SNAPSHOTS OF BAY-DELTA SCIENCE

Just over a thousand scientists, policymakers, and others packed the Sacramento Convention Center in mid-October for the 7th Biennial Bay-Delta Science Conference (formerly the CALFED Science Conference.) The three-day event, with the theme of “Ecosystem Reconciliation: Realities Facing the San Francisco Estuary,” featured 240 speakers, 150 poster exhibits, and the presentation of the Brown-Nichols Science Award to Wim Kimmerer (San Francisco State University Romberg Tiburon Center) and Jim Cloern (U.S. Geological Survey). Here are a few stories that emerged from the presentations.

SUBMERGED SURPRISE

Scanning GoogleEarth images of Suisun Bay a couple of years ago, California Department of Water Resources engineer Chris Enright spotted something unexpected: large beds of submerged aquatic vegetation along islands and on offshore shoals. Katharyn Boyer of SFSU’s Romberg Tiburon Center identified the plants as native pondweeds, *Stuckenia filiformis* and *S. pectinata*. “They’ve probably been present for a long time, just not noticeable,” said Boyer at the conference, referencing an 1886 map and a 1937 aerial photo. Her survey verified at least 1,100 acres covered by *Stuckenia* and indicated the beds are expanding within Suisun Bay and the West Delta. “Native submerged aquatic vegetation is a very turbid environment and may be a positive benefit for native fish,” she added. In a conference poster with Eyyan Borgnis, Boyer also projected that *S. filiformis* may outcompete the exotic *Egeria densa* as the West Delta becomes saltier. **JE**

THE TWO FACES OF SMELT

Two conference presentations looked at the endangered delta smelt in a food web context, as predator and prey. What the smelt are eating, according to Aaron Johnson of San Francisco State University’s Romberg Tiburon Center, came as a surprise. Thought to rely mainly on the small crustaceans called calanoid copepods, the adult smelt sampled by Johnson at a Sacramento River site favored amphipods, which accounted for two-thirds of their diet by weight. Most of the amphipods were benthic species. “If it’s a shift, is it short-term or a function of larger food web changes?” he asked. It could reflect the decline of mysids, another class of smelt prey. Johnson’s study was the first to examine smelt feeding habits over hourly and tidal time frames. Meanwhile, what’s eating the smelt? UC Davis graduate student Scott Brandl is using mitochondrial DNA barcoding to identify smelt remains in the guts of predatory fish. So far, 69 of a sample of 559 exotic Mississippi silversides have tested positive for smelt. Predation appears less common in turbid waters. This winter, the project will be extended to striped, largemouth, and smallmouth bass and Sacramento pikeminnow to compare predation on smelt by native and non-native fish. **JE**

CHAIN OF HABITATS

UC Davis fish biologists call it the North Delta Arc: a chain of aquatic habitats from Suisun Marsh to the Sacramento Deep Water Ship Channel. It seems to be a kind of “Noah’s Ark” as well, where native fish species still outnumber invasives. At the conference, John Durand pointed out that the area is also on everyone’s radar as a site for habitat restoration under the Bay-Delta Conservation Plan. Denise De Carion said fish abundance and species richness were especially high in Cache and Lindsey Sloughs and the Deep Water Ship Channel, where more than half the species recorded were natives. Non-native nearshore fish, booming elsewhere in the Delta, accounted for small percentages at these sites. “Something is allowing natives to persist in the presence of non-natives,” she concluded. The Davis team plans to look at fine-scale habitat characteristics and trophic interactions for clues that might guide restoration efforts. James Hobbs has been using the chemical composition of delta smelt otoliths (ear bones) to reconstruct their migration history. He reported that some smelt are permanent residents in the Arc’s fresh waters despite warm summer temperatures. That’s the good news. The bad, relayed by Peter Moyle, is that some of the Arc’s native species are at risk of extinction. Moyle calculated separate scores for baseline vulnerability to extinction and vulnerability with projected climate change. “Fish have low adaptive capacity to move around,” said Moyle. “Fish can’t fly north. A lot of the natives are highly vulnerable to climate change, but many non-natives will do just fine because they’re already well adapted to human-created environments.” Delta smelt (critically vulnerable with a high probability of extinction) and common carp (indestructible) represent the extremes. In between, some natives should respond to careful management: “One of the places where positive action is possible is the North Delta Arc.” **JE**

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