

**A MULTI-DIMENSIONAL FRAMEWORK FOR REALLOCATING GOVERNMENT
AUTHORITY IN RESPONSE TO REGULATORY STRESS:
THE CLIMATE CHANGE ADAPTATION EXAMPLE**

Alejandro E. Camacho* and Robert L. Glicksman**

[This draft is at a stage for which input would be very helpful. The two case studies discussed in Part III are incompletely analyzed using the framework developed in Part I and we intend to add at least two more case studies. As a result, we are at an early step in the process of generalizing the lessons for government reorganization efforts to be drawn from the case studies, both with respect to climate change and more generally. We welcome input both on the analysis in Parts I and II and the direction we ought to pursue in Part III. For those short on time, we recommend that you read Parts I and II.]

INTRODUCTION

On January 13, 2012, President Obama proposed the consolidation of six agencies “into one more efficient agency to promote competitiveness, exports and American business.”¹ The six agencies – the business and trade functions of the U.S. Department of Commerce, the Small Business Administration, the Office of the U.S. Trade Representative, the Export-Import Bank, the Overseas Private Investment Corporation, and the U.S. Trade and Development Agency – all focus primarily on business and trade. The White House explained that “[f]or too long, overlapping responsibilities among agencies have made it harder, rather than easier, for our small businesses to interact with their government. Those redundancies have also led to unnecessary waste and duplication.”² It added that “[t]he Federal Government is a maze of Federal agencies with overlapping services and missions, making it difficult for businesses – and especially small ones – to find the assistance they need to export, expand, and hire.”³ The consolidation plan would “eliminate[e] duplication, waste and inefficiencies” and “help entrepreneurs and businesses of all sizes grow, compete, and hire, leveraging one cohesive Department with one mission: to spur job creation and expand the U.S.

* Professor, University of California, Irvine School of Law; Member Scholar, Center for Progressive Reform.

** J. B. and Maurice C. Shapiro Professor of Environmental Law, George Washington University Law School; Member Scholar, Center for Progressive Reform. The authors thank Melissa Dolin, Erin Dykstra, and Sharlene Morris for very helpful research assistance.

¹ The White House, Office of the Press Secretary, *President Obama Announces Proposal to Reform, Reorganize and Consolidate Government* (Jan. 13, 2012) [hereinafter *Consolidate Government*], available at <http://www.whitehouse.gov/the-press-office/2012/01/13/president-obama-announces-proposal-reform-reorganize-and-consolidate-gov>.

² The White House, Office of the Press Secretary, *Government Reorganization Fact Sheet* (Jan. 13, 2012) [hereinafter *Reorganization Fact Sheet*], available at <http://www.whitehouse.gov/the-press-office/2012/01/13/government-reorganization-fact-sheet>.

³ *Consolidate Government*, *supra* note 1.

economy.”⁴ The new Department would “lead the development and implementation of an integrated, strategic, government-wide” effort to promote trade effort and support the growth of small business.⁵

To implement the plan, the President requested that Congress “reinstate Presidential authority to reorganize and consolidate the federal government, which will ensure swift action on his proposals to streamline government to make it work better for the American people while eliminating duplication, waste and inefficiencies.”⁶ But the White House pitched its proposed reorganization as a mechanism for achieving more than just efficiency enhancements. It explained that the President’s approach to government reorganization would “initiate new accountability by mandating that any plan must reduce the number of government agencies or save taxpayer dollars. It would also ensure expedient review by Congress.”⁷

The President’s government reorganization plan thus targeted overlapping and duplicative government oversight of small business, and sought to consolidate six agencies into one to provide more effective assistance to small business through a cohesive, integrated new agency that could perform more efficiently the functions previously conducted by the six agencies targeted for elimination. At the same time, the President promised that the restructured agency would be accountable both to taxpayers and Congress. Some academics, including political scientists, applauded the President’s plan as a sensible and overdue effort to reduce government inefficiency while promoting the interests of small business.⁸ President Obama’s announcement was not met with universal acclaim, however. Government reorganizations are often controversial. Political factors certainly play a role. Republicans’ reaction to President Obama’s plan was lukewarm, at best.⁹

Politics aside, differences of opinion may emerge about what values the government is and should be serving, how competing values should be ranked, and whether a particular proposal is likely to achieve its purported objectives. For President Obama’s proposal, some were skeptical of the President’s claim that the consolidation would actually achieve more efficient government, claiming that it takes time to accomplish reorganizations of the sort proposed by the President and that such plans often produce unanticipated costs as a result of changes in the political dynamic between

⁴ *Id.*

⁵ *Reorganization Fact Sheet, supra* note 2.

⁶ *Consolidate Government, supra* note 1.

⁷ *Id.*

⁸ *See, e.g.,* David Mark Landler & Annie Lowrey, *Obama Bid to Cut the Government Tests Congress*, N.Y. TIMES, Jan. 14, 2012.

⁹ Landler & Lowry, *supra* note _ (“Republicans were immediately skeptical, suggesting that the White House was more interested in honing its re-election message than in reducing the size of government.”). Resistance to reorganizations also may stem from efforts by congressional committees with jurisdiction under the existing structures to protect their turf from encroachment by committees that would become responsible for overseeing new or realigned agencies.

agencies and Congress.¹⁰ Others focused on the substantive impact of the reorganization on agency programs, pointing out that good reasons may support what appears to be a “byzantine” governmental structure.”¹¹ Members of the President’s own party, for example, questioned whether the consolidation would sacrifice effective for efficient government. Senator Max Baucus expressed concern that the proposed consolidation would impair the government’s ability “to aggressively open new markets to American goods and services” by folding into the new Department an agency, the U.S. Trade Office, that had been established to serve a distinct role.¹² Baucus asserted that making the Trade Office “just another corner of a new bureaucratic behemoth would hurt American exports and hinder American job creation.”¹³ Similarly, environmental groups raised concerns about another aspect of eliminating the Commerce Department, the placement of the National Oceanic and Atmospheric Administration (NOAA), an agency responsible for protecting marine species under the Endangered Species Act,¹⁴ into the Interior Department instead of the Commerce Department. That shift, they charged, might threaten the agency’s scientific independence, erode its capability to protect marine ecosystems, and overburden an Interior Department already struggling to meet its statutory responsibilities.¹⁵ Still others deferred judgment until they better understood how the plan would affect particular interests and constituencies, such as labor unions, who feared that consolidation would result in the loss of federal jobs.¹⁶

President Obama’s proposed reorganization to promote efficiency in the oversight of small business is not the only recent example of significant reorganization initiatives by the executive and legislative branches. Within the past decade, high-profile agency creations or reorganizations have followed the events of 9/11 (which led to the massive reorganization that accompanied the creation of the Department of Homeland Security),¹⁷

¹⁰ *Id.*

¹¹ *Id.*

¹² David Nakamura & Ed O’Keefe, *Obama Seeks Power to Streamline Government*, WASH. POST, Jan. 14, 2012.

¹³ Landler & Lowrey, *supra* note __.

¹⁴ The U.S. Fish and Wildlife Service, an agency within the Interior Department, is responsible for protection of terrestrial and freshwater species, while NOAA has jurisdiction over marine species. Oliver A. Houck, *The Endangered Species Act and Its Implementation by the U.S. Departments of Interior and Commerce*, 64 U. COLO. L. REV. 277, 279 n.7 (1993).

¹⁵ Phil Taylor, *Enviros Rail Against Plan to Move NOAA to Interior*, E&E NEWS, Jan. 13, 2012. Others minimized these concerns. See, e.g., Lauren Morello, *Would the Interior Department Make a Good Home for NOAA? Will Congress Buy It?*, E&E NEWS, Jan. 16, 2012 (quoting professor of natural resources, who asserted that “[t]he important part is not where NOAA sits, but that its functions and its coherence be strengthened”).

¹⁶ Nakamura & O’Keefe, *supra* note __, The White House estimated that the proposed consolidation would save \$3 million over ten years and cut 1000 to 2000 federal jobs. Landler & Lowrey, *supra* note __.

¹⁷ See generally Dara Kay Cohen, Mariano-Florentino Cuéllar & Barry R. Weingast, *Crisis Bureaucracy: Homeland Security and the Political Design of Legal Mandate*, 59 STAN. L. REV. 673, 718 (2006); Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655 (2006); Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, ____ [16] (2012). Part of the altered post-9/11

the Deepwater Horizon explosion (which prompted the reallocation of regulatory authority over offshore oil exploration and development from the Interior Department’s Minerals Management Service to the new Bureau of Ocean Energy Management, Regulation, and Enforcement),¹⁸ and the economic collapse of 2008 (which led to the creation of the Financial Stability Oversight Council and the Consumer Financial Protection Bureau and the merging of the Office of Thrift Supervision into the Office of the Comptroller of the Currency).¹⁹

Given the recurrence of government reorganization efforts and the high-stakes consequences they may entail, this Article provides an analytical framework for assessing when realignment of agency authority is likely to be beneficial and how it ought to proceed when circumstances warrant it. Part I provides a taxonomy of the allocation (and reallocation) of authority among government entities. Part IA provides a brief description of the principal values that tend to be implicated in government reorganization efforts and that may be useful in assessing the merits of particular reallocation initiatives. Part IB explains how greater attention not only to the scope of the substantive jurisdiction of regulators, but also to the locus of control over different governmental functions — what we call functional jurisdiction — provides insights on when and how regulatory authority should be allocated. Part IC delineates the dimensions of primary importance for characterizing the allocation of regulatory authority. These include the extent that jurisdiction is centralized or decentralized, overlapping or distinct, and coordinated or independent. Many scholars have discussed various aspects of these dimensions in some form, but they often conflate multiple dimensions in analyzing the advantages or disadvantages of a particular allocation or reallocation of regulatory authority.

landscape involved the creation of a new agency, the Immigration and Customs Enforcement within the Department of Homeland Security (DHS). The new agency combined the functions of the Immigration and Naturalization Service and the Customs Service. Bennie G. Thompson, *A Legislative Prescription for Confronting 21st Century Risks to the Homeland*, 47 HARV. J. ON LEGIS. 277, 310 (2010). In an earlier internal reorganization within the Department of Justice, the Executive Office for Immigration Review was created in 1983 by combining the Board of Immigration Appeals with the Immigration Judge function previously performed by the former Immigration and Naturalization Service (INS). The INS was later folded into DHS. Sameer Ahmed, *Targeting Highly Skilled Immigrant Workers in a Post-9/11 America*, 79 UMKC L. REV. 935, 951 n.88 (2011).

¹⁸ See Secretary of the Interior, Order No. 3299 (May 19, 2010); Reorganization of The Bureau of Ocean Energy Management, Regulation and Enforcement, <http://www.boemre.gov/>; Leila Monroe, *Restructure and Reform: Post-BP Deepwater Horizon Proposals to Improve Oversight of Offshore Oil and Gas Activities*, 5 GOLDEN GATE U. ENVTL. L.J. 61 (2011). The Obama Administration’s proposal to merge the Office of Surface Mining (OSM) into the Bureau of Land Management drew opposition from former regulators, environmental groups, and industry alike. See Jennifer Yachnin, *Proposed Agency Merger Draws Jeers at Colo. Public Meeting*, E&E NEWS, Jan. 25, 2012 (noting industry concerns about permitting delays and the former OSM Director’s opposition to centralization of authority in one agency, which would sacrifice OSM’s adaptability, flexibility, and accessibility). See also Statement of Patrick C. McGinley before the United States Senate Committee on Energy and Natural Resources (November 17, 2011), available at <http://energy.senate.gov/public/ files/McGinleyCitizenGroupsTestimonyWithAppendix111711.pdf>.

¹⁹ Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376 (2010).

Part II explains why the physical consequences of climate change, and the stresses they will impose on government entities in the United States currently charged with the responsibility to facilitate adaptation, almost certainly will trigger a need and demand for a reallocation of regulatory and management authority. It draws on analogous situations in which dramatic events or changed circumstances have triggered political energy for realignments of government programs unable to meet the new demands. Part II also provides an overview of the kinds of reallocations scholars have suggested might be appropriate to enhance our ability to adapt to a changing climate.

Part III uses climate change adaptation as a test case for assessing the utility of the taxonomy of authority introduced in Part I for evaluating existing regulatory structures and the ways in which they might be realigned in response to regulatory stress. It includes several case studies covering a range of regulatory areas likely to be substantially impacted by climate change. These include wildlife and associated resource management, coastal resource management, public health protection, and immigration control.

We conclude by examining the lessons that our case studies supply. We believe these lessons are relevant not only in the context of climate change adaptation, but more generally for government reorganizations prompted by regulatory stress. Though the desirability and shape of reallocations of government authority will undoubtedly be context-specific, we argue that the case studies demonstrate that the value of a reallocation of authority along one or more of the dimensions we identify in Part I is likely to largely depend on the particular governmental function at issue. Thus, for example, ambient monitoring, information sharing, and financing are generally likely to be more appropriately managed centrally, with standard setting and planning less so, and implementation and enforcement most appropriately decentralized. Likewise, although we largely concur with the growing literature promoting the value of overlapping regulatory authority coalesced around particular substantive areas, we postulate that such jurisdictional redundancy may not make sense for each and every governmental function. In addition, though the considerable calls for increased coordination among regulatory authorities may make particular sense for functions such as ambient monitoring and financing, we assert that there may be some benefit from maintaining regulator independence and competition for other governmental functions, especially for implementation and enforcement functions.

I. A TAXONOMY OF ALLOCATION OF AUTHORITY

After briefly exploring four key normative considerations for evaluating a particular allocation or reallocation of regulatory authority, this Part sets forth various key dimensions for analyzing or modifying the allocation of authority for addressing regulatory problems. In characterizing governmental jurisdiction, primary attention tends to be given to evaluating agency management based on the scope of the substantive authority of the governmental entity. However, regulatory authority is also consistently apportioned based on the function or functions that a particular governmental institution may exercise. For any

substantive area of regulation and governmental function, regulatory authority can be further evaluated along three key dimensions. These include how centralized the authority is; how much overlap in governmental authority there is among multiple government bodies over a particular regulatory problem; and the extent to which such authority is exercised independently or in coordination with other regulating authorities.

Some of these dimensions have been ignored or conflated in the diverse and substantial federalism and governance literature. Yet each measures a particular component of regulatory authority, representing a different set of policies and ultimately tradeoffs over the appropriate design for managing environmental and other social problems. Accordingly, changes in the allocation of authority to address a regulatory problem, such as climate change, may be appropriate along one dimension, but not others.

A. Normative Considerations for Allocation of Authority

Determining the appropriate ways in which to allocate the authority to design and implement government programs, including programs to address climate change adaptation efforts, requires a comparative assessment of the extent to which the allocations under consideration promote desired normative values or considerations. We use four such evaluative yardsticks in the discussion below: effectiveness, efficiency, equity, and accountability. In those cases in which these measures do not all point in the same direction, it is necessary to determine what the optimal balance is in choosing among allocations that promote some but not other values better than the available options.

An effective regulatory design is one that achieves the identified regulatory goals.²⁰ An adaptation program, for example, that fails to protect society against the harmful effects of climate change by anticipating and preventing them or minimizing the disruption they cause cannot be deemed a success even if it operates efficiently and fairly and is administered by accountable officials. The proper balance among the four criteria identified here will necessarily be context-specific, however.²¹ For example, it may be preferable to sacrifice some degree of effectiveness if the most effective available option among several that promise to achieve regulatory goals at least partially is also harshly inequitable or vests in decision-makers an unacceptable lack of accountability. These kinds of tradeoffs of course are common under the American system of government.²²

²⁰ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [19] (2012) (stating that considerations of effectiveness entail an inquiry into the extent to which a particular design will help to achieve regulatory goals).

²¹ Accountability, for example, “guarantees responsiveness, although not necessarily effectiveness.” Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1719 (2006).

²² See, e.g., *Immigration and Naturalization Serv. v. Chadha*, 462 U.S. 919, 944 (1983) (stating that “the fact that a given law or procedure is efficient, convenient, and useful in facilitating functions of

Assuming multiple options of equal efficacy exist, some may operate more efficiently than others. As Jody Freeman and Jim Rossi have indicated, “[e]fficiency is an obvious criterion” for assessing a given institutional design, and involves comparing the administrative costs a program imposes on government and the compliance costs imposed on the private sector.²³ For example, the costs of administering redundant structures “represent lost funds for other tasks. In other words, if resources are fixed, redundant structures impose additional opportunity costs.”²⁴

The concept of equity clearly involves distributional considerations, but there are different ways to determine whether a particular allocation of societal benefits and burdens is fair.²⁵ Policy analysts of environmental and other regulatory issues sometimes use equity to refer to everything other than efficiency.²⁶ Dan Farber has used the term to

government, standing alone, will not save it if it is contrary to the Constitution. Convenience and efficiency are not the primary objectives – or the hallmarks – of democratic government”); *id.* at 958-59 (stating that “it is crystal clear from the records of the Convention, contemporaneous writings and debates, that the Framers ranked other values higher than efficiency.”). The Court, in striking down the legislative veto in *Chadha*, emphasized the Framers’ choice to sacrifice efficient for accountable, democratic government through the imposition of requirements such as bicameralism and presentment:

The choices we discern as having been made in the Constitutional Convention impose burdens on governmental processes that often seem clumsy, inefficient, even unworkable, but those hard choices were consciously made by men who had lived under a form of government that permitted arbitrary governmental acts to go unchecked. There is no support in the Constitution or decisions of this Court for the proposition that the cumbersomeness and delays often encountered in complying with explicit Constitutional standards may be avoided, either by the Congress or by the President.

Id. at 959.

²³ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [19] (2012). Efforts to improve efficiency seek to “minimize the administrative costs of enforcement.” Guido Calabresi & A. Douglas Melamed, *Property Rules, Liability Rules, and Inalienability: One View of the Cathedral*, 85 HARV. L. REV. 1089, 1093 (1972).

²⁴ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1680 (2006). See also Jason Marisam, *Duplicative Delegations*, 63 ADMIN. L. REV. 181, 223-24 (2011) (“Agencies have limited resources and attention spans. When an agency performs a redundant task, it is not focusing on other potentially critical tasks.”).

²⁵ See CHRISTOPHER D. STONE, *THE GNAT IS OLDER THAN MAN: GLOBAL ENVIRONMENT AND HUMAN AGENDA* 252 (1993) (discussing the “difficulties of sorting through . . . competing standards of ‘fairness’ to find the morally right one”).

²⁶ See, e.g., Wallace Wen-Yeu Wang, *Financial Institutions in Taiwan: An Analysis of the Regulatory Scheme*, 4 J. CHINESE L. 3, 33 (1990) (“The equity criterion is concerned with a broader set of public objectives other than efficiency that embody societal values such as justice, fairness, and equality.”). One economist stated that “[b]y defining efficiency as maximization of total output, the residual political and social goals are easily categorized as equity objectives.” Kenneth G. Elzinga, *The Goals of Antitrust: Other than Competition and Efficiency, What Else Counts?*, 125 U. PA. L. REV. 1191, 1192 (1977). Professor Elzinga asserted, however, that “efficiency and equity are not mutually exclusive domains.” *Id.* at 1193. See also Douglas Kysar, *Sustainable Development and Private Global Governance*, 83 TEX. L. REV. 2109, 2160 (2005) (arguing that “the practices of responsible investment and ethical consumption reject market liberalism’s “view that efficiency, equity, and sustainability are separable goals requiring separate instruments of satisfaction and control”).

include “any standard for determining the just distribution of resources.”²⁷ One widely used distinction is between distributive and corrective justice. The former concept deals with allocation of desirable resources in proportion to the “possession of some morally relevant characteristic” such as humanity (which supports an egalitarian distribution) or virtue (which favors some more than others).²⁸ Corrective (or compensatory) justice “is indifferent to the moral characteristics of different people, but simply seeks to correct transactional wrongs” by requiring wrongdoers to compensate those whom they harm.²⁹ Just as distributive justice assessments turn on the moral characteristic chosen as the basis of allocation, corrective justice results may differ depending on whether mere causation is sufficient to trigger a compensatory obligation or whether fault is also required.³⁰

Making matters even more complex, distributional concerns may arise in several guises, including vertical,³¹ horizontal,³² geographical, and temporal.³³ A climate change adaptation plan that facilitated evacuation of wealthy but not poor neighborhoods in the event of extreme weather events would raise vertical equity concerns.³⁴ A plan that required individuals of similar income levels to pay different amounts to finance adaptation measures, on the basis of some characteristic unrelated to the degree of benefit individuals would accrue from the plan, would invoke horizontal equity concerns. Geographic concerns may arise from a regime that concentrates environmental risk in hot spots such as the area surrounding a waste disposal facility or a high-volume pollution source, or, in the adaptation context, from a decision to leave low-lying coastal areas

²⁷ Daniel A. Farber, *What (If Anything) Can Economics Say About Equity?*, 101 MICH. L. REV. 1791, 1794 (2003).

²⁸ Nathan B. Oman, *The Honor of Private Law*, 80 FORDHAM L. REV. 31, 38 (2011). *See also* STONE, *supra* note __, at 247-48 (describing distributive justice as dealing with “obligations that arise not from what anyone has done to someone else, but from situational disparities”).

²⁹ Oman, *supra* note __, at 38. *See also* Robert R.M. Verchick, *Adaptation, Economics, and Justice*, in ECONOMIC THOUGHT AND U.S. CLIMATE CHANGE POLICY 279, 287 (2010) (stating that “compensatory justice . . . addresses how those inflicting harm should compensate those that they injure”).

³⁰ *See* Oman, *supra* note __, at 38.

³¹ Vertical equity implicates “the fairness of the distribution of wealth among different income groups.” Robert C. Ellickson, *Suburban Growth Controls: An Economic and Legal Analysis*, 86 YALE L. J. 385, 415 (1977).

³² “Horizontal equity requires government to treat like persons alike.” Robert C. Ellickson, *Suburban Growth Controls: An Economic and Legal Analysis*, 86 YALE L. J. 385, 415 (1977).

³³ Temporal equity deals with “the preservation or defeat of expectation interests.” RICHARD B. STEWART & JAMES B. KRIER, ENVIRONMENTAL LAW AND POLICY: READINGS, MATERIALS AND NOTES 168 (1978).

³⁴ Vertical equity concerns are the focus of the environmental justice movement. According to Rob Verchick, “the environmental justice framework embraces a concept of positive liberty and equality” such that “every person should have access to some minimum level of resources so as to allow the pursuit of a safe, purposeful, and dignified existence” and that “all persons are entitled to protection from environmental harm.” ROBERT R.M. VERCHICK, FACING CATASTROPHE: ENVIRONMENTAL ACTION FOR A POST-KATRINA WORLD 118 (2010). *See generally* Vicki Been, *What’s Fairness Got to Do with It? Environmental Justice and the Siting of Locally Undesirable Land Uses*, 78 CORNELL L. REV. 1001 (1993). The evacuation plan relied on during Hurricane Katrina depended on access to cars. Many poor households in New Orleans, however, lacked such access. VERCHICK, *supra*, at 136.

unprotected from the risk of sea-level rise while protecting interior areas affected by risks such as wildfires. Temporal concerns may arise when a government program results in foisting costs on future generations that will not be able to enjoy the benefits of the resource allocations that produce those costs. These concerns would be implicated, for example, if the government chose to indefinitely forestall taking steps to avoid or mitigate climate change-related damage caused by the activities of the present generation, even though it would be far more expensive to resolve the issue on a deferred basis than at present.

Accountability also encompasses multiple considerations. Professors Freeman and Rossi have identified two components of regulatory accountability: transparency and legitimacy.³⁵ According to Anne Joseph O’Connell, “[t]ransparency refers to the availability of information about government policies, structures, and actions. This information helps citizens (and others) assess and attempt to change their government’s performance.”³⁶ Legitimacy may be defined as “the acceptability of the regulation to those involved in its development.”³⁷ The process through which government programs operate can affect acceptability. Social psychologists have argued that “involvement in a process enhances perceptions of legitimacy among participants, independently of whether outcomes ultimately favor these participants.”³⁸ In addition, opportunities to participate are consistent with democratic government.³⁹ Cynthia Farina has called government decisionmaking that reflects the “will of the people” “the wellspring of legitimacy.”⁴⁰ Likewise, perceptions that decisionmakers are honest, unbiased,⁴¹ and competent promote

³⁵ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [19] (2012).

³⁶ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1717 (2006). Professor O’Connell adds that, “[m]uch like shareholders in a corporation, citizens elect representatives to govern as their agents. Citizens need information about their agents’ actions to ensure that those agents follow their preferences.” *Id.* at 1718.

³⁷ Jody Freeman & Laura I. Langbein, *Regulatory Negotiation and the Legitimacy Benefit*, 9 N.Y.U. ENVTL. L.J. 60, 63 (2000).

³⁸ Jody Freeman & Laura I. Langbein, *Regulatory Negotiation and the Legitimacy Benefit*, 9 N.Y.U. ENVTL. L.J. 60, 67 (2000) (citing E. ALLAN LIND & TOM R. TYLER, *THE SOCIAL PSYCHOLOGY OF PROCEDURAL JUSTICE* (1988)).

³⁹ See Jody Freeman & Laura I. Langbein, *Regulatory Negotiation and the Legitimacy Benefit*, 9 N.Y.U. ENVTL. L.J. 60, 133 (2000) (“As a general matter, of course, broad participation and inclusiveness are laudable goals; all things being equal, greater participation strikes us as more consistent with democratic values than does less participation.”).

⁴⁰ Cynthia R. Farina, *The Consent of the Governed: Simple Rules for a Complex World*, 72 CHI.-KENT L. REV. 987, 990 (1997). Professor Farina adds that “‘good’ treatment of citizens – treatment that signals care, responsiveness, courtesy, respect, willingness to help – has legitimating value even if (perhaps especially if) the ultimate decisional outcome is negative.” *Id.* at 1036. She also cites Tom Tyler’s work as supporting the perception that government processes that are fair enhance “identification with, and commitment to, the legal-political system. Because authorities represent the group, and express its norms and values, treatment by a representative authority figure can become a symbol to the individual of her status within the group; this in turn shapes her response to the group.” *Id.* at 1035.

⁴¹ Cynthia R. Farina, *The Consent of the Governed: Simple Rules for a Complex World*, 72 CHI.-KENT L. REV. 987, 1035 (1997).

legitimacy.⁴² Vesting decision-making authority in the hands of those with expertise concerning the issues within their jurisdiction can enhance the perception of competence. Assigning tasks to those with expertise and providing them the tools to perform such tasks can also increase the likelihood that programs will operate effectively, illustrating that the four values we have identified are inter-related.⁴³

The accountability of a regulatory system also turns on the degree to which it protects against the risk that implementing officials will stray from legislative goals because, for example, they have been captured by special interests.⁴⁴ A captured agency seeks to promote the agenda of those to which it is beholden, even if that agenda deviates from statutory goals. Accountability may be fostered through mechanisms that enable elected officials, stakeholders, or even other regulatory agencies to combat capture. The availability of judicial review, for example, may be invoked by stakeholders as a tool for assuring that those implementing regulatory programs do not stray beyond legislative bounds.

Finally, accountability includes adherence to rule of law values, such that “officials must answer for their actions and may suffer penalties for ‘misbehavior’ . . . , both genuine and perceived.”⁴⁵ In short, for purposes of this article, accountability is affected by transparency, opportunities for public participation, perceptions that decisionmakers are competent and unbiased, mechanisms to protect against risks that agency officials will subvert the intent of the legislative bodies that created a regulatory program through capture or otherwise, and adherence to rule of law values.

B. Substantive and Functional Allocations of Authority

Regulatory authority can be assigned in two different ways. First, an agency’s jurisdiction can be determined on the basis of the subject matter it is authorized to regulate or manage (such as activities that result in air pollution or mineral extraction on public lands). Second, jurisdiction can be defined in terms of the functions an agency performs, such that different agencies may be responsible for performing discrete tasks (such as standard-setting, permitting, and enforcement) within the same substantive area.

⁴² “Legitimacy resides in people’s beliefs that their leaders are competent (experts), are personally compelling and dynamic (entrepreneurial), and are stewards (trustworthy).” Cynthia R. Farina, *The Consent of the Governed: Simple Rules for a Complex World*, 72 CHI.-KENT L. REV. 987, 1034 (1997) (quoting Terence R. Mitchell & William G. Scott, *Leadership Failures, the Distrusting Public, and Prospects of the Administrative State*, 47 PUB. ADMIN. REV. 445, 446 (1987)).

⁴³ See Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, ___ [47-48] (2012) (arguing that crafting programs capable of improving the analytic basis for decisionmaking by adding data and expertise “is likely to make decisions better”).

⁴⁴ See Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, ___ [48] (2012) (noting that private interest group capture of agencies “might thwart the goals of a regulatory program”).

⁴⁵ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1719 (2006).

1. Substantive Jurisdiction

Perhaps the most elementary component for assessing how authority is allocated in the management of environmental problems is substantive jurisdiction. Administrative agencies are allocated limited substantive authority to regulate or manage specific social issues or problems. Workplace health and safety falls within the purview of the Occupational Safety and Health Administration. The U.S. Department of Agriculture deals with the agriculture industry. Transportation infrastructure is addressed by the Federal Highway Administration and the Department of Transportation. Immigration is an activity supervised by the United States Immigration and Naturalization Service. The Interstate Commerce Commission, before Congress abolished it, managed interstate commerce such as transportation of goods by rail. The Center for Disease Control conducts disease research and coordinates disease prevention measures. The Federal Emergency Management Agency is charged with conducting disaster planning and management.

In environmental regulation, administrative authority is typically restricted to regulation or management of a particular environmental medium or waste. Federally designated wetlands are regulated by the United States Army Corps of Engineers; air quality and non-nuclear hazardous and solid waste are regulated by the U.S. Environmental Protection Agency (EPA) and state air agencies; the Nuclear Regulatory Commission and Department of Energy control nuclear power generation and waste management.

Regularly, substantive authority is divided based on particular features or components of a medium. For example, surface water quality is regulated by EPA and designated state water quality agencies (such as California's State Water Resources Control Board), while the allocation of water supply falls within the domains of different state and local water resources agencies (such as the California Department of Water Resources and Metropolitan Water District of Southern California). Similarly, management of terrestrial or freshwater (including endangered or threatened) species is under the jurisdiction of the Interior Department's United States Fish and Wildlife Service (FWS), while marine (including endangered or threatened) species are managed by the Commerce Department's National Marine Fisheries Service. Coastal resources are managed and regulated by state coastal agencies and commissions, while management or research on oceans and the atmosphere is delegated to NOAA. Public land management is divided based on particular land management goals. At the federal level alone, the national forests are managed by the United States Forest Service, the national parks by the National Park Service, wildlife refuges by the FWS, and federal lands not otherwise specified by the Bureau of Land Management.

Such division of course is not unique to pollution control or natural resources law. Foods, drugs, and cosmetics are generally regulated by the Food and Drug Administration, while some foods (meat, poultry, and processed egg products) are under the jurisdiction of the United States Department of Agriculture's Food Safety and Inspection Service. General product safety is regulated by the Federal Consumer Product Safety Commission, while pesticide licensing is administered by EPA.

Relatedly, substantive authority may be delegated to a particular authority in recognition of that particular agency's technical expertise that may be brought to bear on the regulatory problem. An expertise in atmospheric chemistry is useful for understanding and regulating air quality, an ecology background for managing biological resources, a public health or medical background for disease prevention, or forestry expertise for forest management.⁴⁶

2. Functional Jurisdiction

Despite the relative inattention to it in the academic literature, perhaps of equal importance to the substantive allocation of authority is understanding the regulatory functions apportioned to a governmental entity. Governmental authority may also be organized according to the particular regulatory activities in which the agency is authorized to engage. These actions might include monitoring (whether ambient,⁴⁷ compliance⁴⁸ or effect and effectiveness monitoring⁴⁹), research/data generation, information distribution, funding, planning, standard setting, implementation/permitting, and enforcement.

For most environmental agencies, functional jurisdiction is a subordinate form of regulatory division, such that the primary organizing principle for determining the bounds of an agency's authority involves substantive authority, while the agency's jurisdiction is secondarily based on function. Typically, an agency is provided substantive authority over particular resources, for which it creates offices or divisions that focus on sub-topics of that substantive authority. For example, EPA includes an Offices for Air and Radiation, Chemical Safety and Pollution Prevention, Solid Waste and Emergency Response, and Water, corresponding with its various substantive authorities to regulate air quality, pesticides and toxic substances, solid and hazardous waste, and water quality, respectively.⁵⁰ These subdivisions often have authority over a range of functions, including monitoring, standard setting, and implementation/permitting, with authority further subdivided either by substantive subcategory and/or by functional activity.

⁴⁶ For discussion of how different scientific disciplines affect the design and management of environmental and natural resource regulatory systems, see Eric Biber, *Which Science? Whose Science? How Scientific Disciplines Can Shape Environmental Law*, ___ U. CHI. L. REV. ___ (forthcoming) (draft version available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1924633).

⁴⁷ See, e.g., Eric Biber, *The Problem of Environmental Monitoring*, 83 U. COLO. L. REV. 1 (2011) (detailing the problems with ambient monitoring by resource agencies).

⁴⁸ See, e.g., Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,252, 35,253 (June 1, 2000) (defining compliance monitoring as verifying permittee compliance with permit terms).

⁴⁹ See, e.g., *id.* (defining effect and effectiveness monitoring as evaluating an action's or plan's effects, the continued validity of initial assumptions and predictions, and whether the action or plan is achieving its stated goals and objectives). See also ROBERT L. GLICKSMAN ET AL., ENVIRONMENTAL PROTECTION: LAW AND POLICY 448-49 (6th ed. 2011) (discussing the use of monitoring and computer modeling by EPA to categorize air quality control regions under the Clean Air Act to determine applicable substantive requirements, to assess state plans for complying with those mandates, and to assist in determining whether individual sources violated permits and emission limits).

⁵⁰ <http://www.epa.gov/aboutepa/organization.html>.

However, agencies also often contain divisions or offices dedicated to particular regulatory functions, regardless of their substantive focus. At EPA, these include the Office of Enforcement and Compliance Assurance, the Office of Environmental Information, the Office of General Counsel, the Office of Inspector General, the Office of International and Tribal Affairs, and the Office of Research and Development.⁵¹ These offices are charged with enforcement, information gathering, and research, respectively, across the entire range of EPA’s substantive authority.⁵²

Furthermore, though most regulatory authority is delegated firstly based on substantive scope, with functional jurisdiction usually a secondary organizing criterion, a number of agencies are organized with function as the principal basis for their authority. For instance, Congress has delegated the United States Government Accountability Office responsibility for audit, investigation, reporting, and evaluation of the federal agencies, regardless of the substantive area of regulation.⁵³ Similarly, the White House Council on Environmental Quality has been granted responsibility to oversee implementation by all federal agencies of environmental impact assessment under the National Environmental Policy Act,⁵⁴ including promulgation of guidelines and dispute resolution when there is interagency conflict.⁵⁵ The United States Geological Survey is a research-only agency that generates biological, geographical, geological, and hydrological information that helps inform policy by regulatory authorities, but has no regulatory functions of its own.⁵⁶ More broadly, of course, the separation of legislative, executive, and adjudicative power among the branches of government is a form of functional jurisdiction. In this regard, William Buzbee has noted that a type of regulatory fragmentation, “institutional fragmentation,” is the result of an allocation of authority to “diverse institutions such as legislatures, agencies, courts and legally empowered citizens.”⁵⁷

Despite recognition of the existence of functional organization, few scholars have considered in comprehensive fashion the range of functions that administrative agencies may conduct as an alternative basis for allocating authority to substantive jurisdiction. Consideration of functional jurisdiction expands the options available in crafting

⁵¹ <http://www.epa.gov/aboutepa/organization.html>.

⁵² See generally Alfred E. Marcus, *EPA’s Organizational Structure*, 54-AUT. L. & CONTEMP. PROBS. 5, 23 (1991) (describing how and why EPA’s first Administrator, William Ruckelshaus, “developed hybrid structures that incorporated elements of both the functional and form-of-pollution organizational methods,” even though he preferred a fully functional plan).

⁵³ <http://www.gao.gov/about/index.html>.

⁵⁴ 42 U.S.C. §§ 4321-4375 (2000).

⁵⁵ The Council on Environmental Quality – About, <http://www.whitehouse.gov/administration/eop/ceq/about> (“CEQ oversees Federal agency implementation of the environmental impact assessment process and acts as a referee when agencies disagree over the adequacy of such assessments.”).

⁵⁶ United States Geological Survey, About USGS, <http://www.usgs.gov/aboutusgs/>.

⁵⁷ William W. Buzbee, *The Regulatory Fragmentation Continuum, Westway and the Challenges of Regional Growth*, 21 J.L. & POL. 323, 348 (2005).

government programs to deal with social problems. For example, although federal authority over ecosystem resources may be apportioned into substantive silos according to the particular type of resource (e.g., forests, oceans, or deserts), such authority could also be divided into functional categories according to the governmental activity at issue (e.g., planning and permitting). Alternatively (and more commonly), a legislature might adopt a hybrid of substantive and functional allocations, in which agencies are only provided authority over certain regulatory functions for particular types of resources. Awareness of this additional dimension provides a more nuanced framework for analyzing the design advantages and disadvantages of a particular allocation of authority.

C. Decentralized versus Centralized Authority

At least in the legal academic literature, perhaps the most frequently analyzed dimension for characterizing the allocation of regulatory authority focuses on the level of government which is granted jurisdiction. One key question for this dimension is whether authority over resources is primarily decentralized to a local or state jurisdiction or more centralized at the federal level. Another question, however, is whether regulatory authority within a certain level is delegated to one entity or divided among two or more entities. Thus, if a statute allows only federal agencies to address a problem (preempting supplemental state or local regulation), the regime is centralized compared to one in which regulators in all fifty states were allowed to regulate. Within the federal government, regulatory authority could be fully centralized in one agency or decentralized by dividing authority among multiple federal agencies.⁵⁸

1. Decentralized Governance

For centuries, at least as far back as the origination of the concept of subsidiarity,⁵⁹ scholars have promoted the idea that authority is best allocated at the local level. Some endorse decentralized governance as more efficient, maximizing social

⁵⁸ An example may illustrate the point. With some exceptions, the authority to regulate federally owned lands and resources is the sole prerogative of the federal government, so that the authority is centralized. In those substantive areas in which states retain some concurrent jurisdiction, such as wildlife management, authority is more decentralized. *See* 3 GEORGE CAMERON COGGINS & ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 32:8 (2d ed. 2007). If Congress had vested federal land management authority in a single federal agency, authority would have been centralized still further. Instead, jurisdiction to manage different kinds of federal lands systems (e.g., national parks, national forests, wildlife refuges, and other public lands) has been delegated to (and decentralized among) a group of agencies, including the National Park Service, the National Forest Service, the FWS, and the Bureau of Land Management.

⁵⁹ Subsidiarity is the organizing principle “that a central authority should have a subsidiary function, performing only those tasks which cannot be performed effectively at a more immediate or local level.” Oxford English Dictionary, <http://www.oed.com/view/Entry/193007?redirectedFrom=subsidiarity#eid>. Derived originally from Catholic social thought, subsidiarity is a general principle of European Union law. *See* Consolidated Version of the Treaty on European Union, Article 5(3) (“Under the principle of subsidiarity, in areas which do not fall within its exclusive competence, the Union shall act only if and in so far as the objectives of the proposed action cannot be sufficiently achieved by the Member States, either at central level or at regional and local level, but can rather, by reason of the scale or effects of the proposed action, be better achieved at Union level.”).

utility through interlocal competition by allowing each local community to shape their interests and goals⁶⁰ In environmental law, some argue that localized control promotes optimal levels of environmental protection in relation to economic development⁶¹ and regulation that leverages local knowledge and expertise and is better tailored to local environmental conditions, preferences, and economic conditions.⁶² Some argue that decentralized allocation of authority makes decision-makers more accessible and therefore promotes more democratic governance.⁶³ Lastly, many argue that decentralized government allows opportunities for regulatory experimentation that can encourage innovation.⁶⁴

Relying in large part on such justifications, before 1960 state and local laws were the only significant governmental constraints on pollution in the United States, with a few exceptions.⁶⁵ These included state common law causes of action such as nuisance,

⁶⁰ Proponents such as Charles Tiebout and Robert Nozick implicitly understood decentralization in terms of the autonomy of the locality as against all other governmental powers. This autonomy model of decentralization recognizes that there is no one conceivable utopia; people are understood as having different interests and goals. Believing that people will fashion their community to meet their particular preferences, proponents of the autonomy-based decentralized model envision a countless variety of local communities. Municipalities can establish a wide array of mixes and levels of public services. People will move to the community that best fits their preferences – “vote with their feet” – so that their substantive values will be reflected in their locality, as will the value that they place on the rights of the individual or minority as against the rights of the group.

This public choice theory sees land use primarily as a market: external competition between cities to attract residents, industries, and merchants drives localities to provide quality, efficient service. Yet, the model goes beyond efficiency. The prospect of diversity of choice is asserted to alleviate the conflict between majority and individual. Although efficiency and competition drive the market system, communities are free to choose what public services and expenditures are offered and how to value the service or commodity. Thus, this system includes as a postulate that efficiency is to some extent subjective, and it asserts that optimal communities may be numerous and various. Localities are given the bulk of decision-making authority, and are seen as autonomous. The central government’s limited function is to settle matters that are not local – conflicts between communities, enforcing the right of the individual to leave a community, and enforcing property and contract rights.

⁶¹ See, e.g., Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the “Race to the Bottom” Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1211-12 (1992).

⁶² See, e.g., Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 136-37 (2005).

⁶³ See, e.g., GERALD E. FRUG, *CITY MAKING: BUILDING COMMUNITIES WITHOUT BUILDING WALLS* (PRINCETON UNIVERSITY PRESS 1999).

⁶⁴ See, e.g., Adelman & Engel, 2007; Adelman and Engel (2009); Jared Snyder & Jonathan Binder, *The Changing Climate of Cooperative Federalism: The Dynamic Role of the States in A National Strategy to Combat Climate Change*, 27 UCLA J. ENVTL. L. & POL’Y 231, 251 (2009); Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 137 (2005).

⁶⁵ The River and Harbors Act of 1899, 33 U.S.C. § 407, prohibited the discharge of “refuse matter” without a permit from the Secretary of the Army, but the program’s principal objective was to promote commerce by preserving navigability of waterways. The statute was not enacted as a pollution control mechanism. Robert L. Glicksman, *From Cooperative to Inoperative Federalism: The Perverse Mutation of Environmental Law and Policy*, 41 WAKE FOREST L. REV. 719, 729 (2006) [hereinafter Glicksman, *Mutation*].

trespass, negligence, and strict liability, as well as local land use regulations designed to segregate industrial from residential uses, thereby minimizing opportunities for pollution produced by the former to harm the latter. Local governments also enacted smoke control ordinances and laws requiring the use of specified pollution-control equipment.⁶⁶

In addition, past congressional regulation over the energy industry has shifted from an initially centralized model to a more decentralized approach. For example, in 1938 Congress authorized the Federal Power Commission (FPC) through the Natural Gas Act of 1938 (NGA)⁶⁷ to regulate sales of natural gas for resale in interstate commerce (wholesales), transportation in interstate commerce, and facilities used for such sales and transportation.⁶⁸ However, because of extensive supply shortages caused in significant part by FPC regulation,⁶⁹ Congress adopted the Natural Gas Policy Act of 1978 (NGPA),⁷⁰ which phased out regulation of rates for producer sales. The enactment of the NGPA allowed competition and state regulation to begin to displace federal price regulation at the wellhead as the principal determinant of producer sales.⁷¹ The NGPA allowed regulation by the states of production and local distribution of natural gas, resulting in a decentralized regime for these transactions.⁷²

It is important to note that though decentralized authority is most likely to be associated with local or state regulatory control, federal regulatory authority could be modified to be more or less decentralized as well. Many of the same justifications for local or state regulatory authority may be similarly levied for delegating jurisdiction over particular substantive areas or regulatory functions to a variety of disparate federal agencies. Interagency competition,⁷³ particularized expertise,⁷⁴ and regulatory

⁶⁶ Glicksman, *Mutation*, *supra* note ____, at 729-30.

⁶⁷ 15 U.S.C. §§ 717-717z.

⁶⁸ See Richard J. Pierce, Jr., *Reconstituting the Natural Gas Industry from Wellhead to Burnertip*, 9 ENERGY L.J. 1, 6 (1988) [hereinafter Pierce, *Reconstituting*]. Among other things, the statute required the FPC to insure that rates for the activities covered by the statute were just and reasonable and nondiscriminatory. Pierce, *Reconstituting*, *supra* note ____, at 6.

⁶⁹ Pierce, *Reconstituting*, *supra* note ____, at 8-11.

⁷⁰ 15 U.S.C. §§ 3341-3348.

⁷¹ Pierce, *Reconstituting*, *supra* note ____, at 22. Congress's decision to allow the free market to dictate natural gas sales prices was threatened, however, when state conservation agencies began ordering interstate pipelines to purchase gas not under contract from producers as a way to alleviate the economic distress experienced by producers as a result of the gas glut that followed adoption of the NGPA. Pierce, *Reconstituting*, *supra* note ____, at 34. In 1986, the Supreme Court concluded that the NGPA preempted state orders of this kind by allowing gas prices to be determined by the market. *Transcontinental Gas Pipe Line Corp. v. State Oil & Gas Bd.*, 474 U.S. 409, *reh'g denied*, 475 U.S. 1091 (1986).

⁷² Pierce, *Reconstituting*, *supra* note ____, at 48, 50. See also *id.* at 53 (noting that even after the NGPA, state regulators continued to regulate retail gas prices).

⁷³ See Dara Kay Cohen, Mariano-Florentino Cuéllar & Barry R. Weingast, *Crisis Bureaucracy: Homeland Security and the Political Design of Legal Mandate*, 59 STAN. L. REV. 673, 710-11 (2006) (noting that “centralization can diminish the competition among agencies and risks creating a bureaucracy with a monopoly of control over a massive portion of the government’s operation,” and that “[t]he absence of competition tends to imply less efficient performance”).

experimentation to promote innovation⁷⁵ may lead to the allocation of federal authority away from a heavily consolidated model toward one with more decentralized jurisdiction.

2. *Centralized Governance*

Nonetheless, legislatures and scholars have increasingly accepted that at least for some regulatory problems, centralization makes sense. Centralization can take advantage of economies of scale that are forfeited if regulatory authority is dispersed.⁷⁶ Some have argued, for example, that certain government functions, such as research or standard setting, should be centralized at the federal level because of the economies of scale of a single authority administering the function.⁷⁷ In addition, authority may be best centrally allocated at the federal level because of the national character of the issues involved or because of collective action concerns. Some regulatory matters, such as immigration policy, have a national footprint that are best addressed by a federal authority.⁷⁸ In the environmental law context, some harms may cross jurisdictional lines, necessitating more centralized regulatory control to prevent or manage interstate spillovers.⁷⁹

⁷⁴ See, e.g., Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, ___ [8] (2012) (noting that “it is also possible that some members of Congress vote to disperse authority because they recognize that social and economic problems are complex, and wish to harness the unique expertise and competencies of different agencies. Even if this will occasionally create conflicts over jurisdiction, produce policy inconsistencies, or result in some wasteful redundancy, members might decide that the benefits of engaging multiple expert bodies are worth the costs.”).

⁷⁵ See Alejandro E. Camacho, *Transforming the Means and Ends of Natural Resources Management*, 89 N.C. L. REV. 1405, 1423 (2011) (noting “the innovation-promoting features of decentralized governance, which can provide substantial opportunities for regulatory experimentation to reduce uncertainty”).

⁷⁶ See Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1680 (2006).

⁷⁷ See e.g., Daniel Esty, *Revitalizing Environmental Federalism*, 95 MICH. L. REV. 570, 614 (1996) (“[I]t makes no sense to ask every state, city, or town to measure the level, size, and type of particulates in the air, determine their connection to respiratory failure and other health problems, identify the safe level of emissions, and design cost-effective policy responses.”); Daniel C. Esty, *Toward Optimal Environmental Governance*, 74 N.Y.U. L. REV. 1495, 1562 (1999) (“Some aspects of environmental governance, moreover, show significant economies of scale. It does not make sense, for example, for government authorities at every level of decisionmaking to replicate each other’s scientific or analytic work.”); Adler, *supra* note ___, at 148. See also Daniel Halberstam, *Federalism: A Critical Guide*, U of Michigan Public Law Working Paper No. 251, at 17-18, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1924939&download=yes (“Just as it can be cheaper to produce certain goods or services by consolidating production or supply, so, too, it can be cheaper to consolidate certain government activities in a central authority.”).

⁷⁸ See J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. 363, 423 (2009) (“Some aspects of adaptation policy are inherently national in scope, such as immigration policy, a secure national food supply, conservation of marine resources, migratory species, and pandemic disease control.”).

⁷⁹ Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 139 (2005) (“The strongest case for federal involvement comes in the context of interstate spillovers, such as when pollution crosses state lines and the affected states are unable to resolve the conflict on their own. Where activity in State A causes pollution in State B, there is an almost unimpeachable case for federal

Moreover, much of American federal environmental law is premised on averting a “race to the bottom” from decentralized governance, in which local jurisdictions compete with each other by progressively lowering environmental standards.⁸⁰ Under this dynamic, individual states have incentives to lower standards to compete for industry whether or not other states do the same, even though the states as a collective would be better off not doing so.⁸¹ Congress invoked the undesirable specter of a race to the bottom when, in 1977, it first amended the Clean Air Act adopted in 1970. A House report warned that “[i]f there is no Federal policy, States may find themselves forced into a bidding war to attract new industry by reducing pollution standards.”⁸² Similarly, the Supreme Court, in *Hodel v. Virginia Surface Mining and Reclamation Association*,⁸³ characterized the Surface Mining Control and Reclamation Act,⁸⁴ also adopted in 1977, as a response “to a congressional finding that nationwide ‘surface mining and reclamation standards are essential in order to insure that competition in interstate commerce among sellers of coal produced in different States will not be used to undermine the ability of the several States to improve and maintain adequate standards on coal mining operations within their borders.’”⁸⁵

Of course, centralization of authority may occur for only a particular governmental function, or, as for the federal air and water pollution control laws, incrementally. Beginning in the 1950s, the federal government’s role in halting air and water pollution increased gradually, with the federal government enhancing its responsibility for performing certain functions before others. At first, Congress imposed greater centralization of information-gathering and dissemination through passage of laws that funded research into the causes and effects of pollution.⁸⁶ These laws reflected the conviction among federal legislators that the states and localities lacked the resources

involvement, even if only to adjudicate the relevant dispute.”); Daniel A. Farber, *Climate Adaptation and Federalism: Mapping the Issues*, 1 SAN DIEGO J. CLIMATE & ENERGY L. 259, 266 (2009).

⁸⁰ Kirsten Engel, *State Environmental Standard-Setting: Is There a “Race” and Is It “to the Bottom”?* 48 HASTINGS L.J. 271 (1997); Joshua D. Sarnoff, *The Continuing Imperative (But Only from a National Perspective) for Environmental Protection*, 7 DUKE ENVTL. L. & POL’Y F. 225 (1997); Peter D. Swire, *The Race of Laxity and the Race to Undesirability: Explaining Failures in Competition Among Jurisdictions in Environmental Law*, 14 YALE J. ON REG. 67 (1996).

⁸¹ If other states do not lower standards, an individual state is in a better position to attract industry, while if other states lower standards, then the state must act in a similar manner to compete effectively.

⁸² H.R. REP. NO. 95-294, at 152 (1977), as reprinted in 1977 U.S.C.C.A.N. 1077, 1231.

⁸³ 452 U.S. 264 (1981).

⁸⁴ 30 U.S.C. §§ 1201–1328 (2000).

⁸⁵ *Hodel*, 452 U.S. at 281–82 (quoting 30 U.S.C. § 1201(g)). The Court added that “[t]he prevention of this sort of destructive interstate competition is a traditional role for congressional action under the Commerce Clause,” and justified exercising Congress’s authority to create a federal regulatory program under the authority vested in it by the Commerce Clause. *Id.* at 282. Other courts have cited the desire to avoid a race to the bottom as one reason Congress passed the Endangered Species Act. See *Rancho Viejo, LLC v. Norton*, 323 F.3d 1062, 1069 n.7 (D.C. Cir. 2003); *Gibbs v. Babbitt*, 214 F.3d 483, 501 (4th Cir. 2000).

⁸⁶ See, e.g., An Act to Improve, Strengthen, and Accelerate Programs for the Prevention and Abatement of Air Pollution, Pub. L. No. 88-206, 77 Stat. 392 (1963); An Act to Provide Research and Technical Assistance Relating to Air Pollution Control, Pub. L. No. 84-159, 69 Stat. 322 (1955).

to engage in or fund the research needed to support the adoption of effective pollution control laws.⁸⁷ Armed with the information that federally assisted research could provide, the states and localities could attack pollution and avoid public health effects more effectively. In the 1960s, Congress chose to provide technical and financial assistance to the states, such as by subsidizing the construction of municipal sewage treatment works.⁸⁸

Before long, the federal government increased its role in standard-setting. Initially, Congress was unwilling to move toward centralized federal standard-setting across the board, viewing it as an appropriate federal endeavor in a limited range of situations of interstate pollution in which state and local action was ineffective.⁸⁹ Congress subsequently concluded that federal standard-setting authority should not be confined to controlling interstate pollution, adopting various regimes in which EPA and other federal agencies were given broad standard-setting authority over a range of environmental media, including air, water, hazardous and solid waste, pesticides, and other toxic substances.⁹⁰

D. Overlapping versus Distinct Authority

Another important dimension is from overlapping to distinct or discrete regulatory authority. Overlap may involve substantive jurisdiction (e.g., more than one agency has the authority to control wetlands development) and/or the exercise of a particular governmental function (e.g., shared enforcement authority between federal and state regulators for state requirements adopted under delegated federal authority). If regulatory power is fully centralized in one regulator, this dimension does not come into play. If, however, authority is divided among more than one entity, the jurisdictional reach of each regulator may be distinct in that each substantive issue or function is vested in a single regulator, notwithstanding that each has a role to play in addressing a problem or set of problems. Alternatively, authority may be overlapping in that at least two regulators share the responsibility to address a particular problem or set of problems or to carry out a particular regulatory function.

⁸⁷ See, e.g., H.R. REP. NO. 89-2170, at 4 (1966), as reprinted in 1966 U.S.C.C.A.N. 3473, 3476 (stating that among the other air pollution problems that are “inherently beyond the reach of State and local agencies” were “the various research and development problems that still remain to be solved. The Federal Government must be prepared to meet these increasing needs for assistance to State and local governments and action at the Federal level”); Federal Water Pollution Control Act Amendments of 1961, H.R. REP. NO. 87-306, at 5 (1961), as reprinted in 1961 U.S.C.C.A.N. 2076, 2079 (“The need for a much greater Federal research effort was consistently recognized during the hearings on the bill.”).

⁸⁸ See Glicksman, *Mutation*, supra note ____, at 730.

⁸⁹ See, e.g., Water Pollution Control Act Amendments of 1956, H.R. REP. NO. 84-1446, at 2 (1955), as reprinted in 1955 U.S.C.C.A.N. 3023, 3024 (“Regulatory authority at the Federal level should be limited to interstate pollution problems and used on a standby basis only for serious situations which are not resolved through State and interstate collaboration.”).

⁹⁰ See RICHARD J. LAZARUS, *THE MAKING OF ENVIRONMENTAL LAW* 70-73 (2004).

Consequently, this dimension implicates two key questions. The first is whether authority over a particular resource or regulatory problem (e.g., water pollution) is divided up so that, even though there are multiple regulators, each is addressing a distinct component of the larger problem (e.g., one controls point source and another controls nonpoint source pollution, or one controls pollution by non-nuclear materials while another has sole authority over nuclear materials).⁹¹ The second is whether regulatory functions overlap (e.g., by authorizing one agency to review and, if appropriate, veto, the issuance of permits by another) or instead comprise distinct mandates (e.g., one agency sets standards, while another applies those standards in the context of resolving individual permit applications).⁹²

1. Distinct Authority

Legislatures have long adopted and scholars have promoted the idea that authority over a particular regulatory problem is best allocated to a single or few regulators. Such a perspective is primarily based on an explicit or implicit “matching principle”—that legislatures should match each regulatory problem (or aspect of a regulatory problem) to the single authority that can best address that problem.⁹³ Among these commenters, the allocation of authority in environmental regulation generally should “go to the political jurisdiction that comes closest to matching the geographic area affected by a particular externality.”⁹⁴ Though governmental jurisdiction over regulatory problems inevitably will involve some intersection of authority, particularly in the United States’ multi-jurisdictional, federal legal system, overlapping jurisdiction may be minimized.

Scholars have identified various weaknesses of a regulatory system with overlapping regulatory authority. Some criticize overlapping governance because of concerns about accountability; in a regulatory system where authority intersects, regulator accountability to the public may be diminished.⁹⁵ Agencies with shared

⁹¹ See, e.g., Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 864 (2006) (discussing jurisdictional overlap, in which “independent public agencies enjoy regulatory authority over the same individuals or institutions, with regard to the same or related issues”).

⁹² See Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, __ [10] (2012) (discussing “*overlapping agency functions*, where lawmakers assign essentially the same function to more than one agency (as when two agencies share enforcement authority over the same malfeasance)”).

⁹³ See HENRY N. BUTLER & JONATHAN R. MACEY, *USING FEDERALISM TO IMPROVE ENVIRONMENTAL POLICY* (1996).

⁹⁴ *Id.* at 48. See also Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 133 (2005) (“As a general structural matter, it is more efficient and effective to address environmental problems through institutions of equivalent scope as the problem in question. . . . By matching jurisdiction with the scope of a given problem, the institutional structure can ensure the greatest ‘match’ between a given problem and the institutional response. Environmental protection efforts are most likely to be optimal where those who bear the costs and reap the benefits of a given policy determine how best, and even whether, to address a given environmental concern.”).

⁹⁵ Robert Schapiro, *From Dualist Federalism to Interactive Federalism*, 56 EMORY L.J. 1, 17 (2006); Robert A. Schapiro, *Monophonic Preemption*, 102 NW. U. L. REV. 811, 812-13 (2008); Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 162 (2006).

authority may shirk their responsibilities, blaming co-regulators for program failures.⁹⁶ Others have posited that overlapping jurisdiction can lead to a lack of finality in the regulatory process.⁹⁷

One of the more common criticisms of overlapping jurisdiction is that it is wasteful and inefficient, both for regulators and regulated entities. As Jody Freeman and Jim Rossi have explained, “[r]edundancy can lead to waste, both in terms of having multiple agencies work on the same problem and in terms of having agencies produce duplicative regulations that require greater expenditures by regulated entities.”⁹⁸ The government’s “transaction costs” of regulating increase if multiple agencies perform tasks that could have been handled by a single agency.⁹⁹ Efforts to coordinate among multiple regulators can address redundancy, but can themselves be costly.¹⁰⁰ Consolidation of authority therefore may make sense within a governmental level. As the proposed reorganization of the six agencies with jurisdiction over small businesses discussed in the introduction to this Article illustrates, such consolidation is often seen as a way to minimize redundancy and duplication of effort.¹⁰¹

For regulated entities, multiple bodies of regulation require tracking and complying with disparate and potentially conflicting sets of obligations.¹⁰² Overlapping regulation also can reduce certainty if the relationships among the mandates of different regulators are unclear.¹⁰³ Some also claim that overlapping authority can be lead to over-

⁹⁶ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [50] (2012); Todd S. Aagard, *Regulatory Overlap, Overlapping Legal Fields, and Statutory Discontinuities*, 29 VA. ENVTL. L.J. 241, 288 (2011) (“Regulatory overlap thus may lead each regulator to shirk – that is, to reduce its attentiveness to problems that arise within an area of overlapping jurisdiction.”).

⁹⁷ Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 162 (2006) (stating that overlapping governance can result in an inefficient lack of finality and accountability).

⁹⁸ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [4] (2012).

⁹⁹ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [4] (2012) (“Overlapping agency functions might easily produce inefficiencies if two or more agencies build their own policymaking and enforcement systems where a single apparatus is adequate.”). Freeman and Rossi cite as an example the shared responsibility of the Department of Justice and the Federal Trade Commission in enforcing the federal antitrust laws. *See also* Jacob E. Gersen, *Overlapping and Underlapping Jurisdiction in Administrative Law*, 2006 SUP. CT. REV. 201, 214 (noting that “redundancy in the assignment of bureaucratic tasks can also create duplicative monitoring and enforcement costs”). *See generally* U.S. GOV’T ACCOUNTABILITY OFFICE, GAO-11-318SP, OPPORTUNITIES TO REDUCE POTENTIAL DUPLICATION IN GOVERNMENT PROGRAMS, SAVE TAX DOLLARS, AND ENHANCE REVENUE (2011).

¹⁰⁰ Todd S. Aagard, *Regulatory Overlap, Overlapping Legal Fields, and Statutory Discontinuities*, 29 VA. ENVTL. L.J. 237, 288 (2011).

¹⁰¹ *See supra* notes __-__ and accompanying text.

¹⁰² Jason Marisam, *Duplicative Delegations*, 63 ADMIN. L. REV. 181, 223 (2011) (referring to “the burdens on regulated entities that must comply with two agencies’ regulations”).

¹⁰³ *See* Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 897 (2006) (“Another cost of intersystemic regulation is the loss of certainty that is attendant to it. . . . While a refined scheme of

regulation where “numerous regulators are confronted with a more particularized project or proposal with localized and discernible effects.”¹⁰⁴ These scholars consider overlapping authority “wasteful because it may result in the development of inefficient standards, both through the introduction of regulatory goals other than externality elimination, and through interference with the free movement of firms through government overappropriation of fixed capital assets.”¹⁰⁵ In addition to being a shift toward centralization, the creation of federal authority in federal air pollution legislation to set standards to control tailpipe emissions represented a movement toward exclusivity and distinctness in that federal legislation preempted supplemental state standards, even if they were more stringent than the federal standards.¹⁰⁶ Congress chose to vest exclusive authority to adopt such standards in the federal government as a means of avoiding the imposition of multiple and potentially conflicting sets of obligations on regulated manufacturers of nationally marketed products.¹⁰⁷

Similarly, Congress adopted exclusive federal jurisdiction over standard-setting for nuclear waste disposal facilities, transportation of hazardous waste, transportation and disposal of other forms of nuclear material, and management of biomedical waste based on concerns that state and local governments would adopt constraints on locally unwanted activities with broader, more diffuse social benefits.¹⁰⁸ For example, Congress

intersystemic regulation might offer the right balance of complexity and certainty, the danger lies in flawed schemes, with too much complexity, and consequently too little certainty.”).

¹⁰⁴ See Buzbee, 2005 *supra* note ___, at 349. See also James M. Buchanan & Yong J. Yoon, *Symmetric Tragedies: Commons and Anticommons*, 43 J.L. & ECON. 1, 11–12 (2000); WILLIAM A. FISCHER, REGULATORY TAKINGS: LAW, ECONOMICS, AND POLITICS 251–52 (1995).

¹⁰⁵ Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 165–66 (2006).

¹⁰⁶ The current Clean Air Act retains a modified form of that preemptive posture. See 42 U.S.C. § 7543 (generally prohibiting the adoption or enforcement of state tailpipe emission standards, but allowing EPA to waive the prohibition by granting a waiver to California). See also *id.* § 7507 (allowing other states to adopt EPA-approved California standards, but prohibiting them from adopting a third set of standards that differ from EPA’s or California’s). See also 7 U.S.C. § 136v(b) (preempting state regulation of labeling and packaging of pesticide products).

¹⁰⁷ A 1965 Senate committee report explained that federal regulation of automotive emissions was warranted because “it would be more desirable to have national standards rather than for each State to have a variation in standards and requirements which could result in chaos insofar as manufacturers, dealers, and users are concerned.” S. REP. NO. 89-192, at 6 (1965). Subsequently, a House committee justified prohibiting the states from adopting their own motor vehicle emission controls by asserting that the need “to prevent a chaotic situation from developing in interstate commerce in new motor vehicles.” H.R. REP. NO. 90-728, at 8 (1967), as reprinted in 1967 U.S.C.C.A.N. 1938, 1958. The committee rejected the suggestion that auto manufacturers could meet any diverse standards that resulted from state regulation by manufacturing vehicles that comply with the most stringent controls. Such a result was objectionable because it “would lead to increased costs to consumers nationwide, with benefit only to those in one section of the country.” *Id.* at 22.

¹⁰⁸ See, e.g., 49 U.S.C. § 5125 (preempting some state regulation of hazardous waste packaging and transportation); *Tennessee v. United States Dep’t of Transp.*, 326 F.3d 729, 730–31 (6th Cir. 2003) (describing the federal hazardous materials transportation legislation as “an effort to create a coherent approach to addressing the problems posed by the interstate transportation of hazardous material”). See

passed the Low-Level Radioactive Waste Policy Act of 1980¹⁰⁹ to distribute the environmental burdens of the disposal of nuclear waste more equitably.¹¹⁰ This expansion of federal regulatory power reflected a movement toward exclusivity.

Others, however, have asserted that overlapping jurisdiction can lead to under-regulation, an unintended result of what Professor William Buzbee has dubbed the creation of a “regulatory commons,”¹¹¹ especially when the regulated problem or harm is large-scale and broadly dispersed.¹¹² Buzbee attributes this to high information costs of developing a regulatory response, limited credit for regulators, bias toward the regulatory status quo, and regulator risk aversion.¹¹³ The result may be that although multiple regulators have authority to address a particular problem, regulatory gaps develop as each assumes or hopes that others are addressing a problem.¹¹⁴

A common response to the incentives toward over-regulation or under-regulation caused by overlapping governance is to call for the consolidation of regulatory authority. A prominent example from the federalism literature is ceiling preemption, under which state governments are barred from regulating more stringently than the federal government.¹¹⁵ Another example may be in the reorganization of fragmented authority,

also Skull Valley Band of Goshute Indians v. Nielson, 376 F.3d 1223, 1246 (10th Cir. 2004) (discussing limitations on state regulation of nuclear energy).

¹⁰⁹ 42 U.S.C. §§ 2021b–2021d (2000). The 1980 Act was amended in 1986. Low Level Radioactive Waste Policy Amendments Act of 1985, Pub. L. No. 99-240, 99 Stat. 1842 (1986).

¹¹⁰ See Robert L. Glicksman & Richard E. Levy, *A Collective Action Perspective on Ceiling Preemption by Federal Environmental Regulation: The Case of Global Climate Change*, 102 NW. U. L. REV. 579, 600-01 (2008).

¹¹¹ William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 5–6 (2003).

¹¹² See William W. Buzbee, *The Regulatory Fragmentation Continuum, Westway and the Challenges of Regional Growth*, 21 J.L. & POL. 323, 348 (2005) (“Even where a social ill is widely recognized, the existence of multiple potential regulators will create predictable incentives for regulatory inattention. Especially where the causes of an ill cross jurisdictional borders, the harms themselves cross borders, and there is vertical or horizontal fragmentation of potential regulatory turfs, incentives for regulatory inattention are strong.”).

¹¹³ William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 30–36 (2003).

¹¹⁴ Professor Ahdieh elaborates:

Regulatory “shirking” and its analogues might be seen as further costs of intersystemic regulation. In the mildest potential critique, intersystemic regulation might be seen to diminish the quality of oversight. While two heads may be better than one on numerous counts, two sets of eyes may also be less cautious than one. . . . Similarly, in the presence of multiple regulators, some free-riding on the expected contributions of one’s counterpart agency may be likely. . . . More affirmatively, regulatory agencies may directly rely on the presence of multiple regulators as a basis to avoid their legal obligations. With someone else to blame, each agency loses its incentive to get it right. In the event of failure, one’s regulatory “partner” can always be stuck with the blame.

Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 897-98 (2006).

¹¹⁵ See William W. Buzbee, *Asymmetrical Regulation: Risk, Preemption, and the Floor/Ceiling Distinction*, 82 N.Y.U. L. REV. 1547, 1551 (2007) (discussing arguments for and against “the new breed of ceiling

such as the creation of the United States Department of Homeland Security (DHS) — in which a suite of federal agencies were combined and rearranged — or calls for the integration of United States intelligence gathering responsibilities, which traditionally has been fragmented among many federal agencies.¹¹⁶ The creation of DHS after 9/11 out of various more fragmented federal authorities was based in part on a desire to reduce the potential for intelligence-gathering agencies to work at cross-purposes.¹¹⁷ Consolidation within a governmental level thus minimizes pursuit of divergent goals or inconsistent actions by multiple agencies that may interfere with agency missions.¹¹⁸

We would actually regard both of these responses as primarily a move toward centralization, although centralization also reduces the potential for overlap simply by reducing the number of regulatory players.¹¹⁹ Some have argued that reducing the number of potential regulators and/or combining the regulatory authority of particular regulators could lessen the incentives for regulatory inaction in some contexts.¹²⁰ Significantly, decreasing overlap could involve centralization of regulatory power at any level of government. For example, federal deregulation that provides for unitary state regulation would decrease overlap in authority just as federal preemption of state law

preemption . . . ‘unitary federal choice preemption . . . [which] . . . by definition, precludes additional state and local protections and eliminates institutional diversity.’”); Robert L. Glicksman & Richard E. Levy, *A Collective Action Perspective on Ceiling Preemption by Federal Environmental Regulation: The Case of Global Climate Change*, 102 NW. U. L. REV. 579 (2008) (concluding that uniformity in regulation to avoid excessive transaction costs provides limited justification for ceiling preemption of state controls of greenhouse gas emissions from motor vehicles but not for such controls on stationary sources); Scott M. Matheson, *The State of Utah’s Role in Coal Mine Safety: Federalism Considerations*, 29 J. LAND RESOURCES & ENVTL. L. 143, 161 (2009) (“A federal ceiling sets a unitary requirement that precludes further regulatory options to state lawmakers and courts. The ceiling prohibits additional or more stringent state regulation”).

¹¹⁶ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655 (2006).

¹¹⁷ See Dara Kay Cohen, Mariano-Florentino Cuéllar & Barry R. Weingast, *Crisis Bureaucracy: Homeland Security and the Political Design of Legal Mandate*, 59 STAN. L. REV. 673, 683-84 (2006) (stating “that virtually every bureaucratic unit that had a role to play in homeland security also had separate functions . . . that were different in scope and, therefore, potentially in conflict with security”).

¹¹⁸ See Todd S. Aagard, *Regulatory Overlap, Overlapping Legal Fields, and Statutory Discontinuities*, 29 VA. ENVTL. L.J. 237, 287-88 (2011) (“Giving multiple agencies jurisdiction to regulate in the same area creates opportunities for conflicting regulations. Regulations that do not directly conflict . . . still may regulate inconsistently or work at cross-purposes.”); Jason Marisam, *Duplicative Delegations*, 63 ADMIN L. REV. 181, 198 (2011) (“Bureaucratic duplication wastes the government resources that legislators are responsible for, impedes the fulfillment of coherent governmental regulatory goals that legislators care about, and burdens regulated entities.”). Cf. Dara Kay Cohen, Mariano-Florentino Cuéllar & Barry R. Weingast, *Crisis Bureaucracy: Homeland Security and the Political Design of Legal Mandate*, 59 STAN. L. REV. 673, 712 (2006) (stating that “reorganization holds promise for greater coordination of effort, potentially allowing the efforts of many previously separate agencies to add up to a whole that is greater than the sum of its parts.”).

¹¹⁹ See *supra* note ___ and accompanying text (discussing the creation of DHS as an example of movement along the centralization-decentralization axis toward centralization).

¹²⁰ See, e.g., William W. Buzbee, *Recognizing the Regulatory Commons: A Theory of Regulatory Gaps*, 89 IOWA L. REV. 1, 51 (2003); William W. Buzbee, *The Regulatory Fragmentation Continuum, Westway and the Challenges of Regional Growth*, 21 J.L. & POL. 323, 362 (2005).

would. Moreover, decreases in overlap may occur not only over substantive jurisdiction but also over particular regulatory functions. For example, increasing limitations or barring the authority of federal agencies to overfile — to commence enforcement action against permit holders in addition to state agency enforcement¹²¹ — would decrease overlap in enforcement functions.

Overlap may be eliminated, however, even without changing the number of players, as long as each is given sole control over a particular substantive problem or is assigned a distinct function. The need for regulatory realignment may be particularly acute if there is directly conflicting or redundant authority by regulators (at whatever level of government) without a discernable difference in subject-matter competence. In short, regulatory overlap over either substantive or functional decision-making may be problematic. That problem may be addressed in one of two ways, either by centralizing power through the elimination of some agencies' authority, or through a realignment that retains the same number of regulators but ensures that each is responsible for addressing distinct problems or performing distinct functions.

2. Overlapping Authority

Overlapping authority has its proponents. A large and growing literature identifies a variety of benefits associated with a regulatory system with concurrent regulatory authority. Some scholars have reasoned that an approach that minimizes overlap and consolidates decision making in a single or few authorities can have a number of negative consequences. In addition to pointing to the implausibility of eliminating already extensive regulatory segmentation,¹²² many scholars have detailed the undesirability of doing so.¹²³

Some scholars argue that the redundancy that occurs through overlapping jurisdiction can be advantageous.¹²⁴ Although much of this literature relates to allocation of authority between the federal government and the states and localities,¹²⁵ the same dynamic applies to overlap within a particular level of government. To begin with, although overlap is more likely to create inefficiencies, as described above,¹²⁶ it can enhance the prospects for effective regulation. The key idea is that concurrent

¹²¹ See *infra* notes ___ – ___ and accompanying text.

¹²² Buzbee, 2003; Ruhl, 2010.

¹²³ Ruhl & Salzman, 2010; Buzbee, 2003; Adelman & Engel, 2007; Schapiro, 1999.

¹²⁴ Jared Snyder & Jonathan Binder, *The Changing Climate of Cooperative Federalism: The Dynamic Role of the States in A National Strategy to Combat Climate Change*, 27 UCLA J. ENVTL. L. & POL'Y 231, 252 (2009) (“Certain redundancies that result from an overlapping cooperative federalism approach are actually desirable.”).

¹²⁵ See, e.g., Blake Hudson, *Reconstituting Land-Use Federalism to Address Transitory and Perpetual Disasters: The Bimodal Federalism Framework*, ___ B.Y.U. L REV. ___ [147] (2012) (accepting “the normative claim that there should be as much overlap as possible in jurisdictional regulatory authority to capture the benefits of dynamic federalism”).

¹²⁶ See *supra* notes ___-___ and accompanying text.

jurisdiction increases the likelihood of regulatory action because there are more actors with authority to regulate.¹²⁷ Should one regulatory entity backslide or fail to regulate, others would be available to fill the gap.¹²⁸ Concurrent jurisdiction thus may be particularly valuable for regulatory contexts where the costs of underregulation are high, such as those that seek to address high-cost or irreversible effects or the management of nonrenewable resources.¹²⁹

In addition, overlapping authority may provide space for initial regulatory strategies by one entity that can serve as a proving ground or can catalyze other intersecting authorities to promulgate regulations.¹³⁰ A dispersed and overlapping regulatory system may allow for a diversity of tailored approaches, promoting innovative management experimentation and creating the opportunity for learning about the advantages and disadvantages of particular management strategies.¹³¹ Thus, concurrent authority can promote innovation by providing regulators close access to information about the efficacy of alternative management strategies based on their observations of the experience of co-regulators.¹³² Concurrent jurisdiction also has the potential to improve

¹²⁷ William W. Buzbee, *State GHG Regulation, Federal Climate Change Legislation, and the Preemption Sword*, 1 SAN DIEGO J. CLIMATE CHANGE & ENERGY L. 23, 53 (2009) (“Empowering state and local governments to play their own supplementary role in enforcing the law could be the equivalent of additional cops on the beat.”).

¹²⁸ See Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, __ [4] (2012) (“[R]edundancy has certain benefits, like providing a form of insurance against a single agency’s failure.”); John C. Dernbach et al., *Making the States Full Partners in A National Climate Change Effort: A Necessary Element for Sustainable Economic Development*, 40 ENVTL. L. REP. NEWS & ANALYSIS 10597, 10604 (2010) (“The U.S. experience during the past decade has shown that states can provide a counterweight in the absence of meaningful federal effort, and such future state climate efforts could help limit the effect of potential federal backsliding.”); Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 883 (2006) (arguing that overlap “may serve a fail-safe function, minimizing the prospect that desirable regulation will fail to be adopted or enforced”).

¹²⁹ See Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 179 (2006) (“The value of the checks and balances provided by jurisdictional overlap is particularly important with respect to environmental issues where the costs of underregulation are high. Environmental protection is different than many other areas of regulation in that it often concerns nonrenewable and irreplaceable resources.”). See also Jason Marisam, *Duplicative Delegations*, 63 ADMIN. L. REV. 181, 224 (2011) (“Unsurprisingly, many examples of redundancies among executive agencies come in areas where there are potentially catastrophic or irreversible risks from agency failures. . . . These redundancies are likely cost-effective because they reduce the risk of catastrophic and irreversible harms.”).

¹³⁰ Carlson, 2009.

¹³¹ Adelman & Engel, 2007; Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 892 (2006) (“Intersystemic regulation may help to facilitate innovation in several ways, most simply, by incorporating the alternative perspectives of distinctly situated regulatory entities. Such differences in perspective may arise from institutional design, national or international context, and sources of authority, among other factors. Whatever the source, distinctly situated agencies may encourage regulatory innovation, simply by offering each other something new.”).

¹³² Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 161 (2006) (stating that the benefits of overlapping jurisdiction include “greater opportunities for regulatory innovation and refinement”). As stated by Professor Engel, “regulatory activity at one level –

management decisions by allowing a range of specialized subject-matter competencies to be brought to bear on a particular resource problem.¹³³

The regulatory safety net resulting from overlap also can foster accountability. It can do so by combating interest group capture that may exist for one governmental entity but not another.¹³⁴ As Anne Joseph O’Connell has noted, “[o]ne interest group generally will find it more difficult to capture several agencies than a single agency; to wield power over multiple agencies, interest groups may have to work together, which is a costly enterprise for the groups.”¹³⁵ In addition, agencies with overlapping jurisdictions may be more reluctant to respond favorably to interest group pressure because other agencies sharing regulatory authority may detect and cast adverse light on that behavior.¹³⁶ Each regulatory authority can serve as an accountability check on the others. Providing government officials access to information on the performance of other regulators not only offers them the opportunity to learn, but also an increased capacity to pressure those other regulators to comply with regulatory requirements.¹³⁷

Federal pollution control law has long been characterized by regulatory overlap in both substantive jurisdiction and function. In most regulatory contexts, the adoption of federal authority over pollution standards in the 1970s did not displace the authority of the states or localities to adopt more stringent substantive controls. These transitions toward federal environmental regulation were thus also a move toward overlapping federal and state substantive authority. States retained significant roles in implementing and enforcing the statutes (and even in adopting supplemental, more stringent standard setting in certain contexts). The Clean Air Act, for example, authorizes EPA to adopt technology-based emission controls for new factories and for sources that emit hazardous air pollutants,¹³⁸ but it allows states to adopt more stringent emission control standards in

state or federal – may be a stepping stone to regulation at the governing level that dual federalism proponents label ‘optimal.’” *Id.* at 179.

¹³³ Camacho, Emory, *supra* note __, at 67-68.

¹³⁴ See Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 178-79 (2006) (“Jurisdictional overlap is also a system for combating the excessive influence of particular interest groups upon elected politicians which can prevent effective regulation by one level of government. If interest groups succeed in negatively influencing a policy initiative at the federal level, under a dynamic system of federalism, the states still have a shot at correcting the ultimate policy result. The regulatory safety net created by jurisdictional overlap is a logical and efficient way of combating excessive interest group influence.”).

¹³⁵ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1677 (2006); Todd S. Aagard, *Regulatory Overlap, Overlapping Legal Fields, and Statutory Discontinuities*, 29 VA. ENVTL. L.J. 241, 294 (2011) (arguing that “regulatory authority dispersed across multiple agencies may make it more difficult to influence policy, because they have to target more decisionmakers”).

¹³⁶ Todd S. Aagard, *Regulatory Overlap, Overlapping Legal Fields, and Statutory Discontinuities*, 29 VA. ENVTL. L.J. 241, 294 (2011) (“From the perspective of agencies, dispersed regulatory authority makes it more difficult [for an agency] to respond favorably to interest group pressure, because each agency shares control over overall policy with other agencies”).

¹³⁷ Camacho, EMORY, at 74-75.

¹³⁸ 42 U.S.C. §§ 7411-7412.

most areas.¹³⁹ Other federal pollution control statutes create a similar safety net by authorizing state standards more stringent than those adopted by EPA.¹⁴⁰

The allocation of functional authority is somewhat more complex. The Clean Air Act allocates primary standard-setting authority to EPA by authorizing it to adopt national ambient air quality standards to protect the public health and welfare.¹⁴¹ The Act vests in the states the responsibility to make essential choices about the manner in which to achieve the standards through the adoption of state implementation plans (SIPs) that impose enforceable emission limitations on individual pollution sources.¹⁴² Similarly, the Clean Water Act requires states to adopt water quality standards to protect designated uses of surface water bodies (such as swimming and fishing) in the event that EPA-issued technology-based effluent standards for industrial and municipal point sources fail to achieve the statute's water quality goals.¹⁴³ Under both the Air and Water Acts, however, EPA has the authority to veto a state action (a proposed SIP or a water quality standard) that fails to comply with minimum statutory requirements,¹⁴⁴ and if a state does not cure a defect identified by EPA, EPA may issue an implementation plan or a water quality standard for that state.¹⁴⁵ The two levels of government thus share responsibility for implementing key statutory programs, although the states normally take the lead in doing so. Similarly, both statutes afford states the opportunity to administer permit programs that are integral to the regulatory programs those statutes create, provided the state permit programs comply with minimal federal requirements.¹⁴⁶ EPA may veto individual state-issued permits,¹⁴⁷ and may suspend or terminate permit programs and take over their administration if a state consistently violates the statute.¹⁴⁸

Finally, these pollution-control statutes typically provide for both federal and state enforcement, although the interactions between federal and state regulators differ depending on the context. In some instances, EPA may only pursue enforcement if the state, after being afforded an opportunity to do so, has not begun enforcement.¹⁴⁹ In others, EPA may pursue enforcement actions regardless of what state regulators have chosen to do (or not do).¹⁵⁰ EPA's enforcement powers are more expansive than they

¹³⁹ *Id.* § 7416. The states have limited authority to adopt more stringent tailpipe emission standards than those adopted by EPA. *Id.* § 7543.

¹⁴⁰ *See, e.g.*, 33 U.S.C. § 1370; 42 U.S.C. § 6929.

¹⁴¹ 42 U.S.C. § 7409.

¹⁴² *Id.* § 7410.

¹⁴³ 33 U.S.C. § 1313(c).

¹⁴⁴ 33 U.S.C. § 1313(c)(3); 42 U.S.C. § 7410(k).

¹⁴⁵ 33 U.S.C. § 1313(c)(4); 42 U.S.C. § 7410(c).

¹⁴⁶ 33 U.S.C. § 1342(b); 42 U.S.C. § 7661a(b), (d).

¹⁴⁷ 33 U.S.C. § 1342(d); 42 U.S.C. § 7661d(b)-(c).

¹⁴⁸ 33 U.S.C. § 1342(c); 42 U.S.C. § 7661a(e).

¹⁴⁹ *See, e.g.*, 33 U.S.C. § 1319(a)(1).

¹⁵⁰ *See, e.g.*, 42 U.S.C. § 7413(b).

were under the pre-1972 water pollution regime, so that the enforcement function is more centralized than it was, but the enforcement function, like the implementation and permitting functions, is shared by EPA and the states with varying degrees of overlap.

E. Independent versus Coordinated Authority

A final dimension for characterizing the allocation of authority focuses on the extent of formal or informal coordination among authorities with jurisdiction over a particular regulatory problem or government function. This dimension assumes some level of jurisdictional overlap among authorities, whether substantive and/or functional. If regulatory power is concentrated in one entity, the issue of whether that authority should be exercised in independent or coordinated fashion is moot (although the degree of coordination among employees or offices within a single agency can differ). On one end of the spectrum is a regulatory framework in which governmental entities are highly independent and isolated in their regulatory activities. At the other end, is a regulatory relationship characterized by close agency collaboration and regulatory coordination. For this dimension, then, the key question is how much multiple regulatory authorities communicate, coordinate, and collaborate in addressing any particular substantive problem or in performing a delegated governmental function.

1. Coordinated Authority

In response to the considerable incentives and effects of regulatory fragmentation, scholars and regulatory actors increasingly have called for more coordination among regulatory authorities. Though eliminating fragmentation or overlap may be implausible or even undesirable, many scholars have emphasized the value of agency dialogue and collaboration to reduce fragmentation's adverse effects.¹⁵¹ Coordination can increase the effectiveness of government action by promoting exchanges of ideas and the pooling of the expertise of different agencies.¹⁵² It also can combat drift, shirking, and free-riding by facilitating inter-agency monitoring.¹⁵³ Although efforts to coordinate require the investment of time and resources that need not be incurred when agencies act independently, these costs may be more than offset by reductions in duplication of effort and inconsistent action, so that coordination can result in a net efficiency gain.¹⁵⁴

¹⁵¹ See, e.g., EUGENE BARDACH, *GETTING AGENCIES TO WORK TOGETHER: THE PRACTICE AND THEORY OF MANAGERIAL CRAFTSMANSHIP* (1998) (providing recommendations for fostering interagency collaboration); Ruhl & Salzman, *supra* note __, at 41–45 (discussing a system of “weak ties” for alleviating the effects of fragmentation).

¹⁵² Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. __, __ [47-48] (2012) (“To the extent coordination improves the analytic basis for decisionmaking by adding data and expertise, and also by diversifying the perspectives an agency takes into account, we think it is likely to make decisions better.”).

¹⁵³ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. __, __ [51] (2012) (noting that “we see coordination instruments as helping to control drift by providing structured opportunities for agencies to account to each other”).

¹⁵⁴ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. __, __ [45] (2012).

Coordination can promote accountability by reducing the risk of capture in much the same manner that overlapping authority does.¹⁵⁵

Natural resource management is an area in which the benefits of coordination have been touted. According to some, effective natural resource management necessitates consideration of connected ecosystem components, and have increasingly called for the development of networks that promote interagency collaboration and coordination focused on particular ecosystems or landscapes.¹⁵⁶ Collaborative management approaches are still the exception and not the rule.¹⁵⁷ However, many inter-jurisdictional governance regimes have been created.¹⁵⁸ In fact, at present most natural resources in the United States are managed not only through a number of local, state, and national authorities, but also by regional inter-governmental networks offered as venues for agency collaboration and cooperation.

Some proponents of these collaborations emphasize the need to focus resource management on regulatory linkages around particular ecosystems or landscapes.¹⁵⁹ Rather than combining institutions or providing one government authority substantive oversight of another, the aim of these regional or ecosystem-based institutions is to serve as a venue for agencies to discuss and possibly coordinate regulatory activity. The expectation is that such opportunities for communication and synchronization will reduce the effects of fragmentation without resort to the consolidation of decision-making authority.

2. *Independent Authority*

¹⁵⁵ See *supra* notes ___-___ and accompanying text; Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, ___ [48] (2012) (“Agencies will be harder to isolate and neutralize to the extent that their approaches are aligned.”).

¹⁵⁶ For such assertions by agencies, see, e.g., U.S. EPA, *Ecosystem Protection Workgroup, Toward a Place-Driven Approach: The Edgewater Consensus on an EPA Strategy for Ecosystem Protection* (March 15, 1994), in JOHN COPELAND NAGLE & J.B. RUHL, *THE LAW OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT* 384, 384–85 (2d ed. 2006); Peterson et al., *supra* note ___, at 51 (explaining that ecosystem-based management “is designed to bring . . . disparate groups together to achieve the integration and coordination of efforts”). For similar assertions by scholars, see, e.g., Norman L. Christensen et al., *The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management*, 6 ECOLOGICAL APPLICATIONS 665 (1996); R. Edward Grumbine, *What Is Ecosystem Management?*, 8 CONSERVATION BIOLOGY 27 (1994); Bradley C. Karkkainen, *Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409, 1439–42 (2008) (explaining “ecosystem management” and “place-based” integrated management).

¹⁵⁷ See Kareiva et al., *supra* note ___, at 30 (“Although such collaboration does occur, formal co-management remains the exception, not the rule.”).

¹⁵⁸ See, e.g., Chesapeake Bay Program, <http://www.chesapeakebay.net/index.aspx> (last visited October 25, 2011); Natural Community Conservation Planning Act, CAL. FISH & GAME CODE §§ 2800-2835 (West 2009); California Bay-Delta Authority (CBDA), <http://calwater.ca.gov/calfed/oversight/CBDA/index.html> (last visited October 25, 2011). For additional examples, see Bradley C. Karkkainen, *Collaborative Ecosystem Governance: Scale, Complexity, and Dynamism*, 21 VA. ENVTL. L.J. 189, 217–18 (2002).

¹⁵⁹ Grumbine, 1994; Bradley C. Karkkainen, *Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409 (2008).

Although coordination of regulatory efforts has theoretical advantages, many of the calls for collaboration and the formation of coordinating regimes are reflexive, without any additional discussion of the costs of such additional regimes. Adding layers of consultation and collaboration requirements to an overlapping regulatory landscape will undoubtedly divert already limited agency resources, and it is worth considering whether the benefits of particular communications or collaborations among authorities are worth these opportunity costs. Particularly if they are not designed properly, efforts at collaboration may not be worth the cost.¹⁶⁰

Moreover, both experience and a notable literature suggests loss of regulatory effectiveness through close agency coordination. At least some inter-jurisdictional collaborations in the past have failed to provide meaningful opportunities for cross-jurisdictional information sharing and collaboration.¹⁶¹ Though perhaps less commonly noted, there may be some benefits in preserving regulator independence, particularly for managing complex and uncertain regulatory problems like climate change. In discussing the benefits of divided regulatory authority, numerous scholars have focused not on cooperation but rather on the value of inter-jurisdictional competition in promoting socially optimal environmental regulation. Richard Revesz has argued in an influential article that “contrary to prevailing assumptions, competition among states for industry . . . can be expected to produce an efficient allocation of industrial activity among the states.”¹⁶² Jonathan Adler argues that inter-jurisdictional competition “can encourage policy innovation as policymakers seek to meet the economic, environmental, and other demands of their constituents” while allowing competing authorities to act as environmental ‘laboratories’ developing new and improved ways of addressing environmental concerns.”¹⁶³ Such competition is premised on the regulatory autonomy

¹⁶⁰ Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ____, __ [45] (2012) (“The up-front investments required to coordinate agencies in fact might be substantial. For example, even . . . relatively mild procedural consultation requirements . . . require the action agency to expend time and staff processing comments—resources that might be deployed elsewhere. And these costs will tend to rise with the burdensomeness of the consultation provisions. At the extreme end, giving one agency veto power over another’s decision has the potential to elevate costs substantially by sometimes requiring extensive negotiations.”).

¹⁶¹ See Camacho, *Adapting Governance to Climate Change*, *supra* note ____, at 30-36 (analyzing the series of inter-jurisdictional collaborations developed for managing resources in the Great Lakes and criticizing these efforts as elaborate but ultimately serving as “yet another layer of fragmentation to the already disjointed regulatory landscape”).

¹⁶² Richard L. Revesz, *Rehabilitating Interstate Competition: Rethinking the ‘Race-to-the-Bottom’ Rationale for Federal Environmental Regulation*, 67 N.Y.U. L. REV. 1210, 1211-12 (1992). See also Henry N. Butler & Jonathan R. Macey, *Externalities and the Matching Principle: The Case for Reallocating Environmental Regulatory Authority*, 14 YALE L. & POL’Y REV. 23 (1996); Daniel A. Farber, *Environmental Federalism in a Global Economy*, 83 VA. L. REV. 1283, 1301-06 (1997); Nestor M. Davidson, *Cooperative Localism: Federal-Local Collaboration in an Era of State Sovereignty*, 93 VA. L. REV. 959, 961 (2007) (discussing how the United States Supreme Court’s modern federalism jurisprudence relies on a federal structure that “privileges state sovereignty in order to promote efficiency and intergovernmental competition.”).

¹⁶³ Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 134 (2005).

and independence of individual regulators from the activities of other government authorities.

Though arguments promoting regulatory independence are typically raised in promoting the devolution of regulatory authority to localities or states,¹⁶⁴ some contend that regulatory competition can be valuable even among federal agencies. In the context of analyzing the possible reorganization of the governmental provision of national security intelligence, Anne Joseph O’Connell has argued that competition among even federal authorities in some instances may be preferable to coordination:

[C]ompetitive structures may prevent “pernicious” collusion, particularly when the organizations are similar. Competition may encourage redundant entities to work harder and more creatively, generating a race to the top in performance; competition may also motivate one entity to correct mistakes made by another entity. . . . In addition, such competition may “make it easier for the organization[s] to adapt to a changing environment.”¹⁶⁵

In addition, O’Connell asserts that providing multiple distinct governmental entities regulatory authority over a particular problem can help prevent “group think”¹⁶⁶ and increase the diversity of viewpoints.¹⁶⁷ Finally, inter-jurisdictional competition may serve as a source of accountability, as regulators may have substantial incentives to vigilantly review and challenge the actions of other intersecting authorities,¹⁶⁸ particularly when there are inter-jurisdictional spillovers or attempts by an authority to obtain a competitive advantage.

¹⁶⁴ See Ann E. Carlson, *Iterative Federalism and Climate Change*, 103 N.W. L. REV. 1097, 1102 (2009) (“Proponents of state devolution base their preference for state regulation principally on Tieboutian-influenced economic models about interstate competition, which predict that states will compete among themselves to produce an efficient level of regulation.”).

¹⁶⁵ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1677-78 (2006).

¹⁶⁶ See IRVING JANIS, VICTIMS OF GROUPTHINK 8-9 (1972) (coining the term “groupthink” as “[a] mode of thinking that people engage in when they are deeply involved in a cohesive ingroup, when the members’ strivings for unanimity override their motivation to realistically appraise alternative courses of action.”). See also Susan Cain, *The Rise of the New Groupthink*, N.Y. TIMES, Jan. 15, 2012 (citing research by neuroscientists and organizational psychologists that supports the conclusion that “brainstorming sessions are one of the worst possible ways to stimulate creativity”). The subtitle of Cain’s article is “Collaboration is in. But it may not be conducive to creativity.”

¹⁶⁷ Anne Joseph O’Connell, *The Architecture of Smart Intelligence: Structuring and Overseeing Agencies in the Post-9/11 World*, 94 CAL. L. REV. 1655, 1676 (2006). Though Professor O’Connell focuses on this as a benefit of regulatory redundancy, it is more properly understood as a feature of whether the applicable regulators are independent from each other.

¹⁶⁸ Cf. Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 178–79 (2006) (discussing how intersecting agencies can promote accountability by monitoring each other’s compliance); Camacho, *Adaptive Governance*, *supra* note ___, at 74-75 (stating that providing “other agencies access to information on the performance of an EPA strategy . . . gives them an increased capacity to pressure EPA to comply . . . and to modify the strategy when performance assessments suggest it has not been entirely effective”).

In some circumstances, then, maintaining the independence of agencies and limiting cooperation may be more consistent with the redundancy benefits of concurrent jurisdiction than a collaborative model. These benefits of regulator independence may be more important for managing certain regulatory problems. Such a circumstance might exist during periods of change,¹⁶⁹ where there is considerable uncertainty, harm may be catastrophic, and prevention or mitigation of such harm by one of the independent authorities is possible (for example, in prevention of terrorism attack or natural disaster).¹⁷⁰

II. WHY THE PHYSICAL AND REGULATORY EFFECTS OF CLIMATE CHANGE WILL CREATE A NEED FOR REALLOCATIONS OF GOVERNMENT AUTHORITY

This Part explains why climate change adaptation provides a useful context in which to assess the value of the taxonomy described in Part I. Section A explains why climate change is likely to trigger realignment needs and demands. Section B describes the role of crisis and dramatic change in providing an impetus for government realignment. Section C summarizes debate and action thus far over realignment to facilitate adaptation to climate change.

A. The Physical Effects and Regulatory Stresses of Climate Change

Several characteristics of the anticipated effects of climate change support the conclusion that regulatory realignment is likely to be needed, including uncertainty about those effects, their unprecedented nature and magnitude, and the potential for climate change to vitiate key assumptions on which existing regulatory programs have been built. It is clear that the physical changes anticipated to occur as a result of climate change will be far-reaching and profound. The exact nature, timing, location, and scope of those physical changes remain uncertain, as does the manner in which they will interact with one another.

Environmental law has always had to deal with uncertainty. Indeed, it is one of the defining characteristics of environmental risk. But climate change threatens to change the physical environment around us in unprecedented ways. We face what J.B. Ruhl and others have referred to as a “no analog” future.¹⁷¹ As Professor Ruhl has indicated, the “envelope” of variability in ecological systems “will not merely grow in size – it will change in basic structure, and no analog exists for predicting its new ground

¹⁶⁹ Robert B. Ahdieh, *Dialectical Regulation*, 38 CONN. L. REV. 863, 890 (2006) (arguing that “intersystemic regulation may minimize regulatory inertia, through patterns of regulatory competition and learning. This role may be especially important amidst transition.”).

¹⁷⁰ Cf. Jason Marisam, *Duplicative Delegations*, 63 ADMIN. L. REV. 181, 224 (2011) (touting the benefits of “redundancies among executive agencies . . . in areas where there are potentially catastrophic or irreversible risks from agency failures”).

¹⁷¹ J.B. Ruhl, *Climate Change and the Endangered Species Act: Building Bridges to the No Analog Future*, 88 B.U. L. REV. 1, 11 (2008) (citing Douglas Fox, *Back to the No-Analog Future?*, 316 SCIENCE 823, 823 (2007)) (“Many ecologists believe we face a no-analog future – one for which we have no experience on which to base projections of ecosystem change, and for which models designed to allow active management decisions as climate change takes effect are presently rudimentary and imprecise.”).

rules. These shifts in ecological systems, along with their impacts on social systems, have the potential for massive swings not only in the quality of the risks humans face, but also in their magnitude and manifestations.”¹⁷² Calling on existing programs to address situations never imagined at the time they were created is likely to impose significant stresses on those programs in ways that impair their functioning. These stresses will affect both the newly developed climate-related problems and more traditional problems competing for resources that have been stretched due to the demands of addressing climate change. The physical effects of climate change may thus outstrip the capacity of programs and institutions to deal with them.

Aside from uncertainty and lack of precedent and experience, the sheer magnitude of the problems created by altered physical realities will stress existing programs. Prominent examples relate to several of the areas we address in the case studies in Part III below, as well as others we have chosen not to explore in depth, such as water resources management. As these examples indicate, the stresses will extend both to core environmental and natural resource law and policy concerns (such as public health protection and management of coastal and water resources) and to areas that have not traditionally been associated with or most directly affected by physical changes in the environment (such as immigration policy and practice).

The capacity of authorities to manage public health problems will be sorely tested by the consequences of climate change. Climate change will exacerbate the health risks posed by traditional air pollutants regulated under laws such as the federal Clean Air Act.¹⁷³ It will increase the likelihood of heat waves, which are associated with increases in mortality and morbidity from strokes and heart attacks,¹⁷⁴ and it will likely impose stresses on public health programs if extreme weather events cause injury or disease while interfering with the ability to transport medical personnel or medications to needed locations.¹⁷⁵ Climate change creates risks that rarely encountered or entirely new public health problems will surface, as warming temperatures expand the range of pathogens that cause the spread of infectious diseases such as West Nile virus, malaria, and avian flu. It is even possible that melting ice will expose people to new or dormant diseases.¹⁷⁶ According to one medical professional, “[i]n coming decades, the likely health effects of

¹⁷² See J.B. Ruhl, *General Design Principles for Resilience and Adaptive Capacity in Legal Systems — With Applications to Climate Change Adaptation*, 89 N.C. L. REV. 1373, 1375 (2011).

¹⁷³ U.S. Environmental Protection Agency, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule, 74 Fed. Reg. 66496, 66525 (Dec. 15, 2010) [hereinafter Endangerment Finding].

¹⁷⁴ Endangerment Finding, *supra* note ___, at 66524-25.

¹⁷⁵ Lindsay F. Wiley, *Adaptation to the Health Consequences of Climate Change as a Potential Influence on Public Health Law and Policy: From Preparedness to Resilience*, 15 WIDENER L. REV. 483, 488-89 (2010).

¹⁷⁶ Robin Kundis Craig, *A Public Health Perspective on Sea-Level Rise: Starting Points for Climate Change Adaptation*, 15 WIDENER L. REV. 521, 534 (2010). Professor Craig adds: “The medical profession in the United States is generally unaccustomed to dealing with malaria, dengue fever, and cholera, especially in epidemic proportions, and *Vibrio vulnificus* and algae blooms are already presenting new medical challenges to many coastal communities.” *Id.*

climate change will challenge our nation’s already overburdened public health infrastructure in new ways. Every public health function will be called upon in response to climate change”¹⁷⁷

Climate change will pose significant challenges for government efforts to protect coastal areas. Sea level rise prompted by warming air and water temperatures may cause flooding, erosion, increases in the salinity of estuaries and aquifers, and alteration of tidal ranges in rivers and bays.¹⁷⁸ These changes may take decades if not centuries to fully manifest themselves. This lag in consequences may afford policymakers time to prepare. On the other hand, as Robin Craig has pointed out, the changes will occur over planning horizons that are “outside the political ken of most government bodies.”¹⁷⁹ In addition, the physical effects of climate change may make traditional solutions impractical. One way to deal with salt-water intrusion is to store fresh water in reservoirs and then release it during droughts. Rising salinity tables and a decrease in available fresh water supplies as droughts worsen may preclude continued reliance on this strategy.¹⁸⁰

The nation’s immigration policies and programs may not be able to handle the influx of “climate migrants” whose home countries will become uninhabitable or inhospitable as a result of climate change. Rising sea levels may displace as many as 200 million people worldwide by 2050, some of whom will seek refuge in the U.S.¹⁸¹ The water shortages anticipated to occur in Mexico may create a similar flow of people.¹⁸² The U.S. may have to commit more resources to surveillance of potential border crossing areas. Legal and illegal immigrants may generate racial animosities among local populations with whom they compete for housing and jobs, triggering social instability

¹⁷⁷ Lindsay F. Wiley, *Adaptation to the Health Consequences of Climate Change as a Potential Influence on Public Health Law and Policy: From Preparedness to Resilience*, 15 WIDENER L. REV. 483, 499 (2010).

¹⁷⁸ Robin Kundis Craig, *A Public Health Perspective on Sea-Level Rise: Starting Points for Climate Change Adaptation*, 15 WIDENER L. REV. 521, 522 (2010) (citing James G. Titus, *Greenhouse Effect, Sea Level Rise and Land Use*, 7 LAND USE POL’Y 138, 140 (1990)).

¹⁷⁹ Robin Kundis Craig, *A Public Health Perspective on Sea-Level Rise: Starting Points for Climate Change Adaptation*, 15 WIDENER L. REV. 521, 524 (2010).

¹⁸⁰ Robin Kundis Craig, *A Public Health Perspective on Sea-Level Rise: Starting Points for Climate Change Adaptation*, 15 WIDENER L. REV. 521, 530 (2010).

¹⁸¹ Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUM. L. REV. 1531, 1584 (2009).

¹⁸² Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUM. L. REV. 1531, 1585 (2009).

and violence.¹⁸³ Health care, education, and unemployment relief systems and the housing stock may struggle to accommodate the new demands.¹⁸⁴

As if the disruptions caused by these kinds of physical effects were not in themselves sufficiently worrisome, climate change will create feedback loops that spur cycles of ever-worsening effects, exacerbating both the magnitude of disruptions and the uncertainties surrounding them.¹⁸⁵ Warming temperatures in Arctic regions, for example, are already melting the permafrost. As the permafrost melts, it may release large quantities of methane gas that had previously been locked up in the frozen tundra. Because methane is a powerful GHG, it will contribute to even more warming of the air.¹⁸⁶ Similarly, rising CO₂ concentrations can stimulate the decomposition and release of carbon in soil through the activity of microbes, especially in grassland soils.¹⁸⁷ Such releases will further increase CO₂ concentrations. A third example of a negative feedback loop involves the polar ice caps. As they melt because of rising temperatures, they will reflect less sunlight away from the Earth, increasing the Earth's surface temperature still further (accelerating permafrost and glacial melting).¹⁸⁸ And so on. These synergistic effects will serve to heighten the disruptive physical effects of climate change on regulatory programs.

Finally, climate change will threaten the functioning of existing laws, policies, and programs by upending the assumptions upon which they are based.¹⁸⁹ These assumptions extend beyond simply those that concern the magnitude of a problem society faces and the size of the resource commitment needed to meet the resulting challenges. As one of us has pointed out, “agencies regularly adopt strategies that subsequent data

¹⁸³ Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUM. L. REV. 1531, 1586 (2009) (noting examples of environmentally induced migrations resulting in violence, such as beatings and arson in California during the Dust Bowl migration during the 1930s). *See also* Elizabeth Burleson, *A Climate of Extremes: Transboundary Conflict Resolution*, 32 VT. L. REV. 477, 498 (2008) (noting that Hurricane Katrina was followed by months of political and racial stress).

¹⁸⁴ Jody Freeman & Andrew Guzman, *Climate Change and U.S. Interests*, 109 COLUM. L. REV. 1531, 1585-86 (2009).

¹⁸⁵ *See generally* Martin Heimann & Markus Reichstein, *Terrestrial Ecosystem Carbon Dynamics and Climate Feedbacks*, 451 NATURE 451 (Jan. 17, 2008). *See also* Robin Kundis Craig, “Stationarity Is Dead” – *Long Live Transformation; Five Principles for Climate Change Adaptation Law*, 34 HARV. ENVTL. L. REV. 9, 15 (2010) [hereinafter Craig, *Stationarity*] (indicating that climate change will create “a world of unpredictability, poorly understood and changing feedback mechanisms, nonlinear changes, and ecological thresholds”).

¹⁸⁶ *See* K. M. Walter et al., *Methane Bubbling from Siberian Thaw Lakes as a Positive Feedback to Climate Warming*, 443 NATURE 71 (Sept. 7, 2006); F.S. Chapin III, *Role of Land-Surface Changes in Arctic Summer Warming*, 310 SCIENCE 657 (Oct. 28, 2005).

¹⁸⁷ Heimann & Reichstein, *supra* note __.

¹⁸⁸ *See* Joseph P. Tomain, “*Our Generation’s Sputnik Moment*”: *Regulating Energy Innovation*, 31 UTAH ENVTL. L. REV. 389, 397 (2011).

¹⁸⁹ *See* J.B. Ruhl, *General Design Principles for Resilience and Adaptive Capacity in Legal Systems — With Applications to Climate Change Adaptation*, 89 N.C. L. REV. 1373, 1374 (2011) (“Climate change soon will begin to disrupt the settled expectations of humans.”).

may demonstrate are insufficient or for which background conditions shift such that the strategy is no longer as effective as previously expected.”¹⁹⁰ Climate change is likely to lead to a manifold increase in situations in which existing management tools quickly become inadequate, and accepted management goals become impossible to meet.

One example of the manner in which the physical effects of climate change may upend the foundations of entire regulatory or resource management programs relates to the underpinnings of much of U.S. natural resource management law, which seeks to preserve existing conditions and/or protect them from human interference. As one of us has noted, the historical preservation goal in natural resources law reflects an antiquated and discredited model of ecology that stresses the natural stability of ecosystems. Efforts to preserve or restore a historical baseline to conserve ecosystems in their “objectively natural state” are incompatible with current ecological knowledge. Climate change makes this discordance between the law and ecological science much more problematic:

[U]ntil recently most ecological change fell within a fairly limited range of variability. In light of the convulsive effects of climate change, however, accomplishing historical preservation or restoration goals becomes at best increasingly costly and perhaps even impossible. Many ecologists have concluded that climate change is likely to stress ecosystems at a rate and to an extent that is outside the range of historical variability, pressuring biotic assemblages and communities to transform in fundamental ways.¹⁹¹

More specifically, the manner in which climate change will affect management of wildlife and water resources illustrates the disruptive impact of vitiated regulatory assumptions. The Endangered Species Act seeks to protect the critical habitat of listed species by, among other things, requiring federal agencies to avoid taking actions that adversely affect that habitat.¹⁹² Warming temperatures are going to induce some animals to migrate northward or upslope. In doing so, they may abandon the areas they have inhabited for decades if not centuries. It may be difficult and time-consuming to modify a species’ critical habitat designation to conform to the new reality. Private landowners whose properties fall within new migration corridors will surely oppose redesignation. Absent adjustments, restrictions on development and other activities that pose risks to the species may apply to areas in which the species once inhabited but no longer does, but not to the species’ new habitat.¹⁹³ Similar problems may arise if a species adequately protected in a national wildlife refuge that has traditionally been its habitat moves to areas outside the boundaries of that or other protected systems. In short, the physical

¹⁹⁰ Alejandro E. Camacho, *Transforming the Means and Ends of Natural Resources Management*, 89 N.C. L. REV. 1405, 1414 (2011) [hereinafter Camacho, *Means and Ends*].

¹⁹¹ Camacho, *Means and Ends*, *supra* note ____, at 1434-35.

¹⁹² 16 U.S.C. § 1536(a)(2).

¹⁹³ See Josh Thompson, Commentary, *Critical Habitat Under the Endangered Species Act: Designation, Re-Designation, and Regulatory Duplication*, 58 ALA. L. REV. 885, 901-02 (2007) (“In short, the natural world is not static, and there should be a reliable, manageable mechanism for revising critical habitat when conditions warrant. However, the current political division over endangered species policy makes the emergence of any such mechanism difficult.”).

effects of climate change, such as shifts in wildlife range to new landscapes, will require a departure from historical preservationism.¹⁹⁴

EPA has acknowledged the unsuitability of continued use of historic baselines in water resources management, too. According to the agency, “[a]lthough water management practices in the United States are generally advanced, . . . the reliance on past conditions as the basis for current planning may no longer be appropriate, as climate change increasingly creates conditions well outside of historical observations.”¹⁹⁵ Robin Craig makes a similar point, arguing that the evidence belies the presumption that abundant aquatic resources preclude the need for efficient management current water management practices in the U.S.¹⁹⁶ She adds that water shortages resulting from climate change will magnify the problems of a fragmented water regulatory system, the likely result being “some form of de facto water triage – the unconscious sacrificing of some uses and some ecosystems, especially downstream marine ecosystems, in pursuit of ‘more pressing’ local needs.”¹⁹⁷ In places governed by appropriative water rights systems, droughts will result in diminished supplies to junior appropriators, “unsettling what were considered ‘settled’ rights in water.”¹⁹⁸ As with wildlife management, changing physical conditions linked to climate change are likely to alter significantly the range of resource restoration that it is possible to accomplish, even if restoration to historic conditions is the stated goal of a particular management regime.¹⁹⁹

Similar upended assumptions are likely to plague government programs in other contexts. The challenge for governments seeking to ensure that regulatory regimes are capable of meeting the challenges of climate change adaptation is to identify those stress points and alter existing regulatory programs or create new ones that fit the altered physical world that climate change will create better than existing programs.

B. The Political Impetus for Reallocation of Government Regulatory and Management Authority

¹⁹⁴ Camacho, *Means and Ends*, *supra* note ____, at 1441.

¹⁹⁵ Endangerment Finding, *supra* note ____, at 66533.

¹⁹⁶ Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 925 (2008).

¹⁹⁷ Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 925 (2008).

¹⁹⁸ Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 883 (2008). Other areas may find that they have too much water as a result of increased precipitation or storms. *Id.* at 882-83. Flooding in these areas may create different legal and management challenges.

¹⁹⁹ “If ecosystem restoration is the equivalent of holistic medicine in environmental law, ‘establishing restoration goals requires some sense of what is possible and what is not, given the magnitude of existing environmental change.’ Climate change is likely to alter – perhaps repeatedly – what ‘restoration’ is actually possible, especially in combination with existing water stressors.” Robin Kundis Craig, *Climate Change, Regulatory Fragmentation, and Water Triage*, 79 U. COLO. L. REV. 825, 926 (2008).

This Article is not the first to recognize that the physical effects of climate change will impose new stresses and demands on regulatory structures not designed to address problems of the kind or magnitude that climate change will cause. Adaptation to climate change would be difficult even if current regulatory and resource management programs were created specifically for the purpose of accommodating climate change. The fact that they were not will surely spur debate over how to realign existing programs to enhance their capacity to provide effective buffers against the adverse consequences of climate change.

Governments create new programs and agencies or realign existing regulatory authority for different reasons. Often, these changes occur as a result of crisis, as both the proliferation of new programs and agencies during the New Deal²⁰⁰ and the creation of DHS after 9/11 illustrate.²⁰¹ Many of the federal environmental laws were adopted in direct response to emergencies or other dramatic events or discoveries. These include the Emergency Planning and Community-Right-to-Know Act,²⁰² adopted in 1986 after the release of toxic air pollutants by a plant operated by Union Carbide in Bhopal, India;²⁰³ the Oil Pollution Act of 1990,²⁰⁴ adopted in the wake of the *Exxon Valdez* oil spill in Prince William Sound, Alaska;²⁰⁵ and the Comprehensive Environmental Response, Compensation, and Liability Act,²⁰⁶ adopted in 1980 after the discovery of the egregious hazardous waste disposal practices at Love Canal, New York.²⁰⁷

In other instances, the prompt for program creation or government reorganization has been the development of a perception over time that existing regulatory programs are inadequate, inefficient, or otherwise deficient. Sometimes conditions have changed since a program was created, making the program unsuitable for dealing with new realities. In other instances, program implementation has revealed unknown flaws that have existed since program inception. The shift of the locus of environmental regulatory authority from the states to the federal government during the 1970s²⁰⁸ and the Obama

²⁰⁰ Wendy Nelson Espelan, *Bureaucratizing Democracy, Democratizing Bureaucracy*, 25 LAW & SOC. INQUIRY 1077, 1081 (2000).

²⁰¹ See Jody Freeman & Jim Rossi, *Agency Coordination in Shared Regulatory Space*, 125 HARV. L. REV. ___, __ [16] (2012) (“The most significant government re-organization of the last fifty years occurred after the September 11, 2001 terrorist attacks, when Congress opted to combine scores of agencies into a DHS, a new ‘mega-agency.’ This seemed politically possible only because of the sense of national emergency at the time.”).

²⁰² 42 U.S.C. §§ 11001-11050.

²⁰³ See RICHARD J. LAZARUS, *THE MAKING OF ENVIRONMENTAL LAW* 111 (2004).

²⁰⁴ 33 U.S.C. §§ 2701-2762.

²⁰⁵ See ROBERT L. GLICKSMAN ET AL., *ENVIRONMENTAL PROTECTION: LAW AND POLICY* 557, 856 (6th ed. 2011).

²⁰⁶ 42 U.S.C. §§ 9601-9628.

²⁰⁷ See RICHARD J. LAZARUS, *THE MAKING OF ENVIRONMENTAL LAW* 108 (2004).

²⁰⁸ See RICHARD J. LAZARUS, *THE MAKING OF ENVIRONMENTAL LAW* 67 (2004).

Administration’s 2012 proposed reorganization of agencies affecting small businesses²⁰⁹ are examples of programmatic changes spurred by events other than one-time emergencies.

Climate change reflects some important characteristics that have led to previous large-scale governmental structural upheavals, making it a likely candidate to trigger future government reorganization and authority realignment. If we are correct that the consequences of climate change are likely to spur dissatisfaction with the capacity of existing regulatory structures to manage the adverse effects of climate change, then climate change adaptation is a useful vehicle for assessing the value of shifting regulatory structures along one or more of the axes we introduced in Part I. The lessons to be gleaned from this analysis may tell us much about the optimal ways in which to organize governmental authority to address climate change, including regulatory realignments along functional and jurisdictional lines and along each of the three dimensions identified in Part I.

Historical precedent is consistent with a prediction that climate change will generate support for regulatory realignment. Climate change is not the kind of single dramatic event, such as the *Exxon Valdez* oil spill, that has triggered regulatory reform in the past. Dramatic events such as extreme heat waves and ferocious storms have been linked to climate change, however, both in the popular press²¹⁰ and the scientific literature.²¹¹ Such events may have already begun to feed the perception, at least among non-climate change skeptics, that the government mechanisms in place to deal with the consequences of a changing climate are not up to the task.²¹² The inadequacies of

²⁰⁹ See *supra* notes ___ – ___ and accompanying text.

²¹⁰ See, e.g., Juliet Eilperin, *Scientists Disagree On Link Between Storms, Warming: Same Data, Different Conclusions*, WASH. POST, Aug. 20, 2006 (“A year after Hurricane Katrina and other major storms battered the U.S. coast, the question of whether hurricanes are becoming more destructive because of global warming has become perhaps the most hotly contested question in the scientific debate over climate change.”).

²¹¹ See, e.g., INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SPECIAL REPORT ON MANAGING THE RISKS OF EXTREME EVENTS AND DISASTERS TO ADVANCE CLIMATE CHANGE ADAPTATION (C.B. Field et al. eds., 2011).

²¹² See, e.g., THE FEDERAL RESPONSE TO HURRICANE KATRINA: LESSONS LEARNED (2006), available at <http://georgewbush-whitehouse.archives.gov/reports/katrina-lessons-learned/> (“Ineffective communications between FEMA and other Federal departments and agencies prevented available Federal resources from being effectively used for response operations” in the aftermath of the storm.). Hurricane Katrina may have marginally raised public consciousness and concern over climate change. See Robert L. Glicksman, *Global Climate Change and the Risks to Coastal Areas from Hurricanes and Rising Sea Levels: The Costs of Doing Nothing*, 52 LOYOLA L. REV. 1127, 1187-97 (2006). Shortly after the storm, Professor Sunstein opined that “if there is anything like a kind of 9/11 for climate change, aggressive measures might well be anticipated.” Cass R. Sunstein, *On the Divergent Reactions to Terrorism and Climate Change*, 107 COLUM. L. REV. 503, 552 (2007). But a spike in publicity about skepticism concerning the link between human activities and climate change subsequently erased any momentum that the storm may have created toward creation of a more focused regulatory program for mitigating and adapting to climate change. See Sarah Krakoff, *Planetarian Identity Formation and the Relocalization of Environmental Law*, 64 FLA. L. REV. 87, 101 (2012) (noting that press coverage of climate skeptics, some of whose research was funded by

existing government institutions and programs to address the consequences of climate change are also likely to be revealed by long-term trends, such as rising sea levels caused by warming ocean temperatures and the melting of polar ice sheets, which pose threats to coastal communities.²¹³

Not all dramatic events with large-scale public consequences trigger realignment, of course. Even when political support does not exist for radical statutory change in the wake of such an event, however, less fundamental but potentially meaningful administrative reform may be forthcoming. The Deepwater Horizon explosion, for example, has yet to produce statutory reform of the processes and standards that govern offshore oil and gas development, but it did induce the Obama Administration to reorganize the components of the Interior Department responsible for regulating that development.²¹⁴ Whether through a legislative establishment of a comprehensive regulatory regime, a fundamental reorganization of regulatory institutions, or a more modest evolution of existing regulatory programs, climate change is likely to provide the political activation energy necessary to lead to a reallocation of regulatory authority.

C. A Preliminary Assessment of the Design of a Climate Change Adaptation Regime

We contend that the debate over regulatory configuration should focus on whether shifts in either substantive or functional jurisdiction, or along the three dimensions identified in Part I, hold the greatest promise of achieving an effective, efficient, equitable, and accountable set of solutions to climate change problems. In Part III below, we take a closer look at a series of specific adaptation challenges in addressing questions such as whether it is possible to draw any generalizations about the comparative utility of substantive or functional jurisdiction as an organizing principle in adaptive efforts, and whether the characteristics of particular adaptation problems provide insights into the appropriate movement along one or more of the three dimensions. In the remainder of

the petroleum industry, contributed to wavering public attention and public confusion about global warming “even as the science became increasingly clear”).

Putting aside the impact that Katrina had on public perceptions of the risk of climate change, according to Dan Farber, “Katrina brought into sharp relief the limitations in the law’s capacity to anticipate and respond to catastrophic events. . . . Katrina was merely a further confirmation that the law is woefully unprepared to handle disasters.” Dan Farber, *Environmental Disasters: An Introduction*, __ B.Y.U. L. REV. __, __ [4] (2012).

²¹³ See U.S. Environmental Protection Agency, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule, 74 Fed. Reg. 66496, 66533-34 (Dec. 15, 2010) [hereinafter Endangerment Finding] (predicting that rising seas will submerge wetlands, inundate land, and cause shoreland erosion by exposing coastlines to strong waves, and that the most vulnerable areas include the Atlantic and Gulf Coasts, Hawaii and other Pacific islands, parts of Alaska, New York, New Orleans, and Miami).

²¹⁴ Secretary of the Interior, Order No. 3302, Change of the Name of the Minerals Management Service to the Bureau of Ocean Energy Management, Regulation, and Enforcement (June 18, 2010), available at <http://www.doi.gov/deepwaterhorizon/loader.cfm?csModule=security/getfile&PageID=35872>. See generally Rebecca Bratspies, *A Regulatory Wake-Up Call: Lessons from BP’s Deepwater Horizon Disaster*, 5 GOLDEN GATE U. ENVTL. L.J. 7 (2011); Leila Monroe, *Restructure and Reform: Post-BP Deepwater Horizon Proposals to Improve Oversight of Offshore Oil and Gas Activities*, 5 GOLDEN GATE U. ENVTL. L.J. 61 (2011).

this section, we briefly survey sentiments by academics and policymakers about the proper institutional design of an adaptation regime, as well as some ongoing efforts or proposals for reform, to see if they shed light on these questions.

1. Centralized versus Decentralized Governance

There is little doubt that much climate change adaptation should and will be left to local and state authorities. Changes in climatic conditions will not be uniform nationally, nor even within states.²¹⁵ Because of such variation, there may be calls to maintain or increase local and state control over adaptation planning. Indeed, much of the legal scholarship on adaptation often focuses on local and regional scales.²¹⁶

In the context of adaptation planning, however, a growing literature has argued for the development of more centralized institutions or policies as a response to the effects of climate change in areas such as natural resource management.²¹⁷ As is the case for many regulatory areas, the existing federal system for managing natural resources adopts a mix of mostly local and state governance, with robust federal authority for certain issues. The effects of climate change may provide increased impetus for centralization of authority. Climate change is projected to accelerate change, spur ecological migration, and transform ecological processes. It is also likely to spur adaptation strategies by some local authorities such as the construction of physical infrastructure that may have collateral effects on other jurisdictions.²¹⁸ As such, it is likely to increase the interaction of jurisdictions, the possibility of resource scarcity and conflict, and the potential for regulatory overlap between regulatory authorities.²¹⁹

In circumstances of resource scarcity, substantial increase in inter-jurisdictional spillovers due to climate change, or likely interstate conflict over adaptation strategies for

²¹⁵ J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. 363, 423 (2009) (“Adaptation for Florida, where sea level rise is the primary threat, will not be what it is for Nevada, where even less water is the likely scenario. Even within many states, local impacts will be sufficiently varied as to demand specialized adaptation profiles”) (citations omitted).

²¹⁶ J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. 363, 423 (2009).

²¹⁷ See e.g., Robin Kundis Craig, __ HARV. ENVTL. L. REV. __; Robert Glicksman, *Climate Change Adaptation: A Collective Action Perspective on Federalism Considerations*, 40 ENVTL. L. 1159 (2010); J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. 363, 423; Alejandro E. Camacho, *Adapting Governance to Climate Change: Managing Uncertainty through a Learning Infrastructure*, 59 EMORY L. J. 1 (2009).

²¹⁸ See J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. LAW 363, 423 (2009).

²¹⁹ See Alejandro E. Camacho, *Assisted Migration: Redefining Nature and Natural Resource Law Under Climate Change*, 27 YALE J. ON REG. 171, 208–10 (2010). See also Alejandro E. Camacho, *Transforming the Means and Ends of Natural Resources Management*, 89 N.C. L. REV. 1405, 1424 n.85 (2011) (“[R]egulatory conflict is likely to occur if BLM, consistent with its stated goals that prioritize consumptive economic land uses, decides to introduce a nonnative species that is well adapted to new climate conditions onto BLM lands, and that species spreads to a nearby Federal Wildlife Refuge and causes harm to other species in contravention with FWS authority over Federal Wildlife Refuges.”)

common resources, increased federal authority for at least some governmental functions may be desirable.²²⁰ Perhaps for those reasons, some have recommended the consolidation of climate change adaptation planning power in the United States in the hands of a central federal authority.²²¹

A selective movement toward centralization may make more sense than across-the-board consolidation, however. Though which government functions to centralize may vary by particular substantive regulatory area, there are likely to be strong collective action reasons for centralization of authority for certain research, monitoring, information-gathering and distribution, and inter-jurisdictional adjudication functions. Depending on the substantive regulatory area, more centralized authority for financing of adaptation strategies, adaptation planning, or even standard-setting may be warranted.²²² More broadly, given the substantial uncertainty about the localized effects of climate change and about the effectiveness of different management strategies in addressing such effects, the impetus for local implementation and adjudication remains strong, if not stronger, to provide opportunities for experimentation and inter-jurisdictional learning. These concerns suggest a cautious approach to centralization.

2. *Overlapping versus Distinct Governance*

It is not obvious whether the effects of climate change will provide conditions that call for more or less overlapping jurisdiction. Despite decades of scientific evidence and

²²⁰ Robert L. Glicksman, *Climate Change Adaptation: A Collective Action Perspective on Federalism Considerations*, 40 ENVTL. LAW 1159 (2010); J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. LAW 363, 423 (2009).

²²¹ A prominent example of an attempt at increased centralization is in the only comprehensive climate change bill adopted to date by either chamber of the United States Congress — Waxman-Markey’s American Clean Energy and Security Act of 2009 (ACES). The bill was passed by the House of Representatives but died in the Senate. The bill would have significantly increased executive oversight and control over both federal and state natural resource adaptation by consolidating authority in the President and Secretary of the Interior. ACES would have established “an integrated Federal program” (ACES § 471), including a Natural Resources Climate Change Adaptation Panel headed by the Chair of the Council on Environmental Quality (CEQ), a division of the Executive Office of the President (ACES § 475). The Panel, which would have included the heads of federal public land and natural resource agencies, would have been tasked with developing and implementing a National Resources Climate Change Adaptation Strategy (ACES § 476). Though ACES would not have adopted a more fundamental centralization scheme, such as requiring a single federal agency to carry out all natural resource adaptation planning, it would have required the adoption of an adaptation plan by each federal natural resource agency that implements and is consistent with the Strategy, as determined by the President (ACES § 478). The institution of more centralized strategic planning, combined with mandated executive review of individual agency plans, would have marked a substantial shift toward more centralized natural resource management in the United States.

²²² For example, ACES would not only shift responsibility for setting federal natural resource goals from Congress or individual federal agencies to the Panel, but also from states to the Panel. Any state that needed federal funding to assist it to adapt its natural resources to the effects of climate change would have to submit an adaptation plan to the Secretary of the Interior, who could disapprove the state plan if it were deemed to be inconsistent with any goal, priority, or standard established by the Panel under its broad authority to adopt a federal Strategy (ACES § 479). Though states would do much of the natural resource adaptation work, the big-picture decision making would be primarily federal.

many governmental reports identifying a lack of governmental planning and activity on climate change adaptation,²²³ adaptation planning and management are still in their infancy.²²⁴ As agencies begin to address climate change challenges in new contexts or under changed conditions, it makes sense to put a premium on experimentation and innovation to provide information on the efficacy of different strategies. Concurrent authority can promote innovation by providing regulators close access to information about the efficacy of alternative management strategies based on their observations of the experience of co-regulators.²²⁵ Professor J.B. Ruhl has asserted this benefit of overlapping authority in the context of climate change adaptation planning:

[W]hile it may appear inefficient to have several agencies at different scales working away on some mutual adaptation policy problem, the built-in redundancy of Dynamic Federalism can provide significant benefits. It gives the overall system of governance more rather than less policy space, which surely will be needed for climate change adaptation.²²⁶

In addition, because the effects of climate change will in some instances be unprecedented, the risk that a single program or limited number of programs will neglect an important aspect of the problem is significant. As indicated above, concurrent jurisdiction is a particularly valuable approach for regulatory contexts where the costs of underregulation are high, such as those that seek to address high-cost or irreversible effects or the management of nonrenewable resources.²²⁷ Such contexts are likely to be common in the context of climate change, especially for threats to ecological resources.²²⁸ Overlapping jurisdiction, therefore, may provide a crucial safety net by

²²³ Numerous reports conclude that natural resource institutions in the United States are still poorly equipped for climate change adaptation (Government Accountability Office [GAO], 2007; Intergovernmental Panel on Climate Change (2007); GAO, 2009; Interagency Climate Change Adaptation Task Force [Task Force], 2010; Pew Center on Global Climate Change [Pew Report], 2010).

²²⁴ The United States Congress has yet to establish a regulatory program directed at climate change adaptation. Though some federal and state resource agencies are finally developing adaptation responses, they remain modest and few in number (GAO, 2009; Task Force, 2010; Pew Report, 2010). Most agency activities continue to ignore adaptation, while most of those actions that address it focus on merely studying the problem and gathering information (GAO, 2009). Some managers still routinely develop strategies based on historically normal conditions, even though officials concede they are likely inapposite under projected climate change scenarios (GAO, 2007; GAO, 2009). At least some state and federal officials have asserted that their narrow jurisdiction leaves them lacking the information or authority to engage in adaptation (GAO, 2007; GAO, 2009).

²²⁵ Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 161 (2006) (stating that the benefits of overlapping jurisdiction include “greater opportunities for regulatory innovation and refinement”). As stated by Professor Engel, “regulatory activity at one level – state or federal – may be a stepping stone to regulation at the governing level that dual federalism proponents label ‘optimal.’” *Id.* at 179.

²²⁶ J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. LAW 363, 425 (2009).

²²⁷ See *supra* notes ___-___ and accompanying text; Kirsten H. Engel, *Harnessing the Benefits of Dynamic Federalism in Environmental Law*, 56 EMORY L.J. 159, 179 (2006).

²²⁸ See Camacho, EMORY L.J., at 19.

increasing the chance that at least one agency with jurisdiction to address a climate-related problem has taken steps to do so. The substantial escalation in uncertainty and prospective irreversibility of harm that accompany climate change thus support reliance on a regulatory system that provides redundancy and allows opportunities for regulatory experimentation, inter-jurisdictional learning, and protection against under-regulation.

On the other hand, climate change is likely to increase and complicate the interactions between existing jurisdictional authorities, and in some instances ecological shifts will lead to new conflicting regulatory overlap and management responses by overlapping authorities that are incongruous or counterproductive.²²⁹ Indeed, whether an increase or decrease in overlap will be required will likely be context specific, depending on the particular area of substantive jurisdiction and/or governmental function. One possible approach for accommodating these competing dynamics might be to decrease regulatory overlap of particular governmental functions such as information-gathering and financing to lessen collective-action incentives to shirk and free-ride, while maintaining overlap of substantive authority to promote interagency accountability and redundancy benefits. Such an approach might serve to balance the efficiency benefits of unitary governance with the diversity benefits of overlapping authority.²³⁰

3. Independent versus Coordinated Governance

Commenters have called for, and regulators have started creating, climate change adaptation mechanisms that promote inter-jurisdictional collaboration and cooperation. One of the earliest collaborative efforts is the U.S. Climate Change Science Program, a federally funded research effort on climate change sponsored by thirteen federal agencies established as a method for assembling federal research on climate change.²³¹ It in turn recommended additional coordination and collaboration between agencies.²³²

Another example is the Inter-agency Climate Change Adaptation Task Force initiated by the Council on Environmental Quality, Office of Science and Technology Policy, and NOAA, which includes over twenty Federal government agencies.²³³ Federal agency participants in the Task Force do not have direct oversight or authority over one

²²⁹ See Camacho, *Assisted Migration*, at 208-09.

²³⁰ See Adelman & Engel, *supra* note __, at 285 (“The challenge is to maintain a process of optimization, which leads to specialization and efficiencies, while cultivating a diversity of backup options in the wings.”).

²³¹ See U.S. CLIMATE CHANGE SCI. PROGRAM & SUBCOMM. ON GLOBAL CHANGE RESEARCH, THE U.S. CLIMATE CHANGE SCIENCE PROGRAM: VISION FOR THE PROGRAM AND HIGHLIGHTS OF THE SCIENTIFIC STRATEGIC PLAN 29 (2003) (“The strategy seeks to optimize the benefits of research that is conducted, sponsored, or applied by 13 agencies and departments of the U.S. Government.”).

²³² See JILL S. BARON ET AL., U.S. CLIMATE CHANGE SCI. PROGRAM, PRELIMINARY REVIEW OF ADAPTATION OPTIONS FOR CLIMATE-SENSITIVE ECOSYSTEMS AND RESOURCES 36 (Susan Herrod Julius & Jordan M. West eds., 2008) (stating that increasing “collaboration among agencies” will “aid in achieving adaptation to climate change”).

²³³ THE WHITE HOUSE COUNCIL ON ENVTL. QUALITY, PROGRESS REPORT OF THE INTERAGENCY CLIMATE ADAPTATION TASK FORCE __ (March 16, 2010).

another on adaptation activities. Rather, the Task Force serves as a venue for federal agencies to communicate, brainstorm, and develop recommendations for the President on potential federal adaptation strategies.²³⁴ The Task Force has developed federal agency work groups, engaged in listening sessions with non-federal stakeholders and experts, and adopted several reports recommending features for a national adaptation strategy. In these reports, the Task Force has called for additional collaboration and coordination among federal agencies²³⁵ and endorses the federal government playing a key coordinating role with other stakeholders in addressing climate change.²³⁶ Other regulators have made similar appeals for agency collaboration to prepare and plan for the effects of climate change.²³⁷

Despite the many calls for additional agency collaboration in this and other aspects of environmental law, there is often little discussion of what collaboration or coordination might entail as a practical matter. Though at a minimum it should presumably include some communication between the different authorities, few delineate precisely how such discussions might translate to concrete alterations in individual regulator management strategies. Moreover, it is often unclear whether such collaborations are supposed to involve merely information sharing or some level of more detailed coordination of planning, standard setting, or even enforcement. Coordination that extends beyond information sharing, for example, might involve requiring all affected regulatory authorities to sign off on standards adopted by the collaboration. For implementation and enforcement, it could also include each agency agreeing to bind itself to implementing and/or enforcing the mutually agreed upon plan or standards. In short, though the academic literature and regulatory agencies have placed considerable emphasis on collaboration in general, they tend to ignore which governmental functions such coordination should cover.

Because of the projected increase in broad, landscape-level inter-jurisdictional effects and the considerable uncertainties likely to accompany climate change, there are significant reasons to support additional communication, collaboration, and coordination

²³⁴ THE WHITE HOUSE COUNCIL ON ENVTL. QUALITY, PROGRESS REPORT OF THE INTERAGENCY CLIMATE ADAPTATION TASK FORCE __ (March 16, 2010).

²³⁵ *See, e.g.*, THE WHITE HOUSE COUNCIL ON ENVTL. QUALITY, PROGRESS REPORT OF THE INTERAGENCY CLIMATE ADAPTATION TASK FORCE 5 (March 16, 2010) (recommending agency coordination and collaboration as a key component for any national strategy on climate change adaptation). *See also id.* (“Adaptation to climate change and building resilience will require collaboration and coordination between U.S. government entities. . . . A formal approach, with clear processes and facilitation, is required to ensure that this coordination and collaboration occurs.”).

²³⁶ *See, e.g.*, WHITE HOUSE COUNCIL ON ENVTL. QUALITY, PROGRESS REPORT OF THE INTERAGENCY CLIMATE ADAPTATION TASK FORCE: RECOMMENDED ACTIONS IN SUPPORT OF A NATIONAL CLIMATE CHANGE ADAPTATION STRATEGY 7–8, 18–19 (2010) (discussing the coordination and collaboration role of the federal government); *id.* at 50 (“Maintaining an open dialogue between Federal and non-Federal decision makers is critical to successful adaptation planning and implementation. The Task Force should establish a partnership committee composed of local, state, Tribal, and Federal Government representatives to exchange information and views on adaptation needs.”).

²³⁷ *See* Camacho, *Adapting Governance to Climate Change*, *supra* note ____, at 52-54 (detailing limited efforts by federal and state agencies).

among governmental authorities, at least for some regulatory functions. Especially in substantive regulatory areas in which information gathering and distribution functions are not merged in a unitary regulatory authority, there is likely to be a strong case for mandating or promoting increased coordination and sharing of information in areas of intersecting jurisdiction. Similarly, coordinating the financing and funding of adaptation activities among regulatory authorities in preparation for and response to the effects of climate change will likely provide significant benefits in limiting duplicative spending as resources inevitably remain limited. At least in some regulatory contexts, mandating or otherwise promoting communication and cooperation over adaptation planning and standard setting may provide substantial benefits in limiting conflicting and counter-productive strategies by regulatory authorities.

There are reasons to be cautious about endorsing cooperation in addressing climate change, however. In some circumstances, close coordination among agencies with intersecting jurisdiction might create vulnerabilities to groupthink and encourage lax inter-jurisdictional accountability as agencies adopt a more cooperative relationship with other regulators. Moreover, close coordination of management strategies may hinder the tailoring of strategies by regulators to their particular situations and sacrifice some of the experimentation benefits of decentralized governance. As a result, as compared to information sharing, financing, and standard setting, the benefits of close cooperation are likely to be less clear for the performance of implementation and/or enforcement governmental functions.

III. TAXONOMY ILLUSTRATED: A DIVERSITY OF CONTEXTS

The physical effects of climate change will place enormous stress on regulatory programs and other social institutions created to protect public health and valuable natural resources, foster important economic activities, and serve a host of other social goals. Absent efforts to accommodate to the new physical realities, these programs may flounder, frustrating efforts to adapt to climate change. Governments at all levels may be able to enhance their capacity to withstand the stresses placed on government programs by climate change by adjusting the manner in which those programs operate. As indicated in the previous section, one way to think about government regulatory programs is in terms of the ways in which they allocate authority to deal with the problems the programs were designed to address. Each program imposes substantive and functional bounds on agency jurisdiction and allocates authority along a spectrum from centralized to decentralized, overlapping to exclusive, and fragmented to coordinated. Movement along any of those axes may improve the government's capacity to prepare society to meet the challenges of climate change.

Because of the range and magnitude of the physical effects anticipated to result from climate change, the problems associated with government adaptation efforts are not likely to suggest uniform government structures. In this Part, we provide case studies of several government programs likely to require reorientation or structural reorganization as a result of the effects of climate change. In each case, we analyze how these effects will impose stresses on existing programs, and how realigned government authority to adapt to climate change along one or more of the dimensions discussed in Part I may

strike an appropriate balance among the values of effectiveness, efficiency, equity, and accountability. The discussion is intended to provide insights that are relevant to potential regulatory realignments in areas other than climate change adaptation.

A. Terrestrial Wildlife and Ecological Resource Management

1. Existing Allocation of Authority

Governmental management and regulation of terrestrial and freshwater ecosystem resources in the United States are primarily characterized by division based on substantive authority—typically geographic—into relatively autonomous spheres of both centralized and decentralized authority over all governmental functions, with some overlap and cooperation among such authorities. Ecological resources are divided largely based on the type of land on which they are located, with the bulk of natural resource management in the United States on federal, state and local public lands. At the federal level, each of the major resource land agencies is subject to a different statutory scheme, and in general each of these agencies engages in the full range of governmental functions in exercising its particular geographic authority.

The FWS manages the National Wildlife Refuge System pursuant to the National Wildlife Refuge System Improvement Act (NWRISA).²³⁸ The mission of this system is to serve as “a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States.”²³⁹ The NWRISA delegates to the FWS the power to engage in a variety of measures to conserve fish, wildlife, plants, and their habitats, including “propagation, live trapping and transplantation.”²⁴⁰

The National Park Service (NPS) manages the national parks under the National Park Service Organic Act’s core preservation mandate: “to conserve the scenery and the natural and historic objects and the wild life therein . . . as will leave them unimpaired for the enjoyment of future generations.”²⁴¹ If an action could lead to the impairment of park resources or values, it cannot be approved.²⁴² There is a presumption of protecting existing natural resources from human activity or management,²⁴³ as well as a preference for natural processes and native species.²⁴⁴ Thus, though the NPS has broad discretion in

²³⁸ 16 U.S.C. § 668dd (2006).

²³⁹ *Id.* § 668dd(a)(2).

²⁴⁰ *Id.* § 668ee(4).

²⁴¹ 16 U.S.C. § 1 (2006).

²⁴² U.S. NAT’L PARK SERV., MANAGEMENT POLICIES § 4.1 (2006), *available at* <http://www.nps.gov/policy/MP2006.pdf>

²⁴³ *See id.* (“In cases of uncertainty as to the impacts of activities on park natural resources, the protection of natural resources will predominate.”).

²⁴⁴ *Id.* § 4.4.2 (“Whenever possible, natural processes will be relied upon to maintain native plant and animal species and influence natural fluctuations in populations of these species.”).

interpreting its statutory authority,²⁴⁵ the NPS generally must take a preservationist approach to existing natural resources.

The National Forest Management Act (NFMA),²⁴⁶ the primary management statute for the United States Forest Service (USFS),²⁴⁷ requires the periodic adoption of detailed management plans for each national forest, but provides the USFS significant discretion in such planning and management activities.²⁴⁸ The NFMA affirms that the national forests are multiple-use lands, meaning the USFS must manage them to give due consideration to various uses, such as “outdoor recreation (including wilderness), range, timber, watershed, wildlife, and fish.”²⁴⁹ However, the USFS has considerable discretion to determine the appropriate balance of these uses.²⁵⁰ The primary requirement for protecting biodiversity in the NFMA states that NFMA plans must “provide for diversity of plant and animal communities . . . in order to meet overall multiple-use objectives.”²⁵¹

Lands governed by the Bureau of Land Management (BLM) are also subject to a multiple-use mandate under the Federal Land Policy and Management Act of 1976 (FLPMA).²⁵² FLPMA mandates BLM planning but provides the BLM extensive substantive discretion. The only definitive standards for BLM planning require the designation and protection of areas of critical environmental concern and compliance with pollution-control laws.²⁵³ The BLM is not subject to any requirement akin to the NFMA’s diversity requirement.

Finally, areas designated as wilderness pursuant to the Wilderness Act of 1964²⁵⁴ must be protected to preserve their natural conditions and wild character. Wilderness is a special designation that Congress overlays on parts of already existing federal lands; thus, the federal agency that manages the land before such designation is charged with

²⁴⁵ See *Davis v. Latschar*, 202 F.3d 359, 365 (D.C. Cir. 2000).

²⁴⁶ 16 U.S.C. §§ 1600-1687 (2006).

²⁴⁷ The Forest Service’s Organic Administration Act of 1897, 16 U.S.C. § 475 (2006), created the USFS, and the Multiple-Use Sustained-Yield Act of 1960, *id.* §§ 528-531, broadened the use objectives of the national forests to include “outdoor recreation, range, timber, watershed, and wildlife and fish purposes.” *Id.* § 528.

²⁴⁸ See 3 GEORGE C. COGGINS & ROBERT L. GLICKSMAN, PUBLIC NATURAL RESOURCES LAW § 32:27 (2d ed. 2007).

²⁴⁹ 16 U.S.C. § 1604(g)(3)(A) (2006).

²⁵⁰ See JAN G. LAITOS, NATURAL RESOURCES LAW 163 (2002).

²⁵¹ 16 U.S.C. § 1604(g)(3)(B) (2006). The NFMA also requires “to the degree practicable, for steps to be taken to preserve the diversity of tree species similar to that existing in the region controlled by [land and resource management plans].” *Id.*

²⁵² 43 U.S.C. §§ 1701-1785 (2006). For more on the multiple-use mandate, see *id.* § 1732(a), which discusses the mandate’s applicability, and *id.* § 1702(c), which defines multiple-use management as “management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people.”

²⁵³ *Id.* § 1712(c) (2006).

²⁵⁴ 16 U.S.C. §§ 1131-1136 (2006).

administering the area specifically as wilderness.²⁵⁵ Federal agencies must ensure that wilderness areas “shall be administered . . . in such manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas [and] the preservation of their wilderness character.”²⁵⁶ A wilderness area must be “protected and managed so as to preserve its natural conditions.”²⁵⁷

Thus, authority over this patchwork of national parks, national forests, federal wildlife refugia, BLM lands and federal wilderness is primarily divided geographically based on the type of land being managed, with each agency charged with primary performance over all the governmental functions related to this substantive authority. In addition to these federal lands, many state agencies (and even tribal and local governments) manage an analogous and parallel system of state (and tribal and local) lands. These lands are typically organized by type of land being managed or protected, and administering authorities typically have authority over the range of government functions over that particular land.²⁵⁸ Accordingly, ecological resources are primarily managed in largely autonomous spheres of decentralized and centralized authority.

There are a few important exceptions, however, to this generally segmented and independent land-based allocation of authority. The most notable are laws protecting or regulating a particular category of species, including endangered species, general wildlife, and invasive species laws.²⁵⁹ The federal Endangered Species Act (ESA),²⁶⁰ administered by the FWS for terrestrial and freshwater species,²⁶¹ for example, makes it unlawful to “take any [endangered animal] species within the United States or the territorial sea of the United States.”²⁶² Many states also have promulgated state

²⁵⁵ Over one hundred million acres of federal land are designated as wilderness. *See* Creation and Growth of the National Wilderness Preservation System, <http://www.wilderness.net/index.cfm?fuse=NWPS&sec=fastfacts> (last visited Aug. 21, 2009).

²⁵⁶ 16 U.S.C. § 1131(a) (2006).

²⁵⁷ *See id.* § 1131(c).

²⁵⁸

²⁵⁹ In addition, many states also have a range of general wildlife management regulations that apply to private and public lands.

²⁶⁰ 16 U.S.C. §§ 1531-1544 (2006).

²⁶¹ The ESA is primarily administered by the Secretary of the Interior through the FWS for land and freshwater species, and the Secretary of Commerce through the National Marine Fisheries Service for marine species. *See* 16 U.S.C. § 1532(15) (2011) (defining “Secretary”); *id.* § 1533(a)(2); 50 C.F.R. § 424.01 (2011) (FWS/NMFS joint regulations).

²⁶² 16 U.S.C. § 1538(a)(1) (2006); *see also id.* § 1532(19) (“The term ‘take’ means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.”); *Babbitt v. Sweet Home Chapter of Cmty. for a Great Or.*, 515 U.S. 687 (1995) (determining that FWS’s interpretation of the statutory definition of “harm” to include “significant habitat modification or degradation” that significantly impairs breeding, feeding, or sheltering patterns was reasonable).

For endangered plants, the ESA only makes it unlawful to import, export, remove from federal land, sell or offer for sale in interstate commerce, or “deliver, receive, carry, transport, or ship in interstate or foreign

endangered species statutes that follow the general template of the federal ESA, with a prohibition on taking an endangered species without a permit, though there are differences in the specific activities prohibited and allowed.²⁶³

These laws can result in overlapping and coordinated management authority when an endangered species exists on land under the jurisdiction of other agencies. Section 7 of the federal ESA, for instance, expressly requires all federal agencies to engage in “interagency cooperation,” a consultation process with the FWS regarding management of endangered species.²⁶⁴ It also requires the FWS to consult with State authorities for determinations of the critical habitat for listed species.²⁶⁵ Such overlapping authority occurs primarily over information-gathering, planning, and standard-setting functions pertaining to endangered species management.

Similarly, there is an assortment of federal and state laws that regulate biological resources, and in particular invasive species. There are many federal laws restricting the movement of alien or invasive species, most focusing on interstate or foreign commerce or the activities of federal agencies. For example, the Lacey Act²⁶⁶ prohibits importation or transportation between states of certain listed species, the Plant Protection Act²⁶⁷ authorizes the Department of Agriculture (USDA) to regulate plant pests and plants in foreign and interstate commerce, and the Animal Health Protection Act authorizes the Department of Agriculture to restrict the importation or interstate movement in commerce of animals to prevent disease or pestilence.²⁶⁸ Executive Order 13,112 prohibits federal agencies from introducing any invasive species unless the agency determines that “the benefits of such actions clearly outweigh the potential harm caused by invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken.”²⁶⁹ The Order also created a National Invasive Species Council composed of thirteen Federal Departments and Agencies and requires federal agencies to consult with the Council in implementing their duties under the Order.²⁷⁰ Similarly, most states prohibit, in some form, the importation of specific species or categories of animals and

commerce, by any means whatsoever and in the course of a commercial activity, any such species.” 16 U.S.C. § 1538(a)(2)(C) (2006).

²⁶³ See Camacho, *Assisted Migration*, 200.

²⁶⁴ 16 U.S.C. §1536(a)(2).

²⁶⁵ *Id.*

²⁶⁶ 18 U.S.C. § 42 (2006).

²⁶⁷ The Plant Protection Act of 2000 authorizes the U.S. Department of Agriculture (USDA) (1) to exclude and manage pests through inspections, surveillance, quarantines, treatments, or destruction, and (2) to create lists of species for which importation to the United States is prohibited. 7 U.S.C. §§ 7701-7786 (2006).

²⁶⁸ The Act empowers USDA to prohibit or restrict, for purposes of commerce, the importation or interstate movement of any animal, article, or means of transport if the Secretary determines that such action is necessary to prevent the introduction or spread of any livestock disease or pest. 7 U.S.C. §§ 8301 et seq. (2006).

²⁶⁹ See Exec. Order No. 13,112, 64 Fed. Reg. 6183, 6184 (Feb. 3, 1999).

²⁷⁰ *Id.*

plants absent a permit,²⁷¹ and many states also require release permits for in-state releases.²⁷² These federal and state laws thus create a framework of overlapping and cooperative governance, at least for the management of invasive species on federal or state lands. However, some state and federal laws provide exceptions to permitting requirements for activities by state agencies.²⁷³

There also is an opportunity for overlapping and coordinated information gathering and planning through the National Environmental Policy Act (NEPA).²⁷⁴ The statute requires federal agencies to prepare environmental impact statements disclosing the effects of and alternatives to any proposed “major Federal actions significantly affecting the quality of the human environment.”²⁷⁵ It also requires lead agencies to “consult with and obtain the comments of any Federal agency which has jurisdiction by law or special expertise with respect to any environmental impact involved.”²⁷⁶ Approximately half of the states have adopted analogous statutes applicable to state and local regulators.²⁷⁷

Finally, the federal government does perform some funding and consequently influences state planning of wildlife and ecosystem management. For example, states receive funds through the federal State Wildlife Grants Program and the Wildlife Conservation and Restoration Program if they adopt a Wildlife Action Plan assessing the condition of a state’s wildlife and outlining necessary conservation actions.²⁷⁸ There thus exists some overlap and cooperation for some governmental functions, such as information gathering, planning, and financing, but authority over ecological resources is largely fragmented and at best loosely coordinated.

²⁷¹ See, e.g., ALASKA STAT. § 6.05.921; ARIZ. REV. STAT. § 17-306; IOWA CODE § 481A.47. Many have promulgated “blacklists” of banned species (see e.g., ALA. ADMIN. CODE R. 220-2-.26, 220-2.93; GA. CODE §§27-5-4, 27-5-5; PA. CONS. STAT. §4219(A)) that may not be imported or have created graded systems of restriction with categories such as unregulated, regulated, restricted, and prohibited. See, e.g., MINN. STAT. §84D.04; MISS. CODE §49-1-29. A few states are more restrictive, with “whitelists” of types of species which may be imported or released, explicitly or implicitly prohibiting importation and release of all others. Illinois, for example, maintains whitelists of birds and of aquatic species that may be imported and released without a permit. See 1 ILL. ADMIN. CODE TIT. 17, §870.10(a), (b).

²⁷² See, e.g., CAL. FISH & GAME CODE § 3515; N.C. GEN. STAT. §113-292; ARIZ. REV. STAT. §17-306.

²⁷³ For example, a few states grant agencies authority to propagate species necessary for stocking programs. See, e.g., CAL. FISH & GAME CODE § 1007 (West 2009); IDAHO ADMIN. CODE r. 13.01.03.100(01)(j) (2010).

²⁷⁴ 42 U.S.C. §§ 4321–4375 (2006).

²⁷⁵ See *id.* § 4332(2)(C).

²⁷⁶ See *id.*

²⁷⁷ See Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 COLUM. L. REV. 903, 905 n.7 (2002) (stating that over 25 states have emulated NEPA).

²⁷⁸ See Pittman-Robertson Wildlife Restoration Act, 16 U.S.C. § 669c(d)(1)(D) (2008). [Discuss Land and Water Conservation Fund Act?]

2. *Potential Reallocation to Manage Climate Change*

Unfortunately, this regulatory framework is not likely to provide an effective and coherent framework for adapting ecological resources to the effects of climate change. Climate change is projected to have a number of physical effects on wildlife and ecological resources that are likely to lead to loss of ecosystem productivity and biodiversity and greater risk of extinctions. EPA has determined that “clear evidence” demonstrates that “climate change is exerting major influences on natural environments and biodiversity, and these influences are generally expected to grow with increased warming.”²⁷⁹ Shifts in habitat ranges, timing of migration patterns, and changes in reproductive timing and behavior are all expected to occur.²⁸⁰ If global average temperatures increase by more than 2° C, many species are at significant risk of extinction.²⁸¹ Short of that, rising temperatures will cause species unable to survive in warmer conditions to shift their ranges northward and toward higher elevations, which will “fundamentally rearrange U.S. ecosystems.”²⁸² Coupled with development pressures, habitat fragmentation, and the intrusion of invasive species (which may be facilitated by climate change), these shifts are likely to “alter ecosystem structure, function, and services, leading to predominately negative consequences for biodiversity and the provision of ecosystem goods and services.”²⁸³

However, perhaps the two components of climate change most likely to raise obstacles to management of ecological resources are scientific uncertainty and the broad scale ecological shifts that significantly increase regulatory interactions and blur the lines between existing management regimes. Climate change proliferates and complicates the allocation of authority among governmental authorities that the existing natural resource management system is ill-equipped to manage. First, there is significant uncertainty regarding the exact local effects and efficacy of possible management strategies in preventing or reducing the harmful effects of climate change. Climate change involves more complex and potentially confounding variables than most environmental issues, and

²⁷⁹ Endangerment Finding, *supra* note __, at 66534.

²⁸⁰ Endangerment Finding, *supra* note __, at 66534.

²⁸¹ Endangerment Finding, *supra* note __, at 66534.

²⁸² Endangerment Finding, *supra* note __, at 66498.

²⁸³ Endangerment Finding, *supra* note __, at 66498. For example, over the short term, forest growth may increase with warmer temperatures and higher atmospheric concentrations of CO₂, which will increase photosynthesis. But increased forest growth will likely be limited to young forests on fertile soils. *Id.* at 66532. In addition, increased wildfire activity and the spread of pests and disease may offset those gains. Climate change is very likely to increase the size and frequency of wildfires, insect infestations, and tree mortality in places such as the Interior West, the Southwest, and Alaska. *Id.* at 66532. The same areas, in addition to portions of the Southeast and the Great Lakes states, are likely to experience declining precipitation. The upshot is that some forest types are likely to expand (such as oak and hickory), others will contract (such as maple, beech, and birch), and some (such as spruce and firs) may disappear entirely from the contiguous U.S. *Id.* at 66534. Such disturbances can completely change forest ecosystems and species composition and distribution. These changes may increase ecosystem vulnerability to other disturbances, including wildfires, insect infestations, and invasive species. *Id.* at 66534. EPA has found that “[f]or the longer term, the risk from adverse effects increases over time, such that overall climate change presents serious adverse risks for forest productivity.” *Id.* at 66498.

localized modeling needed to aid adaptation decisions is especially difficult.²⁸⁴ However, there also is substantial uncertainty regarding the efficacy of potential adaptation strategies because (1) information about the performance of adopted ecosystem management strategies is rarely ever systematically generated, and (2) because there are insufficient avenues for sharing information between existing regulatory authorities.²⁸⁵

Second, the current regulatory framework of primarily segmented, autonomous and uncoordinated authority was not designed to facilitate a landscape-scale shift of ecological resources that blurs the distinctions between legally discrete lands. This system may be particularly ineffectual at addressing the widespread changes in environmental conditions and resulting range shifts, contractions, and expansions for species as wildlife and vegetation respond to altered climatic conditions over the next century. Landscapes where ecosystems currently exist and are protected may not be suitable for those ecosystems in the near future, and many species are likely to need to move considerable distances to adapt or face extinction.²⁸⁶ However, fragmented jurisdiction will create substantial barriers to migration. Species movement will be constrained not only by physical dispersal obstruction (whether natural or human-induced) but also by management differences between jurisdictions. Some flora and fauna will need to move from one designated land category to another, but the management objectives of those new jurisdictions may hinder or bar such migration.²⁸⁷ In addition, conflict is likely to occur between species-focused wildlife preservation laws (such as those governing endangered or invasive species) and the place-based laws of public lands. For example, if a member of a listed endangered species attempts to migrate from through designated Wilderness outside its historical range, such movement arguably would be barred by the Wilderness Act. It also might be considered invasive under federal or state invasive species laws. Accordingly, climate change is likely to increase the overlap of regulatory authority among regulators as well as the conflict between inconsistent management objectives.

Any coherent effort to manage wildlife movement to limit extinction and maintain ecosystem productivity and biodiversity will require a number of changes to the allocation of authority in existing governance of wildlife and ecological resources. In

²⁸⁴ See Alejandro E. Camacho, *Transforming the Means and Ends of Natural Resource Management*, 89 N.C. L. REV. 1405, 1409-13 (2011).

²⁸⁵ See *id.* at 1413-20.

²⁸⁶ See Hoegh-Guldberg et al., at 345; Thompson Webb III, *Past Changes in Vegetation and Climate: Lessons for the Future*, in GLOBAL WARMING AND BIOLOGICAL DIVERSITY, at 59, 60; INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, SUMMARY FOR POLICYMAKERS: CLIMATE CHANGE 2007: IMPACTS, ADAPTATION, AND VULNERABILITY: CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 7, 11 (M.L. Parry et al. eds., 2007) (projecting that twenty to thirty percent of species will face an “increased” risk of extinction if average global temperatures rises more than 1.5 to 2.5 degrees Celsius). A leading but often-contested article in *Nature* concluded that by 2050 up to two-thirds of species will need to migrate or be moved to new habitats to survive. See Chris D. Thomas et al., *Extinction Risk from Climate Change*, 427 NATURE 145, 145 (2004).

²⁸⁷ See Camacho, *Assisted Migration*, at 181-83.

light of the increase in interaction among jurisdictions and the substantial uncertainty that accompanies climate change, it will likely become only more difficult to identify a single appropriate regulatory scale for managing the wide range of important ecological resources or problems. Consequently, natural resources law is likely to remain well-matched to a general model of overlapping authority in managing the effects of climate change.²⁸⁸ In light of the potential for irreversible harm, the redundancy benefits from overlapping jurisdiction may be particularly valuable for the management of ecosystem resources.²⁸⁹

Increased reliance on coordination mechanisms akin to some of those already used in natural resources law would likely help manage the increased intersection of authority due to species movement. One such model might be the ESA's consultation requirement, replicated to require consultation not only on endangered species but also other categories of migrating ecological resources, such as invasive and other major migrating species. NEPA and its state analogs should also continue to provide opportunities for inter-jurisdictional communication on the effects and alternatives to proposed federal management of ecosystems. However, NEPA only contemplates information gathering and assessment in the context of declared federal actions.²⁹⁰ Because the fundamental question in managing climate change is not how a particular human action will affect the environment, but rather how to minimize the effects of climate change most effectively, proactive adaptation may necessitate analyses in contexts in which federal action has not been proposed.²⁹¹

In this vein, there seems to be a need for the development of an adaptation planning framework characterized by greater centralization or at least coordination of authority over information gathering and distribution, financing of adaptation efforts, planning, and possibly even standard setting over wildlife movement. To deal with the considerable uncertainty about the effects of climate change and effectiveness of potential management strategies, there is a credible argument that the federal government should develop an information-sharing framework that houses research, ambient monitoring, and dissemination of information ecological resources more centrally and in a more coordinated fashion. To truly promote inter-jurisdictional learning on resource management, such a clearinghouse would have to include not only scientific information about ecological effects, but also systematic reports on the past performance of management strategies.²⁹² As such information would come from those entities that are adopting and implementing management strategies, Congress also would need to oblige

²⁸⁸ Camacho; Ruhl.

²⁸⁹ See *supra* note ____.

²⁹⁰ Kleppe v. Sierra Club, 427 U.S. 390, 399 (1976). See also Daniel A. Farber, *Adaptation Planning and Climate Impact Assessments: Learning from NEPA's Flaws*, 39 ENVTL L. REP.: NEWS & ANALYSIS 10605, 10608 (2009).

²⁹¹ See Farber, *supra* note ____, at 10607 (“Adaptation planning . . . flip[s] current practices in environmental law around: instead of asking how human activities impact the environment, we instead begin by asking how environmental change will impact humans.”).

²⁹² See Camacho, *Adapting Governance*, at ____.

federal resource agencies to regularly monitor, assess, and adjust adopted management strategies based on their performance in light of regulatory goals and targets.

To reconcile the increased conflict among ecological resource management authorities from the migration effects of climate change, a more coordinated or even centralized mechanism for developing an adaptation strategy to manage those effects is necessary. Though ideally such a framework that establishes and prioritizes broad ecological management goals related to wildlife movement would be defined by Congress, another approach might be a collaborative infrastructure that brings resource management authorities together to engage in broader adaptation planning and sets fundamental management standards and priorities about migrating ecological resources.²⁹³ To both take advantage of the federal government's superior capacity to pool funding and provide a mechanism for coordinating planning requirements and standards with state regulators, the bulk of financing for adaptation efforts would make sense at the federal level.

By combining centralized standard setting and financing with a coordinated system of information sharing, this governance framework would proliferate opportunities for information sharing and cultivate learning. This in turn should help reduce the barriers to regulation exacerbated by uncertainty. Furthermore, providing a transparent means for assessing agency progress toward regulatory goals would help promote more effective agency decision making and regulator accountability.²⁹⁴ It should also promote benefits in increased connectivity between lands through more coordinated planning and standard setting.

However, there are strong arguments for continuing to lodge control of adoption, implementation, and enforcement of specific adaptation plans with localized state and federal agencies. Decentralized authority would allow for a range of management strategies in implementation, which would facilitate the development of specialized approaches tailored to local variations and resource-specific circumstances. Furthermore, maintaining decentralized implementation and enforcement will continue to provide opportunities for regulatory experimentation. To promote such management customization and experimentation, the choice of concrete management strategies related to wildlife movement should likely remain with each agency delegated authority over a particular land or resource.

Such decentralized implementation will serve to reduce uncertainty when accompanied with a broader system of information sharing.²⁹⁵ Requiring centralized

²⁹³ The Federal Interagency Adaptation Task Force, led by the CEQ, NOAA, and the Office of Science and Technology Policy in fact is a first step toward such a coordinated strategy. However, that initiative is almost exclusively federal. In addition, though it has helped develop recommendations for an adaptation strategy, it has limited enforcement or oversight authority, and has not sought to address prioritization of management goals or areas of conflict between regulatory authorities.

²⁹⁴ For a more comprehensive delineation of such an inter-jurisdictional adaptive governance framework, see Camacho (2009).

²⁹⁵ Salkin, 2010.

information sharing and coordinated standard setting accommodates the core experimentation benefits of decentralized governance by allowing jurisdictions to learn from the experiences of other regulatory authorities. The existence of many different regulatory authorities provides considerable opportunities for experimentation and interagency learning.²⁹⁶ In conjunction with pressuring regulators to learn through mandated planning, providing resource managers access to such information and communication will help promote the potential customization and experimentation benefits of decentralized authority. Because such an approach neither requires agency consolidation nor agreement on a particular management strategy, making such information broadly available is valuable whether agencies engage in collaborative efforts or act independently in exercising their implementation and enforcement functions.²⁹⁷

Finally, though there are likely to be considerable benefits from maintaining an allocation structure that provides for overlapping substantive jurisdiction, there might be opportunities to reduce duplication in the allocation of authority over particular governmental functions when the benefits from redundancy are likely to be more limited. For example, though it might make sense to allow the FWS, state wildlife agency, and state land manager to be involved in endangered species migration on state land, all of these authorities would not have to undertake all governmental functions to reap much of the redundancy benefits of overlapping authority. Though FWS might be charged with providing information on similarly situated lands, financing, and standard setting, and all three authorities might participate in the adaptation planning process, implementation could be lodged in the state land management agency, for example. In short, though overlapping regulatory authority coalesced around particular substantive areas may make sense for ecological resources, such jurisdictional redundancy may be better focused on certain governmental functions rather than perfunctory duplication when there are few likely redundancy benefits.

B. Coastal Resource Management

1. Existing Allocation of Authority

Two important federal statutes that help to protect coastal resources are the Coastal Zone Management Act (CZMA)²⁹⁸ and the Clean Water Act's (CWA) dredge and fill permit program.²⁹⁹ Under the CZMA, control over coastal resource management

²⁹⁶ Jonathan H. Adler, *Jurisdictional Mismatch in Environmental Federalism*, 14 N.Y.U. ENVTL. L.J. 130, 134 (2005).

²⁹⁷ See William W. Buzbee, *The Regulatory Fragmentation Continuum, Westway, and the Challenges of Regional Growth*, 21 J.L. & POL. 323, 353 (2005) (“The complex scientific underpinnings of many environmental challenges favor allocation of research and information sharing functions to the federal government. Even if inter-jurisdictional competition is viewed as a good, one can embrace allocation of such information-gathering functions to federal actors.”).

²⁹⁸ 16 U.S.C. §§ 1451-1466.

²⁹⁹ 33 U.S.C. §§ 1251-1387. Other federal statutes affect the use and development of coastal resources, including the Marine Protection, Research, and Sanctuaries Act of 1972, 33 U.S.C. §§ 1401-1445, the

is predominantly decentralized to the state level, with limited federal oversight of a few regulatory functions.³⁰⁰ Management under the CZMA is characterized by considerable overlap in functional jurisdiction and inter-jurisdictional coordination, especially between federal and state agencies. The dredge and fill permit program, which restricts wetlands development, is more federally centralized, with the U.S. Army Corps of Engineers and EPA sharing implementation responsibility. Coordination between authorities administering the CZMA and federal wetlands regulators appears to be limited, even though wetlands development can affect coastal areas (such as by impairing the capacity of coastal ecosystems to diminish storm surges).

More so than most federal environmental statutes, the CZMA preserves state control, with minimal federal intrusion. The CZMA envisions state involvement in virtually all governmental functions affecting coastal resources, including planning and standard-setting, information gathering, financing, implementation, and enforcement. The federal role is primarily limited to information gathering, financing, and ensuring state compliance with the CZMA's procedural and substantive standards through oversight of the state's coastal management planning process. However, the federal government reserves the right to override a state's decision to block a federally permitted activity deemed inconsistent with a state management program, if the federal government regards the activity either as consistent with CZMA goals or as in the interest of national security.

The CZMA recognizes a “national interest in the effective management, beneficial use, protection, and development of the coastal zone.”³⁰¹ Congress concluded that “present state and local institutional arrangements for planning and regulating land and water uses in such areas [are] inadequate.”³⁰² Rather than establishing a centralized unitary framework for coastal management, the CZMA provides that the “key” to more effective coastal zone protection is to encourage the states, with federal assistance, to cooperate with the federal and local governments in making land and water use decisions that have “more than local significance.”³⁰³

River and Harbors Act, 33 U.S.C. §§ 401-402, the Outer Continental Shelf Lands Act, 43 U.S.C. §§ 1331-1356a, and the Coastal Barrier Resources Act, 16 U.S.C. §§ 3501-3510. Our discussion is limited to the CZMA and the CWA, which best illustrate how climate change may affect the management of coastal resources under existing regulatory regimes.

³⁰⁰ The CZMA seeks to avoid infringing on state power to control management of land and water use. Compare 16 U.S.C. § 1451(i) (CZMA) with 33 U.S.C. §§ 1251(b), (g), 1370 (Clean Water Act). The CZMA also promotes cooperation and coordination among all levels of government. 16 U.S.C. § 1452(4), (5).

³⁰¹ 16 U.S.C. § 1451(a).

³⁰² *Id.* § 1451(h). In one of the few references to climate change adaptation in the major federal environmental statutes, the CZMA states that, “[b]ecause global warming may result in a substantial sea level rise with serious adverse effects in the coastal zone, coastal states must anticipate and plan for such an occurrence.” *Id.* § 1451(l).

³⁰³ *Id.* § 1451(i).

The CZMA encourages information collection as a shared endeavor.³⁰⁴ It delegates to an agency within NOAA the task of conducting a program of technical assistance and research to support development and implementation of state coastal zone management programs.³⁰⁵ The CZMA emphasizes the need for coordination, directing information sharing among federal agencies.³⁰⁶ It also authorizes the Secretary of Commerce to make grants to help coastal states administer their programs, although the states must contribute funds.³⁰⁷ Additional federal grants assist states to preserve coastal resources of national significance,³⁰⁸ regulate nonpoint source pollution,³⁰⁹ and purchase property to protect coastal resources.³¹⁰ Federal grants are conditioned on conformity of a state's coastal zone management program with CZMA requirements.³¹¹

Coastal states must submit their programs for review by the Commerce Department. The Department may approve only if a program identifies how the state proposes to control land and water uses with a significant impact on coastal waters, creates authority to resolve conflicts among competing uses, and authorizes acquisition of property if necessary to achieve conformance with the program. The CZMA precludes approval of a state program lacking assurances that local regulations do not unreasonably restrict or exclude land uses and water uses of regional benefit.³¹² The Secretary must withdraw program approval and financial assistance if the state fails to implement the program properly or violates federal grant terms.³¹³

A state's failure to adopt an acceptable management program does not trigger federal regulation, distinguishing the CZMA from statutes such as the Clean Air Act.³¹⁴ Instead, the state only forfeits eligibility for federal grants to support its management program.³¹⁵ Federal approval of a state program benefits the state in another way. Once the Secretary approves a state program, any applicant for a federal license or permit to conduct an activity affecting the coastal zone must certify that the activity complies with the state program. The federal agency may not issue a license or permit until the state has concurred with the certification, or the Secretary finds that the activity is consistent with

³⁰⁴ *Id.* § 1452(3).

³⁰⁵ *Id.* § 1456c(a).

³⁰⁶ *Id.* § 1456(a).

³⁰⁷ *Id.* § 1455(a). The amounts allocated to each state depend on factors that include the extent and nature of the shoreline covered by the state program and the population of the area. *Id.* § 1455(c).

³⁰⁸ *Id.* § 1455a(b).

³⁰⁹ *Id.* § 1455b(f).

³¹⁰ *Id.* § 1456-1. *See also id.* § 1456b(b) (authorizing federal grants to support coastal zone enhancement measures).

³¹¹ *Id.* § 1455(b).

³¹² *Id.* § 1455(d).

³¹³ *Id.* § 1458(c), (d).

³¹⁴ *See* 42 U.S.C. § 7410(c).

³¹⁵ 16 U.S.C. § 1455(b).

CZMA objectives or in the interest of national security.³¹⁶ These provisions reinforce the decentralized character of coastal management authority.

The CZMA promotes cooperation among different federal agencies with authority over activities within or affecting coastal zones³¹⁷ and between federal and state policymakers.³¹⁸ Because neither intrastate nor interstate coordination is mandatory, the extent of coordination varies considerably within and among states. Some states coordinate with adjacent coastal states.³¹⁹ The statute also creates flexibility as to the degree of centralization within a state, allowing programs to be structured in more or less hierarchical fashion. The states have adopted a range of approaches, some involving exclusive and others overlapping authority.³²⁰

The administration of nonpoint source pollution in state coastal areas involves overlapping federal and state authority. The CZMA requires any state with an approved program to submit to EPA and the Commerce Department a nonpoint source control program with management measures conforming to EPA guidance.³²¹ State nonpoint source programs must be “coordinated closely” with state and local water quality plans, CWA nonpoint source programs, and coastal zone management programs under the CZMA.³²² Thus, on top of the overlap between federal and state regulators, the CZMA creates overlapping authority at the federal level.³²³

The Clean Water Act provides relatively centralized federal authority over coastal wetlands development. In 2009, the lower 48 states contained more than five million acres of estuarine and marine intertidal wetlands.³²⁴ Authority over wetlands development is centralized in two federal agencies with some overlapping and coordinated functional authority. The CWA requires a permit from the Corps of

³¹⁶ *Id.* § 1456(c)(1), (3)(A). The President also has the authority to exempt federal activities from the requirement to conform to state programs by determining that an exemption “is in the paramount interest of the United States.” *Id.* § 1456(c)(1)(B).

³¹⁷ *Id.* § 1456(a)-(b).

³¹⁸ *See, e.g., id.* §§ 1451(i), (1452(2)(H), 1454, 1455(d), 1456(h).

³¹⁹ *See, e.g., A Call to Action Framework*, GOVERNORS’ SOUTH ATLANTIC ALLIANCE, <http://www.southatlanticalliance.org/work.htm>.

³²⁰ NOAA has identified five types of management structures, ranging from a single state agency to networks of state and local agencies. *See* William C. Millhouser, *Managing Coastal Resources* (1998), http://oceanservice.noaa.gov/websites/retiredsites/sotc_pdf/CRM.PDF (*see* Appendix E).

³²¹ 16 U.S.C. § 1455b(a)(1). The CZMA charges EPA with the responsibility of developing guidance for managing nonpoint source pollution in coastal waters. *Id.* § 1455b(g).

³²² *Id.* § 1455(b)(a)(2).

³²³ If the two federal agencies approve a state’s nonpoint source program, the state must implement the program through changes to the CWA nonpoint source plan and the state CZMA program. *Id.* § 1455b(c)(2).

³²⁴ UNITED STATES FISH & WILDLIFE SERVICE, STATUS AND TRENDS OF WETLANDS IN THE CONTERMINOUS UNITED STATES 16, 46 (2011) [hereinafter, FWS, WETLANDS].

Engineers for the dredging and filling of waters of the United States,³²⁵ which the Corps has interpreted to include certain wetlands.³²⁶ EPA establishes standards for the issuance of dredge and fill permits,³²⁷ but the Corps rules initially on individual permit applications, applying EPA standards.³²⁸ EPA may veto Corps permits.³²⁹ EPA may authorize states to administer the dredge and fill permit program in lieu of the Corps, though delegation is rare.³³⁰ EPA and the Corps share the authority to enforce permit requirements.³³¹

The dredge and fill permit and CZMA programs are coordinated to a limited extent. State coastal zone management programs encompass wetlands use.³³² A savings clause provides that nothing in the CZMA “shall in any way affect any requirement” established under the CWA.³³³ Rather, CWA requirements must be incorporated in any CZMA program.³³⁴ The significance of this mandate is unclear. The CWA apparently trumps the CZMA, but only as to those aspects of coastal zone management programs that qualify as “water pollution control requirements.” Presumably, dredge and fill permit requirements would qualify, but that is also unclear. The veto power of a state with an approved program over federal activities within the coastal zone provides some additional coordination, but seems to cut in the direction of CZMA predominance over the CWA.³³⁵ Because of this overlap of federal and state power, states can impose additional constraints on wetlands development, beyond those arising under § 404.

2. Potential Reallocation to Manage Climate Change

The threats that climate change poses to coastal areas will impose stress on existing regulatory mechanisms. Climate change is projected to cause increased risk of storm surges, coastal flooding and erosion, and destruction of wetlands. The melting of the ice sheets and glaciers in places such as Greenland and Antarctica are already causing sea levels to rise, and the warming of water temperatures will exacerbate that phenomenon as the volume of heated water expands. The rate of change is likely to

³²⁵ 33 U.S.C. § 1344(a).

³²⁶ *See* Rapanos v. United States, 547 U.S. 715 (2006); United States v. Riverside Bayview Homes, Inc., 474 U.S. 121 (1985).

³²⁷ 33 U.S.C. § 1344(b).

³²⁸ 33 U.S.C. § 1344(a)-(b). *See* National Mining Ass’n v. Jackson, 2011 WL 4600718, at *5-6 (D.D.C. Oct. 6, 2011) (stating that “the Corps is the sole permitting authority” and that EPA “is to play a lesser, clearly defined supporting role”).

³²⁹ 33 U.S.C. § 1344(c).

³³⁰ 33 U.S.C. § 1344(g)-(h). Only New Jersey and Michigan have been approved to administer the permit program.

³³¹ *Id.* § 1344(n), (s).

³³² The CZMA defines “coastal zone” to include wetlands. 16 U.S.C. § 1453(1).

³³³ *Id.* § 1456(f).

³³⁴ *Id.*

³³⁵ *Id.* § 1456(c)(3)(A).

accelerate in the future.³³⁶ Higher air temperatures may increase the destructive force of hurricanes, causing damage to coastal communities.³³⁷ Elevated sea levels heighten storm surges and diminish drainage rates in low-lying areas, increasing the risk of flooding from rainstorms.³³⁸ Coastal areas are likely to experience salt water intrusion that impairs the quality of fresh water supplies.³³⁹ Coupled with the adverse impacts of development and pollution, these effects of climate change may devastate important wetlands ecosystems.³⁴⁰ Species that inhabit salt marshes, mangroves, and coral reefs are likely to be especially vulnerable.³⁴¹ Many of these physical effects will be regional, increasing the interaction and potential for conflict between local and state authorities over coastal resources.

The precise manifestation of these adverse effects is uncertain. Increased ambient monitoring, information sharing, and financing by the federal government may help reduce uncertainty and manage threats. In addition, though there may be sound reasons for continuing primarily state control of most governmental functions in coastal resource management, a more centralized federal role in planning and standard setting for addressing regional coastal effects (such as disasters) and managing inter-jurisdictional spillovers (such as development of transportation and energy infrastructure of regional or national significance) seems advisable. The likely proliferation of cross-jurisdictional effects of management decisions suggests an increased need for collaboration and coordination among local and state authorities. Finally, though in general authority should likely continue to overlap, there may be opportunities to reduce some functional jurisdiction when the benefits of redundancy seem small, such as in federal wetland regulation and for information gathering on coastal resources.

Policymakers will depend on access to up-to-date information to craft effective coastal resource protection programs in the face of climate change. The CZMA vests in the Commerce Department the principal responsibility to develop and disseminate information about land use practices and other activities that affect coastal resources and to provide technical assistance to coastal states. Part of the rationale for allocating this task to the federal government has been the concern that lower levels of government are likely to lack the resources to do the job. This concern is especially acute as the information demands associated with assessing the risks of climate change are likely to outstrip demands for information concerning long-standing, better understood problems.

³³⁶ Endangerment Finding, *supra* note ___, at 66533.

³³⁷ Endangerment Finding, *supra* note ___, at 66498. *See generally* Robert L. Glicksman, *Global Climate Change and the Risks to Coastal Areas from Hurricanes and Rising Sea Levels: The Costs of Doing Nothing*, 52 LOYOLA L. REV. 1127 (2006).

³³⁸ Endangerment Finding, *supra* note ___, at 66533. The devastation caused to communities in New Jersey and upstate New York in the late summer of 2011 as a result of Hurricane Irene is indicative of the havoc that storms and flooding may create. *See* Sam Dolnick, *River, at 100-Year Hugh, Ravages a City that Once Thrived on It*, N.Y. TIMES, Aug. 31, 2011.

³³⁹ Endangerment Finding, *supra* note ___, at 66532.

³⁴⁰ Endangerment Finding, *supra* note ___, at 66533.

³⁴¹ Endangerment Finding, *supra* note ___, at 66534.

In addition, a centralized system of information gathering and distribution is more efficient than one in which governments at all levels duplicate efforts. One area in which the current system might need improvement is rapid dissemination of information concerning fast-developing threats such as severe storms. Communication failures between FEMA and local responders contributed to the slow and inadequate response to Hurricane Katrina, for example.³⁴² Similarly, resource pressures make it sensible for the federal government to continue to help finance state programs such as coastal zone management programs.

The uncertainties associated with climate change will make planning for the protection of coastal resources more difficult, too. Climate change is likely to cause physical changes that differ in nature or magnitude from those previously experienced. More severe storms may increase the frequency and severity of flooding in some places, and may induce flooding in areas not previously affected. These kinds of changes will disrupt land use planning by making existing use designations inappropriate. Policymakers will need to consider redrawing maps that indicate where restrictions on floodplains development apply, but they will have little experience for those efforts, as extrapolating the results of climate models to a local scale is imprecise. In general, a complete shift of land use planning authority away from local governments seems politically infeasible and ill-advised due to superior local knowledge of local needs, but local planners will need to coordinate with government officials with the best access to information about anticipated changes. Because the federal government, through agencies such as EPA and NOAA, will be the primary information-gatherers, local planners should revise land use planning procedures to assure that local officials solicit the input of federal agencies.

In at least one aspect of planning, however, the federal role probably should increase. The CZMA already requires state officials to consider the national interest in planning for the siting of facilities, such as energy facilities, “which are of greater than local significance.”³⁴³ Given the interconnected energy networks that exist in most portions of the United States, one locality’s decision to authorize construction of a power plant in an area vulnerable to flooding or disruption due to storm activity can adversely affect the entire nation. Similar considerations apply to other aspects of infrastructure, such as roads and transportation facilities. To the extent that the federal government does not already control the location of facilities such as interstate highways, a federal veto power over state and local location choices makes sense. Federal authority to require relocation of these key facilities should exist regardless of whether a state participates in CZMA programs.

Increased coordination has the potential to increase the effectiveness of disaster response. If large numbers of people need to be evacuated in the face of flooding or

³⁴² See CENTER FOR PROGRESSIVE REFORM, AN UNNATURAL DISASTER: THE AFTERMATH OF HURRICANE KATRINA 33 (2005), http://www.progressivereform.org/articles/Unnatural_Disaster_512.pdf (noting lack of flexibility and “disturbing reports of lack of situational awareness well into the disaster at the highest levels of FEMA”).

³⁴³ 16 U.S.C. § 1455(d)(8).

major storms, the flow of people is likely to extend across state lines. Contamination of water or food supplies as a result of these events also calls for a coordinated approach that is probably best overseen by the federal government, with the participation of state and local officials. The movement of medical supplies, food, and potable water also calls for a high degree of inter-jurisdictional coordination.

Similarly, it may be appropriate to create federal authority to preclude development and other activities that result in the destruction of wetlands that provide important ecosystem services such as protection against storm surges. The Corps of Engineers and EPA already control the development of wetlands through administration of the Clean Water Act's dredge and fill permit program. But other activities may contribute to wetlands impairment and destruction, including those that facilitate erosion, producing sediment that is transported to wetlands, and those that drive the process of saltwater intrusion into freshwater wetlands.

Other kinds of land use choices should remain the prerogative of the states and localities that have traditionally controlled them. These levels of government generally should be able to choose among basic adaptation choices available for protecting coastal resources, including resistance, adjustment, and retreat.³⁴⁴ The federal government can contribute to these efforts by refusing to provide flood insurance in risk-prone areas to discourage development there. State and local authorities are also likely best situated to make decisions about trade-offs between efforts to limit beachfront development that is at risk from rising sea levels or storms and fears that such limits may impair locally important industries such as tourism.

Retaining state and local authority of certain planning, standard-setting, and implementation functions should provide opportunities for experimentation and customization associated with decentralized governance. Several states are already pursuing different approaches to adaptation planning and program implementation. Delaware and Maryland, for example, are engaged in state-wide sea level rise initiatives. Georgia is educating the public on the physical effects of climate change and creating a "planning toolbox" of adaptation strategies.³⁴⁵ To the extent that these activities fall within the scope of coastal zone management programs, review by the Secretary of Commerce provides some coordination and fosters information sharing. The same rationale may support decentralization within a particular governmental level, although overlapping jurisdiction over the same function creates the potential for contradictory approaches and confusion among regulated entities.

³⁴⁴ For discussion of these options, see Robert R.M. Verchick & Joel D. Scheraga, *Protecting the Coast*, in *THE LAW OF ADAPTATION TO CLIMATE CHANGE: U.S. AND INTERNATIONAL ASPECTS* (Michael B. Gerrard & Katrina Kuh, eds.) (forthcoming). Resistance includes taking steps to reduce the risk of flooding and erosion, such as the erection of seawalls and beach renourishment. Adjustment involves increasing the resilience of coastal areas to sea level rise, such as elevating roads and fortifying buildings. Retreat entails inward migration of people and facilities.

³⁴⁵ *National Coastal Zone Management Program Funding Summary 2010*, NOAA'S OFFICE OF OCEAN & COASTAL RESOURCE MANAGEMENT, <http://coastalmanagement.noaa.gov/resources/docs/czmfy10funding.pdf>.

Efforts to prevent wetlands destruction resulting from climate change would benefit from a reorganization of agency authority to administer the Clean Water Act's dredge and fill permit program. As things now stand, standard-setting authority is EPA's responsibility, while implementation of the program is primarily the job of the Corps of Engineers, which applies EPA's standards in ruling on individual permit applications (subject to EPA's veto power). Enforcement is a shared responsibility. There is little to recommend this division of standard-setting and implementation authority between two federal agencies. The Corps' role in the program is a historical holdover, reflecting reluctance to strip the Corps of permitting authority vested in it under the 1899 Rivers and Harbors Act, long before EPA's creation.³⁴⁶ Even if feedback EPA receives from the Corps on individual projects helps EPA to develop more effective permitting standards, EPA presumably could learn the same things from its own permitting officials if Corps participation were eliminated. Centralization of the authority to administer the dredge and fill permit program in EPA makes the most sense, given that EPA has the most expertise in environmental protection initiatives, and in water pollution and climate change matters in particular. EPA is also better situated to understand the interplay of climate change and wetlands development.

Some aspects of coastal zone management already reflect federal predominance. These include the issuance of CWA dredge and fill permits and the Commerce Department's authority to override a state veto of a federally permitted activity within a state coastal zone based on consistency with CZMA goals or national security considerations. In these areas, management is relatively centralized. A key question is whether stresses on management of coastal resources likely to result from climate change support further centralization. Movement in that direction may be advisable when the adverse impacts of climate change on coastal resources are likely to have spillover effects into jurisdictions other than the one immediately affected by climate change (such as a storm that results in significant flooding). At a minimum, these impacts support making the submission of a CZMA management plan mandatory, rather than only if a state desires federal funding and a veto power over federally licensed projects. The federal government's role in planning for and approving the siting of energy, transportation, and related facilities "of greater than local significance" should also be increased.³⁴⁷

C. Public Health

D. Immigration Control

Other (?)

IV. CONCLUSION

³⁴⁶ Cf. Alyson C. Flournoy, *Supply, Demand, and Consequences: The Impact of Information Flow on Individual Permitting Decisions Under Section 404 of the Clean Water Act*, 83 IND. L.J. 537, 547 (2008) ("The Corps and EPA share authority in a unique arrangement under section 404. Congress authorized the Corps to issue permits for discharges of dredged and fill material as an adjunct to the Corps's historic authority to protect navigation under the Rivers and Harbors Act of 1899.").

³⁴⁷ See 16 U.S.C. § 1456(d)(8).

[To be added]