Environmental Federalism in Indian Country: sovereignty, primacy, and environmental protection

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Abstract
Extensive research on “environmental federalism” investigates the effects of shared state-federal implementation on policy outcomes under the landmark American environmental laws of the 1970s. But these laws originally made no mention of American Indian tribal lands, and subsequent research on environmental federalism has given them little attention. Since 1987, tribes have been eligible to assume implementation primacy under federal environmental law, similar to states. We analyze Clean Water Act (CWA) enforcement under American Indian tribal primacy compared with tribal facilities regulated directly by the U.S. government. To date, 62 tribal governments have been approved for implementation primacy under the CWA. The number and diversity of tribes operating regulated facilities provides uncommon leverage on key questions about environmental federalism. Do tribes that secure primacy enforce environmental rules more rigorously? Or does primacy allow tribes to shirk regulations in a race-to-the-bottom? Analysis of CWA enforcement across 474 tribal wastewater facilities finds that, on average, enforcement increases significantly under tribal primacy. Our findings offer insights about environmental federalism, with important implications for environmental justice.
Introduction

This article analyzes U.S. Clean Water Act (CWA) enforcement under American Indian tribal governance, with an aim toward better understanding federalism, American Indian politics, and environmental justice. The landmark national pollution control laws of the 1970s such as the Clean Air Act, Resource Conservation and Recovery Act, Superfund, Safe Drinking Water Act, and CWA were built under a model of regulatory federalism in which responsibility for implementation is shared between federal and state governments. Extensive research on environmental federalism investigates the effects of this shared state-federal implementation on policy outcomes under American environmental law. But the 1970s-era laws that form the core of American environmental regulation originally made no mention of American Indian tribal lands. Tribal land, air, and water quality thus existed in a regulatory vacuum—outside state jurisdiction and largely neglected by the federal government—until the late 1980s. Research on environmental federalism has neglected tribes similarly.

In the late 1980s and 1990s federal environmental laws were formally extended to tribal lands, and since 1987 tribes have been eligible to assume implementation authority under federal environmental law, just as states are. The entry of tribal authorities into the federal environmental regulatory arena provides an opportunity to address fundamental questions about environmental federalism. While there are just fifty states, nearly all of which hold implementation authority under federal environmental law, there are 573 federally recognized American Indian nations, many of which operate facilities subject to environmental regulation. These tribes vary widely in economic, demographic, and environmental conditions. Importantly for present purposes, they also vary politically and administratively, and so provide an
excellent setting for research on the politics of regulatory implementation under federalism (Ronquillo 2011). What does devolution of implementation to tribes mean for environmental regulation? Does tribal implementation of federal environmental law lead to more or less vigorous enforcement?

Environmental regulation on tribal lands is also objectively important. Tribal governments serve and are homes to a historically oppressed and disadvantaged racial minority. Political science research on environmental justice has found evidence of lax environmental enforcement in lower-socioeconomic status areas or areas with high concentrations of nonwhite populations (e.g., Konisky 2009; Konisky & Schario 2010; Opp 2012; Spina 2015; Switzer & Teodoro 2018). Yet as in so many other areas of inquiry, political scientists have largely neglected American Indians and tribal governance (Ferguson 2016). More than any other minority group in American history, American Indians have experienced systematic efforts by the U.S. government to decimate their populations and cultures. Tribal governments have struggled to assert their sovereignty with respect to a federal government that has repeatedly asserted its plenary authority over tribal lands and waters (Wilkins & Stark 2011). A pair of recent studies indicates that tribes have endured “systemic regulatory neglect of environmental implementation” (Teodoro, Haider & Switzer 2016, 55; Conroy-Ben & Richard 2018).

Research on tribal efforts to build capacity and shape federal policy suggests that more politically assertive tribes might experience different outcomes (Cornell & Kalt 2000; Evans 2011). In this vein, we advance a “driver’s seat” theory of tribal primacy, arguing that tribal administrative capacity and authority lead to more rigorous regulatory enforcement, with
important implications for environmental justice and tribal governance generally.

Our empirical subjects are wastewater treatment facilities owned and operated by American Indian tribes and regulated under the CWA. Specifically, we compare CWA enforcement activity for facilities regulated directly by tribes with enforcement for facilities regulated by the federal government. To summarize our main results, we find that a history of litigiousness positively predicts tribal primacy under the CWA, likely reflecting tribes’ organizational capacity and political claims of sovereignty. Moreover, we find that facilities that operate under tribal primacy are inspected far more frequently than those regulated by the federal government. These results indicate that, for American Indian tribes, primacy is not a means of shirking environmental regulation, but rather asserting sovereignty and implementing environmental protections more vigorously.

We begin with a brief review of research on environmental federalism in the United States, tracing the structure and evolution of environmental protection under American Indian tribal governance. Building on existing research about tribal sovereignty and nationalism, we argue that tribes that have primacy authority over environmental regulations—rather than relying upon federal agency implementation—will enforce those regulations more rigorously than those without primacy authority. We connect primacy over environmental regulation to broader tribal assertions of sovereignty through legal and political channels. Empirical analysis of tribal primacy and CWA inspections follows. We present results, discuss directions for future research, and conclude with a discussion of implications for environmental federalism, environmental justice, and tribal sovereignty.
Environmental Federalism & Tribal Governance

Several landmark American environmental laws were designed under a model of regulatory federalism, in which responsibility for providing environmental protection is shared by federal and state governments (Konisky 2007). Beginning with the Clean Air Act (CAA) in 1970, Congress built explicit roles for states in the implementation and enforcement of new environmental laws, including the CWA (1972), Safe Drinking Water Act (SDWA, 1974) and Resource Conservation and Recovery Act (RCRA, 1976). Under each of these laws, the U.S. EPA establishes environmental quality standards. States may then opt to implement and enforce these federal statutes in cooperation with the EPA, known as “primacy.” If a state elects not to assume primacy, the EPA administers and enforces the statutes within that state. Administration consists of monitoring and enforcing compliance (Scheberle 2004).

Primacy debate. State primacy is a subject of considerable interest to public policy researchers, and a lively literature on environmental federalism has developed debating the effects of these laws. States may lack the institutional capacity to effectively design and implement policy, and may be reluctant to enforce environmental laws stringently against facilities associated with powerful constituents (Rabe 1997; Woods & Potoski 2010). Critics of state primacy argue that states will relax regulations in order to attract mobile capital in an environmentally destructive “race to the bottom” (Peterson 1995). For example, Crotty (1987) notes that state primacy in EPA’s Region 4 (Georgia, Kentucky, North Carolina, South Carolina, Alabama, Mississippi and Florida) was positively related to industrial production in those states and negatively related to environmental efforts.

Others argue that state primacy promotes public participation and responsiveness to
localized environmental interests (Butler & Macey, 1996; Revesz, 1992), and may even lead to a regulatory “race to the top” (Konisky 2007). Potoski (2001) shows that, contrary to the race to the bottom hypotheses, states with CAA primacy adopt more stringent air emission standards and conduct more monitoring than required by federal standards. Similarly, Sigman (2002) finds that some states seek authorization for the CWA and RCRA in order to increase regulatory stringency. California perhaps best embodies this bottom up approach: the Golden State imposed stricter vehicle emissions regulations in part to push other states and the federal government to follow (Vogel 1995).

Scholars have expended considerable effort to understand the effects and effectiveness of primacy on environmental outcomes (e.g., Butler & Macey 1996; Donahue 1997; Rabe 1997; Scheberle 2004; Woods and Potoski 2010; among others). However, nearly all of the discussion on primacy authority has focused on states, which offer little variation in primacy: all but four of the fifty states (Massachusetts, New Mexico, Wyoming and Idaho) hold implementation primacy for the CWA, for example. Limited variation restricts inferences from comparative analysis of state primacy and implementation.

**Tribal sovereignty and governance.** The United States has a unique political and legal relationship with Native American tribes, established through the Constitution and confirmed by subsequent treaties, statutes, executive orders, and judicial decisions. Emanating from this unique relationship is the “trust doctrine” establishing the federal government’s fiduciary responsibility to federally recognized tribes and individual Indian beneficiaries. The trust relationship between tribes and the United States was first acknowledged by the U.S. Supreme Court in *Cherokee Nation v. Georgia* (1831), which declared tribal entities as “domestic
dependents” existing in a state of pupilage with relations to the United States like that of a “ward to its guardian”. While interpretation and implementation of the trust doctrine has evolved and varied since Cherokee Nation v. Georgia, the trust relationship endures as the central principle in federal Indian policy.

Subsequent court decisions extended the federal government’s trust obligations to environmental protections on tribal lands (Ranco 2008). In U.S. v. White Mountain Apache Tribe (2003), the court affirmed that Indian lands held in trust by the U.S. must be adequately maintained and protected. Similarly, in United States v. Mitchell (1983), the court held that the federal government was liable for mismanagement of forest resources on tribal lands. Most recently, in United States v. Navajo Nation (2009) the court held that a trustee is required to preserve and maintain trust assets and not allow them to “fall into ruin on his watch.”

As noted earlier, the major environmental laws of the 1960s and 1970s made no mention of American Indian tribal lands. Perhaps not coincidentally, the research literatures on environmental federalism has paid little attention to tribes. In 1984, President Ronald Reagan published a Federal Indian Policy supporting the primary role of tribal governments in matters affecting American Indian reservations. That policy stressed two related themes with respect to environmental regulation: (1) that the federal government will pursue the principle of Indian “self-government” and (2) that it will work directly with tribal governments on a “government-to-government” basis (Ruckelshaus 1984).

Tribal Primacy & Treatment as States

The time between the initial Self Determination Act of 1974 until the Tribal Self Governance
Act of 1994 marked an important shift in federal Indian policy: these laws allowed tribal governments to manage services previously administered by the federal government. Adam, et al. (2007) observe that tribal governments now “have greater control over [services] than at any point in the last century” (226).

Beginning in 1987 Congress amended several environmental laws authorizing the EPA to treat federally recognized Indian tribes in a manner similar to states, formally known as “Treatment as States” (TAS) for implementing and managing key environmental programs. TAS policy recognized tribal governments as the primary authority for setting standards, making environmental policy decisions, and managing programs consistent with federal standards. Today, the CAA, CWA, and SDWA expressly allow tribes to assume primacy if they satisfy several criteria. First, a tribe seeking primacy must be federally recognized by the Secretary of the Interior. Second, the “governmental body criterion” requires that the tribe have the capacity to carry out substantial governmental duties and powers over the reservation. Third, the “jurisdictional criterion” requires that the tribe possess the requisite legal authority over reservation resources (e.g., land, minerals, bodies of water). Lastly, the tribe must be deemed reasonably capable of carrying out the statutory requirements of the law. As with state primacy, EPA retains authority to decide on the adequacy of tribal implementation. The policy also states that the EPA manages programs for reservations “[u]ntil Tribal Governments are willing and able to assume full responsibility” (EPA 1984). Diver (2018) observes that amendments delegating primacy authority to tribes fit within the environmental federalism models underpinning the pollution control laws of the 1970s. Still, more than thirty years on, little is understood about environmental federalism under tribal authority.
Environmental implementation in Indian country. The modest research on the implementation of environmental regulation in Indian Country documents disparities in environmental quality compared to their state counterparts. Teodoro, Haider & Switzer (2018) find disparities in enforcement and compliance between tribal and nontribal facilities regulated under both the CWA and SDWA (see also Conroy-Ben & Richard 2018). Compared with nontribal facilities, regulated facilities on tribal lands violate these laws significantly more frequently but receive significantly less regulatory enforcement.

Teodoro, et al. (2018) reason that federal regulators have little political incentive to allocate scarce resources to environmental enforcement on tribal lands. To the extent that government behavior is influenced by the political demands of the potentially affected populations, American Indians are uniquely vulnerable. American Indians and Alaskan Natives constitute just 1.2 percent of the U.S. population and have no formal representation in Congress. Konisky and Reenock (2013) argue that federal regulators respond with assertive environmental enforcement where populations can mobilize to demand rigorous environmental enforcement (see also Konisky 2009). Where communities are less likely to mobilize or lack resources to demand government action, regulators have little incentive to enforce regulations vigorously.

Political participation is strongly and positively correlated with socioeconomic status (Brady, Verba, & Schlozman 1995), and poverty among American Indians is higher than any other racial group in the United States (McCartney, Bishaw & Fontenot, 2013), as is alcoholism (Chartier & Caetano 2010), and illicit drug use (U.S. Department of Health and Human Services [HHS], 2014). American Indians lag behind other racial and ethnic groups in educational attainment (Kena, Aud, & Johnson 2014). Given their overall poor socioeconomic conditions, limited
political representation, and sparse population, tribal communities are less likely to mobilize effectively in support of environmental enforcement than other citizens.

Beyond general demographic and economic challenges, tribal governments face structural disadvantages in environmental implementation. By the time Tribes were granted TAS status, federal funding for capacity building and water and sewer infrastructure was dramatically lower than it was a decade earlier, when states assumed primacy. In the CWA amendments of 1972 Congress established the first national standards for sewage treatment and, in turn, significantly increased federal funding to help states meet the law’s regulatory standards. The federal match share of sewer infrastructure funding was raised from 55% to 75%, and from 1972 to 1982, federal water and sewer construction grants approached 20 percent of federal infrastructure spending (CRS 2010). By 1984, Congress had appropriated nearly $41 billion under the CWA’s grant program, representing the largest nonmilitary public works programs since the Interstate Highway System (CRS 2010).

But just as primacy authority was being extended to tribal lands, federal support to develop environmental capacity declined markedly with the Reagan Administration’s cuts to environmental grants (CRS 2015). Over the next 20 years, federal grants for water and sewer systems fell to just 4 percent of federal infrastructure spending (CRS, 2015). Consequently, much of the federal financial support that assisted state facilities achieve CWA compliance was no longer available by the time tribal governments began environmental implementation. By the early 2000s, the U.S. Commission on Civil Rights labeled the spending levels in Indian Country a “quiet crisis” with spending dramatically and disproportionately below levels of funding provided to other at-risk groups and the general population (Cornell and Kalt 2010).
Environmental protection under tribal primacy. Little is understood about environmental implementation under tribal primacy. Importantly, Teodoro et al.’s (2018) and Conroy-Ben and Richard’s (2018) analyses of tribal facilities did not distinguish tribes with primacy authority from those that rely on federal EPA implementation. Whether tribes authorized to implement and enforce federal environmental laws on tribal land perform better in terms of enforcement has yet to be examined.

Beyond its substantive importance for environmental quality, analysis of tribal primacy provides an excellent context for understanding environmental federalism generally. As observed earlier, states are few in number and offer very little variation in primacy status. By contrast, of the 326 Indian land areas administered as federal Indian reservations, 62 tribes to date have applied and received authorization to implement the CWA’s Water Quality Standards (WQS) program. This variation provides extraordinary empirical leverage on core theoretical questions about environmental federalism. Does tribal authority over the implementation of federal environmental law lead to more vigorous enforcement? Or does primacy allow tribes to shirk regulations in a race-to-the-bottom?

In the driver’s seat: a theory of tribal primacy

Building on past studies of tribal governance, we advance a driver’s seat theory of environmental implementation that predicts more rigorous enforcement of environmental regulations under tribal primacy than under direct federal implementation. The driver’s seat logic of tribal primacy over environmental enforcement does not follow conventional theories of
environmental federalism rooted in intergovernmental economic competition, but rather a logic of indigenous sovereignty and self-determination coupled with administrative capacity.

**Competition?** A race-to-the-bottom logic makes little sense for American Indian tribes with respect to environmental protection, if only because federal environmental enforcement is already so lax in Indian Country. As observed earlier, tribal lands and waters were effectively unregulated until the late 1980s. Today the majority of tribal facilities are regulated directly by the EPA, but suffer “systemic regulatory neglect” under federal implementation (Teodoro et al., 2018, 55; Zaferatos 2015). Already occupying the proverbial “bottom,” tribes have little incentive to seek primacy in order to shirk regulatory compliance in a race there. Further declines in environmental enforcement under tribal primacy would be gratuitous.

A race-to-the-top logic also fits awkwardly with contemporary tribal politics. With generally poor social conditions and low human capital relative to the rest of the United States, tribal governments are not poised to compete with resource-rich state and local governments for the high value-added capital associated with an environmental race-to-the-top. The more recent politics of tribal membership disenrollment make it unlikely that tribes would seek stricter environmental enforcement in the hopes of luring new residents into Indian country (Wilkins & Wilkins 2017, 67). For many tribal communities, reservation lands and their respective natural resources may be viewed as essential to tribal identity and serve as a component of larger community objectives (Flanagan & Zaferatos 2000; Diver, et al. 2019). This community norm often assigns to a natural resource a social-use value prior and superior to its economic exchange value, emphasizing a traditional concern for the finiteness of natural resources and the community’s ability to survive.
**Tribes in the driver’s seat.** We argue that securing primacy is a political act, and that tribal primacy leads to more rigorous environmental enforcement because it reflects a tribal government’s capacity and will to improve environmental conditions, for both human health and cultural/ceremonial purposes (Galloway 1995). Prior to the Reagan-era government-to-government self-rule/self-determination policy, American Indians were subjected to uniform, policies and direct administration by federal agencies. What little self-rule there was prior to the 1980s typically took the form of post-policy decisions made in Washington and under the control of federal agencies tasked with administering life on reservations, under policies and programs uniformly applied across all tribes.

Cornell and Kalt (2010) point to major changes in federal policy toward self-government in the 1980s as the “central causal factor” explaining improved conditions across several policy dimensions among many tribes (11). In case after case, tribal performance improves among tribes that effectively assert legal sovereignty and recover decision-making authority from the federal government. The authors reason that empowering tribal officials tightens the link between policy decisions and their consequences. Meanwhile, tribes that have not taken over programmatic and policy implementation are “uniformly marked with little to no signs of development progress” (Cornell & Kalt 2010, 11). Tribal authorities have greater incentive than distant federal bureaucrats to improve the environments of their respective reservations since they and their neighbors bear the costs and benefits of their efforts directly.

Healthcare service provides a notable example of systematic improvement under tribal control. The National Indian Health Board found that measures of patient satisfaction “improve markedly under tribal assumption of management responsibilities” relative to federal
management by the Indian Health Service ("IHS") (Cornell and Kalt, 2010, 15). Tribes still served by the IHS reported being less satisfied with the quality of care received; while the prioritization of preventative programs, and total payments collected from third parties were higher among programs managed directly by tribes (Cornell and Kalt 2010; Dixon et al, 1998). Krepps and Caves (1994) find that tribal authorities manage forest resources on tribal lands more effectively than does the U.S. Forest Service, arguing that tribal administrators receive some share of the collective benefits passing to the tribe, and so are incentivized to maximize performance.

In a similar vein, Zaferatos’ (2015) case studies of tribal environmental protection link the development of capacity for environmental regulation to sovereignty claims and the broader American Indian movement for political empowerment. Describing the process of establishing primacy for the Swinomish Tribe in Washington State, Zaferatos (2015) argued that:

> From the Swinomish perspective, reservation homeland security required the removal of environmental threats from the reservation pursuant to its own established policies, which recognize a sacred obligation to care for and minister to the lands and resources of the reservation and to ensure a homeland that does not pose a risk to human health and to the environment (282).

If Zaferatos (2015) is correct, tribal primacy is likely to bring more rigorous environmental enforcement, as tribes seek to improve health and development while maintaining their traditions and cultural values (see also Diver, et al. 2019).

Particularly relevant to the present study, case studies of water quality disputes between tribes and state and local governments offer more reasons to expect stronger enforcement under tribal primacy. In the early 1980s, while administering parts of its environmental program, the
State of New Mexico exempted from its water quality regulations a stretch of the San Juan River which flowed through several mining and industrial areas, and then into waters of the Acoma and Isleta Pueblos (Monette 1996). In response to the State’s negligence, the Tribes lobbied Congress to authorize the EPA to treat “Tribes as States” so that tribes could administer their own water quality programs and in-turn protect their resources (Monette 1996). Monette (1996) posits that “to tribes, being treated as states meant at least being treated fairly” (114).

The Acoma and Isleta Pueblos of New Mexico set water quality standards more stringent than federal standards after gaining CWA primacy. Lying upstream, the City of Albuquerque was required to upgrade its sewage system in order to comply with the downstream tribal standards. Albuquerque responded by filing suit against the EPA for approving the more stringent tribal standards (Saunders 2010). In this example, tribal primacy allowed tribal authorities to surpass federal standards in order to help protect tribal waters from upstream polluters. Similarly, the Confederated Salish and Kootenai Tribes suffered water quality problems due to municipal and state-owned facilities located within the reservation’s boundaries. The tribe sought and was granted primacy, in part, to “restore those [waters] that have been degraded” (EPA 2006). The State of Montana and the other municipal entities challenged the grant of primacy authority (Cutler 1999), but the court upheld tribal authority because the “activities of the non-members posed such serious and substantial threats to Tribal health and welfare” (Sanders 2010, 544). In each of these cases, tribal primacy was both an assertion of sovereignty and a practical effort to influence the use of a natural resource in conflict with neighboring non-tribal governments (see also Evans 2011).
Taken together, case evidence and theoretical treatments of tribal governance indicate that when tribes are in the driver’s seat—that is, have direct authority over reservation matters—they have greater incentive than federal agencies to preserve and protect the integrity of reservation resources. Empirical evaluation across large numbers of tribes and tribal facilities has not followed these studies, and so systematic research on the effects of primacy remains limited to states. The analysis that follows thus evaluates a tribal “driver’s seat” hypothesis: 

*tribal facilities regulated under tribal primacy will receive more rigorous enforcement than those regulated directly by the EPA.* Moreover, we expect the differences between tribal administration and EPA administration to be greatest for smaller facilities serving smaller populations since smaller facilities in more isolated areas are most likely to be neglected by federal administrators due to the practical costs involved in regulating them (Hanford and Sokolow 1987). Such neglect of small facilities is less likely under tribal primacy.

The Clean Water Act in Indian Country

CWA enforcement on tribal lands offers an excellent case for evaluating hypotheses about the effects of primacy. Water is universally important, and water quality and supply are frequent points of conflict between tribes and their neighbors (Colby, Thorson & Britton 2005). As noted earlier, tribal governments are greater in number than states and vary considerably in size and resources. Many tribes operate CWA-regulated wastewater treatment plants, and a sizable minority hold primacy status under CWA. This variation offers leverage on questions about environmental federalism that are difficult to answer with analysis of the fifty states.

**CWA implementation.** The CWA’s main goal is to maintain the chemical, physical and
biological integrity of the nations’ surface waters so that they are “fishable and swimmable” throughout the United States (Milazzo 2006). The CWA is implemented mainly through the National Pollution Discharge Elimination System (NPDES). All facilities that discharge pollutants into the nation’s waters must obtain a NPDES permit prior to initiating its discharge. NPDES permits establish effluent limits including type and quantity restrictions, pollutant monitoring, record keeping and reporting requirements. Of particular interest in this study are wastewater treatment plants, or Publicly Owned Treatment Works (POTW) that handle municipal sewage. The CWA requires POTW managers to collect samples of effluent discharges at specified frequencies and locations and submit monitoring reports to the regulator.

CWA enforcement involves compliance monitoring and enforcement. All but four states (Idaho, New Mexico, Massachusetts, and New Hampshire) hold primacy status for CWA implementation, and so state agencies administer the CWA in most of the United States. EPA oversees these state programs, and implements the NPDES program directly in the non-primacy states Tribes that hold primacy handle monitoring and enforcement of regulated tribal facilities, with EPA oversight. EPA regulates tribal facilities directly where tribal authorities do not hold primacy status (EPA, 2015).

Compliance with NPDES permits requires POTW facilities to self-monitor and report water quality to regulators on a continuing (typically monthly) basis. Aside from self-monitoring, facility inspections are the principal means by which facility violations are detected. Thus, inspections are crucial to compliance monitoring. When an inspection identifies a CWA violation, the facility is in “non-compliance,” and a series of escalating administrative and civil enforcement actions follows.
Data & Methods

Our analysis focuses on the 474 wastewater treatment plants that are owned and operated by American Indian tribes and regulated under the CWA from the third quarter of 2016 through the second quarter of 2019. Less than fifteen percent of these facilities are regulated by tribes that hold primacy status under the NPDES program; the remaining facilities are regulated directly by the EPA.

Our analysis draws data from several sources. Compliance and enforcement data are from the EPA’s Environmental Compliance History Online (ECHO) database, which includes CWA compliance, enforcement, and other information for every regulated facility in the United States. Demographic data for tribal communities are drawn from the 2010 decennial US Census. Complementing these data are original data on tribal participation in civil litigation, which we collected independently (discussed further, below).

Variables. The main independent variable of interest is tribal CWA primacy, which was gathered directly from the EPA’s website. We measure primacy with a simple dummy variable that equals one if the tribe has primacy for NPDES implementation, zero otherwise.¹

We measure CWA enforcement with three dependent variables. First, we measure as the number of inspections conducted at each regulated POTW from the third quarter of 2016 through the second quarter of 2019. Inspection is the first and most important step in the enforcement process, and previous studies of environmental federalism have measured environmental enforcement with inspection counts (Wood 1992; Ringquist 1995; Konisky &

¹ None of the tribes analyzed here changed primacy status during the period of analysis.
In addition to primacy status, we control statistically for facility-level and tribal-level variables that might affect inspection frequency. We control for facility size as POTW capacity, which we measure as the maximum daily wastewater flow in gallons that the facility is designed to handle. For estimation purposes we transform this variable with its natural logarithm (log design flow) since facility size is expected to have a nonlinear relationship with inspection frequency. We include a dummy variable indicating whether a facility is classified as a major facility under its NPDES permit. We expect both of these measures of facility size to positively predict inspections.

**Predicting primacy.** Primacy is not randomly distributed across tribal facilities, of course. Indeed, research on tribal environmental administration and primacy guidelines themselves provide reasons to expect that primacy is a function of political, demographic, and economic factors. Ideally, an instrumental variable that is correlated with primacy but unrelated to other factors that drive environmental enforcement allow us to estimate the effects of primacy. No such instrument exists, however. Without a pure instrumental variable to predict primacy independently, we employ endogenous hazard function estimation following the method suggested by Heckman (1978) (see also Barnow, Cain & Goldberger 1981; Basinger & Ensley 2010). This approach proceeds with two steps. First we estimate a bivariate probit model of primacy $S_i$

$$S_i = Z_i \alpha + u_i$$

where $Z$ is a vector of covariates of primacy for tribe $i$ and $u$ is an error term for primacy status. We then model CWA enforcement $Y$ as:
\[ Y_i = X_i \beta + \tau S_i + \epsilon_i \]

where \( X \) is a vector of facility covariates that predict enforcement, \( \tau \) is the effect of primacy on enforcement, and \( \epsilon \) is the error for enforcement actions. \( S \) takes the value \( Z_i \alpha + u_i \) if a tribe has primacy status, zero otherwise. Formally, then, the effect of primacy on enforcement is

\[ E[Y_i \mid S=1, X_i] - E[Y_i \mid S=0, X_i] = \tau + \rho \]

Where \( \rho \) is the correlation between the errors of the primacy and enforcement models. This estimate is unbiased only if \( \rho = 0 \). Since \( \rho \) is nonzero when primacy and enforcement are endogenous, \( \tau \) is biased with unknown direction. Assuming standard normal density function \( \phi \) and standard cumulative normal distribution function \( \Phi \), the effect of primacy becomes

\[ \tau + \rho \sigma_e \left[ -\frac{\phi(Z_i \alpha)}{1 - \Phi(Z_i \alpha)} \right] \]

where \( \sigma_e \) is the standard error of the enforcement estimate. A Hausman test of our data confirms endogeneity, and so we add a regressor \( \lambda \) to the primacy model. This primacy correlation variable is

\[ \lambda = \frac{\phi(Z_i \alpha)}{\Phi(Z_i \alpha)} \quad \text{if } S_i = 1, \text{ and} \]

\[ \lambda = -\frac{\phi(Z_i \alpha)}{1 - \Phi(Z_i \alpha)} \quad \text{if } S_i = 0. \]

The final second stage model takes on the form:

\[ Y_i = X_i \beta + S_i \lambda + \epsilon_i \]

In the present study, we estimate the propensity of a tribe to seek primacy with a series of demographic and socioeconomic variables, as well as an added measure of tribal
litigiousness in the first stage equation.² Like primacy, engaging in litigation requires both resources and willingness to engage in costly and risky conflict with non-tribal individuals, governments, and organizations. Tribes have struggled to assert their sovereignty through the court system since Cherokee Nation v. Georgia in 1831 (Anderson & Parker 2008). However, the period from the end of the U.S. Indian termination policy³ in the 1960 until the late 1980s proved to be decisive for tribal sovereignty through litigation. This era saw a series of important legal victories in the struggle to regain a measure of authority over tribal sovereignty (Wilkins & Stark 2011, 131). Cornell and Kalt (1998) suggest that the shift towards self-determination has allowed tribal entities to “turn sovereignty as a legal matter into de facto sovereignty: sovereignty in fact and practice” (1).

With respect to CWA specifically, tribal primacy has triggered lawsuits by neighboring jurisdictions and private parties (Williams 1993; Chandler 1994). A tribe’s decision to pursue primacy, then, implies a capacity and willingness to assert sovereignty claims in court. Diver, et al. (2019) show that CWA primacy is a means by which tribes may pursue environmental goals in conflicts with non-tribal entities. The Sokaogon Chippewa Tribe in northern Wisconsin, for example, opposed mining at a property located one mile upstream from their reservation due to concerns about water quality. However, due to the tribe’s primacy status, the tribes were able to implement water quality standards that made mining activities upstream infeasible (EPA, 2006). A history of litigation thus indicates tribal independence, nationalism, and other political factors related to sovereignty as a means of asserting tribal preference for and capacity for self-

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² We thank Stuart Brettschneider for this suggestion.
³ The U.S.’ Indian termination policy was from 1940 to the mid-1960s and intended to end the U.S. government’s recognition of tribal sovereignty and assimilate Indian Americans as ‘Americans’.
determination. Litigiousness is not purely exogenous to environmental enforcement and so is not strictly an instrumental variable, but the act of litigation is not the same as CWA enforcement, and so litigiousness provides a measure of bias correction to estimates of inspections.

Table 1: Descriptive summary

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<td>Percent college educated</td>
<td>16.48</td>
<td>4.45</td>
<td>0.90</td>
<td>70.36</td>
</tr>
<tr>
<td>Percent unemployed</td>
<td>9.05</td>
<td>6.17</td>
<td>2.40</td>
<td>36.40</td>
</tr>
<tr>
<td>Population density (pop/mi²)</td>
<td>139.96</td>
<td>279.33</td>
<td>0.22</td>
<td>3,118.43</td>
</tr>
</tbody>
</table>

N=474

To measure litigiousness, we used the Thompson-Reuters Westlaw database to identify all state and federal court cases from 1987 through 2015 involving tribal governments that operate POTWs. Each tribe was entered individually, and results set to sort by relevance. All cases listing the tribe as an appellant ‘plaintiff’ or a ‘defendant’ on the first seven pages of the results (100 cases per page) were recorded and counted as one litigation. The observation was

---

4 Notably, litigiousness does not correlate significantly with inspections ($\rho=-.04$).
limited to the first seven pages of results, since the relevance of cases significantly declined after that point. The sampled tribes were involved in an average of 4.95 cases over this twenty-eight-year period, though litigiousness varied widely from zero to 77 cases.

Table 2: CWA inspections of tribal facilities with endogenous primacy

<table>
<thead>
<tr>
<th></th>
<th>Primacy Model</th>
<th></th>
<th>Inspections Model</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>p</td>
<td>Coefficient</td>
<td>p</td>
</tr>
<tr>
<td></td>
<td>(St Error)</td>
<td></td>
<td>(St Error)</td>
<td>p</td>
</tr>
<tr>
<td>Primacy</td>
<td>1.347</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.305)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log design flow</td>
<td>0.107</td>
<td>.007</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.040)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major facility</td>
<td>3.553</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.267)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Litigation actions</td>
<td>0.008</td>
<td>.099</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(.005)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log population</td>
<td>-0.106</td>
<td>.018</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.045)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median income ($000)</td>
<td>-0.006</td>
<td>.582</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%College educated</td>
<td>0.067</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>%Unemployed</td>
<td>-0.032</td>
<td>.012</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population density</td>
<td>-0.001</td>
<td>.027</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.332</td>
<td>.025</td>
<td>-0.770</td>
<td>.095</td>
</tr>
<tr>
<td></td>
<td>(0.596)</td>
<td></td>
<td>(0.461)</td>
<td></td>
</tr>
<tr>
<td>Wald $\chi^2$</td>
<td>546.46</td>
<td>&lt;.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-905.49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rho</td>
<td>-.78</td>
<td>(.08)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood ratio $\chi^2$</td>
<td>11.19</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AIC</td>
<td>1836.99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thus, the first stage equation is a binomial probit predicting primacy status as a function of a tribe’s litigiousness and a set of tribal demographic and economic variables (logged
population, population density, median income, percent college educated adults, and percent unemployment). The second stage is an Ordinary Least Squares (OLS) model that estimates enforcement as a function of includes facility size and primacy. Table 1 provides a descriptive summary of all variables.

Results

Table 2 reports estimation results for the two-stage model of inspections; Table 3 adds an interaction of primacy with logged design flow to evaluate the effects of primacy on facilities of different size. In both estimates, the primacy model is reported in the first two columns, and the two right-hand columns report the inspections model. In both sets of estimates the Rho values (-.78, -.69) and accompanying likelihood ratio tests ($X^2 = 11.2, 14.7$) confirm significant error correlation between the primacy and inspection models, affirming the two-stage strategy.

**Primacy and enforcement.** As expected, the primacy model affirms that tribal litigation correlates positively with the probability of primacy status, with moderate statistical significance (p=.10). Education and unemployment generally have the expected effects, predicting primacy positively and negatively, respectively. Somewhat surprisingly, tribal population and population density negatively predict primacy.

Turning to enforcement, results in Table 2 are consistent with our expectations. Variables measuring facility size yield (design flow and NPDES permittees designated as major facilities) both strongly and positively predict inspections. Most importantly for present purposes, tribal primacy strongly and positively predicts POTW inspections. In substantive terms, the difference between tribal and federal administration is stark. During the period of
analysis, facilities regulated by tribal primacy agencies were inspected an average of 1.35 more times than facilities regulated directly by the EPA. Put another way, with other variables at their means, tribal facilities with primacy were on average inspected more than twice as frequently as EPA-regulated facilities. Figure 1 depicts these comparative estimates.

Figure 1: Tribal primacy and CWA enforcement

![Figure 1: Tribal primacy and CWA enforcement](image)

Note: vertical bars represent 95 percent confidence intervals. Other variables evaluated at their means.

**Primacy and enforcement by facility size.** Estimates reported in Table 3 includes a primacy*\( \log \) design flow interaction term to evaluate effects of primacy for POTWs of different sizes. Addition of the interaction improves overall fit (\( \Delta X^2 +52.92 \)) and efficiency (\( \Delta AIC -9.61 \)). Moreover, the interaction term affirms the expected difference in the effects of primacy for facilities of different sizes: the enforcement gap is greatest for smaller facilities, but declines as facility size grows. For example, for a very small facility (design capacity 5,000 gallons per day), the model predicts 2.75 more inspections under tribal primacy over a three-year period. At a
moderately large facility (2.5 million gallons per day), the difference falls to just 0.24 and is statistically indistinguishable from zero. Figure 2 shows the declining marginal effect of primacy as facility size increases.

Table 3: CWA inspections of tribal facilities with endogenous primacy and primacy-facility size interaction.

<table>
<thead>
<tr>
<th>Primacy Model</th>
<th>Inspections Model</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
</tr>
<tr>
<td></td>
<td>(St Error)</td>
</tr>
<tr>
<td>Primacy</td>
<td>6.322</td>
</tr>
<tr>
<td></td>
<td>(1.535)</td>
</tr>
<tr>
<td>Log design flow</td>
<td>0.134</td>
</tr>
<tr>
<td></td>
<td>(0.040)</td>
</tr>
<tr>
<td>Primacy*Log design flow</td>
<td>-0.419</td>
</tr>
<tr>
<td></td>
<td>(0.129)</td>
</tr>
<tr>
<td>Major facility</td>
<td>3.683</td>
</tr>
<tr>
<td></td>
<td>(0.271)</td>
</tr>
<tr>
<td>Litigation actions</td>
<td>0.008</td>
</tr>
<tr>
<td></td>
<td>(.005)</td>
</tr>
<tr>
<td>Log population</td>
<td>-0.119</td>
</tr>
<tr>
<td></td>
<td>(0.047)</td>
</tr>
<tr>
<td>Median income ($000)</td>
<td>-0.006</td>
</tr>
<tr>
<td></td>
<td>(0.012)</td>
</tr>
<tr>
<td>%College educated</td>
<td>0.073</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
</tr>
<tr>
<td>%Unemployed</td>
<td>-0.040</td>
</tr>
<tr>
<td></td>
<td>(0.013)</td>
</tr>
<tr>
<td>Population density</td>
<td>-0.000</td>
</tr>
<tr>
<td></td>
<td>(0.000)</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.439</td>
</tr>
<tr>
<td></td>
<td>(0.624)</td>
</tr>
<tr>
<td>Wald χ²</td>
<td>599.38</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-899.69</td>
</tr>
<tr>
<td>Rho</td>
<td>-.69</td>
</tr>
<tr>
<td>(.12)</td>
<td></td>
</tr>
<tr>
<td>Likelihood ratio χ²</td>
<td>14.74</td>
</tr>
<tr>
<td>AIC</td>
<td>1827.38</td>
</tr>
</tbody>
</table>

N = 474
Figure 2: Marginal effect of tribal primacy on CWA enforcement by facility size

Note: vertical bars represent 95 percent confidence intervals. Design flow plotted on logarithmic scale. Other variables evaluated at their means.

Discussion: implementation primacy as effective sovereignty

The extant literature on the effects of state primacy implementation on environmental enforcement shows that, contrary to the race to the bottom hypothesis, a significant number of states exceed federal EPA standards in a wide variety of environmental programs (Potoski 2002; Sigman 2003). Moreover, states with primacy strengthen their environmental programs in response to citizen demands rather than weaken their programs in deference to economic pressures (Potoski 2002; Sigman 2003). However, none of these studies analyze the effects of implementation primacy on environmental enforcement under American Indian tribal governance. Rather, theories of environmental federalism tend to emphasize interstate
economic and/or political competition as the main factor conditioning enforcement stringency under primacy.

The present study has advanced a driver’s seat theory of tribal environmental implementation, rooted in the heterogeneous preferences of the communities being served and linked to the broader politics of Indian sovereignty, self-determination, and institutional capacity. Tribes with primacy have greater incentive to enforce environmental laws more rigorously since they are typically members of the tribal community in which they serve. One implication of this perspective is that tribes with implementation primacy are more likely than tribes absent primacy to enforce federal environmental laws more rigorously—especially for smaller facilities that might otherwise be neglected under EPA administration. Here our argument is consistent with Cornell and Kalt’s (2010) observations about tribes that have taken on policy implementation rather than relying on the stewardship of the federal government.

Moving beyond case studies of tribal primacy, we tested our driver’s seat theory with an analysis of CWA implementation. We found that facilities regulated by tribes with primacy received more rigorous enforcement than tribal facilities regulated by the federal government. The differences in enforcement are most pronounced among smaller POTWs. These findings are consistent with primacy as a political act, and suggest that tribal primacy over implementation of environmental regulation may substantially improve human health and environmental quality.

**Conclusion.** In 1999, Deloria and Wilkins argued that political science presented an ideal home for Native Studies; twenty years on, American Indians are still largely “missing from political science” (Ferguson 2016, 1030). More specifically, Ortiz (2002) notes that, while
various forms of federalism have received abundant treatment from scholars, tribal governance in a federal system has been largely ignored. Moreover, systematic research on tribal administration remains underdeveloped (Ronquillo 2011), which can make questions of tribal sovereignty more abstract than real. As Cornell and Jorgensen observe, “it is one thing to make decisions. It is another to implement them effectively” (2007, 146).

In exploring tribal primacy for environmental protection, this study demonstrates the significance of implementation authority as effective sovereignty. The present study is among the first large scale, systematic analyses that directly tests how tribal governance or sovereignty improves tribal outcomes (see also Conner 2014). Similar studies of tribal primacy under different environmental programs and other policy areas can help further refine our understanding of the relationship between legal and practical sovereignty. The processes by which primacy and other policy innovations diffuse across tribes is another promising avenue for inquiry. Research on tribal administrators could help further explain variation across tribes with and without primacy. Finally, our findings are consistent with the depiction of environmental primacy, and administrative capacity more broadly, as means by which tribes assert sovereignty in relation to other governments (Diver, et al. 2019; Deloria 2006). The role of implementation capacity in the broader politics tribal sovereignty is an area ripe for further theoretical and empirical investigation.

One consequence of the federal government’s long history of managing tribal affairs as de facto federal programs is a legacy of institutionalized “ward-to-guardian” dependency, in which tribes profoundly rely on the federal government to oversee and manage tribal affairs. With their isolated locations, high rates of poverty, and low levels of human capital, tribes face
innumerable difficulties to successful implementation of federal programs. The findings in this study affirm Cornell and Jorgensen’s (2007) argument that, where outsiders or federal bureaucrats call the shots, accountability disappears, community engagement declines, and development fails. Given tribal governments’ lack of representation in Congress and the federal government’s systematic neglect of environmental conditions on tribal lands, empowering and building administrative capacity in tribal governance offers a promising avenue for improving life in Indian Country.

Acknowledgement

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References


