

the facility. This focused study has captured the interest of screen designers across the country. As investigations get underway, we should gain a better understanding of the appropriate screen design parameters for large diversion facilities, such as those envisioned in the CALFED Bay-Delta program, or other proposed installations.

For more information on the UC-Davis Hydraulics Lab and this project, please visit their web page at: <http://www.engr.ucdavis.edu/~hydlab/>. If you are interested in tracking the project (via progress reports, comments, etc.), you may subscribe to an email "listserve" that has just been set up on a DFG Bay-Delta office computer server. Send an email message to majordomo@delta.dfg.ca.gov with the following line in the body of your message: subscribe fish-treadmill [your email address].

Category III

Cindy Darling, CALFED

The December 1994 Bay-Delta Accord contained a commitment to funding for fish restoration projects that addressed "non-flow" factors. This commitment was included under Section III and has become known as Category III. In the first 2 years of this program, 38 projects have been approved, using \$21.7 million in contributions from urban water agencies. Funded projects include fish screens and ladders, habitat acquisition and restoration, and programs to reduce pesticide runoff. Many of the projects are partnerships with other funding sources, so the total cost of the projects approved by Category III is over \$57 million.

As the program has grown and developed, the Category III steering committee has been working on a more substantial structure to select and implement projects. At the same time, \$60 million in state matching funds were approved in Proposition 204, and a federal authorization passed in the closing days of Congress authorized \$430 million over 3 years for ecosystem restoration projects.

The CALFED Bay-Delta Program has made significant progress on developing long-term solutions and has committed to help with immediate implementation of ecosystem restoration activities. These developments led to a decision to form the Ecosystem Roundtable to replace the Category III steering committee. This new group operates as a sub-committee of the Bay-Delta Advisory

Council and includes 18 representatives of various interest groups. The mission of the Ecosystem Roundtable is to provide stakeholder input on the coordination of existing and anticipated state and federal ecosystem restoration and management programs. CALFED managers will consider input from the Ecosystem Roundtable in deciding which projects to fund for existing restoration programs and for the new sources of funding from Proposition 204 and the federal government.

The next round of projects to be funded will be selected this spring, with a final list expected in late June. In January, the Ecosystem Roundtable will suggest priority species and habitat types for this round of funding. Technical teams comprised of CALFED agency staff, academic experts, and stakeholder representatives will be working with CALFED in January, February, and March to identify the types of projects they would recommend for funding to address high priority species and habitat types. Those who would like to propose projects should look for these to be solicited in April or May. Anyone interested in submitting a proposal should send a brief letter to the CALFED Bay-Delta Program, 1416 Ninth Street, Suite 1155, Sacramento, CA 95814, asking to be placed on the mailing list.

Calculations of Required Screen Mesh Size and Vertical Bar Interval Based on Delta Smelt Morphometrics

Paciencia S. Young and Joseph J. Cech, Jr., University of California, Davis, in collaboration with Suzanne Griffin, Paul Raquel, and Dan Odenweller, DFG

We conducted a morphometric study of delta smelt to help in developing smelt screen criteria. We took morphometric measurements from preserved (10% buffered formalin) specimens and from fresh (moribund and freshly thawed) specimens. We measured again after specimens had been preserved for several months to determine a preservative-related correction factor.

Morphometric measurements from 341 preserved juvenile and adult delta smelt included: total length, fork length, standard length, maximum body depth, maximum head depth, maximum body width, and maximum head width. Total length, fork length, and standard length were measured with a Vernier caliper. Body depth, head depth, body width, and head width were measured using a Nikon Microplan II image-analyzer with IBM Microplan II imaging program. Generally, at least 30 specimens per size class (10mm intervals) over a 20-80mm TL range were used.

Preliminary results showed that many preserved specimens >40mm TL, had flared operculae so that the maximum head width measurements were greater than those without flared operculae. Some preserved specimens also had bulging eyes and some had sunken eyes. Therefore, we measured an additional 154 fresh specimens (41.1-69.9mm TL). Screen mesh size and vertical bar interval calculations followed Margraf *et al* (1985).

$$SL = (0.06564 \times M + 1.199 \times M \times F) / (1 - 0.0209 \times M)$$

where:

M = screen mesh size or vertical bar interval, and

F (Fineness Ratio) = SL/BD for screen mesh size, or SL/HW for vertical bar interval.

Table 1 provides an overall reference for delta smelt relationships among morphometric measurements in different size classes. The equations incorporate measurements of fresh specimens, corrected values of preserved specimen measurements (based on preservative-correction factor when adequate fresh measurements were not available), and uncorrected preserved measure-

ments (on some SL measurements, when no fresh measurements were available and no correction factors could be calculated). We used body depth for calculations of maximum screen mesh size, and head width for maximum bar interval to retain specific total length and standard length of delta smelt (Figures 1 and 2). These calculations are based solely on the physical dimension (morphometrics) of delta smelt. It is assumed that fish would pass through screens lengthwise and that fish with body depth equal to mesh size would be excluded. However, three other important factors should be considered: behavior of fish in the presence of a screen;

Table 1
EQUATIONS EXPRESSING RELATIONSHIP AMONG MEASUREMENTS IN DIFFERENT SIZE CLASSES OF DELTA SMELT

Size range = 21.8-82.0.

Calculations were based on: fresh, corrected values of preserved specimen measurements; and uncorrected preserved specimen measurements involving standard length, all P<0.001.

Relationship	n	Equation	r ²
FL vs TL	324	FL = 0.608 + 0.910 TL	0.998
SL vs TL	244	SL = 0.003 + 0.840 TL	0.997
SL vs FL	242	SL = -0.439 + 0.922 FL	0.999
BD vs TL	324	BD = -0.539 + 0.147 TL + 0.00025 TL ²	0.959
HD vs TL	244	HD = -0.776 + 0.133 TL	0.974
BW vs TL	244	BW = 0.095 + 0.086 TL	0.939
HW vs TL	324	HW = -2.66 + 0.28 TL - 0.004 TL ² + 0.000028 TL ³	0.849
BD vs FL	324	BD = -0.615 + 0.160 FL + 0.000314 FL ²	0.958
HD vs FL	244	HD = -0.844 + 0.146 FL	0.975
BW vs FL	244	BW = 0.057 + 0.095 FL	0.937
HW vs FL	324	HW = -1.63 + 0.217 FL - 0.003 FL ² + 0.00002 FL ³	0.840
BD vs SL	244	BD = -1.086 + 0.207 SL	0.970
HD vs SL	244	HD = -1.431 + 0.194 SL - 0.0004 SL ²	0.977
BW vs SL	244	BW = -0.477 + 0.132 SL - 0.0003 SL ²	0.940
HW vs SL	244	HW = -3.724 + 0.392 SL - 0.006 SL ² + 0.00004 SL ³	0.881
BW vs BD	242	BW = 0.194 + 0.649 BD - 0.011 BD ²	0.926
HD vs HW	222	HD = -1.290 + 1.834 HW - 0.059 HW ²	0.922

TL Total length
FL Fork length
SL Standard length
BD Maximum body depth
HD Maximum head depth
BW Maximum body width
HW Maximum head width