

APPENDIX 5C

Correlations between Macrophage Aggregates and Hg

Data analyzed using all fish and then separated into species age classes when possible. Data are provided for the model that had the strongest statistical significance. The categories in bold are significant at $P < 0.05$.

Analysis	F	d.f.	R ^{squared}	P	Best Fit Model
All Fish					
Spleen MAs	52.25	1, 163	0.24	<0.0001	Log₁₀(X)
Kidney MAs	35.89	1, 163	0.18	<0.0001	Log₁₀(X)
Sum of MAs	48.69	1, 163	0.23	<0.0001	Log₁₀(X)
Brook trout					
Spleen MAs	82.82	1, 98	0.45	<0.0001	Log₁₀(X)
1-3 y	6.03	1, 28	0.18	0.02	Double Squared
4-6 y	26.27	1, 46	0.36	<0.0001	Log₁₀(X)
7-13 y	2.59	1,20	0.11	0.12	Squared Y; Reciprocal X
Kidney MAs			42.64	1, 98	0.30 <0.0001
Log ₁₀ (X)					
1-3 y	2.51	1, 28	0.08	0.12	Double Squared
4-6 y	6.65	1, 46	0.13	0.01	Double Reciprocal
7-13 y	1.8	1, 20	0.08	0.19	Double Squared
Sum of MAs	66.92	1, 98	0.41	<0.0001	Log₁₀(X)
1-3 y	3.16	1, 28	0.10	0.09	Double Squared
4-6 y	13.06	1, 46	0.22	0.0007	Double Reciprocal
7-13 y	3.21	1, 20	0.14	0.09	Double Squared
Lake trout					
Spleen MAs	6.99	1, 28	-0.2	0.01	Linear
< 20 y	4.77	1, 15	-0.24	0.04	Squared Y
> 20 y	22.64	1, 11	-0.67	0.0006	Reciprocal Y; Squared X
Kidney MAs	0.32	1, 28	-0.01	0.57	Squared Y; Log X
< 20 y	0.00	1, 15	0.0001	0.97	Linear
> 20 y	0.00	1, 11	0.0002	0.96	Linear
Sum of MAs	1.62	1, 28	-0.05	0.21	Squared Y; Square root X
< 20 y	1.48	1, 15	-0.09	0.24	Double squared
> 20 y	0.67	1, 11	-0.06	0.43	Reciprocal Y; Square root X
Cutthroat trout					
Spleen MAs	15.46	1, 23	0.40	0.0007	Double squared
Kidney MAs	16.10	1, 23	0.41	0.0005	Double squared
Sum of MAs	17.15	1, 23	0.43	0.0004	Double squared
Rainbow trout					
Spleen MAs	4.13	1, 8	0.34	0.08	Linear
Kidney MAs	28.83	1, 8	0.79	0.0007	Double reciprocal
Sum of MAs	33.83	1, 8	0.81	0.0004	Double reciprocal
SEKI – Brook Trout					
Spleen MAs	35.65	1, 18	0.66	<0.0001	Square-root Y; Log X
Kidney MAs	6.12	1, 18	0.25	0.02	Multiplicative
Sum of MAs	15.05	1, 18	0.45	0.001	Square-root Y; Log X
Pear					
Spleen MAs	31.24	1, 8	0.80	0.0005	Linear
Kidney MAs	9.85	1, 8	0.55	0.01	Linear
Sum of MAs	19.18	1, 8	0.71	0.002	Linear

Analysis	F	d.f.	R ^{squared}	P	Best Fit Model
Emerald					
Spleen MAs	4.46	1, 8	0.36	0.07	Reciprocal Y; Log X
Kidney MAs	8.35	1, 8	0.51	0.02	Double reciprocal
Sum of MAs	7.98	1, 8	0.50	0.02	Double reciprocal
ROMO					
Spleen MAs	37.35	1, 18	0.67	<0.0001	Double squared
Kidney MAs	16.73	1, 18	0.48	0.0007	Double squared
Sum of MAs	35.87	1, 18	0.67	<0.0001	Squared Y
Mills – rainbow trout					
Spleen MAs	4.13	1, 8	0.34	0.08	Linear
Kidney MAs	28.83	1, 8	0.79	0.0007	Double reciprocal
Sum of MAs	33.83	1, 8	0.81	0.0004	Double reciprocal
Lone Pine – brook trout					
Spleen MAs	21.21	1, 8	0.73	0.002	Squared Y; Square-root X
Kidney MAs	16.38	1, 8	0.67	0.004	Double squared
Sum of MAs	34.55	1, 8	0.81	0.0004	Double squared
GAAR					
Matcharak – lake trout					
Spleen MAs	4.75	1, 8	-0.37	0.06	Squared Y; Reciprocal X
≤ 20 y	4.53	1, 3	0.60	0.12	Linear
> 20 y	5.35	1, 3	-0.64	0.10	Squared Y; Reciprocal X
Kidney MAs	0.26	1, 8	0.03	0.63	Reciprocal Y; Squared X
≤ 20 y	6.35	1, 3	0.68	0.09	Linear
> 20 y	0.18	1, 3	-0.06	0.70	Double reciprocal
Sum of MAs	1.17	1, 8	-0.13	0.31	Squared Y; Reciprocal X
≤ 20 y	7.12	1, 3	0.70	0.08	Linear
> 20 y	0.88	1, 3	-0.23	0.42	Squared Y; Reciprocal X
NOAT					
Burial – lake trout					
Spleen MAs	12.56	1, 8	-0.64	0.009	Squared Y; Reciprocal X
< 15 y	67.70	1, 2	0.97	0.01	Linear
> 15 y	1.11	1, 4	-0.21	0.35	Linear
Kidney MAs	1.47	1, 8	-0.15	0.26	Squared Y; Reciprocal X
< 15 y	8.07	1, 2	0.80	0.10	Linear
> 15 y	0.01	1, 4	0.21	0.93	Linear
Sum of MAs	2.42	1, 8	-0.23	0.16	Squared Y; Reciprocal X
< 15 y	9.56	1, 2	0.83	0.09	Linear
> 15 y	0.01	1, 4	0.13	0.94	Linear
DENA – Lake Trout					
Wonder					
Spleen MAs	4.21	1, 8	0.34	0.07	Reciprocal Y; Squared X
Kidney MAs	5.49	1, 8	0.41	0.05	Reciprocal Y
Sum of MAs	7.61	1, 8	0.49	0.03	Double squared
MORA – Brook Trout					
Spleen MAs	46.03	1, 28	0.62	<0.0001	Log₁₀(X)
Kidney MAs	7.26	1, 28	0.21	0.01	Double reciprocal
Sum of MAs	11.20	1, 28	0.29	0.002	Square root Y; Reciprocal X

Analysis	F	d.f.	R^{squared}	P	Best Fit Model
LP19					
Spleen MAs	89.51	1, 13	0.87	<0.0001	S-curve
Kidney MAs	37.27	1, 13	0.74	<0.0001	Double reciprocal
Sum of MAs	48.48	1, 13	0.79	<0.0001	S-curve
Golden					
Spleen MAs	1.87	1, 13	0.13	0.19	S-curve
Kidney MAs	4.46	1, 13	0.26	0.05	Double reciprocal
Sum of MAs	4.25	1, 13	0.25	0.06	Double reciprocal
GLAC – West Slope Cutthroat					
Spleen MAs	15.46	1, 23	0.40	0.0007	Double squared
Kidney MAs	16.10	1, 23	0.41	0.0005	Double squared
Sum of MAs	17.15	1, 23	0.43	0.0004	Double squared
Oldman					
Spleen MAs	25.26	1, 8	0.76	0.001	Double reciprocal
Kidney MAs	2.71	1, 8	0.25	0.14	Squared Y; reciprocal X
Sum of MAs	3.23	1, 8	0.29	0.11	Squared Y; reciprocal X
Snyder					
Spleen MAs	16.53	1, 13	0.56	0.001	Squared X
Kidney MAs	21.21	1, 13	0.62	0.0005	Double squared
Sum of MAs	23.22	1, 13	0.64	0.0003	Double squared
OLYM – Brook Trout					
Spleen MAs	43.10	1, 38	0.53	<0.0001	Linear
Kidney MAs	30.29	1, 38	0.44	<0.0001	Linear
Sum of MAs	40.29	1, 38	0.52	<0.0001	Linear
PJ2003					
Spleen MAs	14.45	1, 8	0.64	0.005	Squared Y
Kidney MAs	3.87	1, 8	0.33	0.08	Double reciprocal
Sum of MAs	5.00	1, 8	0.38	0.06	Double reciprocal
PJ2005					
Spleen MAs	4.98	1, 13	0.28	0.04	Square-root X
Kidney MAs	16.92	1, 13	0.56	0.001	Reciprocal Y; Square-root X
Sum of MAs	13.30	1, 13	0.51	0.003	Reciprocal Y; Square-root X
Hoh					
Spleen MAs	30.86	1, 13	0.70	0.0001	Reciprocal X
Kidney MAs	29.95	1, 13	0.70	0.0001	Squared Y; Log X
Sum of MAs	34.54	1, 13	0.73	0.0001	Squared Y; Log X
All Fish					
Spleen MAs		Failed lack of fit test			
Kidney MAs		Failed lack of fit test			
Sum of MAs	51.46	1, 163	0.24	<0.0001	S-curve
Brook trout					
Spleen MAs	91.11	1, 98	0.48	<0.0001	Reciprocal X
Kidney MAs	75.84	1, 98	0.46	<0.0001	Reciprocal X
Sum of MAs	104.67	1, 98	0.52	<0.0001	Reciprocal X
Lake trout					
Spleen MAs	35.25	1, 28	0.57	<0.0001	Double reciprocal
Kidney MAs	61.07	1, 28	0.68	<0.0001	Double reciprocal
Sum of MAs	70.02	1, 28	0.71	<0.0001	Double reciprocal

Analysis	F	d.f.	R^{squared}	P	Best Fit Model
Cutthroat trout					
Spleen MAs	18.47	1, 23	0.44	0.0003	Square-root Y; Squared X
Kidney MAs	11.44	1, 23	0.33	0.003	Squared X
Sum of MAs	12.88	1, 23	0.36	0.002	Square-root Y; Squared X
Rainbow trout					
Spleen MAs	19.91	1, 8	0.71	0.002	Squared X
Kidney MAs	52.16	1, 8	0.87	0.0001	Exponential
Sum of MAs	61.84	1, 8	0.88	<0.0001	Exponential
SEKI					
Spleen MAs	26.39	1, 18	0.59	0.0001	S-curve
Kidney MAs	8.7	1, 18	0.33	0.009	Double reciprocal
Sum of MAs	16.23	1, 18	0.47	0.0008	S-curve
Pear					
Spleen MAs	28.74	1, 8	0.78	0.0007	S-curve
Kidney MAs	7.5	1, 8	0.48	0.03	Double reciprocal
Sum of MAs	13.83	1, 8	0.63	0.006	Double reciprocal
Emerald					
Spleen MAs	6.11	1, 8	0.43	0.04	Double reciprocal
Kidney MAs	7.20	1, 8	0.47	0.03	Double reciprocal
Sum of MAs	8.49	1, 8	0.51	0.02	Double reciprocal
ROMO					
Spleen MAs	20.57	1, 18	0.53	0.0003	Double squared
Kidney MAs	23.69	1, 18	0.57	0.0001	Double reciprocal
Sum of MAs	38.64	1, 18	0.68	<0.0001	Double squared
Mills					
Spleen MAs	19.91	1, 8	0.71	0.002	Squared X
Kidney MAs	52.16	1, 8	0.87	0.0001	Exponential
Sum of MAs		61.84	1, 8	0.88	<0.0001
Exponential					
Lone Pine					
Spleen MAs	11.53	1, 8	0.59	0.009	Double squared
Kidney MAs	6.62	1, 8	0.45	0.03	Double squared
Sum of MAs	11.67	1, 8	0.59	0.009	Double squared
GAAR					
Matcharak					
Spleen MAs	28.45	1, 8	0.78	0.0007	Square-root Y
Kidney MAs	19.86	1, 8	0.71	0.002	Reciprocal Y; Log X
Sum of MAs	38.39	1, 8	0.83	0.0003	Reciprocal Y; Log X
NOAT					
Burial					
Spleen MAs	86.15	1, 8	0.93	<0.0001	Double reciprocal
Kidney MAs	30.16	1, 8	0.79	0.0006	Double reciprocal
Sum of MAs	34.27	1, 8	0.81	0.0004	Double reciprocal
DENA					
Wonder					
Spleen MAs	1.83	1, 8	0.19	0.21	Double squared
Kidney MAs	0.41	1, 8	0.05	0.54	Reciprocal Y; Squared
Sum of MAs	1.4	1, 8	0.15	0.27	Double squared

Analysis	F	d.f.	R^{squared}	P	Best Fit Model
MORA					
Spleen MAs	55.96	1, 28	0.67	<0.0001	S-curve
Kidney MAs	61.38	1, 28	0.69	<0.0001	Double reciprocal
Sum of MAs	69.46	1, 28	0.71	<0.0001	Double reciprocal
LP19					
Spleen MAs	44.00	1, 13	0.77	<0.0001	S-curve
Kidney MAs	61.30	1, 13	0.82	<0.0001	Double reciprocal
Sum of MAs	72.66	1, 13	0.84	<0.0001	S-curve
Golden					
Spleen MAs	6.64	1, 13	0.34	0.02	Double squared
Kidney MAs	5.93	1, 13	0.31	0.03	Double reciprocal
Sum of MAs	6.17	1, 13	0.32	0.03	Double reciprocal
GLAC					
Spleen MAs	18.47	1, 23	0.44	0.0003	Square-root Y; Squared X
Kidney MAs	11.44	1, 23	0.33	0.003	Squared X
Sum of MAs	12.88	1, 23	0.36	0.002	Square-root Y; Squared X
Oldman					
Spleen MAs	5.20	1, 8	0.39	0.05	Double squared
Kidney MAs	2.47	1, 8	0.24	0.15	Squared Y; Square-root X
Sum of MAs		2.92	1, 8	0.27	0.13 Squared Y
Snyder					
Spleen MAs	6.01	1, 13	0.32	0.03	Double reciprocal
Kidney MAs	2.43	1, 13	0.16	0.14	Log Y; Squared X
Sum of MAs	2.81	1, 13	0.18	0.11	Log Y; Squared X
OLYM					
Spleen MAs	41.97	1, 38	0.52	<0.0001	Linear
Kidney MAs	49.92	1, 38	0.57	<0.0001	Linear
Sum of MAs	58.09	1, 38	0.60	<0.0001	Linear
PJ2003					
Spleen MAs	48.23	1, 8	0.86	0.0001	Double reciprocal
Kidney MAs	34.67	1, 8	0.81	0.0004	Double reciprocal
Sum of MAs	37.32	1, 8	0.82	0.0003	Double reciprocal
PJ2005					
Spleen MAs	3.2	1, 13	0.20	0.10	Reciprocal X
Kidney MAs	9.27	1, 13	0.42	0.009	Log Y; Squared X
Sum of MAs	7.04	1, 13	0.35	0.02	Exponential
Hoh					
Spleen MAs	250.45	1, 13	0.95	<0.0001	S-curve
Kidney MAs	113.38	1, 13	0.90	<0.0001	Squared Y; Log X
Sum of MAs	104.83	1, 13	0.89	<0.0001	Log ₁₀ (X)