

Region of Waterloo



Balancing Environmental Protection & Transportation

The Laurel Creek Headwaters Environmentally Sensitive Landscape Case Study



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EXECUTIVE SUMMARY

In May 2013, Regional Council endorsed an initiative to examine how best to balance transportation and environmental considerations in Environmentally Sensitive Landscapes (ESL). This study was initially recommended by the Laurel Creek Headwaters ESL Public Liaison Committee, whose members had observed various environmental and traffic concerns on local roads. Following Regional Council's direction, Regional staff worked with staff from the Townships of Wellesley, Wilmot and Woolwich, the City of Waterloo, and the Laurel Creek Headwaters ESL Public Liaison Committee to develop terms of reference and a work plan for the study. In August 2014, the Regional project team selected a study consultant team led by Dougan & Associates (D&A) along with Paradigm Transportation Solutions, Matrix Solutions, and EcoKare International to complete the study.

Laurel Creek Headwaters ESL Location & Context

Environmentally Sensitive Landscapes (ESL) are areas designated in the Regional Official Plan (ROP) that have concentrations of significant environmental features, such as woodlands, wetlands, rivers and creeks, small lakes, groundwater recharge areas and the habitat of endangered and threatened species. The Laurel Creek Headwaters ESL is located within four Area Municipalities, the City of Waterloo and the Townships of Wellesley, Wilmot, and Woolwich (Figure 1, Figure 28). At 2,043 hectares (5,048 acres), the ESL was identified based on the concentration of Environmentally Sensitive Policy Areas (ESPAs) and Provincially Significant Wetlands in the headwaters of Laurel Creek.

Study Process

The goal of this study is to provide recommendations on how best to balance ecological processes and sensitivities with transportation needs within all ESLs, using the Laurel Creek ESL as a case study. The Case Study area within the ESL is limited to the sections of Kressler Road and Wilmot Line that fall within the limits of the ESL boundaries and the adjacent natural



Figure 1: Case Study Area

areas (Figure 1). Public consultation included Project Team meetings, a presentation to the Laurel Creek Headwaters ESL Public Liaison Committee, presentations to Area Municipal Councils, and two public open house meetings. In addition, the report for this study was circulated to the Laurel Creek Headwaters ESL Public Liaison Committee, the Grand River Conservation Authority and the Region's Ecological and Environmental Advisory Committee (EEAC) for review and comment.

Conclusions

Conclusions were divided into the four major study components: terrestrial natural heritage, water resources and aquatic habitat, transportation, and road ecology.

Terrestrial Natural Heritage

- Laurel Creek Headwaters ESL contains many significant features including but not limited to the Sunfish Lake-Laurel Creek PSW Complex, seven ESPAs, one Regional Forest, 21 woodlands that meet the Significant Woodland criteria, and 2 regionally significant ANSIs.
- There are key areas of linkages within the Laurel Creek ESL and conservation areas located to the west of the ESL.
- 48.35% of the Laurel Creek Headwaters ESL consists of natural cover which includes cultural, natural, wetland and aquatic features.
- A total of 56 species of fauna have been recorded within the Laurel Creek Headwaters ESL of which 22 are provincially and/or federally significant (Appendix E).

Water Resources and Aquatic Habitat

- Groundwater quality in the ESL is generally good and chloride levels in groundwater are generally lower than other groundwater features in the Region.
- Water quality results from watershed-wide sampling show that the stations in Laurel Creek (station 21) and Monastery Creek (station 23) show fewer exceedances of guidelines for total phosphorus and total suspended solids than other stations in Laurel Creek. However, Monastery Creek exhibits somewhat poorer quality in terms of these parameters possibly due to agricultural and rural development activities.
- Chloride concentrations in Laurel Creek and Monastery Creek within the ESL are the lowest in the watershed and are well below guidelines. These data suggest that road runoff is not leading to elevated chloride concentrations under current conditions. However, concentrations harmful to aquatic life have historically occurred in the area during spring melt.
- While water quality conditions remain suitable to support coldwater fish species, there is historical evidence that chloride concentrations during spring melt may be harmful to the fish community. In addition, total phosphorus and total suspended solids concentrations exceed Provincial Water Quality Objectives (PWQOs) in certain locations. These results suggest that coldwater fish species are under stress, which is reflective of the upstream drainage area.
- The presence of Brown Trout spawning sites within and downstream of the ESL represent highly sensitive habitat locations that may be impacted by sources of sediment and other contaminants entering streams from within the ESL. Brook Trout and Sculpins have existed historically in these streams and spawning habitat supporting Brown Trout currently exists within the ESL and further downstream.

- Sampling of the benthic invertebrate community indicates that Laurel, Beaver and Monastery Creeks are in a healthy state because of good water quality and aquatic habitat conditions.

Transportation

- Based on Transportation Association of Canada and Regional guidelines, the platform width in the Case Study Area is acceptable to permit the safe passage of two travel lanes of traffic for the current traffic volumes.
- There are significant grades on segments of the gravel portion of the road in the Case Study Area that exceed the maximum desirable grade referenced in the Geometric Design Guide for Canadian Roads published by the Transportation Association of Canada for major transportation facilities (6%) but close to the acceptable range for minor facilities (8%).
- Current traffic volumes are less than 1000 annual average daily traffic (AADT) along the unpaved section, which are well below the typical traffic capacity of a two-lane rural road (that could be anticipated to carry as much as 20,000 vehicles per day on a two-lane cross-section). However, in portions of the Case Study Area current traffic volumes are high enough that hard surface treatment may become economically desirable from a maintenance perspective.
- Cyclists and pedestrians are observed to be using the roads within the Case Study Area and accordingly should be given consideration in the assessment of alternatives.
- Because there is less than 1 collision per million vehicle-kilometres (MVKM), collisions are not a major concern.
- Within the unpaved portion of Wilmot Line, the 85th percentile speeds are generally much higher than the posted speed limit indicating that vehicles are excessively speeding.
- The Terms of Reference for this study did not include analysis of potential future development impacts on traffic patterns and/or volumes in the Case Study Area and therefore no conclusions have been made in this regard.

Road Ecology

- Based on current traffic volumes (average 40 vehicles per hour at certain locations on Wilmot Line) turtles and frogs have about a 20-25% and 15-20% chance of mortality respectively.
- Four locations, known as Wildlife & Hydrological Crossing Locations, within the Case Study Area were identified as having the highest likelihood of wildlife road crossings (Figure 27):
 1. North of the Cedar Grove Road and Wilmot Line intersection
 2. Laurel Creek crossing at Wilmot Line
 3. Southeast of Wideman Road and Wilmot Line intersection
 4. Monastery Creek crossing at Wilmot Line
- The Terms of Reference for this study did not include road mortality surveys, habitat assessments or species specific breeding studies within the Case Study Area and therefore no conclusions have been made in this regard.

Recommendations for the Case Study Area

In recent years, the Township of Wilmot has expressed interest in upgrading the surface of Wilmot Line within the ESL from its current gravel condition to a hard surface (tar/chip or pavement). The Project Team has given careful consideration to the Township's interests throughout the study process and Township staff has been actively involved throughout the study process. It was not within the scope of the study to determine whether or not Wilmot Line should be upgraded, as this decision rests with the Township. The study did conclude that current traffic volumes are less than 1000 AADT along the

unpaved section of Wilmot Line, which are currently well below the typical traffic capacity of a two-lane rural road. However, in portions of the Case Study Area current traffic volumes are high enough that hard surface treatment may become economically desirable from a maintenance perspective.

The Project Team is of the opinion that hard surfacing of gravel roads can help in mitigating impacts by reducing:

- Dust generated from vehicles;
- Sedimentation in watercourses;
- Frequency of ditch cleanouts; and
- Operational/maintenance costs related to all of the above.

However, the hard surfacing of gravel roads in isolation without other mitigation can create impacts to residents and the environment such as increased:

- Traffic speeds (and potentially volumes);
- Conflicts between motorized and non-motorized users;
- Wildlife road mortality;
- Erosion as a result of increased stormwater runoff volume and velocities; and
- Contamination of watercourses as a result of road salting.

Based on public input received to date and technical information gathered as part of the study process, preliminary recommendations for potential measures that could help better balance environmental protection and transportation considerations without road upgrades being undertaken within the Case Study Area, as mentioned above, are listed below. Further details about the mitigation options refer to Section 8. In addition, these potential measures could not only apply to the Case Study Area but could also be considered for roads in other ESLs when crossing environmentally significant areas:

- Wildlife warning signage at potential wildlife crossing locations along the length of the Case Study Area;
- Vehicle activated advanced speed warning signage to advise motorists that they are travelling too fast;
- Temporary road closure (similar to Stauffer Drive in Kitchener) during spring breeding migrations at crossing location 3 (potential Blanding's Turtle and Snapping Turtle habitat), if warranted following completion of detailed amphibian breeding surveys;
- Modifications to road maintenance practices such as regular inspections, conducting maintenance practices outside of breeding seasons and ditch vegetation management at crossing locations 2, 3, and 4;
- Improved stormwater management measures to control runoff and reduce sedimentation to watercourses such as ditch block controls, rock check dams and/or sediment traps;
- Further monitoring of traffic in the area to better understand travel patterns and volumes; and
- Further monitoring of wildlife movement including conducting specific road mortality surveys, habitat assessments, and breeding call surveys.

In the event that the Township wishes to consider upgrades to Wilmot Line, some potential measures that should be evaluated through an Environmental Assessment or Environmental Impact Statement include:

- Investigating operational modifications to the surrounding road network including improving alternative routes or considering road closures;
- Installing new wildlife crossing structures and exclusionary fencing at sites 2, 3, and 4 listed above;
- Developing measures to separate vehicular traffic from cyclists and pedestrians;
- Investigating traffic calming measures such as reducing or narrowing the travelled portion of the road at certain locations; and
- Developing a stormwater management strategy including techniques such as ditch maintenance practices/ditch treatments, bioswales and sediment traps or ponds adjacent to watercourses.

A mitigation strategy to reduce environmental impacts has been suggested in the above synthesis. While there is a significant volume of material presented in the study which suggests that wildlife is or may be present and may benefit from mitigation efforts relating to transportation, the reality is that no field verification was done to verify the presence, population, distribution and travel patterns of wildlife. These studies should be done prior to implementation of mitigation efforts. Monitoring should commence in 2016, and should consist of repeatable and consistent wildlife road mortality surveys as well as wildlife habitat assessments adjacent to the road. Other surveys may also consist of road-side breeding call surveys in the spring season and botanical inventories of features adjacent to the road. Data collection is essential for development of a cost-effective site-specific mitigation plan that meets the requirements of hydrology, habitat and wildlife in the Laurel Creek Headwaters ESL.

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