University of Wisconsin Consortium for

Extension and Research in Agriculture and Natural Resources

Targeting Working Lands and Operations Pilot Project

Findings and Recommendations Report

for

Calumet County, Wisconsin

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Preface

> "No matter how big our economy grows, no matter how technology advances, no matter how global our society, we need people to till the land, produce our food, harvest timber, produce our paper, and conserve our most basic and precious resource, Wisconsin's productive working lands.
>
> *Rod Nilsestuen, Secretary Wisconsin Department of Agriculture, Trade, and Consumer Protection*

The Targeting Working Lands and Operations (TWLO) pilot project provides local decision-makers with the tools and training necessary to identify *Priority Working Lands and Operations. Priority Working Lands and Operations* are important farms and farmlands where protection efforts are desirable and help attain community goals and objectives.

Local people are at the heart of targeting priority working lands and operations. They know their community best and can share critical information about local needs, interests, and biophysical, economical, and cultural conditions. The TWLO pilot project applied local feedback and information using the Land Evaluation and Site Assessment (LESA)[1] system and Geographical Information Systems (GIS)[2] to deliver flexible, accurate and understandable land conservation models. The results target local *Priority Working Lands and Operations* and are intended to help local decision-makers create, defend, and implement balanced public policy choices that protect important working lands and operations yet safeguard private property rights.

Cultivating Educated Local Leaders

Local decision-makers (i.e. citizens, stakeholders, county board members, plan commissioners) are responsible for influencing and making decisions that meet local

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[1] LESA is a rating system developed by the USDA Natural Resources Conservation Service to evaluate the importance of a piece of land for agriculture use. The system has two components. The Land Evaluation (LE) measures soil quality characteristics of the site. The Site Assessment (SA) measures other characteristics of the site.

[2] GIS is a tool to store, modify, analyze, evaluate, visualize, or use spatial information. GIS provides the ability to combine and compare information that may have nothing else in common except for location.

needs. Access to reliable information helps them make sound judgments. The TWLO pilot project helps local decision-makers to:

- Achieve local goals and objectives.
- Communicate policy outcomes to fellow citizens.
- Use model results to make effective public policy choices.
- Build public acceptance of valid models and appropriate public policies.

Balancing Community Interests in a Diverse Landscape

Calumet County's working lands support a diverse set or private and public interests. Working lands here support a valuable agricultural economy and provide natural amenities that foster recreational commerce and ecosystem services that filter water and air, store flood water and provide wildlife habitat. Importantly, working lands provide homes for people that earn a living from the land or love the opportunities these places offer.

However, increased demand for finite resources, especially from incompatible activities, lead to conflict. The results of this project are intended to help people wrestle with and balance the diverse interests in working land to:

- Balance land preservation with rural development interests.
- Optimize the performance of a sustainable bio-based economy.
- Focus protection efforts on the most prized working resources.

Pilot Objectives

Ultimately, this project aims to provide local decision-makers with the research foundations, tools, and educational materials necessary to identify and prioritize agricultural lands and operations worthy of protection. By coordinating citizen stakeholders, government officials, and conservation professionals, our educational and dissemination strategy will enhance public-private partnerships to advance Wisconsin's bio-based economy. If implemented, our methods will address rural development issues and help to optimize the performance of agricultural resources to nurture a sustainable bio-based economy.

Objective One: Develop an Effective LESA Model Using GIS
Our technical protocol and research focused on how GIS can be utilized to develop and deliver a LESA model effectively.   A strong foundation of research and science supports

the rational and locally appropriate application of the LESA model. Our approach addresses three principles:

1. *The model must be flexible.* GIS application of the LESA model must be able to accommodate various local cropping systems, biophysical conditions, social circumstances, and community priorities. For example, corn might be an important crop for some communities while dairying or cranberries are important for others. Model parameters must recognize and accommodate these differences.

2. *Results must be accurate.* Scores that determine the priority of agricultural lands and operations resulting from the model must accurately identify local priority agricultural lands and operations on the ground. The model must include validation and verification procedures, and provide accurate and timely information.

3. *Results must be understandable.* It is not enough that the model is accurate if local staff, citizens, and officials don't understand or trust it. The model must also be easy to understand. Model parameters and their affects on agricultural scores must be transparent and easy to comprehend.

Objective Two: Build the Capacity for Implementing the LESA Model Locally

Secondly, this project aims to build the technical and leadership capacity for effectively implementing LESA using GIS locally through education and training. Two distinct user groups will be targeted, each with specific educational objectives.

1. Professionals: This group consists of resource conservationists, professional planners, and GIS analysts who are employed or contracted by communities to construct local LESA models. Our objective is to build their technical capacity to build flexible, accurate, and understandable models for local applications. We will address:

    - What data are needed?
    - Where are the sources of available data?
    - How is GIS used to construct and administer the LESA model?
    - How can model results be verified for accuracy?
    - How should the public be involved?
    - What are the underlying implications of the approach?
    - How do data, ratings, and weightings affect model results?
    - Which data, ratings, and weightings are locally appropriate and why? What are the underlying assumptions?
    - How does research and science support model choices?

2. Local Decision Makers: Plan commissioners, county board members, and farmers among other related stakeholders define this group. They are responsible for selecting appropriate model parameters so that the LESA model can address local priorities. Our objective is to build their leadership capacity to

understand the model, communicate local priorities to professionals, and build trust and acceptance of the model for use in the community. We will address:

- What is LESA?
- How can LESA help to achieve local goals and objectives?
- How is GIS used to implement the LESA model?
- How do our choices affect model results?
- How do we make choices that will achieve local goals and objectives?
- How does research and science support our model choices?
- How do we know that LESA is accurately identifying agricultural lands and operations that will achieve our goals?
- How can LESA results be incorporated into local programs such as PDR, transfer of development rights, or zoning?

Objective Three: Initiate an Informed Dialogue to Address LESA User Support

Finally, this project will initiate an informed dialogue to address LESA user support at the state level. Ultimately, we aim to cultivate institutional support and longevity to utilize and diffuse our approach for communities statewide. With assistance from DATCP, we will convene institutional partners from state, federal, and local government to:

1. Explore institutional, financial, and technical requirements for implementing a LESA user support network.
2. Identify appropriate institutional roles and tasks to implement a LESA support network.

Funding

This pilot project was made possible with a grant from the University of Wisconsin Consortium for Extension and Research in Agriculture and Natural Resources. The project was funded for fiscal years 2007 – 2008 for the amount of $49,789.

Partners

The following organizations were involved to develop, test, refine, and report LESA methodologies using GIS.

- University of Wisconsin – Stevens Point, Center for Land Use Education
- University of Wisconsin – Madison, Land Information and Computer Graphics Facility
- University of Wisconsin Madison, Department of Urban and Regional Planning
- University of Wisconsin – Extension, Cooperative Extension

The following organizations provided additional support to the project.

- United States Department of Agriculture – Natural Resources Conservation Service
- Wisconsin Department of Agriculture, Trade and Consumer Protection

Executive Summary

The Targeting Working Lands and Operations (TWLO) Pilot Project utilized and refined methodologies to target priority working lands and operations to better inform public policy and decision-making. Priority Working Lands are those that if protected or managed meet agricultural and land use goals, objectives, and policy recommendations articulated in local comprehensive or farmland preservation plans. The Pilot Project utilized a Land Evaluation and Site Assessment (LESA) protocol and Geographical Information Systems (GIS) software to prioritize working lands in Calumet County.

The LESA and GIS protocol was introduced to citizens of Calumet County comprising the Targeting Working Lands Committee, county staff, and interested members of the public. The Committee was responsible to:

1) Define an appropriate purpose for prioritizing working lands
2) Select the defining characteristics of priority working lands
3) Formulate a LESA scoring strategy that accurately targeted priority working lands

Over the course of six committee meetings, the Calumet County Targeting Working Lands Committee (hereafter referred to as "Committee") has made recommendations for how LESA and GIS can be effectively used in Calumet County to target the County's best working lands for conservation, education, or management.

The Committee crafted and proposes a LESA and GIS protocol that:

> ***"Designate specific areas within the county appropriate for agricultural and forestry purposes, mindful of environmental sensitivity.***"

The Committee has chosen and developed scoring criteria for seven characteristics of working lands. These characteristics are used to evaluate and prioritize working lands. These characteristics include:

1. Quality of Soil for Growing Crops
2. Compatibility with Surrounding Land Uses
3. Land Use Policies – Future Land Use Districts
4. Distance from Urban Features and Boundaries
5. Proximity to Protected Working Lands
6. Discounted Costs of Obtaining Easements
7. Protecting Water Quality

Details about these characteristics and how they are scored can be found in chapters 5 – 7.

Summary of Findings and Recommendations

LESA Methodologies are Technically Sound
The LESA system created by the United States Department of Agriculture - Natural Resources Conservation Service (USDA-NRCS) provides a technically sound methodology for evaluating working lands and targeting high priority working lands in Calumet County. LESA methodologies were effectively custom-tailored to local circumstances, public preferences, existing technologies, and available data sets.

Existing Technologies are Abundantly Capable
GIS software and computer hardware technology applied during this pilot project were abundantly capable of prioritizing working lands for Calumet County using the LESA system. Hardware applied for this project had abundant processing speed and file storage capabilities. GIS software applied in this project was able to accommodate the criteria requirements set by the Committee. Additionally, Community Viz software helped customize the LESA criteria so that the user inputs and outputs were more understandable and more user-friendly.

It is anticipated that Calumet County has sufficient technical capacity to implement LESA protocols using existing hardware and software. Calumet County should consider purchasing *Community-Viz 3.3* software to increase their capacity to customize and implement LESA.

County-Level Geographical Data Sufficiently Capable
Geographic data made available by the Calumet County Land Information Office was sufficiently capable to effectively implement the LESA system using GIS. The Calumet County Land Information System was able to provide geographic data that satisfied established criteria, except where a geographic component wasn't applicable.

As anticipated, geographic data in all instances required modifications so that they could be applied to accommodate criteria established by the Committee. Examples of modifications include the use of geographical functions such as, Unions, Buffers, Clips, Aggregation; or modifications to attribute table fields.

Committee Fully Capable of Crafting Appropriate LESA Criteria
The Committee, consisting of citizens across the county from various backgrounds, was fully capable of crafting appropriate LESA criteria to prioritize working lands. The committee members together had a robust set of experiences well suited to understanding issues related to working lands and land use. With assistance from

professional facilitators, planners, and conservationists, the committee could comprehend how their decisions affected the outcome of this project.

Quality Control is Necessary

To ensure that the LESA system provides an accurate result that emulates committee intent, a process of quality control is necessary. During this pilot project, committee members and professional technicians discovered and rectified human errors. Model developers and users should always employ a healthy skepticism meant to uncover and rectify mistakes.

Proposed LESA System Prioritizes Working Lands Generally

The LESA system proposed in this document was designed to evaluate the value or quality of working lands generally. Resulting LESA scores should also then be interpreted generally, to provide information about the quality of working lands to help inform decisions about working lands. LESA can be used to address many different issues related to working lands and land uses. This system, for example, does not consider the wildlife value, the aesthetic value, or the ability of working lands to buffer strategic open spaces, such as parks.

LESA Protocol Should be Custom-Tailored to a Specific Program(s)

The LESA system proposed in this document is suited for broadly evaluating working lands – it was not tailored to complement a specific program or tool, such as zoning. It is highly recommended that once a program is established, such that might come from the Farmland Preservation Plan Update, LESA should be custom-tailored to target working lands that meet the specific goals of that program. If more than one program evolves, LESA should be exploited and custom-tailored to the advantage of that program. LESA modifications should be crafted or reviewed by a technical committee similar to the Committee assembled for this pilot project.

Calumet County is an Appropriate Entity to Implement LESA Effectively

Calumet County Planning, Zoning, and Land Information Department and the Land and Water Conservation Department are appropriate entities for using, maintaining, and providing technical expertise in regard to the LESA system.   Both departments are involved in issues that LESA can help provide valuable information. Both also have the professional capacity to understand how LESA can be applied effectively.

Utilize UWEX as a Public Education Liaison

Although the LESA system and criteria proposed in this document are displayed transparently and created with public input, education is still required to foster a better understanding of the LESA tool and how it is used, and to help interpret and raise awareness about what the results suggest.   The University of Wisconsin Cooperative Extension Agricultural and Community Resource Development Educators should be utilized to provide public LESA education as it relates to land use and working land issues. The public education liaison should work to ensure that the LESA results can be understood by members of the general public.

LESA Should be Shared with Town Governments and Not-for-Profit Organizations

In many instances, the LESA system can be effectively applied by institutions other than the county. Town governments and not-for-profit organizations, such as land trusts can also benefit from using LESA to inform their decision-making. It is recommended that Calumet County share geographic data and technical capacity as appropriate to help Calumet County town governments and not-for-profit organizations apply LESA for mutual benefit to Calumet County.

Additionally, this pilot project was funded using State of Wisconsin funding. Data and protocols created or modified as a result of this project should be distributed openly and at no cost or at the cost of reproduction.

LESA Should be Updated Periodically and Linked to the Parcel Data Model

The characteristics of working lands and operations are dynamic. For example, land ownership and land uses change and conservation agreements accumulate. To remain timely and provide accurate results, the LESA system will require periodic updates to replace outdated geographic data. To efficiently update the LESA system, a data replacement protocol should be considered. Tying LESA system updates to Calumet County's procedures for updating the parcel data model is a recommended approach.

Overview: Using LESA in Calumet County

LESA, or the Land Evaluation and Site Assessment, is a decision-support tool designed to target priority working lands, where protection efforts are desirable and help attain community goals and objectives. LESA applies suitability analysis techniques which prioritize land for its ability to sustain a particular use or activity, such as farming or forestry.   The LE portion of LESA evaluates working lands based on soil characteristics, such as crop yields and erosion limitations. The SA portion evaluates non-soil site characteristics of working lands. Numerous site characteristics based on agricultural productivity, development pressure, and other public values can be considered.

What are common uses for LESA?

Decision-makers use LESA to help them prepare well informed and justifiable policy choices about land use. It is most commonly used to identify, prioritize, and evaluate agricultural or forestry lands, but it has also been applied to identify important riparian areas, wetlands, and even areas suitable for urban uses. LESA helps decision-makers:

- o   Delineate areas on a map that should remain in agriculture or forestry.
- o   Respond to requests for rezoning, a zoning variance, or a zoning permit.
- o   Score agricultural operations or parcels applying for conservation funding.
- o   Evaluate the consequences of a development proposal on working lands.

How does LESA assist with decision-making?

LESA helps decision-makers prepare policy choices that are:

- o   ***Information based.*** Physical and social sciences as well as community held values and public involvement informs how LESA is applied locally.
- o   ***Measurable.*** The choices decision-makers apply using LESA can be systematically measured and evaluated in comparison to community goals and objectives.
- o   ***More equitable.*** The LESA system can evenly apply decisions across an entire jurisdiction, so all working lands and operations are considered more fairly.
- o   ***Transparent.*** Every choice or decision made to develop LESA is openly visible so it is clear how each affects the results.
- o   ***More defensible.*** Decision-makers can point to the systematic procedures and criteria to defend their rationale for making a decision or crafting a policy.

How was the LESA system put into practice in Calumet County?

LESA was custom tailored to fit local conditions and circumstances in Calumet County. The following steps briefly describe the fundamental steps taken in Calumet County. These steps are described in greater detail in the remainder of this document.

Step 1. Contact a resource professional.
Calumet County Planning, Zoning, and Land Information Department and the Calumet County University of Wisconsin – Extension Office applied and succeeded in becoming a pilot partner. If conducted outside of a pilot project, locally elected officials should contact resource professionals for advice how to proceed with LESA locally. For this pilot project, this step was eliminated. In its stead, communities were selected using a request for participation application process. Chapter 1 describes the request for participation application process in further detail.

Step 2. Form a LESA committee.
A committee consisting of knowledgeable professionals and committed local stakeholders was assembled to design and recommend a LESA system to the local governing body. The Calumet County Planning, Zoning, and Land Information Office and the UWEX CRD Office were instrumental in selecting the LESA Committee.
Chapter 2 describes how the Committee was formed for the pilot project.

Step 3. Inform the LESA process.
Understanding local conditions and land use issues is important to ensure that LESA is designed to fit local circumstances.   The process used in Calumet County relied on information recently collected for the Calumet County 2025 Comprehensive Plan. Additionally, Calumet County Planning and Resource Professionals attended meetings to ensure the committee was aware of various agricultural issues and information. Committee members were also selected that were known to be well informed or engaged in various agricultural and land use issues.
Chapter 3 describes the sources used to inform the Calumet County process.

Step 4. Establish a specific purpose for LESA.
The purpose for developing a LESA system should drive its development, so that appropriate working lands are identified. In Calumet County, the County Comprehensive Plan 2025 was carefully examined to establish a fitting purpose. Chapter 4 describes this step in detail.

Step 5. Select characteristics that accurately define <u>priority</u> working lands.
In this step Committee members address questions about how soil quality, agricultural productivity, development pressures, and other public values define working lands that meet the defined purpose. Essentially, committee members identified and selected various characteristics that help target priority working lands for Calumet County. Chapter 5 describes this step further.

Step 6. Rate the characteristics working lands. Working lands are scored based on the qualities of their individual characteristics (i.e. soils, parcel size, distance from urban areas). Each characteristic is rated independently from other characteristics using custom-tailored criteria. Chapter 6 describes the methodologies used to complete this step.

Step 7. Weight the characteristics of working lands. Each characteristic is ranked or prioritized relative to other characteristics to determine which are most and least important for deciding which lands are priority working lands. Important characteristics should have more influence over the final result relative to other characteristics and be weighted with higher scores. Chapter 7 describes methodologies used to weight the characteristics of working lands.

Step 8. Test and calibrate the results. The resulting LESA system was tested in comparison to committee member field observations and personal knowledge of working lands. Seventeen working operations throughout the county were selected at random to compare, test, and refine LESA results. This step, described in Chapter 8, ensures that LESA accurately targets working lands that meet the intended purpose.

Step 9. Recommend the LESA system. After ensuring that LESA is accurate and appropriate, the committee formally recommends the LESA system for use. This report not only describes the methodologies applied, but also provides a recommendation for how the LESA system might best be applied in Calumet County and for future improvements to the LESA system.

Chapter 1. Community Selection Process

Calumet County was selected as one of two pilot areas in Wisconsin to test, refine, and implement LESA using GIS. Calumet County was selected using a Request for Participation application process. The process evaluated applications based on a set of criteria. Calumet County submitted the highest scoring application, based on the following information.

A. Community Typology: Calumet County is rich in agricultural resources and agriculture is a significant land use as measured by percent of total land use.

B. Data Accessibility: Calumet County provided access to modernized land information for which they are responsible for maintaining.

C. Comprehensive Plans: Calumet County had recently completed a comprehensive planning process in 2007, complete with adopting its plan that complies with Wisconsin's Comprehensive Planning Law. Having a completed comprehensive plan helped to inform the pilot project about demographic, land use, and agricultural issues, patterns, and trends. The comprehensive plan also indicated a shared preference for accomplishing goals, objectives, and creating public policy. Additionally, the county was in the process of updating their Farmland Preservation Plan and articulated an interest in researching a purchase of development rights program as a means to protect working lands.

D. Favorable Relationships: Calumet County had favorable relationships among local units of government, county government, the University of Wisconsin – Extension Office and the University of Wisconsin – System. In particular, the UWEX CRD Office and the Planning, Zoning, and Land Information Department provided invaluable staff resources to the project. These institutions also have the capacity to further refine and implement LESA using GIS once the pilot project is completed.

Chapter 2. Committee Selection and Responsibilities

Participation from local stakeholders and planning and resource professionals was a prerequisite for community selection. The University of Wisconsin-Extension Community Resource Development Educator was asked by the Center for Land Use Education to assist in assembling members of the committee based on the following attributes based on information from Barrows, 1979 and Pease, 1994:

1. Farmers with various backgrounds
2. Plan commissioners or other local officials
3. Natural Resources Conservation Service representative, land and water conservationist, or county planner
4. Farmland tax assessor
5. UWEX Educator

Ultimately, the following people were assembled to participate on the Committee:

1. Ken Beuelow, large dairy farmer; Board of Directors of Glacier Land Conservancy
2. Mike Hofberger, retired FSA Director with experience in soils; Town Clerk in Stockbridge
3. Rose Moehn, Organic dairy farmer; Stockbridge Plan Commission
4. Deb Reinhart-Geiser; Dairy farmer; staff member in the County Treasurer's Office who handles land assessment data; Charlestown Plan Commission
5. Joe Sprangers, Harrison Town Chairman (county's most rapidly growing community); former dairy farmer, livestock and cash crop farmer
6. Doug Thiel, Woodville Plan Commission Chairman; large dairy farmer
7. Lylas Tremble, Stockbridge Plan Commission Chairman; rural land owner; retired professional with Outagamie County Land Conservation Department
8. Dale Voskuil, Chilton Plan Commission; rural landowner with property enrolled in a conservation easement program
9. Don Waldvogel; professional agriculture land assessor; rural land owner
10. Eugene McLeod, County Conservationist, Calumet County Land and Water Conservation Department
11. Dena Mleziva, Calumet County Senior Planner, Calumet County Planning Department
12. Mary Kohrell, Calumet County UWEX Community Development Educator and facilitator
13. Douglas Miskowiak, UW-Stevens Point, GIS Center; Specialist and facilitator

Citizens and local officials on the committee were responsible to:

1. Attend and participate at six meetings.
2. Share their personal and professional agricultural and land use experiences and expertise.
3. Select the criteria that would inform the Land Evaluation and Site Assessment system for Calumet County
4. Provide researchers with positive and negative feedback regarding educational products, presentations, methods, and meeting facilitation techniques.
5. Verify that they sufficiently understood the issues related to this project so they could make well-informed decisions.

Planning and resource professional staff were responsible to:

1. Share professional opinions and information regarding land use and agricultural issues regarding working lands in Calumet County.
2. Provide access to information to help construct the LESA model.

Facilitators were responsible to:

1. Provide committee members with sufficient opportunity to articulate their opinions, experiences, and expertise as it related to the project.
2. Ensure that important issues as they related to the project were adequately discussed and abundantly understood by committee participants.

Chapter 3. Informing the LESA Process

Understanding local conditions, land use issues, publicly held values, and community goals and objectives is important to ensure that LESA is designed to fit local circumstances.   The process used in Calumet County relied on information recently collected for the Comprehensive Plan Year 2025.

The comprehensive plan and geographic information was studied and interpreted to recognize how LESA might be applied for Calumet County. This information was compiled into a table that listed goals, objectives, and policy recommendations; and also identified possible uses for LESA. This information is compiled into three sections below: Agricultural Systems, Agricultural and Land Use Issues, and Community Goals, Objectives, and Policies.

Additionally, Calumet County planning and resource professionals attended meetings to ensure the committee was aware of various agricultural issues and information. Committee members were also selected that were known to be well informed or engaged in various agricultural and land use issues. They studied the information presented to them and made decisions about how to build a LESA system for Calumet County.

Agricultural Systems

The types of agriculture that are predominant or function in a community are important to consider. A LESA system custom fit to identify priority rangelands, for example should differ from a LESA system designed to target priority orchards.

Economic Activity: Calumet County agriculture generates more than $338.1 million in economic activity, accounting for about 15 percent of Calumet County's total economic activity. Dairy is the largest single component of Calumet County's agricultural system. Milk producers contribute $142.9 million to the county's economy. On-farm production and sale of milk provides $59.7 million to the economy. Cattle and calves, grains, vegetables, and horticultural crops contribute to the local agricultural system (UWEX, 2004). The 2002 Agricultural Census acknowledges that cattle and calves, mink, pheasants, and bee colonies are the top four livestock items in the county.

Ownership and Size: The family or individually owned farms predominates the agricultural system in Calumet County. Over eighty-seven percent of farms are owned by individuals or families followed by family partnerships (6.4%), family-owned corporations (5.6%), and non-family corporations (0.7%) (UWEX, 2004). Although the average sized farm in Calumet County is approximately 200 acres, over 15,000 acres of

working lands are owned by approximately 20 individuals, partnerships, or corporations (Miskowiak, 2008). Additionally, committee discussions revealed that smaller operations provide agricultural services that support or supply larger operations.

Land Use: According to land use data from Calumet County, 2004, 65.5 percent of the county or 134,148 acres of land are dedicated to farm and cropland. Forestlands contribute almost 30,000 acres or 14.5 percent of existing land uses. These areas, the vast majority of land in Calumet County are working landscapes where economic value is derived from the resources of the land.

Soils: Calumet County soils are generally conducive for growing crops. Over 88,749 acres of Calumet County Soils are considered _Prime Farmland_ by the Natural Resources Conservation Service. Another 78,600 acres are considered _Prime Farmland if Drained._ 57,267 acres are considered _Not Prime Farmland._

Surprisingly, Calumet contains no soils in Capability Class 1 – those that have no limitations (e.g. flooding, ponding, erosion) for growing crops. However, Calumet County has 181,534 acres in Capability Classes 2 and 3 which generally have few limitations for growing crops.

Agricultural and Land Use Issues

Agricultural and land use issues permeate transportation, economic development, natural resources, and other community issues. Understanding the issues affecting the community provides information essential for effectively designing a LESA system. The Calumet County Comprehensive Plan identifies a number of agricultural and land use issues that were considered.

Number of farms decreasing - Cattle and Calves increasing: Although the number of farms are decreasing, the size of farms, and the number of cattle and calves are increasing. Acres lost out of agriculture totaled 481 acres between 1997 and 2002.

How LESA Relates
Large contiguous masses of working lands suitable for inclusion in an agricultural district can be prioritized using LESA.

Agriculture has Cultural Significance: Barns, silos, open fields, and cows not only provide the ingredients for agricultural productivity they contribute to the character of county and link current people to the area's history. Farms also provide open space and access to scenic vistas. Notably, the Town of Stockbridge has acknowledged the cultural significance of working lands by classifying "Rural Character" as a future land use

district. The contribution of working lands to protecting scenic vistas or other important cultural features, such as the Niagara Escarpment are considerations for a LESA system.

How LESA Relates
Working lands that have cultural significance or exhibit characteristics of "rural character" can be prioritized using LESA.

Karst Geology and Water Quality: Of significant concern in Calumet County is the relationship among working lands, water quality, and karst topography. Karst topography, with shallow soils and fissures in bedrock, act as direct conduits from surface to groundwater. Agricultural nutrients and effluence from septic absorption fields can be carried directly to groundwater. Shallow soils, karst topography, agricultural stewardship, and best management practices were considered for crafting and scoring a LESA system.

How LESA Relates
Working lands that exist on karst geology can be identified and scored in such a way to prioritize these areas for education and implementation of best management practices.

Environmental Corridors and Wildlife Habitat: The Calumet County Comprehensive Plan articulates issues related to wildlife habitat, wetlands, floodplains, state and local natural areas and other issues that link the value of working lands to protecting natural resources. Working lands located adjacent to or in close proximity to strategic open space areas or natural resources provides a buffer that can extend the benefits of the resource. For example, surface waters, when buffered in the riparian area deliver fewer nutrients to surface water via runoff.

How LESA Relates
Working lands that are within or connect an environmental corridor or provide a linear corridor beneficial for wildlife habitat can be identified and prioritized.   A LESA system can prioritize working lands that also contribute to protecting or buffering strategic natural and public resources.

Community Goals, Objectives and Recommendations: Public preferences and policy statements articulated in comprehensive or farmland preservation plans provide guidelines for crafting an appropriate LESA system. The following content reiterates segments of the Calumet County Comprehensive Plan and recognizes how the LESA system can potentially be used to addresses statements expressed in the comprehensive plan. This information was considered by the Committee for developing a LESA system for Calumet County.

Calumet County Vision Statement

Calumet County will continue to offer a high quality of life that is enhanced by well planned development, the preservation of natural, agricultural, and cultural resources, the availability of economic opportunities, an efficient and well planned transportation system, and a system of governments and services that continually strive to improve the quality of life for Calumet County residents. This also embraces options and opportunities for all citizens to fully participate in the achievement of this vision.

The *Calumet County Year 2025 Comprehensive Plan* will be a reflection of our values and shared vision, a guide for the management of change, and the foundation for policies, strategies, and implementation of goals.

To accomplish this vision, the rules, regulations, and requirements which will be used to implement the provisions contained in this comprehensive plan must: a) balance the needs of the community with the rights of individuals; b) recognize and reflect the diversity of landscape and development demands found in various parts of the county; and, c) provide for both consistency and flexibility in their application. It is the intent of Calumet County to seek this vision in close partnership with the local towns, villages, and cities and the permanent and seasonal residents who are interested in sustaining and improving the opportunities, character, and environment of Calumet County.

How LESA Relates

LESA was applied in this pilot project using a process that invited citizens to fully participate in achievement of the vision, goals, objectives, and recommendations articulated in the county's comprehensive plan. This project utilized LESA to identify priority working lands that help meet the vision to preserve agricultural resources.

This pilot project considered and balanced the needs of the community with the rights of the individual. LESA helped by providing the committee with a systematic method that measures a proposed alternative and assesses the consequences.

LESA and GIS was employed to recognize the diversity of landscape and development demands by bringing available data to bear on the process. This process utilized over

thirty spatial data sets. LESA is as flexible and as consistent as the committee or the community needs it to be. LESA delivers an output based on the criteria and inputs of the committee. Once data are input into the LESA system, the results are consistently and accurately portrayed on maps or in tables.

Issues and Opportunities Element

Goal 1. Balance appropriate land use regulations and individual property rights with county government interests and goals.
How LESA Relates
- Because LESA applies criteria systematically, policy outcomes are applied consistently and accurately across the landscape, meaning that land owners are treated more equitably.
- LESA can target working lands that are best suited to meeting the public's interests. Limiting a policy to high priority working lands reduces the geographic area a policy controls, thereby limiting the number of affected property owners.

Goal 2. Maintain, preserve, and enhance the county's rural atmosphere, natural resources, open spaces, and small urban centers, and protect Calumet County's overall sense of community.
How LESA Relates
- The Targeting Working Lands Committee considered criteria to prioritize working lands that provide valuable open space or exhibit the characteristics of rural atmosphere. LESA with GIS identifies places on a map that achieve these goals.

Goal 3. Continually recognize the importance of the agricultural industry and natural features of Calumet County in all future land use decisions and promote their preservation for future generations.
How LESA Relates
- LESA identifies high priority working lands that will help sustain a strong agricultural industry.
- Criteria were considered to prioritize working lands that also protect or enhance natural features.

Objective 3. Maintain natural and recreational features in the county and encourage their further development or preservation.
How LESA Relates
- Criteria were considered to prioritize working lands that also protect or enhance natural and recreational features.

Objective 4. Maintain geographic information at the county level to assist local governments with management and preservation of agricultural and natural features.
How LESA Relates

- Results from this pilot project will be delivered to the Planning, Zoning, and Land Information Department to implement.   LESA scores are linked to parcel records and work as a working lands management and monitoring system to guide future land use decisions.

Utilities and Community Facilities Element
Water Supply
Objective 1. Reduce the potential for point and non-point source pollution of the water supply.
How LESA Relates

- LESA criteria consider working lands that have the greatest impact on surface water and ground water resources.

General Utilities and Community Facilities
Policy 7. The conversion and fragmentation of designated environmental corridors by new development, roads, and utilities shall be minimized and/or mitigated to the extent practical.
How LESA Relates

- LESA criteria were considered that prioritize working lands that are adjacent to or connect existing environmental corridors.

Parks and Recreation
Policy 5. Acquire lands as needed to expand the existing park system to meet the demands of a changing and increasing population.
How LESA Relates

- LESA criteria were considered that prioritize working lands that buffer existing parks and public open spaces from developed land uses.

Agricultural, Natural, and Cultural Resources Element
Agriculture
Goal 1. Maintain the operational efficiency and productivity of the county's agricultural areas for current and future generations.
How LESA Relates

- Use LESA to identify core working lands that are found within large contiguous tracts and are supported by appropriate agricultural infrastructure so that operational efficiencies and the benefits of large economies of scale are maintained.

Objective 3. Strive to reduce the rate of prime farmland being converted to non-agricultural development.

How LESA Relates

- Use LE to identify prime farmland or LESA to identify high priority working lands.
- Once LESA is developed, link its results to the parcel database so that conversions of prime farmland can be monitored and the results of the comprehensive plan evaluated for success or failure in achieving this goal.

Objective 5. Encourage farmers to follow Best Management Practices to minimize erosion and groundwater and surface water contamination.

How LESA Relates

- Identify environmentally sensitive working lands where if Best Management Practices were applied they would yield the most positive results.

Objective 6. Work with Calumet County local units of government to identify lands where the primary intent is to preserve productive farmland and to protect agricultural investment in land and improvements.

How LESA Relates

- Use LESA to identify working lands where the primary intent is to preserve productive farmland and agricultural investments in land and improvements, as defined by local units of government.

Objective 7. Manage growth to ensure an adequate supply of land is available for agriculture, and, the land with prime soils remains available for crop production and grazing.

How LESA Relates

- Use GIS to conduct a *build-out assessment* that evaluates the consequences of the comprehensive plan's land use policies, including the implementation of protecting land identified by LESA.

Policy 2. Designate specific areas within the county suitable for intensive agricultural purposes.

How LESA Relates

- Use LESA to identify core working lands that are supported by a viable agricultural infrastructure for supporting intensive agriculture.
- Use LESA to identify soils that are suitable for treating agricultural nutrients from intensive agricultural uses.
- Identify agricultural facilities where agricultural nutrients from intensive operations can be utilized safely.

Policy 7. Develop and implement educational programs for farmers on soil erosion and runoff and best management practices to control them.

How LESA Relates

- Use LESA to identify operations in need of soil erosion and BMP education. Overlay results with parcel database to create a distribution mailing list for operators to receive information and education.

Policy 8. Existing prime farmland shall not be used for future non-agricultural use unless consistent with the comprehensive plan.

How LESA Relates

- Identify prime farmlands that can and cannot be converted to a non-agricultural use consistent with the comprehensive plan.

Policy 9. Municipal services should not be extended into farmland areas unless a plan for their immediate use is in place.

How LESA Relates

- Identify areas where high priority working lands and areas for municipal expansion conflict.
- Identify areas where urban expansion has the least impact on high priority working lands.

Policy 11. Residential subdivision development shall be located in planned growth areas as identified by the comprehensive plan.

How LESA Relates

- Identify areas where high priority working lands and planned growth areas conflict.
- Identify areas where planned growth areas have the least impact on high priority working lands.

Natural Resources - Water

Goal 1. Support practices that provide for a water supply that meets the capacity and quality needs of current and future residents of Calumet County.

How LESA Relates

- Identify areas where water supplies are at risk from agricultural nutrients and runoff.

Objective 4. Direct growth away from environmentally sensitive areas such as wetlands, floodplains, sinkholes and other karst features, and steep slopes in order to protect the benefits and functions they provide and to save future public and private dollars spent on flood control, storm-water management, habitat restoration, erosion control, water quality improvements, and rescue services.

How LESA Relates

- Identify working lands that provide a beneficial buffer to environmentally sensitive areas.
- Identify working lands that are detrimental to the quality of environmentally sensitive features.

Natural Resources – Other Features

Goal 1. Maintain, preserve, and enhance the natural and cultural resources in Calumet County.

Objective 1. Manage growth to protect features which, through their preservation, would: conserve and enhance natural or scenic resources; protect water supply/quality; promote conservation of soils, wetlands, and woodlands; enhance the value of adjoining public lands; maintain and improve public and private recreation opportunities; and/or preserve historic and cultural resources.

Objective 6. Protect and promote the Niagara Escarpment as a valuable natural resource.

Objective 8. Minimize the disturbance of environmental corridors, prime agricultural land, and natural areas for the purpose of accommodating new transportation facilities.

Policy 4. An interconnected network of environmental corridors should be maintained throughout the county in accordance with established waterway regulations (shoreland management zone, wetland corridors, floodways, etc).

Policy 6. The conversion and fragmentation of designated environmental corridors by new development, roads, and utilities shall be minimized to the extent practical.

Historical and Cultural Resources

Goal 1. Maintain, preserve, and enhance the natural and cultural resources in Calumet County.

Objective 1. Manage growth to protect features which, through their preservation, would: conserve and enhance natural or scenic resources; protect water supply/quality; promote conservation of soils, wetlands, grasslands, and woodlands; enhance the value of adjoining public lands; maintain and improve public and private recreation opportunities; and/or preserve historic and cultural resources.

How LESA Relates

- Identify and target working lands that provide a beneficial buffer or work to protect or enhance natural or scenic resource, protect water, conserve soils, wetlands, and woodlands, enhance the value of public lands, maintain and improve private recreation, and preserve natural, historic and cultural resources.
- Apply and score working lands based partly on criteria that reflect natural, cultural, historical, and archeological features of value in Calumet County.
- Use LESA as part of an Environmental Impact Assessment to analyze the affects of transportation development on agricultural land.

Land Use Element
Goal. Provide for a well-balanced mix of land uses within the county that take into consideration the other goals and objectives of the comprehensive plan.

Objective 2. Identify preferred land use management areas which contain areas of similar features and function and can coexist with one another (i.e., agricultural, residential, commercial etc.).

How LESA Relates

- Use LESA to identify the preferred land use management area for agricultural uses.

Objective 9. Preserve the county's natural, cultural, historic, and rural areas, including prime agricultural lands, by focusing new areas of growth close, or adjacent, to existing areas of development and community services.

How LESA Relates

- Identify areas where high priority working lands and planned growth areas conflict.
- Identify areas where planned growth areas have the least impact on high priority working lands.

Objective 12. The county shall consider the transfer of residential density on a parcel to promote flexibility in site design (e.g., density management in conjunction with lot size) and allow clustering of building sites provided proposals are consistent with other provisions of the comprehensive plan.

How LESA Relates
- Use LESA to identify areas where transfer of residential density is a preferred option and clustering is an option on farmlands of mediocre quality.
- Use LESA to identify parcels where transfer of residential density and clustering are options.

Proposed Implementation Strategy: Existing Ordinance Modifications
Recommendation(s): Working in close cooperation with the towns, public, and other codes such as the Calumet County subdivision ordinance, amend the county zoning ordinances and maps to help implement the recommendations of this plan, considering the following amendments: …

g. Require detailed mapping of productive farmland, woodlots, environmental corridors, and their component features (e.g., wetlands, floodplains, surface waters) on preliminary subdivision plats, with certified survey map submittals, and with site plans for larger commercial and industrial projects.

Proposed Implementation Strategy: Plan Updates
Farmland Preservation Plan Update
Farmland Preservation
♦ All existing farm parcels with cropland or pastureland areas containing at least 35 acres of prime agricultural soils should be identified as farmland recommended for preservation.
♦ Parcels meeting the criteria above should be located entirely outside urban service areas.
Parcels within an urban service area meeting all other criteria should be designated as transition areas.
♦ All agricultural preservation areas should be a minimum of 100 acres in size. Transition areas should be a minimum of 35 acres.
♦ Parcels which do not meet the 35 acre minimum requirement should be identified as farmland recommended for preservation if they are part of a larger farm in the county which does meet all the requirements and 75% of the parcel is cropped or pastured and on prime agricultural soils.

♦ Appropriate exclusive agricultural zoning provisions should be incorporated in the existing county zoning regulations.

Urban Growth

Parcels of land already developed non-agriculturally should not be included within an agricultural preservation or transition area.

How LESA Relates

- Utilize goals, objectives, and recommendations from the farmland preservation plan update as criteria for constructing the LESA system.

Maximizing Utility from the LESA System

This chapter has detailed many potential uses for a LESA system. Each potential use was considered by the Committee when developing the LESA system proposed in this document.   LESA, used alone, only prioritizes working lands. It does nothing to protect or manage working lands. To garner any utility from the LESA system, (i.e. achieve the goals, objectives, and policies outlined in the Calumet County Comprehensive Plan) the LESA scores must be linked to support an implementation tool or protection program, such as zoning or a conservation easement program. To maximize utility of the LESA system, it should be custom tailored to the specific implementation tool or conservation program chosen.   It should be noted that the LESA system proposed in this document *was not* designed for any specific implementation tool or conservation program.

Chapter 4. Establishing a Purpose for Prioritizing Working Lands

Before using the Land Evaluation and Site Assessment (LESA) and Geographical Information Systems (GIS) to prioritize working lands, it is essential to first consider, "Why should working lands be prioritized – for what reasons?"   With a specific reason to prioritize working lands established, LESA can be custom tailored to help achieve community goals and objectives and implement policies. The more specific a purpose statement is made, the better LESA is at targeting priority working lands accurately.

Committee Recommendation

The Calumet County Targeting Working Lands Committee crafted the following purpose statement.

> ***"Designate specific areas within the county appropriate for agricultural purposes, mindful of environmental sensitivity.***"

This purpose statement is a general declaration of how the LESA system should be applied in Calumet County. This statement asserts that LESA should evaluate agricultural working lands. Although the committee agreed that both agricultural and forested working lands provide economic, cultural, and natural values to the County, LESA criteria focused on agricultural working lands. Forested working lands should be considered and prioritized with a separate, customized LESA system.

This purpose statement also includes the phrase, "mindful of environmental sensitivity." Committee deliberations revealed that this phrase specifically addresses ground water quality issues related to karst topography and shallow soils. This phrase does not attempt to include the other public or environmental values associated with working lands, such as buffering strategic open spaces such as public parks or the Niagara Escarpment or connecting environmental corridors.

Additionally, this purpose statement is not specific or designed to compliment a particular implementation program, regulation, or policy. Three programs including zoning, conservation agreements, and best management practices education were discussed in committee meetings, but the matter remained unresolved. Because a particular program was not agreed upon, LESA recommendations within this document are broadly characterized.

Facilitator Observations & Recommendations

This Committee, asked to participate as local authorities on agricultural and land use issues, was not the appropriate body to cogitate a specific purpose statement for using LESA. Committee members felt that the County, individual town governments, or a land trust, responsible for directing policy and programs, are better suited to establish a specific purpose statement in which to custom tailor LESA. Once a specific purpose is clearly established, a technical committee such as the Targeting Working Lands Committee is well suited to craft a LESA model that meets an intended purpose.

It is anticipated that a specific purpose statement will emerge from the Farmland Preservation Plan update. It is recommended that this LESA protocol be modified or custom-tailored to complement programs that emerge from that plan.

Additionally, town governments and not-for-profit organizations, such as Glacial Lakes Conservancy can use and benefit from tailoring this LESA protocol for their purposes. It is recommended that the County share geographic data and expertise with town governments and the conservancy when mutually beneficial objectives are anticipated.

Chapter 5. Selecting the Defining Characteristics of Priority Working Lands

Before being able to accurately target priority working lands on the ground, it is important to understand the characteristics that define priority working lands that suit an intended purpose. Generally defined, *priority working lands and operations* are important farms and farmlands where protection efforts are desirable and help attain community goals and objectives.   For Calumet County, the defining characteristics of priority working lands are based on the purpose statement identified by the committee.

> ***"Designate specific areas within the county appropriate for agricultural purposes, mindful of environmental sensitivity.***"

For this proposal, LESA is used to evaluate how appropriate a working land or operation is for agricultural purposes, while also protecting environmental sensitivity. Environmental sensitivity, in committee discussions, has come to be defined as a groundwater quality issue. This chapter describes in detail the seven defining characteristics chosen to evaluate working lands. This chapter also briefly explains the rationale for choosing each characteristic.

Committee Recommendation

The Calumet County Working Lands Committee has selected the following seven characteristics used to evaluate working lands.

1. **Quality of Soil for Growing Crops**
2. **Compatibility with Surrounding Land Uses**
3. **Land Use Policies**
4. **Distance from Urban Features/Boundaries**
5. **Proximity to Protected Working Lands**
6. **Discounted Costs of Obtaining an Easement**
7. **Protecting Water Quality**

1. **Quality of Soils for Growing Crops**

This characteristic evaluates working lands based on the soil's ability to grow crops. Measuring the soil's quality for growing crops provides a valuable indication of an operations viability or agricultural productivity. ***All else equal, working lands with higher quality soils are more appropriate for sustaining a viable bio-based economy.***

This characteristic is measured using information from the Natural Resources Conservation Service's Soil Survey. A combination of soils classifications including

Important Farmlands, Capability classification, and Soil Productivity for corn and alfalfa are used in this evaluation.

Important Farmlands Classification

The Important Farmlands classification is based on the Natural Resources Conservation Service's national criteria for evaluating soils and is useful to compare soils among different communities. This classification evaluates soils more broadly in categories of Prime Farmland, Not Prime Farmland, Prime if Drained, and Farmlands of Statewide Importance, among others.

Capability Classification

The Capability classification evaluates soils based on their limitations for growing crops, such as from erosion, slope, or flooding. Capability classes are measured on a scale from 1-8, best to worst. Classes one through three are generally favorable for growing crops and have few limitations.

Soil Productivity

The Soil Productivity classification evaluates the soils ability to grow an indicator crop, such as corn or alfalfa. This classification assumes an average application of inputs, such as fertilizers. Depending on the crop, productivity is measured in bushels or tons per acre.

2. Compatibility with Surrounding Land Uses

This characteristic evaluates working lands based on its compatibility with surrounding land uses in rural areas. This characteristic considers how neighboring land uses complement or conflict with the productivity of working lands. Working lands surrounded by conflicting uses, such as residential development, can have negative impacts on operation efficiency. Conversely, working lands surrounded by other working lands limit land use conflicts and hold potential to enhance efficiency and productivity. Cooperation and partnerships among neighboring operators is familiar in Calumet County, for example. This characteristic identifies Public Land Survey System (PLSS) sections where working lands complement each other and where such cooperation and partnerships are viable.

This characteristic is evaluated by measuring the percentage of existing land uses within PLSS section boundaries. A LESA score is attributed to the section boundary. The score is based on the percentage of developed land uses, undeveloped non-working lands, and working lands. ***Holding all else equal, section boundaries with higher acreages of***

working lands are more appropriate for sustaining agriculture and forestry than those with fewer working lands.

3. **Land Use Policies (Future Land Uses)**

This characteristic evaluates working lands based upon the *Future Land Use* designation articulated and approved in local comprehensive plans. Future Land Uses displayed on a map, illustrate the community's preference for how it desires to use its public and private lands with a stated timeframe, commonly 25 or more years. Future Land Uses do not provide an exact prediction of the future, but instead provide guidance for framing policy and making land use decisions.

This characteristic is evaluated using the Future Land Uses mapped in local comprehensive plans for each town in Calumet County. *Future Land Uses that favor agriculture receive higher scores than those Future Land Uses that favor developed land uses.* This characteristic emphasizes the importance of local land use preferences.

4. **Distance from Urban Features/Boundaries**

This characteristic evaluates working lands based on their proximity to urban services and urban boundaries. This characteristic measures the influence of cities, villages, and proximity to urban services. Working lands that are within or in close proximity to urban features and boundaries are under more intense pressure to develop than working lands further from cities and villages. Additionally, the Committee articulated that it is generally preferable for new development to occur adjacent to or near existing urban areas.

This characteristic is measured using village and city boundaries, sewer service areas, growth management boundaries, planned areas for urban expansion, and the extraterritorial jurisdiction of cities and villages. *All else being equal, working lands outside these boundaries are more appropriate for agriculture than working lands existing within or near these urban boundaries.*

5. **Proximity to Protected Working Lands**

This characteristic evaluates working lands based on their proximity to other working lands protected in perpetuity, such as with conservation agreements. Three assumptions are applied to this characteristic:

1) Existing investments in protecting working lands are valuable community assets that should be further sheltered with public policy.

2) Isolated working lands, although protected themselves, are at risk of becoming unproductive because of conflicts with future neighboring land uses.

3) Future investments in protecting working lands are more secure and more valuable near where investments have already occurred.

This characteristic is measured by buffering lands protected with conservation agreements at various distances. ***All else being equal, working lands closer to protected working lands are more appropriate for agriculture purposes than working lands further away.***

6.   **Discounted Cost of Obtaining an Easement**

This characteristic evaluates working lands based on the cost of obtaining conservation agreements for permanent protection. Working lands, where conservation agreements are donated or obtained at low monetary cost score better than those attained at high cost. This characteristic is most applicable for a conservation agreement program, whether implemented by the county, towns, or land trust.

This characteristic is measured and LESA scores attributed to the parcel using an application and appraisal process. This characteristic is not measured in this proposal and it does not influence the LESA results shown in this proposal.

7.   **Protecting Water Quality**

This characteristic evaluates working lands based on the susceptibility of the underlying groundwater/aquifer to pollution. The Committee applied the following logic using this characteristic: ***Working lands are more amenable to protecting water quality than other land uses, such as rural residential development.*** This characteristic is measured using data from the United States Geological Survey titled, Susceptibility of the Uppermost Aquifers, Calumet County, WI, published in 2006.

Chapter 6. Rating the Characteristics of Working Lands

This chapter describes the LESA *Rating* procedures applied for Calumet County. Rating procedures evaluate the characteristics of working lands independently of each other. The characteristic *Quality of Soils for Growing Crops,* for example, are measured independently from the *Distance from Urban Features/Boundaries* characteristic*.* Each characteristic has unique attributes that require custom-tailored procedures. Each characteristic is measured on a scale of 0-100, Least to Most Appropriate. Rating criteria were applied to the seven characteristics described in detail in Chapter 5.

1. Quality of Soils for Growing Crops
This characteristic measures the quality of soil for growing crops and is measured using a combination of four soil classification systems. These include Important Farmlands, Capability Classification, Soil Productivity for Corn, and Soil Productivity for Alfalfa. Below are the Rating criteria for this characteristic.   The scoring criteria for soils are described in detail below. See Map 6.1 to view the spatial result of this analysis.

Important Farmlands Classification
Important farmlands classification is based on national NRCS criteria for evaluating soils. This classification is a good method to quickly compare the quality of soils of one county to another. This information is compiled more generally and may not capture the unique local soil qualities.

Notably, *Farmland of Statewide Importance* was assigned a low score. These soils included areas identified as too wet to farm by the Committee. GIS analyses verified the wet condition of these soils.   Scores for this portion of the characteristic were weighted at 10 percent, given slight influence over the result.

Important Farmlands	Score	Weight 10%
Prime Farmland	100 Points	(Most Appropriate)
Farmland of Statewide Importance	10	
Prime if Drained	50	
Prime if Protected from Flooding	25	
Not Prime Farmland	0	

Capability Classification
The capability classification evaluates soils based on their limitations for growing crops, such as erosion, flooding, or hydric condition. This classification does not consider the productivity of these soils for growing crops.

Notably, there exist no soils in Calumet County with a Capability Class rating of "1." Calumet County's best Capability Class rating began with Class 2 soils. Class two soils were given the highest score of 100. Class 8 soils were given the low score of 0. Classes

between 2 and 8 were assigned scores distributed evenly in approximate increments of 17 points. In instances where soil mapping units were not rated with a Capability Class, they were assigned a score of 0. Scores for this portion of the characteristic were weighted at 10 percent, given slight influence over the result.

Capability Class		Score	Weight 10%
"0"	(areas not rated)	0 Points	
"1"	(none exist in the county)	Not Applicable	
"2"		100	(Most Appropriate)
"3"		83	
"4"		66	
"5"		49	
"6"		32	
"7"		15	
"8"		0	(Least Appropriate)

Corn Productivity

The soil survey includes information that indicates the productivity of soils for various indicator crops. For corn, the most productive soils in Calumet County were predicted to yield 150 bushels of corn per acre. These soils scored a high 100 points. The following mathematical algorithm was applied to determine the remainder of scores. *Number of bushels/acre produced * 100 / 150 bushels (e.g. (80bu*100)/150 = 53 points).* Scores for this portion of the characteristic were weighted at 40 percent, given significant influence over the result.

Corn Productivity		Score	Weight 40%
150 bushels/acre (high)	100	(Most Appropriate)	
No bushels		0	(Least Appropriate)

Alfalfa Productivity

The soil survey includes information that indicates the productivity of soils for various indicator crops. For alfalfa, the most productive soils in Calumet County were predicted to yield 5.2 tons of alfalfa per acre. These soils scored a high 100 points. The following algorithm was applied to determine the remainder of scores. *Number of tons/acre produced * 100 / 5.2 tons (e.g. (4.8tons*100)/5.2 = 92 points).* Scores for this portion of the characteristic were weighted at 40 percent, given significant influence over the result.

Alfalfa Productivity	Score	Weight 40%
5.2 tons/acre (high)	100	(Most Appropriate)
No tonnage	0	(Least Appropriate)

Map 6.1

2. Compatibility with Surrounding Land Uses

This characteristic evaluates working lands based on surrounding land uses. Existing land use data was analyzed for this analysis. LESA scores were applied to PLSS section boundaries. Neighboring PLSS sections were also analyzed and an average score was assigned to the PLSS section boundary. See map 6.2 to view the result of this analysis. This analysis was applied using the following steps.

Step 1. For each PLSS Section, calculate acreages of:
- A) Developed land uses   (Conflicts with working lands)
- B) Working lands   (Complements working lands)
- C) Undeveloped, non-working lands (Neither conflicts or complements working lands)

Step 2. Assign scores based on the ratio of calculated acreages analyzed in Step 1. The following scoring strategy was applied to the following characteristics:
- A) Developed land uses   = 0 Percent Point Value
- B) Working lands   = 100 Percent Point Value
- C) Undeveloped, non-working lands   = 50 Percent Point Value
- D) If developed uses exceed 75%   = Then section receives 0 Points

The following examples serve to illustrate the scoring strategy applied in Step 2.

Example 1.	Total Size of PLSS Section	= 640 acres
	Working Lands	= 320 acres at 100% value
	Developed land uses	= 320 acres at 0% value
	Non-working land	= 0 acres
	LESA Score	= (320+0+0)/640 = 50 Points
Example 2.	Total Size of PLSS Section	= 640 acres
	Working Lands	= 450 acres at 100% value
	Developed land uses	= 100 acres at 0% value
	Non-working land	= 90 acres at 50% value
	LESA Score	= (450+0+45)/640 = 77 Points
Example 3.	Total Size of PLSS Section	= 640 acres
	Working Lands	= 160 acres at 100% value
	Developed land uses	= 480 acres at 0% value
	Non-working land	= 0 acres
	LESA Score	= Developed Land Use Exceeds 75%
		= 0 Points

Map 6.2

Step 3. Average the score applied to the PLSS Section using the scores from neighboring sections. The following algorithm was applied to conduct this analysis:
(*a+b+c+d+e+f+g+h+i)/9 = Section Score*

The following illustrations describe how Step 3 is applied.

Figure 6.1. Score BEFORE averaging.   Figure 6.2. Score AFTER averaging.

50	70	75
55	**100**	100
60	80	90

50	70	75
55	**75**	100
60	80	90

3. Land Use Policies

This characteristic evaluates working lands based upon the *Future Land Use* designation articulated and approved in local comprehensive plans. The following scores are applied to each Future Land Use District. See map 6.3 to view the result of this analysis.

Future Land Use Districts	Score	
Agricultural Enterprise	100 Points	(Most Appropriate)
General Agriculture	80	
Escarpment/Rural Character	75	
Rural Character	75	
Planned Urban Transition	0	(Least Appropriate)
Conservancy	0	
Escarpment Conservancy	0	
Single/Two Family Residential	0	
Multi-Family Residential	0	
Mixed Use Hamlet	0	
General Industrial	0	
General Commercial	0	
Government/Institutional	0	
Private Resource	0	
Parks and Recreational	0	
Public Parking	0	
Airport	0	

Map 6.3

4. **Distance from Urban Features/Boundaries**

protects This characteristic evaluates working lands based on their proximity to urban services and urban boundaries. See map 6.4 to view the result of this analysis. The following scoring criteria were applied as follows:

Urban Feature/Boundary	Score	
Outside all Urban Boundaries	100	(Most Appropriate)
Extraterritorial Plat Review Boundary ½ mile	80	
Planning Area Boundary	50	
Growth Management Boundary	25	
Sewer Service Area	0	
Existing City or Village Boundary	0	(Least Appropriate)

IF urban features/boundaries overlap, THEN apply the lowest score applicable.

5. **Proximity to Protected Working Lands**

This characteristic evaluates working lands based on their proximity to other working lands protected in perpetuity. The following scoring criteria were applied as follows (see map 6.5).

Proximity to Protected Working Lands	Score	
Adjacent >= ¼ mi	100	(Most Appropriate)
¼ - ½ mile	90	
1/2 – 3/4 mile	80	
¾ - 1 miles	70	
1 – 1.25 miles	60	
1.25 – 1.5 miles	50	
1.5 - 2 miles	40	
2 – 2.5 miles	30	
2.5 – 3	20	
> 3 miles	0	(Least Appropriate)

6. **Discounted Cost of Obtaining Easement**

This characteristic evaluates working lands based on the cost of obtaining permanent conservation. This characteristic is not measured using geographical information, but rather obtained through an application and appraisal process. Once applications are collected, information can be applied using the LESA system.

Cost of Obtaining Easement	Score	
Donated easements	100	(Most appropriate)

Map 6.4

Map 6.5

< $3,000/acre   90

  $3k – 5K   80

  $5K - $7,500   70

  $7,500 – 10K   60

  > $10k   0 (Least Appropriate)

  7. Protecting Water Quality

This characteristic evaluates working lands based on the susceptibility of the underlying groundwater/aquifer to pollution. Map 6.6 shows how LESA scores are spatially distributed based on this category. Scoring criteria are applied as follows:

Aquifer Susceptibility   **Score**

  Low Susceptibility 25 (least appropriate for working lands)

  Moderate   50

  High   90

  High/Thin Soils   100 (most appropriate for working lands)

Map 6.6

Chapter 7. Weighting the Characteristics of Working Lands

This chapter describes the LESA *Weighting* procedures applied for Calumet County. Weighting procedures assign relative values to each characteristic on a 0 – 100 <u>percent</u> scale. Weighting procedures determine how much influence each characteristic will have on a resulting LESA evaluation. Characteristics assigned higher values have greater influence over the result. For example, if *Quality of Soils for Growing Crops* was assigned 100% value, it would have complete control over LESA results – the remaining characteristics would have zero influence.

The LESA system proposed in this document weights characteristics on a scale of 100 Percent. Characteristics are organized from Most Influence to Least Influence:

1.	Quality of Soil for Growing Crops	21%	(Most Influence)
7.	Protecting Water Quality	18	
5.	Proximity to Protected Working Lands	16	
2.	Compatibility with Surrounding Land Uses	15	
3.	Land Use Policies	11	
6.	Discounted Costs of Obtaining an Easement	10	
4.	Distance from Urban Features/Boundaries	9	(Least Influence)

Weighting procedures were applied to characteristics based on the compilation of results of a Weighting exercise, conducted in July, 2008. Ten committee members completed a forced ranking exercise and a weighting exercise. The results of the exercises were compiled and averaged. The average was utilized to weight the importance of the seven characteristics of working lands.

Forced Ranking Exercise

A forced ranking exercise was applied to help determine which characteristics are most and least important to prioritizing working lands. This exercise does not demonstrate how much more or less important one characteristic is as compared to other characteristics. Participants were instructed to place a number next to each characteristic *(1 = Most Important, 7 = Least Important).* They were instructed to use each number only once. The results are displayed in Table 7.1.

Table 7. 1. Results from the Forced Ranking Exercise (ordered by rank)

CHARACTERISTIC	PARTICIPANT SCORES										AVERAGE	RANK
	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10		
1. Quality of Soil for Growing Crops	1	4	1	2	1	2	1	1	1	4	1.8	1
2. Compatibility with Surrounding Land Uses	5	3	2	4	2	3	4	3	3	2	3.1	2 - 3
5. Proximity to Protected Working Lands	4	1	3	3	4	5	2	2	2	5	3.1	2 - 3
7. Protecting Water Quality	2	2	5	1	5	1	5	4	4	7	3.6	4
3. Land Use Policies	6	6	6	5	3	4	7	7	7	1	5.2	5
4. Distance from Urban Features/Boundaries	3	7	7	6	7	7	3	5	5	6	5.6	6 - 7
6. Discounted Costs of Obtaining an Easement	7	5	4	7	6	6	6	6	6	3	5.6	6 - 7

Weighting Exercise

A weighting exercise was applied to determine how much influence each characteristic should have on the resulting LESA evaluation. Participants were instructed to place a number (0 = not important at all) to (100 = all important) next to each characteristic. They were also instructed that the sum must equal 100. The results are displayed in Table 7.2.

Please note that two participants included scores that did not add up to 100 points. These faulty responses were interpreted to be equally distributed across characteristics and do not significantly influence model results.

Table 7.2. Results from Weighting Exercise (ordered by rank)

	PARTICIPANT SCORES											
CHARACTERISTIC	P.1	P.2	P.3	P.4	P.5	P.6	P.7	P.8	P.9	P.10	AVERAGE	RANK
1. Quality of Soil for Growing Crops	30	30	20	20	15	28	20	20	20	10	21.3	1
7. Protecting Water Quality	30	10	25	15	20	28	15	15	15	10	18.3	2
5. Proximity to Protected Working Lands	10	10	15	20	20	14	20	20	20	10	15.9	3
2. Compatibility with Surrounding Land Uses	10	20	15	20	15	8	15	15	15	15	14.8	4
3. Land Use Policies	10	15	10	5	5	14	5	10	10	30	11.4	5
6. Discounted Costs of Obtaining an Easement	5	10	5	15	10	7	10	10	10	15	9.7	6
4. Distance from Urban Features/Boundaries	5	5	10	5	10	7	15	10	10	10	8.7	7
SUM	100	100	100	100	95	106	100	100	100	100	100.1	

It should be noted that slight differences are found between the forced ranking and weighting exercises. Most notably, 7. Protecting Water Quality is significantly more important in the weighting exercise than in the forced ranking exercise. The results of the weighting exercise were applied to develop the LESA system proposed in this document.

Chapter 8. Testing and Calibrating the LESA Model

To ensure the accuracy of the LESA system for achieving its intended purpose it was tested and calibrated. The LESA system for Calumet County was tested in comparison to field observations and assessments conducted by members of the Committee.

Methods

Initially, twenty locations throughout Calumet County were randomly selected using ArcGIS *Create Random Points* tool. Two locations were identified in each PLSS township. Locations that did not overlap with identified working lands were eliminated (e.g. within city boundaries, on top of lakes). Parcel boundaries that intersected point locations were selected. Parcels under common ownership were selected to test and calibrate the LESA system. Map 8.1 displays locations selected for examination.   Table 8.1 displays the results of the field testing and scoring.

Definition of Scores

Lowest Priority   The operation provides little value as a working land. It is not
                       desirable to protect this operation using conservation
                       agreements, unless donated. Rezoning requests out of agriculture
                       should be <u>accepted</u> based on the operation's value as a working
                       land.

Neutral   It is neither desirable nor objectionable to protect this operation
                       using conservation agreements. Rezoning requests out of
                       agriculture are neither desirable nor objectionable.

Highest Priority   It is highly desirable to protect this operation using conservation
                       agreements. Rezoning requests out of agriculture should be
                       <u>denied</u> based on the operation's value as a working land.

Results

Seventeen test sites were observed and assessed using a five point nominal scale (i.e. lowest priority, low priority, neutral, high priority, highest priority). Six test sites received LESA scores that closely resemble the field assessments. Seven test sites have LESA scores that are slightly different than the field assessments. Four test sites have LESA scores that are significantly different than the field assessments. (see Table 8.1).

Table 8. 1. Land Evaluation Scoring Results and Comparison to Field Observations

This table compiles the LESA scores for each test site. Scores are shown for each individual characteristic and a total LESA score that considers the relative value of each characteristic. Additionally, the scores from field observations are provided as a comparison to LESA scores.

Records shown in:

GREEN have a LESA score that closely resembles the field observation.

ORANGE have a LESA score that is slightly different than the field observation.

RED have a LESA score that is drastically different than the field observation.

Test Site Number	Scores from Field Observations	LESA Ave Score	Soils Ave Score	Urban Features Ave Score	Surrounding Land Uses Ave Score	Water Quality Ave Score	Land Use Policy Ave Score
1	HIGH	71.8	76.3	100.0	91.7	7.1	100.0
2	HIGHEST	80.1	85.5	100.0	93.5	17.4	97.9
3	NEUTRAL - HIGH	76.3	72.2	100.0	88.3	34.4	81.1
4	HIGH - HIGHEST	63.6	60.8	100.0	88.9	26.8	53.1
5	LOWEST	71.6	61.3	100.0	86.9	40.7	70.7
6	HIGH	83.0	76.5	100.0	86.9	40.3	98.4
7	LOW, HIGHEST	62.8	62.2	100.0	87.7	3.0	100.0
8	LOW, HIGHEST	79.2	76.6	75.0	63.5	56.9	100.0
9	LOW	68.1	72.2	100.0	83.7	12.1	91.6
10	NEUTRAL, HIGH	77.2	83.6	100.0	96.9	20.0	75.0
11	HIGH	59.2	81.1	48.8	87.6	18.3	42.9
12	NEUTRAL	68.6	71.4	86.0	81.9	26.8	78.7
13	HIGH, HIGHEST	35.9	47.0	64.3	67.3	1.5	53.4
14	HIGHEST	71.0	74.7	100.0	94.5	13.9	79.7
15	NEUTRAL	69.2	71.3	100.0	92.8	17.8	72.0
16	LOW	82.1	80.7	100.0	79.9	48.7	75.0
17	HIGH	63.6	66.9	100.0	90.9	6.4	80.0

Committee Member Notes

Site 3:   rating depends on future land use; big parcel, but there's a quarry on the land, and may host a future wind turbine

Site 5:   lowest because its too close to residential area (Charlesburg)

Site 7:   low because it is near residential area (St. Anna)

Site 8:   south parcel highest; north parcel low because too close to urban growth corridor

Site 9:   low because it's a smaller parcel and some of the property appears to be low and "marshy"

Site 10:   neutral; it's on/near the "Ledge" and would be high priority, but there's a for sale sign just north of the property

Site 12:   neutral; nice land, but close to Chilton with many houses nearby

Interpretation of Results

LESA scores were compared with field observations and field notes. Three assumptions emerge that require further testing and calibration of the LESA system.

1. Distance from urban features and boundaries appear to have been under weighted. Committee member notes indicate that proximity to urban places such as Chilton influenced their score.

2. Compatibility with surrounding land uses appear to have been under weighted. Committee member notes indicate that proximity to rural residential areas influenced their score.

3. Scores based on water quality cause working land scores to decrease. In comparison to field observations, it is questionable that this scoring criterion is helpful for targeting working lands that achieve the stated purpose.

4. Forested working lands were clearly valued inappropriately in comparison to field evaluations. The LESA system proposed in this document clearly favors agricultural working lands.

Results from Committee Meeting

The calibration scores were carefully compared to the LESA model at the committee meeting. Scores were itemized by characteristic to determine how working lands were evaluated by each criterion. Committee members and professional analysts detected an error that incorrectly assigned scores. GIS Analyst, Tom McClintock, identified the reason for the error. Scores for single geographic areas were in some instances counted more than once, resulting in a score greater than 100. Normalizing scores produced errors for all scores on the scale. This error was rectified for the final report and map.

Chapter 9. Proposed LESA System for Calumet County

In previous chapters, this report has detailed the steps taken by committee members and has described how GIS data and methodologies were applied to develop a LESA system for Calumet County. In Chapter 9, the result of the spatial analysis will be communicated and its impact explained.

The resulting map and spatial statistics described in this chapter are based on the seven characteristics selected (Chapter 5), rated (Chapter 6), and weighted (Chapter 7) by committee members. The assumptions applied by committee members are described in great detail in these chapters.

LESA Scores Classification

The resulting LESA analysis assigns scores to working lands on a 0 – 100 point scale. Working lands with a score of '0' scored the lowest and can be considered lowest priority working lands based. Working lands with a score of '100' scored the highest and are considered Calumet County's highest priority working lands, based on committee criteria.

A five category classification system was chosen to display LESA scores for Calumet County. The classification point breaks are as follows:

- 0 - 55 Points
- 56 - 68
- 69 - 74
- 75 - 79
- 80 - 100 Points

This classification point break implies that working lands that score 80 – 100 points are the areas highest quality working lands and working lands that score 0- 55 points are the lowest priority working lands. However, because working lands are prioritized generally, not to a specific purpose, an estimate of working lands needed to meet specified working land's goals is unknown.

Once a specific purpose for LESA is established, an estimate of working lands needed to meet goals should also be established. The classification should be adjusted accordingly to define meaning to the categories appropriate to the systems purpose.

Areas Not Evaluated Category

Map 9.1 displays in gray areas that were not evaluated and did not receive LESA scores. These are areas that did not meet working lands criteria established by the committee. The following process was used to refine areas for evaluation:
1) 'tax_parcels06 with 26,402 features was employed for this process.
2) Parcels with PINLink value of "XNG, WT, RR, RD, or ALLEY were eliminated.

3) Parcels with VALDESC1 value = Exempt were eliminated.
4) Parcels smaller than one-acre were eliminated.
5) Parcels with a center point in the 'public_ownership' layer were eliminated.
6) Parcels visually inspected to eliminate obvious subdivisions by comparing PINLLink and VALDESC1 with owner1name field.

Itemization Evaluated Working Lands

According to the State of Wisconsin Blue Book, Calumet County has a land area of 319.9 square miles or approximately 204,736 acres. The amount of working lands evaluated in Calumet County totals 167,517 acres or 82% of total land area. Table 9.1 displays the amount of working lands in acres broken down into the five categories.

Table 9.1. Number of Acres in Each LESA Score Category

LESA Score	Number of Acres	Percent of Total Evaluated Working Lands
80 – 100 Points	18,121 acres	11%
75 – 79 Points	9,817 acres	6%
69 – 74 Points	16,032 acres	9%
56 – 68 Points	74,544 acres	44%
0 – 55 Points	50,003 acres	30%
Total	167,517 acres	100%

Explanation of Spatial Results

Map 9.1 is the result of the weighted overlay process used in this LESA assessment. It is the result of combining the scores from each of the seven categories and assigning each category a weight that defines its influence over the map results. Higher weights bestow higher importance and more influence over the result. To visualize how Map 9.1 was created and the effects of each characteristic, it is helpful to compare Map 9.1 to maps in Chapter 6.

Quality of Soils for Growing Crops

This characteristic has the most influence over the results displayed on Map 9.1. Although it has the most influence, its effect on the result is not visually dominant. This is explained because Calumet County consists largely of high quality, high scoring soils. Areas with exceptionally poor soils were generally not evaluated, because they often were not identified as a working land (i.e. wetlands, protected open space, etc).

Protecting Water Quality

This characteristic was also highly rated and had significant influence over the spatial results. The effects of this characteristic are also highly visualized on Map 9.1. This is

explained because of the dramatic shifts among susceptibility polygons. Scores among polygons shift from high to low scores very quickly at a well-defined boundary. Aquifers, most susceptible pollution, get the highest scores. The effect is clearly seen by comparing Map 6.6 to map 9.1.

Proximity to Protected Working Lands
In this instance, a single parcel has significant influence over the spatial result. This characteristic is also weighted highly, so it has real effect on the model. The difference among scores for this characteristic also shifts quickly over a short geographic distance from high to low scores. This intensifies the visual effect on Map 9.1.

Compatibility with Surrounding Land Uses
Although this characteristic has significant influence over the model's result, the visual effect is not dominant. This is explained because scores change slowly between neighboring public land survey sections. Changes occur most quickly near urbanized areas and wetlands/floodplains as should is expected. These areas are more visually apparent on the map.

Land Use Policies
The effect of this characteristic is less apparent on Map 9.1. One explanation is that this characteristic is weighted less and less overall influence over the model results. The second explanation is that scores are distributed over exceptionally large geographic areas, in some instances over large portions of a township. Thirdly, changes in scores among categories were not significant for the geographic extent of the map. A change from 100 points to 75 points for example did not have a dramatic effect on the final result.

Proximity to Urban Features
Map 9.1 clearly shows the effect of this characteristic. Even though this category has the least influence over the final result, the difference among high scores and low scores changes significantly over short a geographic distance.   The visual effect of this is apparent near these boundaries.

Map 9.1

References

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