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September 16, 2009

California Natural Resources Agency Secretary Mike Chrisman
Deputy Secretary for Climate Change and Energy Anthony Brunello
California Natural Resources Agency
1416 Ninth Street, Suite 1311
Sacramento, CA 95814
VIA ELECTRONIC MAIL: adaptation@resources.ca.gov

Re: 2009 California Climate Adaptation Strategy Discussion Draft

Dear Secretary Chrisman, Deputy Secretary Brunello and Participating Agencies:

The California Coastkeeper Alliance (Alliance) represents 12 Waterkeeper organizations safeguarding the coast from the Oregon border to San Diego. On behalf of the Alliance, we are pleased to submit these comments on the "2009 California Climate Adaptation Strategy Discussion Draft" (Strategy). We welcome the state's interest in this critical issue, and its timely work to develop the Strategy and other climate change adaptation initiatives.

In a joint letter to you dated September 14th on which the Alliance was a signatory, we delivered general comments that we hope will assist you and partner agencies developing the final Strategy. We summarize those comments below and incorporate them by reference. We then provide observations and recommendations regarding two sections – Ocean and Coastal Resources, and Water Management – that will help further our progress in meeting the substantial challenges posed by climate change. These more detailed recommendations include, but are not limited to, the following:

- The Strategy should include actions related to implementation of the public trust doctrine, which is currently absent from the document.
- Strategies to address water quality and water rights, and the State and Regional Water Boards' responsibilities in implementing them, are missing and should be included in the final document, particularly in the Water Management Section.
- The links between adaptation and mitigation should be leveraged where possible, particularly with respect to water management (*e.g.*, through greater use of low-energy, sustainable water supplies).
- In addition to advancing sustainable strategies that promote positive action, the final document should provide greater attention to preventing harmful responses to climate change that simply re-direct problems elsewhere (which is the case with many seawalls).

THE STRATEGY SHOULD BE STRENGTHENED OVERALL IN ACCORDANCE WITH THE JOINT STRATEGY COMMENT LETTER DATED SEPTEMBER 14, 2009

As articulated in the joint letter to you dated September 14th on which the Alliance was a signatory, the significant and immediate threats posed by climate change require swift, decisive action. While laudable in its goals and a number of its specific provisions, the Strategy nonetheless should be strengthened considerably to provide the appropriate level of clear, immediate response to these growing threats. These joint recommendations include the following:

- **The Strategy should reflect a stronger commitment to action.** We concur with the concerns raised that "the majority of the actions described in the draft Strategy are either too general to be meaningfully analyzed by the public or are merely suggestions for action that could be taken if the relevant agency decided to do so."
- **The Strategy should commit to securing sufficient funding to effectively implement its adaptation strategies.**
- **The Strategy should prioritize actions that protect and promote public health and environmental and environmental justice values.** For instance, the Strategy focuses on expansion of water storage for both surface and groundwater supplies (p. 87) to the exclusion of prioritizing cost-effective water management strategies that also reduce greenhouse gas emissions and provide other co-benefits.
- **The Strategy should ensure that the proposed actions correspond to the full array of identified impacts.** As one example, the Ocean and Coastal Resources chapter focuses primarily on sea level rise and neglects to incorporate a number of other needed and practicable actions to address identified risks.
- **The Strategy should provide a clearer vision of successful adaptation.**
- **The Strategy should clarify how coordination and collaboration will occur.** For example, the Strategy could include commitments to actively pursue formal agreements (*e.g.* Memoranda of Agreement) among federal, state, and local governments to secure long-term commitments.
- **The Strategy should commit to a strong public outreach and engagement campaign.**

Each of these general recommendations runs through the more detailed set of observations and recommendations below.

THE OCEAN AND COASTAL RESOURCES SECTION OF THE STRATEGY SHOULD BE STRENGTHENED AND BROADENED TO ADDRESS THE PUBLIC TRUST DOCTRINE AND ADDITIONAL, NECESSARY ADAPTATION STRATEGIES

We support and welcome a number of the recommendations for action in the Ocean and Coastal Resources Section. For example, identifying priority conservation areas and lands that should be considered for acquisition and preservation, and considering climate change impacts during restoration efforts and natural shoreline enhancements, are important elements of a sound adaptation strategy (p. 72). We similarly support the call for identifying key habitats that may require more protection as a result of climate change impacts, and the observation that additional

buffer areas may be necessary to allow for climate change-induced phenomena, such as wetlands migrating upland as the sea level rises (p. 72). Finally, we welcome the plan for the Ocean Protection Council to hold coastal community meetings, and to take the lead on identifying funding sources for planning (p. 74).

General concerns that arose in reviewing this section are captured in the above-referenced joint comment letter, including the need to replace many of the "shoulds" and "considers" with "shalls" and "implements." If climate change is indeed posing the threats articulated in the Strategy and elsewhere, which we believe that it is, then the Strategy must be an action strategy, rather than primarily a planning strategy. While more planning and research are certainly necessary, the dearth of mandatory actions – even in the long-term – belies the seriousness of Strategy's grim predictions about the current and near-term impacts of climate change on our coast and ocean.

More specifically, a "long-term" action should not be simply to use "outreach and incentive programs to promote hazard avoidance policies and sound management decisions…" (p. 73, Strategy 1). Climate change demands far stronger action than education and incentives, particularly as we look forward toward the longer term. Similarly, Strategy 3 (state agency adaptation plans) would benefit from more specific direction on the elements of the adaptation plans and the accountability mechanisms needed to ensure that they are prepared and adequate. Strategy 3's long-term action also must include actual implementation and enforcement of the plans. As written, the long-term action is essentially just to update the plans, with no call for implementation (p. 74). This has the potential of being *less* effective than doing no plans at all, since valuable staff time that could be used for implementation activities in other areas would be used to update plans that have no clear implementation mechanisms. Implementation must be required, accountability for the implementation must be set in place, and ideally one entity (perhaps the Ocean Protection Council) should be designated as the lead to ensure that these adaptation actions occur in a coordinated fashion. Finally, there is no long-term set of actions at all for Strategy 4 (local government planning); at a minimum it should call for a date certain for local coastal plans to be updated to address climate change (p. 75).

An additional concern that was touched on in the joint letter is the fact that, as the Strategy articulates, "[a]daptation to sea-level rise drives most of the Ocean and Coastal Resources adaptation strategies presented in this report," and "[t]he priority strategy is for state agencies to avoid establishing or permitting new development inside future hazard zones in most cases if new protective structures would be necessary." While these actions are certainly important, they ignore an array of similarly important actions that will help increase ecosystem resiliency to climate change. These include but are not limited to: completion and implementation of the state's marine protected area network, improved fisheries management, enhanced inland flows important to marine and anadromous species, and improved water quality (see below for further discussion on flows and water quality).

Finally, two other key elements missing from the Ocean and Coastal Resources Section are: (a) a discussion of how to *avoid* problematic "solutions" that seem attractive when faced with an immediate problem but that in fact simply transfer the problem somewhere else (as is the case with many seawalls); and (b) the role of the public trust doctrine in adapting to climate change. As to the latter, there is not a single reference to the public trust doctrine in the entire Strategy, despite at least one coastal agency's extensive review of the utility of the doctrine in

implementing climate change adaptation strategies.[1] This clear gap must be rectified before the Strategy is finalized. The public trust doctrine provides important, additional tools and support for measures to address the impacts of climate change. The Ocean and Coastal Resources section, as well as other relevant sections of the Strategy, accordingly should add a specific sub-Strategy that examines and incorporates the public trust doctrine in taking action to adapt to climate change.

THE WATER MANAGEMENT SECTION OF THE STRATEGY SHOULD BE EXPANDED TO INCLUDE NEEDED WATER QUALITY AND WATER RIGHTS REFORMS

The Water Management section appropriately addresses a number of important actions that should be taken to address water issues arising from climate change, including expansion of the use of the Integrated Water Management Plans. The section also correctly references "changes in water quality" (p. 78) and "higher contaminant concentrations" (p. 80) as impacts of climate change that are of concern. However, the section otherwise overlooks needed actions related to water quality and water rights laws, particularly those authorities held and implemented by the State and Regional Water Boards. The section also fails to take a critical opportunity to leverage mitigation actions for the benefit of adaptation.

First, with respect to water quality, both the Water Management section and the Ocean and Coastal Resources section note the problems that climate change will create with respect to water quality (*see* above and p. 66: – ocean and coastal impacts include "contamination from sewage distribution and treatment systems" and "health risks from contaminated runoff"). However, neither section provides needed adaptation actions related to these impacts, despite the significant amount of water quality authority that could be exercised by the State and Regional Water Boards. A new Strategy in the Water Management section is needed to address water quality-related actions. This can include, for example, revisions to Regional Board Basin Plans needed to ensure that beneficial uses are fully protected in light of evolving information about climate change, including but not limited to ocean acidification.

Second, the Strategy contains no actions that address water rights, despite the repeated findings that water supplies, flows, elevations and locations may change dramatically with climate change. While much work needs to be undertaken to strengthen California water law to address 21st century challenges, there are key tools that can be used now, while that process is ongoing. For example, Water Code Section 275 directs the Department of Water Resources and the State Water Board to take "all appropriate actions" prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in the state. The State Water Board has legislative authorities to implement this directive by, among other things, amending flow objectives and initiating water rights proceedings to impose revised in-stream flow objectives and requirements. The Water Board may also re-open existing water rights permits to impose conservation terms, and conduct groundwater adjudications pursuant to Water Code Section 2100 as needed (for example, to protect water quality threatened by seawater intrusion).

[1] Memorandum from Will Travis and Tim Eichenberg, BCDC to BCDC Commissioners, "Using the Public Trust Doctrine to Adapt to Climate Change in San Francisco Bay" (Feb. 27, 2009), available at: http://www.bcdc.ca.gov/meetings/commission/2009/03-05_Public_Trust_Climate.pdf.

Also with respect to water rights, the Strategy should address the critical need for improved groundwater regulation and water rights enforcement generally, as a longer term strategy. SB 229 (Pavley 2009) took on these issues and should be consulted as this section is further developed, along with groundwater laws in other Western states. Moreover, the State and Regional Water Boards should be explicitly included in Strategy 6 to ensure *strategic* water storage, not simply "expanded" water storage. This may mean taking down dams, revising flow requirements and modifying water rights as discussed above. Each of these is an activity that the Water Boards can and should be assigned in the Strategy to ensure its success. And again, the public trust doctrine provides invaluable tools that should be included as adaptation strategies in the Water Management section.

Related to this topic is the critical need for further information on water diversion and use in the state. Strategy 8 appropriately addresses the need for significantly enhanced monitoring, data analysis and data management, and commits to a "feasibility study" for a water use database and reporting system. We urge that a long-term action be added for this Strategy that identifies the completion date of this essential database and reporting system, and that commits to its prompt implementation. The state currently has *no* reliable information on water diversion and use; this information is essential to sound decision-making, particularly in an environment that is changing rapidly due to climate change.

Finally, the Water Management section should be expanded to take advantage of a critical opportunity to leverage mitigation actions for the benefit of adaptation. As stated in the Climate Action Team public hearing on September 10th, climate change adaptation and mitigation have been treated separately in policy but in reality are closely linked, and should be integrated where possible. One such opportunity for leveraging these efforts is through coordination with the Climate Action Team, which is overseeing the implementation of AB 32 Scoping Plan.[2] This Scoping Plan includes a multi-agency, water-energy subgroup tasked with the development of greenhouse gas (GHG) mitigation strategies for energy consumption related to water use.[3]

The AB 32 Scoping Plan is only generally mentioned in the beginning of the Strategy (p. 6); it should be more prominently highlighted in the actions, particularly in the area of Water Management. For example, the Water Board has been charged with evaluating lower energy use water supplies, some of which can also provide a relatively immediate hedge against disruption of "traditional" water supply sources that transport water many hundreds of miles. According to the California Energy Commission, the treatment and movement of water in the state consumes approximately 20% of the state's electricity. Low-impact development (LID) in particular can provide a low-energy, localized water source that also helps prevent flooding by conserving natural systems and hydrologic functions through rainfall management at the source. Specifically, LID increases infiltration in urban environments, protecting waterways and aquatic ecosystems from scouring and erosive damage, and reduces contaminant loads and consequent water quality degradation introduced by urban runoff. LID also increases infiltration and groundwater recharge that can augment water supplies in some locations. Recycled water –

[2] California Air Resources Board, "Climate Change Scoping Plan" (Dec. 2008) (AB 32 Scoping Plan), available at: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm.

[3] *See* http://www.waterboards.ca.gov/water_issues/programs/climate/index.shtml for details on the State Water Board's oversight of this effort.

when used consistent with state and federal public health *and* water quality laws – provides another important low-energy, localized water supply less subject to the impacts of climate change than stored and transported water. The availability of such sustainable water strategies also reinforces the need to focus Strategy 6's discussion on *strategic* storage, rather than simply expanded storage.

The Appendix to this letter provides a more detailed compilation of different water supply strategies that could be turned to as climate change begins to disrupt current water supply avenues. It addresses their costs – both financial and GHG emission – as well as their benefits (including flood prevention), providing references that could be consulted in expanding the Strategy to include a fuller discussion of these adaptation actions. For example, Strategy 4.f. – Land Use Policies (p. 86) could be expanded to incentivize/require local governments to implement low-impact development techniques. Strategy 5 (p .86) could add an action calling on relevant state agencies – including the State and Regional Water Boards – to work with local governments to implement LID, consistent with new Office of Planning and Research guidance on this topic.[4]

The State and Regional Water Boards, along with the Coastal Commission in the coastal zone, have been active in the application of LID. Activities related to these and other efforts to advance sustainable water strategies that are more resistant to climate change impacts should be featured prominently in the Water Management section.

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Thank you again for your work on this critical initiative and for the opportunity to submit these comments. We look forward to working with you as you finalize and implement the Strategy.

Best regards,

Linda Sheehan
Executive Director

[4] OPR, Technical Advisory, "CEQA and Low Impact Development Stormwater Design," (Aug. 5, 2009), available at: http://www.opr.ca.gov/ceqa/pdfs/Technical_Advisory_LID.pdf.

APPENDIX:

Summary of Financial and Greenhouse Gas Costs versus Benefits of Water Supply Alternatives

Summary of Financial and Greenhouse Gas Costs versus Benefits of Water Supply Alternatives

Linda Sheehan, CCKA, August 2009

This Appendix compiles information regarding the relative costs of sustainable water supply strategies. In particular, the paper touches on water recycling, stormwater capture/reuse and conservation as energy-efficient alternatives that can create millions of acre-feet of "new," local, energy-efficient water supplies. Each of these is briefly discussed below. Attached for reference is a detailed graphic from the recent Legislative Analyst's Office (LAO) October 2008 Water Primer[5] as well as relevant pages from a recent Los Angeles business group report on water.

STORMWATER CAPTURE/REUSE

The AB 32 Scoping Plan specifically promotes low-impact development (LID) as an energy-efficient, sustainable water source, and adds that up to 333,000 acre-feet of stormwater could be captured annually in urban Southern California alone.[6] This would achieve a corresponding 200,000 metric tons of carbon dioxide reductions by 2020.[7] In an August 2008 report covering Los Angeles, Orange, San Bernardino, San Diego, Riverside and Ventura counties, the Los Angeles Economic Development Corporation highly ranked "local stormwater capture" as a cost-effective, energy efficient, relatively immediate local water source, ranking far higher than desalination and new dams. The report found a potential for "[h]undreds of thousands of acre-feet" of water from stormwater capture and reuse.[8] Sample projects include the Inland Empire Utility Agency's water recharge project, which will capture 15,000 to 20,000 acre-feet per year, and the Coachella Valley Water District's project in La Quinta, which will capture 40,000 acre-feet per year via 39 recharge basins on 165 acres.[9] An August 2009 report by NRDC and the Bren School at U.C. Santa Barbara estimates that implementing LID practices solely in new and re- developments in urban Southern California and parts of the Bay Area can yield over 400,000 acre-feet of water annually by 2030 – roughly *two-thirds* of Los Angeles' water use each year.[10]

The January 2009 California Little Hoover Commission report on water governance echoes that:

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[5] CA Legislative Analyst's Office, "California's Water: An LAO Primer," Ch. 6 (Oct. 2008) (LAO Report), available at: http://www.lao.ca.gov/2008/rsrc/water_primer/water_primer_102208.pdf (see Attachment 1). Water savings could also be obtained from such actions as land retirement and groundwater treatment as well; these could be reviewed separately.

[6] California Air Resources Board, "Climate Change Scoping Plan," p. C-135 (Dec. 2008) (AB 32 Scoping Plan), available at: http://www.arb.ca.gov/cc/scopingplan/scopingplan.htm.

[7] *Id.*

[8] LAEDC, "Where Will We Get the Water? Assessing Southern California's Future Water Strategies," at pp. 9-10 (Aug. 14, 2008) (LAEDC Report); available at: http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf (see Attachment 2).

[9] *Id.* at p. 10.

[10] NRDC and U.C. Santa Barbara, "A Clear Blue Future," at p. 4 (Aug, 2009) (NRDC Report), available at: http://www.nrdc.org/water/lid/.

> [a] 2005 report by the Los Angeles and San Gabriel Rivers Watershed Council noted that 500,000 acre-feet of stormwater runoff flow from the Los Angeles County basin to the ocean each year. The report noted that if the region could instead capture that water and reuse it, Southern California would be less dependent on water imports from Northern California.[11]

DWR's 2005 Water Plan reports similarly that:

> The Fresno-Clovis metropolitan area has built an extensive network of storm water retention basins that not only recharges more than 70 percent of the annual storm water runoff (17,000 acre-feet) and removes most conventional storm water pollutants, but also recharges excess Sierra snow melt during the late spring and summer (27,000 acre-feet). Los Angeles County recharges an average 210,000 acre-feet storm runoff a year, which reduces the need for expensive imported water. Agencies in the Santa Ana Watershed recharge about 78,000 acre-feet of local storm runoff a year. The Los Angeles and San Gabriel Watershed Council has estimated that if 80 percent of the rainfall that falls on just a quarter of the urban area within the watershed (15 percent of the total watershed) was captured and reused, total runoff would be reduced by about 30 percent. That translates into a new supply of 132,000 acre-feet of water per year or enough to supply 800,000 people for a year.[12]

LID water management strategies are a "major area" of activity for the State Water Board under its 2008-2012 Strategic Plan, which states that LID simultaneously improves water quality and water supply, enhances neighborhoods, and provides flood control. U.S. EPA found that using LID methods rather than traditional storm water management resulted in cost *savings* of between 15% and 80%.[13]

As is the case for water recycling, the costs associated with LID vary and depend on the situation and locale. The LAEDC report found that notable initial costs can be incurred if aquifer storage is sought (boundaries must be established to protect against contamination, rights to the groundwater must be obtained, associated infrastructure must be installed, etc.). Gravity feeds of excess water into the ground can keep maintenance costs low, though a spreading basin can require significant maintenance to optimize the permeability of the soil. In consideration of these variables, though, the LAEDC report still found very low relative costs, on the order of $350 per AF, based on projects planned and operated by the Inland Empire Utility Agencies and the Coachella Valley Water District.[14] Cities such as Seattle also have found significant savings using LID in street design or improvement projects, which they determined "cost about 10 to 20 percent less than traditional street redevelopment with curb, gutter, catch basins, asphalt, and sidewalks."[15]

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[11] California Little Hoover Commission, "Clearer Structure, Cleaner Water," at p. 81 (Jan. 2009), available at: http://www.lhc.ca.gov/studies/195/report195.pdf.
[12] DWR, "California Water Plan Update 2005," DWR Bulletin 160-05, at p. 21-3 (Dec. 2005) (2005 Water Plan) (emphasis added), available at http://www.waterplan.water.ca.gov/docs/cwpu2005/vol2/v2ch21.pdf.
[13] *See* U.S. EPA LID website at: http://www.epa.gov/nps/lid/.
[14] LAEDC Report at pp. 10-11.
[15] NRDC Report at p. 14.

WATER RECYCLING

DWR's 2005 Water Plan finds that "[t]here is a potential of about 0.9 million to 1.4 million acre-feet annually of *additional* water supply from recycled water by the year 2030."[16] The costs associated with water recycling can vary significantly with the level of treatment and the amount of infrastructure (pipes, etc.) needed. In light of the wide range of local conditions that can affect costs, the majority of applications would cost between $300 and $1,300 per acre-foot of recycled water.[17]

The more recent Los Angeles County Economic Development Corporation (LAEDC) report identifies more than 30 recycling projects in Los Angeles, Orange County, San Diego and the Inland Empire alone with the potential of yielding more than 450,000 acre-feet of water within five years.[18] This report states that "[w]ater recycling projects require a significant amount of initial capital because expensive treatment and distribution facilities must be constructed and winter storage is required to fully utilize available wastewater"; it then estimates a cost averaging $1,000 per acre-foot to produce highly treated recycled water in Orange County.[19] Recycled water treated for less sensitive uses and with lower infrastructure costs (at the Eastern Municipal Water District) averaged $350 per acre-foot, by contrast.[20]

The benefits associated with reducing the energy embedded in water must also be considered in assessing overall costs, however. As discussed in the California's AB 32 Scoping Plan, the DWR report, "Water Recycling 2030: Recommendations of California's Recycled Water Task Force,"[21] finds that "approximately ten percent of municipal wastewater in California is being recycled, but as much as 23 percent of the municipal wastewater flow could be recycled." The California Energy Commission has reported that water supply and conveyance of water from northern to southern California consumes an estimated 3.2 MWh per acre foot (AF). In contrast, the estimated energy needed to recycle wastewater is approximately 0.7 MWh per AF (which will vary with the level of treatment required). As a result, the potential energy savings that could be realized through water recycling, based on the 23 percent recycling goal by 2030, is estimated as 2.5 MWh per AF in southern California communities that import water.[22]

WATER CONSERVATION/EFFICIENCY

Using water more efficiently is one of the key ways to provide water for a growing California. As discussed in the AB 32 Scoping Plan, the Governor directed State agencies to develop and implement a plan to achieve a 20 percent reduction in per capita urban water use by 2020. California should achieve approximately 1.8 million acre-feet of urban water use

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[16] 2005 Water Plan (emphasis added), available at: http://www.waterplan.water.ca.gov/docs/cwpu2005/vol2/v2ch16.pdf.
[17] *Id.*
[18] LAEDC Report at p. 13.
[19] *Id.*
[20] *Id.* at p. 14.
[21] http://www.owue.water.ca.gov/recycle/docs/TaskForceReport.htm.
[22] AB 32 Scoping Plan, Volume 1, at p. C-133, available at: http://www.arb.ca.gov/cc/scopingplan/document/appendices_volume1.pdf.

efficiency by 2020 to meet the Governor's call.[23] This would achieve a corresponding 1.4 million metric tons of carbon dioxide reductions by 2020.[24] Another study (Pacific Institute's "Waste Not, Want Not") indicated even greater potential savings of 2 to 2.3 million acre-feet per year from existing urban conservation techniques.[25] The LAEDC report found that in Los Angeles, Orange, San Bernardino, San Diego, Riverside and Ventura counties, "[u]rban water conservation could have an impact equivalent to adding more than 1 million acre-feet of water to the regional supply (about 25% of current annual use."[26]

The California Bay Delta Authority (CBDA) sponsored a study of urban water conservation potential as part of its comprehensive review of the Water Use Efficiency Element of the CALFED Bay-Delta Program. The CBDA estimated the technical potential for water savings by 2030 at approximately 3.1 million acre-feet per year. Advances in water-saving technology over the next 25 years, which the CBDA analysis did not evaluate, potentially could push savings beyond that.[27]

Costs also favor increased water conservation/efficiencies. The LAEDC report cost out Santa Monica's conservation strategies in its Sustainable Cities Plan at $210 per AF of water saved.[28] The Legislative Analyst's Office wrote recently that according to DWR estimates, urban water use efficiency costs about $1,000 to achieve one acre–foot of water savings per year, making urban water use efficiency "both the most cost–beneficial and the highest potential water producer of all of the solutions evaluated." By contrast, CALFED surface storage (a longer–term solution) costs about $10,000 to achieve one acre–foot of water savings per year.[29]

With respect to agricultural water use efficiency, the 2005 Water Plan reports that the CALFED Record of Decision "estimates that efficiency improvements will result in a water savings (reduction in irrecoverable flows also referred to as net water use) ranging between 120,000 to 563,000 acre-feet per year by 2030. The study also showed a 1.6 million AF per year reduction in applied water (combined recoverable and irrecoverable flows) that provides environmental and crop production benefits."[30] The referenced ROD further "estimates the cost of 563,000 acre-feet net water savings at $35 to $900 per acre-foot."[31] Additional information on costs associated with agricultural water conservation can be found in a just-released report by the Pacific Institute.[32]

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[23] AB 32 Scoping Plan, Volume 1, at p. C-132.
[24] *Id.*
[25] 2005 Water Plan at pp. 22-2 – 22-3, available at: http://www.waterplan.water.ca.gov/docs/cwpu2005/vol2/v2ch22.pdf.
[26] LAEDC Report at p. 6.
[27] 2005 Water Plan at pp. 22-3 – 22-4.
[28] LAEDC Report at pp. 7-8.
[29] LAO Report at pp. 65-67.
[30] 2005 Water Plan at p. 3-5, available at http://www.waterplan.water.ca.gov/docs/cwpu2005/vol2/v2ch03.pdf.
[31] *Id.* at p. 3-7 (costs would need to be normalized to ensure a consistent statewide baseline, such as in the LAEDC report – *see* attached LAEDC table).
[32] Pacific Institute, "Sustaining California Agriculture in an Uncertain Future" (July 2009), available at: http://www.pacinst.org/reports/california_agriculture/final.pdf.

DESALINATION

Seawater desalination, which has been examined with increasing interest of late, has in fact been found in numerous studies to be more costly and more energy intensive than most (and in many regions all) other sources of water. This was the case for the Legislative Analyst's Office (LAO), as indicated in Attachment 1. The Pacific Institute similarly compared the costs of seawater desalination, water recycling and gravity-fed surface water from 1971 through 2005 and consistently found that desalination was far more costly than the other two sources examined.[33] The more recent LAEDC report found that not only was desalination more costly than many other sources, it also scored by far the worst of all sources on greenhouse gas (GHG) emissions.[34] The report stated that:

> [d]esalination facilities are expensive to build, and they must be located near a large source of salty water like the ocean. A large amount of energy is required in the reverse osmosis process to push salty water at high pressure through a membrane. Because of this, desalination plants will not be economically viable without subsidies unless the price of competing sources go up.[35]

The report added a caveat that if such facilities operate significantly below capacity, the debt payments will be spread over fewer acre-feet, so the price per acre-foot will rise.

These significant cost figures, moreover, tend to ignore seawater desalination's enormous energy and GHG emission costs. As noted above, the Los Angeles Economic Development Corporation found ocean desalination to emit more greenhouse gases than any water source. The Inland Empire Utilities Agency, in a presentation before the State Water Board in March 2009, similarly reported that ocean desalination uses *over ten times more energy* in its service area than water recycling.[36]

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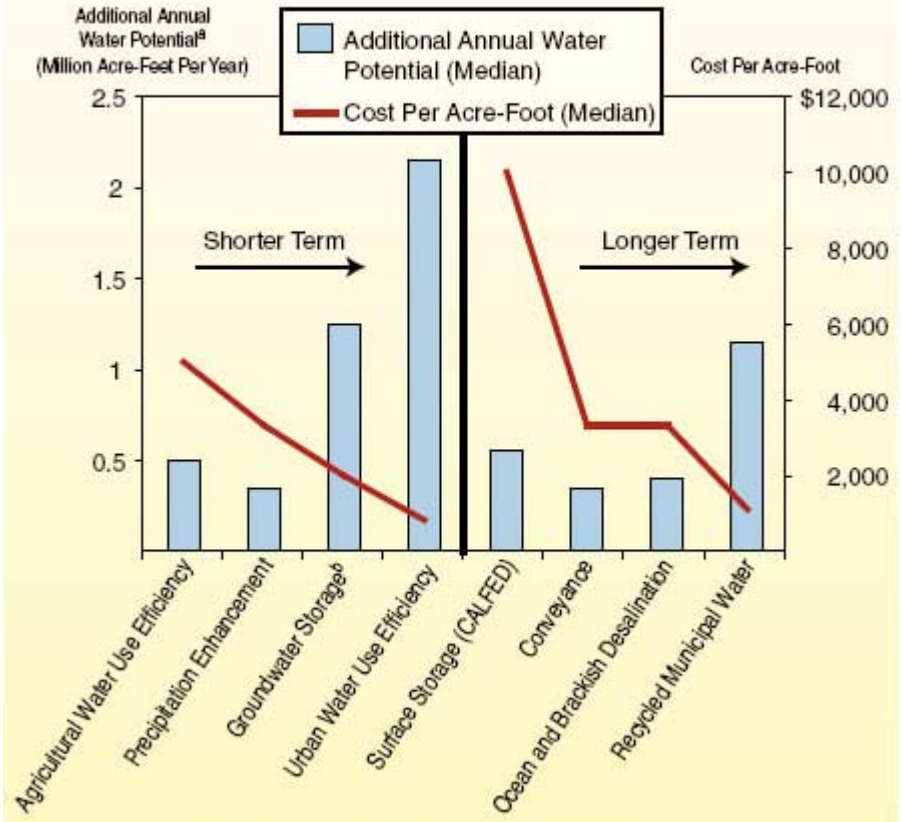
[33] Pacific Institute, "Desalination, with a Grain of Salt: A California Perspective," at p. 58, Figures 19 and 20 (June 2006), available at: http://www.pacinst.org/reports/desalination/desalination_report.pdf.
[34] LAEDC Report; *see* Attachment 2.
[35] *Id.* at p. 16.
[36] Martha Davis, Inland Empire Utilities Agency, Presentation to SWRCB (March 2009), available at: http://www.swrcb.ca.gov/water_issues/programs/climate/docs/ieua_030409.pdf. *See also* California Energy Commission, "Life-cycle Energy Assessment of Alternative Water Supply Systems in California" (CEC-500-2005-101) available at http://www.energy.ca.gov/research/environmental/project_summaries/PS_500-02-004_HORVATH.PDF (evaluating the global warming potential of desalination versus recycling and import of water).

ATTACHMENT 1:

LAO ANALYSIS OF BENEFITS AND COSTS OF WATER SUPPLY ALTERNATIVES

Figure 2

Options for Additional Water Supply: Benefits and Costs



[a]Reflects the midrange of estimates of water supply development potential of particular solutions, Department of Water Resources, California Water Plan 2005.
[b]Includes integrated management of groundwater and surface water.

Legislative Analyst's Office, "California's Water: An LAO Primer" (Oct. 22, 2008), http://www.lao.ca.gov/2008/rsrc/water_primer/water_primer_102208.pdf

ATTACHMENT 2:

ASSESSMENT OF SOUTHERN CALIFORNIA'S FUTURE WATER STRATEGIES

LAEDC, "Where Will We Get the Water?" (Aug. 14, 2008),
http://www.laedc.org/sclc/documents/Water_SoCalWaterStrategies.pdf

Assessing Southern California Water Strategies

Strategy	2025 Regional Potential (TAF*)	Typical Project Characteristics							
		Timeframe (years)	Drought-Proof (Reliability)	Risk (Project Aborted)	Enviro Opinion	GHG	Initial Cap. Cost ($millions)	Annual Oper. Cost ($millions)	30-yr cost Treated ($/AF)
Strategies to Replace or Augment Imported Water									
Urban Water Conservation	1,100+	0-2	🟢	🟢	🟢	🟢	$0	$0.5	$210
Local Stormwater Capture	150+	3-5	🔴	🟢	🟢	🟢	$40-$63	$1-$3.5	$350+
Recycling	450+	6-10	🟢	🟡	🟢	🟡	$480	$30	$1,000
Ocean Desalination	150+	6-10	🟢	🟡	🔴	🔴	$300	$37	$1,000+
Groundwater Desalination	TBD	6-10	🟢	🟡	🟡	🟡	$24	$0.7	$750-$1,200
Strategies to Increase Imported Water									
Transfers-Ag to Urban	200+	1-5	🟡	🔴	🟡	🟢	n/a	n/a	$700+
Strategies to Increase Reliability									
Inter-agency Cooperation	**	0-5	🟢	🟡	🟢	🟢	low	low	n/a
Groundwater Storage	1,500+	3-5	🟡	🟡	🟢	🟡	$68-$135	$13	$580
Surface Storage	0	10+	🔴	🔴	🔴	🟡	$2,500+	$7.5-$15.5	$760-$1,400

*TAF-Thousand Acre-Feet
** Improves reliability and efficiency of existing supplies
Source: LAEDC

🟢 **Favorable** 🟡 **Neutral** 🔴 **Unfavorable**

LAEDC Consulting Practice