

2.0 Blanding's Turtle Biology and Habitat Needs

Blanding's turtles are a medium-sized freshwater turtle distributed throughout parts of North America. Blanding's turtles range from central Nebraska and Minnesota to southern Ontario/southwestern Quebec and Northern New York. There are isolated populations further east in New England and Nova Scotia (**Figure 3**). The species is known for its domed shaped carapace which resembles a German World War II era helmet and their bright yellow chin and throat (**Plate 1**). The turtle is also called a "semi-box" turtle because the plastron (bottom plate) is hinged and allows the turtles to tightly close their plastral lobes for protection.

Blanding's turtles are opportunistic, omnivorous predators in aquatic environments and are known to eat insect larvae, carrion, snails, leeches, crayfish, small fish, frogs, fish and frog eggs, plant matter and seeds from macrophytes (Congdon *et al.*, 2008). While on drier terrestrial habitats, they eat



Plate 1. A typical Blanding's turtle (source: Dillon Consulting Limited).

grasses, herbaceous plants, earthworms and slugs (Natural Heritage and Endangered Species Program, 2007). The species live in wetlands with abundant vegetation surrounded by upland wooded habitat (Congdon *et al.*, 2008). Hatchlings and very young juveniles may use dense aquatic vegetation to shelter themselves from their predators, however, habitat selection by young Blanding's turtles is largely unknown (Pers Comm, Dr. Justin Congdon). Hatchlings are vulnerable to herons, diving ducks, raccoons, skunks and aquatic mammals like mink

and river otter. Permanent pools, which are deep enough to remain ice-free at the bottom over the winter and have a sufficient amount of dissolved oxygen, are required for adult and juvenile hibernation (COSEWIC, 2005). Recent work suggests that hatchlings spend the first winter on land under wood piles, logs and roots (Dinkelacker *et al.*, 2004).

Blanding's turtles are long-lived and have been known to survive more than 80 years in the wild. Fecundity rates are low, because females take up to 25 years to become sexually mature, often only lay one clutch per year, and may not reproduce every year. Clutches of 10-15 eggs are commonly laid in loose soil, sand or gravel, in pits 20-25 cm deep, located with exposure to sunlight, which is needed to warm the soil and aid incubation. After the eggs are laid there is no maternal care given by the parents. The egg shells are soft, smooth, white and ovoid shaped, and can be as large as 3 cm on the long axis. Eggs take approximately 60-90 days to hatch depending on the average number of degree-days at an adequate temperature. Typically, hatchlings emerge in September or early October. The flexible shells of turtles readily exchange water with the incubation environment, therefore wetter conditions result in greater hatching success and higher quality hatchlings (Packard, 1999).

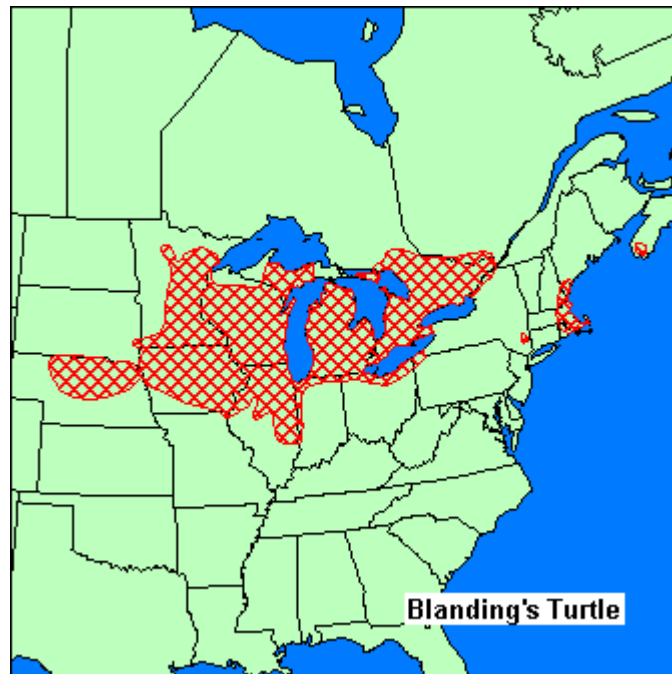


Figure 3. Geographical Distribution of Blanding's Turtle (source: <http://www.dec.ny.gov/animals/7166.html>)

Adult Blanding's turtles have few natural predators, though nest predation is very common. Animals such as foxes, raccoons, snakes, and skunks frequently consume newly laid eggs within minutes of being laid. Parasitism from sarcophagid fly larvae contributes to low nest success. Once grown beyond the 10 cm mark, most turtles have few predators capable of attacking and killing an individual, though attacks during nesting and other periods when turtles are in the open have been known to occur. A long-term (37 year) mark-recapture study conducted in Michigan found that annual survivorship of juveniles (ages 1 to 13) needed to be 72% to replace the number of adults that had died over the course of the study (Congdon *et al.*, 2008). Blanding's turtle reproductive success is limited by low fecundity rates and the vulnerability of eggs and hatchlings, meaning many reproductive females are needed to counterbalance the losses.

With respect to movement behaviour, Blanding's turtles are known to undertake frequent long-distance and long-duration terrestrial movements (Ross and Anderson, 1990; Rowe and Moll, 1991; Kinney, 1999; Dillon Consulting Limited, 2011b; Millar and Blouin-Demers, 2011). Gravid females have been found to move further distances and have larger home ranges than males and non-gravid females (Millar and Blouin-Demers, 2011; Dillon Consulting Limited, 2011b). Mean home range size for males is less than 10 ha, whereas for gravid females it can be as high as 30+ ha (Millar and Blouin-Demers, 2011). In general, gravid adult females, which are the most important to population viability, move around more so than other adults, and thus are more sensitive to mortality from motor vehicles.

In many jurisdictions, including Ontario, the species has been listed as either threatened or endangered. In Ontario, the current status under the *Endangered Species Act, 2007*, (ESA) is

“threatened”. In 2003, a recovery strategy for the Nova Scotia population was released by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) (The Blanding's Turtle Recovery Team, 2002). Major risks to the species include habitat fragmentation and destruction, low recruitment due to nest predation, increased adult mortality from movement patterns intersecting with roads, and poaching of turtles for the exotic pet trade. These risks will be discussed in detail in **Section 3.0**.

2.1 *Local Blanding's Turtle Population Distribution*

The Canadian Wildlife Service (Hamill and Seburn, 2010) conducted a study of the Ottawa region to determine the presence and distribution of Blanding's turtles, based on recent and historical observations, as well as some limited field work. They determined that Blanding's turtles occur sporadically in the central and eastern areas of the City, but are concentrated primarily around wetland complexes in the west and southwest. Mapping prepared by Hamill and Seburn (2010) appears to show four main sub-populations: in the Marlborough Forest, in the Huntley Wetland – Long Swamp Wetland area, in the Carp Hills Wetland – SMH Highlands Wetland area, and along the Constance Creek – Shirley's Bay corridor (**Figure 4**). Blanding's turtles are also found across the Ottawa River, in West Quebec and Gatineau Park. When taken together, the five sub-groups may constitute a larger single Population, now fragmented by urbanization.

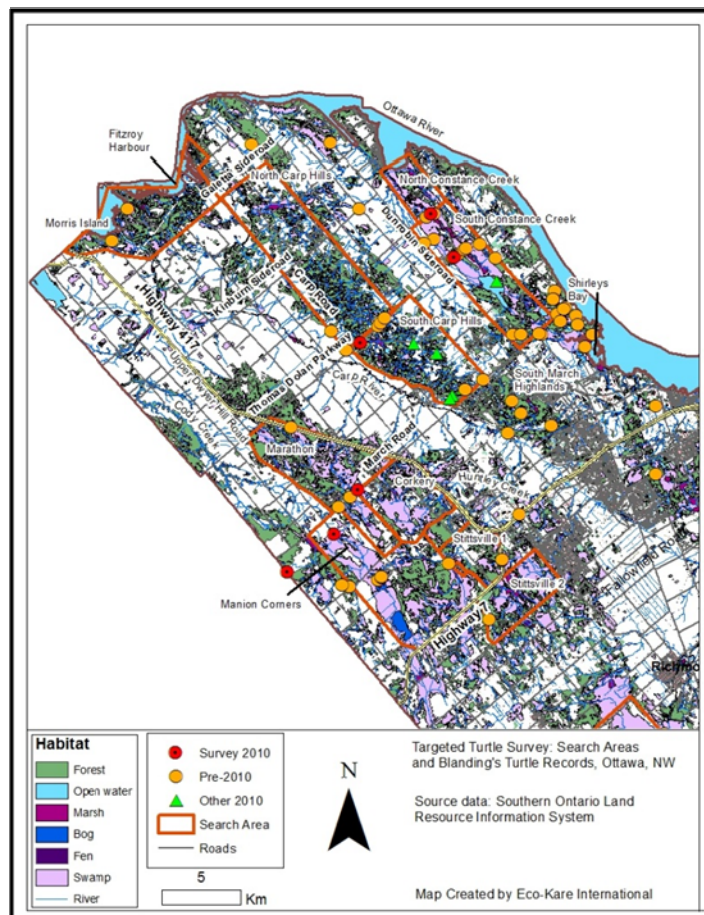


Figure 4. Blanding's Turtles in Ottawa (Source: Hamill and Seburn 2010)

No work has yet been done to determine how well or how recently these sub-populations have been connected. We know, however, that approximately 30% to 40% of Ottawa's wetlands have been converted to agricultural and urban uses over the past 200 years and we can speculate that all sub-

populations were connected prior to European settlement. Opportunities for migration between sub-populations may still exist, especially along creek and river corridors. The Carp Hills – SMH sub-population and the Constance Creek – Shirley's Bay sub-population appear to come within 2 – 3 km of each other in the vicinity of March Road, and Shirley's Brook may have provided a functional movement corridor in the recent past, prior to adjacent urban development in Kanata North. At present, the Carp Hills – SMH sub-population appears at high risk of being split into two isolated sub-populations by estate lot development, by increasing road traffic, and by the proposed expansion of the urban boundary further west along the Carp River. In fact, for the purposes of this study, it has been assumed that fragmentation of this population has already occurred. Fragmentation of populations in this way greatly increases the vulnerability of each sub-population to decline and failure, by exposing each one to more intense, human impacts, by increasing their vulnerability to localized, catastrophic events, by eliminating the potential for migration between habitat areas in response to environmental changes (to drought for example), and by reducing genetic flows, biodiversity and long-term evolutionary potential.

Although this conservation needs assessment focuses on the long-term viability of the SMH sub-population, consideration should be given to the ways in which the recommended strategies and actions could be applied to reconnecting isolated sub-populations and making each one more robust.

2.2 State of the SMH Blanding's Turtle Population

In the fall of 2010, a 4 year population estimate, distribution and range study began with the purpose of predicting the size of the Blanding's turtle adult population and to determine habitat-use and movement patterns. The mark and recapture study is still on-going and is expected to end in the fall of 2013. Adults have been sampled by up to 35 trap nets for over 20 weeks during the 2011 and 2012 mark and recapture program. Current findings have identified that at least 97 adult and juvenile Blanding's turtles inhabit the South March Highlands and the Kizell Drain Wetland (number includes recently deceased turtles). Females outnumber males by about 2 to 1. Field sampling procedures have a low efficiency rate for the collection of juveniles and hatchlings, thus it is uncertain as to how many juveniles and hatchlings are present.

Blanding's Turtle Distribution and Range

The majority of Blanding's turtles in the SMH population have been found in the SMH Conservation Forest, along the Shirley's Brook drainage, while clusters or activity centres of turtles have been found in the Kizell Wetland and along the Carp River floodplain at Huntmar Drive (**Figure 5**). It is unclear at this time how the population is spatially distributed, but movement and recapture data suggest that there are three sub-populations in the SMH population (Kizell Wetland, SMH-central, and SMH-upland; see Section 5.0 below). Currently (October 2012) 19 adults have radio transmitters attached to their shells in order for their movements to be tracked using radio telemetry. Each is tracked 5 times a week in May and June, then 3 times a week in July and October. The number of tagged individuals represents about 26% of the sampled adult population. Distance traveled for

tagged turtles has ranged up to 10 km for one female during the spring/summer of 2011, while some males and females remained in the resident wetland where they were first captured and tagged, traveling less than 500 m annually.

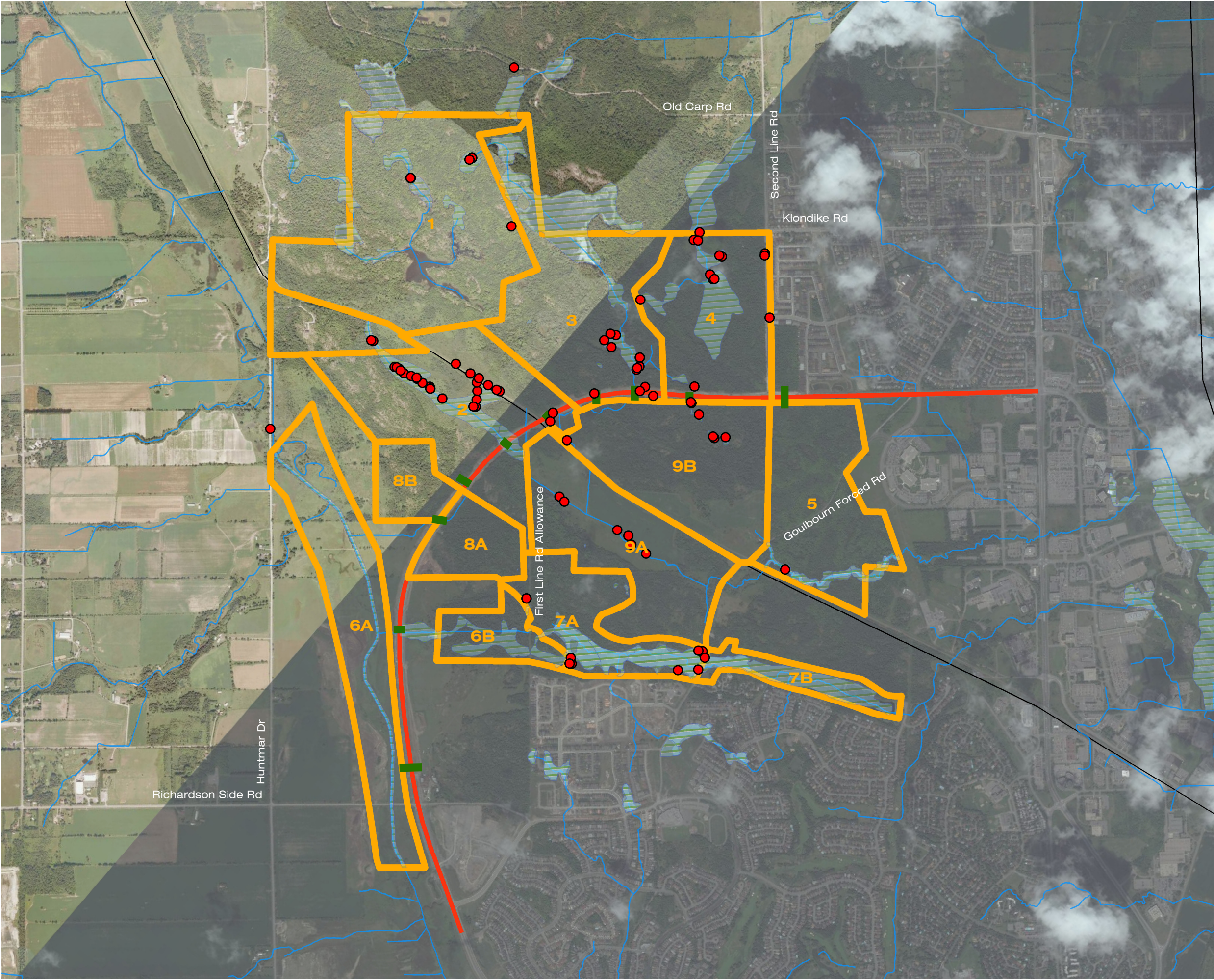
Results from the radio telemetry portion of the study have shown movement among the Blanding's turtles of the SMH to be highly variable, and gender dependent. Males and non-gravid females typically stay within their "resident" wetland for the entire year, while a minority of males may move between distinct wetlands over the course of the year. Gravid females have been found to move over longer distances than males during nest searching. For the most part, gravid female movements typically occurred during mid-June to early July. In some cases the movements crossed Terry Fox Drive, and, based on the telemetry observations and *in situ* trail cameras, we believe that the Wildlife Guide System (see below) is allowing these movements to occur beneath the road through the culverts (Unpublished Data, Dillon Consulting Limited). Of note, no Blanding's turtles have been found dead on Terry Fox Drive as a result of vehicle impacts since the road was opened in July 2011.

Despite the frequent tracking schedule, not all tagged turtles have been tracked continuously throughout the study period. They are often lost for a few days from detection. This may be the result of the turtles moving beyond the area of the study or deep in a wetland, and thus outside of the reception of the radio receivers. In some cases we currently cannot rule out transmitter malfunction or battery failure. However, some of the disappearances occur in the upland habitat of Zone 1, where larger water bodies make consistent tracking more challenging. Furthermore, Blanding's turtles are known to disappear from study areas for long periods of time before returning (Pers Comm, Dr. Justin Congdon). For a more complete discussion of the radio telemetry tracking, figures, and trail camera statistics see the annual summaries (Dillon Consulting Limited; 2011 a, 2011 b; 2012 a, 2012 b).

Blanding's Turtle Nesting Distribution

In the early summer of 2012, Dillon conducted late day targeted nest searches and radio telemetry tracking to locate the specific areas where gravid Blanding's turtles may be laying their eggs. The increased level of effort resulted in a number of depredated nests being found in the upland habitat of Zone 1, though species cannot be confirmed (Blanding's eggs and Painted turtle eggs are easily confused once predated because it is difficult to infer size). Radio tracking however, revealed several confirmed gravid females moving beneath Terry Fox Drive and into Zone 9B. Zone 9B has a string of ephemeral vernal pools, marsh wetlands along East Shirley's Brook, upland mixed forest habitat and hay fields. The Arnprior-Nepean railway bed also bisects the area, separating zones 9A and 9B. Tagged gravid females were tracked to the forest - hay field edge where turtles were again confirmed by hand to be gravid. No nests were found; however, subsequent tracking and handling of the turtles revealed that upon leaving the general area, the turtles were no longer gravid, having laid their eggs overnight. Similar observations indicate that some females move beyond Second Line Road to find nesting grounds, though this is based on an adult female mortality during the nesting season and another radio tracked female near the road; reproductive status of both females was not determined.

A Blanding's turtle was observed nesting on Old Carp Road near the junction with Huntmar Drive, and several predated turtle nests (no species determined) were observed along Huntmar Drive (Pers Comm, Dr. Nick Stow, City of Ottawa Environmental Planner).



City of Ottawa
South March Highlands Blanding's Turtle
Conservation Needs Assessment

**Blanding's Turtle Distribution
in South March Highlands**
Figure 5

- Zone Boundary
- Terry Fox Drive
- Wetlands
- Watercourse
- Railway
- Wildlife Culvert Crossings
- Blanding's Turtle Observations,
excluding radio-telemetry data



MAP DRAWING INFORMATION:
DATA PROVIDED BY MNR, the City of Ottawa, and Dillon Consulting Limited

MAP CREATED BY: AJZ
MAP CHECKED BY: CTH
MAP PROJECTION: NAD 1983 UTM Zone 18N

FILE LOCATION: \\DILLON.CA\\DILLON_DFS\\OTTAWA\\OTTAWA CAD\\2012\\
126019 34\\Design_GIS\\MXDs\\Report Maps\\4-BT_distribution.MXD



PROJECT: 12-6060
STATUS: FINAL
DATE: 10/17/12

2.2.1 Connections to Other Populations

Given that the study has only been collecting data for two years, concrete evidence suggesting that the SMH population is connected to the Carp Hills population has not been found. Two radio-tagged turtles and at least one other adult Blanding's turtle have been found to use the Carp River Plain, but it is unclear as to whether the habitat is being used as a movement corridor or just for daily habitat use. A roadside assessment of turtle habitat between the SMH and the Carp Hills suggest there may be sufficient habitat connecting the two areas, however there is low density housing and a busy arterial road separating the areas. Sampling of wetlands in the Carp Hills may provide evidence that the two populations are connected, especially if turtles tagged in the SMH are found in the Carp Hills and *vice versa*.

2.2.2 Terry Fox Drive Wildlife Guide System

A Wildlife Guide System (WGS) was built within the Terry Fox Drive roadway, integrating a system of culverts, barrier walls and fencing that directs or guides wildlife (small and mid-sized mammals, amphibians and reptiles, including turtles), through the culverts to safely cross under the road. Research into the effectiveness of the WGS using high definition, "trail" cameras mounted in each culvert is ongoing with one year of data analysis complete (Dillon Consulting Limited, 2011a). Although only a few turtles have been visually observed moving through the culverts, we suspect based on radio telemetry that the turtles are using the culverts regularly. As a result of the camera mounts in 2011, there were 783 observations made on 19 species over a 93 day period following the opening of Terry Fox Drive. Thirty three animals were found dead on the road over the 93 day period, of which 23 were snakes, which could pass through the fence mesh. None of the mortalities were Blanding's turtles. Monitoring continued through 2012 with the cameras installed during June and removed in October, providing for a broader time period of study than in 2011. A second year report on the 2012 observations will be due to the regulatory agencies by January 31, 2013.

During the 2012 studies, continuous monitoring was completed between June 4 and October 3, however due to water in several culvert, a few of the cameras were not installed until July 7 so the data set for each camera varies in length (Dillon Consulting Limited, 2012b). Over the study period and 10 culverts, there were 2392 confirmed observations of 24 species of wildlife. The first observation of Blanding's turtle using a culvert was made in this year. The four purpose-built wildlife culverts were monitored for an average of 2048 hours each, saw an average of 288 animals, and an average of 13 species. The hydraulic culvert on East Shirley's Brook (CV6) had 259 observations and 17 species although was monitored for 1393 hours as it was flooded until July 5. Blanding's turtle was observed in two culverts, CV6 and TCV3 which lie side by side near East Shirley's Brook. The results from the 2012 season are indicating that turtles are occasionally using the culverts for their movements, but there were only 8 different observations over the three species found in the study area, but thus far the movements we've observed cannot be called 'frequent' or 'regular'.



Plate 2. A Blanding's turtle moving through culvert CV6 that carries East Shirleys Brook..