

ERF Prioritization Analysis 2020

I. Overview

The following is a GIS analysis performed for the Williston Conservation Commission (WCC). The Town of Williston, Vermont provides an Environmental Reserve Fund (ERF) for the purpose of conservation and protection of land throughout the Town. The goal of this particular analysis was to identify and prioritize parcels of privately-owned land in Williston that have high conservation value. The outcome of this analysis can be used as a decision support tool for the WCC to make recommendations on allocation of ERF funds.

II. Criteria Descriptions

The following are brief descriptions of the data that make up the criteria for the ERF Parcel analysis. Parcels received points for every criterion that they intersected. These criteria are grouped into two categories: Resources and Threats (Development Potential). Parcels with a score of 40 or less were classified as “Low,” 41-60 were “Medium”, and above 60 were “High”.

Resources

Wetlands - This data layer was generated by the Vermont Center for Geographic Information (VCGI) and represents significant wetlands (Class II) as classified by the Vermont Wetlands Office. **Parcels with up to 10 acres of wetlands received 1 point. Parcels with greater than 10 acres of wetlands received 2 points.**

Named Stream - This data was generated by the Vermont Center for Geographic Information (VCGI) and is a part of the Vermont Hydrography Dataset. It displays all named streams in Williston, consisting of the Allen, Muddy, Sucker Brook, and the Winooski River. **Parcels with up to ½ mile of named streams received 1 point. Parcels with over ½ mile of named streams received 2 points.**

Unnamed Stream – This data was generated by the Vermont Center for Geographic Information (VCGI) and is a part of the Vermont Hydrography Dataset. These tributaries are defined as unnamed perennial or intermittent streams identified on the 7.5’ U.S. Geological Survey quadrangles covering the town, or on the Williston Field Stream Survey maps of the Allen and Muddy Brook watersheds prepared by the Vermont Department of Environmental Conservation. **Parcels with up to ½ mile of unnamed streams received 1 point. Parcels with over ½ mile of unnamed streams received 2 points.**

Interior Forest Block (Biofinder) – Forest blocks are areas of contiguous forest and other natural communities and habitats, such as wetlands, ponds, and cliffs, that are unfragmented by roads, development, or agriculture. Interior Forest Blocks provide many ecological and biological functions critical for protecting native species and the integrity of natural systems (Austin et al. 2004). These include: supporting natural ecological processes such as predator-prey interactions and natural disturbance regimes; helping to maintain air and water quality and flood resilience; supporting the biological needs of many plant and animal species, particularly those that are wide-ranging or sensitive to human encroachment; supporting viable populations of wide-ranging animals by allowing access to important feeding habitat, reproduction, and genetic exchange; and serving as habitat for source populations of dispersing animals for recolonization of nearby habitats that may have lost their original populations of those species. **Parcels with up to 25 acres of Interior Forest Blocks received 1 point. Parcels with over 25 acres of Interior Forest Blocks received 2 points.**

Connectivity Block (Biofinder) – Connectivity Blocks are the network of forest blocks that together provide terrestrial connectivity at the regional scale (across Vermont and to adjacent states and Québec) and connectivity between all Vermont biophysical regions. There is a high level of connectivity within individual

forest blocks. The proximity of one forest block to another, the presence of riparian areas, and the characteristics of the intervening roads, agricultural lands, or development determine the effectiveness of the network of Connectivity Blocks in a particular area.

A network of Connectivity Blocks allows wide-ranging animals to move across their range and to find suitable habitat for their daily and annual life needs, allows young animals to disperse, allows plant and animal species to colonize new and appropriate habitat as climate and land uses change, and contributes to ecological processes, especially genetic exchange between populations (Austin et al. 2004). Maintaining the landscape connectivity function requires both Connectivity Blocks and Riparian Corridors, especially in highly fragmented areas of Vermont. **Parcels with up to 25 acres of Connectivity Blocks received 1 point. Parcels with over 25 acres of Connectivity Blocks received 2 points.**

Riparian Connectivity (Biofinder) - Vermont's network of lakes, ponds, rivers and streams, and their associated riparian zones, valley bottoms, and river corridors. The linear network of riparian areas provides a crucial element of landscape connectivity. Many wildlife species use riparian corridors for travel to find suitable habitat to meet their life requisites, but certain species are almost entirely restricted to riparian areas, including mink, otter, beaver, and wood turtle. The combination of Riparian Areas for Connectivity, and Connectivity Blocks, provide the best available paths across the landscape, especially in highly fragmented regions like the Champlain Valley. Riparian connections also allow for long-term plant and animal movement in response to climate change (Beier 2012). **Parcels with up to 10 acres of Riparian Connectivity Area received 1 point. Parcels with over 10 acres of Riparian Connectivity Area received 2 points.**

Unique Natural Community (Biofinder) – Natural communities are interacting assemblages of organisms and their environment, and they are classified into types, such as Northern Hardwood Forest, Hemlock Forest, Red Maple-Black Gum Swamp, and Cattail Marsh, that repeat across the landscape wherever similar conditions are found. Natural communities are one of the most important “coarse filters” for conserving biological diversity (Hunter 1991, Thompson and Sorenson 2000). This is because there are relatively few natural community types—97 in Vermont—compared to the tens of thousands of plant and animal species. Collectively, these 97 types in Vermont encompass the full range of habitat conditions that native flora and fauna evolved with and are adapted to. Therefore, conserving high-quality examples of all the natural community types is an efficient way to conserve most species. **Parcels containing one or more Unique Natural Communities received 1 point.**

Rare, Threatened, and Endangered Species (Biofinder) – Rare species are defined as imperiled species that are at high risk of extinction or extirpation due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors. Rare species face threats from development of their habitat, harassment, collection, and suppression of natural processes, such as fire. Endangered and threatened species are defined by both state and federal law. State law defines endangered species as “a species listed on the state endangered species list under {10 V.S.A. Chap. 123 section 5401} or determined to be an 'endangered species' under the federal Endangered Species Act. The term generally refers to species whose continued existence as a viable component of the state's wild fauna or flora is in jeopardy. Threatened species are defined in 10 V.S.A. Chap. 123 section 5402 as a species whose numbers are significantly declining because of loss of habitat or human disturbance, and unless protected will become an endangered species. **Parcels containing one or more Rare/Threatened/Endangered Species (RTE) received 1 point. Parcels containing one or more Highest Priority Rare/Threatened/Endangered Species (RTE) received 2 points.**

Existing Path – Chapter 9 of the Town Plan defines this shapefile as a low-maintenance primitive trail network which provides hiking, skiing, and where appropriate, mountain biking opportunities in Williston’s rural landscape. **Parcels with an existing trail or trail easement received 1 point.**

Trail Link – Parcels were identified that could connect existing trails and conservation easements. Potential Trail link parcels were identified by doing a visual analysis of the Existing Trails/Easements shapefile and Williston Town Parcels shapefile. **Parcels containing a desired trail or linkage received 1 point.**

Adjacent to Conserved or Excluded Land (A.C.E.L.) – Parcels that met this criterion were adjacent to Conserved or Excluded Land. Conserved Land is defined as a parcel protected by a 3rd party conservation easement. Excluded Land was identified as parcels that were owned by the State of Vermont, the Town of Williston, or the Town of Williston’s Schools. **Parcels adjacent to conserved land received 1 point.**

Acreege – **Parcels greater than 25 acres but less than 100 acres received 1 point. Parcels greater than 100 acres received 2 points.**

LESA – LESA (Land Evaluation and Site Assessment) is an index used to determine the agricultural value of a piece of land. The Land Evaluation (LE) portion of LESA is based on a 0-100 scale and is used to determine the productivity of soil. The Site Assessment (SA) portion of LESA is based on a 0-200 scale and is used to determine how suitable a site is for agricultural development. Several factors go into this analysis, including local agricultural land use, local zoning laws, available resources, and potential environmental impacts. The sum of the Land Evaluation and Site Assessment portions is a total LESA value, with a maximum value of 300. In this analysis, parcels with a LESA value of **greater than 120 were given 1 point.**

Viewshed (Vshed) – The Viewshed criteria was developed from the Focal Points shapefile and the Visual Assessment layer prepared by the Chittenden County Regional Planning Commission (CCRPC). Focal Points can be described as aesthetically pleasing regions one would focus on while on a hike (such as Brownell Mountain). From the Visual Assessment layer, regions classified as “Primary Viewshed” were extracted and used for this analysis. **Parcels containing a Primary Viewshed received 1 point.**

Constraints

Undeveloped (Undvlp) - The Undeveloped Parcel data was derived from an analysis of the Williston Address shapefile and Williston Town Parcels shapefile. All parcels that had an address were identified as developed and all parcels that did not have an address were identified as undeveloped. **Undeveloped parcels received a score of 2 points. Developed parcels that were greater than 10.5 acres got a score of 1 point.**

Designated Open Space – This data is a subset of the town’s Protected Land database and includes land that is permanently protected as open space through subdivision conditions of approval. **Parcels without designated open space received 1 point.**

Wetlands – The same dataset was used as for the resource criterion (see under Resources above) but treated as a development constraint. **Parcels where wetlands covered some, but less than half the parcel received 1 point. Parcels that do not contain wetlands received 2 points.**

Special Flood Hazard Areas – The SFHA is regulated under WDB Chapter 28 and also under State statute (10 V.S.A. Chapter 32 § 753). The SFHA is identified on the most current flood insurance maps and studies published by the Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP). The SFHA is generally defined as the area where flooding frequency is predicted as once every 100 years or less. Note that the actual frequency is most likely higher

than the predicted frequency due to effects of climate change. Development within the SFHA is highly restricted, thus it is treated as a constraint. **Parcels where less than half the parcel is within the SFHA received 1 point. Parcels where greater than half the parcel is within the SFHA received 2 points.**

Slope > 15% and 30% (Slope) – All regions with a slope greater than 30% are displayed in this shapefile. The bylaw prohibits development on slopes greater than 30%. Lands with slopes greater than 30% are also excluded from the land area which is used to calculate density. **Parcels where less than half the parcel has slopes of 30% or greater received 1 point. Parcels where greater than half the parcel has slopes of 30% or greater received 2 points.**

In Sewer Service Area – **Parcels within the Town Sewer Service Area received 1 point.**

Total Score Calculation

The resources criteria were weighted based on their relative importance. To determine the weights for different criteria, the Conservation Commission members were surveyed and the input of WCC members was averaged into a single ranking or relative importance for each criterion. Each criterion score was multiplied by its weighting factor to obtain a weighted score. Resources criteria scores were summed to get a total Resources Score. Constraints criteria were summed to get a Total Constraints Score. Resources Score and Constraints Score were summed to get a Total Score for each parcel.

III. ERF 2020 Prioritization Methodology – GIS Notes

1. Import 2019 parcel data.
2. Create Protected Land feature class (only town-owned parcels and parcels with conservation easements, deed-restricted parcels not included).
3. Create Excluded Parcels feature class (town and state owned)
4. Add field EXCLUDED in Parcels 2019, calculate Y or N. Y = town and state owned, parcels less than 5 acres.
5. Add field UNDEVELOPED. Use E911 points to determine what parcels are undeveloped, select them. Calculate field = 2. Switch selection and calculate field = 0. Select developed parcels > 10.5 acres and calculate field = 1.
6. ACREAGE_SCORE: Parcels < 10 acres = 0, <25 acres = 1, <50 acres = 2, <100 acres = 3, >100 acres = 4
Revision: parcels < 25 acres = 0, parcels 25-100 acres = 1, parcels > 100 acres = 2
7. Intersect Named Streams with Parcels – NamStrms_Int
8. Dissolve by FID Parcels 2019 - NamStrInt_Dis
9. Add field MILES, calculate geometry. Result: natural breaks @ 0.25 and 0.75.
10. Join NamStrInt_Dis (FID_Parcels_2019) with Parcels 2019 (OBJECTID_12)
11. In Parcels 2019 add field NAMED_STREAM
12. Calculate field using MILES of NamStrInt_Dis
13. Remove Join from Parcels 2019
14. Repeat 7-12 for UnnamedStr. Result: natural breaks @ 0.25 and 0.75 miles
15. Repeat 7-12 for Wetlands. Result: natural breaks @ 5 and 20 acres
16. Added BioFinder Landscape Scale and Community/Species Scale Components to the map.
17. Community/Species Components used: Natural Communities, RTE Species
18. Landscape Components used: Priority Forest Blocks, Priority Connectivity Blocks, Highest Priority Riparian Wildlife Connectivity

19. Select all parcels from Parcels 2019 that intersect Highest Priority and Priority Natural Communities and Williston Unique Natural Communities. Calculate field = 1. Switch selection and calculate field = 0
20. Add field RTE to Parcels 2019. Select all parcels that have RTE species and score as follows: Highest Priority RTE = 2, Priority RTE = 1.
21. Repeat 7-12 for Priority Forest Blocks. Parcels with <25 acres of Forest Block = 1, >25 acres = 2.
22. Repeat 7-12 for Priority Connectivity Blocks. Parcels with <25 acres of Connecting Block = 1, >25 acres = 2.
23. Repeat 7-12 for High Priority Riparian Wildlife Connectivity. Parcels with <10 acres of Connecting Block = 1, >10 acres = 2.
24. Primary Viewshed – in primary viewshed=1, outside = 0
25. LESA Farmland Score > 120 = 1
26. Contains a trail, trail easement, or desired trail = 1
27. Contains an important trail linkage (a parcel that could connect two trail segments or easements) = 1
28. Adjacent protected land = 3 points
29. Undeveloped/Developed – Developed < 10.5 acres = 0, Developed > 10.5 acres = 1, Undeveloped = 2
30. Repeat 7-12 for Slope, only calculate the STEEP_SLOPE field this way: Where acreage of steep slopes/total parcel acreage >= .5, then STEEP_SLOPE = 0; where acreage of steep slopes/total parcel acreage > 0 but <= .5, then STEEP_SLOPE = 1; where acreage of steep slopes = 0, then STEEP_SLOPE = 2
31. Repeat 7-12 for Flood Hazard Area and calculate SFHA field the same as 30 above.
32. Repeat 7-12 for Wetland and calculate WETLAND field the same as 30 above.
33. In Sewer Service Area = 1, Outside of SSA = 0
34. Parcels with Designated Open Space = 0, All others = 1
35. Add up all constraints into field CONSTRAINTS_SCORE
36. Add up all resources into field RESOURCES_SCORE
37. Calculate field TOTAL SCORE as CONSTRAINTS_SCORE + RESOURCES_SCORE
38. Export as Results1
39. Alternative calculation – Omit ACREAGE_SCORE from RESOURCES_SCORE calculation. It correlates with many other criteria. Export as Results2.
40. Alternative calculation – Modify ACREAGE SCORE as detailed under Step 6 above. Use weighted criteria (mean weights from WCC survey) to weight each resource score, as shown below:

Criteria	Weight
Streams	8.6%
Wetlands	10.7%
Unique Natural Community	9.6%
Rare/Threatened/Endangered Species	10.3%
Forest Block	14.3%
Riparian Wildlife Corridor	11%
Important Farmland (LESA)	7.2%
Scenic Viewshed	5.7%
Trail/Easement/Linkage	7.1%
Parcel Size	7.2%

Parcel Abutting Conserved Land	8.4%
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Each criteria score was multiplied by its weighting above to obtain a weighted score. This was done for all resource criteria but not for constraints criteria. The weighted criteria were added to the constraints criteria to obtain a total weighted score.