

Conserving Nature through Land Trust Initiatives: A Case Study of the Little Traverse Conservancy, Northern Michigan, USA

Authors: Braddock, Kathryn N., and Heinen, Joel T.

Source: Natural Areas Journal, 37(4) : 549-555

Published By: Natural Areas Association

URL: <https://doi.org/10.3375/043.037.0411>

The BioOne Digital Library (<https://bioone.org/>) provides worldwide distribution for more than 580 journals and eBooks from BioOne's community of over 150 nonprofit societies, research institutions, and university presses in the biological, ecological, and environmental sciences. The BioOne Digital Library encompasses the flagship aggregation BioOne Complete (<https://bioone.org/subscribe>), the BioOne Complete Archive (<https://bioone.org/archive>), and the BioOne eBooks program offerings ESA eBook Collection (<https://bioone.org/esa-ebooks>) and CSIRO Publishing BioSelect Collection (<https://bioone.org/csiro-ebooks>).

Your use of this PDF, the BioOne Digital Library, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Digital Library content is strictly limited to personal, educational, and non-commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne is an innovative nonprofit that sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

Conserving Nature through Land Trust Initiatives: A Case Study of the Little Traverse Conservancy, Northern Michigan, USA

Kathryn N. Braddock^{1,2}

¹ Florida International University
Department of Earth and Environment
11200 SW 8th Street
Miami, FL 33199

Joel T. Heinen¹

² Corresponding author:
Kbraddoc@fiu.edu; 321-626-4335

Natural Areas Journal 37:549–555

ABSTRACT: We present a case study of the Little Traverse Conservancy (LTC) of Harbor Springs, Michigan, as an example of a contemporary land trust. Land trusts are community-based organizations that rely on both economic and social incentives to acquire and monitor lands. Our objective is to define criteria that make land trusts successful and effective. This case focuses on the accomplishments, structure, and challenges of LTC as well as its partnerships with private organizations and local and state governments. Research shows that there are often gaps in the effectiveness of conservation efforts involving land trusts. For organizations such as LTC, these gaps must be addressed for land trust operations to prosper into the future. We finish by proposing an applied research protocol to improve ecological and sociopolitical knowledge about the workings of LTC and, by corollary, other similar land trusts.

Index terms: conservation easements, land trusts, Little Traverse Conservancy, Michigan, stewardship

INTRODUCTION

The number of land trusts within the United States increased in the 1980s through the 1990s, when the US economy stimulated expansion for nonprofit organizations (Howard 1992). This growth was attributed to the effective publicity of land trusts regarding acquisition of ecologically and historically important lands (Parker 2004). Currently there are over 1700 land trusts within the US, most of which base their organizational models on programs that target stakeholders through economic and social incentives (LTA 2011; Rissman and Butsic 2011; Higgins et al. 2012). While lands conserved under land trust arrangements are frequently small and do not meet IUCN–World Conservation Union standards for national parks and equivalent reserves (e.g., Heinen 1995), they can be important for the conservation of myriad species (Mir and Dick 2012; Parker 2012; Diamond and Heinen 2016) and as stopover or overwintering habitat for migratory birds (Alonzo and Heinen 2011). Depending on location, lands can also provide corridor or buffer habitat for larger protected areas and allow for recreational opportunities (Rissman et al. 2007).

Here we use key informant surveys (Shrestha-Acharya and Heinen 2006; Ter-Ghazaryan and Heinen 2006) with stakeholders of the Little Traverse Conservancy (LTC) of Harbor Springs, Michigan, as well as document surveys and a broader literature review to explore the workings of LTC. We ask several broad questions: (1) what are the successes of the organization, (2) what levels and types of incentives has LTC used to achieve success and efficacy, and (3) what are the challenges? We finish by proposing a research protocol to expand

knowledge about LTC's conservation impact.

THE LITTLE TRAVERSE CONSERVANCY

The LTC, founded in 1972 and Michigan's first regional land trust, is a private organization that uses a combination of economic and social incentives to inspire people to conserve (Rohe 2002; LTC 2016a). In an effort to not compete with other organizations (e.g., The Nature Conservancy), LTC's primary focus is to conserve the aesthetics of Northern Michigan and not necessarily the ecological importance of natural areas. This is central to the conservancy, particularly at the local level.

The major goal of LTC is to ensure that future generations can enjoy the natural beauty of Northern Michigan and the bylaws of the organization address this in accordance with the steps needed to maintain 501(c)(3) nonprofit status (LTC 1994, 2016a; Griesedieck 2007). The main office of LTC is in Harbor Springs, a small town that caters to a large resort community. This community is a dedicated and spatially attached group of people who visit yearly and are motivated to preserve the current state of the environment.

THE TOOLS OF THE LITTLE TRAVERSE CONSERVANCY

The LTC uses a variety of tools to achieve its goal, including traditional (e.g., conservation easements, monetary and land donations, and purchasing land outright) and strategic (e.g., optimizing partnerships and publicity, taking advantage of incentives, and facilitating community involvement)

methods (B. Bailey, LTC executive director, pers. comm. 2016; LTC 2016a). For example, LTC uses a variety of media to attract new members and advertise its mission and preserves. It maintains education programs that reach out to thousands of school-aged children annually by promoting science education and outdoor recreation. The LTC also puts large signs outside each preserve that show the incorporation date and name of the parcel. The organization encourages people to experience nature hands-on, thus fostering community relationships and making preservation a source of pride for local citizens. The LTC has an interactive website, a mobile application that details preserve locations, and pamphlets that are distributed to businesses and organizations throughout Northern Michigan (LTC 2016a; B. Bailey, pers. comm. 2016; S. Mayhew, LTC environmental education coordinator, pers. comm. 2016).

A combination of these traditional and strategic methods is what has led to LTC's successes in Northern Michigan. The following section lists key tools for the development of successful and effective land trusts and how the tools have worked for LTC.

Traditional Land Trust Methods

Traditional land trust methods include implementing conservation easements, encouraging monetary and land donations, and purchasing land outright (Cheever 1996). LTC utilizes each of these methods in their work. While easements are not the focus of LTC's conservation initiatives, they are important in bringing together private and public interests (Gustanski and Squires 2000). Easements are also often the only viable option to achieve land conservation (i.e., when a land owner does not want to sell a parcel outright; K. Fleming, LTC director of land protection and stewardship, pers. comm. 2016).

LTC uses easements as a land protection tool by limiting the type or amount of development on the property while the owner retains many private rights. Agreements are enforced and monitored into perpetuity. A record kept with the County

Register of Deeds requires all future owners to comply with the terms of the original easement (LTC 2015a). LTC has a process for approving potential easement properties involving its board agreeing that the property has some conservation value in accordance with Internal Revenue Service regulations (Lindstrom 2008). Reserved rights, common restrictions of LTC easement agreements, and steps for donation are all freely available to donors and the public (LTC 2015a).

A major component of a successful land trust is encouraging donations, which involves two parties: the donor prospect and the solicitor. LTC has succeeded thus far in breaking down the normally rigid construction of this interaction (Gustanski and Squires 2000). Its board believes that fostering relationships is the best way to receive funding from potential donors and prospects are more inclined to donate to their peers than to strangers (B. Bailey, pers. comm. 2016). Many LTC solicitors are board members who use their positions in the local community to fundraise. This fosters a sense of reciprocity between LTC and donors.

The LTC uses a private protection fund for conservation purchases. If real estate prices are favorable and the fund is well endowed, this funding source can be a major asset, especially in purchasing time-sensitive lands (Clark 2007). The fund is the source for many private land purchases and the mechanism for giving monetary donations to the organization. LTC seeks monetary donations from owners of conservation easements, their member base, and the public (Griesedieck 2007). Memorials and honoraria are frequently used strategies by LTC for encouraging donations. Such gifts have created a culture in nearby communities that promotes further giving through social incentives. These gifts amount to between \$50,000 and \$65,000 each year for the organization (LTC 2005; Clark 2007).

Partnerships

LTC takes pride in its many partnerships that help to facilitate its success and efficacy. One major partner to LTC is the

Michigan Department of Natural Resources (DNR). LTC has taken advantage of Michigan's state-financed Natural Resource Trust Fund established in 1976 to aid local governments and Michigan's DNR in acquiring land to protect Michigan's natural resources (McQueen and McMahon 2003). Part of the reason that LTC has been successful in acquiring funds from the Trust Fund is that they have built a relationship with Trust Fund members (K. Wieber, Michigan DNR forest administrator, pers. comm. 2016).

LTC has worked with many local and state entities to provide stewardship and educational opportunities as well as to encourage participation in and publicity of the organization. A short list includes school groups, Boy Scouts of America, the University of Michigan Biological Station, Michigan State University, Little Traverse Bay of Odawa Indians, Petoskey Regional Audubon Society, and Tip of the Mitt Watershed Council (TMWC) (LTC 2016a; B. Bailey, pers. comm. 2016). LTC is expanding its capacity for outreach through collaboration and partnerships with other organizations. For example, LTC has partnered with TMWC and the Petoskey-Harbor Springs Area Community Foundation to develop the "New Land and Water Education Fund," which aims to promote natural resource education to local youth (LTC 2016b).

LTC's non-adversarial approach allows them to create many partnerships that in turn foster community awareness and land preservation. Including LTC, there exist 29 land trusts in association with the Land Trust Alliance (LTA) within Michigan. There are many benefits to being associated with LTA, especially for small land trusts such as LTC. The LTA works to connect land trusts throughout the United States by providing technical resources, legal security, accreditation, and funding for conservation efforts, and takes on the advocacy burden that small land trusts cannot afford for fear of jeopardizing their membership bases (LTA 2016).

Incentives

Economic and social incentives (Low and

Heinen 1993) are LTC's most successful tools. Contributions to LTC are tax deductible under section 170 of the Internal Revenue Code, providing an economic incentive for donors. Property donations made to LTC are appraised at fair market value at the time of donation to determine the appropriate tax reduction (Griesedieck 2007). Financing for land conservation in Michigan includes the state's incentive program for property tax, the "Farmland and Open Space Preservation Act," which allows landowners to write off property taxes for enrolling their land (MDARD 2016). The program has evolved to include a mechanism that localities can use to purchase development rights on properties within Michigan (McQueen and McMahon 2003).

Families or individuals donating money to purchase properties, or donating land directly (a frequent occurrence for LTC), can opt to have their names placed on prominent signs on LTC preserves. This is an example of a social incentive that can enhance community standing and be effective in encouraging others to donate (Heinen 1994). Landowners generally identify with the sentiment that they want to protect their land because of an attachment to nature and their desire to preserve it into perpetuity. Although economic incentives (through tax deductions) are inherent to these transactions, attachment to the land is the primary motivator for many (e.g., Taylor-Rogers et al. 2003).

Community Involvement

LTC is a proponent of community education through citizen-science opportunities and youth naturalist programs such as their Bio-Blitz, youth summer education, and EcoSteward events, which provide opportunities for educators and youth to interact with the natural world (LTC 2015b, 2016b). These educational programs are often paired with and complementary to stewardship and volunteer programs including trail maintenance, bird watching, field trips, and fundraising (LTC 2016a).

The organization has an obligation to evaluate and monitor lands under conservation

easements in accordance with set Internal Revenue Service regulations (Griesedieck 2007). Stewardship programs and volunteer activities play a large role, such as monitoring and evaluation. LTC has cameras on various trails used to monitor trail visitation frequency, needed maintenance, and wildlife activity (K. Fleming, pers. comm. 2016). Cameras, however, are not the most effective in the monitoring of wildlife or maintenance needs due to their restrictions in visual range. While monitoring exists, there is little published information on its results for the public.

THE SUCCESSES AND EFFICACY OF LTC

LTC has preserves in five counties of Northern Michigan (Figure 1) that are either managed by LTC or exist because of LTC land acquisitions. Since LTC's beginning, over 4000 members have joined; the organization owns over 5900 hectares of land throughout Northern Michigan and has conserved over 8900 more hectares through easements (LTC 2012, 2016a; K. Fleming, pers. comm. 2016). LTC's location in Michigan provides the organization with a variety of advantages in terms of opportunities for success. Understanding the demographics of areas where LTC is active is important as it influences member base, willingness to contribute, partnership opportunities, and public opinion of the organization (Klenosky et al. 2015).

Recently, LTC has successfully incorporated working forest preserves (B. Bailey, pers. comm. 2016). Land recognized as working forest under Michigan's Commercial Forest Act Program (CFA) must be designated as working forest into perpetuity and open to the public for hunting, fishing, and other recreation (MDNR 2014). The initiative offers an opportunity for the organization to preserve more lands and creates a source of sustainable resource extraction. CFA preserves currently make up less than 10% of LTC land holdings, but are expected to increase in the future (K. Fleming, pers. comm. 2016).

One of LTC's largest successes came in 1987 when it partnered with the nearby

University of Michigan Biological Station (UMBS) to purchase Colonial Point Forest, a 118-ha tract that added to UMBS's 4047 ha along Douglas and Burt Lakes (Heinen and Vande Kopple 2003; B. Bailey, pers. comm. 2016). This single purchase stimulated substantial positive publicity nationwide, which led to LTC's rapid growth in part by making the Station's 5000+ alumni familiar with LTC activities. The "Save the Trees" fundraiser is a prominent annual event that promotes donations to LTC. In the fall of 2016, the organization earned approximately \$57,000 and has raised more than \$700,000 over the past 27 years through this event (LTC 2016b).

LTC's successes as a land trust can also be attributed to factors such as owning land outright and in partnership with local and state government. This has led to strong relationships with Michigan's state resource agency (DNR; B. Bailey, pers. comm. 2016; K. Wieber, pers. comm. 2016). The organization has helped to acquire state parks, state forests, and state wildlife research areas. At the federal level, LTC has helped the US Forest Service purchase inholdings within National Forests in the region (B. Bailey, pers. comm. 2016; K. Fleming, pers. comm. 2016).

The success and efficacy of the tools used by LTC depend on support of their member base and local communities. Therefore, understanding these stakeholder groups through social science techniques is imperative for LTC and other land trusts. LTC recognizes that they have a strong and dedicated membership that allows them to tap into people's enlightened self-interest, a reference to Adam Smith's *Wealth of Nations* (Smith 1904), and use this interest as a stepping-stone to grow the organization (B. Bailey, pers. comm. 2016).

CHALLENGES AND OPPORTUNITIES

Myriad obstacles can inhibit land trust organizations. One such obstacle is that economic incentives offered by trusts are not relevant to some landowners. Tax deductions tend to be more helpful for landowners with higher incomes, however, many landowners have large quantities of

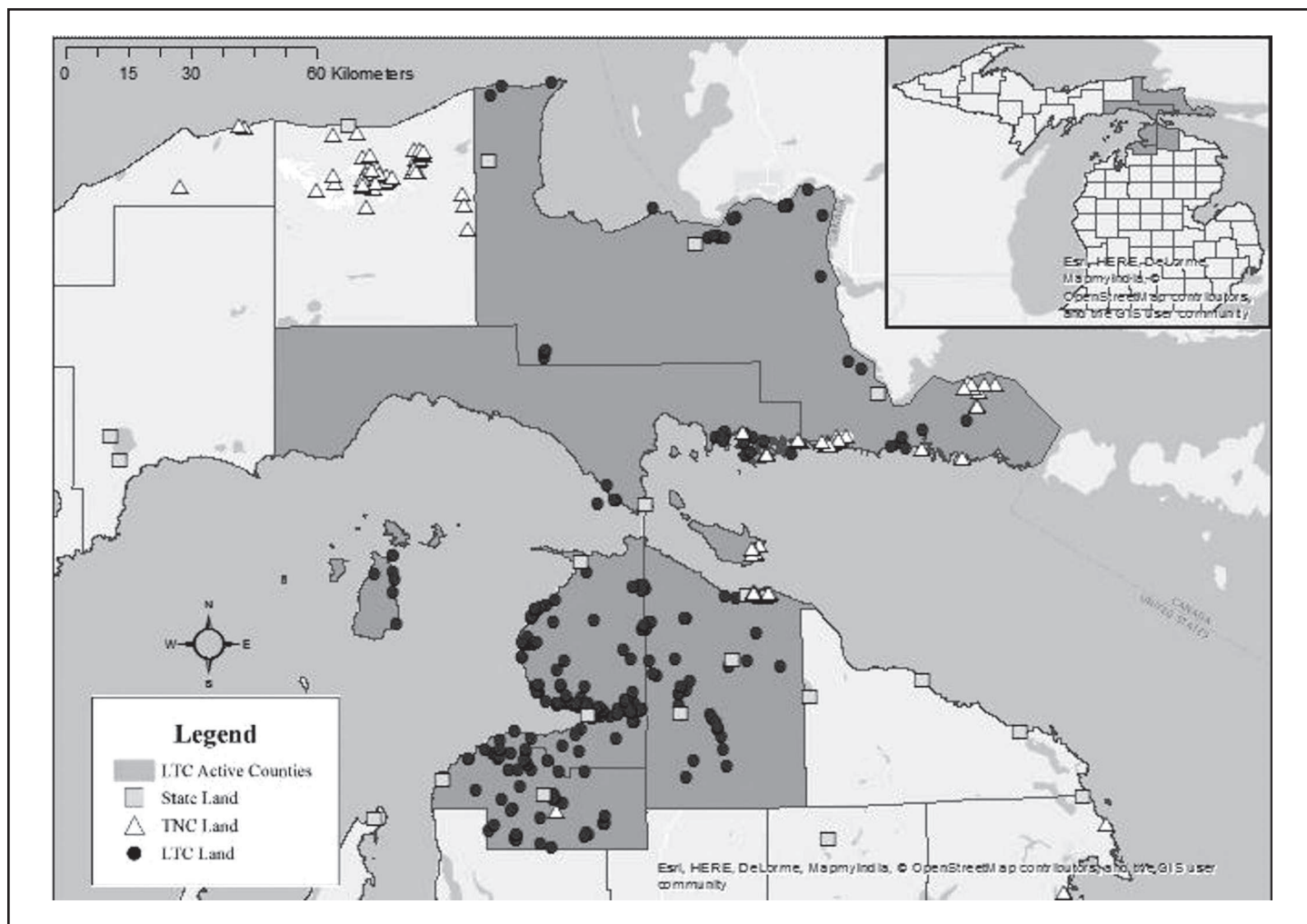


Figure 1. Locations of LTC, TNC, and state-owned lands in Charlevoix, Cheboygan, Chippewa, Emmet, and Mackinac Counties in Michigan, USA (LTC 2016a; MDNR 2016; The Nature Conservancy 2016).

land but low incomes, therefore, decreasing the appeal of a tax deduction (Taylor-Rogers et al. 2003). This could undermine some incentives and keep potential donors from becoming involved with land trusts. Land trusts also need to assure that taxes, managerial control, public access, and financial compensation are clearly presented to landowners in all agreements (Bastian et al. 2017).

Two primary impediments for landowners are the hesitancy of current landowners to restrict the land use options of future landowners (e.g., their heirs) and the fear of decreasing their property's value (Taylor-Rogers et al. 2003). These challenges may also serve as a potential opportunity for land trusts such as LTC. The realization that financial incentives may not always be

successful or sufficient allows the organization to take advantage of already existing social incentives options (Heinen 1994).

Controversy exists concerning the ecological value of lands acquired by land trusts and the role they play in conservation. For small land trusts, such as LTC, there is a lack of quantitative data supporting biodiversity conservation due to a deficiency of research detailing ecological values. This leaves a gap in knowledge of conserving biodiversity (Geldmann et al. 2013). There is extensive documentation of qualitative data (e.g., social surveys, newsletters, annual reports, and reflections; e.g., LTC 2016a) regarding land trusts and their successes (Kiesecker et al. 2007). However, lands acquired by land trusts should be systematically monitored even if natural assets are

not at the forefront of the trust's agenda. The expenses and manpower needed to collect such data are deterrents for many small organizations (Kiesecker et al. 2007; Rissman and Butsic 2011). One positive factor of easement programs and general land preservation is conserving land that may have otherwise been developed. The biggest threat to biodiversity is habitat destruction (Primack 1993). So, whether monitoring takes place to determine the components of biodiversity that are preserved or not, conservation does indeed take place.

Trade-offs surrounding environmental, social, and economic needs promote conflicts between development and preservation. Such conflicts must be met through fostering community awareness and by

striking a balance of community and conservation needs (Giannini and Heinen 2014). However, not all conservation strategies are effective in the face of impeding developmental pressures. Therefore, it is important that organizations, such as LTC, be realistic in their conservation goals (Dorning et al. 2015).

While the mission of LTC is not ecologically driven, its preserved lands have the potential to be sanctuaries for endangered and threatened species in Northern Michigan (MDNR 2016; Table 1). Considering the state and national parks and forests of Michigan, alongside the lands preserved through other organizations, LTC's preserves could very well be serving as corridors, buffers, nesting sites, and ancillary habitat for many imperiled species. Detailed studies are needed to assess how LTC preserves fit in the landscape-level conservation matrix of protected areas in Northern Michigan.

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

Land trusts are popular methods for small-scale conservation in the United States. Stewardship and local commitments to conservation are the powerhouses behind small land trusts such as LTC. Education and a strong environmental ethic improve the chance that people will be involved in, and supportive of, land trusts. Incentive-based programs can suffer from problems in cost, efficacy, and enforcement, yet have advantages over more traditional practices

(Griesedieck 2007) and both economic and social incentives can be used to promote many conservation programs. Easement and land purchases by land trusts can prevent development and raise community awareness for conservation (Milder and Clark 2011; Owley and Rissman 2016). But political and financial elements can make land trust operations complex. These intricacies suggest that land trusts should implement legal guidance in their operational platform (Howard 1992).

Successful land trusts are those that have clear and focused goals. As a land trust becomes more established, it benefits the organization to focus on refining criteria for land acquisition and protection (Howard 1992; Merenlender et al. 2004). In the early formation, there should be an accounting of the organization's resources including, but not limited to, educated manpower, evaluation techniques, allocation criteria, and a strong member base for stability in both stewardship and finances (Merenlender et al. 2004; Klenosky et al. 2015). Elements of LTC that have assisted in its successes include meticulous record keeping, development, transparency, and maintenance of relationships at all levels of government and with the public, and taking a non-advocacy approach (Clark 2007).

Monitoring should be thought of strategically, in terms of the societal and ecological uses, needs, and potential of the conserved area. Land trust programs are dependent on the effectiveness of biological and social data as a means of securing public

trust (Kiesecker et al. 2007). As with any local and community-based conservation effort, the need for examining cultural, historical, and community goals to determine best management practices cannot be overlooked. The central motivation for all conservation is protection of the natural world. Since much of the natural world is inhabited and altered by humans, research focused on demographic variables (i.e., age, income, and education) and incentives (i.e., social and economic) can encourage community involvement, which is essential for effective implementation of conservation programs (Morris 2008; Suich 2013; Baldwin and Leonard 2015).

To address the issues and questions discussed, we propose, and have begun to undertake, a research program that explores more deeply the importance of economic and social incentives used by LTC. Specifically, we have conducted 30 detailed key informant surveys with staff and board members of the organization, local political and civic leaders, and staff of public land management agencies concerning LTC and its programs in the broader context of conservation within the region. These surveys will operate as a means of better understanding the attitudes and behaviors that lead to participation in, and successes of, LTC (Klenosky et al. 2015). In addition, we are in the process of collecting hundreds of semi-structured surveys, which are generally more statistically robust (e.g., Shrivastava and Heinen 2007), from the general membership of LTC to explore views on the effectiveness of social and

Table 1. LTC preserve counts, size, ecosystem types, and endangered or threatened species for Charlevoix, Cheboygan, Chippewa, Emmet, and Mackinac Counties in Michigan, USA (Cohen et al. 2015; LTC 2016a; USFWS 2016).		
LTC preserve count and approximate size	Examples of major ecosystem types within LTC preserves	Selected endangered species with presence within LTC preserves
187 preserves (6250 ha)	submergent marsh emergent marsh north wet meadow north shrub thicket conifer swamps floodplain forest dry northern forest mesic north forest wooded dune/swale sand/gravel beach	Grey wolf (<i>Canis lupus</i>) Kirtland's warbler (<i>Setophaga</i> Piping plover (<i>Charadrius melodus</i>) Hine's emerald dragonfly Hungerford's crawling water beetle Michigan monkey-flower (<i>Mimulus</i>

economic incentives that encourage them to join and donate to the organization (Suich 2013). Results from that work will be forthcoming.

As stated, LTC does not emphasize ecological importance of the lands it protects and has limited capacity to do more. Some of its holdings are mid-successional growth (pole-stage) forests or abandoned pastures with rather limited current ecological importance, while others are quite old and relatively ecologically diverse. Future conservation and monitoring efforts should include increased research on the ecological functions of land parcels (Baldwin and Leonard 2015). We propose that LTC, perhaps in partnership once more with UMBS, should develop a research program that would encourage outside researchers (e.g., undergraduates with course project requirements and graduate students with thesis requirements) to pursue projects on individual tracts using standard methods of surveying flora and fauna. Broader projects that use habitat suitability models, land administration domain models, remote sensing, and/or geographical information system technology to assess the importance of LTC preserves at the landscape level would also be relevant and many well-tested techniques exist that could accomplish this goal (e.g., Heinen and Cross 1983; Heinen 1984; Lyon et al. 1987; Lemmen et al. 2015).

ACKNOWLEDGMENTS

We thank the director, board, and staff of LTC and all people, organizations, and agencies they represent, who acted as key informants, for giving their time to discuss local land conservation issues. We also thank the University of Michigan Biological Station for funding the field portion of this study and Florida International University Department of Earth and Environment for its support.

Kathryn N. Braddock, a Master's of Science candidate in the Department of Earth and Environment at Florida International University, has a Bachelor's of Science in biology and anthropology from the University of Miami. Her research interests include

environmental policy and law as well as conservation biology and management with a focus on the human dimensions of these disciplines.

Joel T. Heinen received his Ph.D. from the University of Michigan and is professor and former chair of environmental studies in the Department of Earth and Environment at Florida International University. His research interests range from conservation policy to natural resource management, focusing on the management of protected natural areas.

LITERATURE CITED

- Alonzo, J., and J.T. Heinen. 2011. Miami-Dade County's Environmentally Endangered Lands Program: Local efforts for a global cause. *Natural Areas Journal* 31:500-506.
- Baldwin R.F., and P.B. Leonard. 2015. Interacting social and environmental predictors for the spatial distribution of conservation lands. *PLOS ONE* 10(10):e0140540. <<https://doi.org/10.1371/journal.pone.0140540>>.
- Bastian, C.T., C.M.H. Keske, D.M. McLeod, and D.L. Hoag. 2017. Landowner and land trust agent preferences for conservation easements: Implications for sustainable land uses and landscapes. *Landscape and Urban Planning* 157:1-13.
- Cheever, F. 1996. Public good and private magic in the law of land trusts and conservation easements: A happy present and a troubled future. *Denver University Law Review* 73:1077.
- Clark, S. 2007. *A Field Guide to Conservation Finance*. Island Press, Washington, DC.
- Cohen, J.G., M.A. Kost, B.A. Slaughter, and D.A. Albert. 2015. *A Field Guide to the Natural Communities of Michigan*. Michigan State University Press, East Lansing.
- Diamond, J., and J.T. Heinen. 2016. Conserving rare plants in locally-protected urban forest fragments: A case study from Miami-Dade County, Florida. *Urban Forestry and Urban Greening* 20:1-11.
- Dorning, M.A., J. Koch, D.A. Shoemaker, and R.K. Meentemeyer. 2015. Simulating urbanization scenarios reveals tradeoffs between conservation planning strategies. *Landscape and Urban Planning* 136:28-39.
- Geldmann, J., M. Barnes, L. Coad, I.D. Craigie, M. Hockings, and N.D. Burgess. 2013. Effectiveness of terrestrial protected areas in reducing habitat loss and population declines. *Biological Conservation* 161:230-238.
- Giannini, H.C., and J.T. Heinen. 2014. Miami-Dade County's Environmentally Endangered Lands Covenant Program: Creating protected areas on private lands via financial incentives. *Natural Areas Journal* 34:338-345.
- Griesedieck, J.H.A. 2007. Conservation easements: Tax shields with philanthropic means. *Glass v. Commissioner*. *Journal of Environmental and Sustainability Law* 14(3). <<http://scholarship.law.missouri.edu/jesl/vol14/iss3/4>>.
- Gustanski, J.A., and R.H. Squires. 2000. *Protecting the Land: Conservation Easements Past, Present, and Future*. Island Press, Washington, DC.
- Heinen, J.T. 1984. The use of two model-fitting procedures for the determination of the best fitting model for four spatially defined variables. *Canadian Journal of Remote Sensing* 10:25-31.
- Heinen, J.T. 1994. A behavioral ecological perspective on the issue of garbage. *Human Ecology Review* 1:56-61.
- Heinen, J.T. 1995. Nature Preserves. Pp. 551-561 in W.A. Nierenberg, ed., *Encyclopedia of Environmental Biology*, Vol. 2. Academic Press, San Diego, CA.
- Heinen, J.T., and G.H. Cross. 1983. A technique to measure interspersed, juxtaposition, and spatial diversity from cover type maps. *Wildlife Society Bulletin* 11:32-37.
- Heinen, J.T. and R. Vande Kopple. 2003. Profile of a biosphere reserve: The University of Michigan Biological Station and its conformity to the Man and Biosphere Program. *Natural Areas Journal* 23:165-173.
- Higgins, A., K. Serbesoff-King, M. King, and K. O'Reilly-Doyle. 2012. The power of partnerships: Landscape scale conservation through public/private collaboration. *Natural Areas Journal* 27:236-250.
- Howard, B.C. 1992. Creative Conservation 101: An introduction to local land trusts. *William and Mary Environmental Law and Policy Review* 16(2):115-137.
- Kiesecker, J.M., T. Comendant, T. Grandmason, E. Gray, C. Hall, R. Hilsenbeck, P. Kareiva, L. Lozier, P. Naehu, A. Rissman, M.R. Shaw, and M. Zankel. 2007. Conservation easements in context: A quantitative analysis of their use by The Nature Conservancy. *Frontiers in Ecology and the Environment* 5:125-130.
- Klenosky, D.B., R. Perry-Hill, N.D. Mullendore, and L.S. Prokopy. 2015. Distinguishing ambivalence from indifference: A study of attitudes toward land trusts among members and nonmembers. *Land Use Policy*

- 48:250-260.
- Lemmen, C., P. Van Oosterom, and R. Bennett. 2015. The land administration domain model. *Land Use Policy* 49:535-545.
- Lindstrom, C.T. 2008. *A Tax Guide to Conservation Easements*. Island Press, Washington, DC.
- Low, B.S., and J.T. Heinen. 1993. The environment: Everybody's talking about it, but... *Michigan Quarterly Review* 42:338-349.
- [LTA] Land Trust Alliance. 2011. 2010 National Land Trust Census Report. Land Trust Alliance, Washington, DC. <[http://www.landtrustalliance.org/and-trusts/land->](http://www.landtrustalliance.org/and-trusts/land-)
- [LTA] Land Trust Alliance. 2016. Land Trust Alliance. <www.landtrustalliance.org>.
- [LTC] The Little Traverse Conservancy. 1994. *Bylaws of The Little Traverse Conservancy*. Harbor Springs, MI.
- [LTC] The Little Traverse Conservancy. 2005. Fall 2005 Little Traverse Conservancy Newsletter 27(3):1-16.
- [LTC] The Little Traverse Conservancy. 2012. *Nature Preserves. The Little Traverse Conservancy Preserve Guide*. Harbor Springs, MI.
- [LTC] The Little Traverse Conservancy. 2015a. *The Conservation Easement: As land protection and financial planning tool*. Harbor Springs, MI.
- [LTC] The Little Traverse Conservancy. 2015b. Fall 2015 Little Traverse Conservancy Newsletter Vol. 37. Harbor Springs, MI.
- [LTC] The Little Traverse Conservancy. 2016a. Little Traverse Conservancy. <www.landtrust.org>.
- [LTC] The Little Traverse Conservancy. 2016b. Fall 2016 Little Traverse Conservancy Newsletter Vol. 38. Harbor Springs, MI.
- Lyon, J.G., J.T. Heinen, N.E.G. Roller, and R.A. Mead. 1987. Approaches to wildlife habitat modeling using remote sensor data. *Journal of Surveying Engineering* 113(2):88-100.
- McQueen, M., and E. McMahon. 2003. *Land Conservation Financing*. Island Press, Washington, DC.
- [MDARD] Michigan Department of Agriculture and Urban Development. 2016. *The Farmland and Open Space Preservation Program. The Michigan Department of Agriculture and Rural Development*. <http://www.michigan.gov/mdard/0,4610,7-125-1599_2558-10301--,00.html>.
- [MDNR] Michigan Department of Natural Resources. 2014. *Commercial Forest Summary*. <http://www.michigan.gov/documents/dnr/IC4171_CommercialForestSummary_185969_7.pdf?20151119122438>.
- [MDNR] Michigan Department of Natural Resources. 2016. *DNR Maps and Data*. <<http://www.michigan.gov/dnr/>>.
- Merenlender, A.M., L. Huntsinger, G. Guthey, and S.K. Fairfax. 2004. Land trusts and conservation easements: Who is conserving what for whom? *Conservation Biology* 18:65-76.
- Milder, J.C., and S. Clark. 2011. Conservation development practices, extent, and land use effects in the United States. *Conservation Biology* 25:697-707.
- Mir, D.F., and K. Dick. 2012. Conservation approaches to protecting critical habitats and species on private property. *Natural Areas Journal* 32:190-198.
- Morris, A.W. 2008. Easing conservation? Conservation easements, public accountability, and neoliberalism. *Geoforum* 39:1215-1227.
- Owley, J., and A.R. Rissman. 2016. Trends in private land conservation: Increasing complexity, shifting conservation purposes and allowable private land uses. *Land Use Policy* 51:76-84.
- Parker, D.P. 2004. Land trusts and the choice to conserve land with full ownership or conservation easements. *Natural Resources Journal* 44:483-518.
- Parker, S. 2012. Small reserves can successfully preserve rare plants despite management challenges. *Natural Areas Journal* 32:403-411.
- Primack, R.B. 1993. *Essentials of Conservation Biology*. Sinauer Associates, Sunderland, MA.
- Rissman, A.R., and V. Butsic. 2011. Land trust defense and enforcement of conserved areas. *Conservation Letters* 4:31-37.
- Rissman, A.R., L. Lozier, T. Comendant, P. Kareiva, J.M. Kiesecker, M.R. Shaw, and A.M. Merenlender. 2007. Conservation easements: Biodiversity protection and private use. *Conservation Biology* 21:709-718.
- Rohe, J.F. 2002. *Mary Lou and John Tanton: A Journey into American Conservation*. FAIR Horizon Press, Washington, DC.
- Shrestha-Acharya, R.J., and J.T. Heinen. 2006. Emerging policy issues on non-timber forest products in Nepal. *Himalaya* 26(1):51-53.
- Shrivastava, R.J., and J.T. Heinen. 2007. A microsite analysis of communities around Kaziranga National Park, India: Implications for conservation and development. *Journal of Environment and Development* 16:207-216.
- Smith, A. 1904. *An Inquiry into the Nature and Causes of the Wealth of Nations*, 5th Edition. Methuen and Co., Ltd., London. <<http://www.econlib.org/library/Smith/smWN.html>>.
- Suich, H. 2013. The effectiveness of economic incentives for sustaining community based natural resource management. *Land Use Policy* 31:441-449.
- Taylor-Rogers, S.J., J. Bernstein, and R. Etgen. 2003. *Impediments to the Donation of Conservation Easements*. Maryland Center for Agro-Ecology, Queenstown.
- Ter-Ghazaryan, D., and J.T. Heinen. 2006. Reserve management during transition: The case of Issyk-kul Strict Nature and Biosphere Reserve, Kyrgyzstan. *Environmental Practice* 8(1):11-22.
- The Nature Conservancy. 2016. *The Nature Conservancy – Michigan*. <www.nature.org/ourinitiatives/regions/northamerica/unitedstates/michigan/>.
- [USFWS] United States Fish and Wildlife Service. 2016. *Endangered Species in Michigan. Endangered Species - Midwest Region*. US Fish and Wildlife Service, East Lansing, MI. <<https://www.fws.gov/midwest/endangered/lists/michigan-spp.html>>.