



Selenium May Harm Razorback Suckers in the Green River, Utah

The razorback sucker, *Xyrauchen texanus*, is a federally listed endangered species that inhabits the Colorado River basin. Studies of the fish in the Green River of Utah between 1979 and 1986 revealed low numbers of adults, little growth, and no apparent recruitment. The decline of the species throughout the Colorado River system has been attributed to dams, habitat destruction, degraded water quality, and interactions with non-native fishes. Despite the presence of irrigated agriculture in the Green River drainage, little attention has been given to the effects of contaminants from irrigation. A detailed investigation of the middle Green River by the Department of the Interior revealed elevated concentrations of selenium in water, sediments, and biota and raised concerns about adverse effects on the endangered razorback sucker.

In spring 1992, a study of the middle Green River near Jensen, Utah, was conducted in cooperation with the Colorado River Fishery Project (CRFP). To determine selenium concentrations, biologists of CRFP collected samples of eggs from three female and milt from five male razorback suckers that were captured in the middle Green River. A 0.5-mm diameter muscle plug was removed from the back of each adult and analyzed for selenium.

Eggs and Muscle Plugs Had Elevated Selenium

Selenium in the eggs of three razorback suckers from the Green River were 3.7 to 10.6 ppm (Table). One sample of eggs collected from a razorback sucker

in the Green River in 1991 had 28 ppm selenium. By comparison, eggs of razorback suckers from the Dexter National Fish Hatchery, New Mexico, had 2.8 ppm (dry weight) selenium, which is similar to concentrations in other fish species (2.0–3.1 ppm) from other uncontaminated locations in the United States. Increased edema and lordosis have been reported in fathead minnow larvae hatched from fish with 24 ppm selenium in their ovaries and reduced survival of bluegill larvae hatched from fish with 18 ppm selenium in their ovaries.

Selenium concentrations in milt of five razorback suckers from the Green River were <1.1 to 6.7 ppm. These concentrations are similar to about 2.0–3.8 ppm selenium in milt of fish species from uncontaminated sites in the United States.

Muscle plugs from razorback suckers contained 4.4 to 32 ppm selenium in females and 3.6 to 26 ppm in males. These concentrations highly correlated with selenium in eggs ($r = 0.99$) and in milt ($r = 0.87$). This relation may allow future prediction of selenium concentrations in gonads based on concentrations in muscle tissue. Findings from concurrent research strongly suggest that muscle plugs from the anterior, middle, and posterior areas of the back of adult razorback suckers have similar selenium concentrations.

Selenium May Be Harming Endangered Fishes

The above-normal selenium concentrations in eggs may harm the reproductive success of razorback

suckers from the Green River. Before spawning, adult razorback suckers congregate at the mouth of Ashley Creek, a tributary of the Green River near Jensen, Utah, that contains irrigation drain water laden with selenium. This section of the Green River also receives selenium-contaminated drain water from Stewart Lake. Exposure to elevated concentrations of selenium before spawning may contribute to the observed above-normal selenium concentrations.

Fry from successful spawns may also be harmed from exposure to selenium. The limited number of larval razorback suckers that have been found in the Green River were in shallow, low-current backwater areas such as the mouth of Ashley Creek where the larvae can readily accumulate selenium through waterborne and dietary exposures.

Although it is yet undetermined whether the selenium in eggs of razorback suckers collected in 1992 is harming reproductive success, the concentrations are above normal and warrant additional collections and investigation. The survival of eggs with 28 ppm selenium is, however, unlikely. There is reason to believe that selenium contamination may be contributing to the decline of endangered fish in the Green River and may interfere with recovery efforts.

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Table. Selenium concentration (ppm, dry weight) and percent moisture in eggs and milt, and selenium in muscle plugs of razorback suckers from the Razorback Bar (about 20 km upstream of the mouth of Ashley Creek) in the Green River, Utah.

Fish number	Collection date	Sex	Fish		Moisture (%)	Selenium (ppm)	
			Weight (g)	Length (mm)		Egg or milt	Muscle plug
1	04/29/92	F	1,798	549	67.6	3.7	4.37
2	04/29/92	F	1,485	545	84.1	10.6	31.97
3	04/29/92	F	1,649	540	78.2	4.7	7.14
4	04/29/92	M	1,814	546	91.9	1.8	7.37
5	04/29/92	M	1,176	477	95.0	6.7	25.95
6	04/29/92	M	1,127	471	92.9	1.3	4.51
7	05/05/92	M	1,375	504	95.3	2.8	3.55
8	05/05/92	M	1,570	526	91.1	<1.1	11.51