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State turns attention to selenium levels in river

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Like other trace minerals, selenium is essential to human health: It repairs DNA, it boosts immune systems and some researchers believe that it might even halt cancer in its tracks.

But in high doses and some chemical forms, it can be toxic to people, fish and migratory birds.

Some once-common native fish species are especially sensitive to long-term selenium exposure, which can damage their reproductive systems, cause deformities or kill them outright.

At least eight of those species happen to live in the Colorado River between the Utah-Colorado state line and the Green River confluence. Yet that same stretch of river occasionally contains elevated levels of selenium, and researchers believe those conditions may be one of many factors that led to the species' overall decline.

Living Rivers Conservation Director John Weisheit worries that the situation could hamper efforts to restore populations of endangered or at-risk species, including the humpback chub, bonytail, Colorado pikeminnow and razorback sucker. It also points to a much broader ecological problem, he said.

"One could say, 'to hell with these silly fish,' but 35 million people also drink this water and 5 million acres are irrigated with this water, as well," Weisheit said in an email to *The Times-Independent*. "It's just another canary in the coal mine for a river system that is crashing on more than one level."

There are some encouraging trends to report, though, according to the Utah Division of Water Quality.

Years of research show that selenium levels in the Colorado River are down significantly from where they were at the turn of the century.

According to the U.S. Geological Survey, levels at the state line have dropped by about 40 percent since the mid-1980s.

The problem that remains appears to be seasonal in nature.

Data from four Utah Department of Environmental Quality monitoring sites along the river show that August is the only time of year that selenium loads actually exceed state standards.

"When the Colorado River is really low, that's when you see these conditions," Utah Division of Water Quality Project Manager Mike Allred said earlier this month.

To gain a better understanding of the issue, Division of Water Quality researchers collected just under 150 samples from the river between 2000 and 2010.

They found that 40 of those samples exceeded the state's standards. But they also noticed a couple of trends: Selenium concentrations at each site appear to be falling over time, and they're also going down from one monitoring site to the next.

"It actually gets better at each monitoring site further downstream," Allred said.

That's not to say that things are back to normal yet.

In 2006, the Utah stretch of the river between the state line and the Green River confluence appeared on the state's list of impaired waters under the Clean Water Act, and it will remain there until federal regulators say otherwise.

The state Division of Water Quality responded by drafting new limits on the highest amounts of selenium that can enter the river each day, short of violating federal water quality standards. (The proposed limits are called Total Maximum Daily Loads, or TMDLs.) The state released the selenium study in late September and the public comment period closed Oct. 30.

Aside from that work, however, Allred said there isn't much that people on this side of the state line can do to address the problem.

Agricultural operations cover less than 3 percent of the total Upper Colorado River watershed in Utah, and urban impacts to the area are even smaller, at about one-third of 1 percent.

"It really means that it's going to be hard for us to do anything on the Utah side because of the small amount of agriculture," he said.

But there is more that can be done on the Colorado side of the border, where the problem originates, according to Allred.

"I hate to point a finger upstream, but the data really does that," Allred said.

Selenium from the Grand Valley and the Lower Gunnison River Basin has been trickling into the Colorado River since an ancient seabed dried up, creating a geological formation known as the Mancos Shale.

While the shale contains high levels of selenium, the area's dry climate served as

a natural check on loads into the river.

However, the mineral dissolves easily when it's exposed to water, and more than a century of agricultural development in and around Grand Junction created a pathway that increased those loads.

According to estimates from the Gunnison Basin/ Grand Valley Selenium Task Forces, up to 75 percent of the selenium loading near the state line comes from the Grand Valley and the Uncompahgre irrigation project. The Gunnison River alone accounts for more than half of all selenium loading into the Colorado.

The good news, from Allred's perspective, is that upstream users are aware of the problem, and they're collaborating on projects to address it.

"They're actually working quite hard to reduce the selenium there," he said.

By some estimates, the various stakeholders in the area have spent $250 million on related improvements.

Task force coordinator Sonja Chavez de Baca said that work includes upgrades to more efficient irrigation techniques, including center pivot sprinklers, micro-spray and drip irrigation systems. Other projects have focused on improvements to unlined canals and lateral ditches that previously seeped water into selenium-rich soils.

"I think we're starting to see things happen, which is good," she said Oct. 22. "Hopefully, we can continue this downward trend."

Moving forward, Chavez de Baca would like to see more farmers embrace practices that build healthier soils and use water more wisely.

In doing so, they can also develop healthier crops and increase their production, she said.

However, she believes that some stakeholders are counting a bit too much on agricultural improvement projects to solve the overall problem.

As communities from Grand Junction to Delta and Montrose continue to grow, selenium is reaching the river system through a new pathway: Suburban sprawl.

Montrose County's population alone grew by nearly 25 percent between 2000 and 2010, and much of that growth occurred in previously undeveloped rural areas.

In recent years, new homes have been built on adobe soils, where selenium concentrations are up to 34 times higher than normal levels, according to Chavez de Baca.

Homeowners in those areas are often hooked up to individual septic systems, and many of them have installed water-loving lawns that ultimately leach selenium back into the river and its tributaries.

The 2008 recession put a dent in that growth, and Chavez de Baca sees a new window of opportunity for community leaders to adopt water conservation measures.

"I think that in the future, it would be great to see county officials buy in [to that idea]," she said.
