The Ecology of Power: U.S. Environmental State Capacity, 1973-2021.

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Abstract

What shapes the power and the resources needed for the environmental state to provide environmental welfare? Drawing from political, organizational, and environmental sociology, we sketch an ecological theory of political control to explain cross-unit and over-time variance in environmental state capacity. The theory is ecological in two senses: the political and organizational "ecology" that units of the state embed within modulate the politics that shape their resources and thus capacity; and the various and distinctive politics of nature and ecology, as such, structure those dynamics, too. We assess our account using original administrative data spanning 239 governmental units over nearly 50 years, from 1973 to 2021, allowing us to simultaneously situate the environmental state in the full federal bureaucracy, and also to disaggregate the environmental state into its constituent elements to show how distinctive organizational characteristics shape unit-specific shifts in capacity. Our findings hold broad relevance for students of state power and governance, and especially environmental statecraft, revealing how hidden developmentalism and the politics of nature differently shape state capacity within diverse units of the environmental state, and offering a more general template for disaggregating states and theorizing the political-ecological origins of their dynamism and internal heterogeneity.

Note: *the text that follows is a rough draft. The theoretical frame – reflected in brief in the abstract – remains in flux and is not fully reflected in the text. Likewise, some written details do not reflect more up-to-date findings showin in figures.*

What shapes the state's capacity to provide environmental welfare, where environmental welfare is "the set of biophysical and social conditions required to support life and livelihoods" (Rea and Frickel 2023:256)? Few environmental-political questions are more fundamental – or more urgent. Answering promises insight into elemental questions of environmental politics and statecraft: How do the ebbs and flows of the macroeconomy and partisan politics shape the state's capacity to provide and protect an environment that sustains life and enables people to realize their capabilities (Sen 2009)? Are state-led regulatory roles, often assumed to invite the ire of business groups and their political allies, associated with the long-term erosion of environmental state capacity (Schnaiberg, Pellow, and Weinberg 2002)? Might developmental interventions by the environmental state, focused on investing in environmental infrastructure and supporting economic growth, blunt those anti-environmental attacks (Block, Keller, and Negoita 2024)? How does the provision of celebrated forms of nature that transcend ideological divisions, like the sublime and widely loved landscapes of national parks and forests, shape these same capacity-altering dynamics of environmental political economy (Cronon 1996; Taylor 2016)?

These basic questions of *environmental* state capacity also bear on sociological understandings of state capacity more broadly. Nation-states are diverse, internally heterogenous organizational networks with minimal internal coherence and consistency, especially in highly federalized examples like the United States (Mann 1993; Morgan and Orloff 2017). As a result, many of the dynamics that shape the state's capacity to provide environmental welfare will be specific to the environmental state. But the mechanisms of capacity growth and decay in the environmental domain may also have broad analogs in other and overlapping parts of the state, like the social welfare state (Esping-Andersen 1990; Skocpol 1992), the carceral state (Gottschalk 2008; Wacquant 2009), and the developmental state (Block 2008; Evans 1995). At the very least, uncovering the patterns and probable reasons for environmental state growth and decay offers a theoretical starting point for understanding similar dynamics in other domains of governance, even if exact mechanisms of change are different.

To better understand how environmental state capacity grows and decays through time, and to help shed further light on the sociological processes that shape state capacity generally, we build an original data set spanning 239 governmental units for nearly 50 years, from 1973 to 2021. We use these data to investigate and theorize changes in state capacity across 18 core units of United States environmental state and, for context, across all 239 units of the federal bureaucracy as a whole. Empirically, we use a complimentary combination of conventional regression analysis and less conventional fuzzy set qualitative comparative analysis (fsQCA; Ragin 2000; Schneider and Wagemann 2012) to identify the determinants of environmental state capacity growth and decay. Our outcome is *change in capacity*, i.e., capacity growth rates, not absolute levels or "amounts" of capacity. "How much" capacity a unit of the state has, after all, is only meaningful insomuch as that amount relates to a difficult judgment of how much capacity it *ought* to have. The more useful and tractable question is how social forces shift state capacity growth rates, and thus how state capacity accretes or erodes over time, from whatever baseline. With capacity growth as our focus, regression models help us identify long-term average correlates of rates of change in capacity across the environmental state and across the entire federal bureaucracy. fsQCA allows us to further investigate the conjunctural conditions associated with high levels of capacity growth or decay in the environmental state specifically, including divergent causal pathways that may be washed out in the average effects revealed by regression models.

We build from distinctively dynamic and relational views of state capacity that have recently come to the fore in sociology (Bradlow 2024; McDonnell 2020; see also Meckling and Nahm 2018). We define state capacity as the infrastructural power available to implement government's policy choices (Lindvall and Teorell 2016; Mann 1984; Williams 2021; see also Skocpol, Evans, and Rueschemeyer 1985). Environmental sociologists, for their part, have not systematically taken up the question of state capacity, but political sociologists and scientists, scholars of public administration, and scholars of development mostly emphasize the internally determined origins of such infrastructural power, shaped by resource stocks like money, knowledge, and staffing (Bersch, Praça, and Taylor 2017); administrative and management practices within states (Brown and Potoski 2003; Donahue, Selden, and Ingraham 2000; Koerner and Johnston 2022; Lazzarini et al. 2020); or manifestations of either of these categories, like the capacity of the state to police its borders (cites), or build and maintain infrastructure (cites). As a matter of operationalization, we follow in these intellectual footsteps. We use a combination of governmental spending and staffing levels as an intentionally simple and foundational proxy for state capacity.

Theoretically, however, we turn our attention to the ways that the resource stocks and particular governance mandates of different units of the state shape state capacity not just internally, but by evoking distinctive patterns of politics that develop from beyond the state – for example, in the overlapping fields of business and civil society. Units of the environmental state with governance mandates and internal features that evoke strong business opposition - for example, from the fossil fuel or petrochemical industries - might erode through time, given consistent and well-resourced political attack from industry groups and their allies (cites). Elements of the environmental state with governance mandates and internal features that evoke less industry opposition or that garner widespread popular support, by contrast – for example, units that manage widely loved National Parks or that support more than inhibit extractive industries – might steadily grow their state capacity. Seen through this theoretical lens, state capacity appears less like an endogenous quality of states and their internal features, and more like a dynamic quality coproduced by interactions between the state and extra-state organizations embedded in wider social and strategic action fields (cites).

To develop our argument, we first draw out the concept of state capacity generally, elaborate its relations to the environmental state, and then theorize environmental state capacity change based on insights drawn principally from environmental and political sociology, political science, and science and technology studies. Next, drawing from detailed administrative data on the U.S. federal bureaucracy and related political processes, we measure features of units of the U.S. federal (national level) environmental state, like regulatory prominence and formal expertise, that our theorizations suggest should shape changes in state capacity over time. Measures in hand, we use regression models and fsQCA to scrutinize the hypothesized relations we have set out, drawing out patterned relationships that seem to predict capacity growth and decay and also noting those theorized relations with little-to-no support in our data. As a last step, we return to theory building, positing mechanisms of capacity change suggested by prior scholarship and our present findings, including dynamics in need of more careful qualitative investigation and that are difficult to assess using our relatively high-level administrative data. We end by emphasizing the substantive importance of our findings for questions of environmental politics and statecraft in the United States, and by pointing to the broader implications of our investigation for sociological accounts of state power and capacity in general.

Understanding State Capacity

"Capacity" is one of the most widely used and also one of the most easily misused concepts in studies of states and bureaucracies. Inherent to the idea is potentiality: state

capacity signals the *available potential* for a state to wield power in service of implementing government's policy choices (Mann 1984; Martin 2021). This draws capacity conceptually away from questions of governmental effectiveness or policy outcomes: that a state has the power to do things does not imply that it will do them or do them well. This distinction is theoretically important. Conflating state capacity with state effectiveness or outcomes makes it impossible to assess how one quality effects the other and invites teleology: as Fukuyama (2013) warns, scholars risk "discovering" that high-capacity states, defined in terms of their effectiveness at things like building infrastructure, regulating industry, or policing their borders, are also effective states, exactly "because" they have high capacity. Attending to the conceptual distinction between a state's capacity to act and its actions avoids these theoretical traps. It also creates space for investigating the widely appreciated phenomenon of decoupling between 'policy and practice' or between organizational means employed and ends sought (Bromely and Powell 2012), both of which are central to organization studies, policy studies, and public administration.

We therefore train our attention on state capacity as such and operate one conceptual step prior to questions of state effectiveness and outcomes. Some readers, eager to understand how state actions shape, for example, concrete outcomes related to environmental protection, may view this as an abdication of scholarly responsibility. Particularly in a domain like environmental policy, where state action is urgently needed, does not capacity only matter in so much as it relates to concrete outcomes? We agree in spirit but stand by our approach. Carefully attending to the determinants of environmental state capacity allows us to theorize and investigate what makes environmental states grow stronger or become weaker and how that strength might evolve over time. As a next conceptual and empirical step - beyond the work we present here - those changes in capacity can be set in relation to outcomes, like indicators of regulatory enforcement or environmental justice. Separately theorizing and investigating the determinants of capacity, first, and capacity's impacts on outcomes, second, prevents the serious conceptual problems that emerge when capacity and effectiveness or outcomes are defined in terms of the other. Just as importantly, it also prevents the problems that emerge from ignoring the potential for decoupling and instead assuming that capacity translates straightforwardly into outcomes – an assumption with little theoretical or empirical support (cites).

If state capacity is the infrastructural power available to implement government's policy choices, then what is infrastructural power, and where does that power come from? Building from Mann (1984), we understand infrastructural power as the ability of government to shape behaviors and actions through organizational infrastructures. Collapsing these two definitions, state capacity can thus be understood as *the ability of government to shape behaviors and actions through organizational infrastructures (that is)*

available to implement government's policy choices. "Organizational infrastructures" in this context are, first and foremost, elements of the state bureaucracy, but as is well-known, those state elements often spill into networks non-state organizations that also help transform governmental choices into behaviors and actions on the ground, especially in systems of delegated governance common in the United States (Kettl 2002, Morgan 2011, Hollstein 2017). This network structure has important implications for state power and politics because the same organizations that help the state wield its own infrastructural power also create channels for non-state actors to reflect power back on the state itself (Mann 1993, Lindvall 2016, Clemens 2020), including in ways that can create remarkable divergences in policy outcomes across implementation contexts (Merriman and Pacewicz, 2022). This means that state capacity is always reciprocally co-constituted by interactions between state and non-state actors: the state relies on its own and also private organizations to wield infrastructural power, but those same organizations can use their power to reshape the state.

State capacity and the power latent within it are thus not only shaped by the internal features of the state, like how many people work in various offices and agencies, how well-trained they are, or how big their budgets are.[1] In the broader understanding of state capacity we advance here, state capacity is also shaped by the ways that extra-state organizations and related patterns of politics act back on the state – patterns that are always shaped by the nationally and historically peculiar institutions that organize politics in specific times and places (cites). The unusual privileging of judicial review as a political institution in the United States, for example (cites), centers civil legal action as a means of political advocacy and channels capacity-shaping political action through the judiciary, empowering minority (often elite) interests and raising questions of democratic accountability (cites). Similarly, in the context of U.S. environmental statecraft, the historically trans-ideological embrace of protecting land for conservation and recreation, especially in the West, suggests that politics will work differently on elements of the state focused on these forms of environmental welfare, as opposed to other forms like pollution reduction or environmental justice (Taylor 2014; Taylor 2016). To help ground discussion of these capacity-shaping political dynamics, we turn next to a discussion of capacity and the environmental state.

[1] Even these "internal" state features are buffeted by external forces that directly shape state activity, like electoral outcomes and macroeconomic dynamics that might change bureaucratic staffing levels, policy priorities, and tax revenues.

Capacity and the Environmental State

We adopt Rea and Frickel's (2023) definition of the environmental state as "all governmental organizations and institutions that aim to reorganize production, consumption, and other forms of human activity in ways that try to minimize long-term ecological degradation and that attempt to uphold environmental rights" (p. 256). Like the social welfare state, we therefore understand the environmental state as a source of environmental stratification and decommodification: it attempts to redistribute environmental goods and bads created by capitalist production and market dynamics such that "bads" are minimized and, to the extent that environmental rights are universal, both goods and bads are more equitably distributed. In short, it attempts to deliver environmental welfare. Like the social welfare state, the environmental state is also imperfect and nationally particular, always produced by the distinctive histories, institutional features, a ongoing political-economic developments of different nation-states around the world (cites).

Environmental and political sociologists are only now starting to take up the environmental state as a serious object of inquiry (but see Mol 2016, 2018) and have therefore never explicitly theorized the features of the environmental state that might shape its capacity to deliver environmental welfare. Nonetheless, environmental and political sociologists and kindred spirits working in science and technology studies offer a great deal of insight into the dynamics of environmental political economy likely to shape environmental state capacity growth and decay. We focus on the most central and well-developed insights from this diverse body of literature: the dynamics of environmental regulation and business opposition; advocacy by nonprofits and civil society; the politics of scientific expertise; state-led developmentalism; and the moral and cultural politics of nature.

Regulation and Industry Opposition

The historical core of North American environmental sociology posits that the environmental state is effectively subordinate to the interests of capitalists and the structural features of the "treadmill of production" Schnaiberg (1980). As Schnaiberg, Pellow, and Weinberg (2002) put it, "economic criteria remain the foundation of decision making about the design, performance and evaluation of production and consumption, dwarfing any ecological concerns," and "the state also shares this orientation" (p. 16; repeated verbatim at pp. xx). They elaborate that in United States in particular, "treadmill organizations generally resist environmental regulation with all the substantial means at their disposal," and, "where direct resistance against any environmental legislation becomes infeasible… firms first dilute the legislation to minimize its impacts on their operations. Then they wait for opportunities to further lighten their regulatory load" (pp. xx).

In short, political action by the state that slows or restricts capital accumulation will invoke industry resistance and, moreover, in Schnaiberg et al.'s (2002) reading of history, that resistance has consistently and effectively disarmed the environmental state.

A great deal of environmental social science builds from this perspective. That state-led environmental regulatory threats invoke political attack from firms and industries is as clear an empirical finding as one will encounter in social science. An extensive body of work on the climate change counter movement documents the ways that fossil fuel interests and their political allies have, for decades, undermined climate-related political interventions that threaten their business models (Stokes 2020; Brulle XXXX, Franta XXXX; Roberts XXXX). There is evidence that economic output is beginning to "decouple" from carbon emissions in nation-states where climate policy is stringent – a pattern that suggests at least some environmental state autonomy from the control of carbon-related interests – but effects are small and muddied by patterns of "offshoring" emissions from high- to low-intensity national economies (Thombs and Jorgenson 2025). More specific industry-specific case studies reveal how specific historical conditions, like cooptation of health-based activism by labor groups, the relegation of harm to narrow constituencies, and bottom-up construction of regulatory rules, can facilitate the "invisiblization" of environmental risk and support the continued existence of environmentally harmful industries like coal mining (Lévesque 2025). Beyond industry interests in particular, accounts of climate politics suggest that labor groups are prone to siding with the "climate forcing" industries that employ them (Mildenberger 2020; Colgan et al 2023, Green 2025), and evidence suggests that even climate-concerned citizens can mobilize against interventions like carbon taxes when they perceive them as unfair and expensive (Driscoll 2023). Investigations of the innerworkings of the environmental state itself show how scientific sensibilities can clash with state-led policy goals focused on environmental justice (Harrison 2023). There is, in short, considerable evidence to support Schnaiberg et al.'s (2002) assessment that environmental state capacity is consistently weakened by industry and its allies – even unwitting ones, like scientists working in environmental ministries.

Pro-Regulatory Dynamics and Developmentalism

Other regulatory dynamics are possible. As Hart (2004) insists, "business" – and by extension, "capital" and "labor" – are not cohesive interest groups with uniform preferences vis-à-vis environmental regulation and the environmental state. The political logic of aspirational policy agendas like the Green New Deal and green industrial policy more broadly center on mobilizing labor and industrial sectors with vested interests in renewable energy technologies and a fully electrified economy (Allan and Nahm 2025;

Block et al. 2024; Meckling and Nahm 2018). Regulatory limits on fossil fuel use – for example, carbon taxes and cap-and-trade schemes – may thus invite industry opposition from some industrial sectors, but they also invite support from, for example, battery-powered electric vehicle manufactures, reenable energy firms, electric appliance manufacturers, and related factions of industry and labor (cites). To the extent that the environmental state takes up policy positions in support of the renewable energy and an 'electrified economy,' it can expect political support from related factions of capital and labor.

More broadly, as Buttel (2000) recognized a quarter century ago, developmentalist dynamics like these are central to understanding the environmental state and its role supporting various "green" economic innovations, even when that developmentalism is not widely appreciated and may be "hidden" (Block 2008, Block et al. 2024). Of course, developmentalism in general may be ecologically destructive, especially as it is related to resource extraction and industrial pollution (Bunker and Ciccantell, 2005). Which is to say, the broader developmental state often works at odds with the environmental state. But a great deal of developmental activity driven by the environmental state is strongly coupled with the provision of environmental welfare, including subsidies and technical assistance given to farmers to control erosion since the 1930s (cite), hundreds of billions of 2020 dollars invested in municipal wastewater treatment and pollution reduction infrastructure in the 1970s (cite), and the more recent and short-lived efforts under the Biden Administration's Inflation Reduction Act to use large-scale public spending to support environmental justice and the renewable energy transition (cites).

The generally hidden nature of these interventions means that such political activities are less likely to evoke the widespread popular support that highly visible, universal social welfare policies do (e.g. social security and Medicare). Environmental-developmentalism may thus be less likely to trigger growth in environmental state capacity via legislative responses to popular support for expanded spending on these forms of environmental welfare (cites). Narrower interests linked to specific developmental programs, though – for example, support from agricultural groups or municipalities or manufacturers that benefit from environmental-developmental subsidies – are still likely, and suggest that the environmental state's developmentalism may generate a more contingent but still present politics conducive to growth in environmental state capacity. Indeed, low visibility and low public salience can work as something of a political benefit, allowing firms and industry groups to quietly advocate for, for example, pro-environment subsidies that might cut against popular partisan positions ideologically coded as liberal in a hyper polarized political context (cites). Thus, developmentalism might play a considerable role in

overcoming some of the probable environmental state capacity erosion driven by political resistance to regulatory interventions.

Advocacy by Civil Society

The environmental state also receives considerable support from civil society, especially from environmental social movement organizations. In the United States this advocacy is encouraged by the institutional and organizational infrastructure of the state itself. U.S. welfare provision is substantially delegated to a network of private and often nonprofit organizations that support the work of governance through everything from formal public-private partnerships to a much wider array of "associational policy" forms where boundaries between state and non-state actors are far less clear (Morgan and Campbell 2011; Mayrl and Quinn 2016). In the context of the environmental state, these "hybrid arrangements among the state, market, and civil society actors" (Fisher et al. 2021, p. 334) support everything from brokering land acquisition and doing habitat management work (e.g., the Nature Conservancy) to monitoring wastewater pollution levels to help hold local, state, and federal governments accountable to legal standards (e.g., the federated Waterkeeper Alliance). Such a networked state structure, extending far beyond the formal organizational bounds of the state itself, creates the institutional and organizational channels that interest groups, service providers, and partisan bureaucrats use to reflect power back on the state and reshape, in our case, the provision of environmental welfare (Bartley 2007; Fisher and Svendsen 2013; Clemens 2020; Merriman and Pacewicz 2022; Brandtner 2026).

Within this broader network, the structure of environmental judicial politics in the United States provides one especially important institutional channel for civil society groups to shape environmental welfare provision and environmental state capacity. Most major environmental statutes in the United States, as penned and revised in the 1970s, contain "citizen suit" provisions that explicitly invite civil lawsuits from advocacy groups and citizens in service of holding the state accountable to its legal obligations to provide environmental welfare. As a matter of history, such provisions arose out of mid-twentieth century public interest law movement (Sabin 2021); as a matter of sociology, they institutionalize a channel for advocacy groups to reshape environmental state capacity by making formal, legally enforceable demands for environmental welfare provision. The empirical evidence makes clear that environmental groups – and not firms and industry groups – dominate this channel for change-making, winning about as often as they lose and regularly helping to set precedent that reshapes environmental policy and that has, over the arc of the past half-century, generally supported an expanded and more interventionist environmental state (Lazarus 2022; Rea, Merton, and Rife 2024; Lifset

2014; Sabin 2021). Exposure to environmental litigation, then, is best understood as a central source of capacity-enhancing supportive political pressure: overwhelmingly, it is driven by advocacy groups demanding more robust forms of environmental protection and leads to formal-legal obligations imposed upon the state that require the provision of environmental welfare. At times, these legal demands filter all the way up to concrete discussions of fiscal appropriations and are visible in agency budget requests, when leaders of units of the environmental state make requests for specific budget line items needed to adhere to court-mandated environmental requirements (cites).

The Politics of Scientific Expertise

[*Note: the text that follows is a placeholder lifted directly from a prior publication, Rea and Frickel 2023, and needs to be rewritten for this paper.*] Human impacts on the biophysical world are increasingly understood through the lenses of natural and technical sciences like biology, toxicology, ecology, atmospheric chemistry and physics, hydrology, as well as engineering – areas of expertise that have flourished and professionalized in parallel with the environmental state's own development (Bocking 2004; Frickel 2004; Hays 1989; Nash 2007). The politics of expertise that develops as a result works from within and from without the environmental state. Endogenously, bureaucrats and agency leaders marshal their organizational expertise to assess environmental impact, moderate conflict, build reputation, and establish legitimacy (Carpenter 2001, 2010; Demortain 2019; Oppenheimer et al. 2019). More exogenously, environmental movement organizations leverage their expertise to gain disproportionate access to legislative hearings (Ganz and Soule 2019) and advocate for environmental justice (Ottinger and Cohen 2011). And anti-regulatory organizations build counter-expertise to slow regulatory momentum on everything from greenhouse gas emissions (Brulle 2022; Lahsen 2008) to endangered species (Scoville 2019) to chemicals (Creager 2021). Technoscientific expertise is thus doubly important for theorizing the environmental state: first, science is a central source of environmental knowledge and environmental policymaking (Jasanoff 1990), as well as a principal source agency reputation, authority, and autonomy (Carpenter 2001, 2010). Second, it is also a focal point of political contention that offers entrepreneurial bureaucrats, movement organizations, industry groups, and scientists themselves a foothold for expanding or challenging state regulatory authority and control over society-environment relations – including by challenging expertise itself (Jasanoff 2006; Moore et al. 2011; Scoville 2022).

Like regulation, however, technoscientific expertise is also organized by the developmental and, more broadly, the organizational histories of environmental state ministries. EPA's roots in public health, FWS's roots in wildlife management, and Army Corps' roots in

infrastructure development (to say nothing of its embeddedness in the U.S. military) all shape the organizational structure and suites of professions that dominate these elements of the environmental state. Professionalization in general can act as a central source of bureaucratic autonomy important for understanding state development (Carpenter 2001), but the composition of professions and their attendant expertise are also crucial for explaining the ways agencies and ministries approach the provision of environmental welfare, from historical approaches to forest management (Carpenter 2001) to the contemporary management of environmental risk (Demortain 2019; Elliott 2021), to the incorporation of environmental justice – or lack thereof – into environmental governance mandates (Harrison 2019). Agency histories organize the distribution of expertise across the environmental state, and the distribution of expertise helps organize the politics that shape the provision of environmental welfare.

Cultural Politics of Nature

[*Note: the text that follows is a placeholder lifted directly from a forthcoming publication, Rea and Frickel 2026, and needs to be rewritten for this paper.*] The cultural politics of nature also remain understudied and theorized in environmental state theory. Conventional environmental sociological approaches to the state have been, at root, materially focused political-economic theories (Mol and Spaargaren 2000; Schnaiberg 1980) and have paid less attention to the role of culture in shaping environmental outcomes.

Even so, a wide and growing range of sociological literature highlights how understandings of nature and the natural world, often as mediated through state institutions, shape environmental statecraft. Fourcade (2011), for example, highlights how legal-cultural constructions of nature dramatically shape the valuation of ecological harm in the United States and France, while Bargheer (2018) uses culturally particular understandings of birds to help explain different protection regimes in Germany and the United Kingdom. Angelo (2021) foregrounds the ways that particular constructions of nature as public benefit shaped urban development in the Ruhr Valley in northwestern Germany. Elliott (2021) uncovers the ways that the moral politics of value shape state response to climate disasters, while Scoville (2022) shows how different understandings of nature in legal and scientific domains shape the conflicts that structure environmental governance and, more exactly, endangered species protection in the Sacramento River Delta (see also Farrell 2015). In a similar way, Elliott (2024) helps reveal how particular ideas about home ownership evolve along with changing understanding of environmental risk in a climate changed world, as questions of ownership rights and economic value are mediated by

courts, the law, and scientific and economic expertise. And Farrell (2020) documents the ways that the ultra-wealthy reshape conservation politics in the West, at least in part as a means of moral legitimation of their extreme wealth.

To be sure, environmental statecraft cannot be entirely reduced to questions of social construction and the cultural mores that shape it. But neither can it be fully reduced to "objective" questions of material environmental harm and benefit. As the literature we cite here foregrounds, how people understand the natural world is both collectively constituted and also constitutive of the politics that shape how environmental policy is made and implemented, and thus how environmental welfare is provided. A full-blown sociology of environmental states must grapple squarely with these sorts of phenomena: not just who wins and losses in environmental conflicts, and with what biophysical consequences, but also, in tandem, how culturally contingent and contested understandings of nature shape those conflicts, as they manifest within and shape environmental state activity.

Data and Operationalizing Theory

To study the evolution of environmental state capacity through time and across the diversity of governmental units that constitute the environmental state, we need longitudinal unit-level data that spans the full diversity of the U.S. federal government over many years. Data spanning decades is necessary to capture the dynamics that shape ebbs and flows of environmental state capacity over time. Data extending beyond the environmental state itself is necessary in order to set the changes in environmental state capacity we observe in broader context, so as to better understand which changes are attributable to broader patterns of politics, and which are particular to environmental politics and statecraft.

To fulfill these goals, we build an original data set by merging account-level spending data from the U.S. Office of Management and Budget (OMB) with more than 94.7 million person-years of individual-level employment data from Office of Personnel Management (OPM) for the period 1973-2021. We aggregate both data sources up to the unit-level (e.g., agency or bureau-level) measures of features, like aggregate spending, number of employees, and aggregate educational attainment of staff.

These data allow us to directly measure total positive outlays and employment levels in all major and most minor agencies, bureaus, offices, and other administrative units in the U.S. federal government. We take account of agency mergers and reorganizations through time to ensure long-term continuity between OPM personnel data and OMB spending data. We exclude agencies that house fewer than 50 employees in any observed year (this excludes

89 agencies, 51 of which are special commissions); agencies that exist for less than 10 years (this excludes an additional 22 agencies); and a handful of intelligence agencies and quasi-public, quasi-private agencies and enterprises not tracked by OPM (e.g. the Central Intelligence Agency, Post Office, Freddie Mac).

We also exclude the department of defense for two reasons. First, OPM data do not disaggregate the department of defense into the subunits that we track across the rest of the federal bureaucracy (e.g., the National Park Service is a subunit of the Department of Interior that we can trace across the data; comparable subunits of the Department of Defense are disaggregated in the OPM data). Second, especially in aggregate form, there are strong reasons to expect that the politics of national defense spending are distinct from the rest of the bureaucracy and might skew findings that otherwise apply across units. This leaves us with 239 bureaucratic units that comprise the vast majority of the federal bureaucracy in the United States (Supplemental Materials). 18 of those units are the core units of the environmental state (Table 1).

Taken as a whole, these data offer the most comprehensive and detailed portrait of the U.S. federal bureaucracy – and the environmental state nested within it – that we know of. They account for between 1.74 and 2.18 million federal civil servants and between $2.16 and $5.6 trillion in federal spending annually. Spanning eight presidential administrations and twenty-three Congresses, the data allows us to develop a long – but detailed – view of the environmental state as a historical and organizational formation. Our focus on individual bureaucratic subunits of the state also makes our investigation empirically unusual: despite widespread theoretical appreciation of the state's heterogenous and disjoined internal character (cites), social scientists – mostly political scientists – are only beginning to analyze changes in capacity *within and between* diverse governmental units and over time (Harbers 2015, Ang 2017, Bersch 2017, Koren 2018, McDonnell 2020, Agneman 2022).

Operationalizing State Capacity

We operationalize capacity simply, as the log of the sum of spending for a unit of the federal bureaucracy, adjusted for inflation, and number of employees employed by a the unit. We weight spending values such that they make a roughly contribution to our capacity measure as employment values.[2] Our operationalization is obviously an abstraction – the

[2] Specifically, the raw spending values we begin with are represented in billions of dollars. We multiply those values by 5,000, which makes spending and employment roughly equal in magnitude. Mathematically, this can be thought of as a simple weighting exercise. If one prefers to think in terms of dollar units, this adjustment is the equivalent of transforming spending figures from billions of dollars to millions of dollars (multiplying by 1,000) and then multiplying by 5 again, which can be thought of as shifting to units of $200,000s rather than millions - an unconventional but perfectly logical unit of value. For example, a spending value of 10 in the starting data represents $10 billion dollars. Multiplying by 1,000 yields a new

log of the sum of dollars spent and people employed has no clear meaning on its face – but it simply and directly captures two of the most fundamental components of state capacity. Annual spending levels capture the elemental, highly commensurable fiscal resource – money – that units of the state transform into all the other resources and sources of power they need to concretely 'penetrate territory and logistically implement decisions across a territory' - that is, wield infrastructural power. Staffing levels capture an elemental, translational resource – human capital – that enables units of the state to translate pure resources – fiscal and otherwise, including knowledge and technology – into specific acts of governance and domination.

A simple thought experiment illustrates the centrality of spending and staffing levels to state capacity: at the limit where a governmental unit's spending and staffing levels approach functionally infinite levels, the unit is poised to wield very high levels state infrastructural power, to say nothing of whether it actually does so (which is a matter of implementation and effectiveness, not capacity as such). Conversely, at the limit where a unit's spending and staffing levels both approach zero, the unit will struggle to penetrate the state's territory and logistically implement decisions – its infrastructural power will decline to zero. The actions of the second Trump Administration in 2025 illustrate this dynamic writ large: huge investments in the budget and staffing of Immigration and Customs Enforcement (ICE) and dramatic cuts in the spending and staffing of units like the Environmental Protection Agency, the U.S. Agency for International Development, and the Department of Education have dramatically impacted the capacity of these units to wield infrastructural power.

Spending and staffing levels are also especially useful indicators of state capacity for two other important reasons. First, these two quantities are easily measurable; (relatively) easily accessible in our specific context and in many others (i.e. comparable data exist in other nation-states or sub-national units); and are each, individually, highly commensurable, offering readily comparable metrics within and across governmental units that have vastly different governance mandates and that do very different things. All units need fiscal resources and human capital; at a first-order approximation, all will see capacity increase as spending and employment grow and decline as spending and employment erode away.

Second, public spending and employment are broadly substitutable measures of capacity, particularly in a federal, delegated welfare state like the United States where government

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figure of 10,000 units of millions of dollars. Multiplying by 5 then yields a figure of 50,000 units of $200,000. We take the natural logarithm to account for the multiple orders of magnitude differences in spending and employment in the federal bureaucracy (Supplemental Materials).

routinely delegates and outsources the work of governing to lower-level and private organizations. Where a unit's employment shrinks but its spending grows, aggregate levels of capacity arguably remain relatively steady: an increased budget allows the unit to fund lower level (e.g., state or local) or private (e.g., contracted private or nonprofit) organizations to do work that unit employees could otherwise do themselves. In cases like this, the governmental unit becomes an indirect enabler of a different organization's capacity, reorganizing but not eliminating the state's overall ability to penetrate its territory and logistically implement decisions. Conversely, where a unit's staff size grows but its overall spending shrinks, it is likely that the unit's internal capacity to govern grows, via in-house human capital, while its external capacity to support outside organizations declines, again yielding a close to net-zero change in aggregate state capacity.[3] We reiterate that such tradeoffs between 'in-house' and outsourced governance should not be conflated with variance in governmental performance or effectiveness related to these tradeoffs. Along with questions of equity, the essence of debates about governmental delegation and privatization turn on assessments of the *effectiveness* of, for example, trading off governmental spending (e.g., outsourcing and contracting) for direct governmental employment and action (e.g., public works) – not on the higher-level question of whether financial capital and human capital are, in principle, substitutable elements of the state's overall *capacity* to govern.

Operationalizing the Environmental State

Building from the data above, we operationalize the environmental state inductively, including all agencies whose annual spending on "natural resources and environment" or "energy" as categorized by Office of Management and Budget averages one third (33%) or more of total agency outlays. This approach identifies 22 candidate agencies as constituting core elements of the environmental state. From this list, we cull the Advisory Council on Historic Preservation, a tiny federal agency that focuses on historic preservation but not "environment"; the Rural Utilities Service, which focuses primarily on rural development but not on environmental welfare; both the Dept. of Interior Office of Inspector General and the Office of the Solicitor, both office-level organizations that play largely administrative roles, the former as a government watchdog and the latter as the chief lawyer for the Department of Interior; and the residual organizational category linked to the generic Office of the Secretary of the Interior, which captures all employees in the

[3] Of course, at the limit that spending reductions also lead to declines in staffing, in absolute numbers or in terms of the qualifications and skill, then reductions in spending may also lead to reductions in human capital-linked capacity.

Department of Interior not linked to other specific units, including employees whose membership to a discrete unit of federal bureaucracy cannot be confidently identified.

This leaves 18 key agencies that constitute the environmental state in our analysis (Table 1). Defined this way, the environmental state represents over 9 million person-years within the broader data (10% of all observations and 13% of observations excluding the Department of Defense), signaling the substantial human capital invested in environmental protection and resource management and the importance of these functions for understanding the modern U.S. state as a whole. Notably, however, the environmental state only accounts for a small fraction of total government outlays: about 5% of discretionary and less than 1% of net spending by the U.S. federal government in 2019.

Operationalizing Regulatory Prominence

[to be written]

Operationalizing Developmentalism

[to be written]

Operationalizing Civil Society Support

[to be written]

Operationalizing Formal Expertise

[to be written]

Operationalizing the Cultural Politics of Nature

[to be written]

Modeling Changes in State Capacity

Starting with the operationalization described above, we construct a measure of average rate of change in capacity by estimating the rolling five-year average of change in state capacity for all units of the federal bureaucracy from 1973 to 2021. Specifically, for each governmental unit in our data, we estimate a binomial linear regression of capacity as a function of time (years) over a period of five years, moving from the first five-year period (1973-1978) to the last (2016 to 2021) for each unit in our data. The slope (β) from each regression yields the five-year average rate of change in capacity for each unit-year, yielding estimates that span from 1975 (the first midpoint of our rolling estimates) to 2019 (the last

midpoint of our estimates). This yields a total of 8,601 unit-year capacity estimates across the entire federal bureaucracy, and 652 unit-year observations in the 18 primary units of the environmental state.

Figure 1 plots these capacity estimates for each of the 18 individual units of the environmental state. Figure 2 plots (A) the same estimates for each unit of the environmental state, shown together, and (B) the same estimates for all 239 units in our data. For Figures 1 and 2, positive rates indicate times and units experiencing *growth* in capacity. Negative rates indicate times and units experiencing *declines* in capacity. Thus, lines mostly above zero – even when sloping downwards – represent units of the bureaucracy growing in capacity, while lines falling mostly below the zero line – even when sloping up – represent units that are declining in capacity.

A few points are noteworthy. First, a clear periodicity is visible in the environmental state entire bureaucracy, suggesting that common factors impact changes to state capacity across the state. Second, the overall linear trend subtly declines in the case of the environmental state (Figure 2A) and subtly grows in the entire bureaucracy (Figure 2B) – a difference in trends implied by a negative median growth rate for the environmental state and a positive median growth rate for the bureaucracy as a whole (Figure 3).

[Table 1 to go here]

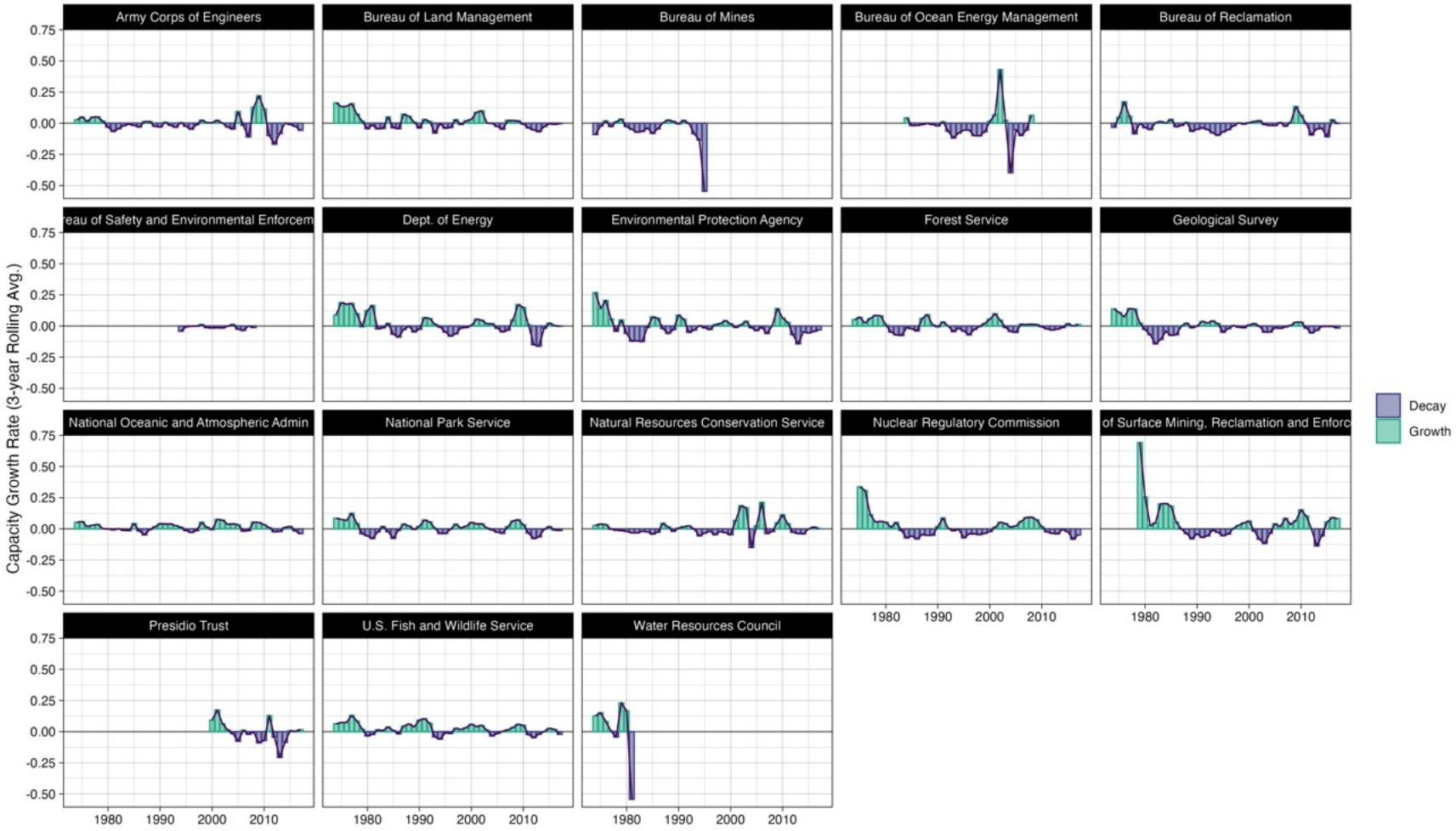


Figure 1: Average state capacity growth rate for 18 principal elements of the environmental state, 1975-2019.

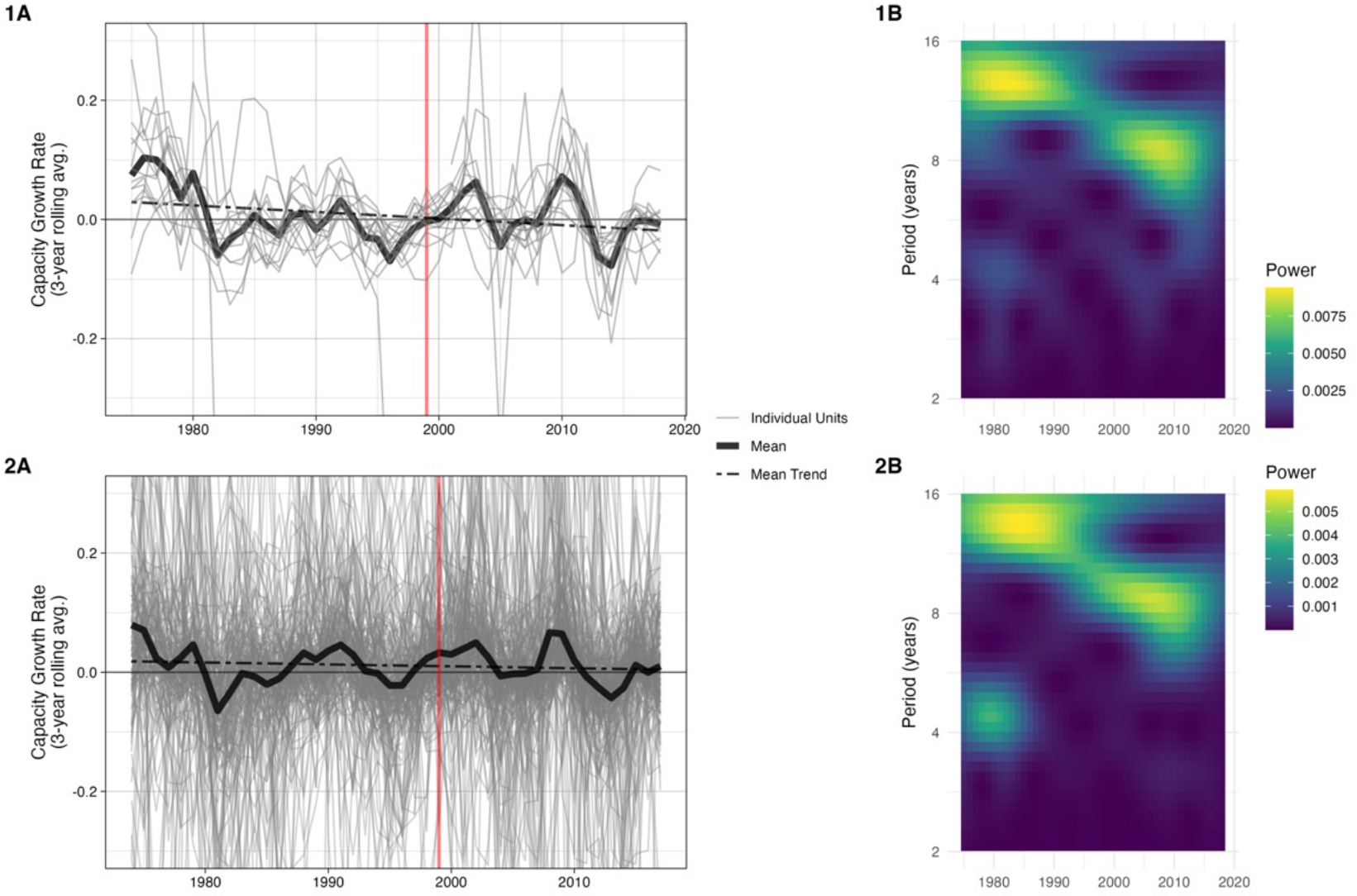


Figure 2: Average state capacity growth rates for (1A) for 18 principle environmental state agencies, 1975-2019 and (2A) for 239 federal agencies, bureaus, and offices over the same time span. Red vertical line early and late period divide used in fsQCA. Dominant periods of fluctuation in capacity growth rates for (1B) the 18 principle environmental state agencies, 1975-2019 and (2B) for 239 federal agencies, bureaus, and offices of the full bureaucracy.

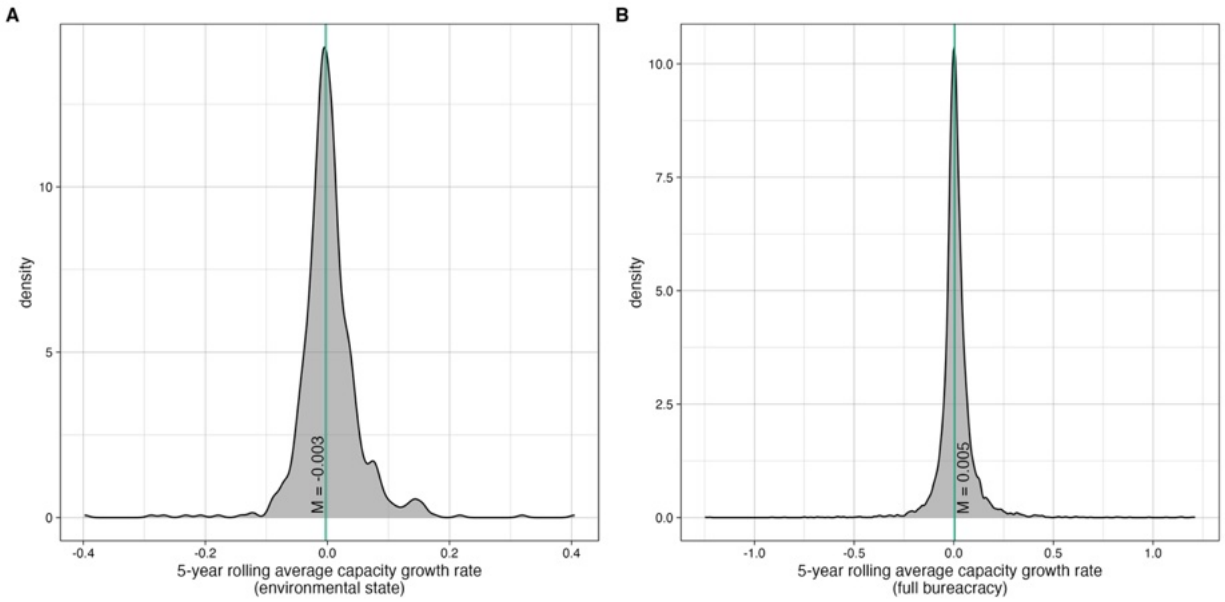


Figure 3: distribution of average state capacity growth rates (A) for 18 principle environmental state agencies, 1975-2019 and (B) for 239 federal agencies, bureaus, and offices over the same time span. M (green vertical line) indicates median value, -0.003 for units of environmental state and 0.005 for the bureaucracy as a whole.

Bureaucracy-Wide Changes

To assess what shapes the ebbs and flows of state capacity overall, we first model shifts in capacity as a function of national and unit-level predictors across the entire federal bureaucracy (Table 2). Results suggest that economic growth and partisanship in federal office are key predictors of changes in state capacity across the U.S. federal bureaucracy. Two-year lagged growth in GDP strongly and positively predicts growth in state capacity across the entire federal bureaucracy – and thus when GDP contracts, capacity also decreases. Over the study period, Democratic control of the presidency and the House of Representatives, both also lagged two years, also have a positive effect on changes in state capacity across the federal bureaucracy, relative to Republican control of those institutions. (There is no clear relationship between capacity and political control of the Senate.[4]) Despite a pervasive sense that state capacity has steadily eroded since the 1970s, as presumed by theories of neoliberalism and the "hollowing out" of the state, we find no clear evidence of a secular decline in state capacity over time.

[4] The two-year lagged indicator of partisan control of the Senate remains not significant even if the House and President control variables are removed from the model.

Table 2: Linear model of 5-year moving average change in capacity across 239 units of the federal bureaucracy, 1975-2019. No fixed effects (1,2) and year fixed effects (3).

	1	2	3
	Context	**Context + Unit**	**Context + Unit + year FE**
President (D =1)	0.0181***	0.0177***	
	(0.0041)	(0.0037)	
House Maj. (D =1)	0.0185***	0.0178***	
	(0.0047)	(0.0046)	
Senate Maj. (D =1)	0.0052	0.0053	
	(0.0039)	(0.0039)	
Δ GDP (%)	0.0025***	0.0023***	
	(6e-04)	(6e-04)	
Year	0	0	
	(2e-04)	(2e-04)	
Master's + (%)		0	0
		(2e-04)	(2e-04)
Size [log(n)]		4e-04	5e-04
		(0.0012)	(0.0012)
Devel'mental [log($)]		-8e-04	-3e-04
		(0.0036)	(0.0035)
Devel'mental (%)		7e-04	-5e-04
		(0.0097)	(0.0095)
Environmental State		-0.0122*	-0.0127*
		(0.0054)	(0.0054)
Special Nature [log($)]		-0.0109	-0.0109
		(0.0082)	(0.0084)
Special Nature (%)		0.0202	0.0213
		(0.0136)	(0.0137)
Intercept	0.0545	-0.0699	
	(0.3669)	(0.3904)	
R2	0.0179	0.0197	0.0619
Adj. R2	0.0173	0.0182	0.0561
Within R2			0.0013
sigma	0.0964	0.0925	0.0907
# obs.	8208	8097	8097
AIC	-15099.6701	-15563.4965	-15844.0727
BIC	-15057.5929	-15472.5063	-15487.111
Log-likelihood	7555.8351	7794.7483	7973.0363

Note: Agency clustered standard errors. p ≤ 0.001 *** p ≤ 0.01 ** p ≤ 0.05 * p ≤ 0.1 †

For the most part, our bureaucracy-wide models do not suggest that unit-specific features and the politics they produce – a focus on developmentalism, for example, or levels of formal expertise – are systematically related to capacity growth or decay. Core elements of the environmental state that we focus on seem to have marginally lower levels of change in capacity than the bureaucracy overall – they experience lower growth rates (Tables 2, 3 models 2, 3) – but no other theoretically indicated predictors of changing state capacity bubble up from our models. This remains true even when we control for all unit-invariant factors each year, like global external shocks and macro political and economic conditions that impact the entire bureaucracy (i.e., estimating a model with year fixed-effects (Table 2, model 3). It is not unreasonable to assume that differential political and organizational dynamics across different sectors of government – the different and even diverging politics of healthcare (Carpenter 2012) and policing and incarceration (Wacquant 2008), for example – offset one another and yield aggregate null effects in our bureaucracy-wide models.

Table 3: Linear model of 5-year moving average change in capacity across 239 units of the federal bureacracy, 1975-2019. Unit fixed effects (1,2) and unit and year fixed effects (3).

	1	2	3
	Context	**Context + Unit**	**Context + Unit + unit FE + year FE**
President (D =1)	0.0182***	0.0156***	
	(0.0041)	(0.0035)	
House Maj. (D =1)	0.0177***	0.0148***	
	(0.0047)	(0.0042)	
Senate Maj. (D =1)	0.0056	0.0054	
	(0.0039)	(0.0036)	
Δ GDP (%)	0.0024***	0.0019**	
	(6e-04)	(6e-04)	
Year	-2e-04	3e-04	
	(2e-04)	(3e-04)	
Master's + (%)		-1e-04	-1e-04
		(4e-04)	(4e-04)
Size [log(n)]		-0.0446***	-0.0419***
		(0.0092)	(0.0093)
Devel'mental [log($)]		-0.0851***	-0.0816***
		(0.0175)	(0.0171)
Devel'mental (%)		0.0876*	0.0797†
		(0.0421)	(0.0412)
Special Nature [log($)]		-0.1101***	-0.1032**
		(0.0319)	(0.0347)
Special Nature (%)		0.2214**	0.2149**
		(0.075)	(0.0732)
R2	0.1069	0.1792	0.2127
Adj. R2	0.0804	0.1538	0.1844
Within R2	0.0189	0.0988	0.0753
sigma	0.0933	0.0859	0.0843
# obs.	8207	8096	8096
AIC	-15412.7907	-16535.9766	-16797.9948
BIC	-13743.7579	-14828.19	-14824.2414
Log-likelihood	7944.3953	8511.9883	8680.9974

Note: Agency clustered standard errors. p ≤ 0.001 *** p ≤ 0.01 ** p ≤ 0.05 * p ≤ 0.1 †

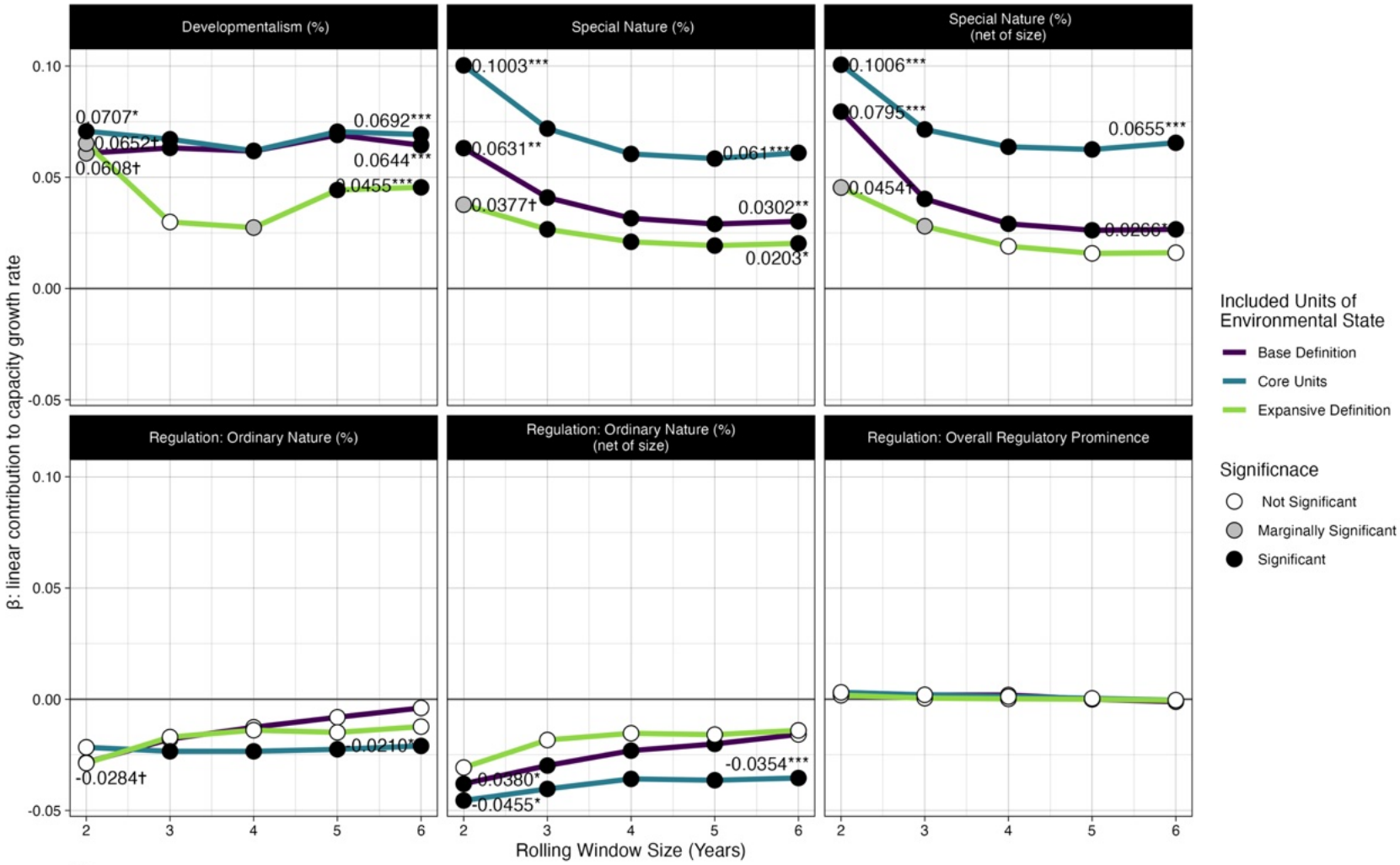
Estimating models with unit fixed-effects helps bring into focus how time-varying changes to *shared context or internal features* of governmental units relate to shifts in state capacity *within* those governmental units (Table 3). High-level contextual factors, like GDP and partisan control of the levers of government, remain highly significant predictors: across the board, growth in GDP and Democratic control of the presidency and the House supports growth in state capacity within governmental units (Table 3, models 1, 2, 3). There is no evidence that a unit's formal expertise related to changes capacity, but developmentalism – the fraction of its spending issued as external grants to support economic development and delegated governance – and the provision of special nature – is positively associated with capacity growth rates across the entire bureaucracy. Changes in unit size emerge as significant (Table 3, models 2, 3, 4), but in a unit fixed-effects specification, where variation is constrained to within-unit changes over time, this is an artifact of variable construction: since the dependent variable in our model is the rate of change of the log of the sum of employment and spending, rates of change of capacity will be smaller for larger agencies that increase employment levels relative to baseline.

Partially in line with the expectations of Rea and Frickel (2023), increases in the provision of special nature *within* units are associated with growth in capacity, but we should not conflate this finding with the observation that within *and between* governmental units across the entire bureaucracy, there is no evidence that, on average, the provision of special nature is related to growth in state capacity (Table 2, models 2,3).

Changes in Environmental State Capacity

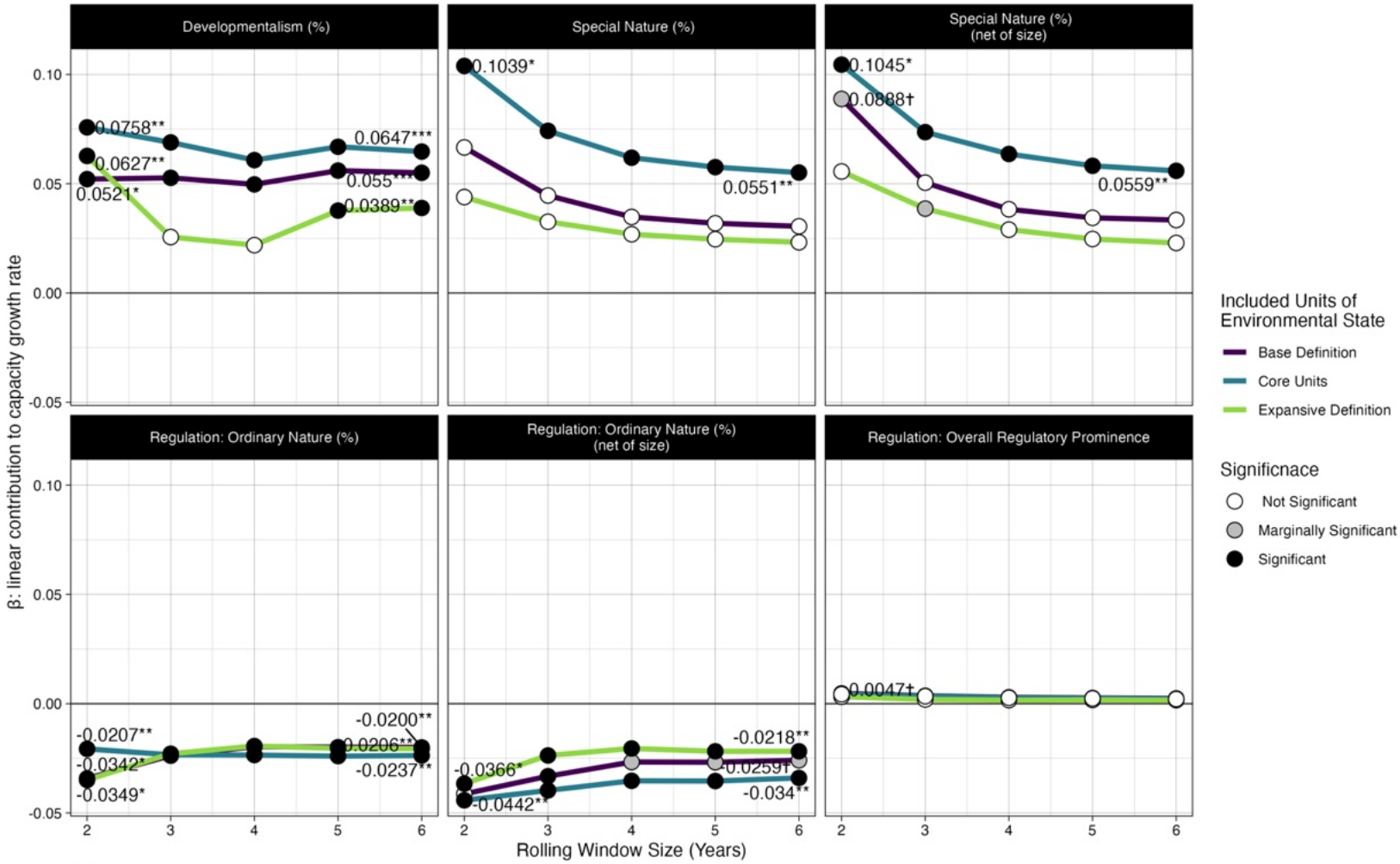
What factors drive changes in capacity across the environmental state in particular? Our findings suggest two sets of causal forces. As expected, undulations in average capacity growth rates in environmental agencies closely mirror those in the federal bureaucracy as a whole (Figure 2). Similar to the previous analysis, we find that partisanship – but not the macroeconomy – are closely related to shifts in capacity in the environmental state (Table 4, models 1-8; Table 5 models 1-8). And unlike in the bureaucracy as a whole, we find clear evidence of a secular average decline in capacity over time. In this general sense, the environmental state is, in part, one of the bureaucratic flock, buffeted by the same partisan forces that shape the entire federal government, while the macro-historical forces of long-term erosion, perhaps shaped by environmental neoliberalism, emerge in the environmental state.

We also find evidence that environmental state capacity is likely be shaped by an additional set of factors distinctive to the politics of environmental welfare. Focusing in on the 18 core units of the environmental state, as shown in Table 4, helps uncover these more distinctive dynamics. For example, higher levels of expertise are positively associated with capacity growth (Table 4, models 1-7), even net of exogenous shocks and cross-cutting forces that uniformly shape politics and administration across the bureaucracy (i.e., in year fixed-effect models; Table 4, models 8-10). The association with expertise disappears in unit fixed-effect models, however, suggesting that this finding is mostly driven by differences between agencies and bureaus, not changes within them. The implication is that, unlike the federal government as a whole, units of the environmental state with higher levels of formal, expert knowledge may be structurally positioned in the field of environmental politics in ways that invite a type of politics that generally supports capacity growth. Expanding educational capital within particular units, by contrast, would be unlikely to shift these structural positions.



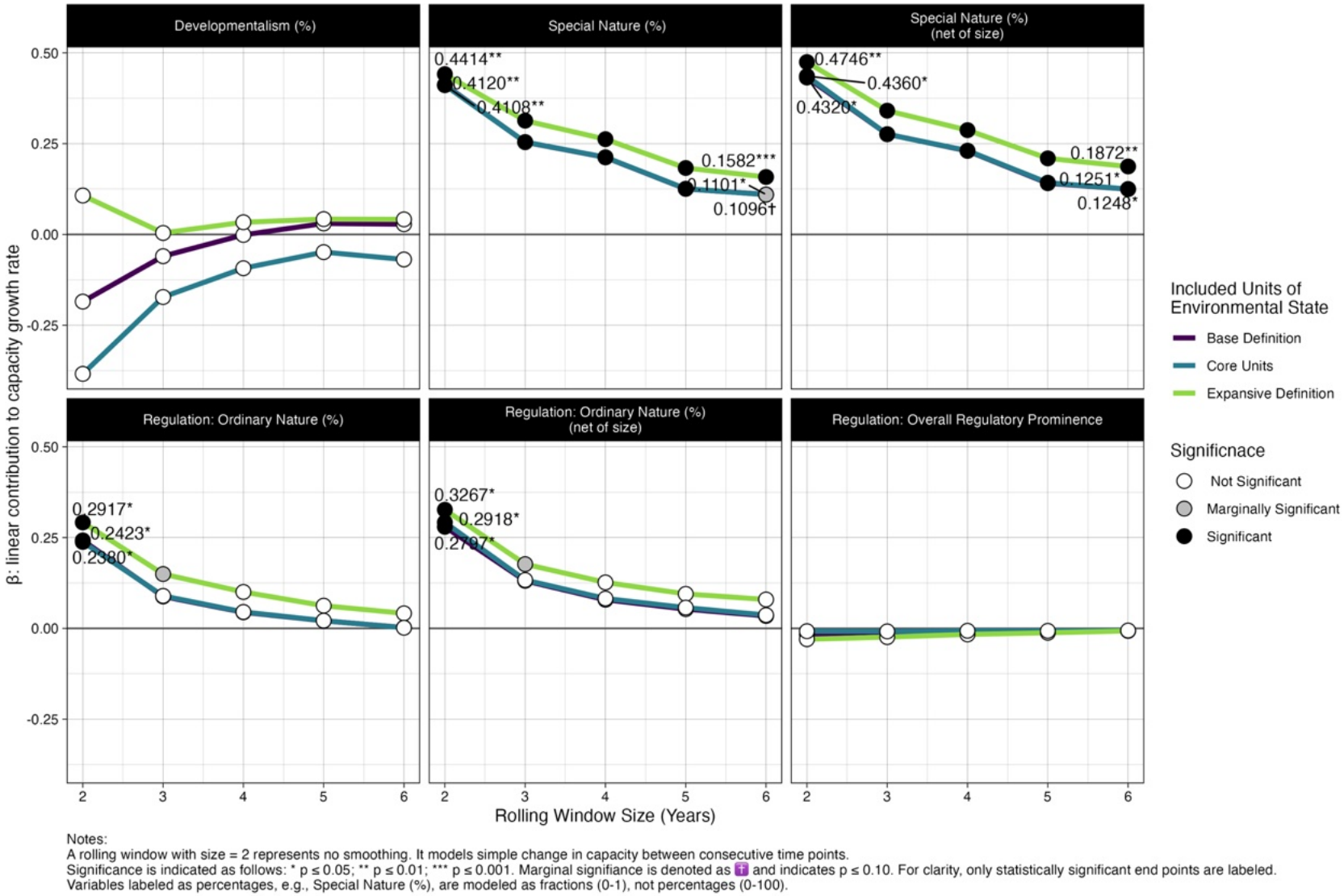
Notes:
A rolling window with size = 2 represents no smoothing. It models simple change in capacity between consecutive time points.
Significance is indicated as follows: * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001. Marginal signifiance is denoted as † and indicates p ≤ 0.10. For clarity, only statistically significant end points are labeled.
Variables labeled as percentages, e.g., Special Nature (%), are modeled as fractions (0-1), not percentages (0-100).

Figure 4: *Key results from* ***random effects*** *models predicting capacity growth. Results from models with different rolling window sizes (2 to 6 years) are shown for the* ***base model*** *of the environmental state (as defined in-text); the* ***core units*** *of the environmental state (all boundary cases excluded); and an* ***expansively defined*** *environmental state (all boundary cases included). Most effects are most dramatic for the core units, highlighting the specificity these effects for the most explicitly and overtly "environmental" units of the environmental state.*



Notes:
A rolling window with size = 2 represents no smoothing. It models simple change in capacity between consecutive time points.
Significance is indicated as follows: * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001. Marginal signifiance is denoted as † and indicates p ≤ 0.10. For clarity, only statistically significant end points are labeled.
Variables labeled as percentages, e.g., Special Nature (%), are modeled as fractions (0-1), not percentages (0-100).

*Figure 5: Key results from **year fixed effects** models predicting capacity growth. Results from models with different rolling window sizes (2 to 6 years) are shown for the **base model** of the environmental state (as described in-text); the **core units** of the environmental state (all boundary cases excluded); and an **expansively defined** environmental state (all boundary cases included). As in Figure 4, Most effects are most dramatic for the core units, highlighting the specificity these effects for the most explicitly and overtly "environmental" units of the environmental state.*



Notes:
A rolling window with size = 2 represents no smoothing. It models simple change in capacity between consecutive time points.
Significance is indicated as follows: * p ≤ 0.05; ** p ≤ 0.01; *** p ≤ 0.001. Marginal significiance is denoted as † and indicates p ≤ 0.10. For clarity, only statistically significant end points are labeled.
Variables labeled as percentages, e.g., Special Nature (%), are modeled as fractions (0-1), not percentages (0-100).

*Figure 6: Key results from **two-way, year and unit fixed effects** models predicting capacity growth. Results from models with different rolling window sizes (2 to 6 years) are shown for the **base model** of the environmental state (as described in-text); the **core units** of the environmental state (all boundary cases excluded); and an **expansively defined** environmental state (all boundary cases included).*

The same pattern holds for unit size (Table 4, models 2-10): in the environmental state, more larger employee rolls are associated with higher capacity growth. Unlike our bureaucracy-wide finding, this effect is likely to be substantive (and not an artifact of variable construction) since, if anything, the mechanical relation between capacity growth and size should be negative (as we see in our unit fixed-effects models; Table 5). As with education, and in line with our theoretical expectations, larger units of the environmental state appear to be structurally predisposed to higher levels of capacity growth, but that increases in employment size *within* agencies and bureaus, by themselves, are unable to change these structural positions. Size, in other words, likely signals a level of political support (for large agencies) or precarity (for smaller ones) associated with categorical differences in the kinds of politics that shape units of the environmental state.

There is moderate evidence that changes in developmentalism in the environmental state are negatively associated with capacity growth (Table 4, models 2-11) – a statistical result that, opposite size and education, seems robustly driven by changes in developmental expenditure *within* specific agencies and bureaus at least as much as it is by differences between them (Table 5, models 2-8; Table 6, models 1-6). Our models cannot reveal the mechanisms that generate this pattern, but the dynamics posited by Rea and Fickel (2023) are one plausible possibility: increases in developmentalism provoke political backlash. Where developmental spending benefits environmental advocates, environmental critics mount political pressure against that spending, perhaps especially when environmental politics is symbolically coded and highly polarized – and, as we document, driven by Democratic control of political institutions (cites). Although outside the scope of our analysis, the second Trump Administration's assault on the Biden Administration's highly developmental climate legislation, the Inflation Reduction Act, illustrates this dynamic in stark form (cites). By contrast, when developmental spending benefits industry and other groups not classically aligned with environmental interests, like housing or rural development and agriculture, environmental advocates may mount political pressure against it. [example]. More generally, developmentalism may become a political liability when it operates without the support of cross-cutting political coalitions.

Rea and Frickel (2023) posit a similar dynamic with respect to regulation, but we find no evidence that regulatory prominence, broadly defined, is linked to changes in environmental state capacity. This runs counter to commonsense theories of

environmental politics and, indeed, regulatory politics generally, but it is less surprising in light of the more nuanced insights of the political science and sociology of regulation. As Rea and Frickel (2023) themselves remind us, a regulatory role is not an inherent political liability. Regulation often invites political support, for example, from industry incumbents interested in erecting barriers to market entry (Carpenter and Moss 2014) and in service of preserving market stability and 'business confidence' (Block 1987), as when auto manufacturers lobby against cuts to emissions requirements in the name of regulatory stability and consistency (cites). And of course, in the case of the environmental state, regulatory roles can also invite support from environmental advocates – indeed, the modern environmental state was born of growing political demands for exactly such regulatory interventions (cites). These kinds of pro-regulatory dynamics may offset the more commonly emphasized – and empirically real (cites) – anti-regulatory advocacy of business interests and free market ideologues. The *qualities* of regulation, in short, and the patterns of political contestation they invite, are likely to matter more than quantity of regulation.

For the environmental state, a focus on special nature is one of the peculiar qualities of governance that complicates simple theories of regulatory politics, and thus the political dynamics that shape changes in state capacity. And just as Rea and Frickel (2023) posit, we find that higher levels of special nature provision are positively and robustly correlated with growth in environmental state capacity (Table 4, models 1-3, 5-8), even net bureaucracy-wide dynamics and external shocks (i.e., net of year fixed-effects; Table 5, models 9-11) *and* net of all time-invariant and unit-invariant factors controlled for together (i.e., in two-way fixed-effects models; Table 6, models 1-6). This relation does not hold, however, when we model changes in special nature *within* bureaucratic units alone (i.e., in unit fixed-effects models; Table 5, models 2-8)[5]. Like with education and size, this suggests that the effects of special nature on capacity growth are the result of categorical differences in governance mandates across units of the environmental state that, in turn, invite structurally different patterns of political contention and conflict. Put more directly, a focus on special nature is associated with distinctive patterns of political support that facilitate growth in capacity – at least in the U.S. environmental state from the mid-1970s to 2019.

Litigation is one means of expressing these distinctive patterns of politics. Lawsuits, of course, are not banal political tools that act uniformly across governmental units. They are instead complex expressions of legal opportunity, political strategy, organizational

[5] Statistically, variance in special nature provision is also far higher between units of the environmental state than within them, reflective of categorically different governance mandate. This is likely why the indicator of special nature is not significant in unit fixed-effect models (Table 5).

resources, and cultural resonances (cites). Rea et al. (2024) document that in the period we investigate here, the overwhelming plurality of environmental of litigation targeting the federal government is brought by environmental advocacy groups – not by anti-regulatory business interests – and further, that this legal pressure overwhelmingly focuses on conservation- and land-use-based disputes, particularly in the West – in short, on special nature. In supplemental analyses, Rea et al. (2024) additionally document that many of the most litigated agencies are those that also score high on our indicator of special nature, like the U.S. Forest Service (USFS) – the most litigated agency in their data – and the U.S. Fish and Wildlife Service (USFWS) – the second-most litigated agency. (USFS manages about 193 million acres in the National Forest System, overwhelmingly in the West, while the USFWS manages about 96 million acres of land and another 760 million acres of marine submerged lands and waters in the National Wildlife Refuge System.) Such lawsuits are directly linked to the regulatory responsibilities of these governmental agencies, essentially asserting that the targeted units are not fulfilling their environmental governance mandates. And indeed, the Forest Service and Fish and Wildlife Service also score high on our metrics of regulation – along with units more classically associated with regulatory responsibilities, like the U.S. Environmental Protection Agency (Supplemental Materials, Figure X).

Unlike popular assumptions that litigation is an expression of political hostility, however, these lawsuits essentially signal political *support* for the basic governance mandates of these agencies and bureaus. They amount to demands for *more* regulation and *more* resources, just the opposite of anti-regulatory challenges. Little surprise, then, that we find evidence that litigation is positively associated with growth in capacity in the environmental state (Table 4, models 3, 4, 8) – although not when also controlling for the overall quantity of regulation broadly, which muddies the statistical waters. A great deal of environmental litigation in the United States, in other words, can be understood as a culturally mediated expression of regulatory advocacy for special nature. (The conjunctural causality implied by this is why we turn additionally to fsQCA, below.)

Beyond special nature and its attendant politics, Rea and Frickel (2023) also posit that the politics of the environmental state are distinctively shaped by the ways developmental and regulatory dynamics interact. They argue, “arms of the environmental state that combine extractive pasts with newer regulatory responsibilities are better able to build broad support, whereas narrowly regulatory or developmental arms struggle to do so” (p. 255). For them, “regulatory responsibilities” seems to imply support from narrowly and conventionally defined ‘environmental’ advocates, while “extractive pasts” seems to stand in for political support from firms and industry groups, perhaps like timber or mining industries, that are often at odds with contemporary environmental goals.

We are less certain that our proxies for regulation and developmentalism can reliably stand in for the cross-domain coalitions Rea and Frickel (2023) seem to be imagining, and as our foregoing discussion makes clear, we are hesitant to assume that regulation primarily attracts support from environmental advocates, while developmentalism (including extractivism and its organizational legacies) primarily attracts support from otherwise 'anti-environmental' critics and skeptics. Still, we model several statistical interactions that we think might, broadly, get at these dynamics: the interaction of developmentalism with regulatory prominence, with litigation, and with the provision of special nature.

By in large, we find null results: in each case, net of main effects, there is no statistically significant interactive effect between our measure of unit developmentalism and the various and nuanced proxies for regulatory activity we measure. The singular exception is the interaction between developmentalism and litigation, which has a clear and highly significant positive relation to capacity in models focused on within-unit variation (Table 5, model 7; Table 6, model 5). The within-unit political returns to capacity driven by litigation, in other words, seem to be conditioned by an agency's developmentalism. It is plausible that where grant-making and outsourcing is low, growth in litigation is capacity-enhancing, as units translate legal pressure into demands for resources to address court-mandated actions. But as an agency shifts towards higher levels of developmentalism, litigation may become constraining, as the same legal mandates fall on a unit with fewer internal resources to address those demands. This is an important detail for investigation in future research. More broadly, we uncover limited statistical evidence of interactive effects between developmentalism and regulatory role, whether as measured by absolute quantity of regulatory prominence, the relative focus on special nature, or the relative level of legal attention a unit of the environmental state receives, as moderated by its regulatory role and the priorities of environmental advocates.

Considering Conjunctural Effects

Our linear models subject our theorical claims to the discipline of statistical inference, helping us sort out which predicted patterns seem to hold in the case of the U.S. environmental state, and which do not. But our models also have serious limitations. In particular, they focus on average effects within and between bureaucratic units and through time, telling us little about specific cases, outliers, or diverging patterns with opposite effects. They also treat theoretical factors as independent, additive causes when, in terms of both measurement and theory, they probably are not. Regulatory role, exposure to litigation, and the provision of special nature, for example, are all highly endogenous: regulations are the legal basis for lawsuits, which, as Rea et al. (2024) imply, are structured

in the U.S. context by cultural, political, and organizational predispositions towards special nature. To speak of an effect of litigation *net of an agency's provision of special nature and regulatory prominence* thus begins to raise statistical and, perhaps more importantly, theoretical questions: what does it mean to speak of an effect of litigation net of the factors that mutually constitute it? It may be more theoretically tenable to speak of the conjunctural effects of regulation, litigation, and special nature working together. This way of thinking moves away from average effects and emphasizes the ways different factors combine in distinctive ways that may have different or even opposite effects depending on their intersections with causal elements or conditions, or in different cases.

We turn to fsQCA to investigate such patterns of conjunctural causation that may wash out in statistical averages or that would require mathematical interactions too complex to reasonably test and interpret in our linear models. As with Grant et al. (2010), these findings add depth to the causal-theoretical claims we can make, helping us further "test" but also extend our theorization of relations between state capacity, environmental welfare, and environmental politics.

One clear advantage of our regression analysis is its ability to account for changes over time – an advantage we lose in standard fsQCA. To help account for the historically specific dynamics that might differently shape state capacity in different times, we break our fsQCA analysis into two periods, from 1973 to 1990, and from 1990 to 2021 (Figure 2). Methodologically, this bisection allows us to relax the very strong assumption that the same causal forces work uniformly on state capacity growth rates over nearly a half-century, from 1973 all the way to 2021. Theoretically, it allows us to differentiate two periods of environmental politics: the early formation, growth, and maturation of the contemporary U.S. environmental state from the early 1970s and through the 1980s; and the contrasting period of environmental polarization and retrenchment that follows, taking hold in the 1990s and accelerating through 2020 (cites). Empirically, our bisection falls at a clear inflection point for capacity growth rates: 1990 is the year when a long and slow period of steadily increasing capacity growth rates finally peaked and then began to decline, both in the environmental state and in the entire bureaucracy (Figure 1). It also just predates the start of the Clinton Administration in January of 1993, which presides over the largest declines in average state capacity at any time in our data and, far more than is widely known, launches the modern era of erosion in the environmental state. It follows that patterns of capacity change are starkly different in the two periods: for many of the most prominent units of the environmental state, the formative period from 1973 to 1990 was characterized by average capacity growth (Figure 2A), whereas 1990 to 2021 was overwhelmingly a period of decay (Figure 2B, C).

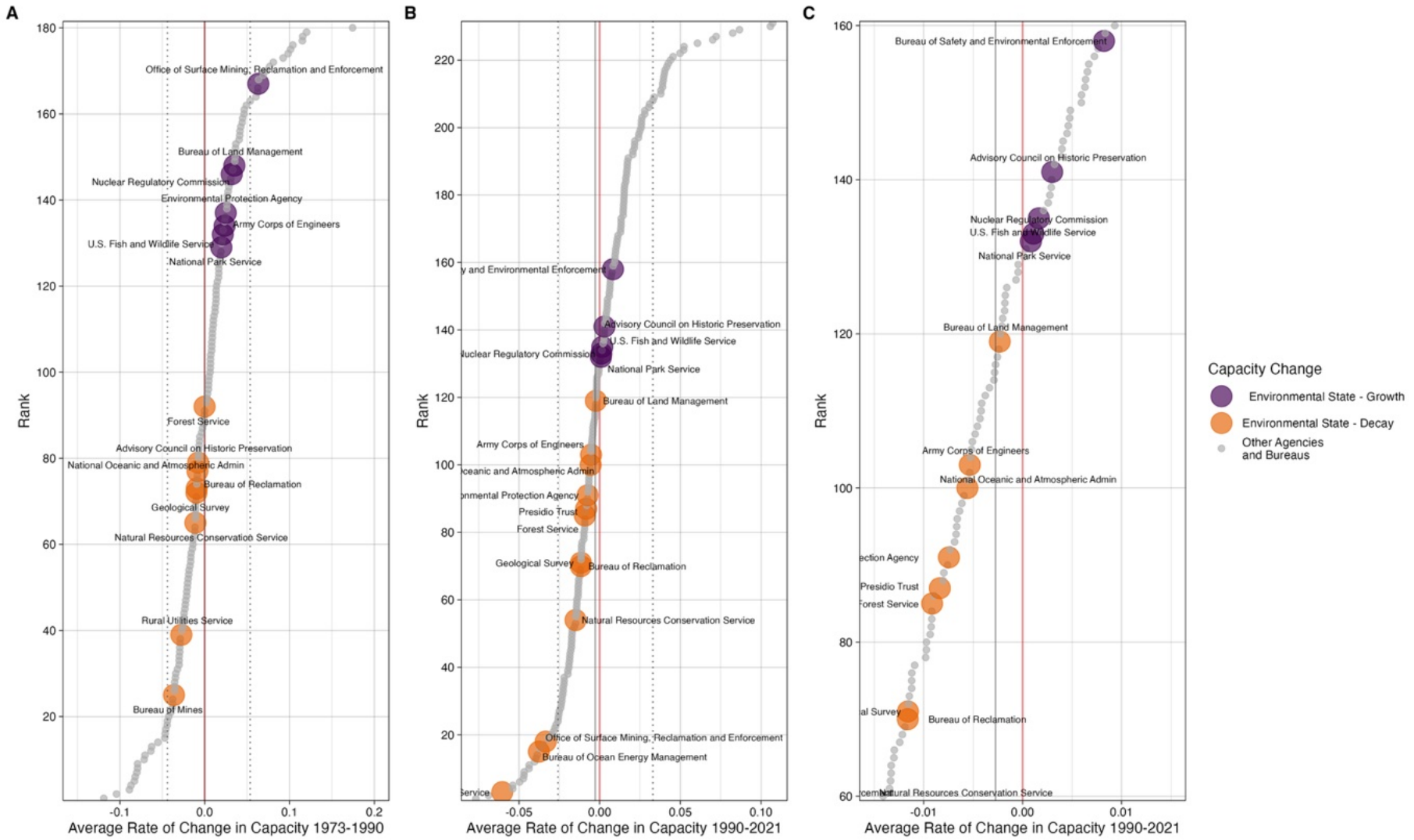


Figure 7: Average rate of change in state capacity for 239 federal agencies with units of the environmental state highlighted (A) from 1973-1990; (B) from 1990-2021; (C) inset from B more clearly showing the handful of (marginal) instances of average growth from 1990-2021. Zero lines shown in red. Solid grey lines show period median. Dotted lines show 15th-percentile (left) and 85th-percentile (right). Statistics calculated for entire bureaucracy

As is standard practice in fsQCA, we calibrate (rescale on a logistic scale from 0 to 1) our capacity growth rates and predictor variables and set related thresholds for delineating set inclusion and exclusion. For most measures, including out outcome, we set our inclusion thresholds at the 90th percentile and exclusion at the 10th percentile, relative to the full set of agencies and bureaus across the entire bureaucracy.[6] For the provision of special nature, which is unique to the environmental state, and for the two conditions we do not have bureaucracy-wide data for, litigation and regulatory prominence, we calibrate with respect to units of the environmental state only. For all our explanatory conditions we set the center point for fuzzy set calibration at the median. For our output, capacity growth rate, we set the center point at 0, when growth rates move from negative to positive. All unit rankings and the thresholds used for all predictors are presented in supplemental materials.

Drawing on the same data we use in our regression analysis, our explanatory conditions include unit size (SIZE), expertise (EXP), legal pressure (LIT), developmentalism (DEV), and focus on special nature (SN). In supplementary analysis, we also include our measure of regulatory prominence (REG), but as we find no evidence of a statistical relationship between regulation and capacity growth in our statical models, we leave it out of most of our primary fsQCA analysis. Adding regulation complicated but did not improve our fsQCA results (e.g, simply solutions or improve consistency scores.

Interpreting fsQCA Results

The results below present set-theoretic configurational combinations of conditions, ("solutions") that overlap with cases that exhibit high capacity growth (CAP) cases that exhibit high capacity decay (~CAP), where "cases" are units – agencies and bureaus and offices – of the environmental state. Throughout, tilde (~) indicate the negation of set membership. Asterisks (*) signal Boolean "AND" while pluses (+) denote Boolean "OR" relationships between conditions.

[6] Setting our calibration thresholds relative to the entire bureaucracy is crucial for many indicators, but especially our outcome. Unlike in in our regression analyses, in fsQCA we are essentially asking a how a small number of theoretical-causal conditions overlap with the set of either high capacity growth or high capacity decay units of the environmental state. What constitutes "high growth" or "high decay" is a qualitative judgement that only makes substantive and theoretical sense when put in relation to broader reference points. The patterns of capacity change in our later period, from 1990-2021, make clear why. If we calibrated our outcome measure of capacity change *only with respect to other environmental state agencies* in this period, we would classify units like Bureau of safety and Environmental Enforcement (which regulates offshore drilling), Nuclear Regulatory Commission (which regulates nuclear energy and related processes, e.g. waste storage), the USFWS, and National Park Service as examples of "high growth" in capacity (Figure 2C). But as becomes clear when we set the units of the environmental state in relation to the rest of the bureaucracy, state capacity in these units hardly grows at all (Figure 2B). By any reasonable assessment, this is a period of stasis and decay for the environmental state, not one of growth. Our fsQCA analysis must treat it as such. Alternatively stated, if we calibrated set membership only relative to other environmental state agencies, our analysis would implicitly shift to an analysis of the configurational causes of capacity stasis, not growth. See n7.

Results also present statistics that help assess the quality and meaningfulness of the combinations of conditions that overlap with outcomes. Solution consistency (or inclusion sufficiency, inclS) indicates how much set-theoretic overlap there is between solutions and the outcome. In line with fsQCA conventions, when constructing solutions, we only consider configurations that have consistency scores of 0.9 or higher in underlying truth tables. Final solutions, especially in reduced form, may have consistency scores somewhat lower. In general, solution consistency scores higher than 0.9 signal very strongly that a solution co-occurs with the outcome. Scores of greater than 0.8 still indicate high evidence of overlap. Proportional reduction in inconsistency (PRI) is a measure of how much a solution explains an outcome but not its negation – an important signal that an observed configuration is associated with the outcome specifically and is not just a pattern present in all outcomes. PRI scores over 0.8 are generally considered a strong signal that a solution overlaps with the outcome but not its negation. Coverage scores (covS and covU) are indicators of substantive importance. Raw sufficiency coverage (covS) measures the portion of the outcome explained by a given configurational solution. Unique coverage (covU) measures much of the outcome is explained by a given configurational solution *alone*. There are no hard and fast rules for interpreting coverage scores. covU scores as low as 0.1 or even lower may signal that a given configuration is an important, unique contributor to an outcome. covU scores of 0.0 signal overlap with other combinations, not irrelevance or unimportance. Solutions can overlap: different combinations of conditions can occur in the same outcome cases. As a result, coverage scores are not additive.

Our fsQCA results must be interpreted differently than results from regressions. No condition in a solution configuration can be understood in isolation. To the extent that solutions signal causal relations, they must be understood as conjunctural, with *all* Boolean AND-linked conditions intersecting to produce an outcome. Solution statistics also do not signal explanatory importance and fsQCA offers no means of estimating effect size. High consistency scores are requisite for identifying solutions – configurations of conditions must be present in outcome cases for there to be a plausible causal relation – but even configurations with low coverage scores may be important if they co-occur in outcome cases that are theoretically or substantively important. Thus, while statistical significance in our regression models signals that factors that have *independent* associations with changes in state capacity, fsQCA solutions allow us to unearth the *conjunctural combinations* of these factors that co-occur with cases of either growth or decay in environmental state capacity. All results are shown in reduced, parsimonious, form. Unreduced, conservative solutions are presented in Supplemental Materials, along with their underlying truth tables.

Formative Period: 1973-1990

During the modern environmental state's formative period, a simple causal-theoretical condition is associated with growth in state capacity: litigation. Our fsQCA analysis shows that from 1973 to 1990, units of the environmental state that experienced high levels of

legal pressure also experienced state capacity growth (Table 8). Both direct and indirect mechanisms are probable. In terms of direct effects, sustained, high levels of legal pressure can drive budget requests and growth in staffing to address new and growing legal mandates driven by court orders and case law. The formative period of the environmental state was filled with such dynamics, as strategic lawsuits brought by environmental adorates dramatically expanded the scope and governmental responsibilities under key statutes like the Endangered Species Act (e.g., Tennessee Valley Authority v. Hill; cites), the Clean Water Act (e.g., Natural Resources Defense Council v. Callaway in 1975; cites), the Clean Air Act (e.g., Sierra Club v. Ruckelshaus in 1972; cites) and in the context of environmental protection generally (e.g., Scenic Hudson Preservation Conference v. Federal Power Commission in 1965; Sierra Club v. Morton in 1972; cites). But litigation can also work indirectly, as a process that raises the salience of issues and governance mandates in ways that "independently" attract further political and fiscal support from well-resourced environmental advocates, as in the generalized awareness of water pollution of deforestation that arises out of legal and other related political conflicts.

*Table 1 (Note this is actually Table 8): fsQCA solutions for **capacity growth** in the environmental state's formative period, from 1973 to 1990.*

	Solution Fit				
Configurations	**inclS**	**PRI**	**covS**	**covU**	**Cases/Units**
LIT	0.867	0.783	0.747		Army Corps of Engineers, Forest Service, Bureau of Land Management, National Park Service, Nuclear Regulatory Commission, Environmental Protection Agency, U.S. Fish and Wildlife Service
M1	0.867	0.783	0.747		

Note:
Truth table outcome set inclusion threshold set at 0.9 consistency (inclS).

Notably, although present in several unreduced solution combinations (Supplemental Materials), special nature drops out of the reduced solution. For example, whereas a strong focus on special nature, in combination with large size, high levels of developmentalism and litigation, support growth in the National Park Service and USFWS, a complete lack of focus on special nature low levels of special nature, combined with large size, high levels of formal expertise, and litigation, co-occur with capacity growth for prominent regulatory agencies like the Nuclear Regulatory Commission and the EPA. In the early period of environmental state formation, in other words, capacity growth seems to transcend

substantive and cultural-political divisions in environmental politics, and to evolve out of the kind of cross-cutting political attention signaled by legal action.

Of fsQCA analysis suggests that decay in capacity during the environmental state's formative years works, at least in part, though inverse mechanisms. First, decay in capacity would seem to be linked to the lack of political support and salience that comes with very low levels of legal pressure. In this instance, though, (a lack of) lawsuits works in combination with a paired lack of focus on special nature (Table 9). However much the environmental litigation present in these formative years transcended the historic attention paid to special nature by environmental advocates, where special nature was absent, litigation was too – and that mutually produced void overlaps heavily with capacity decay. This stands to reason: special nature is the legal object of focus by environmental advocates and the most well-resourced organizations in the U.S. environmental movement (Rea et al. 2024; Johnson 20XX) ; it is a major source of fuel for that fierce green fire that helped gives to the environmental state in the first place (Shabecoff 1993). Sans fuel, and the advocacy and political attention that come with it, and environmental state capacity fades.

*Table 2: Note this is actually Table 9): fsQCA solutions for **capacity decay** in the environmental state's formative period, from 1973 to 1990.*

	Solution Fit				
Configurations	**inclS**	**PRI**	**covS**	**covU**	**Cases/Units**
~LIT*~SN	0.875	0.794	0.647		Rural Utilities Service, Bureau of Reclamation, Geological Survey, Bureau of Mines, National Oceanic and Atmospheric Admin
M1	0.875	0.794	0.647		

Note:
Truth table outcome set inclusion threshold set at 0.9 consistency (inclS).

Period of Retrenchment: 1990-2021

Few units of the environmental state indicate average capacity growth in the period from 1990 to 2021 (Figure 2B, 2C). The Bureau of Safety and Environmental Enforcement (BSEE) is the only notable example of capacity growth, but it is historically peculiar: BSEE was formed in 2011 in the wake of the BP oil spill in the Gulf of Mexico. It was created as a result of the dissolution and restructuring of the industry-captured Minerals Management Service, whose lax regulatory stance and conflicting interests were deemed by the Obama Administration as one of the causes of the disastrous spill. BSEE's growth in capacity, in other words, emerged out of a once-in-a-generation environmental calamity and reflects the inherent growth trajectory of a brand-new bureaucratic unit. The handful of more well-

established units that exhibit growth in the span from 1990 to 2021, like the Nuclear Regulatory Commission, USFWS, and National Park Service, in fact barely grow at all, and are better characterized as only managing to maintain average capacity stasis. The overwhelming majority of units of the environmental state from 1990 to 2021 see their capacity decay (Figure 2B).

Substantively, this means that there are few cases – really, only one case – of capacity growth to explain in this period of retrenchment. Methodologically, it means that not a single row in the truth table for capacity growth exceeds the requisite consistency score (0.9) needed to count as a member of the outcome set, and thus to be used to identify fsQCA solutions (Supplemental Materials). Put plainly, we cannot deduce the constellations of conditions that support capacity growth where growth is not present.

Two methodological modifications help us make inferences about the factors that may support capacity *stasis* – not growth – during this period. First, reducing our consistency threshold to 0.7 – far lower than the conventions of fsQCA recommend – allows us to count cases that hover around zero growth as positive "growth" outcomes for the purposes of deducing fsQCA solution configurations (Figure 2C).[7] Second, adding regulatory prominence back into our set of explanatory conditions adds information that helps further differentiate cases. Without it, even with a reduced consistency threshold, the only case we can make inferences about is the USFWS.

As expected, the resultant solutions indicate low consistency,[8] but they point to a decay-insulating combination of high legal pressure and high focus on special nature that seems to buoy capacity in land management agencies, which fare among the least-bad during this period (Table 10) . The solution also suggests an alternative pathway to stasis, characterized by low expertise, low developmentalism, and high regulatory prominence – a pattern that captures the BSEE, the Army Corps of Engineers, and the Bureau of Land Management (also present in the other pathway). [elaborate]

[7] This change and the low consistency scores it implies are less empirically worrisome than it may seem at first. This is because the change in threshold does not risk lumping high-growth with low-growth cases, because there are no high-growth examples in this period. An alternative and functionally similar approach is to rescale and calibrate the outcome (change in capacity) only with respect to environmental state agencies, thereby shifting stasis cases with near zero growth to the positive outcome solution set. This approach yields similar substantive results (Supplemental Materials).

[8] This mostly indicates how far from our pre-defined growth threshold we must deviate to "find" positive outcome cases.

*Table 3: (Note this is actually Table 10): fsQCA solutions for **capacity stasis** in the environmental state's period of retrenchment, 1990-2021.*

	Solution Fit				
Configurations	**inclS**	**PRI**	**covS**	**covU**	**Cases/Units**
LIT*SN	0.565	0.058	0.429	0.074	National Park Service, Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service
~EXP*~DEV*REG	0.681	0.167	0.591	0.236	Bureau of Safety and Environmental Enforcement, Army Corps of Engineers, Bureau of Land Management
M1	0.587	0.139	0.665		

Note:
Truth table outcome set inclusion threshold set at 0.9 consistency (inclS).

Differently than growth, there are ample, clear-cut cases of capacity decay to explain in the period from 1990 to 2021, without making any methodological adjustments. Variations in legal pressure and focus on special nature again factor prominently. Agencies that have low levels of formal expertise and that also come under minimal legal pressure see declines in capacity growth over this roughly thirty-year period (e.g., Natural Resources Conservation Service; Rural Utilities Service). Units that do not focus on special nature and are developmental (e.g., EPA); do not focus on special nature and have low formal expertise (Bureau of Reclamation); and that do not focus on special nature but still experience high levels of litigation (EPA once more; Army Corps of Engineers) all see declines in capacity growth rates over this period. And large agencies that *do* focus on special nature but that are not targeted often with legal pressure (e.g., Natural Resources Conservation Service) also see declining rates of in capacity.

*Table 4: (Note this is actually Table 11): fsQCA solutions for **capacity decay** in the environmental state's period of retrenchment, 1990-2021.*

		Solution Fit				
	Configurations	**inclS**	**PRI**	**covS**	**covU**	**Cases/Units**
	~EXP*~LIT	0.903	0.834	0.439	0.049	Presidio Trust, Bureau of Safety and Environmental Enforcement, Rural Utilities Service, Natural Resources Conservation Service
	DEV*~SN	0.983	0.970	0.251	0.006	Rural Utilities Service, Office of Surface Mining, Reclamation and Enforcement, Environmental Protection Agency
	SIZE*~LIT*SN	0.954	0.909	0.289	0.031	Natural Resources Conservation Service, Bureau of Ocean Energy Management
	~EXP*~SN	0.969	0.945	0.361	0.02	Rural Utilities Service, Bureau of Reclamation, Army Corps of Engineers
	LIT*~SN	0.857	0.723	0.286	0.018	Bureau of Reclamation, Army Corps of Engineers, Environmental Protection Agency
M1	~EXP*~LIT + DEV*~SN + SIZE*~LIT*SN + (~EXP*~SN)	0.908	0.852	0.624		
M2	~EXP*~LIT + DEV*~SN + SIZE*~LIT*SN + (LIT*~SN)	0.868	0.791	0.622		

Note:

Truth table outcome set inclusion threshold set at 0.9 consistency (inclS).