CONSERVATION

Atlas Pegs Water Prices

In 1979, California produced an atlas for the ages. *The California Water Atlas* used state-of-the-art technologies to produce spectacular maps of runoff and seasonality, stream flows, regional water delivery systems, and water use around the state. A big blue tome roughly the length and height of a couch cushion, the atlas became an instant classic among ecologists and hydrologists alike.

The authors of the atlas — a group that ranged from Governor Jerry Brown, to founder of the *Whole Earth Catalog* Stewart Brand, to California natural resources director Huey Johnson — had a more radical purpose in mind. They aimed to give the public a better understanding of the state's infamously complex water system.

Thirty years on, most Californians still have only a foggy notion of how water arrives in their taps. Yet it's hard to blame them. The story of California water involves rights that date back to the Mexican ranchos, aqueducts that reach half the length of the state, rivers overdrawn by thirsty farms and cities, and much more.

Now a project known as the New California Water Atlas seeks to make moldering government water information available to everyone. It is transforming columns of arcane data into elegant and intuitive maps accessible online.

"We want to use the tools of the internet to both engage the public but also hopefully make government more transparent and responsive to the citizens they serve," says Laci Videmsky, who leads development of the atlas for the nonprofit Resource Renewal Institute. Not coincidentally, the Institute was founded by Huey Johnson, one of the original atlas authors.

Unlike the original book, which provides a snapshot of two to three years of water conditions, the maps in water atlas 2.0 are always as current as the data available from government agencies.

The new atlas is heir to all the radicalism of its predecessor, this time with a populist twist. Self-described civic hackers do much of the programming out of a sense of public duty and as advocates of open government principles. They use shared, open-source programming platforms to develop apps and websites for community good.

When Videmsky began working on the atlas in 2013, he thought it could be completed in under two years. Then he got a look at his first set of data, on water rights.

"It was definitely an eye opener," Videmsky laughs. "We discovered a lot of water rights are not even in the state's database; they're located on old pieces of parchment in superior court archives in every county, and the state has not gone out and taken note." The atlas project has suggested ways in which the state can use technologies allowing the public to share the data. The state is now beginning to employ some of these new methods.

Another atlas map illustrates how wildly the price of water varies across the state. The data is all crowdsourced. Users can submit information from their water bill and compare costs. The map is the first effort to collect statewide information about the cost of water.

Already the map shows that water users in Los Angeles and parts of Southern California pay far less than more northerly cities, which would seemingly have more abundant water. Why the cost disparity? "We price water not according to scarcity but the infrastructure delivering it to you, so you

continued on back page

SPECIES SPOT

Lavender Lowlife

Invasive *spartina* isn't the only vegetative threat to San Francisco Bay's tidal wetlands. Meet the exotic sea lavenders: attractive little plants, but potentially big trouble (see "Front-line Invaders," *Estuary News,* August 2012.) Two species of *Limonium* native to Mediterranean shores have put down roots here. So far, *L. duriusculum* has been detected only at Strawberry Marsh in Richardson Bay and Guadalcanal Village Wetlands on Mare Island. *L. ramossisimum* subspecies provinciale (LIRA for short), on the other hand, is widespread in the Central and South Bay. "It's almost everywhere we look," says Katharyn Boyer of San Francisco State University's Romberg Tiburon Center. She and Gavin Archbald, a restoration ecologist with H. T. Harvey, found it in multiple disturbed and restored sites from the Albany Bulb and San Francisco's Pier 94 down to Greco Island and Coyote Creek Lagoon. LIRA can outcompete native plants in the high marsh transition zone, reducing habitat value for endangered tidelands species. The good news: control efforts are underway.

Local nurseries once sold both species but they're now off the market. Mistaken for a similar native species, LIRA was accidentally planted at several south bay restoration sites. Like many successful weeds, both invasive sea lavenders are prolific. In a recent article, Boyer and Archbald describe LIRA's seed production as "prodigious"— up to 17,400 from a single plant. Their experimental studies indicate better growth and higher seed output in less saline conditions, suggesting a potential for rapid spread in brackish and freshwater marshes. It's useless as wildlife cover: "It's low-growing," she explains. "It almost looks like an alpine plant." Restoration sites are particularly vulnerable: "They're a clean slate, with no competition. We're concerned for all the restorations that are in progress or coming up."

At Don Edwards San Francisco Bay National Wildlife Refuge, hand removal of LIRA began in 2010. This summer, US Fish & Wildlife Service biologist Rachel Tertes applied herbicides to patches at Coyote Creek before the plants set seed; she's monitoring the results. The San Mateo County Flood Control District is funding eradication projects on mitigation sites, and at least one Invasive Spartina Project staffer is hand-pulling it. **JE**

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OAKLAND, CA
PERMIT NO. 2508

ESTUARY News
September 2014, Vol. 23, No. 3
www.sfestuary.org/estuary-news/

MANAGING EDITOR Ariel Rubissow Okamoto

CONTRIBUTING WRITERS
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COVER PHOTO Mokelumne River by Steve Evans

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ATLAS, *continued from page 4*

end up with situations where people in Seattle pay more for water than people in Las Vegas," Videmsky says.

The atlas team soon hopes to launch a groundwater map that would show where aquifers are located and how much water each contains. Once again, the information is incomplete. "The state collects it, drillers have to submit it for regulatory measures, but we are the last state in the West to continue to make that data private," Videmsky says. Making this data public could greatly improve how California manages this hidden resource. "Researchers now only have a two-dimensional perspective. They need this missing underground component to fully understand the hydrodynamics," he adds.

The new atlas is popular with journalists. And other states have contacted the institute about launching water pricing maps of their own—a practice the programmers encourage.

"Hopefully we can use the atlas as an educational tool," Videmsky says, and "as a conversation starter about why these problems exist in the first place." **KW**

ATLAS http://ca.statewater.org/

CREEKS, *continued from page 5*

as help fish. "We're close to finding the sweet spot," he says.

At the bottom of the flood control channel, meanwhile, the State Coastal Conservancy is eager to breach levees between the channel and its salt ponds. With more connectivity to the creek and the Bay, the restored ponds may serve as estuarine transitional habitat and nursery grounds for outmigrating steelhead smolts. Add some innovative new levees with broad backsides and the combination could also protect nearby suburbs from storm surges, high tides and sea level rise.

"Making sense of all that is going on along Alameda Creek is like trying to explain quantum physics to a kindergartener. It's a tough subject to tackle," says Mahoney. **ARO**

DELTA HABITATS, *continued from page 9*

recreation and local sustainability. "If it's successful, it could be a model for other parts of the Delta," says Davenport. **ARO**

SUSPENSE, *continued from page 10*

impact the free-flowing character and extraordinary values that make a river eligible for the Act's special protections." Such an exemption, she adds, would have made the Mokelumne "a Wild and Scenic River in Name Only."

"Protection for the Mokelumne River deserved a straight up and down vote in the Assembly on its merits," says Evans. "The bill's demise, at least for now, is a classic example of politics triumphing over good public policy in the California Legislature."

"I am very disappointed," Hancock commented after 1199's death by suspension. "However, I remain committed to the goals of designating portions of the river as Wild and Scenic and insuring that the East Bay continues to have a source of safe and clean water." It is unclear at this point whether Hancock will reintroduce a Mokelumne bill next year. **JE**

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THERE'S MORE TO THESE THREE STORIES! To see the extended online versions of the stories on Alameda Creek, Delta Habitat paper, and Mokelumne River click here or go to http://www.sfestuary.org/estuary-news/