Exhibit CCWD-5 (1994 Workshops) MAY 16 1994

Statement of Contra Costa Water District
Submitted to State Water Resources Control Board

Review of Standards for the
San Francisco Bay/Sacramento-San Joaquin Estuary
May, 1994

Summary

1. Modeling studies indicate that fish entrainment at the Contra Costa Canal accounts for a small proportion of fish populations. Sampling data are sparse. However, monitoring programs are required at intakes to the Contra Costa Canal and at Mallard Slough, and are being implemented.

2. There is no field evidence, biological or physical, that confirms the effectiveness of limitations on western Delta reverse flow in reducing fish entrainment at Delta diversions.

3. The DWRSIM operations model and its supporting programs utilize simplifying assumptions that do not correspond to operating experience, and the model does not provide sound estimates of flows required for Bay-Delta salinity control. In the near term, use of DWRSIM or similar procedures should continue, but model results should be compared with those of parallel studies conducted using a recommended alternative procedure. The State Board should encourage development of improved operations models.

Effects of Diversions from Bay-Delta Estuary on Fishery Resources

Diversions by Contra Costa Water District

Historically, fish entrainment sampling at Contra Costa Water District intakes has been conducted only rarely and for short periods. Relative entrainment indices at the Contra Costa Canal intake have been estimated using fish transport simulation models (for example, see Exhibit WRINT-CCWD-23, from the State Board's hearings on interim Bay-Delta standards in 1992). Such studies suggest that entrainment at the Canal accounts for a small proportion of fish populations. However, the models do not estimate actual entrainment and are subject to significant uncertainty.

Recent biological opinions issued under the Endangered Species Act require the District and the Bureau of Reclamation to conduct fish monitoring programs at the intake of the Contra Costa Canal as well

as at CCWD's Mallard Slough intake in the vicinity of Chipps Island. Monitoring programs at both locations are being developed and will be implemented in cooperation with the California Department of Fish and Game, the U. S. Fish and Wildlife Service and the National Marine Fisheries Service. Trial monitoring at Rock Slough began in February, 1994, for the initial purpose of developing an effective sampling methodology. A monitoring plan for the Mallard Slough intake is under development by the Department of Fish and Game.

Effects of Western Delta Reverse Flow (QWEST)

Limitations on western Delta reverse flow, estimated by the QWEST index, have been incorporated in biological opinions issued under the Endangered Species Act by the National Marine Fisheries Service and the U. S. Fish and Wildlife Service. The rationale for QWEST limits is that reverse flow restrictions will protect fishery resources by reducing physical transport of aquatic organisms from the western Delta to the interior, where they are subject to entrainment by the Federal and State Project pumps.

We are unaware of any biological data which confirm that fish entrainment is dependent upon to the value of QWEST. The available data on physical transport include salinity data from the western Delta and the interior, and DAYFLOW estimates of QWEST and Delta outflow compiled by the Department of Water Resources. Contra Costa Water District reviewed these data during the 1992 hearings on interim Bay-Delta standards (See Exhibits WRINT-CCWD-9 through 13 and the accompanying testimony).

Based upon analysis of the data, the District concludes that reverse flow has little if any effect on physical transport in the western Delta, especially in comparison with other transport mechanisms. We therefore conclude that QWEST limitations have little if any value in protecting Bay-Delta fishery resources.

Methods to Analyze Water Supply Effects of Alternative Standards

Contra Costa Water District has used the DWRSIM operations model extensively in Delta planning programs since late 1989. In the course of its work, the District has conducted detailed reviews of the DWRSIM representation of ocean salinity intrusion and its relationship to Delta flows, including effects of operations by the Federal and State water projects. The District has discussed its findings with the Department of Water Resources and others and has presented results of its work on this topic at proceedings before the State Water Resources Control Board.

Status of DWRSIM Operations Model

DWRSIM and its supporting program, MDO, use simplifying assumptions to approximate the relationship between Delta flows and ocean salinity intrusion. Comparisons with field data show that these

assumptions differ significantly from observed experience. Differences between the flow/salinity relationships used in DWRSIM and those observed in the field result primarily from the use of two simplifying assumptions:

1. The MDO component of the DWRSIM model assumes that the physical transport of salinity in Delta waterways, especially in the lower San Joaquin River, is due only to the effects of tidally-averaged flow. The model assumes that transport due to tidal flows is unimportant.

2. The model assumes that it is unnecessary to consider the effects of antecedent flows on salinity. It does not account for the lagged response of salinity to changes in flow.

Neither these assumptions nor the quantitative results of their application to field data correspond with operating experience. For that reason we conclude that DWRSIM, as presently formulated, does not provide sound estimates of the flows that must be provided through water project operations to control ocean salinity intrusion in the Bay-Delta estuary.

Alternative Method to Analyze Water Supply Impacts

In its statement at the State Board's workshop on April 26, 1994 (Exhibit CCWD-1), Contra Costa Water District presented results of an analysis of additional Delta outflows required to meet the estuarine habitat standard proposed by the Environmental protection Agency in January, 1994. The analytical method used is described in Exhibit CCWD-2, a report on EPA's proposed Bay-Delta standards prepared by Contra Costa Water District for the California Urban Water Agencies.

The method of Exhibit CCWD-2 is described and illustrated at pages 18-29. This analysis provides estimates of additional outflows required to meet salinity standards based upon a historical sequence of daily Delta outflows. The method accounts for tidal transport and antecedent flows. Its correspondence with field data is illustrated in Exhibit CCWD-2 at pages 22-26.

The method of Exhibit CCWD-2 can provide reliable estimates of additional Delta outflow requirements associated with alternative salinity standards. However, it requires specification of a base case. Currently, the method uses the historic hydrologic record as a base, but does not provide a means of adjusting the record to account for alternative levels of water resources development or changing Delta standards. In addition, the method does not consider changes in water project operations required to produce needed flow augmentations. Thus the method addresses only one aspect of water supply impact analysis. It should be viewed as one component of a larger process for estimating water supply effects of alternative Bay-Delta salinity standards.

Recommendation on Estimating Water Supply Impacts

To assess water supply impacts of alternative standards, the State Board must utilize results of DWRSIM or a conceptually similar Central Valley operations model. Available models share limitations imposed by the assumptions discussed above under the heading, "Status of DWRSIM Operations Model." To provide an independent check on the results of operations model studies, Contra Costa Water District recommends that the State Board conduct parallel studies using the method of Exhibit CCWD-2, and that differences in conclusions suggested by the various studies be identified, explained and, when possible, resolved. We are prepared to assist the State Board in such an effort.

In addition, the State Board should encourage parties to these proceedings to cooperate in the early development of improved modeling techniques, including improved sets of modeling assumptions. Many parties participate in work of the recently formed Bay-Delta Modeling Forum, which promotes the development of sound modeling methods. Apart from the Forum's program, Contra Costa Water District and the Department of Water Resources are discussing incorporation of the method of Exhibit CCWD-2 in a modified approach to studies using the DWRSIM model. We will report results at appropriate intervals.