South Nation Conservation
de la Nation Sud

Prescott Russell

theCounties SDG
Stormont · Dundas · Glengarry

Raisin Region Conservation Authority

Natural Heritage System Study

Final Report

2021

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Acknowledgements

The Project Managers would like to acknowledge the dedication, support, and guidance of the Technical Team and Working Group.

The project brought together a diverse group of professionals from the Counties and Conservation Authority to collaborate on a comprehensive environmental study resulting in new natural heritage system mapping and significant environmental policy improvements.

The partnership included cooperation from the Raisin Region Conservation Authority and guidance from the Eastern Ontario First Nations Working Group including the Algonquins of Pikwakanagan and Mohawks of Akwesasne.

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EXECUTIVE SUMMARY

The United Counties of Prescott and Russell (UCPR) and the United Counties of Stormont, Dundas and Glengarry (SDG) partnered with South Nation Conservation (SNC) to complete the Natural Heritage Systems Study.

The Report provides updates to the County Official Plan schedules to define natural linkages based on a regional landscape analysis. The Report also includes Official Plan policy amendments to streamline development where minimal environmental impact is expected and to protect large core natural areas. The focus of Natural Heritage System policy is to encourage public land acquisition and stewardship where it matters most.

This Report provides a description of how the Natural Heritage System was developed and gives general policy direction for the proposed Official Plan updates. Detailed policy updates were provided to each County through edited versions of the current Official Plans.

1.0 INTRODUCTION

1.1 Natural Heritage System Benefits

Natural Heritage System (NHS) planning is about maintaining, restoring, and enhancing landscapes by linking natural core areas like significant woodlands and wetlands. These systems promote wildlife movement, increase biodiversity, reduce habitat fragmentation, and create a landscape resilient to disturbances like climate change by enabling species to migrate between core areas.

NHS planning also facilitates the restoration and enhancement of critical natural areas. For example, tree planting projects can be directed to watercourse corridors helping to reduce erosion, protect water quality, and increase local forest cover. These efforts enhance the connectivity between water and land.

Healthy NHSs provide ecosystem services that support human well-being and the health, safety, and economic prosperity of our communities. These benefits include lowering flood risk, soil retention, water purification and storage, improved air quality, pollination, and outdoor recreation opportunities that support tourism. When protected, these services can be provided in perpetuity, reducing the need for costly infrastructure solutions.

1.2 Provincial and Municipal Planning

The Province directs municipalities to identify and protect NHSs through the Provincial Policy Statement. Municipalities achieve this by including NHS mapping and policies in the Official Plan.

As primary public agencies for long-term land use planning, municipalities play a key role in managing natural heritage features and areas for the benefit of their communities. County Official Plan policies balance the need for land development, resource use, and protection of ecosystem services for the community while also considering the effects of climate change.

The Counties committed to updating their Natural Heritage System mapping and policies as part of their Official Plan updates. This Report summarizes provides the mapping and methodology for the final Natural Heritage System which will be added to both County Official Plans by amendment.

2.0 NATURAL HERITAGE SYSTEM MAPPING

2.1 Guiding Principles

NHS mapping is guided by principles and concepts drawn from the fields of landscape ecology and conservation biology, and by the spatial and temporal scales necessary to support regional and long-term movement of plant and animal species. These guiding principles were established with the municipal planners working groups during the early consultation meetings.

Several principles helped guide the methodology and design of the NHS:

- Large natural areas are preferred over fragmented areas.
- Wide corridors are better than narrow corridors.
- Corridors with continuous natural cover make the best wildlife movement routes.
- Connecting each core to multiple corridors ensures the NHS is resilient to landscape changes and will function long-term.
- Areas in public ownership have the highest level of protection and should be included in the natural heritage system where possible.
- Agricultural lands are recognized as part of the working rural landscape and can form part of a Natural Heritage System.

2.2 Scale

The Counties NHS functions at a regional scale, over a long period of time, to accommodate species with large ranges like fishers and moose, two keystone local wildlife species identified by the Province for regional scale NHS planning. These regional scale connections enable species to expand to new areas over generations.

The regional scale is equally important for plant and animal species that do not require a large range as it enables populations to be resilient to the impacts of a changing landscape, disease outbreaks, and long-term climate change. The regional NHS also allows species to migrate and repopulate areas that have experienced localized die-offs.

The NHS is intended to support natural heritage system planning at other scales. Many species require local scale connections to meet their lifecycle needs. There are also many smaller natural areas with unique ecosystems that are valued by local communities. Future natural heritage system mapping projects completed at a subwatershed or municipal scale can seamlessly tie into this natural heritage system map to incorporate regional wildlife movement.

2.3 Input Data and Studies

The NHS generally includes wetlands, waterways, areas of natural and scientific interest, woodlands, significant wildlife habitat, public land including trails and greenspaces, and natural hazard areas including floodplains.

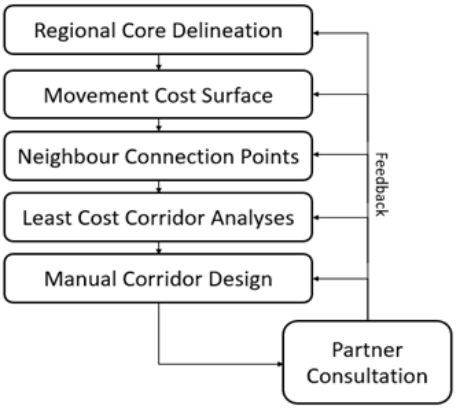
Only existing spatial data and studies, or datasets that could be readily derived from existing data, were used. The most current local information was used in place of older or coarser resolution data.

Sources of information included provincial agencies, conservation authorities, municipalities, environmental conservation agencies, environmental consultants, and academic institutions.

Information from neighbouring NHS and inventory projects was obtained in GIS format, or by georeferencing maps associated with a study or schedule of an Official Plan. A table of the input datasets and studies is provided in Appendix A.

2.4 Methodology

The Regional Cores were identified first. A dataset of wildlife movement costs was then compiled, neighbouring connection points were established, and the least cost corridor approach was used to connect these features. Partner feedback was incorporated throughout the process which led to revisions and adjustments to the final NHS. Public feedback was used to improve and support the final report.



2.5 Regional Cores

Regional Cores are large areas of mostly natural cover that are intended to remain in a natural state for an extended period. They are essential natural areas that protect biodiversity by accommodating functional wildlife populations.

These areas are often regionally and socially significant and include a large proportion of publicly owned lands. Examples of Regional Cores include the Larose Forest and Alfred Bog in UCPR, and Loch Garry Marsh in SDG.

Regional Cores act as anchor points for the County Natural Heritage System.

Local Cores are the building blocks for the Regional Cores. Local Cores are wetland and woodland areas identified as significant for land use planning purposes (i.e., shown on official plan schedules). The wetlands are identified as Provincially Significant by the Ministry of Natural Resources and Forestry (MNRF), while woodlands are areas that meet MNRF significance criteria detailed in the Natural Heritage Reference Manual.

The significant features were combined into a single map layer, and areas within 20 meters were ‘complexed’ or grouped together. The total area and degree of fragmentation were generated for each complex. The largest complexes with the lowest degree of fragmentation were selected as the Local Cores (see notes 1 & 2, Appendix B).

Regional Cores were formed by complexing Local Cores within 50 metres, manually simplifying the outer boundaries to create large blocks, and dissolving the inner boundaries. The complexes were sorted by size, and thresholds were chosen to select the largest areas (see notes 3 & 4, Appendix B). The area was then buffered by an additional 25 metres around the perimeter.

The resulting Regional Cores are the largest areas of natural cover for the Counties. The features are shown in Figure 5. Table 2 provides a breakdown of landcover uses and public ownership for each Regional Core.

The resulting areas were reviewed by ecologists, forestry staff, and municipal planners. This review resulted in several additional Regional Cores, some of which were under the original size threshold but were identified as regionally significant (see note 4, Appendix B).

2.6 Wildlife Movement Cost Mapping

A least cost corridor analysis relies on a dataset that represents wildlife movement across the landscape. This dataset estimates the 'cost' or difficulty for species to migrate, with lower values assigned to good habitats that provide resources and safety, and higher scores assigned to unsuitable and potentially dangerous land uses.

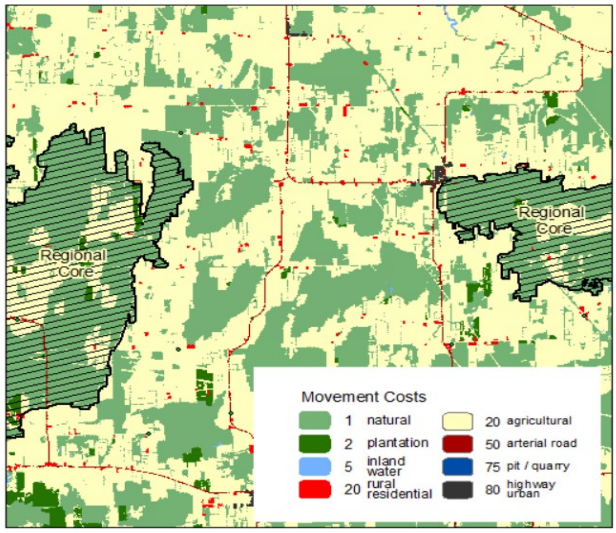
A movement cost map was generated by building a land cover / land use datasets for the project area and assigning a movement cost score to each land use category. These scores and an example of the mapping are provided in Table 1 and Figure 2.

Additional maps were created for important landscape characteristics that influence wildlife movement (i.e., floodplains, agricultural lands, etc.). These maps, called 'modifiers' were layered over the movement cost map, and a uniform factor was applied to increase or decrease underlying movement costs. Floodplains and vegetated watercourse riparian areas were used to lower movement costs by 50%. Prime agricultural lands doubled movement costs. The natural cover in prime agricultural land, however, was not adjusted to preserve these areas as 'stepping-stones' with lower movement costs. Finally, the movement costs within and adjacent to urban areas were increased to ensure the natural heritage system would avoid built-up areas.

Land Cover / Land Use	Movement Cost
Woodland	1
Wetland	1
Woodland - Plantation	2
Open Water	5
Golf Courses	5
Railway	20
Ottawa & St. Lawrence Rivers	20
Rural Residential	20
Agriculture	20
Local Roads	30
Arterial Roads (County Roads)	50
Quarry	75
Highways	80
Urban and Bult-up Areas	80

Modifier Map	Multiplier
100 year Floodplain	0.5
Watercourse 30m Riparian	0.5
Prime Agricultural	2
Urban Areas, plus 50m buffer	4

Table 1: Movement Cost and Modifier Scores



2.7 Regional Boundary Linkages

A natural heritage system must also connect to neighbouring habitats and populations i to ensure long-term wildlife health and resilience across expansive landscapes.

NHS and natural heritage inventory studies were identified for each neighbouring Canadian municipality. For New York State, a NHS study from the Algonquin to Adirondacks Collaborative was used. GIS files were obtained or study maps georeferenced to place these studies adjacent to the eastern Ontario study boundaries.

Boundary linkage points were identified to a core or corridor in each neighbouring study, and aerial imagery and local knowledge were used to identify specific crossing points on the Ottawa and St. Lawrence Rivers. To be selected as a crossing point, both sides of the river were required to have natural cover, minimal shoreline development, and no shipping infrastructure. The distance between shorelines was also measured, and shorter distances used to prioritize crossings.

Studies from adjacent jurisdictions are listed in Appendix A.

2.8 Corridors

Regional cores are connected by corridors: predominantly natural, semi-natural, or rural areas that provide or have potential to provide ecological connectivity. Corridors include natural heritage features, and rural, agricultural, and other supporting lands. Without these corridors, wildlife populations in regional cores cannot easily migrate and are vulnerable to genetic isolation.

Corridors were delineated between the Regional Cores, neighbouring studies (i.e., the boundary linkage points) and between the Counties by determining the lowest scoring route across the movement cost map.

The least cost corridor method provides a travel 'cost' between a defined start and end point. Depending on the tool used, the output is a single line delineating the lowest cumulative cost between the two points, or a map of the cumulative cost for every pixel.

Both tools were used to evaluate potential corridors. To focus the analysis, only the lowest 1% of the pixels from the second tool were used (see note 5, Appendix B). The resulting layers provided the 'least cost paths' as the discrete lines, and the 'least cost pixels' to provide potential alternatives of similarly scoring paths, as shown in Figure 3.

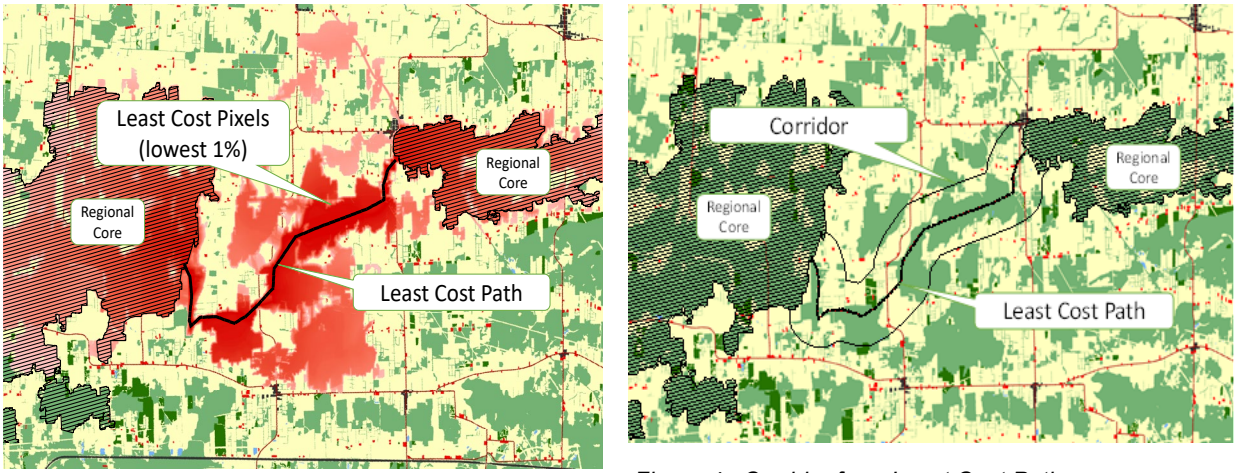


Figure 4: Corridor from Least Cost Path

The least cost paths were buffered to create the corridors with widths of one or two kilometres. The two-kilometre corridor width was selected for most terrestrial linkages, while a one-

kilometre width was used where the path followed a watercourse surrounded primarily by agriculture. An example of a standard 2-km width corridor is shown in Figure 4 (above).

Where a path passed through a built-up area, the corridor was reduced to the width of the watercourse plus riparian vegetation and public land to avoid incompatible land uses. Some of the corridors in rural lands include Enhancement Areas which are areas without natural cover that have potential to be restored to a natural state.

2.9 Corridor Design

The corridors follow natural areas but also captured adjacent incompatible lands. Large blocks of natural cover south of Highway 401, for example, resulted in a two-kilometre buffer that encompassed the highway.

To avoid incompatible areas, the least cost paths were manually edited using two sources of information as reference: least cost pixels (i.e., the lowest 1% of the cumulative movement cost pixels) and publicly owned conservation lands. Alternate least cost pixels routes were followed when the route would help avoid an incompatible area.

The publicly owned conservation lands were prioritized because they provide the greatest long-term protection for the NHS. The adjusted paths were buffered again to regenerate the corridors. Finally, manual refinements were made to the corridor boundaries and widths to avoid built up areas and large settlement areas designated for future growth.

2.10 Expert Review and Consultation

A draft version of the NHS was circulated to ecologists, land use planners, and forestry staff at the local municipalities and conservation authorities for feedback.

The input was used to adjust the Regional Core size thresholds, movement cost scores and modifier overlays, and to add or remove connection points to neighbouring studies.

The models were updated with each adjustment and the full analysis repeated. The feedback resulted in important changes to the NHS including:

- The size threshold for Regional Cores in SDG was adjusted and two new Regional Cores were added.
- Movement costs were fine-tuned for inland rivers and rural residential parcels.
- Natural cover was omitted from the agricultural modifier.
- Many settlement areas were removed from Regional Cores and corridors.
- A full corridor was removed due to a conflict with a settlement area.
- New corridors were added to increase connectivity between the Counties and neighbouring jurisdictions to the east and south.

Please see the full Record of Municipal Engagement was provided to the County as part of theh the Supporting Documentation.

2.11 Natural Heritage System Components

The analysis resulted in fifteen Regional Cores, approximately twenty-five corridors, and twenty-one connections to neighbouring jurisdictions (Figure 5).

2.12 Regional Core Summary

Regional Cores comprise approximately 18% (95,988 hectares) of the total land area within both Counties.

The cores range in size from 1,335 hectares to over 21,000 hectares for the Loch Garry Marsh. Most of these areas are wetlands (43%), followed by upland forest (36%), and agriculture (17%). Approximately 1% of the system captures open water areas associated with wetlands or rivers. Approximately 26% (24,739 hectares) of the land in Regional Cores is in public ownership.

Percent Cover	Alfred Bog	Beaver Brook	Black River Swamp	Dickensons Creek	Hammond Wetland	Hosaic Creek	Larose Forest	Loch Garry Marsh	Newington Bog	Sand Hill Forest	Summerstown Forest	Treadwell Creek	Voyageur Park	Warwick Forest	Winchester Bog
Agriculture	2.2	19.1	13.6	11.9	14.4	18.9	18.9	20.1	21.0	15.9	11.1	17.8	20.6	16.9	3.9
Golf	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Open Water	0.0	0.4	0.5	0.8	0.6	0.1	0.3	2.4	0.1	0.0	0.1	0.4	0.1	0.0	0.4
Pits & Quarry	0.0	0.2	0.0	0.0	2.7	0.3	0.4	1.1	1.3	0.0	0.0	1.0	0.7	6.8	0.9
Plantation	1.0	1.9	1.3	6.5	9.9	3.0	43.2	2.0	2.2	7.0	2.4	5.7	4.6	12.6	0.6
Transportation	0.1	1.2	1.7	1.4	1.1	1.5	1.3	1.1	1.0	0.4	1.8	1.3	1.7	1.7	0.1
Urban	0.0	0.4	0.6	0.6	1.3	0.2	0.5	0.3	0.4	0.2	0.4	0.7	0.1	0.1	0.0
Wetland	95.5	41.7	56.1	26.2	23.8	62.9	14.1	47.5	52.4	37.6	66.9	22.2	35.8	40.3	91.9
Woodland	1.2	35.1	26.1	52.2	46.2	11.6	20.7	25.6	21.6	38.9	17.2	50.9	34.4	21.5	2.1
Hectares	4,259	4,201	2,182	6,282	3,600	12,677	18,661	21,641	8,866	1,335	2,296	3,880	1,593	2,005	2,547
Public Ownership (%)	80	3	5	22	17	20	57	6	5	0	27	8	40	50	63

Table 2: Proportion of Land Cover and Land Uses within Regional Cores

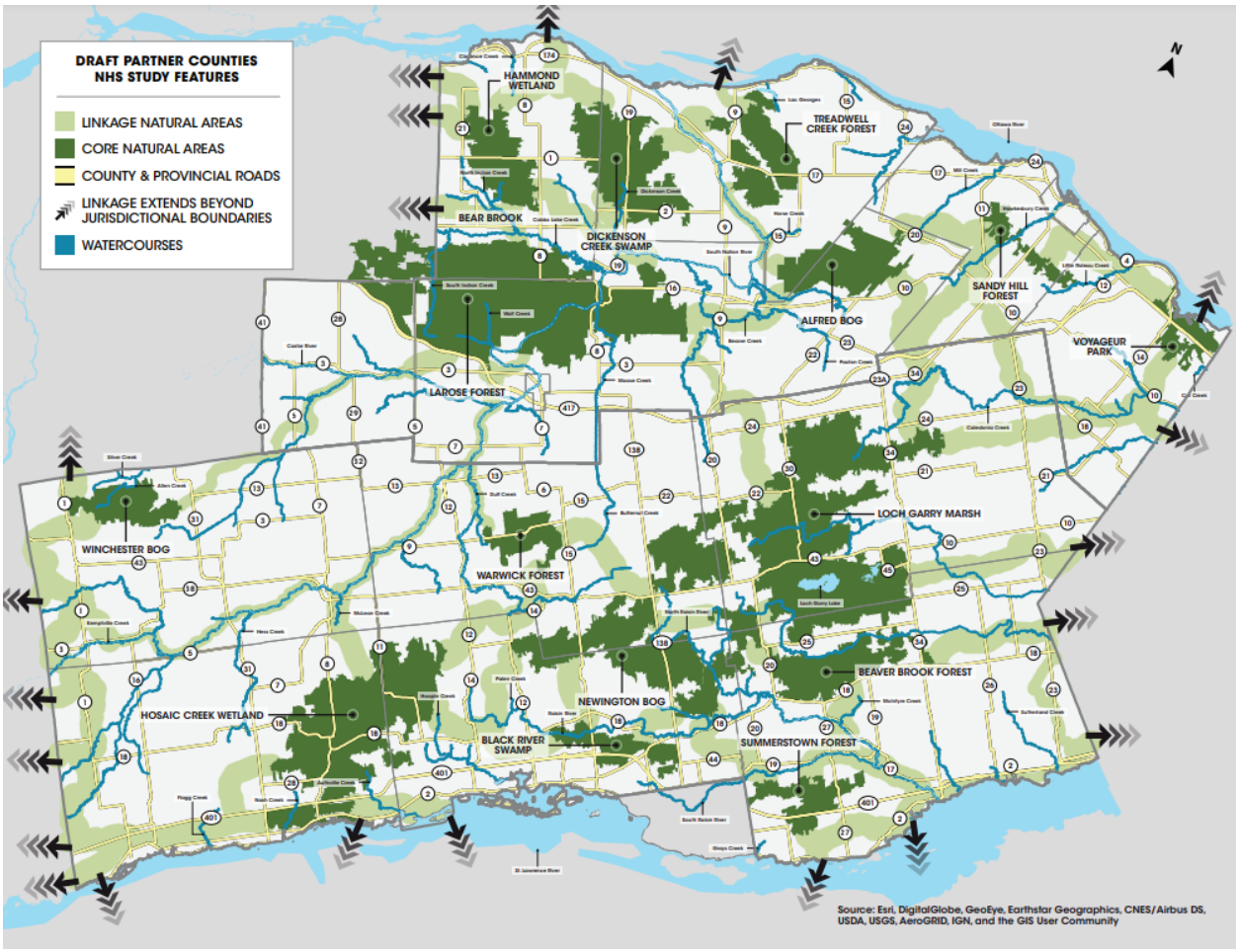


Figure 5: Natural Heritage System Components

2.13 Corridor Summary

Corridors account for approximately 19% or 101,123 hectares of the total land area within both Counties.

Wetlands, woodlands, and open water account for 36% of the corridors overall, ranging from as low as 8% in one corridor to as high as 60% (Figure 6).

Agriculture accounts for most of the remaining area in the corridors (59%). Most corridors are two kilometres in width (73%), while 25% are one kilometre. Approximately 2-3% were narrowed further as they travel through built-up areas such as Embrun, Chesterville and Crysler, and many smaller areas to avoid areas of designated future growth.

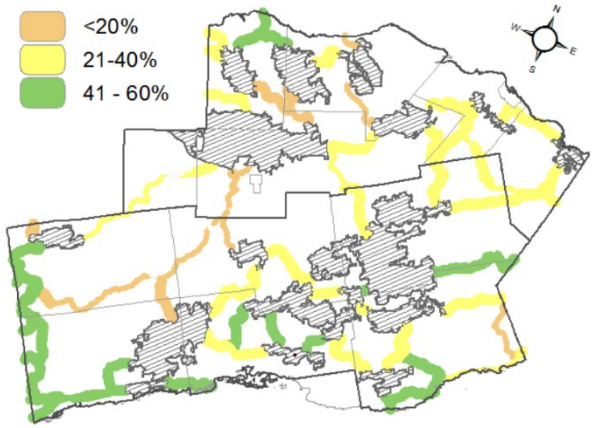


Figure 6: Corridors' Percent Natural Cover

The one-kilometre corridors tend to follow watercourses, such as the Castor River and South Nation River, but also some upland areas. For example, a corridor along the St. Lawrence River was narrowed to avoid Highway 401, while another corridor between Larose Forest and Warwick Forest follows the Payne River and South Nation River, but then connects through blocks of natural cover separated by agricultural lands.

3.0 OTHER MAPPING UPDATES

Both Counties identified sub-projects that were associated with the Natural Heritage System project. These components reflected local priorities and interests and are described generally below. These sub-projects are being provided to the Counties for their consideration and may result in Official Plan amendments or additional, more detailed study.

3.1 Significant Valleylands

Significant valleylands are natural areas in a valley or depression where water flows. These features are extremely important wildlife corridors that provide safe areas for animals to move through habitat. Valleylands also serve as genetic reservoirs and biodiversity hubs due to the difficulty in developing within or around them; meaning they often remain untouched for extended periods.

The County Official Plans contain policies regarding Significant Valleylands; however, there are no existing significant valleylands identified on the Schedules. A Significant Valleyland was recently close to Larose Forest during a development-specific Environmental Impact Study.

UCPR expressed interest in scoping areas of significant valleylands in Larose Forest (publicly owned lands) to better understand the process for mapping these features when they are identified through site-specific or comprehensive assessments.

As a pilot investigation, Valleylands in Larose Forest were identified using GIS methods and high-definition aerial topographic imagery (LiDAR) (Figure 7). Further information on these areas is included in the Supporting Documentation.

3.2 Coastal Wetlands

Coastal wetlands are defined in the Provincial Policy Statement as:

a) any wetland that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Marys, St. Clair, Detroit, Niagara, and St. Lawrence Rivers); or

b) any other wetland that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located 2 kilometres upstream of the 1:100 year flood line (plus wave run-up) of the large water body to which the tributary is connected.

The direction for coastal wetlands is provided in Section 2.1.5(f) of the PPS. The policy states that:

> Development and site alteration shall not be permitted in:
>
> f) coastal wetlands in Ecoregions 5E, 6E and 7E that are not subject to policy 2.1.4 unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions.

Section 5.5.6 of the Stormont, Dundas and Glengarry Official Plan describes these wetlands; however, they are not included on the schedules as mapping was not available from the Ministry of Natural Resources and Forestry (MNRF) at the time of Official Plan adoption.

SNC developed a methodology for identifying these wetlands. The process was reviewed with the Raisin Region Conservation Authority and a complete a Coastal Wetlands Identification Technical Memo was prepared.

The methodology for defining Coastal Wetlands was applied to existing datasets and a draft coastal wetland layer was provided to the RRCA for review. The final coastal wetland dataset was provided to the County for future adoption into the Official Plan.

3.3 Groundwater Recharge Areas

The need for an update to UCPR Groundwater Recharge Areas mapping was identified in the Terms of Reference for the NHS Project. UCPR's Official Plan includes a specific policy goal (Section 5.5.9. (1) & (2)) to protect natural areas and features associated with vulnerable aquifers and groundwater recharge areas.

Section 5.5.9.2 of the UCPR Official Plan refers to a specific geographic area of known groundwater vulnerability; however, groundwater recharge areas extend throughout the County's geology (i.e, the Champlain Sand Aquifer).

Soil type is a key factor in determining groundwater recharge. Soil types have various recharge factors: clay has a low permeability (low recharge), whereas sand is highly permeable (high recharge). Groundwater vulnerability is also generally related to soil thickness in the area. Areas where bedrock is at the surface or areas with karst formations are more vulnerable to groundwater contamination and are also important from a recharge perspective.

An appropriate scope and scale for UCPR Groundwater Recharge Areas was discussed with the hydrogeologist, source protection policy staff, and planning staff; the draft mapping incorporates Source Water Protection Assessment Report studies, local geological information, and provincial karst mapping. These areas provide a more complete picture of the known groundwater recharge information within the County.

Significant groundwater recharge areas can be included in Natural Heritage System mapping as the hydrologic system is an essential component that ensures biodiversity and ecosystem resiliency are maintained and enhanced over the long term.

The groundwater recharge area mapping for the County is expansive and most of the area was not deemed significant through Source Protection assessment, meaning no Clean Water Act policies apply.

It was not recommended to include these areas in the Natural Heritage System; however, they could be included as an Appendix to the Official Plan for information purposes. The ultimate decision on how to incorporate this information into the Official Plan will be determined by the County.

Mapping details and policy recommendations were provided the County as Supporting Documentation.

3.4 Significant Woodlands Mapping Criteria

SDG is working with a local municipality to refine criteria for mapping significant woodlands. This is associated with an appeal to the Land Use Planning Tribunal on the Official Plan Schedules approved in 2018.

The NHS Technical Team investigated the background information on the SDG Significant Woodlands layers. Comments were provided to the County directly to support their review. General information is provided below.

The Natural Heritage Reference Manual allows the planning authority to determine certain criteria and size thresholds for mapping significant woodlands. While forest size is one criterion used to determine significance, the manual also recommends establishing a minimum patch size for most of the other criteria (e.g., interior habitat, old growth, economic criteria, etc.).

The County may choose to use the same minimum patch size across the landscape (this is the approach used in the adopted Official Plan), or they can select different minimum patch sizes based on the forest cover percentage within each municipality or subwatershed, for example.

SDG will work with the local municipalities to determine the best path forward. The NHS mapping may assist in defining woodland significance (ex. Presence of Regional Cores or Corridors could be used as an additional criterion for significance).

4.0 POLICY UPDATES

4.1 Overview

The Counties have long-standing Official Plan policies that guide development and land use around significant natural features and areas. Periodically, these policies need to be reviewed and updated as communities grow and as implementation best practices emerge.

The Counties goal is to have clear, appropriately scoped, streamlined development policies that can be efficiently implemented after approval is granted. When policies are reasonable and clear, it strengthens environmental protection while allowing rural development in appropriate areas.

Key policy updates are provided below including modernizing development setbacks, scoping environmental impact studies, and natural system planning policies to improve environmental planning in the region. The policy considerations below include feedback from public engagement, conversations with County staff and local municipal planners, and discussions with stakeholders.

Policy considerations are organized by type and County Official Plan Section references are included at the beginning of each section. Detailed policy edits were provided to each County

separately.

4.2 Natural Heritage System Policies

Section 5.3.1 United Counties of Prescott and Russell
Section 5.5.8 United Counties of Stormont, Dundas and Glengarry

Most of the land in the Counties is privately owned. In areas where the natural heritage system crosses privately owned lands, policies already promote land donation, biodiversity offsetting, parkland acquisition, and conservation easement programs.

Policy Recommendations:

1. The County should update their respective Natural Heritage System schedules to include the new mapping including the Regional Cores and Corridors.

2. Policies should describe the new regional cores and corridors and include discussion of natural system planning and its benefits, and the regional connections to the broader natural system.

3. Policies should include reference to stewardship and restoration programs including targeted environmental grants.

4. Policies should clarify that impacts on the NHS and its connectivity must be assessed when an Environmental Impact Study is required (i.e., the development is in or near a significant natural feature).

5. Policies should discuss potential enhancement areas outside of the NHS that have the potential to be improved or restored to a natural state. These areas could be added to the NHS over time through watershed plans, subwatershed studies, natural heritage system studies or other site-specific studies.

6. Preserving or conserving existing natural cover remains the most effective way to maintain the NHS. The principle of no net loss should be included for the regional cores: if habitat must be removed due to development, the same or greater amount of habitat must be replaced elsewhere, preferably within the same subwatershed.

4.3 Environmental Impact Studies

Section 5.6 United Counties of Prescott and Russell
Section 5.5.7 United Counties of Stormont, Dundas and Glengarry

An Environmental Impact Study (EIS) helps shape new development by confirming boundaries of natural heritage features on the site and ensuring the development will not negatively impact these features.

EISs are completed by qualified professionals and peer-reviewed by specialists (i.e., Conservation Authority). Often, an EIS sets out a development setback from a natural heritage feature which is agreed upon by technical reviewers, planning staff, and the developer.

EISs often include mitigation measures to protect natural heritage features from construction impacts (e.g., vegetated buffers next to rivers, timing windows for animal breeding, protection of

species at risk habitat) and limits encroachment in natural heritage features (e.g., backyard fencing along a significant woodland).

Municipal and Conservation Authority staff agree that some development proposals warrant a more flexible, 'scoped' approach. Generally, this would apply to minor development like single family homes, single lot severances, and/or proposals where a development impact will take place entirely outside of the natural heritage feature (within 120 metres). In this case, there are standard mitigations that can be applied.

Consistent policies are proposed to allow the municipality, in consultation with a qualified environmental professional (i.e., a biologist from the Conservation Authority), to waive or scope the requirement for an EIS.

Policy Recommendations:

1. The Counties receive numerous applications for single lot severances in the 120-metre adjacent lands. Screening area distances can be adjusted by the approval authority (as noted in Section 4.4.2 of the Natural Heritage Reference Manual.

    a. If the proposed severance is separated from the significant feature by a barrier such as a road or existing development, the risk of impacting the significant feature is low. The EIS requirement can be waived by the approval authority in consultation with the Conservation Authority.

    b. Small-scale development (e.g., severances for single-family development) more than 30 metres from a natural heritage feature would be eligible for either a scoped EIS or the EIS may be waived completely.
        i. Where the requirement is to be waived, a site visit should be completed to confirm there are no additional natural features or species at risk on site. The cost of a site visit would be the responsibility of the applicant.
        ii. Where the EIS is waived, the Conservation Authority may recommend standard mitigation measures in the severance review comments.

2. EISs submitted by consultants often do not address the policies of the Official Plan regarding significance and no negative impact. A pre-screening process is recommended to help landowners work with the municipality or Conservation Authority to review applications and assess the EIS requirements up front. The goal is to ensure applicants do not pay for unnecessary assessments and the reports are focused on the policy requirements.

3. Both Counties expressed a strong interest in consistency between Conservation Authorities and municipalities. New EIS guidelines and standard conditions will be prepared by the Conservation Authorities to help municipalities respond to development applications quickly and consistently. The guidelines will also help environmental consultants focus on important criteria and policy requirements.

4.4 Development Setbacks, Buffers, and Adjacent Lands

Section 5.5 (generally) United Counties of Prescott and Russell
Sections 3.5.2.9, 5.5.2, and 5.6.2 United Counties of Stormont, Dundas and Glengarry

4.4.1 Terminology

The purpose and function of setbacks, buffers, and adjacent lands are sometimes used interchangeably in application of Official Plan policies which can cause confusion for staff and applicants.

'Adjacent Lands' is defined in the PPS and further explained in the Ministry of Natural Resources and Forestry's Natural Heritage Reference Manual. Adjacent Lands distances (generally 120 m for most features) set the screening area for EISs. Adjacent lands are the lands closest to a natural heritage feature or area where it is possible that development or site alteration would have a negative impact on the natural heritage feature or area. Generally, an EIS is required to assess the potential impacts of the proposed activities and recommend appropriate setbacks and buffers from the natural heritage feature or area within the adjacent lands to ensure no negative impacts.

The Official Plans include detailed policies to establish setbacks from watercourses, woodlands, and wetlands. Setbacks describe the minimum distance required between development and a specified line. Setbacks may also contain buffers, but setbacks are simply distances between two specified points and are not necessarily vegetated.

A buffer is a zone specifically designed to protect adjacent natural heritage features and functions or preserve a natural transition area between development and the natural feature. Buffers should be vegetated through native plantings or allowed to naturalize. Buffers should not be treated as extensions of the natural feature. The functions and benefits of buffers to natural heritage features will vary with the proposed adjacent land use and include reducing encroachment, reducing light and noise, space for tree fall, protection of root zones, core habitat protection, locations for trails, and attenuation and filtration of water runoff. In the case of steep or unstable slopes and woodland edges, a buffer can also mitigate hazards by providing separation from the hazard zone.

Buffers prevent degradation and impacts to natural heritage features and functions and to the Natural Heritage System. In contrast to adjacent lands, which are established before development is proposed in official plans and or zoning by-laws, buffers are determined once the nature of development is known, natural heritage features are identified and assessed, and the extent of potential impacts can be determined.

Minimum buffer distance requirements are identified in Appendix C.

Policy Recommendations:

1. A new subsection in the Official Plan is proposed to describe the function and purpose of setbacks and eliminate confusing terminology. This additional clarity will help consultants, developers, and planners apply the correct setback to protect a natural feature.

2. Both Counties have low riparian (water's edge) forest cover, especially in agricultural areas. Figure 6 notes major regional corridors with less than 20% natural cover; some are noted as low as 8%. Watercourse cover is essential for local water quality, temperature, aquatic habitat, and animal movement.

   Policy updates are proposed to strengthen natural shoreline setbacks including tree and vegetation buffers (riparian lands). Restoration policies will be added to encourage tree planting and naturally vegetated setbacks especially where they are associated with the Natural Heritage System or natural hazard areas.

4.4.2 Implementation Challenges

Setbacks are generally required when development is proposed near natural features and/or hazards. When setbacks include private property, local municipalities face challenges trying to control landscaping and development encroachment over time. This can be dangerous for the property owner and their neighbours in the case of setbacks associated with a floodplain or unstable slope.

Official Plan policies also permit setback reductions (i.e., a 30-metre watercourse setback reduced to 20-metre) following technical studies that usually propose specific mitigation requirements. Setbacks premised on development conditions are notoriously difficult to implement. For example, 'no-touch' setbacks must be naturally vegetated (not a manicured lawn) and not subject to any site alteration or development.

Landowners often purchase property without knowing these setbacks or requirements exist. When these areas are not described anywhere except on a map in a supporting study for a Draft Plan application, it is easy to see how these requirements can be missed or ignored.

Without tree-cutting by-laws or site alteration by-laws, municipal staff are not able to prevent impacts in setback areas. Where setbacks serve multiple purposes (e.g., flooding, erosion, and water quality) municipal staff have challenges explaining what is and is not permitted in the setback. The multitude of technical studies are often filed away and are easily missed when building permits come in.

Follow-through is an important consideration in planning policy: additional tools are needed once the planning process ends to ensure setbacks are protected and mitigation is completed.

Policy Recommendations:

1. Zoning setback lands is essential to provide notice to landowners. Zoning information is readily available to property owners, real estate agents, lawyers, and municipal staff, and is considered legal notice. Zoning is also enforceable by by-law officers and through the building code. Polices should be added to require setback to be zoned as a condition of development. This could be done on an annual 'house-keeping' basis to reduce administrative cost.

2. Setback areas are regularly impacted by tree cutting, landscaping, and small-scale development even when zoned restrictively. Public ownership is the most straightforward approach to protecting these areas.

Policies are proposed to strongly encourage public ownership for larger setback areas, especially where natural hazards are present. In some urban municipalities, developers transfer setback lands to the municipality as part of the development process. These public lands create ecological buffers, keep development out of hazardous areas, and allow passive recreational uses for residents to share and enjoy natural spaces.

5.0 AGRICULTURE AS PART OF A NATURAL HERITAGE SYSTEM

Natural systems and agricultural lands collectively provide habitat for different species. In Southern and Eastern Ontario, agricultural lands are working landscapes that provide valuable ecosystem services such as pollination, atmospheric regulation, soil retention, and wildlife habitat (MNRF, 2009).

Agriculture is the predominant land use on the rural landscape and nearly all the province's prime agricultural lands are located below the Canadian Shield. It is important that working landscapes be included in natural system planning in Eastern Ontario.

As such, the Counties Natural Heritage System mapping was prepared using approaches supported by the Ontario Federation of Agriculture (2017, Growth Plan).

Not all farming practices benefit the environment, some result in habitat loss and fragmentation. However, natural heritage policies recognize and value practices that encourage and foster cooperation with private landowners to protect the environment and improve the quality of natural habitat and corridors.

Financial incentives were identified by the local Agricultural Forest Cover Committee as an important tool for retention of natural cover. The policies for the Counties NHS incorporate these important recommendations, making it clear to landowners the areas of vital importance for the region's biodiversity. This information can be used to prioritize areas for best management practices, grant programs, land donation, or passive restoration. Stewardship projects completed by landowners in these areas will help improve the NHS for local wildlife populations and contribute to regional landscape connectivity.

6.0 CONCLUSION

The NHS is a network of interconnected natural features and areas like forests, lakes, rivers, agricultural lands, and wetlands. The NHS helps conserve biological diversity, maintain ecological functions (e.g., movement corridors for wildlife, endangered species habitat) and sustain ecosystem services that we all depend on (e.g., pollination, clean water, flood damage reduction).

The Province of Ontario requires the Counties to identify the NHS and preserve the diversity and connectivity of these features. This is translated into mapping and policies to inform development, stewardship actions, climate change resiliency, environmental studies, and conservation efforts. This strategic approach to maintaining biodiversity preserves green infrastructure that is resilient to climate change and development pressure.

The new NHS and proposed policy updates provided in the Report are a step forward for environmental planning and stewardship in the Counties.

SNC would like to thank the Counties for engaging the Conservation Authority to work on this project. The Report brings together many years of CA-Municipal collaboration and committee recommendations to provide a new perspective on natural heritage planning and stewardship.

SNC also extends our appreciation to members of the public and stakeholder groups who provided feedback and discussion on the draft maps, including those who live, work, and depend on the landscape. Personal, lived experience, historical, and indigenous perspectives helped make the Counties planning framework more inclusive and comprehensive.

Appendix A: Input Datasets and Studies

Input Studies

Study	Date	Website
Algonquin to Adirondack Analysis Methodology	2014	http://www.a2acollaborative.org/mapping.html
Cartographie détaillée des milieux humides du territoire des basses-terres de l'Outaouais et ses environs	2017	http://maps.ducks.ca/cwi/com/duc/assets/reports/Rapport_carto_MH_Outaouais_2017.pdf
Portrait des milieux naturels de la MRC d'Argenteuil	2013	https://www.argenteuil.qc.ca/database/Image_usager/2/Amenagement/Environnement/Strat%C3%A9gie%20annexes/Annexe%201%20Rapport_portrait%20septembre%202013.pdf
L'environnement et les milieux naturels MRC de Vaudreuil-Soulanges	2018	http://mrcvs.ca/wp-content/uploads/2018/12/Chapitre-7-Cartable-Final-2018-04-12_web.pdf
MRC de Papineau - Schéma d'aménagement et de développement	2018	http://www.mrcpapineau.com/89%7CSchema-d-amenagement
United Counties of Leeds and Grenville Official Plan	2019	https://www.leedsgrenville.com/en/government/official-plan.aspx
City of Ottawa Natural Landscape Linkage Analysis	2012	http://greenspace-alliance.ca/wp-content/uploads/2013/12/Natural_Linkages_Analysis_-__Final_-Doc_11-red.pdf

Input Datasets

Process Step	Dataset	Source	Resolution Scale	Effective Date	Contribution
1	Southern Ontario Land Resource Information System (SOLRIS vs. 3.0)	GeoHub (LIO)	15m pixel	2015	provided continuous pixel base to build upon, urban classes retained
2	Assessment Parcels (residential codes)	Province	1:10,000	2020	identified rural residential parcels and golf courses, added to urban areas
3	Woodlands	Counties	1:10,000	2014	represented natural managed and unmanaged forests and hedgerows
4	Wetlands	GeoHub (LIO)	1:10,000	downloaded 2019	identified wetlands and open water , modified forests where coincident
5	Railways	GeoHub (LIO)	1:10,000	downloaded 2019	represented active railway routes, represented by 20m corridors, modified underlying classes where coincident
6	Waterbodies (Ontario Hydrologic Network)	GeoHub (LIO)	1:10,000	downloaded 2019	identified additional open water areas, modified underlying class where coincident
7	Roads (Ontario Road Network)	GeoHub (LIO)	1:10,000	downloaded 2020	represented corridors for local roads (14m), arterial roads (26m) and provincial and federal highways (40m)
8	Pits and Quarries	MNRF/OPs	varies	varies	combined from multiple sources to represent aggregate sites
9	1:100 Year Floodplains	CAs	1:10,000	varies	used as overlay to reduce movement scores by 50%
10	Riparian Vegetation	derived dataset	1:10,000	varies	used as overlay to reduce movement scores by 50%, derived using watercourse, woodland and wetland layers
11	Assessment Parcels (agricultural codes)	Province	1:10,000	2020	used as overlay to double movement scores, excluded all natural areas in calculation

Appendix B: Technical GIS Endnotes

1. Complexing to create the Local Cores and Regional Cores was achieved by buffering features by half the distance of the intended feature separation. For example, a buffer of 10m was used to group features within 20m. The option to dissolve internal boundaries was selected when buffering. The Multipart to Singlepart tool was used to break apart buffer polygons. Each buffer polygon was given a unique number in the attribute table. A Union between the buffer polygons and original features then transferred the unique number to the features. The polygons representing the buffered area was removed from the Local Core layer. The polygon, however, was not removed when complexing features to create the Regional Cores.

2. Fragmentation was determined by dividing the complex perimeter by the total complex area so that lower scores indicated lower fragmentation. Complexes were then sorted from lowest to highest for both criteria (i.e., fragmentation and total area), and the top 20% of the features for each criterion documented in the attribute table (i.e., those features with the lowest fragmentation scores and largest total areas). Features attributed for both criteria were then selected as the final Local Cores.

3. Simplifying the outer boundary involved manually reshaping the polygons to remove narrow encroachments of other land uses, primarily agriculture, and complex boundaries where a simple arc could replace many vertices. The 25m buffer, generated to complex the individual features together, also helped to simplify the boundary.

4. A size threshold of 1000 hectares in United Counties of Prescott and Russell identified the large, obvious blocks of natural cover. The threshold for the United Counties of Stormont, Dundas and Glengarry, however, required considerably more analysis before a size threshold of 1900 hectares was selected. Manual grouping also occurred before Regional Cores were finalized. Treadwell Creek is a grouping of Regional Cores and two Local Cores that did not meet the proximity threshold, which together, capture an ecologically important area. Local Cores on the south side of Highway 401 were added to Summerstown Forest and Hoasic Creek in recognition that these have an ecological connection, even though the highway is a considerable barrier. Without these connections, the natural heritage system would not adequately represent the north-south wildlife movement within the study site or to other jurisdictions.

5. The Spatial Analyst tools for least cost movement analyses were Cost Path to delineate the least cost lines, and Cost Distance to create a cumulative raster surface. The raster surface was subset to the lowest 1% of the pixels for the final analysis.

Appendix C: Minimum Buffer Distances

Natural Heritage Feature or Area	Minimum Buffer Width	Final Buffer Width	Adjacent Lands Distance
Significant Areas of Natural and Scientific Interest (ANSIs)	No minimum buffer	Established through EIS or in consultation with MNRF	50 – 120 m
Significant Habitat for Provincially Endangered and Threatened Species	No minimum buffer	Established through EIS or in consultation with MECP, MNRF, or DFO	120 m
Provincially Significant Wetlands	30 m	Established through EIS or in consultation with the Conservation Authority	120 m
Locally Significant Wetlands	15 m	Established through EIS or in consultation with the Conservation Authority	120 m
Significant Coastal Wetlands	30 m	Established through EIS or in consultation with the Conservation Authority	120 m
Permanent Surface Water Features and Fish Habitat	30 m	Established through EIS	120 m
Intermittent Surface Water Features and undetermined Fish Habitat	15 m	Established through EIS	120 m
Significant Woodlands	10 m from the tree drip line	Established through EIS	120 m
Significant Valleylands	No minimum buffer	Established through EIS	120 m
Significant Wildlife Habitat	No minimum buffer	Established through EIS	120 m