

USFWS 2012 Report on Environmental Contaminants RIPRAP Activities

Note: this is an annual report from the U.S. Fish and Wildlife Service regarding its activities to address contaminant concerns outlined in the RIPRAP. Contaminants remediation is conducted independently of and funded outside of the Recovery Program.

II.B. Support actions to reduce or eliminate contaminant impacts

Pesticide exposure prevention The Grand Junction office continues to work with the local mosquito control agency to prevent mosquitocide exposure of endangered Colorado River fish in backwater and wetland habitat in approximately 30 miles of the Colorado and Gunnison rivers. The total treatment area is approximately 73 square miles, or a total of 46,720 acres.

Mercury exposure to the endangered Colorado pikeminnow The objectives of this investigation were to determine mercury concentrations in Colorado pikeminnow (CPM) collected from several different river reaches within critical habitat by using biopsied muscle plugs, and to develop a regression equation between CPM length and mercury concentrations.

An FY2012 interim report was submitted to the Service's R9, Division of Environmental Quality. A final report is being prepared for completion in FY2013. The Service presented the results of this investigation at the annual Colorado River Endangered Fish Recovery Program Researchers Meeting in January, 2010. Results were presented to the Mercury Technical Advisory Council of the Colorado Division of Water Quality on December 6th, 2012.

The combined reaches of the Green River sampled covered nearly 205 river miles. The combined reaches of the Colorado River sampled covered nearly 80 river miles. The White River sampled covered nearly 103 river miles, the Yampa River sampled covered nearly 22 river miles, and the San Juan River sampled covered nearly 40 miles. Ten Colorado pikeminnow muscle plug samples were taken from river reach, with the exception of the San Juan River where 20 muscle plug samples were collected.

Beckvar et al. 2005 suggested a threshold-effect level of ≤ 0.2 $\mu\text{g/g}$ wet weight (ww) mercury in whole body fish as protective of juvenile and adult fish. Compared with this threshold, mercury concentrations in Colorado pikeminnow were elevated. Colorado pikeminnow within critical habitats, and in larger fish collected from the San Juan River, are above this threshold that may be indicative of sub-lethal effects. Seventy-eight percent of Colorado pikeminnow collected (98 out of 126) had expected whole body mercury concentrations that exceeded Beckvar et al. (2005) threshold of effect level of 0.2 $\mu\text{g/g}$ wet weight (ww). Based on effect level ranges discussed in publications, 2 to 60 percent of the Colorado pikeminnow sampled have mercury concentrations in fish muscle or whole body that are associated with biochemical changes, tissue damage, and reduced reproduction in other fish species. Additionally, mercury exposure and accumulation was found in all subpopulations of Colorado pikeminnow sampled and throughout their critical habitat, which increases the relative risk of mercury contamination to the recovery of this species. Because of the high mercury concentrations found in roundtail chubs (0.11 - 1.97 $\mu\text{g/g}$ ww, mean = 0.6 $\mu\text{g/g}$ ww) and Colorado pikeminnow (0.43 - 1.83 $\mu\text{g/g}$ ww, mean = 1.1 $\mu\text{g/g}$ ww) collected from the White River, we suggest that further investigation is warranted to assess potential adverse impacts to these species, as well as determine the source of mercury

contamination. The largest roundtail chubs contained mercury concentrations as high as those found in Colorado pikeminnow.

The Grand Junction EC has staff provided technical assistance to the Albuquerque ES office regarding the proposed coal-fired power plant, the Desert Rock Energy Project, and potential effects to endangered Colorado pikeminnow and razorback sucker from aerial deposition of mercury and selenium into the San Juan River from the plant. Both offices have partnered to assess current mercury residues in Colorado pikeminnow.

Mercury Exposure and Risk Assessment in Colorado Pikeminnow and Roundtail Chub from the White River: Roundtail chub populations in Utah have declined precipitously since the 1970s and populations in the Colorado River below Lake Powell are on the Candidate List of the Endangered Species Act. Recent data from the Utah Division of Wildlife suggest population trends continue to decline. Based on this information and the potential for a status review, we collaborated with Utah Division of Natural Resources to assess exposure and potential risk in roundtail chub, a Utah state sensitive species, collected from the White River, Utah. We also collected additional data on mercury concentrations in Colorado pikeminnow muscle to support an on-going investigation by the FWS Grand Junction Field Office. Muscle mercury concentrations were converted to whole body mercury concentrations and compared to a toxicity reference value (Beckvar et al. 2005) to calculate hazard quotients for each species and year. If the hazard quotient exceeds 1, the risk of adverse effects in exposed organisms may be of concern, with the probability and/or severity of adverse effect tending to increase as the value the hazard quotient increases.

In 2009, we collected muscle plugs from 11 roundtail chub and six Colorado pikeminnow. Over half of the chub samples contained mercury concentrations greater than the toxicity reference value (average hazard quotient of 1.55), suggesting that there is potential for adverse biochemical changes, tissue damage, and/or reduced reproduction. All of the Colorado pikeminnow samples contained mercury concentrations greater than the toxicity reference value (average hazard quotient of 3.25), suggesting a greater potential for effects relative to roundtail chub. In 2012, we found similar results to the 2009 dataset. The average hazard quotient for roundtail chub was 1.22 and 50% of the samples (n = 10) exceeded the toxicity reference value. One Colorado pikeminnow was sampled in 2012 and it contained a muscle mercury concentration 3.5 times higher than the toxicity reference value. Based on the potential risk associated with mercury exposure in these two sensitive fish species, this information should be used by conservation teams when evaluating threats.

Salinity Coordinator The Grand Junction EC staff continues in their role as the Salinity Coordinator for the Service on the Colorado River Basin Salinity Control Program. This position is responsive to the request by various Federal and state and local programs to reduce salinity concentrations within the upper Colorado River Basin to meet salinity compact requirements with Mexico at the US/Mexican Border. Direct results of the Salinity Control Program are reductions in canal leakage, improved delivery systems, more efficient irrigation practices, and protecting wildlife habitat values. This program ties into the Aspinall Biological Opinion to reduce selenium concentrations in the Gunnison Basin with the ultimate effect of reducing selenium concentrations throughout the upper and lower Colorado River Basins.

Pariette Draw Selenium and TDS loads to Green River: The Pariette Draw is a tributary of the Green River that is not supporting its warm water fisheries and waterfowl beneficial use classifications due to violations of the criterion for selenium. EPA approved Total Daily Maximum Daily Loads (TMDL) for selenium, total dissolved solids (TDS), and boron, and in the TMDL they included best management practices for mitigating the potential effects of TDS, selenium, and boron to Pariette Draw and Green River aquatic habitats. The Utah Ecological Services (ES) Field Office continues to work with Utah Division of Water Quality to investigate sources and fate of selenium within the Pariette Draw and wetlands. The Utah ES office received funding in 2012 to conduct water quality monitoring and wetland characterization in Pariette Draw Watershed in 2013 with the Utah Division of Water Quality, Utah State University, and other stakeholders. The project will span over two years and provide selenium exposure data for several biological matrices, including fish.

II.B.1.a. Identify actions to reduce selenium contamination to levels that will not impede recovery (Ongoing)

Selenium Task Force The Grand Junction office continues to engage with the Selenium Task Force.

Technical Assistance The Aspinall Programmatic Biological Opinion (BO) was finalized in 2010. A Selenium Reduction Program was formed in conjunction with the BO, to implement remediation projects associated with selenium exceedences in the Uncompahgre Project area and downstream. The Grand Junction EC staff has been an active member in the Selenium Management Program during 2012, attending all work group meetings.

Grand Junction EC staff submitted an off-refuge proposal in 2010 which was accepted for 2011 funding, to determine selenium concentrations in endangered fish in the Gunnison River, as well as surrogate fish species in the Gunnison River. While Colorado Parks & Wildlife and CRFP staff conducted endangered fish population surveys, muscle plug samples were collected for selenium analysis. Results from this selenium study will be used in the new Selenium Management Program (SMP) to determine baseline selenium concentrations and evaluate effectiveness of selenium remediation efforts. Selenium concentrations in endangered fish in the Gunnison River have not yet been determined. Selenium concentrations in surrogate fish species (roundtail chub, carp, and speckled dace) collected in 2010, 2011, and 2012 will be compared to the same species collected in 1992, to investigate any changes over the last 20 years and remediation efforts taken thus far by the selenium task force.

Selenium concentrations will be compared to toxicity reference values associated with adverse effects, in particular to those values associated with reproductive impairment. These tissue selenium concentrations will also be divided by water concentrations to determine bioaccumulation factors. The bioaccumulation factors will in turn be used to help assess load reductions needed by the Selenium Management Program in remediation efforts to minimize risk of reproductive impairment for the endangered Colorado River fish.

During 2010 fish population surveys conducted by the CDOW, muscle plug samples were taken

from 15 roundtail chubs and 15 carp for selenium analysis. Fifteen whole body speckled dace were also collected for selenium analysis. Results are displayed in Table 1.

Table 1. Selenium concentrations in fish tissue collected from the Gunnison River. (Note: concentrations are reported on a dry weight (dw) basis.)

Species Name	Sample type	Collection		Selenium ($\mu\text{g/g dw}$)
		Date	% Moisture	
Roundtail Chub	Muscle plug	07/21/10	79.3	12.76
Roundtail Chub	Muscle plug	07/21/10	78.9	5.32
Roundtail Chub	Muscle plug	07/21/10	78.9	7.78
Roundtail Chub	Muscle plug	07/21/10	78.0	6.96
Roundtail Chub	Muscle plug	07/21/10	78.2	5.80
Roundtail Chub	Muscle plug	07/21/10	79.7	10.78
Roundtail Chub	Muscle plug	07/21/10	79.2	8.00
Roundtail Chub	Muscle plug	07/21/10	78.1	9.45
Roundtail Chub	Muscle plug	07/21/10	77.9	6.45
Roundtail Chub	Muscle plug	07/21/10	77.6	8.26
Roundtail Chub	Muscle plug	07/21/10	78.5	8.03
Roundtail Chub	Muscle plug	07/21/10	78.2	8.83
Roundtail Chub	Muscle plug	07/21/10	77.5	32.35
Roundtail Chub	Muscle plug	07/21/10	78.4	8.65
Roundtail Chub	Muscle plug	07/21/10	78.4	6.39
Common Carp	Muscle plug	07/21/10	76.8	8.41
Common Carp* ¹	Muscle plug	07/21/10	77.2	13.47
Common Carp* ¹	Muscle plug	07/21/10	77.3	13.69
Common Carp	Muscle plug	07/21/10	75.6	20.44
Common Carp* ²	Muscle plug	07/21/10	74.9	9.93
Common Carp* ²	Muscle plug	07/21/10	75.9	10.00
Common Carp	Muscle plug	07/21/10	74.4	8.47
Common Carp	Muscle plug	07/21/10	77.3	12.75
Common Carp	Muscle plug	07/21/10	74.3	8.76
Common Carp	Muscle plug	07/21/10	74.4	9.41
Common Carp* ³	Muscle plug	07/21/10	75.3	10.96
Common Carp* ³	Muscle plug	07/21/10	72.5	10.05
Common Carp	Muscle plug	07/21/10	76.4	11.19
Common Carp	Muscle plug	07/21/10	74.6	16.51
Common Carp	Muscle plug	07/21/10	73.8	19.33
Common Carp	Muscle plug	07/21/10	76.0	15.43
Common Carp	Muscle plug	07/21/10	73.4	12.54
Common Carp	Muscle plug	07/21/10	75.2	11.70

Table 1. Selenium concentrations in fish tissue collected from the Gunnison River. (Note: concentrations are reported on a dry weight (dw) basis.)

Species Name	Sample type	Collection		Selenium ($\mu\text{g/g dw}$)
		Date	% Moisture	
Speckled dace	Whole body	07/21/10	67.2	8.29
Speckled dace	Whole body	07/21/10	63.9	7.13
Speckled dace	Whole body	07/21/10	63.3	7.44
Speckled dace	Whole body	07/21/10	66.2	6.11
Speckled dace	Whole body	07/21/10	67.0	6.09
Speckled dace	Whole body	07/21/10	58.7	7.07
Speckled dace	Whole body	07/21/10	66.6	7.49
Speckled dace	Whole body	07/21/10	66.0	8.38
Speckled dace	Whole body	07/21/10	63.9	8.50
Speckled dace	Whole body	07/21/10	65.1	6.55
Speckled dace	Whole body	07/21/10	66.9	5.74
Speckled dace	Whole body	07/21/10	61.2	6.21
Speckled dace	Whole body	07/21/10	64.2	8.82
Speckled dace	Whole body	07/21/10	70.3	8.45
Speckled dace	Whole body	07/21/10	69.5	9.68

*^{1,2,3} These samples are double replicates

These samples were collected from the upper portion of designated critical habitat in the Gunnison River from the Uncompahgre River confluence in Delta, CO (RM 56.3) to Escalante at RM 44.1. No endangered fish were encountered during this 2010 survey, so no endangered fish muscle plugs were collected. Selenium concentrations in all speckled dace samples exceeded the 4 $\mu\text{g/g}$ dry weight (dw) selenium toxicity guideline for whole body fish (Lemly 1996).

Selenium concentrations in muscle plugs from 9/15 roundtail chub and all 15 carp collected in 2010 exceeded the 8 $\mu\text{g/g dw}$ toxicity guideline (Lemly 1996; equivalent to 0.2 $\mu\text{g/g ww}$ given a moisture content of 75%) for selenium in fish muscle tissue. Muscle plug collections continued the summer 2011 on the lower stretch of critical habitat in the Gunnison River between Escalante (RM 44.1) and the Colorado River confluence (RM 0.7). Muscle plugs were taken from 15 carp and 15 roundtail chub during July/August, and 15 whole body speckled dace were also collected. Muscle plugs were also collected from four bonytail. White sucker egg and invertebrate samples were collected to augment the Gunnison River dataset. The spring of 2011 brought very high flows in the Colorado River.

During 2012 which was a low flow year similar to 2002, there was an opportunity to collect more biota samples for selenium analyses. Fourteen carp muscle plugs, 16 speckled dace samples, 6 invertebrate samples were collected from the Gunnison R. for selenium analyses. Also, CRFP staffs were able to take plugs from 4 Colorado pikeminnow, 5 razorback suckers, and 1 bonytail. Samples have been sent to the lab for selenium analyses. A final report will be completed on this project.

II.B.2.a. Ensure that all new petroleum product pipelines have emergency shutoff valves (Ongoing)

USFWS Ecological Services addresses this through Section 7 consultation, although not all pipeline approvals have a federal nexus that results in consultation. USFWS should consider how best to address this concern.

II.B.2.b. Identify locations of existing petroleum-product pipelines potentially affecting critical habitat and determine if they have emergency shutoff valves. (Pending)

The Pipeline and Hazardous Materials Safety Administration has developed the Pipeline Integrity Management Mapping Application (PIMMA) for use by pipeline operators and Federal, state, and local government officials. This should be a valuable tool in assessing threats to endangered fish. USFWS should investigate use of PIMMA to address existing pipelines that may need shutoff valves.

II.B.3. Review and recommend modifications to State and Federal Hazardous materials spills emergency response programs (Ongoing)

Spill contingency response EC staff from Grand Junction and Salt Lake City maintain an ongoing presence within State and Federal hazardous materials spills emergency response programs. Through routine participation in response programs we review and recommend modifications to various response actions, contingency plans, and spill drills affecting the CO River and tributaries. EC staff met with EPA in November and December of 2012 to discuss improvements to the Green River Spill Contingency Plan. EPA met with federal and state agencies, which act as natural resource trustees, and industry to develop a watershed protection plan that would be more effective than the Green River Spill Contingency Plan, which was primarily meant to facilitate coordination among federal and state response agencies. As part of the watershed protection plan for the Green River Basin, EPA is updating its information concerning FWS trust resources and best coordination and communication procedures in the event of an oil spill or release of hazardous substance. A similar meeting with EPA, Chevron, and EC staff is planned this March, 2013 in Rangely, CO to address pipeline location and spill planning for the White River.

II.C.1. Support actions to reduce or eliminate contaminant impacts of selenium in the Grand Valley (Ongoing)

The Grand Junction EC staff has remained involved with both the Gunnison Basin and Grand Valley Selenium Task Forces and Selenium Management Program.

II.D. Support actions to reduce or eliminate selenium impacts at Ashley Creek and Stewart Drain (Ongoing)

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