

**American Bar Association  
Section of Environment, Energy, and Resources**

**The Climate has Changed: Now what?  
Integrated Regional Water Management and Climate Change Planning  
A Coincidental or Inevitable Union?**

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**ABSTRACT**

*Adapting California's water management systems in response to climate change presents one of the most significant challenges for the 21st century. In the course of the past five years, the California Department of Water Resources has taken an active role in both identifying opportunities to mitigate greenhouse gas (GHG) emissions and in positioning California to adapt to changes happening now and in the future. The recent publication of the Climate Change Handbook for Regional Water Planning is the most recent effort to bring together two separate water planning efforts – integrated regional water management and climate change mitigation and adaptation. The key to this planning synthesis is a significant change in the way water planners have addressed issues of water management. This paper looks at the development of integrated regional water management and climate change planning by the CDWR and their current union in the Handbook.*

**Introduction**

Climate change is already affecting California's water resources. Warmer temperatures, changes in precipitation patterns and runoff, and rising sea levels increasingly affect the ability to manage water and other natural resources. Like those of most regions, California's water management objectives include ensuring water supplies and water quality for multiple uses, managing floods and protecting ecosystem functions and critical habitats.<sup>2</sup> In an era when California's water resources are strained and future demands for water supply for agriculture and urban uses and for environmental purposes are expected to increase, managing these resources in a way that considers the effects of one action on another and maximizes the beneficial uses of water is critical. Climate change adds to the complexity of these issues since it affects California water resources in several ways. Sea levels are rising, snowpack is decreasing, runoff is occurring earlier in the season and water temperatures are increasing. In the future, it is expected that droughts will become more frequent and more severe and storm intensities will increase. These changes affect the ability to meet crucial water management objectives.

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<sup>1</sup> Any personal views expressed in this paper are those of the author and not those of the California Department of Water Resources or any other state agency.

<sup>2</sup> <http://www.water.ca.gov/about/mission.cfm>

The California Department of Water Resources (CDWR) has taken an active role in the state in identifying challenges and ways of coping with climate change. These include evaluating the water-energy relationship and greenhouse gas (GHG) emissions in the planning process; identifying mitigation strategies to reduce GHG for water supply projects; identifying impacts of climate change on water supply planning processes and identifying adaptation strategies to help ameliorate the adverse impacts of climate change on water supply and water quality; establishing a state-wide plan to guide, direct and advise local and regional water planners; and encouraging regional and watershed approaches to water planning.

The recent publication of the *Climate Change Handbook for Regional Water Planning (Handbook)*,<sup>3</sup> developed as a cooperative effort of the Environmental Protection Agency, the CDWR, the Resources Legacy Fund, and the United States Army Corps of Engineers, is the most recent effort to bring together two separate water planning efforts – integrated regional water management planning and climate change mitigation and adaptation. The key to this planning synthesis is a significant change in the way water planners address issues of water management. In the past, planners relied primarily on the historical record and often did not look at the relationship of their projects to other projects. Planners today are encouraged, and sometimes required, to manage the uncertainty caused by climate change by looking not only at the historical record but also projected changes in precipitation and temperature and to plan in an integrated manner that considers the relationships of projects in regions and watersheds and even outside of the region. As highlighted by the Handbook, “[w]hile significant uncertainty still exists about how quickly and to what degree climate change will occur, a preponderance of the scientific evidence related to projected future climate changes compels planners to act now. It is therefore imperative that regional water planners begin to consider potential futures where temperatures have increased appreciably and precipitation patterns no longer follow the statistical distribution of past observations”.<sup>4</sup>

## **Background**

California has, for the most part, considered water policy planning to be a local responsibility. Cities and counties have the primary authority to plan where and when urban and agricultural development will occur and local government, including special water districts, has the primary responsibility to develop and provide the water needed for local growth. Concerns about effects of urban and agricultural development and of water supply development on the environment have led to a number of state and federal legislative and administrative regulatory actions to protect the environment as well as expansive grant and loan programs to encourage water conservation, water recycling, ground water management and other water management tools. Within the last 5-10 years, there has been a greater emphasis on regional water planning, including integrated water management planning as an objective and tool used in the California Water Plan Update and the passage of the Integrated Regional Water Management Planning Act in 2002.

California has also invested in, and depends upon, a system that relies on historical hydrology as a guide to the future for water supply and flood protection. The system anticipated years that fluctuate significantly with periods of extreme drought alternating with periods of heavy rain and even flooding. Water planners and flood experts have always understood that models based on previous water years would not necessarily anticipate the full range of events that might occur.

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<sup>3</sup> Referred to as the *Handbook* in later citations. This handbook was prepared by CDM under a contract to EPA and published in November 2011. The handbook and a searchable database of climate change resources is available at: <http://www.water.ca.gov/climatechange/CCHandbook.cfm>.

<sup>4</sup> *Handbook*, page 1-4

However, due to climate change, it is widely assumed that the hydrology of the past is an even less reliable an indicator of future conditions. Within the last 5-7 years, there has been a greater emphasis on identifying the impact of water supply planning on GHG (mitigation) and on identifying risks of climate change on water planning (adaptation), both for supply and flood management, and strategies to manage such risks.

### **Climate Change Planning**

**Adaptation** in the context of climate change has been described as “[a]djustments in natural or human systems in response to actual or expected climatic stimuli or their effects, which minimize harm or take advantage of beneficial opportunities.”<sup>5</sup>

Although California had been taking the lead nationally in a number of efforts to reduce the emissions of greenhouse gases, Executive Order S-3-05 issued June 1, 2005<sup>6</sup> was an historic document that framed the issues of climate change adaptation and mitigation as they affected California and established a comprehensive approach for California with regard to these issues. The Executive Order recognized that “California is particularly vulnerable to the impacts of climate change”. The Order requires biennial reports on impacts of climate change on California mitigation and adaptation plans to combat these impacts. Three significant reports were issued by CDWR in the following three years that set the foundation for current climate change water management planning:

First, in the *California Water Plan Update 2005(CWP Update 2005)*, CDWR substantively assessed the threats of climate change, at the time a landmark for any major State planning process. It also introduced for the first time policy recommendations regarding climate change planning and planning for an uncertain future. With regard to global climate change, the report found that “California’s future hydrologic conditions will likely be different from patterns observed over the past century. Predictions include increased temperatures, reductions to the Sierra snowpack, earlier snowmelt, and a rise in sea level, although the extent and timing of the changes remain uncertain. These changes could have major implications for water supply, flood management, and ecosystem health. The prospect of significant climate change warrants examination of how California’s water infrastructure and natural systems can be managed to accommodate or adapt to these changes, and whether more needs to be done. Managing water resources with climate change could prove different than managing for historical climate variability because climate change could produce hydrologic conditions, variability, and extremes that are different from what current water systems were designed to manage; may occur too rapidly to allow sufficient time and information to permit managers to respond appropriately; and may require special efforts or plans to protect against change is to perform sensitivity analyses with different assumptions about potential future conditions. Incorporating flexibility and adaptability into our current system can strengthen our ability to respond to change.”<sup>7</sup> The *CWP Update 2005* recommended that CDWR evaluate management responses to potential impacts of global climate change on the State Water Project and California’s hydrology and work with climate change experts to develop alternative flow data to help State and regional planners test potential effects of global climate change on different management strategies.<sup>8</sup>

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<sup>5</sup> Intergovernmental Panel on Climate Change (IPCC). Climate Change 2001: Synthesis Report and Glossary of Terms. IPCC Third Assessment Report. [http://www.grida.no/publications/other/ipcc\\_tar/](http://www.grida.no/publications/other/ipcc_tar/)

<sup>6</sup> <http://gov.ca.gov/news.php?id=1861>

<sup>7</sup> CDWR. 2005. California Water Plan Update 2005 – A Framework for Action. DWR Bulletin 160-05, pp.4-32 to 4-36. <http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm>

<sup>8</sup> Ibid, page 5-16.

Second, the very next year in 2006, CDWR issued *Progress in Incorporating Climate Change into Management of California's Water Resources*<sup>9</sup>, a technical report that described in detail the potential impacts of climate change to the operations of the State and federal water projects, the Delta, and flood management. This report, updated in 2008<sup>10</sup>, documented the CDWR's first efforts to quantify and incorporate multiple climate change scenarios into the management of California's water resources.

Third, in 2008, CDWR issued *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water (Managing an Uncertain Future)*<sup>11</sup>. This groundbreaking adaptation document focuses discussion on the need for California's water managers to adapt to impacts of climate change, some of which are already affecting our water supplies. The report noted that “[w]hile the exact conditions of future climate change remain uncertain, there is no doubt about the changes that have already happened.”<sup>12</sup> This report formed the basis for the broader *California Climate Adaptation Strategy* adopted by the California Natural Resources Agency in 2009.<sup>13</sup>

*Managing an Uncertain Future* echoed the conclusion of the 2005 California Water Plan Update that historic hydrologic patterns can no longer be solely relied upon to forecast the water future and precipitation and runoff patterns are changing, increasing the uncertainty for water supply and quality, flood management, and ecosystem functions. It stated “[u]se of historical hydrologic data has long been the standard of practice for designing and operating water supply and flood protection projects. For example, historical data are used for flood forecasting models such as the National Weather Service's River Forecast System Model and to forecast snowmelt runoff for water supply. This method of forecasting assumes climate “stationarity” – that the climate of the future will be similar to that of the relatively brief period of historical hydrologic record. Paleoclimatology (which relies upon records from ice sheets, tree rings, sediment, and rocks to determine the past state of Earth's climate system), as well as other research revealing expected impacts of climate change, indicate that our traditional hydrologic approach can no longer be solely relied upon. That is, the hydrologic record cannot be used to predict expected increases in frequency and severity of extreme events such as floods and droughts. Going forward, model calibration or statistical relation development must happen more frequently, new forecast-based tools must be developed, and a standard of practice that explicitly considers climate change must be adopted.”<sup>14</sup> *Managing an Uncertain Future* proposed 10 adaptation strategies in four categories: investment, regional, statewide and improving management and decision making.<sup>15</sup>

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<sup>9</sup> CDWR. 2006. *Progress in Incorporating Climate Change into Management of California's Water Resources*.

<http://www.dwr.water.ca.gov/climatechange/docs/DWRClimateChangeJuly06.pdf#pagemode=bookmarks&page=1>.

<sup>10</sup> CDWR. 2008. *Progress in Incorporating Climate Change into Management of California's Water Resources*. [http://www.dwr.water.ca.gov/climatechange/docs/ClimaticChange\\_DWRarticle\\_Mar08.pdf](http://www.dwr.water.ca.gov/climatechange/docs/ClimaticChange_DWRarticle_Mar08.pdf).

<sup>11</sup> CDWR. 2008. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water* <http://www.dwr.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf>.

<sup>12</sup> Ibid. page 3.

<sup>13</sup> [http://resources.ca.gov/climate\\_adaptation/docs/Statewide\\_Adaptation\\_Strategy.pdf](http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf)

Developed in response to Executive Order S-13-08. <http://gov.ca.gov/news.php?id=11036>

<sup>14</sup> 2008. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water*, pages 2-3. <http://www.dwr.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf>.

<sup>15</sup> More recent documents have built upon the foundations laid in the three CDWR documents discussed above. They include:

**Mitigation** in the context of climate change has been described as human intervention to reduce the sources of greenhouse gases or to enhance sinks that remove them from the atmosphere<sup>16</sup>. Two major areas of California law frame the issue of mitigation – efforts to reduce GHG emissions and identification of adverse impacts and mitigation measures under the California Environmental Quality Act (CEQA).

The 2005 Executive Order S-3-05<sup>17</sup> established ambitious targets for reducing GHG emissions in California: by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels and by 2050, reduce GHG emissions to 80 percent of 1990 levels. In 2006, the California legislature passed the California Global Warming Solutions Act (AB 32)<sup>18</sup> which required the California Air Resources Board (CARB) to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990 to be achieved by 2020 and to adopt rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emission reductions specified. In 2006, CARB issued an inventory of GHG emissions and sinks 1990-2004<sup>19</sup> and in 2008, CARB adopted a *Climate Change Scoping Plan*<sup>20</sup> which outlined

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A May 2009 report of the California Climate Change Center, *Using Future Climate Change Projections to Support Water Resources Decision Making in California*, evaluates how climate change could affect the reliability of California's water supply.

[http://www.dwr.water.ca.gov/pubs/climate/using\\_future\\_climate\\_projections\\_to\\_support\\_water\\_resources\\_decision\\_making\\_in\\_california/usingfutureclimateprojtosuppwater\\_jun09\\_web.pdf](http://www.dwr.water.ca.gov/pubs/climate/using_future_climate_projections_to_support_water_resources_decision_making_in_california/usingfutureclimateprojtosuppwater_jun09_web.pdf).

The 2009 California Water Plan Update continues to build upon the climate change planning policy recommendations first proposed in *CWP Update 2005* and by incorporating *Managing an Uncertain Future*; it also and significantly expands the modeling and explanation of potential climate change impacts on California water resources.

[http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v1c5\\_uncertfuture\\_cwp2009.pdf](http://www.waterplan.water.ca.gov/docs/cwpu2009/0310final/v1c5_uncertfuture_cwp2009.pdf).

In October 2010, the Coastal and Oceans Climate Action Team Sea Level Task Force issued its *Final Interim Sea Level Rise Guidance Document*.

[http://www.dwr.water.ca.gov/climatechange/docs/SLR\\_GuidanceDocument\\_SAT\\_Responses.pdf](http://www.dwr.water.ca.gov/climatechange/docs/SLR_GuidanceDocument_SAT_Responses.pdf)

Also in December 2010, CDWR issued *Climate Change Characterization and Analysis in California Water Resources Planning Studies* which provides a comprehensive and comparative look at planning studies by CDWR and its partner agencies that have addressed climate change. The report reviews and summarizes thirteen studies completed since 2006 or that are in the process of being completed.

[http://www.dwr.water.ca.gov/climatechange/docs/DWR\\_CCCStudy\\_FinalReport\\_Dec23.pdf](http://www.dwr.water.ca.gov/climatechange/docs/DWR_CCCStudy_FinalReport_Dec23.pdf)

In July 2011, the Journal of Hydrology (Volume 405, pages 83-92) published *Isolated and integrated effects of sea level rise, seasonal runoff shifts, and annual runoff volume on California's largest water supply*, written by staff of the CDWR Bay-Delta Office.

<http://www.sciencedirect.com/science/article/pii/S0022169411003222>.

<sup>16</sup>US Climate Change Science Program. 2008. Weather and Climate Extremes in a Changing Climate. Regions of Focus: North America, Hawaii, Caribbean, and U.S. Pacific Islands. A Report by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research, page 134. [Thomas R. Karl, Gerald A. Meehl, Christopher D. Miller, Susan J. Hassol, Anne M. Waple, and William L. Murray (eds.)]. Department of Commerce, NOAA's National Climatic Data Center, Washington, D.C.

<http://www.climate-science.gov/Library/sap/sap3-3/final-report/default.htm>.

<sup>17</sup> <http://gov.ca.gov/news.php?id=1861>

<sup>18</sup>AB 32(Nunez). Statutes of 2006, Chapter 488. Adds Division 25.5 (commencing with Section 38500) to the Health and Safety Code. [http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab\\_0001-0050/ab\\_32\\_bill\\_20060927\\_chaptered.pdf](http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_0001-0050/ab_32_bill_20060927_chaptered.pdf)

<sup>19</sup> California Air Resources Board. 2006. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990-2004*. <http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF>.

<sup>20</sup> California Air Resources Board. 2008. *Climate Change Scoping Report: A Framework for Change*.

<http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm>.

regulations, market mechanisms, and other actions that would be undertaken to meet the 2020 emissions target. The *Climate Change Scoping Plan* includes recommendations for 39 GHG reduction measures that put the state on a path to meet the long-term 2050 goal of reducing California's GHG emissions to 80 percent below 1990 levels. A number of these measures apply to CDWR's activities.

Since the early 1970's, public agencies in California are subject to CEQA which requires identification of the potential adverse environmental effects of the agency's projects, including projects carried out, permitted or funded by the agency and potential mitigation measures. Regulations promulgated by the California Natural Resources Agency that implement CEQA are called the CEQA Guidelines.<sup>21</sup> In 2010, CEQA was amended primarily to implement the directive in Senate Bill 97 (2007)<sup>22</sup> which required the guidelines to deal with mitigation of GHG emissions or the effects of GHG emissions. The amendments were preceded by a report from the California Office of Planning and Research which identified in a general way potential impacts and mitigation measures relating to climate change.<sup>23</sup> Almost entirely, the amendments apply to issues of GHG emissions mitigation and address those issues where analysis of GHG emissions may differ in some respects from more traditional CEQA analyses and refer to use of GHG emissions reduction plans. Comments on the proposed changes specifically suggested that the Guidelines incorporate the California Climate Adaptation Strategy into the Guidelines. The Final Statement of Reasons (SOR)<sup>24</sup> which responded to issues raised by comments on the draft declined to incorporate the Strategy pointing out that "First, the Adaptation Strategy is a policy statement that contains recommendations; it is not a binding regulatory document. Second, the Adaptation Strategy focuses on how the State can plan for the effects of climate change. CEQA's focus, on the other hand, is the analysis of a particular project's greenhouse gas emissions on the environment, and mitigation of those emissions if impacts from those emissions are significant. Given these differences, CEQA should not be viewed as the tool to implement the Adaptation Strategy; rather, as indicated in the Strategy's key recommendations, advanced programmatic planning is the primary method to implement the Adaptation Strategies" The FSOR, however, pointed out that the Guidelines may require an analysis of the effects of a changing climate under certain circumstances and pointed out that Section 15126.2(a) had been expanded to provide examples. Section 15126(a) now says "Similarly, the EIR should evaluate any potentially significant impacts of locating development in other areas susceptible to hazardous conditions (e.g., floodplains, coastlines, wildfire risk areas) as identified in authoritative hazard maps, risk assessments or in land use plans addressing such hazards areas".

CDWR has responded in several ways to the issues raised by the actions of the Governor and the Legislature to reduce CDWR's carbon footprint and to analyze the impacts of CDWR's projects. Responding to the executive and legislative call to reduce GHG emissions in California, CDWR has adopted Sustainability (2009) and Environmental Stewardship Policies (2011) and Sustainability Targets (2010).<sup>25</sup> The Sustainability Policy articulates CDWR's intentions to minimize its impact on the environment and be a sustainability leader in state government and the

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<sup>21</sup> California Public Resources Code, starting with Section 21000. The CEQA Guidelines are found at California Code of Regulations, Title 14, starting at Section 15000.

<sup>22</sup> SB 97(Dutton). Statutes of 2007, Chapter 185. Adds Section 21083.05 to the Public Resources Code. [http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb\\_0051-0100/sb\\_97\\_bill\\_20070824\\_chaptered.pdf](http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0051-0100/sb_97_bill_20070824_chaptered.pdf)

<sup>23</sup> California Office of Planning and Research. 2008. *Technical Advisory- CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review*. <http://www.opr.ca.gov/ceqa/pdfs/june08-ceqa.pdf>.

<sup>24</sup> [http://ceres.ca.gov/ceqa/docs/Final\\_Statement\\_of\\_Reasons.pdf](http://ceres.ca.gov/ceqa/docs/Final_Statement_of_Reasons.pdf), pages 101-103.

<sup>25</sup> Copies can be made available on request.

water community. CDWR's Sustainability Targets establish several specific goals for reducing water use, wastewater production, energy use, carbon emissions, and waste generation. CDWR has adopted or will adopt a number of measures to achieve the targets, including reducing GHG emissions to 50 % of 1990 levels by 2020.

In 2009, responding to the call to adequately analyze and mitigate for any increased GHG emissions, CDWR established an internal review committee, called the CEQA Climate Change Committee to review all CDWR documents for their analysis of climate change. To streamline the consultation and review process, the Committee developed several guidance documents to assist CDWR staff and consultants. These include a summary of the approach to addressing climate change in CEQA documents; a more detailed guidance document on how to do an emissions inventory and model climate change sections for the three types of CEQA documents.<sup>26</sup> The initial focus of the documents is on the mitigation aspect of climate change. The review of each CEQA project has helped with providing consistency among CDWR documents.

CDWR is currently in the process of developing a Climate Action Plan. This plan is a response to call to reduce GHG emissions and to analyze and mitigate for any increased emissions. The first stage of the plan is a Greenhouse Gas Emissions Reduction Plan for most of CDWR's activities through 2020. The objectives of the Plan are to (1) document CDWR's progress in reducing its GHG emissions consistent with the GHG emissions reduction targets established in Assembly Bill (AB) 32, Executive Order S-3-05, and CDWR policy as expressed in the CDWR Sustainability Policy and Sustainability Targets, and (2) provide CDWR's analysis of forecasted GHG emissions and GHG emissions reductions associated with certain future CDWR projects and activities, which can then be relied on by CDWR in the GHG impacts sections of later project-specific CEQA environmental documents. Future phases of the Climate Action Plan will address technical approaches for characterizing and analyzing the impacts of climate change on CDWR projects (both existing and planned), and measures for resiliency and adaptation to future conditions expected as a result of climate change. CDWR will also issue a CEQA environmental document to cover the plan so that it can be used for CEQA purposes.<sup>27 28</sup>

## **Water Management Planning**

**The State Water Plan** evaluates water supplies and assesses agricultural, urban, and environmental water uses to quantify the gap between water supplies and uses.<sup>29</sup> The California Water Code requires the CDWR to publish an update of the *California Water Plan* (Bulletin 160) every five years. The *CWP Update 2005* was a significant milestone in California water management planning. As Director Snow stated in the introduction, "[t]his is not just another update of the California Water Plan. Update 2005 represents a fundamental transition in how we look at water resource management in California. It also represents a fundamental transition in the way state government needs to be involved with local entities and interest groups to deal with water issues in the state. The way we manage California's water resources is changing. We need to consider a broader range of resource management issues, competing water demands, new approaches to water supply reliability, and new ways of financing. Methods like storage and conveyance are being adapted to include more water conservation, recycling, desalination, and

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<sup>26</sup> Copies can be made available on request.

<sup>27</sup> *CEQA Guidelines*, section 15183.5, subdivision (b)(1). See footnote 21..

<sup>28</sup> This plan is currently in process. A draft may be out for public review by the time of the conference in February

<sup>29</sup> Previous reports and Bulletins in the early part of the 21<sup>st</sup> century set the foundation for later reports. <http://www.waterplan.water.ca.gov/previous/index.cfm>

many other strategies. And today, local agencies and governments are beginning to work together to develop regional water plans that are more integrated, more inclusive, and more cost effective. As the first update of the 21st Century, *California Water Plan Update 2005* is a roadmap for meeting the state's water demands today and into the future. It identifies pressing issues and includes a strategic plan with goals, policy recommendations, and actions to ensure sustainable water uses and reliable water supplies in the face of uncertainty and change. The plan also outlines an array of management strategies and collaborative approaches to increase supply, use water efficiently, protect water quality, and restore the environment."<sup>30</sup>

With the 2005 plan, CDWR began a much more open and collaborative planning framework for elected officials, agencies, tribes, water and resource managers, businesses, academia, stakeholders, and the public to develop findings and recommendations and make informed decisions for California's water future. *CWP Updates 2009 and 2013* continue and add to the process begun with 2005 to producing a strategic water plan that: meets California Water Code requirements; guides State investments in innovation and infrastructure; and advances integrated water management and sustainable outcomes.<sup>31 32</sup>

In 2008, CDWR's adaptation strategy, *Managing an Uncertain Future*, was issued as part of the process of updating the California Water Plan, and as part of the California Resources Agency's draft statewide Climate Adaptation Plan. The report also placed heavy reliance on integrated regional water management planning for both the investment and the regional strategies. The report noted that "California spans multiple climate zones ranging from mountain to coastal. Because of this diversity, each region of the state will experience unique impacts from climate change. For some, watershed health will be the chief concern. Other areas will be affected by saltwater intrusion. Regions that depend heavily upon water imports will need strategies to cope with greater uncertainty in supply. Economic and environmental impacts depend upon location, so adaptation strategies must be regionally appropriate."<sup>33</sup>

**Integrated Regional Water Management Planning** offers a framework for water managers to address water-related challenges and provide for future needs. Over the past decade, California has improved its understanding of the value of regional planning and made significant steps to implement IRWM. Formally, IRWM is a comprehensive approach for determining the appropriate mix of water demand and supply management options and water quality actions. This approach provides reliable water supplies at lowest reasonable cost and with highest benefits for economic development, environmental quality and other societal objectives. Moreover, if appropriately developed and implemented, IRWM plans—in combination with other regional planning efforts for transportation and land use—can serve as the basis for broader community adaptation plans for climate change.<sup>34</sup>

Although the concept of integrated regional water management planning has been around for a while, significant steps occurred in 2002. The Integrated Regional Water Management Planning Act (IRWMP Act) encouraged local agencies to work cooperatively to manage local and

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<sup>30</sup> <http://www.waterplan.water.ca.gov/previous/cwpu2005/index.cfm>;

<http://www.waterplan.water.ca.gov/docs/cwpu2005/cwphighlights/highlights.pdf>, Director's message.

<sup>31</sup> <http://www.waterplan.water.ca.gov/>

<sup>32</sup> <http://www.waterplan.water.ca.gov/technical/waterplancode.cfm>

<sup>33</sup> CDWR. 2008. *Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water*, page 11. <http://www.dwr.water.ca.gov/climatechange/docs/ClimateChangeWhitePaper.pdf>. See also footnote 10.

<sup>34</sup> Ibid.



imported water supplies to improve the quantity, quality and reliability of these supplies.<sup>35</sup> In November of that same year, voters passed Proposition 50 which funded competitive grants for projects consistent with an IRWM plan.<sup>36</sup> While these actions provided authority and funding for IRWM plans and projects, it gave little guidance for IRWM planning or implementation. The 2005 *California Water Plan Update* named the IRWM as a key initiative to ensure reliable water supplies and the CDWR “guidelines” for grant programs were several of the factors that led to Proposition 84 and Proposition 1E in 2006<sup>37</sup> which provide over \$1 billion in funding for IRWM programs.

The CDWR program describes IRWM as “looking at water management issues from a multitude of perspectives as diverse stakeholders engage one another. That process can yield multi-benefit projects that meet several entities’ goals and objectives in a more cost effective manner than each entity acting on its own. Previously, water management entities tended to work with a narrow focus on their service area and primary function, sometimes competing against similar efforts to resolve similar issues or advancing duplicate efforts.”<sup>38</sup> Similarly prior bond programs for grants and loans also focused on narrow areas or subject matters<sup>39</sup>. Proposition 50 provided some monetary encouragement for local agencies to think as a region with regard to water management planning. Propositions 84 and 1E, for the most part, have divided the grant and loan pie into two pieces – flood and integrated regional water management.

As of 2011, IRWMP planning covered over 87% of the state and included approximately 99% of the population. Some regions cover an entire hydrological area and others watersheds have multiple IRWM planning regions.<sup>40</sup>

### **Union of Climate Change and Water Management Planning**

For several years, climate change adaptation documents had been referring to IRWM planning as a strong tool for looking at how to plan for climate changes. At the same time IRWM documents were encouraging regional plans to consider climate change as a critical issue. In 2008, legislation repealed and replaced the 2002 IRWM Planning Act with a 2008 IRWM Planning Act.<sup>41</sup> In addition to strengthening the tie between IRWM plans and planning regions and bond funding, the legislation also specifically requires IRWM Plans to include an evaluation of the adaptability to climate change of water management systems in the region.<sup>42</sup>

In 2010, Integrated Regional Water Management Grant Program Guidelines published for Proposition 84 and related Proposition 1E funding further expanded the scope of issues that need to be addressed in IRWM Plans and for the first time added climate change adaptation and

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<sup>35</sup> SB 1672(Costa). Statutes of 2002, Chapter 676. Adds Part 2.2 (commencing with Section 10530) to Division 6 of the Water Code. [http://www.leginfo.ca.gov/pub/01-02/bill/sen/sb\\_1651-1700/sb\\_1672\\_bill\\_20020921\\_chaptered.pdf](http://www.leginfo.ca.gov/pub/01-02/bill/sen/sb_1651-1700/sb_1672_bill_20020921_chaptered.pdf)

<sup>36</sup> 2002 Proposition 50. [http://vote2002.sos.ca.gov/2002-vig/pdf/bp\\_pe01.pdf](http://vote2002.sos.ca.gov/2002-vig/pdf/bp_pe01.pdf)

<sup>37</sup> 2006 Proposition 84. <http://vote2006.sos.ca.gov/voterguide/props/prop84/prop84.html>

<sup>38</sup> 2006 Proposition 1E. <http://vote2006.sos.ca.gov/voterguide/props/prop1e/prop1e.html>

<sup>39</sup> 1996 Proposition 204. <http://vote96.sos.ca.gov/Vote96/html/BP/204.htm> and [2000 Proposition 13. http://primary2000.sos.ca.gov/VoterGuide/pdf/13.pdf](http://primary2000.sos.ca.gov/VoterGuide/pdf/13.pdf)

<sup>40</sup> 2009 CDWR Brochure on IRWM.

[http://www.water.ca.gov/irwm/docs/Brochures/Brochure\\_IRWM\\_020410.pdf](http://www.water.ca.gov/irwm/docs/Brochures/Brochure_IRWM_020410.pdf)

<sup>41</sup> 2008 SB X 2 1 (Peralta). Statutes of 2008, Special Session, Chapter 1.

[http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb\\_0001-0050/sbx2\\_1\\_bill\\_20080930\\_chaptered.pdf](http://www.leginfo.ca.gov/pub/07-08/bill/sen/sb_0001-0050/sbx2_1_bill_20080930_chaptered.pdf)

<sup>42</sup> Water Code, 10451(e)(1)

greenhouse gas mitigation as required elements of planning and project selection.<sup>43</sup> The Guidelines state that “[t]he IRWM Plan must address both adaptation to the effects of climate change and mitigation of GHG emissions. The IRWM Plan must include the following items: a discussion of the potential effects of climate change on the IRWM region, including an evaluation of the IRWM region’s vulnerabilities to the effects of climate change and potential adaptation responses to those vulnerabilities, and a process that discloses and considers GHG emissions when choosing between project alternatives.”<sup>44</sup> The Guidelines Appendix C provided information regarding the legislative and policy context for the climate change standard, as well as guidance on assessing mitigation and adaptation options and a list of references that could assist IRWM practitioners in developing or revising IRWM plans can be found at the end of that discussion.

In November 2011, CDWR and EPA announced the publication of the *Climate Change Handbook for Regional Water Planning*- developed as a cooperative effort among EPA, CDWR, Resources Legacy Fund, and the US Army Corps of Engineers.<sup>45</sup> The press releases identified The *Climate Change Handbook for Regional Water Planning* as a document that “provides a framework for considering climate change in water management planning. Key decision considerations, resources, tools, and decision options are presented that will guide resource managers and planners as they develop means of adapting their programs to a changing climate.”<sup>46</sup> The *Handbook* uses CDWR’s IRWM planning framework as a model into which analysis of climate change impacts and planning for adaptation and mitigation can be integrated. The *Handbook* offers an innovative analytical framework for incorporating climate change impacts into a regional and watershed and brings together information from both the climate change and integrated regional water management planning spheres that can be used not only by California practitioners but by practitioners in other states and other countries when incorporating climate change into any watershed or water supply planning process.<sup>47</sup>

## Conclusion

Although integrated regional water management and climate change planning efforts began independently, in hindsight, their current union is not at all coincidental and, in fact, appears to have been inevitable. “Water resource planners need ways to integrate climate change considerations into decisions and planning processes, today and in years to come. Integrated regional water planning is an excellent framework for addressing water-related climate impacts, as it provides a process for stakeholders with varied water-related priorities to work together to develop solutions that satisfy all water uses and needs. Because climate change impacts so many aspects of water resources, this process is ideal for addressing adaptation to climate change and for developing measures to help mitigate future climate change.”<sup>48</sup>

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<sup>43</sup> [http://www.water.ca.gov/irwm/docs/Guidelines/Prop84/GL\\_Final\\_07\\_20\\_10.pdf](http://www.water.ca.gov/irwm/docs/Guidelines/Prop84/GL_Final_07_20_10.pdf)

<sup>44</sup> Ibid. page 24.

<sup>45</sup> The *Handbook* can be downloaded from <http://www.water.ca.gov/climatechange/CCHandbook.cfm>.

<sup>46</sup> <http://www.water.ca.gov/climatechange/CCHandbook.cfm>.

<sup>47</sup> *Handbook*, Foreward.

<sup>48</sup> *Handbook*, page 1-1.