Chapter 9: Discussion and Conclusions

OVERVIEW

The Upper Manistee River Watershed Conservation Plan provides GTRLC and other organizations a framework to stimulate and expand conservation work in the study area and the surrounding region. Throughout the project, the team worked to develop a plan according to the overarching principles of landscape ecology and ecosystem management. The team incorporated desirable elements of other conservation planning approaches and used readily available information that increases the transferability of the approach to other regions and organizations.

The team used multiple, landscape-level drivers that are scientifically based and tailored to the study area to identify the most ecologically valuable land within the study area and to prioritize lands at two different scales: regional (Conservation Focus Areas) and local (individual land parcels). To facilitate the implementation of its conservation recommendations, the team provides an overview of the social, political, and ecological setting and assesses and maps the threats and sources of threats to the ecological landscape.

The team is confident that it has produced a plan that can effectively guide the conservation efforts in the study area in the coming years. To make the most efficient use of this plan, it is important to consider factors that will affect its implementation. Understanding how decisions were made, the team's overall priorities, and the limitations of the project will help GTRLC and other organizations understand more fully how to translate the plan into actions or apply the methodology to other landscapes.

IMPLEMENTATION CONSIDERATIONS

This section outlines several issues that GTRLC and others should consider when 1) protecting individual parcels based on the results of the project, and 2) developing alternative strategies to help widen conservation impacts throughout the study area and the surrounding region.

CONSIDERATIONS FOR PROTECTING PARCELS

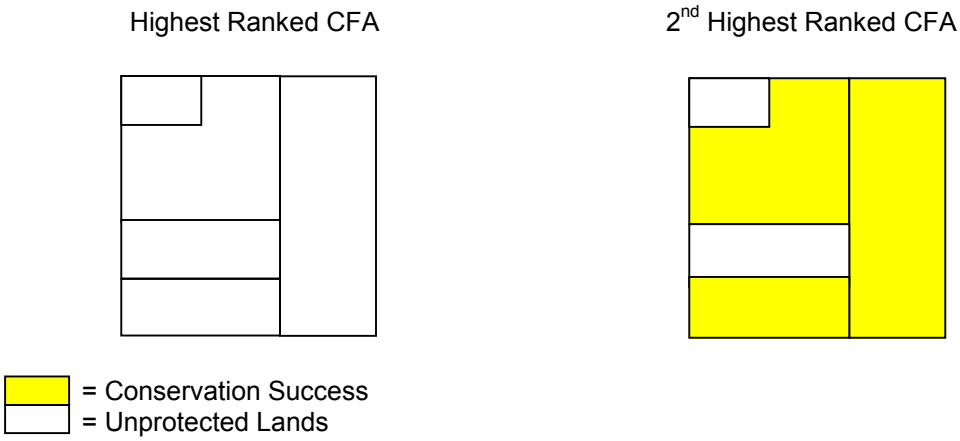
The team established a quantitative hierarchy to guide the systematic conservation of high priority parcels (see Chapters 7 and 8). This prioritization hierarchy is consistent with the ecological focus of the project drivers and the project's adherence to the overall principles of landscape ecology. The three-tiered hierarchy emphasizes that initial conservation efforts should focus on the highest scored parcels within the highest ranked landscape features of the highest ranked CFAs. As conservation progress is made on individual parcels, conservation organizations should continue to direct resources to the highest ranked landscape feature of the highest ranked CFA. This approach drives the protection of a group of adjoining parcels as opposed to a number of dispersed and fragmented parcels. However, it should be noted

that the team created this hierarchy assuming that the chances for conservation success were equal across all parcels. The team understands that, in practice, landowners will respond differently to proposed conservation strategies. Therefore, GTRLC and others should use the established hierarchy but should also adapt it as necessary depending on the real-world success or failure of protection efforts. The following section provides a few examples of how one might modify the hierarchy during implementation.

Example #1

If implementation is slow or unsuccessful in the highest ranked CFA but conservation strategies are successful in another, the team recommends that additional resources be directed toward the CFA where success has been achieved (Figure 9.1). This strategy will help keep protected lands clustered in one area, increasing the overall ecological value of each individual tract.

Figure 9.1: Implementation options – success-based strategy

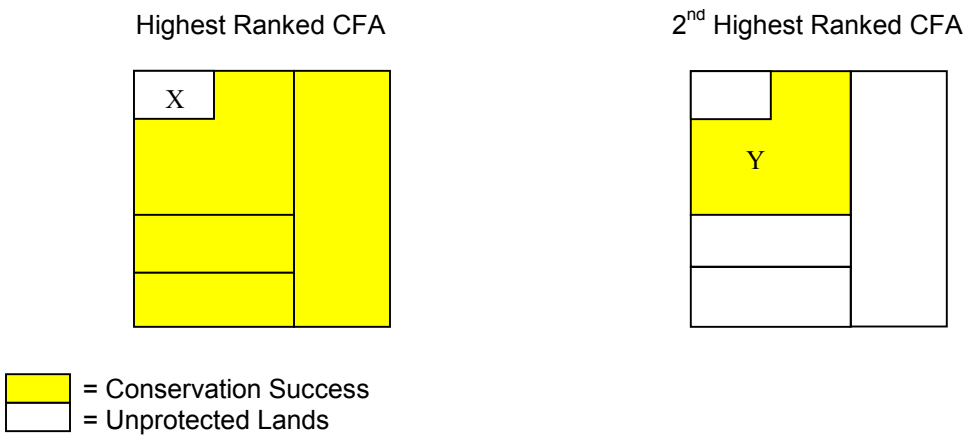


In this scenario, the lack of conservation success in the highest ranked CFA and the abundance of success in the 2nd ranked CFA would, over time, shift their relative conservation importance. In other words, the 2nd highest ranked CFA would become the top priority because it is clear success is possible in this area.

Example #2

The team also recognizes that the lowest ranked parcel of the highest ranked CFA may be less valuable to GTRLC than the highest ranked parcel of the second highest ranked CFA (see Figure 9.2). If a significant amount of land (but not all) has been conserved in the highest ranked CFA, GTRLC may choose to begin directing resources to the next CFA.

Figure 9.2: Implementation options – CFA progression strategy



In this scenario, Parcel X represents the lowest scoring parcel in the highest-ranking CFA. Parcel Y represents the highest scoring parcel in the second highest-ranking CFA. Since the vast majority of the highest ranking CFA is already protected, GTRLC may want to move on and focus it attention on Parcel Y, rather than investing considerable additional energies in Parcel X.

Example #3

Lastly, the team realizes that some of the largest parcels may be more desirable to GTRLC to conserve despite the fact that they have a lower mean score than some smaller parcels or are found in a lower ranked CFA. One can justify this point based upon the efficient use of resources (i.e. more bang for the buck), an examination of the methods used to determine a given parcel's final score provides further emphasis. As outlined in Chapter 7, the team used a parcel's mean score (the average value of the weighted grid cells that it contained) to calculate the parcel's ecological score. This technique can sometimes assign lower ecological scores to larger parcels if they contain areas of low to medium priority grid cells. For example, a 250-acre parcel may contain 50 acres of highly ecologically valuable land and 200 acres of land that is less ecologically valuable. Since only 20 percent of this tract contained
high or highest priority grid cells, its overall mean score might be fairly low. A neighboring 40-acre parcel may contain 30 acres of highly ecologically valuable land and 10 acres that is less ecologically valuable. In this case, the tract's overall mean score might be fairly high since 75 percent of the tract contains high or highest priority grid cells. Thus, the smaller parcel would receive a higher ecological score than the larger parcel, even though the larger parcel contains more ecologically valuable land. The team corrected for this issue by directly considering parcel size in the overall final score, but there is no guarantee the overall scoring system captures and addresses every nuance of the interface between mean score, size, and other factors.

ALTERNATIVE CONSERVATION STRATEGIES

One of the potential challenges facing GTRLC as it strives to implement the recommendations of this project and achieve landscape-scale success is the sheer amount of land outlined for protection. The team highlights over 12,000 acres of private lands as suitable for protection in the top three CFAs in Kalkaska County alone. When one considers all 18 CFAs in the study area, that total rises above 20,000 acres. GTRLC estimates many existing conservation opportunities will be lost to development in the next ten years. While not an impossible task, directly protecting this much land before it is lost to development is a significant challenge. Success may be more feasible if GTRLC and others employ new and innovative strategies.

The financial demands of conserving all the land within the CFAs are daunting. GTRLC traditionally conserves land through donations of conservation easements and donations of land (Rigney, 2002). If landowners in the priority areas are not willing to donate, fee simple acquisition or the purchase of development rights represent the next option. This option requires large, up front capital and interest costs (Rigney, 2002). In addition, the resources required for proper management and monitoring of protected lands is significant and may exceed the outright purchase price of the property over the long run.

While easements and fee simple acquisition may be the most attractive option in many situations, GTRLC and others must work to protect land through a variety of additional approaches, including:

- Support policy initiatives such as the designation of the Manistee River as one of Michigan's Natural Rivers.
- Explore conservation banking techniques, such as conservation mortgaging[1] and habitat banking.[2]
- Develop cooperative agreements with landowners.

Even more broadly, all parties working in the study area and surrounding region must emphasize collaborative efforts that improve trust and communication and share limited knowledge and resources. The principles of ecosystem management suggest many key components of such efforts. Perhaps most importantly, ecosystem management suggests that sustained conservation requires collaborative decision-making among the many landowners and organizations that have a stake in the landscape (Ecosystem Management Initiative, 2002). Collaboration requires building bridges between people who often have different values, interests, and capabilities. As GTRLC is a non-partisan and non-political organization, it may be able to help organize collaborative efforts in the study area. This report presented important social, demographic, economic, and political information that may

[1] Conservation mortgages are low interest loans given to property owners in exchange for development rights and easements.
[2] Habitat banking is a process used to mitigate the effects of development projects that result in habitat loss or degradation. Developers agree to help permanently conserve habitat in areas away from the new development to make up for habitat losses caused on site by the development.

help GTRLC and others pursue these efforts. Some suggested collaborative strategies are outlined below:

- Share information with local residents to encourage participation in conservation activities and to influence land management practices on privately owned lands.
- Partner with the Michigan Department of Natural Resources and other state agencies to improve land management practices and public acquisition endeavors.
- Collaborate with willing local governments (counties and townships) to help promote ecologically sensitive land use through the revision of master plans, zoning ordinances, and other land use related documents.
- Work with resource-based industries to minimize the impact of incompatible logging, oil drilling and mining practices in the most ecologically sensitive areas (such as the lands within the CFAs).

Should GTRLC and others choose to implement these alternative conservation strategies, they may want to consider adopting measures of success that reflect its efforts. For example, assume that an organization currently assesses its conservation success based on the number of acres that it *directly* acquires or places in conservation easements. These measures of success can be expanded to include acreage that it *indirectly* protects through the alternative strategies. Should an organization actively work for the Natural Rivers designation, for example, it could share in the success of the additional acreage of the river corridor protected under the designation.

By maintaining records of and promoting both direct and indirect land protection successes, GTRLC and others can generate ever-increasing momentum for conservation in the study area and surrounding region. Sharing information with a variety of stakeholders can generate familiarity with the project. Engaging these stakeholders in conservation decisions will encourage buy-in to the project. By broadening support for the project among area residents and organizations, conservation organizations can increase the interest of potential funders who may then offer additional resources for conservation activities.

UNDERSTANDING THE APPROACH

Users of the conservation plan should have a firm understanding of how the planning approach was developed, the data sources that were used, and limitations of the results. A thorough study of the plan may reveal some of this information. There are, however, several points of discussion worth mentioning here.

DECISION MAKING

Developing a conservation plan requires making numerous discrete decisions that hinge on a number of unique and often hard to quantify variables. The scientific literature provides few black and white answers or objective criteria. For example, it is well established that larger

tracts of natural areas are more valuable than smaller tracts, but how large is large enough? Specifically for this project, what acreage threshold is appropriate for the CFAs? Is 500 acres too small to represent a significant landscape, or does 500 acres set too high a hurdle and exclude more localized, but still highly valuable, sites? While the team endeavored to base its decisions on the best data and most relevant conservation principles, it cannot deny the subjectivity of some of its choices nor the potential cumulative impact of that subjectivity on the overall analysis. While the team is confident that its approach is rigorous and justifiable, it readily acknowledges that there are several other approaches that would be equally appropriate.

DATA LIMITATIONS AND LIMITED GROUND TRUTHING

From the start, the team recognized that there are several factors that limit the depth and scope of its investigation and analyses. First, the team worked hundreds of miles from the study area. Second, it had a limited familiarity with the area. Lastly, it had a limited amount of time to complete the project. Given these constraints, the team had to rely heavily on existing data sources and simple research techniques to identify the most ecologically important lands within the study area. This reliance on existing data poses two possible problems for the project: data limitations and limited use of ground-truthing to confirm results.

As previously noted, being able to use existing data was generally advantageous for the project as it greatly reduced the time and costs necessary to complete the project. The team used the most complete and accurate GIS data it could locate, but all data has errors and inaccuracies that should be noted:

- *Data collection errors* – Many of the data sets attempt to provide information for large portions of the state. Human error and technological limitations can result in data inaccuracies.
- *Spatial resolution* – Much of the data was collected for large regions, often through the use of remote sensing techniques. The use of data collected from imagery with a spatial resolution of 30x30 meters for a parcel level analysis may produce generalizations and possibly inaccurate conclusions.
- *Temporal resolution* – Many of the project's data sets are from different time periods. While much of the study area has remained unchanged, dated information could result in sources of error.

With new advances in technology and the proliferation of the use of geographic information systems as management and planning tools, GIS data sets should become more accurate and more available. Even with these improvements, the previously mentioned limitations will always need to be considered when conducting and implementing this sort of project.

The team conducted some ground-truthing, albeit to a limited extent. It completed the parcel level analysis using aerial photographs from 1998 and 1999. The team examined each parcel

using the photographs to determine the parcel's land cover and land use and the occurrence of disturbances, such as roads and extractive operations. However, this method provides little insight into the quality of an area's land cover or the occurrence of flora or fauna of specific concern, such as threatened or endangered species. The team was unable to conduct any field inspections of parcels and acknowledges the need for GTRLC or other organizations to conduct field analyses before making conservation decisions on specific parcels.

DRIVER CORRELATION

Prior to selecting the conservation drivers that form the backbone of its analysis, the team did not determine the relative correlation between the drivers. In addition, the team did not conduct any preliminary research to identify the sort of lands the cumulative overlay of all drivers would select as top priority.

For example, the project team recognizes that many of the CFAs are focused around hydrologic features such as wetlands or streams. This emphasis may be caused by a correlation between numerous drivers, such as riparian ecosystems, groundwater accumulation, and wetlands. Although the team intended to place emphasis on hydrologic functions because of the unique hydrologic characteristics of the Manistee River, the possible correlation of these drivers may have devalued certain upland features such as northern hardwood forests found on glacial moraines. A statistical regression analysis of the drivers would highlight these subtle correlation patterns and may help GTRLC and others to better understand the results and improve the replication of the project's approach and methodology.

CHALLENGES TO REPLICATION

One of the benefits of this plan is that it created a methodology that other organizations can adapt and apply to a variety of landscapes. In certain cases, an organization may want to use the overall methodology but develop its own conservation goals, drivers, and ranking schemes. In other settings, an organization may also utilize some of the same drivers and weighting schemes that this plan incorporates. Despite these opportunities for replication, organizations should be aware of a couple of potential challenges to the application of this plan's methodology to other landscapes:

- *GIS expertise* – Using GIS resources requires specific knowledge and skills. To apply this plan's methodology to other projects, organizations should evaluate their GIS expertise and ensure that they have adequate GIS capabilities and/or access to outside expertise.
- *Data availability* – Researchers in the state of Michigan have access to a wide array of existing GIS information through the Michigan Department of Natural Resources' Spatial Data Library. GIS information may be less readily available in other locations and this lack of data would present serious difficulties in conducting the sort of analysis presented in this project.

NEXT STEPS

This project is the first of many steps in creating and implementing a successful landscape conservation plan in the upper Manistee River watershed and the surrounding areas. GTRLC and others have several options for advancing the recommendations of this report. Traditional land conservation approaches combined with new and innovative approaches that embrace collaborative strategies will likely yield positive results.

ASSESSING PARCEL ANALYSIS

While the team established final parcel scores in part by using aerial photographs, it is still necessary to field check the priority areas to ensure that quality areas have been identified. Acknowledging that access to private property is sometimes an involved process, preliminary "windshield" surveys or other less rigorous field checks are suggested to verify that prioritized parcels are worth further investigation.

If field surveys show that the project's results do not correspond to the established conservation criteria, GTRLC and others could modify the results in a few ways:

- Reexamine the conservation drivers used in the project and experiment with refining them to achieve better results.
- Modify the weighting scheme of the drivers by giving higher priority to one driver over another. For example, an organization may have reservations about the accuracy of a particular driver, or it may want to place more emphasis on a different driver. Groups could also change the maximum number of points for each driver to best meet its objectives.
- Change the delineation of the CFAs. For example, if GTRLC decided that the current CFAs either encompassed too large of an area or were too restrictive, it could change the number of points necessary to classify each grid cell as low, medium, high, or highest priority. The alteration of the classification thresholds would either shrink the CFAs by including only higher scoring grid cells or expand the CFAs by including lower scoring grid cells.

Although these and other modifications are possible, and perhaps desirable in certain cases, the team highlights a few key issues to consider when altering the project's analysis:

- Many GIS-related activities can be time-intensive.
- When making changes, such as changing driver weights or CFA delineation criteria, decisions that lack scientific justification may alter results and make it difficult to track how more substantive changes affect the results.
- The team distributed this plan (minus sensitive information) to a variety of stakeholders that expressed an interest in the plan and with whom GTRLC may wish to collaborate. Changing certain elements of the plan, such as the boundaries of the CFAs, could lead to confusion among various stakeholders regarding which

conservation plan to follow.

BETTER INTEGRATION OF SOCIAL AND POLITICAL INFORMATION WITH ECOLOGICAL ANALYSIS

When GTRLC and others use this plan to guide conservation efforts in the upper Manistee River watershed, they need to integrate more systematically the team's social/political analysis and threats assessment with the project's ecologically based conservation prioritization work. The team fully understands that identifying Conservation Focus Areas and ranking parcels for protection represents only the first step in this process. However thorough, accurate, and necessary the team's analysis, the success of any conservation plan depends not on its creation, but on its implementation. And successful implementation depends more on understanding and addressing social and political considerations than any other single factor. The team has worked hard to identify and evaluate these considerations, but it has not linked them directly to the delineation and prioritization of CFAs or individual parcels. Developing and carefully managing these linkages is critical to translating the plan's ideas into reality on the ground.

FINAL NOTES

The team encourages GTRLC and other organizations to use the plan in a way that will best meet the organization's objectives. If modifications to the prioritization process are deemed necessary, the team encourages users to carefully review the plan and consider the benefits and drawbacks of making alterations prior to implementing them.

This plan lays the groundwork for what the team believes will be many years of successful conservation work in the upper Manistee River watershed. Perhaps the three most fundamental lessons from the project are as follows:

- The study area contains a wealth of lands that support important and relatively intact ecological functions and processes.
- Development and degradation threaten nearly all of these lands.
- While the task of protecting the watershed is a massive one, this project outlines a sensible and scientifically-based strategy for prioritizing these crucial efforts.

The entire project team wishes GTRLC and others working in the watershed the best of luck!