

## **USFWS 2013 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.

#### Surface Water Sampling For Pesticides, Pharmaceuticals, Personal Care Product, Waste Water Indicators

Beginning in 2009, EPA Region 8 has been supporting the Colorado Water Quality Control Division (WQCD) in the sampling and analyses of pesticides data. In 2009-to present, along with the pesticide analyses, the EPA Region 8 Laboratory analyzed for a suite of pharmaceuticals, personal care products (PPCPs), and waste water indicators. As more is learned about the health and aquatic life effects those parameters have and at what concentrations, the WQCD can address new criteria in a meaningful way. The focus of the 2011&12 projects were on the Denver Metro Area streams. During 2013, the study added other project areas, including the Grand Valley. Pesticides are of particular interest because of the Grand Valley's irrigated agricultural drainage into several washes. These washes empty into critical habitat in the 18-mile reach of the Colorado River. The Grand Junction, CO EC staff has been collecting monthly samples from four Grand Valley tributaries from March-November, 2013. Sampling will continue in 2014, hopefully with the addition of more sites. Thus far, results have shown an interesting variety of chemicals, including the presence of the herbicide 2,4D in the tributaries, and an array of pharmaceuticals below wastewater treatment facilities.

Mercury exposure to the endangered Colorado pikeminnow The Grand Junction EC staff initiated a study in 2008 to assess 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. This study involved a cooperative partnership of Service fisheries and EC staff from Colorado, Utah, and New Mexico, staff associated with both the San Juan and upper Colorado River Recovery Programs, and state fisheries staff from Colorado and Utah.

An FY2013 interim report was submitted to the Service's R9, Division of Environmental Quality. A final report will hopefully be completed in FY2014. 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 6<sup>th</sup>, 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.

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. The Utah EC office collaborated with Utah Division of Natural Resources to assess exposure and potential risk of mercury exposure in roundtail chub, a Utah state sensitive species, collected from the White River, Utah.

Beckvar et al. 2005 suggested a threshold-effect level of  $\leq 0.2$   $\mu\text{g/g}$  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 exceeded 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. 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.

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.

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. Due to staffing shortfalls in the Utah ES office, Utah State University agreed to take over the field component of this project in 2013. Graduate student Colleen Jones evaluated selenium concentrations at several sites in the Pariette Draw, in surface water and pore water, soil and plants. She also sampled volatile Se to evaluate selenium fate and transport in the system. Some avian egg and fish samples were collected in 2013, but the majority of this work will be performed in 2014. When data are collected, a spatially explicit exposure model (SEEM) will be used to evaluate selenium exposure risk to a variety of bird, fish and other important species in the Pariette Wetlands. Besides characterizing current selenium exposure risk, the SEEM model can also be used to support decision-making for future selenium reduction or management actions

#### **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 since 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 CPW, 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. 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 survey, so no endangered fish muscle plugs were able to be collected. Muscle plug collections continued during 2011 summer on the lower stretch of critical habitat in the Gunnison River between Escalante (RM 44.1) and the Colorado River confluence (RM 0.7). During 2011 fish population surveys conducted by Colorado River Fisheries Project, muscle plugs were taken from 15 roundtail chub, 15 common carp, and four bonytail for selenium analysis. Also, 15 whole body speckled dace were collected, and egg samples were taken from 7 white suckers for selenium analysis. Nine composite samples of invertebrates were collected from Delta to Grand Junction to examine selenium concentrations in dietary items. During 2012 fish population surveys conducted by Colorado River Fisheries Project, muscle plugs were taken from 15 carp, 5 razorback suckers, and 4 Colorado pikeminnow for selenium analysis. Whole body samples of 16 speckled dace, and 6 composite invertebrate samples were also collected. Results of all data sets are displayed in Table 1.

Selenium concentrations in muscle plugs from 14 out of 30 total roundtail chub, 42 out of 44 carp, and 2/4 bonytail exceeded the 8 ug/g DW toxicity guideline (Lemly 1996) for selenium in

fish muscle tissue. The range in selenium concentrations found in bonytail from 0.8 to 8.6 ug/g DW is most likely a function of how long they had been at large in the Gunnison River or in Butch Craig pond (adjacent to the Gunnison River) after release from the hatchery. Selenium concentrations in 1 of the 3 captured Colorado pikeminnow exceeded the toxicity guideline of 8 ug/g DW. One Colorado pikeminnow captured in Redlands fish ladder July 31, 2012 was recaptured in the Gunnison River at river mile 15.2 on October 4, 2012. While in the Gunnison River, the selenium concentration in muscle increased from 2.9 to 5.1 ug./g DW. Selenium concentrations in razorback suckers were <2 ug/g DW in recently released hatchery raised fish, but one razorback sucker at large in the Gunnison River contained 7.3 ug/g DW, approaching the 8 ug/g DW toxicity guideline. Selenium concentrations in all whole body speckled dace samples exceeded the 4 ug/g DW selenium toxicity guideline for whole body fish (Lemly 1996).

Selenium concentrations in Gunnison River water samples measured at Whitewater demonstrated a statistically significant downward trend from 1986-2008 (Mayo and Leib, 2012). Compared to those collected in 1992, speckled dace selenium concentrations in 2010-2012 also showed a decreasing trend. There was, however, no significant decrease in muscle plug selenium in roundtail chubs when comparing recent samples to those collected in 1992. Decreasing selenium trends in the Gunnison River are in part due to efforts of the salinity control program and selenium task force to reduce deep percolation of irrigation water into Mancos shale soils. Future efforts of these two groups, plus the newly formed selenium management program, will aim at meeting the selenium state water quality standard, and benefiting the recovery of the endangered Colorado River fish. A final report will be completed on this project in 2014.

Table 1. Selenium concentrations in biota collected from the lower Gunnison River.

Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes
Roundtail Chub	07/21/10	51.7	79.3	12.8	380	MP	
Roundtail Chub	07/21/10	51.7	78.9	5.3	275	MP	
Roundtail Chub	07/21/10	51.7	78.9	7.8	264	MP	
Roundtail Chub	07/21/10	51.7	78.1	7.0	280	MP	
Roundtail Chub	07/21/10	51.7	78.2	5.8	300	MP	
Roundtail Chub	07/21/10	51.7	79.7	10.8	264	MP	
Roundtail Chub	07/21/10	53.0	79.2	8.0	264	MP	
Roundtail Chub	07/21/10	53.8	78.1	9.5	383	MP	
Roundtail Chub	07/21/10	53.8	77.9	6.5	330	MP	
Roundtail Chub	07/21/10	54.6	77.6	8.3	252	MP	
Roundtail Chub	07/21/10	54.6	78.5	8.0	242	MP	
Roundtail Chub	07/21/10	54.6	78.2	8.8	245	MP	
Roundtail Chub	07/21/10	54.6	77.5	32.3	293	MP	
Roundtail Chub	07/21/10	54.6	78.4	8.7	391	MP	
Roundtail Chub	07/21/10	54.6	78.4	6.4	403	MP	
Roundtail Chub	08/17/11	39.1	79.4	6.5	337	MP	
Roundtail Chub	08/18/11	21.3	80.0	6.2	297	MP	
Roundtail Chub	08/17/11	39.1	80.4	7.1	315	MP	
Roundtail Chub	08/19/11	12.9	80.7	8.5	291	MP	
Roundtail Chub	08/17/11	39.1	79.3	5.6	339	MP	
Roundtail Chub	08/19/11	12.9	80.0	8.9	293	MP	
Roundtail Chub	08/19/11	4.4	79.8	7.9	347	MP	
Roundtail Chub	08/19/11	4.4	80.0	8.8	275	MP	
Roundtail Chub	08/19/11	12.9	79.9	7.8	267	MP	
Roundtail Chub	08/19/11	12.9	79.5	7.8	245	MP	

<sup>1</sup>MP=Muscle plug, WB=Whole body, Composite=Multiple specimens

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Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes
Roundtail Chub	08/18/11	21.3	80.7	5.5	332	MP	
Roundtail Chub	08/19/11	12.9	80.7	11.2	264	MP	
Roundtail Chub	08/18/11	21.3	80.7	6.9	308	MP	
Roundtail Chub	08/17/11	39.1	79.7	5.5	340	MP	
Roundtail Chub	08/18/11	21.3	81.5	7.0	390	MP	
Common Carp (duplicate)	07/21/10	53.0	77.2 77.3	13.5 13.7	545	MP MP	
Common Carp	07/21/10	53.0	76.8	8.4	440	MP	
Common Carp	07/21/10	53.0	75.6	20.4	535	MP	
Common Carp (duplicate)	07/21/10	53.0	74.9 76	9.9 10	547	MP MP	
Common Carp	07/21/10	53.0	74.4	8.5	500	MP	
Common Carp	07/21/10	53.0	77.3	12.8	470	MP	
Common Carp	07/21/10	53.8	74.3	8.8	550	MP	
Common Carp	07/21/10	53.8	74.4	9.4	560	MP	
Common Carp (duplicate)	07/21/10	53.8	75.3 72.5	11 10.1	455	MP MP	
Common Carp	07/21/10	53.8	76.4	11.2	615	MP	
Common Carp	07/21/10	54.6	74.6	16.5	610	MP	
Common Carp	07/21/10	54.6	73.8	19.3	552	MP	
Common Carp	07/21/10	54.6	76	15.4	448	MP	
Common Carp	07/21/10	54.6	73.4	12.5	453	MP	
Common Carp	07/21/10	54.6	75.2	11.7	505	MP	
Common Carp	08/19/11	4.4	72.5	10.2	573	MP	
Common Carp	08/18/11	21.3	79.3	12.2	595	MP	
Common Carp	08/18/11	23.1	78.5	8.50	604	MP	

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Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes
Common Carp	08/18/11	12.9	79.4	10.2	685	MP	
Common Carp	08/17/11	39.1	77.9	10.6	476	MP	
Common Carp	08/19/11	4.4	77.5	10.0	598	MP	
Common Carp	08/19/11	12.9	79.0	10.9	547	MP	
Common Carp	08/19/11	14.4	70.7	8.5	580	MP	
Common Carp	08/17/11	39.1	78.0	9.7	525	MP	
Common Carp	08/17/11	39.1	82.3	32.2	360	MP	
(duplicate)			81.8	35.1		MP	
Common Carp	08/18/11	21.3	76.4	10.5	493	MP	
Common Carp	08/19/11	12.9	76.7	10.9	545	MP	
Common Carp	08/19/11	21.3	77.4	11.6	591	MP	
(duplicate)			77.7	11.1		MP	
Common Carp	08/19/11	4.4	72.0	9.7	540	MP	
Common Carp	08/18/11	21.3	79.7	11.0	564	MP	
Common Carp	08/27/12	52.7	76.2	8.49	565	MP	
Common Carp	08/27/12	54.4	76.6	9.76	643	MP	
Common Carp	08/28/12	47.6	79.8	8.04	546	MP	
(duplicate)			76.4	7.40		MP	
Common Carp	08/29/12	21.8	72.2	8.47		MP	
Common Carp	08/29/12	21.8	75.7	6.03		MP	
Common Carp	08/29/12	35.4	75.9	9.49		MP	
Common Carp	08/30/12	18.2	71.9	9.39	614	MP	
(duplicate)			85.3	8.66		MP	
Common Carp	08/30/12	14.5	77.9	10.45		MP	
Common Carp	08/30/12	13.5	78.9	6.87	716	MP	
Common Carp	08/30/12	12.4	78.6	9.15	676	MP	
Common Carp	08/31/12	8.3	74.3	7.64		MP	

<sup>1</sup>MP=Muscle plug, WB=Whole body, Composite=Multiple specimens



Table 1. Selenium concentrations in biota collected from the lower Gunnison River.

Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes
Common Carp	10/05/12	12.1	75.6	10.1	559	MP	
Common Carp	10/03/12	35	77.7	10.7	555	MP	
Common Carp	10/03/12	35	78.2	9.67	658	MP	
		Butch					
Bonytail	06/09/11	Craig pond	80.5	8.43	336	MP	
Bonytail	08/23/11	---	74.4	0.89	352	MP	
Bonytail	08/19/11	12.9	72.4	0.81	308	MP	
(duplicate)		12.9	74.4	0.89		MP	
Bonytail	08/29/11	RFL	79.0	8.58	366	MP	
Razorback sucker	10/01/12	54	80.8	1.53	380	MP	
Razorback sucker	10/01/12	54	77.3	1.35	382	MP	
Razorback sucker	10/05/12	---	78.2	7.28	456	MP	
Razorback sucker	10/05/12	4.3	72.8	5.2	448	MP	
Razorback sucker	10/04/12	21.4	78.7	1.4	356	MP	
Colorado pikeminnow	10/04/12	15.2	78.2	5.08	645	MP	
Colorado pikeminnow	07/31/12	RFL	66.2	2.93	640	MP	
Colorado pikeminnow	07/18/12	RFL	83.7	8.68	518	MP	
Colorado pikeminnow	07/18/12	RFL	76.4	5.68	398	MP	
Speckled dace	07/21/10	53.8	67.2	8.29	91	WB	
Speckled dace	07/21/10	53.0	63.9	7.13	106	WB	
Speckled dace	07/21/10	53.0	63.3	7.44	94	WB	
Speckled dace	07/21/10	53.0	66.2	6.11	108	WB	
Speckled dace	07/21/10	53.0	67.0	6.09	95	WB	

<sup>1</sup>MP=Muscle plug, WB=Whole body, Composite=Multiple specimens

Table 1. Selenium concentrations in biota collected from the lower Gunnison River.

Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes
Speckled dace	07/21/10	53.8	58.7	7.07	95	WB	
Speckled dace	07/21/10	53.8	66.6	7.49	74	WB	
Speckled dace	07/21/10	53.8	66.0	8.38	95	WB	
Speckled dace	07/21/10	53.8	63.9	8.5	91	WB	
Speckled dace	07/21/10	53.8	65.1	6.55	91	WB	
Speckled dace	07/21/10	54.6	66.9	5.74	113	WB	
Speckled dace	07/21/10	53.8	61.2	6.21	115	WB	
Speckled dace	07/21/10	54.6	64.2	8.82	84	WB	
Speckled dace	07/21/10	54.6	70.3	8.45	83	WB	
Speckled dace	07/21/10	54.6	69.5	9.68	101	WB	
Speckled dace	08/17/11	37.8	73.5	10.5	100	WB	
Speckled dace	08/17/11	39.1	72.9	9.12	57	WB	
Speckled dace	08/17/11	39.1	73.2	6.93	53	WB	
Speckled dace	08/19/11	11.4	74.8	7.85	89	WB	
Speckled dace	08/19/11	12.9	74.3	7.97	60	WB	
Speckled dace	08/18/11	22.3	73.2	9.06	92	WB	
Speckled dace	08/18/11	22.3	74.4	7.27	100	WB	
Speckled dace	08/18/11	22.3	75.2	8.04	101	WB	
Speckled dace	08/19/11	12.9	77.0	10.0	79	WB	
Speckled dace	08/18/11	22.3	74.1	7.29	120	WB	
Speckled dace	08/19/11	11.4	70.8	6.9	96	WB	
Speckled dace	08/19/11	9.8	73.9	11.0	100	WB	
Speckled dace	08/17/11	39.1	75.0	9.85	71	WB	
Speckled dace	08/19/11	11.4	76.8	8.41	75	WB	
Speckled dace	08/19/11	12.9	77.3	11.2	78	WB	
Speckled dace	08/27/12	50.9	68.6	8.14	118	WB	

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Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes
Speckled dace	08/27/12	52.7	66.3	9.48	92	WB	
Speckled dace	08/27/12	54.4	67.7	9.02	70	WB	
Speckled dace	08/28/12	38	65.3	6.06	82	WB	
Speckled dace	08/28/12	48.1	64.8	6.64	86	WB	
Speckled dace	08/29/12	24.1	68.2	5.54	85	WB	
Speckled dace	08/29/12	35.1	65.9	7.53	102	WB	
Speckled dace	08/29/12	21.8	68.9	9.69	47	WB	
Speckled dace	08/30/12	18.2	62.4	7.37	91	WB	
Speckled dace	08/30/12	14.4	65.4	8.58	72	WB	
Speckled dace	08/30/12	13.3	65.5	8.38	70	WB	
Speckled dace	08/30/12	12.4	69.5	8.54	47	WB	
Speckled dace	08/31/12	8.2	64.6	7.11	90	WB	
Speckled dace	10/05/12	10.5	67.5	9.13	74	WB	
Speckled dace	10/02/12	47.7	68.8	7.97	63	WB	
Speckled dace	10/01/12	54.5	72.1	12.1	70	WB	
White sucker	05/19/11	51.4	75.5	8.80		Fish eggs	Formed eggs with a little fluid
White sucker	05/19/11	51.4	75.5	8.80		Fish eggs	Formed eggs with a little fluid
White sucker	05/19/11	51.4	75.2	8.71		Fish eggs	Most eggs not fully formed
White sucker	05/26/11	27.3	76.0	6.85		Fish eggs	Eggs fully formed with lots of fluid
White sucker	06/02/11	27.3	80.9	8.15		Fish eggs	Eggs with lots of fluid
White sucker	06/02/11	38.4	73.3	8.52		Fish eggs	Well formed eggs
White sucker	05/18/11	30.4	67.5	6.53		Fish eggs	Very formed eggs

<sup>1</sup>MP=Muscle plug, WB=Whole body, Composite=Multiple specimens

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Species	Collection Date	River Mile	% Moisture	Selenium (ug/g DW)	Length (mm)	Matrix <sup>1</sup>	Notes <sup>2</sup>
Invertebrates	08/12/11	50.3	96.9	7.52		Composite	Mostly Hydropsychidae
Invertebrates	08/12/11	56.3	77.0	8.24		Composite	Mostly Hydropsychidae-BUC
Invertebrates	08/12/11	57.0	77.6	5.46		Composite	Mostly Hydropsychidae-AUC
Invertebrates	08/12/11	57.0	68.4	5.67		Composite	Perlidae-AUC
Invertebrates	08/12/11	56.3	66.7	11.3		Single	Perlidae-BUC
Invertebrates	07/29/11	4.8	72.3	7.31		Single	Odonata-1 nymph
Invertebrates	07/29/11	4.8	97.2	7.98		Composite	Mostly Hydropsychidae
Invertebrates	07/29/11	9.9-15.4	97.5	8.74		Composite	Mostly Hydropsychidae, few mayflies
Invertebrates	07/28/11	33.0	76.3	8.39		Composite	Mostly Hydropsychidae
Invertebrates	06/25/12	8.5	73.8	9.19		Composite	Mostly Hydropsychidae
Invertebrates	06/26/12	22	89.3	5.33		Composite	Mostly Hydropsychidae
Invertebrates	06/28/12	57	90	6.39		Composite	Hydropsychidae-AUC
Invertebrates	06/28/12	56	87.4	6.45		Composite	Hydropsychidae-BUC
Invertebrates	06/28/12	48	91	5.91		Composite	Hydropsychidae
Invertebrates	07/03/12	3	88.3	5.99		Composite	RFL, Mostly Hydropsychidae-RFL

<sup>1</sup>MP=Muscle plug, WB=Whole body, Composite=Multiple specimens: <sup>2</sup>BUC=Below Uncompahgre confluence, AUC=Above Uncompahgre confluence, RFL=Redlands fish ladder

### **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. Meetings with EPA, Chevron, and EC and Fisheries staff were conducted during 2013 in Rangely, CO and Vernal Ut. to address pipeline locations and spill planning for the Green River watershed, including tributaries White and Yampa Rivers.

### **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.

### **Lower Colorado River (Segment 3.) Mixing Zone Sampling with EPA**

During 2011, the Colorado Water Quality Control Commission (Commission) revised

its list of Water-Quality-Limited Segments Requiring Total Maximum Daily Loads (TMDLs) (Regulation #93), including delisting of the lower Colorado River main stem between the Gunnison River confluence and Colorado-Utah Stateline (segment 3) for impairment by selenium. This segment is included in designated critical habitat for the endangered Colorado River fish. The standard for impaired waterways, developed in 2002, is 4.6 parts per billion (ppb) selenium. The Commission is proposed the delisting due to the 85<sup>th</sup> percentile selenium concentration of 4.3 ppb for 37 water samples collected from the Lower Colorado River segment between 2002 and 2006.

Barb Osmundson, who has worked for many years on selenium issues and recovery of the 4 listed Colorado River fishes, reviewed the proposed regulation change, and expressed concern related to the proposal, including:

- 1) Use of the 85<sup>th</sup> percentile selenium concentrations is not accurate enough to support delisting the segment. The difference between the 85<sup>th</sup> percentile value of the samples and the standard is not enough to disallow the possibility of analytical error.
- 2) Geographical areas and timing of data collections biased the samples towards lower selenium concentrations by avoiding collection below smaller tributaries that contribute higher loads to the Colorado River system, and lack of sampling during low flow seasons and drought years when selenium values would be more concentrated.

Barb provided written testimony to the Commission regarding these concerns on October 27, and testified at the public hearing before the Commission on December 12, 2011. Despite concerns, the Commission ended up delisting Segment 3.

EPA understood Service concerns and was able to secure funding for 2012 to collect water samples for selenium analysis in the mixing zones where high selenium tributaries empty into lower Colorado R. (segment 3). Samples were collected by Grand Junction EC staff during August and again during September (accompanied by EPA staff Karl Herman). During 2013, samples were collected during August, but the government shutdown prevented the scheduled sampling during October. We plan to continue this sampling effort in 2014. This is the first time that samples have been taken in the mixing zones occurring in the segment. We are anxiously waiting for the results, which will be included in datasets to determine future impairment of this segment. This impacts critical habitat and sites where hatchery raised endangered fish are released during recovery efforts.

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

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