

Turtles know where they are going

If you are familiar with turtles and practiced in the art of helping them across roads, you are probably aware that turtle conservation groups and experts urge rescuers to move turtles across the road in the direction they are facing when found. Why is this? When you find a turtle crossing a road coming from a lush wetland, heading towards a dry rocky outcrop,



doesn't it make the most sense to turn it around and place it back in the wetland? Even though your natural instincts might tell you to turn a travelling turtle around and put them in a more "turtle-friendly" habitat, this will actually result in the turtle having to cross the road again when they inevitably turn around to head back the way they were going. To understand why turtles will turn back around if you take them off course, you need to know how turtles navigate.



Turtles are excellent navigators within the areas they are familiar with, ie. their "home ranges." These home ranges include their yearly nesting site (if female), their overwintering grounds, and the wetlands they frequent during their active season. In the early years of their lives turtles will create 'mental maps' of their home areas, and it appears that as turtles age they lose this ability to create new mental maps (Caldwell and Nams 2006). Adult turtles tend to rely on their internal compass to navigate through their home range that they know well, and have previously 'mapped' (Caldwell and Nams 2006).

There is scientific research that suggests a turtle's internal compass could be one of two things, or possibly even a combination of both. Turtles could be using the position of the sun in the sky to navigate, or possibly they are able to sense the earth's magnetic fields; both of these methods would help them know where north is. Scientists have confirmed some Sea Turtle species have magnetite in their brains which allows the animals to sense magnetic fields (Fuentes, et al. 2004). In the case of Ontario freshwater turtle species such as Blanding's Turtles and Snapping Turtles, researchers have found evidence for both the sun and the magnetic field compass mechanisms (Pappas et al. 2013, Landler et al. 2015, Krentz et al. 2018). More research is needed to determine if both methods are being used by freshwater turtles here, or if some species are using only one.

So what do turtles' mental maps and internal compasses have to do with always making sure to help them across roads in the direction they are facing? Well, everything! Because turtles are such good navigators, when you find them crossing



a road, they are heading some where specific – don't think for a second they are just wandering or confused!! They know where they are going – even if they are heading somewhere that seems to you like poor turtle habitat.

Ontario turtles are capable of long distance travel over land, and some individuals have very large home ranges with nesting sites far from the

wetlands they use during the summer months, which can be separate and further still from the wetland they might use for their overwintering (Pettit et al. 1995, Brown and Brooks 2004). For example, Snapping Turtles in Algonquin Park have been found to travel up to 3.9 km between August and late September when they head back to their overwintering grounds, and can return within 1 m of the exact spot they hibernated the year before (Brown and Brooks 2004). What amazing proof of these superb navigators in action! This helps put into perspective the turtle you might find heading into a forest away from a perfectly good wetland – this turtle could be travelling to another wetland you can't see via this forest, or potentially their nesting site is a sandy bank along a small creek on the other side of the forest. Who knows? We don't, but the turtle definitely does.

An important implication of turtles making mental maps of their home ranges when they are young and using their using internal compasses to navigate after

this, is that if an adult turtle is relocated far outside their home range it can be very disorienting and stressful. A study done in Nova Scotia with Eastern Painted Turtles (which are closely related to the subspecies of Painted we find here in Ontario - Midland and Western), found that 60 adult turtles removed from their home ranges did not successfully navigate towards water when released in new habitat (Caldwell and Nams 2006). Instead, they travelled in a straight line in one consistent direction after being released until being recaptured at the end of the 24-hour study period. This suggests that when adult freshwater turtles are relocated to a new habitat outside of their home range, they may not be able to imprint on this new area as they did when they were younger with their home range. The adult turtles in this study seemed to follow an internal compass, but without a mental map of the unfamiliar area, they just travelled in one single direction without any way to navigate towards water.

The only exception to the rule of always helping a turtle across the road in the direction they are travelling, is if you are lucky enough to find a hatchling (a.k.a. brand new baby turtle). Ontario turtle hatchlings are usually no bigger than a toonie, and when they first emerge from their nests they will not have a mental map of their surroundings, although their internal compass mechanisms will activate within hours of emerging from the nest (Pappas et al. 2013). Their instincts will guide them to head towards an open horizon, which will hopefully lead them to water (Krenz et al. 2018). So in this one special case, if you find a hatchling on a road or road shoulder, because they do not have a mental map of their surroundings yet, the best spot to move them is actually the closest shallow water body. This water body should ideally have slow moving water (or no flow at all) and lots of aquatic vegetation where they can hide from predators and find things to eat. This could be a flooded road ditch, a small pond, or a grassy bank of a near by marsh. It is important to note that we still don't want to relocate a hatchling far from where we found it, do not move a hatchling more than 250 m. If you can not see any water within this distance from where you found it, move the hatchling safely far off the road and road shoulder in the direction they were travelling. It is even more important to note that we don't want you to take the hatchling home. Without the first years spent in nature, the mental map will not be made and the turtle will be lost



for all time to navigating the wild. Meanwhile, we are losing too many turtles to road traffic, pet trades, and habitat loss. So, watch out for hatchlings (and adults too) at the end of August and through September (for Snappers and Blanding's) and when many Painted Turtle hatchlings emerge at the end of May / beginning of June.

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