

Integrating Adaptive Management and Oil and Gas Development: Existing Obstacles and Opportunities for Reform

by Melinda Harm Benson

Melinda Harm Benson is an assistant professor, University of New Mexico, Department of Geography.

Editors' Summary

Adaptive management is gaining influence with natural resource decisionmakers. Current laws and regulations in the United States, however, limit effective implementation of adaptive management. Wyoming's Pinedale Anticline can be examined as a case study focusing on barriers to adaptive management in the context of oil and gas development in the United States. Beginning with a brief primer on adaptive management, this case study reveals how three legal structures—the Federal Advisory Committee Act, the National Environmental Policy Act, and the Mineral Leasing Act—are currently impeding effective utilization of adaptive management.

Adaptive management is an innovative and relatively recent environmental management strategy gaining influence with natural resource decisionmakers. It is a method by which scientific research is incorporated in the management actions through an iterative process. Efforts to utilize adaptive management in the United States are on the increase.¹ In March 2007, Secretary Dirk Kempthorne directed all bureaus within the U.S. Department of the Interior (DOI) to utilize adaptive management whenever possible.² Efforts to employ adaptive management in projects extracting oil and gas from federal reserves, however, have stumbled. The Bureau of Land Management's (BLM's) flagship effort in this area is the Pinedale Anticline Oil and Gas Exploration and Development Project in northeastern Wyoming.³ From an adaptive management perspective, the project has been unsuccessful. The stakeholder group designed to implement the process fell apart, wildlife populations in the area are in significant decline, and oil and gas extraction

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1. Agencies throughout the federal government have begun incorporating adaptive management into actions ranging from species recovery and resource management planning to ocean dumping and cattle grazing. *See, e.g.*, 73 Fed. Reg. 67542 (Nov. 14, 2008) (Notice of Intent to Revise a Resource Management Plan for the Buffalo Field Office, Wyoming, and Prepare an Associated Environmental Impact Statement); 73 Fed. Reg. 71575 (Nov. 25, 2008) (Designation of Ocean Dredged Material Disposal Sites Offshore of the Umpqua River); 73 Fed. Reg. 67835 (Nov. 17, 2008) (Kemmerer Grazing and Rangeland Vegetation Management Project).
2. *See* U.S. Secretary of the Interior, Secretariat Order 3270 (2007), available at <http://www.doi.gov/initiatives/AdaptiveManagement/documents/SecretarialOrder3270AM030907.pdf>. The order recognized that a number of conditions are necessary for a management situation to allow for adaptive management. The order states that 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.
3. U.S. Department of Interior, Record of Decision (ROD) Environmental Impact Statement for the Pinedale Anticline Oil and Gas Exploration and Development Project, Sublette County, Wyoming (2000) [hereinafter Pinedale Anticline Project or 2000 ROD].

is escalating, despite increasing concerns over wildlife and air quality.⁴

As the DOI moves forward with integration of adaptive management into its decisionmaking structure, it is important that the BLM learn from its experience on the Pinedale Anticline. Efforts to utilize adaptive management in the energy development context have merit. As a general matter, adaptive management represents a significant step forward in natural resource management, recognizing the need to incorporate the inevitability of scientific uncertainty into management planning.⁵ With regard to oil and gas development specifically, adaptive management is particularly important because, as will be explained, oil and gas development involves management actions that can be as dynamic as the ecosystems they alter. Better utilization of adaptive management in this context is also of increasing importance, given intensifying pressure to develop domestic sources of natural gas. Due to its relatively low greenhouse gas emissions in comparison to coal and oil, natural gas is viewed by many as a critical “bridge fuel” key to building meaningful approach to global climate change.⁶ The Energy Information Administration (EIA)⁷ recently raised its projection of U.S. production and consumption of natural gas, reflecting its view that there will be both increased availability of natural gas and higher demand for electric power-generation.⁸ The EIA also projects fewer imports and increased domestic production for natural gas.⁹ Pressure on these resources will

continue, and it is essential that adaptive management be more effectively engaged in these efforts.¹⁰

It might be tempting to blame the BLM’s failure on the Pinedale Anticline on politics. Adaptive management efforts there were conceived in the last year of the relatively ecologically innovative William J. Clinton Administration but were then implemented by the George W. Bush Administration, which had a National Energy Plan that called for expediting development of domestic oil and gas reserves.¹¹ Or blame could be placed on the inherently controversial nature of oil and gas development in relatively pristine areas like the Pinedale Anticline, which is part of the Greater Yellowstone Ecosystem. While these factors are at play, this Article argues that the core difficulty is the current legal and regulatory framework, which hinders, rather than facilitates, effective implementation of adaptive management in oil and gas development.

This Article begins with a brief primer on adaptive management. It then examines the BLM’s efforts to implement adaptive management on the Pinedale Anticline. It addresses why three legal structures associated with the development of federal oil and gas reserves—the Federal Advisory Committee Act (FACA),¹² the National Environmental Policy Act (NEPA),¹³ and the Mineral Leasing Act (MLA)¹⁴—are currently impeding effective utilization of adaptive management. First, FACA was passed into law in an attempt to eliminate inappropriate involvement by industry groups in government decisionmaking. In practice, however, FACA impedes stakeholder involvement in collaborative processes that are necessary for successful adaptive management in many natural resource contexts. Second, NEPA requires federal agencies to take a hard look at the environmental consequences of their proposed actions. This is problematic in the oil and gas context, where management actions evolve over time in five distinct stages. Moreover, NEPA’s assumption that the agency engages in a single, well-defined “major fed-

4. See Hall Sawyer, *Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field*, 70 J. WILDLIFE MGMT. 396, 403 (2006); Rebecca Hunnington, *Stuck in the PAWGMire: How the BLM Failed in Pinedale*, HIGH COUNTY NEWS (Nov 18, 2008), available at <http://www.hcn.org/issues/40.21/stuck-in-the-pawgmire>; Jeff Gearino, *DEQ Issues Ozone Alert for Pinedale*, CASPER STAR TRIB. (Feb. 3, 2009), available at <http://www.trib.com/articles/2009/02/04/news/wyoming/11bcbd52f2a1893a87257530005cc76.txt>.
5. See J.B. Ruhl, *Regulation by Adaptive Management—Is It Possible?*, 7 MINN. J.L. SCI. & TECH. 21, 21-22 (2005); Julie Thrower, *Adaptive Management and NEPA, How A NonEquilibrium View of Ecosystems Mandates Flexible Regulation*, 3 ECOLOGY L.Q. 871, 884 (2006). Adaptive management has its critics. See Holly Doremus, *Adaptive Management, the Endangered Species Act, and the Institutional Challenges of “New Age” Environmental Protection*, 41 WASHBURN L.J. 50, 53 (2001) (noting skepticism regarding agencies’ ability to implement adaptive management effectively, and concerns that the flexibility inherent in adaptive management will be subject to the influence of political pressure more than the needs of biological resources). See also 73 Fed Reg. 61292, 61300 (Oct. 15, 2008) (comments on the U.S. Department of the Interior’s new rules for implementation of the National Environmental Policy Act, which include integrating adaptive management).
6. See PAUL ROBERTS, *THE END OF OIL: ON THE EDGE OF A PERILOUS NEW WORLD* 168 (2004). Chuck Alston, Progressive Policy Institute, *Natural Gas Bridge to a Clean Energy Future*, June 2003, available at http://www.pponline.org/documents/Natural_Gas_0603.pdf.
7. The EIA was created by the U.S. Congress in 1977 and is the statistical agency of the U.S. Department of Energy. By law, EIA’s products are prepared independently of administration policy considerations. For more information, see the EIA’s website at <http://www.eia.doe.gov/>.
8. U.S. EIA, *Annual Energy Outlook 2009: Early Release Summary Presentation*, available at http://www.eia.doe.gov/oi/aeo/pdf/aeo2009_presentation.pdf.
9. *Id.*

10. The pressure to bring federal reserves to market is increasing and is embedded in our national laws and policies. See National Energy Policy, <http://www.whitehouse.gov/energy/2001/National-Energy-Policy.pdf>; Gary C. Bryner, *The National Energy Policy: Assessing Energy Policy Choices*, 73 U. COL. L. REV. 331 (2002). The Energy Policy Act of 2005, Pub. L. 109-58, 119 Stat. 594 (2005). See also *Park County v. U.S. Department of Agriculture*, 817 F.2d 609, 620, 17 ELR 20851 (10th Cir. 1987), which states:

It is the stated public policy of the United States to make public lands, including national forest land, available for mineral leasing in an effort to reduce our energy dependence on foreign sources and to protect our national security. This policy is reflected in such legislation as the Federal Land Policy and Management Act, 43 U.S.C. §§1701-1784 (1982) and the Mineral Lands Leasing Act, discussed earlier, as well as §100 of the Energy Security Act of 1979, 42 U.S.C. §8701(b)(1), explicitly establishing a national policy to end dependence on foreign energy sources.

11. See Bryner, *supra* note 10.
12. 5 U.S.C. app. 2 §§1-15 (2005).
13. 42 U.S.C. §§4321-4370f, ELR STAT. NEPA §§2-209.
14. 30 U.S.C. §§181 et seq. (2008).

eral action” lacks the tolerance for flexibility and experimentation required by adaptive management. Finally, the MLA defines the rights and responsibilities of federal leaseholders. Current leasing provisions, however, make it difficult for oil and gas development to proceed at a pace that allows for implementation of adaptive management. With regard to each of these laws, the Article includes suggestions for more effective adaptive management implementation.

I. Adaptive Management: A Primer

Adaptive management is an innovative new tool for integrating scientific information into land management decisions.¹⁵ C.S. Holling developed the concept of adaptive management in an attempt to provide a basis for incorporating the inevitability of scientific uncertainty into management actions involving natural systems.¹⁶ The central tenet is that “management involves a continual learning process that cannot conveniently be separated into functions like ‘research’ and ongoing ‘regulatory activities,’ and probably never converges to a state of blissful equilibrium involving full knowledge and optimum productivity.”¹⁷ The DOI’s definition of adaptive management, adopted from the National Research Council, explains:

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 help adjust policies or operations as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. It is not a “trial and error” process, but rather emphasizes learning while doing. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. Its true measure is in how well it helps meet environmental, social and economic goals, increases scientific knowledge, and reduces tension among stakeholders.¹⁸

Adaptive management represents a breakthrough in the complexity of our thinking about natural resource challenges. Rather than providing discrete conclusions based on “science,” adaptive management recognizes the natural world as a network of complex, adaptive ecosystems.¹⁹ It reflects a willingness to test our assumptions about the natural

environment in order to adapt and learn.²⁰ It incorporates research into real-world action, as opposed to controlled experiments. In turn, the opposite is also true, real-world action becomes research informing further action. Adaptive management has been successfully employed in several different environmental management contexts, ranging from fisheries to forestry.²¹

While there is no one-size-fits-all, cookbook approach for the application of adaptive management, there are several basic steps required to implement it appropriately.²² The basic formula for adaptive management outlined by leading researchers in the field, based on their review of the literature, includes seven steps: (1) establish a clear and common purpose; (2) design an explicit model of your system; (3) develop a management plan that maximizes results and learning; (4) develop a monitoring plan to test your assumptions; (5) implement your management and monitoring plans; (6) analyze data and communicate results; and (7) use results to adapt and learn.²³

A. Step One: Establish a Clear and Common Purpose

The adaptive management process begins by formulating a clear idea of what the manager wants to achieve—what will define “success.” The common purpose of the project sets forth management objectives that are shared among the various collaborators on the project. It is important that all collaborators have a shared sense of why the project is necessary and the goal it is intended to achieve. “If you don’t know where you want to go, chances are you won’t get there.”²⁴ While not always required, it is commonly understood that, in situations where the management objectives are controversial or are of interest to various stakeholders, including local communities, members of industry, and conservation groups, it is wise to include those stakeholders at this initial stage. Experts in the field, including the Collaborative Adaptive Management Network, note that this initial step, while time-consuming, helps minimize disputes and enhances the likelihood of the project’s success.²⁵ This step recognizes up

15. See generally BRYAN G. NORTON, *SUSTAINABILITY: A PHILOSOPHY OF ADAPTIVE ECOSYSTEM MANAGEMENT* (2005).
 16. See CRAWFORD S. HOLLING, *RESILIENCE AND STABILITY OF ECOLOGICAL SYSTEMS* (1978).
 17. See CARL WALTERS, *ADAPTIVE MANAGEMENT OF RENEWABLE RESOURCES* 9 (1986). See also KAI N. LEE, *COMPASS AND GYROSCOPE* (1993). LANCE GUNDERSON ET AL., *BARRIERS AND BRIDGES TO RENEWAL OF ECOSYSTEMS AND INSTITUTIONS* (1995).
 18. U.S. DEPARTMENT OF THE INTERIOR, *ADAPTIVE MANAGEMENT: A TECHNICAL GUIDE* (2007), available at <http://www.doi.gov/initiatives/AdaptiveManagement/documents/SecretarialOrder3270AM030907.pdf>.
 19. See J.B. RUHL ET AL., *THE LAW AND POLICY OF ECOSYSTEM SERVICES*, 18-20 (2007).

20. See Kai N. Lee, *Appraising Adaptive Management*, 3 *ECOLOGY & SOC’Y* 3 (1999), available at <http://www.ecologyandsociety.org/vol3/iss2/art3/>.

21. See, e.g., British Columbia Ministry of Forests and Range, *Adaptive Management Initiatives in the BC Forest Service*, <http://www.for.gov.bc.ca/hfp/amhome/index.htm>; John M. Volkman & Willis E. McConaha, *Through a Glass, Darkly: Columbia River Salmon, the Endangered Species Act, and Adaptive Management*, 23 *ENVTL. L.* 1249 (1993).

22. See J.B. Ruhl, *Adaptive Management for Natural Resources—Inevitable, Impossible, or Both?* 54 *Rocky Mountain Law Institute*, ch. 11, §11.03 (2008).

23. See NICK SALAFSKY ET AL., *ADAPTIVE MANAGEMENT: A TOOL FOR CONSERVATION PRACTITIONERS* 33 (2001), available at http://fosonline.org/Site_Docs/AdaptiveManagementTool.pdf. This articulation of the adaptive management cycle is similar to that adopted by the BLM via DOI’s technical guidance, which describes the following steps: (1) Ensure stakeholder commitment to adaptive management for duration of enterprise; (2) Identify clear, measurable, and agreed-upon objectives; (3) Evaluate management effectiveness over time; (4) Identify management actions for decisionmaking; (5) Model different benefits and costs as outputs of management through time; and (6) Design and implement a monitoring plan.

24. See SALAFSKY ET AL., *supra* note 23, at 34.

25. The Collaborative Adaptive Management Network (CAMNet) is a network of academics, managers, and scientists, “dedicated to the proposition that adaptive management that involves active stakeholder collaboration is the

front that managers implementing adaptive management are often continually faced with the need to accommodate a variety of interests and competing demands.

B. Step Two: Design an Explicit Model of Your System

As discussed above, most environmental management challenges involve complex ecological interactions that are only generally understood. The second step requires the project team to develop a model that reflects the best current understanding of the existing baseline conditions for the project area. The model reflects not only ecological knowledge but also an assessment of “cultural, social, economic and political systems that influence the behavior of many stakeholders at the project site.”²⁶ In this modeling effort, establishment and identification of what is *not known* about the system is as important as acknowledging what is understood. The model incorporates predicative qualities that allow practitioners to provide a basis for testing assumptions that are inevitably built into the model and creates the necessary “framework for learning.” This process also provides a structure for exploring the different perspectives of the various stakeholders involved. By working together to establish a “shared viewpoint” in the process of creating the model, the process also becomes an exercise in highlighting the various perspectives, e.g., disagreements about the primary “cause” of the problem, and allows for their acknowledgment and incorporation.²⁷

C. Step Three: Develop a Management Plan That Maximizes Results and Learning

Once a model is established that provides the best guess at how a system works, it is time to choose a management scheme. Management should reflect the common purpose/goal established in Step One. Then, based on the system model outlined in Step Two, management actions are identified that are most likely to both achieve the desired effect and tell project managers the most about the accuracy/inaccuracy of the model. This is achieved in three steps: identifying threats/factors; setting objectives; and then taking action. First, because there are inevitably a multitude of variables at issue, managers must explicitly identify which specific factors they want to affect. By focusing first on the identified threats that are most likely to influence the system, the managers are then able to take the second step, which is setting objectives. “[O]bjectives are specific statements detailing the desired accomplishments or outcomes of a project in relation to specific factors.”²⁸ Because time and resources are limited, the management plan necessarily ranks the objectives and, ideally, initially engages in those activities that address the objectives identified to address the most significant threats, leveraging change to the greatest extent possible. Manage-

ment actions will then become experiments in which managers not only meet their objectives but also learn more about the accuracy of the system model.²⁹

D. Step Four: Develop a Monitoring Plan to Test Your Assumptions

Once the management actions have been identified, but *before* the actions are actually taken, it is necessary to develop a monitoring plan. Monitoring is the key to the feedback loop, allowing managers to test the assumptions built into the model. Data-collection alone is not enough; it must be integrated into a monitoring scheme that provides the managers with the capability to determine whether the assumptions built into the system model are accurate and, if not, provide a basis for corrective action. The monitoring plan must include clear protocols for analyzing the data collected and should guard against collecting more data than needed.³⁰

E. Step Five: Implement Your Management and Monitoring Plans

With monitoring capacity in place, it is time to implement the management plan by taking action. This is what makes adaptive management different from a scientific experiment. The actions implemented are anything but theoretical. They are real, on-the-ground efforts to meet environmental management responsibilities. Practitioners know the dangers of “paralysis by analysis” and the importance of putting ideas into motion. At the same time, the monitoring plan is implemented. It is important to create a data management system that is easily integrated into daily project work. Recognizing the challenges associated with making time for data-collection, experts encourage adaptive management practitioners to make the investment up front.³¹

F. Step Six: Analyze Data and Communicate Results

Analysis of the data allows for a shared understanding of the information gathered. If adaptive management has been implemented correctly during the previous steps, analyzing the data is less onerous:

Your conceptual model and management plan should contain the questions you’re asking, the assumptions you’re making, and the interventions you’re using to test them. Your monitoring plan should outline what data you have been collecting. And your database should contain the information that you have collected. You thus now only need to interpret what these results mean and then com-

preferred paradigm for resolving many complex natural resource management problems.” Their website is available at <http://www.adaptivemanagement.net/whatis.php>.

26. See SALAFSKY ET AL., *supra* note 23, at 38.

27. See SALAFSKY ET AL., *supra* note 23, at 39.

28. See SALAFSKY ET AL., *supra* note 23, at 43.

29. See SALAFSKY ET AL., *supra* note 23, at 44. The authors identify three types of experiments: (1) Exploratory Experiments, when action is undertaken, without accompanying predictions or expectations; (2) Move-Testing Experiments, when action is taken in order to produce intended change; and (3) Hypothesis Testing Experiments, when action is undertaken to discriminate among competing hypotheses.

30. See SALAFSKY ET AL., *supra* note 23, at 48-49.

31. See SALAFSKY ET AL., *supra* note 23, at 53.

municate them in a way that addresses the needs of your key audiences.³²

The communication of data results is as important as the analysis itself. Transparency at this stage builds confidence in the process by allowing all interested parties to examine the results. Without proper documentation and sharing of information with the key collaborators identified in Step One, the opportunity to learn from the project and make necessary adjustments is lost.

G. Step Seven: Use Results to Adapt and Learn

The final step involves using the information gained to learn from the experience and change management strategies as needed to reflect a better understanding of the issues involved. This is the big payoff. Practitioners use the data results to reexamine the conceptual model. Based on this information, the management plan should change to reflect what has been learned, identify what still needs further inquiry, and develop a process for exploring new questions that may require inquiry. Once the new information is integrated into the model, the cycle is then repeated, with the reexamination of the common purpose and goal of the project also informing needed adjustments to the conceptual model.³³

II. BLM's Use of Adaptive Management to Develop Natural Gas in Wyoming's Pinedale Anticline

A. The BLM, Federal Oil and Gas Interests, and the Segmented Nature of Oil and Gas Development

The BLM is the agency responsible for management of federally owned mineral interests. Nationally, the BLM manages 261 million surface acres and 700 million subsurface acres of mineral estate.³⁴ In addition to the duty to manage federal minerals, the BLM also has a duty to manage its lands in accordance with the Federal Land Policy and Management Act (FLPMA).³⁵ FLPMA requires that BLM lands be managed for multiple uses including

recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific and historical values.³⁶ Further, FLPMA calls for “coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with consideration being given to the relative values of the

resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.³⁷

FLPMA requires the BLM to balance competing demands on its lands.

Before outlining the BLM's attempt to balance these resource values on the Pinedale Anticline, it is important to have a basic understanding of how oil and gas development takes place. One key feature of oil and gas development important to note at the outset is the segmented nature of oil and gas development. These are five distinct stages to a typical oil and gas project involving federal minerals: leasing; exploration; drilling; production; and reclamation.³⁸ At the first stage, the government issues a lease, which is essentially a contract giving the leaseholder the exclusive right to engage in activities necessary to explore for and extract fluid minerals from the leased area. The nature of oil and gas leasing and its implications are discussed in detail below. Important here is the acknowledgment that at the leasing stage—the point at which the federal government makes the contract—there is often little known about the actual potential of a leased tract for oil and gas development. Basic geologic information provides clues, but not promises. Instead, the lease provides the leaseholder with the right to first explore for and then, if successful, extract and bring to market the oil and/or gas discovered pursuant to the lease.

During the exploration stage, oil and gas developers are better able to assess the area's potential, either through drilling exploratory wells or through seismic surveys.³⁹ Exploratory, “wildcat” wells can only be drilled once an area is leased.⁴⁰ Exploratory wells help identify the lease's potential for economically viable development.⁴¹ If economically viable quantities of oil or gas are found, lessees move forward with what is often termed “full field development.”⁴² Full field development encompasses both the drilling and production stages. Wells are drilled and the associated infrastructure needed to extract the oil or gas and deliver it to market is constructed. Activities associated with this stage include the constructing and maintaining roads and well pads, locating

37. *Id.*

38. While distinct, these stages can overlap within a particular project area.

39. Seismic surveying is a process by which seismic waves are used to map the underground geology of possible oil and gas reserves. This is one form of assessment that can actually occur pre-leasing by requesting access through issuance of a Notice of Intent to Conduct Oil and Gas Exploration Operation and often helps operators identify areas desirable for leasing. See 43 C.F.R. §§3150-54 (detailing requirements, which include posting a bond and rehabilitation of lands, etc.).

40. THOMAS F. DARIN & TRAVIS STILLS, PRESERVING OUR PUBLIC LANDS: A CITIZEN'S GUIDE TO UNDERSTANDING AND PARTICIPATING IN OIL AND GAS DECISIONS AFFECTING OUR PUBLIC LANDS 8 (2002).

41. *Id.* at 8-9.

42. There is a distinction made between oil and gas that is “technically” versus “economically” recoverable. While the means for assessing it range somewhat broadly, the term “technically recoverable” refers to “the amount judged to be recoverable given certain assumptions about technical capabilities.” TOM LA-TOURRETTE ET AL., ASSESSING GAS AND OIL RESOURCES IN THE INTERMOUNTAIN WEST REVIEW OF METHODS AND FRAMEWORK FOR A NEW APPROACH at 6; http://www.rand.org/pubs/monograph_reports/MR1553/MR1553.pdf. “Economically recoverable,” by contrast, involves “balancing the costs of exploration and development with the anticipated value of the resource to determine if its extraction is economically justified.” *Id.* at 33.

32. See SALAFSKY ET AL., *supra* note 23, at 56.

33. See SALAFSKY ET AL., *supra* note 23, at 59.

34. In Wyoming alone, the BLM manages 18.4 million surface acres and 41.6 million acres of subsurface mineral estate.

35. 43 U.S.C. §§1701 et seq. (2008) [hereinafter FLPMA]. See Eleanor Schwartz, *A Capsule Examination of the Legislative History of the Federal Land Policy and Management Act (FLPMA) of 1976*, 21 ARIZ. L. REV. 285; Roger Flynn, *Daybreak on the Land: The Coming of Age of the Federal Land Policy and Management Act of 1976*, 29 VT. L. REV. 815 (2005); Norton v. S. Utah Wilderness Alliance, 124 S. Ct. 2373, 2376, 34 ELR 20034 (2004).

36. 43 U.S.C. §1702 (2008).

the pipelines and compression stations needed to deliver the gas to a centralized facility, and digging reserve pits necessary to hold wastes associated with extraction.⁴³ Once a well is successfully drilled, the field goes into the production phase, which lasts as long as is economical. Traditional oil and gas wells often produce between 20-50 years. Once completed, the reclamation phase returns the area back to its natural state.⁴⁴

As will be explained in detail below, this phased approach to development creates challenges when it comes to compliance with environmental laws such as NEPA. However, it is ideally suited to adaptive management, which does not require a complete understanding of the project model. Adaptive management has the capacity to build those uncertainties into the model and engage in an iterative process that allows for incorporation of additional knowledge as it becomes available.

B. Background: The Pinedale Anticline Project Area

The Pinedale Anticline Project was the BLM's first attempt to use adaptive management to extract oil or gas. The project was intended to showcase adaptive management and its potential to mitigate environmental concerns while facilitating development.⁴⁵ The Pinedale Anticline Project Area, also referred to as the Mesa, is located in the Upper Green River Valley of Wyoming. Nestled between the high peaks of several converging mountain ranges, the Upper Green River Valley is home to abundant wildlife, including the greater sage grouse, a species currently petitioned for listing under the Endangered Species Act (ESA),⁴⁶ as well as impressive herds of mule deer, pronghorn antelope, and elk. This area provides important migration corridors for these ungulates, connecting Greater Yellowstone and Grand Teton National Parks with one of the most unique and spectacular landscapes in North America: the Red Desert.⁴⁷ Each fall, more than 100,000 animals travel on ancient paths from their summer homes in Greater Yellowstone's mountain highlands to the grasslands of the Upper Green River Valley. Some of these paths comprise the longest big-game migration routes for both mule deer and pronghorn antelope in the lower 48 states.⁴⁸

Wildlife is not the only resource in the Pinedale Anticline. The area is also home to an estimated 21 trillion cubic feet of

natural gas, enough to heat 12.5 million homes for 20 years.⁴⁹ The Pinedale Anticline Project Area comprises approximately 198,037 acres, roughly 300 square miles.⁵⁰ The natural gas there is trapped in tight sand formations that, until recently, were not recoverable. With the advent of new drilling techniques, development became viable, and leaseholders in the area brought forward a proposal to extract the gas.

This qualified as a "major federal action" and triggered an environmental analysis under NEPA. The Environmental Impact Statement for the Pinedale Anticline Oil & Gas Exploration & Development Project Record of Decision (ROD) was approved by the BLM in 2000.⁵¹ The 2000 ROD authorized the development of up to 900 well pads and 700 producing well pads over 10-15 years.⁵² While the 2000 ROD allowed for drilling throughout the project area, it also implemented seasonal restrictions on drilling during the winter in order to protect the crucial winter range habitat for mule deer, pronghorn antelope, moose, and elk.⁵³

The 2000 ROD also committed to using adaptive management:

The [adaptive management] process will be designed to ensure that the implementation of the Pinedale Anticline Project is managed and monitored in a manner that will guide mid-course corrections in adapting to the inevitable problems or changes associated with and inherent in each authorization for the implementation, operation and abandonment of activities to develop the mineral resource.⁵⁴

Appendix C to the ROD outlined the adaptive management process, which included establishing a Pinedale Anticline Working Group (PAWG) comprised of a diverse set of stakeholders, including state and federal agencies, environmental groups, and local residents.⁵⁵ The PAWG's role, as articulated in the 2000 ROD, was to take the lead on establishing a plan and designing modeling efforts for the implementation of adaptive management.

While the project was intended to highlight adaptive management and its potential to mitigate environmental concerns while facilitating development, problems with implementation immediately arose.⁵⁶ Yates Petroleum, one of the leaseholders in the project area, filed a lawsuit challenging the 2000 ROD.⁵⁷ Yates Petroleum specifically challenged the BLM's decision to use adaptive management, claiming, among other allegations, that the PAWG could not be established without first complying with the terms and conditions of FACA. As a result of this litigation, the BLM did not implement the adaptive management portions of the

43. See DARIN & STILLS, *supra* note 40 at 10 ("Wastes include drilling fluids used initially to lubricate the drill bit.")

44. See 43 C.F.R. §3160, Onshore Oil and Gas Operations Federal and Indian Oil and Gas Leases Onshore Oil and Gas Order Number 1 Approval of Operations (2007), available at http://www.blm.gov/pgdata/etc/medialib/blm/wo/MINERALS_REALTY_AND_RESOURCE_PROTECTION/energy/onshore_order_videos.Par.24124.File.dat/Onshore-Order_No_1_Preamble.pdf. ("Reclamation is described in the Order as returning the disturbed land to as near its pre-disturbed condition as is reasonably possible.")

45. See Telephone Interview with Carol Kruse, Special Projects Coordinator, Arapaho-Roosevelt National Forest and Pawnee National Grasslands (Nov. 14, 2008). Ms. Kruse was the BLM staff member in charge of facilitating the Pinedale Anticline Working Group.

46. 16 U.S.C. §§1531-1544, ELR STAT. ESA §§2-18.

47. See Sawyer, *supra* note 4.

48. See Sawyer, *supra* note 4.

49. See Hunington, *supra* note 4, at 8.

50. See 2000 ROD, *supra* note 3. Of this total, approximately 158,415 surface acres (80%) are administered by the BLM; 9,800 surface acres (5%) are owned by the state of Wyoming; and 29,822 acres (15%) are privately owned.

51. *Id.*

52. See 2000 ROD, *supra* note 50, at 5.

53. See 2000 ROD, *supra* note 50, at 5.

54. See 2000 ROD, *supra* note 50, at 4.

55. See 2000 ROD, *supra* note 50, app. C at 4.

56. See Kruse, *supra* note 45.

57. See Petition for Review, *Yates Petroleum v. Norton*, Civil No. 00-CV-206-J (Nov. 6, 2000) (on file with the author).

project, and it was over three years before the PAWG was properly established.⁵⁸

Despite setbacks in adaptive management implementation, the BLM proceeded with drilling.⁵⁹ Another major controversy arose when industry operators began pressuring the BLM to waive restrictions on winter drilling in crucial winter range for wildlife. In response, the BLM began granting exceptions to seasonal restrictions to winter drilling on a regular basis, beginning in 2002.⁶⁰ During this period, some monitoring of both sage grouse populations and ungulates (particularly mule deer) was conducted, though it is unclear exactly how much. Monitoring results that were provided indicated that wildlife were in trouble. Mule deer in the project area declined by 46% during the first five years of the project.⁶¹

At the same time, the adaptive management process continued to struggle. The PAWG was properly chartered under FACA and had its first meeting in 2004. Its first action was to request an update regarding the BLM's mitigation and monitoring activities.⁶² When the PAWG's Wildlife Monitoring Task Group suggested setting aside winter habitat for mule deer to help ensure the population did not decline further, the BLM declined to accept the recommendation, because it had already authorized plans to allow additional drilling within mule deer habitat.⁶³ Questions then immediately arose regarding the proper role of the PAWG and its associated task groups, and, in 2005, the BLM notified the PAWG that their input was only appropriate on a "post-decisional" basis.⁶⁴ Two PAWG members resigned in protest.⁶⁵

58. See Prill Mecham, Pinedale Area Manager, Comments Made at the Natural Resources Law Center 2002 Summer Conference Panel, Lessons Learned From the Pinedale Anticline, October 12, 2008 <http://www.colorado.edu/law/centers/nrlc/events/bmpFiles/Lessons%20Learned%20from%20the%20Pinedale%20Anticline.doc> (last visited Aug. 18, 2009).

59. *Id.*

60. Exceptions to these types of restrictions are often granted. From the Energy Working Group's Executive Summary in *Who Owns the West? Oil and Gas Leases*:

BLM field offices in Wyoming indicate that the BLM may often waive environmental protections at the request of gas and oil companies. The Pinedale Field Office in western Wyoming granted at least 251 exceptions to protections for wildlife between September 2002 and July 2003 while the Rawlins Field Office in southern Wyoming reported that since October 2003, it has granted 66 exceptions to protections for wildlife.

Available at http://www.ewg.org/oil_and_gas/printerfriendly.php.

61. See Sawyer, *supra* note 4.

62. See Theodore Roosevelt Conservation Partnership, Complaint at 18 (on file with author). See also Telephone Interview with Linda Baker, Community Organizer Upper Green River Valley Coalition (Nov. 5, 2008). Ms. Baker noted that when the PAWG rejoined with an official charter, it was not allowed to talk about its previous efforts, which included an initial design for monitoring.

63. April Reese, *Pinedale Working Group Struggles to Apply "Adaptive Management" to Wyoming Field*, LAND LETTER (Aug. 10, 2006).

64. The BLM explained that predecisional input on projects is available to PAWG participants through the public participation opportunities provided by NEPA.

65. See Pinedale Online: Is PAWG Dead? Some Pinedale Anticline Working Group Members Are Seriously Concerned About the Future of Group Created by BLM to Oversee Oil & Gas Activity on Pinedale Anticline (May 3, 2006) <http://www.pinedaleonline.com/news/2006/05/IsPAWGdead.htm> (last visited Aug. 18, 2009). In her article *Stuck in the PAWGmire: How the BLM Failed in Pinedale*, reporter Rebecca Hunington interviewed many of the PAWG participants and paints a general picture of their disillusionment. See Hunington, *supra* note 4, at 8-11.

Eventually, a legal challenge was brought forward, this time by conservation groups who claimed that the mitigation and monitoring efforts required by the 2000 ROD were not adequately implemented and that fish and wildlife resources suffered as a result.⁶⁶

Meanwhile, the leaseholders concluded that they needed to drill more intensely than authorized by the 2000 ROD in order to extract the natural gas held by their leaseholds. Specifically, operators sought access to the project area on a year-round basis, without having to apply for exceptions to winter drilling restrictions. To accommodate the leaseholders, the BLM initiated another round of environmental analysis under NEPA, this time in the form of a supplemental environmental impact statement, and came forward with a new ROD in 2008 for the project area that allows for intensified drilling on a year-round basis.⁶⁷ The 2008 ROD authorized an additional 4,399 wells and 600 well pads over a production life of 40 years.⁶⁸ It also allows "for year-round development and delineation activity within big game (pronghorn and mule deer) and greater sage grouse seasonal use areas by granting exceptions to the big game and greater sage grouse seasonal restrictions."⁶⁹ In an effort to mitigate impacts from more intense drilling, directional drilling techniques—already proven to be successful in the project area—will be required over much of the area.⁷⁰ The revised project

66. See Theodore Roosevelt Conservation Partnership, *TRCP Sues Interior Department Over Mismanaged Wyoming Energy Project* (June 18, 2008) <http://www.trcp.org/newsroom/pressreleases/46.html> (last visited Aug. 18, 2009). As described in a fact sheet:

The PAWG requested an accounting of the ROD requirements and actions and learned that most AEM requirements were not being met. The PAWG struggled from 2004-2006, during which time many participants abandoned the group, disillusioned by the process. In 2006, the PAWG reformed with a new direction, whereby only post-decision actions were to be addressed. This change effectively eliminated one of the primary functions of the AEM process—the PAWG's working with the BLM and industry to plan operations to reduce or eliminate impacts identified through monitoring or research. This and the BLM's inaction on previous recommendations left the AEM process in limbo, and no official PAWG meeting took place in 2006. The wildlife task group, a critical part of the PAWG, dissolved in 2005, with its recommendations for mule deer ignored by the BLM.

Theodore Roosevelt Conservation Partnership, *Pinedale Anticline Fact Sheet*, <http://www.trcp.org/issues/energy/98.html#q5> (last visited Aug. 18, 2009).

67. See U.S. BUREAU OF LAND MANAGEMENT PINEDALE ANTICLINE PROJECT AREA SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT AND RECORD OF DECISION (2008); <http://www.blm.gov/wy/st/en/info/NEPA/pfodocs/anticline/seis.html> [hereinafter 2008 ROD or SEIS]. The Draft SEIS accompanying the 2008 ROD explains:

scoping notice was mailed to potentially interested parties on October 21, 2005. All issues and concerns identified during scoping were evaluated to identify concerns that formed the basis for development of alternatives and the impact analyses. The nine key issues and concerns identified were: pace of development; conservation of wildlife; need for wildlife mitigation; wildlife displaced to private land; increased winter traffic; economic stability in Sublette County; industrialization and single use of land; declining wildlife populations; effects to surface water and groundwater; and effects to air quality in the region.

68. See 2008 ROD, *supra* note 67, at 4.

69. See 2008 ROD, *supra* note 67, at 4.

70. Conservationists argue that while the new project has fewer well pads due to directional drilling, the end result is still more wells and more disturbed acreage:

The most recent proposal calls for 4,399 more wells and 250 additional pads for a total of approximately 600 well pads, only 100 fewer than now approved. On paper this looks like a slight improvement, but what they don't tell you is that the well pads on the Anticline now

decision again puts adaptive management forward as the key management strategy, but with modifications. Environmental groups have now challenged the 2008 ROD's ability to achieve necessary natural resource protection and amended their original suit against the 2000 ROD to include claims against the 2008 ROD.⁷¹

III. Legal and Regulatory Frameworks Influencing Adaptive Management Implementation

A. FACA

I. Statutory Overview

FACA was enacted in 1972 in response to increasing concern over an escalating amount of influence by industry groups in government decisionmaking.⁷² It set forth three goals: (1) to reduce wasteful expenditure on committees created to advise the executive branch; (2) to make advisory committees more accountable to the public; and (3) to ensure a balance of perspectives is reflected those committees.⁷³

A comprehensive review of FACA and its requirements is beyond the scope of this Article.⁷⁴ For purposes of understanding how FACA limits effective adaptive management implementation, several key aspects of FACA are important to note. The first is the statute's definition of advisory committee, which is very broad and "includes any group, with

are only five and a half acres in size while the pads allowed under the proposed SEIS will be up to 20 to 25 acres in size—four to five times larger. So in reality the footprint is going to more than double in size in spite of a reduction in the total number of well pads. (From 5,049 acres of surface disturbance to 12,278 acres.)

Upper Green River Valley Coalition, *Fact Verses Fiction*, http://www.uppergreen.org/library/docs/SEIS_factsfiction.pdf (last visited Aug. 18, 2009).

71. See 2008 ROD, *supra* note 67, app. E. The new 2008 ROD puts adaptive management implementation more squarely within the BLM: "BLM will implement and coordinate the adaptive management process. The BLM Pinedale Field Manager will accomplish that through the Pinedale Anticline Project Office (PAPO) as established in this ROD. The PAPO will be staffed by BLM, Wyoming Department of Environmental Quality Air, and Wyoming Game and Fish Department employees." *Id.* at E-2. The role of the PAWG in all this is unclear.
72. See Stephen P. Croley & William F. Funk, *The Federal Advisory Committee Act and Good Government*, 14 YALE J. REG. 451, 459-60 (1997) (estimating that at the time FACA was passed, there were an estimated 3,000 such committees. *Id.* at 460 (citing H.R. REP. NO. 91-1731, at 14 (1970). "During the 1971 hearings, about 1,800 committees were specifically identified. See Advisory Committees: Hearings on S. 1637, S. 1964, and S. 2064 Before the Subcommittee on Intergovernmental Relations of the Senate Committee on Gov't Operations, 92d Cong., 1st Sess. 12 (1971)." *Id.*
73. See Croley & Funk *supra* note 72, at 452; Michael J. Mongan, *Fixing FACA: the Case for Exempting Presidential Advisory Committees From Judicial Review Under the Federal Advisory Committee Act*, STAN. L. REV. 895, 903 (2005). FACA caught popular attention most recently with regard to challenges to the Cheney Energy Taskforce. See *In re Cheney*, 406 F.3d 723 (D.C. Cir. 2005) (holding that the task force, more formally known as the National Energy Policy Development Group and its associated subgroups were not advisory committee under FACA).
74. Profs. Stephen Croley and William Funk provide a comprehensive examination of the history and basic structure of the FACA, including an analysis and recommendations for reform based on a survey of agency officials and others charged with FACA implementation. See Croley & Funk, *supra* note 72.

one or more public members, created by law or established or 'utilized' by an agency or the President."⁷⁵

Second, FACA requires that each advisory committee file a formal charter.⁷⁶ The charter "must contain the committee's designation, its objectives, its duration, the official to whom it reports, the agency or organization providing support, the duties of the committee, estimated operating costs, estimated number of meetings, and its termination date."⁷⁷ The advisory committee cannot begin work until the charter is formally approved.⁷⁸ Further, the term for each advisory committee expires every two years.⁷⁹ While two-year extensions can be granted as needed, the advisory committee must file a new charter.⁸⁰

FACA also attempts to limit the number of advisory committees that can exist at any given time: "the executive branch may only create advisory committees at the direction of the President himself or where an agency head 'determine[s] as a matter of formal record [that the committee is] in the public interest in connection with the performance of duties imposed on that agency by law."⁸¹

There is currently an Executive Order in place that reinforces this provision by placing an administrative ceiling on the number of advisory committees that can exist at any given time.⁸² FACA also requires continual review of existing committees in order to eliminate committees no longer needed and to avoid duplication of efforts.⁸³

75. See Mongan, *supra* note 73, at 903 (citing 5 U.S.C. app. 2 §3 (2005)). "The Act specifically excludes: the Advisory Commission on Intergovernmental Relations; the Commission on Government Procurement, any committee which is composed wholly of full-time officers or employees of the Federal Government," §3(2); "any advisory committee established or utilized by the Central Intelligence Agency . . . or the Federal Reserve System," §4(b) (internal numbering omitted); and "state or local entities," §4(c). *Id.*
76. 5 U.S.C. app. 2 §9(c).
77. U.S. GENERAL SERVICES ADMINISTRATION, WHEN IS FEDERAL ADVISORY COMMITTEE ACT (FACA) APPLICABLE? (2008), available at http://www.gsa.gov/Portal/gsa/ep/contentView.do?contentType=GSA_BASIC&contentId=10348&noc=T. The U.S. General Services Administration (GSA) is the federal agency responsible for FACA administration.
78. See Croley & Funk, *supra* note 72, at 462 ("FACA . . . prohibits any advisory committee from meeting or taking any action until its charter has been filed with the Administrator (for presidential advisory committees) or with the head of the agency to which the committee will report, as well as with the standing committees of the House and Senate with jurisdiction over the agency.").
79. See Croley & Funk, *supra* note 72, at 462 (citing §14(b)). Courts are split on the issue of whether pre-FACA information produced by a committee may be utilized by an agency. See Thomas C. Beierle & Rebecca J. Long, *Chilling Collaboration: The Federal Advisory Committee Act and Stakeholder Involvement in Environmental Decisionmaking*, 29 ELR 10399, 10406-07 (July 1999) (citing California Forestry Ass'n v. U.S. Forest Service, 102 F.3d 609, 614 (D.C. Cir. 1996); Alabama-Tombigbee Rivers Coalition v. Dept. of the Interior, 26 F.3d 1103, 24 ELR 21333 (11th Cir. 1994)).
80. See Croley & Funk, *supra* note 72, at 462.
81. Mongan *supra* note 73 n.59 (citing §5(b); §9(a)).
82. See Exec. Order No. 12838 (1993). Passed in 1993 by President William J. Clinton, this order requires all agencies to reduce the number of advisory committees by one-third and providing that, in the future, agencies shall not create or sponsor a new advisory committee subject to FACA unless the committee is required by statute or the agency head (a) finds that compelling considerations necessitate creation of such a committee, and (b) receives the approval of the Director of the Office of Management and Budget. Such approval shall be granted only sparingly and only if compelled by considerations of national security, health or safety, or similar national interests.
83. Profs. Stephen Croley and William Funk write: Accordingly, section 5(a) of the Act requires each standing committee of Congress to make a continuing review of all advisory committees

2. FACA as a Barrier to Adaptive Management Implementation on the Pinedale Anticline

While enacted with the best of intentions, FACA has actually paved the way for restricted public involvement. This was the case on the Pinedale Anticline, where FACA's requirements were raised as a barrier to adaptive management implementation. The PAWG, like most collaborative processes involving federal agencies, was caught in the FACA's definition of advisory committee. By the time an official charter was obtained, the group lost both its momentum and its ability to keep pace with development. It took two years for the PAWG to receive its first charter once the process was finally initiated, which was then four years into the project.⁸⁴

From an adaptive management standpoint, these difficulties impeded Step One—establishing a clear and common purpose. The BLM's 2000 ROD, which outlines the project in detail, is *clear* in the sense that it is fairly specific about the purpose (to allow for 700 producing wells and 900 well pads for oil and gas development over 10-15 years while also protecting wildlife and other resources), but it is not *common* in the sense that it is not the result of a collaborative process involving all the stakeholders. Instead, the decision was made by the land management agency—the BLM. Still, if the PAWG had been able to establish quickly, it might have been possible to establish the necessary common ground to employ adaptive management.

3. Implications for Adaptive Management and Recommendation for Reform

At its best, adaptive management requires active involvement from all stakeholders in a collaborative process at the initial stages of a project's development. The DOI's new technical guidance for adaptive management specifically emphasized this point. Ensuring stakeholder commitment to adaptive management for duration of the process is the first step in the DOI's descriptive model.⁸⁵

Stakeholders should be involved early in the adaptive management cycle, to help assess the problem and design activities to solve it. Stakeholders can also help monitor those activities and participate in the evaluation of results. Involvement of stakeholders from the beginning increases

management effectiveness and the likelihood of achieving agreed-upon outcomes.⁸⁶

This type of collaborative process, as opposed to mere consultation, is precisely the type of committee action that triggers FACA. The DOI's guidance mentions FACA as a law that must be obeyed, but provides little insight on how to do so while also incorporating stakeholders in the manner recommended.⁸⁷

The reality is that within federal agencies, FACA's requirements are viewed as onerous, and fear of running afoul of FACA's requirements is often used as an excuse to avoid engaging those outside government.⁸⁸ A 1998 Government Accountability Office survey of federal agencies found that several agencies decided not to obtain outside input because of the possibility of future litigation over compliance with FACA.⁸⁹ Even when agencies are willing to put forth the effort, it normally takes several years to go through the administrative process required to receive a formal charter. This limits citizen advisory groups in time-sensitive situations, which include many actions involving natural resources. The requirement that a new charter must be obtained every two years is also cumbersome, especially within natural resource contexts, where decisions are often implemented over many years.

In their article *Chilling Collaboration: The Federal Advisory Committee Act and Stakeholder Involvement in Environmental Decisionmaking*,⁹⁰ Thomas C. Beierle and Rebecca J. Long discuss in detail the "chilling effect" FACA has had on citizen participation. They cite a 1994 study in which natural resource professionals ranked FACA as the greatest legal barrier to ecosystem management.⁹¹

Reform of FACA is needed in order to better utilize collaborative processes necessary for adaptive management implementation. FACA should be made more flexible and should encourage, rather than hinder, adaptive management. Beierle and Long make several recommendations for reform, two of which are directly relevant in this context. First, they recommend lifting the administrative ceiling on FACA committees.⁹² This would allow agencies to engage in collaborative processes more often and benefit from public involvement. Second, they recommend streamlining the procedural requirements for establishing an advisory committee.⁹³ Current procedures result in unreasonable delays that undermine collaborative process and its effectiveness. Another, more sweeping suggestion for reform is to exempt

under its jurisdiction to determine whether they should be abolished or merged with another committee, whether their responsibilities should be revised, and whether they perform necessary functions not already being performed elsewhere. Similarly, the President is to report annually on the activities, status, and changes in the composition of advisory committees in existence during the preceding year. The report is to include information on the cost of advisory committees, a list of advisory committees that the President has abolished, and a list of statutorily created committees for which the President has recommended abolition. The FACA also requires the Administrator of the General Services Administration, who is given general management responsibility over advisory committees, to make an annual review of all advisory committees to determine whether they should be abolished or merged." (citations omitted).

Croley & Funk, *supra* note 72, at 461.

84. See Kruse, *supra* note 45.

85. See U.S. Dept. of the Interior, *supra* note 2, at 22.

86. *Id.* at 4-5.

87. *Id.* at 44.

88. Kruse, *supra* note 45; Beierle & Long, *supra* note 79, at 10406.

89. U.S. GOVERNMENT ACCOUNTABILITY OFFICE. FEDERAL ADVISORY COMMITTEE ACT: VIEWS OF COMMITTEE MEMBERS AND AGENCIES ON FEDERAL ADVISORY COMMITTEE ISSUES 5 (July 9, 1998).

90. 29 ELR 10399 (July 1999).

91. *Id.* at 10402 (citing Daniel B. Schlager & Wayne A. Freimund, Institutional and Legal Barriers to Ecosystem Management, Paper presented at the Integrating Social Science in Ecosystem Management Conference 1-3 (Dec. 12-15, 1994)). Professor Ruhl refers to adaptive management as the "methodological sibling of ecosystem management." See Ruhl, *supra*, note 31 §11.1.

92. Beierle & Long, *supra* note 79, at 10410.

93. *Id.*

certain categories of committees from FACA altogether.⁹⁴ Collaborative processes designed to implement adaptive management on a statewide or regional scale may be appropriate for such an exemption.

B. NEPA

I. Statutory Overview

NEPA was enacted in 1969 with the twin goals of (1) encouraging federal agencies to make better informed decisions regarding the impact of their activities on the environment, and (2) involving the public in the government's decisionmaking process.⁹⁵ NEPA applies to all "major federal actions significantly affecting the quality of the human environment."⁹⁶ It requires detailed analysis in the form of an environmental impact statement (EIS)⁹⁷ of the projected environmental consequences of the proposed action. It also requires the agency to list alternatives to the proposed action and to provide an assessment of any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented.⁹⁸ NEPA's required analysis of environmental consequences includes an examination of the cumulative impacts of the agency's actions on the environment.⁹⁹ Combined, these requirements have come to be known as the "hard look" an agency must take before it "leaps" into action. The issue with regard to oil and gas development becomes, when does that leap actually occur?

There is currently no clear answer to that question, as there is a split of authority regarding the level of environmental analysis required during each stage of oil and gas development under NEPA. As previously noted, oil and gas development involves five distinct stages: leasing; exploration; drilling; production; and reclamation. In *Sierra Club v. Peterson*¹⁰⁰ and *Conner v. Burford*,¹⁰¹ both the U.S. Court of Appeals for the District of Columbia (D.C.) Circuit and the U.S. Court of Appeals for the Ninth Circuit respectively concluded that an EIS is required at the leasing stage. In the U.S. Court of Appeals for the Tenth Circuit, however, the controlling authority is *Park County Resource Council v. U.S.*

Dept. of Agriculture,¹⁰² which held that the BLM does not have to prepare an EIS prior to leasing because a lease itself is not a "major federal action significantly affecting quality of human environment."¹⁰³ An examination of these three cases highlights the difficulty applying NEPA to oil and gas development.

All three cases involved proposed oil and gas development within national forests.¹⁰⁴ In both *Conner* and *Sierra Club*, the government argued that it would be difficult to do a proper EIS at the leasing stage of development, when so little is known about how development will eventually take place.¹⁰⁵ These courts held that, despite these uncertainties, an EIS was required, focusing on the irrevocable nature of the agency's action at the leasing stage. In *Conner*, the D.C. Circuit held that: "The government's inability to fully ascertain the precise extent of the effects of mineral leasing in a national forest is not . . . a justification for failing to estimate what those effects might be before irrevocably committing to the activity." Likewise, in *Sierra Club*, the Ninth Circuit rejected the argument that environmental protections placed on the leases in the form of stipulations would be able to avoid environmental impacts that would trigger NEPA at the leasing stage:

Even assuming, *arguendo*, that all lease stipulations are fully enforceable, once the land is leased the Department no longer has the authority to preclude surface disturbing activities even if the environmental impact of such activity is significant. The Department can only impose "mitigation" measures upon a lessee who pursues surface disturbing exploration and/or drilling activities. None of the stipulations expressly provides that the Department or the Forest Service can prevent a lessee from conducting surface disturbing activities.¹⁰⁶

Both courts also recognized that, where stipulations to a lease prohibit all surface use activities—a "no surface occupancy" stipulation—the government preserves its right to control environmental impacts and therefore an EIS would not be required.¹⁰⁷

By contrast, the Tenth Circuit in *Park County* focused on the fact that: "[an] oil and gas lease, by itself, does not cause a change in the physical environment." The court noted that "[i]n order to work the lease, the lessee must submit site-specific proposals to the Forest Service and BLM who can then modify those plans to address any number of environmental considerations. Each action is subject to continuing NEPA review."¹⁰⁸ The *Park County* court was less concerned about

94. *Id.*

95. 42 U.S.C. §§4321 et seq. (2008). See 42 U.S.C.A. §4342, 40 C.F.R. §1515.2 (1978). It also established the Council on Environmental Quality (CEQ) to administer NEPA. A comprehensive examination of NEPA, its regulations, and requirements can be found at <http://nepa.gov/nepa/nepanet.htm>. See also DANIEL R. MANDELKER, NEPA LAW AND LITIGATION (2008).

96. 42 U.S.C. §4332(c) (2008).

97. *Id.*

98. *Id.*

99. 40 C.F.R. §1508.7 ("cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. See also 40 C.F.R. §1508.8 (definition of "effects" including ecological effects "whether direct, indirect, or cumulative.").

100. 717 F.2d 1409, 13 ELR 20888 (D.C. Cir. 1983).

101. 848 F.2d 1441, 18 ELR 21182 (9th Cir. 1988).

102. 817 F.2d 609, 17 ELR 20851 (10th Cir. 1987).

103. *Id.* at 624.

104. Remember, the BLM manages all federal mineral interests, including those under land managed by the U.S. Forest Service.

105. See *Sierra Club*, 717 F.2d at 1415 ("The Department asserts that it cannot accurately evaluate the consequences of drilling and other surface disturbing activities until site-specific plans are submitted."); *Conner*, 848 F.2d at 1450 ("Appellants also complain that the uncertain and speculative nature of oil exploration makes preparation of an EIS untenable until lessees present precise, site-specific proposals for development.").

106. *Sierra Club*, 717 F.2d at 1414.

107. *Id.* at 1415; *Conner*, 848 F.2d at 1445.

108. *Park County*, 817 F.2d at 622.

environmental impacts resulting from the leasing, in large part due to its recognition that leasing does not always result in full field development. Plaintiffs' argument that leasing created an "irrevocable and irretrievable commitment of resources"—the precise argument found persuasive in the *Conner* and *Sierra Club* decisions—did not persuade the Tenth Circuit in *Park County*:

This argument would have more force in this context if full field development were likely to occur and could be specifically described at the leasing stage. The paradigmatic oil and gas lease, however, does not fall into such a category. Full field development is typically an extremely tentative possibility at best at the leasing stage.¹⁰⁹

The reality is that all three courts are correct. Leasing is an irrevocable and irretrievable commitment of resources and leases are issued at a stage in development that makes it very difficult to provide a meaningful environmental analysis. As a practical matter, modern leasing is usually associated with an EIS, regardless of jurisdiction. However, as noted, there is rarely any site-specific information about the course of development. As a result, the analysis relies on broad generalizations that offer little basis for the understanding of the potential impact of oil and gas development on the landscape.

The situation that results can be referred to as the "NEPA shell game" involving various NEPA documents, including the leasing EIS, an EIS examining the impacts of full field development, and the less detailed environmental assessment (EA) that accompanies an application to drill an individual well.¹¹⁰ All these documents cross-reference each other, with no one analysis providing a clear and comprehensive picture of how development will take place.

2. NEPA as a Barrier to Adaptive Management Implementation on the Pinedale Anticline

Due to the staged nature of development, the BLM has struggled to apply NEPA effectively to oil and gas development. When the added complexity of adaptive management

is added to the mix, the results were problematic. On the Pinedale Anticline, the NEPA process did not facilitate adaptive management and it was actually hindered to the extent to which the BLM played the NEPA "shell game." Much of the area was leased in accordance with the Resource Management Plan (RMP)¹¹¹ of 1988, which was accompanied by a full EIS. The RMP that authorized leasing for oil and gas development used an analysis based on a "Reasonably Foreseeable Development Scenario."¹¹² At that point, however, no one could have foreseen the scale of development that would eventually take place on the Pinedale Anticline. As a result, the RMP had to be amended in 2000, because the NEPA analysis conducted in 1988 was inadequate. A new EIS was developed—the 2000 ROD—which, in addition to amending the RMP, was also the "full field development" EIS for the project. This EIS anticipated the impacts associated with the development for 900 well pads and 700 producing wells.¹¹³ Ultimately, this estimate again proved inaccurate given the potential for development, and the supplemental EIS—the 2008 ROD—was then produced that authorized an additional 4,399 wells and 600 well pads. Meanwhile, site-specific EAs for actual drilling operations provided much needed detail on the actual, on-the-ground impact of the drilling, but provided no assessment of the cumulative impacts of development.¹¹⁴ The development continually outgrew its previous NEPA analysis. As a result, the BLM was never able to accurately anticipate the scale of impacts that would eventually take place.

As a result, the NEPA analysis that took place never really incorporated adaptive management. Adaptive management requires managers to identify explicit assumptions based on lack of scientific information. While ideally this would have happened at the leasing stage, the leases were already issued *before* the BLM had any clear sense of what development would actually take place or that it would attempt to employ adaptive management.

Even at the full field-development stage, the potential for adaptive management was squandered. The draft EIS to the 2000 ROD is accompanied by many technical documents that

109. *Id.* (citing the government's brief for the proposition that "only about one of ten federal leases issued and development activities are conducted on only one of ten of those leases on which exploration activities have been approved and completed"). The *Park County* court also took issue with the financial burden, arguing that "require[ing] a cumulative EIS contemplating full field development at the leasing stage would thus result in a gross misallocation of resources. . . . NEPA's goal is not to generate paperwork evaluating speculative possibilities that the odds favor will never occur." (citations omitted). The U.S. Court of Appeals for the Tenth Circuit declined to reverse its position on this issue in *Pennaco Energy, Inc. v. United States Department of Interior*, 377 F.3d 1147, 34 ELR 20072 (10th Cir. 2004).

110. An EA is appropriate under NEPA when it tiers to a programmatic EIS that appropriately analyzes the environmental impacts of the site-specific action. The NEPA regulations provide:

Whenever a broad environmental impact statement has been prepared (such as a program or policy statement) and a subsequent statement or environmental assessment is then prepared on an action included within the entire program or policy (such as a site specific action) the subsequent statement or environmental assessment need only summarize the issues discussed in the broader statement and incorporate discussions from the broader statement by reference and shall concentrate on the issues specific to the subsequent action.

40 C.F.R. §1502.20.

111. U.S. Bureau of Land Management, Pinedale Resource Management Plan (Dec. 1988), available at <http://www.blm.gov/pgdata/etc/medialib/blm/wy/programs/planning/rmps.Par.49880.File.dat/pfo-rmp.pdf> [hereinafter RMP]. The BLM, which has been in the process of revising this RMP since February of 2002, just recently finalized the new RMP. See U.S. Bureau of Land Management, Pinedale Resource Management Plan (2008), available at <http://www.blm.gov/rmp/wy/pinedale/documents.html>.

112. RMP, *supra* note 111.

113. See 2000 ROD, *supra* note 3, at 5. The number of well pads exceeded the number of authorized wells precisely because the BLM was unsure where development would ultimately successfully take place, anticipating some "dry holes" and associated surface disturbance.

114. See, e.g., U.S. BUREAU OF LAND MANAGEMENT FINDING OF NO SIGNIFICANT IMPACT, DECISION RECORD AND ENVIRONMENTAL ASSESSMENT FOR THE QUESTAR YEAR-ROUND DRILLING PROPOSAL, SUBLETTE COUNTY, WYOMING 2004. Environmental groups challenged the BLM's decision to waive wildlife protections set forth in the 2000 ROD and allow for year-round drilling, but their action was dismissed on mootness grounds when the new 2008 ROD was developed. See Order Dismissing Administrative Appeal, *Wyoming Outdoor Council v. Bennett*, Wyoming District Court No. 00-CV-50-J (Aug. 2, 2007) (on file with author).

would have helped the BLM with adaptive management,¹¹⁵ but it was envisioned that the PAWG would take the lead on establishing a plan and designing modeling efforts, and due to the PAWG's failure both to keep pace with development and to reach its potential, this never happened.¹¹⁶ This, then, made it impossible for the BLM to engage in development in a way that maximizes results and learning. Instead, the BLM proceeded to allow drilling under the 2000 ROD, even though the adaptive management process was delayed. It then did a new NEPA analysis, the 2008 ROD, when its previous estimates proved inaccurate.

3. Implications for Adaptive Management and Recommendations for Reform

The major difficulty associated with integrating NEPA and adaptive management stems from what has been referred to as the "front-end" approach taken by NEPA.¹¹⁷ Because NEPA assumes a single, well-defined "major federal action," rather than an iterative process, it lacks the tolerance for flexibility and experimentation required by adaptive management.¹¹⁸ Prof. J.B. Ruhl explains "agencies are trapped between a rock and a hard place when it comes to practicing environmental assessment *and* adaptive management."¹¹⁹ Under NEPA, the discovery of "significant new information" triggers the requirement for a supplemental EIS.¹²⁰ The resulting situation is one in which agencies implementing adaptive management are constantly in danger of triggering the need for additional NEPA analysis, which can be both time-consuming and counterproductive. In order for NEPA to be able to respond adequately to adaptive management, Professor Ruhl calls for NEPA reform that places less emphasis on a final EIS and more emphasis on continual assessment and monitoring.¹²¹ By placing less emphasis on a single agency action, an adaptive management-based NEPA analysis would

address the basic framework for the system model, including details regarding the management and monitoring activities that would potentially take place. It would draw fewer conclusions but would also be clearer about what assumptions are being made and would include mitigation strategies to address anticipated outcomes.¹²²

Effective monitoring is a key to adaptive management and is an important area for NEPA reform. NEPA currently does not require monitoring, and funding for monitoring is often the first thing to go when budget constraints influence a project.¹²³ Even when monitoring is specifically included in a project design, it does not always happen. The 2000 ROD was clear that operators would be required to bear the costs associated with monitoring, but it lacked any specifics regarding (1) how much money was going to be required, and (2) a mechanism for gathering the necessary funds.¹²⁴ Adaptive management requires a detailed monitoring plan designed to test assumptions built into the model. In the case of the Pinedale Anticline, both the management and monitoring plans were supposed to be developed by the PAWG's technical agency group.¹²⁵ While some monitoring did occur, it was not linked to a management strategy that informed decisions. As already explained, the opposite actually happened. Despite the fact that monitoring demonstrated significant declines in the mule deer population, drilling was intensified, and recommendations by the PAWG to slow the pace of development were ignored.

Finally, more guidance is needed with regard to the relationship between NEPA and adaptive management. This

115. See U.S. BUREAU OF LAND MANAGEMENT, PINEDALE ANTICLINE OIL AND GAS EXPLORATION AND DEVELOPMENT PROJECT DRAFT ENVIRONMENTAL IMPACT STATEMENT TECHNICAL REPORT (1999), available at <http://www.blm.gov/pgdata/etc/medialib/blm/wy/information/NEPA/pfdocs/anticline>.

116. See Kruse, *supra* note 45. Kruse, who was the BLM person in charge of facilitating the PAWG, confirms that "no explicit model of the system was ever done" explaining "the PAWG was supposed to get the plan together, we all thought the modeling would happen there."

117. See J.B. Ruhl, *The Disconnect Between Environmental Assessment and Adaptive Management*, 36 TRENDS 6 (2005).

118. *Id.* See also Thrower, *supra* note 5, at 879-80. Thrower argues that NEPA does not preclude adaptive management, but like most environmental statutes of its era, NEPA makes basic assumptions about science's ability to achieve certainty that are unrealistic given the realities of dynamic natural systems. She notes that NEPA's SEIS process anticipates that new information may warrant additional analysis but argues that "without an established standard for distinguishing adaptive management techniques from a substance change in the agency action plan, it would be difficult to discern when a change in plans falls into the adaptive management umbrella and when the agency must prepare an SEIS." *Supra* note 5, at 893.

119. See Ruhl, *supra* note 117, at 14. ([w]henver an agency actually practices adaptive management it faces a substantial risk of being sued for failure to comply with environmental assessment procedures").

120. See 40 C.F.R. §1502.9 (c)(1)(ii) (Agencies: Shall prepare supplements to either draft or final environmental impact statements if: . . . There are significant new circumstances or information relevant to environmental concerns and bearing on the proposed action or its impacts").

121. See Ruhl, *supra* note 117, at 14.

122. The case law in this arena is still developing. What case law does exist cautions agencies to be sufficiently specific regarding how they intend to employ adaptive management. In the unpublished decision *Western Watersheds Project v. U.S. Forest Service*, the court held that the failure of the NEPA documents at issue to fully explain the adaptive management strategy and its protocols violated the National Forest Management Act. 2006 WL 292010 (D. Idaho).

123. See Kruse, *supra*, note 45.

124. See 2000 ROD, *supra* note 3, at C-5. ("The BLM and the cooperating agencies lack the resources to adequately fund the implementation of monitoring programs specified. . . . the majority of costs to implement these programs will have to be borne by the operators.") The mule deer monitoring conducted by Sawyer and colleagues was funded in large part by Questar, the natural gas operator who initially sought and received exemptions from the restrictions on winter drilling contained in the 2000 ROD. Many viewed this funding as a quid pro quo for approval of these requests. See Associated Press, *Drilling Causes Concern About Deer Habitat*, BillingsGazette.com (Nov. 23, 2003), http://www.billingsgazette.com/news/state-and-regional/wyoming/article_7b3174f0-decd-5c37-a791-c0eb3fbbd7dd.html. The new SEIS is more specific regarding funding and creates a Pinedale Anticline Monitoring and Mitigation Fund designed to "mitigate potential impacts to wildlife, air, and other resources identified in the Final SEIS (BLM 2008)." SEIS, *supra* note 67, at 17.

The total contribution to the fund by Ultra, Shell, and Questar will be \$36 million. Ultra, Shell and Questar will each annually contribute \$7,500 for each well spudded on their respective leaseholds the previous calendar year. Ultra, Shell and Questar may make advanced contributions to the Fund to implement projects. Such contributions will be credited toward the end of development contributions. Annual contributions are anticipated to be \$1.8 million per year with an initial contribution of at least \$4.2 million. This Fund will provide the financial support for mitigation and monitoring for the life of the project.

Id.

125. See 2000 ROD, *supra* note 3, at 15: "The technical agency group will draft the various monitoring plans and other management decisions. The public group will review the plans for adequacy and recommend were additional monitoring may be necessary before any of the plans are implemented."

need has already been identified, but action has been slow in coming. In 2002, the Council on Environmental Quality (CEQ)¹²⁶ created a NEPA task force to address issues associated with modernizing NEPA, including the need for better integrating adaptive management.¹²⁷ A year later, the task force did come forward with a series of recommendations, which included the recommendation that the CEQ convene an Adaptive Management Working Group that would assist in promulgating regulations specific to adaptive management.¹²⁸ This has not yet happened. More guidance on what level of analysis is appropriate at each stage in development would assist the BLM in avoiding the “shell game.” As noted above, the DOI recently came out with a technical document on use of adaptive management in land management decisions. The document discusses the importance of NEPA, but it provides little guidance regarding how to actually integrate NEPA and adaptive management.¹²⁹

C. The MLA

I. Statutory Overview

The MLA of 1920,¹³⁰ as modified by the Federal Onshore Oil and Gas Leasing Reform Act of 1987,¹³¹ governs the development of both onshore and offshore oil and gas resources owned by the federal government.¹³² It is implemented by two federal agencies within the DOI. The BLM oversees the issuance of leases and actual development for oil and gas, while the Mineral Management Service collects, accounts for, and distributes revenues associated with mineral production.¹³³ Leases are issued through a bidding process, generally with a primary term of 10 years.¹³⁴ Once leased, “reasonable

diligence” must be exercised to develop the resource, though that term has not been well-defined.¹³⁵ The primary term lease provisions create an incentive to proceed quickly with development in order to move into the “production” phase that will both secure the leaseholder’s interest and provide an economic return on the investment.¹³⁶

Lessees are required to proceed with due diligence, not only by the terms of the lease, but also due to established doctrines of oil and gas property law. In addition to the contractual duty to proceed diligently, leaseholders also have a duty to avoid drainage.¹³⁷ Drainage is a situation in which oil or gas, which are both liquid substances subject to movement underground, are removed by drilling operations *adjoining* the leased area. If one imagines a gas reserve as a giant pool, individual wells can be thought of as straws that pull out the gas from various points on the surface. Where the straw goes in, and how many straws there are, dictate the speed and efficiency with which the pool is drained. Under the “rule of capture,” a leasehold has the potential to drain the reserves not only directly underneath it but also from surrounding leaseholds, as well.¹³⁸ While modern regulatory provisions control this issue to some degree with well spacing requirements, drainage is still a concern, especially in instances involving federal leases, where required environmental analyses can slow the relative pace of development and create a situation where state and private lands adjoining the federal leaseholds go into production much more quickly, draining the federal interests.¹³⁹

2. The MLA as a Barrier to Adaptive Management Implementation on the Anticline

An oil and gas lease is essentially a contract. It defines the right and responsibilities of both parties, and herein lies one

126. The CEQ is located within the Executive Office of the President. The CEQ assists federal agencies meet their obligations under NEPA and promulgates the regulations governing NEPA implementation.

127. See Memorandum to James L. Connaghton, Chairman, Council on Environmental Quality, from Horst G. Greczmiel, Associate Director for NEPA Oversight, Approval of National Environmental Policy Act Task Force (Apr. 10, 2002), available at <http://www.nepa.gov/ntf/20020410memo.html>. (“The [Taskforce] will also examine opportunities to employ adaptive management during program/project/activity implementation and explore opportunities where greater clarity in the regulations or guidance could afford greater efficiencies in analysis and documentation.”).

128. NATIONAL ENVIRONMENTAL POLICY TASK FORCE. REPORT TO THE COUNCIL ON ENVIRONMENTAL QUALITY 45 (2003), available at <http://www.nepa.gov/ntf/report/finalreport.pdf>.

129. See Final Rule on NEPA Implementation: Section 46.145, Using Adaptive Management, 73 Fed. Reg. 61291, 61300-01 (Oct. 15, 2008):

The establishment of specific provisions with respect to the use of adaptive management is beyond the scope of this rule. The intent of this provision is only to clarify that the use of an adaptive management approach is not inconsistent with NEPA. That is, proposed actions must be analyzed under NEPA. Each proposed action, including possible changes in management resulting from an adaptive management approach, may be analyzed at the outset of the process, or these changes in management may be analyzed when actually implemented.

130. 30 U.S.C. §§181 et seq. (2008).

131. 10 U.S.C. §§226 et seq. (2008).

132. See generally Thomas L. Sansonetti & William R. Murray, *A Primer on the Federal Onshore Oil and Gas Leasing Reform Act of 1987 and Its Regulations*, 25 LAND & WATER L. REV. 375 (1990).

133. See generally ROCKY MOUNTAIN MINERAL LAW FOUNDATION, THE LAW OF FEDERAL OIL AND GAS LEASING §12 (1996) (on fees and rentals).

134. Minerals covered are for “oil and gas,” a term that includes “all nongaseous hydrocarbon substances other than those substances leaseable as coal, oil shale, or

gilonite.” 30 U.S.C. §181; 42 C.F.R. §3000.0-5(b). In *Amoco Production Co., v. Southern Ute Tribe*, 119 S. Ct. 1719, 29 ELR 21274 (1999), this provision was interpreted to include coalbed methane, a form of natural gas.

135. “Each lease shall contain provisions for the purpose of insuring the exercise reasonable diligence, skill, and care in the operation of said property . . .” 30 U.S.C. §187. See U.S. GOVERNMENT ACCOUNTABILITY OFFICE, OIL AND GAS LEASING: INTERIOR COULD DO MORE TO ENCOURAGE DILIGENT DEVELOPMENT 2 (2008), available at <http://www.gao.gov/new.items/d0974.pdf>. (“Both MMS and BLM require ‘reasonable diligence’ in developing and producing oil and gas on federal leases, but neither agency has precisely defined the activities or time frames that constitute reasonable diligence. If lessees want to develop leases, some requirements apply.”).

136. It should be noted that there are several ways to extend, suspend, or renew a lease. See ROCKY MOUNTAIN MINERAL LAW FOUNDATION, *supra* note 133, §9.2 (Date and Primary Term).

137. Daniel F. Sullivan, *Implied Duty of Oil and Gas Lessee to Protect Against Drainage*, 18 A.L.R. 4th 14, §2[a] (1982) (“courts in all jurisdictions that have considered the question have held or recognized that, in the absence of an express provision to the contrary, an oil and gas lessee is subject to an implied duty to protect the leased premises against drainage of substantial quantities of oil or gas by producing wells on other lands”).

138. *Id.*

139. Drainage issues were of concern with regard to coalbed methane development in Wyoming’s Powder River Basin. In a motion asking the Interior Board of Land Appeals to reconsider its decision that the BLM must do additional NEPA analysis, the BLM argued “the United States is losing valuable [CBM] and related royalties each month through drainage caused by CBM wells on private and state tracts adjacent to Federal lands.” Wyoming Outdoor Council et al., 157 I.B.L.A. 259 (Oct. 15, 2002). The Interior Board of Land Appeals denied the motion. *Id.*

of the core difficulties for purposes of adaptive management. As noted above, leasing is only the first step in the process of developing oil and gas. Following the leasing stage is exploration, drilling and production, and reclamation. At the leasing stage—the point at which the federal government makes the contract—there is only a limited amount of information regarding the actual potential for development or the impact of the development on surface resources. Yet, this is the point at which the federal government has the most leverage in terms of its ability to shape the contours of development. On the Pinedale Anticline, the entire area was leased *before* the 2000 ROD was completed.¹⁴⁰ There was, therefore, no opportunity to modify lease terms to reflect what was learned through that environmental analysis.

There are currently some measures in place to address this problem. Environmental protections in the form of stipulations may be added to a lease in order to retain some management flexibility. For example, “Seasonal” or other “Special” stipulations may limit activities for specific periods of time to protect species that might be affected by development. And as noted in the *Connor* and *Sierra Club* cases “No Surface Occupancy” stipulations prohibit operations that create surface disturbance in situations where steep slopes or important surface values, such as archeological sites, make surface use untenable.¹⁴¹ In addition to stipulations, the lease terms themselves also typically contain provisions that reserve the authority necessary to comply with federal law designed for environmental management and natural resource protection.¹⁴²

Stipulations, however, can limit the desirability of a lease. They also require the BLM to have information at the leasing stage that such a stipulation may be necessary. In any case, the reality is that despite any attempts to retain management flexibility, once an area is leased, oil and gas operators have both a right and a duty to exploit the resource. For these and other reasons, the BLM has been reluctant to enforce provisions that impede development, and stipulations are often waived.¹⁴³

This was the case on the Pinedale Anticline, where wildlife protections were routinely waived, and development has

accelerated despite unanticipated degradations in air quality and wildlife habitat.¹⁴⁴ BLM officials were under pressure to move the Pinedale Anticline into production, not only from leaseholders, but also from the Bush Administration’s domestic energy policies that demand development of oil and gas resources on public lands.¹⁴⁵ BLM managers in the Pinedale Anticline were under almost daily pressure from higher officials in the BLM, and even directly from the White House itself, to advance development.¹⁴⁶ As a result, the BLM struggled to balance its new approach to integrate science with the expectations of industry and its mandate to develop the resource more quickly.

3. Implications for Adaptive Management and Recommendations for Reform

The pressure to proceed quickly made it difficult for the BLM to implement adaptive management on the Pinedale Anticline. For adaptive management to be successful in the oil and gas context, more explicit management authority must exist to control the pace of development in order to allow the necessary learning to take place and feedback into the management actions at issue. There are two specific and related ways to establish this authority—unitization and phased development. When combined with more effective stipulations, adaptive management has the potential to be successful in the context of oil and gas development.

Phased development is just what it sounds like—development occurs over time, focusing on only one part of the landscape at a time. In the case of oil and gas, it would require the BLM to “[f]ully develop one area, while resting others. Subsequent development occurs as other areas are completed and restored.”¹⁴⁷ Phased development is a relatively new approach to oil and gas development. It is currently being utilized only in limited areas with outstanding scenic or other values, such as Colorado’s Roan Plateau, where oil and gas development has been highly controversial.¹⁴⁸ The BLM

140. Telephone Interview with Laurie Goodman (Jan. 22, 2009). Goodman worked for Ultra Petroleum, one of the major leaseholders on the Pinedale Anticline, in the 1990s and was one of the chief proponents for adaptive management of the project area. She believes that, absent some sort of explicit law or regulation requiring adaptive management, such efforts will continue to be unsuccessful.

141. When surface use is prohibited, development occurs with a process referred to as “directional drilling.” As Kenneth S. Deffeyes notes, “directional drilling was originally a stunt to reach a location under a lake or under the Oklahoma State Capitol. As techniques improved, wells could be diverted ninety degrees from a surface vertical hole to a horizontal hole.” See KENNETH S. DEFFEYES, *BEYOND OIL: THE VIEW FROM HUBBERT’S PEAK* 25 (2005).

142. Standard leases terms, which apply to all but the oldest leases, contain several sections that potentially retain agency authority for environmental protections. Section 4: “Diligence, Rate of Development, Unitization, and Draining” provides that “Lessor reserves the right to specify rates of development and production in the public interest” This provision has been recognized as having “vest[ed] [BLM] with adequate authority to protect wildlife values.” National Wildlife Federation, 169 I.B.L.A. 146, 164 (2006).

143. See U.S. GOVERNMENT ACCOUNTABILITY OFFICE report, *supra* note 135, at 22 (“Industry officials cited increasing federal regulations and the withdrawal of lands for wildlife and environmental protection as having the greatest negative impact on their ability to develop oil and gas at a faster pace since the 1990s.”).

144. THE WILDERNESS SOCIETY, *OIL AND GAS ON PUBLIC LANDS: AN OVERVIEW* (Nov. 2005), available at http://www.sagebrushsea.org/pdf/TWS_O&G_Public_Lands_Overview.pdf. This overview cites data published by the BLM’s Pinedale Resource Area (Wyoming) for October 2004 through September 26, 2005, indicating that 97 out of 113 requests from oil and gas operators to waive stipulations designed to protect raptors were granted. Similarly, the BLM granted 103 of 116 requests from operators to waive wildlife winter range protections. And the BLM granted 119 out of 170 requests to waive stipulations to protect sage grouse, a species petitioned for listing under the ESA.

145. See Bryner, *supra* note 10 and accompanying text; see also Park County Resource Council v. U.S. Department of Agriculture, 817 F.2d 609, 620, 17 ELR 20851 (10th Cir. 1987). It is the stated public policy of the United States to make public lands, including national forest land, available for mineral leasing in an effort to reduce our energy dependence on foreign sources and to protect our national security.

146. Kruse, *supra* note 45.

147. See BUREAU OF LAND MANAGEMENT, FINAL SUPPLEMENT TO THE MONTANA STATEWIDE OIL AND GAS ENVIRONMENTAL IMPACT STATEMENT AND PROPOSED AMENDMENT OF THE POWDER RIVER AND BILLINGS RESOURCE MANAGEMENT PLANS 2-4; http://www.blm.gov/eis/mt/milescity_seis/ [hereinafter Montana SEIS].

148. See BUREAU OF LAND MANAGEMENT, ROAN PLATEAU RESOURCE MANAGEMENT PLAN AMENDMENT OIL AND GAS DEVELOPMENT SUMMARY, available at http://www.blm.gov/pgdata/etc/medialib/blm/co/programs/land_use_planning/rmp/roan_plateau/documents.Par.54218.File.dat/OG_DevelopmentSummary.pdf.

recently rejected phased development and adaptive management as a management approach in Montana's portion of the Powder River Basin. The BLM's reasons for rejecting phased development highlight the issues just discussed.¹⁴⁹ The BLM found that, because there was already development occurring on adjoining state and private lands in the project area, this would preclude the BLM's ability to effectively phase development.¹⁵⁰ Drainage by these nonfederal wells was also a consideration.¹⁵¹ Finally, the BLM argued that, as a practical matter, oil and gas development already occurs in phases because "[p]ractical constraints, especially infrastructure to get the project out and state and federal permitting require-

ments, all dictate industry's proposed development occurs in phases."¹⁵²

The BLM's last observation, however, makes it seem as though phased development is an end in and of itself, which of course it is not. Phased development is needed to accomplish the goals of "learning by doing" that can further inform future management action. When employed properly, phased development allows managers to evaluate the impacts of development and the efficacy of reclamation efforts before moving forward with additional surface disturbance. It reserves the ability to adapt.

A separate but related concept is unitization. Unitization is a long-established tool of oil and gas property law. It is the process by which all of the lease interests in a designated area are combined into a common pool that is developed as a single unit.¹⁵³ Once established, a plan for development is designed that maximizes the potential for efficient extraction of the oil or gas throughout the area.¹⁵⁴ The lessees then have a pro rata share of both the costs and benefits of production. Unitization is usually employed in an effort to avoid the drainage issues. By unitizing a field, the managing agency can ensure that the oil or gas is developed with maximum efficiency and with the greatest potential for fully tapping the reserve.¹⁵⁵

While unitization has been used almost exclusively for economic purposes, it also has the potential to address environmental goals. In Alaska, congressional approval of oil and gas development requires consideration of environmental interests, "activities undertaken pursuant to this section shall include or provide for such conditions, restrictions, and prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable and significantly adverse effects on the surface resources of the National Petroleum Reserve in Alaska."¹⁵⁶ The regulations implementing this provision require consideration of environmental concerns in the process of unitization.¹⁵⁷

Unitization can be utilized to protect mineral interests while allowing adaptive management to occur. Because all

Roan Plateau's RMP provides: "Surface disturbance on top of the plateau is limited to about one percent of the area at any one time—which means no more than 350 acres total of drill pads, new access roads, pipelines and other areas of surface disturbance. Previous areas disturbed must be satisfactorily reclaimed before development would be approved for new acres." *Id.*

149. In Montana, the BLM was required to consider a "phased development alternative" in its NEPA analysis for coalbed methane development in its portion of the Powder River Basin. See *Northern Cheyenne Tribe v. Bureau of Land Management*, U.S. Dist. LEXIS 4678, 48 (2005). The district court held that phase development should have been considered in range of alternatives for the development, and granted an injunction prohibiting the BLM from moving forward with full field development until it considered a phased development alternative among the "range of reasonable alternatives" required by NEPA. *Id.* In holding that phased development must be among the reasonable range of alternatives, the court emphasized the BLM's stated purpose of analyzing "options for managing the environmental effects of CBM 'exploration, production, development, and reclamation . . .'" *Id.*

Nothing in the Statement restricts those options to full-field development. Rather, the goal of the EIS is to determine what options, including mitigating measures, will help minimize the environmental and societal impacts related to CBM activities. Phased development, such as controlling the number of rigs operating in an area or developing one geographic area at a time . . . would not hinder this goal. To the contrary, a phased development alternative would serve the stated purpose and need of the EIS by providing additional options for minimizing impacts related to CBM exploration, production, and development.

Id. (citations omitted). The court noted that not only the plaintiffs but also EPA Region V and the Montana Department of Fish Wildlife and Parks encouraged consideration of a phased development alternative." The U.S. Court of Appeals for the Ninth Circuit upheld a partial injunction limiting development in the area until supplemental NEPA provided this analysis. *Northern Cheyenne Tribe v. Norton*, 503 F.3d 836, 841, 37 ELR 20227 (9th Cir. 2007). In creating a partial injunction that prohibited coal bed methane development on 93% of the resource area until BLM completed a revised environmental impact statement, but permitted development on 7% of the resource area, the court was attempting to allow some "phase" of development to continue to proceed. *Id.* The Ninth Circuit allowed this, holding "district court did not abuse its discretion in issuing the partial injunction proposed by BLM because it provides an equitable resolution consistent with the purposes of NEPA." In her dissent, the Chief Judge disagreed with the decision to allow partial development before the full NEPA analysis was completed, arguing that "result here is also contrary to fundamental injunction principles, which stress avoiding undue hardship and maintaining the status quo pending completion of agency or other legal proceedings." *Id.*

150. In their comments on the draft Montana SEIS, Northern Plain Resource Council, one of the plaintiffs in the original case, took issue with this rationale, arguing that "Federal ownership of more than half the CBM resources in the area most likely to be developed makes a compelling case for the BLM to choose a phased-development alternative that controls the pace of development." Comments of Mark Fix, Chair Northern Plains Resource Council on the Draft Supplement to the Montana Statewide Oil and Gas Environmental Impact Statement and Amendment of the Powder River and Billings Resource Management Plans, submitted on May 1, 2007 (on file with author).

151. Instead, the BLM is proposing to establish multiple "screens" that development activities must pass through that establish thresholds to protect wildlife, air and water quality, etc. The BLM states that it will engage in adaptive management, though it does not appear to have any clear articulation of how it will apply adaptive management principles.

152. See *Montana SEIS*, *supra* note 148, at 2-5.

153. See *ROCKY MOUNTAIN MINERAL LAW FOUNDATION*, *supra* note 133. The Alaska Department of Natural Resources explains:

154. Unitization is the grouping or pooling of working interest and royalty ownership in oil and gas leases that overlay a common petroleum reservoir. It is a method for developing an oil or gas pool that maximizes ultimate recovery, prevents economic and physical waste, and protects the rights of all parties with an ownership interest in the accumulation. A unit agreement defines a contractual relationship between the state, the royalty owners, and the working interest owners of the oil and gas leases included in the unit area.

Alaska Department of Natural Resources, Division of Oil and Gas, Annual 2007 Report, at 2-2 [hereinafter ADNR Annual Report], available at http://www.dnr.state.ak.us/oil/products/publications/annual/2007_annual_report/2_Units_2007n.pdf.

155. The leases in the Pinedale Anticline were unitized, though for economic rather than environmental reasons. See Goodman, *supra* note 140.

156. 42 U.S.C. §6508.

157. See 43 C.F.R. §3137.23(f). The regulations require, as part of a complete application for unitization in the Petroleum Reserves in Alaska "a discussion of reasonably foreseeable and significantly adverse effects on the surface resources of NPR-A and how unit operations may reduce impacts compared to individual lease operations . . ." *Id.* See generally 43 C.F.R. pts. 3130 and 3160 (implementing statutory authority allowing operators to form units in the National Petroleum Reserve-Alaska.); Telephone Interview with Greg J. Noble, Energy Section Chief, BLM Alaska State Office (Dec. 9, 2008).

of the unitized interests are bound together, the process removes the competition created by the “rule of capture” and allows for phased development paced by adaptive management.¹⁵⁸ It addresses the concerns raised by the BLM in Montana regarding development on state and private lands because unitization has the potential to cross jurisdictional boundaries.¹⁵⁹

Finally, stipulations that explicitly anticipate and accommodate adaptive management would improve the BLM’s ability to integrate adaptive management and oil and gas development. As discussed above, the BLM arguably has adequate authority under existing leasing provisions to pace development. However, as a practical matter, the experience on the Pinedale Anticline demonstrates that, absent more explicit authority, it may be difficult for the BLM to marshal the necessary institutional will to do so. A special “Adaptive Management” stipulation would place operators on notice that development would be paced to adaptive management implementation.

This idea is not entirely new. In 1989, the National Academy of Sciences (NAS) published its report *Land Use Planning and Oil and Gas Leasing on Onshore Federal Lands*.¹⁶⁰ The study was commissioned in response to the U.S. Congress’ inability to reach agreement of whether the Federal Oil and Gas Leasing Reform Act of 1987¹⁶¹ should have included more detailed requirements regarding planning and environmental analyses.¹⁶² As a compromise, Congress directed that a study be conducted on “the manner in which oil and gas resources are considered in land use plans.”¹⁶³ The NAS did the study, and they came up with a series of recommendations.

While published well before adaptive management became widely recognized (the document makes no mention of adaptive management) the study recognized the need for adaptation to protect environmental resources. In its identification of “the problem,” the NAS states:

The question becomes how the congeries of values served by the public lands can be identified and protected when the relevant information becomes available during the subsequent leasing, exploration, and development stages, particularly in those circumstances where the information discloses that prospective oil and gas activities will have unacceptable impacts on other uses and values.

Their recommendations included two specific ideas for placing stipulations on leases to both reserve management flexibility while also accommodating industry. One recom-

mendation focused on areas high in oil and gas potential but also high in potential for land use conflicts. For these areas, the NAS recommended that areas be leased with stipulations that allowed only for exploratory wells, at least initially. The information gained during exploration would guide later decisions regarding whether to allow further development, and the lessee would be reimbursed for the costs of the lease and exploration if it turned out that the land use values precluded mineral development.¹⁶⁴ This stipulation would allow the BLM “to engage in better-informed, less speculative analysis of the benefits and costs of production, before making a final decision whether to allow it.”¹⁶⁵

The second recommendation applied to all leases issued by the BLM and maximized the agency’s ability to pace and control development to protect natural resources. The recommendation:

All leases should include a standard stipulation that preserves the government’s flexibility to control and if necessary, to prohibit, activities on leases that pose serious and unacceptable impacts on other values, but with the provision that a lessee would be reimbursed for its direct costs in acquiring and developing its lease if further exploration and development is prohibited.¹⁶⁶

The NAS speculated that these stipulations might have an effect on the amount potential lessees would be willing to bid on leases, but viewed this as an acceptable compromise that allowed for maximum flexibility in the absence of certainty.¹⁶⁷

While neither of these recommendations was ever acted upon by either Congress or the BLM, they are worthy of reexamination. Combined with adaptive management methodology, they have the potential to address many challenges associated with leasing federal minerals in the absence of adequate information regarding corresponding environmental impacts.

When implemented effectively, adaptive management is ideally suited to the inevitable uncertainties of oil and gas development. Oil and gas development is a form of natural resource development in which the proposed management action can be as dynamic as the ecosystem it alters. From an adaptive management perspective, beginning the process at the leasing stage, with large tracts of land, is ideal because of the “growing agreement that biologically effective preservation of species, habitats, and ecological processes requires

164. Recommendation Two:

In areas where available information indicates the potential for high-value oil and gas resources, but here surface values are especially high and potential land use conflicts cannot be resolved during planning, lands should be made available for leasing with a right only to drill exploratory wells in defined locations. Information gained by that exploration should be used to make a subsequent analysis and agency decision on proceeding with development if discovery of petroleum makes development possible. If, after that analysis, further exploration and development is prohibited, the lessee should be reimbursed for its direct costs of obtaining and exploring the leasehold.

Id. at 118-19.

165. *Id.* at 120.

166. *Id.* at 127.

167. *See id.* at 120.

158. See ADNR Annual Report, *supra* note 153, at 2-2. (“Unitization minimizes impacts to the environment, protects the value of leases, and ensures efficient and equitable recovery of hydrocarbons.”).

159. See, e.g., WYO. REV. STAT. §30-5-109(f) (providing authority for the Wyoming Oil and Gas Commission to order compulsory pooling of interests into a single drilling unit); see also Noble, *supra* note 157 (noting that units often include both state and federal lease parcels).

160. NATIONAL ACADEMY OF SCIENCES COMMITTEE ON ONSHORE OIL AND GAS LEASING, *LAND USE PLANNING AND OIL AND GAS LEASING ON ONSHORE FEDERAL LANDS* (1989).

161. 10 U.S.C. §§226 et seq.

162. *Id.* at 10.

163. *Id.*

working on large spatial scales.”¹⁶⁸ The lack of information about the impact of the proposed development would not deter or surprise an adaptive management practitioner but would instead provide a basis for building the necessary assumptions into a model that would guide further development informed by science. Combined, the management tools of phased development, unitization, and adaptive management stipulations, can provide the necessary flexibility to effectively employ adaptive management.

IV. Conclusion

Adaptive management represents a significant step forward in the complexity of our thinking about natural resource challenges. Efforts to employ adaptive management in the context of oil and gas development are increasing. It is important to examine the BLM’s failure on the Pinedale Anticline, learn from the mistakes made there, and modify the regulatory framework to better incorporate adaptive management. Improvements in three key legal structures would greatly improve adaptive management’s success. First, FACA, in its current form, hinders the type of stakeholder-based, collaborative process necessary for effective adaptive management.

Both relaxing and streamlining FACA’s requirements, or even exempting certain types of collaborative processes from FACA, would enable federal agencies to involve key interests outside government for better adaptive management of resources. Second, NEPA’s “front-end” approach limits effective implementation of adaptive management because of NEPA’s assumption that a single, well-defined “major federal action” lacks the tolerance for flexibility and experimentation required by adaptive management. The result in the oil and gas context is a “shell game” in which oil and gas projects shift, overlap, and mask the actual impacts associated with energy development. In order for NEPA to provide a substantive basis for decisionmaking, it must inform a committed process that allows for the assumptions to be effectively tested, built upon, and learned from. Finally, current leasing under the MLA makes it difficult for oil and gas development to proceed at a pace that allows for implementation of adaptive management. Phased development, unitization, and more explicit “adaptive management” stipulations are needed to incorporate adaptive management and allow the BLM to extract minerals while also meeting its multiple use mandate on federal lands.

168. See Lee, *supra* note 20, at 3.