

Mercury in the Snake River Basin

Columbia River Toxics Workgroup
February 7, 2008

Helen Rueda, USEPA, Oregon Operations Office

Acknowledgements

- Don Essig, Mike Ingham, Lauri Monnot, Lynn Vanevery – IDEQ
- Agnes Lut, Tonya Dombrowski, Doug Drake at Oregon DEQ
- Mary Hanson, ODFW
- Jim Vannoy, Fred Partridge – Idaho Dept of Health
- Terry Maret, USGS
- Mike Cox, Spencer Peterson, Liz Doyle, Ikuyo Fredrickson, Dana Davoli, Randy Hjort, Tony Olsen, Gretchen Hayslip, Lorraine Edmond -USEPA
- Susan Burch, Ken Crabb, Bruce Nierwienski, Damian Higgins, Tim Hall, Judy Bischoff - USFWS
- Tom Porta, Nevada DEP
- Mark Warren, John Elliot – Nevada DOW
- Darren Brandt – Terragraphics
- Larry Curtis – OSU
- Tracy Richter – Idaho Power Co.



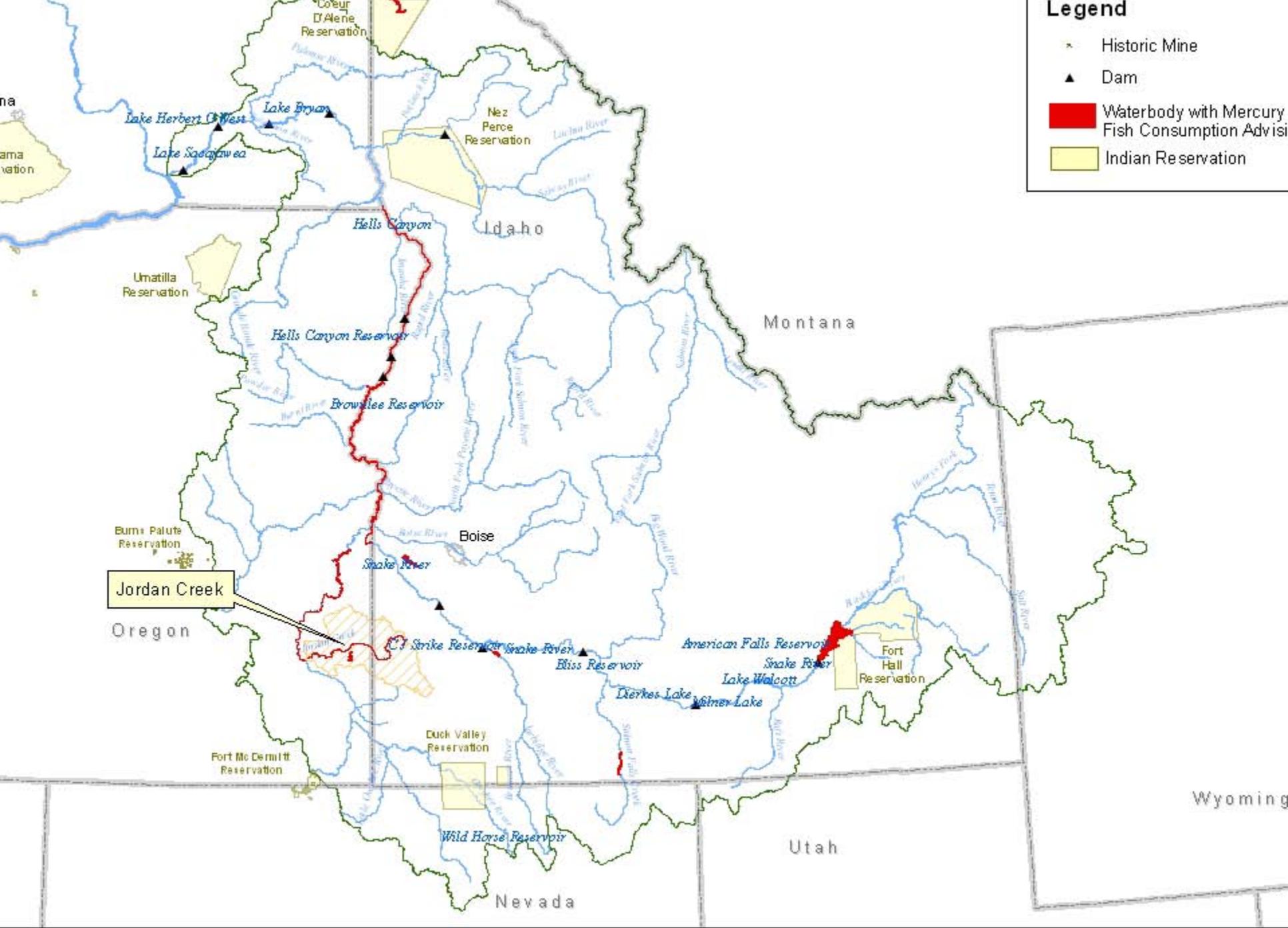
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Columbia River Basin and



Mercury Listings and Advisories in the Snake River System

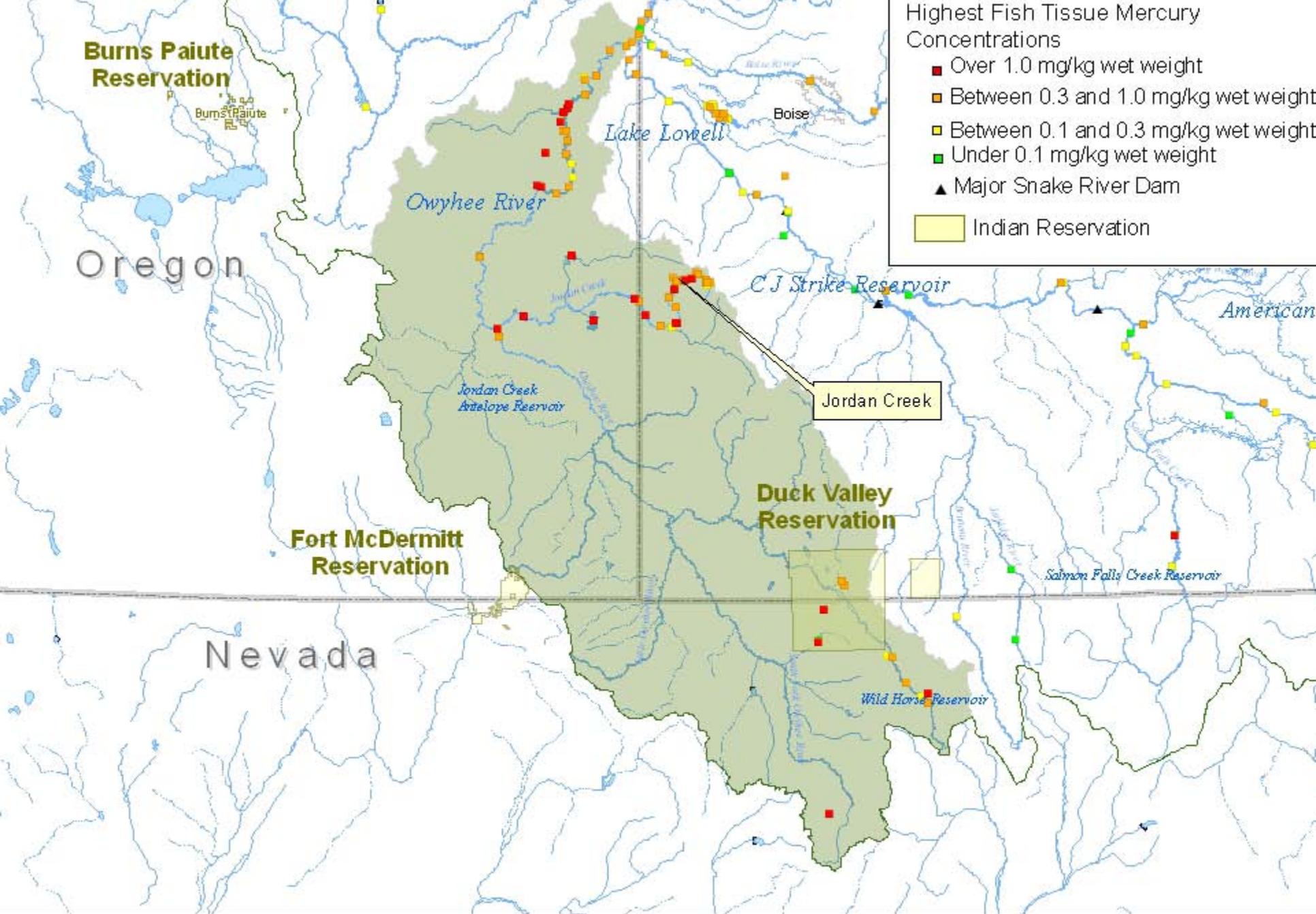
Waterbody	River Miles	Tributary to	State	Fish Advisory	Impaired Waters
Snake River	173 - 404	Columbia River	OR	X	X
Owyhee River	71 - 124	Snake River (RM 396)	OR	X	X
Owyhee Reservoir	28.7 - 71	Snake River (RM 396)	OR	X	X
Jordan Creek	0 - 54	Owyhee River (RM 124)	OR	X	X
Antelope Reservoir		(Water diverted from Jordan Creek)	OR	X	X
Brownlee Reservoir - Snake River	285 - 337	Columbia River	ID	X	X
Jordan Creek	54 - 96	Owyhee River (RM 124)	ID	X	X
Lake Lowell		Snake River (~RM 416)	ID	X	
American Falls Reservoir - Snake River	714-734	Columbia River	ID	X	
C.J. Strike Reservoir - Snake River	494 - 520	Columbia River	ID	X	
Salmon Falls Creek Reservoir		Snake River (RM 586)	ID	X	X



Legend

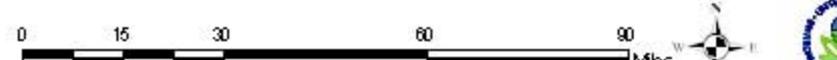
- ✕ Historic Mine
- ▲ Dam
- Waterbody with Mercury Fish Consumption Advisory
- Indian Reservation

Jordan Creek



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Fish Tissue Mercury Data



Jordan Creek Historic Mining Area

- Intensive mining from 1860 to 1920
- Elemental mercury used to amalgamate precious ore
- Estimates of mercury lost
 - 76 pounds per day
 - Two and a half tons from one mill site between 1866 and 1868

Figure 1. Average Mercury in Fish Fillets from Jordan Creek and the Owyhee River
(1971 - 2005 Data)

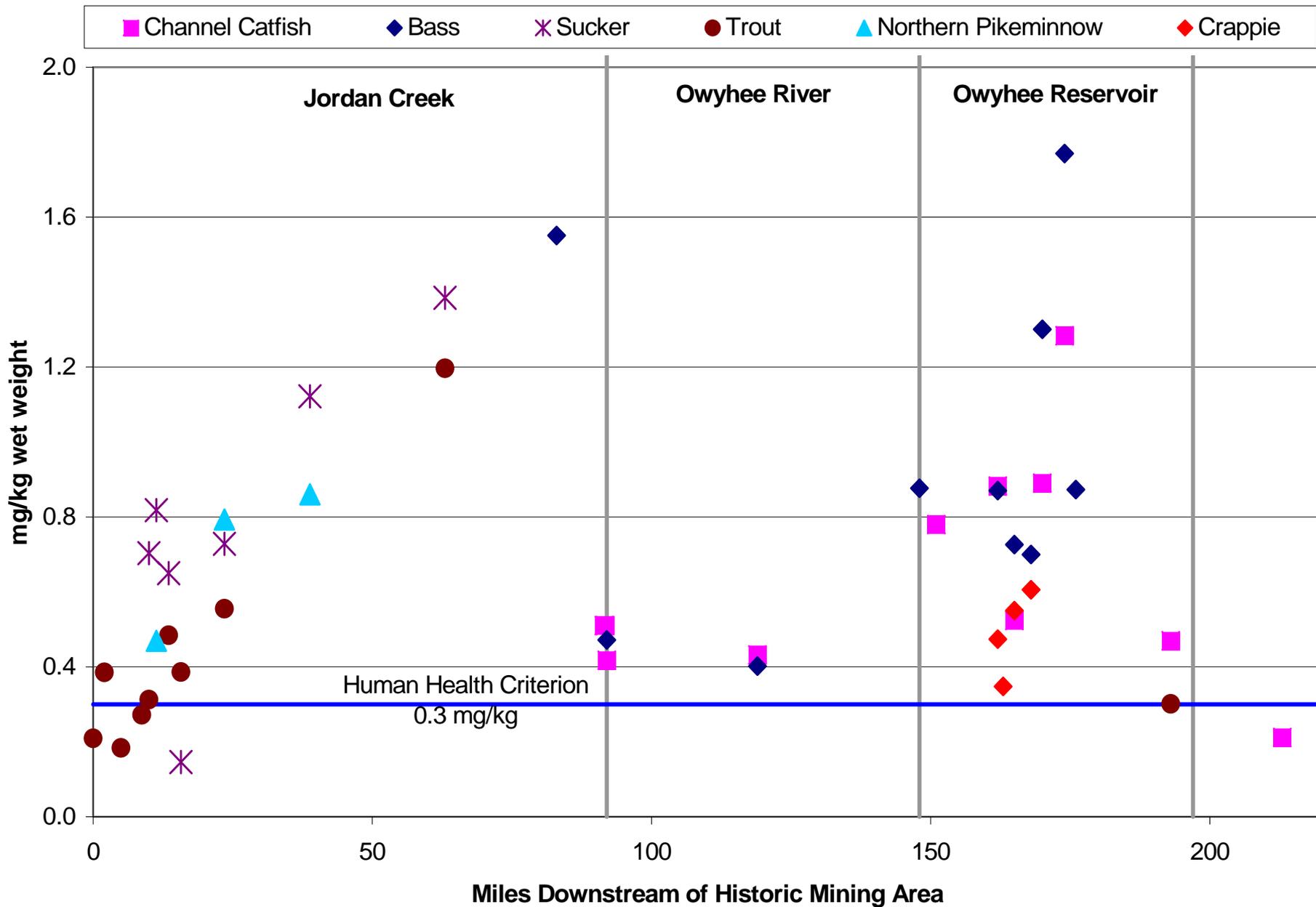


Figure 1. Average Mercury in Fish Fillets and Total Mercury in Water from Jordan Creek and the Owyhee River (1971 - 2005 Data)

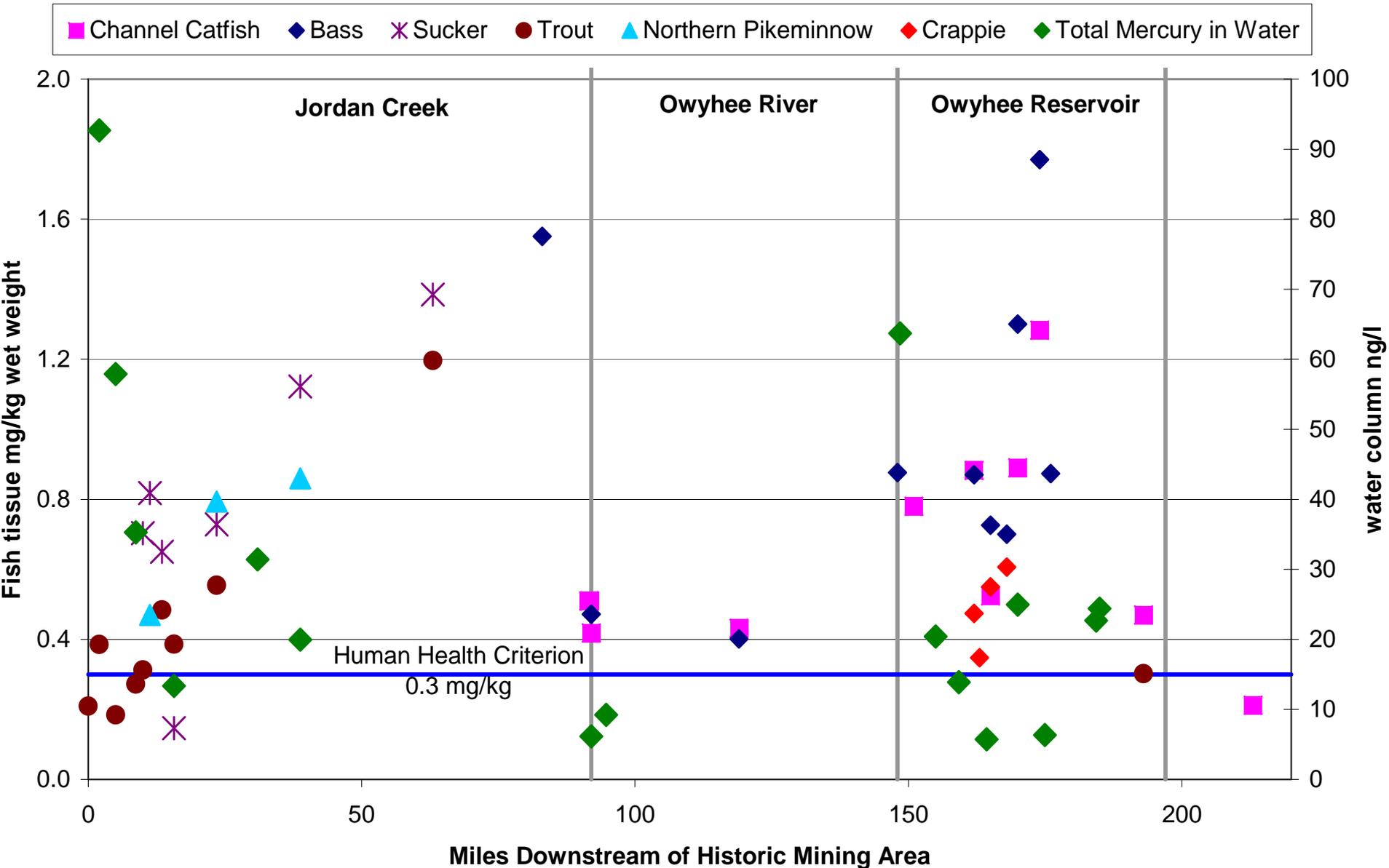
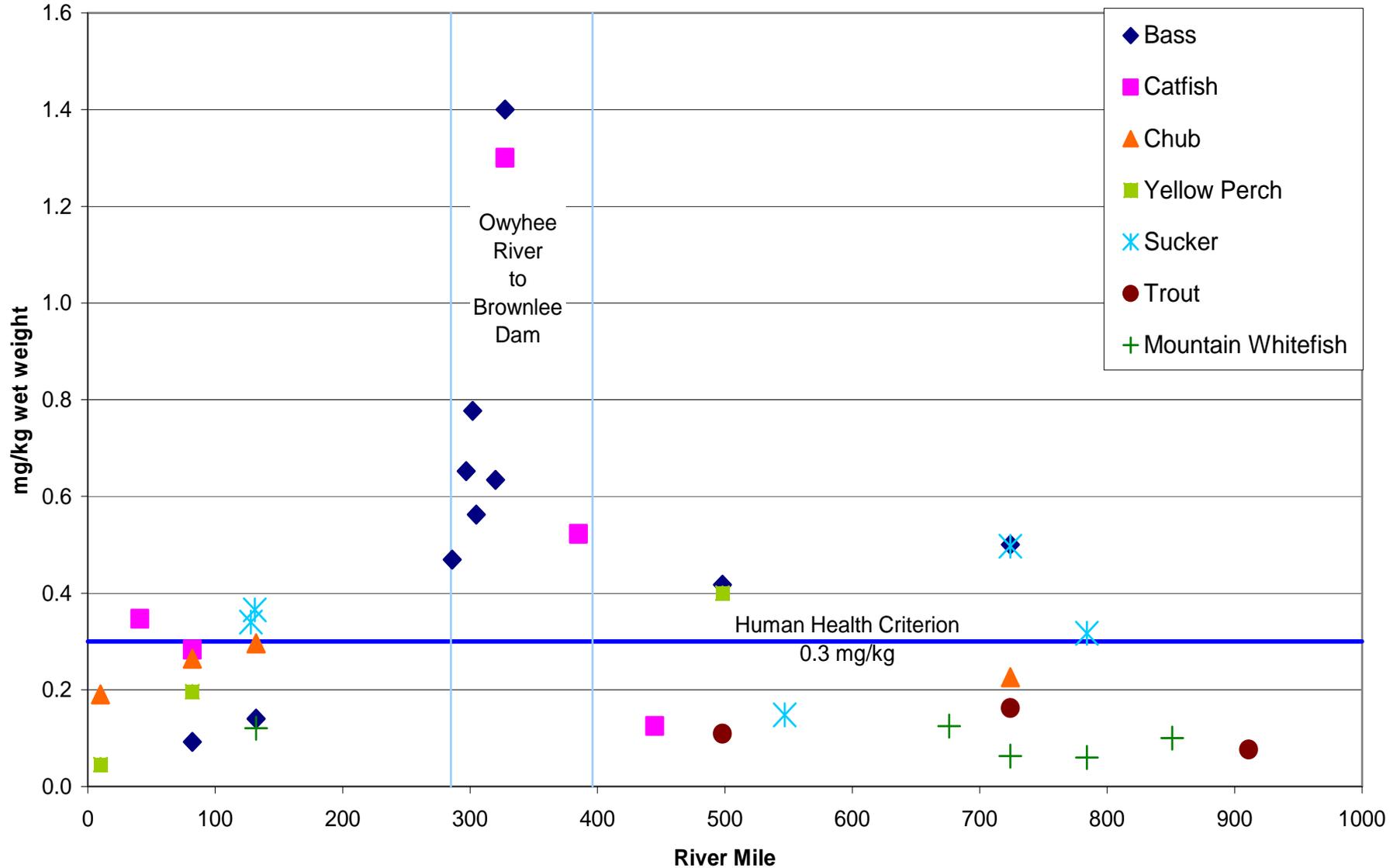
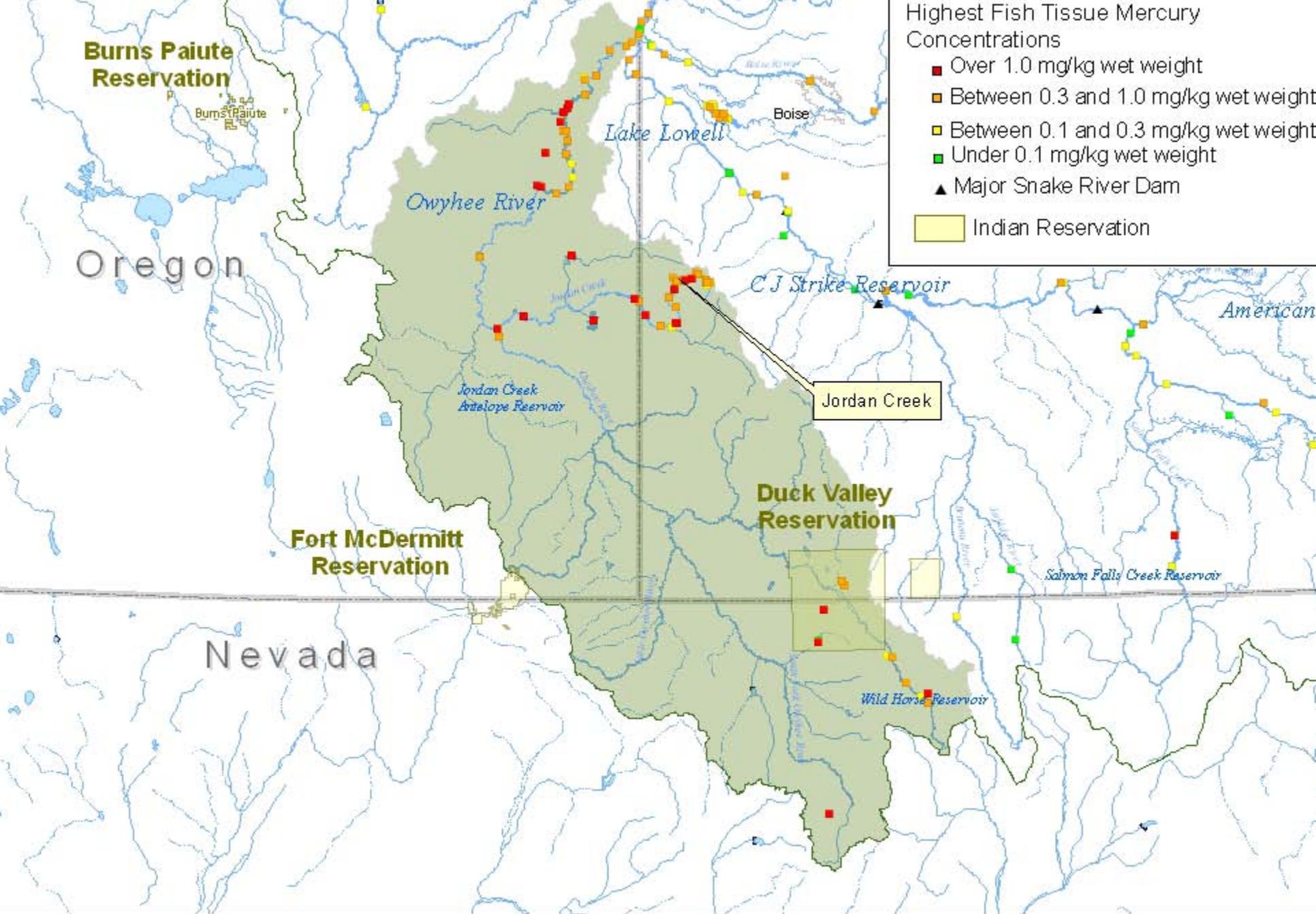


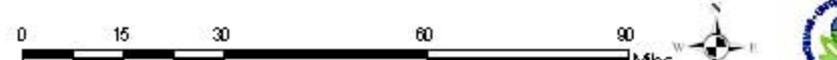
Figure 2: Average Snake River Fish Fillet Mercury Concentrations
(1995 through 2007 Data)





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Fish Tissue Mercury Data



Air Deposition

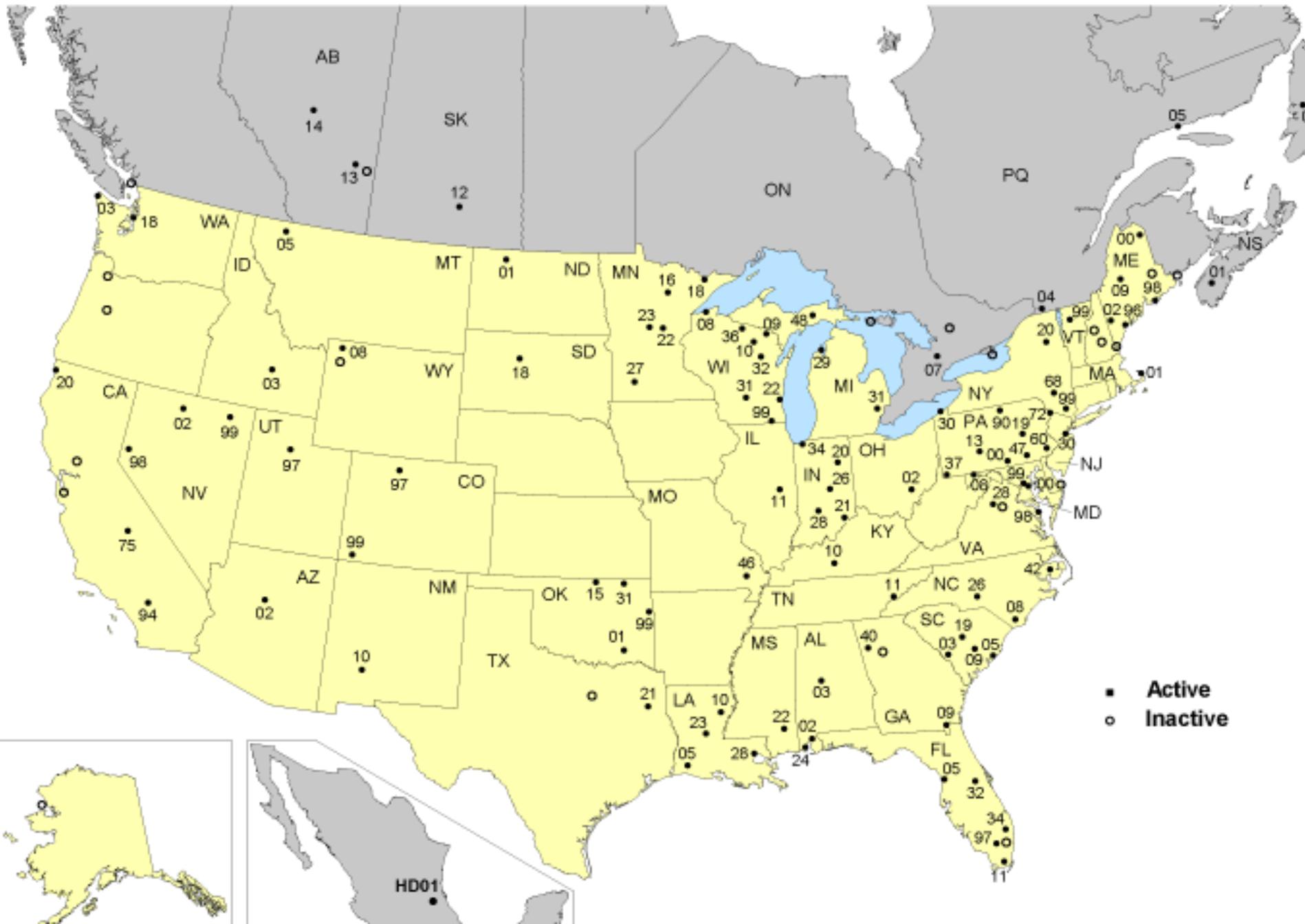
- Air deposition from coal fire power plants a major source of mercury in the eastern US
- No coal fire power plants in the Snake River Basin
- 1999 mercury emission reporting required by Toxic Release Inventory
- Gold mines in Northern Nevada had the highest reported emissions in the nation

State	Name	2005	2004	2003	2002	2001	2000	1999*
NV	Jerrit Canyon Gold Mine	381	462	790	4,741	7,991	6,701	9,400
NV	Cortez Gold Mine	851	1,342	1,381	1,356	1,503	3,110	
OR	Ash Grove Cement Plant	1538	2,153	1,845	1,824	1,902	195	
NV	Barrick Goldstrike Gold Mine	1701	2,205	1,452	1,299	1,324	1,514	1,411
MT	Asarco Smelter	0	0	0	0	769	3,273	
ID	P4 Production LLC Chemical Plant	725	710	620	620	620	670	
NV	Newmont Twin Cr Gold Mine	592	327	588	560	603	648	1,248
WY	Jim Bridger Power Plant	388	441	467	461	442	543	
NV	Newmont Carlin S. Gold Mine	690	262	565	534	501	106	90
45 Lesser Sources		1269	1121	1146	1013	1332	1374	108
Totals		8,135	9,023	8,854	12,408	16,987	18,134	12,257

Air Deposition

- Gold Mines agreed to make voluntary reductions
- Nevada is now regulating gold mine emissions
- REMSAD modeling global mercury
- Background mercury in the Western US

Mercury Deposition Network

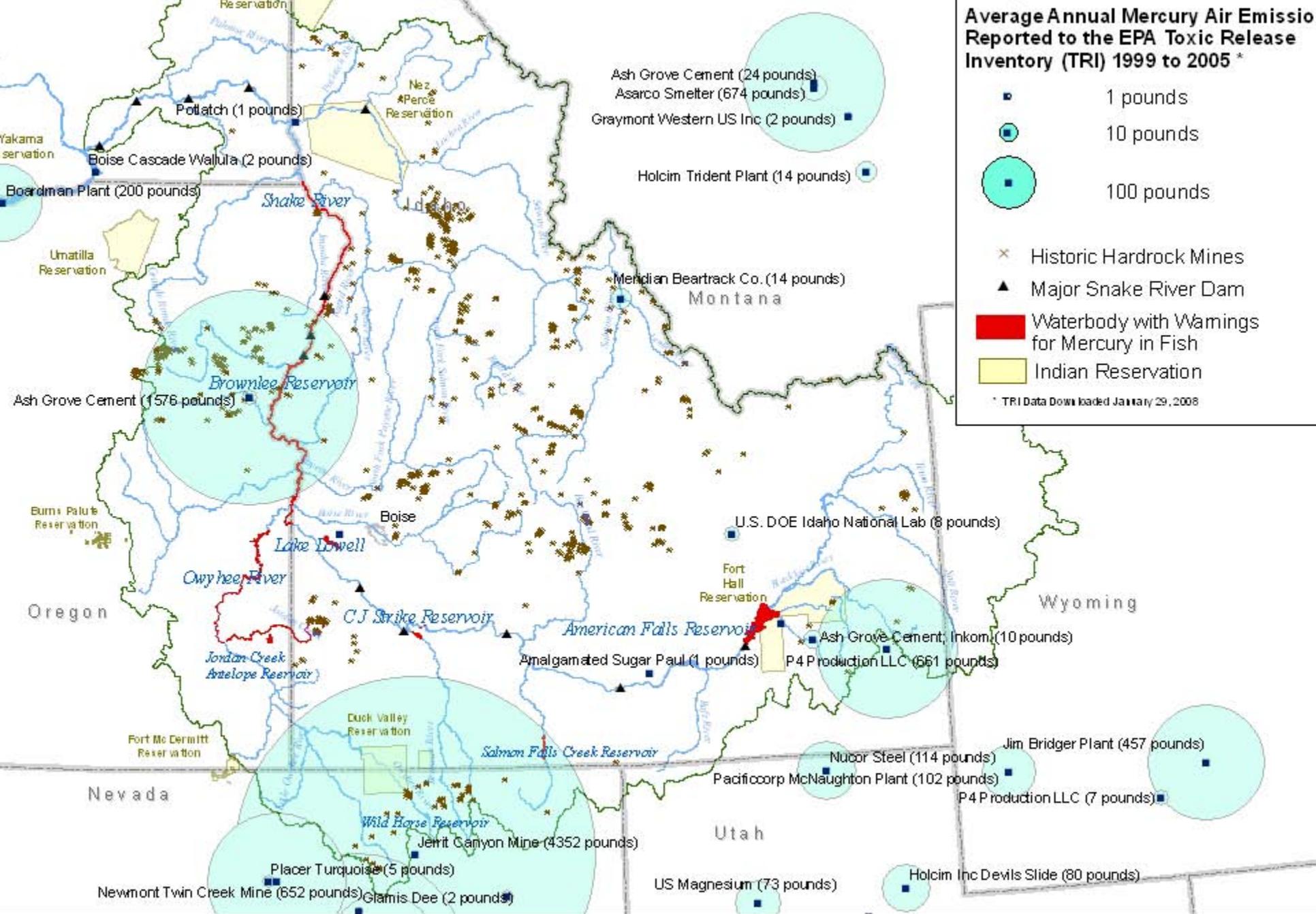


Average Annual Mercury Air Emission Reported to the EPA Toxic Release Inventory (TRI) 1999 to 2005 *



- × Historic Hardrock Mines
- ▲ Major Snake River Dam
- Waterbody with Warnings for Mercury in Fish
- Indian Reservation

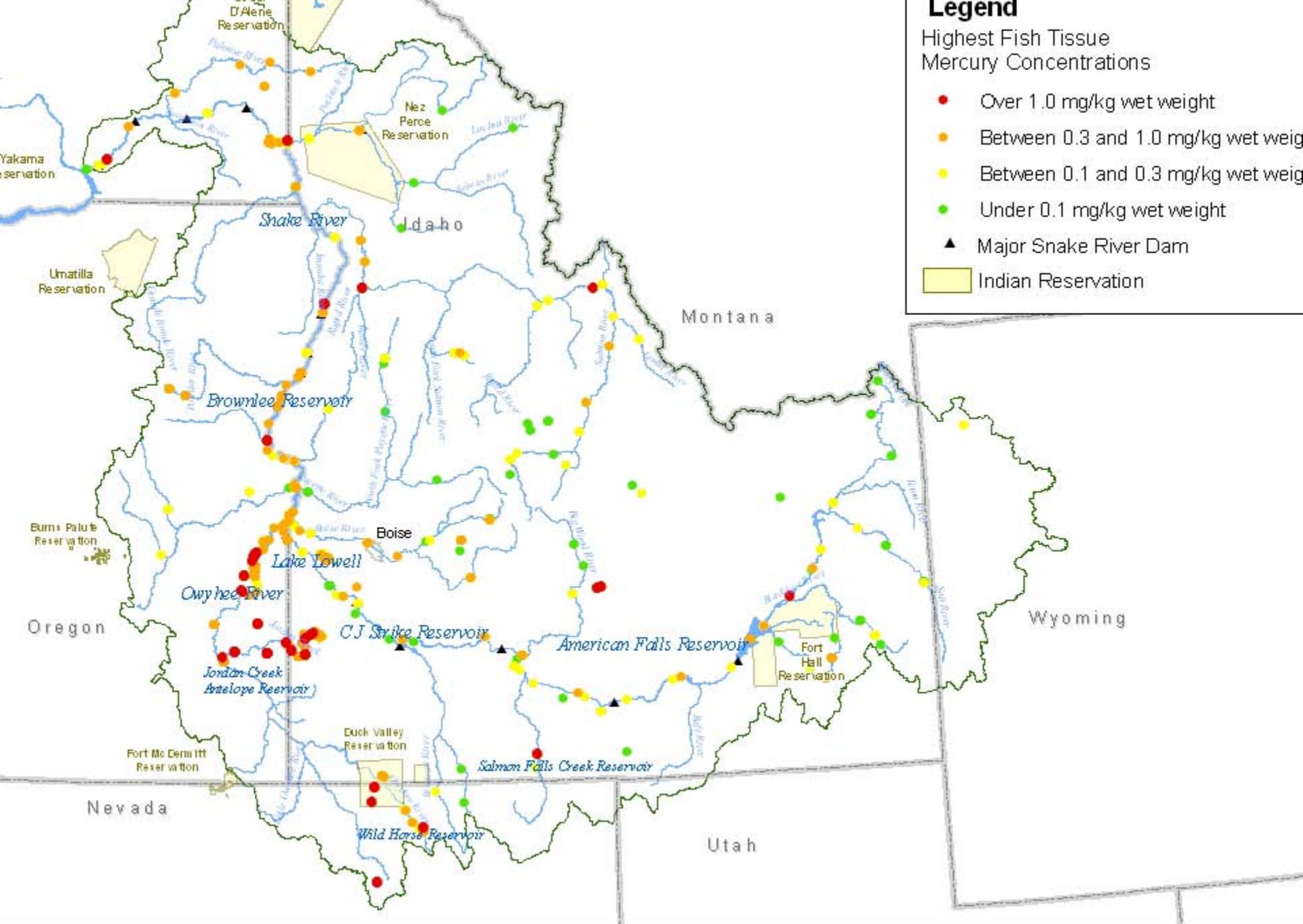
* TRI Data Downloaded January 29, 2008



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Mercury in the





Legend

Highest Fish Tissue Mercury Concentrations

- Over 1.0 mg/kg wet weight
- Between 0.3 and 1.0 mg/kg wet weight
- Between 0.1 and 0.3 mg/kg wet weight
- Under 0.1 mg/kg wet weight
- ▲ Major Snake River Dam
- Indian Reservation

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Factors Affecting Mercury Pollution

- East – Lots of data
 - Lakes
 - Acid pH
 - Carbon rich
 - Natural sulfate limited
 - Little natural mercury
 - No selenium
 - Sources
 - Primarily air deposition from point sources in US
- West – Data deficit
 - Reservoirs
 - Alkaline pH
 - Carbon limited
 - High natural sulfate
 - Mercury in native rock
 - Selenium present
 - Sources
 - Historic mining areas
 - Regional air sources
 - Global mercury

Recommendations

- Air deposition data - more monitors in region collecting long term data
- Fish data - downstream of historic mining areas
- Factors affecting mercury methylation and uptake into the food chain -
Need more information on Western waterbodies
- To calibrate air models and understand deposition trends
- To assess whether consumption advisories and clean up actions are needed
- To understand what other factors can be adjusted to reduce mercury levels in fish