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To:  
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Subject: The re-initiated NEPA process on recreation uses analysis on the Chattooga North Fork

Thank you for the opportunity to provide new information at this time. It has been over 29 months since the closure of the last public comment period. *“Throughout this process, the public has expressed agreement on their desire to protect and enhance the outstandingly remarkable values of the Chattooga River (geology, biology, scenery, recreation and history); maintain a sense of solitude away from modern life; offer a remote wilderness experience; preserve the spectacular scenery and setting; and protect the natural resources of the North Fork of the Chattooga Wild and Scenic River that make this area a special and unique place. In the NEPA process, these goals collectively are called a “desired condition.”* (quote from the Scoping Package dated 8/14/2007)

In the Forest Service news release on 12/9/2010, Paul Bradley was quoted as saying:

“More specifically, we are asking for new information on proposed management actions that would allow for boating opportunities above S.C. Highway 28, use separation strategies to mitigate conflict, and establish visitor use capacities to manage use during peak-use times of the year,” emphasized Bradley. “We’re also seeking any new details on management actions that would limit overnight camping to designated campsites and incorporate adaptive management measures that will help us maintain desired use levels.” (underline added)

In this document I will attempt to address the above underlined topics with the following:

1. Comments on the “new information” from the Burrell's Ford USGS gauge
2. Comments on Displacement and Separation Strategies:
3. Comments on Adaptive Management
  - A. The use of Adaptive Management was introduced without involving the stakeholders:
  - B. The “new” comments concerning adaptive management
  - C. New article: *“Engaging Stakeholders for Adaptive Management Using Structured Decision Analysis”*:
  - D. New article: *“Adaptive Management in the Courts.”*
4. Desired use levels *“Within the Recreation ORV, solitude was identified as an important element.”*
  - A. New article: *“The Last Wild River”*
  - B. New article: *“Ramming Speed!”*
5. Comments: A final thought on displacement and separation:

#### 1. The “new information” from the Burrell's Ford USGS gauge:

The first thing “new” that comes to my mind is the Burrell's Ford on-line USGS gauge with depth, flow and temperature (plus trends and accumulating history). I look at it almost every day and use the information to plan when and where I will go when I visit THE RIVER and how I will dress. Base on the water temperature, I know before I leave home if I will wade wet or need to wear waders (50 degrees F is my threshold temperature). Actually, the river temperature fluctuates more than I had previously

thought. I already knew how quickly the water level can rise in a rain event, I have witnessed that many times. The water level drops a lot quicker after a rain event than I previously thought. Based on water depth and flow, I now know exactly where I can go and comfortably wade even before I leave home.

I usually go alone so now I can tell my wife exactly the section I'm going to visit. By combining the internet gauge data with internet weather radar information, I'm now able to anticipate not only the fishing conditions, but also the probability fish activity. The mystery of what the conditions will be when I arrived at THE RIVER has always been a part of the thrill of trip anticipation, and sometimes a disappointment. I'm now in my 76<sup>th</sup> year (and in my 56<sup>th</sup> year of visiting the Chattooga North Fork) and I happily trade that excitement for facts. So I greatly appreciate the information provided by the new gauge.

## **2. Displacement and Separation Strategies:**

It appears inevitable that the future recreation management of the Chattooga North Fork will include some level of boating access and zoning to provide separation of boating from other user groups. I will use the Burrell's Ford gauge information to anticipate the possibility of encountering boating during a visit. I will be displaced to a location that should be boating free. Displacement is what I and many others did 40 years ago when we lost our solitude on the lower Chattooga and separated by moving above the Highway 28 Bridge. I would rather go to section of river that is experiencing an influx of foot travel visitors than to experience conflicts with boating. In a foot travel only section I can always keep walking along the trail until I find my personal envelope of solitude and a stretch of water where the trout have not been disturbed.

I suppose it is fair to say the new Burrell's Ford gauge provides a separation strategy through an indirect method of education.

## **3. Adaptive Management:**

The following are excerpts from the Forest Service scoping letter dated 12/9/2010:

We want to identify any new information, such as recently released articles or publications or new concerns that should be incorporated into the analysis or be part of the decision-making process. Specifically, we are asking you to submit any information on proposed management actions that would allow boating opportunities above SC Highway 28, use separation strategies to mitigate conflict, and establish visitor use capacities to manage use during peak-use times of the year. Additionally, the management actions would limit overnight camping to designated campsites and incorporate adaptive management measures that aid in maintaining the desired use levels.

- Protect and enhance the visitors' frontcountry and backcountry<sup>1</sup> experiences by establishing visitor use capacities.
- Protect and enhance solitude and a sense of remoteness in the backcountry by limiting and/or redesigning and relocating trails and campsites, as well as limiting numbers of groups and encounters per day, group sizes and available parking.
- Maintain current use levels and protect natural resources by monitoring use and adopting adaptive management strategies such as indirect measures (e.g. signage or education) and/or direct measures (e.g. limiting parking spaces, permitting or registration).

**Comments:** In the above excerpts, "adaptive management" is mentioned twice: once to aid in managing "overnight camping" and the other to "maintain current levels and protect natural resources." Adaptive management was not mentioned to "protect and enhance the visitor' front country and backcountry experiences" nor to "protect and enhance solitude and sense of remoteness in the backcountry".

On the other hand, the following excerpts from USFS Response to Public Comments (8/25/2009) offer a different explanation for the use of Adaptive Management.

Pg 7 – Response 24 “The assumptions in the EA about use and encounters between different user groups may well prove to be higher or lower in practice. However, this information will be fine tuned through monitoring and adaptive management during implementation.” (underline added)

Pg 77 – Response 231 “The carrying capacity that the Upper Chattooga can sustain is primarily a social question, not a biophysical one - i.e. encounters (see the next to the last bullet on page 57 of the Integrated Report, Whittaker and Shelby, 2007). The EA does set group encounter limits for all upper Chattooga users in Alternatives 2-10 (Chapter 2, EA). The boating alternatives include an adaptive management strategy that includes indirect and direct measures to take if the encounter limits are exceeded.” (underline added)

Pg 89 – Response 268 “All alternatives set encounter limits to manage both conflicts and solitude. Monitoring, followed by adjusting management through adaptive management may be necessary to protect the ORV and Wilderness.” (underline added)

### **3.A. The use of Adaptive Management was introduced without involving the stakeholders:**

At the first public meeting (10/13/2005) the Forest Service advised the stakeholders that a process known as Limits of Acceptable Change would be used in the Visitor Use Capacity Analysis. Then 20 months later adaptive management was mentioned 3 times in the conclusion of the Integrated Report (7/2007). At the final public workshop (9/29/2007) adaptive management was mentioned in the documents but not discussed or explained. The Forest service version of adaptive management (as described in Federal Register on 4/21/2008; National Forest System Land Management Planning) was brought fully into the process as the primary implementation tool for managing social impacts (encounters, conflicts and solitude issues) in the DRAFT EA (7/2/2008).

### **3.B. The “new” comments concerning adaptive management**

Needless to say, I’m disappointed that stakeholders were not given an earlier opportunity to participate in discussions concerning adaptive management.

I believe adaptive management is a proper implementation tool for the biophysical issues as indicated in the scoping letter. But I have a concern about the use of adaptive management with one of the social issues, namely “encounters.” I don’t believe monitoring for adaptive management will account for those traditional visitors displaced from river sections when and where boating is permitted (see my comments above in 2. Displacement and Separation Strategies). As a result, the encounters will be “lower in practice” (see above USFS Response to Public Comments, Pg 7 – Response 24) and through adaptive management the boaters will be requesting and granted more access. With more boater access, there will be more traditional visitor displacement and encounters will be “lower in practice” again.

As we know, this is what happened in the lower river 35 to 40 years ago. The traditional visitors seeking solitude and undisturbed waters in the lower Chattooga were the first to be displaced as boating activity increased. As boating activity continued to increase, there were conflicts. Then the USFS requested that trout stocking be discontinued in the lower Chattooga (adaptive management). Eventually more of the traditional visitors that had been seeking to catch and keep trout were displaced. What remains are boaters and visitors that are tolerant of boating.

Monitoring to assure that the Limits of Acceptable Change for encounters is not being exceeded is the proper thing to do; but don’t allow adaptive management to increase boating access when encounters are “lower in practice”. There should be Limits of Acceptable Change that will protect and enhance backcountry solitude for future generations, not managed to fill an allowable quota.

The Department of the Interior describes adaptive management as “learning by doing”; I can support that. But I disagree with the concept of management to a “failure” then making an adjustment.

### 3.C. “Engaging Stakeholders for Adaptive Management Using Structured Decision Analysis”

Here is an attached “new” (Sept 2008) article for your consideration:

<http://pubs.usgs.gov/sir/2009/5049/pdf/Irwin.pdf>

Excerpts from the article: “Adaptive management is different from other types of management in that it includes all stakeholders (versus only policy makers) in the process, uses resource optimization techniques to evaluate competing objectives, and recognizes and attempts to reduce uncertainty inherent in natural resource systems.” (underline added)

“Many adaptive management projects fail because of the lack of stakeholder identification, engagement, and continued involvement.”

### 3.D. “Adaptive Management in the Courts”

Here is another attached “new” (Jan 2010) article for your consideration:

[http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1542632&rec=1&srcabs=1537229](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1542632&rec=1&srcabs=1537229)

Go to: [One-Click Download](#)

Excerpt from article on pg 22 of 61, “Nonetheless, thirty-one federal court decisions do grapple with the legality of adaptive management. The United States lost more than half of these cases, a poor record given the deference accorded to agencies under administrative law.”

## 4. Desired Use Levels: “Within the Recreation ORV, solitude was identified as an important element.”

(The above quotation is an excerpt from USFS Response to Public Comments pg 40 – response 131)

4.A. The following excerpt is from the essay *The Last Wild River*, by Bronwen Dickey, daughter of James Dickey, author of Deliverance: “When I read some months back that a lawsuit brought by a boating organization called American Whitewater had prompted the Forest Service to consider opening the river’s headwaters to boaters, an unexpected sadness came over me. It was a variant of what I felt years ago when I learned that my childhood home had been torn down and rebuilt into something I couldn’t recognize.”

Attached is the eloquent and powerful “new” essay *The Last Wild River* (published Summer 2008): <http://www.bronwendickey.com/writing/the-last-wild-river.php>

4.B. The following excerpt is from an article titled *Ramming Speed!*, published in *American Angler* magazine November/December 2008 issue: “So now, there is no refuge. No waterway free of mobs. But here’s the deal: I go fishing to escape mobs. And the kayaker has the gall to ask, ‘How’s the fishing?’”

Attached is a copy of this “new” article.

5. **A final thought on displacement and separation:** Even some boaters are being displaced from the lower Chattooga (the below excerpt from USFS Response to Public Comments - 8/25/2009):

Pg 89 – comment 268 “I, as a private, self guided whitewater paddler, have been displaced exclusively to the lower river since 1976 where I must contend with some 40,000 commercial users a year! Where’s my opportunity as a paddler for the cherished back country experience and solitude provided by the upper Chattooga River?”

Here is my answer to the boater’s question, “Your opportunity to boat with a backcountry experience is in the other half of the upper Chattooga – on the Overflow/West Fork half.”

Sincerely, Doug Adams

# Engaging Stakeholders for Adaptive Management Using Structured Decision Analysis

Elise R. Irwin, Kathryn D. Mickett Kennedy

## Abstract

Adaptive management is different from other types of management in that it includes all stakeholders (versus only policy makers) in the process, uses resource optimization techniques to evaluate competing objectives, and recognizes and attempts to reduce uncertainty inherent in natural resource systems. Management actions are negotiated by stakeholders, monitored results are compared to predictions of how the system should respond, and management strategies are adjusted in a “monitor-compare-adjust” iterative routine. Many adaptive management projects fail because of the lack of stakeholder identification, engagement, and continued involvement. Primary reasons for this vary but are usually related to either stakeholders not having ownership (or representation) in decision processes or disenfranchisement of stakeholders after adaptive management begins. We present an example in which stakeholders participated fully in adaptive management of a southeastern regulated river. Structured decision analysis was used to define management objectives and stakeholder values and to determine initial flow prescriptions. The process was transparent, and the visual nature of the modeling software allowed stakeholders to see how their interests and values were represented in the decision process. The development of a stakeholder governance structure and communication mechanism has been critical to the success of the project.

**Keywords:** stakeholders, structured decision-making, adaptive management, regulated rivers, socioecological systems

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## Introduction

Riverine systems in the Southeast are highly fragmented and managed for hydropower, navigation, flood control, and recreational needs (Irwin and Freeman 2002, Richter and Thomas 2007). These multiple-use systems require innovative approaches for management of both natural and water resources for societal needs (Irwin and Freeman 2002, Poff et al. 2003). Adaptive management is being used as a framework for managing complex riverine systems where (1) management goals conflict and (2) system uncertainty is great. Adaptive management is different from other types of management because it includes all stakeholders in the process, uses resource optimization techniques by incorporating competing objectives, and recognizes and focuses on the reduction of uncertainty inherent in natural resource systems by attempting to reduce it via knowledge acquisition (Walters 1986, Williams et al. 2007). Stakeholders negotiate a starting point for management actions, effects of management are monitored and compared with predicted results, management strategies are adjusted, and the process continues iteratively through the “monitor-compare-adjust” routine. We are actively involved in adaptive management of a southeastern regulated river. In this paper we describe the method by which we involved stakeholders in the framework by engaging them in a structured decision-making process.

## Methods

The study system is the Tallapoosa River below R.L. Harris Dam in the Piedmont region of east-central Alabama (Figure 1) (Irwin and Freeman 2002). Management issues in the study reach below Harris Dam revolve around the effects of the hydropower operation on values associated with the general health of the Tallapoosa River ecosystem. In addition, power production and economic development potential in the area are management concerns and valued uses. For a

full description of the study site and management concerns, see Irwin and Freeman (2002).

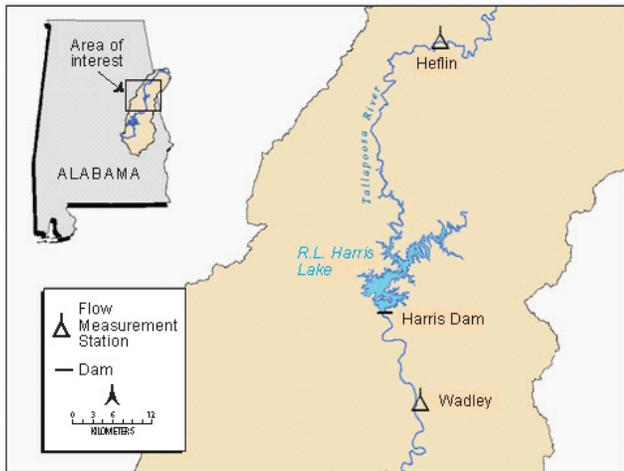


Figure 1. Location of R.L. Harris Dam on the Tallapoosa River, AL, and two USGS gages (Heflin and Wadley) are used to determine specific discharges for flow management.

We conducted a workshop in 2005 to incorporate stakeholder values and objectives into a structured decision-making model. Participants engaged in an open discussion for building consensus on management objectives and values. Presentations by experts in adaptive management of natural resources were followed by a professionally facilitated forum. We used professional facilitators to gather information from the stakeholders in an electronic format (Groupware Systems Software). Suggested objectives were judged in an electronic poll by one representative from 23 participating stakeholder groups. Fundamental objectives were developed and discussed by stakeholders; it was agreed that they were complete and representative of all involved parties. It was also agreed that the framework of adaptive management would be adopted for future discussions and management decisions. In addition, the stakeholders developed a governance structure (the R.L. Harris Stakeholders Board) to assist in future decision-making.

Objectives were used in the development of a decision support model to assist stakeholders in defining the first flow prescription in the adaptive management process. Bayesian belief network (BBN; Marcot et al. 2006) software (Netica 3.19; Norsys Software Corp. 2008) was used to develop a structured decision model.

## Results

Stakeholders identified ten fundamental objectives that became the basis for the structured decision model (Table 1). Many objectives were conflicting (e.g., maximizing reservoir water levels and provision of river boating opportunities).

Table 1. Fundamental objectives identified by stakeholders via a facilitated polling process.

Fundamental objective
Maximize economic development
Maximize diversity/abundance of native fauna/flora
Minimize bank erosion downstream from Harris
Maximize water levels in the reservoir
Maximize reservoir recreation opportunities
Maximize river boating and angling opportunities
Minimize total revenues to the power utility
Maximize power utility operation flexibility
Minimize river fragmentation
Minimize consumptive use

Management options (decisions) were also identified by stakeholders and were incorporated into the BBN. The BBN incorporated 3 main decisions, 11 uncertainty nodes (stakeholder objectives), and 5 stakeholder value nodes (Figure 2). The conditional probability tables associated with each uncertainty node and decision were populated with empirical data and information from expert opinion (Kennedy et al. 2006).

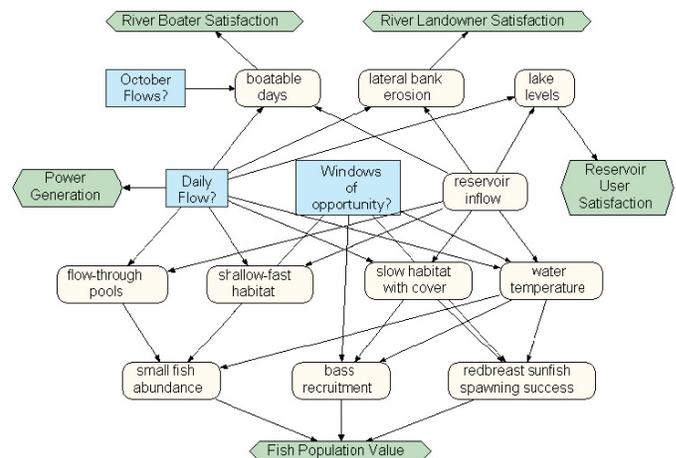


Figure 2. Influence diagram with relational arrows linking nodes included in the Bayesian Belief Network. Three decision nodes (blue boxes), 11 uncertainty nodes (white boxes), and 5 stakeholder value nodes (green hexagons) were included in the model.

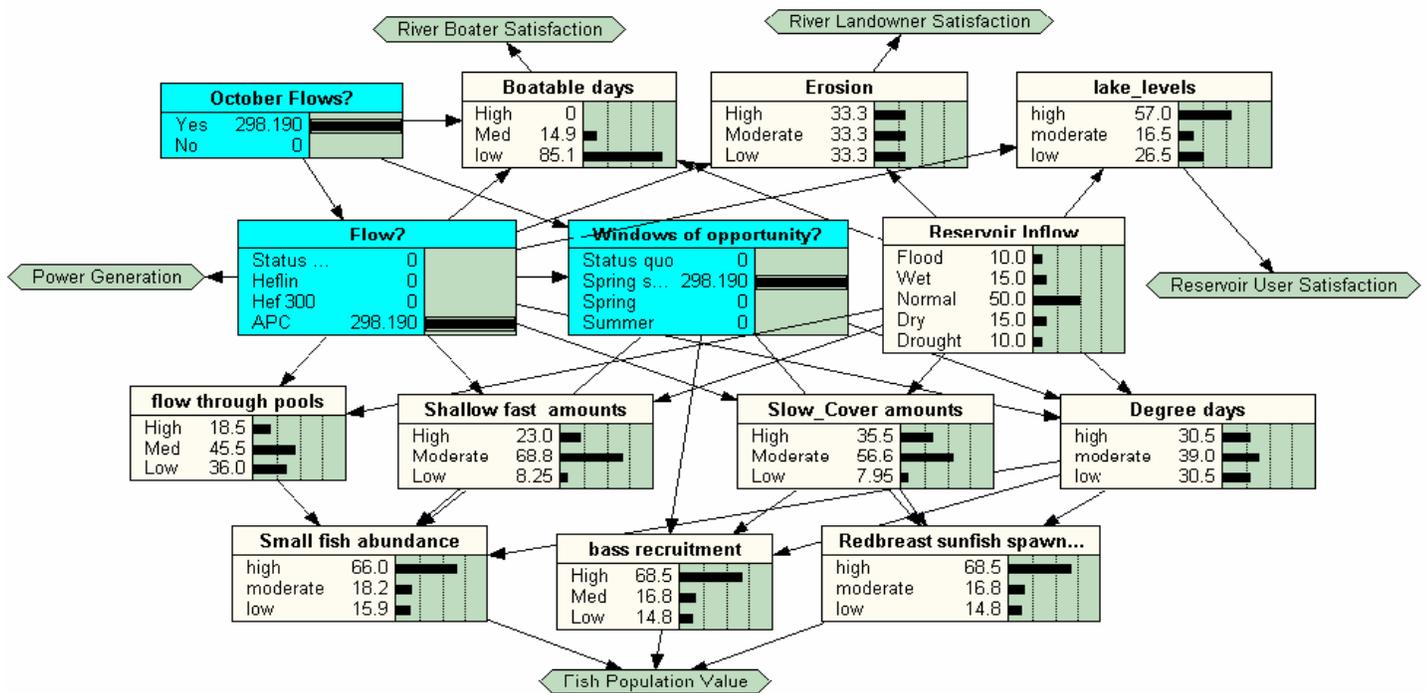


Figure 3. Bayesian Belief Network (BBN) used for structured decision-making regarding flow management below R.L. Harris Dam on the Tallapoosa River, Alabama. The decision model identified initial flow prescriptions that included pulse flows matched to the unregulated river upstream, provision of spawning periods for fish, and provision of boating flows in October. The visual nature of the BBN allowed for stakeholders to understand how the system functioned.

Management decisions were related to daily discharge (volume passed) at the dam, provision of spawning conditions (timing), and provision of October boating flows to mitigate the usual low flows in this month. Optimization was used to determine the management decision that maximized stakeholder values (Figure 3). The initial flow prescription was determined and consisted of pulse discharge from the dam that mimicked the hydrology of an upstream USGS gage in the unregulated Tallapoosa River (Heflin, Figure 1), periods of decreased power generation for fish spawning, and provision of suitable river flows for boating in October. More information regarding the specifics of the BBN can be found in Kennedy et al. (2006).

## Conclusions

Quality decision making for resource allocation in complex, multi-use systems depends upon the inclusion of all individuals and groups with an investment in the system. Inclusion of a diverse group of stakeholders as active decision making participants leads to higher-quality management decisions in most cases (Beirle

2002). In addition, stakeholder involvement in decision making increases public education and fosters positive interactions among stakeholders with conflicting interests.

While stakeholders hold a vital role in management decision-making, the literature also suggests that group decision-making is least successful when it is unaided. Rather, groups of people—whether lay people, experts, or both—are most successful at making complex decisions within a structured decision process (Slovic et al. 1977, McDaniels et al. 1999, Beirle 2002). Bayesian network-based decision analysis tools are capable of providing this structure by linking all measurable variables, valued objectives, and sources of uncertainty within a visual framework supported by conditional probabilities based on empirical data and expert opinion (Netica Software Corp. 2008). Through evaluation of these inputs, stakeholders and decision makers may examine the expected effects of different management scenarios and potential system impacts (e.g., climate change, population growth) (Clemen 1996, Peterson and Evans 2003, Kennedy et al. 2006). The use of such a tool has been a key factor in

successfully engaging the stakeholder group involved with developing management strategies in the middle Tallapoosa River below R.L. Harris Dam ([www.rivermanagement.org](http://www.rivermanagement.org); Kennedy et al. 2006).

Ongoing successful adaptive management in the Tallapoosa River has also been attributed to continued involvement of stakeholders through their governance structure, commitment to long-term monitoring, and assessment for adjustment of future management regimes. Involvement of stakeholders in conflict resolution is critical to progress in management and evaluation of management. The use of a visual structured decision model that allowed for stakeholder input and optimization of values associated with various decisions was also critical in the process. We have been monitoring the system for 4 years and often stakeholders are involved in the collection of field data. In addition, the stakeholders have exhibited patience relative to reporting of results; updates can be viewed on the website [www.rivermanagement.org](http://www.rivermanagement.org). Our evaluation of management will ensue in 2009 and our hope is to begin another 5-yr assessment with continued stakeholder involvement and support.

## Acknowledgments

The authors would like to thank the many stakeholders that contributed to this project. They are listed at [www.rivermanagement.org](http://www.rivermanagement.org). The project would not have been successful without the involvement of our facilitators, Vern Herr and Brett Boston; many hats off to them. The project was funded by the U.S. Geological Survey as a U.S. Fish and Wildlife Service Science Support Partnership Program Project (FWS SSPP # 02-R4-08) and administered through Alabama CFWRU RWO 86. The Alabama Power Company also provided funding for portions of the workshop and for facilitation of board meetings. The Alabama CFWRU is sponsored by the USGS; the Alabama Agricultural Experiment Station, Auburn University; the Alabama Department of Conservation and Natural Resources, Division of Wildlife and Freshwater Fisheries; the Wildlife Management Institute; and the USFWS.

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## Article

# Adaptive Management in the Courts

J.B. Ruhl<sup>†</sup> and Robert L. Fischman<sup>††</sup>

## INTRODUCTION

Adaptive management has become the tonic of natural resources policy. With its core idea of “learning while doing,”<sup>1</sup> adaptive management has breathed life and hope into a policy realm beset by controversy, uncertainty, and complexity. It offers what many believe is needed most in a world bombarded by ecological deterioration of massive scales—expert agencies exercising professional judgment through an iterative decisionmaking process emphasizing definition of goals, description of policy decision models, active experimentation with monitoring of conditions, and adjustment of implementation decisions as suggested by performance results. This ideal has become infused into the natural resources policy world to the point of ubiquity, surfacing in everything from mundane agency per-

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1. Professor Holly Doremus explains:

[A]ctive learning is rarely incorporated into the resource management process. For iterative or related decisions, where there is no “safe” choice, precaution and science are not in tension. Both point us toward an incremental framework for decision making that emphasizes learning. We might call that framework adaptive management, but . . . I prefer the more descriptive phrase “learning while doing.”

Holly Doremus, *Precaution, Science, and Learning While Doing in Natural Resource Management*, 82 WASH. L. REV. 547, 550 (2007). For more detail on what “learning while doing” entails, see *infra* Part I.

mits<sup>2</sup> to grand presidential proclamations.<sup>3</sup> Indeed, it is no exaggeration to suggest that these days adaptive management *is* natural resources policy.

But is it working? Does appending “adaptive” in front of “management” somehow make natural resources policy, which has always been about balancing competing claims to nature’s bounty, something more and better? Many legal and policy scholars have asked that question, with mixed reviews.<sup>4</sup> Their

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2. For example, the U.S. Fish and Wildlife Service (FWS) has proclaimed it will use adaptive management in administering habitat conservation plan (HCP) permits it issues pursuant to the Endangered Species Act (ESA). This will be done as a means to “examine alternative strategies for meeting measurable biological goals and objectives through research and/or monitoring, and then, if necessary, to adjust future conservation management actions according to what is learned.” Final Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 64 Fed. Reg. 11,485, 11,486 (Mar. 9, 1999). As one FWS official explained:

We will continue to incorporate contingency planning within all types of HCPs. In the future, HCPs will have improved structure in their adaptive management strategies . . . . Increased structure in adaptive management strategies will require increased vigilance on the part of permittees and the Service during implementation of long-term plans; this reflects the nature of the conservation partnership created by HCPs.

Marj Nelson, *The Changing Face of HCPs*, 25 ENDANGERED SPECIES BULL. 4, 7 (2000).

3. See, e.g., Exec. Order No. 13,508, 74 Fed. Reg. 23,099, 23,101–03 (May 12, 2009) (directing the EPA to draft pollution-control strategies for the Chesapeake Bay watershed that are “based on sound science and reflect adaptive management principles,” while also directing the Departments of the Interior and Commerce to use “adaptive management to plan, monitor, evaluate, and adjust environmental management actions” in the Chesapeake Bay watershed).

4. See Mary Jane Angelo, *Stumbling Toward Success: A Story of Adaptive Law and Ecological Resilience*, 87 NEB. L. REV. 950, 951–52 (2009) (detailing the theory of adaptive management through a case study based in Florida); Alejandro Esteban Camacho, *Can Regulation Evolve? Lessons from a Study in Maladaptive Management*, 55 UCLA L. REV. 293, 294–99 (2007) (critiquing the use of adaptive management in the ESA); Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of “New Age” Environmental Protection*, 41 WASHBURN L.J. 50, 50–52 (2001) (identifying challenges for adaptive management in the administration of the ESA); Robert L. Glicksman, *Ecosystem Resilience to Disruptions Linked to Global Climate Change: An Adaptive Approach to Federal Land Management*, 87 NEB. L. REV. 833, 871 (2009) (proposing the broad use of adaptive management in public land management); Bradley C. Karkkainen, *Panarchy and Adaptive Change: Around the Loop and Back Again*, 7 MINN. J. L. SCI. & TECH. 59, 70–71 (2005) (examining the theory of active adaptive management); J.B. Ruhl, *Regulation by Adaptive Management—Is It Possible?*, 7 MINN. J. L. SCI. & TECH. 21, 33–34 (2005) (identifying disconnects between adaptive management and conventional administrative procedure); Annecoos Wiersema, *A Train Without Tracks: Rethinking the Place of Law and Goals in Environmental and Natural Resources Law*, 38 ENVTL. L. 1239, 1239 (2008)

evaluations, however, have rested on theory,<sup>5</sup> program-specific surveys,<sup>6</sup> and focused case studies.<sup>7</sup> No study has comprehensively explored and extracted lessons from what likely matters significantly to the natural resource agencies practicing adaptive management—how is it faring in the courts? We do so in this Article.

Part I of this Article examines the theory, policy, and practice of adaptive management, focusing on the experience of the federal resource management agencies. From theory to policy to practice, at each step forward in the emergence of adaptive management something has been lost in the translation. The end product is something we call “a/m-lite,”<sup>8</sup> a watered-down version of the theory that resembles ad hoc contingency planning more than it does planned “learning while doing.” This gap between theory and practice leads to profound disparities between how agencies justify decisions and how adaptive management in practice arrives at the courthouse doorsteps.

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(arguing that adaptive management by agencies pays insufficient attention to substantive goals).

5. See, e.g., Karkkainen, *supra* note 4, at 69–74 (examining the theories of passive and active adaptive management).

6. The use of adaptive management to implement ESA programs has received considerable attention. See, e.g., Camacho, *supra* note 4, at 293; Doremus, *supra* note 4, at 50–52; J.B. Ruhl, *Taking Adaptive Management Seriously: A Case Study of the Endangered Species Act*, 52 KAN. L. REV. 1249, 1250–51 (2004).

7. See, e.g., Angelo, *supra* note 4, at 966–90 (Lake Apopka in Florida); Melinda Harm Benson, *Adaptive Management by Resource Management Agencies in the United States: Implications for Energy Development in the Interior West*, 28 J. ENERGY & NAT. RESOURCES L. 87, 92–95 (2010) (Bureau of Land Management energy development on federal public lands in Wyoming); Melinda Harm Benson, *Integrating Adaptive Management and Oil and Gas Development: Existing Obstacles and Opportunities for Reform*, 39 ENVTL. L. REP. 10,962, at 10,962 (2009) (oil and gas development in Wyoming); Alejandro Esteban Camacho, *Beyond Conjecture: Learning About Ecosystem Management from the Glen Canyon Dam Experiment*, 8 NEV. L.J. 942, 944–49 (2008) (Glen Canyon Dam adaptive management project); John H. Davidson & Thomas Earl Geu, *The Missouri River and Adaptive Management: Protecting Ecological Function and Legal Process*, 80 NEB. L. REV. 816, 820–33 (2001) (Missouri River); Alfred R. Light, *Tales of the Tamiami Trail: Implementing Adaptive Management in Everglades Restoration*, 22 J. LAND USE & ENVTL. L. 59, 69–89 (2006) (Florida Everglades); Lawrence Susskind et al., *Collaborative Planning and Adaptive Management in Glen Canyon: A Cautionary Tale*, 35 COLUM. J. ENVTL. L. 1, 7–23 (2010) (Glen Canyon Dam adaptive management project).

8. “a/m-lite” is a stripped-down version of adaptive management that often fails due to management, implementation, and planning problems. See *infra* text accompanying notes 69–70.

In Part II, we review how these disparities have played out in courts. We consider claims that agency practice of adaptive management has not lived up to either its theoretical promise or to the legal demands of substantive and procedural law. Our overall assessment is that, although courts genuinely and often enthusiastically endorse adaptive management theoretically, they frequently are underwhelmed by how agencies implement adaptive management in the field. We extract three key themes from the body of case law in this respect: (1) larger-scale plans are more likely to incorporate adaptive management plans that withstand judicial scrutiny than are smaller-scale ones; (2) the practice of tiering site-specific environmental impact analyses to an earlier, overarching, cumulative study is well suited to adaptive management, and adaptive management can reduce the need for supplemental analyses; and (3) adaptive management procedures, no matter how finely crafted, cannot substitute for showing that a plan will meet substantive management criteria required by law.

The pool of judicial opinions on adaptive management is still limited in scope, leaving many questions unanswered and providing only a partial playbook for how agencies should move forward. In Part III, therefore, we extend from the existing case law to draw lessons for both Congress and agencies about the future practice of adaptive management. The message for Congress is straightforward—provide more funding and clearer standards. With neither option likely in the foreseeable future, agencies cannot as a practical matter hope to practice a fully-realized version of adaptive management theory. Our message to agencies, however, is that even compromised adaptive management, in the form of a/m-lite, can be an effective decision method—and one that survives judicial scrutiny. But, in order for that to be the case, agencies must be more disciplined about its design and implementation. This includes resisting the temptation to employ adaptive management to dodge burdensome procedural requirements, committing to substantive management criteria, and engaging contentious stakeholder participation.

#### I. THE THEORY, POLICY, AND PRACTICE OF ADAPTIVE MANAGEMENT

Adaptive management has moved amazingly fast from theoretical drawing board to policy marketing plan to practice production line. Along the way, however, it has been watered down

to a weak lemonade of ad hoc contingency planning. Adaptive management as practiced by the federal resource management agencies just does not seem to have quite the same refreshing appeal as adaptive management in theory. In this Part of the Article, we explore this gap and identify the tensions it poses for adaptive management in the courts.<sup>9</sup>

#### A. THEORY

Over the past two decades, natural resources policy has gravitated to a model of nested, ever-changing, complex ecosystems, the essence of which demands a management policy framework every bit as dynamic as the ecosystems it seeks to manage.<sup>10</sup> This rapidly solidifying framework, known as ecosystem management, focuses on natural resources as ecologically functioning landscape units rather than as disassembled parts—the trees, the water, the grassland, the species, and so on.<sup>11</sup> To achieve this goal, ecosystem management intends to move decisionmaking from a process of setting rigid standards based on comprehensive rational planning to one of experimentation using continuous monitoring, assessment, and recalibration. The dominant of these new decision methods emerged in

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9. This Part builds on themes developed in J.B. Ruhl, *Adaptive Management for Natural Resources—Inevitable, Impossible, or Both?*, 54 ROCKY MTN. MIN. L. INST. 11-1, 11-2 (2008).

10. The development of natural resources law has taken many of its cues from environmental and ecological sciences, which themselves have evolved over time. See Fred P. Bosselman & A. Dan Tarlock, *The Influence of Ecological Science on American Law: An Introduction*, 69 CHI.-KENT L. REV. 847, 847–54 (1994). With ecology in particular, the trend over the past half-century has been increasingly to focus on the complex flux qualities of ecosystems and to place less emphasis on conceptions of stasis and natural stability. See Reed F. Noss, *Some Principles of Conservation Biology, as They Apply to Environmental Law*, 69 CHI.-KENT L. REV. 893, 893 (1994) (“Among the new paradigms in ecology, none is more revolutionary than the idea that nature is not delicately balanced in equilibrium, but rather is dynamic, often unpredictable, and perhaps even chaotic.”); see also Bryan Norton, *Change, Constancy, and Creativity: The New Ecology and Some Old Problems*, 7 DUKE ENVTL. L. & POL’Y F. 49, 49 (1996); Jonathan Baert Wiener, *Law and the New Ecology: Evolution, Categories, and Consequences*, 22 ECOLOGY L.Q. 325, 326–27 (1995).

11. For the seminal works developing ecosystem management theory and policy, see Norman L. Christensen et al., *The Report of the Ecological Society of America on the Scientific Basis for Ecosystem Management*, 6 ECOLOGICAL APPLICATIONS 665, 665–66 (1996), and R. Edward Grumbine, *What Is Ecosystem Management?*, 8 CONSERVATION BIOLOGY 27, 27 (1994). The legal contours of ecosystem management are comprehensively explored in JOHN COPELAND NAGLE & J.B. RUHL, *THE LAW OF BIODIVERSITY AND ECOSYSTEM MANAGEMENT* (2d ed. 2006).

the theory of adaptive management C.S. “Buzz” Holling and his co-authors laid out in the influential book from the late 1970s, *Adaptive Environmental Assessment and Management*.<sup>12</sup>

Holling and his fellow researchers found conventional environmental management methods, particularly the environmental impact analysis process that lies at the core of the National Environmental Policy Act (NEPA),<sup>13</sup> at odds with the emerging model of ecosystem dynamics. They focused on the basic properties of ecological systems to provide the premises of a new assessment and management method.<sup>14</sup> Under a dynamic model of ecosystems, they concluded, management policy must put a premium on collecting information, establishing measurements of success, monitoring outcomes, using new information to adjust existing approaches, and a willingness to change.<sup>15</sup> The traditional management approach of natural resources policy was “to attack environmental stressors in piecemeal fashion, one at a time,” and to parcel decisionmaking “out among a variety of mission-specific agencies and resource-specific management regimes.”<sup>16</sup> In contrast, the adaptive management framework is more evolutionary and interdisciplinary, relying on iterative cycles of goal determination, model building, performance standard setting, outcome monitoring, and standard recalibration. Indeed, advanced versions of adaptive management incorporate an experimentalist research element, in which management actions deliberately probe for information to evaluate testable hypotheses about the effects of active intervention in ecological processes, such as evaluating the effects a chosen habitat management action and its alternatives might have on invasive species by running small-scale test plot experiments.<sup>17</sup>

Adaptive management has evolved well beyond an idea. Indeed, from the earliest emergence of ecosystem management

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12. C.S. HOLLING ET AL., *ADAPTIVE ENVIRONMENTAL ASSESSMENT AND MANAGEMENT* (C.S. Holling ed., 1978); Kai N. Lee & Jody Lawrence, *Restoration Under the Northwest Power Act: Adaptive Management: Learning from the Columbia River Basin Fish and Wildlife Program*, 16 ENVTL. L. 431, 442 n.45 (1986) (tracing the term “adaptive management” to Holling’s book).

13. NEPA is explored in more detail *supra* Part III.

14. HOLLING ET AL., *supra* note 12, at 25–37.

15. *Id.* at 1–21.

16. Bradley C. Karkkainen, *Bottlenecks and Baselines: Tackling Information Deficits in Environmental Regulation*, 86 TEX. L. REV. 1409, 1439 (2008).

17. See CARL WALTERS, *ADAPTIVE MANAGEMENT OF RENEWABLE RESOURCES* 232 (1986); Karkkainen, *supra* note 4, at 70–71.

policy, there has been broad consensus among resource managers and academics that adaptive management is the only practical way to implement ecosystem management.<sup>18</sup> Recently, for example, the National Research Council branch of the National Academy of Sciences convened a committee of scientists to explore how adaptive management might be used to improve resource agency decisionmaking for ecosystem management in the Klamath River Basin, which straddles southern Oregon and northern California.<sup>19</sup> The basin had been beset for decades with water management conflicts pitting farming, fishing, tribal, recreational, and species interests in constant battle.<sup>20</sup> Noting there had been “little effort to implement adaptive-management strategies in the Klamath basin,”<sup>21</sup> the committee synthesized the theoretical formulations to date to outline eight key steps of adaptive management: (1) definition of the problem, (2) determination of goals and objectives for management of ecosystems, (3) determination of the ecosystem baseline, (4) development of conceptual models, (5) selection of future restoration actions, (6) implementation and management actions, (7) monitoring and ecosystem response, and (8) evaluation of restoration efforts and proposals for remedial actions.<sup>22</sup> The committee’s description of the last stage provides some flavor of how adaptive management differs from conventional natural resources management in the way Holling and his fellow researchers deemed most important:

After implementation of specific restoration activities and procedures, the status of the ecosystem is regularly and systematically reassessed and described. Comparison of the new state with the baseline state is a measure of progress toward objectives. The evaluation process feeds directly into adaptive management by informing the implementation

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18. See Ronald D. Brunner & Tim W. Clark, *A Practice-Based Approach to Ecosystem Management*, 11 CONSERVATION BIOLOGY 48, 56 (1997); Anne E. Heissenbuttel, *Ecosystem Management—Principles for Practical Application*, 6 ECOLOGICAL APPLICATIONS 730, 732 (1996); Paul L. Ringold et al., *Adaptive Management Design for Ecosystem Management*, 6 ECOLOGICAL APPLICATIONS 745, 745–46 (1996). Indeed, the Ecological Society of America’s comprehensive study of ecosystem management treats the use of adaptive management methods as a given. See Christensen et al., *supra* note 11, at 670.

19. See COMM. ON ENDANGERED & THREATENED FISHES IN THE KLAMATH RIVER BASIN, ENDANGERED AND THREATENED FISHES IN THE KLAMATH RIVER BASIN: CAUSES OF DECLINE AND STRATEGIES FOR RECOVERY 1–3 (2004). In the interests of full disclosure, Professor Ruhl served on the so-called “Klamath Committee.”

20. See *id.* at 17–45.

21. *Id.* at 335.

22. See *id.* at 332–35.

team and leading to testing of management hypotheses, new simulations, and proposals for adjustments in management experiments or development of wholly new experiments or management strategies.<sup>23</sup>

By contrast, the committee observed that “[e]cosystem management in the Klamath basin typically has pursued the widely recognized alternatives to adaptive management: deferred action and trial and error involving crisis management.”<sup>24</sup> These approaches magnify losses to resources, undervalue information, and overvalue action for action’s sake.<sup>25</sup> While an adaptive management approach would need to adhere to legal constraints of the Endangered Species Act (ESA) and established water rights, the committee identified a number of management innovations that could take pressure off the water management conflicts, such as water banks and reoriented agency management structures and processes.<sup>26</sup>

## B. POLICY

Federal resource management agencies have had difficulty translating the theoretical descriptions of adaptive management into policy. Rather than elaborating on the theoretical framework by providing details for implementation of the eight steps of adaptive management, agencies adopting adaptive management have gone in the reverse direction, condensing the policy of adaptive management into the bumper-sticker sized slogan of “learning while doing.”<sup>27</sup>

For example, one of the first movers on adaptive management, the U.S. Fish and Wildlife Service (FWS), has employed this definition of adaptive management in its policy guidance for the ESA permit program since 2000:

Adaptive management is an integrated method for addressing uncertainty in natural resource management. It also refers to a structured process for learning by doing . . . . Passive adaptation is where information obtained is used to determine a single best course of action. Active adaptation is developing and testing a range of alternative strategies. The Services believe that both of these types of adaptive management are appropriate to consider when developing a strategy to address uncertainty. Therefore, we are defining adaptive manage-

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23. *Id.* at 335.

24. *Id.* at 336.

25. *See id.*

26. *See id.* at 340–43. For a thorough history of the basic controversy in the Klamath basin dispute, including the impact and aftermath of the Committee report, see HOLLY DOREMUS & A. DAN TARLOCK, WATER WAR IN THE KLAMATH BASIN (2008).

27. *See supra* note 1 and accompanying text.

ment broadly 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.<sup>28</sup>

Similarly, the Department of the Interior (DOI), in its *Adaptive Management Technical Guide*, defines adaptive management using a long-winded version of the “learning while doing” theme adopted from the National Research Council:

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 . . . . It is not a “trial and error” process, but rather emphasizes learning while doing.<sup>29</sup>

The mantras of “learning while doing” and “learning by doing” may capture the essence of adaptive management, but these phrases hardly convey how to do it. The picture gets no clearer as one moves from policy guidance to formal regulatory definitions. For example, the joint regulation for compensatory wetland mitigation—promulgated in April of 2008 by the U.S. Army Corps of Engineers (Army Corps) and the Environmental Protection Agency (EPA)<sup>30</sup>—defines adaptive management as

the development of a management strategy that anticipates likely challenges associated with compensatory mitigation projects and provides for the implementation of actions to address those challenges, as well as unforeseen changes to those projects. It requires consideration of the risk, uncertainty, and dynamic nature of compensatory mitigation projects and guides modification of those projects to optimize performance. It includes the selection of appropriate measures that will ensure that the aquatic resource functions are provided and involves analysis of monitoring results to identify potential problems of a compensatory mitigation project and the identification and implementation of measures to rectify those problems.<sup>31</sup>

The U.S. Forest Service’s 2008 rule on national forest planning,<sup>32</sup> which drips with references to adaptive management, provides even less definitional detail:

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28. Notice of Availability of a Final Addendum to the Handbook for Habitat Conservation Planning and Incidental Take Permitting Process, 65 Fed. Reg. 35,242, 35,252 (June 1, 2000) (internal citations omitted).

29. BYRON K. WILLIAMS ET AL., ADAPTIVE MANAGEMENT: THE U.S. DEPARTMENT OF INTERIOR TECHNICAL GUIDE, at v (2009).

30. See Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594 (Apr. 10, 2008).

31. 33 C.F.R. § 332.2 (2009).

32. National Forest System Land Management Planning, 73 Fed. Reg. 21,468 (Apr. 21, 2008).

Adaptive management: A system of management practices based on clearly identified outcomes and monitoring to determine if management actions are meeting desired outcomes; and, if not, to facilitate management changes that will best ensure that outcomes are met or re-evaluated. Adaptive management stems from the recognition that knowledge about natural resource systems is sometimes uncertain.<sup>33</sup>

The point is that these and other legal definitions of adaptive management have done little to pin down what makes natural resources management “adaptive” for purposes of measuring and evaluating agency decisions. Further content is not generally supplied in agency substantive and procedural regulations. For example, section 404 of the new Clean Water Act’s wetland compensatory mitigation program regulations requires applicants to develop adaptive management plans as part of a larger, permitting process and use it to guide decisionmaking over relevant permit time frames.<sup>34</sup> Thus, among

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33. 36 C.F.R. § 219.16 (2009) (emphasis removed). This rule is currently enjoined by *Citizens for Better Forestry v. U.S. Department of Agriculture*, 632 F. Supp. 2d 968, 980 (N.D. Cal. 2009), and the Forest Service has requested public input on what direction the planning rule should take. See National Forest System Land Management Planning, 74 Fed. Reg. 67,165, 67,166 (Dec. 18, 2009). The Forest Service adopted the same definition in its August 2007 proposed rules updating its procedures for NEPA compliance. See National Environmental Policy Act Procedures, 72 Fed. Reg. 45,998, 46,003 (Aug. 16, 2007). States do little better. California defines adaptive management, in the context of wildlife conservation planning, as “us[ing] the results of new information gathered through the monitoring program of the plan and from other sources to adjust management strategies and practices to assist in providing for the conservation of covered species.” CAL. FISH & GAME CODE § 2805(a) (West 2010). A Minnesota statute implementing the Great Lakes compact defines it as “a water resources management system that provides a systematic process for evaluation, monitoring and learning from the outcomes of operational programs and adjustment of policies, plans and programs based on experience and the evolution of scientific knowledge concerning water resources and water dependent natural resources.” MINN. STAT. § 103G.801(1.2) (2010). Adaptive management in Oregon means “applying management or practices over time and across the landscape to achieve site specific resource goals using an integrated and science based approach that results in changes over time in response to feedback or monitoring.” OR. REV. STAT. § 541.351(1) (2010). In Washington it means simply “reliance on scientific methods to test the results of actions taken so that the management and related policy can be changed promptly and appropriately.” WASH. REV. CODE ANN. § 76.09.020(1) (West 2010).

34. Section 404 of the Clean Water Act, jointly administered by the Army Corps of Engineers (Army Corps) and the EPA, establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States regulated under section 404 include fill for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and mining projects. Section 404 requires a permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from section 404 regulation (e.g., certain farming and forestry activities).

the regulatory requirements for “planning and documentation” in mitigation plans, the rule requires compilation of an “adaptive management plan” to “guide decisions for revising compensatory mitigation plans and implementing measures to address both foreseeable and unforeseen circumstances that adversely affect compensatory mitigation success.”<sup>35</sup> With the requirement of adaptive management plans in hand, however, the rule does not go much further in explaining how they are to be designed and implemented, leaving it to the local Army Corps “district engineer, in consultation with the responsible party (and other federal, tribal, state, and local agencies, as appropriate), [to] determine the appropriate measures.”<sup>36</sup> The upshot of the rule is that the adaptive management plan will be used when needed, at which time the district engineer and regulated party will figure out how to adapt.

This wait-and-see approach hardly seems what Holling and his adaptive management theory progeny have in mind. Rather than require plans that build in the objectives, hypotheses, models, standards-information flows, and transparency of adaptive management, these rules leave the actual content of plans undetermined and the practice of adaptive management up to the opaque post-permit contacts between local Army Corps officials and permittees. This is indicative of how an elaborate theory has descended into a vague promise of future adjustments without clear standards. The litigation described in Part II provides many other examples of this devolution from theory to a/m-lite.<sup>37</sup>

Some of the open-ended qualities of the Army Corps’ adaptive management policy could be explained as necessary given the nature of section 404 as regulating primarily private lands and actions<sup>38</sup>—meaning the Army Corps takes proposed actions as they come and cannot know ahead of time how adaptive management can be effectively designed. But the story is little better for federal public land management agencies. There is no shortage of stakeholders interested in how public lands are

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See *Wetland Regulatory Authority*, U.S. EPA OFF. WATER, [http://water.epa.gov/type/wetlands/outreach/upload/reg\\_authority.pdf](http://water.epa.gov/type/wetlands/outreach/upload/reg_authority.pdf) (last visited Sept. 26, 2010).

35. 33 C.F.R. § 332.4(c)(12) (2009).

36. *Id.* § 332.7(c)(3).

37. See *infra* Part II.

38. Jason Scott Johnston, *The Tragedy of Centralization: The Political Economics of American Natural Resources Federalism*, 74 U. COLO. L. REV. 487, 620 n.361 (2003).

managed and plenty of opportunities exist for them to challenge agency decisions. The U.S. Forest Service and the DOI have led the way toward adaptive management among federal land management agencies. The Forest Service positioned adaptive management as the driver in its 2008 “environmental management systems” (EMS) rules for national forest planning,<sup>39</sup> and the DOI adopted a broad adaptive management policy for all its agencies in March 2007.<sup>40</sup> Still, details are lacking.

The Forest Service’s 2008 rule, for example, touts adaptive management over twenty times in the preamble,<sup>41</sup> but only twice in the rule text: once to define it,<sup>42</sup> and once to proclaim it is the essence of land management planning,<sup>43</sup> but never to explain how it is implemented. Instead, the agency adopted the concept of “environmental management systems” to, in theory (according to the preamble), capture all that is part of adaptive management and more.<sup>44</sup> The agency said it “believes incorporating EMS in the planning rule better integrates adaptive management and EMS in Forest Service culture and land management planning practices.”<sup>45</sup>

The DOI approach is in one sense more substantive but in others more indirect. The DOI has proposed, as part of its rules implementing NEPA, that all its agencies adopt adaptive management, but does not therein define adaptive management or prescribe the contents of adaptive management plans.<sup>46</sup> Rather, the March 2007 DOI policy mandates use of a “technical guide”

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39. National Forest System Land Management Planning, 73 Fed. Reg. 21,468, 21,469 (Apr. 21, 2008) (emphasizing the need for a forest system management rule that “[p]romotes the use of adaptive management”).

40. See Secretary of the Interior, Order No. 3270, § 2 (Mar. 9, 2007) (“Consideration of [adaptive management] is warranted when: (a) there are consequential decisions to be made; (b) there is an opportunity to apply learning; (c) the objectives of management are clear; (d) the value of reducing uncertainty is high; (e) uncertainty can be expressed as a set of competing, testable models; and (f) an experimental design and monitoring system can be put in place with a reasonable expectation of reducing uncertainty.”).

41. National Forest System Land Management Planning, 73 Fed. Reg. at 21,469–505.

42. 36 C.F.R. § 219.16 (2009).

43. *Id.* § 219.3(a) (“Land management planning is an adaptive management process that includes social, economic, and ecological evaluation; plan development, plan amendment, and plan revision; and monitoring.”).

44. *Id.* § 219.5.

45. National Forest System Land Management Planning, 73 Fed. Reg. at 21,475.

46. Using Adaptive Management, 43 C.F.R. § 46.145 (2009).

to define what adaptive management is and how an agency is to implement it.<sup>47</sup> The DOI adaptive management website presents a series of case studies to illustrate the technical guide in action, with contexts including multiple use lands, wildlife refuges, national forest restoration projects, and the Glen Canyon dam.<sup>48</sup> The guidance and the case studies do provide useful practical suggestions for adaptive management, but they do not aggregate into a coherent policy. The DOI nonetheless believes this approach “has great promise as an effective means to address significant resource management challenges under conditions of uncertainty.”<sup>49</sup> That, of course, will depend on how it is put into practice.

### C. PRACTICE

Natural resource law is as much the management of conflict as it is the management of public lands, waters, or species. The first generation of litigation over adaptive management highlights two key disparities that are likely to exacerbate conflict and misunderstanding as agencies attempt to translate theory into action. One disparity arises from the different values evident in law and management. The other disparity separates scholarly adaptive management theory<sup>50</sup> from actual federal agency practice.

#### 1. Perspectives on Agency Decisionmaking: Law Versus Management

Modern U.S. administrative law and many of the environmental statutes enacted over the past forty years value the transparency and certainty of two-step decisionmaking. The first step is the pluralist debate during which groups comment on draft documents and debate various alternatives. The second step is the final agency action, when the government throws the switch and makes the decision it will implement and defend if challenged in court. The legal system regards the point of final agency action as a phase change when the fluid period of deliberation ends and implementation/defense of a

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47. See WILLIAMS ET AL., *supra* note 29, at v.

48. See *Adaptive Management In Use*, U.S. DEPARTMENT INTERIOR, <http://www.doi.gov/initiatives/AdaptiveManagement/casestudies.html> (last modified Sept. 14, 2010).

49. Secretary of the Interior Order No. 3270, *supra* note 40, at § 2.

50. For a discussion of adaptive management theory, see text accompanying *supra* notes 12–17.

fixed record and plan of action begins.<sup>51</sup>

This decision method relies on two central attributes: (1) use of “front-end” analytical tools comprehensively conducted *and concluded* prior to making the decision final, and (2) the assumption of a robust capacity to predict and assess environmental impacts and overall costs and benefits of a proposed action.<sup>52</sup> For example, regulations promulgated under the ESA provide for consultations between the FWS and other federal agencies about the impacts of actions on protected species. These regulations require the FWS to “[e]valuate the effects of the action and cumulative effects” and decide “whether the action, taken together with cumulative effects, is likely to jeopardize the continued existence of listed species.”<sup>53</sup> In other words, the FWS must decide, once and for all, whether an action taken today will jeopardize a species at some point in the future. The agency may revisit its decision only if the action remains subject to continuing federal control and either new information or modifications of the action present effects that were not previously considered.<sup>54</sup>

As shown above, adaptive management in theory employs a much more complicated, multistep approach, which values

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51. See *Citizens to Preserve Overton Park v. Volpe*, 401 U.S. 402, 419–20 (1971) (holding that a record contemporaneous with agency deliberation must document the consideration of relevant factors supporting the decision—justifications offered after the final agency action cannot provide the legal support to uphold an agency action).

52. Professors Sidney Shapiro and Robert Glicksman have produced a rich body of scholarship exploring the “front-end” prediction approach to environmental agency decisionmaking. See SIDNEY A. SHAPIRO & ROBERT L. GLICKSMAN, *RISK REGULATION AT RISK: RESTORING A PRAGMATIC APPROACH*, at x (2003) (suggesting that pragmatism, rather than utilitarianism, is the “appropriate baseline from which to design and implement risk regulation”); Sidney A. Shapiro & Robert L. Glicksman, *Improving Regulation Through Incremental Adjustment*, 52 U. KAN. L. REV. 1179, 1179 (2004) (advocating a shift in focus from “front-end” regulatory adjustment to “back-end” regulatory improvements, including use of adaptive management); Sidney A. Shapiro & Robert L. Glicksman, *The Missing Perspective*, ENVTL. F., Mar.–Apr. 2003, at 42, 42 (“Instead of the increased ‘front end’ examination of regulations, such as cost-benefits analysis, that is pushed by the critics—and is causing stagnation of rulemaking—a pragmatic approach would look at a regulation’s actual ‘back end’ effects after promulgation and make incremental adjustments as needed.”).

53. 50 C.F.R. § 402.14(g)(3)–(4) (2009). The agency defines cumulative effects as “those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area.” *Id.* § 402.02.

54. See *id.* § 402.16.

the honing of predictive models and outcomes more than the fairness of the process.<sup>55</sup> Adaptive management theory regards decisionmaking as more of a series of fine-tuning steps that are continually and perpetually reevaluated.<sup>56</sup> The legal view of a resource management plan is that it comprehensively evaluates all rational considerations at once and then flips a toggle switch; the adaptive management approach twiddles the dial as information trickles in.

Adaptive management squares up much better with the needs of many contemporary resource management problems.<sup>57</sup> The comprehensive, front-end assessment methods of conventional resource management will likely face significant challenges in addressing problems such as climate change. The impacts of climate change necessitating human and environmental adaptation are excruciatingly difficult to predict.<sup>58</sup> Nonlinearities in change dynamics, environmental feedback properties, and the interactions of social and ecological responses will soon exceed the boundaries of knowledge and experience that have allowed environmental impact assessment and cost-benefit analysis to maintain what reliability and credibility they have.<sup>59</sup> Indeed, even before climate change adapta-

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55. See *supra* text accompanying notes 12–17.

56. See *supra* text accompanying notes 12–17.

57. See *supra* Part I.A (discussing how ever-changing ecosystems require management policies that can adapt to new and uncertain climate conditions).

58. Many ecologists believe we face a “no-analog” future—one for which we have no experience on which to base projections of ecosystem change, and for which models designed to allow active management decisions as climate change takes effect are presently rudimentary and imprecise. See Peter Cox & David Stephenson, *A Changing Climate for Prediction*, 317 *SCIENCE* 207, 207 (2007); Matthew C. Fitzpatrick & William W. Hargrove, *The Projection of Species Distribution Models and the Problem of Non-Analog Climate*, 18 *BIODIVERSITY & CONSERVATION* 2255, 2255 (2009); Douglas Fox, *Back to the No-Analog Future?*, 316 *SCIENCE* 823, 823 (2007); Douglas Fox, *When Worlds Collide*, *CONSERVATION*, Jan.–Mar. 2007, at 28, 31.

59. The scientific literature exploring these complex dynamics and exposing our lack of understanding about what lies ahead as temperature rises is legion. See, e.g., U.S. CLIMATE CHANGE SCI. PROGRAM, THRESHOLDS OF CLIMATE CHANGE IN ECOSYSTEMS 74–84 (2009), available at <http://downloads.climate-science.gov/sap/sap4-2/sap4-2-final-report-all.pdf> (examining numerous positive feedback properties leading to nonlinear thresholds in climate change dynamics); Almut Arneeth et al., *Clean the Air, Heat the Planet?*, 326 *SCIENCE* 672, 672–73 (2009) (examining the feedback effects between conventional air pollution control and climate change mitigation, and concluding that complex positive and negative feedback links exist and that, on balance, the evidence and models suggest that “air pollution control will accelerate warming in the coming decades”); Gordon B. Bonan, *Forests and Climate Change: Forcings, Feedbacks, and the Climate Benefits of Forests*, 320 *SCIENCE* 1444,

tion became a pressing need, the challenges of front-end environmental impact assessment were evident in ecological contexts that were increasingly understood to be exceedingly complex.<sup>60</sup>

For example, a 1997 guide on considering cumulative effects under NEPA explains that “[d]etermining the cumulative environmental consequences of an action requires delineating the cause-and-effect relationships between the multiple actions and the resources, ecosystems, and human communities of concern. Analysts must tease from the complex networks of possible interactions those that substantially affect the resources.”<sup>61</sup> The guide advises analysts to “gather information about the cause-and-effect relationships between stresses and resources” and to develop “a conceptual model of cause and effect . . . [with] [n]etwork[] and system diagrams [as] the preferred methods of conceptualizing cause-and-effect relationships.”<sup>62</sup> Adaptive management seems more in tune with this approach than does conventional front-end decisionmaking.

The problem with adaptive management is that courts are better equipped to review toggle switching than dial twiddling.<sup>63</sup> As the previous section demonstrated, agency policies

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1444 (2008) (“[C]omplex and nonlinear forest-atmosphere interactions can dampen or amplify anthropogenic climate change.”); I. Eisenman & J.S. Wettlaufer, *Nonlinear Threshold Behavior During the Loss of Arctic Sea Ice*, 106 PROC. NAT’L ACAD. SCI. 28, 28 (2009) (describing the nonlinear “tipping points” in the ice-albedo feedback effect); Jerome Gaillardet & Albert Galy, *Himalaya—Carbon Sink or Source?*, 320 SCIENCE 1727, 1727–28 (2008) (explaining the uncertainties of the sinks and sources of the carbon geological cycle); Steven W. Running, *Ecosystem Disturbance, Carbon, and Climate*, 321 SCIENCE 652, 652–53 (2008) (explaining the uncertainties of ecological sinks and sources and how they might be impacted by episodic disturbances such as fires and insect epidemics).

60. See generally Daniel A. Farber, *Probabilities Behaving Badly: Complexity Theory and Environmental Uncertainty*, 37 U.C. DAVIS L. REV. 145 (2003) (discussing environmental complexity theory, which suggests that environmental events do not follow typical statistical distributions and are, thus, extremely difficult to plan for or predict); J.B. Ruhl, *Thinking of Environmental Law as a Complex Adaptive System: How to Clean up the Environment by Making a Mess of Environmental Law*, 34 HOUS. L. REV. 933 (1997) (explaining how the subject matter of environmental law consists of “interlinked complex adaptive systems,” the existence of which pose unique problems in terms of environmental management and regulation).

61. COUNCIL ON ENVTL. QUALITY, *CONSIDERING CUMULATIVE EFFECTS UNDER THE NATIONAL ENVIRONMENTAL POLICY ACT*, at vi (1997).

62. *Id.* at 38.

63. See *infra* Part II (discussing how courts have analyzed the legality of adaptive management).

for implementing adaptive management arose in a statutory vacuum and are themselves largely devoid of legal details.<sup>64</sup> While judges might generally understand the rationale for adaptive management and worry about discouraging experimentation that will lead to better conservation outcomes, the absence of clear statutory authority and well-defined regulatory standards will likely make evaluating agency adaptive management plans a struggle.<sup>65</sup> There are no statutory standards for oversight, no concrete legal definitions for determining what qualifies as adaptive management, and few binding steps in adopting adaptive management.<sup>66</sup> In rejecting “cookbooks” for adaptive management, agencies have failed to fill in the gaps left by statutes that either predate, ignore, or simply mention adaptive management in passing.<sup>67</sup> Agency policies support adaptive management as “learning while doing,” but courts are bound to review agency behavior in accordance with laws premised on a different paradigm. Part II of this Article reviews the court decisions relating to this disparity between agency policies and traditional administrative law and describes how judges attempt to reconcile it.

## 2. Adaptive Management: Theory Versus Practice

If one disparity in judicial interpretation arises from the disconnect between adaptive management and conventional administrative law, the second key disparity arises from the gap between the theory of adaptive management as explored in the scholarly literature and the practice as manifest in the actual plans agencies label as “adaptive management.” The “learning while doing” policy approach to adaptive management, although formless in substance, could have accommodated agencies’ implementation of adaptive management by adopting plans that fulfill the theory of adaptive management. But the fiscal realities of natural resources management in the field demand bare-bones approaches to project planning and conservation.<sup>68</sup> In this lean environment, the incentives for field-level

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64. See *supra* Part I.B (describing how adaptive management lacks a concrete definition or framework of statutory guidance and, thus, is difficult to implement in practice).

65. See *supra* Part I.B.

66. See *supra* Part I.B.

67. See *supra* Part I.B.

68. See Robert L. Fischman, *Predictions and Prescriptions for the Endangered Species Act*, 34 ENVTL. L. 451, 471–75 (2004) (explaining how many environmental laws do not allocate the funds necessary to operate at optimum

resource managers are to get the doing done through triage and to save the learning for better times.

Indeed, as the agency policies discussed above and the cases explored in Part II illustrate, agencies in practice have employed what we call “a/m-lite,” a stripped-down version of adaptive management that almost always neglects to develop testable hypotheses as the basis for management actions.<sup>69</sup> Often a/m-lite fails even to structure a learning procedure, whether through experimentation, historical research, or modeling.<sup>70</sup> Furthermore, lack of follow-through plagues implementation. As the cases show, there are other dimensions to the agency plans that depart from adaptive management theory because of limited funding.<sup>71</sup> This a/m-lite approach, in its most extreme form, is open-ended contingency planning or “on-the-fly” management that promises some loosely described response to whatever circumstances arise. Some a/m-lite implementation can fairly be considered a passive form of adaptive management, suitable to circumstances where the range of possible variations in actions and outcomes are small.<sup>72</sup> But a/m-lite may also slip into “basic trial and error learning in which explicit hypotheses are absent or vague,” or there may be a complete lack of monitoring and meaningful adjustments.<sup>73</sup> At its worst, a/m-lite may be a pretext for postponing difficult, but important, decisions in order to dodge the constraints of budg-

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levels); *see also* OUTDOOR RES. REVIEW GRP., GREAT OUTDOORS AMERICA 4 (2009), available at [http://www.orrgroup.org/documents/July2009\\_Great-Outdoors-America-report.pdf](http://www.orrgroup.org/documents/July2009_Great-Outdoors-America-report.pdf) (finding appropriations to be “woefully inadequate to meet identified needs for land and water conservation and outdoor recreation”); Caitlin A. Burke et al., *Policy News: Natural Resource Agency Funding*, 32 WILDLIFE SOC’Y BULL. 260, 262 (2004) (“Working to achieve enhanced funding and sound policies for wildlife conservation has always been important for wildlife professionals, but now—in this time of budget shortfalls—it is essential.”).

69. *See* Doremus, *supra* note 1, at 562 (“The potential for learning has too often been ignored in environmental regulation and natural resource management.”).

70. *See id.*

71. *See, e.g.*, *S. Fork Band Council v. U.S. Dep’t of the Interior*, 588 F.3d 718, 725–26 (9th Cir. 2009) (per curiam) (describing a hastily-prepared EIS that the court held inadequate due to its lack of detail).

72. *See* R. Gregory et al., *Deconstructing Adaptive Management: Criteria for Applications to Environmental Management*, 16 ECOLOGICAL APPLICATIONS 2411, 2412 (2006) (distinguishing active adaptive management, which hews closely to the theoretical model, from passive adaptive management, which retains some of the benefits of the theoretical approach while sacrificing some scientific rigor).

73. *Id.*

ets, politics, or scientific uncertainty.<sup>74</sup>

The difference between adaptive management, as practiced, and the adaptive management concept universally praised as essential for dealing with the complexities of natural systems does not illustrate a disagreement about how adaptive management should work as much as it reveals the budgetary and political limitations of agencies responsible for implementation.<sup>75</sup> After all, we cannot expect agencies to carry out projects for which they have no funding. Moreover, adaptive management cannot dissolve the political conflicts that surround competition for scarce resources.<sup>76</sup>

Nonetheless, the gap between theory and practice raises an important concern about bait and switch. Agencies base their departure from the conventional, comprehensive rationality model on the literature arguing that adaptive management is a superior approach.<sup>77</sup> But as the examples in Part II show, the policies and rules agencies have adopted leave them plenty of room to implement something different from the adaptive management approach supported by the management literature. Our concern is whether the agency-implemented a/m-lite is enough of an improvement over the comprehensive rationality assumption of front-end decisionmaking to justify the loss of certainty and transparency. This concern is particularly important because adaptive management is most often invoked as a tool to handle decisionmaking in the face of uncertainty.<sup>78</sup> Theoretical adaptive management reduces uncertainty over time, as experiments yield insights about how ecosystems respond to various interventions.<sup>79</sup> But a/m-lite, which typically neglects hypothesis testing, does not help in this manner.<sup>80</sup>

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74. *See id.* at 2411.

75. *See id.*

76. *See* Carol Hirschon Weiss, *The Experimenting Society in a Political World*, in *VALIDITY & SOCIAL EXPERIMENTATION* 283, 284 (Leonard Bickman ed., 2000) (discussing the view that politics play an important role “in influencing how feasible . . . advocacy of experimental reform [can] be”).

77. *See supra* Part I.A (discussing the theories that have caused adaptive management to become a popular modern approach to environmental regulation).

78. *See supra* Part I.A (describing how ever-changing ecosystems demand management policies that can keep pace with changing conditions).

79. *See* Doremus, *supra* note 1, at 549 (“[I]t is possible to reduce uncertainty over time in ways that are relevant to subsequent iterations or related decisions.”).

80. *See id.* at 569 (discussing how adaptive management is often used as a means to “muddle through” and act in the face of uncertainty “without any en-

Even when it does specify a hypothesis to test, management practice often shortchanges evaluation. Part II of this Article examines this disparity by analyzing cases that have engaged the courts in disagreements about what constitutes legal adaptive management.

## II. LITIGATION OVER ADAPTIVE MANAGEMENT

In a relatively short time, the adaptive management label for agency resource management plans has become ubiquitous. Since 1993, each of the major federal resource management agencies has made a policy commitment to employ adaptive management.<sup>81</sup> At one time, a casual reader of a draft Environmental Impact Statement (EIS) could predict which alternative an agency would likely prefer by identifying the one that included “balanced approach” in its title.<sup>82</sup> Over the past decade the tip-off has become “adaptive.”<sup>83</sup>

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forceable requirements for learning or incorporating new knowledge”).

81. Many of these are discussed *infra* in Part II.B. The Northwest Power Planning Council was the most important early adopter when it employed “adaptive management” in its 1982 Columbia Basin Fish and Wildlife Program to address pervasive scientific uncertainty regarding salmon recovery. *See* *Nw. Res. Info. Ctr. v. Nw. Power Planning Council*, 35 F.3d 1371, 1380 (9th Cir. 1994). Adaptive management continues to be the organizing principle for fish conservation in the Columbia Basin today. *See* NAT’L OCEANIC & ATMOSPHERIC ADMIN. ET AL., FCRPS ADAPTIVE MANAGEMENT IMPLEMENTATION PLAN: 2008–2018 FEDERAL COLUMBIA RIVER POWER SYSTEM BIOLOGICAL OPINION (2009), available at [http://www.salmonrecovery.gov/Files/BiologicalOpinions/AMIP\\_09\\_10\\_09.pdf](http://www.salmonrecovery.gov/Files/BiologicalOpinions/AMIP_09_10_09.pdf) (purporting to strengthen the agencies’ 2008 biological opinion—which the U.S. District Court in *National Wildlife Federation v. National Marine Fisheries Service*, 524 F.3d 917 (9th Cir. 2008), remanded for being structurally flawed under the ESA—by, inter alia, establishing new biological triggers to activate short- and long-term responses, and providing a rapid response to any detected significant decline in fish populations).

82. *See, e.g., Or. Natural Desert Ass’n v. Singleton*, 47 F. Supp. 2d 1182, 1195 (D. Or. 1998) (stating that the preferred alternative is one which articulates an intention to provide a “balanced approach” to protecting Oregon’s rivers); *Am. Motorcyclist Ass’n v. Watt*, 534 F. Supp. 923, 928 (C.D. Cal. 1981) (demonstrating that the Bureau of Land Management takes a balanced approach to conservation planning).

83. *See, e.g., U.S. DEP’T OF THE INTERIOR, RECORD OF DECISION: FINAL BISON AND ELK MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT 4* (2007), available at <http://www.fws.gov/bisonandelkplan/ROD.pdf> [hereinafter BISON AND ELK PLAN] (choosing the “Adaptively Manage Habitat and Populations” alternative). Increasingly, however, it can be difficult to find an alternative in a resource management EIS that does not purport to be adaptive. *See, e.g., Cal. Res. Agency v. U.S. Dep’t of Agric.*, No. C 08-1185 MHP, 2009 WL 6006102, at \*16 (N.D. Cal. Sept. 29, 2009) (rejecting a challenge to a forest-plan EIS in which all alternatives employed adaptive management because

Therefore, it was inevitable that courts would be called upon to evaluate how well the “adaptive” alternatives selected by agencies meet legal requirements. Every year, more and more published federal court decisions employ the term “adaptive management.” However, most cases using or even discussing the term “adaptive management” focus on issues peripheral to the key disparities at the heart of this analysis. Because an increasing majority of new federal resource management decisions use an adaptive management framework, a steady stream of challenges to federal resource management decisions need to discuss the framework to set the stage for evaluating the unrelated legal challenges.

A May 13, 2010, search of Westlaw and LexisNexis reported 120 federal court decisions containing the phrase “adaptive management.”<sup>84</sup> That group can be distilled to sixty-nine cases involving a challenge to adaptive management of the environment or natural resources.<sup>85</sup> In most of those cases, courts did not directly apply law to the adaptive aspect of the agency action. Instead, the courts employed the term to describe the action before getting to the legal issues dispositive to the case.<sup>86</sup>

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the Forest Service is not compelled to evaluate alternatives incompatible with its “basic policy objectives” or its “fundamental policy choice”).

84. Our focus is on identifying and analyzing judicial decisions in which the court directly evaluates the legality of an agency’s use of adaptive management to implement a regulatory program. We recognize that there are likely many pieces of litigation involving disputes over, among other things, an agency’s use of adaptive management that does not produce a judicial opinion directly assessing its legality. Some judicial opinions might also evaluate the legality of a specific agency action designed to implement adaptive management without ever mentioning adaptive management as the agency’s fundamental guiding motivation; though our impression is that as much as agencies advertise their purported use and implementation of adaptive management in policy documents, they would be no less eager to do so in court filings. Identifying and analyzing cases in both of these categories of cases would be important to gain a complete understanding of how adaptive management has fared in the judicial forum. The most important cases for our purposes, however, are those in which a court speaks directly to the use and legality of adaptive management. The language of these judicial opinions most substantively forms the jurisprudence of adaptive management.

85. The disparity between “decisions” and “cases” represents the fact that thirteen disputes (i.e., cases) produced more than one court decision. *E.g.*, *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Gutierrez*, 606 F. Supp. 2d 1122 (E.D. Cal. 2008). No single case produced more than one decision applying the law directly to adaptive management.

86. *See, e.g.*, *Se. Conference v. Vilsack*, 684 F. Supp. 2d 135, 139 (D.D.C. 2010) (mentioning that the plan in question employs adaptive management, but recognizing that the disposition of the case actually turns on the definition of “withdrawal” under 16 U.S.C. § 3213(a), rather than the legality of adaptive

Nonetheless, thirty-one federal court decisions do grapple with the legality of adaptive management. The United States lost more than half of these cases,<sup>87</sup> a poor record given the deference accorded to agencies under administrative law.<sup>88</sup> It is these cases that reveal the most about the two key disparities highlighted previously: (1) between the principles underlying law and adaptive management, and (2) between adaptive management in theory and a/m-lite in practice. This study of the first round of litigation emerging from the federal consensus that natural resources agencies should practice adaptive management yields three key lessons about how those disparities have worked out in the courts: (1) larger-scale plans are more likely to incorporate successful adaptive management plans than smaller ones;<sup>89</sup> (2) the practice of tiering site-specific environmental impact analyses to an earlier, overarching, cumulative study is well suited to adaptive management, and adaptive management can reduce the need for a supplemental EIS;<sup>90</sup> and (3) adaptive management procedures, no matter how finely crafted, cannot substitute for showing that a plan will meet the substantive management criteria required by law.<sup>91</sup>

To set the stage for the analysis of these three themes, three sweeping observations are in order. First, it is worth noting that a court upholding an a/m-lite approach does not necessarily endorse the practice as advancing the goals of either law or conservation policy. It simply means that the use of a/m-lite did not run afoul of any specific legal requirement or substitute for a required finding or procedure.<sup>92</sup> While courts may approve

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management).

87. Not all of the government losses were due to problems with adaptive management. For instance, the Ninth Circuit overturned the 2004 Sierra Forest Framework for NEPA violations while upholding its adaptive management component. *See infra* notes 130–41 and accompanying text (discussing the analysis of the 2004 Sierra Forest Framework and the legitimacy of adaptive management techniques).

88. While the loss record for the United States is poor in these cases compared to administrative litigation overall, natural resource challenges generally fair better for plaintiffs in court than one would expect given the deferential standard of review. *See* Denise M. Keele et al., *Forest Service Land Management Litigation 1989–2002*, 104 J. FORESTRY 196, 198 (2006) (discussing how, of the 729 cases challenging Forest Service resource management decisions, the agency won only 57.6 percent).

89. *See infra* Part II.A.

90. *See infra* Part II.B.

91. *See infra* Part II.C.

92. *See, e.g.*, *Env'tl. Prot. Info. Ctr. v. U.S. Fish & Wildlife Serv.*, No. C 04-04647 CRB, 2005 WL 3021939, at \*7 (N.D. Cal. Nov. 10, 2005) (demonstrating

agency actions that involve terrible applications of adaptive management, it is fair to say that the most vague and incomplete plans have a greater likelihood of remand.<sup>93</sup>

Second, many decisions applying the administrative law standards of deference to agency expertise do not involve adaptive management, but are relevant to understanding how courts regard it. For instance, the rigor with which an agency should explore the effects of similarly situated actions before committing to a new one is central to many natural resource cases.<sup>94</sup> The active learning component of adaptive management makes these cases relevant even if they did not review plans that purported to apply adaptive management. Therefore, we bring to bear on the question of how courts apply law to adaptive management cases beyond the relatively small sample of decisions that have already evaluated specific challenges to adaptive management.<sup>95</sup>

Third, regardless of the particular outcome of judicial review, courts generally wish to support the trend toward adaptive management.<sup>96</sup> They seem to understand that arguments in the conservation management literature all regard adaptive management as the best-suited decisionmaking technique for ecosystems.<sup>97</sup> Indeed, at least one court has come close to *requiring* adaptive management in holding that ESA HCPs must contain some provision to respond to unforeseen circumstanc-

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that the court did not pass judgment on the wisdom of an adaptive management approach, but still found that the approach satisfied NEPA planning requirements).

93. *See, e.g.*, *Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 997 (9th Cir. 2004) (holding that a general discussion of an environmental problem across a large area did not satisfy NEPA).

94. *See* *Lands Council v. McNair*, 537 F.3d 981, 991–92 (9th Cir. 2008) (refusing to analyze whether the agency incorporated adaptive learning from prior logging projects before beginning another, similar project); *see also infra* note 243 and accompanying text (discussing the implications of the *Lands Council v. McNair* case in greater depth).

95. *E.g.*, *S. Fork Band Council v. U.S. Dep't of the Interior*, 588 F.3d 718 (9th Cir. 2009) (*per curiam*) (providing an example of how courts deal with resource management plans that are relatively vague and general in scope); *see also infra* note 227 and accompanying text (discussing the problems of open-ended contingency planning).

96. *See, e.g.*, *Cal. Res. Agency v. U.S. Dep't of Agric.*, No. C 08-1185 MHP, 2009 WL 6006102, at \*16 (N.D. Cal. Sept. 29, 2009) (accepting a limitation on the range of alternatives considered in a national forest plan's EIS to exclude strategies other than adaptive management).

97. *See id.*

es.<sup>98</sup> Courts sometimes explicitly state that they do not wish to create disincentives for using adaptive management.<sup>99</sup> Even where adaptive management plans have run afoul of judicial review, courts are careful to state that only the particular application in the case at hand is illegal, not adaptive management itself.<sup>100</sup> It is fair to conclude from this litigation that courts, despite their roots in the conventional administrative law model of a phase change at the time of final agency action, generally give agencies wide berth within statutory constraints to alter traditional planning approaches to accommodate adaptive management.

#### A. BIGGER IS BETTER

Spatial and temporal scale is a critical component of adaptive management.<sup>101</sup> Applying adaptive management through larger area, longer time frame plans has tended to produce better outcomes for agencies in the courts.<sup>102</sup> Though this may be due to the larger budgets associated with developing (and to a lesser extent, implementing) the plans, the primary advantage enjoyed by large-scale plans is slack.<sup>103</sup> The larger the plan, the more room there is for trade-offs between competing interests, zones with different dominant uses (including control areas for

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98. *Sw. Ctr. for Biological Diversity v. Bartel*, 470 F. Supp. 2d 1118, 1144 (S.D. Cal. 2006); see also discussion *infra* note 215.

99. See, e.g., *Envtl. Prot. Info. Ctr. v. U.S. Fish & Wildlife Serv.*, No. C 04-04647 CRB, 2005 WL 3021939, at \*7 (N.D. Cal. Nov. 10, 2005) (holding that the agency's implementation of an adaptive management plan does not constitute a "major federal action" under NEPA, therefore sparing it from the requirement of preparing a supplemental EIS and making the plan easier to put into place).

100. For example, see *Northwest Resources Information Center, Inc. v. Northwest Power Planning Council*, 35 F.3d 1371, 1380 n.18 (9th Cir. 1994), where the court described adaptive management as "scientifically sound," but rejected particular aspects of the government's implementation of the plan.

101. See Robert L. Fischman & Jaelith Hall-Rivera, *A Lesson for Conservation from Pollution Control Law: Cooperative Federalism for Recovery Under the Endangered Species Act*, 27 COLUM. J. ENVTL. L. 45, 146-48 (2002) (summarizing the benefits of large-area plans).

102. See, e.g., *Seattle Audubon Soc'y v. Lyons*, 871 F. Supp. 1291, 1311 (W.D. Wash. 1994) (suggesting that compliance with environmental protection statutes requires planning on a scale that considers the entire ecosystem), *aff'd sub nom. Seattle Audubon Soc'y v. Moseley*, 80 F.3d 1401, 1404-06 (9th Cir. 1996) (per curiam).

103. See Fischman & Hall-Rivera, *supra* note 101, at 147 (noting that larger-scale plans are "more flexible because [they disperse] the burden of preservation or restriction of development over a broad area to allow for more trade-offs").

experiments), and flexibility for revising management guidelines to reflect lessons learned.<sup>104</sup> Larger plans tend to employ a version of adaptive management that comes closer to the model in the scholarly literature than do smaller-scale plans.<sup>105</sup> The literature addressing how conservation can adapt to climate change also highlights the greater utility of larger spatial and temporal scale planning.<sup>106</sup>

The litigation over adaptive management discussed in the remainder of Part II.B also reflects the advantages of the larger-scale plans. Four major adaptive management efforts constitute about half of the federal litigation grappling with the concept. With a few notable exceptions, discussed below, federal agencies in these four areas have experienced success in persuading courts to defer to their management choices and adaptive plans. Two of the efforts deal with forest management: the Northwest Forest Plan, covering 24.4 million acres in Washington and Oregon, and the Sierra Forest Framework, covering 11.5 million acres in California. The other two deal with water infrastructure: management of the Sacramento-San Joaquin River Delta (and its related infrastructure supplying water to the Central Valley) and operation of the Missouri River works controlled by the Army Corps.

The Northwest Forest Plan (NWFP) is one of the earliest large-scale adaptive management efforts,<sup>107</sup> and one of the most successful in attracting support from the courts for the adaptive management concept. Its age and scope make it the cham-

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104. This mirrors the experience of habitat conservation planning under the ESA. *See id.* at 147–48 (“Just as flexibility to trade off between habitat conservation and degradation shrinks with the geographic size of the plan, it also diminishes over time as a species becomes more imperiled.”). *But see* Gregory et al., *supra* note 72, at 2423 (highlighting the problems of large-scale, long-term experimental design, and noting the failures in applying adaptive management to the Columbia River Basin and the Everglades).

105. *See* Fischman & Hall-Rivera, *supra* note 101, at 147 (suggesting that larger plans more closely follow adaptive management techniques because they are more comprehensive, and less piecemeal, than smaller plans).

106. *See, e.g.*, Brad Griffith et al., *Climate Change Adaptation for the US National Wildlife Refuge System*, 44 ENVTL. MGMT. 1043, 1043 (2009) (noting that “[g]eographic isolation and small unit size compound the challenges of climate change,” which means that “strategic response requires system-wide planning”).

107. The Northwest Power Planning Council was an agency that sought to use adaptive management in a large-scale plan early on with the 1982 Columbia Basin Fish and Wildlife Program. *See* *Nw. Res. Info. Ctr., Inc. v. Nw. Power Planning Council*, 35 F.3d 1371, 1380–83 (9th Cir. 1994) (discussing the implementation of the 1982 plan and subsequent adaptations).

pion survivor of dozens of rounds of litigation. The NWFP resulted from a compromise brokered by President Clinton, who played an unprecedented (and, to date, unemulated) personal role in shaping the contours of the compromise it represented between timber and environmental interests.<sup>108</sup> The immense plan is strikingly complex, but in general outline it consisted of four elements: land allocation, aquatic conservation strategy, survey and monitoring requirements, and adaptive management.<sup>109</sup>

The goal of the NWFP, originally completed in 1994, is to allow for substantial timber harvesting while maintaining the forest characteristics that support viable populations of northern spotted owls, salmon runs that breed in forest streams, and hundreds of other species sensitive to logging operations.<sup>110</sup> Adaptive management plays a leading role in two aspects of the plan: administration of lands specially designated for adaptive management experimentation, and as a general principle for implementation and revision of the overall set of management prescriptions for the NWFP.<sup>111</sup> As we later discuss, it is this second aspect of adaptive management in the NWFP that has generated litigation.

The land-allocation zones fall into three categories.<sup>112</sup> Some seventy-eight percent of the lands covered by the NWFP are

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108. See U.S. DEP'T. OF AGRIC. ET AL., RECORD OF DECISION FOR AMENDMENTS TO FOREST SERVICE AND BUREAU OF LAND MANAGEMENT PLANNING DOCUMENTS WITHIN THE RANGE OF THE NORTHERN SPOTTED OWL 1 (1994) [hereinafter ROD NORTHERN SPOTTED OWL], available at <http://www.reo.gov/library/reports/newroda.pdf> (identifying the conference held by President Clinton as a catalyst for the NWFP); STEVEN L. YAFFEE, THE WISDOM OF THE SPOTTED OWL 141-43 (1994) (describing the conference and its surrounding circumstances).

109. Both a Record of Decision and an EIS were based on FOREST ECOSYSTEM MGMT. ASSESSMENT TEAM, FOREST ECOSYSTEM MANAGEMENT: AN ECOLOGICAL, ECONOMIC, AND SOCIAL ASSESSMENT, at II-3 to II-4 (1983) [hereinafter FEMAT REPORT] (discussing the general approach of the plan). See generally U.S. DEP'T OF AGRIC. ET AL., FINAL SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT ON MANAGEMENT OF HABITAT FOR LATE-SUCCESSIONAL AND OLD-GROWTH FOREST RELATED SPECIES WITHIN THE RANGE OF THE NORTHERN SPOTTED OWL (1994) (demonstrating that two documents based on the FEMAT report were similarly complex and focused).

110. See FEMAT REPORT, *supra* note 109, at II-1 to II-2 (outlining numerous goals of the FEMAT Report).

111. See *id.* at II-4 (discussing the development of long-term management alternatives); *id.* at II-11 to II-12 (identifying adaptive management areas as places used to test and develop management approaches).

112. The Record of Decision actually identifies seven different types of land allocations, but those allocations fit into categories of reserves, land allowing

designated late-successional reserves, where maintaining and encouraging the development of old-growth forests is the primary aim.<sup>113</sup> Some logging consistent with this aim, such as thinning to promote or enhance old-growth attributes, occurs in this category.<sup>114</sup> Most of the timber output, however, comes from the second category, the matrix lands between the reserves. The third category designates ten zones ranging from 84,000 to 400,000 acres to serve as “adaptive management areas,” where experiments with adaptive management would be the primary purpose.<sup>115</sup> Though the track record of the adaptive management areas does offer some general lessons for improving adaptive management generally, the unique mandate limits their application.<sup>116</sup> The true test of NWFP adaptive management is its success in guiding the vast majority of lands designated matrix or reserve, where balancing timber production against environmental values generated—and continues to generate—enormous controversy.<sup>117</sup> It is the lands not specifically set aside for adaptive management experiments where the NWFP experience most closely resembles routine federal conservation policy challenges.

The overarching NWFP mandate for adaptive management

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for timber output, and land for adaptive management. See ROD NORTHERN SPOTTED OWL, *supra* note 108, at 6–7.

113. See *id.* at 29.

114. See *id.* at 62–63 (discussing the importance of thinning).

115. FEMAT REPORT, *supra* note 109, at III-24, III-30 to III-33 (identifying the regions to be used as adaptive management areas).

116. For discussions on the track record of adaptive management areas, see generally, GEORGE H. STANKEY & BRUCE SHINDLER, ADAPTIVE MANAGEMENT AREAS: ACHIEVING THE PROMISE, AVOIDING THE PERIL (1997), available at [ftp://ftp.blm.gov/pub/blmlibrary/BLMpublications/AdaptiveManagement/AdaptiveMgmtTechGuide/CDReferences/Stankey\\_1997\\_Adaptive%20Management%20Areas%20-%20Achieving%20the%20Promi.pdf](ftp://ftp.blm.gov/pub/blmlibrary/BLMpublications/AdaptiveManagement/AdaptiveMgmtTechGuide/CDReferences/Stankey_1997_Adaptive%20Management%20Areas%20-%20Achieving%20the%20Promi.pdf); Andrew N. Gray, *Adaptive Ecosystem Management in the Pacific Northwest: A Case Study from Coastal Oregon*, CONSERVATION ECOLOGY (Nov. 23, 2000), <http://www.ecologyandsociety.org/vol4/iss2/art6/>; Forest Fleischman, *Bureaucracy, Collaboration and Coproduction: A Case Study of the Implementation of Adaptive Management in the U.S.D.A. Forest Service* (Apr. 15, 2008) (unpublished manuscript), available at [http://www.indiana.edu/~workshop/publications/materials/conference\\_papers/fleischman.pdf](http://www.indiana.edu/~workshop/publications/materials/conference_papers/fleischman.pdf).

117. The leading analysis of how well the NWFP modeled actual adaptive management is B.T. Bormann et al., *Adaptive Management of Forest Ecosystems: Did Some Rubber Hit the Road?*, 57 *BIOSCIENCE* 186, 186 (2007), who explore “the concepts of adaptive management as they were developed [through FEMAT] and applied on federal lands through the Northwest Forest Plan.”

through monitoring and evaluation involved multiple levels of planning to restrict disturbance to riparian areas in an “aquatic conservation strategy” (ACS) and “survey and manage” (S&M) requirements for over 400 species, with some triggering population surveys before ground-disturbing activity, such as logging. Courts rejected challenges to the original NWFP, including its adaptive elements.<sup>118</sup> Subsequently, the ACS and S&M provisions of the NWFP were common bases for judicial remands overturning timber sales.<sup>119</sup> Appropriations and political will never fully supported implementation of these components of adaptive management, but the framework for forest management remains a workable process for some projects.<sup>120</sup> Still, the adaptive management requirements and the degraded conditions of the forests in the NWFP resulted in far less logging than promised.<sup>121</sup>

In response to the underperformance of the NWFP in producing cut timber, the George W. Bush Administration adopted amendments in 2004 that unsuccessfully attempted to relax two key elements of adaptive management: the ACS and the S&M rules.<sup>122</sup> The issues with both actions are similar, but the

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118. *E.g.*, *Seattle Audubon Soc’y v. Lyons*, 871 F. Supp. 1291, 1310–17 (W.D. Wash. 1994), *aff’d sub nom.* *Seattle Audubon Soc’y v. Moseley*, 80 F.3d 1401, 1404–06 (9th Cir. 1996) (per curiam).

119. *See, e.g.*, *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Nat’l Marine Fisheries Serv.*, 265 F.3d 1028, 1037–38 (9th Cir. 2001) (emphasizing the ACS’s short-term protections that work to ensure the habitat will support the migration cycles of salmon, while also finding that the long-term recovery of the aquatic habitat may not be sufficient to comply with the NWFP); *Or. Natural Res. Council Action v. U.S. Forest Serv.*, 59 F. Supp. 2d 1085, 1093–94 (W.D. Wash. 1999) (emphasizing the importance of S&M to the NWFP process because finding new populations of sensitive species before logging allows for the placement of protections).

120. *See* K. Norman Johnson et al., *Forest Ecosystem Management Assessment Team Assessments*, in *BIOREGIONAL ASSESSMENT: SCIENCE AT THE CROSSROADS OF MANAGEMENT AND POLICY* 85, 107–11 (K. Norman Johnson et al. eds., 1999) (discussing measurements for success and support of adaptive management in the NWFP). Nonetheless, new circumstances, including the incursion of aggressive barred owls and climate change, have prompted the Obama Administration to begin a revision of the recovery plan for the Northern Spotted Owl in the NWFP. *See* April Reese, *New Threats Could Undermine Obama Administration’s Plan for Northern Spotted Owl*, LAND LETTER (Apr. 9, 2009), <http://www.eenews.net/Landletter/print/2009/04/09/2>.

121. *See* Johnson et al., *supra* note 120, at 107–09 (discussing the failure to meet goals for forest outputs).

122. *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Nat’l Marine Fisheries Serv.*, 482 F. Supp. 2d 1248, 1251–53 (W.D. Wash. 2007) (overturning the Bush administration’s ACS amendments); *Nw. Ecosystem Alliance v. Rey*, 380 F. Supp. 2d 1175, 1197–98 (W.D. Wash. 2005) (overturning the Bush Admin-

court more thoroughly explored the issues in the context of S&M. A district court overturned the 2004 amendments to the NWFP that removed the S&M requirement for insufficient environmental analysis in the EIS.<sup>123</sup> The original 1994 EIS for the NWFP justified the S&M standard as needed to gain information to ensure viability for a host of species, a core adaptive function.<sup>124</sup> The court agreed with the government that it could change its opinion about the best way to balance goals in the NWFP, but it found that a change eliminating a fundamental standard of adaptive management requires thorough analysis and disclosure of the environmental consequences.<sup>125</sup> In other words, the adaptive framework of the NWFP depends on certain fundamental monitoring tools, such as S&M, that cannot be reversed without revisiting the original charter and analysis (in this case, the NWFP and its EIS). A similar effort by the Bureau of Land Management to eliminate pre-logging surveys for the red tree vole (prey for spotted owls) met the same fate for failure to revise the underlying, large-scale adaptive management plans.<sup>126</sup>

The Sierra Forest Framework is smaller, younger, and subject to fewer lawsuits. Still, it offers a useful contrast with the NWFP in the use of adaptive management to modify a multi-forest management charter. In 2004 the Bush Administration significantly amended California's Sierra Forest Framework, which governs administration of eleven national forests in the Sierra Nevada Range.<sup>127</sup> The changes shifted the "management emphasis from biodiversity conservation and prescribed fire to aggressive mechanical thinning" and timber production.<sup>128</sup> One particularly contentious aspect of the 2004 framework expanded the number of trees that could be logged from those twelve to twenty inches in diameter to those up to thirty inches in diameter.<sup>129</sup> Although the Ninth Circuit found the 2004 framework flawed because its environmental impact analysis failed

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istration's S&M amendments).

123. *Nw. Ecosystem Alliance*, 380 F. Supp. 2d at 1192–93.

124. *Id.* at 1192.

125. *Id.* at 1193.

126. *Klamath Siskiyou Wildlands Ctr. v. Boody*, 468 F.3d 549, 560–61 (9th Cir. 2006).

127. *Sierra Forest Legacy v. Rey*, 577 F.3d 1013, 1018 (9th Cir. 2009).

128. Robert B. Keiter, *Breaking Faith with Nature: The Bush Administration and Public Land Policy*, 27 J. LAND RESOURCES & ENVTL. L. 195, 231 (2007).

129. *Sierra Forest Legacy*, 577 F.3d at 1018, 1020.

to consider a reasonable range of alternatives,<sup>130</sup> a district court evaluating a challenge to the adaptive management provisions endorsed the approach.<sup>131</sup> The adaptive management amendments were able to take advantage of the large scale of the Framework to employ different “modules” in different areas to comprise an “integrated research project.”<sup>132</sup> This, along with the use of modeling projections, is a principal reason why the 2004 Framework survived the allegation that the Forest Service deferred taking the required “hard look” at wildlife impacts of more logging.<sup>133</sup> Along with the NWFP, the 2004 Framework is one of the only adaptive management plans considered by courts that explicitly employed different management regimes in different areas to create experiments testing hypotheses about effects on forest fires and old-growth dependent species. In upholding the adaptive management approach, the district court fairly characterized the 2004 Framework as providing “more flexibility to strategically locate treatments across the landscape.”<sup>134</sup> The large area covered by the Framework made these elements of the plan easier to employ.

On the other hand, monitoring and mitigation modules do not necessarily lead to learning that can or will be applied to reshape projects. Indeed, the State of California complained that the Forest Service had increased the logging intensity in 2004 without having applied data from the earlier, more conservative adaptive management approach in the 2001 framework.<sup>135</sup> A federal district court recently upheld individual forest plan amendments in the Sierra region against a challenge that reduced monitoring of sensitive species created a foreseeable risk of degradation through the activities, such as logging, authorized by the plans.<sup>136</sup> The court wrote that “it presumes too much to argue that [the previous, more detailed monitoring] obligations would have turned up information that would have inclined the Forest Service to significantly alter or modify a

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130. *Id.* at 1021–22.

131. *California ex rel. Lockyer v. U.S. Dep’t of Agric.*, No. 2:05-cv-0211-MCE-GGH, 2008 WL 3863479, at \*16–17 (E.D. Cal. Sept. 3, 2008).

132. *Id.* at \*19.

133. *Id.* at \*4, \*17–21.

134. *Id.* at \*8.

135. State of California’s Memorandum of Points and Authorities in Support of Motion for Summary Judgment at 2, *California ex rel. Lockyer*, 2008 WL 3863479 (No. 2:05-cv-0211-MCE-GGH).

136. *Sierra Forest Legacy v. U.S. Forest Serv.*, 652 F. Supp. 2d 1065, 1088–91 (N.D. Cal. 2009).

particular project.”<sup>137</sup> Though one can view the court’s decision as skepticism about the value of the additional monitoring, it also speaks to the absence of enforceable commitments in most a/m-lite to revise projects in light of monitoring.<sup>138</sup>

It is also worth noting that big plans often enjoy special appropriations associated with congressional support of adaptive experiments.<sup>139</sup> In the case of the Sierra forests, the Herger-Feinstein Quincy Library Group Forest Recovery Act authorized specific funding for pilot projects.<sup>140</sup> Combined with the national priority to address fire risk and forest health, the high-profile Framework was able to secure funds for monitoring and response of management experiments.<sup>141</sup> This funding is a rare, but reassuring, element of adaptive management practice that ameliorated the loss of certainty in management criteria occasioned by the 2004 amendments.

The 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 dams. After the D.C. District Court enjoined a river-operating plan for failing to comply with the ESA,<sup>142</sup> a series of cases beginning in 2004 have upheld the Army Corps’ approach of employing adaptive management to balance the needs of wildlife dependent on the natural seasonal

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137. *Id.* at 1090.

138. *See, e.g.*, Alejandro E. Camacho, *Adapting Governance to Climate Change: Managing Uncertainty Through a Learning Infrastructure*, 59 EMORY L.J. 1, 47–48 (2009) (describing the problems with adaptive management implementation for portions of the Colorado River that flows downstream of the Glen Canyon Dam).

139. *See, e.g.*, Act of Feb. 12, 1994, Pub. L. No. 103-211, ch. 3, 108 Stat. 3, 16 (1994) (earmarking funding for the NWFP). The Northwest Forest Plan program reported that it spent \$50 million for monitoring. VALERIE RAPP, NORTHWEST FOREST PLAN—THE FIRST 10 YEARS (1994–2003), at 11 (2008).

140. Herger-Feinstein Quincy Library Group Forest Recovery Act, Pub. L. No. 105-277, § 401, 112 Stat. 2681, 2681-307 to -308 (codified as amended at 16 U.S.C. § 2104 (1998)). Funding for the pilot projects totaled \$25.3 million in 2008, more than three times the amount appropriated in 1999. U.S. DEP’T OF AGRIC. ET AL., STATUS REPORT TO CONGRESS FISCAL YEAR 2008: HERGER-FEINSTEIN QUINCY LIBRARY GROUP FOREST RECOVERY ACT PILOT PROJECT 4 (2009), available at [http://www.fs.fed.us/r5/hfqlg/monitoring/report\\_to\\_congress/2008/fy08\\_report\\_to\\_congress\\_letter.pdf](http://www.fs.fed.us/r5/hfqlg/monitoring/report_to_congress/2008/fy08_report_to_congress_letter.pdf).

141. *California ex rel. Lockyer v. U.S. Dep’t of Agric.*, No. 2:05-cv-0211-MCE-GGH, 2008 WL 3863479, at \*19 (E.D. Cal. Sept. 3, 2008).

142. *Am. Rivers v. U.S. Army Corps of Eng’rs*, 271 F. Supp. 2d 230, 253–58 (D.D.C. 2003) (finding mere mitigation measures inadequate to meet the ESA, but launching a new biological opinion that triggered subsequent litigation in the Eighth Circuit).

variation in flows (especially for the imperiled pallid sturgeon, least tern, and piping plover) with the interests of flood control and navigation.<sup>143</sup> Though the courts did not grapple with the adaptive management approach as deeply in this litigation as in the other examples we discuss, its use on this scale by the Army Corps is a significant step in the spread of comprehensive adaptive management plans beyond the traditional public land and wildlife agencies.

Probably the most complex of all the large-scale plans addresses the vast infrastructure diverting huge volumes of water coming down the Sacramento River, around the delta it shares with the San Joaquin River, and directing it to users further south.<sup>144</sup> The dams and diversions are operated jointly by state and federal agencies, and the environmental issues include wildlife, irrigation, flood risk, and potability of municipal water supplies for tens of millions of people.<sup>145</sup> The litigation challenging the adaptive management regimes pertaining to different species in the water system composes a mixed record.<sup>146</sup> As with the other examples discussed in this Section, the large area covered by the watersheds and the large volumes of water certainly permit a wider array of trade-offs than can occur with smaller projects.<sup>147</sup> But, in these Delta cases, the enormous complexity of the statutes, contracts, and governing bodies (both state and federal) likely undermined what would otherwise be a strong candidate for successful adaptive management. We will discuss how a single court approved one Delta adaptive management plan but remanded another in Part II.C, below, when we discuss the relationship between substantive legal standards and the adaptive process.

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143. *In re* Operation of the Mo. River Sys. Litig., 516 F.3d 688, 690–94 (8th Cir. 2008) (finding that an EIS was not necessary because adaptive management flexibility was provided for in an earlier Record of Decision); *In re* Operation of the Mo. River Sys. Litig., 421 F.3d 618, 635–36 (8th Cir. 2005) (allowing for flow adjustment based on subsequent information and providing for a focus on adaptive management).

144. *See* Cent. Delta Water Agency v. U.S. Fish & Wildlife Serv., 653 F. Supp. 2d 1066, 1073 (E.D. Cal. 2009).

145. *See id.* at 1073–74.

146. *Compare* Pac. Coast Fed'n of Fishermen's Ass'ns v. Gutierrez, 606 F. Supp. 2d 1122, 1193–94 (E.D. Cal. 2008) (upholding adaptive management plan), *with* Natural Res. Def. Council v. Kempthorne, 506 F. Supp. 2d 322, 387–88 (E.D. Cal. 2007) (finding that the adaptive management plan failed to take into account sufficient information).

147. *See* Natural Res. Def. Council, 506 F. Supp. 2d at 327–47 (discussing the trade-offs that occur when assessing an adaptive management plan for the Central Valley Project).

## B. NEPA: EFFECTIVE USE OF TIERING AND REDUCED NEED FOR SUPPLEMENTS

The environmental impact analysis required by NEPA is perhaps the grandest expression of the comprehensive rationality worldview rejected by adaptive management.<sup>148</sup> So, it is somewhat surprising to find in NEPA practice a tool well suited to adaptive management: a/m-lite roots well in the soil of NEPA tiering. Tiering, a practice dating to the 1970s, permits agencies to proceed with broad programs without examining site-specific effects.<sup>149</sup> In situations such as the adoption of a forest plan, or a regional methane leasing program, the agency may defer the details of impact analysis until such time as it proposes a timber sale<sup>150</sup> or receives applications for permits to drill.<sup>151</sup> The first NEPA tier concentrates on cumulative impacts of anticipated successive activities without evaluating the peculiar situations that may arise from any particular activity.<sup>152</sup> Tiering relieves an agency from evaluating uncertain contingencies with tenuous connections to the overall impacts.<sup>153</sup> The subsequent levels of NEPA compliance occur as particular, site-specific projects requiring approval.<sup>154</sup> At that point, the general discussions of the first tier may be incorporated by reference, and the EIS or EA will focus on just those issues specific to the particular activity.<sup>155</sup> In fact, a subsequent EIS will often be unnecessary if a particular project creates only effects already anticipated in the first tier EIS.<sup>156</sup> For site-specific projects, agencies commonly prepare environmental assessments concluding in findings of no significant impacts (FONSI) that

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148. See generally Bryan D. Jones, *Bounded Rationality*, 2 ANN. REV. POL. SCI. 297, 299 (1999) (describing comprehensive rationality).

149. See 40 C.F.R. §§ 1502.20, 1508.28 (2009); Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026, 18,033 (Mar. 23, 1981) (describing in question 24(c) the function of tiering).

150. See, e.g., *Klamath-Siskiyou Wildlands Ctr. v. Bureau of Land Mgmt.*, 387 F.3d 989, 992–93 (9th Cir. 2004).

151. See, e.g., *Wilderness Soc'y v. Salazar*, 603 F. Supp. 2d 52, 63–66 (D.D.C. 2009).

152. See Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. at 18,033.

153. See 40 C.F.R. § 1508.28 (“Tiering . . . helps the lead agency to focus on the issues which are ripe for decision and exclude from consideration issues already decided or not yet ripe.”).

154. See *id.* § 1502.20.

155. See *id.* § 1508.28.

156. See *id.*

go beyond those adumbrated by the original program's EIS.<sup>157</sup>

Large-scale adaptive management generally involves a massive EIS intended to serve as an overarching analysis to which subsequent projects and adjustments may be tiered.<sup>158</sup> This is how the adaptive charter works to guide subsequent projects for the NWFP,<sup>159</sup> and the national forests in the Sierra Nevada Range.<sup>160</sup> Indeed, the adaptive elements of the EISs may even reduce the need for a subsequent supplemental EIS. In *Oregon Natural Resources Council Action v. United States Forest Service*,<sup>161</sup> a court remanded a timber sale because it did not include the S&M required by the NWFP.<sup>162</sup> The NWFP created binding law that the court ordered the agency to follow or amend.<sup>163</sup> However, the court rejected a NEPA claim that the United States needed to prepare a supplemental EIS to consider a variety of new information about forests, wildlife and, water quality that had emerged since the adoption of the NWFP.<sup>164</sup> The court rebuffed the claim by relying, in part, on the adaptive management strategy in the NWFP.<sup>165</sup> The court determined that adaptive management anticipated that new information would emerge and provided mechanisms for adjustment.<sup>166</sup> This is an example of how the flexibility of adaptive management can ease the burden for an agency needing to comply with NEPA over the course of a very long-term project, such as restoring late-successional forests. A different judge in the same court later reached the same result in a challenge to a different timber sale after subsequent developments raised doubts about the NWFP's assumptions concerning logging on private land.<sup>167</sup> Again, the court relied on the adaptive man-

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157. See Bradley C. Karkkainen, *Toward a Smarter NEPA: Monitoring and Managing Government's Environmental Performance*, 102 COLUM. L. REV. 903, 909–10 (2002) (explaining that a vast majority of environmental assessments result in a FONSI).

158. See Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18,026, 18,033 (Mar. 23, 1981).

159. See, e.g., *Seattle Audubon Soc'y v. Moseley*, 80 F.3d 1401, 1403–04 (9th Cir. 1996) (per curiam) (noting the overarching EIS process).

160. See, e.g., *California ex rel. Lockyer v. U.S. Dep't of Agric.*, No. 2:05-cv-0211-MCE-GGH, 2008 WL 3863479, at \*1–3 (E.D. Cal. Sept. 3, 2008).

161. 59 F. Supp. 2d 1085 (W.D. Wash. 1999).

162. See *id.* at 1091–94.

163. *Id.* at 1093.

164. *Id.* at 1096.

165. *Id.*

166. *Id.*

167. See *Hanson v. U.S. Forest Serv.*, 138 F. Supp. 2d 1295, 1301–04 (W.D.

agement component of the NWFP to establish an assumption that no supplemental study would be needed absent a showing that the information could not be addressed by the adaptive process.<sup>168</sup>

On the other hand, a subsequent decision justified as adaptive modification may go too far in changing the terms of the original framework in the first tier. In that case, courts require a supplemental EIS. In *Klamath Siskiyou Wildlands Center v. Boody*,<sup>169</sup> the Ninth Circuit enjoined timber sales in part because a change in the survey requirements for the red tree vole went too far beyond what the tier one NWFP EIS anticipated, even with adaptive management.<sup>170</sup> The federal government had argued that the decision to change the vole's S&M designation was within the adaptive latitude created by the NWFP.<sup>171</sup> The court examined the NWFP EIS and disagreed.<sup>172</sup> The lesson from *Klamath Siskiyou* is that an agency cannot tier when revising a fundamental standard of an overarching adaptive management plan.<sup>173</sup>

Another risk posed by the attraction of tiering is that an agency will defer making controversial decisions on the basis that it can work out the details of a fairly vague commitment to goals in subsequent tiers.<sup>174</sup> Unfortunately, the agency may be setting itself up for failure if it is unable to secure the resources to adequately tackle the difficult analysis in subsequent tiers. Also, vague commitments that do not include site-specific criteria may simply allow political momentum to overwhelm the plan's objective. In the EIS supporting the elk and bison management plan for the National Elk Refuge and nearby lands, the agency defined the (ultimately selected) "adaptive management" alternative as a plan implemented through a "structured framework . . . of adaptive management criteria and actions for transitioning from intensive supplemental winter feeding."<sup>175</sup> However, the plan neither describes the "structured framework" nor defines the "criteria." Given the strong local po-

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Wash. 2001).

168. *Id.* at 1304.

169. 468 F.3d 549 (9th Cir. 2006).

170. *Id.* at 561.

171. *Id.* at 560.

172. *Id.*

173. *See id.*

174. *Cf.* 40 C.F.R. § 1502.20 (2009) (discussing the "broader statement" created in the first tier).

175. BISON AND ELK PLAN, *supra* note 83, at 65.

litical support for maintaining supplemental winter feeding, opponents are understandably skeptical that such a vague commitment will result in a transition to more natural winter ranging behavior and lower elk populations.<sup>176</sup> The goal of the “adaptive management” alternative is to reduce the winter elk population of the region by nearly twenty percent,<sup>177</sup> but the path to achieve it is not evident in the plan. Deferring a firm decision to take a critical action, such as terminating winter feeding, until a subsequent incremental adaptive process, may be a recipe for failure.<sup>178</sup> Yet adaptive management and tiering can make it easier for agencies to yield to the temptation to dodge difficult, controversial decisions.<sup>179</sup> It is not surprising, then, that courts frequently reject adaptive management plans as too amorphous.<sup>180</sup> Professor Glicksman has characterized some of this litigation as standing for the principle that agencies may not rely “on adaptive management as an excuse for deferring real planning in favor of” an approach that promises to

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176. See Robert L. Fischman & Angela M. King, *Savings Clauses and Trends in Natural Resources Federalism*, 32 WM. & MARY ENVTL. L. & POLY REV. 129, 137–41 (2007). Defenders of Wildlife and other environmental groups have challenged the plan for these and other reasons. Complaint for Declaratory and Injunctive Relief ¶¶ 37–43, *Defenders of Wildlife v. Kempthorne*, 698 F. Supp. 2d 141 (D.D.C. 2010) (No. 08-CV-00945).

177. See BISON AND ELK PLAN, *supra* note 83, at 3, 19 (proposing a reduction in elk numbers from 13,000 to 11,000).

178. See Mary O’Brien, *Uneasy Riders: A Citizen, a Cow, and NEPA*, 39 ENVTL. L. REP. 10,632, at 10,633 (2009) (describing environmental impact analysis for Forest Service allotment management plans that respond to degraded conditions with “vague commitments to future adaptive management” without “clear triggers for applying the unspecified adaptive management measures”). Another example of deferring difficult decisions through adaptive management is the decision to adopt grazing allotments in the Sawtooth National Forest. See *W. Watersheds Project v. U.S. Forest Serv.*, No. CV 05 189 E BLW, 2006 WL 292010, at \*2 (D. Idaho Feb. 7, 2006) (stating that the adaptive management strategy “did not define the protocols it would use or describe the monitoring that is the heart of the strategy”).

179. See Beth C. Bryant, *NEPA Compliance in Fisheries Management: The Programmatic Supplemental Environmental Impact Statement on Alaskan Groundfish Fisheries and Implication for NEPA Reform*, 30 HARV. ENVTL. L. REV. 441, 450 (2006).

180. See, e.g., *Greater Yellowstone Coal. v. Kempthorne*, 577 F. Supp. 2d 183, 209–10 (D.D.C. 2008); *Natural Res. Def. Council v. Kempthorne*, 506 F. Supp. 2d 322, 387 (E.D. Cal. 2007); *Mountaineers v. U.S. Forest Serv.*, 445 F. Supp. 2d 1235, 1250 (W.D. Wash. 2006); *Natural Res. Def. Council v. U.S. Army Corps of Eng’rs*, 457 F. Supp. 2d 198, 234–35 (S.D.N.Y. 2006). *But see* *Defenders of Wildlife v. Salazar*, 698 F. Supp. 2d 141, 149–50 (D.D.C. 2010) (upholding the National Elk Refuge’s elk management plan despite its amorphous adaptive management approach to reducing winter elk populations), *appeal docketed*, No. 08-cv-00945 (D.C. Cir. Mar. 26, 2010).

deal with expected future problems as they arise.<sup>181</sup>

Even if not amorphous, a promise to adaptively manage problems may not fulfill the NEPA requirement that agencies take a “hard look” at the impacts of their action. For instance, *High Sierra Hikers Association v. Weingardt*<sup>182</sup> overturned a Forest Service decision to liberalize the rules limiting campfires in high country parts of a wilderness area.<sup>183</sup> Despite a record raising a number of problems with the decision, including disparate treatment of commercial-pack trips compared to private backpacking, physical impacts from fires and their residues, and potential introduction of exotic seeds and pathogens through packed wood, the Forest Service went forward with the looser rules on the basis that it could monitor and adjust in response to problems.<sup>184</sup> The court ruled that the agency could not rely on adaptive management to overcome an inadequate response to the problems raised in the record.<sup>185</sup>

On the other hand, *Theodore Roosevelt Conservation Partnership v. Salazar (TRCP)*<sup>186</sup> rebuffed a claim that an adaptive management approach to handling site-specific and uncertain impacts violated the NEPA’s requirement to evaluate environmental effects *before* an agency undertakes an action.<sup>187</sup> In contrast to *High Sierra Hikers Association*, which involved site-specific environmental analyses for each special use permittee and lifted an outright ban on campfires above specified elevations,<sup>188</sup> *TRCP* reviewed a broad plan (covering more than 270,000 acres in the Atlantic Rim of Wyoming) for natural gas development that did not yet authorize a specific ground-disturbing activity.<sup>189</sup> The *TRCP* court refused to read the NEPA regulations to require detailed commitments to mitigation for “long-term” plans.<sup>190</sup> Specific activities are subject to subsequent evaluations, tiered to the plan, and “exact application of mitigation measures will be determined on a site-specific basis.”<sup>191</sup> Once again, tiering helped rescue a/m-lite.

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181. Glicksman, *supra* note 4, at 871.

182. 521 F. Supp. 2d 1065 (N.D. Cal. 2007).

183. *Id.* at 1090–91.

184. *Id.*

185. *Id.* at 1091.

186. No. 09-5162, 2010 WL 2869778 (D.C. Cir. July 23, 2010).

187. *Id.* at \*14 (citing 40 C.F.R. § 1500.1 (b)).

188. *High Sierra Hikers Ass’n*, 521 F. Supp. 2d at 1072, 1090.

189. *Theodore Roosevelt Conservation P’ship*, 2010 WL 2869778, at \*3–4.

190. *Id.* at \*16.

191. *Id.* at \*15.

Though adaptive management, in and of itself, does not trigger an EIS,<sup>192</sup> adaptive management is not an alternative to NEPA.<sup>193</sup> A district court relied (in part) on NEPA itself to reject a 2005 rule substituting adaptive management for preparing EISs in developing national forest plans.<sup>194</sup> The court found that the administrative record failed to support a judgment that substituting adaptive management would result in no significant environmental outcomes.<sup>195</sup>

### C. PROCEDURES FOR ADAPTATION CANNOT SUBSTITUTE FOR SHOWING COMPLIANCE WITH SUBSTANTIVE STANDARDS

Another temptation of adaptive management is to lavish attention on the iterative process at the expense of addressing the substantive management criteria required by law.<sup>196</sup> Courts are particularly attentive to substantive management criteria in statutes, such as the “no jeopardy” standard in the ESA,<sup>197</sup> and regulations, such as the “viability” standard for animal populations in national forests.<sup>198</sup> Since the 1970s, courts have

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192. See *Env'tl. Prot. Info. Ctr. v. U.S. Fish & Wildlife Serv.*, No. C 04-04647 CRB, 2005 WL 3021939, at \*6 (N.D. Cal. Nov. 10, 2005).

193. See Julie Thrower, *Adaptive Management and NEPA: How a Nonequilibrium View of Ecosystems Mandates Flexible Regulation*, 33 *ECOLOGY L.Q.* 871, 894 (2006).

194. *Citizens for Better Forestry v. U.S. Dept. of Agric.*, 481 F. Supp. 2d 1059, 1086–87 (N.D. Cal. 2007).

195. *Id.* at 1089–90.

196. See Wiersema, *supra* note 4, at 1256 (arguing that adaptive management by agencies pays insufficient attention to substantive goals).

197. The “no jeopardy” standard explains that each federal agency must ensure that its actions “are not likely to jeopardize” any endangered species or habitats. 16 U.S.C. § 1536(a)(2) (2006). Courts are often attentive to the “no jeopardy” standard. See *Nat'l Assoc. of Home Builders v. Defenders of Wildlife*, 551 U.S. 644, 669 (2007) (“[N]o-jeopardy duty covers only discretionary agency actions and does not attach to actions (like the NPDES permitting transfer authorization) that an agency is *required* by statute to undertake once certain specified triggering events have occurred.”); *Gifford Pinchot Task Force v. U.S. Fish & Wildlife Service*, 378 F.3d 1059, 1067 (9th Cir. 2004) (“Because the ESA does not prescribe how the jeopardy prong is to be determined, nor how species populations are to be estimated, we hold that it is a permissible interpretation of the statute to rest the jeopardy analysis on a habitat proxy.”); *Pac. Coast Fed'n of Fishermen's Assoc. v. Gutierrez*, 606 F. Supp. 2d 1122, 1167 (E.D. Cal. 2008) (“[A] jeopardy regulation . . . requires . . . agencies to consider both recovery and survival impacts on listed species.” (citing *Nat'l Wildlife Fed'n v. Nat'l Marines Fisheries Serv.*, 481 F.3d 1224, 1237 (9th Cir. 2007))).

198. The “viability standard” is embodied in 36 C.F.R. § 219.19 (2000) (“In order to insure that viable populations [of fish and wildlife] will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that

required agencies to develop records showing how they will meet substantive standards.<sup>199</sup> The first round of litigation over adaptive management reveals that courts are holding firm to this principle. Promises to plan, collaborate, or manage toward compliance should environmental conditions degrade below the substantive management criterion are insufficient to survive judicial review.<sup>200</sup>

The ESA is a prevalent vehicle for placing substantive management criteria on otherwise discretionary management of public lands and waters. The listing of a species often triggers new restrictions on longstanding management regimes, such as water allocations (for example in California's Sacramento Delta)<sup>201</sup> or timber harvests (for example in the Pacific Northwest).<sup>202</sup> The ESA, therefore, often drives adaptive man-

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those individuals can interact with others in the planning area.”). Although formally revoked by National Forest System Land and Resource Management Planning, 65 Fed. Reg. 67,514 (Nov. 9, 2000), that replaced it with a less specific “sustainability” standard, the “viability” standard remained in place for forest planning through most of the Bush Administration. *See, e.g.*, Native Ecosystems Council v. U.S. Forest Serv., 428 F.3d 1233, 1237 n.5 (9th Cir. 2005) (“[A]pplication of these [new] regulations was delayed . . . . As a result, the regulations relevant [in the case at bar] are found in the July 1, 2000 Code of Federal Regulations.”).

199. *See, e.g.*, Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 419 (1971) (affirming the Administrative Procedure Act's, 5 U.S.C. § 706 (2006), requirement that courts review agency decisions based on the agency's “whole record”).

200. *See, e.g.*, Natural Res. Def. Council v. Kempthorne, 506 F. Supp. 2d 322, 387 (E.D. Cal. 2007) (“Adaptive management is within the agency's discretion to choose and employ, however, the absence of any definite, certain, or enforceable criteria or standards make its use arbitrary and capricious under the totality of the circumstances.”); Nat'l Wildlife Fed'n v. U.S. Army Corps of Eng'rs, 92 F. Supp. 2d 1072, 1078, (D. Or. 2001) (explaining that the Army Corps' adaptive management approach provided the court with insufficient information to rule on summary judgment); Fund for Animals v. Babbitt, 903 F. Supp. 2d 96, 113 (D.D.C. 1995) (holding that a FWS management plan for grizzly bears, which included adaptive management among other schemes, did not meet ESA requirements because “[d]efendants have not met their burden to develop objective, measurable criteria by which to assess present or threatened destruction, modification or curtailment of the grizzly bear's habitat or range”). *But cf.* Or. Natural Res. Council Action v. U.S. Forest Serv., 59 F. Supp. 2d 1085, 1096 (W.D. Wash 1999) (“The plan's adaptive management approach is adequate to deal with any new information plaintiffs have identified.”).

201. Cent. Delta Water Agency v. U.S. Fish & Wildlife Serv., 653 F. Supp. 2d 1066, 1093 (E.D. Cal. 2009) (describing the effects of the decision to list smelt on the water management plan).

202. Seattle Audubon Soc'y v. Moseley, 80 F.3d 1401, 1404 (9th Cir. 1996) (per curiam) (noting the effect of listing the spotted owl on the existing forest management plan). *See generally* YAFFEE, *supra* note 108 (describing the his-

agement plans to substitute for older ways of using public resources. Once a management issue triggers ESA compliance, the biological opinion of the Fish & Wildlife or Fisheries Service will essentially establish the boundaries for permissible management options.<sup>203</sup> The biological opinions determine which actions will cross the line into jeopardizing the continued existence of a species, and what measures will be required to protect an agency from liability under the ESA. The litigation reveals that it is these biological opinions that often prompt agency adaptive management.<sup>204</sup>

A pair of decisions by U.S. District Court Judge Oliver Wanger in the Eastern District of California provides a particularly illuminating contrast in the relationship between adaptive management and substantive legal standards.<sup>205</sup> Both cases concerned challenges to adaptive management plans for operating the vast water infrastructure that moves water through and around the Sacramento-San Joaquin River Delta in California. The listing of the Delta smelt by the FWS and salmonid species by the Fisheries Service triggered two different biological opinions in order to fulfill the legal duty not to jeopardize the continued existence of the fishes under the ESA. The water project consulted separately with the two services. This gave rise to two sets of adaptive management plans (one for the smelt and one for the salmonids) that generated two different lawsuits.

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tory of the listing decision for the spotted owl and its ramifications with respect to politics and environmental regulations).

203. This is particularly true after the action agency has adopted the conditions of the biological opinion. See *Delta Smelt Consol. Cases*, 686 F. Supp. 2d 1026, 1043–44 (E.D. Cal. 2009) (“The adaptive management protocol prescribed . . . leaves FWS with the final word on exactly what flow requirements will be imposed.”).

204. See, e.g., *In re Operation of the Mo. River Sys. Litig.*, 421 F.3d 618, 626 (8th Cir. 2005) (“The 2000 BiOp RPA also mandated habitat restoration, a comprehensive species and habitat monitoring program, and an adaptive management framework.”); *Consol. Salmonid Cases*, 688 F. Supp. 2d 1013, 1025 (E.D. Cal. 2010) (“[In the] 2008 Smelt BiOp . . . the adaptive management protocol [was] prescribed in the RPA.”); *Pac. Coast Fed’n of Fishermen’s Ass’ns v. Gutierrez*, 606 F. Supp. 2d 1122, 1128 (E.D. Cal. 2008) (“The BiOp was intended to address the potential adverse impacts of ongoing (for the next twenty-five years) CVP and SWP operations on the salmonid species.”); *id.* at 1184–85 (discussing the biological opinion’s impact on adaptive management).

205. Compare *Pac. Coast Fed’n of Fishermen’s Ass’ns*, 606 F. Supp. 2d at 1194 (remanding the case, but upholding the adaptive management plan), with *Natural Res. Def. Council*, 506 F. Supp. 2d at 387 (remanding the adaptive management plan).

Both plans employed adaptive management, but Judge Wanger upheld one and remanded the other under the usual judicial standard that an agency must provide “reasonable certainty” that it will meet a statutory requirement.<sup>206</sup> The explanation for these disparate results hinges on whether the adaptive management framework offered more than mere process. The salmonid adaptive management protocol, approved by Judge Wanger, contained definite, substantive criteria that served as triggers for reinitiating ESA consultation to revise management.<sup>207</sup> Also, the Fisheries Service’s biological opinion imposed “enforceable definite and certain requirements” on the operation of the water works.<sup>208</sup> In contrast, the smelt adaptive management protocol failed to provide enforceable, precise criteria to bind operators of the system.<sup>209</sup> The adaptive management protocol for the smelt did not bind the operators, but it was procedurally elaborate. It involved a complex “risk assessment matrix” containing criteria that, if met, would trigger a working group to meet.<sup>210</sup> The group would then “consider” a range of management changes.<sup>211</sup> While the process itself was mandatory, the court faulted the protocol for failing to assure that the result of the process would be some kind of action taken to secure the continued existence of the smelt.<sup>212</sup> Judge Wanger did not assert that the agency meant to disregard its statutory responsibilities, just that the record of decision failed to ensure that they would be met.<sup>213</sup>

In overturning the smelt adaptive management protocol, the court contrasted another ESA case addressing a large-scale HCP that would allow land development in the Natomas Basin

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206. See *Pac. Coast Fed’n of Fishermen’s Ass’ns*, 606 F. Supp. 2d at 1184; *Natural Res. Def. Council*, 506 F. Supp. 2d at 353.

207. *Pac. Coast Fed’n of Fishermen’s Ass’ns*, 606 F. Supp. 2d at 1186 (establishing a temperature trigger of fifty-six degrees to reinitiate consultation). Judge Wanger subsequently remanded a later salmonid biological opinion for an arbitrary and capricious formulation of water flow restrictions. See *Consol. Salmonid Cases*, No. 1:09-cv-01053-OWW-DLB, at \*5 (E.D. Cal. May 18, 2010) (Finding of Fact and Conclusions of Law Re: Plaintiffs’ Request for Preliminary Injunction), available at <http://www.endangeredspecieslawandpolicy.com/uploads/file/Salmon%20PI.pdf>.

208. *Pac. Coast Fed’n of Fishermen’s Ass’ns*, 606 F. Supp. 2d at 1185 (imposing mandatory terms and conditions as part of an incidental take statement).

209. *Id.* (comparing cases).

210. *Natural Res. Def. Council*, 506 F. Supp. 2d at 341.

211. *Id.*

212. See *id.* at 352.

213. See *id.* at 354.

of the Sacramento area to proceed notwithstanding harms to listed species.<sup>214</sup> The Natomas Basin HCP employed adaptive management to deal with the uncertainty of where and when development would occur (as well as how effective mitigation measures would conserve the effected species).<sup>215</sup> Judge Wanger distinguished the adaptive adjustment in the Natomas Basin plan as “employ[ing] *well-defined* mitigation measures” such as conservation land purchases, adjustment of conservation reserve size, and modification of agricultural practices.<sup>216</sup> He also distinguished the Natomas Basin plan for its quantified objectives and required mitigation measures, even though those elements could be adjusted.<sup>217</sup> These substantive distinctions allowed Judge Wanger to distinguish the Natomas Basin plan, which was actually more vaguely drawn than the smelt adaptive matrix.

The pair of Wanger opinions are important for two reasons. First, they likely contain the most thorough judicial discussion to date of adaptive management’s strengths and weaknesses.

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214. *Nat’l Wildlife Fed’n v. Babbitt*, 128 F. Supp. 2d 1274 (E.D. Cal. 2000) (endorsing the adaptive management elements of the HCP/incidental take permit while overturning it on a variety of other grounds related to the misfit between the scale of the plan and the governance/commitment of the program).

215. A subsequent case overturning a HCP found that long-term take permits under the ESA require some procedure to deal with unforeseen circumstances. *See Sw. Ctr. for Biological Diversity v. Bartel*, 470 F. Supp. 2d 1118, 1145 (S.D. Cal. 2006). The court relied, in part, on *National Wildlife Federation* to show that adaptive management may fulfill that necessary role. *See id.* at 1144. The origin of the requirement to address unforeseen circumstances is in the original HCP dealing with development of San Bruno Mountain, which the House Conference Report endorsed with legislation that ultimately authorized incidental take permits. *See* ENDANGERED SPECIES ACT AMENDMENTS OF 1982, H.R. REP. NO. 97-835, at 31–32 (1982), *reprinted in* 1982 U.S.C.C.A.N. 2860, 2872–73. Courts now routinely approve HCPs that rely on adaptive management. *See, e.g., Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, 202 F. Supp. 2d 594, 598 (W.D. Tex. 2002) (upholding a conservation plan, which included adaptive management, because it was “negotiated and regulated vigorously” by the FWS).

216. *See Natural Res. Def. Council*, 506 F. Supp. 2d at 355–56 (emphasis added).

217. *Id.* at 356. In contrast, *Animal Welfare Institute v. Beech Ridge Energy*, 675 F. Supp. 2d 540 (D. Md. 2009), enjoined construction of a ridge-top, wind turbine project because of the likely harm to endangered Indiana bats. In language reminiscent of the smelt biological opinion, the state permit required the energy company to “consult” with a technical advisory committee regarding the “potential for adaptive management” and agree to “test adaptive management strategies.” *Id.* at 556. The court found the adaptive management scheme too discretionary to overcome the need for an incidental take permit for the bats likely to be harmed. *Id.* at 579.

They recognize a role for adaptive management within administrative law, allowing a “balance” between “flexibility” (adaptive management) and “certainty” (final agency action).<sup>218</sup> This is the fundamental trade-off that courts will continue to mediate in future adaptive management cases. Second, the opinions are important because they draw a line illustrated by two concrete examples, one on the legal side (salmonids) and one on the illegal side (smelt). This comparison is particularly significant because the smelt adaptive management protocol was not at all vague. It was far more detailed than most a/m-lite plans. Yet, when held against a substantive legal standard, the court could not find the “reasonable certainty” of compliance.<sup>219</sup>

It is not surprising that the ESA, with its famously uncompromising mandate,<sup>220</sup> would establish a boundary limiting weak forms of a/m-lite.<sup>221</sup> However, several other types of cases find that adaptive management fails to meet substantive criteria of agency law and policy. Agencies employing adaptive management to sustain FONSI's justifying a decision not to prepare an EIS have seen their efforts overturned by courts unconvinced that vague, a/m-lite will assure that the impacts of a project will not be significant.<sup>222</sup> In this respect, a/m-lite may be better suited to an EIS where mitigation need only be discussed, not assured, than to mitigated FONSI's, which must create a record of decision demonstrating (generally through

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218. *Pacific Coast Fed'n of Fishermen's Association v. Gutierrez*, 606 F. Supp. 2d 1122, 1188 (E.D. Cal. 2008).

219. *Id.*; see also *Greater Yellowstone Coal. v. Servheen*, 672 F. Supp. 2d 1105, 1116 (D. Mont. 2009) (holding that a commitment to future monitoring of the agency designation for grizzly bear populations could not substitute for substantive findings required in the statute).

220. *Tenn. Valley Auth. v. Hill*, 437 U.S. 153, 184, 194–95 (1978) (noting that the ESA intends to “halt and reverse the trend toward species extinction, whatever the cost,” and thereby strikes a balance “in favor of affording endangered species the highest of priorities”).

221. An early case grappling with adaptive management's role in meeting substantive legal standards is *Oregon Natural Resources Council v. Daley*, 6 F. Supp. 2d 1139, 1158 (D. Or. 1998), which rejected Oregon's habitat restoration program that included watershed councils, monitoring, and adaptive management, as the basis for not listing coho salmon runs. The court found the program to consist of insufficiently certain “future, voluntary and untested habitat measures.” *Id.* at 1159.

222. *E.g.*, *Natural Res. Def. Council v. U.S. Army Corps of Eng'rs*, 457 F. Supp. 2d 198, 234 (S.D.N.Y. 2006) (acknowledging that adaptive management practices “provide no assurance as to the efficacy of mitigation”); *Mountaineers v. U.S. Forest Serv.*, 445 F. Supp. 2d 1235, 1250 (W.D. Wash. 2006) (“[A]daptive management strategies . . . amount . . . to a build-first, study later approach . . . [which is a] violation of NEPA.” (internal quotations omitted)).

the mitigation measures) the absence of significant impacts.<sup>223</sup> The mitigation in the record of decision subsequently binds agency action, unlike a mitigation discussion in an EIS, which an agency need not implement.

However, it is possible for an agency to fail to provide enough detail about mitigation under the more flexible standards of an EIS. Mitigation as open-ended contingency planning is not unique to adaptive management. The Ninth Circuit recently found the Bureau of Land Management's (BLM) Final EIS for expansion of a gold mine in Nevada to be inadequate because it failed to assess the effectiveness of mitigation proposed to address possible hydrologic impacts from mine dewatering.<sup>224</sup> Without an assessment of effectiveness, the court determined that mitigation cannot fulfill its purpose as described by the Supreme Court; specifically, to evaluate whether anticipated environmental impacts can be avoided.<sup>225</sup> In this case, the EIS described a monitoring regime and indicated that, if the monitoring showed mitigation measures were necessary, then the mining company would prepare a "detailed, site-specific plan to enhance or replace the impacted perennial water resources."<sup>226</sup> The absence of detail about the tools employed in such a plan, or on when exactly the plan would be triggered, is common in EISs employing adaptive management to defer some decisions to a later date. Recent draft guidance from the Council on Environmental Quality (CEQ) aims to improve NEPA mitigation by urging agencies to include more specific descriptions of mitigation measures (especially measurable performance standards) and to ensure that mitigation is car-

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223. Two recent, very deferential decisions from Judge Leon illustrate how nebulously described adaptive management may support EIS mitigation. *See, e.g.,* *Defenders of Wildlife v. Salazar*, 698 F. Supp. 2d 141, 147-48 (D.D.C. 2010) (upholding an elk management plan with little detail on mitigation measures to reduce harms of winter elk concentrations); *Theodore Roosevelt Conservation P'ship v. Salazar*, 605 F. Supp. 2d 263, 279 (D.D.C. 2009) (citing *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 351-52 (1989)) (noting that adaptive management fulfills the EIS mitigation requirement, which only requires discussion of possible measures, not assurance that they will occur), *aff'd*, No. 09-5162, 2010 WL 2869778 (D.C. Cir. July 23, 2010).

224. *S. Fork Band Council v. U.S. Dep't of the Interior*, 588 F.3d 718, 727 (9th Cir. 2009) (per curiam).

225. *Id.* (internal citation omitted).

226. U.S. DEP'T OF THE INTERIOR: BUREAU OF LAND MGMT., CORTEZ HILLS EXPANSION PROJECT: FINAL EIS § 3.2, at 111 (2008), available at [http://blm.gov/nv/st/en/fo/battle\\_mountain\\_field/blm\\_information/national\\_environmental/cortez\\_hills\\_expansion.html](http://blm.gov/nv/st/en/fo/battle_mountain_field/blm_information/national_environmental/cortez_hills_expansion.html).

ried out.<sup>227</sup> Both of these suggestions would significantly improve federal adaptive management, which the CEQ recommends, “in order to minimize the possibility of mitigation failure.”<sup>228</sup>

Outside of NEPA, environmental laws frequently impose substantive standards on agencies that cannot be eluded through adaptive management. For instance, a federal district court found that an adaptive management approach to improving stormwater phosphorus abatement did not fulfill the legal requirements of the Clean Water Act, which demand that specific effluent limitations be met.<sup>229</sup> Even the public land organic acts, which grant broad discretion to agencies, including the latitude to manage adaptively, sometimes provide standards that a/m-lite fails to meet.<sup>230</sup> Agencies run the risk of relying on adaptive management as an alternative to the harder work of showing how their plans will meet the substantive legal criteria for their land systems.

Moreover, the focus on adaptive management in public land planning may distract agencies from the hard work of establishing substantive objectives that translate statutory and regulatory goals into place-based standards.<sup>231</sup> Richard L.

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227. See Memorandum from Nancy H. Sutley, Chair, Council on Env'tl. Quality on Draft Guidance for NEPA Mitigation & Monitoring, 3 (Feb. 18, 2010), available at [http://ceq.hss.doe.gov/nepa/regs/Mitigation\\_and\\_Monitoring\\_Draft\\_NEPA\\_Guidance\\_Final\\_02182010.pdf](http://ceq.hss.doe.gov/nepa/regs/Mitigation_and_Monitoring_Draft_NEPA_Guidance_Final_02182010.pdf).

228. *Id.* at 4.

229. See *Miccosukee Tribe of Indians v. United States*, No. 04-21448, 2010 WL 1506267, at \*8 (S.D. Fla. Apr. 14, 2010).

230. *E.g.*, *Klamath Siskiyou Wildlands Ctr. v. Boody*, 468 F.3d 549, 558–59 (9th Cir. 2006) (arguing that adaptive management modifications contemplated in a resource management plan do not shield subsequent management changes from complying with regulations setting out criteria for amending plans); *Greater Yellowstone Coal. v. Kempthorne*, 577 F. Supp. 2d 183, 195 (D.D.C. 2008) (stating that an adaptive management plan for snowmobiles “provides no quantitative standard or qualitative analysis to support” a conclusion of no impairment under the park system Organic Act); *High Sierra Hikers Ass'n v. Weingardt*, 521 F. Supp. 2d 1065, 1091 (N.D. Cal. 2007) (illustrating that an agency may not rely on adaptive management to avoid a showing in the administrative record that it will meet the standards of the Wilderness Act).

231. See Refuge Planning Policy Pursuant to the National Wildlife Refuge System Administration Act as Amended by the National Wildlife Refuge System Improvement Act of 1997, 65 Fed. Reg. 33,892, 33,906 (May 25, 2000) (stating that one of the eight goals of unit-level planning is “[to] provide a basis for adaptive management by monitoring progress, evaluating plan implementation, and updating refuge plans accordingly”). Substantive statutory goals for refuges include ensuring “that the biological integrity, diversity, and environmental health of the System are maintained,” 16 U.S.C.

Schroeder's recent study of the comprehensive conservation plans that each unit of the National Wildlife Refuge System must prepare under its organic legislation, revealed that the biological objectives, a key element of the plans required under implementing policy, seldom meet even two of the five criteria in the FWS handbook.<sup>232</sup> The handbook requires each biological objective to be: "(1) Specific, (2) Measurable, (3) Achievable, (4) Results-oriented, and (5) Time-fixed."<sup>233</sup> Schroeder describes the problem with the plans' neglect of substantive benchmarks:

If [the FWS] is to be able to manage in a manner consistent with the plans, and to practice adaptive management by monitoring progress, then the biological objectives in the plan must be specific and measurable, as recognized by [the FWS's] own policy. If the objectives lack specificity and detail, as the majority do, then [the FWS] will be unable to measure progress toward their achievement, and thus, will be unable to know if they are indeed managing refuge lands in a manner consistent with the plans.<sup>234</sup>

In their haste to complete plans and to describe adaptive management procedures, agencies too often neglect the establishment of site-specific standards for measuring compliance with statutory or regulatory criteria.

### III. LESSONS FOR THE NEXT GENERATION OF ADAPTIVE MANAGEMENT

The picture that emerges from the first round of litigation over adaptive management should not surprise observers of conservation conflicts. One reason the ambitions expressed in law and policy exceed the abilities of agencies to implement is inadequate funding.<sup>235</sup> Agencies attempt to maximize their discretion and minimize their exposure to political controversy from unpopular decisions.<sup>236</sup> Interest groups, including environmentalists, seek to lock in promises through binding commitments early in the management process.<sup>237</sup> Courts are at-

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§ 668dd(a)(4)(B) (2006), and sustaining "healthy populations of fish, wildlife, and plants," 16 U.S.C. §§ 668dd(a)(4)(D)–668ee.

232. See Richard L. Schroeder, *Evaluating the Quality of Biological Objectives for Conservation Planning in the National Wildlife Refuge System*, 26 GEO. WRIGHT F. 22, 25 (2009).

233. *Id.* at 23 (quoting ROBERT S. ADAMCIK ET AL., U.S. FISH & WILDLIFE SERVICE, WRITING REFUGE MANAGEMENT GOALS AND OBJECTIVES: A HANDBOOK 8 (2004)).

234. *Id.* at 27.

235. See *supra* note 68 and accompanying text.

236. See Doremus, *supra* note 4, at 56.

237. *Id.* at 85.

tentive to substantive management standards in reviewing agency records for compliance with the law. Most environmental managers and stakeholders approve of adaptive management in theory; disagreements focus on application in practice.<sup>238</sup> Courts cannot directly distinguish legitimate adaptive management from imposters.<sup>239</sup> But in policing compliance with administrative and environmental law, courts can unmask some of the most egregious failures to incorporate the key elements necessary for structured learning during the course of a project, which often get sidelined in the rough and tumble of implementation.<sup>240</sup> Given the limitations of the judicial role, we now offer some lessons for agencies and Congress for further improvement of adaptive management in practice.

#### A. LESSONS FOR AGENCIES

Our research confirms the intuition that adaptive management is one of the most difficult tasks for agencies attempting comprehensive ecosystem stewardship.<sup>241</sup> However, the impression in agencies that lawsuits and appeals present a barrier to implementing adaptive management<sup>242</sup> is unfounded. 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. Several strategies can help agencies avoid that pitfall.

##### 1. Shoring Up a/m-lite in Substance

In order to wring the most benefits from a/m-lite, agencies should strive to do their best to create plans that include as many of the elements of adaptive management theory as possible, especially designing management actions as experiments so that they promote learning to reduce uncertainty. However, this crucial element of adaptive management is not generally

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238. See Fred Johnson, *Protocol and Practice in the Adaptive Management of Waterfowl Harvests*, 3 CONSERVATION ECOLOGY 8 (June 30, 1999), <http://www.ecologyandsociety.org/vol3/iss1/art8/>.

239. See Gregory et al., *supra* note 72, at 2424.

240. See *id.*; Doremus, *supra* note 1, at 569–70.

241. Tomas M. Koontz & Jennifer Bodine, *Implementing Ecosystem Management in Public Agencies: Lessons from the U.S. Bureau of Land Management and the Forest Service*, 22 CONSERVATION BIOLOGY 60, 60 (2008).

242. *Id.* at 65–66.

required by law and courts will not impose it.<sup>243</sup> More structured learning would improve a/m-lite by capturing more benefits of adaptive management theory. This reform will need strong prompting from Congress, agency leadership, and administrative guidance. The courts will, however, impose some discipline on the use of a/m-lite.

The lessons for an agency embarking on a/m-lite require it to restrain its enthusiasm for discretion: the plan must be as detailed as practical. The more vague the a/m-lite, the more likely that a court will find it inadequate.<sup>244</sup> Criteria for measuring success and triggering contingency actions must be clearly articulated in the record of decision.<sup>245</sup> Agencies should commit to monitoring the key criteria and should employ their data when revising or expanding projects.<sup>246</sup> Most important, adaptive management must have direction—it needs to deploy its procedural tools to home in on specific goals.

Related to this lesson is that adaptive management cannot substitute for a showing of reasonable certainty that substantive criteria will be met. The pageantry of procedures and flow charts may distract agencies from their mandates to achieve specific environmental objectives. Agencies should resist looking at adaptive management as a short cut around the difficult task of compiling a record that substantiates claims about such key tests as viability, nonimpairment, or no jeopardy. Adaptive plans, to be effective, must translate the substantive standards of statutes, rules, and manuals into place-based objectives.

## 2. Improving a/m-lite as Procedure

While substantive standards, where they exist, helpfully constrain and focus adaptive management, there is also a set of lessons for agencies involving the procedural charter established by NEPA, which requires all federal agencies to prepare an EIS for “major Federal actions significantly affecting the quality of the human environment.”<sup>247</sup> Indeed, as the origins of adaptive management are found in Holling’s critique of conventional environmental impact analysis, it is fitting that NEPA

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243. See *Lands Council v. McNair*, 537 F.3d 981, 988 (9th Cir. 2008) (refusing to take a close look at whether the agency adaptively learned from previous logging before undertaking another, similar logging project).

244. See *supra* text accompanying note 180.

245. See *supra* text accompanying notes 176–80.

246. See *supra* text accompanying note 138.

247. 42 U.S.C. § 4332(2)(C) (2006).

recently has been the subject of much thinking about how to promote adaptive management. In 1997, for example, the CEQ echoed Holling's assessment that under the traditional NEPA model "adequate environmental protection depends solely on the accuracy of the predicted impacts and expected mitigation results" and that NEPA should be reoriented around "[a]daptive environmental management."<sup>248</sup> Building on that theme, the 2003 NEPA Task Force Report, *Modernizing NEPA Implementation*, contained a full chapter devoted to "[a]daptive [m]anagement and [m]onitoring,"<sup>249</sup> the gist of which was to use NEPA to help move federal agencies from the "predict-mitigate-implement" model to the "predict-mitigate-implement-monitor-adapt" model.<sup>250</sup>

NEPA, of course, imposes no enforceable substantive duties on federal agencies and thus cannot mandate adaptive management.<sup>251</sup> Moreover, environmental impact analysis performed under NEPA assumes the conventional front-end comprehensive predecisional form, so it cannot incorporate adaptive management as an assessment tool per se.<sup>252</sup> But, the NEPA Task Force identified two avenues in which adaptive management and NEPA can usefully intersect in ways consistent with our evaluation of the adaptive management case law presented in Part II.

First, federal agency actions that employ adaptive management may be in a position to reduce the need for new or supplemental NEPA analyses when changed conditions require

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248. COUNCIL ON ENVTL. QUALITY, EXEC. OFFICE OF THE PRESIDENT, THE NATIONAL ENVIRONMENTAL POLICY ACT: A STUDY OF ITS EFFECTIVENESS AFTER TWENTY-FIVE YEARS 32 (1997).

249. NEPA TASK FORCE, REPORT TO THE COUNCIL ON ENVIRONMENTAL QUALITY: MODERNIZING NEPA IMPLEMENTATION 44 (2003).

250. *Id.* at 45.

251. The Supreme Court's oft-repeated observation is that while "NEPA does set forth significant substantive goals for the Nation[,] . . . its mandate to the agencies is essentially procedural." *Vt. Yankee Nuclear Power Corp. v. Natural Res. Def. Council, Inc.*, 435 U.S. 519, 558 (1978); *see also* *Stryker's Bay Neighborhood Council, Inc. v. Karlen*, 444 U.S. 223, 227 (1980) (per curiam) (stating that once an agency has complied with NEPA procedures, the courts do not question the choice of action the agency has taken).

252. Agencies must prepare the EIS prior to deciding which action to select, and there is no need for subsequent monitoring and assessment to follow up on the EIS after the agency action has been selected and implemented. *See* David R. Hodas, *NEPA, Ecosystem Management and Environmental Accounting*, 14 NAT. RESOURCES & ENV'T 185, 188 (2000) (describing NEPA's lack of post-EIS review as inadequate to support ecosystem management).

changes in resource management.<sup>253</sup> This is one of the lessons manifest in the litigation over the NWFP.<sup>254</sup> Second, federal actions that employ adaptive management may be in a better position to argue that mitigation measures incorporated in the federal action and put into effect through adaptive management justify the decision not to prepare a full EIS (i.e., to mitigate to a finding of no significant impact, or FONSI).<sup>255</sup> Our review of adaptive management litigation bolsters this claim by the CEQ only in circumstances where there is an earlier, comprehensive EIS to which the Environmental Assessment tiers.<sup>256</sup>

Hence, whereas the traditional NEPA model provides no incentive to federal agencies (or the state, local, and private entities sponsoring the projects federal agencies fund or authorize) to incorporate adaptive management in the actions being evaluated under NEPA, the Task Force used the prospect of avoiding having to prepare a full or supplemental EIS as an incentive to do just that. Indeed, in 2007 the Forest Service proposed rules to update its procedures for NEPA compliance with numerous references to adaptive management built around the provision that

[a] proposed action or alternative(s) may include adaptive management strategies allowing for adjustment of the action during implementation. If the adjustments to an action are clearly articulated and pre-specified in the description of the alternative and fully analyzed, then the action may be adjusted during implementation without the need for further analysis.<sup>257</sup>

Similarly, in 2008 the DOI proposed revisions to its NEPA implementation rules directing that “[b]ureaus should use adaptive management as part of their decisionmaking processes, as appropriate, particularly in circumstances where long-term impacts may be uncertain and future monitoring will be needed to make necessary adjustments in subsequent implementation decisions.”<sup>258</sup>

Another theme of NEPA reformers consistent with the case law on adaptive management has been to encourage more at-

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253. See NEPA TASK FORCE, *supra* note 249, at 47.

254. See *supra* text accompanying note 166.

255. See NEPA TASK FORCE, *supra* note 249, at 48.

256. See *supra* text accompanying notes 222–27.

257. National Environmental Policy Act Procedures, 72 Fed. Reg. 45,998, 46,005 (Aug. 16, 2007).

258. Implementation of the National Environmental Policy Act (NEPA) of 1969, 73 Fed. Reg. 126, 135 (Jan. 2, 2008).

tention to large-scale or programmatic EISs.<sup>259</sup> Early-stage analyses can be difficult to perform because activities may still be nebulous. But, early and broad evaluations can steer agencies in more effective and environmentally benign directions.<sup>260</sup> They are the analyses most likely to actually help agency decisionmakers. The bigger temporal and geographic scales representing the greatest agency successes in the adaptive management litigation bolster this general argument of NEPA reformers. Because adaptive management is expensive, agencies should place their highest funding priorities on large-scale efforts, which are most likely to yield useful, incremental adjustments over time.<sup>261</sup>

Despite fundamentally different assumptions about knowledge and decisionmaking, adaptive management is compatible with NEPA. Adaptive management is well suited to the NEPA tiering that natural resources agencies already use adeptly. An added incentive for agency use of adaptive management in EISs is that it may raise the threshold for requiring a supplemental EIS should new information emerge. Agencies must be attentive to the obligation that mitigated FONSI demonstrate that impacts will fall below the significance threshold. Adaptive management alone, without substantive triggers, may not shoulder the burden.

### 3. Extending a/m-lite to Pollution Control

The pollution-control side of environmental litigation has not directly addressed adaptive management. The strong “cooperative federalism” structure of pollution-control law introduces the complications of state implementation that go far beyond the Sacramento-San Joaquin Delta example.<sup>262</sup> Pollution control also involves far more regulation of private economic activity than does resource management.<sup>263</sup> But the relatively stronger emphasis on meeting substantive criteria, such as Na-

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259. See, e.g., COUNCIL ON ENVTL. QUALITY, *supra* note 248, at 11–13.

260. See *id.* at 12.

261. See *id.* at 14.

262. See Robert L. Fischman, *Cooperative Federalism and Natural Resources Law*, 14 N.Y.U. ENVTL. L.J. 179, 207–29 (2005) (contrasting the versions of cooperative federalism in pollution control and resource management).

263. See Robert L. Fischman, *The Divides of Environmental Law and the Problem of Harm in the Endangered Species Act*, 83 IND. L.J. 661, 663 (2008) (discussing the characteristic differences between pollution control and natural resources law). The ESA is a resource management statute that straddles the divide and does regulate some private activities directly. *Id.* at 684.

tional Ambient Air Quality Standards (NAAQS),<sup>264</sup> in pollution-control law will increasingly provide some lessons for implementing adaptive management. For example, the Fifth Circuit upheld the EPA's approval of a Texas State Implementation Plan (SIP), which the Clean Air Act requires to demonstrate that the state will be able to attain NAAQS.<sup>265</sup> The SIP at issue purported to demonstrate that the Houston-Galveston area would comply with the NAAQS for ozone.<sup>266</sup> The state was able to devise control measures that would achieve ninety-four percent of the pollution reduction needed to attain the NAAQS.<sup>267</sup> In order to extract the additional six percent reduction, the EPA accepted the SIP's "enforceable commitment to adopt and implement additional . . . controls."<sup>268</sup> The SIP could not specify what those additional controls would be, but it did provide "a list of soon-to-be-available, cutting-edge technologies."<sup>269</sup> The court upheld the EPA determination under the *Chevron* standard of review.<sup>270</sup> The Texas SIP case illustrates how pollution control benefits from large-scale plans that promise to meet substantive criteria through thousands of small steps. Texas benefited from the large scale in committing to additional reductions (six percent) without specifying the exact sources of contribution to that goal. The court's deferential standard of review afforded the EPA flexibility to approve the experiment of meeting the standard through as-yet-unavailable technology.<sup>271</sup> This is a form of narrowing uncertainty over time that is widely viewed as an attribute of adaptive management.

On the other hand, the EPA recently refused to extend its flexibility in proposing to disapprove a Texas SIP revision employing a "Flexible Permits" approach to meet the Clean Air Act's new source review requirements for industrial sources of pollution.<sup>272</sup> The Texas program would allow individual sources

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264. 42 U.S.C. §§ 7408–7409 (2006).

265. *BCCA Appeal Grp. v. U.S. Env't Prot. Agency*, 355 F.3d 817, 821–22 (5th Cir. 2003).

266. *Id.* at 822–23.

267. *Id.* at 838.

268. *Id.* at 839–40.

269. *Id.* at 841.

270. *Id.* at 842.

271. *Id.* at 841.

272. *Approval and Promulgation of Implementation Plans*, 74 Fed. Reg. 48,480, 48,480 (Sept. 23, 2009). New source review provides for the "regulation of the modification and construction" of certain stationary sources of air pollution. 42 U.S.C. § 7410(a)(2)(C) (2006).

to exceed standards as long as they provided cumulative emissions reductions on a case-by-case basis.<sup>273</sup> The EPA's proposed finding emphasized that the state program does not meet the statutory standards and fails to ensure accountability, compliance, and monitoring.<sup>274</sup> These are familiar criticisms of the a/m-lite plans reviewed in the natural resources litigation.

The EPA recently restructured its Chesapeake Bay Program (CBP) to emphasize adaptive management. The CBP covers a larger area than the Texas SIPs, or even the NWFP. In response to a 2007 congressional mandate, the EPA revised its CBP around four basic components, one of which is adaptive management.<sup>275</sup> In 2009, President Obama ordered the EPA to work with other federal agencies to implement adaptive management in the CBP.<sup>276</sup> However, in contrast to the SIPs, the CBP has few enforceable criteria (but many quantitative goals) and its multistate dimension tends to create adaptive management plans focused primarily on the process of coordination.<sup>277</sup> With diffuse responsibility, an emphasis on monitoring and study, and few interim targets, the new CBP has already received criticism as a helpless giant.<sup>278</sup> Nonetheless, we expect

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273. Approval and Promulgation of Implementation Plans, 74 Fed. Reg. at 48,485–86.

274. See *id.* at 48,482. This is consistent with the *Miccosukee Tribe* rejection of adaptive, incremental improvement through best technology in lieu of strictly imposed water-quality based, storm-water effluent limitations for phosphorus in order to meet Clean Water Act substantive requirements. See *Miccosukee Tribe of Indians v. United States*, No. 04-21448, 2010 WL 1506267, at \*8 (S.D. Fla. Apr. 14, 2010).

275. U.S. ENVTL. PROT. AGENCY, CBP/TRS-292-08, STRENGTHENING THE MANAGEMENT, COORDINATION, AND ACCOUNTABILITY OF THE CHESAPEAKE BAY PROGRAM, at ii–iii (2008) [hereinafter CHESAPEAKE BAY PROGRAM], available at [http://cap.chesapeakebay.net/docs/EPA\\_Chesapeake\\_Bay\\_CAP.pdf](http://cap.chesapeakebay.net/docs/EPA_Chesapeake_Bay_CAP.pdf).

276. Chesapeake Bay Protection and Restoration, Exec. Order No. 13,508, 74 Fed. Reg. 23,099, 23,101–03 (May 15, 2009) (directing the EPA in section 301(b) to draft pollution-control strategies that are “based on sound science and reflect adaptive management principles” and noting in section 801 that the DOI is to use “adaptive management to plan, monitor, evaluate, and adjust environmental management actions”).

277. See, e.g., CHESAPEAKE BAY PROGRAM, *supra* note 275, at 26 (listing quantitative goals with adaptive management strategies); *id.* at 34 (providing the CBP management system diagram illustrating a detailed procedural method).

278. See Rena Steinzor & Shana Campbell Jones, *Reauthorizing the Chesapeake Bay Program: Exchanging Promises for Results* 1 (Ctr. for Progressive Reform, Working Paper No. 903, 2009). The detailed management system is reminiscent of the ecosystem management model skewered by Professor Houck for lack of substance and neglect of lawmaking. See Oliver Houck, *On the Law of Biodiversity and Ecosystem Management*, 81 MINN. L. REV. 869,

increased use of adaptive management in adjusting water quality standards and total maximum daily loads of pollutants for impaired bodies of water, such as the Chesapeake Bay.

#### 4. Public and Industry Buy-In

The courts are not the only institution reviewing adaptive management. Private regulated interests have expressed concerns about the capacity of adaptive management to add continually to the conditions imposed by resource development authorizations without the security of finality. The Army Corps, for example, heard this complaint as it developed adaptive management provisions in the new wetlands compensatory mitigation rule:

One commenter suggested that if a permittee has made a “good faith effort” to meet performance standards, no additional compensatory mitigation requirements should be imposed other than an extension of the monitoring period. Several commenters said that requiring adaptive management efforts beyond what is currently required as remediation or contingency actions will impose additional financial and resource burdens on mitigation providers.<sup>279</sup>

The agency’s response was a Solomonic mixed bag. On the one hand, the Army Corps acknowledged the reality that “there may be additional costs associated with an adaptive management approach, but we believe that such an approach is necessary to achieve compensatory mitigation project objectives, or to provide comparable or superior ecological benefits.”<sup>280</sup> Yet, the agency did clarify that the scope of adaptive management is not boundless, noting that “adaptive management does not require anticipation of all potential challenges, since that would be impossible to accomplish.”<sup>281</sup> This is unlikely to be of comfort to regulated interests, however, as it leaves much to the details of the adaptive management plan and subsequent implementation. As we conclude from our case law evaluation, courts may find this approach too open-ended if the plan is not sufficiently detailed to assure substantive compliance.

Just as regulated interests are concerned that adaptive management will lead to runaway land management burdens,

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937–39 (1997) (“Nothing better illustrates the potential benefit and reach of ecosystem management, and its latent danger, than the Inner Columbia Basin story . . .”).

279. Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594, 19,647 (Apr. 10, 2008).

280. *Id.*

281. *Id.* at 19,620.

environmental protection interests are concerned that it will lead to closed-door resource development approvals. For example, as FWS brought adaptive management on line for the HCP permit program under the ESA,<sup>282</sup> environmentalists complained about inadequate access to meaningful public participation in the HCP negotiation process and the lack of an ongoing public role in the implementation of adaptive management over the life of the HCP permit.<sup>283</sup> By the late 1990s, environmental groups had begun to accuse the HCP of making decisions without following “biological standards” and to demand more public participation as a result.<sup>284</sup> For example, in 1999 the Defenders of Wildlife issued a blistering critique of the HCP program, complaining that, among other things,

[c]itizens from various stakeholder groups have no formal role in the HCP process except through the public comment period and . . . generally have not had a seat at the negotiating table in many major recent negotiations despite the fact that conservationists (in addition to FWS) represent the public’s interest in protecting endangered species.<sup>285</sup>

Since then, some HCPs have been found by courts to contain robust adaptive management provisions that detail a comprehensive monitoring and adjustment protocol and specify the kinds of events and responses for which adjustments will be made.<sup>286</sup> FWS has also joined other state and federal agencies

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282. See *supra* notes 2, 6 and accompanying text.

283. See, e.g., LAURA C. HOOD, *FRAYED SAFETY NETS: CONSERVATION PLANNING UNDER THE ENDANGERED SPECIES ACT*, at vi–xiii (1998) (presenting a pessimistic assessment of the HCP program); John Kostyack, *Surprise!*, 15 ENVTL. F., Mar.–Apr. 1998, at 19, 19–24 (presenting an extensive criticism of the HCP program from the perspective of an attorney for the National Wildlife Federation); cf. Robert D. Thornton, *Habitat Conservation Plans: Frayed Safety Nets or Creative Partnerships?*, 16 NAT. RESOURCES & ENV’T 94, 95–96 (2001) (describing criticism from other organizations).

284. See, e.g., HOOD, *supra* note 283, at 59–61, 80–81 (summarizing the Defenders of Wildlife’s critique of the HCP program).

285. *Id.* at 41; see also Holly Doremus, *Preserving Citizen Participation in the Era of Reinvention: The Endangered Species Act Example*, 25 ECOLOGY L.Q. 707, 712–15 (1999) (examining the growing tension between the HCP and other ESA reform programs and public participation values).

286. For an example, see *Center for Biological Diversity v. U.S. Fish and Wildlife Service*, 202 F. Supp. 2d 594 (W.D. Tex. 2002). This case involved a dispute between plaintiff Center for Biological Diversity environmental group and defendant-intervener La Cantera, a commercial development company, regarding 750 acres of land in Bexar County, Texas. *Id.* at 597. The FWS issued an Incidental Take Permit to La Cantera, and the plaintiff challenged virtually every aspect of the permit, including the adequacy of the adaptive management provisions, but lost on every claim notwithstanding the court’s expressed aversion to allowing development in habitat of endangered species.

to develop detailed technical guidance for monitoring protocols to assist adaptive management in large-scale HCPs.<sup>287</sup> Yet, public participation of the kind demanded has yet to be made a component of HCP adaptive management implementation. The pressure for more public input on this and other aspects of HCP permits thus continues to build.<sup>288</sup> We expect similar issues to develop in other permitting and approval programs using adaptive management.<sup>289</sup>

Neither the regulated industry certainty nor the public participation concern has surfaced in claims brought against adaptive management in the courts to date, and no court has expressed concern in either respect *sua sponte*. This probably is due more to the hybrid nature of a/m-lite than it is to the underlying justifications for the respective concerns. Agencies practicing a/m-lite do so against the context of conventional natural resources management laws, which tend not to specify conditions for regulated party certainty and which prescribe fairly minimal public participation in the form of notice and comment. So long as an agency satisfies the black-letter requirements of statutes in these respects, courts are unlikely to nullify use of a/m-lite on these grounds. By the same token, however, the black-letter law also constrains how far agencies can go with a/m-lite, as truly iterative “learning while doing” may at some point run afoul of permitting procedures and criteria, as well as the demands of public notice and comment. Our message to agencies in this respect is not to take the ab-

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The court’s discussion of the adaptive management provisions emphasized the comprehensive and detailed nature of the monitoring and response protocols. *See id.* at 616. Seven years later, after reviewing an annual report the court required to be filed each year describing management actions under the permit, the court issued an order congratulating the permittee and agency “for coming to this positive result and a fine example of corporate citizenship.” *Ctr. for Biological Diversity v. U.S. Fish & Wildlife Serv.*, No. SA-01-CA-1139-FB (W.D. Tex. May 5, 2009) (order acknowledging annual report on file with author). In the interest of full disclosure, Professor Ruhl served as a consultant to the HCP applicant in the case.

287. *See* U.S. DEPT OF THE INTERIOR ET AL., DESIGNING MONITORING PROGRAMS IN AN ADAPTIVE MANAGEMENT CONTEXT FOR REGIONAL MULTIPLE SPECIES CONSERVATION PLANS 10–40 (2004), available at <http://www.dfg.ca.gov/habcon/nccp/publications.html>.

288. For a recent evaluation of the HCP program, including a proposal for more public participation, see David Dana, *Reforming Section 10 and the Habitat Conservation Program* 12–17 (Nw. Univ. School of Law & Econ., Working Paper No. 09-44), available at <http://papers.ssrn.com/abstract=1519515>.

289. For example, the public participation issue confronted the NEPA Task Force as well. *See* NEPA TASK FORCE, *supra* note 249, at 51.

sence of these concerns registering in the case law to date as evidence that there is no limit to how far agencies can implement a/m-lite without regard to regulated industry and public interests. Stretch it too far in either respect and the lawsuits are sure to come.

#### B. LESSONS FOR CONGRESS

Even if agencies follow the lessons we have extracted from the existing adaptive management case law, which we believe would reduce adverse judicial reaction, the most they could hope for is to be able to implement a disciplined form of a/m-lite. The courts cannot provide the funding necessary to support true “learning while doing,” and neither can they supply more authority or clearer standards than exist in existing statutory text. Only Congress can let agencies break out of the a/m-lite mold without fear of public, industry, and judicial pushback. Of course, Congress is not bound to follow the lead the courts have given agencies, but we believe Congress would be well advised to codify judicial guideposts for determining when the practical demands on adaptive management warrant departure from the pristine theory and when, on the other hand, the agencies have given themselves too long a leash.

On the funding question, it is time for Congress to consider supporting adaptive management plans through the purchase of annuities that would ensure a steady stream of subsequent funding for the development of management experiments, monitoring, and revision.<sup>290</sup> Current appropriation practice, which provides most funding for the first stage of planning and not for the subsequent iterations, is inadequate to reap significant benefits from adaptive management. Prior efforts, most notably through the Forest and Rangeland Renewable Resources Planning Act of 1974,<sup>291</sup> failed in disciplining Congress to make

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290. Examples abound of agencies unable to afford the monitoring described in adaptive plans. A common scenario is national forests unable to fund the monitoring of indicator species populations identified in forest plans. *See, e.g.*, *Lands Council v. McNair*, 537 F.3d 981, 999–1001, 1000 n.12 (9th Cir. 2008); *Utah Envtl. Cong. v. Bosworth*, 439 F.3d 1184, 1190–97 (10th Cir. 2006); *Sierra Club v. Martin*, 168 F.3d 1, 3–8 (11th Cir. 1999); *Inland Empire Pub. Lands Council v. U.S. Forest Serv.*, 88 F.3d 754, 763–65 (9th Cir. 1996); *see also* *W. Watersheds Project v. U.S. Forest Serv.*, No. CV-05-189-E-BLW, 2006 WL 292010, at \*4–8 (D. Idaho 2006) (identifying inadequate funding for the Forest Service to apply forest plan standards relating to grazing suitability using on-the-ground studies).

291. 16 U.S.C. §§ 1601–1613 (2006).

strategic investments in resource management.<sup>292</sup> The 1974 statute established an elaborate planning regime which viewed forests as capital assets requiring reliable future funding to maintain their value. It required an annual “Statement of Reasons” from the President explaining deviations of proposed budgets from the needed funds projected in long-term plans, but both branches ignored the well-intentioned legislation.<sup>293</sup> Creating endowments or purchasing annuities are more concrete assurances of follow-through and deserve further exploration. This would be a timely project as Congress considers climate change legislation that may provide new revenues from sales of emission allowances.<sup>294</sup> In the absence of congressional action, agencies should at least use NEPA to disclose funding needs for adaptive management and the environmental effects that would result from failure to find the means for implementation of monitoring, mitigation, or adjustment.<sup>295</sup>

In addition to reforming the appropriations process, Congress could substantially improve the practice of adaptive management in natural resource administration. It is possible to establish clearer standards to ensure that an agency purporting to employ adaptive management actually does an adequate job. Congress should explicitly require adaptive management plans to (1) clearly articulate measurable goals, (2) identify testable hypotheses (or some other method of structured learning from conceptual models), and (3) state exactly what criteria should apply in evaluating the management experiments. These requirements would address the vast majority of nonbudgetary problems with a/m-lite. With explicit learning goals and established measures of success, agencies could retain discretion to adjust their decisions while offering far greater assurances to stakeholders.

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292. See *Nat'l Wildlife Fed'n v. United States*, 626 F.2d 917, 919–20 (D.C. Cir. 1980); GEORGE C. COGGINS ET AL., *FEDERAL PUBLIC LAND AND RESOURCES LAW* 690 (6th ed. 2007).

293. COGGINS ET AL., *supra* note 292, at 690.

294. See Glicksman, *supra* note 4, at 873. The leading bills in both the House and Senate provide substantial funding for natural resource conservation. Clean Energy Jobs and American Power Act, S. 1733, 111th Cong. (2009); American Clean Energy and Security Act of 2009, H.R. 2454, 111th Cong. (2009).

295. See Memorandum from Nancy H. Sutley, *supra* note 227, at 4 (recommending disclosure of these needs and effects relating to mitigation); *id.* at 7 (citing U.S. Army NEPA regulations assuring effective mitigation by barring actions until mitigation measures are fully funded or until lack of funding is addressed in the NEPA analysis, 32 C.F.R. § 651.15(a)(5)(d)).

Assuring future funding and requiring that the experimental elements of adaptive management be more precisely defined would address both the disparities we noted at the beginning of Part II.C. of this Article. These elements would provide judicially enforceable benchmarks for oversight of natural resources planning and management. They would also rein in the a/m-lite practices that currently serve as open-ended contingency planning by ensuring that all adaptive management plans get the benefit of the scientific method to guide future iterations. In narrowing the disparities, they would wring more benefits from adaptive management by reducing uncertainty as plans move forward.<sup>296</sup> True, adaptive management in practice would remain a somewhat grotesque hybrid of conservation policy's complexity theory and modern administrative law's approach to pluralism and finality. But it would likely achieve more of the benefits we wish to extract from ecosystems with less rancor.

The federal government has noted that “[c]limate change creates new situations of added complexity for which an adaptive management approach may be the only way to take management action today while allowing for increased understanding and refinement tomorrow.”<sup>297</sup> Commentators agree, and there are currently no viable alternative approaches to respond to the increased uncertainties surrounding conservation.<sup>298</sup> Therefore, the stakes are high for public agencies to refine their approach to adaptive management in light of the lessons from the first generation of litigation.

### CONCLUSION

Our review of the first generation of adaptive management litigation provides more than an analysis of how the law applies or the reaction of the judiciary. It also opens a window into the actual practices that agencies have justified under the title adaptive management. Not surprisingly, implementation fails to mirror the finely wrought theory of adaptive management. The litigation reflects the practical and political compromises agencies make, whether applying adaptive manage-

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296. Doremus, *supra* note 1, at 569.

297. JILL S. BARON ET AL., PRELIMINARY REVIEW OF ADAPTATION OPTIONS FOR CLIMATE-SENSITIVE ECOSYSTEMS AND RESOURCES 25 (Susan Herrod Julius & Jordan M. West eds., 2008), available at <http://www.climate-science.gov/Library/sap/sap4-4/final-report/#finalreport>.

298. See Glicksman, *supra* note 4, at 871.

ment or any other model of natural resources management decisionmaking. It highlights how rarely real learning and reduced uncertainty result, and how haphazardly they feed back into agency programs. But it also points the way toward improved implementation and legislative reform.

The next round of lawsuits over adaptive management will likely focus on how well the procedures developed in large-scale plans have fulfilled their promise. Only the NWFP is old enough to have experienced much second-generation litigation. However, agencies should prepare by being careful about what they promise. The temptation to defer difficult and costly analysis, or punt on politically controversial decisions, may create problems for agencies down the line. What might have been a routine implementation project may explode into an expensive, complex task if the initial a/m-lite failed to commit to a course of action, applied only vague criteria for evaluating actions, or deferred substantial analysis of site-specific effects.

One must wonder, however, about how much time we have for lessons to come out of the second generation of adaptive management litigation. The pressure on Congress, agencies, the courts, and all natural resources policy stakeholders to further refine, implement, and work within a regime of adaptive management is not about to let up. There is widespread agreement, for example, that the effects of climate change on natural resources will be complex, dynamic, nonlinear, and frequently unpredictable over anything but short time frames, all of which are conditions that demand adaptive management responses.<sup>299</sup> Yet, although the first generation of litigation seems to have

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299. See Camacho, *supra* note 138, at 64 (calling for “an adaptive methodology for assessing and adjusting government decision making over time”); Robin Kundis Craig, “Stationarity Is Dead”—*Long Live Transformation: Five Principles for Climate Change Adaptation Law*, 34 HARV. ENVTL. L. REV. 9, 65–67 (2010) (“Be serious about using adaptive management—and change both natural resources and administrative laws to allow for it.”); Glicksman, *supra* note 4, at 868 (“The land management agencies, in the planning process as well as in other contexts, must *rely heavily* on the management technique known as *adaptive management*.”); J.B. Ruhl, *Climate Change Adaptation and the Structural Transformation of Environmental Law*, 40 ENVTL. L. 363, 416–23 (2010) (discussing greater need for adaptive management to implement climate change adaptation policy). Experts from environmental organizations, such as the Environmental Law Institute’s Carl Bruch, concur in the important role adaptive management will play in climate change policy. See Carl Bruch, *The End of Equilibrium*, ENVTL. F., Sept.–Oct. 2008, at 30, 32 (“Incorporating adaptive management into laws and institutions can enhance the capacity of governance systems and ecosystems to adapt to changing climactic conditions, to develop and deploy new technologies and techniques.”).

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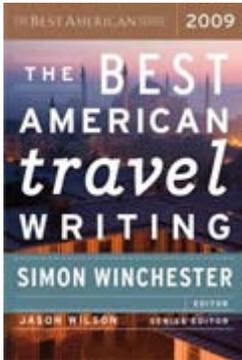
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laid down some important foundational lessons for this effort, doing so took a span of roughly fifteen years. Adaptive management litigation now risks getting down in the weeds, so to speak, and must avoid letting the perfect be the enemy of the good at a time when decisive action is needed. Our assessment of adaptive management in the courts suggests there is a good model in place. If agencies follow it and courts enforce it faithfully, it may serve as a potent component of climate change policy notwithstanding its flaws.

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## *The Last Wild River*

One need not weep romantic tears for them,  
But when the last moonshiner buys his radio,  
And the last, lost wild-rabbit of a girl  
Is civilized with a mail-order dress,  
Something will pass that was American,  
And all the movies will not bring it back.

-Stephen Vincent Benet, "John Brown's Body"

Thick strokes of early-evening crimson smeared across the rolling mountains of Rabun County as I drove up Highway 23 from Atlanta toward Clayton. The whole world looked like it was burning up right behind the horizon line. It was the nine-degree, molar-rattling middle of January in North Georgia, and I was on my way to visit the Chattooga River, fifty-seven miles of fierce backcountry water and etched stone where the film of my father's first novel, *Deliverance*, was shot in the summer of 1971.

When I read some months back that a lawsuit brought by a boating organization called American Whitewater had prompted the Forest Service to consider opening the river's headwaters to boaters, an unexpected sadness came over me. It was a variant of what I felt years ago when I learned that my childhood home had been torn down and rebuilt into something I couldn't recognize. The Chattooga River is generally recognized to be the wildest, most unforgiving in Southern Appalachia; its headwaters flow through some of the toughest terrain in the region. It's a twenty-one-mile stretch of swirling water where the battalions of rafters, kayakers, and canoeists who float the rest of the river every year can't go, or at least not legally. According to American Whitewater, it's the only piece of river in the entire National Forest system, in fact, where boaters aren't allowed. For reasons that differ according to who you ask, the Forest Service banned boating on the upper third of the river in 1976, two years after the Chattooga was designated a Wild and Scenic River by Congress, in order to prevent boaters and fishermen from getting in one

another's way. That laws and lawsuits and controversy could extend even into the North Georgia backcountry was a reminder for me that the outside world was always pressing in on the Chattooga and on the people who lived around it.



Really, though, the outside world has been pressing in for over a century-the devastating logging period after the Civil War, the TVA dams following the Great Depression, the ever-increasing numbers of vacation homes going up-but it started pressing a lot harder when *Deliverance* hit theaters in 1972, and with that fact comes, for me, a twinge of guilt.

I wasn't born until ten years after *Deliverance* was filmed. What I knew of the river-and by extension, what I knew of Southern Appalachia-I knew only from the film and from memories of my father: the stories he told me and the bluegrass ballads he picked out on his guitar every morning before he worked on his writing. Both of my parents' families had at one point come down from the hills, from North Georgia on my father's side and East Tennessee on my mother's. They used to say that the mountains are something you carry in your blood. If that was true for me I couldn't feel it.

But the Chattooga I did carry with me. Ever since I was old enough to watch *Deliverance*, the river-called the Cahulawassee in the story-thundered through my imagination and, perhaps more importantly, pooled in a certain corner of my heart. It was where my father's work came alive for millions of people and lodged itself permanently in the American brain, for better and for worse. Every time I watch the film and I see the Ainty sheriff, my father at a healthy forty-eight years old, standing on the banks of the river, I want to reach right through the screen. And when I hear some version of the old spiritual "Shall We Gather at the River," I remember him playing it on his twelve-string, and I imagine the river in the song is the Chattooga. The two are forever fused in my mind. That I can't help.

I wanted to see the river while it remained, as it was called in the movie, "the last wild...river in the South." I wanted the place that lived for me only in film and photographs and secondhand stories to live for me in a real way, in the winter, after the tourists had gone.

The free-flowing waters of the Chattooga are the color of faded denim, so wide and flat in places that it looks like you could walk right out on them and so boulder-strewn in others that it looks like a bruise-colored sculpture garden, half-submerged. The river begins near Cashiers, North Carolina, then stretches along to form a good bit of the Georgia-South Carolina border before it turns back

into Georgia, joins with the Tallulah River and surrenders to Lake Tugaloo about seven miles south of Clayton. Its boiling rapids say as much about the people who named them as they do about the treacherous topography of the river itself: Warwoman, Bull Sluice, Sock 'Em Dog, Rock Jumble, Raven Chute, Jawbone, Dead Man's Pool.

"It is," Buzz Williams, one of the principal founders of the Chattooga Conservancy, kept reminding me when he took me up into the headwaters, "a killer river." He meant that thirty-nine people have drowned in it since the Forest Service started keeping records on river fatalities in the '70s. Several rapids are considered "certain death" if you are unlucky enough to fall into them. Some of the people who fell out of their boats or fell in trying to cross the river were sucked into hydraulics or "strainers" (a piece of wood jammed into a rapid) so dangerous that their bodies couldn't be recovered.

Before *Deliverance* was released only a few hundred people traveled down the river every year; after, that number jumped into the thousands and then the tens of thousands, and when a drowning occurred, it was attributed to "*Deliverance*-fever." Despite the river's dangers-or maybe because of them-the lower Chattooga quickly became one of the most popular whitewater destinations in the country; in the past two decades, over a million people have floated it. The fever may be gone, but there's no question that the mystique of the *Deliverance* river endures.

Many of the locals were none too pleased with the flood of outsiders that arrived during the making of the film and for years following its release, especially when they began to see that the rest of America viewed them as violent, inbred rednecks. In much the same way as *Jaws* tapped into a primal fear of what lies under water, *Deliverance* tapped into a collective unconscious fear of the watcher in the woods that is as old as American literature itself. A person is most afraid when he is the most vulnerable, and never is he more vulnerable than when he is at the mercy of the wild.

The sadistic mountain men in *Deliverance* were, of course, fictional, as were the town of Ainty and the Cahulawasse River, but the residents of Rabun County were left to contend with the peculiar legacy of the film long after the cameras stopped rolling. The theme from the movie, "Dueling Banjos," is used in commercials to sell everything from dish detergent to SUVs. PADDLE FASTER, I HEAR BANJO MUSIC is printed on T-shirts and bumper stickers all over the South. The character actor Bill McKinney, who uttered the improvised line "squeal like a pig" (the line does not appear in either the novel or original screenplay), now maintains his official website at [www.squealikeapig.com](http://www.squealikeapig.com). It's hard to get away from.

When Congress designated the Chattooga a Wild and Scenic River-the only one in Georgia-that brought its own tensions. The designation protected the river watershed from industrial and commercial development, but also placed it under the control of the Forest Service, making some of the locals feel that the river had been taken from them and given to the federal government. New regulations on how the river could be used chafed against old mountain traditions. No cars were allowed within a quarter mile of the water, for example, which discouraged large family gatherings like baptisms. "With that government corridor they've created a desert," one local resident told John Lane when he was working on his book, *Chattooga: Descending into the Myth of Deliverance River*, "and nobody can make a living out there but a bunch of rich kids with colorful boats."

Most of the paddlers who flocked to the river were from elsewhere, and they soon became the lightning rod for local resentment. People told me stories of boaters who left their cars in parking

areas near river put-ins and came back to smashed windows and slashed tires. Even as late as the mid-'80s, "The Narrows," Chattooga River, section III

"The Narrows," Chattooga River, section III

photo by Peter McIntosh they said, arson was a problem. So was theft. Backwoods roughnecks trying to scare off paddlers sometimes fired warning shots from the bank, strung barbed wire across the river to slash up rafts, or even hauled boats right out of the water.



Buzz drove me up to where the headwaters ended and the rest of the river began, at the Highway 28 bridge, the dividing line between where boaters are allowed and where they aren't. The bridge isn't far from Chattooga Old Town, the site of the former Cherokee village for which the river was named. No one is completely certain, but most believe that the word Chattooga is related to a Cherokee word for crossing, *tsatugi*, meaning either "we have crossed here" or "he has crossed the river and come out upon the other side." European disease and forced displacement wiped out the Old Town's ninety or so inhabitants by 1775. All that is left is a flattened patch of grass, hardly bigger than a high-school football field, a place where something used to be.

Originally from nearby Pendleton, Buzz has been coming to the river "since he could stick his thumb out," and worked on it as both a raft guide and a Forest Service employee before he focused on conservation. There's a saying down on Cumberland Island that the devil has his tail wrapped around the place, and that's sort of how Buzz feels about the Chattooga. "There's always something threatening it," he said. He has a deep respect for the people who live near the river and a stronger understanding than most of the circumstances affecting their lives: Skyrocketing property taxes, for example, force many to pick up and move from the land their families farmed before the mountains represented the luxury of weekend getaways. When rich folks build million-dollar vacation homes on similarly expensive lots, land values and property taxes for everyone go up, and that happens with more frequency every year. "If you're a farmer and your land is worth two million dollars," Buzz said, "how are you gonna grow enough to compete with that?"

As we drove from place to place in his pickup, Buzz pointed out who lived where and how long they'd been there, whose barn he helped build, who spent a third of his life in the pen, who had a still out back, whose moonshine was better than whose. One woman kept a deer in her fenced yard.

We talked some about a story I'd read about a Forest Service employee who claimed to have been chased into the Chattooga by a cougar last fall. I'd heard several people in Clayton joking around about the sighting, playfully warning each other to "watch out for the cougar." The Eastern cougar is believed to be extinct in the South; no one has seen any proof of one for decades. Buzz didn't think there was any chance that a big cat was prowling around the backcountry of North Georgia. "Probably just a bobcat," he said. Small ranch-style and A-frame houses with dusty pickups out front intermittently dotted the snow-dusted hillsides, smoke curling from their brick chimneys. Barns

with rusted tin roofs listed at precarious angles. A power line near the road sagged under the weight of two hefty red-tailed hawks.

You can feel it when you leave the pavement in North Georgia. Even in the dead of winter, the air wraps around you with the smell of mountain laurel, hemlock, and rhododendron, a smell just a notch sweeter than that of fresh-cut grass. The world unfolds in sheaves of green and gray and blue and brown, then folds back up in layers of shadow. The dirt road drops off steeply to either side, without the added security of guardrails. Radio stations come in infrequently, if at all. Walk half an hour into the woods, and you're away from ninety percent of the population. Walk an hour into it, and you leave behind ninety-nine percent. It's just you and the limitless indifference of a vast, tangled country.

I was in the South, certainly, but it was not the suburban South I grew up in or even a South I recognized. It was a place where people accepted the dictates of the land they were living on and understood its character, a place free-at least for now-of the gated communities and department stores, happy hours and hustle that make so many cities interchangeable. There is a sense in the hills that things are built to last.

We stopped for lunch in the town of Highlands, about ten miles from where the river actually begins, and I saw for a moment what could be on the horizon for Rabun County. Heavy gates and thick walls began appearing around large, lavish houses, some with FOR SALE signs from "Country Club Properties" staked into their yards. The shops downtown boasted faux-Tudor storefronts. At Buck's Café, I ate a mozzarella and basil sandwich while the lilting horns of loungey jazz played on the stereo. In the corner, heavily accessorized blonde women with glossy polished nails picked at scones and nursed cappuccinos. The mounted deer head on the wall looked, if anything, like an ironic touch. There was no doubt that we were in high-dollar country.

On the way back to Clayton, we passed an old sign, so faded that I struggled to read it: AMUSEMENTS, PICNICS, COLD BEER, USED CARS. Buzz told me it was the sign for Burrell's Place, a small bar where everyone used to sit out on the front porch and drink beer while a guy named Junior Crowe played the banjo. Before it closed years ago, all kinds of people gathered at Burrell's: rich kids from Highlands, hippie river guides, old-timers and farmers from the mountains. It was the sort of place that doesn't exist in Chattooga country anymore.

"It's magic out there," Dave Perrin said of the headwaters when I met up with him at his office one afternoon, speaking of it with the tenderness one usually reserves for a first love. Perrin is the Chattooga Outpost Manager of the Nantahala Outdoor Center, one of three commercial rafting companies that are allowed to run trips on the river. Just like Buzz and most of the other people I met who have dedicated their lives to the Chattooga, Dave started out decades back as a longhaired raft guide, and like them, the river got under his skin.

Even though there had been no talk of allowing commercial outfitters to run trips on the headwaters, Dave felt that private boaters (whose interests American Whitewater represents) should be allowed access to it. "How can anyone want to protect what they can't even see?" he asked. Moreover, in his view, floating a river in a boat was the most low-impact vantage point from But the headwaters controversy struck me as an issue of supply and demand that goes on in all the unkempt corners of America: The demand is getting stronger while the supply is getting smaller. which to explore it. "Boating," he remarked, "is not evil. You take people out on the Chattooga, and you can see the river affect them. You can see the light bulbs go on. Most people

come from a computer-driven world, and this is something that isn't virtual. It's not a computer game. If I'm taking kids out of their urban environment and they go home and they appreciate [nature] differently, that's a win."

I remembered how exhilarating and edifying my own whitewater trips had been, on rivers in North Carolina and Oregon, and how much they informed my feelings about the outdoors and I couldn't disagree with him. Could I really blame anyone in techno-heavy 2008 who longed to "get back to nature?" I'd do it more if I could. But I also thought about the Nantahala and Ocoee Rivers near the Chattooga, two once-wild rivers that are now essentially water parks, clogged with tourists looking for "wilderness adventures."

It was true: No one was trying to dam up the Chattooga or build a shopping mall on it. And it was also true that the Forest Service restricted how many people could or could not travel down it in a given year. But the headwaters controversy struck me as an issue of supply and demand that goes on in all the unkempt corners of America: The demand is getting stronger while the supply is getting smaller. Once the land is fought over like it's private property, like it's just another view lot, who draws the lines and where do they draw them?

Sometimes the only way to keep something wild, I thought, is to keep as many people out of it as you can. There was no doubt that everyone I talked to loved the Chattooga. But I began to worry that some of them, in a phrase I heard many times that week, would love it to death.

\*

Driving through the backcountry reminded me of the first scene in the novel of *Deliverance*, where the four main characters, Atlanta suburbanites, are sitting in a bar planning a canoe trip in the mountains. Lewis, the hard-edged survivalist of the group who lacks the pure instinct for actual survival, points to the Cahulawassee on his map, set to be dammed up and turned into a lake for hydroelectric power (as so many rivers were back then) and explains to the others that, "Right now it's wild. And I mean wild. It looks like something up in Alaska. We really ought to go up there before the real estate people get hold of it and make it over into one of their heavens." Famously, this is a trip that throws the men into a horrifying struggle for their lives: One is raped, another shatters his leg, another is killed on the river.

My father didn't talk much about wilderness, it was "wildness" he was interested in. Wilderness, to him, was just an idea, a romantic falsification of nature rather than the untamed, untamable thing itself. Wildness was a place where man risked everything; it wasn't a theme park or a toy you played around with or a place you ventured into for thrills. It could kill you. The characters in *Deliverance* were prepared only for wilderness, and they found wildness. Wildness bites back.

"I think a river is the most beautiful thing in nature," my father wrote in one of his journals, right before the novel was published in 1970. "Any river is more beautiful than anything else I know." He was drawn to writers who felt similarly inspired by water, like Melville and Conrad. Heraclitus's philosophy of universal flux and his famous dictum, "you cannot step into the same river twice," particularly moved him. But there were few things that terrified my father as much as man's ever-growing intrusion into the natural world. "We're never going to be able to get out of the 'man world,'" he said in a documentary back in the '70s, "if we don't have any place to go to from the man world. That's why we need these rivers and streams and creeks and woods and mountains. You need to be in contact with nature as it was made by something else than men." As much as *Deliverance* was a story of survival, or, as so many define it, a story of "man against nature," it was

a story about the commercial destruction of a rugged, primordial landscape and a part of the South that was slipping away, even back then.

Right across the river from Clayton, the Long Creek Bar is a plain, white box of a building that looks like it might have been converted from something else, like a warehouse for three-wheelers. Inside, the place has concrete floors and the ratty shine of exposed ductwork on the ceiling. The weak lamps above the two pool tables give off the only light in the room, and, on the night I stopped in with Buzz to grab a beer, leftover Christmas garland sagged off tables in the back, waves of cigarette smoke stung my eyes, and two guys in trucker caps shot pool while AC/DC's "Shoot to Thrill" played feebly on the jukebox.

Buzz ordered a Budweiser and sat down at the bar next to a sixty-something-year-old man with a bushy beard and camo cap whom he knew from the old days at Burrell's Place. The man had clearly had a few, and when the subject turned to the fight over the upper Chattooga My father didn't talk much about wilderness, it was "wildness" he was interested in. Wilderness, to him, was just an idea, a romantic falsification of nature rather than the untamed, untamable thing itself. (which he pronounced Chatt-ooga), he took a long drag from his Winston and became agitated, like he couldn't stand to hear another word about it. "All I wanna know is," he said, "if they open up that upper river, who's gonna pay to get the bodies out?"

Buzz asked him what some of the old-timers from Burrell's might have thought about all the controversy, and the guy shook his head and rested his hands on his pack of cigarettes. "I don't know about that, but I do know that the worst thing that ever happened to this area was that-" I knew what was coming. "-that *Deliverance*."

I was silently grateful that he didn't know who I was. Half of me wanted to apologize to him for something, and half of me didn't feel there was anything to apologize for. That was a feeling that I walked around with my entire time in Chattooga country: a shadow of guilt about the lasting legacy of *Deliverance* doing battle with the pride of my father's work. I've often wondered what it must be like to have grown up in North Georgia and to see your life, your town, your way of living flattened out for someone else's purposes and eventually turned into a national punch line. Hollywood has not been kind to Southern Appalachia in this sense. Even before *Deliverance*, there were the Kettle clan from the '40s and the Clampetts, but the shocking violence of *Deliverance*, in the imagination of so many, ratcheted up the stereotype.

It's hard for me to read much of what is written about Appalachia in popular media, because it tends to be written in a cartoonish "them-thar-hills" vernacular, always something about a "feisty, clannish" people who sit around a-drinkin' and a-stompin' and a-pickin' on the banjo. Some of that's true, sure, but some of it isn't. It's as though Southern Appalachia is the corner of America that America forgot, and the virtues that are generally lauded as defining the American frontier identity-self-reliance, resourcefulness, hard work-are now ripe material for ridicule. If the people around the Chattooga River had no particular love for the rest of the world, I couldn't really blame them.

More than the guilt/pride, though, I had to contend with the sharp pangs of loneliness that were setting in. As enraptured as I was by the Chattooga, I couldn't know it the way the locals, the paddlers, the fishermen, and the activists knew it, because they knew it like they knew a person: its moods, its temper. This is a part of the world that I always thought would feel familiar to me, but it didn't. That stuff my parents told me about the mountains being in the blood didn't feel true. I realized, slowly, that everything I did-from the clothing I wore to how I put my hair up to the way I

spoke-marked me as a person who wasn't from here, and I was in a place where being "from here" mattered.

On my last day in North Georgia, I drove over to Mountain Rest, South Carolina, to meet up with Butch Clay, who wrote a guidebook on the river and possesses an intimate knowledge of the headwaters area. He was fighting off strep throat, but felt so strongly talking with me about preserving the wildness up there that he filled a thermos with lime juice, honey, and a bit of Jack Daniels and insisted we hike down into a place called the Rock Gorge. "You're lucky," he said, "that I have to save my voice."

He and I drove to a small parking area near the Chattooga River Trailhead, packed up two sets of hip waders and some lunch, and started our hike to the gorge, some of the most intractable wilderness on the entire river. It was not far from the Rock Gorge, incidentally, where the Forest Service employee claimed he had seen the cougar. "If there is one around, it'd be up here," Butch said, the naturalist in him sounding hopeful. "Lots of overhanging cliffs for it to drag food into."

The hike was a sweaty, slippery, merciless hour-long climb down, with all the potential to be twice that coming back up. "There are no roads in it, and no roads to it," Butch kept saying of the gorge, speaking more philosophically than to me. "If you want to see it then you have to earn it." In the words of Dwight Yoakam, we were a thousand miles from nowhere, a fact that sank in when Butch told me that if I broke an ankle, he'd build me a fire and leave me his gun.

The gorge looked like a hulking rock coliseum, with the pine-covered mountains forming a steep V on either side that the noonday sun blanketed with light. The wind galloped straight through with as much purpose as the river did, chilling my skin under all the layers of sweat-soaked clothes. Once we picked our way down to the water, we saw that there were thin sheets of ice all over it, looking like someone had encased the scene in glass. "Rime ice," Butch said, as he broke off some of it with his boot. Ever so often a huge sheet of ice would break off of a ledge somewhere in the gorge and crash into the water, and I would wheel around, thinking it was a bear or a wild hog.

The water was about two-and-a-half to three-feet deep and, from the bank, didn't seem to be moving too fast. Butch and I pulled on our hip waders and slowly stepped out into the river. The carpet of rounded rocks on the riverbed was too slick for the traction on my waders to grip, and the current so strong it felt like someone had a rope around my waist and was pulling at it, hard. I tilted and stumbled. My arms reached out, though there was nothing to grab onto. The water spilled over the tops of my waders and was so cold that my body didn't register it as cold but as scorching heat; it burned the tops of my legs and painted my skin bright red. If the river wanted to take me, it could have.

I wanted to lock the wildness of the river into the sandstone somehow so that it couldn't be touched...and climb back out-straight up-through the mud and undergrowth, crawling over decayed logs, tripping over vines, my lungs burning from the effort because there weren't any roads. Eventually, we made the crossing, climbed onto an imposing boulder, and talked while we ate lunch about the people who wanted to bring boats to the upper river. The tide of tourism seemed inevitable: The three major cities nearby-Atlanta, Asheville, Chattanooga-are growing all the time, as are the popularity of whitewater sports and the technology with which those sports can be enjoyed. Rapids that were unrunnable thirty years ago are easy to navigate in today's smaller boats. Really, there was no empirical evidence to make a convincing case against boaters using the headwaters. Aside from the possibility for the sort of pollution that comes with every outdoor

activity, I didn't feel that boaters represented more of a threat to the landscape than, say, the hunters and campers in the headwaters did. It all came down to gut feeling, not reasoning: Either you wanted people up there or you wanted people to stay away; either you wanted things to change or you wanted things to stay the same.

"Everyone is asking, 'What's in it for me?'" Butch said. "No one is saying 'What can I give up?'" Perhaps thinking of his young son, he continued, "Where else are we gonna teach our children about this kind of wilderness? There is nowhere else." I asked him if he thought there was anything that could be done about it. He paused for a second, looking out onto the water. "I believe someone with deep pockets and a stout heart could hold 'em off for a while, and I'll stick right there with 'em." He sliced off a piece of cheese and some sausage. "But I ain't got the deep pockets."

The last time my father saw the river was in 1988, when he visited it on a snowy winter weekend to participate in a short film about his career. Buzz Williams showed him around, and some months later, after the documentary aired in Columbia, Buzz told me that my father shook his hand at the screening and said, "Say goodbye to the river for me." In a dark twist on that line from Heraclitus, he knew that he could never step into the same river twice, and the Chattooga that existed as a site for *Deliverance* tourism wasn't the same river he stepped into back in 1971.

Sitting in the Rock Gorge, I looked around at the ice-sheathed cliffs and fallen trees spanning the water and wanted everything I could see to stay right like it was, as my father had once seen it. I wanted to lock the wildness of the river into the sandstone somehow so that it couldn't be touched by men, and climb back out-straight up-through the mud and undergrowth, crawling over decayed logs, tripping over vines, my lungs burning from the effort because there weren't any roads. In my heart, if not my head, I wanted the glittering, jade eyes of the last cougar in the South to study me from under a ledge. I wanted to feel that cold fear that sluices through your veins when you realize you're truly alone out in the wild-or that you aren't. Emerging from the woods at dark-thirty (the Appalachian term for half past sunset), looking rougher, as my dad used to say, than a night in jail, I wanted to drive back down out of the mountains knowing that the people who had been living there for generations weren't in any danger of being forced out, because I didn't want to walk around in fifty years and see flattened patches of grass where the farmers and moonshiners and hellraisers used to live. And, before I arrived home, I wanted to stop at Burrell's Place and drink a beer out on the porch while Junior Crowe played songs that sounded familiar to me. "Shall We Gather at the River," maybe. That's one I know.

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*Photos Credits: Jon Voight in Deliverance (1972). Courtesy of Warner Bros./Photofest*

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# Ramming Speed!

*Modern mini kayaks can navigate small streams, but that doesn't mean that they should.*

**L**AST SUMMER, I WAS FISHING on the upper section of western Wisconsin's Kinnickinnic River—the narrower section, where on weekends I can avoid the flotilla of canoeists that clog the larger water below the city of River Falls. The trout weren't rising to any insects, and my mayfly imitation had been drifting unmolested for quite a while. I clipped off the Adams and was about to tie on an Elk-Hair Caddis when I heard a clunking from upstream. From around the bend appeared a vessel that resembled a fuchsia elf shoe with a human torso sticking out of it. The torso was frantically stirring the water with one end of a double paddle in the effort to avoid skewering me, so I leaped out of the stream.

"How's the fishing?" asked the kayaker as he paddled past me.

He was gone before I could give him a piece of my mind.

## A New Foe

**I**'m aware that I seem uncharitable about the incident. After all, it was my first encounter with a kayak on that section of the Kinni. It's only a kayak, right? I mean, why grouse? Navigable waters are for everyone, and kayakers ought to be allowed anywhere they can float, I



The author shows his Cheesehead colors on the banks of the Upper Kinnickinnic, which he believes should be wading-only.

sales in recent years.

So now, there is no refuge. No waterway free of mobs. But here's the deal: I go fishing to escape mobs. And the kayaker has the gall to ask, "How's the fishing?"

Canoes, which are a fact of life on larger Midwestern streams and rivers, have

resent an all-new menace, and the limits of my tolerance have been reached. I must draw a line in the water somewhere.

And then there is the matter of aesthetics. The modern, polyethylene kayak is an ugly, vulgar artifact, unlike its Eskimo forebear. Why is it that kayak manufacturers choose to make their products in the most eye-frying colors of the color wheel? Day-Glo orange. Fuchsia. Porta-Potty aquamarine. Pink. Tie dye, for heaven's sake! The damn things come in the colors of bath toys. I half expect a bar of Ivory soap to float behind each one of them.

**Kayaks represent an all-new menace, and the limits of my tolerance have been reached. I must draw a line in the water somewhere.**

guess. In theory, a kayaker's riverine rights are difficult to argue against, but I am sulfuric in my attitude toward kayaks on small trout waters.

These miniature watercraft enable their owners to navigate streams that were impossible to float in canoes. These days, it seems as if the smaller kayaks could float in a rain gutter. Further, kayaks take less skill to maneuver, cost less, are smaller, and more easily transported. These qualities have led to the explosion in kayak

always been merely an irritant to me, and I have worked hard, over the years, to accept them. I trained myself to bite my lip as an aluminum-borne flotilla of teens boomed over the watery rocks, its passengers bellowing war whoops between swigs of Leinenkuegels. Sure, a string of canoeists could ruin the fishing on a summer afternoon, but I resigned myself to the need to coexist with them.

But kayaks on narrow streams were not a fact of life until recently. They rep-

## Holding the Line

**I** know, I know: I'm a curmudgeon. Anyone who opposes anything is subject to attack because the mantra of the present day is that *We must be tolerant*. This is, after all, America, where tubby citizens enjoy nature primarily by driving some sort of vehicle over it. Did I mow down your wildflowers and rip up your trails with my four-wheeler? Too bad. You say my Jet Ski is too loud? Tough. You don't like my snowmobile smogging the

atmosphere in Yellowstone Park? Who cares? You don't like the straight pipes on my Harley Softail? Stick it where the sun don't... and so on.

Yes, yes, I realize that kayaks are environmentally friendly and that many sportsmen own them. And, yes, I realize some models are specifically designed for anglers, even fly fishermen. There are sea kayaks, surf kayaks, stunt kayaks, fastwater kayaks, and more. Hell, there's probably an Amy Winehouse kayak, for all I know. Fine. I have no issue with kayaks when they're paddling waters of proper proportion.

I also realize the futility in trying to prevent kayakers from paddling small waters. I should, as they tell the rehabbers to do, accept the things I cannot change. I accept the existence of mosquitoes. But that doesn't mean I love them. I use high-power insect repellent. But there's nothing I can spray on that'll make the kayaks go away.

I have learned, in the days following my incident on the river, that the canoe livery here in River Falls is shuttling kayaks to and from the upper Kinnickinnic. Yesterday, a friend—another acerbic angler—to whom I had mentioned my encounter, reported having to evacuate the upper river as a pod of eight miniature kayaks drifted through the riffle he was fishing, the paddlers grinning and waving like royalty from a float in the Rose Bowl parade, infuriating him with inquiries like, "How's the fishing, dude?"

"How'd that make you feel?" I asked.

"I wanted to set those damned people on fire!" he said with wry laughter.

Perhaps I'd be more convivial to the small-stream kayakers if there were some restorative justice in the offing. If kayakers have the right to intrude on my solitude and ruin my sport, why am I not allowed to do the same? Wouldn't it be fair, after that their having frightened away the fish and forced me out of the stream, that I be awarded the right to capsize one or two of them? I mean, if kayakers have the right to ruin my sport, oughtn't I to have the right to ruin theirs? I believe so. 🐟

*Bill Stieger lives in River Falls, Wisconsin, along the banks of his beloved Kinnickinnic River.*

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