

Managing “Islands of Biodiversity” for Species at Risk

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The Front Range Urban Corridor, stretching from Cheyenne, Wyoming, to Pueblo, Colorado, is one of the fastest growing regions in the United States. Numerous DoD installations are located in this corridor or nearby. Three DoD installations found here were the focus of this project: Fort Carson, home of the 4th Infantry Division; Piñon Canyon Maneuver Site (PCMS); and the U.S. Air Force Academy (USAFA). These installations are testing the concept of military lands as “islands of biodiversity.” Population growth, urban and exurban development, energy development, land-use conversion and other factors threaten habitats and the species that depend on them. As these pressures encroach upon the areas surrounding DoD lands, the natural habitats on DoD lands become important refuges for species at risk (SAR). DoD could find its installations shouldering more conservation responsibility as threats to biodiversity continue.

The DoD Legacy Program funded project, *Threats and Stressors to SAR and Ecological Systems, Practical Implications, and Management Strategies for Installations in Colorado and the Western U.S.*, was awarded to Colorado State University in 2016. The project provides DoD natural resources managers an approach to better understand the evolving local and regional threat components affecting management challenges. The project team analyzed current and potential threats (including but not limited to residential development, energy production, introduction of invasive species, air and water pollution, and non-stationary climate) to three ecological systems (shortgrass prairie, pinyon-juniper woodlands, cliffs and canyons) and five SAR (pinyon jay, gray vireo, golden eagle, Preble’s meadow jumping mouse, burrowing owl) on Fort Carson, PCMS, and USAFA.

Researchers found that all of the ecological systems and SAR studied were vulnerable to the impacts of habitat encroachment. To help mitigate impacts on these ecosystems, the study makes a number of recommendation, including:

- Investing in planning and cross-boundary collaboration as a top priority;
- Enhancing internal collaboration and communication on Best Management Practices and data sharing;
- Implementing landscape-scale monitoring to support habitat management; and
- Managing for resilience of natural processes and systems dynamics, including prairie dogs as a keystone species, in the context of drought.

For many elements examined, regional threats such as land-use conversion and non-stationary climate may be more pronounced than threats within the installations themselves. This underscores the importance of military lands in conserving species and their habitats as well as the need for cross-boundary collaboration to conserve unfragmented habitats at large scales.

Other landscapes in the U.S. that are near large DoD land areas are undergoing similar population increases, and the installations near these expanding population centers will have similar environmental pressures and concerns. Understanding, anticipating, and responding to an

increasingly complex set of threats is a significant challenge for DoD natural resources managers. Past and ongoing management and planning efforts for SAR and their habitats on the installations examined have helped the DoD accommodate mission requirements where these species are present and will help minimize future impacts to military training. The information generated by this project will help continue and expand on these efforts, allowing the DoD to maintain operational readiness even under increasingly challenging conditions. The flexibility of this framework will allow DoD natural resources managers in other ecoregions to assess the vulnerability of their particular habitats and SAR.

For additional details, see the full technical report available at

http://www.cnhp.colostate.edu/download/documents/2017/DODLEGACY_REPORT_FINAL_Project14-770.pdf or contact Lee Grunau, Colorado Natural Heritage Program, at Lee.Grunau@colostate.edu.



Two of the ecological systems analyzed, shortgrass prairie and cliffs and canyons, meet at PCMS. Source: David Jones, CEMML



Looking out toward Purgatoire Canyon from a pinyon-juniper woodland typical of the region at PCMS. Source: David Jones, CEMML



Flooding induced erosion of Kettle Creek at the USAFA. Increased storm water runoff due to local residential development has led to increased erosion at several streams and creeks that were considered to be high-value habitat for the federally threatened Preble's Meadow Jumping Mouse. Source: Brian Muhlbacher, USFWS.



Pinyon Jay (Gymnorhinus cyanocephalus). Source: Chris, Flickr Creative Commons.



Gray Vireo (Vireo vicinior). Source: Roger Staples (birds.netai.net).



Burrowing Owl (Athene cunicularia). Source: Nicole Beaulac, Flickr Creative Commons.



Golden Eagle (Aquila chrysaetos). Source: Dick Daniels, www.carolinabirds.org.



Preble's meadow jumping mouse (Zapus hudsonius preblei). Source: Rob Schorr, CO Natural Heritage Program.