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Decision-making Triggers, Adaptive Management, and Natural Resources Law and Planning**

ABSTRACT

This Article examines the use of decision-making triggers in adaptive management plans focused on federal lands and fish and wildlife management. Triggers are pre-negotiated commitments made by an agency within an adaptive management or mitigation framework specifying what actions will be taken if monitoring information shows x or y. The Article begins by placing adaptive management in its complicated political and legal context. Particular attention is paid to how adaptive management and triggers fit into NEPA decision-making and can be used to meet substantive environmental legal standards. We then describe six cases where triggers are being used in adaptive management and mitigation planning and outline the political and legal challenges to their implementation. Several key findings emerge from our research. Rather than adaptive management, the terms adaptive mitigation and/or contingency planning are more accurate ways to describe the case studies reviewed. Another dominant theme is the limited enforceability of monitoring commitments and triggered mitigation actions. Enforceability is contingent upon several factors, but agencies can design triggers so that they are meaningful, enforceable and promote learning. Triggers also bring to the fore a number of long-standing scientific and political considerations about monitoring. The most difficult question about triggers is where to set them. Some interests want triggers to be used in a more precautionary way in order to acknowledge diminished ecological baselines and to prevent the crossing of ecological and regulatory thresholds. We finish with recommendations. Though not without challenges, well-designed triggers can be used as a way to improve implementation of adaptive management while ensuring greater political accountability.

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INTRODUCTION

The language and ideas of adaptive management now pervade federal lands management. Agencies typically view the approach as a way to promote learning and proceed with actions in light of uncertainty about potential resource effects and future conditions. In some cases, agencies have interpreted adaptive management in a way that puts a premium on flexibility, discretion, and the need for expedited decision-making. This, in turn, has led to some criticism of how agencies selectively apply the theory of adaptive management on-the-ground. There are concerns that the flexibility and discretion purportedly needed to practice adaptive management can be easily abused by agencies and make it harder to hold them accountable for their actions.

There are two important political realities of adaptive management: (1) it is often being implemented in contexts high in mutual mistrust and, and (2) political interests are often seeking *more* certainty and greater assurances about how resources will be managed in the future. Add to this challenge the complicated legal reality of adaptive management, which is that its practice must comport to numerous environmental laws and regulations, with NEPA perhaps being most challenging of all.

This Article examines one way to possibly reconcile the theory and politics of adaptive management with the need for legal and political accountability: using pre-identified decision-making “triggers” or commitments in an adaptive management framework. Put simply, a trigger specifies what actions will be taken by an agency if monitoring information shows *x* or *y*. In other words, some predetermined decisions, or more general courses of action, are built into the adaptive framework from the beginning of the process (i.e., if this, then what).

Triggers are being used as a way to provide an adaptive, yet more structured, decision-making framework by identifying in advance precisely how, when, and why adaptive management plans will be altered based on monitoring information. If explicit desired outcomes and goals are identified at the outset, along with a monitoring plan to identify progress towards those goals, then triggers can be used as signals to indicate progress or potential problems. A red light trigger would correspond with a legal standard that cannot be crossed, whereas a yellow-light trigger would indicate that a protected resource is being affected negatively, signaling the need for increased mitigation of effects, a change in management approach, or slowing of the pace of resource extraction. Green-light triggers also might be used to signal the conditions are satisfactory to proceed with increased development or other planned activities.

This Article analyzes the use of triggers specifically in the context of adaptive management and mitigation plans for natural resources. Part I provides a brief background on adaptive management and the political context in which it is practiced. Here we discuss how federal land agencies have implemented adaptive management and planning and review some of the criticism and backlash that has ensued. The basic challenge is how to plan and manage more adaptively while providing political accountability and assurances that agencies will follow through on their commitments. With these challenges in mind, we explore the concept of triggers and how they might be used. This section also reviews how ecological and decision-making thresholds are used in this context and their relationship to trigger mechanisms.

In Part II, we turn to the case law on adaptive management. Other reviews have considered the broader landscape of case law on adaptive management in general, but we focus on several legal issues that are particularly germane to the role of triggers in adaptive management plans. These include the task of demonstrating compliance with substantive legal standards and the nuances of navigating NEPA, while advancing a less-traditional and sometimes innovative planning framework. We find that courts have allowed agencies to proceed with adaptive management plans as long as they demonstrate compliance with substantive standards and comply with key NEPA requirements. If triggers are employed, agencies must explain what they indicate, demonstrate that they are enforceable if legal requirements are implicated, and show that the plan as a whole will ensure that substantive legal requirements will be met. In the NEPA context, agencies must analyze potential effects up front, but they also have been successful in deferring some analysis to the project level, while at the same time tiering to adaptive management in programmatic plans.

Part III then reviews a number of cases in which triggers, or trigger-like devices, have been used by agencies in implementing an adaptive management plan or project. All four federal land agencies are covered in this section with cases focused on endangered species, fish and wildlife, oil and gas, and forest and rangeland management. These cases show that triggers are being used in some high profile adaptive management initiatives and highlight some of the challenges that arise, both legally and politically, with the use of triggers in such plans.

We reserve the bulk of our analysis for Part IV, where we analyze in detail, from both political and legal perspectives, the most critical issues that arise from our review of the cases discussed in Part III. A number of contentious issues arise around the use of triggers. Despite the fact that they are intended to increase accountability, numerous commentators on agency plans point out problems with the enforceability and de-

sign of trigger mechanisms: Where are trigger points set and by whom? How are monitoring and mitigation commitments enforced? Who designs, conducts, and assures the quality of the monitoring that takes place? What, precisely, is triggered? And, are the plans themselves promoting learning and adaptive management in practice, or are we simply getting a lot of lip-service for trial-and-error learning with ample room for discretion and delays? We explore these issues in Part IV and conclude with recommendations for the incorporation of triggers into adaptive management plans.

I. BACKGROUND

This section places the practice of adaptive management in its political context. It begins by defining the term and making distinctions between the theory of adaptive management and how it is often implemented by agencies. The section then explains why some political interests are concerned about the amount of discretion and flexibility purportedly needed by agencies to practice adaptive management. It then shows why triggers are seen by some people as a way to balance the need for flexibility with political accountability. Taken together, these factors help explain the interest in using triggers in adaptive resources management.

A. Adaptive Management

Definitions of adaptive management abound. Thankfully, most of them trace the approach to similar roots and include similar principles (and cyclical flowcharts).¹ In the context of federal lands management, a standard definition, as adapted from the National Research Council, is as follows:

Adaptive management [is a decision process that] promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a 'trial and error' process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to

1. Most referenced in this regard is C.S. HOLLING, *ADAPTIVE ENVIRONMENTAL ASSESSMENT & MANAGEMENT* (1978).

more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social, and economic goals, increases scientific knowledge, and reduces tensions among stakeholders.²

From this definition, we emphasize several key characteristics of adaptive management. For one, it goes hand-in-hand with monitoring; without monitoring, there can be no improved understanding of conditions or responses to management actions, and therefore, no informed adjustment of on-the-ground practices. Secondly, adaptive management has dual but interconnected purposes: these are to learn, or advance scientific understanding, and to adjust policies based on this information in an iterative process.

People consistently distinguish adaptive management from trial-and-error. The distinction is that trial-and-error processes are not designed intentionally to test various hypotheses, to promote learning, or to proactively track resource responses and conditions. In fact, some have pointed out that a trial-and-error could be maladaptive, in the sense that it fails to improve management practices.³ If there is not improved understanding of the causes of problems, a series of mitigation measures might be pursued that do not effectively address these causes, potentially creating more problems and leading to a failure to improve resource conditions despite adjustments in practices. One need only to make the analogy of an ecosystem to an extremely complex piece of machinery to understand why trial-and-error tinkering, undertaken only when problems are blatantly apparent, might not lead to ideal outcomes.

By comparison, the adaptive process, as explained by Interior, is more purposeful than trial-and-error management or what might be better described as “muddling through.”⁴ They explain:

Adaptive management as described [in the Technical Guide] is infrequently implemented, even though many resource planning documents call for it and numerous resource managers refer to it. It is thought by many that merely by monitoring activities and occasionally changing them, one is doing adaptive management. Contrary to this commonly held belief, adaptive management is much more than simply tracking and changing management direction in the face of failed policies,

2. U.S. DEPT. OF INTERIOR, ADAPTIVE MANAGEMENT: THE U.S. DEPARTMENT OF THE INTERIOR TECHNICAL GUIDE V (2009) [hereinafter INTERIOR TECHNICAL GUIDE]; see also NAT'L RESEARCH COUNCIL, ADAPTIVE MANAGEMENT FOR WATER RESOURCES PLANNING (2004).

3. *Id.*

4. Charles E. Lindblom, *The Science of "Muddling Through"*, 19 PUB. ADMIN. REV. 79 (1959).

and, in fact, such a tactic could actually be maladaptive. An adaptive approach involves exploring alternative ways to meet management objectives, predicting the outcomes of alternatives based on the current state of knowledge, implementing one or more of these alternatives, monitoring to learn about the impacts of management actions, and then using the results to update knowledge and adjust management actions.⁵

Most scientific and scholarly definitions include a similar set of components, all designed to proceed in spite of, and at the same time reduce, the inherent uncertainty of environmental management. Adaptive management is a systematic, iterative, incremental approach requiring the continuous monitoring, evaluation, and adjustment of management actions. As such, it requires up-front design and often slowing the pace of management activities in order to monitor, allow for detection of resource responses, and adjust accordingly.

Adaptive management can also be understood in the negative, as it is quite different than more typical front-ended approaches to management whereby assumptions and predictions are made in the beginning of the process, but then not necessarily adjusted according to what actually happens as a result. A NEPA Task Force, for example, contrasts the status quo “predict-mitigate-implement” NEPA-based model with a “predict-mitigate-implement-monitor-adapt model.”⁶

Similar to the point made by the Department of Interior that ad hoc adjustments based on monitored conditions do not constitute adaptive management, some authors characterize what most agencies do as “a/m-lite.” Ruhl and Fischman use this phrase to describe, “a watered-down version of the theory that resembles ad hoc contingency planning more than it does planned ‘learning while doing.’”⁷ As we explain in Part IV, what is being called adaptive management is often really contingency planning or adaptive mitigation. The idea is this: if we see resources do x, then we will respond by changing y or z, even if we do not have any new understanding of why resources responded the way they did. There is often nothing resembling an experimental framework, no controls or research design to allow for learning, and, importantly, no clear feedback loop indicating how information will be used to change management actions.

5. INTERIOR TECHNICAL GUIDE, *supra* note 2, at 1.

6. THE NEPA TASK FORCE, REPORT TO THE COUNCIL ON ENVIRONMENTAL QUALITY: MODERNIZING NEPA IMPLEMENTATION ch. 4 (2003).

7. J.B. Ruhl & Robert L. Fischman, *Adaptive Management in the Courts*, 95 MINN. L. REV. 424, 426 (2010).

A commonality found in most adaptive management literature is the need for a structured decision-making process and the identification of clear and measurable management objectives. The Interior Department's Technical Guide emphasizes both as crucial to the success of adaptive management:

If the objectives are not clear and measurable, the adaptive framework is undermined. Objectives need to be measurable for two purposes: first, so progress toward their achievement can be assessed; second, so performance that deviates from objectives may trigger a change in management direction. Explicit articulation of measurable objectives helps to separate adaptive management from trial and error, because the exploration of management options over time is directed and justified by the use of objectives.⁸

There is also an important distinction between active and passive forms of adaptive management. The former is a more scientifically based, experimental approach to management replete with formal study design, controls, and replication. Here, learning is the primary objective. Passive adaptive management, which is what we see more commonly in natural resource management, is an approach wherein monitoring is used to facilitate learning in order to inform the adjustment of management actions.⁹ However, without a study design to facilitate learning, understanding causality may be more difficult under a passive approach.

B. Adaptive Management and Agency Discretion

Agency behavior is explained by numerous internal and external political factors, from an organization's culture and legislative mandate to how it is funded and controlled by other branches of government. This means that adaptive management is practiced by agencies with their own goals, values, and biases, and one of the most universal biases shared by agencies is their pursuit of administrative discretion. Federal land agencies have a long and well-documented history of seeking administrative discretion in various forms, from open-ended statutes to flexible budgets.¹⁰

8. INTERIOR TECHNICAL GUIDE, *supra* note 2, at 11.

9. See, e.g., C.J. Walters, *Challenges in Adaptive Management of Riparian and Coastal Ecosystems*, 1 CONSERVATION ECOLOGY 1 (1997); see also Cameron L. Aldridge et al., *Adaptive Management of Prairie Grouse: How Do We Get There?* 32 WILDLIFE SOC'Y BULL. 92 (2004).

10. See, e.g., MARTIN NIE, THE GOVERNANCE OF WESTERN PUBLIC LANDS: MAPPING ITS PRESENT AND FUTURE (2008).

The innate administrative tendency to prioritize discretion helps explain how some agencies have implemented adaptive management and some of the backlash that has ensued. In some cases, agencies have interpreted adaptive management in a way that emphasizes those aspects of the paradigm that promotes flexibility, discretion, and expedited decision-making, while emphasizing less the aspects that allow for knowledge generation and favor precautionary decision-making. They have, in other words, embraced some parts of the adaptive management model while eschewing others.

Consider, for example, how the USFS approached adaptive management in its 2005 and 2008 planning regulations.¹¹ The agency emphasized the problems and challenges of NEPA-based rational comprehensive planning and proposed in its stead a “paradigm shift in land management planning.”¹² The 2005/2008 regulations embraced the language and some of the core principles of adaptive management. The agency emphasized the need for flexibility and adaptability of plans, while at the same time categorically excluding National Forest plans from NEPA analysis.¹³ To be truly adaptive the agency wanted to respond to new science, information, and problems more quickly.¹⁴ Forest plans, therefore, would become “strategic and aspirational” in nature, one tentative step in a more adaptive planning process, and not decision-making documents.¹⁵ Also gone from the regulations were some of the sharpest standards and legal hooks holding the agency accountable, such as the wildlife viability standard.¹⁶ Taken together, the message from the

11. The 2008 regulations are basically the same as the 2005 regulations, though the 2008 iteration went through the NEPA process, as ordered by a District Court whom found the 2005 planning regulations in violation of the APA, NEPA, and ESA. *See* *Citizens for Better Forestry v. USDA*, 481 F. Supp. 2d 1059 (N.D. Cal. 2007). *Compare* *National Forest System Land Management Planning*, 73 Fed. Reg. 21,468 (Apr. 21, 2008) (codified at 36 C.F.R. pt. 219), *with* *National Forest System Land Management Planning*, 70 Fed. Reg. 1023 (Jan. 5, 2005) (codified at 36 C.F.R. pt. 219).

12. 70 Fed. Reg. 1023, 1024.

13. *Id.* at 1033. (stating that plan development, amendment, or revisions do not significantly affect the environment and thus are categorically excluded from NEPA analysis unless extraordinary circumstances are present; and that the USFS will comply with NEPA when considering specific projects).

14. *Id.* at 1023. (“[i]ntended effects of the final rule are to streamline and improve the planning process by making plans more adaptable to changes in social, economic, and environmental conditions.”); *see* Deann Zwright, *Smokey and The EMS*, 21 THE ENVTL. FORUM 28 (2004) (discussing the need for a more adaptive forest planning process).

15. Emphasized throughout the rule, and in subsequent forest plans using it, is that the rule and plans “will not contain final decisions that approve projects or activities except under extraordinary circumstances.” 70 Fed. Reg. 1023, 1024.

16. In its stead the USFS put forth a much less prescriptive “ecosystem approach” to diversity. *Id.* at 1028.

USFS was that it needed more flexibility and discretion in order to practice adaptive management.

The USFS's discretion-based approach to adaptive management did not sit well with environmental groups and their lawyers. Some critics believed that these regulations simply used the rhetoric of adaptive management as cover to remove standards, undermine NEPA and NFMA, and maximize agency discretion.¹⁷ The court also found fault with the regulations,¹⁸ and at the time of this writing the USFS continues to grapple with how to practice adaptive management while lawfully implementing its other substantive and procedural obligations.¹⁹ Regardless of the outcome, the example demonstrates the suspicions around adaptive management in light of the agency's pursuit of discretion.

C. Adaptive Management and the Search for Certainty

Another important factor to understanding the politics of adaptive management is to appreciate the widespread search for certainty by political actors of all persuasions. The search for certainty—through law, policy, contract, or other means—is a dominant theme in natural resource politics. Political interests, from conservationists to industry to communities, seek certainty in multiple forms: wilderness legislation that permanently protects a place,²⁰ more predictable timber supplies for industry,²¹ long-term leases and property rights created in federal lands mining,²² concession contracts in the National Parks,²³ and the creation of

17. See, e.g., Complaint for Declaratory and Injunctive Relief, *Defenders of Wildlife et al. v. Schafer*, No. C08-02326 (N.D. Cal. 2008); Alyson Flournoy, Robert L. Glicksman & Margaret Clune, *Regulations in Name Only: How the Bush Administration's National Forest Planning Rule Frees the Forest Service from Mandatory Standards and Public Accountability* (Wash. D.C.: Center for Progressive Reform, White Paper, 2005); Nathaniel S.W. Lawrence, *A Forest of Objections: The Effort to Drop NEPA Review for National Forest Management Act Plans*, 39 ENVTL. L. REP. 10651 (2009); SOC'Y FOR CONSERVATION BIOLOGY, COMMENTS ON PROPOSED CHANGES TO THE NATIONAL FOREST SYSTEM LAND AND RESOURCES MANAGEMENT PLANNING RULE (2005); WILDLaw, REVIEW OF THE NEW NFMA PLANNING REGULATIONS (2005) (on file with authors).

18. *Citizens for Better Forestry v. USDA*, 481 F. Supp. 2d 1059 (N.D. Cal. 2007).

19. See Notice of Intent to prepare an EIS, 74 Fed. Reg. 67,165 (Dec. 18, 2009) (asking how the USFS's new planning rule can be more adaptive and address uncertainty).

20. Pub. L. No. 88-577, 78 Stat. 890 (1964); 16 U.S.C. §§ 1131–36 (2006).

21. Martin Nie, *Place-Based National Forest Legislation and Agreements: Common Characteristics and Policy Recommendations*, 41 ENVTL. L. REP. 10229 (2011).

22. See, e.g., General Mining Law of 1872, 30 U.S.C. §§ 21–54 (2006) (creating a form of property rights after the discovery of a valuable mineral deposit); Mineral Leasing Act of 1920, 30 U.S.C. §§ 181–287 (2006).

23. See National Park Service Concessions Management Act of 1998, 16 U.S.C. §§ 5951–83 (2006).

“grazing preferences” in federal range law,²⁴ among others. In each instance, political interests seek certainty, stability, and assurances. The challenge is clear: adaptive management is necessitated by the uncertainty inherent in science and management, and natural resource politics is driven by the pursuit of certainty and stability.

Habitat conservation planning, as governed by the ESA, shows this tension. As discussed below, habitat conservation plans (HCPs) are basically a deal between the federal government and non-federal property owners. Both parties want something from the other: the federal government wants their non-federal partners to contractually commit to doing particular things for the benefit of species; and non-federal entities want regulatory assurances and greater certainty about what they can and cannot do in the future.

In an effort to bridge the tensions between the inherent uncertainties of ecosystem science and the desire for regulatory certainty, the USFWS has promoted the use of adaptive management in HCPs.²⁵ The problem is that such provisions are often more rhetorical than substantive in nature: lots of boilerplate language about adaptation without any specifics or guarantees that it will be done.²⁶ In several cases, basic scientific information, monitoring, and adaptation are altogether absent in such plans.²⁷ But as we show below, in other cases triggers are being used to implement the adaptive management schemes in HCPs as a way to constrain the flexibility inherent in such plans, thus limiting the amount of discretion given to an agency or regulated party.

24. The Federal Land Policy Management Act (FLPMA) provides various protections to ranchers when grazing permits are cancelled, including two year prior notification and reasonable compensation for adjusted values. See 43 U.S.C. 1752(g) (2006). Certainty has also been central in the debate over grazing preferences and its relationship to base property and a specified quantity of forage. Current regulations define preference as “the total number of animal unit months on public lands apportioned and attached to base property owned and controlled by a permittee, lessee, or an applicant for a permit or lease. . . [g]razing preference holders have a superior or priority position against others for the purpose of receiving a grazing permit or lease.” 43 C.F.R. § 4100.0-5 (2010).

25. J.B. Ruhl, *Taking Adaptive Management Seriously*, 52 U. KAN. L. REV. 1249, 1274 (2004) (noting that since 1999 the USFWS’ handbook has promoted the use of adaptive management in HCPs).

26. See, e.g., George F. Wilhere, *Adaptive Management in Habitat Conservation Plans*, 16 CONSERVATION BIOLOGY 20 (2002).

27. See Alejandro E. Camacho, *Can Regulation Evolve? Lessons From a Study in Maladaptive Management*, 55 UCLA L. REV. 293 (2007) (showing how monitoring and adaptation is mostly missing from the “ultimately defective” HCP program).

D. Adaptive Management and Accountability

How to practice adaptive management while holding agencies accountable is another major challenge. Some interests are concerned that the perceived need for flexibility, discretion, and expedited decision-making can be easily abused by agencies and make it harder to hold them accountable for their actions.

These fears are exacerbated by the lack of specificity given to adaptive management in law or regulation. Most administrative definitions are actually more vague than those found in the academic literature. No statute defines the term, and agency regulations doing so are generally silent about how to implement the approach in its complicated planning and regulatory context. Take, for example, the definition used by the USFS:

A system of management practices based on clearly identified intended outcomes and monitoring to determine if management actions are meeting those outcomes; and, if not, to facilitate management changes that will best ensure that those outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain.²⁸

As Ruhl points out, “One has to be concerned when legal text becomes even more obscure than the theory on which it is based.”²⁹ The

28. 36 C.F.R. § 220.3 (2010). The USFS definition is essentially the same as that used by the BLM (43 C.F.R. § 46.30 (2010)) and NPS (516 Dept. Manual § 4.16; NPS Management Policies 156 (2006)). As discussed in Part III, the USFWS and NOAA Fisheries provide a more specific definition as applied to habitat conservation planning:

For the purposes of the HCP program, we are defining adaptive management as a method for examining alternative strategies for meeting measurable biological goals and objectives, and then, if necessary, adjusting future conservation management actions according to what is learned. The Services are incorporating a broad perspective of adaptive management, with the key components that make an adaptive process in HCPs meaningful. These components include careful planning through identification of uncertainty, incorporating a range of alternatives, implementing a sufficient monitoring program to determine success of the alternatives, and feedback loop from the results of the monitoring program that allows for change in the management strategies.

Notice of Availability of a Final addendum to the Handbook for habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,242, 35,245 (June 1, 2000).

29. J.B. Ruhl, *Adaptive Management for Natural Resources—Inevitable, Impossible, or Both?* 54 ROCKY MTN. MIN. L. INST. 11-1 (2008).

problem, as Ruhl sees it, is that “[m]ushy definitions of adaptive management are likely to make for mushy standards of implementation.”³⁰

How to appropriately balance the twin needs of adaptation and accountability is a core but contested question in environmental governance. Much of the policy and legal scholarship on adaptive management (and governance) goes so far as to suggest that modern environmental problems require a fundamental reorientation of environmental law and planning.³¹ But others offer a more modest and incremental approach. Doremus takes this path in analyzing how adaptive management can be used and abused by agencies in implementing the ESA. She believes that without changes, adaptive management “may become just another smokescreen to cover politically adaptive evasion of agency responsibilities.. . .”³² Doremus shows how agencies can use the highly malleable term of adaptive management “as a ploy to placate demands for environmental protection without actually imposing any enforceable constraints on themselves.”³³

Nefarious agencies are not to blame here, but rather a set of built-in agency biases and political pressures influencing what questions are asked in adaptive management, what controversies are avoided, and how information is collected, interpreted, and acted upon. Doremus suggests a number of ways in which these biases might be counteracted and accountability secured. These include citizen suits, mandated monitoring and disclosure requirements, and the use of pre-negotiated management commitments. She describes the latter:

Pre-negotiated commitments, in which the management agencies and regulated parties agree in advance on specific steps that will be taken if monitoring shows that the species or system is in decline, are another strategy that can allow management decisions to precede heated controversies. Such pre-commitments have the advantage of leaving the exact parameters of management free to respond to future information,

30. *Id.*

31. See, e.g., RONALD BRUNNER ET AL., *ADAPTIVE GOVERNANCE: INTEGRATING SCIENCE, POLICY, AND DECISION MAKING* (2005); Bradley C. Karkkainen, *Collaborative Ecosystem Governance: Scale, Complexity, and Dynamism*, 21 VA. ENVTL. L.J. 89 (2002); see Annecoos Wiersema, *A Train Without Tracks: Rethinking the Place of Law and Goals in Environmental and Natural Resources Law*, 38 ENVTL. L. 1239 (2008) (providing a thorough review and critique of the “new governance” literature).

32. Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of ‘New Age’ Environmental Protection*, 41 WASHBURN L.J. 50, 52 (2001).

33. *Id.* at 53.

while providing closure to the decision-making process and a degree of certainty to the regulated community.³⁴

For Doremus, pre-negotiated commitments, or what we term triggers, are a way to combine the flexibility required by adaptive management with the accountability sought by various political actors. However, the questions of accountability, transparency, and enforceability are pervasive; the trick is to include triggers and monitoring that are meaningful so that they result in real management changes in a relevant timeframe, and are enforceable. We take up this issue in more detail in Part IV.

E. Triggers

The term trigger, as used here, is a type of pre-negotiated commitment made by an agency within an adaptive management or mitigation framework specifying what actions will be taken if monitoring information shows *x* or *y*. In other words, predetermined decisions, or more general courses of action, are built into an adaptive framework from the beginning of the process.

The cases and examples reviewed in Part III show how differently triggers, or trigger-like mechanisms, are used by agencies. As shown in Table 1, they run the gamut in terms of their design, specificity and enforceability. In some cases, triggers are detailed, legally binding commitments made in a contract or management plan. For example, in the case of the biological opinion for salmonid species on the Sacramento and San Joaquin River systems, a reviewing court approved the plan precisely because the monitoring, triggers, and mitigation measures were legally enforceable.³⁵ In other instances, triggers are more discretionary and simply activate a range of possible contingency and/or mitigation actions. In most cases, however, triggers are used as a way to limit the amount of discretion afforded to agencies in practicing adaptive management.

In one sense triggers are common in environmental law. Consider the ESA, for example, under which the protective measures of the statute are not activated until the listing of a species.³⁶ NEPA provides another example, as certain processes and analyses are triggered when particular findings are made by an agency, such as having to write a supplemental

34. *Id.* at 85.

35. *See Pac. Coast Fed'n of Fishermen's Ass'ns v. Gutierrez*, 606 F. Supp. 2d. 1122 (E.D. Cal. 2008).

36. 16 U.S.C. §§ 1531–33 (2006).

TABLE 1. Examples of triggers and responses in adaptive management/mitigation

Case	Trigger	Response
Plum Creek HCP	If stream temperature increases by 1° C with timber harvest	Revise or create riparian prescription enhancements
Federal Columbia River Power System Adaptive Management Implementation Plan	If there is a significant decline in the natural abundance of the species (salmon)	“Rapid response actions” identified in four areas (hydro operations, predator control, harvest, and hatcheries)
Pinedale Anticline Oil and Gas Exploration and Development Project in Wyoming Phased development	If there is a 15% decline in mule deer population Developed area has been returned to functioning habitat and successful reclamation completed	BLM chooses pre-identified mitigation response (e.g., lease buyouts, habitat enhancements) Leased areas closed to development in the project area will be considered available for development
Montana State Wolf Management Plan	If there are >20 breeding pairs of wolves in state	Annual harvest of wolves is allowed
Rocky Mountain National Park Elk and Vegetation Management Plan	If after 5 years of monitoring, vegetation conditions do not show improvement over baseline conditions	Additional protective measures will be implemented, including the use of elk redistribution techniques, fertility control, additional fencing, and possibly wolf reintroduction

EIS if “significant new circumstances” emerge.³⁷ For many years under the Marine Mammal Protection Act, a trigger was set at the level of the maximum net productivity level (MNPL) for populations; above this level, no management was implemented, and below this level no kills were allowed.³⁸ These and other laws are important to our study. However, our use of the term is more narrowly focused on how pre-negotiated commitments are made in adaptive management plans.

Related to triggers is the use of thresholds in resources management. In the scientific literature, an ecological threshold is defined as “the point at which there is an abrupt change in an ecosystem quality, property or phenomenon, or where small changes in an environmental driver

37. The writing of a supplemental EIS is triggered when the “agency makes substantial changes in the proposed action that are relevant to environmental concerns; or there are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.” 40 C.F.R. § 1502.9(c) (2010). See *infra* notes 262–273 and accompanying text.

38. Barbara L. Taylor et al., *Incorporating Uncertainty into Management Models for Marine Mammals*, 14 CONSERVATION BIOLOGY 1243, 1244 (2000).

produce large responses in the ecosystem.”³⁹ Scientific and managerial interest in using thresholds has grown in concert with the popularity of adaptive management.⁴⁰

Triggers and thresholds can be used together when a crossing of a threshold causes, or triggers, a legal or management response. Some wildlife laws and regulations, such as the ESA and NFMA’s diversity/viability regulation, use thresholds based on the abundance of a species.⁴¹ In these cases, a minimum demographically viable population threshold is used. If the viability threshold is crossed, certain legal and management actions are initiated. In other words, the crossing of threshold *x*, triggers action *y*.

While important, legal thresholds such as these are inadequate because if crossed, management actions are initiated too late in the process. Another problem is the mismatch between the relatively simple and dichotomous use of legal thresholds and the more complex identification and nature of ecological thresholds. An ecological continuum of change, for example, might be less problematic than predicting a single threshold.⁴² Of course, the question of where to set thresholds and trigger points is full of value judgments, such as how precautionary they should be. Questions also arise as to what exactly is triggered, over what time frame, and how such requirements might be enforced if not undertaken. Triggers are also inextricably linked to monitoring, which raises the persistent questions of who funds, designs, and conducts the monitoring, how quality is assured, and how monitoring requirements are enforced. We pick up these issues again in Part IV.

II. ADAPTIVE MANAGEMENT, TRIGGERS, AND THE COURTS

Agencies have only fairly recently begun to utilize adaptive management as a formal component of their decision-making, and the case law in this area is relatively sparse. Nonetheless, several large-scale plans, including the Northwest Forest Plan, species management on the

39. Peter Groffman, et al., *Ecological Thresholds: The Key to Successful Environmental Management or an Important Concept with No Practical Application*, 9 *ECOSYSTEMS* 1, 1 (2006).

40. *Id.* at 2; see also Emery Roe & Michel Van Eeten, *Threshold-Based Resource Management: A Framework for Comprehensive Ecosystem Management*, 27 *ENVTL. MGMT.* 195 (2001).

41. Endangered Species Act, 16 U.S.C. §§ 1531–33 (2006); National Forest Management Act, 47 Fed. Reg. 43,026, 43,048 (Sept. 30, 1982) (codified at 36 C.F.R. §219.19 (1983-2000)) (providing a viability standard). See generally Robert L. Fischman & Jeffrey B. Hyman, *The Legal Challenge of Protecting Animal Migrations as Phenomena of Abundance*, 28 *VA. ENVTL. L.J.* 173 (2010) (providing a more detailed discussion of various thresholds in environmental law, and how they can be used an improved upon to conserve animal migrations).

42. Malcolm L. Hunter, et al., *Thresholds and the Mismatch between Environmental Laws and Ecosystems*, 23 *CONSERVATION BIOLOGY* 1053 (2009).

Sacramento and San Joaquin Rivers, and flood control on the Missouri River, have all seen several rounds of litigation regarding their approaches to adaptive management.⁴³

Plaintiffs also have raised challenges to adaptive management as an aspect of project-level decisions in forest management, Habitat Conservation Plans, and biological opinions issued in accordance with the Endangered Species Act. Although the case law is not extensive, some key lessons, which we discuss in detail below, can be taken as to what courts are looking for in adaptive management plans in order to satisfy legal requirements. These primary lessons are: 1) Agencies must show that they will meet substantive standards;⁴⁴ 2) If they acknowledge uncertainty, they must show that they have a clear monitoring and mitigation strategy that is within their power to implement if unexpected or unacceptable effects are detected;⁴⁵ 3) Tiering can be an appropriate tool for pursuing adaptive management while complying with NEPA;⁴⁶ 4) Courts do not always require additional NEPA analysis when new information comes to light, as long as any changes in action and predicted effects are within the range of what was analyzed in the original NEPA document.⁴⁷

Ruhl and Fischman recently published the only comprehensive overview of adaptive management case law written to date.⁴⁸ They analyze thirty-one federal court decisions in which the judiciary speaks directly to the legality of adaptive management and find that federal agencies lost more than half of these cases. A key theme of their analysis is that larger-scale plans are often more suited to adaptive management than smaller projects or plans, due to the array of mitigation options available across large scales. Courts have upheld two adaptive management regimes, the Northwest Forest Plan and the Sierra Forest Framework, that employ experimentation and monitoring, even in situations where listed species are at risk.⁴⁹ For instance, an experimental approach to assessing short-term risk to California Spotted Owls, which included a clear commitment to monitor effects, coupled with reliable modeling of potential future impacts, withstood challenges under NEPA as to whether the agency took a “hard look” at environmental consequences.⁵⁰

43. Ruhl & Fischman, *supra* note 7.

44. See *infra* notes 54–69 and accompanying text.

45. See *infra* notes 70–80 and accompanying text.

46. See *infra* notes 89–99 and accompanying text.

47. See *infra* notes 100–109 and accompanying text.

48. Ruhl & Fischman, *supra* note 7.

49. *Id.* at 448.

50. See *California ex rel. Lockyer v. USDA*, No. 2:05-CV-0211-MCE-GGH, 2008 WL 3863479 (E.D. Cal. Sept. 3, 2008).

The key challenge with large-scale plans is striking the balance between adaptability and a satisfactory level of commitment to monitor results and take action if thresholds or trigger points are reached.

Ruhl and Fischman also note that tiering of NEPA documents appears to be well-suited to the practice of adaptive management.⁵¹ Adaptive management frameworks can be established at larger scales that consider cumulative impacts or programmatic standards, and more site-specific documents can tier to that analysis, obviating the need in some cases for more detailed environmental impact assessment at the project level. A final theme to emerge out of the adaptive management jurisprudence is that the courts demand assurances that adaptive management plans meet substantive management criteria required by law. Examples of substantive mandates include the “no jeopardy” standard in the ESA under Section 7 and the viability standard in NFMA regulations.⁵² Ruhl and Fischman explain, “When agencies lose challenges to their adaptive management plans, it is often because their preference for management latitude runs afoul of the need to show they can meet substantive and procedural standards in statutes, regulations, or even their own earlier plans.”⁵³

Using the aforementioned analysis as a starting point, we explore several issues in more detail. The use of triggers in adaptive management plans raises several important questions in the context of judicial review. For instance, how much certainty do courts require from agencies in meeting substantive requirements by law, and when do these standards limit the room agencies have to pursue more flexible approaches? Secondly, what approaches can an agency take to NEPA that allow for flexible planning and the use of triggers or thresholds? When do courts allow tiering and when do they require supplemental analysis? We explore these topics in more detail below in order to shed light on the case law that is most relevant to the incorporation of trigger mechanisms into adaptive planning.

A. Adaptive Management and Substantive Standards

To get a sense of the role of substantive standards, we consider several cases involving species protection requirements under the ESA as part of adaptive management plans. Agencies have achieved some success using adaptive management, even in the context of clear requirements not to jeopardize species, but only when mechanisms are built

51. Ruhl & Fischman, *supra* note 7, at 456–61.

52. 16 U.S.C. § 1536(a)(2) (2006); 36 C.F.R. § 219.19 (2010).

53. Ruhl & Fischman, *supra* note 7, at 471.

into the plan that require clear and meaningful actions that are triggered when specific conditions are met.

Center for Biological Diversity v. Rumsfeld dealt with the issue of future monitoring and mitigation to meet substantive legal standards as part of an adaptive framework.⁵⁴ The case provides some clarity on the matter of subsequent standards and the leeway allowed in adaptive management plans at smaller scales. At issue was the US Army's Fort Huachuca 10-year operating plan and the associated biological opinion from the U.S. Fish and Wildlife Service (USFWS). The draft biological opinion found that the Fort's planned actions were likely to adversely affect several species and outlined specific requirements for water savings and for monitoring of species status.⁵⁵ According to the Army, the requirements were beyond the Army's authority to implement, so it proposed a collaborative approach to water conservation in the watershed.⁵⁶ The final biological opinion did not include specific requirements and instead relied on a memorandum of agreement indicating that the Army would undertake development of collaboratively designed mitigation measures within the broader watershed.⁵⁷ The final biological opinion gave the Army three years to prepare the regional plan and identify potential conservation measures, but specific requirements were not included and were to be developed over the subsequent three years.⁵⁸ The result was that the no jeopardy opinion was reliant upon the future, successful development of a water conservation strategy, for lands outside of the control of the Army in the larger sub-basin. The court noted that until such a collaborative approach was in place and mitigation measures had been identified, the Army still had an obligation to show that it was meeting substantive requirements of the ESA.⁵⁹ Thus, the Army's responsibility to not jeopardize species remained unmet.

The court also ruled that potential mitigation measures were not specific enough and did not include any targets reductions in water use by any specific dates. "Without such specificity," the court explains, "the mitigation measures in the Final BO are merely suggestions."⁶⁰ Finally, the court noted that a monitoring program that assesses which *projects* have been implemented is not a meaningful analysis of *impacts* to the watershed, which would require monitoring of actual waterflows.⁶¹

54. *Ctr. for Biological Diversity v. Rumsfeld*, 198 F. Supp. 2d. 1139 (D. Az. 2002).

55. *Id.* at 1146.

56. *Id.*

57. *Id.* at 1146-47.

58. *Id.* at 1150.

59. *Id.* at 1154.

60. *Id.* at 1153.

61. *Id.* at 1154.

A pair of cases reviewing adaptive management frameworks in two biological opinions issued for operation of the State Water Project and Central Valley Project in California illustrate how adaptive management and triggers can be situated within large-scale plans and when agencies run afoul of legal requirements. At issue in *Natural Resources Council v. Kempthorne* was the biological opinion issued for the Delta smelt, a listed species under the ESA.⁶² Among the many challenges in this case was the question of whether the adaptive management process to mitigate impacts to the fish was adequate. In this case, the adaptive management framework listed a number of factors that would trigger action; these included, among other things, fish counts from the previous year and estimations of the length of the spawning season.⁶³ As the court explains in its decision, if any of the triggers were set off, a working group *could* meet if they deemed it necessary, decide whether to recommend any changes, and then submit recommendations that *could potentially* be undertaken by a separate management team.⁶⁴ The court agreed with plaintiffs that this was too uncertain and unenforceable of a framework to support a no jeopardy conclusion for ongoing operations of the projects.⁶⁵ Citing precedent from *Center for Biological Diversity v. Rumsfeld*, the court noted:

Mitigation measures must be ‘reasonably specific, certain to occur, and capable of implementation; they must be subject to deadlines or otherwise-enforceable obligations; and most important, they must address the threats to the species in a way that satisfies the jeopardy and adverse modification standards.’⁶⁶

What was triggered in this case, in the view of the court, was an unenforceable and discretionary process, devoid of any clear requirements to take action, and the court found this to be legally insufficient given the substantive requirements under section 7 of the ESA.

On the other hand, the same judge upheld the biological opinion for the anadromous fish species affected by the same water projects.⁶⁷ In that case, the court determined that mitigation measures were specific and were included under the terms and conditions of the incidental take

62. *Natural Res. Council v. Kempthorne*, 506 F. Supp. 2d. 322 (E.D. Cal. 2007).

63. *Id.* at 351–52.

64. *Id.* at 351.

65. *Id.* at 355–56.

66. *Id.* at 350 (citing *Center for Biological Diversity v. Rumsfeld*, 198 F. Supp. 2d. 1139, 1152 (D. Az. 2002)).

67. *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Gutierrez*, 606 F. Supp. 2d. 1122 (E.D. Cal. 2008).

statement, which, the court noted, is enforceable by law and therefore binding.⁶⁸ In contrast to the case of the Delta smelt, the mitigation measures were specific, non-discretionary, and enforceable. For example, a temperature requirement of 56 degrees or below was included for part of the river system, and if it was not met, alternative methods of compliance had to be sought; reinitiation of consultation was triggered before annual water delivery decisions could be made.⁶⁹ In this case, the court was satisfied because mitigation measures based on an enforceable standard and a non-discretionary mandate to reinitiate consultation were both required before proceeding.

Another case demonstrating the importance of standards in adaptive management is *Greater Yellowstone Coalition v. Servheen*.⁷⁰ This decision vacated the delisting of the Greater Yellowstone Grizzly Bear Distinct Population Segment (DPS) from the Endangered Species Act.⁷¹ One of the five factors to be considered when listing or delisting under the ESA is “the inadequacy of existing regulatory mechanisms.”⁷² Though not defined in the statute, the language means that sufficient regulations must be in place before a species can be delisted so as to ensure its long-term conservation. At issue in this case was the Grizzly Bear Conservation Strategy, which included amendment of National Forest plans within the DPS boundaries and the creation of state grizzly bear management plans for Idaho, Montana, and Wyoming. The Strategy, according to the USFWS “is an adaptive, dynamic document that establishes a framework to incorporate new and better scientific information as it becomes available or as necessary in response to environmental changes.”⁷³ It included population standards and monitoring, with a goal of maintaining more than 500 bears. The court ruled that this approach was inadequate under the ESA because the Strategy was largely unenforceable and non-binding on state and federal agencies:

The majority of the regulatory mechanisms relied upon by the Service—the Conservation Strategy, Forest Plan amendments, and state plans—depend on guidelines, monitoring, and

68. *Id.* at 1185–86.

69. *Id.* at 1185–86.

70. *Greater Yellowstone Coalition v. Servheen*, 672 F. Supp. 2d 1105 (D. Mont. 2009).

71. *Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife*, 72 Fed. Reg. 14,866 (Mar. 29, 2007) (codified at 50 C.F.R. pt. 17).

72. 16 U.S.C. § 1533(a)(1) (2006); 50 C.F.R. § 424.11(d) (2010).

73. *Designating the Greater Yellowstone Ecosystem Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife*, 70 Fed. Reg. 69,854, 69,861 (Nov. 17, 2005) (codified at 50 C.F.R. pt. 17).

promises, or good intentions for future action. Such provisions are not adequate regulatory mechanisms when there is no way to enforce them or to ensure that they will occur.⁷⁴

In this regard, the Court cited precedent holding that “the ESA does not permit agencies to rely on plans for future action or on unenforceable efforts.”⁷⁵

Promises of monitoring made in the Conservation Strategy were also insufficient according to the court, partly because such promises are not a legally binding commitment that is enforceable under the Administrative Procedures Act (as discussed in Part IV).⁷⁶ Though monitoring protocols were included in the Conservation Strategy, there was no way to enforce them. Even if they were enforceable, said Judge Molloy, monitoring alone would do nothing to protect grizzly bears: “Without tangible requirements specifying how the population will be maintained at 500 bears and how the mortality limits will be enforced, there is nothing in this portion of the Conservation Strategy that actually serves as a regulatory mechanism to maintain the grizzly bear population.”⁷⁷

The court also found inadequate the Forest Plan Amendments included as part of the Conservation Strategy. Like the USFWS, the U.S. Forest Service (USFS) invoked adaptive management in amending six forest plans in the Greater Yellowstone Area, but it did so with a more problematic definition: “The direction in this amendment embraces an adaptive management approach—as conditions change, so will management direction.”⁷⁸ The court held that the Forest Plan Amendments contained few standards, most of which only applied within the bear’s primary conservation area. Outside this area, the USFS provided no enforceable standards but, rather, “discretionary and thus legally unenforceable” guidelines.⁷⁹ The lack of enforceable standards outside the Primary Conservation Area, said the court, was not an adequate regulatory mechanism as required by the ESA. The same was true for the state grizzly bear management plans that failed to require the states “to take

74. *Greater Yellowstone Coalition*, 672 F. Supp. 2d at 1118.

75. *Id.* at 1114 (citing *Natural Res. Council v. Daley*, 6 F. Supp. 2d 1139, 1155 (D. Or. 1998)).

76. *Id.* (citing *Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 72 (2004)).

77. *Id.* at 1115.

78. U.S. FOREST SERV., FOREST PLAN AMENDMENT FOR GRIZZLY BEAR HABITAT CONSERVATION FOR THE GREATER YELLOWSTONE AREA NATIONAL FORESTS: RECORD OF DECISION A-2 (2006).

79. *Greater Yellowstone Coalition*, 672 F. Supp. 2d at 1117 (“[w]hen Forest Plans contain standards, the standards are ‘mandatory requirements,’ in contrast to guidelines, ‘which are discretionary’”) (citing *Miller v. U.S.*, 163 F.3d 591, 594 (9th Cir. 1998)).

any specific management response if mortality exceeds the limits in the Conservation Strategy.”⁸⁰

The take-home lesson is that agencies risk running afoul of the courts if they cling too strongly to agency discretion and vague adaptive management plans that are bereft of measurable standards and objectives. As Ruhl and Fischman explain, “Promises to plan, collaborate, or manage toward compliance should environmental conditions degrade below the substantive management criterion are insufficient to survive judicial review.”⁸¹ Agencies must be clear how they will measure success or failure and what exactly will trigger contingency actions.

B. Adaptive Management and NEPA Compliance

The art of coupling adaptive management with NEPA compliance requires skillful navigation of several key issues. One question involves the role of thresholds and triggers in plans and how they relate to effects analysis in the NEPA context. Another challenging area is how to effectively utilize tiering of project-level analyses to larger-scale plans and analyses and still meet requirements under NEPA. The questions here are: how specific do large-scale or programmatic plans have to be, when is supplemental analysis required, and how detailed do project level plans need to be? The following cases provide insight into these issues.

In 2003, the National Park Service (NPS) issued a Temporary Winter Use Plan, in effect from 2004-2007, with a daily limit of 720 snowmobiles.⁸² The plan involved an “Adaptive Management Program,” which included thresholds to determine whether goals for soundscapes, air quality, and the wildlife protection were being met.⁸³ At issue in *Greater Yellowstone Coalition v. Kempthorne* was the NPS’ 2007 final environmental impact statement and record of decision (ROD) for a new Winter Use Plan.⁸⁴ Data collected under the temporary plan period indicated the crossing of thresholds for noise and air quality on multiple occasions, and the plaintiffs cited this as evidence of unacceptable impacts and impairment to park resources.⁸⁵ The NPS responded that the plaintiffs were misguided in assuming the thresholds correlated with a finding of unacceptable impacts; instead, they claimed, the thresholds were in place to

80. *Id.* at 1117.

81. Ruhl & Fischman, *supra* note 7, at 462.

82. *Greater Yellowstone Coalition v. Kempthorne*, 577 F. Supp. 2d 183, 187 (D.D.C. 2008).

83. *Id.* at 188.

84. *Id.*

85. *Id.* at 192.

serve as a warning system of when conditions might be trending in an undesirable direction.⁸⁶

The NPS lost this case because it failed to indicate what *would have* constituted an unacceptable impact. The court wrote, “The ROD makes no effort to explain, for example, why impacts on soundscapes characterized as ‘major and adverse’ do not ‘unreasonably interfere with the soundscape’ and cause an unacceptable impact.”⁸⁷ Without some “quantitative standard or qualitative analysis to support its conclusion that the adverse impacts of the [Winter Use Plan] are ‘acceptable,’”⁸⁸ the court found the justification in the ROD to be arbitrary. The lesson here is that all thresholds do not necessarily have to correlate with significance in terms of impacts; however, if thresholds are crossed and an agency nonetheless finds impacts to be less than significant, there must be a clear justification or rationale offered as to how this evaluation is made. Perhaps the most transparent methodology would be to include several kinds of thresholds, some of which serve as indicators or warnings, and some of which indicate bottom line standards for legal compliance that cannot be crossed.

Another key issue with regard to NEPA compliance for adaptive management frameworks is how to successfully utilize tiered NEPA analyses. An instructive case is *Klamath Siskiyou Wildlands Center v. Boody*, which revolved around the issue of when, under an adaptive management plan, supplemental NEPA analysis is required.⁸⁹ The Northwest Forest Plan (NWFP) of 1994 amended all National Forest plans and resource management plans for BLM districts in the Pacific Northwest; it also established Survey and Manage (S&M) requirements for individual species that would not be adequately protected as a result of the land management allocations.⁹⁰ In 2000 the BLM and USFS issued a final environmental impact statement (2000 FEIS)⁹¹ and in 2001, a Re-

86. *Id.* at 195.

87. *Id.* (reviewing the issue of unacceptable impacts in light of the National Park Service’s mandate under the National Park Service Organic Act of 1916, 16 U.S.C. § 1 (2006), and subsequent amendments and agency policies).

88. *Id.*

89. *Klamath Siskiyou Wildlands Ctr. v. Boody*, 468 F.3d 549 (9th Cir. 2006).

90. USDA FOREST SERV. AND USDI BUREAU OF LAND MGMT., RECORD OF DECISION FOR AMENDMENTS TO FOREST SERVICE AND BUREAU OF LAND MANAGEMENT PLANNING DOCUMENTS WITHIN THE RANGE OF THE NORTHERN SPOTTED OWL (1994) [hereinafter NWFP ROD].

91. USDA FOREST SERV. AND USDI BUREAU OF LAND MGMT., FINAL ENVIRONMENTAL IMPACT STATEMENT FOR AMENDMENT TO THE SURVEY AND MANAGE, PROTECTION BUFFER, AND OTHER MITIGATION MEASURES STANDARDS AND GUIDELINES (2000).

cord of Decision (2001 ROD)⁹² for amendments to the NWFP, including changes to the S&M requirements. The 2000 FEIS considered the status of the red tree vole and stated that approximately five years of data collection would likely be necessary prior to contemplating any changes to its status under S&M requirements.⁹³ In the summer of 2002, after doing the first annual review for red tree voles, the BLM downgraded the species' status, and in December 2003 the BLM removed the vole from S&M designation completely.⁹⁴ Neither of these decisions was accompanied by any NEPA document, and plaintiffs brought challenges under FLPMA and NEPA. Given that the decisions were contrary to what had been anticipated under the 2000 FEIS and relied on significant new data, the court ruled that these decisions constituted plan amendments.⁹⁵

As for the NEPA claim, the BLM argued that the 2000 FEIS/2001 ROD contemplated changes in S&M designations as part of an adaptive management framework. However, the court stated that simply because an adaptive management plan *contemplates* potential changes, this does not obviate the need to comply with FLPMA or NEPA.⁹⁶ Essentially, even though the 2000 FEIS contemplated adaptive management modifications, there are limits on how dramatic these can be without triggering plan amendment requirements and NEPA; otherwise, plans would be too open-ended. This was especially true in the case of the red tree vole, given that the 2001 FEIS stated that this particular species would require extensive additional research. The court held that if an agency takes action so contrary to what they found in a previous NEPA document, it must explain the rationale for the action and complete a new NEPA anal-

92. USDA FOREST SERV. AND USDI BUREAU OF LAND MGMT., RECORD OF DECISION AND STANDARDS AND GUIDELINES FOR AMENDMENTS TO THE SURVEY AND MANAGE, PROTECTION BUFFER, AND OTHER MITIGATION MEASURES STANDARDS AND GUIDELINES (2001).

93. See USDA FOREST SERV. AND USDI BUREAU OF LAND MGMT., *supra* note 91, at 392–93.

94. *Klamath Siskiyou Wildlands Ctr*, 468 F.3d at 553.

95. *Id.* at 556–57.

96. The court explained:

BLM is partly correct: the 2001 ROD contemplated that moving a species from one survey strategy to another or dropping Survey and Manage protection for any species whose status is determined to be more secure than originally projected could occur under the plan. However, merely because the 2001 ROD contemplated this type of change, it does not necessarily follow that all contemplated changes fall under the narrow definition of plan maintenance in § 1610.5-4. If that were the law, BLM could circumvent the mandates of § 1610.5-5 (i.e., requiring environmental assessments and impact statements, public disclosure, etc.) by merely designing a management plan that “contemplates” a wide swath of future change.

Id. at 557.

ysis.⁹⁷ In this case, the original FEIS did not provide any basis for the BLM's decisions; therefore, the judge explained, the decisions were plainly inconsistent with the prior plan and EIS.⁹⁸ NEPA also requires SEISs when there is significant new information, as there was in this case.⁹⁹

When the agencies have tried to make substantial changes to requirements in adaptive management plans, courts have required new analysis, in the form of plan amendments and supplemental NEPA analysis. This is the case when the new information or the permitted actions are outside the bounds of what was originally discussed in the NEPA document.¹⁰⁰ On the other hand, in cases such as *Oregon Natural Resources Council Action v. USFS* courts have also indicated that the USFS does not always need to prepare supplemental analyses if the adaptive management actions and collection of additional information were covered in a prior, programmatic EIS.¹⁰¹ In this case, where new information emerged regarding water quality and the status of some species under the Endangered Species Act, the court explained, "The plan's adaptive management approach is adequate to deal with any new information plaintiffs have identified. If circumstances warrant, the ROD gives the Forest Service and the BLM the flexibility to reduce or halt logging in order to comply with their statutory mandates."¹⁰² In other words, flexibility can be built into a NEPA assessment that anticipates changes in conditions and gives an agency the opportunity to adjust activities within certain limits. In the case of the NWFP, survey and manage requirements allow for adaptive decision-making if species are detected; there are also baseline standards that limit the total amount of logging and require compliance with standards and guidelines.¹⁰³ New information does not always require the preparation of a supplemental EIS, unless it fundamentally alters the predictions in the original EIS or if the response to the new information is plainly contrary to what was planned or predicted in the original EIS.

A final example provides several other lessons related to tiering and supplemental NEPA analysis. Ruhl and Fischman explain, "The

97. *Id.* at 561–62.

98. *Id.*

99. *Id.* at 561–62 (noting that the change in the vole's status was based on data, 80 percent of which was new since the prior FEIS).

100. See *Klamath Siskiyou Wildlands Ctr.*, 468 F.3d 549; *Or. Natural Res. Council Action v. U.S. Forest Serv.*, 59 F. Supp. 2d 1085 (W.D. Wash. 1999); *Nw. Ecosystem Alliance v. Rey*, 380 F. Supp. 2d 1175 (W.D. Wash. 2005).

101. *Or. Natural Res. Council Action*, 59 F. Supp. 2d 1085.

102. *Id.* at 1096.

103. *Klamath Siskiyou Wildlands Ctr.*, 468 F.3d 549 (9th Cir. 200); see also *id.*

most cited litigation endorsing the notion that adaptive management is compatible with NEPA and administrative law concerns the Army Corps' management of the Missouri River, which it controls through its dams."¹⁰⁴ For example, in a 2008 hearing, the court ruled that it was appropriate for the Corps to utilize an environmental assessment (EA) to determine whether impacts resulting from changes in its springtime water release strategies were consistent with management strategies that had been analyzed in a 2004 FEIS.¹⁰⁵ The Corps determined that the impacts resulting from the new bimodal springtime release strategy were within the range of impacts considered in the 2004 FEIS and determined that no supplemental EIS was necessary.¹⁰⁶ At the same time, they also determined that a FONSI was not appropriate, because significant impacts, which had already been analyzed in the 2004 FEIS, were predicted.¹⁰⁷ The court ruled that Corp's method of complying with NEPA while navigating the incorporation of a change in management strategy was adequate.¹⁰⁸ It noted a supplemental EIS is only required when the change in management direction is one that was not within the spectrum of alternatives analyzed in the prior EIS.¹⁰⁹ Even if an agency decides to implement aspects of an alternative not originally selected, as long as the impacts have been analyzed and no significant new information has arisen, supplemental NEPA analysis is not required.

Several other issues related to NEPA are worth mentioning briefly. As discussed above, agencies must clearly demonstrate that they will not cross any substantive legal thresholds. Where compliance with a land use plan, such as a forest plan, is at issue, a NEPA analysis often will need to explain how forest plan standards will be met, if these are written as legally enforceable and substantive standards. If a land use plan allows for trending towards desired conditions, then adaptive management could be used to explore different management strategies, as long as the analysis showed that contemplated courses of action will trend resources in the desired direction.

Agencies must undertake some analysis of effects, based on the information available, even if they acknowledge a role for future research on effects. For example, in *Mountaineers v. USFS* (2006) plaintiffs challenged a project that would have allowed for greater access to the overall off-road vehicle trail system in the area.¹¹⁰ A court enjoined a pre-

104. Ruhl & Fischman, *supra* note 7, at 454–55.

105. *In re Operation of the Mo. River Sys. Litig.*, 516 F.3d 688, 695 (8th Cir. 2008).

106. *Id.* at 694.

107. *Id.* at 695.

108. *Id.*

109. *Id.* at 693.

110. *Mountaineers v. U.S. Forest Serv.*, 445 F. Supp. 2d 1235 (W.D. Wash 2006).

vious incarnation of this project and ordered the USFS to study the cumulative effects of the trail system on wildlife.¹¹¹ In their cumulative effects analysis for the Mad River Trail EA, the USFS provides “a general level of analysis, and then stops, proposing further study.”¹¹² The court calls this a “build first, study later” approach and enjoins the project.¹¹³ The court cites *Neighbors of Cuddy Mountain v. USFS* (1998), noting that it is well-established that even when monitoring information is limited, NEPA requires effects analysis before a project takes place.¹¹⁴

As we discuss further in Part IV, if an agency plans on utilizing an EA and a FONSI to support its decision, it must provide assurance that future mitigation measures will be undertaken and will prevent effects from reaching the threshold of significance under NEPA.¹¹⁵ If an agency is planning an adaptive approach and is unsure of possible significant effects, an EIS is the appropriate document.¹¹⁶ An EA cannot be used if there is significant uncertainty about how planned actions will affect resources. Adaptive management or mitigation tools in an EA are appropriate for responding to relatively minor changes in environmental conditions or tweaking management within allowable and anticipated limits. If an EIS is used, there is more room to acknowledge uncertainty about effects. However, it still must be clear that the proposed action and any adaptive management options will not violate legal standards.

III. EXAMPLES OF TRIGGERS IN ADAPTIVE MANAGEMENT/ MITIGATION PLANS

In this section we consider a number of cases where agencies use triggers as part of an adaptive management plan. These are short summaries of the general history and adaptive management framework for each example, with information on the primary controversies or challenges. It is not our intention to provide full-fledged case studies, with a complete history and full range of perspectives on each situation, although we summarize some of that detail. This is also not intended to be an exhaustive catalog of all cases where triggers are part of some kind of explicit or implicit adaptive management plan. The examples selected

111. See *N. Cascades Conservation Council v. U.S. Forest Serv.*, 98 F. Supp. 2d 1193 (W.D. Wash. 1999).

112. *Mountaineers*, 445 F. Supp. 2d at 1250.

113. *Id.*

114. *Neighbors of Cuddy Mountain v. U.S. Forest Serv.*, 137 F.3d 1372 (9th Cir. 1998).

115. See *infra* notes 236–243 and accompanying text.

116. See 42 C.F.R. § 1508.27 (b)(5) (2010) (stating that an EIS is triggered in cases where “[t]he degree to which the possible effects on the environment are highly uncertain or involve unique or unknown risks . . .”).

provide a variety of contexts and approaches, include a clear use of trigger mechanisms, and offer insight into how triggers are used and the associated challenges.

A. Federal Columbia River Power System Adaptive Management Implementation Plan

Salmon and Steelhead populations in the Columbia Basin are threatened because of the construction and operation of the Federal Columbia River Power System (FCRPS). Thirteen evolutionary significant units (ESUs) of salmon and steelhead in the Basin are listed as threatened or endangered under the Endangered Species Act (ESA). As a result, NOAA Fisheries (formerly National Marine Fisheries Service (NMFS)) must write a biological opinion (BiOps) determining whether operation of the system is jeopardizing these species. These decisions have been extremely controversial and litigated since the first salmon listing in 1991.¹¹⁷ Several BiOps have been rejected by the courts with their rewriting guided by these decisions.

The FCRPS Adaptive Management Implementation Plan (AMIP) was developed in response to the latest federal court decision setting aside the 2008 BiOp. The revised BiOp describes the adaptive management approach as a way to deal with uncertainty, use best available science, and address the deficiencies of the previous BiOp as identified by the court. Core to the revised BiOp are “biological triggers that when tripped, will activate near and long-term contingency actions, should the agencies detect a significant decline in the species’ condition.”¹¹⁸ These pre-defined biological triggers are designed to “alert the federal agencies if further action is warranted,” and are meant to be more precautionary than the 2008 BiOp.¹¹⁹

Contingency actions are initiated in two ways. An “early warning indicator” will alert agencies “to a decline in species’ abundance level for natural-origin adults that warrants further scrutiny because it indicates that a significant decline may be reached in one to two years. The indicator for each species will be a running four-year mean of adult

117. For a review of this litigation see NIC LANE, KRISTINA ALEXANDER & EUGENE H. BUCK, CONGRESSIONAL RESEARCH SERVICE REPORT RL34453: ENDANGERED SPECIES ACT AND LEGAL ISSUES REGARDING COLUMBIA BASIN SALMON AND STEELHEAD (2008), available at <http://wlstorage.net/file/crs/RL34453.pdf>; and Michael C. Blumm & Hallison T. Putnam, *Imposing Judicial Restraints on the “Art of Deception”: The Courts Cast a Skeptical Eye on Columbia Basin Salmon Restoration Efforts*, 38 ENVTL. L. 47 (2008).

118. FED. COL. RIVER POWER SYS. ADAPTIVE MGMT. IMPLEMENTATION PLAN, 2008—2018 FEDERAL COLUMBIA RIVER POWER SYSTEM BIOLOGICAL OPINION (Sept. 11, 2009), at 8.

119. *Id.*

abundances that falls below a 20 percent likelihood of occurrence.”¹²⁰ Also used in the BiOp is a “significant decline trigger,” whereby agencies will check yearly for a significant decline in the natural abundance of the species, and this is “judged to occur when the running four-year mean of natural-origin adult abundance falls below a 10 percent likelihood of occurrence based on historical data.”¹²¹ Various thresholds are used in this regard and “represent significant deviations from the biological expectations in the 2008 BiOp.”¹²² If a significant decline trigger is tripped, the AMIP identifies “rapid response actions” in four areas (hyrdro operations, predator control, harvest, and safety-net hatchery programs) and long-term contingency actions that may be taken.

The states of Washington, Idaho, and Montana, among other parties, support the AMIP and believe it is consistent with the ESA and the growing body of adaptive management case law (as discussed in the previous section). The plan, they say, “reflects a commitment to do what it necessary to ensure that continued operation of the FCRPS will not appreciably reduce the likelihood that wild salmon will continue to survive and ultimately recover.”¹²³ This being the case, the States argue that deference should be given to NOAA Fisheries in how the AMIP and its triggers are designed and implemented. They also argue that the habitat mitigation responses comport with the theory and legal parameters of adaptive management because they include “some form of measurable goals, action measures, and a certain implementation schedule.”¹²⁴ In short, those supporting the AMIP argue that its trigger mechanisms, along with other protective measures in the 2008 BiOp, provide reasonable assurances that mitigation, if necessary, will in fact occur.

Despite this elaborate process, environmental plaintiffs are not at all impressed with the BiOp’s adaptive management plan and have challenged it in court.¹²⁵ They complain that the plan, despite all of its bells-and-whistles, does nothing to change the final no-jeopardy analysis, as found in the previous 2008 BiOp, nor provide any meaningful ways to

120. *Id.* at 12. For more detail on the formation and application of these triggers see *id.* at Appendix 4.

121. *Id.* at 13.

122. *Id.*

123. Joint Memorandum of Washington, Idaho and Montana In Support of Their Cross-Motion for Summary Judgment and In Opposition to Summary Judgment Motion of Plaintiffs and Oregon at 1, *Nat’l Wildlife Fed’n v. Nat’l Marine Fisheries Serv.*, 839 F. Supp. 2d 1117 (D. Or. 2011).

124. *Id.* at 30 (citing *Natural Res. Def. Council v. Kempthorne*, 506 F. Supp. 2d 322, 355 (E.D. Cal. 2007)).

125. Supplemental Memorandum in Support of NWF’s Supplemental Motion for Summary Judgment, *Nat’l Wildlife Fed’n, et al., v. Oregon* (D. Or. 2010) (regarding 2010 Supplemental BiOp) (on file with authors).

protect listed species. They question the science on which it is based and want a more precautionary approach, as they believe is required by the ESA.

One problem plaintiffs have with the AMIP is that “the rapid response measures of the AMIP are just *possible* responses if a decline trigger is tripped. The response measures certainly are not actions the agencies actually are required to implement now to avoid jeopardy.”¹²⁶ Furthermore, plaintiffs argue that the AMIP is replete with “stock phrases about adaptive management,” but “the critical objective standards, analytic methods, detailed monitoring plan, and contingent actions are all missing or—at best—will be addressed later.”¹²⁷ What is needed in the Plan, say plaintiffs, are specific quantitative performance standards:

What is missing is any objective standard for population-specific productivity that must be met by a particular time, or a specific survival standard for habitat actions for a particular species in a particular tributary, methods that will be used to make these determinations, specific monitoring that will collect the necessary data, and specific contingent actions that will occur if the standards are not met. Rather than science-based adaptive management, the 2008/2010 BiOps propose a vague flow-chart process that lacks all of the hallmarks of science-based adaptive management.¹²⁸

Plaintiff’s also argue that the triggers included in the AMIP need to be more precautionary, conservative, and be used in a way to comply with, and not evade, the ESA. They want the triggers set with a greater margin of safety, and to be used in a more meaningful way, so that if they are tripped, more than vague administrative processes will result.¹²⁹

The State of Oregon, which is another plaintiff in the case, similarly argues that the AMIP is “little more than a recasting of the existing BiOp in a ‘precautionary’ light.”¹³⁰ “It’s precise legal character is un-

126. *Id.* at 3.

127. *Id.* at 28.

128. *Id.*

129. *Id.* at 29. Plaintiffs cite *Natural Res. Def. Council v. Kempthorne*, 506 F. Supp. 2d 355 (E.D. Cal. 2007), as it rejected an adaptive management plan that was “in substance an organizational flow chart that prescribes that certain administrative processes (meetings) will be held whenever a trigger criteria is met or exceeded. Although mitigation measures are identified, no defined mitigation goals are required, nor is any time for implementation prescribed.”

130. The State of Oregon’s Response to the Adaptive Management Implementation Plan, *Nat’l Wildlife Fed’n v. Nat’l Marine Fisheries Serv.*, 839 F. Supp. 2d 1117 (D. Or. 2011), at 3.

clear” says the State, and it does nothing to improve what it sees as an invalid biological opinion. Oregon argues that promises of things that *might* be done in the future are an inadequate way of complying with the ESA and recovering salmon populations. “Vague mitigation measures cannot support a biological opinion,” says the State.¹³¹

Oregon is particularly critical of how biological triggers are used in the AMIP, arguing that they will not be activated until long after salmon species have declined to dangerous levels. It argues “the new measure of success is to simply avoid disastrous declines” of salmon.¹³² Instead, the State wants triggers to be set to ESA recovery standards, a bar set much higher. Furthermore, if pulled, the State believes the AMIP’s triggers deploy plans and studies, not actions that will benefit salmon.¹³³ And if such responses did ever materialize, Oregon believes they would be implemented much too late to avoid jeopardy.¹³⁴

Although triggers were used in this case as a way to provide greater certainty and precaution than what was provided in earlier biological opinions, the 2008/10 BiOp and AMIP met the same fate as earlier management plans. It failed to survive judicial review because it improperly relied upon future actions that “are not reasonably certain to occur.”¹³⁵ Judge Redden concluded that the BiOp “failed to adequately identify specific and verifiable mitigation plans beyond 2013” and that the no-jeopardy finding by NOAA Fisheries was therefore arbitrary and capricious. Of particular relevance to triggers and adaptive management is Judge Redden’s finding that the ESA requires specific actions be taken and not just an agency “commitment” to species survival: “It is one thing to identify a list of actions, or combination of potential actions, to produce an expected survival improvement and then modify those actions through adaptive management to reflect changed circumstances. It is another to simply promise to figure it all out in the future.”¹³⁶

This case provides another instance where the use of trigger mechanisms are purportedly used as a way to provide a more structured and less discretionary approach to adaptive management. Their use came as a result of litigation and the need to provide a more precautionary, science-based, and assured way of meeting the strictures of the ESA. But as demonstrated in other cases, there are serious concerns about where the triggers are set and what happens if they are pulled.

131. *Id.* at 13.

132. *Id.* at 18.

133. *Id.* at 22.

134. *Id.*

135. Nat’l Wildlife Fed’n v. Nat’l Marine Fisheries Serv., 839 F. Supp. 2d 1117, 1122 (D. Or. 2011).

136. *Id.* at 1128.

B. The Pinedale Anticline Oil and Gas Exploration and Development Project in Wyoming

The BLM uses trigger mechanisms in various adaptive approaches to energy development in the West.¹³⁷ A controversial example is the Pinedale Anticline oil and gas exploration and development project in the Upper Green River valley of northeastern Wyoming. The project was the BLM's first effort in using adaptive management in oil and gas development.¹³⁸ The agency tried the approach partly because of the possible impacts of natural gas development to wildlife in the area, including sage grouse, mule deer, and pronghorn antelope.

The BLM's 2008 Supplemental Environmental Impact Statement (SEIS) and Record of Decision (ROD) include the use of a "wildlife monitoring and mitigation matrix" in which wildlife populations and behavior changes serve as triggers for mitigation measures.¹³⁹ The 2008 ROD states that "this process is designed to provide certainty to the affected agencies and the public that impacts to wildlife will be addressed before consequences become severe or irreversible by monitoring changes and responding early."¹⁴⁰ The matrix specifies the changes that will be monitored for mule deer, antelope, sage grouse, and other sensitive species. Take mule deer for example. The specific change requiring mitigation for this species is a 15 percent decline in any year, or cumulatively over all years compared to a reference area.¹⁴¹

137. See e.g., the Jack Morrow Hills Coordinated Activity Plan, which is an amendment to the BLM's Green River Resource Management Plan in southwestern Wyoming. BUREAU OF LAND MGMT., RECORD OF DECISION AND JACK MORROW HILLS COORDINATED ACTIVITY PLAN/GREEN RIVER RESOURCE MANAGEMENT PLAN AMENDMENT (2006). The Plan uses a "measure and trigger" matrix for various indicators, from elk distribution to sage grouse lek use. The matrix is used to "guide" management decisions, though "[a]ction will be taken before an indicator reaches a trigger point since operating outside these bounds indicates a failure of the management strategy." BUREAU OF LAND MGMT., JACK MORROW HILLS COORDINATED ACTIVITY PLAN/GREEN RIVER RESOURCE MANAGEMENT PLAN AMENDMENT: FINAL ENVIRONMENTAL IMPACT STATEMENT (2004), app. 17, at 12. The BLM acknowledges the uncertainty of where the measures and triggers are set and sees them as a "first cut" that might be refined later. *Id.* The agency also anticipates using a "better safe than sorry" approach in responding to various indicator changes. *Id.* at 17.

138. See generally Melinda Harm Benson, *Integrating Adaptive Management and Oil and Gas Development: Existing Obstacles and Opportunities for Reform*, 39 ENV'T'L. L. REP. 10962 (2009).

139. BUREAU OF LAND MGMT., PINEDALE ANTICLINE PROJECT AREA SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT AND RECORD OF DECISION (2008), at 19. The 2008 ROD/SEIS was preceded by a ROD issued in 2000 that was challenged by oil and gas and conservation interests.

140. *Id.* at B-4.

141. *Id.* at B-1.

If triggered, the BLM is then required to select a mitigation response that is listed in the matrix. Mitigation includes on-site and off-site responses, such as voluntary lease suspensions, lease buyouts, habitat enhancements, and the purchase of conservation easements and property for wildlife benefits. Monitoring and mitigation are paid for out of a designated fund, financed by the three largest operators in the region (Ultra, Shell, and Questar) who provided \$36 million to mitigate impacts.¹⁴²

Related to the project's use of triggers is the use of concentrated, staged, or a "phased" type of development. This approach staggers development so that some places are off-limits to exploitation until reclamation, as measured by various indicators, is completed in other areas. Phased development is being used elsewhere by the BLM, such as on the equally controversial Roan Plateau in Colorado.¹⁴³ At a general level, conservationists generally favor this phased approach,¹⁴⁴ while the oil and gas industry has some concerns about how it is designed and the impact it could have on existing lease rights.¹⁴⁵

On the Anticline, phased development means that the project area is divided into zones, including a core area for intensive development, potential development areas, flank areas and river corridors. After a five-year period, individual or multiple leases closed to development "will be considered for conversion to 'available for development' when a comparable acreage in the core area. . .has been returned to functioning habitat through the completion of all development operations and successful reclamation of all portions of the well pads within the comparable area."¹⁴⁶ Habitat is considered "functioning when the comparable area is

142. *Id.* at 17.

143. See BUREAU OF LAND MGMT, ROAN PLATEAU PLANNING AREA: RESOURCE MANAGEMENT PLAN AMENDMENT AND ENVIRONMENTAL IMPACT STATEMENT (2006).

144. See e.g., Bruce M. Pendery, *BLM's Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations*, 40 ENV'T'L. L. 599, 676 (2010). The BLM was forced to consider the approach in its NEPA analysis of developing of coal bed methane in Montana's portion of the Powder River Basin. See *N. Plains Res. Council v. U.S. Bureau of Land Mgmt.*, CV 03-69-BLGRWA, 2005 WL 6258093 (D. Mont. Apr. 5, 2005); *N. Cheyenne Tribe v. Norton*, 503 F.3d 836 (9th Cir. 2007).

145. Some in the petroleum industry view forms of phased development as "unduly restrictive and violative of valid existing lease rights." This is because some leases could be held in suspense until monitoring shows that specific resource indicators have not been breached. DENISE A. DRAGOO, AM. PETROLEUM INSTITUTE, ADAPTIVE MANAGEMENT AS APPLIED TO OIL AND NATURAL GAS DEVELOPMENT ON ONSHORE FEDERAL LANDS 21 (2004), available at <http://nwc.org/Resources/AM%20Materials/Final%20AdaptMgt%20Report%206%2010%2004.pdf>.

146. THE WILDERNESS SOC'Y, THE 2008 PINEDALE ANTICLINE PROJECT AREA (PAPA) SEIS/ROD: LESSONS AND CHALLENGES 6 (2010) (on file with authors).

providing sustainable forage (shrubs, forbs, and grass) for wildlife and livestock as determined by animal use and stable populations based on the Wildlife Monitoring and Mitigation Matrix.”¹⁴⁷

The BLM’s use of triggers and adaptive management on the Pinedale Anticline has had a mixed reception. On the one hand, some players in the region, like the Wilderness Society (TWS), believe the matrix “has potential as a model for how BLM can include concrete thresholds of changes that will trigger adaptive management actions to ameliorate or mitigate wildlife impacts,” but that unfortunately, “this model has not been realized.”¹⁴⁸ The potential is there, says TWS, for the Pinedale project to “showcase best practices and more responsible drilling on public lands,” but that this potential “only exists on paper if the BLM cannot deliver on implementation.”¹⁴⁹

Another complaint is that the 2008 SEIS stems from the BLM’s experiment with adaptive management on the Anticline in 2000, which many believe was an unequivocal failure. Instead of following through on the commitments made in the 2000 ROD, some groups believe the BLM made “adaptive” adjustments as a way to simply allow for more intensive energy development in the region. Some groups also mistrust the BLM because some mitigation commitments made by the agency in 2000 were not implemented as expected.

More mitigation is promised in the 2008 SEIS, but the Theodore Roosevelt Conservation Partnership (TRCP) believes the promised responses are an insufficient way of protecting wildlife on the Anticline.¹⁵⁰ According to the Partnership, the triggered responses are more of a recommendation that must be approved by industry than a secure binding commitment. The Partnership also takes issue with the industry’s role in designing the mitigation matrix. “Because the Companies developed the Matrix, it is no surprise the Matrix is opaque and ultimately places the decision of whether to change operations, in the Companies’ hands.”¹⁵¹ Regardless of their impacts, TRCP doubts that oil and gas operations will change “until all other options are exhausted, and then such changes may be made *only if the Companies agree*.”¹⁵² Furthermore, the Partnership argues that even if changes were triggered, they could not be made quickly enough to benefit wildlife.

147. *Id.*

148. *Id.* at 3.

149. *Id.*

150. Theodore Roosevelt Conservation Partnership, Motion for Summary Judgment and Supporting Memorandum of Points and Authorities, Theodore Roosevelt Conservation P’ship v. Salazar, 744 F. Supp. 2d 151 (D.D.C. 2010).

151. *Id.* at 28.

152. *Id.* at 29.

These arguments did not persuade a D.C. District Court, which found the BLM's discussion of mitigation measures satisfactory for purposes of NEPA.¹⁵³ Despite its tumultuous history, the 2008 SEIS and its mitigation matrix were upheld by the Court. However, at the time of this writing its implementation is far from certain. The BLM is now confronted with research showing that the area's deer herd has declined to less than half its size as estimated in 2001, thus triggering the mitigation measures as described above. All eyes are on the BLM to see how it responds, with some observers seeing the situation as a referendum on adaptive management.¹⁵⁴

C. Habitat Conservation Planning

Section 10 of the ESA provides for the writing of Habitat Conservation Plans (HCPs) that provide regulatory assurances to non-Federal property owners through the issuance of an incidental take permit (ITP). The commitments provided in an HCP are made binding through the ITP. To be granted, the permit requires that (1) the taking of a species will be incidental to otherwise lawful activities, (2) the taking will, to the maximum extent practicable, be minimized and mitigated; (3) adequate funding for the plan be provided, and (4) the taking will not appreciably reduce the likelihood of the survival and recovery of a species in the wild; and (5) such other measures be implemented that the services may require as being necessary or appropriate for purposes of the plan.¹⁵⁵

HCPs are essentially a deal between non-federal property owners and the Fish and Wildlife Service and/or NOAA Fisheries. The former are seeking increased and long-term certainty about what they can and cannot do on their lands, while the agencies hope to provide appropriate incentives to private property owners while gaining net conservation benefits for species in need of protection. In many respects, the pursuit of regulatory certainty drives much of the HCP process, as it does with other incentive-based ESA programs such as Safe Harbor Agreements and Candidate Conservation Agreements with Assurances.¹⁵⁶ HCPs are

153. *Theodore Roosevelt Conservation P'ship v. Salazar*, 744 F. Supp. 2d 151, 164 (D.D.C. 2010).

154. Phil Taylor, *Mule Deer Declines in Wyo. Gas Field Warrant 'Serious' Mitigation Response*, N.Y. TIMES, Oct. 21, 2010, <http://www.nytimes.com/gwire/2010/10/22/22green-wire-mule-deer-declines-in-wyo-gas-field-warrant-se-56702.html?pagewanted=all>.

155. 16 U.S.C. § 1539(a)(2)(A) (2006).

156. The safe harbor policy is "designed to create incentives for non-Federal property owners to implement voluntary conservation measures for certain listed species by providing certainty with regard to possible future restrictions should the covered species later become more numerous as a result of the actions taken by the non-Federal cooperator. Non-Federal property owners, who through a Safe Harbor Agreement commit to imple-

made binding through the issuance of the ITP and these contracts contain several legal commitments made by both parties. Plans, for example, are to specify the measures that will be taken by the permittee to monitor, minimize, and mitigate impacts and the funding that will be made available to implement these measures.

One of the most controversial provisions in HCPs are the inclusion of “no surprises” assurances.¹⁵⁷ These are promises made to the holder of an ITP that if “unforeseen circumstances” arise, the FWS will not require the commitment of additional land, water, or financial compensation or any additional restrictions beyond the level otherwise agreed to in the HCP without the consent of the permittee.¹⁵⁸ What constitutes “unforeseen circumstances” are negotiated by the parties. The basic posture of the FWS is that “all reasonably foreseeable circumstances, including natural catastrophes that normally occur in the area, should be addressed in the HCP,” but such plans must not “address all hypothetical future events, no matter how remote the probability that they may occur.”¹⁵⁹

The no surprises provision is predicated on the belief that several “changed circumstances” can be adequately planned for in an HCP, such as the listing of a new species or a catastrophic event in an area prone to such events. “Unforeseen circumstances,” on the other hand, are those which could not have been reasonably anticipated, such as the eruption of Mount St. Helens.¹⁶⁰ Though not necessarily labeled as such, trigger mechanisms are built into HCPs through the negotiation of these changed circumstances. As discussed below, a non-Federal property

ment voluntary conservation measures for a listed species, will receive assurances that no additional future regulatory restrictions will be imposed.” Safe Harbor Agreements and Candidate Conservation Agreements with Assurances, 69 Fed. Reg. 24,084 (May 3, 2004) (codified at 50 C.F.R. pt. 13, 17). Regulatory certainty is also the main incentive behind Candidate Conservation Agreements with Assurances. These agreements provide “non-Federal property owners who voluntarily agree to manage their lands or waters to remove threats to candidate or proposed species assurances that their conservation efforts will not result in future regulatory obligations in excess of those they agree to at the time they enter into the Agreement.” U.S. FISH & WILDLIFE SERV., CANDIDATE CONSERVATION AGREEMENTS WITH ASSURANCES FOR NON-FEDERAL PROPERTY OWNERS (2002), available at http://library.fws.gov/pubs9/cca_assurances.pdf; see 69 Fed. Reg. 24,084.

157. See e.g., *Spirit of Sage Council v. Norton*, 294 F. Supp. 2d 67 (D.D.C. 2003); George F. Wilhere, *Adaptive Management in Habitat Conservation Plans*, 16 CONSERVATION BIOLOGY 20 (2002).

158. Habitat Conservation Plan Assurances, 63 Fed. Reg. 8,859, 8,860 (Feb. 23, 1998) (codified at 50 C.F.R. pt. 17).

159. *Id.* at 8,863.

160. *Id.* at 8,868.

owner holding an ITP will commit to taking particular actions if particular circumstances change.

HCPs now typically include some sort of adaptive management provision.¹⁶¹ On its face, the two approaches to biodiversity conservation seem irreconcilable. HCPs, after all, are about providing regulatory certainty, and adaptive management is about responding to change. This juxtaposition has not gone unnoticed by critics of HCPs and “no surprises” who argue that adaptive management “must allow for adaptations to change as they occur rather than trying to plan for everything up front.”¹⁶² The Services obviously disagree and view adaptive management and monitoring an essential part of habitat conservation planning, especially when there are significant biological data gaps.

Plum Creek Timber Company Native Fish Habitat Conservation Plan

Plum Creek Timber Company’s Native Fish Habitat Conservation Plan (NFHCP) covers native salmonids on roughly 1.6 million acres of Plum Creek timberlands in Montana, Idaho, and Washington. The purpose of the HCP is to “help conserve native salmonids and their ecosystems while conducting commercial timber harvest within a framework of long-term regulatory certainty and flexibility.”¹⁶³ An ITP was issued to Plum Creek for a 30-year term in exchange for a set of conservation commitments and land management prescriptions covering categories such as roads and upland management, riparian areas, forest management practices, and land use planning.¹⁶⁴

As described by Plum Creek, the NFHCP is a mixture of a complex science plan and a business agreement designed to give the Company long-term business predictability.¹⁶⁵ Adaptive management is incorporated into the Plan in such a way that the agreement outlines “the range of possible adjustments and circumstances under which these adjustments would be triggered.”¹⁶⁶ Triggers are selected in the NFHCP because they serve as “early warning indicator[s] of results that may be

161. U.S. DEPT. OF INTERIOR & U.S. DEPT. OF COMMERCE, HABITAT CONSERVATION PLANNING AND INCIDENTAL TAKE PERMIT PROCESSING HANDBOOK, at 3-24 (1996).

162. Habitat Conservation Plan Assurances, 63 Fed. Reg. at 8,863.

163. U.S. FISH AND WILDLIFE SERV. & NAT’L MARINE FISHERIES SERV., FINAL ENVIRONMENTAL IMPACT STATEMENT AND NATIVE FISH HABITAT CONSERVATION PLAN VOL. 1 (2000), at ES-1.

164. FISH & WILDLIFE SERV. ET AL., RECORD OF DECISION: PROPOSED ISSUANCE OF A PERMIT TO PLUM CREEK TIMBER CO., AUTHORIZING INCIDENTAL TAKE OF NATIVE FISH IN MONTANA, IDAHO, AND WASHINGTON (2000).

165. *Id.* at 8.

166. PLUM CREEK TIMBER CO., FINAL PLUM CREEK TIMBER COMPANY NATIVE FISH HABITAT CONSERVATION PLAN, at 1-2 (2000).

biologically relevant.”¹⁶⁷ Instead of counting fish, the triggers use a set of measurable habitat variables that are supposed to serve as a proxy for biological health.

Some triggers specified in the Plan trip non-discretionary, pre-identified steps or “management responses” required by Plum Creek. In other cases, triggers are used to initiate “mandatory collaborative management responses.” The latter are not specifically described in the NFHCP but are to be collaboratively developed by Plum Creek and the Services. It is within this process that some triggers can be either strengthened or relaxed based on new information and agreement by the parties. As viewed by Plum Creek, adaptive management is a “two-way street” in habitat conservation planning.¹⁶⁸ That is, “information and experience obtained from research and monitoring may suggest the applicant can meet biological objectives with more, or less, restrictive conservation measures.”¹⁶⁹

The adaptive management commitments by Plum Creek are specified in matrix form, with a column of triggers followed by a column of applicable management responses. So, for example, if a “statistically significant increase of 1.0° C in stream temperature relative to pre-treatment conditions is observed,” the management response is to “revise or create riparian prescription enhancements” that are based upon an earlier evaluation.¹⁷⁰ In other parts of the Plan triggers are used in a more general and curious fashion. Take, for example, the Plan’s goal to fence one hundred percent of severely impacted stream reaches by the ninth year of the Plan. In this case a trigger is used so that if less than fifty percent of stream reaches are fenced by the sixth year, the identified management response is to simply “increase rate of fencing to achieve 100 percent by the end of year 9.”¹⁷¹

Several conservation groups find fault with Plum Creek’s HCP. Much of their criticism stems from the belief that the Plan’s conservation commitments are biologically and legally insufficient, vague, and not certain to happen. Trout Unlimited (TU) asks for more sensitive triggers to be used and for them to be defined in more quantitative terms.¹⁷²

167. *Id.* at 8-7.

168. *Id.* at 8-11.

169. *Id.*

170. *Id.* at 8-19. This trigger is further explained to be a “statistically significant (alpha=0.1) increase of 1.0°C in maximum weekly average temperature based on a pooling of all measured sites.” *Id.* at 8-25.

171. *Id.* at 8-20.

172. TROUT UNLIMITED, PRINCIPAL FINDINGS OF TROUT UNLIMITED’S REVIEW OF THE PROPOSED PLUM CREEK NATIVE FISH HABITAT CONSERVATION PLAN (Mar. 17, 2000) (on file with authors)

Some of the conservation commitments found in the Plan, says TU, such as promises to use best management practices are either not measurable or are things that are already being practiced.¹⁷³ The Pacific Rivers Council specifically focuses on the HCP's "unprecedented and unjustifiable level of reliance on Adaptive Management mechanisms."¹⁷⁴ Core to its concerns about the HCP is how adaptive management is used as a substitute for a more precautionary approach to species conservation.

We pick up this issue again in Part IV, but important to this critique is where triggers are set and how the burden of proof is established. The problem, as the Council sees it, is that the HCP's "scientific questions revolve around the hypothesis that harmful change is not occurring in the ecosystem."¹⁷⁵ The Council believes the triggers in the HCP essentially ask "scientists to take a very noisy and structurally complex system, with a relatively small sample size, and demonstrate some 'undesirable' trend in the data before remedial management action will be considered."¹⁷⁶ The adaptive approach, according to the Council, does not account for the full spectrum of uncertainties inherent in Plum Creek's HCP. The Plan's design, it says, does more to ensure certainty for Plum Creek's business interests than it does for the covered species.¹⁷⁷

Running throughout the HCP, says the Council, is an unfounded optimism that adaptive management can be used to easily reverse adverse changes to habitat and fish. This is problematic, it says, because of the biological time-lags between management activity and biological responses. And even if quickly identified and measured, says the Council, "many of the most important adverse changes cannot be effectively reversed through any known management intervention."¹⁷⁸ What the Council would like instead is a more risk-averse approach that prioritizes the conservation needs of salmonids.

173. Letter from Bruce Farling, Trout Unlimited, to Ted Koch (Mar. 16, 2000) (on file with authors) (regarding comments on proposed Plum Creek NFHCP and DEIS).

174. Letter from Mary Scurlock, Pac. Rivers Council, to Thomas Dwer, William Stelle, Jr., Ted Koch & Bob Ries (Mar. 17, 2011) (on file with authors) (regarding Plum Creek Native Fish Habitat Conservation Plan).

175. CHRIS FRISSELL ET AL., AN ECOLOGICAL ASSESSMENT OF THE PLUM CREEK NATIVE FISH HABITAT CONSERVATION PLAN 24v (Pac. Rivers Council, Mar. 17, 2000) (on file with authors).

176. *Id.*

177. *Id.* at 26.

178. *Id.* at 24.

D. State Wolf Management Plans for ESA Delisting

Montana and Idaho wrote state wolf management plans that would be implemented upon the delisting of wolves from the ESA in the Northern Rocky Mountains.¹⁷⁹ The delisting rule requires at least ten breeding pairs and at least 100 wolves for three consecutive years in three core recovery areas: northwestern Montana, central Idaho, and the Greater Yellowstone Area. This is a recovery standard as first used in the 1987 Wolf Recovery Plan.¹⁸⁰ In order to delist wolves in the Northern Rockies, the USFWS required the writing of state wolf management plans that will serve as an “adequate regulatory mechanism,” one of the five delisting requirements of the ESA.¹⁸¹

Unlike Wyoming, the states of Montana and Idaho wrote wolf plans that were deemed sufficient by the USFWS.¹⁸² Both plans invoke adaptive management and use population-based triggers to initiate different types of wolf management upon delisting. Montana’s Department of Fish, Wildlife, and Parks uses an “adaptive management trigger” in its state wolf management plan.¹⁸³ A minimum of fifteen breeding pairs of wolves is the trigger point requiring the agency to manage the wolf population more conservatively or liberally. More conservative management strategies would be used by the agency as the number of breeding pairs decreases and approaches the fifteen mark. In contrast, management strategies would become more liberal with increasing numbers of breeding pairs. The agency lays out the types of management required when numbers are above or below the fifteen pair trigger. For example, no hunting or trapping of wolves is allowed when there are fewer than fifteen breeding pairs of wolves in the state, and regulated hunting and trapping is permitted when over this mark. The control of wolves is also

179. Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife, 74 Fed. Reg. 15,123 (Apr. 2, 2009) (codified at 50 C.F.R. pt. 17).

180. *Id.* at 15,130, 15,131. If written, the ESA requires recovery plans to include “objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list . . .” 16 U.S.C. § 1533 (f)(1) (2006).

181. 16 U.S.C. §1533(a)(1) (2006); 50 C.F.R. §424.11(c) (2010).

182. See Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife, 74 Fed. Reg. at 15,124; *Defenders of Wildlife v. Hall*, 565 F. Supp. 2d 1160 (D. Mont. 2008) (finding Wyoming’s wolf plan an inadequate regulatory mechanism because it classifies wolves as predators that are subject to unregulated killing across roughly 90 percent of the state and that Wyoming’s Plan only commits the state to managing for 7 breeding pairs of wolves outside National Parks).

183. MONT. FISH, WILDLIFE & PARKS, MONTANA WOLF CONSERVATION AND MANAGEMENT PLAN: FINAL ENVIRONMENTAL IMPACT STATEMENT 74 (2004).

determined by the fifteen pack trigger, with more liberal lethal removal of problem wolves allowed when the number is greater than fifteen.

Idaho's wolf management plan similarly uses a "management trigger" or "threshold" based on the number of breeding pairs of wolves in the state.¹⁸⁴ These range from a "FWS threshold" or bare minimum of <10 breeding pairs which signals a status review for ESA relisting to a "hunting threshold" where annual harvest of wolves is allowed when >20 breeding pairs are in the state. In between are additional thresholds requiring the state to be more restrictive in controlling wolves and intensifying monitoring efforts among other actions.

Environmental plaintiffs challenged the delisting rule and faulted state wolf management plans as part of the problem. Most of their criticism stems from the belief that the USFWS's wolf recovery goal is woefully inadequate and not based on "best available science," as required by the ESA. Instead of a dated 30 breeding pair/300 wolf standard, these groups emphasize science suggesting that a "connected population of 2,000-5,000 wolves is necessary to ensure a genetically viable northern Rockies wolf population over the long term."¹⁸⁵ Plaintiffs and other critics are arguing, in effect, that the Montana and Idaho plans, and their breeding pair triggers, are inadequate because they proceed from the federal government's problematic 30/300 wolf threshold, a threshold that they see as biologically indefensible.¹⁸⁶

Earthjustice, who represented environmental groups in the litigation, also argues that "the states' wolf management plans are largely vague and unenforceable, making no representations as to the number of wolves that will be protected and offering few guarantees as to the actions that will (and will not) be taken in pursuit of the states' management goals."¹⁸⁷ For Earthjustice, the FWS's "reliance upon Montana's and Idaho's unenforceable wolf management guidance documents evinces a failure to distinguish between regulatory and non-regulatory mechanisms."¹⁸⁸ Montana refutes this claim, though it does not directly address

184. IDAHO DEPT. OF FISH & GAME, IDAHO WOLF POPULATION MANAGEMENT PLAN, 2008-2012 at 19 (2008).

185. Earthjustice's Complaint for Declaratory and Injunctive Relief, *Defenders of Wildlife et al., v. Salazar*, Case No. CV-09-77-M-DWM (D. Mont. June 2, 2009).

186. See e.g., Bradley J. Bergstrom et al., *The Northern Rocky Mountain Gray Wolf is Not Yet Recovered*, 59 *BIOSCIENCE* 991 (2009).

187. Letter from the Fed. List of Endangered & Threatened Wildlife to Dirk Kempthorne and H. Dale Hall, Earthjustice (Feb. 27, 2008) (on file with authors) (regarding notice of violations of the Endangered Species Act in designating the Northern Rocky Mountain population of the Gray Wolf as a distinct population segment and removing that distinct population segment).

188. Earthjustice's Complaint for Declaratory and Injunctive Relief at 34, *Defenders of Wildlife et al., v. Salazar*, Case No. CV-09-77-M-DWM (June 2, 2009).

the issue of whether or not the State's Wolf Conservation and Management Plan is in fact enforceable. Instead the State argues that the plan must be understood in its larger regulatory context, and that it is consistent with applicable and legally binding state constitutional provisions, statute, rules, and policies and that these "regulatory mechanisms provide strong, multi-layered protection for the wolf."¹⁸⁹

Also a concern is the tenuous standing of these plans in light of various wolf management resolutions, state "defense of property" laws, and proposed bills in both state legislatures.¹⁹⁰ Some legislation, if enacted, would undermine the wolf plans, and their introduction has created some concern about the permanence of these plans.

The certainty of these plans being implemented absent adequate funding is another concern by Earthjustice and others commenting on the wolf-delisting rule. The state plans lack guaranteed sources of funding, a problem partly caused by the withdrawal of most federal dollars once the species is delisted. Without such funds, some groups question whether or not the plans will be implemented.¹⁹¹ In countering, the USFWS acknowledges the inherent uncertainties of appropriations, but nonetheless believes that the states are committed to secure the necessary funding to implement the plans.¹⁹²

E. Rocky Mountain National Park Elk and Vegetation Management Plan

In 2007 the National Park Service issued a final environmental impact statement for the "Rocky Mountain National Park Elk and Vegetation Management Plan."¹⁹³ Elk numbers in the Park were at carrying capacity and having deleterious effects on vegetation communities, including aspen, willow, and upland herbaceous communities. The presence of elk also was crowding out beavers, causing changes to the hydrology in riparian areas, with further negative impacts on riparian willow communities. In the absence of natural predators, elk were less

189. Mont. & Mont. Dept. of Fish, Wildlife & Parks' Brief Opposing Plaintiffs' Motion for Preliminary Injunction at 2, *Defenders of Wildlife, et al., v. Hall*, Case No. CV-08-56-M-DWM (May 16, 2008).

190. Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife, 74 Fed. Reg. 15,123, 15,149-150 (Apr. 2, 2009) (codified at 50 C.F.R. pt. 17).

191. Letter from the Fed. List of Endangered & Threatened Wildlife, *supra* note 187, at 5.

192. Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife, 74 Fed. Reg. at 15,151.

193. NAT'L PARK SERV., FINAL ENVIRONMENTAL IMPACT STATEMENT ELK AND VEGETATION MANAGEMENT PLAN, ROCKY MOUNTAIN NATIONAL PARK (2007).

mobile than they would have been historically, causing increased damage to vegetation communities. Between 1997-2001 the elk community reached numbers of 2800-3500 animals, whereas under natural conditions populations would likely be between 1200-2100 animals.¹⁹⁴

The NPS' Record of Decision was issued in 2008, and the selected alternative includes culling of elk populations to maintain them at the higher end of their range of natural variation.¹⁹⁵ Given that elk numbers are to be maintained at relatively high levels, the alternative also includes fencing of some vegetation communities to promote their recovery. The selected alternative also includes the potential use of fertility control agents, methods for redistributing elk, and possible reintroduction of wolves.¹⁹⁶

A key component of the Management Plan is a monitoring and adaptive management framework. In the 2007 EIS, the NPS explains, "Monitoring and evaluation are crucial in determining whether management actions are achieving objectives. . . . This process of using information as it becomes available to alter management actions is called adaptive management. Adaptive management is an iterative process that requires selecting and implementing management actions, careful monitoring, comparing results with objectives, and using feedback to make future management decisions."¹⁹⁷

There is a control/treatment framework in place, with monitoring occurring in fenced and non-fenced areas, in core ranges versus non-core ranges, and compared to baseline conditions, which allows for some causal inference of factors affecting vegetation conditions.¹⁹⁸

The monitoring framework has several primary purposes.¹⁹⁹ One is to determine if management actions are making progress towards desired conditions. Other goals are to model elk populations to guide annual removal rates and to gather data for model improvement. The steps of this process include, first, extensive collection of baseline data. Next, desired future conditions are established for elk and vegetation. Management actions are then applied, followed by monitoring to ensure progress towards desired conditions and to be sure the actual impacts, for

194. *Id.* at iv.

195. NAT'L PARK SERV., FINAL ENVIRONMENTAL IMPACT STATEMENT ELK AND VEGETATION MANAGEMENT PLAN, RECORD OF DECISION, ROCKY MOUNTAIN NATIONAL PARK (2008).

196. *Id.*

197. NAT'L PARK SERV., *supra* note 193, at 53.

198. LINDA C. ZEIGENFUSS ET AL., U.S. GEOLOGICAL SURVEY, OPEN-FILE REPORT 2011-1013, MONITORING PLAN FOR VEGETATION RESPONSES TO ELK MANAGEMENT IN ROCKY MOUNTAIN NATIONAL PARK (2011).

199. NAT'L PARK SERV., *supra* note 195, at 10-1 (These are outlined in the Record of Decision).

example to factors such as visitor experience, are within ranges analyzed in the EIS. Monitoring tracks whether these goals are being met and then adjustments will be made if there is no progress towards the desired future conditions. Adjustments for vegetation, for example, might include increased or decreased fencing of plant communities, increased redistribution or aversive conditioning, and fertility control of elk, among other things.²⁰⁰

The EIS includes several indicators with thresholds that are evaluated to determine whether management actions are successful or need to be altered.²⁰¹ For example, for aspen, the desired future condition is a distribution of stems of ~75 percent small diameter, ~20 percent medium diameter, and ~5 percent large diameter and regeneration in at least 45 percent of stands each decade. The indicator is the number of stems/acre. In the case of riparian willow, the desired future condition is 70 percent willow cover in suitable habitat, although the NPS acknowledges that this will not be possible to accomplish in the 20 year life of the plan. Indicators are consumption/offtake, percent cover, and structure.

In 2011, based on additional collection of baseline monitoring data, thresholds were refined from those in the original EIS and fleshed out in detail in the "Monitoring Plan for Vegetation Responses to Elk Management in Rocky Mountain National Park."²⁰² Desired future conditions and indicators are the same, but thresholds were updated to reflect baseline conditions. For example, the threshold for aspen is, "Progressive increase in aspen regeneration above the [baseline] level of 13%. . . . Progressive shift in the distribution of stem size toward the desired future condition."²⁰³ For willow the threshold is no net increase in offtake above the baseline level of 35 percent and increase in cover and height above the baseline levels of 21 percent and .9m, respectively.²⁰⁴

These thresholds represent baseline conditions before implementation of the new elk management plan, and monitoring will be conducted every 5 years to ensure that progress is made towards desired conditions.²⁰⁵ If not, management actions will be adjusted within the flexible parameters set in the selected alternative. Importantly, the language in the EIS is written in a way that constitutes a clear commitment. For example, the section on monitoring response of aspen communities states, "As a result of monitoring the indicators defined. . .management

200. More details are provided in the EIS. NAT'L PARK SERV., *supra* note 193, at 52-3.

201. *Id.* at 57.

202. *Id.*

203. *Id.* at 9.

204. *Id.*

205. NAT'L PARK SERV., *supra* note 195, at 35.

actions would be adjusted to ensure that progress is made toward achieving desired future conditions.²⁰⁶ It is clear that monitoring results will be evaluated every 5 years, although the timeframe for implementing mitigation measures is less clear. As explained above, desired conditions are quantified and measurable, and the threshold establishes baseline conditions before implementation of the plan, essentially serving as a baseline against which progress can be measured.

F. Northwest Forest Plan

In 1994 the USDA and USDI jointly published a record of decision (ROD) that amended the land management plans on all forested public lands managed by the U.S. Forest Service and the Bureau of Land Management within the range of the Northern Spotted Owl (*Strix occidentalis*).²⁰⁷ This ROD, with amendments, still applies to land management plans in Washington, Oregon, and California and is commonly known as the Northwest Forest Plan (NWFP). The NWFP has been hailed as one of the foremost examples of adaptive management embedded within a large-scale land management plan.²⁰⁸

The primary components of the NWFP are 1) land allocations with associated standards and guidelines for each type of allocation, 2) an aquatic conservation strategy to improve watershed health over time, 3) a comprehensive monitoring program, including pre-implementation surveys for some species, post-project implementation monitoring, and effectiveness and validation monitoring, and 4) the creation of adaptive management areas (AMAs).²⁰⁹ The AMAs thus far have not been particularly successful, and therefore they are not the focus of this discussion.²¹⁰ However, consideration of the other aspects of the NWFP sheds some light on how triggers are used in the NWFP.

Management triggers are not a prominent aspect of the NWFP, but, as we will see, there is some use of triggers or thresholds. In their discussion of the design of an effectiveness monitoring program for the NWFP, Barry Noon and others write that the lack of trigger points tied to a change in management action has historically been a weakness of mon-

206. NAT'L PARK SERV., *supra* note 193, at 56.

207. NWFP ROD, *supra* note 90.

208. See e.g., Ruhl & Fishman, *supra* note 7; Bernard T. Bormann et al., *Adaptive Management of Forest Ecosystems: Did Some Rubber Hit the Road?* 57 *BIOSCIENCE* 189 (2007).

209. NWFP ROD, *supra* note 90.

210. See Bormann et al., *supra* note 208; George H. Stankey, et al., *Adaptive Management and the Northwest Forest Plan: Rhetoric and Reality*, 40 *J. FORESTRY* 101 (2003).

itoring programs.²¹¹ They explain that absent decision thresholds or triggers, management is disconnected from monitoring. Despite this affirmation of the need for management triggers, the team concludes it is too complex of an issue to address for the NWFP effectiveness monitoring program at the time this document was prepared, in 1999, but is something to be addressed and improved over time.²¹² Therefore, the effectiveness monitoring program for the NWFP does not include specific management triggers. For example, there is no provision that states if Northern Spotted Owl populations reach a certain level, then management will be changed in a particular fashion. In their review of the progress of adaptive management under the NWFP after the first 10 years, Bormann and others write, “The questions posed by the monitoring program could have been more relevant to the unfolding decisions. . .,” and they explain that one improvement would be the addition of quantitative expectations.²¹³

Nonetheless there are some types of thresholds that exist as part of the NWFP. These are discussed in turn below and include 1) assumptions within the effects analysis of the final environmental impact statement for the NWFP, 2) the use of a baseline for comparison as part of the Aquatic Conservation Strategy (ACS), 3) standards and guidelines of the NWFP, and 4) survey and manage requirements that in some cases trigger certain monitoring and mitigation actions.

If the effects analysis in a NEPA document sets limits on predicted effects, these may effectively serve as triggers when the NEPA document covers long-term, ongoing actions, such as in the case of the NWFP. For example, the NWFP FEIS predicted no more than a 5 percent loss of Northern Spotted Owl habitat; monitoring after 15 years of implementation shows that losses of habitat are <1 percent, or less than what was predicted in the FEIS.²¹⁴ If monitoring had shown that effects were outside the range of predicted effects in a programmatic EIS such as the NWFP this would trigger supplemental analysis under NEPA and likely force such analysis before any further actions were undertaken.

Standards and guidelines also can act as types of triggers. The NWFP’s ACS includes riparian reserves, designation of key watersheds, watershed analysis, and watershed restoration.²¹⁵ Agencies *must* imple-

211. Barry R. Noon et al., *Conceptual Basis for Designing an Effectiveness Monitoring Program*, in BARRY S. MULDER ET AL., *THE STRATEGY AND DESIGN OF THE EFFECTIVENESS MONITORING PROGRAM FOR THE NORTHWEST FOREST PLAN*, GEN. TECH. REP. NO. 437 (1999).

212. *Id.* at 40.

213. Bormann et al., *supra* note 208, at 189.

214. RAY DAVIS ET AL., *NORTHWEST FOREST PLAN-THE FIRST 15 YEARS [1994-2008]: SUMMARY OF KEY MONITORING FINDINGS 2-3* (2011).

215. *See* NWFP ROD, *supra* note 90, at B-12.

ment the ACS in order to maintain existing conditions or improve degraded conditions.²¹⁶ Projects cannot go forward that do not promote or that prevent attainment of the ACS objectives. However, there are no quantified thresholds under the ACS (although other water quality thresholds may apply in the plan area that are associated with Clean Water Act or Endangered Species Act compliance). Rather, the ACS works as a set of standards and guidelines constraining planned actions under the NWFP. Effects on watersheds are compared to baseline conditions when the NWFP was implemented, and maintenance or improvement is expected in comparison to those baseline conditions. Other standards and guidelines under the NWFP trigger specific actions. For example, in the “matrix” lands, which are the allocated lands where the vast majority of timber harvest can occur, in watersheds with less than 15 percent late-successional forest remaining, a watershed analysis is required prior to harvesting of additional late-successional stands.²¹⁷ In this case, prior logging in a watershed might trigger this additional analysis.

Finally, survey and manage protocols under the NWFP also act as a type of trigger.²¹⁸ These protocols apply to approximately 400 species of amphibians, mammals, bryophytes, mollusks, vascular plants, fungi, lichens, and arthropods. Under the original survey and manage protocols, species generally fell into one of four categories, and more than one category could apply to the same species. The first category required management of known sites (essentially protection of acres and the use of management guidelines around known points of occurrence). The second category required surveys prior to ground-disturbing activities. For most of the history of survey and manage, the red tree vole (*Arborimus longicaudus*), a prey species for northern spotted owls, fell into this category. If the species was found prior to ground-disturbing activities, mitigation requirements and management activities were triggered to protect the species in that location. Other species were in a category that required extensive surveys to identify high priority sites. A final category required general regional surveys for species whose status was highly uncertain; the purpose of these surveys was to collect additional information to determine if protection is needed and to inform management strategies. The approach, unprecedented in scope, was meant to reduce uncertainty and “assess new information under an adaptive manage-

216. *Id.* at B-9 to B-10.

217. *Id.* at E-5.

218. *Id.* at C-4.

ment approach for evaluating needs for conservation and protection of the species.”²¹⁹

Jack Ward Thomas chaired the original Forest Ecosystem Management Assessment Team (FEMAT), which designed the Northwest Forest Plan; in a review of the NWFP he explains that survey and manage protocols were never part of Option 9, the management option identified by FEMAT that was selected by President Clinton as the administration’s preferred approach.²²⁰ According to Thomas, in the final EIS, the agencies decided to include survey and manage in the selected alternative for the NWFP, likely because they anticipated the plan would not survive legal challenge without it. Thomas explains that the effect of survey and manage was a dramatically different outcome than what the FEMAT anticipated under Option 9, and in fact more closely resembled Option 1, which the team referred to as “the green dream,” in which all old-growth forest was protected.²²¹ Thomas explains that if sensitive species were found in pre-disturbance surveys, mitigation measures were supposed to be triggered. As a result, he writes, “In most cases, the proposed sale was simply dropped from consideration.”²²² This, Thomas explains, is one reason the timber outputs under the NWFP have been significantly less than what was predicted by the FEMAT and in the FEIS. Others note that pre-disturbance surveys were the most contentious part of the program and required more resources and time than originally anticipated.²²³

Since 2000, the Clinton and Bush administration have pursued a number of changes to survey and manage protocols, with an attendant array of lawsuits and legal settlements. The parties are currently in settlement discussions, and the current status of survey and manage is a combination of the original guidelines, changes from the 2001 Record of Decision modifying the survey and manage protocols, and other amendments.²²⁴

Some of the primary legal challenges to the NWFP revolved around whether the management approaches for northern spotted owls and aquatic resources provided enough certainty as to whether resources would be protected. For example, the agencies in their FEIS predicted an

219. Randy Molina et. al., *Protecting Rare, Old-Growth, Forest-Associated Species under the Survey and Manage Program Guidelines of the Northwest Forest Plan*, 20 CONSERVATION BIOLOGY 306, 310 (2006).

220. JACK WARD THOMAS, SUSTAINABILITY OF THE NORTHWEST FOREST PLAN—DYNAMIC VS. STATIC MANAGEMENT (2011), available at www.fs.fed.us/r5/nwfp/plans/sus.shtml.

221. *Id.*

222. *Id.*

223. Molina et al., *supra* note 219, at 311.

224. *Survey and Manage*, DEP’T OF INTERIOR BUREAU OF LAND MGMT, <http://www.blm.gov/or/plans/surveyandmanage> (last updated Jan. 2012).

80 percent or greater likelihood of maintaining viability for all but three species, with a ~20 percent likelihood of extinction in the long run.²²⁵ In light of the presence of significant scientific uncertainty as to both the status of some species and the effects of current and anticipated management strategies, the presence of a monitoring plan was crucial to the success of the NWFP in court. In his decision upholding the NWFP, Judge Dwyer writes, “Monitoring is central to the plan’s validity. If it is not funded, or not done for any reason, the plan will have to be reconsidered.”²²⁶

IV. ANALYSIS

Throughout the cases examined in sections II and III, several persistent issues surface as some of the primary themes and challenges associated with triggers in adaptive management plans. For instance, are these examples of “real” adaptive management or something else that is inappropriately labeled as such? How enforceable and binding are these adaptive management plans? When it comes to monitoring and mitigation, how do we ensure it occurs, who pays for it, and who does it? How is NEPA navigated and who sets the triggers in these plans? In this section we provide in-depth analysis of the primary issues that arise as a result of our investigation into the use of triggers.

A. Adaptive Management or Adaptive Mitigation?

Rather than adaptive management, the terms “adaptive mitigation” and “contingency planning” are more accurate ways to describe most of the cases in Part III. Each case emphasizes uncertainty and the importance of monitoring, among other central principles of adaptive management, but they are generally not designed as hypothesis-driven experiments that will necessarily reduce uncertainty and promote learning. Instead, the main emphasis is to monitor conditions and adapt actions over time. This type of adaptive mitigation is more common in the cases reviewed, but that is not to say that no learning is occurring.

In some cases, such as that of Rocky Mountain National Park’s Elk and Vegetation Management Plan, monitoring includes a detailed plan and design with control plots, allowing for some causal inference and comparison across different types of treatment areas.²²⁷ Although such

225. See *Seattle Audubon Soc’y v. Lyons*, 871 F. Supp. 1291 (W.D. Wash. 1994) (upholding the NWFP); *Seattle Audubon Soc’y v. Moseley*, 80 F.3d 1401 (9th Cir. 1996).

226. *Lyons*, 871 F. Supp. at 1324.

227. See LINDA C. ZEIGENFUSS, THERESA JOHNSON & ZACHARY WIEBE, MONITORING PLAN FOR VEGETATION RESPONSES TO ELK MANAGEMENT IN ROCKY MOUNTAIN NATIONAL PARK,

plans may not be primarily set up to test alternate hypotheses, there is some knowledge generation that goes beyond a kind of adaptive mitigation.

However, in other cases, although monitoring is incorporated, the opportunities for understanding causality are limited, and the primary focus is on adapting practices if conditions are less-than-desirable, even if our understanding of what is causing such resource conditions is not necessarily improved. What is more, in some cases the link between monitoring information and adapting management actions is not entirely clear. In other words, plans do not always make it explicit what will happen once a trigger is pulled in response to monitoring information. In such cases, monitoring and mitigation can be an inefficient use of everyone's time. This point has not been lost on the public. One observer writes:

Under current practice, cookie cutter mitigation is typically applied in decision records and the agencies require operators to bear the expense of monitoring to prove that their mitigation is working. No triggers or feedback mechanisms are defined. In the BLM's [adaptive management] approach, for example, monitoring plans are designed to gather an entire universe of data without regard to cause of the effects monitored.²²⁸

To be fair, some definitional and operational variation of adaptive management is to be expected. In the context of habitat conservation planning, for example, the Services recognize how their broad approach to adaptive management differs from how the term is used in the scientific literature. But they note that the term "is used in many other disciplines and contexts and has different meanings to different people."²²⁹ The Services thus distinguish between experimental-based adaptive management, which can be difficult in the context of the ESA,²³⁰ and types of contingency planning that may or may not include adaptive

U.S. DEP'T INTERIOR & U.S. GEO. SURVEY (2011), available at <http://pubs.usgs.gov/of/2011/1013/pdf/OF11-1013.pdf>.

228. Letter from Clair M. Moseley, Exec. Dir., Public Lands Advocacy to Ted Boling, Attorney, Senior Council, at 5 (May 22, 2010) (on file with author).

229. Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,242, 35,245 (June 1, 2000).

230. See DONALD LUDWIG & CARL J. WALTERS, FITTING POPULATION VIABILITY ANALYSIS INTO ADAPTIVE MANAGEMENT, POPULATION VIABILITY ANALYSIS (Steven R. Beissinger & Dale R. McCullough eds., 2002) (suggesting that experimental adaptive management approaches to endangered species will be infrequent).

management. As discussed in Part III, contingency planning is used by the Services when negotiating “changed circumstances” in an ITP. These are “circumstances that can be reasonably anticipated, and the HCP can incorporate measures to be implemented if the circumstances occur.”²³¹ As explained by the Services, “This flexibility also allows previously agreed upon management and/or mitigation actions to be implemented or discontinued, as needed, in response to changed circumstances.”²³²

The Pinedale oil and gas case is a good example of what is primarily a kind of adaptive mitigation, as its “wildlife monitoring and mitigation matrix” serves as a trigger for various management actions. This is when agencies incorporate adaptive mechanisms “specifying in advance an expected range of uncertainties and offering a corresponding range of mitigation measures, to be triggered and adjusted in response to actual impacts subsequently revealed by monitoring data.”²³³ In some cases, the concepts of adaptive mitigation and contingency planning are often interchangeable because some contingency plans include built-in mitigation measures. Recall, for instance, the FCRPS Adaptive Management Implementation Plan in which biological triggers are used to activate short and long-term contingency actions.

What’s the point, though, of making all these distinctions between the various types of projects agencies call “adaptive management?” We take two primary lessons from the cases. First, there should be some truth in advertising. Members of the public may have a particular idea of what constitutes adaptive management. If an agency advances something that is really just contingency planning, but is packaged as adaptive management, this can appear disingenuous and erode trust in already contentious contexts. Secondly, if so-called adaptive management plans fail to make the link between monitoring information, action, and learning, then there is genuine cause for concern or at least some attention. Key questions arise such as: will any learning occur or is there a lost opportunity to reduce uncertainty about the ecosystem? And, is there a feedback loop to tie learning, or at least monitoring information, back into revised planning and actual management changes? These are critical questions and reasons why it is important to be discerning about what exactly is taking place under the umbrella of “adaptive management.”

231. Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. at 35,253 .

232. *Id.*

233. Bradley C. Karkkainen, *Towards a Smarter NEPA: Monitoring and Managing Government’s Environmental Performance*, 102 COLUM. L. REV. 903, 945 (2002).

B. Enforceability of Promised Monitoring and Mitigation Actions

One of the most challenging issues emerging in these cases is the question of whether monitoring and mitigation commitments are enforceable and certain to occur. What if promises are made to conduct monitoring or undertake mitigation and these promises simply are not kept? When are they enforceable? This is a fundamental issue: if monitoring and triggers are meant to add a level of accountability to adaptive management plans, then we likely want to know how much accountability we are actually getting. In this section we address the requirements regarding mitigation measures, which often are triggered by, and therefore inextricably linked to, monitoring information, and more generally the enforceability of monitoring, mitigation, and other commitments in Records of Decision.

1. The Enforceability of Mitigation Commitments in a Record of Decision

Part III shows how agencies often use triggers to initiate a range of mitigation measures. These mitigation “commitments” are made in resource management plans, biological opinions, habitat conservation plans, and various NEPA-related documents. There are a number of things to consider about commitments to mitigate when they are made in agency decisions. In the NEPA context, mitigation measures are not necessarily legally binding. In preparing EIS alternatives, NEPA’s implementing regulations require agencies to “include appropriate mitigation measures not already included in the proposed action or alternatives.”²³⁴ However, agencies are not required under NEPA to implement mitigation measures that are discussed in an EIS.²³⁵ At the same time, mitigation measures committed to as part of the ROD in an EIS are potentially legally binding, as will be discussed more below.

Mitigation measures are scrutinized more closely when agencies make mitigation promises as a way to justify a finding of no significant impact (FONSI) in lieu of preparing an EIS. Though most agencies do not call them as such, the “mitigated-FONSI” is used by agencies when they reduce project impacts below the NEPA “significance” threshold by ad-

234. 40 C.F.R. § 1502.14(f) (2010). The regulations define mitigation to include: a) avoiding the impact altogether by not taking a certain action or parts of an action, b) minimizing impacts by limiting the degree or magnitude of the action and its implementation, c) rectifying the impact by repairing, rehabilitating, or restoring the affected environment, d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action, and e) compensating for the impact by replacing or providing substitute resources or environments. 40 C.F.R. § 1508.20 (2010).

235. See *Robertson v. Methow Valley Citizens Council*, 490 U.S. 322, 352–53 (1989).

ding mitigation measures to the original proposed action. Though they can be controversial, mitigated-FONSI offer a possible way for agencies to navigate NEPA in a more streamlined fashion, by avoiding significant impacts up-front. However, although it is not required, follow-up monitoring would ideally occur to confirm that predictions of non-significance were accurate. The CEQ recommends that monitoring occur in “important” cases, and especially where uncertain mitigation approaches support a mitigated FONSI.²³⁶ The CEQ “approves the use of the ‘mitigated FONSI’ when the NEPA process results in enforceable mitigation measures.”²³⁷

Several legal observers outline the broad parameters provided by the courts when it comes to reviewing mitigation measures when they justify the issuance of a mitigated FONSI.²³⁸ First, agencies must “convincingly establish” that mitigation will succeed in reducing impacts below the NEPA significance threshold.²³⁹ “Inchoate or speculative mitigation measures” have been rejected by the courts.²⁴⁰ They have also demanded “more than mere vague statements of good intentions” and have “rejected reliance on measures demonstrably unlikely to be enforced.”²⁴¹ All the same, courts have not “required absolute certainty or any binding legal commitment to mitigation measures.”²⁴² The general judicial trend is to require a “moderately high level of assurance” that mitigation measures will be performed, with the recognition that funding for monitoring and mitigation often must materialize after the decision point has passed.²⁴³

In 2011 guidance on monitoring and mitigation, CEQ says that agencies “should not commit to mitigation. . . unless they have sufficient legal authorities and expect there will be necessary resources available to

236. Council on Env'tl. Quality, Final Guidance for Federal Departments and Agencies on the Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact, 76 Fed. Reg. 3,843, 3,849 (Jan 14, 2011) (codified at 40 C.F.R. pts. 1500-02, 1505 -08) [hereinafter CEQ Final Guidance on Mitigation and Monitoring] (stating that “an agency should also commit to mitigation monitoring in important cases when relying upon an EA and mitigated FONSI”).

237. *Id.* at 3,848.

238. See Albert I. Herson, *Project Mitigation Revisited: Most Courts Approve Findings of No Significant Impact Justified by Mitigation*, 13 *ECOLOGY L.Q.* 72 (1986); Dave Owen, *Probabilities, Planning Failures, and Environmental Law*, 84 *TULANE L. REV.* 265 (2009).

239. Owen, *supra* note 238 (citing *Conner v. Burford*, 848 F.2d 1441, 1450 (9th Cir. 1988)).

240. *Id.* (citing *O'Reilly v. U.S. Army Corps of Eng'rs*, 477 F.3d 225, 234 (5th Cir. 2007)).

241. *Id.* (citing *Audubon Soc'y of Cent. Ark. v. Dailey*, 977 F.2d 428, 435-36 (8th Cir. 1992)).

242. *Id.*

243. *Id.*

perform or ensure the performance of the mitigation.”²⁴⁴ This authority may come from the agency itself or from another legal requirement or statute. An agency may commit to a mitigation alternative in an EA or EIS; in general, the CEQ recommends that mitigation commitments be clearly identified in the appropriate decision documents and “should be carefully specified in terms of measurable performance standards or expected results, so as to establish clear performance expectations.”²⁴⁵ In essence, the message is that the agency should have the authority and a high degree of certainty that it will perform any promised mitigation measures, and these measures should be enforceable in some way. A key challenge is having enough precision in mitigation goals and commitments to determine whether they have been implemented and successful.

However, there is ample confusion as to when mitigation measures as promised in a ROD for an EA with a FONSI or an EIS constitute legally binding and enforceable commitments.²⁴⁶ This question was raised in several of the case studies. Those participating in these processes often asked for greater assurances that if pulled, triggers would initiate mandatory and enforceable mitigation measures. Several environmental groups asked for the use of triggers and thresholds in the Pinedale case for example, but they also wanted more certainty that the corresponding mitigation measures would be “clearly specified, adequately funded, and enforceable.”²⁴⁷ In their critiques of the current approach, they stated, “These vague and potentially nonbinding provisions are insufficient to meet BLM’s obligations under NEPA,” and “[t]his is especially true because BLM has a history of not fulfilling its mitigation commitment on the Pinedale Anticline.”²⁴⁸ In comments on CEQ’s draft guidance on monitoring and mitigation, one observer notes, “[T]here is some confusion as to whether mitigation commitments made in a record of decision (ROD) are legally enforceable. While the regulation at 40 C.F.R. §1505.3 provides that, ‘Mitigation. . .and other condi-

244. CEQ Final Guidance on Mitigation and Monitoring, *supra* 236, at 3,847.

245. *Id.* at 3,848.

246. The 2003 NEPA Task Force asked for CEQ guidance on this issue and surmised that “[w]hen using a mitigated FONSI that is not a decision document, the binding commitment must come from a statute other than NEPA and should be incorporated in an agency’s decision document.” THE NEPA TASK FORCE, REPORT TO THE COUNCIL ON ENVIRONMENTAL QUALITY: MODERNIZING NEPA IMPLEMENTATION 69 (2003).

247. Letter from Bruce Pendery, Attorney at Law, Wyoming Outdoor Council, to Matt Anderson, Project Lead at 42 (Apr. 5, 2007), available at http://www.wyomingoutdoorcouncil.org/html/what_we_do/air_quality/pdfs/Draft%20PAPASEIS%20Comments.pdf [hereinafter Pendery, SEIS Comments].

248. *Id.* at 43.

tions. . . committed as part of the decision shall be implemented by the lead agency or other appropriate consenting agency,' some courts have viewed ROD commitments as legally enforceable by citizens, and others have not."²⁴⁹

There are the two key questions here: what legal recourse would one have to challenge an agency if it does not adopt the terms of a ROD? Secondly, how exactly does an agency, as CEQ recommends, include monitoring and mitigation commitments in a ROD in a way that constitutes an enforceable commitment? CEQ guidance addresses this issue of whether ROD commitments are legally binding, but the sum total of the guidance is a bit ambiguous. In a 1981 guidance document, CEQ indicates that they are enforceable:

This is based on the principle that an agency must comply with its own decisions and regulations once they are adopted. Thus, the terms of a Record of Decision are enforceable by agencies and private parties. A Record of Decision can be used to compel compliance with or execution of the mitigation measures identified therein.²⁵⁰

In the most recent guidance on the monitoring and mitigation in NEPA documents, the language is less assertive. CEQ explains in cases of "mitigation failure," or where the promised mitigation either fails or does not take place, the basis of the original NEPA document is called into question; if federal action remains, NEPA supplementation may be required.²⁵¹ CEQ also notes that mitigation failures may cast doubt on whether similar mitigation measures should be relied upon in future NEPA documents. However, nowhere in the guidance does it say outright that commitments made in a ROD are legally binding and enforceable by private parties. CEQ also reminds us that it is only under other legal authorities that agencies may be required to actually do monitoring and/or mitigation.²⁵² Mitigation failures would be more legally binding

249. Letter from Bruce Pendery Attorney at Law, Wyoming Outdoor Council to Nancy Suttley, Chair Council on Env'tl. Quality, Exec. Office of the President (Apr. 7, 2010), *available at* http://ceq.hss.doe.gov/current_developments/docs/mmcomments/Wyoming_Outdoor_Council_MM_Comments_04072010.pdf.

250. Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026, 18,037 (Mar. 23, 1981) (codified at 40 C.F.R. pts. 1500-08).

251. CEQ Final Guidance on Mitigation and Monitoring, *supra* note 236, at 3,845 (CEQ notes, "[I]f there is Federal action remaining, it is appropriate for agencies to consider preparing supplementation NEPA analysis. . . to pursue remaining opportunities to address the effects of that remaining action.").

252. CEQ Final Guidance on Mitigation and Monitoring, *supra* 236, at 3,844 (stating that: "it is an agency's underlying authority that provides the basis for the agency to com-

if the mitigation had served to justify a FONSI, and thus the failure triggers the need for an EIS, or if they served to keep the agency from violating another legal standard.

CEQ highlights in its 2011 guidance document the strength of the Department of the Army's NEPA regulations and the fact those regulations affirmatively make ROD commitments legally binding.²⁵³ The importance of funding is also addressed by the Army in its regulations, which state the "project cannot be undertaken until required mitigation efforts are fully resourced, or until the lack of funding and resultant effects, are fully addressed in the NEPA analysis."²⁵⁴ These regulations are used as exemplars in part because they make mitigation and monitoring commitments in RODs clearly enforceable and thus give such commitments in NEPA documents added integrity. In their 2011 guidance, CEQ explains that agencies also could self-impose a system whereby funding, permitting, or other agency decisions are contingent upon the completion of mitigation measures, and they recommend agencies do this.

A number of courts have held that NEPA "does not give rise to a 'private right of action' to enforce promises made in EISs."²⁵⁵ In other cases, courts have acknowledged that commitments in a decision are legally binding, but generally in cases where agencies issued FONSI's.²⁵⁶ It

mit to perform or require the performance of particular mitigation. That authority also allows the agency to implement and monitor, or to require the implementation and monitoring of, those mitigation commitments to ensure their effectiveness. . . . NEPA in itself does no compel the selection of a mitigated approach. But where an agency chooses to base the use of less extensive NEPA analysis on mitigation, then this guidance is designed to assist agencies in ensuring the integrity of that decision."

253. *Id.* at 3852 (citing 32 C.F.R. § 651.15(b) (2010)) (stating that mitigation measures assessed and chosen in an EA or EIS are a binding commitment: "The proponent must implement those identified mitigations, because they are commitments made as part of the Army decision."). 32 C.F.R. § 651.15(c) (2010) states the mitigation measures in FONSI's are legally binding commitments; if they do not occur the project proponent must submit an NOI to prepare an EIS, according to the Army's regulations.

254. *Id.* The regulations also state that "[t]he mitigation shall become a line item in the proponents budget or other funding document, if appropriate, or included in the legal document implementing the action (for example, contracts, leases, or grants)." 32 C.F.R. § 651.15(b) (2010).

255. See Thomas O. McGarity, *Judicial Enforcement of NEPA-Inspired Promises*, 20 ENVTL. L. 569 (1990).

256. For example, in *Lee v. U.S. Air Force*, 220 F. Supp. 2d 1229 (D.N.M. 2002), a district court held that 40 C.F.R. § 1505.3 (2001) makes it clear that agencies are bound to abide by the mitigation measures they commit to in a Record of Decision. The court explained the agency is "legally bound by the Record of Decision," and if they fail to uphold their commitments "they are subject to all recourse contemplated by federal law." 220 F. Supp. 2d at 1236. In this case, no failure had occurred; the court was responding to challenges regarding the uncertainty, at least in the view of the plaintiffs, that mitigation measures would be implemented. Commitments made in the Record of Decision to mitigation measures set

may be challenging, in either case, to bring a claim that an agency has not fulfilled commitments in a ROD for a variety of reasons. For one, if there is no remaining federal action, courts may not intervene to require compliance with a record of decision for an action that is over.²⁵⁷ CEQ explains, as we noted earlier, in cases where mitigation measures have not taken place, “if there is Federal action remaining, it is appropriate for agencies to consider preparing supplemental NEPA analysis and documentation and to pursue remaining opportunities to address the effects of that remaining action.”²⁵⁸

Some observers take issue with the question of when federal actions are considered over. The Society for Conservation Biology makes this argument most clearly:

[I]f there is a substantial mitigation failure, then there is still Federal agency responsibility as a matter of consistency with NEPA’s policies, so it should be treated as a continuing action. . . . It is illogical to inextricably tie the goals of the mitigation to the initial Federal agency action’s life-span, when the mitigation may have little, if anything, to do with the action’s life-span. Said another way, if a short-term Federal action that substantially fails in its mitigation efforts, it is contrary to the purpose of the NEPA to abandon the environmental issues simply because the initial Federal action is no longer ongoing if the final Federal compliance with NEPA or other Federal responsibilities depended upon effective mitigation.”²⁵⁹

It is not inconceivable that a court would review a case for compliance with NEPA or other laws after an agency action is completed. Generally, courts assess whether a case is moot based on whether there is

forth in a biological opinion also were considered legally binding. In *Tyler v. Cisneros*, 136 F.3d 603 (9th Cir. 1998), the court remanded a district court decision that held that claims against the Housing and Urban Development Agency for failing to enforce mitigation measures were not justiciable, because HUD had no continuing authority over the project. However, the 9th Circuit reversed, stating that HUD had some authority to act and that commitments in an ROD shall be implemented (citing 40 C.F.R. § 1505.3 (2010)). Both of these situations involved FONSI.

257. See generally McGarity, *supra* note, 255 (reviewing earlier “late detection scenario” NEPA cases where courts ruled them moot and other cases where the court did not find the claims moot).

258. CEQ Final Guidance on Mitigation and Monitoring, *supra* note 236, at 3,845 (emphasis added).

259. Letter from John M. Fitzgerald, Policy Dir., Soc’y for Conservation Biology & Lyn Arnold, Policy Assoc. Soc’y for Conservation Biology to Ted Boling, Sr. Counsel, Council on Env’tl. Quality (May 24, 2010) (on file with author).

any available relief to plaintiffs.²⁶⁰ Courts have in the past reviewed and ruled against agencies in cases where the only relief available was for the agency to re-do the environmental analysis and explore possible alternative to mitigate environmental harms.²⁶¹

2. NEPA Supplementation

If NEPA supplementation is triggered, this could potentially stop further action until the agency has completed the supplemental analysis. NEPA requires supplementation in some cases where the assumptions or commitments in a ROD are no longer valid. CEQ regulations require federal agencies to prepare a supplemental EIS (SEIS) if: 1) “The agency makes substantial changes in the proposed action that are relevant to environmental concerns,” or 2) “There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts.”²⁶² Additional analysis need not be prepared every time new information emerges, but an SEIS is required if a new proposal or changes in conditions “will have a significant impact on the environment in a manner not previously evaluated and considered.”²⁶³

Some studies point to NEPA’s SEIS requirement as a real and potential obstacle to practicing adaptive management.²⁶⁴ Agencies practicing a monitoring and information-intensive adaptive management could find that new information repeatedly triggers additional NEPA analysis, which is not cheap or quick. However, supplementing NEPA analysis can be an appropriate vehicle for meshing adaptive management and NEPA. And, as discussed in Part II, in some cases courts have allowed agencies to proceed under an adaptive management plan, despite the emergence of new information, without supplementation; in others, when substantial management changes have been undertaken by an

260. *See* *Neighbors of Cuddy Mountain v. Alexander*, 303 F.3d 1059, 1065 (9th Cir. 2002).

261. *Id.* at 1065, *discussing*, *Cantrell v. City of Long Beach*, 241 F.3d 674 (9th Cir. 2008) (in which the adequacy of an EIS was challenged after a number of buildings and bird habitat had already been destroyed; the court held that the agency could undertake additional environmental review to seek potential alternatives and options to mitigate the habitat damage); *Nw. Env'tl. Def. Ctr. v. Gordon*, 849 F.2d 1241 (9th Cir. 1988) (declaring that challenges to regulation for a fishing season that had ended were not mooted because effective relief could be available by allowing more fish to spawn in future years).

262. 40 C.F.R. § 1502.9(c)(1)(i-ii) (2010).

263. *Westlands Water Dist. v. Dept. of Interior*, 376 F.3d 853, 873 (9th Cir. 2004); *see also* *Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 378–85 (1989) (requiring agencies to take a “hard look” at new information to assess whether NEPA supplementation is necessary).

264. *See e.g.*, *Benson*, *supra* note 138; *Ruhl*, *supra* note 29, at 11-33.

agency, supplementation has been required.²⁶⁵ Agencies also have used an EA when new information has emerged, to assess whether they are still compliant with a prior EIS or need to prepare a new EIS.²⁶⁶ Recall our discussion in Part II that agencies do not necessarily need to supplement an EIS in cases where they change their decision, as long as the new decision falls within the range of alternatives analyzed in the original EIS.²⁶⁷

SEISs can also be controversial in that agencies have considerable discretion to decide when an SEIS is necessary. Courts generally consider whether the changes are substantial and significant and will result in effects beyond what was contemplated in any of the alternatives analyzed in the original NEPA document.²⁶⁸ In the case of oil and gas development, as an example, courts have required the BLM to supplement their analysis when changing the configuration of wells due to potential effects to wildlife habitat that were not analyzed in the original NEPA document, but they have also allowed the BLM, based on its handbook, not to supplement analysis when the number of wells has increased substantially, but the number of acres disturbed has not changed.²⁶⁹

The SEIS issue also is complicated in the context of land use planning. The Supreme Court ruled in *Norton v. Southern Utah Wilderness Alliance* (2004) that a BLM land use plan is not an “ongoing” major federal action requiring supplementation.²⁷⁰ Therefore the BLM did not have to write an SEIS due to increased ORV use in the planning area. Several district courts have followed *SUWA* and ruled that there is no ongoing action requiring NEPA supplementation once an agency approves a land use plan or issues a license, even if the assumptions in the plan are no

265. See, e.g., *Or. Natural Res. Council. Action v. Forest Serv.*, 659 F. Supp. 1441 (1987); *Nw. Ecosystem Alliance v. Rey*, 380 F. Supp. 2d 1175 (W.D. Wash. 2005); *Klamath Siskiyou Wildlands Ctr. v. Boody*, 468 F.3d 549 (9th Cir. 2006).

266. See *Mo. v. Army Corps of Eng’r (In re Operation of the Mo. River Sys. Litig.)*, 516 F.3d 688 (8th Cir. 2008).

267. *Id.*

268. Michael S. Freeman & Meg Parish, *Supplemental NEPA Analyses: Triggers and Requirements*, ROCKY MTN. MIN. L. FOUND., PROCEEDINGS FROM A SPECIAL INSTITUTE ON THE NATIONAL ENVIRONMENTAL POLICY ACT, at 6 (Denver, CO: Earthjustice, October 28-29, 2010), at 6 (on file with authors).

269. *Id.*

270. *Norton v. S. Utah Wilderness Alliance*, 542 U.S. 55, 72 (2004). In *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 374 (1989), the Court ruled that supplementation is necessary only if “there remains ‘major Federal action[s]’ to occur.” The Court in *Southern Utah Wilderness Alliance* ruled that a land use plan constitutes an “action that is completed when the plan is approved,” so there is therefore no ongoing “major Federal action” requiring supplementation (“though BLM is required to perform additional NEPA analysis if a plan is amended or revised”). *Norton*, 542 U.S. at 72.

longer valid.²⁷¹ In these cases new information came to light, such as an ESA listing or evidence that protective wildlife measures were not working as predicted, but still the courts did not require an SEIS to be prepared. One review of post-SUWA case law summarizes that “federal agencies have experienced considerable, if not universal, success in arguing that they have no obligation to supplement their NEPA analysis after SUWA,” particularly when it comes to decisions in land-use plans.²⁷² However, plan amendments require NEPA analysis, as do decisions made in accordance with plans, including projects such as timber sales or annual range management decisions; these project-level decisions require compliance with NEPA and may require supplemental analysis in light of new information if the action is ongoing.²⁷³

3. Monitoring

Given this complicated legal landscape, how enforceable is monitoring or an associated toolbox of possible mitigation measures? These processes are flexible, discretionary in nature, and rely upon a high degree of expertise. It seems unlikely that a court would intervene and rule an agency’s monitoring insufficient, if they are meeting their commitments at all. So when is monitoring enforceable, if ever?

Agency commitments to monitor are especially suspect when they are made in a land use plan. In *Norton v. Southern Utah Wilderness Alliance* (2004), the Supreme Court rejected the argument that the BLM violated its land use plan’s promise that OHV use “will be monitored and closed if warranted.”²⁷⁴ The Court reasoned that unlike a specific statutory command, “a land use plan is generally a statement of priorities; it guides and constrains actions, but does not (at least in the usual case) prescribe them.”²⁷⁵ The Court ruled that the BLM’s commitment to monitor OHV use—“like other ‘will do’ projections of agency action set forth in land use plans—are not a legally binding commitments enforceable under [the Administrative Procedures Act (APA)],” because a broad commitment to monitor is not a discrete action reviewable under the APA.²⁷⁶ The result is that discretionary processes such as the implemen-

271. See Michael C. Blumm & Sherry L. Bosse, *Norton v. SUWA and the Unraveling of Federal Public Land Planning*, 18 DUKE ENVTL. L. & POL’Y F. 105 (2007).

272. *Id.* at 144. The authors note, however, that “SUWA has not absolved agencies from all obligations to provide supplemental NEPA analysis,” such as the USFS’s management of an ongoing timber contract for example, or the decision to approve a forest plan amendment. *Id.*

273. *Id.*

274. 542 U.S. 55.

275. *Id.* at 71.

276. *Id.* at 72.

tation of monitoring and subsequent mitigation are not generally justiciable when they are written into programmatic plans. However, the Court acknowledged that monitoring commitments *could* be written in a way that they were enforceable if the action were written as a clear and binding commitment. Still, it was not entirely clear to some observers, “why a promise in a land plan that an agency ‘will’ undertake a certain action was not such a ‘binding commitment,’ nor was it clear what it would take to create such a binding commitment.”²⁷⁷

However, if commitments in plans are written in ways such that monitoring is required *before* an action can be taken, this is still actionable under the APA. For example, survey and manage requirements under the NWFP require some species to be surveyed prior to ground disturbing activities.²⁷⁸ A failure to comply with these guidelines would be reviewable in court, if an agency planned an action that was inconsistent with these requirements in the land use plan. Likewise, environmental groups have successfully challenged the BLM in court when it approved grazing leases without monitoring resource conditions, when the land use plan explicitly stated that such monitoring would occur prior to the authorization of grazing.²⁷⁹

In the past, plaintiffs have also had success challenging more general monitoring commitments in land use plans when they do so in the context of discreet agency actions. For example, in *Neighbors of Cuddy Mountain v. Alexander* (2002), the 9th Circuit wrestled with the question of whether plaintiffs could challenge the Forest Service for not demonstrating, with appropriate monitoring information, that it was in compliance with a forest plan standard for old-growth protection (maintaining a certain percentage of old-growth forest-wide).²⁸⁰ In this case, the court ruled it could review compliance with a land-use plan standard because it was being reviewed in the context of a discreet agency action: the approval of a timber sale. Both the regulations to maintain well-distributed habitat across the forest to protect species viability²⁸¹ and a forest plan standard requiring a forest-wide percentage of old-growth were relevant to the question of whether this particular sale was consistent with the land-use plan and the regulations. Even though enough old-growth remained in the project area, the court agreed that the USFS needed to demonstrate with some monitoring information that it was in compli-

277. Blumm & Bosse, *supra* note 271, at 133.

278. See *supra* notes 218–219 and accompanying text.

279. See Blumm & Bosse, *supra* note 271, at 145 (discussing *Western Watersheds Project v. Bennet*, 392 F. Supp. 2d 1217 (D. Idaho 2005)).

280. *Neighbors of Cuddy Mountain v. Alexander*, 303 F.3d 1059 (9th Cir. 2002).

281. 36 C.F.R. § 219.19 (2010).

ance with the plan. One has to wonder, however, how this case would fare post-SUWA, if the agency could at least show there was no evidence that it was out of compliance.

Even outside the context of land use planning, the courts are often reluctant to force agencies to conduct monitoring. Biber explains that there are three primary reasons for this: “an agency monitoring program is neither a ‘final’ nor specific agency ‘action’ that a court can review or mandate under the APA; the level of compliance by an agency with a mandatory duty is not for the court to review, as long as at least some compliance exists; or, the apparently mandatory language in the statute, regulation, or plan is in fact only hortatory.”²⁸² As was the case with *Norton v. SUWA*, courts will make a distinction between the reviewability of discreet agency actions and ongoing agency operations or conduct, which they are unlikely to interfere with. Courts are also unlikely to review the quality and extent of monitoring taking place, as long as some monitoring is occurring. For these reasons, and because intermittent court decisions are unlikely to lead to an effective ongoing monitoring program, Biber suggests that relying upon the judiciary to make monitoring happen may not be the best strategy.

However, and this is of relevance to triggers, Biber says, “Usually, courts are more willing to step in when a monitoring duty can be framed as a precondition to the agency being able to pursue some other activity that it seeks to accomplish (such as a timber sale or road construction).”²⁸³ If triggers are written so that specific requirement to monitor x or y must take place *before* taking a particular action, this type of commitment is more enforceable. As we saw in the case of the biological opinion for salmonid species on the Sacramento and San Joaquin rivers, clearly outlined commitments to monitor may be written into legally binding agreements, such as incidental take permits, such that they are legally enforceable.²⁸⁴ In that case, it was precisely the enforceability of the monitoring and mitigation commitments that allowed an adaptive management plan to survive in court. Compliance with the plan’s standards had to be demonstrated prior to annual water delivery decisions being made, or consultation was reinitiated.

The lesson is that monitoring commitments can be made enforceable, and in some cases they must be made enforceable for an adaptive management plan to survive legal challenge. Members of the public concerned about accountability should focus on the enforceability of adap-

282. Eric Biber, *The Problem of Environmental Monitoring*, 83 U. COLO. L. REV. 1, 60 (2011).

283. *Id.* at 62.

284. *Pac. Coast Fed’n of Fisherman’s Assns. v. Gutierrez*, 606 F. Supp. 2d 1122,1188 (E.D. Cal. 2008).

tive management plans and their associated triggers. Agencies also have an interest in creating enforceable plans so that they can proceed with adaptive management in light of uncertainty around legal standards. In order to be enforceable, plans must include specific monitoring requirements and timelines tied, through the use of explicit trigger points, to clear mitigation requirements, also with specific implementation timelines. When such a monitoring/mitigation program is part of a legally binding agreement, such as an incidental take permit, enforcement is possible, especially where monitoring serves as a precondition for renewal. If monitoring is written into a land-use plan or project level decision in a way that it serves as a precondition for future actions, this is also legally enforceable. Furthermore, if such a program served as the basis for a FONSI and were not implemented, NEPA supplementation would be triggered. In other cases, even for an EIS ROD, there may be a requirement for supplementation under NEPA if commitments in the ROD are not kept. Other statutes with clear legal standards may provide a vehicle for challenges to a promised monitoring/mitigation program that is either not succeeding or not occurring at all.

All of these strategies will be less enforceable if monitoring and mitigation programs are not written with sufficient detail about what is to be monitored and when, where triggers are set, and what mitigation measures will be implemented over what timeframe. The perennial questions of who designs and conducts the monitoring and whether the monitoring program is affordable, scientifically valid, and reliable remain critically important. These issues are not likely to be resolved by courts, and must be addressed directly by agencies and stakeholders in adaptive management decisions.

C. Other Monitoring Challenges

Monitoring is the keystone of adaptive management. The importance of monitoring, and learning from what is found, is what fundamentally differentiates adaptive management from other approaches. All of the case studies, for example, are premised upon some sort of monitoring that is used to gauge whether a trigger is pulled and subsequent actions are necessary.

There are multiple types and purposes of monitoring.²⁸⁵ Managers use implementation monitoring to assess whether or not a management action has been implemented as designed. Effectiveness monitoring is

285. See e.g., David B. Lindenmayer & Gene E. Likens, *The Science and Application of Ecological Monitoring*, 143 *BIOLOGICAL CONSERVATION*, 1317 (2010); Caroline Stem, et al., *Monitoring and Evaluation in Conservation: A Review of Trends and Approaches*, 19 *CONSERVATION BIOLOGY* 295 (2005) (for additional information on the purposes of monitoring).

used to check whether agency actions are having the intended results, such as reducing fire risk in an area, or allowing for riparian biodiversity to improve. Compliance monitoring may require both of these types of monitoring to determine whether an agency has complied with a legal standard, regulation, or trigger. Efficacy or verification monitoring may be used as part of a research program to further understanding of ecological or social systems. Some federal land laws require forms of monitoring, inventory, and research.²⁸⁶ But monitoring has a checkered past on the federal lands and for natural resources in general, and is the Achilles heel of adaptive management.²⁸⁷ There has historically been a chronic absence of information that is fed back into land use plans and projects.

Even when required by law or regulation, monitoring often fails to happen. “Monitoring is a mandatory element of all HCPs” for example.²⁸⁸ Yet research shows that most HCPs do not have adequate monitoring programs.²⁸⁹ One comprehensive review of the literature concludes that “HCP monitoring and adaptation have both fallen exceedingly short of their potential.”²⁹⁰ USFS management of OHVs provides another example. Monitoring the effects of vehicle use off National Forest System roads “will be monitored” according to agency regulations.²⁹¹ Nevertheless, serious monitoring is often not done by the agency, due to insufficient financial resources and staff and a variety of

286. See e.g., 16 U.S.C. § 1604(g)(3)(c) (2006) (NFMA’s requirement to “insure research on and [based on continuous monitoring and assessment in the field] evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land”).

287. See generally W.H. Moir & W.M. Block, *Adaptive Management on Public Lands in the United States: Commitment or Rhetoric?* 28 ENVTL. MGMT. 141 (2001); Holly Doremus, *Data gaps in Natural Resource Management: Sniffing for Leaks Along the Information Pipeline*, 83 IND. L.J. 407 (2008).

288. Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,242, 35,253 (June 1, 2000); see also 16 U.S.C. § 1539(a)(2)(A) (2006); 50 C.F.R. §§ 17.22, 17.32, 222.307 (2010).

289. PETER KAREIVA ET AL., NATIONAL CTR. FOR ECOLOGICAL ANALYSIS & SYNTHESIS WORKING GROUP, *USING SCIENCE IN HABITAT CONSERVATION PLANS* 29 (1999) (finding that “barely 50% of the plans contain clear monitoring programs, and they rarely include monitoring programs that are both clear and sufficient for evaluation of a plan’s success”), available at http://courses.washington.edu/vseminar/Esc458-8/nceas_hcp.pdf.

290. Camacho, *supra* note 27, at 324; see also Holly Doremus, *The Endangered Species Act: Static Law Meets Dynamic World*, 32 WASH. U. J.L. & POL’Y, 175, 228 (2010) (stating that “HCP approval under the ESA is one prominent example of giving lip service to the concept of adaptive management while ignoring its substance”).

291. 36 C.F.R. § 295.5 (2010).

other programmatic failures.²⁹² These and numerous other examples show a pattern of systemic failures to monitor particular resources on federal lands.²⁹³

In addition to the legal challenges explored in the previous section, there are other significant challenges to implementing a monitoring-intensive adaptive management or mitigation program. The first is the tricky set of scientific and technical questions that emerge when designing a monitoring program. This is especially so in the case of “effectiveness monitoring” when monitoring is used to determine whether an action has achieved its objective. We cannot do justice to this complicated topic here. But, consider the all-important questions of what to monitor and how to appropriately monitor something. NFMA’s wildlife diversity mandate provides a case-in-point, as the USFS and the courts have struggled for years to negotiate a scientifically credible and legally defensible way to monitor wildlife populations or their habitat on National Forest lands as a way to ensure their viability.²⁹⁴

Similar sorts of scientific disagreements about what and how to monitor something are a central theme in the case studies. In several instances, outside groups have questioned the science underpinning a monitoring program or protocol. In the Pinedale oil and gas case, for example, The Wilderness Society takes issue with the “lack of credible, defensible science for wildlife monitoring plans,” including their design parameters, sample sizes, and geographic study boundaries.²⁹⁵ And in the salmon case, Earthjustice complains that the monitoring promised by

292. GOV’T ACCOUNTABILITY OFFICE, FEDERAL LANDS: ENHANCED PLANNING COULD ASSIST AGENCIES IN MANAGING INCREASED USE OF OFF-HIGHWAY VEHICLES, GAO-09-509 (2009), available at <http://www.gao.gov/assets/300/291861.pdf>.

293. For examples pertaining to forest restoration see Thomas H. DeLuca et al., *The Unknown Trajectory of Forest Restoration: A Call for Ecosystem Monitoring*, 108 J. FORESTRY 288 (2010); and GOV’T ACCOUNTABILITY OFFICE, WILDLAND FIRE REHABILITATION AND RESTORATION: FOREST SERVICE AND BLM COULD BENEFIT FROM IMPROVED INFORMATION ON STATUS OF NEEDED WORK, GAO-06-670 (2006), available at <http://www.gao.gov/assets/260/250705.pdf>.

294. *Compare* Inland Empire Public Lands Council v. U.S. Forest Service, 88 F.3d 754, 761–62 (9th Cir. 1996) (ruling that nothing in the 1982 NFMA regulations mandated species population assessments via on-the-ground counting), *with* Sierra Club v. Martin, 168 F. 3d 1, 5–7 (11th Cir. 1999) (ruling that the USFS must count actual management indicator species on the ground based on its land-use plan). Much of this debate culminated in the decision *Lands Council v. McNair*, 537 F.3d 981 (9th Cir. 2008) (en banc). See also Barry R. Noon et al. *Conservation Planning for US National Forest: Conducting Comprehensive Biodiversity Assessments*, 53 BIOSCIENCE 1217 (2003).

295. THE WILDERNESS SOC’Y, *supra* note 146, at 3.

NOAA Fisheries will not be effective in protecting salmon populations or their habitat needs.²⁹⁶

Part of the challenge in these and other cases is the time needed to make short-term management decisions compared to the time needed to obtain valid and reliable monitoring data. This mismatch is a central theme in the monitoring literature and emerged in our review. In the Pinedale case, for example, some fear that by the time impacts to big game in the region are detected through monitoring, it may be too late to remedy them.²⁹⁷ And in the grizzly bear delisting litigation, several groups voiced concern about the “lag effects” associated with species viability and habitat modification. Impacts from habitat degradation to a species are often delayed, so there is some concern that short-term monitoring will be insufficient.²⁹⁸ Another issue may be that the spatial design needed to establish an effective monitoring program may not always nest perfectly with where an agency wants to take action, making it difficult to design monitoring programs that allow for causal inference with limited resources.

There is also no escaping the political questions inherent in monitoring. What gets measured? Who does the monitoring? And what activities are permitted or disallowed while the monitoring is being done? These sorts of questions surfaced repeatedly in the case studies. Consider again, some of the conflicts about monitoring wildlife on the Pinedale Anticline. Some groups have questioned how the mule deer population, which serves as a trigger on the Anticline, was defined in the SEIS in such a way that the Pinedale Herd was lumped together with a larger Sublette County Herd for purposes of measurement and analysis.²⁹⁹ The players involved in this case agreed to using mule deer as a trigger, but there are ongoing questions about how that trigger could lose its significance if the population is defined too broadly.

Another controversy to arise in the Pinedale case is the role given to the oil and gas industry in developing and implementing wildlife monitoring and mitigation plans. Operators in the region were given a large role to play in not only developing plans but also in the writing of monitoring contracts. To some, this arrangement “violates basic principles of good governance, public transparency, and the Federal Advisory

296. Supplemental Memorandum in Support of NWF’s Supplemental Motion for Summary Judgment at 10–11, *Nat’l Wildlife Fed. et al., v. State of Or.* (D. Or. 2010) (regarding the 20120 supplemental BiOp).

297. Pendery, SEIS Comments, *supra* note 247, at 13

298. *See e.g.*, Complaint for Declaratory and Injunctive Relief at 19, *Western Watersheds Project et al., v. Servheen*, No. 07-cv-243 (D. Idaho June 4, 2007), available at <http://www.westernwatersheds.org/legal/07/grizzly/grizzlycomplaint.pdf>.

299. Pendery, SEIS Comments, *supra* note 247, at 13.

Committee Act.”³⁰⁰ Perceptions of impropriety in the Pinedale monitoring program were raised by others as well, with some groups suggesting that “the oil and gas industry was attempting to influence wildlife science in order to achieve the most desirable results.”³⁰¹

In other cases, questions have arisen about agency-implemented monitoring programs. As discussed in Part I, bureaucracies have organizational values and biases that help determine what gets measured and how information is interpreted. As noted by Doremus, “Just as scientists tend to interpret equivocal evidence in the light most consistent with their preferred theories, decisionmakers are likely to see equivocal evidence as confirming their preexisting management biases.”³⁰² Agencies also may have histories that cause them to have staff, databases, or expertise that allow them to monitor certain resources more effectively than others.

Another important political question is what activities get to proceed while monitoring is ongoing? Consider how the BLM proposed to use monitoring in its 2006 rangeland regulations.³⁰³ In this case, the BLM could not correct a permittee’s grazing practices or enforce the agency’s standards and guidelines unless monitoring data showed changes were necessary. The catch was that “BLM funding and staffing levels do not provide adequate resources for even minimal monitoring. . . .”³⁰⁴ This arrangement was a concern to many groups and commenting agencies because it meant that monitoring, however unlikely to occur, would have to be done before remedial actions could be taken for the sake of wildlife and other resources.³⁰⁵

Monitoring, Mitigation and Funding

Uncertain and inadequate funding is one of the most widely acknowledged challenges to monitoring.³⁰⁶ It is one of the primary reasons why so many people view with skepticism agency promises to monitor

300. Letter from Stephanie Kessler, The Wilderness Soc’y, to Don Simpson, Wyoming Dir. BLM (Jan. 6, 2010) (on file with authors).

301. Letter from Dan Heilig, W. Res. Advocates, to Chuck Otto, Field Office Manager, Pinedale BLM (Oct. 6, 2009) (on file with authors).

302. Doremus, *supra* note 32, at 55–56.

303. See *Grazing Administration – Exclusive of Alaska*, 71 Fed. Reg. 39,402 (July 12, 2006) (codified at 43 C.F.R. pt. 4100).

304. See *W. Watersheds Project v. Kraayenbrink*, 620 F.3d 1187, 1203 (9th Cir. 2010).

305. *Id.* at 1204.

306. Former CEQ General Counsel Dinah Bear summarizes: “Money for monitoring and mitigation, particularly in the absence of a particularly high-profile issue or binding agreement, is notoriously tough to get and. . . always seems to be first on the budgetary chopping block.” Dinah Bear, *Some Modest Suggestions for Improving Implementation of the National Environmental Policy Act*, 43 NAT. RESOURCES J. 931, 945 (2003).

and practice adaptive management. This skepticism comes from a history of agency monitoring programs and commitments being unfunded through Congressional appropriations or internal agency budgeting priorities. Monitoring dollars are often the first to be cut or reshuffled in agency budgets. This is partly because monitoring can be expensive. Monitoring as part of the Northwest Forest Plan, for example, cost more than \$50 million over ten years.³⁰⁷ Dollars for monitoring must also compete with other agency priorities. The GAO emphasized this point in its audit of oil and gas development. It found that the BLM had less time to mitigate and monitor the environmental impacts associated with oil and gas development because “staff had to devote increasing amounts of time to processing drilling permits.”³⁰⁸

Agency commitments to monitor and mitigate are contingent upon adequate and certain funding. Future agency budgets are inherently uncertain, so how can promises of future monitoring and mitigation be considered binding commitments? This question repeatedly emerged in the case law and case studies. How, for example, can we delist wolves or grizzly bears from the ESA and return their management to the States given the uncertainty of future funding? Some argue that the wolf and grizzly bear plans are not “adequate regulatory mechanisms,” justifying delisting under the ESA, because “no reliable source for [their] future funding” exists.³⁰⁹

In some of our cases the issue of funding is directly addressed by agencies in their decision documents. Recall, for instance, the monitoring and mitigation fund provided by industry (and discussed in the SEIS) in the Pinedale Anticline case. Habitat conservation plans provide another example. The ESA requires that “the applicant will ensure that adequate funding for the plan will be provided.”³¹⁰ Instead of a “pay as you go” funding program, HCPs most often outline *a priori* how mitigation mea-

307. Bormann et al., *supra* note 208, at 189 tbl.1.

308. GOV'T ACCOUNTABILITY OFFICE, OIL AND GAS DEVELOPMENT: INCREASED PERMITTING ACTIVITY HAS LESSENED BLM'S ABILITY TO MEET ITS ENVIRONMENTAL PROTECTION RESPONSIBILITIES, GAO-05-418 (2005), at 5, available at <http://www.gao.gov/new.items/d05418.pdf>.

309. See Final Rule Designating the Greater Yellowstone Area Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife, 72 Fed. Reg. 14,866 (Mar. 29, 2007) (codified at 50 C.F.R. pt. 17) (discussing this issue as it pertains to grizzly bear delisting and responding to those comments citing *Federation of Fly Fishers v. Daley*, 131 F. Supp. 2d 1158, 1167–68 (N.D. Cal. 2000) in making this argument).

310. 16 U.S.C. § 1539(a)(2)(B)(iii) (2006)

tures will be funded, even if such funds are not always set aside at the onset of the HCP.³¹¹

Agencies typically concede that funding for future planning, monitoring, and mitigation is uncertain, but they nonetheless commit themselves to trying to secure requisite funds. A typical response is that offered by the FWS in their decision to delist wolves in the Northern Rockies: “It is not possible to predict with certainty future governmental appropriations, nor can we commit or require Federal funds beyond those appropriated. . . [but]. . . [t]he States have committed to secure the necessary funding to manage the wolf populations under the guidelines established by their approved State wolf management plans.”³¹² A commitment to seek funding is essential to CEQ, who also asks agencies to disclose “the possible lack of funding and assess the resultant environmental effects.”³¹³ In other cases, agencies have made up-front commitments to devote a percentage of funding to monitoring. For example, monitoring was required under the original Stewardship Contracting Authority, and some National Forest units promised stakeholders up-front that a particular percentage of funding would be committed to monitoring.³¹⁴

311. KAREIVA, *supra* note 289, at 28 (finding that “98% of the HCPs outlined *a priori* the funding sources for the mitigation proposed, but only 77% had significant funds set aside to pay for mitigation at the onset of the HCP”).

312. Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife, 74 Fed. Reg. 15,123, 15,151 (Apr. 2, 2009) (codified at 50 C.F.R. pt. 17); *see also* Rule Designating the Greater Yellowstone Area Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife, 72 Fed. Reg. 14,866 (Mar. 29, 2007) (codified at 50 C.F.R. pt. 17) (FWS responding to the issue of uncertain funding upon grizzly bear delisting).

313. Memorandum For Heads of Federal Departments and Agencies: Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact (Jan 14, 2011), at 9, *available at* http://ceq.hss.doe.gov/current_developments/docs/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf. This sort of assessment is often not done by agencies. In responding to an appeal of the Forest Plan Amendments necessary for the delisting of grizzly bears, the USFS states that “[i]t is outside the scope of the FEIS to analyze the implication of not receiving the funding to implement the amendment” and to conduct the promised monitoring. U.S. Forest Service, Intermountain Region, Appeal Decision #06-04-00-0051-A217 (Apr. 2, 2007) (on file with authors), *available at* <http://www.fs.fed.us/r4/reading/appeals/decisions/bt/06-04-00-0051.pdf>.

314. Pub. L. No. 105-277, 347 (1998). Under the White Mountains Stewardship Contract, for example, the Apache-Sitgreaves National Forest dedicated three percent of project costs to funding a monitoring program. *See* S. SITKO AND S. HURTEAU. EVALUATING THE IMPACTS OF FOREST TREATMENTS: THE FIRST FIVE YEARS OF THE WHITE MOUNTAIN STEWARDSHIP PRO-

Ideally, a realistic funding strategy for a monitoring program will be identified by agencies and other parties before an adaptive management plan is implemented. Monitoring is expensive, and parties should devote time up front to determine what funds are available, what can be realistically monitored with those funds, and what the monitoring priorities are. Stakeholders, including partnering agencies, can help ensure that monitoring is funded and implemented. If parties want to be certain monitoring occurs, the monitoring can be linked to showing compliance with a legal standard or written into a plan as a precondition for future actions. Alternatively, they could be written into an ROD as a specific and enforceable commitment and coupled with regulations like those of the Department of the Army's affirmatively stating that ROD commitments are legally binding (as discussed in Part IV, 2).

Agencies should pay close attention to ensuring transparency and limiting conflicts of interest in the design, implementation, and interpretation of a monitoring program. Ideally, a kind of multi-party monitoring oversight board would be set up to support transparency and accountability. If industry or other parties help to fund monitoring, there should be a separation or some kind of check and balance, so that those with vested interests in monitoring outcomes, including agencies, are not solely entrusted with the design and implementation of the monitoring program. If there is significant doubt that a monitoring program will be implemented, agencies should disclose and analyze the potential consequences of this in their NEPA documents.

D. Setting the Triggers

The most important question about using triggers is where to set them. Each case is very different, so there is obviously no single answer that can be provided to this question. Nonetheless, our review brings into relief some issues that should be considered.

As discussed in Part I, adaptive management is most often recommended in situations characterized by widespread uncertainty. Unlike synoptic planning, adaptive management not only acknowledges, but embraces, uncertainty and sees these situations as an opportunity to learn. With adaptive management, decision makers more fully appreciate how things might not go as predicted and to some extent expect the unexpected. Given this, some important questions arise: does the use of pre-identified triggers run counter to the theory and spirit of adaptive management? Why assume that a manager knows enough about a given

problem that trigger mechanisms can be pre-identified and then correctly set? And does such an approach discount inherent uncertainties and lead us back to the predictive-based management models of the past?

These questions explain why most of the cases reviewed in Part III are more aligned with contingency planning and adaptive mitigation than adaptive management. All of them attempt to bring a degree of certainty and accountability to the practice of adaptive management by planning for a range of possible contingencies and mitigation measures. The uncertainties inherent in the cases are essentially negotiated by agencies and outside groups.

Instead of paralyzing all parties, the uncertainty is managed by focusing on a set of relevant triggers and responses. Take, for instance, the negotiation of “changed circumstances” and “unforeseen circumstances” in HCPs (as reviewed in Part III). The former are planned for in HCPs so that a permittee commits to taking particular actions if a pre-identified changed circumstance arises. This is not the case for the latter, however, as a permittee can go about her business even if an “unforeseen circumstance” changes things.³¹⁵ As discussed above, this is what makes the “no surprises” provision so controversial, but it also demonstrates how uncertainty can be made more manageable.

Common to the case studies are scientific and political disagreements about where triggers and thresholds should be set. People often like the idea of using triggers in theory but disagree on how they are used in practice. At the core of these conflicts are different political judgments about what to do in the face of uncertainty and risk—a pervasive question in environmental law and policy.³¹⁶ Who carries the burden of proof and what value gets the benefit of the doubt when it comes to making decisions that may or may not cause harm to the environment? Shall a precautionary principle be used in setting trigger points for example, or should we demand that regulations not be imposed without more unequivocal scientific justification? And what probability of success should plans using triggers provide?

315. Though in granting an ITP, the Services must ensure that the taking will not “appreciably” reduce the likelihood of survival and recovery of the species. 16 U.S.C. § 1539(a)(2)(B) (2006).

316. See e.g., Courtney Schultz, *Responding to Scientific Uncertainty in U.S. Forest Policy*, 11 ENVTL. SCI. & POL’Y 253 (2008); Dave Owen, *Probabilities, Planning Failures, and Environmental Law*, 84 TULANE L. REV. 265 (2009); Holly Doremus, *The Purposes, Effects, and Future of the Endangered Species Act’s Best Available Science Mandate*, 34 ENVTL. L. 397 (2004); J.B. Ruhl, *The Battle Over Endangered Species Act Methodology*, 34 ENVTL. L. 555 (2004); Cass R. Sunstein, *Beyond the Precautionary Principle*, 151 U. PA. L. REV. 1003 (2003).

Generally speaking, environmental interests involved in the case studies urge that more precaution be used in setting triggers points. Instead of managing at knife's edge, they want greater levels of confidence that an action will not cause harm. Triggers, they argue, should be set with more precaution and larger margins of safety. Wolf management plans provide an example. Those groups challenging them argue that the breeding pair triggers used in the Montana and Idaho Plans are biologically indefensible. The breach here is significant: the states are basing their triggers on the FWS's 30 pair/300 wolf recovery threshold, while plaintiffs make the case for 2,000-5,000 wolves.

A similar sort of divide is evident in the Columbia case with those challenging the plan wanting triggers to be set with a greater margin of safety for salmon. But this case also raises another common question related to our selected cases: what happens when a trigger is pulled or a threshold is crossed? Those challenging the Columbia AMIP take issue not only with the lack of precaution in setting triggers, but also criticize the lack of meaningful actions that *shall* take place if they are pulled. Plaintiffs cite *NRDC v. Kempthorne* (as discussed in Part II) in arguing that adaptive management needs to do more than prescribe more meetings to be held whenever a trigger is pulled.³¹⁷ Instead, the triggers should initiate mandatory and substantive actions that must be taken by NOAA Fisheries—and these actions should be geared towards the recovery of salmon, not an evasion of the ESA and its no jeopardy standard.³¹⁸

Using the ESA in this fashion provides one of the most relevant ways in which wildlife-based triggers can be set. Though numerical thresholds will have to be established on a case-by-case basis, the ESA provides a purpose and legal sideboards. The ESA's no-jeopardy standard is important in this regard, but so too is the law's goal of promoting recovery.³¹⁹ In some of our cases groups want thresholds established for wildlife that ensure their long-term viability; in other words, they want minimum population numbers that will not be crossed.³²⁰ But triggers could also be established in a more proactive way using the ESA. Trig-

317. Supplemental Memorandum in Support of NWF's Supplemental Motion for Summary Judgment, in *National Wildlife Federation, et al., v. State of Oregon* (D. Or. 2010), at 29 (regarding the 2010 Supplemental BiOp).

318. *The State of Oregon's Response to the Adaptive Management Implementation Plan at 18*, *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 839 F. Supp. 2d 1117 (D. Or. 2011).

319. ESA recovery plan are to include "objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list." 16 U.S.C. § 1533(f)(1)(B)(ii) (2006).

320. See e.g., Pendery, SEIS Comments, *supra* note 247, at 39.

gers could be set, for example, so that agencies do not contribute toward the need to list candidate species or other species of special status.

The ESA can help formulate the appropriate use of triggers in some situations, and a variety of additional laws, regulations, and standards could be used in others. Triggers do not have to be invented in the dark; they can be built by using preexisting laws and regulations for guidance and purpose. Some environmental laws, such as the Clean Air Act, are especially up to the task because they require compliance with quantifiable standards.³²¹ In these cases, triggers could be used to specify how standards will not be violated or what would happen if they were.³²²

For example, forest planning under the National Forest Management Act has historically incorporated standards into forest plans that serve as triggers that cannot be crossed.³²³ A standard, as defined by the USFS, is a “mandatory constraint on project and activity decisionmaking, established to help achieve or maintain the desired condition or conditions, to avoid or mitigate undesirable effects, or to meet applicable legal requirements.”³²⁴ Standards are generally binding and legally enforceable, so if used as triggers, they could provide greater assurances that pre-identified lines are not crossed.

The types of standards used in land use planning differ in scale, specificity, and complexity. Some administrative regions of the USFS, for example, have standards cutting across multiple National Forests. For example, soil quality standards exist with quantified thresholds for soil productivity that, if exceeded, trigger restorative practices.³²⁵ Questions remain about how soil thresholds are determined and monitored by the USFS, but they demonstrate how a planning standard could be used in the context of adaptive management. Another example is the Grizzly Bear Amendment, which amended multiple forest plans and set stan-

321. *Id.* at 38 (reviewing BLM law and regulations requiring compliance with air quality standards).

322. *Id.* at 38–39 (making the case that the BLM should set air quality thresholds based on current laws, regulations, and standards).

323. 36 C.F.R. § 219 (2010).

324. National Forest System Land Management Planning, 76 Fed. Reg. 8,480, 8,517(d)(1)(iii) (proposed Feb. 14, 2011) (to be codified at 36 C.F.R. pt 219).

325. One such threshold requires management action be taken if there is a “detrimental disturbance” of greater than fifteen percent, a number typically applied across a timber unit area. See Thomas H. DeLuca & Vincent Archer, *Forest Soil Quality Standards Should be Quantifiable*, 64 J. SOIL & WATER CONSERVATION 117, 118, 122 (2009); Deborah Page-Dumrose, et al., *Soil Quality Standards and Guidelines for Forest Sustainability in Northwestern North America*, 138 FOREST ECOLOGY & MGMT. 445 (2000).

dards for road density, grazing, food storage, and other practices, that applied in key areas of grizzly habitat.³²⁶

Other standards apply to particular areas or “zones” as delineated in a land use plan; they often permit or prohibit various uses. Standards can also be applied forest-wide, such as having so many feet required for a stream buffer or a specified percentage of old growth that shall be maintained. Standards like these can be controversial, but they can also be used in tandem with triggers and adaptive management because they help define their purpose and boundaries. Triggers could be set at the same point as standards, and thus function as a kind of red-light trigger, or could be set to indicate that conditions are moving towards a forest plan standard, serving more as a yellow-light or warning trigger. As discussed in Part I, adaptive management requires the identification of clear and measurable management objectives, and standards can provide a relevant metric for doing so.

Laws, regulations, and plan standards can be used to determine what triggers to use and where to set them, but it is also possible to go above and beyond these legal requirements and use triggers and thresholds in a more precautionary way. One problem with using thresholds in natural resources management is the tendency to manage at a point just shy of the tipping point.³²⁷ For example, some laws and regulations are designed so that nothing happens until some threshold is crossed, such as an impermissible load of sediment being dumped into a waterway, as prohibited under the Clean Water Act. Triggers get pulled in these cases, but the response might be too little, too late. For example, relying upon listing under the ESA to trigger species protections is undesirable, because in the U.S. species are often listed well after the crossing of what would be considered viability thresholds.³²⁸

Regulatory thresholds should be informed by, but often should not correspond with ecological thresholds. In almost all cases, if we are aiming for resource protection, we would want to alter management practices before reaching a potentially irreversible ecological tipping point. Ideally, we might design regulatory triggers and thresholds along a continuum, including green, yellow, and red light triggers, that is more

326. See USDA FOREST SERV., FOREST PLAN AMENDMENT FOR GRIZZLY BEAR HABITAT CONSERVATION FOR THE GREATER YELLOWSTONE AREA NATIONAL FORESTS, RECORD OF DECISION (2006), available at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5187774.pdf.

327. See e.g., David R. Montgomery, *Input and Output-Oriented Approaches to Implementing Ecosystem Management*, 19 ENVTL. MGMT. 183 (1995).

328. For additional information, see D.W. Crumpacker, *Prospects for sustainability of biodiversity based on conservation biology and US Forest Service approaches to ecosystem management*, 40 LANDSCAPE & URBAN PLAN. 47 (1998).

aligned with ecological reality, although this would undoubtedly create a complicated legal framework.³²⁹

Finally, a common conflict in the case studies is how baselines are used in conjunction with triggers and mitigation responses. In some cases fish and wildlife numbers are used in a way to trigger various management actions. This means that a temporal reference point must be chosen by an agency in order to anchor a standard and trigger. A reference point is needed in order to measure and evaluate change and the selection of a baseline date and level can be highly contentious. Consider, for instance, long-running conflicts regarding the baseline against which salmon jeopardy and recovery is evaluated. Biological opinions require that environmental baselines be assessed, so what historical reference point should the Services choose in determining its baseline reference: a period of relative salmon abundance or scarcity?³³⁰

Another example of contested baselines is provided by the Pinedale case. In designing its wildlife monitoring and mitigation matrix, the BLM chose mule deer and sage grouse as two relevant metrics. A specified percentage decline of these species triggers various responses and mitigation measures. But what year should be used for the baseline? For mule deer, the BLM chose 2006, six year after oil and gas development intensified in the region. This was challenged by environmental groups who understand how easily baselines can be “gamed” by agencies (and lawmakers).³³¹ On the Pinedale Anticline, The Wilderness Society wants baseline information collected *prior* to development so that “appropriate standards and thresholds can be developed that warn of environmentally damaging trends before it is too late.”³³² And the Theodore Roosevelt Conservation Partnership argues that the BLM strategically reset the mule deer baseline in order to incorporate substantial declines in the herd since 2000.³³³

All of these issues lead us back to the contentious issue of who sets the trigger points and where. Although determinations of risk will have to be made on a case-by-case basis, we can offer two recommendations. First, decisions about trigger points should be transparent in terms

329. See Malcolm L. Hunter et al., *Thresholds and the Mismatch Between Environmental Laws and Ecosystems*, 23 CONSERVATION BIOLOGY 1053, 1054 (2009).

330. See Blumm & Putnam, *supra* note 117.

331. See J.B. Ruhl & James Salzman, *Gaming the Past: The Theory and Practice of Historic Baselines in the Administrative State*, 64 VAND. L. REV. 1 (2011).

332. THE WILDERNESS SOC'Y, *supra* 146, at 2.

333. Plaintiff's Motion for Summary Judgment and Supporting Memorandum of Points and Authorities at 14, Theodore Roosevelt Conservation P'ship v. Salazar, Case No. 1:08-cv-1047-RJL (D.D.C. Oct. 9, 2009), available at http://www.eenews.net/public/25/17642/features/documents/2009/10/15/document_il_02.pdf.

of the choices that are made about risk, how baselines are used, and how goals and outcomes are identified. The framework of mitigation, monitoring, and the role of triggers should ideally be established through a multi-party process that spreads out decision-making and oversight to limit conflicts of interest. Secondly, agencies should consider how to use a continuum of trigger points instead of simply a single red-light trigger that must not be crossed. This allows for proactive intervention before resource conditions reach a crisis point. Additionally, in almost all cases we would ideally utilize triggers in a way that prevents the crossing of ecological thresholds.

V. RECOMMENDATIONS AND CONCLUSIONS

Natural resource managers are increasingly using adaptive management approaches in their plans and decisions. Situations where agencies choose to pursue an adaptive decision-making framework will almost always be characterized by high levels of uncertainty and controversy. Adaptive plans provide a way to proceed in the face of uncertainty and use management as an opportunity to learn about resources conditions and ecosystem processes. Triggers offer a potential way of providing accountability to the practice of adaptive management. This can be critically important to ensuring the integrity of decision-making, meeting legal requirements, and providing some certainty about the sideboards of future actions to stakeholders.

Based on our review, we can make several key observations and recommendations for the effective use of triggers. Generally the most contentious issues are where and how triggers are set, who designs, conducts, and funds the monitoring, and the enforceability of mitigation and monitoring timelines. The following recommendations offer some suggestions for navigating these issues.

A. Adaptive management should include a clear feedback loop and be conducted in a way that allows for learning.

We make a number of distinctions between different decision-making frameworks that are implemented under the umbrella of adaptive management. Some of the cases reviewed fail to capitalize on opportunities to learn about resource conditions and the causes of those conditions. Instead, they follow what is more of an adaptive mitigation approach. We argue that in most cases agencies should pursue something more than adaptive mitigation and should be careful about defining adaptive management in a loose, ad hoc fashion. This can create unmet expectations and subsequently erode trust with partners.

Furthermore, opportunities to learn should not be foregone. Learning will make mitigation, and resource management in general, more effective and efficient in the future. Without learning, mitigation may be increased in cases where resources are not responding as desired, without knowing what is the cause of failure. Put simply, this may be a waste of time and money for both agencies and private parties.

Some efforts do not specify what will be done with monitoring information or how it will feed back into decision-making. Methods for feeding information back into a structured decision-making process should be explicit and determined during the design of an adaptive management program.

B. Monitoring programs and triggered mitigation measures should be enforceable and include pre-specified timelines.

The enforceability of a monitoring and mitigation program should be of interest to agencies, to ensure the integrity of their processes, and to private parties seeking to hold agencies accountable if they do not meet their commitments. Without enforceability, such programs will appear to be a lot of hand waving to disguise open-ended, discretionary processes devoid of accountability. This will only increase controversy. There is little point in going through the process of using triggers if, in the end, they provide no additional degree of certainty and accountability.

It is challenging, but not impossible, to write monitoring and mitigation commitments in a way that they are enforceable. As we have seen, in some cases commitments must be made enforceable for an adaptive management plan to survive legal challenge. Monitoring is most clearly enforceable when it is required as a pre-condition for another decision. For example, monitoring under the NWFP was required for some species prior to project implementation. Explicit monitoring and mitigation requirements can also be included in legally binding agreements, such as permits, and the terms of these permits can be enforced in some situations by agencies and/or private parties. A monitoring and/or mitigation commitment that serves as the basis for a NEPA decision also could be enforceable, in the sense that a lack of monitoring or mitigation might trigger supplemental NEPA analysis.

In all of these cases, monitoring and mitigation will be more enforceable and constitute a clearer commitment if the details of the plan are pre-specified. It is necessary to identify what will be monitored, when monitoring will occur, when monitoring information will trigger a change in management action, where the trigger points are set, when the mitigation will be implemented, and what activities can continue while monitoring or mitigation decisions are ongoing.

If commitments are made in large-scale planning documents, these will be most meaningful if desired conditions are clearly outlined and monitoring commitments are made binding. If agencies are committed to making monitoring and mitigation commitments legally binding, the Department of the Army's regulations serve as exemplars, as they affirmatively make commitments in a ROD legally binding and enforceable. In short, enforceability is contingent upon several factors, but agencies have the discretion to make their monitoring and mitigation measures binding and enforceable if they choose to do so.

C. In order to survive judicial review, agencies must demonstrate that they will not violate substantive legal requirements.

Agencies must demonstrate that their adaptive management plans will meet legal standards and requirements. If they choose to proceed despite uncertainty that substantive standards will be met in the future, they must show that they have a specific and enforceable monitoring and mitigation strategy that is within their power to implement if unacceptable effects are detected.

In the context of NEPA, agencies can successfully use tiering and build adaptability into documents. Courts do not always require additional NEPA analysis when new information emerges, as long as any changes in action and predicted effects are all within the range of what was analyzed in the original NEPA document. Additionally if agencies use thresholds in their monitoring programs, they must pay attention to how they interpret these thresholds in their NEPA documents. Courts may look for explicit explanation of how pre-set thresholds or triggers relate to significance of effects under NEPA or how they relate to other legal requirements.

D. The responsibilities for designing, conducting, interpreting, and funding monitoring should be made explicit and up front.

Some of the most contentious issues that arise throughout our analysis are who designs and conducts the monitoring program and whether it is affordable, scientifically valid, and likely to yield useable information about resource effects. This requires concerted attention early in the stages of project and program planning to determine where uncertainty is prevalent, what the monitoring priorities are, what can be effectively monitored, and how the monitoring will be funded.

Strategic choices will have to be made as to what can and should be monitored with available resources. Agencies and other parties should identify a funding strategy before an adaptive management plan is implemented. Effecting a high quality and useful monitoring program

is something that will require collaborative engagement with stakeholders and partnering agencies, as this is not something that will be achieved through legal enforcement. Courts may be able to enforce whether some monitoring occurs, but they are limited in their ability to determine the quality of monitoring.

Agencies should aim for transparency and avoid conflicts of interest in the design and implementation of a monitoring program. We recommend considering the establishment of some kind of multi-party monitoring oversight board to ensure transparency and accountability. If industry or other parties help fund monitoring, there should be a system in place so that those with vested interests in monitoring outcomes, including agencies, are not solely entrusted with the design and implementation of the monitoring program.

E. Decisions about trigger points and trigger mechanisms should be made transparently and be explicit.

One of the most contentious issues is that of who sets the trigger points and where. This determination is a heavily loaded choice involving determinations about how risk-prone or risk-averse a program or project is in its approach to resource management. Determinations of risk will have to be made on a case-by-case basis. We recommend that decisions about trigger points be transparent in terms of the choices that are made about risk, how baselines are used to set the trigger points, and how goals and outcomes are identified. Again, agencies and stakeholders should consider utilizing a multi-party process to navigate these contentious issues.

Agencies also should consider incorporating a continuum of trigger points instead of a single red-light trigger that must not be crossed. This allows for proactive intervention before resource conditions reach a crisis point. In almost all cases where natural resource conservation is a goal, we recommend that triggers be used in a way that prevents the crossing of ecological thresholds, since these often correspond with tipping points that may not be reversible. In some cases, the best approach will be to include several types of triggers, some of which serve as green lights allowing activities to proceed, some of which serve as indicators or warnings, and some of which indicate bottom line standards for legal compliance that cannot be crossed.

