Strategic Plan Framework – DRAFT

History

1. The Greenbelt in the First 15 Years [draw from Remy's presentation]

Process

1. Overview of strategic planning process and stakeholder engagement sessions
2. Summary of findings – incl. U-M report, public sessions, comments (full data in appendices)

Our vision for the future

To support a high quality of life, with fresh air to breathe, clean water to drink, sustainable productivity of soils, and a diverse, local food system for dietary choices and overall health, we envision...

1. **Large swaths of contiguous protected land support healthy biodiversity in the regional ecosystem that…**
    a. Provides wildlife corridors,
    b. Protects our water resources,
    c. Supports pollution breakdown and absorption,
    d. Fortifies our defenses against natural disasters, and
    e. Strengthens natural sustainability.

2. **A flourishing agricultural region that is valued for its rich soil and innovative farming practices which…**
    a. Provides the next generation of farmers with access to affordable land,
    b. Enables small farms and local food production,
    c. Protects high-quality nutrient-rich soils, and
    d. Offers beautiful views along area roadways.

3. **The Greenbelt is well-understood and supported throughout the region which…**
    a. Enhances opportunities for people to appreciate and use vibrant natural spaces,
    b. Highlights the economic and environmental value of preserving soil quality and biodiversity, and
    c. Results in early renewal of a new Greenbelt millage and millage approvals in surrounding townships.

4. **A well-supported vision for regional sustainability is actualized…**
    a. With strong partnerships between the county, townships, land conservancies, community agencies and the Greenbelt,
    b. Aligned with regional health and equity goals,
    c. Integrated with climate goals, and
    d. Drawing support from foundations and other funders.

5. **Communities across the state and the nation look to the Ann Arbor area as a benchmark model for similar initiatives.**

Strategic priorities

1. **Actively participate in authentic regional planning for land preservation.**
    a. Engage county, townships, land conservancies, and other partners.
    b. Secure creative funding streams to support quality parcel acquisition in areas with fewer resources.
    c. Align Greenbelt investments in a manner that maximizes city and township agricultural and open space plans and related community priorities.

2. **Build awareness of Greenbelt program impacts and priorities throughout Ann Arbor and the surrounding communities.**
    a. Educate on the successes of the Greenbelt's first 15 years,
        i. for the general public, and
        ii. to enhance equitable access for those who might benefit from the program.
    b. Share the future-focused vision, the economic value of biodiversity, significant metrics on air/water quality and social, cultural, and health impacts.
    c. Initiate millage renewal conversations to understand most valuable adjustments in a future millage.

3. **Preserve the highest quality lands with parcel level prioritization.**
    a. Prioritize soil quality and biodiversity.
    b. Include targeted outreach as part of the acquisition process.

4. **Align Greenbelt acquisitions with water, climate and health equity goals.**
    a. Prioritize water quality.
    b. Align with the Climate Action Plan.
    c. Align Greenbelt actions with city and township health and equity goals.

Core dilemmas

1. **Regional planning -** Community is seeking enhanced collaboration and integrated regional planning. There is limited to no capacity for convening and guiding this work within the constraints of the Greenbelt millage or in the broader community.

2. **Quality data on impact** - require sophisticated analysis for which there is low- no capacity within the current millage. Highly valuable to communicate the use of investments.

Critical success factors

1. **Alignment of resources**
    a. Specifically, to support regional planning and outreach efforts.
    b. Generate financial and in-kind support via private citizens, foundations, university and agency partners, use of matching funds.

2. **Clear articulation of scoring criteria**
    a. Must clarify the definition of quality, assuming the use of existing county metrics.
    b. Communicate priorities to landowners and townships.

Summary of Public Engagement Data

Background

To date, four public engagement sessions have been held as part of the Ann Arbor Greenbelt strategic planning process. The sessions were held on July 29, August 15, and September 24 and 30. All of the sessions were held at the Ann Arbor District Library (AADL) Westgate branch location, with the exception of the August 15 session which was held at the AADL Traverwood branch. The sessions drew a total of 43 attendees, including 8 members of the Greenbelt Advisory Commission (GAC), and 3 members of City Council. The desired outcomes of the public sessions were to: build shared understanding of the successes and challenges of the first 15 years of the Ann Arbor Greenbelt; elicit stakeholders' values and visions of success for the Greenbelt; and gather stakeholder input to inform strategic direction and future priorities.

The two-hour meetings were facilitated by Francine Alexander and Anica Madeo of local firm Bridgeport Consulting. The following summary includes data from all four public sessions.

Feedback Survey

Participants were asked to complete a 5-question survey rating the overall performance of the Greenbelt to date, identifying the most important Greenbelt strategy, specifying any concerns, and sharing ideas for addressing those concerns. The survey was completed by 40 session attendees. A total of 24 reported living in Ann Arbor and 16 outside Ann Arbor. A total of 9 reported working for a conservation organization and 7 identified as farmers or farm owners.

- When asked to rate the Greenbelt's performance to date on a scale of 1 (Poor) to 4 (Great), the average score was 3.48. Ratings included:
    - 4 - Great (19 respondents, plus 1 who wrote in "3.8")
    - 3 - Good (15 respondents)
    - 2 - Fair (2 respondent)
    - 1 - Poor (0 respondents)
    - No answer (4 respondents)

- When asked what the "most important" Greenbelt strategy was from their perspective the most frequently cited strategies were:

    - **Quality Parcels** (6 mentions+) – Representative comments:
        - *"Preserve high quality parcels."*
        - *"Prioritize habitats with high floristic quality, farms with high quality soils and riparian habitats that can be maintained in good quality."*

        - Additionally, 3 respondents mentioned farmland complexes with one stating "[I chose] farmland complexes because [I] support protecting 'best properties'" indicating that the concept of farmland complexes and parcel prioritization are closely linked in the minds of some participants.

    - **Outreach and Education** (6 mentions) – Representative comments:
        - *"More information provided to the community about the entire program. It should become more visible."*
        - *"While very successful, it has very low visibility and is poorly understood by the public and some decision-makers, including current City Council members."*

    - **Regional Planning** (6 mentions) – Representative comments:
        - *"Coordinating efforts with conservancies, townships, and other government and social groups that could spearhead donations and cooperation."*
        - *"Developing priorities with regional input."*

    - **Additional priorities with at least 2 mentions**:
        - Contiguous blocks (3 mentions)
        - Water quality (3 mentions)
        - Prevent sprawl (3 mentions)
        - Millage renewal (2 mentions)
        - Local food (2 mentions)

- When asked what "concerns" they had the most frequently cited themes were:

    - **Slow process** (5 mentions) – Representative comments:
        - *"Streamline the process. Closing needs to be within 12 months unless otherwise agreed."*
        - *"Too many players involved causes delays in purchases which impedes effective implementation of preservation strategy."*
        - *"We are waiting too long to buy stuff we need to be more aggressive."*

    - **Lack of education/awareness** (4 mentions) – Representative comments:
        - *"Not enough education to people in Greenbelt, especially township boards."*
        - *"The public doesn't understand what the Greenbelt is doing."*

    - **Park Advisory Commission concerns** (4 mentions) – Representative comments:
        - *"I understand that the PAC portion is not part of this discussion, but I am concerned that Ann Arbor residents are expected to give up quality of life for density while out county can have open spaces with no access to public."*

- *"Inside the city opportunities are disappearing. We're losing irreplaceable sites."*

- **Additional concerns with at least 2 mentions**:
  - Future funding (3 mentions)
  - Public perception within density debate (3 mentions)
  - Paying too much for land (2 mentions)

Priorities

Participants were asked to complete a worksheet allocating 10 points across a series of priority areas. The list included 6 existing priority domains and space to write in, and score, additional priorities. While the worksheet was used primarily as a discussion activity, participants were asked to leave their responses for aggregation as an additional data source.

The following represents the percent distribution of all points allocated across the 4 sessions, as well as the number of people who allotted any number of points to a given domain. Response data is presented below based on "original domains" and "write-in domains," with the caveat that write-in domains varied based on topics that organically emerged from the participants at each session. Therefore, not all participants had an equal opportunity to select and rank each of the write-in responses.

Original Domains:	% of total points:	# of people who selected:
Huron River / Water Quality*	21.0%	34
Farmland Complexes	16.1%	25
Local Food and New Farmers	12.4%	22
1,000 Acre Blocks	10.5%	20
Recreation and Access	8.3%	17
Viewsheds	5.4%	15

* Many respondents noted a preference for expanding "Huron River" to "all water sources," including tributaries, and emphasizing *water quality* in general.

Write-in Domain:	% of total points:	# of people who selected:
Parcel Level Priority / Contiguity	9.3%	11
Regional Planning and Partnership	3.9%	8
Habitat / Wildlife Corridors	2.4%	4
Streamline Administration / Closing	2.2%	3
Other write-in responses: Awareness and outreach, sustainable farming, local farms, environmental practices, proximity	8.5%	14

MEMORANDUM

TO: Greenbelt Advisory Commission
FROM: Remy Long, Greenbelt Program Manager, The Conservation Fund
SUBJECT: Greenbelt District Parcel-level Prioritization Recommendations
DATE: October 3, 2019

This memo serves as a summary of staff's process and considerations for establishing parcel-level priorities for the Greenbelt Program.

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1. **Leveraging Available Data and Methodologies**

There are over 1,300 land conservancies in the United States, and many more purchase of development rights (PDR) programs at the state and local levels complimenting those conservation efforts. Each conservancy and PDR program has developed an internal review process to assess and rank prospective projects, many of which are informed by a geographic information systems (GIS) parcel-level analysis of available lands, utilizing available data to reflect program priorities. Some of these analyses are extremely extensive and cost-intensive, while others are relatively simple.

The City of Ann Arbor Greenbelt Program is uniquely situated in an area with a relatively high-density of conservation programs, both nonprofit and governmental, and frequently partners with those entities to achieve our collective conservation goals. While the extent and capacity of each program may vary, many values and goals are shared, and all programs value the long-standing partnerships we've shared.

As the Greenbelt Program entertains adopting parcel-level priorities to help guide future conservation efforts, we need to first ask ourselves how our partners have established their priorities, and what additional value can we bring to the landscape of priorities. Simply put: will we be adding another layer of priorities to the collective conservation map that is divergent or convergent with our partner's priorities? With partnerships as important as they are to the Greenbelt's success, it would be advisable to closely align ourselves with the priorities of our partners.

Thankfully for the Greenbelt Program, our partners at the Washtenaw County Parks and Recreation (WCPARC) Natural Areas Preservation Program (NAPP) have developed an excellent methodology for ranking both farmland and open space protection priorities. To read more about their data and methods, please see Appendix A, or watch the November 2, 2017 GAC meeting recording where WCPARC staff provide a detailed presentation on their methodology. As well, WCPARC staff have offered to attend GAC's November 7, 2019 meeting to present on how their data and methodology was used to develop the draft Greenbelt parcel-level priorities.

Given that the Greenbelt District only reaches three township with PDR millages (Scio, Webster, Ann Arbor), and WCPARC NAPP serves the entire extent of the Greenbelt District (and beyond), it would be logical to first leverage the data and methods used by WCPARC, and then vet those priorities with the townships and our partners to ensure the priorities accurately represented at a hyper-local level.

2. Vetting Priorities

After the Greenbelt Advisory Commission adopts draft parcel-priorities, staff will engage with our conservation partners, as well as the townships covered by the Greenbelt Program, to vet the priorities and capture any additional information that may inform adjustments to the parcel-level priorities. In practice, this will likely involve comparing the Greenbelt's priorities to those established by millage-funded programs and our nonprofit partner, adding or removing select parcels to increase alignment of priorities. When engaging with the townships, we will also refer to the township master plan to make an effort to align the Greenbelt's priorities with the goals of that local government.

3. Integrating Priorities with Scoring System

While the draft map is being vetted by partners and townships, the Greenbelt Advisory Commission's Scoring Committee will continue to meet and develop an updated scoring system for evaluating Greenbelt District applications. The process of vetting the parcel-level priorities and updating the scoring system can occur in-tangent.

It is anticipated that the Greenbelt Program's preservation priorities would be used as one factor guiding GAC's recommendations, not the sole determining factor for the quality of an application. If an applicant is not identified as a priority, that would not exclude them from consideration. In practice, the value given to an applicant being a priority or non-priority would be guided by the weights assigned by GAC's scoring committee. The map may reflect a GIS analysis of the criteria the Greenbelt Advisory Commission values most, but the best measure of an application will be through the scoring system and ground-truthing efforts provided by staff.

4. Targeted Outreach

Having the parcel-level priority map affords the Greenbelt the opportunity to identify top candidates for protection and proactively engage them through outreach. However, there are 356 priority parcels identified in the enclosed draft parcel-level priority map. In practice, it is unlikely that the Greenbelt Program would solicit applications from all the landowners identified in the analysis, but rather, for example, select from the top 50-100 ranked parcels, or conduct more selective mailings based on future strategies that emerge.

APPENDIX A:

Washtenaw County Parks and Recreation Commission

Natural Areas Preservation Program:

NATURAL & AGRICULTURAL LANDS ASSESSMENT & PRIORITIZATION

April 2017

NATURAL & AGRICULTURAL LANDS ASSESSMENT & PRIORITIZATION

Summary

April 2017

Washtenaw County Parks and Recreation Commission

In partnership with:
Natural Areas Advisory Committee (NATAC)
Agricultural Lands Preservation Advisory Committee (ALPAC)
Huron River Watershed Council (HRWC)

ACKNOWLEDGEMENTS

WASHTENAW COUNTY PARKS AND RECREATION COMMISSION

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Janis Bobrin

Dan Ezekiel

Barbara Fuller (Road Commission)

Ricky Jefferson (County Commission)

Robert W. Marans Commission President

Evan Pratt (Drain Commission)

Patricia Scribner

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Kris Olsson Huron River Watershed Council, NATAC

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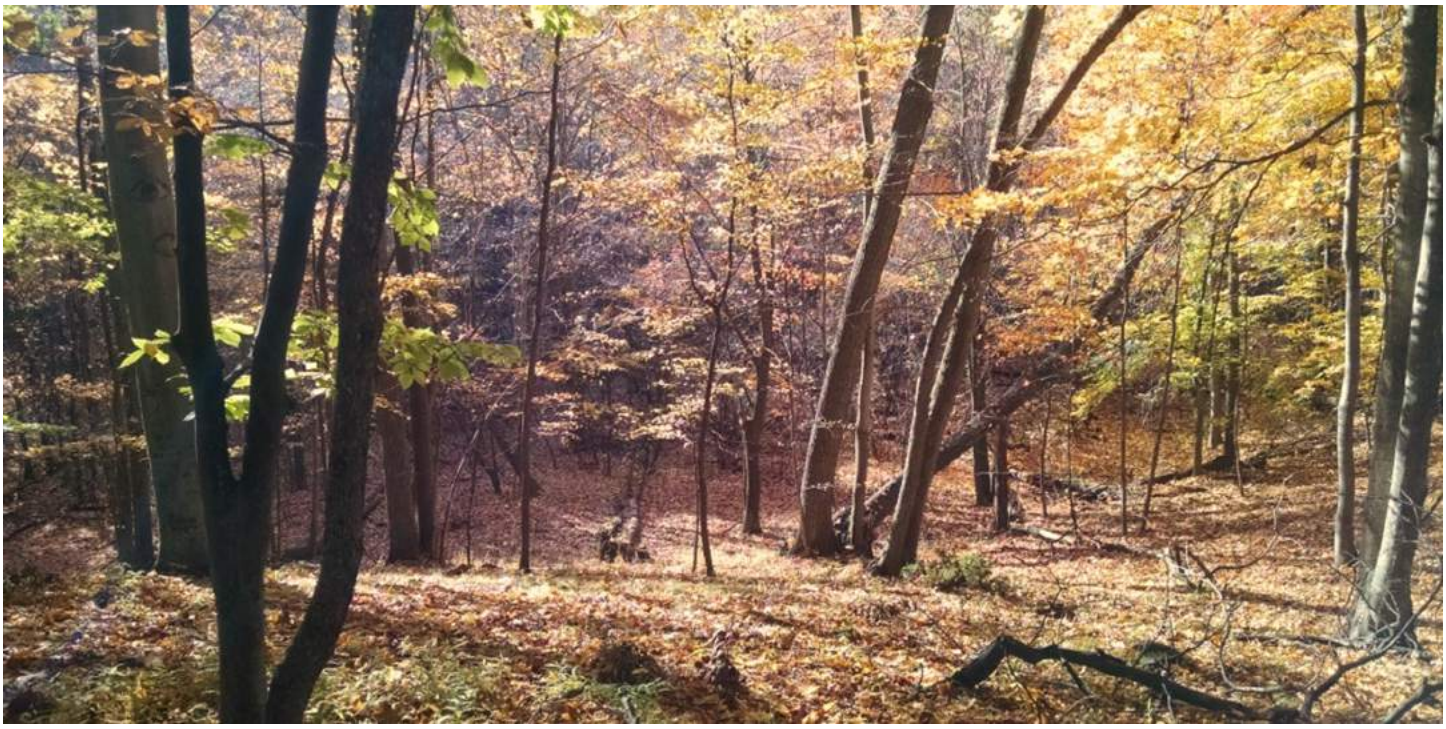


EXECUTIVE SUMMARY

In September 2015, the Washtenaw County Parks and Recreation Commission (WCPARC) adopted guidelines intended to direct the future of the Natural Areas Preservation Program (NAPP). To implement the guidelines, Commission staff, the Natural Areas Technical Advisory Committee (NATAC), and the Agricultural Lands Preservation Advisory Committee (ALPAC) had to decide on an objective, deliberate process that would consistently and accurately identify properties that could be considered "high priority" for protection.

NATAC, ALPAC, and Commission staff agreed that separate assessments for natural areas and agricultural lands should be implemented because of the differences in criteria that are necessary to identify potential high quality land. Geographic Information Systems (GIS) was used for all assessments. For natural areas, the Bioreserve Site Assessment was selected for its continuity with existing work, overall approval from multiple agencies, and regional collaboration opportunities. The Huron River Watershed Council (HRWC) had already performed the Bioreserve Site Assessment on the majority of Washtenaw County in 2007. In the summer of 2016, WCPARC expanded it to cover the remaining county land. Bioreserve sites are contiguous natural areas 20 acres or larger that ignore political and parcel boundaries. For agricultural land, Commission staff digitized and automated ALPAC's existing scoring system to achieve a county-wide agriculture assessment; this is a parcel-based assessment. Together, the Bioreserve Site Assessment and ALPAC Assessment evaluated 65% (264,147 acres) of Washtenaw County's total land area (462,300 acres)—the remainder of the land (35% of the county) is developed.

	Assessed acres	Prioritized acres	Prioritized % of county acreage
Natural Land/ Bioreserve	94,667	51,209	11%
Agricultural Land/ALPAC	169,480	61,216	13%
Total	**264,147**	**112,425**	**24.3%**

Numeric summary of results
*All numbers exclude already protected lands

To develop goals around the assessments and help guide NAPP in the future and due to the amount of land assessed, additional ecological factors were deemed necessary to filter the results and begin to define "priority areas." Discussions with NATAC and ALPAC determined that these factors should be: patch expansion, corridors, new patch establishment, protecting waterways, and special Ecoregion focus. Each of these factors was accounted for through spatial analyses. Lands that were already protected, such as parks, nature preserves, and conservation easements were excluded from final priority areas. The majority of sites that were prioritized fit multiple criteria and were identified through multiple analyses. The prioritization extracted 51,209 acres of Bioreserve sites and 61,216 acres of agricultural land for a total of 112,425 acres of prioritized land. This equates to only 24% of the county's total land area.

It should be understood that a property's appearance on WCPARC's Bioreserve or ALPAC priorities map does not automatically mean the property is of high value to WCPARC, nor will WCPARC pursue acquisition without a willing seller. NAPP has and will continue to rely solely on landowner nominations before formally considering any property. Furthermore, the assessments and prioritization are only "tools in the toolkit" to assist with land acquisition decision making and are not meant to replace the existing manual evaluation process for nominated properties, which includes on-the-ground assessments by NATAC, ALPAC, and Commission staff. It is unlikely that WCPARC will actively pursue specific properties for acquisition as a result of the Bioreserve and ALPAC assessments and prioritization, but may use

the information for public outreach in an effort to raise awareness of land preservation options in specific areas of the county. Additionally, it will serve as a long-term planning tool and help WCPARC and its partners understand the broader context of nominated properties.

The next step is to share this information with local governments in Washtenaw County and other WCPARC partners. Collaboration with other governments, nonprofits, and businesses will engender the full potential of this assessment and prioritization: the assessments can be expanded to more places; conservation goals can be shared and refined; preservation can be implemented by using a variety of tools with a variety of partners (not only the Washtenaw County government); priorities or the assessments alone can support other agencies' goals, help inform decision making, and contribute to local green infrastructure plans.

Overall, the Bioreserve and ALPAC assessments and prioritizations are important to the Washtenaw County Parks and Recreation Commission for several reasons. Not only do they directly fulfill the Commission's guideline to "utilize a deliberate process for identifying properties," but also functionally contain the guideline to "focus on enhancement and enlargement of existing preserves." With further investment, this project will help NAPP to continue to protect high quality land for the betterment of all Washtenaw County citizens and make efficient use of public resources by pursuing partnerships and collaborative opportunities for both acquisition and stewardship efforts.

INTRODUCTION

In spring of 2015, the Washtenaw County Parks and Recreation Commission (WCPARC) held two retreats (March 10 & May 12) to discuss the future direction of the Natural Areas Preservation Program (NAPP). On September 8, 2015, the Parks Commission adopted guidelines and directed staff to proceed with their implementation. The guidelines were intended to "address [and set] priorities for future purchases, identification of high-quality, unprotected ecotypes/ landscapes and [to establish] a sustainable source of funding for future stewardship activities."[1] The guidelines, as expressed by the Parks and Recreation Commission, are:

> Establish a dedicated reserve that serves as a sustainable funding source for future stewardship of the natural area properties purchased by the Washtenaw County Parks and Recreation Commission. *(Approved 9/13/16)*

> Utilize a deliberate process for identifying properties that can be considered a high priority for protection, incorporating input from the technical advisory committees and other organizations committed to land preservation in Washtenaw County. *(Addressed in this analysis)*

> Focus on enhancement and enlargement of existing preserves, especially when it meets the objectives expressed in the previous guideline. *(Addressed in this analysis)*

> Continue to pursue partnership and collaborative opportunities for both acquisition and stewardship efforts. *(Supported by this analysis)*

> Continue to acquire conservation easements when appropriate, to preserve and protect natural areas, including high quality agricultural lands. *(Supported by this analysis)*[2]

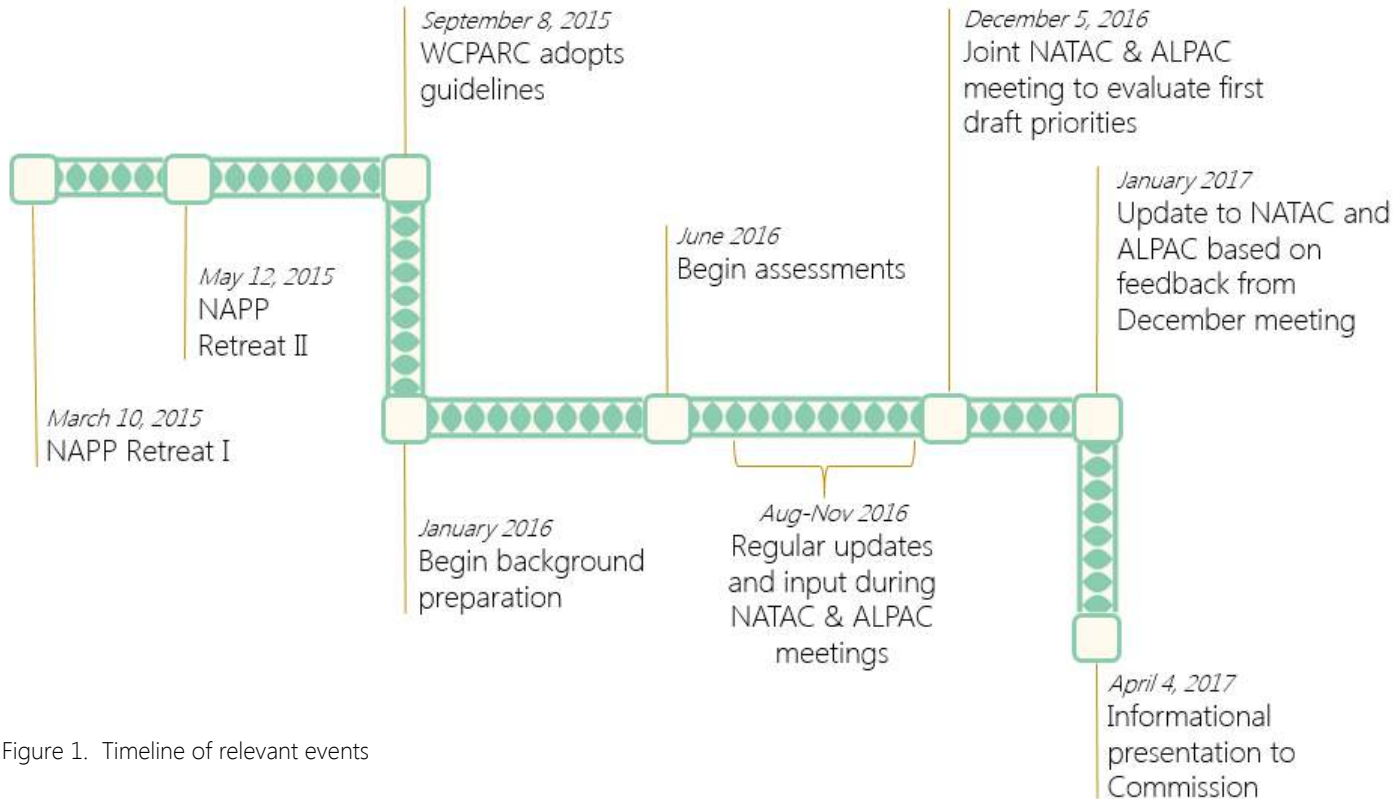


Figure 1. Timeline of relevant events

INTRODUCTION

To help implement the guidelines, Commission staff, the Natural Areas Technical Advisory Committee (NATAC), and the Agricultural Lands Preservation Advisory Committee (ALPAC) had to determine what "deliberate process" would objectively, consistently, and accurately identify high-potential-quality land across Washtenaw County. They determined that the process should have separate methodologies for natural and agricultural land to account for differences in criteria to identify high quality land. NATAC opted for the vetted "Bioreserve Site Assessment," which was pioneered by the Huron River Watershed Council and has led to hundreds of acres of protected land in Washtenaw County, Oakland County, and Livingston County.[3] ALPAC felt strongly that their existing scoring system, created using state and federal land scoring systems as guides, would achieve the goal of a county-wide assessment. Both methodologies are carried out through Geographic Information Systems (GIS) analyses using ArcGIS software.

Throughout the development of all assessments and processes, Commission staff regularly consulted NATAC and ALPAC for all major decisions. The initial discovery meetings also reinforced that any assessment should account for the overarching goals of each technical advisory committee (and thereby NAPP), which are to "identify lands which, through long-term preservation, will:

Protect and preserve the natural, ecological diversity/heritage of Washtenaw County;

[Preserve] working farms, particularly prime/unique soils and farms that support the ecological integrity of wildlife habitat or important natural habitats;

Complement the existing network of publicly and privately protected lands;

Maximize the public benefit.[4]

Visit HRWC's website: www.hrwc.org/

WCPARC staff and NATAC elected to use the Bioreserve Site Assessment because of its consistency with existing work, overall approval from multiple agencies, and regional collaboration opportunities. The Bioreserve Site Assessment was originally developed at the University of Michigan in 2002 as a methodology to evaluate potential ecological quality of natural areas based on an array of data and using Geographic Information Systems (GIS) software. In 2007, the Huron River Watershed Council (HRWC) refined the assessment, now known more commonly as the Bioreserve Project, and implemented it across the Huron River watershed, which covers parts of Washtenaw, Livingston, Oakland, Ingham, Monroe, and Wayne counties. HWRC has shown that the Bioreserve Project is a widely-accepted and communicable plan around which individuals and groups can gather. For example, in Oakland County, Six Rivers Land Conservancy's partnership with HRWC around the Bioreserve Project resulted in 34 acres of protected natural area in 2016, with 200 acres of projects to come.[5] In their 2014 Green Infrastructure Vision for Southeast Michigan, the Southeast Michigan Council of Governments (SEMCOG) describes the HWRC's Bioreserve Project as a significant resource in Washtenaw and especially Livingston County's green infrastructure network.[6] In Washtenaw, NATAC had already been using the Bioreserve Site Assessment as supplemental information.

Most of the Bioreserve data for Washtenaw County was generated in 2007 as part of the initial assessment. To use the Bioreserve Site Assessment as a part of the overall NAPP Prioritization Assessment, however, it was necessary to expand it to cover the southern five townships in Washtenaw County that are not in the Huron River watershed. This was completed by park staff in the summer of 2016.

There are three major components of the assessment: selection, scoring, and ranking. The first component, selection, produces the "Bioreserve sites," which are polygons representing approximate boundaries of contiguous natural area (unbroken by paved roads, agriculture, or development) and are irrespective of parcel and municipal boundaries. The minimum size of the contiguous natural area must be 20 acres. Bioreserve sites are created in GIS by combining land use data that indicate vacancy or existing environmental protections; environmental data such as tree cover, wetlands, and topography; and manual adjustments from viewing aerial imagery captured between 1940 and 2015.

The scoring process evaluates the potential quality of each Bioreserve site, based on the criteria listed below. For each criterion, a spatial analysis (see Technical Documentation) determines a predictive, numeric score for each site, where higher values indicate better quality. For example, the spatial analysis for the criterion "presence of wetlands" finds Bioreserve sites that contain wetlands, according to the National Wetlands Inventory, and gives those a score of 100. The sites that do not contain wetlands are assigned a score of zero. Other criteria have more than two possible scores. All scores for a Bioreserve site are summed into a final score.

Bioreserve Scoring Criteria

See technical documentation for more information

- Core habitat size
- Presence of water resources
- Presence of wetlands
- Potential for groundwater recharge
- Potential presence of less common precolonial vegetation types
- Presence of glacial landforms/features
- Topographical variation
- Connectivity to other Bioreserve Sites
- Unchanged vegetation between years 1800 and 2000 (level of site disturbance)
- Restorability potential
- Documented plant and animal occurrence, from Michigan Natural Features Inventory (MNFI)
- Biorarity Index from MNFI

The final step is to rank the Bioreserve sites. This is done by classifying the final scores for all 2016 and 2007 together using "natural breaks statistics," also called Jenks. Each class is considered a quality rank from High to Low. Four classes/ ranks were established to place the average score as close as possible to a statistical break without making excessive

numbers of ranks. Thus, Bioreserve Sites are ranked as High, Medium-High, Medium-Low, or Low quality. Although significant efforts were made to ensure the accuracy of this analysis, it is important to note that scores and rankings only indicate the potential quality of the site based on the best available GIS data—field assessments are still necessary to understand the specific site conditions.

As with most analyses, assumptions are made and limitations are reached. Limitations to this process are rooted primarily in the time change between 2007 when HRWC originally performed this analysis on the Huron River watershed and 2016 when WCPARC performed the analysis on the remainder of Washtenaw County. WCPARC assumed for the purpose of the assessment that the 2007 Bioreserve sites had not amassed significant development since 2007. This is a reasonable assumption in most areas, since development in the county slowed greatly following the 2008 recession. Development began to recover in 2012 and by 2016 had reached pre-2008 levels. The 2016 assessment was intended to partner with the 2007 one, not to update the entire county. Bioreserve sites on the border between the 2016 and 2007 analyses were an exception; they were combined, redrawn, and rescored where appropriate. Updated and improved datasets were used when possible, but some datasets used in 2016 are the same datasets from the 2007 assessment. The 2007 datasets have the drawback of being outdated and slightly inaccurate; however they have the advantage of better replicating the 2007 assessment. Lastly, ArcGIS itself has evolved. A few analyses were performed slightly differently in 2016 because the functions and capabilities of the program had improved or changed. Overall, the two assessments were combined successfully.

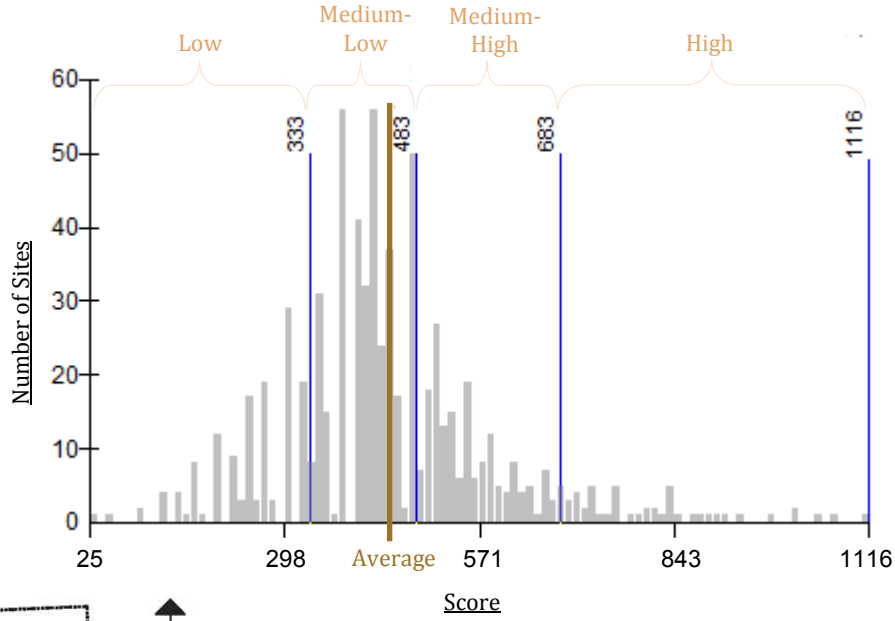
Bioreserve Ranks

Low: well below the average scores

Medium-Low: below average to slightly above average scores

Medium-High: above average scores

High: much higher than average scores



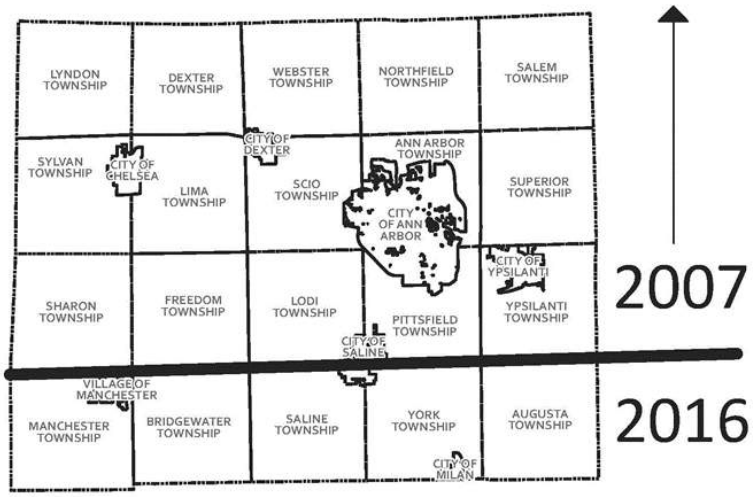


Figure 2. (above) Histogram of Bioreserve Assessment scores. Blue lines indicate the natural breaks that determine the rankings.

Figure 3. (left) Boundary between Bioreserve Site Assessment completed in 2007 and 2016. Sites along the boundary were reassessed in 2016 where appropriate.

AGRICULTURAL LAND ASSESSMENT

AGRICULTURAL LAND PRESERVATION ADVISORY COMMITTEE (ALPAC)

As human populations grow, urban and suburban development tends to encroach on agricultural land, especially as farmers retire and sell their land to developers. A significant component of NAPP is to protect high quality farmland in Washtenaw County for the residents' economic and social well-being, improved sustainability, and the County's rural character. The Commission is advised by the Agricultural Lands Preservation Advisory Committee (ALPAC) to ensure that they protect the best agricultural land possible. The county-wide Agricultural Lands Assessment, also called the ALPAC Assessment, is a GIS translation of ALPAC's manual scoring system used to evaluate quality of agricultural properties that are nominated to the NAPP program. In use for more than a decade and last updated in 2011, the scoring system is based on state and federal scoring models for agricultural land protection, specifically the State of Michigan's Purchase of Development Rights (PDR) program and the United States Department of Agriculture's (USDA) Agricultural Conservation Easement Program-Agricultural Land Easements (ACEP-ALE) formerly known as the Farm and Ranch Lands Protection Program (FRPP). Typically, ALPAC scores properties manually based on the exact configuration of parcels that are nominated. For this GIS assessment, the system was automated so all 121,000 tax parcels in the county could be evaluated simultaneously.

The scoring process evaluates the potential agricultural quality of every parcel in the county individually, based on ALPAC's system. For each criterion, a spatial analysis (see Technical Documentation) determines a predictive, numeric score for each parcel, where higher values indicate better quality. For example, the spatial analysis for the criterion "proximity to protected lands" finds the minimum distance from the parcel to a protected area. The parcel is assigned a higher score if that distance is small and a lower score if that distance is large—outside of a certain distance, the score becomes zero. All scores from all analyses are summed into a final score for each parcel.

The final step was to rank the parcels. Only parcels with 50% or more of their land area in active agricultural use were assigned a rank because a property must meet that condition for ALPAC to consider its purchase. Ranking is done by classifying the final scores using "natural breaks statistics," also called Jenks. Each class is considered a quality rank from High to Low. Four classes/ranks were established to place the average score as close as possible to a statistical break without making excessive numbers of ranks and to be consistent with the Bioreserve ranks. Thus, ALPAC parcels are ranked as High, Medium-High, Medium-Low, or Low quality.

There were certain limitations to digitizing ALPAC's scoring system. For example, certain portions of the system could not be used, because of an absence of available data (e.g. irrigation) and because evaluation of leveraged properties (financial contributions from partners) was impossible without a formal nomination to the program. Another point of difference between the manual scoring system and GIS is that the GIS model does not aggregate parcel ownership, but scores only on a per parcel basis; a property owner will often nominate more than one of the parcels they own, but the exact combination of parcels that may be nominated to NAPP cannot be predicted reliably. For example, it is an extraordinary assumption that parcels with owner names of "John Smith," "Smith, J.," and "Smith Farms, LLC" are under the same ownership and would be nominated together, regardless of proximity to each other.

ALPAC Scoring Criteria

See technical documentation for more information

Soil quality, relative to parcel size

Acreage of parcel

Percentage of parcel in agricultural use

Scenic quality (large open views and road frontage)

Septic field suitability (depth to water table)

Percentage of perimeter in agricultural use or natural area

Percentage of perimeter zoned for agriculture or conservation

Proximity to existing and planned public sanitary sewer or water service area

Proximity to protected lands

Protection of water resources

Biorarity Index, from MNFI

ALPAC Ranks

Low: well below the average scores

Medium-Low: below average to slightly above average scores

Medium-High: above average scores

High: much higher than average scores

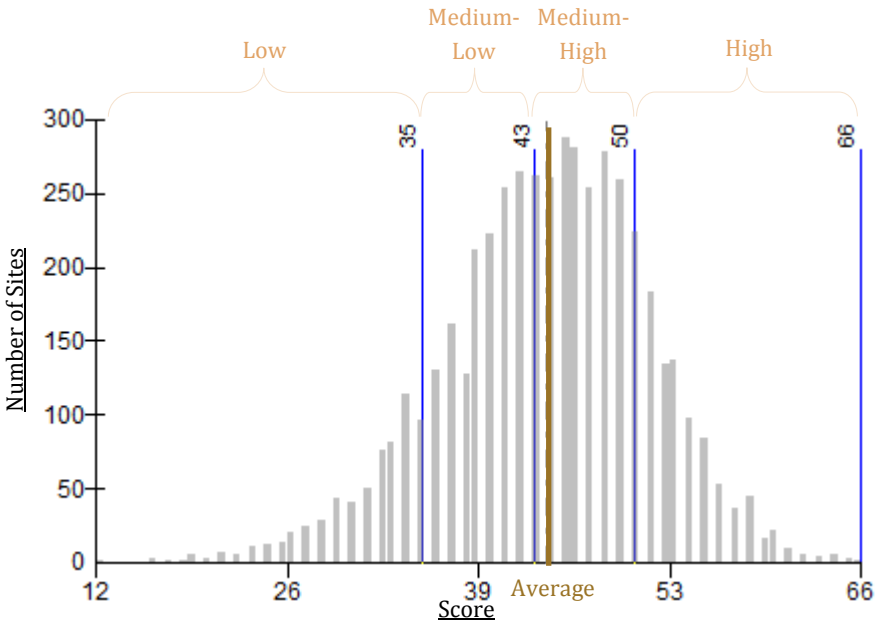


Figure 5. Histogram of ALPAC Assessment scores. Blue lines indicate the natural breaks that determine the rankings..

PRIORITIZATION

Excluding area that falls within already protected lands, the Bioreserve Site Assessment covers 94,667 acres (147.92 square miles, ~7,506 parcels) of the county. The ALPAC Assessment covers ~169,480 acres (264.81 square miles, 4,823 parcels). Together these areas cover 57% (264,147 acres) of the Washtenaw County area (462,300 acres, 720 square miles).

These 264,147 acres of assessed land show existing undeveloped land and its quality, but not what should be protected nor the reason for doing so. Permanently protecting 264,147 acres in Washtenaw County would also be an unrealistic goal. To develop goals around the assessments and help guide NAPP in the future, additional ecological factors were deemed necessary to filter the results and begin to define "priority areas." To discern these factors, a short survey was conducted amongst WCPARC staff, NATAC, and ALPAC. The results of the survey unanimously indicated that the most important factors that should drive the NAPP's future priorities are:

Expanding the size of existing protected lands (reinforcing the Parks Commission's guideline)

Increasing connectivity between protected lands

Identifying unprotected lands that have high rankings according to the two assessments

Protecting ecological communities that are special, rare, or unrepresented in the current NAPP system

The analyses developed to address the new prioritization factors were largely driven by principles of landscape ecology. Landscape ecology is, in short, the study of humans and nonhuman species and their interactions with their surroundings at multiple spatial scales. A few key ideas and terms from this discipline are important for interpreting the prioritization analyses. The basic unit of a landscape is a patch, which is an area of relatively homogenous habitat or land use. In the prioritization, parks and preserves of any ownership and Bioreserve sites acted as patches for the Bioreserve Site Assessment; farmland easements and ALPAC parcels acted as patches for the ALPAC Assessment.

Larger patches of natural area are usually more desirable because of their greater core habitat, in which a species uses the most resources.[7] Larger patches of agricultural land tend to have stronger networks and resources for farmers, allow for sufficient production capacity to be economically sustainable, and protect rural character.[8] Patches generally have improved function when they are physically connected by a corridor, which is a pathway of least resistance between two patches that provides habitat connectivity and allows for the exchange of individuals.[9] From an agricultural perspective, corridors are beneficial for the same reasons as having large patches; additionally, agricultural land in Washtenaw County often contains natural areas, which may not be of the highest quality but still provide food, shelter, and can serve as part of a linkage between better habitats.[10] Corridors can create functional or structural connectivity.[11] Functional connectivity accounts the various biological requirements of one or more species, thus functional corridors are usually identified or planned with a particular species in mind.[12] Structural connectivity is not species-based, but refers instead to physical linkages of generally high quality patches.[13] Protection of either corridor type at least provides safe places for species, including humans, to be and prevents habitat fragmentation.[14] Structural connectivity is used here.

A joint NATAC/ALPAC meeting was held in December 2016 to present and seek feedback on the preliminary drafts of prioritization analyses and to confirm that they were consistent with all previous discussions. The prioritization models consist of a series of five analyses described below. For more details, see Technical Documentation.

Patch Expansion

Patch expansion searched for High and Medium-High quality Bioreserve sites within ¼ mile of existing parks & preserves and High and Medium-High quality ALPAC parcels within ¼ mile of existing farmland easements.

Corridors

The corridor analysis intended to identify connectivity among the highest scoring Bioreserve sites using least-cost-path in GIS. Least-cost-path creates lines from one site to another while passing through other Bioreserve sites, ALPAC parcels, other natural features, and less intensely developed areas while avoiding highways, heavy industry, dense development, and other intense land uses. A notable limitation to this analysis is that areas at the edges of the county were not always favorably scored for connectivity, because no connections were being assessed outside of the county's boundaries.

New Patch Establishment

The new patch establishment analysis essentially identifies places for new preserves or easements. The analysis searched for clusters of High and Medium-High Quality Bioreserve sites at least ½ mile away from existing parks & preserves and clusters of High and Medium-High quality ALPAC parcels at least ½ mile away from existing farmland easements. Like corridors, establishing patches also generates structural connectivity, but in a "stepping stone" style appropriate for birds, who do not need contiguous corridors.

Protecting Waterways

Waterways are natural corridors with special, sensitive, or threatened ecological communities, and they are also the basis of livelihood and health for many Michigan residents. The land around streams directly affects water quality; therefore, protecting streams and surrounding land can have far reaching benefits beyond the immediate protection of sensitive ecological communities. It improves water quality in the stream itself and the parent river (e.g. Huron River), reduces impacts to humans when flooding occurs, and facilitates Best Management Practices (BMPs) on agricultural land. Bioreserve sites and ALPAC parcels of High and Medium-High quality that contained streams were prioritized.

Ecoregion Focus

Ecoregions are "areas of similarity in the mosaic of biotic, abiotic, terrestrial, and aquatic ecosystem components."[7] Washtenaw County contains three level III ecoregions: Southern Michigan/Northern Indiana Drift Plains, Eastern Cornbelt Plains, and Huron/Erie Lake Plains. Lake Plains may be found in the southeast portion of Washtenaw County— the historical location of the Great Lakes during glaciation 13,800 to 12,500 years ago. Lake Plains are underrepresented in protected areas in Washtenaw County, which made them high priority for protection for NATAC, and offer potential for regional partnerships with organizations such as The Nature Conservancy. Both Bioreserve sites and ALPAC parcels in the Lake Plain ecoregion were prioritized.

SUMMARY OF RESULTS

The models prioritized 44,138 acres (~2,910 parcels) of Bioreserve sites and 46,206 acres of agricultural land (867 parcels), for a total of 90,344 acres identified as good potential quality and high priority for protection within an ecologically driven framework. In total, these 90,344 acres of prioritized land cover 34% of the total acreage initially assessed in the county through both the Bioreserve and ALPAC assessments (Fig. 10). 90,344 acres may seem massive, but Figure 11 illustrates that it is only 20% of the county (for reference, 35% of the county is already considered developed). The majority of sites that appear in the final prioritization were identified through multiple analyses and is documented as such. For example, if an ALPAC parcel is adjacent to a farmland easement and also contains part of a stream, it will contain a record of both prioritizations in the GIS database.

	Assessed acres	Assessed % of county acreage	Prioritized acres	Prioritized % of assessed	Prioritized % of county acreage
Natural Land/ Bioreserve	94,667	20.5%	51,209	54.1%	11%
Agricultural Land/ALPAC	169,480	36.7%	61,216	36.1%	13%
Total	**264,147**	**57.2%**	**112,425**	**42.6%**	**24.3%**

Figure 8. Numeric summary of results

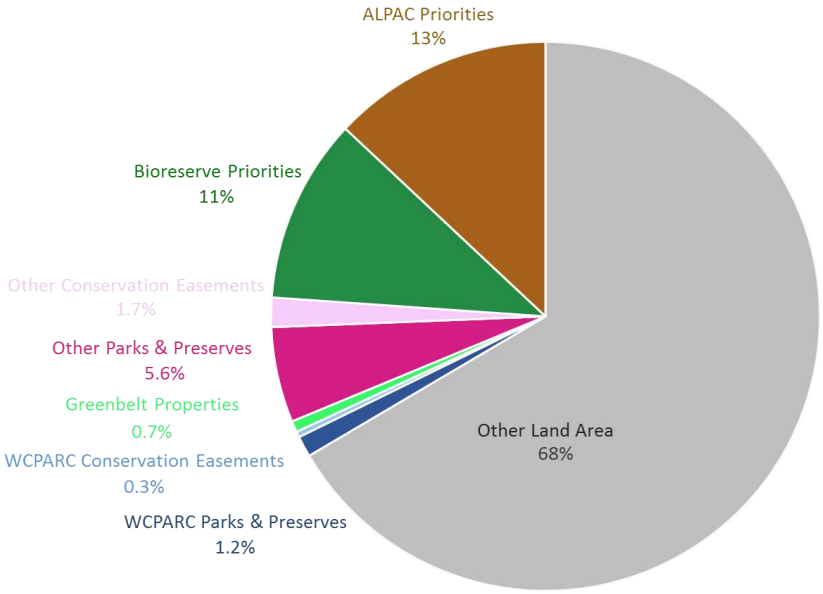


Figure 9. Pie chart describing breakdown of county land coverage

WCPARC typically preserves natural areas through fee simple land acquisition, which puts the natural area into government ownership and guarantees ecological stewardship and public access; townships, cities, and nonprofits also have this capability. Government ownership may not be desirable in every case and fortunately, there is more than one way to ensure a particular land use and protect land in perpetuity. Conservation easements are another common tool to permanently protect land and offer unique benefits: they are less expensive than purchasing land fee simple; allow the property owner to maintain ownership, help set parameters for future use of land (the easement is part of the title deed); keep the property with the easement on the tax roll (benefiting municipalities); can be used for natural or agricultural lands; and can be publically accessible or closed, depending on the easement holder and the property owner's needs. NAPP holds more than ten easements and has participated as a partner in many others, but 85% of existing easements in the county are held by land conservancies, the Ann Arbor Greenbelt, and townships. Another way to determine land use, driven by townships and cities, is zoning, which could take the form of traditional agricultural zoning or a more unique conservation oriented zoning overlay district. Under zoning, land owners have an expectation for their land's future (and the surrounding area) and thus can more easily plan for it. Several townships in Washtenaw County already have agriculture preservation districts designated in their master plans that attempt to congregate agriculture.

These districts are not legally binding, but rather offer a flexible approach that can meet changing local needs.

It should be understood that a property's appearance on WCPARC's Bioreserve or ALPAC priorities map does not automatically mean the property is of high value to WCPARC, nor will WCPARC pursue acquisition without a willing seller. NAPP has and will continue to rely solely on landowner nominations before formally considering any property. Furthermore, the assessments and prioritization are only "tools in the toolkit" to assist with land acquisition decision making and are not meant to replace the existing manual evaluation process for nominated properties, which includes on-the-ground assessments by NATAC, ALPAC, and Commission staff. It is unlikely that WCPARC will actively pursue specific properties for acquisition as a result of the Bioreserve and ALPAC assessments and prioritization, but may use the information for public outreach in an effort to raise awareness of land preservation options in specific areas of the county. Additionally, it will serve as a long-term planning tool and help WCPARC and its partners understand the broader

NEXT STEPS

If WCPARC hopes to protect an additional 110,000 acres of natural and agricultural land over the course of the future, it must collaborate with other governments, nonprofits, and businesses. Thus the next step to take with this information is to share it with local governments in Washtenaw County and other WCPARC partners. WCPARC's decision not only adopt but to expand the Bioreserve Site Assessment to the full county could influence other agencies in the Huron River watershed to expand or adopt the assessment as well. While a plethora of agriculture suitability analyses have been published, WCPARC is unaware of other similar GIS-based agricultural land assessments for conservation in Michigan. It may be possible to expand or adapt this assessment to the region or state. Information, language, and preservation or conservation goals could then be more easily shared, promoting regional collaboration in ecological planning and bolstering existing partnerships. More to the point, the identified priorities or the assessments alone can support other agencies' goals, help inform decision making, and contribute to local green infrastructure plans. In support of partnerships, the 110,000 acres of priorities can and should adapt to and be refined by local priorities and interests.

Overall, the Bioreserve and ALPAC assessments and prioritizations are important to the Washtenaw County Parks and Recreation Commission for several reasons. Not only do they directly fulfill the NAPP guideline to "utilize a deliberate process for identifying properties," but also functionally contain the guideline to "focus on enhancement and enlargement of existing preserves." With further investment, this project will help WCPARC to continue to pursue partnership and collaborative opportunities for both acquisition and stewardship efforts.

REFERENCES

1 WCPARC, "Washtenaw County NAPP Future Guidelines," September 8, 2015.
2 "WCPARC, "Washtenaw County NAPP Future Guidelines."
3 Kris Olsson, "Bioreserve Project Helps Partners Protect Land," Bioreserve (category archive), March 10, 2017, http://www.hrwc.org/2017/03/bioreserve-project-helps-partners-protect-land/; Kris Olsson (watershed ecologist, HRWC, Ann Arbor), in discussion with the authors, 2016).
4 "Natural Areas Preservation Program (NAPP)," Washtenaw County Parks & Recreation Commission, accessed April 20, 2017, http://www.ewashtenaw.org/government/departments/parks_recreation/napp/pr_natac.html.
5 Olsson, "Bioreserve Project Helps Partners Protect Land."
6 Southeast Michigan Council of Governments (SEMCOG), Green Infrastructure Vision for Southeast Michigan (Detroit: SEMCOG, 2014): 76; Ibid, 71.
7 Richard E Warner, Jeffery W. Walk, and James R. Herkert, "Managing Farmlands for Wildlife," in The Wildlife Techniques Manual: Management, ed. Nova Silvy, 7th ed. (Baltimore: The Johns Hopkins University Press), 162. While patch size and patch isolation (concepts from island biogeography theory) are commonly used in ecological analyses, it is worth noting that their usefulness has been recently challenged by the habitat amount hypothesis, cf. Lenore Fahrig, "Rethinking patch size and isolation effects: the habitat-amount hypothesis," Journal of Biogeography 40, no. 9 (2013): 1649-1663.
8 Tom Daniels, "Chpater 14: Planning for Sustainable Working Landscapes," in The Environmental Planning Handbook: For Sustainable Communities and Regions," 2nd ed. (Chicago: American Planning Association), 428-429.
9 Warner et al. "Managing Farmlands for Wildlife," 162-163.
10 Warner et al. "Managing Farmlands for Wildlife," 163.
11 Katie Meiklejohn, Rob Ament, and Gary Tabor, Habitat Corridors & Landscape Connectivity: Clarifying the Terminology (Bozeman, Montana: Center for Large Landscape Conservation), https://www.wildlandsnetwork.org/sites/default/files/terminology%20CLLC.pdf.
12 Ibid.
13 Ibid.
14 Andrew J. Gregory, "Importance of Ecological Connectivity and Opportunities Along the European Green Belt" (PowerPoint slides, European Green Belt); Warner et al. "Managing Farmlands for Wildlife," 162-163.
15 EPA, "Level III and IV Ecoregions of Michigan [map]" (Washingston D.C.: EPA, June, 2010), ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/mi/mi_eco.pdf.

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