a-tracker: A Technology Solution for Animal Tracking Using GPS and an Internal Pedometer

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SUMMARY

Understanding the relationship between species and their habitat is a fundamental step in developing more realistic models to assist animal and habitat management. Habitat structure and species abundance are well known to be drivers of animal forage behaviour (Schoener 1987), and consequently reproductive fitness. If researchers are to understand the spatial choices that an animal makes, then it is important that the researcher understands how an animal moves through its home range. In recent times, GPS has been used to monitor the movements of animals. However, because wildlife tends to move through environments that are often denied GPS signals, results from GPS derived studies can be expected to be biased to some unknown extent. For example, an animal may go undetected in some habitat types, and GPS accuracy is variable due to the physical location of an animal and satellite geometry at the time of a fix. In addition, there is also likely to be some bias associated with a particular animal, which may result in reference data for some habitat types being under sampled or not sampled at all. To compound these issues we do not know what an animal is doing at the time a GPS position is acquired, i.e., is the animal in a particular location because of interaction with other animals, because of human factors, or for some other reason. We only know that the animal passed through a particular location. This limits the knowledge that can be derived from the data that is currently being collected. To address these issues, we have developed a dead reckoning solution to augment GPS, and enable the acquisition of continuous movement trajectories for animals that have been tracked. Analysis of an animal's velocity allows one to identify different types of movement behaviours that can be associated with foraging, searching for food, and locomotion between food patches. In addition, the ability to capture continuous paths allows researchers to identify habitat that is not important to a species – something that is not possible when just relying on GPS to track animals. This paper will

present preliminary findings from a field campaign carried out during the summer of 2006 in the Foothills of the Rocky Mountains in Canada. The system is based on a traditional dead reckoning solution using MEMS accelerometer and magnetometer sensors to detect animal steps and heading.

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