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Supplementary Information for

Private Provision of Public Goods by Environmental Groups

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Construction of Water Quality Data Sample

We follow several steps to construct our sample from the data available in the Water Quality Portal (1). To minimize the impact of outliers we replace values greater than the 99th percentile of the measurement distribution with the 99th percentile value. We drop measurements with missing observation date, and keep only actual (as opposed to estimated or calculated) measurements. We choose only total (as opposed to dissolved, particle, or suspended) measurements from surface waters. We drop measurements from non-routine hydrologic events, such as floods, storms, or hurricanes, and keep only routine (as opposed to quality control) samples. We convert all measures to a standard unit (mg/L) and drop measurements with units that cannot be converted.

Details on Matching Procedures

For the matching procedure preceding fixed effects estimation, we tried nearest neighbor Mahalanobis covariate matching and propensity score matching, with and without calipers.[*] Propensity score matching yielded unequivocally better balance on covariates than Mahalanobis covariate matching. Propensity score matching with calipers yielded better balance on some, but not all, covariates than matching without calipers. However, this comes at the cost of a smaller number of matched treated watersheds and therefore a smaller estimation sample. We chose the matching procedure that yielded the largest number of treated watersheds while achieving balance across all covariates: nearest neighbor one-to-one propensity score matching with replacement and without caliper. The propensity score is estimated using a logit model with dependent variable corresponding to a watershed's treatment status and explanatory variables given by the 1995 values of the watershed characteristics described above.

We assess the effect of the matching procedure on the balance of the sample by calculating, for each covariate, the standardized difference in means (for 1995) between treated and control watersheds. The standardized difference in means is calculated as $\Delta_{ct} = \frac{\bar{X}_t - \bar{X}_c}{\sqrt{(s_c^2 + s_t^2)/2}}$, where $\bar{X}_t$ and $\bar{X}_c$ are the sample means of the covariate values for the treated and control groups, respectively, and s_t^2, s_c^2 are the corresponding conditional within-group variances. Current practice suggests that a standardized difference above 0.25 can cause bias in regression estimates (3, 4). Figure S1 shows the standardized differences for unmatched and matched watersheds, and Table S1 gives the standardized differences and the corresponding percentage reduction (in absolute value) in bias achieved by matching for the DOD model. The figure and the table indicate that before matching the sample was unbalanced across several covariates, with

[*] Mahalanobis covariate matching measures the distance between matched subjects using the complete variance-covariance matrix of the covariates. The caliper is the maximum tolerated difference between matched subjects. The propensity score is the likelihood of treatment. See Imbens and Rubin (2) for more details on concepts and procedures for matching.

standardized differences exceeding 0.25. Before matching, watersheds with water-focused groups tended to be more urban, have higher precipitation, per capita income and population density. These watersheds also received less spending under federal water quality programs, and had lower high school graduation and unemployment rates. After matching, all standardized differences are below 0.25, and the matching procedure generally achieved substantial reductions compared to before matching. The only exceptions are home ownership and CWA violations, for which standardized differences increased after matching. However, the higher post-matching differences remain below 0.25. An alternative way to assess the effectiveness of the matching procedure in achieving a balanced sample is shown in Figure S2, which presents box plots for water quality and for covariates with the largest pre-matching standardized differences. These plots suggest that the distributions for these covariates are much more similar post-matching. Note that initially the sample is balanced in terms of water quality, but the balance improves further after matching. This indicates that the matching procedure successfully breaks any pre-estimation link between water quality and presence of water-focused groups, thus mitigating joint causation concerns. We followed the same pre-estimation matching procedure for proportion swimmable and proportion fishable as for DOD. Standardized differences are all below 0.25.

Matching constructs a control group based on observable watershed characteristics. This means that omitted variables can still lead to bias. Combining matching with fixed-effects methods allows us to control for time-invariant omitted variables (4). Furthermore, if water groups locate where water quality is worse, any bias remaining from unobserved characteristics will be towards a negative impact of group activity on water quality, and hence we would be underestimating the positive impact of water groups on water quality.

In the matching procedure used as a robustness check (corresponding to results in table S10 below), we define the outcome of interest (Y) as the percentage change in DOD between 1996 and 2008, define the same treatment (presence of at least one water group during the study period) and use matching to non-parametrically estimate the local average treatment effect: $ATE = \frac{1}{N}\sum_{i=1}^{N}\left(Y_i(1) - Y_i(0)\right)$, where $Y_i(1)$ and $Y_i(0)$ correspond to the outcome in treated and control watersheds, respectively. We use Mahalanobis matching on covariates with four nearest neighbors and bias adjustment for inexact matching with continuous covariates (5).

Robustness to Omitted Federal Conservation Programs

We estimate the impact of watershed groups on water quality conditional on expenditures under three federal programs aimed at improving water quality: the Conservation Reserve Program (CRP), the EPA 319 Grants Program, and the Environmental Quality Incentives Program (EQUIP). While these are three key federal programs that affect water quality, there are other programs we cannot condition on because data are not available. To assess the extent to which this omission may introduce bias, we conduct a test suggested by Oster (6). The test is based on assessing the effect of omitting observable covariates on coefficient stability and on changes in R^2. The procedure yields a test statistic (δ) for how important the omitted unobservables would have to be relative to the observables in

explaining the outcome (the degree of selection on unobservables relative to observables) to eliminate the observed effect. We conduct the test by estimating our main models for DOD without conditioning for payments under CRP, EPA 319, and EQUIP, and calculating the test statistic δ. We obtain the following results.

- For the model with Number of Water Groups: $\delta = 2.869$
- For the model with Donations: $\delta = 10.764$
- For the model with Expenditures: $\delta = 8.270$.

These results suggest that the omitted federal programs would have to be 2.87 times as important as the included programs to introduce sufficient bias to reduce the measured effect of number of water groups on DOD to zero. Similarly, omitted programs would have to be 10.76 times and 8.27 times as important as included programs to reduce the effects of water group donations and expenditures on DOD to zero, respectively. Given the importance of the programs included in the model, we believe this is unlikely.

Comparison of Private and Public Expenditures

The estimated coefficients for watershed group program expenditures and federal water quality expenditures are not directly comparable because watershed group expenditures are measured within state, at the watershed level, whereas federal program expenditures, included only as a conditioning variable, are measured at the state level. To carry out a coarse comparison of the impacts of private and public expenditures, we aggregate group expenditures to the state rather than the HUC8 watershed level and estimate the main models for DOD, proportion swimmable, and proportion fishable. There are important caveats to take into account when interpreting the results of this exercise. As mentioned in the Methods section, the ideal scale for this analysis is the HUC8 watershed, not the state. Additionally, to aggregate expenditures to the state level we have to omit watersheds that cross state boundaries. Finally, to estimate the impact of state-level expenditures we leave out state-level fixed effects. Coefficient estimates for these models indicate that the effect of an additional $1,000 in federal expenditures on DOD is 1.4 times larger than the effect of an additional $1,000 in watershed group expenditures. The relative magnitude of the effects is the same for proportion swimmable and proportion fishable. However, as in the main models (table 2), the estimates for federal expenditures are not statistically significant. Given the above-mentioned caveats, these results should be interpreted with caution.

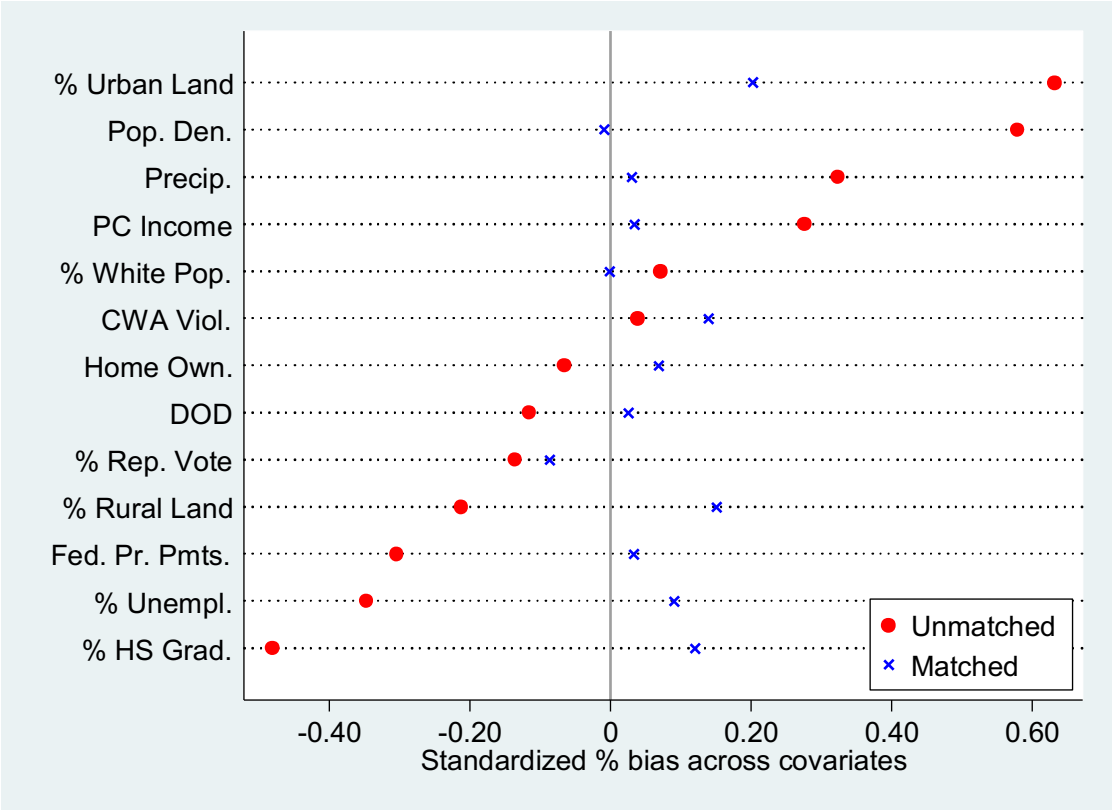

Figure S1. Standardized Differences Before and After Matching

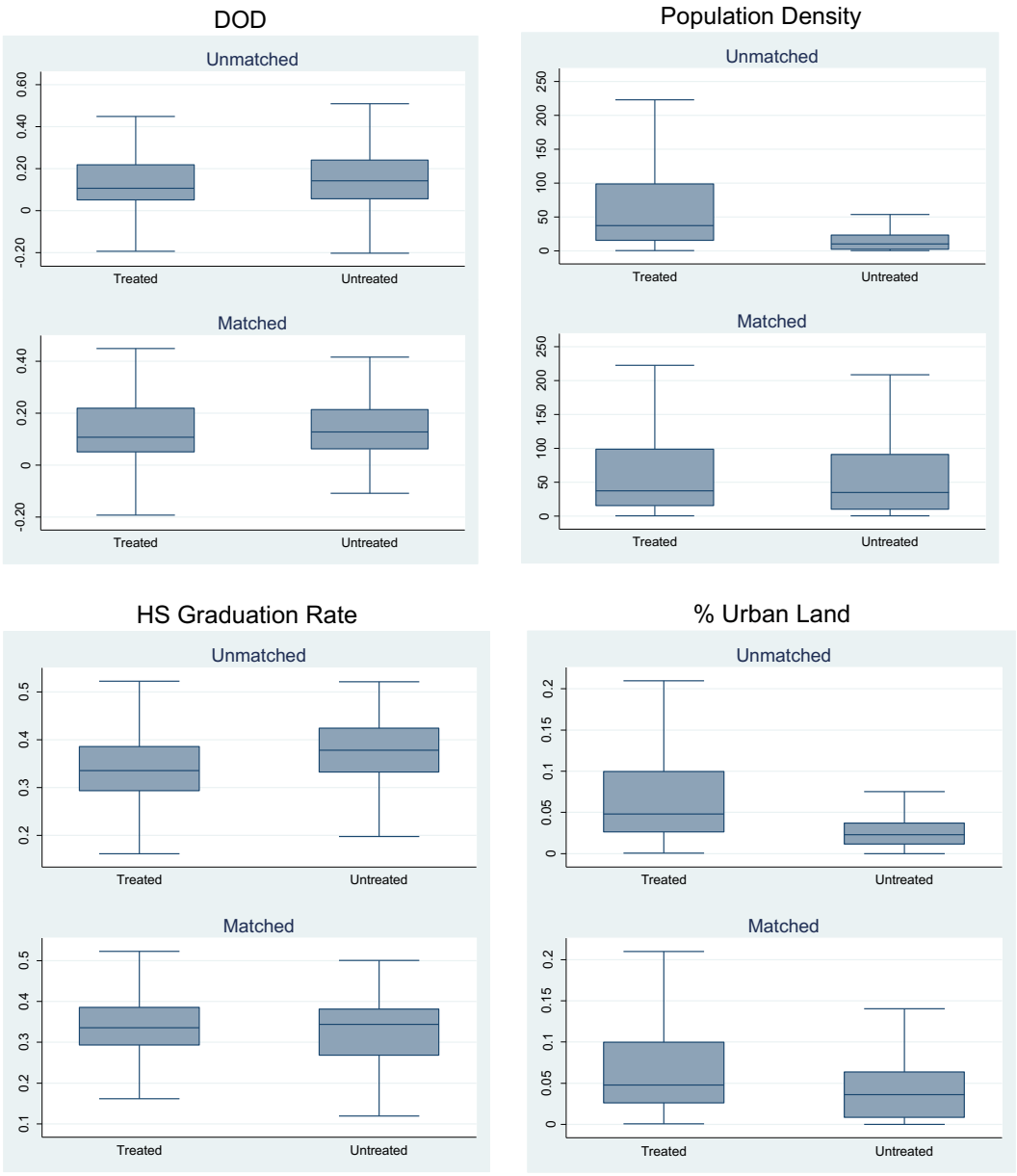

Figure S2. Box Plots for Selected Covariates

Note: The box plot displays the upper adjacent value, the 75th percentile, the median, the 25th percentile, and the lower adjacent value.

Table S1. Sample Means by HUC8 Watershed

Variable	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Dissolved Oxygen Deficiency	15.0	14.8	15.2	14.3	15.0	15.4	15.5	15.8	15.2	14.8	14.6	10.0	10.2
Proportion swimmable	0.641	0.635	0.633	0.632	0.621	0.617	0.620	0.623	0.633	0.640	0.653	0.728	0.734
Proportion fishable	0.872	0.883	0.875	0.878	0.872	0.868	0.869	0.860	0.872	0.882	0.879	0.907	0.909
Number of water groups	0.372	0.412	0.434	0.328	0.517	0.564	0.580	0.605	0.603	0.646	0.670	0.674	0.294
Number of water groups conditional on at least one group	2.395	2.509	2.563	2.373	2.610	2.634	2.661	2.739	2.723	2.778	2.802	2.832	2.298
Total donations to water groups (1,000s $)	746	886	1,040	865	1,211	1,503	1,336	1,340	1,356	1,561	1,522	1,702	1,223
Expenditures by water groups (net of fundraising – 1,000s $)	1,175	1,439	1,047	1,448	1,739	1,755	1,997	2,057	1,977	2,377	2,207	2,434	1,804
Violations	0.061	0.071	0.070	0.076	0.085	0.090	0.095	0.171	0.177	0.180	0.195	0.203	0.170
Federal Water Quality Expenditures (millions $)	42.03	40.42	38.25	33.40	32.83	36.22	39.70	43.10	46.87	51.46	53.45	62.35	63.28
Percent agricultural land	0.292	0.285	0.277	0.270	0.263	0.255	0.246	0.238	0.228	0.220	0.211	0.202	0.183
Percent urban land	0.047	0.047	0.050	0.052	0.054	0.055	0.057	0.059	0.060	0.062	0.064	0.065	0.063
Population density (persons/mi^2)	47.89	48.43	48.96	49.49	50.00	50.44	51.05	51.44	51.77	52.13	52.58	52.90	50.75
Per capita income (1,000s $)	29.86	30.43	31.68	32.15	33.10	33.61	30.81	31.46	32.12	32.52	33.06	34.08	35.43

Table S1 - Continued

Percent of population with high school degree	0.34	0.34	0.33	0.33	0.33	0.33	0.32	0.32	0.31	0.31	0.31	0.31	0.31
Mean precipitation(1,000s mm)	94.19	89.67	95.93	81.18	79.50	81.96	83.14	87.52	90.16	81.65	82.92	79.57	85.12
Percent Republican vote in US Senate race	0.536	0.536	0.529	0.529	0.557	0.557	0.549	0.549	0.535	0.535	0.513	0.513	0.516
Home ownership rate	0.596	0.598	0.600	0.602	0.604	0.601	0.598	0.596	0.593	0.591	0.591	0.589	0.586
Unemployment rate	0.068	0.068	0.067	0.067	0.066	0.067	0.068	0.069	0.070	0.071	0.072	0.073	0.079
Percent white population	0.880	0.880	0.878	0.877	0.873	0.872	0.871	0.870	0.868	0.867	0.866	0.863	0.840

Table S2. Covariate Balance

	Standardized Difference in Means		
Variable	*Unmatched*	*Matched*	*% Reduction*
Dissolved Oxygen Deficiency	-0.115	0.025	78.1
Per Capita Income	0.276	0.034	87.6
Population Density	0.579	-0.009	98.5
High School Graduation Rate	-0.481	0.120	75.0
Ethnicity (%White Population)	0.071	-0.001	98.2
Unemployment Rate	-0.347	0.091	73.8
Home Ownership Rate	-0.066	0.068	-3.7
CWA Violations	0.038	0.140	-265.9
Precipitation	0.324	0.030	90.6
Percent Agricultural Land	-0.212	0.151	29.0
Percent Urban Land	0.632	0.203	67.9
Percent Republican Senate Vote	-0.135	-0.087	35.8
Federal Water Quality Expenditures	-0.304	0.033	89.1

Nearest neighbor propensity score matching, no caliper.
Treated watersheds with matches: 352.
State dummy variables are not included in the table. All of their post-matching standardized differences are below 0.25.

Table S3. Sensitivity: State-by-Year Fixed Effects

Explanatory Variables	Dependent Variable: DOD		
Number of Water Groups$_{t-1}$	-0.263***		
	(0.102)		
Donations $_{t-1}$ (1,000s $)		-4.1×10^{-05}***	
		(9.9×10^{-06})	
Program Expenditures $_{t-1}$ (1,000s $)			-1.8×10^{-05}***
			(3.7×10^{-06})
Violations $_{t-1}$	4.056	4.300	4.236
	(3.474)	(3.487)	(3.476)
Fraction Agricultural Land	-1.399	-1.474	-1.481
	(3.640)	(3.616)	(3.615)
Fraction Urban Land	6.444	4.421	4.576
	(8.756)	(8.792)	(8.851)
Population Density (persons/mi^2)	0.005	0.005	0.005
	(0.005)	(0.005)	(0.005)
Per Capita Income (1,000s $)	0.002**	0.001**	0.001**
	(6.5×10^{-04})	(6.5×10^{-04})	(6.5×10^{-04})
High School Education	14.425	14.917	15.034
	(9.316)	(9.267)	(9.273)
Unemployment Rate	-51.734	-49.392	-49.133
	(38.544)	(38.520)	(38.550)
Precipitation (1,000s mm)	0.087	0.080	0.080
	(0.068)	(0.068)	(0.068)
Precipitation^2 (1,000s mm^2)	-2.6×10^{-04}	-2.3×10^{-04}	-2.4×10^{-04}
	(2.8×10^{-04})	(2.8×10^{-04})	(2.9×10^{-04})
Percent Republican Vote	-4.870	-3.896	-3.849
	(5.721)	(5.679)	(5.680)
Home Ownership Rate	-21.349***	-21.048***	-20.990***
	(7.216)	(7.231)	(7.236)
Percent White Population	-15.978***	-15.975***	-16.089***
	(5.952)	(5.988)	(5.982)
R^2	0.31	0.31	0.31
Observations	7,204	7,204	7,204

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

HUC8-clustered std. errors in parentheses.

Table S4. Sensitivity: Transboundary State Fixed Effects

Explanatory Variables	Dependent Variable: DOD		
Number of Water Groups$_{t-1}$	-0.185		
	(0.119)		
Donations $_{t-1}$ (1,000s $)		$-5.4\times10^{-05***}$	
		(1.0×10^{-05})	
Program Expenditures $_{t-1}$ (1,000s $)			$-2.4\times10^{-05***}$
			(3.6×10^{-06})
Violations $_{t-1}$	1.964	2.238	2.175
	(2.357)	(2.382)	(2.368)
Federal Water Quality Expenditures (1,000s $)	5.1×10^{-05}	5.1×10^{-05}	5.1×10^{-05}
	(4.7×10^{-05})	(4.7×10^{-05})	(4.7×10^{-05})
Fraction Agricultural Land	-2.863	-2.733	-2.719
	(3.789)	(3.775)	(3.774)
Fraction Urban Land	6.733	5.446	5.645
	(7.366)	(7.250)	(7.304)
Population Density (persons/mi^2)	0.006	0.007	0.007
	(0.005)	(0.005)	(0.005)
Per Capita Income (1,000s $)	0.002^{***}	0.002^{***}	0.002^{***}
	(0.001)	(0.001)	(0.001)
High School Education	20.129^{**}	20.082^{**}	20.339^{**}
	(9.085)	(8.942)	(8.952)
Unemployment Rate	-22.950	-20.366	-20.034
	(36.954)	(36.704)	(36.738)
Precipitation (1,000s mm)	0.036	0.031	0.031
	(0.051)	(0.050)	(0.050)
Precipitation^2 (1,000s mm^2)	-1.2×10^{-04}	-1.3×10^{-04}	-1.3×10^{-04}
	(2.1×10^{-04})	(2.0×10^{-04})	(2.0×10^{-04})
Percent Republican Vote	-1.521	-1.123	-1.079
	(3.372)	(3.347)	(3.346)
Home Ownership Rate	-25.481^{***}	-25.735^{***}	-25.673^{***}
	(7.412)	(7.387)	(7.392)
Percent White Population	-6.824	-6.287	-6.404
	(6.283)	(6.288)	(6.280)
R^2	0.33	0.33	0.33
Observations	7,204	7,204	7,204

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

HUC8-clustered std. errors in parentheses.

Table S5. Sensitivity: Exclude Conditioning Variables

Explanatory Variables	Dependent Variable: DOD		
Number of Water Groups$_{t-1}$	-0.194		
	(0.118)		
Donations $_{t-1}$ (1,000s $)		$-2.0\times10^{-05***}$	
		(5.4×10^{-06})	
Program Expenditures $_{t-1}$ (1,000s $)			$-8.6\times10^{-06***}$
			(1.6×10^{-06})
R^2	0.0017	0.0006	0.0006
Observations	7,204	7,204	7,204

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

HUC8-clustered std. errors in parentheses.

Table S6. Sensitivity: Monitors with at Least 25 Measurements Only

Explanatory Variables	Dependent Variable: DOD		
Number of Water Groups$_{t-1}$	-0.258***		
	(0.096)		
Donations$_{t-1}$ (1,000s $)		-4.1×10^{-05}**	
		(8.4×10^{-06})	
Program Expenditures$_{t-1}$ (1,000s $)			-1.7×10^{-05}***
			(3.1×10^{-06})
Violations$_{t-1}$	5.559*	5.770*	5.685*
	(3.216)	(3.226)	(3.216)
Federal Water Quality Expenditures (1,000s $)	-8.1×10^{-05}**	-8.1×10^{-05}**	-8.1×10^{-05}**
	(4.0×10^{-05})	(4.0×10^{-05})	(4.0×10^{-05})
Fraction Agricultural Land	-0.047	-0.098	-0.107
	(3.717)	(3.691)	(3.689)
Fraction Urban Land	9.384	7.446	7.582
	(8.045)	(8.039)	(8.083)
Population Density (persons/mi^2)	0.002	0.002	0.002
	(0.004)	(0.004)	(0.004)
Per Capita Income (1,000s $)	-1.8×10^{-04}	-2.5×10^{-04}	-2.6×10^{-04}
	(6.5×10^{-04})	(6.4×10^{-04})	(6.4×10^{-04})
High School Education	17.757*	18.190*	18.350*
	(9.732)	(9.703)	(9.710)
Unemployment Rate	-68.362*	-66.078*	-65.872*
	(39.012)	(38.950)	(38.981)
Precipitation (1,000s mm)	0.075	0.070	0.070
	(0.057)	(0.057)	(0.057)
Precipitation^2 (1,000s mm^2)	-1.9×10^{-04}	-1.6×10^{-04}	-1.7×10^{-04}
	(2.2×10^{-04})	(2.2×10^{-04})	(2.2×10^{-04})
Percent Republican Vote	-2.061	-1.445	-1.424
	(3.504)	(3.507)	(3.506)
Home Ownership Rate	-23.756***	-23.402***	-23.321***
	(7.631)	(7.630)	(7.633)
Percent White Population	-22.745***	-22.694***	-22.795***
	(6.206)	(6.241)	(6.238)
R^2	0.28	0.28	0.28
Observations	6,839	6,839	6,839

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

HUC8-clustered std. errors in parentheses.

Table S7. Sensitivity: National Water Quality Assessment Network Monitors Only

Explanatory Variables	Dependent Variable: DOD		
Number of Water Groups$_{t-1}$	-0.277***		
	(0.102)		
Donations $_{t-1}$ (1,000s $)		-2.4×10^{-05}**	
		(1.1×10^{-05})	
Program Expenditures $_{t-1}$ (1,000s $)			-1.0×10^{-05}**
			(4.4×10^{-06})
Violations $_{t-1}$	2.090	2.033	1.923
	(2.777)	(2.759)	(2.721)
Federal Water Quality Expenditures (1,000s $)	2.1×10^{-05}	2.1×10^{-05}	2.1×10^{-05}
	(4.0×10^{-05})	(4.0×10^{-05})	(4.0×10^{-05})
Fraction Agricultural Land	4.435	4.290	4.282
	(5.595)	(5.641)	(5.645)
Fraction Urban Land	8.374	5.200	5.097
	(14.119)	(14.254)	(14.270)
Population Density (persons/mi^2)	0.007	0.007	0.007
	(0.008)	(0.008)	(0.008)
Per Capita Income (1,000s $)	-0.010***	-0.011***	-0.011***
	(0.001)	(0.001)	(0.001)
High School Education	20.169	20.575	20.729
	(13.678)	(13.795)	(13.812)
Unemployment Rate	-47.075	-41.427	-40.905
	(49.681)	(49.760)	(49.780)
Precipitation (1,000s mm)	0.073	0.059	0.058
	(0.057)	(0.057)	(0.057)
Precipitation^2 (1,000s mm^2)	-4.3×10^{-04}**	-3.6×10^{-04}*	-3.6×10^{-04}*
	(2.1×10^{-04})	(2.1×10^{-04})	(2.1×10^{-04})
Percent Republican Vote	-4.049	-3.087	-3.049
	(4.694)	(4.685)	(4.682)
Home Ownership Rate	-13.484**	-12.765**	-12.743**
	(5.992)	(6.251)	(6.275)
Percent White Population	-14.809	-12.398	-12.623
	(10.752)	(11.104)	(11.160)
R^2	0.41	0.41	0.41
Observations	2,238	2,238	2,238

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

HUC8-clustered std. errors in parentheses.

Table S8. Sensitivity: Summer DOD Averages

Explanatory Variables			
Number of Water Groups$_{t-1}$	-0.316**		
	(0.130)		
Donations $_{t-1}$ (1,000s $)		-5.9×10^{-05}***	
		(1.1×10^{-05})	
Program Expenditures $_{t-1}$ (1,000s $)			-2.5×10^{-05}***
			(4.2×10^{-06})
Violations $_{t-1}$	6.371*	6.662*	6.547*
	(3.688)	(3.706)	(3.689)
Federal Water Quality Expenditures (millions $)	-9.7×10^{-05}**	-9.7×10^{-05}**	-9.7×10^{-05}**
	(4.4×10^{-05})	(4.4×10^{-05})	(4.4×10^{-05})
Fraction Agricultural Land	-2.154	-2.163	-2.167
	(4.242)	(4.216)	(4.214)
Fraction Urban Land	6.846	4.312	4.501
	(10.315)	(10.139)	(10.215)
Population Density (persons/mi^2)	0.006	0.008	0.007
	(0.006)	(0.006)	(0.006)
Per Capita Income (1,000s $)	-0.9×10^{-04}	-1.7×10^{-04}	-1.9×10^{-04}
	(8.4×10^{-04})	(8.2×10^{-04})	(8.2×10^{-04})
High School Education	9.227	9.647	9.845
	(10.423)	(10.358)	(10.370)
Unemployment Rate	-75.604	-73.186	-72.861
	(45.003)	(44.906)	(44.960)
Precipitation (1,000s mm)	0.141**	0.132**	0.132**
	(0.060)	(0.060)	(0.061)
Precipitation^2 (1,000s mm^2)	-4.6×10^{-04}*	-4.2×10^{-04}*	-4.2×10^{-04}*
	(2.4×10^{-04})	(2.4×10^{-04})	(2.4×10^{-04})
Percent Republican Vote	-1.262	-0.534	-0.508
	(4.355)	(4.331)	(4.331)
Home Ownership Rate	-21.268**	-21.103**	-21.013**
	(8.597)	(8.591)	(8.595)
Percent White Population	-24.935***	-24.927***	-25.093***
	(7.536)	(7.579)	(7.575)
R^2	0.24	0.24	0.24
Observations	6,609	6,609	6,609

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

HUC8-clustered std. errors in parentheses.

Table S9. Sensitivity: Forty States with Reliable Impaired Water Bodies Lists

Explanatory Variables			
Number of Water Groups$_{t-1}$	-0.344***		
	(0.107)		
Donations$_{t-1}$ (1,000s $)		-5.2×10^{-05}***	
		(1.2×10^{-05})	
Program Expenditures$_{t-1}$ (1,000s $)			-2.2×10^{-05}***
			(4.8×10^{-06})
Violations$_{t-1}$	4.516	4.606	4.477
	(3.916)	(3.937)	(3.921)
Federal Water Quality Expenditures (1,000s $)	-8.8×10^{-05}*	-8.8×10^{-05}*	-8.8×10^{-05}*
	(4.6×10^{-05})	(4.6×10^{-05})	(4.6×10^{-05})
Fraction Agricultural Land	-3.010	-3.042	-3.007
	(4.497)	(4.480)	(4.477)
Fraction Urban Land	8.779	6.222	6.030
	(11.251)	(11.311)	(11.345)
Population Density (persons/mi^2)	0.004	0.005	0.005
	(0.008)	(0.008)	(0.008)
Per Capita Income (1,000s $)	0.259**	0.250*	0.247*
	(0.127)	(0.128)	(0.129)
High School Education	17.657	18.552	18.767
	(13.230)	(13.129)	(13.133)
Unemployment Rate	-5.857	-4.406	-4.321
	(48.690)	(48.569)	(48.594)
Precipitation (1,000s mm)	0.109*	0.099	0.099
	(0.061)	(0.062)	(0.062)
Precipitation^2 (1,000s mm^2)	-3.3×10^{-04}	-2.9×10^{-04}	-2.8×10^{-04}
	(2.4×10^{-04})	(2.4×10^{-04})	(2.4×10^{-04})
Percent Republican Vote	-2.506	-1.741	-1.691
	(5.137)	(5.159)	(5.158)
Home Ownership Rate	-14.002*	-13.167*	-13.087
	(7.944)	(7.955)	(7.956)
Percent White Population	-20.809***	-20.955***	-21.124***
	(7.744)	(7.796)	(7.790)
R^2	0.26	0.26	0.26
Observations	5,272	5,272	5,272

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

HUC8-clustered std. errors in parentheses.

Table S10. Sensitivity: Mahalanobis Covariate Matching and Average Treatment Effect

	Outcome: $\%\Delta DOD_{96-08}$	
	Average Treatment Effect	*t - Statistic*
Main Model (4 nearest neighbors)	-1.758***	-2.62
Sensitivity to Number of Nearest Neighbors		
One nearest neighbor	-1.763**	-2.47
Two nearest neighbors	-1.849**	-2.52
Three nearest neighbors	-1.684**	-2.48
Five nearest neighbors	-1.992***	-2.96
Sensitivity to Omitted Covariates		
Omitted: *Violations*	-1.840***	-2.86
Omitted: *Proportion urban, rural land*	-1.619**	-2.51
Omitted: *Population Density*	-1.711**	-2.56
Omitted: *Per Capita Income*	-2.045***	-3.19
Omitted: *Percent Republican Vote*	-2.155***	-3.14
Omitted: *Home Ownership Rate*	-1.725***	-2.57
Omitted: *Federal Water Quality Expenditures*	-1.456**	-2.28
Falsification Test: Effect on pre-treatment outcome	0.815	1.44

Supplementary References

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