Proactive Conservation Planning for Emerging Industries

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By anticipating the likely geography of change, resource managers can identify at-risk species, proactively propose best practices, and strategically allocate monitoring efforts to adaptively respond to change.

Rapidly developing, emerging industries can drastically change landscapes in ways that negatively impact biodiversity – often irreversibly. Yet, managers tasked to evaluate, negotiate, and permit land use by emerging industries can be hard pressed to find relevant, local data to define expected impacts. If impacts cannot be proactively anticipated and addressed, there may be limited options and high costs to later recover from, or mitigate, species and habitat loss.

In North Carolina, intensification of biofuel production due to state renewable fuel targets and incentives has the potential to radically change the percent cover and distribution of various land cover classes with associated impacts to wildlife. The specific effects of this increase, however, will likely vary across species, crop types, land use histories, landscape contexts, geographic regions, crop management practices, and spatial and temporal scales. We worked with the Biofuels Center of North Carolina to formulate a proactive plan in the face of these complexities.

We built our approach around existing methods for simulating landscape change, but we embedded these transition models within a broader context. First, with economic models, we identified commercially viable settings for and conditions of land conversion, thus narrowing the geographic scope of anticipated change.

1. *Economic modeling to predict where market demand, infrastructure, and other industry requirements co-occur.*
2. *Landscape change modeling to predict how industry expansion will affect habitat availability and species distribution.*
3. *For species most likely to share altered landscape, identifying potential "Best Practice" recommendations* a priori *of negative impacts.*

Then, after running the landscape transition models and distinguishing between species likely displaced and species likely to remain, we evaluated alternative field-level biofuel production decisions (e.g., crop type, growing strategies, harvest strategies, etc.) to determine if certain options presented greater or lesser expected threat to the impacted species. Our results suggest practical opportunities exist to minimize some risks of negative wildlife impacts of emerging biofuels industry. Furthermore, given that industry has not yet established (proposals and permits are in review), there remains time to guide industry towards these solutions while simultaneously guiding limited conservation resources towards effective monitoring as industry expands.

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