Wildlife Technical Session

Use of Infrared-triggered Cameras and Monitors in Aquatic Environments

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Abstract: The use of infrared-triggered activity monitors in wildlife science has increased during recent years. In most cases, trail monitors are mounted to stationary objects. However, trail monitors in aquatic environments where change in elevation is necessary, because of varying water levels, curently restricts their use. In our study of Florida Key deer, we needed information on deer activities in areas influenced by tides. We developed an inexpensive device that allowed trail monitors to operate as tides changed. We propose that this device can expand the use of trail monitors to include aquatic environments.

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The use of infrared-triggered activity monitor technology (hereinafter referred to as trail monitors) in wildlife science has recently increased. Commercial (e.g., Trailmaster®, DeerCam®, Camtracker®) and non-commercial trail monitors have allowed biologists to learn more about animal behavior (Savidge and Seibert 1988, Carthew and Slater 1991), animal biology (Kucera and Barrett, 1993, Foster and Humphrey 1995) and in facilitating population estimates (Mace et al. 1994, Jacobson et al, 1997). In most cases, trail monitors are mounted to stationary objects (e.g., trees, telephone poles) with an optional camera. For active trail monitors, events are recorded when an object breaks the electrical pulse between the receiver and transmitter. Use of trail monitors where the elevation change of the receiver and transmitter is necessary (e.g., aquatic environments) restricts their use in those situations.

In our study of Florida Key deer *(Odocoileus virginianus clavium),* we used the commercially available Trailmaster® (TM 1500) trail-monitors (*note:* Trailmaster® monitors are one among several commercially-available passive and active monitors, and we encourage readers to investigate options available by other manufacturers in selecting a trail monitor system) to gather information about deer density and movements on small outer keys (R. Lopez and N. Silvy, Texas A&M University, unpubl. data). In some instances, we needed information on Key deer activities in areas influenced by tides. In this paper, we describe a device allowing use of trail monitors in such environments.

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Methods

Construction

Our device allowing trail monitors to operate at varying heights consisted of 2 components: (1) unit housing and (2) housing guide (Fig. 1). A Trailmaster® (TM 1500) active infrared monitor and camera (Goodson and Associates, Inc., 10614 Widmer, Lenexa, KS 66215) used in conjunction with our device helped monitor Key deer. A floating, 30-caliber ammunition box (U.S. Army, 28×10×18 cm) housed the Trailmaster® receiver/camera and transmitter. We drilled 2 1.9-cm holes in the receiver unit housing for the receiver window and red alignment indicator light (Goodson 1992, Fig. 1). We then placed the receiver at the bottom of the ammunition box. A 5.0×7.6-cm flap cut in the ammunition box and bent upwards served as sun visor for the Olympus Infinity Twin® 35mm camera (Olympus America, Inc., Denver, Colo.). We placed the camera on top of the receiver. For the transmitter unit housing,

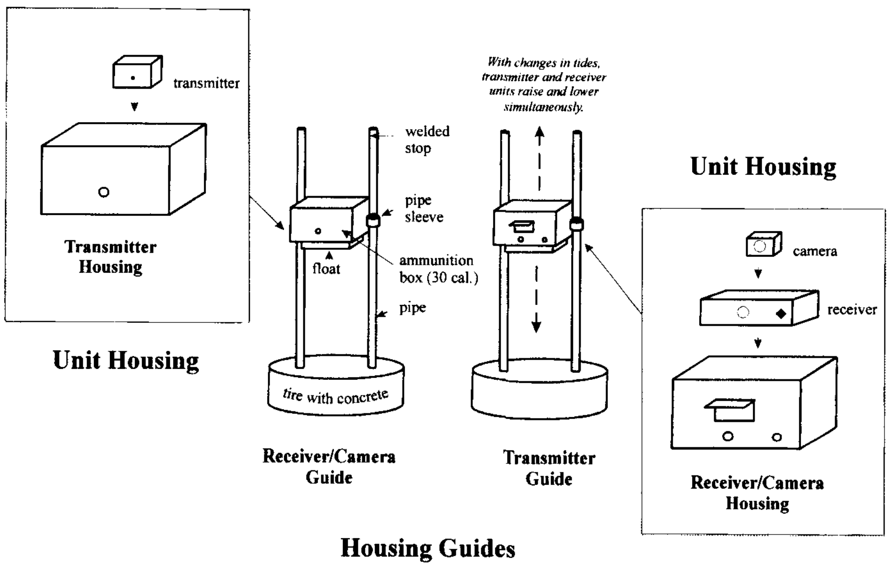

Figure 1. Schematic diagram of device used in conjunction with Trailmaster® trail monitors to monitor the activities of Key deer, Big Pine Key, Florida, 1999.

we drilled a 1.9-cm hole for the infrared emitter (Goodson 1992, Fig. 1). We then placed the transmitter on its side at the bottom of the ammunition box. A 2.5-cm chain link welded to the ammunition boxes in the middle of each handle allowed boxes to be locked and protected from vandals. We welded pipe sleeves (diameter—3.8 cm, length—10.2 cm) to the back 2 corners of the ammunition boxes. Sleeves attached ammunition boxes to housing guides. A plastic boat bumper (Cabela's Inc., One Cabela Drive, Sidney, Neb.) attached to the bottom of each ammunition box (Fig. 1) served as the flotation device.

The housing guide consisted of 2 2.5-cm. diameter iron pipes each 1.8 m in length. We set pipes 33 cm apart and parallel in a tire filled with concrete (Fig. 1). As the tide changed, the housing guide allowed the trail monitor units to raise or lower simultaneously. A metal stop welded at the tops of guide pipes prevented units from being taken. We also marked guides with reflective tape every half meter to record tide levels with photographs taken. Total cost for camera housing was approximately $40 (1999 prices).

Field Operation

We selected sites for monitors based on evidence of deer activity (e.g., trails, visuals). We placed 2 trail monitors using our device near Howe Key and Munson Island from 22 March–22 April 1999 to monitor Key deer movements between islands. Both keys are located <0.25 km from Big Pine Key, Monroe County, Florida. We placed trail monitors in standing water or in an area subject to daily flooding. Criteria in selecting camera sites included protection from strong winds and waves (i.e., relatively calm water). We aligned trail monitors during the lowest tide to ensure the bases of housing guides were level to each other. We set trail monitor sensitivity at 7 with a photographic interval of 30 minutes. We checked cameras weekly, and replaced batteries and film when necessary.

Results and Discussion

A total of 134 pictures was taken using our device: 115 (86%) with 1 or more deer, 14 (11%) misfires (pictures taken due to technical problems), 3 (2%) birds, and 2 (1%) other. Approximately 51% (69 pictures) were taken at Howe Key and 49% (65 pictures) were taken at Munson Island. We found our device performed well in acquiring information on Key deer activities in tidal environments. The use of our device provided useful information about Key deer movements between keys including frequency, time of day, and associated tide levels.

The floating ammunition boxes adequately protected the Trailmaster® trail monitors from wind, rain, and salt water. They were easy and inexpensive to construct. We propose that our device can expand the potential use of trail monitors in aquatic environments (e.g., ponds, lakes, rivers, flood plains). We also suggest that our device can successfully be used with passive infrared trail monitors (e.g., Trailmaster® TM700v, DeerCam®) which do not require a receiving unit.

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