

Leveraging Federal Land Plans Into Landscape Conservation

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Since the transformation of natural resources law from an emphasis on private rights to a focus on the public interest, planning has played a central role in mediating disputes. Spurred by the statutory reforms to the organic acts governing public lands, federal agencies began in the 1970s to devote substantial energy to planning for units, such as individual national forests. These unit-level plans guide management for periods generally exceeding a decade. The unit-level plans apply system-wide statutes, rules, and policies to particular places, creating “law of the land.”

Unfortunately, the unit-level plan has proven inadequate to achieve broader national objectives for conservation. Typically, the unit-level plan steps down broad principles to guide management for a specific place but does little to step up or link place-based contributions to a region or landscape. In this respect, planning is a one-way street, allowing movement only from broad to narrow. Recent literature in conservation management suggests useful tools to facilitate two-way communication that includes unit-level plans considering and contributing toward broader, landscape-level aims.

The *raison d'être* of organic legislation is to orchestrate management of units into a conservation system that achieves more than the sum of its parts. Yet, the primary planning focus on individual units undermines this goal by creating disparate management regimes with little attention to what is happening beyond the unit boundary. Modern conservation science emphasizes ecosystem management, adaptive management, and climate change resilience. All three require coordination over a spatial scale larger than the public land unit.¹ The great paradox of organic mandates for planning is the misfit between the actions mandated by statutes and the planning scale necessary to achieve the organic objectives.

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1. See, e.g., BYRON K. WILLIAMS ET AL., U.S. DEP'T OF THE INTERIOR, ADAPTIVE MANAGEMENT: THE U.S. DEPARTMENT OF THE INTERIOR TECHNICAL GUIDE 10, 15 (2009) (adaptive management); Robert L. Glicksman, *Ecosystem Resilience to Disruptions Linked to Global Climate Change: An Adaptive Approach to Federal Land Management*, 87 NEB. L. REV. 833, 871 (2009) (climate change resilience); R. Edward Grumbine, *Reflections on "What Is Ecosystem Management?"* 11 CONSERVATION BIOLOGY 41, 44–45 (1997) (ecosystem management).

But implementation can balance competing objectives and overcome less-than-ideal statutory guidance.

This Article explores how unit-level plans required by organic legislation can achieve better landscape-scale outcomes. It discusses the ways that public land planners can integrate broader considerations into their management prescriptions to project conservation benefits beyond unit boundaries. This Article draws upon the experience of the national wildlife refuge system, which has the most recent set of unit-level plans. The refuge unit plans display some current practices that can be adapted by other land managers. The plans also highlight gaps between conservation scholarship and agency implementation. This Article proposes building on emergent tools to expand the focus of plans beyond the boundaries of federal lands.

I. The Need for Integrated Landscape-Scale Planning

Organic legislation expressly requires unit-level planning.² Daily management decisions and project authorizations need a framework for allocating resources. Because public land units are the organizational elements of federal conservation systems and the hub for staff, they offer clear boundaries for the scope of plans.

The need to tie unit-level planning to larger scale activities is not quite so obvious. Landscapes, regions, and areas that encompass many different land management regimes may be connected economically and ecologically, but any one federal land agency has a weak capacity to make conservation decisions outside of its property boundaries. Indeed, the federal government generally exercises limited powers to control many activities that affect conservation, such as land development, on private lands.³

Nonetheless, there are both practical and legal reasons for unit-level plans to peek around their boundaries. This Part first addresses the conservation management rationale for landscape-scale planning. It then examines the legal and

2. Robert L. Fischman, *The National Wildlife Refuge System and the Hallmarks of Modern Organic Legislation*, 29 *ECOLOGY L.Q.* 457, 511 (2002).

3. Notable exceptions include the U.S. Forest Service's Sawtooth National Recreation Area, 16 U.S.C. § 460aa-3 (2012), and the U.S. National Park Service's Fire Island National Seashore, 16 U.S.C. § 459e (2012).

administrative materials that support efforts to leverage unit-level plans to support regional conservation plans.

A. Conservation Management

Conservation science literature over the past two decades has increasingly embraced the imperative of landscape-scale planning. In the 1990s, the term “ecosystem management” came to be closely associated with several resource management principles. An overriding concern of ecosystem management is promoting sustainability through “ecologically relevant geographical and temporal [scales], unconstrained by conventional boundary lines, jurisdictional jealousies, or short-term . . . considerations.”⁴ Though an ecosystem may be as small as a puddle, ecosystem management concerns itself more with large areas that present management challenges because they cross boundaries requiring “collaborative, cross-jurisdictional planning protocols.”⁵

Ecosystem management can be adapted to many sorts of resource management goals, but it is closely associated with sustaining and restoring ecological integrity over the long term.⁶ It is also an important management policy for public land conservation.⁷ “Ecological integrity,” a term associated with Aldo Leopold’s seminal land ethic,⁸ refers to the proper functioning of an ecosystem within its natural range of variation.⁹ The interrelated properties of resiliency, vigor, and complexity also play a role in the meaning of integrity.¹⁰ All require management on geographic scales that reach beyond public land unit boundaries.

One commonly highlighted procedural element of ecosystem management is adaptive management, which is an approach to action under conditions of uncertainty.¹¹ Adaptive management conceives administration of resources to be a continual set of experiments, calling for “learning while doing”¹² with the aim of reducing uncertainty over time.¹³

It does this through iterative adjustment of management in response to monitoring of ecosystems. Resource management tradeoffs, comparative experiments, and subsequent adjustments tend to be easier over larger areas, so adaptive management has had some of its greatest successes in multi-unit planning.¹⁴

Climate change has become one of the great uncertainties vexing public land planning. Prescriptions for adaptation to climate change universally call for consideration of large geographic areas.¹⁵ In addition to the ordinary advantages of large-scale planning for adaptive management, climate change adaptation must consider how the ranges of species shift over broad areas. Providing corridors for migration, or even more active translocations, generally necessitates planning over a span of elevations and latitudes that any single federal land unit seldom fully encompasses. No-regrets strategies with nonadaptation benefits, notably reducing existing environmental stressors and enhancing ecological connectivity, are common suggestions for climate change adaptation that require a landscape-scale plan.¹⁶

Landscape-scale planning also sets the stage for the kind of collaboration that builds upon social capital. Conservation scientists now widely acknowledge that social systems operating around land reserves play an important role in the ability of individual units to achieve their goals. Ecosystem-based management requires collaborations that build strength through trust across jurisdictional boundaries.¹⁷ Fruitful conservation efforts generally trace their success to strong relationships and communications among scientists, managers, and key stakeholders.¹⁸ Collaborative conservation requires deep understanding of the social nuances involved in a project.¹⁹ Adaptive management stumbles when resource managers fail to identify key collaborators, communicate effectively with local (human) communities, and build a consensus based on the concerns and information available to all.²⁰ For instance, preventing exotic weeds from invading reserves generally requires active removal in coordination with neighboring landowners outside of the reserves. In fact, monitoring and removing exotic weeds is a common action

4. ROBERT B. KEITER, KEEPING FAITH WITH NATURE: ECOSYSTEMS, DEMOCRACY, AND AMERICA’S PUBLIC LANDS 71 (2003).

5. *Id.*; see also Grumbine, *supra* note 1.

6. Grumbine, *supra* note 1.

7. *E.g.*, Mollie Beattie, *An Ecosystem Approach to Fish and Wildlife Conservation*, 6 *ECOLOGICAL APPLICATIONS* 696 (1996) (noting Fish and Wildlife Service’s formal adoption of ecosystem management and explaining approach); Michael P. Dombek, *Thinking Like a Mountain: BLM’s Approach to Ecosystem Management*, 6 *ECOLOGICAL APPLICATIONS* 699 (1996) (noting Bureau of Land Management’s formal adoption of ecosystem management and explaining approach).

8. ALDO LEOPOLD, *A SAND COUNTY ALMANAC* 224–25 (1949).

9. Robert L. Fischman, *The Meanings of Biological Integrity, Diversity, and Environmental Health*, 44 *NAT. RESOURCES J.* 989, 998–99 (2004).

10. Laura Westra et al., *Ecological Integrity and the Aims of the Global Integrity Project*, in *ECOLOGICAL INTEGRITY: INTEGRATING ENVIRONMENT, CONSERVATION, AND HEALTH* 19, 26–29 (David Pimentel et al. eds., 2000).

11. KEITER, *supra* note 4, at 73.

12. Holly Doremus, *Precaution, Science, and Learning While Doing in Natural Resource Management*, 82 *WASH. L. REV.* 547, 550 (2007).

13. See J.B. Ruhl & Robert L. Fischman, *Adaptive Management in the Courts*, 95 *MINN. L. REV.* 424, 424, 429 (2010).

14. *Id.* at 447–48.

15. Robert L. Fischman & Jillian R. Rountree, *Adaptive Management*, in *THE LAW OF ADAPTATION TO CLIMATE CHANGE: U.S. AND INTERNATIONAL ASPECTS* 19, 24 (Michael B. Gerrard & Katrina Fischer Kuh eds., 2012).

16. *See, e.g.*, Joshua J. Lawler et al., *Resource Management in a Changing and Uncertain Climate*, 8 *FRONTIERS ECOLOGY & ENV’T* 35, 41 (2010).

17. Steven L. Yaffee, *Collaborative Strategies for Managing Animal Migrations: Insights From the History of Ecosystem-Based Management*, 41 *ENVTL. L.* 655 (2011).

18. Christopher M. Raymond & Andrew T. Knight, *Applying Social Research Techniques to Improve the Effectiveness of Conservation Planning*, 63 *BIOSCIENCE* 320, 321 (2013).

19. T. Bruce Lauber et al., *Linking Knowledge to Action in Collaborative Conservation*, 25 *CONSERVATION BIOLOGY* 1186, 1188 (2011).

20. Susan K. Jacobson et al., *Understanding Barriers to Implementation of an Adaptive Land Management Program*, 20 *CONSERVATION BIOLOGY* 1516, 1523 (2006).

prescribed in national wildlife refuge plans.²¹ Similarly, some animal conservation requires building new, strong relationships with stakeholders along migratory paths.²²

The need for integration of unit-level plans into a broader regional framework involves all of the foregoing justifications, which often overlap. Ecosystem management requires adaptive management, which is a key tool for adapting to climate change, involving social capital as well as more concrete resources. Overall, a useful way of thinking about the conservation techniques that push toward larger geographic domains for federal land planning is that they do two things. First, they help project conservation benefits beyond federal land boundaries. A wetland displaying high ecological integrity may fulfill a goal for a particular public land unit in which it is located. But it also provides ecological services, such as pollution abatement, for the surrounding area. Similarly, federal nesting habitat for migratory birds benefits hunters and other stakeholders outside of the land unit when the birds move out for winter. Second, techniques expanding spatial planning horizons abate external threats that impair the ability of federal land units to achieve their goals. Restoring fish in a stream flowing through a federal land unit may not be possible without addressing the activities upstream of the public land that contribute to water quality and quantity impairment. Most of the legal and administrative materials promoting large-area planning speak to these two overarching themes, which show that reaching across property boundaries for planning generates benefits that flow both ways.

B. Law and Administrative Policy

The law and policy of federal land management reflects the trend of increased emphasis on broader area spatial planning in the conservation literature. The most fundamental basis for planning beyond unit boundaries comes from general mandates to achieve conservation goals. The expert discretion exercised by federal land agencies allows them to coordinate across boundaries to implement the conservation practices discussed above.²³ A national wildlife refuge created to help recover an endangered species whose range encompasses an area beyond the unit borders can justify planning to act outside the refuge in order to achieve its establishment purpose.

Nonetheless, specific mandates and policies provide more direct support for planning across jurisdictional lines. Only the national forests have a mandate to plan across larger areas than individual units.²⁴ But uninterested administrations and congressional appropriation riders have rendered that

mandate largely a dead letter.²⁵ Therefore, landscape-level planning must emerge from unit-level plans looking beyond the federal boundaries to coordinate across wider areas.

Cooperative federalism, designed to enlist the states in attaining federal objectives, is a deep design principle of federal land and resources law.²⁶ In public land planning, Congress employs “procedural favoritism” to reserve to states a special role to advance their objectives through unit plans.²⁷ Though the organic acts do not guarantee that a federal resource manager will adopt the initiatives a state wants, they do require that federal agencies “document their consideration of the state’s view and . . . explain why it did not prevail.”²⁸ These organic act provisions provide incentives for states to undertake their own resource planning efforts in order to qualify for the procedural favoritism.

For instance, the Federal Land Policy and Management Act (“FLPMA”)²⁹ requires the U.S. Bureau of Land Management (“BLM”) to coordinate with state and local governments in the development of land use plans “to the extent consistent with the laws governing the administration of the public lands,” and to consider input concerning land use decisions from states (and other non-federal entities).³⁰ Likewise, the National Forest Management Act (“NFMA”)³¹ requires the Secretary of Agriculture to coordinate with the natural resource “planning processes of State and local governments.”³² The National Wildlife Refuge System Improvement Act³³ requires national wildlife refuge plans to be consistent with state wildlife conservation plans, “to the extent practicable.”³⁴ In preparing the plans, the U.S. Fish and Wildlife Service (“FWS”)

(A) shall, to the maximum extent practicable and consistent with this Act—

consult with adjoining Federal, State, local, and private landowners and affected State conservation agencies; and

(B) coordinate the development of the conservation plan or revision with relevant State conservation plans for fish and wildlife and their habitats.³⁵

25. GEORGE C. COGGINS ET AL., FEDERAL PUBLIC LAND AND RESOURCES LAW 658–60 (7th ed. 2014).

26. Robert L. Fischman, *Cooperative Federalism and Natural Resources Law*, 14 N.Y.U. ENVTL. L.J. 179, 187–88 (2005).

27. *Id.* at 200.

28. *Id.*

29. Federal Land Policy and Management Act of 1976, Pub. L. No. 94-579, 90 Stat. 2743 (codified as amended at 43 U.S.C. §§ 1701–1787 (2012)).

30. 43 U.S.C. § 1712(c)(9).

31. National Forest Management Act of 1976, Pub. L. No. 94-588, 90 Stat. 2949 (codified as amended at 16 U.S.C. §§ 1600–1614 (2012)).

32. 16 U.S.C. § 1604(a).

33. National Wildlife Refuge System Improvement Act of 1997, Pub. L. No. 105-57, 111 Stat. 1252 (codified as amended at 16 U.S.C. §§ 668dd–668ee (2012)).

34. 16 U.S.C. § 668dd(e)(1)(A)(iii); see also *Wyoming v. United States*, 279 F.3d 1214, 1231 (10th Cir. 2002) (quoting *California v. United States*, 438 U.S. 645, 650 (1978) (stating that the statute “inspires a ‘cooperative federalism,’ calling for, at a minimum, state involvement and participation in the management of the” refuges).

35. 16 U.S.C. § 668dd(e)(3).

21. Vicky J. Meretsky & Robert L. Fischman, *Learning From Conservation Planning for the U.S. National Wildlife Refuges*, 28 CONSERVATION BIOLOGY 1415, 1419 (2014).

22. Peter P. Marra et al., *Migratory Connectivity and the Conservation of Migratory Animals*, 41 ENVTL. L. 317, 344 (2011).

23. *E.g.*, *Sierra Club v. Lyng*, 663 F. Supp. 556, 556 (D.D.C. 1987) (upholding logging in a wilderness unit to, in part, prevent beetle infestations from spreading beyond the wilderness boundary to the larger region).

24. See 16 U.S.C. § 1602 (2012).

These specific planning requirements combine with more general cooperative federalism provisions, such as “savings clauses,”³⁶ to promote consistency between state priorities and federal land unit plans. This push toward coordination beyond the unit boundary has the effect of opening planning to more landscape considerations. Especially now that every state has completed a wildlife action plan approved by the FWS in order to qualify for federal nongame wildlife conservation funding,³⁷ state plans address many habitat issues across private and public lands.

Adopting a unit-level plan is a federal action requiring compliance with both the National Environmental Policy Act (“NEPA”)³⁸ and the Endangered Species Act (“ESA”),³⁹ which broaden the analysis beyond the federal property lines. NEPA regulations require agencies to consider cumulative impacts of major federal actions affecting the quality of the environment. Cumulative effects of federal actions include “foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions.”⁴⁰ Cumulative impacts may make individually minor actions significant in the aggregate. For example, a federal unit-level plan contributing a small amount of deforestation to a watershed will need to consider logging activities outside of the planning area in order to determine the cumulative impact on water quality.

Similarly, the ESA requires an evaluation of a plan that may affect listed species in order to ensure the plan will not jeopardize the continued existence of the species or adversely modify designated critical habitat.⁴¹ The regulatory definition of “cumulative effects” under this provision of the ESA is somewhat narrower than the NEPA concept.⁴² Nonetheless, it too draws unit-level planning into a broader context, particularly if a recovery plan provides a set of range-wide tasks to which the public land unit can contribute.

In recognition of the conservation imperatives discussed above, federal land agencies have committed to linking their unit plans to larger landscapes. The most recent comprehensive rulemaking for public land plans concerns the unit-level land and resource management plans (“LRMPs”) of the U.S. Forest Service (“Forest Service”). That 2012 LRMP rule con-

tains several provisions promoting a broad geographic view. The rule plainly states that forest plans shall “describe the plan area’s distinctive roles and contributions within the broader landscape.”⁴³ While plan descriptions do not influence management as much as objectives and strategies, they may establish an important foundation for cooperation and integration with other programs. More substantively, the forest plans must provide for sustainability under the rule, which includes maintaining or restoring ecological integrity, by accounting for “conditions in the broader landscape that may influence” sustainability.⁴⁴

Historically, provisions to implement the NFMA diversity mandate have been the most important component of the national forest planning regulations.⁴⁵ The diversity rule’s restrictions on logging were key factors in the suspension of the Forest Service’s timber program in the early 1990s,⁴⁶ which led to the path-breaking regional Northwest Forest Plan.⁴⁷ The 2012 diversity provision calls for forest plans to maintain or restore biodiversity but recognizes that the federal government often does not manage sufficient proportions of ecosystems to succeed on its own. In those circumstances, the rule requires the plans

to maintain or restore ecological conditions within the plan area to contribute to maintaining a viable population of the species within its range. In providing such plan components, the responsible official shall coordinate to the extent practicable with other Federal, State, Tribal, and private land managers having management authority over lands relevant to that population.⁴⁸

Other federal land agencies have less exacting, but similar, policies and rules intended to broaden planners’ considerations to wider areas. For instance, the refuge planning policy provides state and tribal conservation agencies opportunities to serve on planning teams to better integrate their views.⁴⁹ The refuge planning process also includes reaching out to private landowners in identifying “the relationship between the planning unit and its ecosystem(s) and watershed(s) as well as relationships between the planning unit and . . . other important fish and wildlife habitats in the vicinity.”⁵⁰ It also requires planners to describe the “[c]ontext of the planning unit in relation to the surrounding ecosystem,” including ecological processes that cross boundaries, such as fire and hydrologic regimes.⁵¹

36. *E.g., id.* § 668dd(m). This provision states:

Nothing in this Act shall be construed as affecting the authority, jurisdiction, or responsibility of the several States to manage, control, or regulate fish and resident wildlife under State law or regulations in any area within the System. Regulations permitting hunting or fishing of fish and resident wildlife within the System shall be, to the extent practicable, consistent with State fish and wildlife laws, regulations, and management plans.

Id. On the role of savings clauses and public land management, see Robert L. Fischman & Angela King, *Savings Clauses and Trends in Natural Resources Federalism*, 32 WM. & MARY ENVTL. L. & POL’Y REV. 129 (2007).

37. Vicky J. Meretsky et al., *A State-Based National Network for Effective Wildlife Conservation*, 62 BIOSCIENCE 970, 971 (2012).

38. National Environmental Policy Act of 1969, Pub. L. No. 91-190, 83 Stat. 852 (1970) (codified as amended at 42 U.S.C. §§ 4321–4347 (2012)).

39. Endangered Species Act of 1973, Pub. L. No. 93-205, 87 Stat. 884 (codified as amended at 16 U.S.C. §§ 1531–1544 (2012)).

40. 40 C.F.R. § 1508.7 (2015).

41. 16 U.S.C. § 1536(a)(2).

42. Compare 40 C.F.R. § 1508.7, with 50 C.F.R. § 402.02 (2015).

43. 36 C.F.R. § 219.7(f)(1)(ii) (2015).

44. 36 C.F.R. § 219.8(a)(1) (2015).

45. 16 U.S.C. § 1604(g)(3)(B) (2012).

46. See *Seattle Audubon Soc’y v. Evans*, 771 F. Supp. 1081, 1086 (W.D. Wash. 1991).

47. See generally STEVEN L. YAFFEE, *THE WISDOM OF THE SPOTTED OWL: POLICY LESSONS OF A NEW CENTURY* (1994) (providing a comprehensive account of the controversy and resulting plan).

48. 36 C.F.R. § 219.9(b)(2)(ii) (2015).

49. U.S. FISH & WILDLIFE SERV., U.S. DEP’T OF THE INTERIOR, 602 FW 3, *REFUGE PLANNING: COMPREHENSIVE CONSERVATION PLANNING PROCESS* pt. 3.4(C)(1)(a) (2000), available at <http://www.fws.gov/policy/602fw3.pdf>.

50. *Id.* at pt. 3.4(C)(1)(e).

51. *Id.* at pt. 3.4(C)(1)(e)(ii).

II. The Practice of Planning

The need for unit-level planning is clear. Organic legislation requires it and daily management decisions rely on the criteria of the plans. Congress mandated comprehensive, unit-level plans for BLM lands and national forests in 1976,⁵² for national parks in 1978,⁵³ for Alaska refuges in 1980,⁵⁴ and all other refuges in 1997.⁵⁵ Today, almost every federal public land unit has a plan. Comprehensive planning, in contrast to more limited economic planning for particular commodities, such as petroleum and timber, has common features that cut across public land systems. Some planning mandates highlight particular resources, such as timber for the national forests⁵⁶ and visitor facilities for the refuges and parks.⁵⁷ All comprehensive plans involve land use designations for different purposes and practices.⁵⁸ The plans also describe the full range of economic, ecological, and social resources on the unit and evaluate the effects of alternative management strategies and development possibilities on those resources.⁵⁹ Plans also contain management goals and objectives.⁶⁰ It is selection of the goals and objectives that has the greatest influence on subsequent management. All of the federal land agencies have mandates to manage their lands in accordance with the unit-level plans.⁶¹

This Part explores how federal lands can respond to the conservation, legal, and administration arguments for integrating unit-level plans into broader landscape programs. It takes its examples from a study of comprehensive conservation plans (“CCPs”), the unit-level documents guiding management of the national wildlife refuges. In its 1997 mandate to the FWS to complete CCPs for refuge units, Congress imposed a 2012 deadline.⁶² A major push to meeting the deadline resulted in a large number of plans being completed between January 1, 2005 and January 1, 2012—covering 58% of the refuges then in existence. The results of a study evaluating these 185 CCPs covering 324 refuge units are reported elsewhere.⁶³ This Article draws upon the study to illustrate current planning practices.

Besides the availability of the study, there are good reasons to examine public land planning practices through the CCPs. First, they are, by far, more numerous and current

than plans for other public land units. National park plans, which have no express expiration dates, have been stalled for years as the U.S. National Park Service searches for less demanding ways to revise management approaches.⁶⁴ The BLM resource management plans, which also have no statutory deadlines for revisions, often receive updates to respond to new circumstances, particularly interest in energy development, management of off-road vehicle recreation, or conservation of the greater sage grouse. But, compared with the FWS, the BLM has few thorough comprehensive plan revisions from the past eight years. The national forest LRMPs do expire after fifteen years, but the Forest Service has been whipsawed by multiple attempts to revise its rules governing plan preparation and content.⁶⁵ It is only now getting down to the business of revising its scores of overdue forest plans. Therefore, the CCPs open a window into current planning practices through a fairly large sample size ($n=185$ CCPs).

Second, national wildlife refuges have particularly strong legal prods for integrating their plans into the regional landscape. Most notably, the congressional mandates for the refuges to maintain “biological integrity, diversity, and environmental health”⁶⁶ and to grow in such a way as to “contribute to the conservation of the ecosystems of the United States”⁶⁷ provide a stronger foundation for acting beyond unit boundaries than other public land systems. The FWS built upon this foundation in its policy manual that contains relatively strong encouragement to abate external threats⁶⁸ and avoid habitat fragmentation.⁶⁹ Therefore, a study of the CCPs will reveal many of the useful tools of regional coordination.

Third, compared to other federal land systems, the refuges are diverse in location and in the habitats they contain.⁷⁰ They are not as isolated from private land uses as other public lands, and so deal with a wide array of external threats. For example, 36% of the CCPs completed during the 2005–2011 period have suburban neighbors.⁷¹ Refuges also more frequently occur at lower locations in watersheds compared to other public lands, so they deal with greater upstream water quality and quantity problems.⁷² These geographic characteristics make integration of unit-level plans particularly impor-

52. 43 U.S.C. § 1712 (2012) (BLM resource management plans); 16 U.S.C. § 1604 (2012) (national forest LRMPs).

53. 16 U.S.C. § 1a-7 (2012) (national park general management plans).

54. Alaska National Interest Lands Conservation Act, Pub. L. No. 96-487, § 304(g), 94 Stat. 2394, 2394–95 (1980) (Alaska refuge comprehensive conservation plans).

55. 16 U.S.C. § 668dd(e) (2012) (national wildlife refuge comprehensive conservation plans).

56. *E.g.*, 16 U.S.C. § 1604(g)(3)(E)–(F), (k), (m).

57. *E.g.*, 16 U.S.C. § 668dd(e)(2)(D) (refuges); 16 U.S.C. § 1a-7(b)(2) (parks).

58. Fischman, *supra* note 2; *see also* JOHN LOOMIS, INTEGRATED PUBLIC LANDS MANAGEMENT (2d ed. 2002) (standard text on public land plan content and analysis).

59. Fischman, *supra* note 2, at 492.

60. *Id.*

61. *E.g.*, 16 U.S.C. § 668dd(e)(1)(E).

62. *Id.* § 668dd(e)(1)(B).

63. Meretsky & Fischman, *supra* note 21, at 1417–22.

64. For example, in Arkansas, the Buffalo National River General Management Plan has been stalled due to budget cuts. *General Management Plan Information and Comments: Buffalo National River*, U.S. NAT'L PARK SERV., http://www.nps.gov/buff/gmp_info.htm (last visited May 24, 2015).

65. 36 C.F.R. § 219.7(a) (2015); *see also* *History of Forest Planning*, U.S. FOREST SERV., <http://www.fs.usda.gov/main/planningrule/history> (last visited Feb. 5, 2015) (showing a timeline of rule revisions and revision attempts).

66. 16 U.S.C. § 668dd(a)(4)(B).

67. *Id.* § 668dd(a)(4)(C).

68. U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, 601 FW 3, NATIONAL WILDLIFE REFUGE SYSTEM: BIOLOGICAL INTEGRITY, DIVERSITY, AND HUMAN HEALTH pt. 3.20 (2001), available at <http://www.fws.gov/policy/601fw3.pdf>.

69. U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, 603 FW 2, NATIONAL WILDLIFE REFUGE SYSTEM USES: COMPATIBILITY pt. 2.5 (2000), available at <http://www.fws.gov/policy/603fw2.pdf>.

70. J. Michael Scott et al., *National Wildlife Refuge System: Ecological Context and Integrity*, 44 NAT. RESOURCES J. 1041, 1042 (2004).

71. Meretsky & Fischman, *supra* note 21, at 1424.

72. Scott et al., *supra* note 70, at 1047.

tant in achieving the overarching mandates of the refuge system. As a result, emerging tools of integrated landscape coordination should appear in the CCPs.

A. Connectivity

The most direct way that unit-level plans can integrate their goals and strategies with the larger landscape is through consideration of the ecological and socio-economic connections that tie them together. Though the 2012 National Forest Rule promotes this, no plans have yet been prepared that demonstrate how it will play out in the forthcoming LRMPs.⁷³ But national wildlife refuges have been planning for fifteen years under the FWS policies that promote consideration of connectivity.

A majority of the CCPs for refuges completed during the period from 2005 through 2011 discussed in some way issues of fire regimes (67%), aquatic connectivity (68%), and terrestrial connectivity (77%).⁷⁴ However, as with most issues discussed in unit-level plans, fewer refuges incorporated objectives related to connectivity in the prescriptions for management. Prescriptions, unlike many other descriptive parts of federal public land unit planning, set out how an agency will manage its resources and achieve its desired future conditions. Still, 54% of the CCPs included prescriptions for fire regimes and aquatic connectivity; 49% accounted for terrestrial connectivity.⁷⁵ A particularly notable trend in integration is the increasing proportions of CCPs addressing aquatic connectivity over time.

One reason connectivity is such an important issue for federal land management is that development in the matrix surrounding public lands may block ecological processes and animal movements from one land unit to another. Climate change, in particular, raises the stakes for maintaining and restoring connectivity in order to promote resilience.⁷⁶ Because connections among reserves generally cross private lands, collaborative management is often necessary to coordinate efforts to create controlled burns, restore riparian corridors, and improve connections in terrestrial habitats. For example, the Willamette Valley National Wildlife Refuges' CCP calls for restoring riparian habitat to provide wildlife corridors and assist in lowering water temperatures.⁷⁷ In this manner, a federal land unit can simultaneously improve habitat, reduce existing stressors, and enhance resilience (by creating habitat for dispersal and migration) through a corridor project.

73. 36 C.F.R. § 219.8 (2015).

74. Meretsky & Fischman, *supra* note 21, at 1418, tbl. 3.

75. *Id.* at tbl. 2.

76. See Joshua J. Lawler, *Climate Change Adaptation Strategies for Resource Management and Conservation Planning*, 1162 ANNALS N.Y. ACAD. SCI. 79, 83 (2009); Tracy-Lynn Humby, *Law and Resilience: Mapping the Literature*, 4 SEATTLE J. ENVTL. L. 85, 87 (2014).

77. U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, WILLAMETTE VALLEY NATIONAL WILDLIFE REFUGES FINAL COMPREHENSIVE CONSERVATION PLAN AND ENVIRONMENTAL ASSESSMENT 2-37 to 2-41 (2011), available at www.fws.gov/pacific/planning/main/docs/OR/Willamette%20Valley/Will-ValleyFinalCCPforWeb.pdf.

Such projects may be precluded in the future because of the increasing residential development around and between many refuge units in the eastern and southern United States.⁷⁸ Securing corridors and buffers today for short-term goals would retain opportunities for more effective adaptation in the coming decades, especially if the projects were designed with long-term impacts of climate change in mind.⁷⁹ Though a majority of the CCPs identified existing and future development as issues, a minority (37% for existing development and 29% for future development) provided prescriptions to address them.⁸⁰ Given the suburban context of many refuges, the next generation of CCPs will need to identify opportunities to work with local jurisdictions and landowners to secure corridors for landscape connectivity. This will increasingly be true for other public lands as well.

B. Integration of Other Plans and Programs

A simple way of integrating unit-level plans into landscape-scale initiatives is to employ those initiatives in crafting objectives for the public land unit. Federal lands may prescribe actions based, in part, on the usefulness of those actions to regional aims. Federal land management agencies themselves are promoting regional conservation vision documents in order to more effectively coordinate unit-level plans to achieve broad-scale goals.⁸¹ An eco-regional plan created by a land unit's own agency will likely be easier to incorporate into a unit-level plan because it would be written with the agency's procedures and policies in mind. It may also offer more readily available opportunities for cost sharing and collaboration than a plan prepared by another entity. However, these initiatives are only just beginning to get off the ground.

The easiest landscape-scale projects to incorporate into unit-level plans are those that provide information. Eco-regional vulnerability assessments have become available in the past several years and are useful to public land planners considering how to adapt to the effects of climate change.⁸² Similarly, the ESA recovery plans and state wildlife action plans provide a wealth of information about habitat needs for key species of concern to federal land managers in a region.

78. Christopher M. Hamilton et al., *Current and Future Land Use Around a Nationwide Protected Area Network*, 8 PLOS ONE, Jan. 31, 2013, DOI: 10.1371/journal.pone.0055737.

79. See NAT'L FISH, WILDLIFE & PLANTS CLIMATE ADAPTATION PARTNERSHIP, NATIONAL FISH, WILDLIFE AND PLANTS CLIMATE ADAPTATION STRATEGY 59 (2012), available at <https://www.st.nmfs.noaa.gov/Assets/ecosystems/documents/NFWPCAS-Final.pdf>.

80. Meretsky & Fischman, *supra* note 21.

81. *E.g.*, U.S. FISH & WILDLIFE SERV., U.S. DEP'T OF THE INTERIOR, FINAL REPORT: A LANDSCAPE-SCALE APPROACH TO REFUGE SYSTEM PLANNING 14 (2013), available at <http://catalog.data.gov/dataset/a-landscape-scale-approach-to-refuge-system-planning>.

82. See, *e.g.*, PATRICK J. COMER ET AL., U.S. FISH & WILDLIFE SERV., CLIMATE CHANGE VULNERABILITY AND ADAPTATION STRATEGIES FOR NATURAL COMMUNITIES: PILOTING METHODS IN THE MOJAVE AND SONORAN DESERTS (2012); see generally *What Is Climate Change Response Framework*, CLIMATE FRAMEWORK, <http://climateframework.org/> (last visited Jan. 19, 2015) (collecting other examples).

However, using other plans merely to better understand the ecological circumstances of a federal land unit does not promote as much coordination as actually prescribing actions that contribute to regional goals. The recent CCPs show deep integration—using other plans to justify objectives—for only three kinds of regional plans. The first are plans prepared under the auspices of the North American Bird Conservation Initiative (“NABCI”), which includes many well-funded programs with a long history of success, such as Partners in Flight, the North American Waterfowl Management Plan, the U.S. Shorebird Conservation Plan, Waterbird Conservation for the Americas, the North American Grouse Management Strategy, and the National Bobwhite Conservation Initiative.⁸³ Sixty percent of the CCPs used NABCI plans to justify goals and objectives, which is consistent with the proportion of the refuges established, in part, through the Migratory Bird Conservation Act.⁸⁴

Second are state comprehensive wildlife conservation strategies, often called state wildlife action plans (“SWAPs”). States have default jurisdiction and trust responsibility to conserve all animals within their borders, regardless of whether they occur on private or public land. The states prepared SWAPs at the invitation of Congress, which created a nongame wildlife grant program for those states with approved SWAPs.⁸⁵ By the 2005 deadline, every state had an approved SWAP,⁸⁶ which provides information, actions (with priorities for implementation), and monitoring and review programs.⁸⁷ Even though the CCP study begins with plans completed in 2005, most of those CCPs were prepared over the course of several years. Therefore, the first few years of the CCP study involved plans largely devised before many SWAPs were complete. Still, 22% of the CCPs used SWAPs to justify goals and objectives during the period of the study.⁸⁸ The trend for integration of SWAPs reflected a strong increase from 2005 to 2010. By 2010, more than 70% of the CCPs either discussed how the refuge fit into the context of a SWAP or used a SWAP to justify a CCP prescription for achieving an objective.⁸⁹

Third, of the refuges on which ESA-listed species occur, 47% of the CCPs integrated into prescriptions ESA recovery plans.⁹⁰ Another 27% of CCPs covering those refuges

discussed recovery plans.⁹¹ Because the FWS is responsible for recovering the vast majority of species listed under the ESA, and because the refuge system is dedicated to plant and wildlife conservation, this category should not be surprising.

There are many more types of eco-regional programs that may be important to integrate into unit-level plans. Sometimes, even when federal land managers interact with programs, they may not incorporate the relationship into unit-level plans. For instance, farm bill programs, which provide money to private landowners who engage in conservation activities, are an important incentive for federal land managers to employ in order to persuade neighbors to better contribute to regional goals. However, only 32% of CCPs even mention such programs.⁹² Even in the four FWS regions encompassing the farm belt, only 40–56% of CCPs mention the programs, let alone justify goals based on the programs (11–29%).⁹³ Many plans fail to take into account and coordinate existing practices employed by the refuge staff.

C. Prescribing Actions Outside of Unit Boundaries

Even where there is not a regional plan to integrate into a CCP, there are still myriad opportunities to coordinate with other resource managers. When unit-level plans incorporate into prescriptions such opportunities through actions outside of the unit boundaries, they increase the likelihood of implementation. Strong integration of plans, as described in Part II.B, correlates weakly with high use in the CCPs of actions outside of refuge boundaries.

Planning to act beyond federal land borders is controversial, particularly where neighbors resent the federal presence in the area.⁹⁴ Where neighboring land uses impose negative externalities on federal land management objectives, local jurisdictions may rightly fear federal interference with business as usual. This political dynamic makes acting outside of federal boundaries particularly perilous for a federal land manager, and raises the stakes for including necessary actions in a unit-level plan upon which a manager can rely.

The greatest surprise from the CCP study is that a majority (68%) of refuge plans contain at least one action outside the refuge in a prescription to achieve a plan objective.⁹⁵ This may have been partly spurred by the path-breaking refuge policy stating that “refuge managers should address” threats to ecological integrity that originate from actions that occur outside of the refuge boundary.⁹⁶ The policy advises voluntary, collaborative efforts to forge solutions to external threats, but if that does not work, then refuge managers may seek redress before local planning and zoning boards, and

83. See U.S. N. Am. Bird Conservation Initiative, *Bird Conservation Plans*, U.S. NABCI, <http://www.nabci-us.org/plans.htm> (last visited May 23, 2015).

84. Meretsky & Fischman, *supra* note 21, at 1422; see also Migratory Bird Conservation Act of 1929, ch. 257, 45 Stat. 1222 (codified as amended at 16 U.S.C. §§ 715–715s (2012)). The Migratory Bird Conservation Act is the most common establishment authority for national wildlife refuges. See Robert L. Fischman, *From Words to Action: The Impact and Legal Status of the 2006 National Wildlife Refuge System Management Policies*, 26 STAN. ENVTL. L.J. 77, 115 (2007).

85. Act of Dec. 21, 2000, Pub. L. No. 106-553, 114 Stat. 2762A-122 (codified as amended at 16 U.S.C. § 669c(d) (2012)).

86. JEFF LERNER ET AL., CONSERVATION ACROSS THE LANDSCAPE: A REVIEW OF THE STATE WILDLIFE ACTION PLANS 5 (2006).

87. 16 U.S.C. § 669c(d).

88. Meretsky & Fischman, *supra* note 21, at 1422.

89. *Id.*

90. *Id.*

91. *Id.*

92. *Id.*

93. *Id.*

94. See Joseph L. Sax & Robert B. Keiter, *Glacier National Park and Its Neighbors: A Study of Federal Inter-Agency Cooperation*, 14 ECOLOGY L.Q. 207, 210–11 (1987); see also Robert B. Keiter, *On Protecting the National Parks From the External Threats Dilemma*, 20 LAND & WATER L. REV. 355, 398–99 (1985).

95. See Meretsky & Fischman, *supra* note 21.

96. FISH & WILDLIFE SERV., *supra* note 68.

state agencies.⁹⁷ The most common prescription category that included actions outside the refuge is providing animal habitat (40% of CCPs), followed by environmental quality prescriptions (including water quality goals) (37%), landscape ecology prescriptions (including connectivity goals) (32%), invasive species prescriptions (including weed eradication goals) (27%), and ESA-listed species recovery (26%).⁹⁸

Actions outside of federal land unit boundaries need not trample private property rights. What counts as an “action” requires some line drawing. For instance, cooperative monitoring and education partnerships are both valuable and common federal land management actions. But, to count as an action outside a federal land boundary, the CCP study searched for bolder initiatives, which sort into five categories:

- (1) Actions that abate specific threats and involve participation in state or local planning (e.g., working with a state pollution control agency to abate point-source discharges, participating in local planning to protect refuge resources, and advocating for state agency establishment of a minimum stream flow and state legislation to protect water);
- (2) Actions that promote habitat conservation on neighboring lands (e.g., employing farm bill and forest stewardship programs, working with adjacent landowners to restore degraded areas to benefit riparian birds, providing technical assistance to enhance privately owned habitat and to encourage best management practices);
- (3) Partnerships with tribes, agencies, and nongovernmental organizations to accomplish specific objectives (e.g., protecting wildlife in non-refuge waters, maintaining shoreline protection, and establishing hunting and fishing buffer zones);
- (4) Wildlife management outside the refuge (e.g., working to establish new subpopulations of target species on private lands, establishing buffers on private lands around sinkholes to protect cavefish, and minimizing barriers to amphibian movement adjacent to the refuge); and
- (5) Invasive species control (e.g., coordinating control efforts on and off the refuge, working with neighbors to control invasive plants, and working with a state agency to control mute swans).⁹⁹

While cooperative conservation principles have been widely promoted for a long time,¹⁰⁰ on the ground examples have been slow to emerge. The experience of the CCPs suggests that federal land management agencies are ready to generalize from the ad hoc circumstances to begin planning for greater coordination across boundaries.

III. Lessons for Integration

The need for unit-level planning is clear. It is the only type of planning required by all the federal organic statutes. It is the foundation for public land budgeting and management. Yet, conservation scholarship is nearly unanimous in pointing out the limitations of property-bounded unit planning to achieve social goals such as resilience to climate change, biological integrity, and the maintenance of ecosystem services upon which people rely. While landscape-scale planning will increasingly shape future unit-level plans, these plans will remain the basic applications of organic mandates and agency policy to particular places. Part III sketches three sets of suggestions for improving the public land law, unit-level plans, and research.

A. Lessons for the Law

While local circumstances play the leading role in driving plans, organic legislation remains the fundamental charter for public land management. Particularly for national forests and BLM lands, which generally do not have competing establishment mandates for individual units, organic guidance is the starting point for determining planning prescriptions. Though the 2012 national forest LRMP rule joins the refuge planning policy in emphasizing ecological integrity, it has a weaker basis in legislation. Current congressional gridlock makes short-term reform of organic legislation unlikely. Eventually, though, Congress will need to revise its vintage 1970s statutes guiding national park, national forest, and BLM plans. When it does, establishing clear mandates for ecological integrity will spur greater efforts at integrating unit planning with larger landscape-scale initiatives. Mandates for ecological integrity should emphasize hydrologic as well as terrestrial connectivity. Often, it is the aquatic systems that drive coordinated conservation, and landscapes are frequently defined by watershed boundaries. Amending the national forest organic legislation to require planning to improve hydrologic connectivity would build upon the 1897 mandate to secure “favorable conditions of water flows”¹⁰¹

In 2014, Congress briefly cleared the gridlock to enact a new farm bill.¹⁰² It consolidated a variety of programs, such as the wetland reserve program and conservation reserve program, into a single initiative to promote conservation priorities that will vary by region. Public land managers accustomed to working with the old programs are adjusting to the new system. They will need plans to promote landscape-scale implementation in order to optimize the use of these new conservation incentives. Particularly for conservation priorities outside of protecting wetlands from cultivation, which is now incorporated into crop insurance, public land managers will need to work more closely with the Natural Resources Conservation Service of the U.S. Department of Agriculture. Ecosystem coordination across property lines is lubricated by

97. *Id.* The management policies for the national parks now include a similar directive. U.S. NAT'L PARK SERV., U.S. DEPT OF THE INTERIOR, MANAGEMENT POLICIES § 1.6 (2006).

98. See Meretsky & Fischman, *supra* note 21.

99. *Id.*

100. *E.g.*, Exec. Order No. 13,352, 69 Fed. Reg. 52,989 (Aug. 30, 2004).

101. Organic Administration Act of June 4, 1897, ch. 2, § 1, 30 Stat. 11, 35.

102. Agricultural Act of 2014, Pub. L. No. 113-79, 128 Stat. 649.

money, and the farm bill program is one of the few historically reliable sources of funding. Supporters of integrating unit-level plans into successful collaborations should push for robust farm bill funding for conservation incentives, which are generally more popular in Congress than appropriations to federal land management agencies.

The monetary carrots of the farm bill and other programs should be balanced with regulatory sticks. Often the sticks are controlled by state agencies, such as those that establish water quality standards. But, federal land agencies could induce more coordinated management with strengthened powers to abate external threats, especially where those threats can be characterized as nuisances. The ESA is a frequent spur for cooperative conservation because the regulatory alternative repels many resource managers.¹⁰³ State and private stakeholders have an incentive to devise a place-based approach to avoid the harsher consequence of ESA enforcement. Area-wide plans with distinct-but-coordinated roles for different landowners, such as those prompted by ground-nesting prairie bird declines, reflect the future of landscape conservation in many places.¹⁰⁴

When no listed species (or candidate species, such as the sage grouse) is involved, land managers have a harder time inducing cooperation. Congress has constitutional power in the Property Clause to require private landowners to change their practices where they are frustrating public land policies.¹⁰⁵ But Congress has delegated very little of its power to the land management agencies.¹⁰⁶ The ambitious organic act objectives could be more successfully achieved by agencies wielding more congressionally delegated power to act outside of federal property lines.

Unit-level federal land plans are just documents on a shelf unless they are actively implemented, which is increasingly difficult as congressional appropriations have largely flat-lined in recent years. The adaptive management techniques promoted in almost every public land plan of the past five years all require significant downstream funding. Because adaptive management requires continual monitoring and readjustment of actions, its costs are less frontloaded than traditional management approaches. Congress can aid implementation of adaptive management by requiring plans to contain explicit performance measures that trigger reevaluation of actions in exchange for assured funding. Adaptive management should be seen as a long-term project requiring

an endowment or annuity to cover future implementation costs for monitoring and adaptive response.¹⁰⁷ Unfunded monitoring and re-adjustment of adaptive management plans will undermine the viability of an otherwise outstanding tool to achieve landscape-scale conservation.

B. Lessons for Plans

Unit-level plans, like the environmental impact statements that often accompany them, generally overemphasize description of the environment at the expense of robust, comparative impact analysis. The CCPs, in particular, are much more thorough in their descriptions of refuge threats and concerns than they are in specifying prescriptions to address the problems. Specific, measurable prescriptions for action would improve all aspects of planning. More specifically, they would be particularly helpful for integrating public land management into larger landscapes. It is just too comfortable for public land managers to focus on activities within their units when no plan expressly describes concrete actions that should be taken outside of the unit's boundaries. Plans must establish high expectations and clear benchmarks for landscape-scale coordination. Also, unit-level plans that merely describe or contextualize regional conservation plans, such as those in NABCI, may never spur action. In contrast, where the landscape plans are a basis for prescribed actions, future land managers are more likely to pursue coordination.

Even where plan prescriptions are specific, they often add up to vastly more work than land managers can realistically accomplish with even the most optimistic fiscal forecast.¹⁰⁸ Plans would more effectively leverage their actions into landscape-significant contributions if they set clearer priorities. Prescribing more objectives than a manager is likely to be able to implement is a sensible strategy to justify more money and to ready future managers to seize opportunities when they arise. Nonetheless, a hierarchy of priorities would aid managers in doling out their own budgets and staff time.

To promote landscape-scale conservation, plans must explicitly connect programs, such as farm bill payments and SWAP projects, to the ultimate regional goals. The other federal land management agencies should emulate the approach of the FWS to create landscape-level designs ("LCDs") that will help subsequent unit-level planning step up to broader priorities.¹⁰⁹ The LCDs and their equivalents should incorporate goals of non-agency stakeholders, such as state fish and game departments, to create landscape designs in which many partners are invested.

Finally, planners need to participate attentively in the experiments that will shape what adaptations to climate change best meet public land objectives. Currently, prescriptions for climate change adaptation focus on resistance and

103. See Yaffee, *supra* note 17, at 677 (conducting qualitative analysis of ecosystem-based collaborations to estimate that about half succeeded because they were driven by fear of ESA regulatory consequences).

104. *E.g.*, 50 C.F.R. § 17.41(d)(2)(i) (2015) (exempting from the ESA take prohibitions any activity conducted pursuant to the Lesser Prairie-Chicken Interstate Working Group's *The Lesser Prairie-Chicken Range-Wide Conservation Plan*, which is available at: <http://www.wafwa.org/Documents%20and%20Settings/37/Site%20Documents/Initiatives/2013LPCRWPfinalfor4drule-12092013.pdf>).

105. U.S. CONST. art. IV, § 3, cl. 2; see also *Kleppe v. New Mexico*, 426 U.S. 529, 539–41 (1976) (supporting an "expansive reading" of Congress' Property Clause power).

106. See generally COGGINS ET AL., *supra* note 25, at 155–58 (discussing congressional delegations of power to agencies to address external threats to public land-related resources).

107. Ruhl & Fischman, *supra* note 13, at 481.

108. See Jacobson et al., *supra* note 20, at 1516.

109. See U.S. FISH & WILDLIFE SERV., *supra* note 81.

monitoring.¹¹⁰ Those are valuable, but ultimately insufficient, responses. Because corridors and reductions in environmental stressors will be a key component of all resilience strategies, planners can build on those landscape-integrated objectives in demonstrating best adaptation practices. Climate change is neither the sole nor most urgent challenge facing most federal land units. But it needs to be a consideration for all plan prescriptions in order to build resilience.

C. Lessons for Research

The adaptive management paradigm for resource administration views management actions as experiments. Therefore, public land management should be monitored and adjusted accordingly. This will require a stronger partnership between federal land managers and researchers. Collections of searchable case studies help with analysis.¹¹¹ But even more learning and adjustment can grow from protocols to compare the performance of plans and landscape initiatives across agencies and organizations. Moreover, the performance of planning rules and policies themselves should be subject to monitoring and reevaluation so that these administrative tools may improve with time.¹¹² Conservation institutions, including public agencies, are complex and often managed with a top-down approach poorly suited to the flexibility adaptive management and regional collaboration require. The planning practices recommended in this Article require that institutions themselves be capable of experimenting with and modifying longstanding, parochial practices.¹¹³ The business management literature has grappled with this issue and offers insights that might be profitably applied to conservation institutions.¹¹⁴

The relative lack of quantitative triggers in unit plans to determine when reevaluation and adjustment are necessary in carrying out plan prescriptions is not entirely the fault of planners. Researchers need to generate better benchmarks and standardized monitoring techniques to quantify con-

cepts such as ecological integrity and connectivity. Planners and managers need help from researchers to identify measures of plan effectiveness.

Although the research emphasized by this Article focused on the natural sciences, it is clear that the social sciences have an important role to play in making plans effective. This is particularly true for plans requiring coordination with a diverse group of stakeholders in a region. The best defined ecosystem performance standards in unit-plan prescriptions will never make the leap from the page to the landscape without better understanding how collaborative conservation works.

IV. Conclusion

The promising trend of greater attention of federal agencies (e.g., through LCDs), state agencies (e.g., through SWAPs), and other entities (e.g., through LCC partnerships) to ecoregional strategies will help create solid regional programs to which unit-level plans can tier. Linking unit-level plans to landscape initiatives will open greater opportunities for public lands to contribute to large-scale conservation objectives. But it can also ameliorate the problems imposed on the land unit from other resource users in the area.

Achieving landscape conservation, securing corridors for resilience, coordinating scores of stakeholders, and other necessary steps will always be difficult, polycentric problems.¹¹⁵ The suggestions offered here will help in the aggregate, but will sometimes fail in a particular place. Still, drawing upon the elements of actual plans—already completed and underway—means that the recommendations are not purely speculative. They are operational and await energetic implementation by the dedicated professionals in public land agencies. Lawmakers, administrators, and researchers owe those public servants careful monitoring of plan implementation to better understand what works.

110. Robert L. Fischman et al., *Planning for Adaptation to Climate Change: Lessons From the US National Wildlife Refuge System*, 64 *BIOSCIENCE* 993, 996, 1001 (2014).

111. See, e.g., *Ecosystem Management Initiative Case Studies*, U. MICH., www.snre.umich.edu/ecomgt/cases/map.htm (last visited Jan. 19, 2014).

112. See Alejandro Camacho, *Adapting Governance to Climate Change: Managing Uncertainty Through a Learning Infrastructure*, 59 *EMORY L.J.* 1, 17, 64 (2009) (describing an approach for applying adaptive management to law and administration involved in addressing climate change).

113. Fischman et al., *supra* note 110, at 1003.

114. E.g., Kevin Rogers et al., *Challenges for Catchment Management Agencies: Lessons From Bureaucracies, Business and Resource Management*, 26 *WATER S. AFR.* 505, 507 (2000).

115. Elinor Ostrom, *Polycentric Systems for Coping With Collective Action and Global Environmental Change*, 20 *GLOBAL ENVTL. CHANGE* 550, 552 (2010).