SLIDES: Adaptive Management: Pros, Cons, and Lessons Learned

Pete Morton

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Adaptive Management: Pros, Cons, and Lessons Learned

Pete Morton, Ph.D

The Wilderness Society
Adaptive **Ecosystem** Management

“…the primary goal of ecosystem management is to conserve, restore, and maintain the ecological integrity, productivity, and biological diversity of public lands….The overriding objective…is to insure the ecological sustainability of the land.”

“Ecosystem management in the BLM” (BLM 1994)
Adaptive Ecosystem Management

AEM is an experimental, systems approach to using applied science and monitoring to improve resource management. Learning to manage, managing to learn.

Adaptive Ecosystem Management Plans should ask well-defined questions, place a premium on collecting, analyzing and monitoring data, and examine cumulative environmental impacts at multiple spatial and temporal scales as part of the NEPA process.
Adaptive Ecosystem Management

According to Walters (1997), in addition to a greater emphasis on data collection and monitoring, AEM requires a concerted effort to integrate agency experience and scientific information into dynamic models that predict the impacts of management alternatives.

1) Retrospective modeling
2) Predictive modeling
3) Cumulative impact modeling
“Footprint” of Big Piney-Labarge Oil and Gas Field

1,400 miles of linear features

3.8 miles$^2$ of spatial features

7 mile$^2$ (4%) physical footprint
## Percentage of the Study Area with Different Feature Edge Densities

<table>
<thead>
<tr>
<th>Linear feature density (miles/square mile)</th>
<th>Based on a one-square-mile grid</th>
<th>Based on a four-square-mile grid</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 3</td>
<td>22%</td>
<td>12%</td>
</tr>
<tr>
<td>3 - 6</td>
<td>49%</td>
<td>64%</td>
</tr>
<tr>
<td>6 - 9</td>
<td>20%</td>
<td>14%</td>
</tr>
<tr>
<td>&gt; 9</td>
<td>9%</td>
<td>10%</td>
</tr>
</tbody>
</table>
The area of the Jonah Gas Field in Wyoming, showing the undisturbed sagebrush and grassland habitat prior to drilling in 1986

(Credit: Amos 2003).
The Jonah Field in 1999 after one year of drilling at 80-acre spacing (8 well pads per square mile) using state-of-the-art drilling technology. (Credit: Amos 2003).
The Jonah Field in 2002, after nearly 400 wells were drilled at 40-acre spacing, close to the maximum number allowed by the 1998 management plan.
The Jonah Field in 2002, after nearly 400 wells were drilled at 40-acre spacing, close to the maximum number allowed by the 1998 management plan. Industry now wants 850 new well pads at 16-acre well spacing (40 well pads per square mile) (Credit: Amos 2003).

Is allowing higher density drilling an example of adaptive ecosystem management?

Is 16 acre spacing consistent with BMPs?
Adaptive Ecosystem Management Requires an Analysis of Cumulative Environmental Impacts

- Montana Thrust Belt;
- Powder River Basin;
- Greater Green River Basin;
- Uinta/Piceance Basin; and
- San Juan/Paradox Basin
Adaptive Ecosystem Monitoring

Monitoring is needed to evaluate resource conditions, estimate management impacts, determine trends, and verify assumptions. Monitoring is a critical requirement for dealing with uncertainty in managing large-scale ecosystems.

At a minimum, monitoring plans must:
1) Outline how monitoring information will be evaluated and interpreted
2) Outline procedures for responding to monitoring results, including how they will be incorporated into future decision making
3) Provide a contingency plan that reduces the risk, if things do not go as planned – for example, when budgets are less than required to implement mitigation plans.
Adaptive Ecosystem Monitoring

Implementation monitoring – examines whether the plan was properly implemented.

Status and change monitoring – provides information on whether desired future conditions are being achieved.

Cause and effect monitoring and research – entails testing hypotheses directly related to the effectiveness of the plan in achieving desired future conditions, and testing the validity of the underlying assumptions used in plan development.

Key information monitoring – provides information on key areas of uncertainty and risk in order to make better informed decisions.
Adaptive Ecosystem Monitoring

The success of adaptive ecosystem management is dependent upon a well-designed, adequately funded, and carefully implemented monitoring, mitigation and research plan.
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The success of adaptive ecosystem management is dependent upon a well-designed, adequately funded, and carefully implemented monitoring, mitigation and research plan.

Unfortunately there are few long-term success stories.
The Environmental Risks from Current Drilling Plans are High

>> The scale of drilling proposed in management plans is large

>> The plans are being developed at an accelerated pace

>> The scientific knowledge on environmental impacts is poor

>> Baseline data are inadequate

>> Budgets - staffing levels for field “ologists” are insufficient
Adaptive Ecosystem Management Requires Good Data

“Lack of solid economic, analytical procedures and hard data continually handicaps planning by failing to portray objectively trade-off values to be gained or lost through managerial decisions” (Crawford 1986).

“In the DEIS there is a pattern of first asserting a lack of data as a rationale for no quantitative analysis and then concluding no adverse effects” (Noon 2002).

“The lack of a coordinated, national program for inventory of (wildlife and fish) resources on BLM-managed land is problematic, because it is difficult to manage resources without full knowledge of their status on public land. When inventory is performed, coverage of resources may be inconsistent, and in some instances, current office staff may be unaware of inventory efforts by previous employees” (BLM 2003).
Adaptive Ecosystem Management is Compromised by Speed and Lack of Staff and Funding

“The accelerated time frame for completing time sensitive (energy) plans may not provide sufficient time to address ...species conservation issues” (BLM 2003c).

“In areas with high demand for energy development there is insufficient time for existing staff to keep up with the workload it creates. In all cases, staffing and funding are insufficient to establish and implement a proactive FWBSSS program…. The increased workload generated by energy development...(is) creating a workforce that is stressed, over-worked, and facing potential burnout.” (BLM 2003c).
Adaptive Ecosystem Management

Institutional constraints

>> Lack of long-term budget commitment to mitigating environmental impacts and monitoring resource conditions.

>> Lack of research staff
Slow down, reduce the scale, increase staff and budgets, collect and monitor data, and adopt an incremental science-based, adaptive ecosystem management approach.

“In the absence of data and high uncertainty, logic would suggest a slow and incremental approach to CBM development coupled with close monitoring to detect possible adverse impacts. The public expects responsible resource managers to implement monitoring and adaptive management in an incremental fashion when irrevocable or irreversible outcomes are possible”. (Noon 2002)