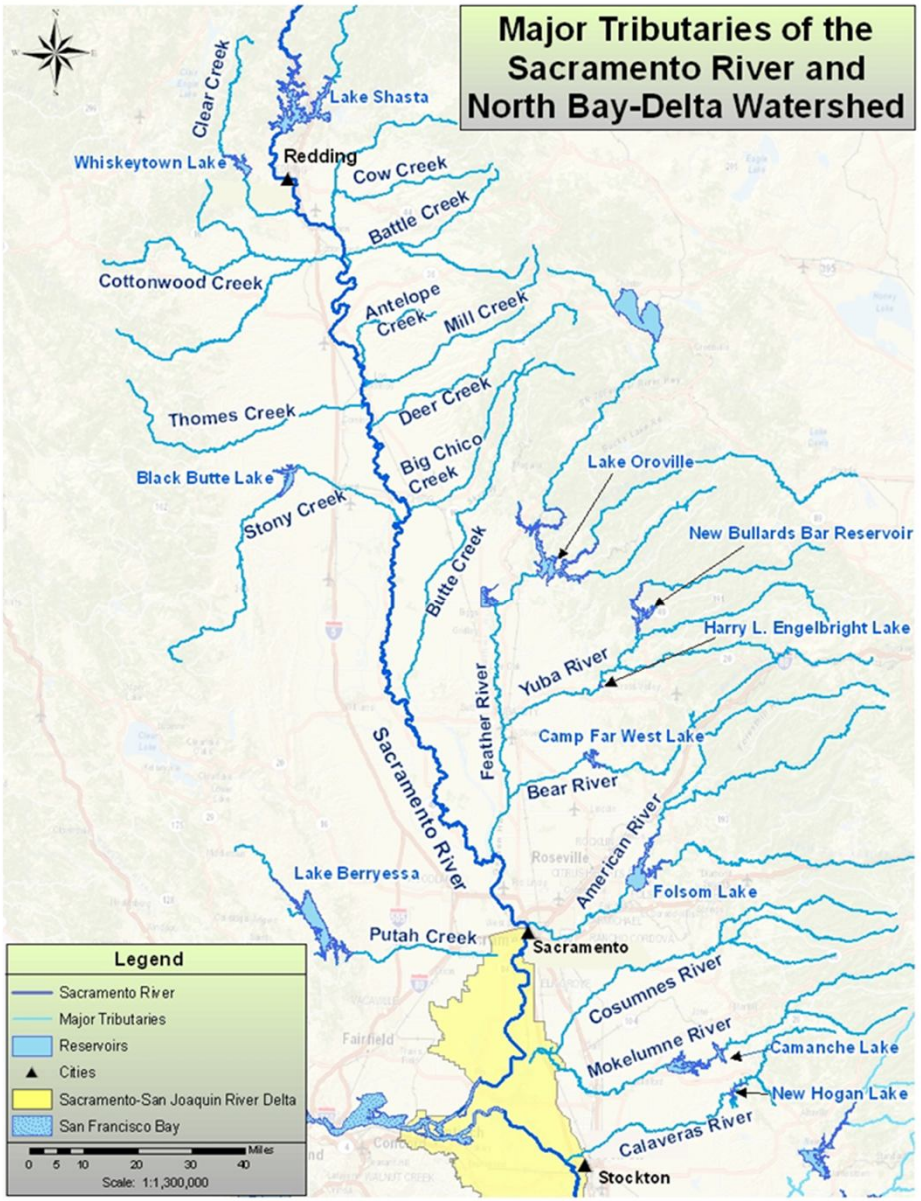
- Restore Key Mountain Meadow Habitat
- Manage Headwaters for Multiple Benefits
- Water for Wetlands and Waterfowl
- Eliminate Barriers to Fish Migration
- Assess Fish Passage at Large Dams
- Enhance Water Flows in Stream Systems Statewide
  - So. Fork Eel, Shasta, Ventura, Mark West Cr., Mill Cr. (Sac.)
- Achieve Ecological Goals through Integrated Regulatory and Voluntary Efforts

State Water Board Wetlands Policy

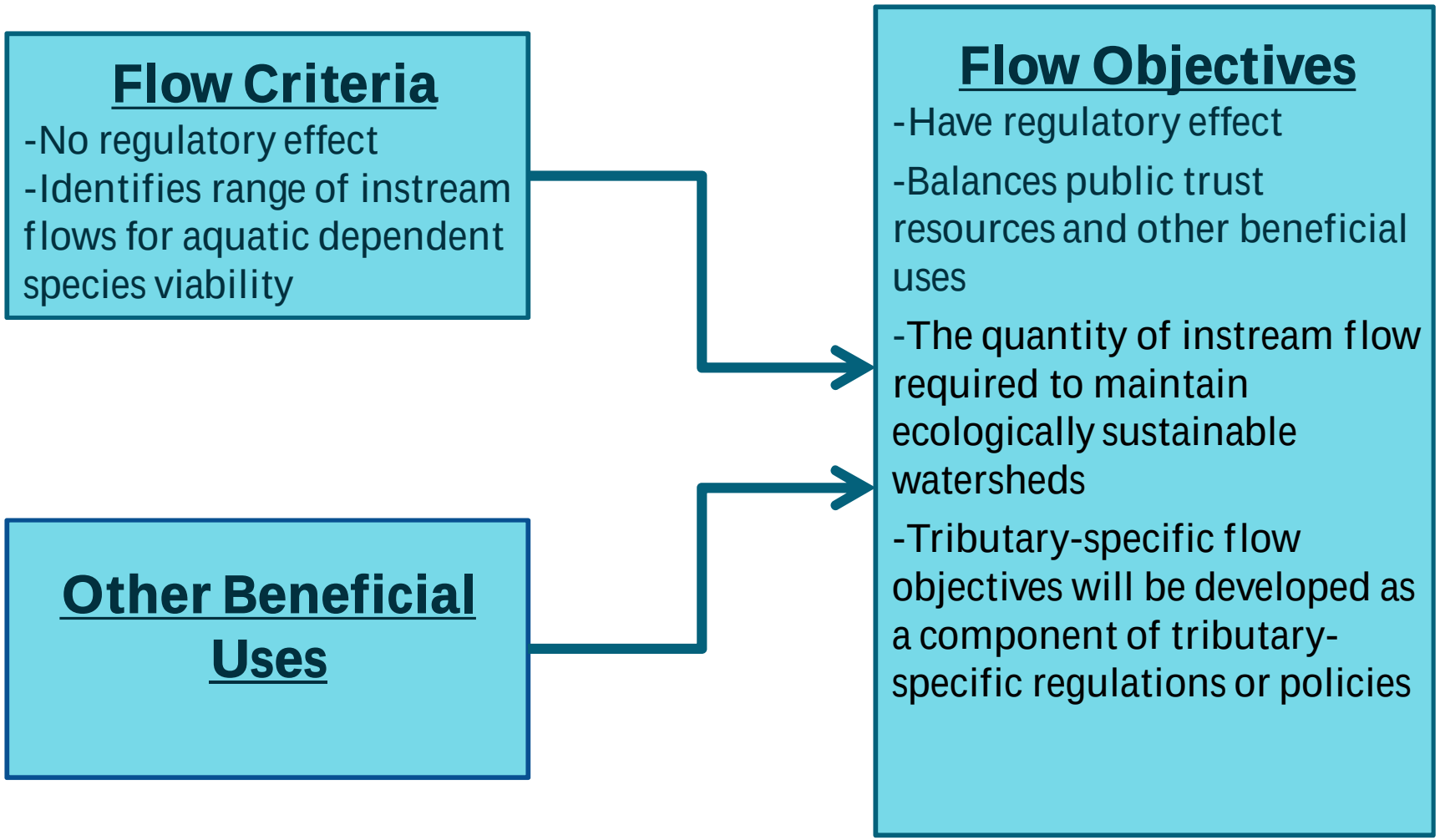
- Engaging highly respected wetland scientists
- California Water Quality Monitoring Council
  - Informs Water Board on Monitoring of Wetland and Riparian Areas
- Mitigation Bank Documents
- Wetland Delineations
- Wetland and Riparian Area Monitoring Plan (WRAMP) and the California Rapid Assessment Method (CRAM)

State Water Board Bay-Delta Activities

- **Phase 4:**
  Development and implementation of flow criteria and flow objectives for priority tributaries to the Sacramento-San Joaquin Delta watershed, with a focus on the Sacramento River watershed

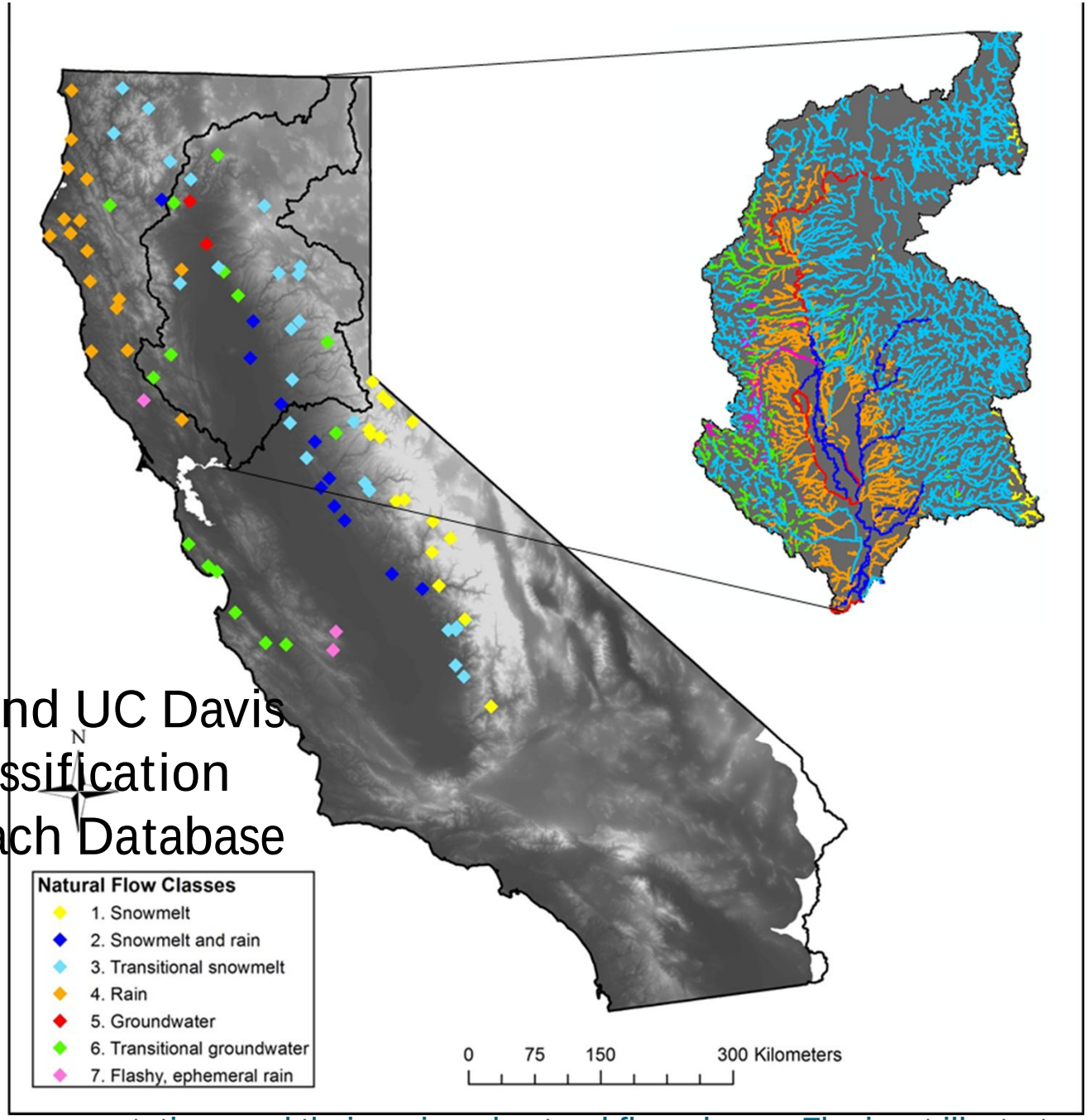


Flow Criteria vs Flow Objectives



DSP Panel Recommendation: Use of a Hybrid Approach of ELOHA & IFIM

1. Stream and river classification based on geomorphic, hydrologic, geographic, and/or faunal characteristics
2. Hydrologic analyses that separate the hydrograph into flow regimes (blocks) and examine historical changes
3. Assessment of whether any site-specific field work is required in the catchment or river reach to address specific information gaps
4. Extrapolation of understanding of flow-ecology relationships from other sites to the study catchment or segment
5. Production of an environmental flow regime that meets the needs of species and ecosystem processes in the system
6. Assuring clear and transparent dialogue and interaction between scientists and stakeholders
7. Designing an effective adaptive management protocol with robust implementation measurements to support the decision-making process



Map of reference gauge stations and their assigned natural flow classes. The inset illustrates the hydrologic classification of NHD flowlines (excluding Strahler first-order) within the Sacramento River Basin.


Phase 4 of Bay-Delta Effort, Deer Creek

Parting thoughts

- Science provides light for decision making for water, and reduces heat
  - Public responds favorably to “the real facts”
  - State Water Board relies heavily on Scientists, Peer Review, and Panels for Successful Policy Adoption
- Drought Poll – Public Wants Environmental Protection
- Administration’s California Water Action Plan calls for science-based water quantity values that can be allocated
  - It is OK to think “acre-feet/year” as well as “ppm”, etc.
- Bioassessment is still under-utilized
  - State Water Board’s Bio-integrity Plan


FRESHWATER SCIENTISTS:
LIVE LONG AND PROSPER