**Online Supplement: Tables**

***Table S1***

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| Table S1. Sampling and profiling locations. |
| latitude | longitude | water samples collected?a | distance upstream from dam (km) | description |
| 36.4643 | -95.0362 | yes | -0.5 | below dam |
| 36.4719 | -95.0415 | yes | 0.2 | near dam |
| 36.4977 | -95.0249 | no | 4.75 | main channel |
| 36.5041 | -94.9697 | only in Feb/March, May, August | 10 | main channel opposite Duck Cr. |
| 36.5733 | -94.8994 | only in Dec. | 22.5 | main channel near Snake Island |
| 36.5462 | -94.8466 | yes, except Dec. | 29.5 | main channel near Woodard Hollow |
| 36.5649 | -94.8102 | no | 41.5 | main channel near Carey Bay |
| 36.6358 | -94.7912 | yes | 48.5 | main channel near OK-59 |
| 36.6531 | -34.7682 | no | 52 | main channel downstream of Elk R. |
| 36.7362 | -94.7303 | yes | 67.5 | main channel below Sycamore Cr. |
| 36.7700 | -94.7829 | no | 75 | main channel below railroad bridge |
| 36.8522 | -94.8533 | yes | 102 | Neosho R. below I-44 |
| 36.8052 | -94.7657 | no | 80.5 | Neosho R. above Twin Bridges S.P. |
| 36.8109 | -94.7482 | no | 85 | Spring R. above Twin Bridges S. P. |
| 36.8742 | -94.7649 | yes | 97 | Spring R. above OK-10 |
| 36.5473 | -94.7195 | yes | 42 | Honey Cr. upstream of reservoir |
| 36.6323 | -94.5883 | yes | 83 | Elk R. upstream of reservoir |
| 36.6389 | -94.6302 | yes | 75 | Buffalo Cr. near Elk R. |
| a No water samples implies that only T, SC, and DO were measured in the water column as vertical profiles. |

***Table S2A***

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| Table S2A. Concentrations of chemical analytes (ng/L) for all samples collected in **December 2010**. |
| location, depth | HgTf | MeHgf |
| km-0.2, 0.2 m | 0.27 | BDL |
| km-0.2, 16 m | 0.63 | BDL |
| km-0.2, 35 m | 0.77 | BDL |
| km-22.5, 0.5 m | 0.28 | BDL |
| km-22.5, 21 m | 0.59 | BDL |
| km-22.5, 25.5 m | 0.50 | BDL |
| km-48.5, 0.2 m | 0.32 | BDL |
| km-48.5, 14.5 m | 0.85 | 0.06 |
| km-67.5, 0.2 m |  0.55 | 0.03 |
| Neosho R., 0. 5 m | 0.71 | 0.03 |
| Spring R., 0.2 m | 0.28 | BDL |
| Buffalo Cr., 0.2 m | 0.22 | BDL |
| Elk R., 0.2 m | 0.26 | BDL |
| Honey Cr, 0.2 | 0.25 | BDL |
| Grand R., 0.5 m | 0.34 | BDL |

***Table S2B***

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| Table S2B. Concentrations of chemical analytes (ng/L) for all samples collected in **February-March 2011**. |
| location, depth | HgTf | MeHgf |
| km-0.2, 0.2 m | BDL | 0.01 |
| km-0.2, 10 m | BDL | 0.01 |
| km-0.2, 35 m | 0.06 | 0.07 |
| km-10, 0.5 m | BDL | 0.01 |
| km-10, 10 m | BDL | 0.02 |
| km-10, 33 m | 0.77 | 0.04 |
| km-29.5, 0.1 m | 0.10 | 0.02 |
| km-29.5, 25 m | 1.78 | 0.04 |
| km-48.5, 0.2 m | 0.28 | 0.08 |
| km-48.5, 14.5 m | 1.01 | 0.21 |
| km-67.5, 0.2 m | 1.39 | 0.29 |
| Neosho R., 0.5 m | 1.14 | 0.18 |
| Spring, R., 0.2 m |  |  |
| Buffalo Cr., 0.2 m | 0.19 | 0.03 |
| Elk R., 0.2 m | 0.25 | 0.04 |
| Honey Cr., 0.2 m | 0.34 | 0.06 |
| Grand R., 0.5 m | 0.09 | 0.02 |

***Table S2C***

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| Table S2C. Concentrations of chemical analytes (ng/L) for all samples collected in **May 2011**.  |
| location, depth | HgTf | MeHgf |
| km-0.2, 0.2 m | 0.74 | 0.10 |
| km-0.2, 16 m | 0.85 | 0.07 |
| km-0.2, 35 m | 0.46 | 0.07 |
| km-10, 0.5 m | 0.83 | 0.06 |
| km-10, 20 m | 1.59 | 0.12 |
| km-10, 33 m | 0.59 | 0.08 |
| km-29.5, 0.2 m | 1.11 | 0.10 |
| km-29.5, 25 m | 0.90 | 0.07 |
| km-48.5, 0.2 m | 0.73 | 0.07 |
| km-48.5, 9.2 m | 0.48 | 0.07 |
| km-48.5, 14.5 m | 0.66 | 0.06 |
| km-67.5, 0.2 m | 0.54 | 0.09 |
| Neosho R., 0.5 m | 0.45 | 0.08 |
| Spring R., 0.2 m | 0.29 | 0.05 |
| Buffalo Cr., 0.2 m | 0.22 | 0.02 |
| Elk R., 0.2 m | 0.27 | 0.03 |
| Honey Cr., 0.2 m | 0.31 | 0.03 |
| Grand R., 0.5 m | 0.84 | 0.06 |

***Table S2D***

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| Table S2D. Concentrations of chemical analytes (ng/L) for all samples collected in **August 2011**.  |
| location, depth | HgTf | MeHgf |
| km-0.2, 0.2 m | 0.80 | 0.14 |
| km-0.2, 16 m | 0.93 | BDL |
| km-0.2, 25 m | 0.81 | 0.05 |
| km-0.2, 35 m | 1.50 | 0.62 |
| km-10, 0.5 m | 0.70 | 0.03 |
| km-10, 20 m | 1.02 | 0.05 |
| km-10, 33 m | 1.15 | 0.12 |
| km-29.5, 0.2 m | 0.93 | 0.05 |
| km-29.5, 16 m | 1.05 | 0.10 |
| km-29.5, 22 m | 1.16 | 0.11 |
| km-48.5, 0.2 m | 0.96 | 0.07 |
| km-48.5, 8 m | 1.68 | 0.01 |
| km-48.5, 14.5 m | 1.32 | 0.32 |
| km-67.5, 0.2 m | 1.80 | 0.04 |
| km-75, 0.5 m | 1.12 | 0.18 |
| km-75, 7.5 m | 3.93 | 0.10 |
| Neosho R., 0.2 m | 1.91 | 0.05 |
| Spring R., 0.2 m | 2.05 | 0.11 |
| Buffalo Cr., 0.2 m | 0.57 | 0.04 |
| Elk R., 0.2 m | 0.61 | 0.11 |
| Honey Cr., 0.2 m | 2.72 | 0.14 |
| Grand R., 0.5 m | 1.73 | 0.55 |

***Table S2E***

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| Table S2E. Concentrations of chemical analytes (ng/L) for all samples collected in **November 2011**.  |
| location, depth | HgTf | MeHgf |
| km-0.2, 0.2 m | 0.35 | 0.02 |
| km-0.2, 16 m | 0.40 | 0.03 |
| km-0.2, 25 m | 0.34 | 0.01 |
| km-0.2, 35 m | 0.29 | BDL |
| km-29.5, 0.1 m | 0.17 | BDL |
| km-29.5, 25 m | 0.15 | 0.02 |
| km-48.5, 0.2 m | 0.08 | 0.02 |
| km-48.5, 14.5 m | 0.25 | BDL |
| km-67.5, 0.2 m | 0.23 | 0.02 |
| Grand R., 0.5 m | 0.29 | BDL |

**Online Supplement: Figure Captions**

Figure S1. Contour plots of temperature (expressed in degrees C) measured in Grand Lake during this study. Vertical dashed lines indicate the locations where profiles were measured. Values in boxes connected to the reservoir by arrows indicate (from left to right) concentrations in the Grand River leaving the dam, the Elk River 10 km upstream of the reservoir and 25 km upstream of the reservoir main channel, and the flow-weighted average of the Neosho and Spring Rivers (measured 35 and 30 km upstream of the region depicted on the contour plot, respectively) to the main channel of the reservoir. The color bar at bottom applies to all panels.

Figure S2. Contour plots of dissolved oxygen (DO, expressed in mg/L) measured in Grand Lake during this study. Vertical dashed lines indicate the locations where profiles were measured. Values in boxes connected to the reservoir by arrows indicate (from left to right) concentrations in the Grand River leaving the dam, the Elk River 10 km upstream of the reservoir and 25 km upstream of the reservoir main channel, and the flow-weighted average of the Neosho and Spring Rivers (measured 35 and 30 km upstream of the region depicted on the contour plot, respectively) to the main channel of the reservoir. The color bar at bottom applies to all panels; the discontinuity in the color scale occurs at 4 mg/L to indicate the approximate concentration at which fish health will be impaired due to lack of oxygen.

**Online Supplement: Figures**

***Figure S1: Temperature***











***Figure S2: Dissolved Oxygen***









