

Technology Comes of Age: Soaring into the Future...

Jesse Watson is a M.Sc. student at the University of Alberta studying the movement patterns of Ferruginous Hawks in relation to industrial development. He has been working with Ferruginous Hawks since 2007 and with raptors for 15 years.



In early February, 2012, I delved into the world of satellite telemetry. As part of a team at the University of Alberta studying Ferruginous Hawks under the guidance of Drs. Erin Bayne and Troy Wellicome, I embarked on my first M.Sc. field season in the prairies of southern Canada. Canada has always been a stronghold for this migratory hawk, but it is now endangered in Alberta and the focus of my research is to investigate local and long-range movements of adult hawks in relation to industrial development. To that point in time, movement of Canadian Ferruginous Hawks had been assessed from banding studies and more recently, monitoring with Argos PTTs, but my study needed location precision to assess home range and resource selection. After several weeks of scouring telemetry websites, making phone calls, and writing emails, I opted for 30g solar Argos/GPS PTTs. During that 2012 breeding season I deployed Argos/GPS PTTs on seven Ferruginous Hawks. I was pleasantly satisfied with the data I received every 3rd day at my office in chilly Edmonton, Alberta, that allowed me to analyze home ranges. Before I knew it, 2012 was coming to a close and the 2013 field season was fast approaching...it was already time to order transmitters for my second field season.

The GSM/GPS transmitter is the most technologically advanced avian telemetry device on the market. Fix rates are dynamic and can acquire up to 1 location/minute as opposed to the 1 location/hour provided by Argos/GPS PTTs. The high frequency and volume of GPS locations are now allowing some researchers to understand flight patterns in relation to wind speed, topography, and bird elevation. My biggest concerns when stepping into this technology were the potential "dead zones" throughout the Canadian prairie. The GSM network is available throughout most of the world. Although GSM coverage is often available at the broad scale in most countries, "dead zones", with a lack of GSM coverage may occur, depending on the region where transmitters are deployed. After studying maps, I could see this potential lack of coverage for areas of southeastern Alberta and southwestern Saskatchewan, but opted to order GSM transmitters because the migration of these hawks through the lower 48 would bring them into GSM coverage providing a mega-download of backlogged data.

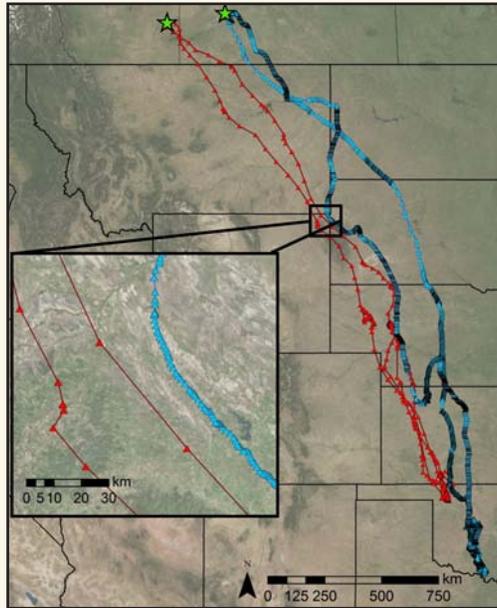
Since then I have deployed 29 GSM/GPS transmitters on adult male Ferruginous Hawks and now have some insight into the efficacy of the use of GSM/GPS technology on Buteos. When shifting from Argos/GPS PTTs to GSM/GPS transmitters, the first difference I noticed was the increase in the number of emails in my

Photo by Jesse Watson



Adult male Ferruginous Hawk 118208 (left) with Argos/GPS PTT in 2012 and his home range (right).

inbox on a daily basis. The transmitters will attempt to transmit data 3 times each day and if the bird is within GSM range the user will receive an email with the most recent data within minutes. If you're like me, you look forward to checking each of those emails to see where your bird has spent the past day, and to get instant information in case of mortality.



A comparison between hawks monitored with Argos/GPS and GSM/GPS satellite telemetry. I began tracking 118208 (Argos/GPS PTT - in red) in 2012 and began tracking 202 (GSM/GPS - blue) in 2013, both hawks are currently transmitting data.



Adult male Ferruginous Hawk 203 with his GSM/GPS transmitter in 2013.

Although, initially my biggest concern was deploying GSM/GPS units in dead zones, 24 out of my 29 hawks nested in areas where GSM coverage was consistent. Of the 5 hawks in dead zones, 4 had their first transmission once migration began (~2 months after deployment) and each transmitter backfilled their entire summer's dataset...let me tell you, receiving those emails was like an early Christmas! The increased volume of data provided by GSM/GPS transmitters is striking. Throughout one breeding season (April 1 - Sept 20), one breeding male transmitted just shy of 80,000 locations in comparison to another hawk wearing an Argos/GPS unit which has transmitted around 3,000 locations throughout the same duration. I am just

beginning my analysis, but due to the volume of information transmitted from the GSM/GPS units I expect to gain insight into previously unstudied flight characteristics of Ferruginous Hawks at fine and large scales, and habitat use both on the home range and during migration. Adding to the appeal of GSM/GPS transmitters is the

decreased amount of paperwork to get a program running and lower cost of data retrieval. I estimate that for 1 year of Argos/GPS service for 1 PIT costs around \$1200 while yearly service for a GSM/GPS unit costs around \$400.

As technology moves forward, we can only expect that it will allow us to peer deeper into the daily lives of the wild birds we study in order to preserve their populations. I am pleased to say that GSM/GPS technology has helped the success of my M.Sc. research and I thank MTI for their continued support!

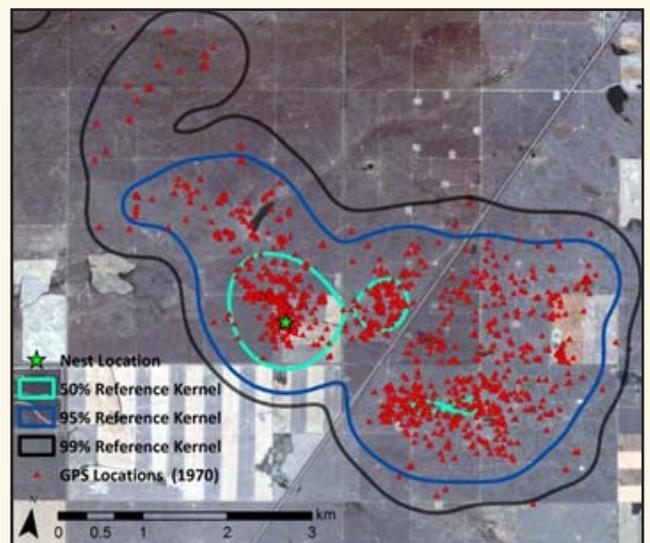


Photo by Janet Ng