

Comments offered on Draft Proposed First Update to Scoping Plan
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I have been carrying out research on Sierra Nevada water and climate for over 30 years, Together with many UC and agency collaborators, I and am currently doing research aimed at developing an accurate predictive ability for how the water and ecosystems in different parts of this highly varied mountain range will respond to changes in climate and land cover.

With better management, California's water can go further toward meeting the critical needs of the state, with less energy impact and greater opportunity for its citizens.

The AB-32 scoping report recognizes the need to reduce the energy impact of water distribution, heating and use, and discusses the critical need to decarbonize the energy production in the state. In order to assure future generations a sustainable water supply to support our economy and ecosystems, the state must also take a more-aggressive approach to reducing greenhouse-gas emissions that lead to dangerous climate warming. This will likely need to be more aggressive than the in Executive Order S-3-05 goal of 80% reductions below 1990 levels by 2050.

We also need nearer-term targets to begin planning for emissions reductions after 2020. This is why I, along with 100 other California climate scientists and economists, signed the letter submitted into the record at the Feb 20, 2014 meeting of the Air Resources Board that calls on the state to set a 2030 target for the reduction of global warming emissions.

In addition, there are much-needed water-accounting measures that the state can undertake that will result in a more-sustainable water supply, and one with less energy impact and more energy benefit. A new water-accounting system can help optimize hydropower production, water storage, flood control, drought management, watershed management and water deliveries.

Current measurements of California's source waters, particularly in the Sierra Nevada and surrounding valleys, are extremely limited; and many critical decisions with large economic and energy implications are based on historical precedent.

The technology for a new and accurate water-accounting system is currently available, and includes: i) low-cost, low-power embedded wireless-sensor networks, ii) remotely sensed satellite data, supplemented by aircraft measurements, iii) cyber-infrastructure advances in data and information management, and iv) modeling and prediction tools that can use these advances in measurement to provide the information needed for better decision making.

More-accurate forecasts of snowmelt and runoff, based on a new generation of low-cost sensors, can optimize hydropower, which will become ever more important for filling gaps in other renewable supplies that depend on sun and wind. It can allow committing and making water deliveries accurately, which is especially important in years that deviate significantly from the historical mean. It can help optimize groundwater recharge and pumping, and their associated heavy energy costs.

Water storage is the foundation for water security in semi-arid regions, and California is slowly losing one of its main seasonal-storage reservoirs, the Sierra Nevada snowpack. In an average year, this snowpack provides about half as much storage as do the reservoirs behind the dams that rim the Sierra foothills. Making up for this difference through greater groundwater recharge and extraction will have additional energy costs.

An accurate water-accounting system is also central to distributing the costs and benefits of much-needed watershed management, particularly in the many non-sustainable Sierra Nevada forests. With better information, our forests can be managed with lower fire risk, greater water yield, better wildlife habitat and other benefits.

In summary, both mitigating and adapting to climate change means managing water; and managing water means managing ecosystem services. Strategic investments in data and information systems around water are an essential foundation for meeting the goals in the AB-32 scoping report, and the more-aggressive goals for reducing greenhouse-gas emissions needed by California and the rest of the world.