



September 18, 2019

Nancy Vogel
Director, Governor's Water Portfolio Program
California Natural Resources Agency
1416 Ninth Street
Sacramento, CA 95814

Re: California's Water Resilience Portfolio Initiative

Dear Ms. Vogel:

On behalf Sierra Club California's more than 500,000 members and supporters statewide, we write to offer the attached recommendations as the Newsom Administration prepares to implement Executive Order N-10-19. Signed in April 2019 by Governor Newsom, the executive order directs the California Natural Resources Agency, the California Environmental Protection Agency, and the California Department of Food and Agriculture to recommend a suite of priorities and actions to build a climate-resilient water system and ensure healthy waterways.

For decades Sierra Club California has argued California needs a diverse water portfolio that includes firm commitments of water for the environment and encourages regional resilience. We believe California can meet its water needs and provide the flows needed to restore the Delta with a combination of increased agricultural and urban conservation, groundwater storage and management, increased water reuse, and stormwater capture.

Our recommendations promote a smart and sustainable water portfolio that will enable the State to meet the challenges of climate change and provide the water our families, farms, and ecosystems require to flourish. Our recommendations include strategies to better manage salinization in the San Joaquin Valley; prioritize climate adaptation and mitigation in both the agricultural and urban sectors; manage groundwater to increase storage levels without diverting additional water from the environment; protect both surface and groundwater quality; and establish instream flow requirements adequate for protecting aquatic ecosystems. Additionally, we have provided direct actions that institutions and/or individuals should take to implement these recommendations.

If pursued and implemented accordingly, these solutions and practices will limit dependency on the Delta and act as an alternative to the single tunnel project proposed by Governor Newsom. So, we encourage the Administration to consider the portfolio initiative and the tunnel process in concert: if the portfolio initiative is implemented correctly, the need for single tunnel project would be wholly unnecessary. This would save both the state and taxpayers billions of dollars.

If you have any questions or concerns, please contact either Kathryn Phillips at 916-557-1100 ext. 1020 or Brandon Dawson at 916-557-1100 ext. 1090.

Sincerely,



Kathryn Phillips
Director
Sierra Club California



Brandon Dawson
Policy Advocate
Sierra Club California

CC: Governor Gavin Newsom, State of California
Secretary Jared Blumenfeld, California Environmental Protection Agency
Secretary Wade Crowfoot, California Natural Resources Agency
Secretary Karen Ross, California Department of Food and Agriculture
Christine Hironaka, Deputy Cabinet Secretary – Office of Governor Gavin Newsom



Sensible Water Portfolio Guidance for State Agencies

Ron Stork, Chiara Scaramuzzino, Katja Irvin, Chris Gilbert, Kenneth Gibson, Deirdre Des Jardins, Katie Bailey, Charlotte Allen

Sierra Club California Water Committee Volunteers

September 2019

California can meet its human water needs while providing enough water to ensure that its ecosystems, including the Bay Delta, will flourish. This will take a cooperative effort on the part of urban residents, state officials, and California’s farmers. All will need to work together to improve agricultural and urban conservation, increase water reuse, and maximize the potential of better groundwater storage and management.

In this paper we describe specific actions that state agencies and elected officials can take to implement our proposal for a sensible and sustainable water portfolio.¹ These include strategies to: better manage salinization in the San Joaquin Valley; prioritize climate adaptation and mitigation in both the agricultural and urban sectors; manage groundwater to increase storage levels without diverting additional water from the environment; protect both surface and groundwater quality; and establish instream flow requirements adequate for protecting aquatic ecosystems. We have the tools necessary to implement 21st century water solutions that will provide California with the water it needs while protecting some of the world’s most vital and beautiful waterways. We just need the political will to use them.

¹ Scaramuzzino C, Parfrey E, Malotte C, Evelyn C, Bailey K, Allen C. 2019. “The Smart Alternative to Tunnel(s): A Sensible Water Management Portfolio.” Sierra Club California. Available at https://www.sierraclub.org/sites/www.sierraclub.org/files/sce-authors/u14412/SCC_Water_Report_2019.pdf

Agricultural Water Use

Principle: State water management should assess and manage soil and groundwater salinization in the San Joaquin Valley. Almost 1,000,000 acres on the west side are now moderately to extremely saline.

- Provide funding for CDFA and the Department of Conservation to use remote sensing for regional-scale inventories of soil salinization.² **Who: Legislature.**
- Provide funding for the Department of Conservation to produce current regional farmland conversion reports.³ **Who: Legislature.**
- Incentivize tiered water pricing for lands with drainage impairment and/or saline-sodic soils. Tiered pricing, based on usage per acre, would encourage growers to reduce over-irrigation, which is one of the root causes of drainage impairment and soil salinization.⁴ Over-irrigation of saline-sodic soils also degrades groundwater. **Who: Legislature. Example: Broadview Irrigation District.⁵**
- Provide bond funds for acquisition of tracts of degraded lands that are going out of production for habitat restoration. Coordinate habitat acquisition with recovery plans for endangered species.⁶ **Who: Legislature through Department of Fish and Wildlife.**
- Provide tax incentives for location of solar projects on degraded lands that are going out of production and have low potential habitat value. **Who: Legislature.**

²Scudiero E, Corwin D, Anderson R, Yemoto K, Clary W, Wang Z, Skaggs T. 2017. "Remote sensing is a viable tool for mapping soil salinity in agricultural lands." *Calif Agr* 71(4):231-238. Available at <http://calag.ucanr.edu/Archive/?article=ca.2017a0009>.

³ The latest Department of Conservation California Farmland Conversion Report was done in 2015 and used data from 2010- 2012. See *Farmland Conversion Reports*, web page, <https://www.conservation.ca.gov/dlrp/fmmp/Pages/Farmland%20Conversion%20Reports.aspx>.

⁴ US Department of Interior and California Resources Agency, *A Management Plan for Agricultural Subsurface Drainage and Related Problems on the Westside San Joaquin Valley : Final Report of the San Joaquin Valley Drainage Program*, 1990. Available at <https://ia800202.us.archive.org/21/items/managementplanfo00sacr/managementplanfo00sacr.pdf>.

⁵Hanemann, M., and Brooks, B., "Tiered Pricing of Water," Work Group, April 11, 2006. Available at <https://www.iid.com/home/showdocument?id=212>.

⁶ Kelley, P., Borders, B., Ritter, N., Lair, K., Lee, S., "Challenges and Opportunities in Restoration of Retired Agricultural Lands in Fresno County, California," presentation to 2009 National Conference on Ecosystem Restoration. Available at https://conference.ifas.ufl.edu/ncer2009/PPTPDF_pres/5-Friday/2-Emerald%20Bay/AM/0850%20P%20Kelly.pdf.

- When doing cost-benefit analyses of water supply projects, consider total investment needed to maintain agricultural productivity of lands. **Who: Natural Resources Agency. What: Directive.**

Principle: Provide increased accuracy of data on agricultural water use through better measurement and remote sensing.

- In reviewing 2020 Agricultural Water Management Plans, the Department of Water Resources should scrutinize implementation of regulations mandating metering of water deliveries by agricultural water districts, pursuant to SB X7-7.⁷ The 2012 regulations cite availability of cost-effective commercial devices for agricultural water metering.⁸ **Who: Department of Water Resources.**
- DWR should provide a thorough report to the legislature on implementation of Agricultural Water Management Plans, as required under Water Code section 10845, particularly with respect to new technologies for measuring agricultural water use. **Who: Department of Water Resources.**
- Remote sensing data should be used to generate reports of regional crop patterns and crop water use, for use in the California Water Plan Updates and water management decisions. **Who: Legislature through Department of Water Resources and State Water Resources Control Boards.**

Principle: Provide targeted investments in agricultural practices that promote climate adaptation.

- Increase funding for programs in the California Healthy Soils Initiative to reduce water loss through evapotranspiration. Changing farming techniques to use cover crops, compost, etc. can reduce water use (and evaporation), sequester carbon, and reduce the need for fertilizers that runoff into waterways and cause water quality issues (eg. toxic algae). **Who: Governor and Legislature. What: increase funding and staffing at the Department of Food and Agriculture. How: Increase funding, provide case**

⁷ Department of Water Resources, *Agricultural Water Use Efficiency*, web page. Available at <https://water.ca.gov/Programs/Water-Use-And-Efficiency/Agricultural-Water-Use-Efficiency>.

⁸ DWR's adopted regulation, Title 23, Chapter 5.1. Water Conservation Act of 2009, Article 2. Agricultural Water Measurement, is available at https://water.ca.gov/LegacyFiles/wateruseefficiency/sb7/docs/Revised%20Ag%20Water%20Measurement%20Reg%20Adopted_07052011.pdf. Section 597.3(b) states, "When a water measurement device becomes commercially available, that is comparable in cost to other measurement devices commonly in use, and that can meet the measurement options in §597.3(a)(2) at the individual customer's delivery points, an agricultural water supplier shall include in its Agricultural Water Management Plan a schedule, budget and finance plan to measure water at the individual customer delivery points in compliance with §597.3(a) of this Article."

studies, conduct more extensive outreach, and increase incentives to get larger farms to participate. Example: The team can start planning now for the increased funding in the 2020-2021 budget.

- Restore and increase funding for State Water Efficiency and Enhancement Program (SWEEP) for targeted crops. Over-irrigation of nitrate-fertilized crops not only results in high evaporative losses, it contaminates groundwater. **Who: Governor. How: State budget. What will it build on: SWEEP is credited with saving annually over 100,000 acre-feet of water.**⁹
- Provide funding for agricultural water districts to assess condition of district owned water delivery infrastructure, including seepage and subsidence. **Who: Legislature.**
- Provide funding for agricultural water districts to repair and upgrade water delivery infrastructure in exchange for returning some of the conserved water to the environment. **Who: Legislature. Example: in Oakdale Irrigation District, where annual water losses amount to 100,000 acre-feet per year (afy), with 45-55% of these coming from on-farm losses, reducing water spills by 75% could save 15,000 afy of water.**
- Fund a comprehensive analysis of the costs and impacts of water transfers during the 2013-2016 drought. **Who: Legislature through Department of Water Resources. How: Budget.**
- Prop 1 storage projects have generally been too costly for agricultural water users. Providing low interest loans for growers with permanent crops to purchase shares in groundwater banks for storage of water allocations in wet years would be more affordable and help with SGMA compliance.
- Fund a comprehensive analysis of the costs and impacts of water transfers during the 2013-2016 drought. **Who: Legislature through Department of Water Resources. How: Budget.**

Urban Water Use

Principle: Prioritize both climate adaptation and climate mitigation (GHG emission reduction) in the Water Portfolio.

⁹ Jeanne Merrell, "California Falls Short on Climate Smart Farming Investments," California Climate and Agriculture Network, June 13, 2019. Available at <http://calclimateag.org/california-falls-short-on-climate-smart-farming-investments/>.

- Direct that state agencies, for water supply planning, explicitly evaluate energy intensity and greenhouse gas emission intensity of alternative water sources. **Who: Governor and Natural Resources Agency.**
- Prioritize state funding for water supply projects that reduce greenhouse gas emissions over existing supplies. **Who: Governor and Natural Resources Agency.**
- Produce reports summarizing changes in regional and statewide embedded water-energy use and associated greenhouse gas emissions.¹⁰ **Who: California Energy Commission and Department of Water Resources.**

Principle: Increase drought resiliency of urban water supplies.

- Require that urban water agencies analyze potential water shortages in a six year drought in Urban Water Management Plans, and consider potential actions to avoid shortages beyond Stage 4 “critical shortage” curtailments. **Who: Directive and/or legislation, DWR and SWRCB implementation.**
- Accelerate development of criteria for Direct Potable Reuse to speed up implementation of DPR projects. **Who: SWRCB. How: accelerate the adoption of regulations allowing raw water augmentation. What will it build on: SWRCB’s Proposed Framework for Regulating Direct Potable Reuse in California and SWRCB’s 2018 regulations for Surface Water Augmentation. Example: Create regulations by 2021 for raw water augmentation.**
- Produce report on technology for net zero water use commercial buildings, and regulatory barriers to implementation. **Who: Governor and Legislature through DWR.**

Principle: Aggressively promote residential and commercial landscaping appropriate for California’s mediterranean climate. Ensure appropriate irrigation to avoid water waste.

- Analyze remote sensing data to estimate landscape water use in water districts for more accurate assessment of past and current outdoor use. Analyze data to determine which conservation programs are most effective, and to estimate current regional residential and commercial outdoor use. **Who: Legislature through Department of Water Resources.**
- Fund collaborative assessment of effectiveness of local public outreach programs on implementation of drought-tolerant landscaping and appropriate irrigation, and outdoor

¹⁰ Regional and statewide estimates were provided in Klein, Gary, 2005. “California’s Water-Energy Relationship, Final Staff Report.” CEC 700-2005011-SF. Sacramento, CA.: California Energy Commission. The estimates are still being cited.

conservation incentives. **Who: Department of Water Resources and local and regional water agencies.**

- Provide training and support for local planning agencies to fully implement Model Water-Efficient Landscape Ordinances. Produce training materials on MWELo for planning staff. Hold training webinars for architects, builders, and landscape designers. **Who: Department of Water Resources and local agencies.**

Groundwater Storage/Replenishment/Use

Principle: Accelerate the implementation of SGMA. Aim for an increase in the current levels of groundwater without exporting additional water from the Delta. Research and provide funding for implementing methods of storing big rainfall year water in depleted groundwater basins.

- Create and fully fund a Statewide Groundwater Management Division in DWR so that GSPs can be carefully evaluated on submission to be sure their data for replenishment and extraction is accurate, and so that after submission GSAs can be carefully monitored to be certain they are achieving the milestones for sustainability set forth in their GSPs. **Who: Director of DWR and Governor Newsom. How: Allocate funding for a new DWR Division and hire to staff it. What will it build on: Adoption of SGMA and appointment of Taryn Ravazzini as Deputy Director of Statewide Groundwater Management.**
- Provide funding for application of NASA's Gravity Recovery and Climate Experiment (GRACE) downscaled maps to track regional trends in groundwater storage for evaluation of effectiveness of SGMA implementation.¹¹ **Who: Governor and Legislature. What: Budget.**

Principle: Contamination of groundwater is a major issue for climate adaptation. Fully fund regulation of hazardous waste, oil and gas exploration, and mining to prevent further groundwater contamination.

- Support enforcement of California's hazardous waste laws by the state Department of Toxic Substances Control. Make protection of groundwater a priority of the DTSC, and

¹¹ Miro, M.E.; Famiglietti, J.S. Downscaling GRACE Remote Sensing Datasets to High-Resolution Groundwater Storage Change Maps of California's Central Valley. *Remote Sens.* 2018, *10*, 143. Available at <https://www.mdpi.com/2072-4292/10/1/143>.

provide adequate funding for the DTSC to carry out its core missions.¹² **Who: Governor, Natural Resources Agency, Legislature. What: Agency priorities and Budget.**

- Fund needed information technology upgrades at the DTSC, including those needed for cost recovery programs.¹³
- Provide increased funding for the SWRCB to analyze data from its Groundwater Ambient Monitoring and Assessment (GAMA) Program for antidegradation purposes and protection of source waters and to coordinate with the Department of Toxic Substances Control to ensure that groundwater is protected from contamination wherever it is being used or could be restored in California. **Who: Legislature. What: Budget.**
- Ensure there is adequate funding for the original purpose of the SWRCB's Cleanup and Abatement account. (Funding was redirected to emergency drinking water projects during the 2013-2016 drought.) **Who: Governor and Legislature. What: Budget.**
- Provide support and increased funding for the SWRCB to implement TMDLs for surface water quality issues that impact groundwater.¹⁴ **Who: Natural Resources Agency, Legislature.**
- Mandate that all state agencies comply with local groundwater protection ordinances where applicable to activities. **Who: Governor. What: Executive Order.**
- Accelerate production of reports by the independent panel review of the Division of Oil, Gas and Geothermal Resources Underground Injection Control Program, pursuant to Section 46 of SB 83.¹⁵ **Who: Natural Resources and Cal EPA.**

¹² In November 2017, the DTSC reported that "Though recent changes to the Hazardous Waste Control Account have relieved some pressure, the fees that fund this account do not always cover the cost of managing the State's hazardous waste. Similarly, the Toxic Substances Control Account may not have sufficient funding to cover future operations and management costs at federal cleanup projects requiring long-term oversight by the State." Department of Toxic Substances Control, *Process Improvements Summary for the Independent Review Panel*, November 2017. <https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/04/DTSC-Process-Improvements-Summary-November-9-2017.pdf>.

¹³ In November 2017, the DTSC reported that "DTSC continues to evaluate the best means of leveraging its resources while also modernizing its fiscal management systems, both internally through cost recovery processes and externally through upgraded information technology improvements." *Process Improvements Summary for the Independent Review Panel*, *ibid*.

¹⁴ The 303(d) process should be applied to address nitrates and other pervasive groundwater contaminants.

¹⁵ SB 83 can be accessed at https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160SB83.

- Transfer oversight of the Underground Injection Control Program to the State Water Resources Control Board and Regional Water Quality Control Boards. **Who: Legislature.**
- Pass legislation requiring oil and gas production companies and mining companies to pay volume based fees for better regulation of surface discharges or injection discharges. The fees would support increased regulatory oversight, including testing of water produced by development and production activities of oil and gas companies. The fees would also fund independent assessment by water-geology professionals of such injection making water in that zone leaking or leaching into any other zone and making it less potable. **Who: Legislature.**

Environmental Water

Principle: Before permitting significant new diversions for groundwater replenishment, storage, or conveyance, the SWRCB must determine instream flows needed to protect aquatic ecosystems.

- Mandate that all water management and regulatory decisions of state agencies explicitly analyze compliance with Water Code section 85023: The longstanding constitutional principle of reasonable use and the public trust doctrine shall be the foundation of state water management policy and are particularly important and applicable to the Delta. **Who: Governor.**
- Ensure that all actions by the SWRCB in determining instream flow criteria are based on independent science. **Who: SWRCB, support from Natural Resources Agency.**
- Ensure a State Water Resources Control Board that implements adequate instream flows to protect and restore aquatic ecosystems. **Who: Governor Newsom. How: as Board terms expire, appoint board members who have knowledge of instream flow criteria and support the Board's exercise of public trust to protect aquatic species. What will it build on: 2014 California Water Action Plan guidance to enhance flows in streams statewide.**
- Restore funding from the general fund for the water rights division of the State Water Resources Control Board, adequate to support full implementation of the core missions

of the water rights division. (Funding from the general fund was eliminated in 2003.¹⁶)

Who: Governor and Legislature. What: Budget.

- Provide funding for accelerated determination by the SWRCB's of instream flow criteria in the 127 high priority streams identified in the report produced pursuant to Water Code section 85087. These include, Schedule 1, High-priority Rivers and Streams Tributary to the Sacramento River and Delta, Schedule 2, High Priority Rivers and Streams that Support Anadromous Species, and Schedule 3, High Priority Rivers and Streams that Support Only Non-Anadromous Species. **Who: Governor and Legislature. What: Budget.**
- Provide funding for the State Water Resources Control Board to evaluate projected impacts of climate change on water availability. **Who: Governor and Legislature. What: Budget.**

Principle: Plan for environmental water supply reliability in the management of state owned reservoirs.

- The Department of Water Resources's 2006 plan to meet the State Water Project's obligations under the Bay-Delta Water Quality Control Plan¹⁷ is obsolete, given the December 2018 changes to the Coordinated Operation Agreement with the US Bureau of Reclamation. Either the Governor should direct that DWR prepare a new plan to meet the SWP's obligations, or Water Code 138.10 should be revised to require a new plan. **Who: Governor or Legislature.**

Water Quality

Principle: Climate change has many adverse impacts on water quality. Increased funding is needed for water quality monitoring and regulatory programs.

¹⁶ In 2003, at the beginning of the California budget crisis, the Governor proposed eliminating General Fund funding for the Water Board's water rights program, shifting it to fees. The LAO noted that the cut would have a "significant adverse impact on the board's ability to process applications in a timely manner." See the LAO's 2003 analysis, available at https://lao.ca.gov/analysis_2003/resources/res_19_3940_anl03.htm.

¹⁷ Department of Water Resources, "Description of Department of Water Resources Compliance With State Water Resources Control Board Water Right Decision 1641: Response to Senate Bill 1155 Enacting California Water Code Section 138.10." Available at http://baydeltaoffice.water.ca.gov/announcement/D1641_final.pdf.

- Provide funding for the SWRCB and Regional Boards to address climate-related impairments through the 303(d) listing process, including listing for temperature impairment. **Who: Governor and Legislature. What: Budget.**
- Many models project higher contaminant concentrations in waterways as less frequent but more intense rainfall patterns change water quality.¹⁸ Provide funding for accelerated implementation of TMDLs by State Water Resources Control Board and Regional Boards. **Who: Governor and Legislature. What: Budget.**
- Ensure that 303(d) lists include groundwater loadings or withdrawals including dewatering as a source of impairment for surface waters. **Who: State Water Resources Control Board.**
- Provide funding for SWRCB’s monitoring of Harmful Algal Blooms, and for comprehensive and coordinated regional responses. **Who: Governor and Legislature. What: Budget.**

Resilience

Principle: The Water Portfolio should consider “water stress.” Water stress includes impacts of water pollution, flooding, and sea level rise as well as inadequate access to drinking water and wastewater services.¹⁹

- Technical assistance should be made available to vulnerable communities to respond to water stress from impacts of climate change. **Who: Legislature through SWRCB, Central Valley Flood Board, California Coastal Commission. What: Budget.**
- Climate change adaptation funding should prioritize projects that improve resilience in the state’s most vulnerable communities, including protection from flooding and sea level rise as well as drought.²⁰ **Who: Governor and Legislature. What: Budget.**

¹⁸ “2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2006,” p. 82. Available at http://resources.ca.gov/docs/climate/Statewide_Adaptation_Strategy.pdf.

¹⁹ US Water Alliance, *An Equitable Water Future: A National Briefing Paper*. Available at <https://kresge.org/sites/default/files/library/equitable-water-future-us-water-alliance.pdf>.

²⁰ *An Equitable Water Future: A National Briefing Paper*.

- The state should restore funding for the scientific conferences on Climate Adaptation that were organized by the California Climate Change Center to facilitate exchange of scientific knowledge on climate adaptation.
- The state should conduct a vulnerability assessment of the state's water infrastructure to identify facilities that are located in floodplains, have been damaged by floods in the past, or are located in coastal areas that are susceptible to sea level rise and increasing risk of coastal flooding.²¹ **Who: Department of Water Resources, California Coastal Commission, in collaboration with local agencies.**
- Re-evaluate dam flood operations. Require re-evaluation of design inflows for existing dams in light of climate change and assess the need to increase effective flood reservation space, and release capacity²² **Who: DWR Division of Safety of Dams (State jurisdictional dams). What: Dam safety reviews for revised extreme flood inflow estimates and orders resulting in necessary spillway capacity improvements.**
- Re-evaluate downstream flood management. Require re-evaluation of the size of downstream floodways (and unregulated rivers and streams) to allow flood flows to safely reach natural or managed floodplains or the ocean (including competence of bridges and floodplain infrastructure). **Who: Central Valley Flood Protection Board (CVFPB) (San Joaquin and Sacramento River Valleys), DWR, DWR Division of Floodplain Management, State PUC, and local public agencies (for locations outside the jurisdiction of the CVFPB and for dams owned by investor-owned utilities) What: Evaluation of appropriate reservoir design flood (design flood used for flood protection rather than dam-safety spillway-competence purposes) and measures to improve flood-management competence and floodplain environmental resources such as revised reservoir regulation manuals, dam outlet-work capacity, improved floodplain management, and downstream physical and natural infrastructure.**

²¹ A Pacific Institute study found that a 1.4 meter sea level rise makes 28 wastewater treatment plants vulnerable to inundation: 21 plants around the San Francisco Bay and 7 other plants on the Pacific coast. See California Coastkeeper, Sierra Club et al. comments on SWRCB Climate Adaptation Resolution https://www.waterboards.ca.gov/board_info/agendas/2017/mar/comments_item7/sara_aminzadeh.pdf, p. 42.

²² During the federal relicensing of the Oroville Dam, the California Department of Water Resources (DWR) chose not to assess how climate change might affect the dam's operation. *J. Christian-Smith, Learning from Oroville: Water Board Proposes Climate Change Resolution*. Available at <https://www.newsdeeply.com/water/community/2017/02/20/learning-from-oroville-water-board-proposes-climate-change-resolution>.

- Provide funding for DWR and the Hydrologic Research Center in San Diego to fully implement the Integrated Forecast and Reservoir Management (INFORM) system as a decision support tool. While long-term forecasts have been implemented, short- and medium-term forecasts, which are essential for management of flood flows, still need to be implemented. It is also essential to extend the integrated forecasting system for the San Joaquin Valley.²³ **Who: Legislature through California Energy Commission and DWR. What: funding.**
- Direct that California’s State Hazard Mitigation Plan (SHMP) explicitly evaluate the actions that can be taken to reduce the vulnerability of the state’s water infrastructure to climate change.²⁴ **Who: Governor. What: Directive.**
- Water supply projects have a revenue stream, unlike most flood control projects. New water supply projects, and upgrades of existing water supply infrastructure should be paid for by beneficiaries. **Who: Governor & Legislature. What: Budget.**

²³ INFORM generates sets of likely inflows to major reservoir sites in Northern California on the basis of NWS large scale predictions and uses such to develop risk-based tradeoffs for the multi-objective management of the system of reservoirs. For more information, see <https://www.hrcwater.org/projects/project-2>.

²⁴ Poole, K. and Moore, R. NRDC Comments on Proposed Climate Change Policy, March 3, 2017. Available at https://www.waterboards.ca.gov/board_info/agendas/2017/mar/comments_item7/katherine_poole.pdf.