

9.0 POTENTIAL IMPACTS OF PROPOSED LAND USE

In regard to natural heritage features and areas, the PPS (2014) defines *negative* impacts as degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities” (p. 45). Further, the ROP (2015) defines *adverse environmental impacts* as “changes likely to arise directly or indirectly from development or site alteration within or contiguous to an element of the Greenlands Network that result in widespread, long-term, or irreversible degradation of the significant features or impairment of the natural functions of the designated area” (p. G-1).

Potential adverse environmental impacts associated with land use stressors within the Project Study Area and Stage 2 Lands are outlined in **Table 9-1** and are discussed in detail in Section 9.1 and 9.2 respectively.

9.1 POTENTIAL IMPACTS WITHIN THE PROJECT STUDY AREA

Given the existing natural heritage designations and policy protection regarding ‘development’ within and adjacent to natural heritage features, potential impacts are primarily related to agriculture and related activities, and indirect impacts as a result of increasing urbanization on adjacent lands. Potential impacts associated with anticipated development within the Stage 2 Lands are discussed in Section 9.2. Key issues within the rural PSA are discussed below.

9.1.1 LOSS OF / DEGRADATION TO WETLAND HABITAT

Small, sometimes seasonal or ephemeral wetlands that are not associated with a PSW may be filled / encroached upon, drained due to hydrological changes, or contaminated through agricultural practices within the PSA or through development activities within the Stage 2 Lands. Generally, impacts to these small wetlands is not considered significant within the PSA.

Comparatively, larger wetlands within the PSA generally receive protection through designation as Provincially Significant. However degradation of existing PSWs and / or unevaluated wetlands may occur through edge encroachment and woodlot management associated with agricultural practices, recreation (off-road vehicles, informal trails, introduction and spread of invasive species) and occupancy impacts that could result in the alteration, degradation and / or loss of the form and / or function of a PSW. The long term effects of these incremental direct or indirect impacts could include reductions in feature biodiversity or negative effects to the ecosystems services rendered by the feature(s)

9.1.2 WOODLOT USE

Woodlots within the PSA may be actively managed as a resource (e.g. lumber, firewood) and/or may provide recreational opportunities (e.g. hiking or ATV trails). Tree removal cutting) and recreational use may impact existing species through direct (e.g. mortalities, habitat loss) or indirect (e.g. disturbance during sensitive life cycle processes). Rural woodlots can also

become dumping areas (edges) for excess materials (e.g. brush, equipment). However, rural uses have maintained these features on the landscape historically as maintenance of these features for rural resource use, recreation or conservation is an important aspect of retaining and maintaining the Greenlands Network.

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Table 9-1 – Land Use Stressors and Potential Impacts on Natural Heritage Features

Land Use (Stressor)	Natural Heritage Feature Impacted					
	Wetlands	Vegetation	Wildlife	Fish and Fish Habitat	Landscape Level Systems	Surface and Groundwater
<p>Agricultural</p> <p>Agricultural practices have the potential to impact Natural Heritage Features. Impacts associated with agricultural practices are discussed in several sections per the table references.</p>	Section 9.1.1 – Loss/degradation to Wetlands	Section 9.1.2 – Woodlot Use Section 9.1.5 – Agricultural Activities	Section 9.1.5 – Agricultural Activities	Section 9.1.3 – Water Quality & Aquatic Habitats	Section 9.1.4 – Linkage Function	Section 9.1.3 – Water Quality & Aquatic Habitats
<p>Recreational</p> <p>Recreational activities – formal (approved trails and uses) and informal (unapproved trails and uses) have the potential to impact natural heritage Features. Impacts associated with recreational activities are discussed in several sections per the table references.</p>	Section 9.1.1 - Loss/degradation to Wetlands	Section 9.1.2 – Woodlot Use Section 9.1.6 – Recreational Use	Section 9.1.6 – Recreational Use	Section 9.1.6 – Recreational Use	Section 9.1.4 – Linkage Function	
<p>Development</p> <p>Current and proposed future development has significant potential to impact existing natural heritage features across all areas (wetlands, vegetation, etc.). Impacts associated with development are discussed in numerous sections per the table references.</p>	Section 9.1.1 - Loss/degradation to Wetlands Section 9.2.4 – Site Grading Section 9.2.7 – Building Construction and Associated Requirements	Section 9.2.2 – Vegetation Removal Section 9.2.7 – Building Construction and Associated Requirements Section 9.2.8 – Human Occupancy	Section 9.1.7 – Roads and Traffic Section 9.2.2 – Vegetation Removal Section 9.2.3 – Wildlife Habitat Section 9.2.5 – Infrastructure Section 9.2.7 – Building Construction and Associated Requirements Section 9.2.8 – Human Occupancy	Section 9.1.7 – Roads and Traffic Section 9.2.4 – Site Grading Section 9.2.5 – Infrastructure Section 9.2.6 – Stormwater Discharge, Water Quality & Aquatic Habitats Section 9.2.7 – Building Construction and Associated Requirements Section 9.2.8 – Human Occupancy	Section 9.2.1 – Fragmentation Section 9.2.5 – Infrastructure	Section 9.1.7 – Roads and Traffic Section 9.2.4 – Site Grading Section 9.2.5 – Infrastructure Section 9.2.6 – Stormwater Discharge Section 9.2.7 – Building Construction and Associated Requirements Section 9.2.9 – Groundwater Resources

9.1.3 DEGRADATION OF WATER QUALITY & AQUATIC HABITATS

Rural water quality can be impacted by standard farm practices (e.g. biosolids, fertilizers) and runoff (e.g. sediment-laden during storm events) or other effluent releases from rural land uses (e.g. meat packaging plant, junk yards, etc.). Limited buffering along existing watercourses are, in many areas, not sufficient to buffer inputs to the watercourses; additionally, narrow vegetated buffer strips are often lacking in woody species (shrubs and trees) resulting in thermal impacts to the watercourses that flow through rural agricultural lands.

Similarly, these impacts to water quality (including thermal regime) and habitat changes can negatively impact aquatic habitats and functions for the biotic communities they support. Benthic Invertebrate Communities are generally reflective of water quality and habitat type and in term, these communities support both aquatic and terrestrial biodiversity as food sources and as part of natural cycling processes. Fish communities are also directly affected by water quality and habitat conditions within streams and can be negatively or positively impacted with changes to the water quality and habitat condition one or multiple reaches in the system.

9.1.4 LOSS OF LINKAGE FUNCTION

Linkages within the PSA are generally associated with watercourses; hedgerows may also offer linkages by assisting with the movement of seeds / plant materials and wildlife. Existing linkages – both large and small – provide important functions for the permeability of the landscape. Loss of hedgerows and narrowing of buffer strips along watercourses will impact the transfer of materials and movement of animals within the landscape, resulting in decreased genetic mixing, potential loss of species (e.g. no seed source connection) and / or loss of access to habitat requirements. Large farm practices often remove hedgerows and connections to increase yield and for access / use of large farm equipment. Additional impacts to linkage functions may include avoidance / reductions in use due to high activity areas (e.g. off-road vehicles) through narrow corridors, etc.

9.1.5 AGRICULTURAL ACTIVITIES

In addition to other agriculture- and farm-related impacts discussed above (i.e., tree cutting in woodlots, wetland removal and filling, fertilizer / biosolid application, degradation of linkages, tile drainage), agricultural activities have the potential to directly impact vegetation and wildlife. Potential impacts to wildlife through agricultural activities include grassland birds that nest in certain crops (particularly hay), and typical harvesting times may result in nestling mortality; timing of field preparation (tilling) in the spring may also coincide with movement of herpetofauna between breeding habitats and overwintering / summer foraging habitats. Vegetation impacts in addition to wetland and woodlot impacts are associated with the loss of edge and meadow / open vegetation and habitat areas. As agricultural practices continue to seek opportunities to increase yield, edge areas and open vegetation communities are often removed from the landscape.

9.1.6 RECREATIONAL USE

Off-road vehicle use, trails, hunting, and bush parties have already been noted within the forested features during the course of field work for this study. Recreational use (informally or formally) can impact features directly through alteration, degradation, loss or fragmentation of vegetation communities / habitat features, wildlife mortalities, fording streams with motorized vehicles (e.g. bank erosion, stream bed impacts, sedimentation) and indirectly through altering behavioral patterns (e.g. avoidance or nest abandonment) and through impacts to biodiversity (long-term reduction of seed dispersal, etc.).

9.1.7 DEVELOPMENT AND USE OF TRANSPORTATION INFRASTRUCTURE

Two busy Regional Roads cross the PSA in the west and south: Fountain Street North and Kossuth Road / Fairway Road North, respectively. Kossuth Road bisects the Kossuth PSW Complex in the southern portion of the study area. In addition to these busy Regional Roads, several smaller municipal and rural roads bisect the PSA.

Existing and potential environmental stressors associated with these roads include: lack of wildlife passage structures and resultant road mortality; impacts to surface water quality, aquatic habitat and terrestrial vegetation from road salt application and other contaminants, reduction in watercourse length and the creation of barriers to fish migration; wildlife habitat 'sinks' in the form of turtle nesting habitat on gravel shoulders; and other indirect impacts (e.g., noise, light).

9.2 POTENTIAL IMPACTS WITHIN THE STAGE 2 LANDS

Many of the 'potential' impacts discussed in Section 9.1 have already been experienced in natural areas within the Stage 2 Lands to varying degrees, based on the long history of agricultural use and urbanization in the general area over the past several decades. These include: fragmentation (via roads and mono-cultural croplands); loss of terrestrial and wetland habitat (through historical agricultural clearing); woodland disturbances (abiotic edge effects, cutting, trails, uncontrolled recreational use), tile drainage and drain maintenance; indirect impacts from roads and traffic (e.g., noise, light, saltspray, roadkill); and soil erosion / sedimentation of creeks and wetlands (from typical farm practices). Some of these have the potential to be exacerbated through development (such as occupancy effects), while others (uncontrolled sediment transport) will be greatly lessened or eliminated following development with proper design and implementation of SWM measures.

In addition to the general potential impacts discussed above, there are a number of specific impacts that can result from urban development and occupancy, as discussed below. With implementation of the proposed NHS and management plan recommendations (Section 10), no additional direct natural / semi-natural area removals or new road crossings of natural areas are anticipated. Specific mitigation measures are identified in Section 10.

9.2.1 LANDSCAPE FRAGMENTATION

As a result of the long history of agricultural land use and urban development, the Stage 2 Lands are an ecologically fragmented landscape (by roads, an airport, agricultural fields and some development), though there is some connectivity between remaining natural blocks. Future development has the potential to further fragment natural heritage features through roads, services or other development related infrastructure.

9.2.2 VEGETATION REMOVAL

All significant and sensitive natural features, based on information available at the time of the subwatershed study, are recommended for retention and protection within the Greenlands Network (e.g. Core Environmental Features). Features, such as hedgerows, unevaluated / unregulated wetlands, and 'low constraint' features (**Figure 5-5**) will face increased pressure for removal / development; and could potentially be removed through development subject to Provincial, GRCA and municipal policies at the time of application. Although not part of the Greenlands Network, removal of these features in association with development may reduce landscape permeability and marginal habitat opportunities for some species. Function of these features should be further assessed prior to removal to assess their ecological function at a local level. Vegetation removals are not known at the time of the subwatershed study and should be fully assessed through site-specific / scoped EIS prior to development.

9.2.3 DEGRADATION OF WILDLIFE HABITAT

All significant and sensitive natural features are recommended for retention and protection within the Greenlands Network (Core Environmental Features). Effects to wildlife habitat will generally be through indirect effects (Section 9.2.8).

Impacts to wildlife habitat should be assessed and confirmed in the context of proposed development to refine anticipated impacts; development type (e.g. industrial vs residential) will have different potential direct and indirect impacts to wildlife and wildlife habitat and should be assessed through a site-specific / scoped EIS prior to development.

9.2.4 SITE GRADING

Site grading, including cutting and filling, has potential for: changes to hydrogeological inputs (surface and groundwater); increased erosion and sedimentation; increased turbidity in watercourses; increased nutrient and contaminant inputs to wetlands and watercourses; soil compaction (with impacts to infiltration and vegetation); and root damage (cutting, burying).

With the proposed NHS and SWM strategy, it is recommended that all watercourses be retained in full and surface flow patterns / catchments generally be maintained (with minor revisions).

9.2.5 INFRASTRUCTURE DEVELOPMENT AND USE

Installation of roads, sewers and other services has the potential to: fragment natural areas; require dewatering (with influence on groundwater levels, potential erosion at discharge etc.); change groundwater flow; increase sedimentation and erosion; disturb wildlife during construction (noise, vibration, proximity to natural areas); and increase contaminant inputs to natural areas. Maintenance of infrastructure, including municipal drains can also directly and indirectly impact natural heritage features and functions, particularly where drains directly support fish and fish habitat and / or provide contributing habitat to downstream systems (e.g. change to allochthonous⁷ inputs, sediment, etc.).

9.2.6 INCREASED STORMWATER DISCHARGE

Impacts of increased discharge of stormwater as a result of development has the potential to impact receiving areas (i.e., watercourses) through: increased erosion and sedimentation; changes to instream temperature (warming); and increased contaminant and salt loading. Note that implementation of a stormwater management strategy provides some improvements over the current uncontrolled discharge from active croplands (i.e., decreased nutrient, pesticide, fertilizer and sediment input). However, the above noted potential impacts are still possible.

Water quality changes associated with development will largely be influenced by stormwater management, however additional sources of impact may include: reduction in agricultural inputs (phosphorous, etc.) which may have a benefit to system water quality, negative impacts may include – detritus, dumping and any indirect inputs to the system from site-specific development.

Aquatic habitat may see improvements through buffer implementation and management through thermal mitigation and buffer strips providing both allochthonous inputs and providing a direct buffer to contaminants entering the system.

9.2.7 BUILDING CONSTRUCTION AND ASSOCIATED SITE ALTERATION

Anticipated future construction has the potential for short-term (during-construction) and long-term ecological impacts including: terrestrial and aquatic feature removal or alteration; changes to hydrogeology (e.g., increase in impervious substrates, changes to surface flow patterns); fragmentation of natural areas; wildlife disturbance / mortality (e.g., road kill, building collisions); and edge effects.

While edge effects (such as ‘residential encroachment’) are known to extend up to 50 m into natural areas (e.g., Matlack 1993; McWilliam et.al. 2010), it is important to re-iterate that natural areas within the PSA have already experienced edge effects to varying degrees based on the

⁷ For the purposes of this report, Allochthonous Inputs refer to biotic or abiotic inputs to the aquatic system from upstream or terrestrial areas.

long history of agricultural use and urbanization in the general area over the past several decades.

9.2.8 INCREASED HUMAN OCCUPANCY

With anticipated future residential development in the Stage 2 Lands, human presence will increase relative to the current land use. Note that the impact of human presence and use in the local landscape has likely already been experienced in the Stage 2 Lands to some degree (residential properties are all existing (and for some, longstanding) uses within the Stage 2 Lands). Breslau has seen residential development west of Fountain Street in 2009 through 2016 with additional development anticipated in the near future.

Potential impacts associated with human presence include: uncontrolled access to natural areas with trail creation, dumping, vegetation disposal; introduction of contaminants; vegetation trampling / compaction; increased roadkill; pet predation of wildlife; light / noise impacts on sensitive wildlife; and introduction / spread of non-native species. In addition to these, indirect effects associated with increased human presence include increased traffic as a wildlife deterrent from road crossings; increased dust, debris and litter; increased use of recreational opportunities (increased frequency, density and duration of users) resulting in impacts to species presence and success (e.g. flushing from nests, etc.).

9.2.9 DEGRADATION OF GROUNDWATER RESOURCES

Impacts to groundwater resources within the Breslau Drain and Randall Drain subwatersheds will be related to threats to groundwater quality and quantity. Additional investigations are required under the technical work program to provide additional input to assess impacts to groundwater. However, based on the background review, the following items are potential impacts:

- Portions of the Breslau and Randall Drains within the Stage 2 Lands within the identified WHPA for RMOW production wells may be vulnerable to DNAPLs. Portions of the Randall Drain subwatershed have a vulnerability score that indicates susceptibility to waste and sewage disposal systems.
- It is expected that groundwater infiltration will be significant in areas where the surficial materials consist mainly of sand and gravel. In areas where impermeable surfaces are constructed during development, infiltration of precipitation should be undertaken to maintain the water balance.