

**Economic Impacts of the Wanger  
Interim Order for Delta Smelt**

**December 8, 2008**

**Prepared by:**

**Berkeley Economic Consulting  
2550 Ninth Street Suite 102  
Berkeley, CA 94710**

## **Authors**

Dr. David Sunding<sup>1</sup>  
Dr. Newsha Ajami<sup>2</sup>  
Dr. Steve Hatchet<sup>3</sup>  
David Mitchell<sup>4</sup>  
Dr. David Zilberman<sup>5</sup>

<sup>1</sup> Berkeley Economic Consulting, Inc., 2550 Ninth Street Suite 102, Berkeley CA, 94710; Department of Agricultural and Resource Economics, UC Berkeley

<sup>2</sup> Berkeley Water Center, UC Berkeley; Berkeley Economic Consulting, Inc

<sup>3</sup> WREcon, Davis, CA

<sup>4</sup> M.Cubed, Oakland, CA

<sup>5</sup> Department of Agricultural and Resource Economics, UC Berkeley

## Executive Summary

On December 14, 2007, Judge Oliver Wanger issued an Interim Remedial Order Following Summary Judgment and Evidentiary Hearing (the “Interim Order” or the “Wanger Decision”). To protect the threatened Delta smelt, the Interim Order restricts water exports from the Delta to agricultural and urban customers of the State Water Project (“SWP”) and the Central Valley Project (“CVP”).

Modeling based on the California Department of Water Resources’ CALSIM II framework is used to measure supply losses in different types of water years. CALSIM II predicts the change in water deliveries over the hydrologic record in California from 1922 to 2003. The supply losses presented here are for the mid-point between the low- and high-flow targets on the Old Middle River specified in the Wanger decision.

In an average water year, the Wanger decision for Delta smelt results in the loss of 586 thousand acre-feet of SWP and CVP supply. Losses can exceed 1 million acre-feet in some wet years. Generally, impacts to the SWP exceed impacts to the CVP in both absolute and proportional terms.

Table A supplies are the basic water supplies delivered by the State Water Project. The Interim Order for Delta smelt significantly reduces the reliability of Table A deliveries. The mean annual reduction in Table A deliveries is 320 thousand acre-feet. Table A deliveries are reduced in nearly all years, and decline by an average of 11%.

The Monterey Amendment stipulates that any SWP contractor is entitled to water available to the SWP when excess water to the Delta exceeds the State Water Project’s operational requirements. Article 21 water supplies are severely impacted by the Wanger decision. Article 21 supplies are reduced by 96 thousand acre-feet on average, and are totally eliminated in many years.

Changes in CVP deliveries are evaluated using the same CALSIM II model runs used to calculate impacts to SWP deliveries. The Interim Order reduces CVP water supply by 170 thousand acre-feet in an average year, with an average reduction of 6%.

Generally, the water supply impacts of the Interim Order for Delta smelt are largest in above average water years. Wet year supplies are generally used to replenish groundwater and fill off-stream storage facilities. Thus, the loss of wet year water supplies can have consequences that “spill over” into subsequent dry years.

It should be emphasized that these supply loss estimates only cover restrictions resulting from conservation of the Delta smelt. There are several other species, including salmon and longfin smelt, that are candidates for additional protections that may increase the supply losses presented here. Further, other factors such as the revisions to the Long-Term Operations Criteria and Plan for the SWP and CVP will affect water supply reliability as well.

The SWP and CVP are important sources of water supplies to agricultural and urban customers in Southern California, the San Joaquin Valley and the San Francisco Bay Area. This report details the economic effects of the supply restrictions resulting from Delta pumping constraints related to conservation of the Delta smelt. The analysis shows that near term economic effects average more than \$500 million annually, and can exceed \$3 billion in a prolonged dry period such as the one experienced from 1978-1992.

Municipal and industrial impacts of the Interim Order are calculated using the Least Cost Planning Simulation Model (LCPSIM) developed by the California Department of Water Resources (DWR). LCPSIM measures the change in water supply cost and shortage losses for two regions in California: the San Francisco Bay Area and the South Coast. The South Coast region corresponds roughly to the service area of the Metropolitan Water District of Southern California (MWD). For the San Francisco Bay Area, the version of LCPSIM used in this report includes three South Bay agencies – Santa Clara Valley Water District, Alameda County Water District, and Zone 7 Water District.

LCPSIM allows for water agencies to invest in conservation and alternative water supply programs to cope with future shortages. The model also attempts to capture existing conservation and recycling programs, as well as existing storage and water transfer arrangements. Two configurations of LCPSIM were employed in this analysis. In the short run configuration, recycling, conservation and storage programs are set at current levels, and spot water transfers can be implemented to avoid shortages. In the long run configuration of LCPSIM, agencies can make additional investments in conservation and alternative water supply options to enhance reliability and reduce shortage losses.

The South Coast region is especially vulnerable to the water supply losses resulting from Interim Order. LCPSIM calculates these losses at \$467.3 million per year on average, assuming current levels of demand, conservation, storage and recycling. These costs result from a combination of increased water rates and an increased frequency of episodes of rationing and mandatory conservation. Over a longer horizon, as water agencies in the South Coast region have time to make desired investments in conservation, recycling and alternative supplies in response to the Interim Order, average annual losses can be brought under \$100 million.

The actual impacts of the Wanger decision to urban water users will depend on whether future years are wet or dry. While the average near-term impacts are \$467.3 million, annual losses could exceed \$3 billion should the state enter a prolonged dry period, such as the one experienced in 1987-1992. Thus, the Interim Order poses significant new risks to Southern California's water system. In the long run scenario, annual losses to South Coast water consumers can still exceed \$800 million in a drought.

LCPSIM calculates generally smaller impacts to the southern San Francisco Bay Area agencies: roughly \$5 million per year under the short-run scenario and \$1 million per year in the long-run. In a long-term drought, annual impacts to Bay

Area agencies can reach \$200 million. Bay Area agencies have already made significant investments in local and San Joaquin Valley groundwater storage and recovery projects. These projects provide a water supply reserve that helps them cope with the supply losses imposed by the Interim Order.

The analysis of agricultural impacts was conducted using the Central Valley Production Model (CVPM), a standard modeling framework used to assess changes in farm water supplies in California. Combining effects across SWP and CVP service areas, CVPM calculates average economic losses as \$48.4 million annually. Farmers will cope with reduced water supplies in part by reducing levels of crop production (i.e., fallowing) and job losses will occur as a result. The analysis addresses these anticipated job losses by using the IMpact analysis for PLANning (IMPLAN) model developed by the U.S. Forest Service. IMPLAN calculates that 720 jobs will be lost in the San Joaquin Valley as a result of the Interim Order. The large majority of these farm jobs are held by low-wage workers living in economically depressed areas.

The table below summarizes the economic impacts of the water supply losses resulting from Judge Wanger’s Interim Order. In the short-run, the Interim Order results in economic losses greater than \$500 million per year, most of which occur in the South Coast region. Losses are, however, distributed widely across the State. Extensive preventive investments in conservation, recycling and more aggressive banking and transfer programs in urban areas reduce expected losses to around \$140 million annually.

### **Summary of Average Annual Economic Impacts**

<b>Sector</b>	<b>Annual Impact (millions)</b>
Agriculture	\$48.4
Municipal & Industrial	
South Coast	
Short Run	\$467.3 (maximum \$3 billion)
Long Run	\$90.3 (maximum \$839 million)
San Francisco Bay Area	
Short Run	\$5.4 (maximum \$200 million)
Long Run	\$1.2 (maximum \$44 million)
Total: Short Run	\$521.1
Total: Long Run	\$139.9