

Appendix

Table A1.

Sensitivity to Model Specification: Effect of Number of Impaired Water Bodies on Fundraising Expenditures (2SLS Results)

Explanatory Variables	Lagged Effects	Public Expenditures	Fundraising per group	Trans-boundary FEs
ln (Number of Impaired Water Bodies)	1.086** (0.428)	0.939** (0.375)	1.391*** (0.374)	0.643* (0.375)
Violations	-0.065 (0.289)	-0.261 (0.225)	-0.340 (0.246)	-0.149 (0.205)
Fraction Agricultural Land	-0.609** (0.273)	-0.541** (0.255)	-0.402 (0.308)	-0.625** (0.252)
Fraction Urban Land	6.952*** (2.426)	6.419*** (2.251)	7.209** (3.023)	6.178** (2.451)
Population Density (persons/mi ²)	-0.002** (0.001)	-0.002* (0.001)	5.48E-05 (0.002)	-0.001 (0.001)
Per Capita Income (1000s \$)	0.060*** (0.021)	0.061*** (0.021)	0.071*** (0.018)	0.066*** (0.020)
High School Education	1.147** (0.464)	1.075** (0.450)	1.274*** (0.473)	1.149*** (0.429)
Unemployment Rate	-13.575*** (3.188)	-10.539*** (2.932)	-13.103*** (3.301)	-10.065*** (2.839)
Number of Water Groups	0.656*** (0.207)	0.697*** (0.228)		0.734*** (0.195)
Home Ownership	-5.564*** (1.222)	-5.032*** (1.132)	-6.828*** (1.165)	-4.980*** (1.122)
Percent Republican Vote	-1.044** (0.509)	-1.155** (0.476)	-1.602*** (0.493)	-1.290*** (0.501)
Percent White Population	-0.926 (0.662)	-0.760 (0.626)	-0.974 (0.727)	-0.726 (0.712)
Government Expenditures		4.03E-06* (2.13E-06)		
R^2	0.43	0.45	0.26	0.50
Stock-Yogo F – stat.	52.71	56.21	60.05	48.43
Prob > F	0.000	0.000	0.000	0.000
Observations	9,420	10,990	10,990	10,990

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A2.

Sensitivity to Included Demographic Variables: Effect of Number of Impaired Water Bodies on Fundraising Expenditures (2SLS Results)

Explanatory Variables				
ln (Number of Impaired Water Bodies)	1.130*** (0.392)	0.770** (0.360)	1.018*** (0.378)	1.065*** (0.358)
Violations	-0.247 (0.229)	-0.257 (0.232)	-0.241 (0.223)	-0.320 (0.232)
Fraction Agricultural Land	-0.278 (0.256)	-0.888*** (0.256)	-0.491* (0.258)	
Fraction Urban Land	6.058*** (1.783)	7.768*** (2.187)	6.105*** (2.243)	
Population Density (persons/mi ²)		-0.002* (0.001)	-0.002 (0.001)	0.001 (0.001)
Per Capita Income (1000s \$)		0.059*** (0.020)	0.062*** (0.021)	0.065*** (0.021)
High School Education	0.764* (0.454)		1.054** (0.454)	1.443*** (0.438)
Unemployment Rate		-6.223*** (2.373)	-10.104*** (2.946)	-10.481*** (3.051)
Number of Water Groups	0.714*** (0.235)	0.727*** (0.235)	0.688*** (0.228)	0.711*** (0.230)
Home Ownership	-4.531*** (1.103)		-5.120*** (1.140)	-4.965*** (1.162)
Percent Republican Vote	-0.903* (0.489)	-1.409*** (0.483)		-1.088** (0.481)
Percent White Population	0.257 (0.559)		-1.041* (0.621)	-0.865 (0.618)
R^2	0.42	0.45	0.45	0.44
Stock-Yogo F – statistic	62.63	57.99	58.50	61.34
Prob > F	0.000	0.000	0.000	0.000
Observations	10,990	10,990	10,990	10,990

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A3.
Sensitivity to Model Specification: Effect of Dissolved Oxygen Deficiency on
Fundraising Expenditures (2SLS Results)

<i>Explanatory Variables</i>	Lagged Effects	Public Expenditures	Fundraising per group	Transboundary FEs
In (Dissolved Oxygen Deficiency)	22.872*** (8.247)	20.229*** (7.523)	24.651*** (8.089)	18.020*** (6.866)
Violations	-1.303*** (0.577)	-1.233** (0.502)	-1.304** (0.530)	-1.012** (0.412)
Fraction Agricultural Land	0.196 (0.568)	0.120 (0.500)	0.354 (0.607)	0.236 (0.493)
Fraction Urban Land	12.429*** (2.668)	11.569*** (2.657)	16.582*** (2.753)	9.722*** (2.694)
Population Density (persons/mi ²)	-0.003* (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Per Capita Income (1000s \$)	0.7E-04* (4.22E-05)	4.36E-05 (0.001)	-2.61E-04 (0.002)	-0.001 (0.001)
High School Education	0.557*** (0.198)	0.517 (0.421)	0.593 (0.483)	0.658 (0.401)
Unemployment Rate	-7.202 (5.433)	-6.230 (5.044)	-9.180 (5.844)	-11.191** (5.046)
Number of Water Groups	0.766*** (0.204)	0.738*** (0.220)		0.765*** (0.188)
Home Ownership	-0.536 (1.772)	-0.664 (1.639)	-1.704 (1.893)	-0.747 (1.710)
Percent Republican Vote	-0.433 (0.935)	-1.237 (0.839)	-2.082** (0.914)	-1.674** (0.796)
Percent White Population	2.369 (1.542)	2.578 (1.644)	3.081* (1.851)	1.502 (1.710)
Government Expenditures		1.53E-05** (6.22E-06)		
R^2	0.45	0.47	0.30	0.15
Stock-Yogo F – statistic	12.62	13.25	12.62	10.03
Prob > F	0.000	0.000	0.000	0.000
Observations	14,781	14,974	14,974	14,974

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A4.
 Sensitivity to Included Demographic Variables: Effect of Dissolved Oxygen Deficiency
 on Fundraising Expenditures (2SLS Results)

Explanatory Variables				
In (Dissolved Oxygen Deficiency)	20.677*** (7.314)	19.461*** (7.343)	20.540*** (7.410)	20.694*** (7.461)
Violations	-1.226** (0.497)	-1.168** (0.479)	-1.162** (0.494)	-1.210** (0.502)
Fraction Agricultural Land	0.432 (0.523)	0.050 (0.505)	0.252 (0.517)	
Fraction Urban Land	9.644*** (2.243)	11.977*** (2.610)	11.592*** (2.671)	
Population Density (persons/mi ²)		-0.002 (0.001)	-0.002 (0.001)	0.002** (0.001)
Per Capita Income (1000s \$)		0.002*** (3.62E-04)	-3.66E-05 (0.001)	-0.002 (0.002)
High School Education	0.547*** (0.192)		0.519 (0.427)	1.244*** (0.454)
Unemployment Rate		-10.201** (4.068)	-5.905 (4.925)	-9.936** (5.112)
Number of Water Groups	0.738*** (0.222)	0.738*** (0.223)	0.744*** (0.220)	0.790*** (0.227)
Home Ownership	-0.388 (1.575)		-0.665 (1.636)	0.142 (1.688)
Percent Republican Vote	-1.060 (0.821)	-0.904 (0.884)		-1.245 (0.857)
Percent White Population	3.453** (1.511)		2.367 (1.646)	2.099*** (1.610)
R^2	0.45	0.47	0.30	0.15
Stock-Yogo F – statistic	14.40	13.01	14.17	14.19
Prob > F	0.000	0.000	0.000	0.000
Observations	14,974	14,974	14,974	14,974

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A5.
Sensitivity to Model Specification: Effect of Number of Impaired Water Bodies on Contributions (2SLS Results)

Explanatory Variables	Lagged Effects	Public Expenditures	Fundraising per group	Transboundary FEs
In (Number of Impaired Water Bodies)	1.680*** (0.568)	1.910*** (0.539)	2.487*** (0.541)	1.460*** (0.544)
Violations	0.015 (0.380)	-0.133 (0.323)	-0.234 (0.351)	0.124 (0.291)
Fraction Agricultural Land	-1.009** (0.397)	-1.012*** (0.387)	-0.816* (0.457)	-1.132*** (0.379)
Fraction Urban Land	11.882*** (2.983)	9.757*** (2.917)	10.848*** (3.981)	9.632*** (3.110)
Population Density (persons/mi ²)	-0.005*** (0.001)	-0.004*** (0.001)	-0.002 (0.002)	-0.004** (0.002)
Per Capita Income (1000s \$)	0.089*** (0.026)	0.085*** (0.026)	0.099*** (0.023)	0.092*** (0.026)
High School Education	1.810*** (0.548)	1.705*** (0.556)	1.963*** (0.586)	1.809*** (0.520)
Unemployment Rate	-18.868*** (4.215)	-15.931*** (4.079)	-19.315*** (4.596)	-14.751*** (3.847)
Number of Water Groups	0.759*** (0.261)	0.856*** (0.308)		0.904*** (0.265)
Home Ownership	-6.628*** (1.569)	-6.397*** (1.509)	-8.716*** (1.562)	-6.114*** (1.479)
Percent Republican Vote	-0.672 (0.705)	-0.370 (0.687)	-0.999 (0.716)	-0.828 (0.714)
Percent White Population	-0.207 (0.891)	-0.302 (0.878)	-0.559 (1.016)	-0.325 (0.953)
Government Expenditures		7.22E-06** (3.39E-06)		
R^2	0.41	0.41	0.23	0.49
Stock-Yogo F – statistic	52.71	56.21	60.05	48.43
Prob > F	0.000	0.000	0.000	0.000
Observations	9,420	10,990	10,990	10,990

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A6.
 Sensitivity to Included Demographic Variables: Effect of Number of Impaired Water
 Bodies on Contributions (2SLS Results)

Explanatory Variables				
In (Number of Impaired Water Bodies)	2.258*** (0.564)	1.697*** (0.516)	1.953*** (0.540)	2.138*** (0.520)
Violations	-0.152 (0.339)	-0.127 (0.326)	-0.126 (0.323)	-0.235 (0.334)
Fraction Agricultural Land	-0.510 (0.393)	-1.454*** (0.381)	-0.926** (0.389)	
Fraction Urban Land	6.722*** (2.320)	11.844*** (2.909)	9.625*** (2.877)	
Population Density (persons/mi ²)		-0.005*** (0.001)	-0.004*** (0.001)	-3.24E-04 (0.001)
Per Capita Income (1000s \$)		0.079*** (0.025)	0.085*** (0.026)	0.090*** (0.027)
High School Education	1.408** (0.563)		1.687*** (0.556)	2.245*** (0.558)
Unemployment Rate		-11.476*** (3.350)	-15.947*** (4.093)	-15.867*** (4.245)
Number of Water Groups	0.869*** (0.316)	0.895*** (0.318)	0.857*** (0.308)	0.874*** (0.311)
Home Ownership	-5.591*** (1.498)		-6.429*** (1.520)	-6.430*** (1.552)
Percent Republican Vote	0.118 (0.711)	-0.559 (0.689)		-0.262 (0.697)
Percent White Population	1.353* (0.794)		-0.367 (0.866)	-0.439 (0.871)
R^2	0.37	0.42	0.41	0.39
Stock-Yogo F – statistic	62.63	57.99	58.50	61.34
Prob > F	0.000	0.000	0.000	0.000
Observations	10,990	10,990	10,990	10,990

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A7.
Sensitivity to Model Specification: Effect of Dissolved Oxygen Deficiency on
Contributions (2SLS Results)

Explanatory Variables	Lagged Effects	Public Expenditures	Fundraising per Group	Transboundary FEs
In (Dissolved Oxygen Deficiency)	34.547*** (11.118)	34.013*** (11.490)	40.106*** (12.488)	31.010*** (10.672)
Violations	-1.815** (0.823)	-1.573** (0.788)	-1.671** (0.835)	-1.175* (0.659)
Fraction Agricultural Land	0.246 (0.821)	0.071 (0.797)	0.411 (0.942)	0.236 (0.794)
Fraction Urban Land	19.503*** (3.628)	18.172*** (3.825)	24.927*** (3.877)	15.389*** (3.914)
Population Density (persons/mi ²)	-0.005*** (0.002)	-0.005** (0.002)	-0.003 (0.002)	-0.003* (0.002)
Per Capita Income (1000s \$)	9.65E-05* (5.71E-05)	-0.002 (0.002)	0.002 (0.002)	-0.003 (0.002)
High School Education	0.677** (0.303)	1.060 (0.646)	1.163 (0.732)	1.340** (0.607)
Unemployment Rate	-6.924 (7.797)	-5.108 (8.008)	-9.188 (9.117)	-12.644 (7.727)
Number of Water Groups	0.877*** (0.261)	0.930*** (0.294)		0.949*** (0.255)
Home Ownership	0.695 (2.503)	0.774 (2.528)	-0.591 (2.880)	0.965 (2.598)
Percent Republican Vote	-0.161 (1.279)	-0.283 (1.285)	-1.473 (1.394)	-1.477 (1.221)
Percent White Population	5.387** (2.192)	6.272** (2.560)	6.964** (2.872)	4.767** (2.235)
Government Expenditures		2.36E-05** (1.01E-05)		
R^2	0.45	0.47	0.30	0.15
Stock-Yogo F – statistic	13.94	13.25	12.62	10.03
Prob > F	0.000	0.000	0.000	0.000
Observations	15,423	14,973	14,974	14,974

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A8.
 Sensitivity to Included Demographic Variables: Effect of Dissolved Oxygen Deficiency
 on Contributions (2SLS Results)

Explanatory Variables				
In (Dissolved Oxygen Deficiency)	34.411*** (11.103)	32.766*** (11.279)	33.491*** (11.069)	35.146*** (11.440)
Violations	-1.552** (0.774)	-1.454* (0.751)	-1.477* (0.763)	-1.555* (0.799)
Fraction Agricultural Land	0.646 (0.824)	0.040 (0.798)	0.259 (0.803)	
Fraction Urban Land	12.607*** (3.174)	19.042*** (3.794)	18.249*** (3.812)	
Population Density (persons/mi ²)		-0.006** (0.002)	-0.005** (0.002)	0.002 (0.002)
Per Capita Income (1000s \$)		0.002*** (4.66E-04)	-0.002 (0.002)	-0.005** (0.002)
High School Education	0.920** (0.373)		1.059* (0.644)	2.202*** (0.720)
Unemployment Rate		-16.078*** (6.263)	-5.883 (7.645)	-10.637 (8.108)
Number of Water Groups	0.918*** (0.296)	0.923*** (0.298)	0.932** (0.294)	1.011*** (0.306)
Home Ownership	0.903 (2.425)		0.656 (2.477)	2.033 (2.623)
Percent Republican Vote	0.004 (1.262)	0.689 (1.381)		-0.282 (1.320)
Percent White Population	7.519*** (2.316)		6.110** (2.524)	5.613** (2.529)
R^2	0.45	0.47	0.30	0.15
Stock-Yogo F – statistic	14.40	13.01	14.17	14.19
Prob > F	0.000	0.000	0.000	0.000
Observations	14,974	14,974	14,974	14,974

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

As tables A1-A8 indicate, our results are robust to several changes in model specification. Lagged effects and effects on expenditures and contributions per group are generally larger than in our preferred specification, except for the effect of lagged impairment listings on contributions. Including government expenditures in the model has little effect on the estimated coefficients. Estimated coefficients in the models that include transboundary fixed effects are somewhat smaller than in our preferred specification. Finally, coefficients in specifications with different combinations of demographic controls are mostly somewhat larger than in our main specification.

Table A9.

Covariate Balance – Effect of Impairment Listings on Fundraising Expenditures

Variable	Standardized Difference in Means		
	Unmatched	Matched	% Reduction
Fundraising Expenditures	0.043	0.019	56.1
Per Capita Income	-0.205	0.010	95.2
Population Density	0.101	-0.009	98.5
High School Graduation Rate	-0.135	0.120	-33.4
Percent White Population	-0.109	0.097	11.3
Unemployment Rate	0.019	-0.032	-69.5
Home Ownership Rate	0.082	-0.006	92.9
CWA Violations	-0.098	0.050	48.8
Precipitation	0.136	0.092	32.1
Percent Agricultural Land	0.197	0.012	94.1
Percent Urban Land	0.144	-0.069	52.1
Percent Republican Senate Vote	-0.134	-0.080	40.7
Number of Water Groups	-0.005	0.053	-914.1
Federal Water Quality Expenditures	0.045	-0.038	15.1

Nearest neighbor propensity score matching, no caliper.

Treated watersheds with matches: 396.

State dummy variables are not included in the table. All of their post-matching standardized differences are below 0.25.

Table A10.

Covariate Balance – Effect of Dissolved Oxygen Deficiency on Fundraising Expenditures
Standardized Difference in Means

Variable	Unmatched	Matched	% Reduction
Fundraising Expenditures	0.081	0.029	63.5
Per Capita Income	-0.040	0.012	69.8
Population Density	0.286	-0.001	99.6
High School Graduation Rate	-0.013	0.051	-288.6
Percent White Population	0.242	0.056	77.0
Unemployment Rate	-0.159	-0.045	71.6
Home Ownership Rate	0.349	0.148	57.5
CWA Violations	0.116	0.094	19.2
Precipitation	0.322	-0.035	89.0
Percent Agricultural Land	0.047	0.054	-14.8
Percent Urban Land	0.349	0.125	64.1
Percent Republican Senate Vote	-0.280	-0.055	80.5
Number of Water Groups	0.265	-0.075	71.6
Federal Water Quality Expenditures	-0.451	-0.102	77.3

Nearest neighbor propensity score matching, caliper = $0.03 \times \text{SD}$ of Prop. Score.

Treated watersheds with matches: 303.

State dummy variables are not included in the table. All of their post-matching standardized differences are below 0.25.

Table A11.
Covariate Balance – Effect of Impairment Listings on Contributions

Variable	Standardized Difference in Means		
	Unmatched	Matched	% Reduction
Contributions	0.030	0.019	35.0
Per Capita Income	-0.213	0.036	83.1
Population Density	0.097	0.094	3.6
High School Graduation Rate	0.167	-0.046	72.5
Percent White Population	-0.133	-0.028	78.6
Unemployment Rate	0.052	0.018	66.2
Home Ownership Rate	0.050	-0.146	-193.3
CWA Violations	-0.095	0.014	85.1
Precipitation	0.141	0.011	92.4
Percent Agricultural Land	0.139	0.003	97.8
Percent Urban Land	0.136	0.076	44.2
Percent Republican Senate Vote	-0.149	-0.062	58.6
Number of Water Groups	-0.002	-0.111	6460.7
Federal Water Quality Expenditures	0.013	0.011	9.3

Nearest neighbor Mahalanobis matching, no caliper.

Treated watersheds with matches: 398.

State dummy variables are not included in the table. All of their post-matching standardized differences are below 0.25.

Table A12.

Covariate Balance – Effect of Dissolved Oxygen Deficiency on Contributions

Variable	Standardized Difference in Means		
	Unmatched	Matched	% Reduction
Contributions	0.071	0.002	96.0
Per Capita Income	-0.040	-0.020	48.8
Population Density	0.286	-0.002	99.3
High School Graduation Rate	-0.013	0.064	-384.9
Percent White Population	0.242	-0.017	93.0
Unemployment Rate	-0.159	0.080	49.4
Home Ownership Rate	0.349	0.122	65.1
CWA Violations	0.116	0.013	88.8
Precipitation	0.322	-0.046	85.0
Percent Agricultural Land	0.047	0.036	23.2
Percent Urban Land	0.349	0.076	78.3
Percent Republican Senate Vote	-0.280	-0.031	88.9
Number of Water Groups	0.265	-0.178	32.8
Federal Water Quality Expenditures	-0.451	-0.147	67.5

Nearest neighbor propensity score matching, caliper = $0.02 \times \text{SD}$ of Prop. Score.

Treated watersheds with matches: 289.

State dummy variables are not included in the table. All of their post-matching standardized differences are below 0.25.

Table A13.
Sensitivity to Identification Strategy: Results of Estimation Using Post-Matching
Balanced Samples

Explanatory Variables	Dep. Var: ln(Fundraising Expenditures)		Dep. Var: ln(Contributions)	
ln (Number of Impaired Water Bodies)	0.585*** (0.142)		0.992*** (0.169)	
ln (Dissolved Oxygen Deficiency)		0.465* (0.278)		0.092 (0.401)
Violations	0.116 (0.515)	-0.871** (0.348)	-0.101 (0.531)	-0.065 (0.519)
Fraction Agricultural Land	0.514 (0.802)	-0.573 (0.364)	0.889 (1.059)	-0.435 (0.630)
Fraction Urban Land	14.165*** (3.842)	5.100 (3.685)	17.522*** (6.299)	8.069** (3.412)
Population Density (persons/mi ²)	-0.003** (0.002)	-0.001 (0.002)	-0.007** (0.003)	2.73E-04 (0.002)
Per Capita Income (1000s \$)	-0.016 (0.063)	0.122*** (0.032)	0.019 (0.081)	0.120*** (0.041)
High School Education	-0.825 (0.880)	1.268* (0.692)	-0.201 (1.192)	1.752** (0.772)
Unemployment Rate	-19.092* (10.064)	-0.192 (4.288)	-36.028** (14.061)	-7.721 (6.186)
Number of Water Groups	0.558*** (0.182)	0.519*** (0.170)	0.530** (0.218)	1.029*** (0.329)
Home Ownership	-8.094** (2.350)	-4.629*** (1.367)	-13.798*** (2.832)	-3.661 (2.458)
Percent Republican Vote	-1.545 (1.156)	-2.131*** (0.796)	-2.392 (1.850)	-0.052 (1.163)
Percent White Population	0.355 (1.905)	-0.875 (0.942)	-0.968 (2.507)	-1.904 (1.518)
R ²	0.49	0.45	0.44	0.43
Observations	4,242	6,784	4,046	6,896

Includes year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.

Table A14.
Threshold Effects of Water Quality Using Post-Matching Balanced Samples

Explanatory Variables	Dep. Var: ln(Fundraising Expenditures)	Dep. Var: ln(Contributions)		
ln (Number of Impaired Water Bodies)×50 th Percentile	0.026 (0.069)	0.061 (0.108)		
ln (Number of Impaired Water Bodies)×70 th Percentile	0.091 (0.072)	0.174* (0.094)		
ln (Number of Impaired Water Bodies)×90 th Percentile	0.337*** (0.110)	0.539*** (0.130)		
ln (Dissolved Oxygen Deficiency)×50 th Percentile	0.038 (0.044)	0.055 (0.079)		
ln (Dissolved Oxygen Deficiency)×70 th Percentile	0.023 (0.038)	-0.083 (0.054)		
ln (Dissolved Oxygen Deficiency)×90 th Percentile	0.075* (0.045)	-0.027 (0.069)		
R^2	0.48	0.45	0.43	0.44
Observations	4,242	6,784	4,046	6,896

Includes all other controls as well as year and state fixed effects. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Standard errors clustered at the HUC8 watershed level in parentheses.