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Prepared in cooperation with the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation

Fishery Assessments on the Duck Valley Indian Reservation, Idaho and Nevada 2007-2009

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Introduction

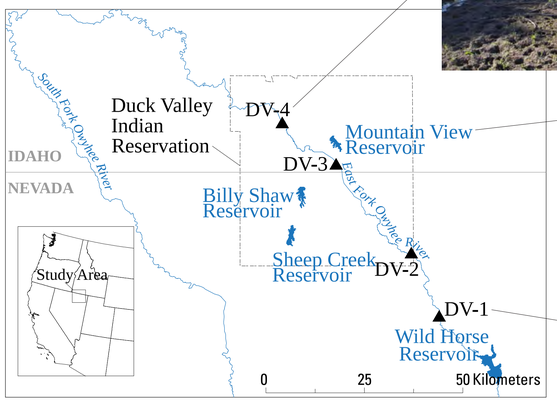
The U.S. Geological Survey (USGS), in cooperation with the Shoshone-Paiute Tribes of the Duck Valley Indian Reservation, assessed the fishery resources in Mountain View Reservoir, Billy Shaw Reservoir, Sheep Creek Reservoir, and the East Fork Owyhee River from 2007 to 2009. Gold mines located near the study area have emitted mercury at rates of up to 1,000 lb per year, potentially affecting the important sportfishing resources on the reservation. The shallow reservoirs and wetland habitat on and near Tribal lands were of particular concern because of their potential to methylate mercury into more bioavailable forms.

Objectives

- Evaluate mercury concentrations in catchable rainbow trout, the most popular sportfish taken on the reservation.
- Assess the condition of the fish community and associated summer water temperatures along the East Fork Owyhee River.

Downstream DV-4

Mountain View Reservoir



Upstream DV-1

Methods

During 2007 and 2009, fish were collected from reservoirs using gill nets; in 2008, fish were collected from Owyhee River sites from representative reaches of about 300 m using backpack electrofishing. Fish were identified by species, and they were then measured for total length and weight. Multiple age classes of rainbow trout were collected and fileted for tissue analyses that followed standard USGS protocols. Hatchery fish tissue samples were analyzed as part of the quality-assurance program to describe background mercury concentrations. All tissue samples were processed at the USGS Mercury Research Laboratory in Middleton, Wisconsin following standard laboratory methods.Tissue analysis, continuous summer water temperatures were recorded and fish community metrics were calculated to evaluate coldwater habitats on the Owyhee River. The Index of Biological Integrity (IBI) developed for Pacific Northwest rivers was used to summarize community metrics.

Common name	Origin*	Pollution tolerance*	Temperature preference*	DV-1	DV-2	DV-3	DV-4
Bridgelip sucker	Native	Tolerant	Cool	•	•	•	•
Largescale sucker	Native	Tolerant	Cool			•	•
Smallmouth bass	Alien	Intolerant	Cool				•
Paiute sculpin	Native	Intolerant	Cold	•	•	•	
Chiselmouth	Native	Intolerant	Cool				•
Tui Chub	Native	Intolerant	Cool			•	
Longnose dace	Native	Intolerant	Cool	•	•	•	
Northern pikeminnow	Native	Tolerant	Cool				•
Redside shiner	Native	Intolerant	Cool	•	•	•	•
Speckled dace	Native	Intolerant	Cold	•	•	•	•
Brown trout	Alien	Intolerant	Cold	•			
Rainbow trout	Native	Sensitive	Cold	•	•	•	

*assigned following Zaroban and others (1999)

Contact and More Information

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Scan for Web site URL

Study Web site and bibliography:
http://id.water.usgs.gov/projects/duck_valley/

Findings

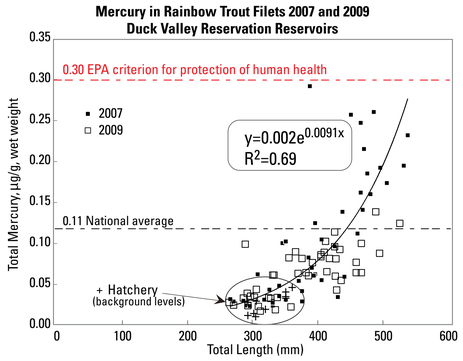
Mercury concentrations in rainbow trout were elevated above background concentrations (i.e., 0.01-0.05 µg/g, wet weight). Two rainbow trout filets from the East Fork Owyhee River contained mercury concentrations above U.S. Environmental Protection Agency (EPA) criterion for protection of human health, although the overall analysis results did not warrant a fish consumption advisory. Nearly 70 percent of the variation in mercury concentrations in reservoir trout was due to fish size; the larger the fish, the greater the mercury concentration.

Upstream diversion and channel straightening may be contributing to high summer water temperatures at the downstream sampling sites. Summer water temperatures recorded at sites DV-3 and DV-4 regularly exceeded Idaho's Maximum Daily Average Water Temperature criteria for coldwater aquatic life (19° C). These temperatures may be precluding coldwater native species and favoring alien species.

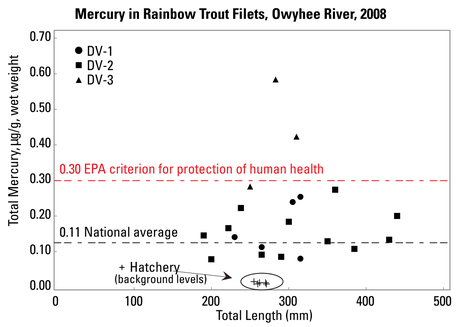
The absence of coldwater native species such as rainbow trout and sculpin appears to be the primary reason for these low IBI scores.

Paiute sculpin

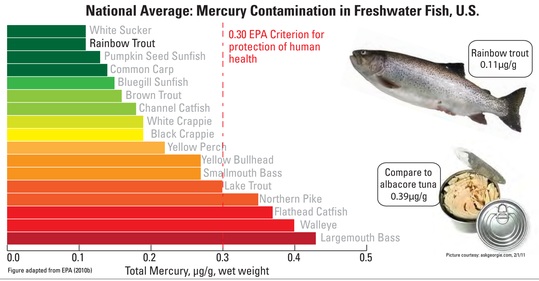
Mercury



No rainbow trout fish tissue exceeded the EPA human health criterion of 0.3 µg/g, but some samples did exceed the national average of 0.11 µg/g.

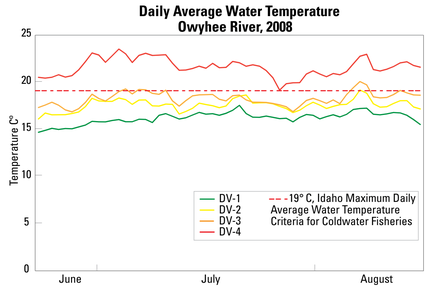


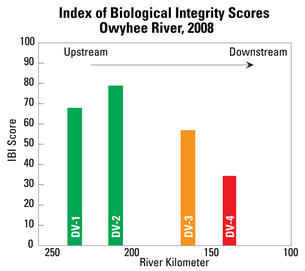
Rainbow trout were only found at three of the four river sites. Two tissue samples from site DV-3 exceeded EPA human health criterion of 0.3 µg/g.



Temperature and IBI

Mean daily water temperatures were recorded at the four sampling sites along the East Fork Owyhee River in 2008. Between June 21 and August 17, 2008, downstream sites DV-3 and DV-4 exceeded daily average criteria 16% and 100%, respectively. Temperatures at the sites DV-1 and DV-2 did not exceed coldwater temperature criteria.





The IBI scores (ranging from 34 to 57 out of 100) at downstream sites DV-3 and DV-4 indicate impairment of the coldwater fishery.

Metrics* Used in IBI Scoring	DV-1	DV-2	DV-3	DV-4
Number of coldwater native species	2	2	2	0
Percent sculpins	14	25	1	0
Percent sensitive native individuals	2	4	1	0
Percent coldwater individuals	19	29	2	0
Percent tolerant individuals	17	4	5	29
Number of alien species	1	0	0	1
Percent common carp individuals	0	0	0	0
Number of salmonid age classes	4	4	3	0
Catch per unit effort (coldwater species)	0.8	1.6	0.2	0

*based on metrics from Mebane and others (2003)

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U.S. Geological Survey

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