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A critical review of efforts to protect Florida panther habitat on private lands

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ABSTRACT

This paper examines the use of federal regulations and market-based incentives to conserve habitat for the Florida panther on private lands. We examine: the role of habitat conservation in panther recovery efforts; the limitations of existing regulatory mechanisms, in particular the Endangered Species Act, in conserving panther habitat on private lands; and how market-based incentives for habitat conservation may complement regulations. In particular, we examine how a payment for ecosystem services (PES) program could attain both economic and ecological efficiency in habitat conservation on private lands. We conclude that a strategic combination of regulatory and market-based incentives would be more effective at conserving contiguous habitat on private lands, especially when the loss of habitat is driven by rapid urban and exurban development.

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1. Introduction

Although the U.S. Endangered Species Act (ESA) has been successful in preventing species extinction, regulatory interventions are insufficient to ensure species recovery (Male and Bean, 2005; Schwartz, 2008). Regulatory interventions typically cannot attain either ecologically optimal or cost-effective habitat conservation in large part because agencies have incomplete information about the relative costs and benefits of habitat conservation (Polasky and Doremus, 1998). In the case of the Florida panther (*Puma concolor coryi*), federal efforts at recovery are largely confounded by the wide-ranging nature of the species and the rapid loss of contiguous habitat due to development and land conversion (Kautz et al., 2006).

Currently, the Florida panther has a single breeding population restricted to southwest Florida. Mitigation for incidental take under the ESA and various zoning regulations have been employed within this current range to conserve panther habitat. These regulations have also acted as catalysts for several market-based approaches to panther habitat conservation, namely: habitat conservation banking, purchase of development rights (or conservation easements), tax relief, and tradable development rights programs. Each of these instruments has contributed toward panther habitat conservation. However, habitat conservation in southwest Florida remains piecemeal because mitigation under the ESA – the primary catalyst for habitat conservation – typically only applies to land conversion that requires Federal permits

The challenges of panther habitat conservation increase outside southwest Florida. These lands are currently not subject to mitigation for habitat conversion under the ESA because only transient male panthers have been documented on these lands. This is a key concern. Panther recovery requires the conservation of sufficient habitat to support three viable, self-sustaining panther populations in the southeastern United States (USFWS, 2008). As such, privately-owned rangelands north of the current panther breeding range are central to panther recovery. Currently, these lands provide a mosaic of native habitats and agricultural lands which benefit the panther's prey base and are able to support an expanding panther population. Strategic implementation of conservation policies and programs is required to secure habitat for a breeding panther population on these private lands.

To address the existing limitations of panther habitat conservation efforts, in 2014 the United States Fish and Wildlife Service (USFWS) proposed two programs to assist in panther recovery efforts: payments for habitat management and a regulatory assurance. The Florida Panther Payment for Ecosystem Services Pilot Program is a per-acre payment program that is intended to offset the costs to private landowners of managing panther habitat (prescribed burning, exotics removal, roller chopping, and prescribed grazing) in the panther's current breeding range. The proposed safe

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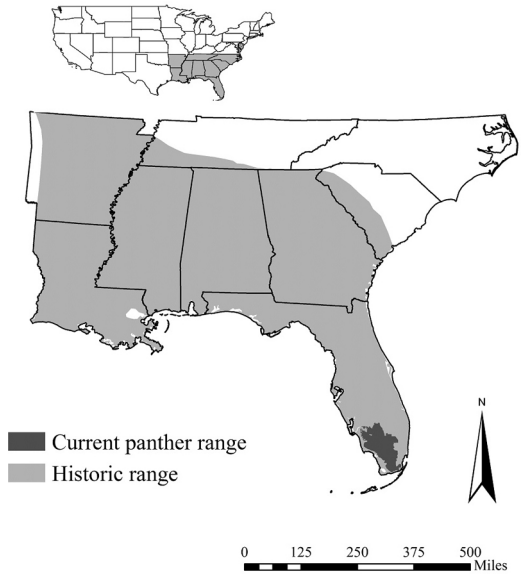

Fig. 1. Current and historic panther range in the southeastern US.

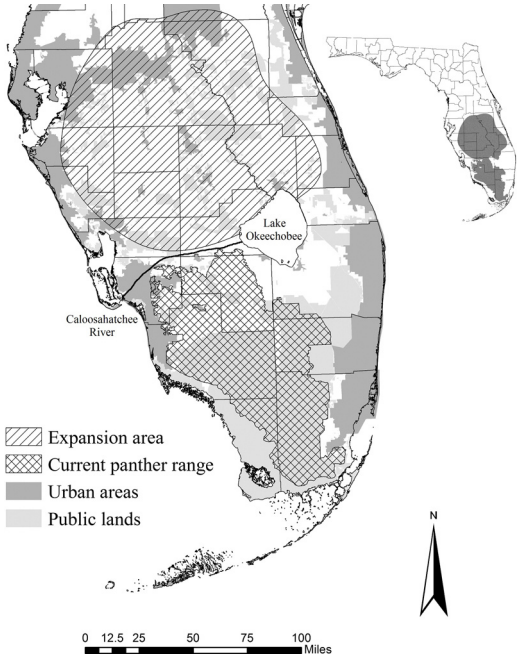

Fig. 2. Current panther range and potential expansion area crossing public and private lands in both central and south Florida. The area for potential range expansion is based on Thatcher et al., (2009).

harbor agreement is a regulatory assurance to landowners (north of the current breeding range) that efforts to manage panther habitat on their lands will not negatively impact them under the ESA. Both programs have merit. However, both programs are subject to limitations. For example, the current structure for the payment program, and funding constraints faced by the USFWS, may limit the program's effectiveness in conserving sufficient habitat to support panther recovery.

Given the inherent complexity in utilizing both regulatory and market-based programs to recover the Florida panther, a critical review of existing and proposed programs is necessary to identify appropriate next steps. Our discussion largely focuses on the comparative effectiveness of regulatory and voluntary programs in conserving contiguous panther habitat over time. We conclude that scarce financial resources should be invested in expanding voluntary programs that complement regulatory interventions.

2. The need for Panther habitat conservation

The Florida panther is currently restricted to less than 5% of its historic range and exists as a single breeding population in south Florida (Fig. 1) (USFWS, 2008). Listed as endangered in 1967, the most recent population estimates are between 100 and 180 adults and sub-adults (USFWS, 2008). Delisting of the Florida panther requires: (1) the establishment of three viable, self-sustaining populations each containing at least 240 adults and sub-adults; and (2) securing and protecting habitat of sufficient quality, quantity and spatial configuration to support panther populations in the long run (USFWS, 2008). Delisting also requires natural dispersal of panthers and gene flow among the three viable, self-sustaining populations, which is contingent on habitat connectivity (Maehr et al., 2002). Accordingly, recovery of the panther depends on habitat conservation on both public and private lands, as well as private landowner support for panther conservation.

The current range of the Florida panther already crosses multiple private and political boundaries throughout south Florida (Fig. 2). A large portion of existing habitat is located on state and federal lands (e.g., wildlife preserves) that are concentrated around the southern tip of Florida. Private lands, containing important habitat, are located along the coast and the interior of the state, just north of the state and federal lands. The coastlines of south Florida are characterized by rapidly growing urban areas which are expected to move inland due to population growth and sea level rise (Titus et al., 1991). In contrast, the interior of the state (the potential expansion area)[1] is dominated by private rangelands primarily used for cattle grazing, as well as citrus production and row crops. These lands are also under pressure from exurban and residential development, which would undermine panther conservation and recovery efforts (Kautz et al., 2006).

Based on habitat conversion trends, the USFWS predicted a 0.8% loss of habitat each year within the current panther breeding range (USFWS, 2008). The USFWS further predicted that 32,591 acres of important habitat within the breeding range would be developed over a 5-year period because the ESA would not apply to these development actions (USFWS, 2008). Thus, an integrated approach to habitat conservation on private lands is required to ensure panther recovery.

3. Use of regulatory approaches in conserving Florida panther habitat

Under Section 9 of the ESA, the USFWS retains the right to intervene to protect the panther if land use changes will result in "...significant habitat modification or degradation where it actually kills or injures [the panther] by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering" (USFWS, 2011; see also Ruhl, 2008). Land use conversion that adversely affects panther habitat is classified as incidental take of the panther, and provides the USFWS with leverage to mitigate for habitat loss or conversion.

To date, the USFWS has only required mitigation in the documented breeding range for the Florida panther (i.e., lands south of

[1] The potential expansion area illustrated in Fig. 2 is based on a study by Thatcher et al. (2009) who used a variety of spatial analyses to evaluate the potential of lands north of the Caloosahatchee River to support panthers. Panthers are able to use a wide variety of rural landscapes as habitat, including forests and rangelands and some agricultural lands. However, a least-cost path analysis revealed that sections of potential panther habitat in the expansion area are isolated by barriers such as major highways, water ways and areas with a high human population density.