Efficacy of Road Underpasses for Minimizing Bear-Vehicle Collisions on the 4-Lane Section of Georgia 96, Phase 1

Michael Hooker 1 (406-291-4572, hookerm@uga.edu), Graduate Research Assistant
Dr. Michael Chamberlain 1 (706-542-1181, mchamberlain@warnell.uga.edu), Professor of Wildlife Ecology and Management
Dr. Karl Miller 1 (706-542-1305, kmiller@warnell.uga.edu), Professor of Wildlife Ecology and Management
Dr. Robert Warren 1 (706-542-6474, warren@warnell.uga.edu), Professor of Wildlife Ecology and Management

1Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA 30602

Introduction and Study Area

There are 3 geographically distinct populations of black bear (Ursus americanus) in the state of Georgia. The smallest of these 3 is the Central Georgia Bear Population (CGBP). The CGBP is comprised of an estimated 200-300 animals residing in approximately 400km2 of forested land along the Ocmulgee River in Central Georgia (Carlock et al. 1999, Fig. 1). This area is almost completely surrounded by human development and highly fragmented agricultural land. Georgia State Route 96 (GA96), a 2-lane highway, bisects the area inhabited by the CGBP. Plans to widen and fence portions of GA96 include the use of wildlife underpasses to reduce bear-vehicle collisions while allowing bear movement across the highway.

Objectives

Use Global Positioning System (GPS) telemetry collars with Global System for Mobile (GSM) data download (Fig. 2) to document bear movement near and across GA96 during the pre-construction phase of the proposed highway widening project.

Methods

During Summer 2012 and 2013 bears were captured and collared with Lotek, Wildcell GPS/GSM collars. A virtual “geo-fence” was used to control location acquisition rate (Fig. 3). When greater than 250m from GA96 the collars acquired 1 location every 20 minutes. When less than 250m from the highway, the collars acquired 1 location every 5 minutes.

Estimating an animal’s movement path from location data involves uncertainty, even at a fine scale (e.g., 1 location every 5 minutes, Fig. 4a). We will use Brownian bridge analysis to reduce this uncertainty. Brownian bridges use location error and movement variance to create probability distributions between successive animal locations (Horne et al. 2007, Fig. 4b). Lewis et al. (2011) used Brownian bridges to identify habitat characteristics associated with black bear highway crossings in Idaho.

Results (in progress)

A total of 48 bears (26M:22F) have been collared resulting in more than 375,000 locations. Five GPS-collared bears (3M:2F) have crossed GA 96 for a total of 68 crossings (Fig. 5). Bear #140, a yearling male accounts for 74% of all crossings.

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Literature Cited


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