Abstract: Changing Climates and the Incorporation of Adaptive Management into Our State Wildlife Action Plans

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The loss of biodiversity is repeatedly identified as the primary threat to long-term ecosystem resilience, with the potential to not only undermine natural ecosystem function, but threaten human socio, political and economic stability. Concerns about biodiversity increasingly have led to efforts to reduce the rate of species loss, but despite the good intentions of numerous public and private organizations, the number of species at risk continues to rise. In the United States alone, there are currently more than 1,200 species listed as threatened or endangered, with potentially thousands more at risk. Moreover, it is becoming increasingly apparent that changing climatic conditions may accelerate species loss, while ironically, the maintenance of species diversity may be crucial in efforts to both mitigate and adapt to new climatic conditions. Given the current and pending challenges of conserving biodiversity, there is an ever increasing need to develop strategic conservation efforts that proactively address the continuing threats to biodiversity, and despite numerous attempts to initiate large-scale conservation implementation, there are surprising few successful examples.

In 2002, Congress created the State Wildlife Grants (SWG) program to provide funding to states with the goal of maintaining biodiversity, and avoiding the costly and controversial regulations that accompany listing under the Endangered Species Act. To receive SWG funds, each state developed a state wildlife action plan to articulate their vision for the biodiversity conservation. In the summer of 2009, the U.S. House of Representatives further challenged the states by requesting the inclusion of language and approaches for mitigating and adapting to changing climates and the potential impacts to biodiversity. While not explicitly outlined by Congress, the elements central to the SWG program form the foundation of adaptive management, a management paradigm that aims to continually assess management practices as a means to address uncertainty both in knowledge and outcome. The use of adaptive management for managing declining species, especially in light of climate change, may be particularly appropriate, as adaptive management explicitly acknowledges and attempts to address the uncertainty inherent in managing species where basic biological information and an understanding of appropriate management strategies is too often lacking. Moreover, the uncertainty inherent in predicting future climatic conditions and the need to act to mitigate and adapt to new and ever changing climatic conditions are ideally suited for implementation of adaptive management. Indeed, the potential benefits of incorporating adaptive management as a paradigm were not lost on SWG planners, as nearly every state plan mentions adaptive management; yet, despite the awareness that adaptive management may function well in meeting the goals outlined by Congress, the development of an effective adaptive management framework is challenging.

In an effort to assess the extent to which states embraced adaptive management in the initial development of their plans, and as a means to help states begin to consider how adaptive management approaches may assist in managing changing climate conditions, I reviewed 53 plans from all 50 states, the District of Columbia, and the territories of Puerto Rico and Northern Marias Island. I evaluated plans based on the extent to which they developed sound adaptive management principles expressed through explicit programmatic and project-level management frameworks and how this approach may poise states for coping with climate change.

Despite an obvious awareness by the states that adaptive management was an effective method of meeting the goals of the SWG program, it was clear that the development and incorporation of explicit adaptive management approaches within each plan remained elusive. Only about 20 percent of the plans included a framework for how adaptive management would be implemented at the project level within their state. There was, however, considerable support across plans for further development and implementation of adaptive management. Unfortunately, there are also numerous obstacles and constraints. Some obstacles highlight the enormity of the challenge the states face in biodiversity conservation. For example, many plans communicated the challenge of decision making, from identifying imperiled species and habitats to outlining alternative management strategies. Making complex decisions with enormous implications is challenging, but these obstacles can be overcome by incorporating decision tools that increase the structure and transparency of the decision process and thereby the defensibility of outcomes. This is particularly true when decisions are made with a great deal of uncertainty, as would be expected for decisions concerning mitigation of or adaptation to climate change. Other obstacles involve more dogmatic shifts in the way we think about, fund and implement management. As a reactionary society, many natural resource management decisions are made in response to current sociopolitical perceptions of resources, but adaptive management calls for a more proactive approach. The nature of climate change in particular, with the time lags inherent in mitigation and adaptation, will require a proactive management approach to ensure that desired outcomes are achieved well in advance of projected changes.

Finally, although Congress explicitly identified monitoring as a key element of the SWG program, prioritizing monitoring from both a budgetary and a design perspective remains a challenge. Again, climate change in particular warrants support for more stringent design of monitoring efforts. Unlike other perturbations to the environment, climate change has the potential to alter ecosystems so completely as to in some cases remove the opportunity for returning systems to historical states. Which is not to say environments cannot be maintained or restored, but rather that the nature of pristine conditions may change for a location, creating a continually moving target which will require extensive monitoring efforts to not only identify current conditions and ecosystem drivers, but also potential future stable states.

Despite the obstacles, states have a rich history of natural resource management success, andby building upon their strengths and improving upon their weaknesses they can overcome the challenges and ensure the conservation of biodiversity. By furthering the incorporation of adaptive management principles in their conservation plans and outlining the decision-making process more explicitly, states will be poised to meet the pending challenges of maintaining biodiversity in a changing climate.