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SPEAKER REMARKS

These speakers set the context for the panel discussions at the *Managing Drought* event on January 12, 2015. Here are their prepared remarks.

Jay Lund, *Managing Urban and Agricultural Water Scarcity*

Jeffrey Mount, *Conserving Ecosystems During Droughts*

Brian Gray, *Allocating Water During Droughts*

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Managing Urban and Agricultural Water Scarcity

Jay Lund, director of the Center for Watershed Sciences at UC Davis and PPIC adjunct fellow

Droughts have always been stress tests for California's water system. Throughout history, droughts have helped California focus on making changes to better align its water management system to its changing economy and social aspirations. Small and large improvements to water management have been a long-lasting silver lining from the costs and dislocations of drought. This drought has been no exception.

A recap of 2014

Let's quickly review drought impacts to cities and agriculture in 2014, the worst year of the current drought.

The drought was experienced differently in different parts of the system.

In general, large urban areas have suffered little from this drought, so far. Santa Cruz has been the most affected large city, although the Sacramento metropolitan area was threatened before the rains in February 2014. Major urban areas have done well due to good preparation and some good luck. Preparation since the 1988–92 drought included a range of actions. Steady reductions in per-capita urban water use have kept overall use fairly flat in many cities, and in some places overall use has even declined. Investments in surface and groundwater storage, expanded inter-connections, diversification of supply, and water markets have helped greatly. So most urban areas felt no need to enforce strong water conservation requirements.

Shortages (or threats of shortages) have been experienced by some single-source, small communities and rural households, most depending on single wells. The drought hit hard many small systems that were struggling already, and so were clearly unprepared. The fragility of these small water systems is a difficult problem deserving of more strategic attention by the state.

Agriculture faced the prospect of a major economic hit, resulting from loss of about a third of its surface water supply. This loss was dampened by large amounts of additional groundwater pumping. About 5 million acre-feet (maf) of additional groundwater use largely offset about 6.5 maf in surface water cutbacks. Water trading was also essential to shift water to permanent crops and other economically valuable crops. About 5% of cropland was fallowed, incurring more than \$2 billion in lost revenues and the loss of about 17,000 full and part-time jobs.

Strong global commodity prices also helped dampen losses—with great years for almond and tomato revenues. The drought's threat to the third of California's cropland planted to permanent crops helped focus attention on groundwater management.

This drought is not yet over. Although we have had some good rains in parts of Northern California, this year so far has provided less than average precipitation and snowpack in much of state – but we still have three months of wet season to go. That said, even with ample rains this season, considerably more precipitation is needed to replenish surface and groundwater reserves.

What can we do better?

First, a general observation: Water is scarce in California, so we should account, administer, and manage it more tightly. This will improve certainty, transparency, and speed in managing drought, and improve information for drought preparation and water management overall. Second, here are

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some specific suggestions for improving the ability of agricultural and urban sectors to respond to droughts:

- 1. Strengthen water markets.** Both agricultural and urban sectors would benefit from improving the state's ability to arrange for drought water market transfers in advance (e.g., multi-year agreements that pre-approve dry-year transfers, as with the Yuba Accord). This would give everyone more certainty, but it will require some changes in the regulatory environment.
- 2. Implement groundwater reform.** Agriculture overall would also benefit from implementing groundwater reform sooner rather than later. Orchard owners in particular need more certainty in local water supplies so they can better prepare for dry years. Ideally, implementation will include allocating shares that water users can trade within basins, as well as the means to accomplish the hard task of eliminating long-term overdraft.
- 3. Improve urban pricing.** Urban agencies need to improve their pricing structures to encourage conservation while remaining financially solvent. Drought pricing should be established in advance, given Proposition 218 review requirements, with higher prices during droughts and some protections for low use by low-income households.
- 4. Address problems of small communities.** For small, vulnerable communities, state and county agencies need to strengthen emergency preparedness with vulnerability tracking and strengthening or merger of small systems.
- 5. Conduct dry runs.** Regional "dry run" drought preparation drills would alert water and regulatory agencies to likely drought management problems, helping them coordinate and prepare internally and externally.

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Conserving Ecosystems During Droughts

Jeffrey Mount, PPIC senior fellow

Conventional biological wisdom suggests that native species are well-adapted to drought and will likely bounce back when the rains come again. But that conventional wisdom does not apply here. First, drought resilience of species is associated with healthy populations. The majority of our freshwater-dependent fishes are already at risk. Second, our ecosystems have lost much of their ability to support recovery after drought because they have been dramatically altered by human uses of land and water, along with a host of invasive non-native species.

For these reasons it matters greatly how we manage ecosystems during a drought. There are very practical reasons to do this well. The best example comes from the Delta during the 1987–92 drought. Low inflows and sustained high exports occurred for six consecutive years, helping invasive plants and animals, like Brazilian waterweed and the overbite clam, become entrenched in the Delta. All water users who rely on the waters that flow through Delta are impacted by the legacy of these invasions.

As has been noted previously, this drought offers a chance for the state to identify what worked and what could be improved. And to be clear, the Department of Fish and Wildlife, Department of Water Resources, and the State Water Resources Control Board deserve a great deal of credit for their efforts. Still, there is room for improvement during this drought (if it continues) and before the next drought. Here are three general proposals.

1. Improve drought preparation

As the discussions of the previous panel show, pre-drought investments in the urban sector paid dividends. When it comes to managing ecosystems, the current approach is more passive, usually involving setting water quality and flow standards and reacting to dry conditions as they occur.

While some amount of “on the fly” management is necessary during droughts, the state should follow the model of the urban sector by placing greater emphasis on drought preparation. Several actions include:

- **Designate priority habitats.** During droughts, it’s especially important to be able to get the most benefit per acre-foot of water. The state needs to identify those rivers and streams that are critical to maintaining native biodiversity and focus resources on them. Examples include: areas with more reliable flows and lower water temperatures (such as spring-fed systems); potential high-quality habitat useful for drought refugia and recovery; existing populations of at-risk species; and willing partners.
- **Secure drought water supplies for ecosystems.** This will require greater, not lesser, flexibility in water quality and flow standards so that water can be shifted—both directly and indirectly through trading—to priority ecosystem uses. Acquiring water rights for the environment from other users and allowing ecosystem managers to sell water—as the Australians are doing—is a promising direction.

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- **Conduct dry runs.** Many of the “surprises” of this drought were thoroughly predictable. Dry runs—currently employed in flood, fire, and earthquake management—reduce uncertainty for all water uses, not just the environment.

2. Fund drought preparation and response

As the recent PPIC report on water finance noted, the environment is one of the “fiscal orphans” of California water, lacking a reliable funding source. Yet reliable funding is critical to improve the drought resilience of our aquatic ecosystems. Here are two suggestions:

- **Spend the new bond wisely.** Proposition 1, the new water bond, authorizes roughly \$1.5 billion for ecosystem investments, and at least half of the \$2.7 billion set aside for storage projects must provide ecosystem benefits. As state agencies develop guidelines, they should examine closely whether expenditures will improve drought resilience.
- **Establish a dedicated funding source.** California also needs a dedicated, reliable source of funds to support ecosystem health. Options include a per-acre-foot surcharge on water use, or a small increment on the sales tax. This won't be popular, but the need to prevent long-term regulatory consequences of poor environmental drought management makes this a good investment.

3. Have a plan for the next drought

The two previous suggestions—prepare for the next drought and develop new sources of funding—require a plan. Rather than modifying each of the innumerable plans in existence, the state should set up a biodiversity task force—made up of agency and academic experts in biology, ecology, engineering, economics, and law—whose first order of business should be to harvest the knowledge gained from this remarkable dry period and develop a drought preparation and response plan that identifies drought preparation actions, funding sources, and legislation necessary for implementation.

Dwight Eisenhower famously noted: “Plans are nothing; planning is everything.” Ecosystem management during the latest drought would have benefitted from both.

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Allocating Water During Droughts

Brian Gray, professor of law, UC Hastings

In these brief remarks, I will provide a few examples of how California's water rights system and other water allocation processes coped with severe and widespread drought.

In 2014, state and federal water managers and regulators took a variety of significant actions to allocate scarce supplies and to protect environmental uses.

- Early in the water year, the State Water Resources Control Board, the Department of Water Resources, the U.S. Bureau of Reclamation, and state and federal fish and wildlife agencies agreed to allocate stored water in Central Valley Project and State Water Project reservoirs for essential instream flow and wetlands requirements.
- In January, the board approved temporary urgency changes to Central Valley Project and State Water Project permits that relaxed Delta outflow and salinity standards for the projects. This allowed the projects to conserve upstream storage and to pump water under conditions when exports normally would not be authorized.
- For the first time since the 1976–1977 drought, the board also issued curtailment orders for the Sacramento-San Joaquin River and Delta watershed and the Scott, Russian, and Eel river systems. These orders directed junior water right holders immediately to cease diverting water. The board also notified more senior appropriators and riparians that their diversions might be curtailed as well if severe drought conditions persisted.

Although the water allocation and curtailment processes were controversial, both generally worked well—especially given the hydrologic uncertainty, limited time that the agencies and affected water users had to prepare, and significant economic and environmental interests at stake. Yet, despite these salutary efforts, several important policy issues emerged.

- Many affected appropriators questioned the fairness of the board's decision completely to curtail their diversion rights, in favor of those with higher seniority, without considering differences in type of use, efficiency of use, return flow, and other relevant factors.
- Critics—including some members of Congress—argued that the Central Valley Project and State Water Project over-allocated water to the environment, and therefore unnecessarily shorted some contractors. Conversely, environmental interests questioned the science and risk assessments that the interagency water allocation group used to balance environmental needs against urban and agricultural water demands.
- Project operators, fisheries agencies, and the board struggled to manage acute, and sometimes conflicting, demands for releases of stored water previously allocated to environmental uses, as well as water needed for public health and safety.
- Finally, many observers noted that the board's curtailment process was hampered by limited or out-of-date information on water rights, water use, and return flows, and lacked adequate scientific support.

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These programmatic issues and criticisms are not surprising. Regulators had to move quickly to accommodate and to protect a multiplicity of often-conflicting interests under unprecedented hydrologic conditions. But we can nevertheless learn from this experience in planning for the next drought—and navigating the current one.

I would like to offer the following suggestions, drawing in part on **recommendations a group of us made to the board last October**:

- **Modernize information.** The board and its agency partners should modernize the data and information systems used for curtailment and allocation decisions. This entails more than simply improving the technology used to measure and predict flows. It also requires annual water diversion and use reporting from all right holders, especially the largest water users. Moreover, it requires reporting on discharges, which comprise a major portion of the flow of some rivers.
- **Consider public health and the environment more explicitly.** The board should revise its curtailment procedures to define urgent public health and safety needs—especially when users cannot reasonably find alternative sources—rather than waiting for those users to self-identify. The board and the interagency allocation group also should adopt policies that identify priority environmental water uses, including flows to ensure the protection of vulnerable fish and water for state and federal wildlife refuges.
- **Look beyond priority of rights.** The board also should revise its curtailment procedures to allow it to consider factors other than strict priority of right when deciding how to allocate the available water in a stream system. These factors should include each diverter's type of use, actual use of water in the three to five years preceding the curtailment, net depletion of water from the river, and access to other sources of supply. This would enable the board to take into account a broader array of considerations (in addition to priority) that are relevant to the question of fair and efficacious allocation in times of severe shortage and gain a more realistic assessment of the effects of each diversion on the actual flow of water in the river.
- **Promote reasonable use.** Finally, the board should exercise its statutory and constitutional authority to prevent waste and promote the reasonable use of water. These actions should include stricter supervision of urban water agencies' demand reduction and efficient use programs, and greater scrutiny of water districts and individual users whose methods of diversion or use are either wasteful or impose inordinate harm to other water users or to the environment. The board also might consider whether local restrictions on the transfer of water constitute unreasonable use during severe drought conditions.