

Monitoring Effectiveness of Reptile Tunnels and Exclusion Fencing on Highway 69 in Ontario, Canada

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Background

The following study documents the results of monitoring road mitigation measures for reptiles on a new highway realignment. The study area is located on Highway 69 between Parry Sound and Sudbury and is part of a larger highway expansion project funded by the Ontario Ministry of Transportation. Three reptile crossing structures (concrete box 2.8 x 3.3 m) were installed in 2011. Subsequently, 4.8 km of reptile exclusionary fencing was installed from June to October in 2012. Monitoring and evaluation was completed in 2012 and 2013 (Baxter-Gilbert et al. 2013) and again as part of this study in 2015 and 2016.

Progression of reptile fence expansion:

2011

- June
- Three reptile tunnels built

2012

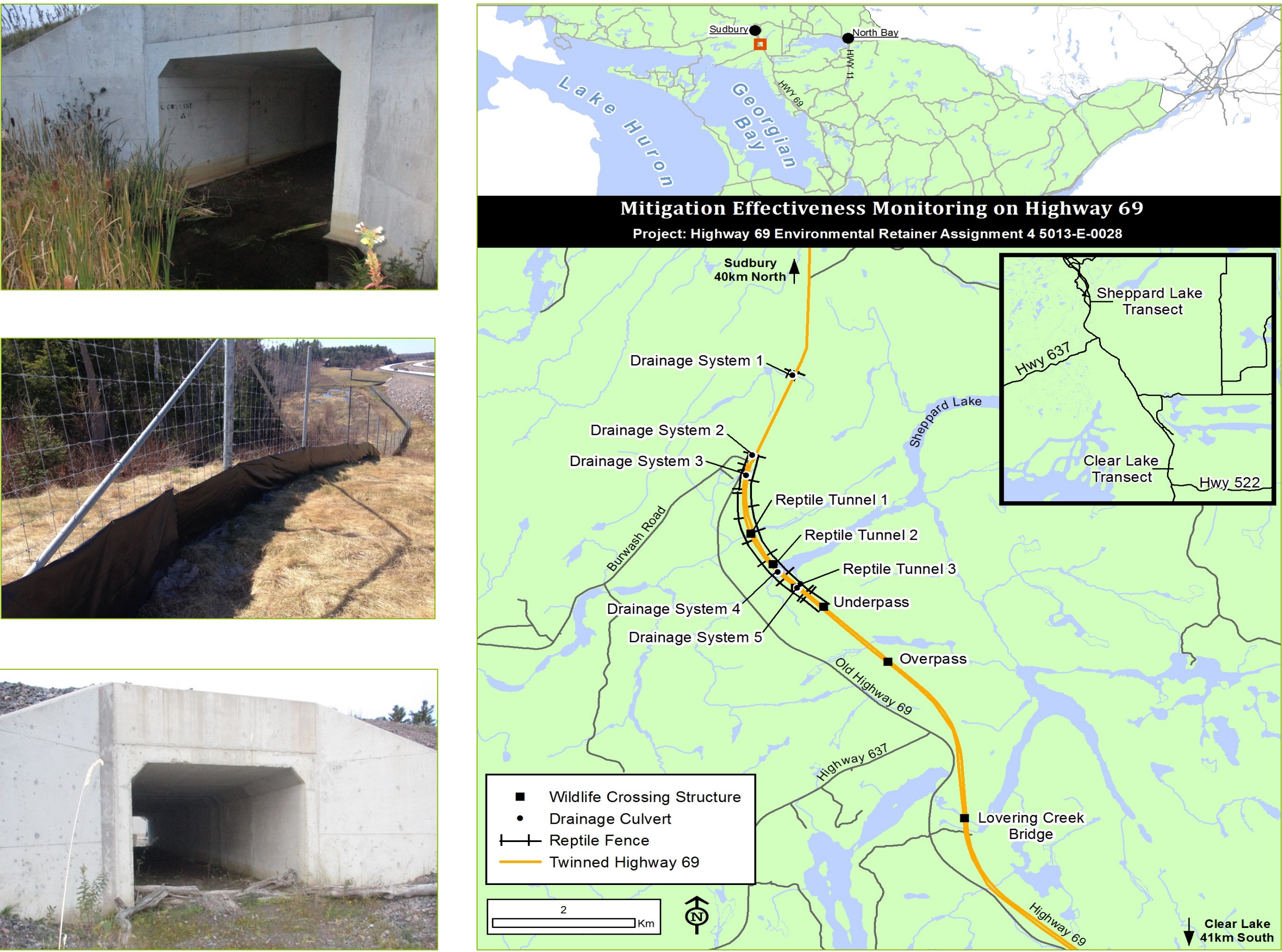
- June to October
- 4.8 km of reptile exclusion fencing added along Sheppard's Lake Transect

2015

- May
- Reptile exclusion fencing maintenance: closed gaps and one-way gates, extended 50 m, increased fence height at drainage culverts

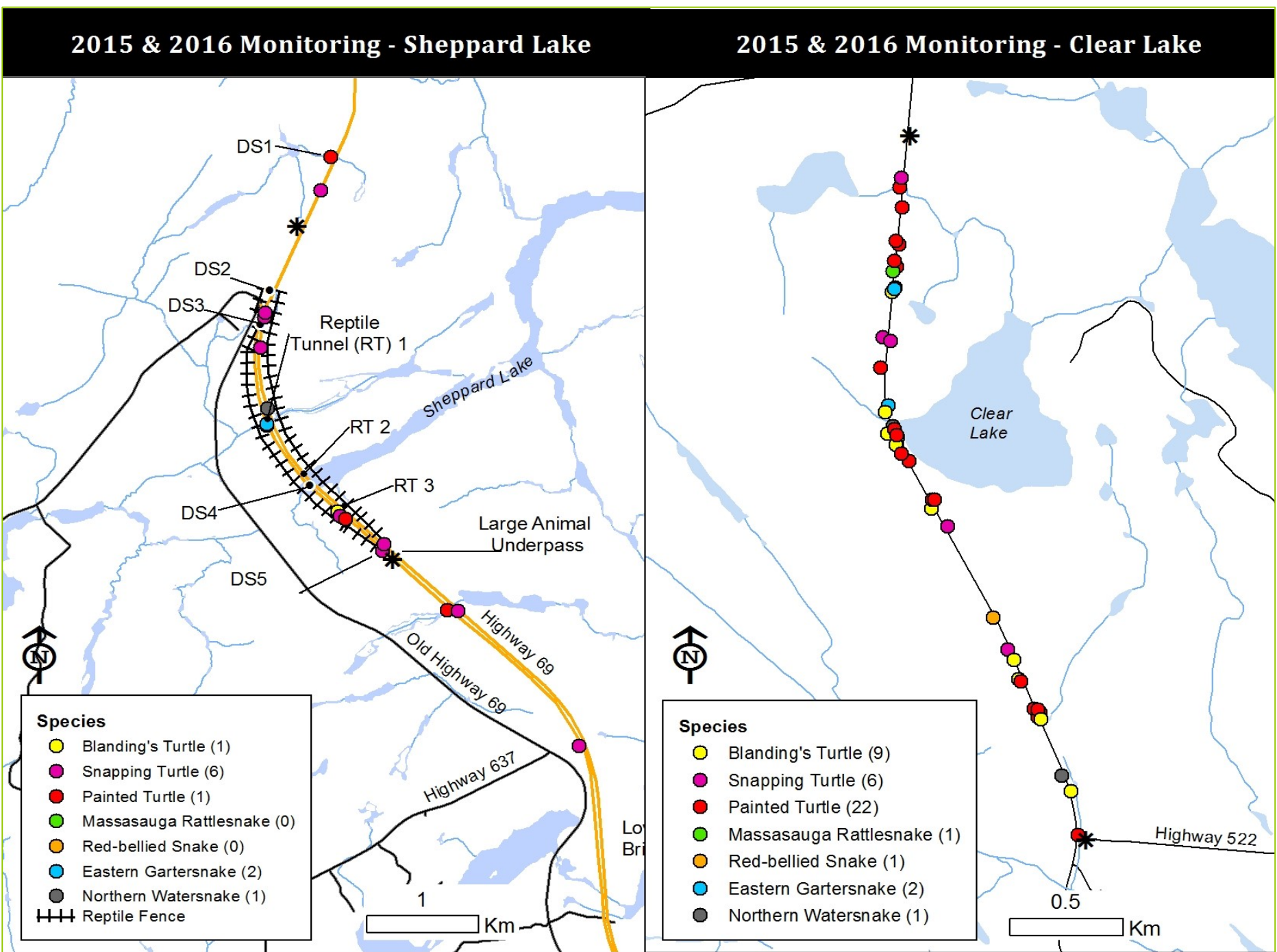
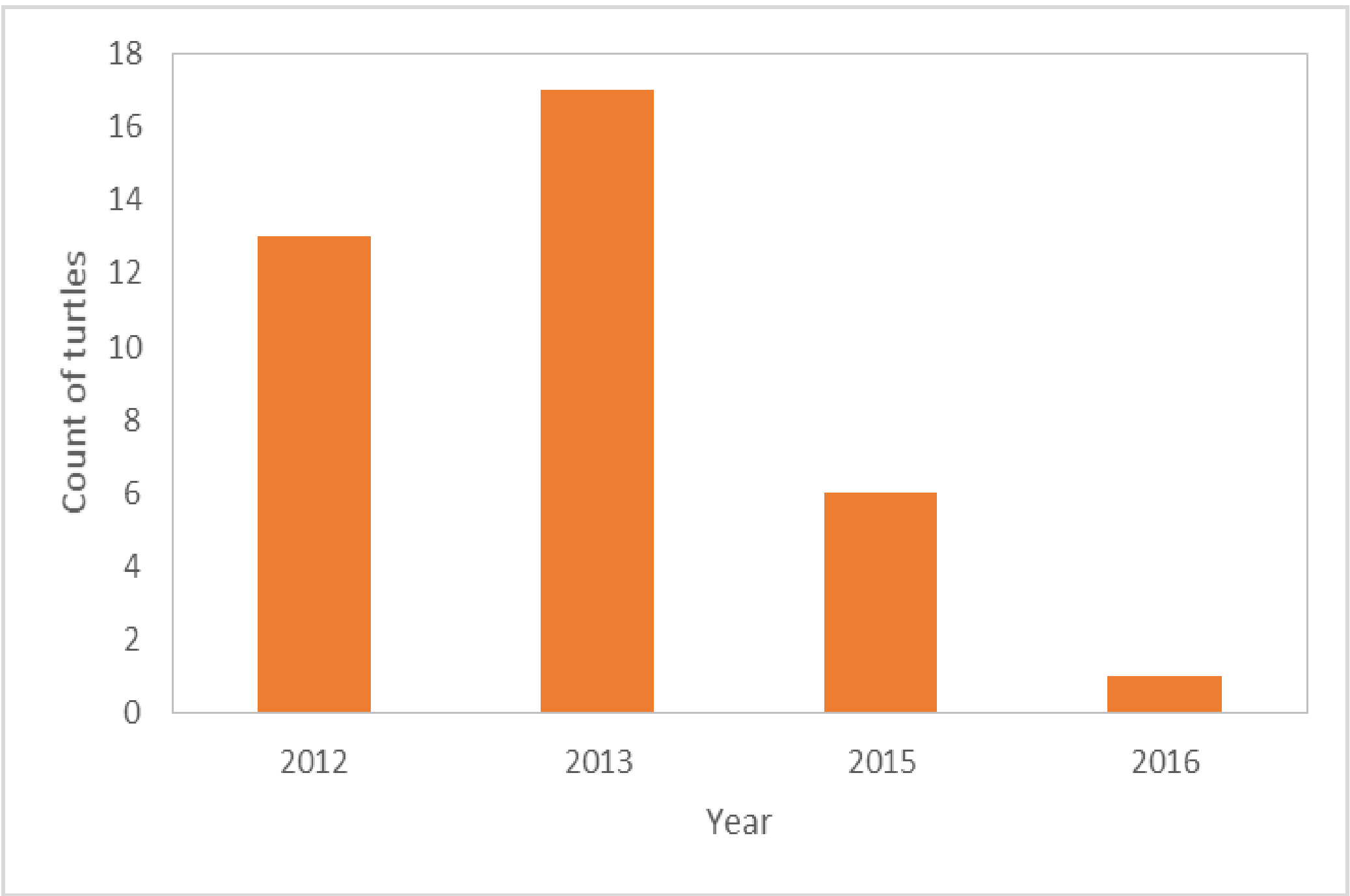
2016

- May
- Reptile exclusion fencing maintenance: extended 300 m south on both sides of highway and 150 m north along the SB lanes



Results

In 2015 and 2016, the reptile exclusion fence resulted in a significant reduction in the number of turtles on the road at the Sheppard Lake mitigated site (7 turtles) site relative to the Clear Lake site (36 turtles) (Figure right below). Furthermore in 2015 and 2016 there was a considerable decline of turtles found on the highway as compared to 2012 and 2013 (bar graph below)



An evaluation of the mitigated site at Sheppard Lake over four years (2012 to 2016) using a Poisson generalized linear model (GLM) - *count turtles ~ mean temp + mean rain + nesting + year* – The model found that the improved reptile fence in 2016 would result in a 90% reduction in the number of turtles hit on the road relative to the unmitigated status in 2012 when other factors are held constant. Rain also was significant and increased the probability of finding turtles.

Monitoring Methods

Walking Surveys:

- May-July in 2015 and 2016
- Two 3.5 km sections of highway; one mitigated (Sheppard Lake) and one not mitigated (Clear Lake)
- Transects bisected similar wetland habitat and were approximately 40 km apart
- When a turtle was found the species, sex, nesting behaviour, plastron mid-line length and width, age (hatchling, juvenile, adult) and location (UTM) were recorded

Camera Monitoring:

- June-October in 2015 and 2016
- Camera systems: Remote passive infra-red trigger (Reconyx and Bushnell) and Active beam trigger (JTS)
- Camera set-up: Rock/dirt/wood ramps for funnel; camera placement at side or top of tunnel
- Camera settings: Time lapse and Motion



Conclusions

- All turtle road mortality at Sheppard Lake (mitigated site) can be attributed to no fence on one side of the highway, or a fence end issue.
- In 2015, 10 turtles (5 Snapping Turtle and 5 Painted Turtle) on both time lapse and active beam triggered cameras set-up at crossing structures. Monitoring cold-blooded reptiles with available camera technologies is challenging. Time lapse photography, and active beam worked the best.
- Exclusionary fencing that spanned all turtle habitat and that was maintained for any gaps and holes was effective at reducing road mortality for turtles and snakes (Blanding's Turtle); therefore routine fence assessments and maintenance are recommended to ensure functionality for reptile exclusion from the highway.

Acknowledgements

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