

to generate a significant amount of money. Citizens also found that by forming a LID they could be more competitive for grants, qualify for more cost-sharing programs, be better candidates for loans and for major construction costs for flood control structures, and be better equipped to deal with unanticipated costs that might be encountered.

This structure we used to have probably cost \$1,000 fifty years ago. To replace that and put in what the DNR wanted, FEMA and federal flood management. What they want for control structures now are these super-gigantic engineered structure things. You can either do that or nothing. There's no halfway, half measures with them. The only way we could finance that or pay for it— we needed a government Lake Improvement District.
(3)

Conclusion

The LIDs assessed in this study were able to overcome two major hurdles often encountered by citizen-based volunteer groups. First, everyone within the district contributes money to management plans regardless of whether or not they choose to be involved in LID activities, thus overcoming the free-rider problem. Second, citizens are able to tackle environmental problems that require long-term management activities because they are guaranteed a consistent source of funding over time. Citizens were therefore able to pursue larger-scale projects as compared to an individual landowner or a Lake Association plagued by low membership and small contributions.

Perceived Problems

When this project began in the summer of 2007 there were 24 recognized LIDs in Minnesota. This was cause for inquiry for two reasons. First, LID legislation was created in the mid-1970s and subsequently amended, meaning that the statute was well established. Second, Wisconsin is home to many of the same surface water management issues as in Minnesota, and created a similar Lake District statute in 1974. As of 2007 that program had resulted in the formation of more than 200 Lake Districts. A goal of related and ongoing research is to identify the reasons for why Minnesota's implementation of the LID program has resulted in much lower participation than the comparable Wisconsin program.¹

Interviews point to a myriad of struggles at all phases of the LID process starting with barriers to entry, problems encountered once a LID was formed, and a series of frustrations encountered over the long-term (Figure 3). The back-story for why citizens determined a LID was their best option was nearly identical in theme for all the LIDs involved in this project. The sequence of events always started with an awareness of an environmental problem, the acknowledgement or perception that this problem threatened either citizens' homes or way of life, and the realization that if citizens did not try to find solutions to their environmental problems no other office or agency would. With inaction perceived to have devastating consequences, citizens who might in other scenarios shy away from involved lake stewardship activities found themselves persevering through the challenges they encountered with an eye on what was at stake if they failed.

¹Note, a more in-depth comparative study between Minnesota's LIDs and Wisconsin's Lake Districts was funded by the University of Minnesota's Consortium on Law and Values in Health, Environment, and the Life Sciences. Data was collected in the summer of 2008 and is currently in the analysis phase as of the date this report.

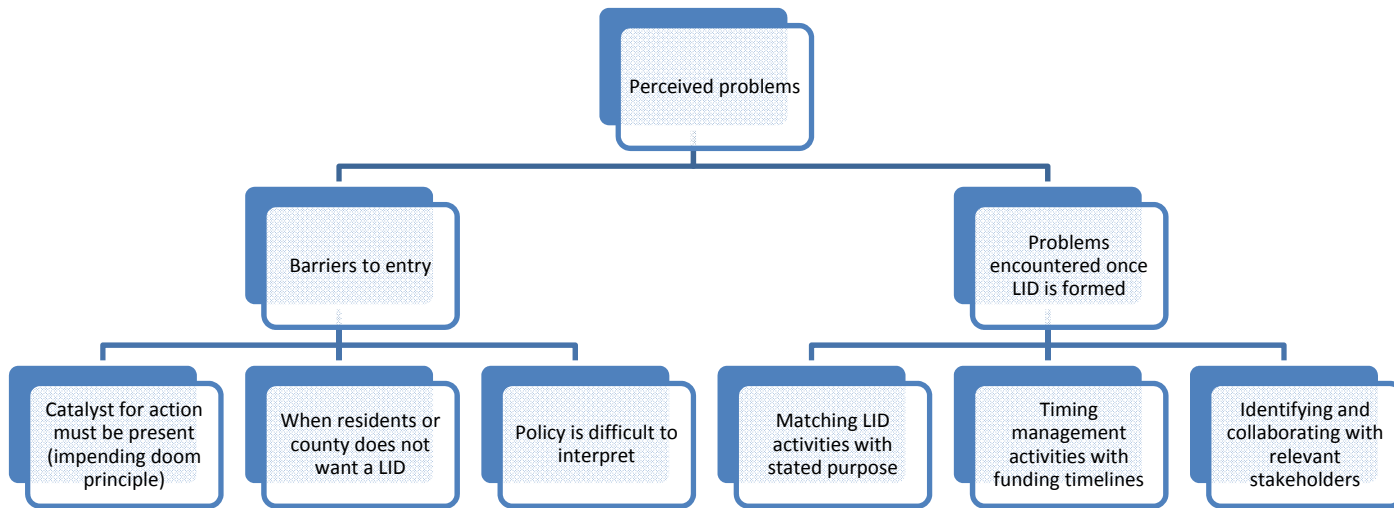


Figure 3. Diagram of perceived problem codes.

Barriers to Entry

Significance

Several participants commented on how difficult it was to find information regarding the LID statute, program requirements, and agency assistance. They commonly insinuated that had there not been a major environmental problem on the lake, they would not have pursued LID formation. Such comments are important when studying the adoption and diffusion of a policy meant to promote citizen participation because they illustrate potential barriers to entry.

Major Themes

Catalyst for action must be present. The LIDs in this project were all created in reaction to an environmental problem. Though many interviewees admitted to always having an interest in the health of their lake, it was not until a problem was readily apparent did environmental awareness on their part move to action in the form of LID creation. The question becomes, why did a major catalyst in the form of impending doom have to be present for citizens to work together to improve water quality? A collective action problem is when everyone wants the same thing—in the instance of riparian landowners this could be a healthy lake—but fail to work together to achieve it. Yet citizens were only motivated to work together and take on a LID when calamity seemed imminent.

The reason that we got our Lake Improvement District is because we had a very pressing move-off-houses need. They were moving houses of our lake because of the flooding. (9)

The Department of Natural Resources would not do anything to help with the lake coming up. They said that this is the natural flow and it's been this high before and that's just nature's way. So they wouldn't help us and all these homes were sandbagged and there were pictures in the Minneapolis Star Tribune with canoes going through the second story windows of houses. (11)

It was discovered that the lake contained Eurasian water milfoil... Once it was discovered the lake owners were upset and met with the DNR, and the DNR more or less told us what Eurasian water milfoil is that once it's in a lake it never comes out. The best you can hope to do is do your very best to control it, but there's no financial resource of any significance available to finance the control of it, and good luck. (12)

This approach, though effective in getting citizen support, is less than ideal from an environmental and human safety perspective. If a lake knows that it is at a high risk for flooding or if invasive aquatic vegetation is present in neighboring lakes, there is little rationale to wait until the worst flood or the lake is clogged with Eurasian water milfoil to think about pursuing LID formation. In other words, it is better to be preventative than reactionary with management plans. As the program is being implemented now, it appears citizens only became LIDs when they had a problem. Healthy lakes do not pursue LID status; a point that will be further discussed in the *Policy Implications* section of this report.

Complexity and transparency of the Lake Improvement District statute. Across the interviews it was apparent that the LID statute itself was challenging to interpret. This was demonstrated by what citizens noted as early confusion regarding what a LID actually was, the discrepancies in how citizens interpreted the requirements of the statute, and the general sense of intimidation participants felt when they tackled the process for the first time. While some LIDs sought the help of lawyers, others pushed forward without legal consults. In one instance when a LID was litigated by a disgruntled resident, the LID found that it had fallen out of compliance when the statute was updated in 2005. No one had notified them that the statute had changed. For citizens, who are neither lawyers or policy experts, the requirements of the LID statute were not always immediately transparent nor the rules of being a LGU intuitive.

It's just this legal enigma that I don't think anyone understands. The DNR was largely silent during our whole process. The county just knew somebody was in the process of trying to save [the lake]. (12)

It's pretty daunting to look at all that paperwork because you almost have to hire an attorney then...I think you need that because you do have a group of people that have the ability to tax people and that's kind of a scary deal. (9)

When there is opposition to LID formation. The interviews consistently expressed that not everyone was excited at the prospect of creating a LID. Two specific stakeholder groups were identified as major opponents. In many instances there were residents from within the proposed district boundaries who opposed the LID formation, and in other cases the county had reservations. In the cases with unsupportive residents, concerns included a distinct dislike for taxation, disagreement with the proposed LIDs management activities and/or priorities, or a combination of both. Where conflicts could not be resolved, opponents often found themselves in the minority and unable to change the minds of the voting majority. For counties that resisted formation of LIDs, citizens believed it was because the counties were nervous about their liability or unconvinced that enough citizens supported an additional tax. In the example of existing LIDs, citizens were generally able gain support from county officials through education and public meetings. In other cases, no matter how many citizens signed onto the LID petition, if the county was unsupportive, little recourse could be taken.

Residents

You've got the township, you've got the school district, you've got all these entities that are already taxing you. The last thing you want is another line on your tax statement saying, Lake Improvement District unless it's a worthy obtainable entity that you can see results....You don't necessarily want another layer of government without accountability. (9)

It seems like the weekenders have more of a concern of drawing-down the lake and being without it for a year, maybe a year and a half depending on how long it takes. But still, the part that really I can't understand why, you have to make some kind of sacrifice to improve. And that's really what we're asking them for. Give the lake two years to come back better than it was. On most days there are no boats on this lake. The amount of usage is minute. (2)

The people who lived on top of the hills wanted to pay nothing, because they didn't care about the lake level. The problem we had was half the residents needed the protection or they'd lose their places and the other half couldn't care less. (3)

County

I get calls from different Lake Associations that want to form a district or this or that, want to talk. I met with the people from [the lake] and told them what we did. They go to [the county] and [the county] just says no and hell no. They come up with a petition to form a district and they tell them to go fly a kite. (4)

I think one of the biggest concerns from our county attorney was the liability that falls back on the county from this. The DNR, the state, said if the LID fails and owes us any bills, the county has to pay. To the county board and the county attorney that seemed like a major flaw in the statute. (7)

Problems Encountered Once a LID is Formed

Significance

After successfully forming a LID, citizens commented that they often encountered unexpected hurdles matching management activities with the LID's stated purpose, and, timing funding with management activities. Overcoming these two challenges, participants talked about having to learn ways to collaborate with relevant stakeholders involved in water stewardship activities. These challenges point to the idea that a LID's success is dependent on its ability to adapt to new situations.

Major Themes

Matching LID management activities with stated purpose. When a LID forms it is statutorily required to state its purpose. After successfully forming and completing intended tasks, citizens often began to plan for additional management activities for new or different water quality problems. What some failed to realize was that a LID can only generate funds for its originally stated purpose. To do anything beyond this, such as go from flood management to invasive aquatic vegetation management, does not comply with the statute or their ability to assess taxes. Furthermore, there is no easy and apparent way to amend a LID's statement of purpose. In the absence of rules on how to amend a LID's charter, LIDs that sought legal advice were told they had to start the process over and essentially become a new LID with a new statement of purpose.

In the petition process you have to identify exactly what you're assessing for. We didn't want to say Eurasian milfoil because three years or whatever after it was identified to have Eurasian milfoil it was discovered that we also have zebra mussels. I don't think we're doing anything to treat for zebra mussels because it's not the threat that the milfoil is, but it did make us think maybe we shouldn't identify the purpose of the LID as being so specifically limited to milfoil. We would have to set up a second LID if some new threat – on the other hand we didn't want to make it so broad that persons being assessed would be afraid, “Good god what's the budget going to be”? (12)

We had to go back to the county and redefine our mission in essence... We got enough flack from people saying that we're concerned about we were doing that we went to the county and had them expand our charter. (9)

Timing management activities with flow of funding. A hurdle for LIDs, especially in their first year, was the timing of when revenue generated through tax collection is available versus when the money is needed to pay for management activities. This was especially troublesome for LIDs formed around invasive aquatic plant management needs. There are only brief windows of time during the year when a lake can be treated for such things as Eurasian water milfoil and curly leaf pondweed. Many citizens admitted to being caught off guard by this discrepancy in timing and scrambling to find solutions. In response, LIDs commonly created a small buffer in their funds to insure adequate funds for out year expenses.

We work through the county and through the state where you work on a calendar year budget. Whatever you tax or assess gets paid twice a year. The first money you get comes around on the 5th of July. Then the second half comes in October. We have to do all of our treatment in April or early May. So we thought, well Christ what are we going to do? They won't let us borrow money. You could borrow money for certain categories—improvement projects, if you were going to build a dam or something—you could borrow money for that. You could borrow some money to study what you should do, but you can't borrow money to do the treatment. So we didn't know what the hell we were going to do. (4)

You get a fall assessment and a spring assessment, but that has nothing to do with when you need the money. So we had to assess a little higher initially because we thought we were going to be behind, so we needed to get more money with the first assessment to have money ready to pay the lake treatment company to go in. (12)

Identifying and collaborating with relevant stakeholders. In the wake of challenges and uncertainty, many citizens had trouble connecting with the right stakeholders to get the information they needed. As newcomers to water resource management activities in Minnesota, many were ill prepared in their understanding of which county offices or county/state agencies had jurisdiction in their particular lake's environmental issues. For some this problem was resolved in a few simple phone calls, while for others it was a frustrating cycle of referrals. Participants voiced concern over a distinct lack of guidance available after the LID formed. Others expressed disappointment that after lining up citizens to create a LID and get funding, there was no one waiting to help them. A consistent theme was that LIDs that forged ahead and pursued meaningful collaborative efforts with other local and governmental stakeholders involved in water quality improvements, the easier the process felt to them.

It's hard to get information. Going to a conference is one way. I got a bunch of stuff there. Trying to get the information out to the residents of the lake is really hard. (4)

I think that if we didn't have the help of the [county] Soil and Water person...if we did not have the help of the gentleman from the DNR...it would have been a very daunting project. But they were there and they did help, and I think that when I go around the

state and talk to people about LIDs it is really interesting. If you boil it down the bottom line comes down to, has your county embraced them and have your experts embraced them? Are they open to you to help you with these things because it can be very easy if they are and it can be almost impossible if they aren't. (10)

When we go out to talk to other agencies for help, we always get channeled back to a beginning point of, as an organization you must do your strategic planning, you've got to do this, you've got to do your monitoring. We're going, we've done that! We've been there! We're all set to go! Help us put the actual work program together. Even today for every program that comes out, you can do funding if you do this plan. We've done the plan. I've got fifteen years of monitoring data. We have all this going on. We have everything. Let's just go do it. That's probably one of the biggest frustrations that we have right now. (6)

Policy Implications

Findings of the cross-case analysis demonstrate that there are a number of overarching lessons to be learned from the LID program. In this section, observations are made with regard to how the adoption and diffusion of the LID program has been impacted by the institutional landscape in which it is placed. Additionally, citizens' perspectives on barriers to entry to the LID program are generalized to apply to citizen participation in water resource management activities on a broader regional and state scale. What emerges is that at the interface between policy and citizen participation, policy needs to be written with an understanding of institutional arrangements of the stakeholders involved for the following reasons: power, resources, and accountability.

Barriers to adoption and diffusion:

Issues of Power

Unknown is the number of citizens groups that have pursued becoming a LID and never made it. LID creation generally happens at the county level with the MN DNR becoming involved only once a formal LID proposal is registered with the county and provided to the state. Information from our interviews suggests that knowledge about the LID program is not widely shared with the target audience. The MN DNR, the state coordinator for the program, takes a rigid stance on what it considers advocacy by encouraging the program versus legitimate outreach and education. The MN DNR policy is to provide information only when an inquiry is made and care is taken to explain and not promote the LID program. With no direct funding to support the program within the MN DNR and concern about advocating for taxes, there is little incentive to increase its priority within the agency. The limited diffusion of the program is perpetuated by lack of institutional support where few know about it, even fewer inquire about its purpose, and therefore only handful of citizen groups pursue it each year and succeed. The project found that communication among LIDs and those interested in forming a LID was limited at best.

Beyond the number of LIDs, much of the concern attached to the LID program revolves around their limited size, which limits their effectiveness in improving water quality. Though the boundaries of a LID can technically encompass an entire watershed, it is more common for them

to be comprised of only the riparian landowners around a lake. Most LIDs are formed by a petition of property owners. Other ways a LID can form are through a county board resolution, by order of a MN DNR Commissioner if a county board denies a petition request, or a petition can be submitted to the Commissioner of the MN DNR if a county board of one or more of the counties disapproves a petition for creation of a LID.

Though the statute appears to create a checks-and-balance system to safeguard against a county stopping the creation of a LID if there is demonstrated need and overwhelming citizen approval, the MN DNR takes the unofficial stance that it will not overrule a county's decision because it is in their best interest from a stakeholder relations standpoint to defer to the county's judgment. Some counties, nervous that those pursuing a LID are the minority, will ask that citizens have more than a majority of residents within the proposed district sign the petition. Citizens, who at the early stages of the LID formation process are volunteers confronted by limited time, money, and manpower, which translates into smaller sized districts. Since a majority (or more) of the property owners within the proposed district boundaries must sign the petition, keeping the district limited to riparian landowners cuts down on the size and expense of mailings for public meetings and notices related the LID creation, as well as reduces the total number of signatures citizens must collect to achieve a majority and the number of citizens in which to negotiate tax assessments. The implications are that though the intent of the statute appears to be the encouragement of watershed-level citizen-based stewardship activities, what has resulted is site-specific management activities focused on a single lake or chain of lakes. Furthermore, the balance of power resides with the county having unofficial veto power.

One scenario that can tip the scales in a proposed LID's favor is the nature of the environmental calamity that serves as a catalyst for action. In instances such as major flooding or human health concerns, citizens are more likely to find cooperation on the road to LID formation. This "impending doom" principle provides recourse for creating LIDs where there is great need, but it should be noted that this exists because of how the policy is interpreted and implemented *not* how it was written. There is little evidence in statute to suggest that LIDs should only be created in reaction to environmental problems. From an environmental systems perspective, measures to avoid crisis are generally accepted as being the preferred management approach.

Policy Lessons

- Knowledge about the program has to be diffused to target audiences before the program can expect to be adopted and effectively implemented.
- Education and outreach about the LID program cannot be limited to citizens. The relationship between a proposed LID and its county demonstrates that county board members and county staff must be part of the planning process, informed of the benefits, and appraised of potential challenges.
- Lake Associations and similar entities are vulnerable to the same types of hurdles encountered in volunteer-based citizen groups such as limitations on leadership, time, money, and manpower.
- LID formation is reactionary in relation to environmental problems, often not preventative.

Issues of Resources

Indicative of the larger problems related to the LID program is the issue of a LID's statement of purpose when formed. A LID can legally only undertake activities that are within its original scope. To illustrate, a LID created to lower lake levels to keep houses from flooding are legal prohibited from collecting taxes for invasive species control measures. During formation, members must at the same time create a broad charter that incorporates anticipated future management objectives while being specific enough to garner necessary support from lake residents, respective county officials, and MN DNR representatives. Failure to do so risks the need to create a new LID for new activities or be held legally accountable. In the absence of county enforcement, and barring a LID finds itself in court, there is little incentive on the part of LIDs to reform so that their stated purpose matches their management activities.

However, it would be inaccurate to suggest that citizens are *knowingly* breaking the law. To the contrary, the problem does not reside with rogue local governmental units run by power-crazed citizens. The issue is that the statute itself is opaque. In the end, citizens do the best that they can to interpret it with the resources at their disposal. Sometimes LIDs work with lawyers, sometimes they cannot afford them. On occasion, the MN DNR or county provides guidance. **The key is that the citizens who try to form LIDs have often found themselves trying to be recognized stakeholders in a complex water governance system that they perceive to be as impenetrable as it is intimidating.** As indicated by the project's interviews, it takes a great threat to either their homes or ways of life to motivate citizens to overcome their aversion to policy and government. After this hurdle is overcome, it is who the LID identifies as relevant actors in their cause, and how these actors are arranged in relation to each other— how they communicate and collaborate—that perhaps makes the difference in determining whether a LID will succeed or fail.

This project demonstrates the importance of matching responsibility with power. When a LID is created, the county delegates it a local governmental unit (LGU). This is potentially problematic in that decentralized responsibilities are rarely matched with appropriate levels of authority (Kincaid 1998; Kettl 2000). LIDs form to undertake lake-based conservation activities (decentralization of responsibility), which is funded through an additional property tax (level of authority). This underscores the idea that stakeholder participation involves two core components: decentralization of responsibility and the devolution of a specific degree of authority that matches the level of responsibility given (Raik et al. 2008). For example, emerging from common pool resource literature is the differentiation between co-management and multi-stakeholder bodies. While co-management refers specifically to the vertical link between local-level users and the government level resulting in a formal partnership, multi-stakeholder bodies refer to a broader array of user and interest groups who participate in advisory roles (Berkes 2002). While these definitions may seem artificial, they are important because they draw attention to the issue of power sharing. In co-management a local stakeholder has more equal standing in relation to governmental stakeholders, whereas in multi-stakeholder bodies local stakeholders are below governmental stakeholders in the power hierarchy. Returning to Arnstein's seminal paper on citizen participation (1969), in over three decades since she characterized the differences between citizen power in participation versus tokenism and nonparticipation, research has struggled to understand and overcome issues of power-sharing in natural resource management settings (Raik et al. 2008), a problem to which the LID program succumbs.

Policy Lessons

- The state's water governance system is confusing and intimidating to non-experts.
 - LIDs that identify and collaborate in meaningful ways with relevant stakeholders, such as the county, state agencies, businesses, and/or nonprofits, are better equipped to navigate the state's water governance system and successfully pursue lake stewardship activities.
 - Decentralization of lake management responsibilities must be matched with the appropriate degree of power and control over management outcomes.
-

Issues of Accountability

Why does the whole process depend upon whether or not you get a group of people like we did to get off their butts and go out and do it? That's what happened on some other lakes. They just didn't have a dozen people who got active and said, we've got to do something to save this lake. Well okay, then do you lose the lake? Whose job is it? (12)

We don't do it for the same reason that the DNR doesn't do it at the state level. There's not enough political will to put the resources in to take the political heat to have to administer a program. So in some respects the county is as guilty of not taking responsibility for that public water as the DNR is. The only saving grace I would tell you is it's not the county's responsibility to take care of public waters. That is not traditionally a county role. It's traditionally either a state role or there's this creature called a LID. (8)

When the burden of policy implementation rests with no clear authority—which results in no one being held accountable—problems ensue. A policy needs to be written with an understanding of institutional arrangements surrounding the stakeholders involved when it comes to accountability. In the instance of LIDs, it's not the citizens "job" to create LIDs, nor is it the responsibility of the county to create LIDs, nor does the MN DNR have a legal obligation to do anything more than review proposals and answer questions. The program is instead promoted on a case-by-case basis with specific lakes taking up the cause when they have few to no other options left. This is in stark contrast to two other state-level programs, Soil and Water Conservation Districts (SWCD) and Watershed Districts (WD). Each is connected to the Board of Soil and Water Resources headquartered in St. Paul, Minnesota, and each have a state-level nonprofit vested in overseeing activities (the Minnesota Association of SWCD and the Minnesota Association of WD, respectively).

The limited coordination of the LID program and with other water quality improvement initiatives mirrors what is happening on a state and national level with water resource management activities. Essentially, there lacks a common vision that policymakers and management practitioners can use to guide decision-making. In 2009 Minnesota legislators, in acknowledgement of the lack of federal guidance allocated \$750,000 to the University of Minnesota's Water Resource Center to create a 25-year water framework for the conservation, protection, and remediation of the state's water quality and water quantity. As findings from the LID program appears to indicate, in the absence of centralized decision-making and a unifying management plan, the emphasis has been and will continue to be on site-specific problem solving.

Policy Lessons

- Lacking clear accountability and responsibility there is little reason to believe the LID program will be fully implemented and chance of reaching its potential.
 - Lacking centralized coordination of the LID program at either the county or state levels the focus will remain site-specific (i.e., lake-centric).
 - A policy's slow diffusion is not indicative of the policy's merit or effectiveness. External forces related to institutional arrangements (e.g., funding, authority) may be at play.
-

Generalized Recommendations to Improve Water Policy

Find the Ideal Balance Between Centralized and Decentralized Authority:

Policies meant to promote citizen participation in water stewardship activities can increase their likelihood of success if they initiate the appropriate balance of centralized and decentralized authority when it comes time for implementation. If no one entity is clearly recognized as having responsibility and clearly has a vested interest in the success of the program, implementation and the ultimate success of the policy will falter. Yet as our findings illustrate, there needs to be some degree of flexibility at the local level to create tailor-made solutions to local problems.

Improve Awareness:

Knowing is half the battle. If no one knows about the program, no one will take part in it. There needs to be a genuine attempt that first identifies the target audience and then focuses outreach and education on them, without engaging in lobbying efforts. These findings illustrate that citizens and counties often had misgivings about the LID program simply because they did not understand its purpose, intentions, and what it could accomplish.

Increase Transparency:

Once citizens found out about the LID program they were often at a loss for how to actually form one. The interpretations of the statute were often different from LID to LID, indicating that the formation process was less than transparent or clear. Looking outside the LID program to think broadly about this issue, if a policy is overly complicated it serves as a barrier to entry. If the policy was created to achieve results, then it is doing a disservice by being so complicated as different groups interpret different requirements. To promote citizen involvement, such programs need to provide clear guidance for their creation along with technical support staff vested in their success. This may also involve conducting training programs or creating literature that interprets the statute in a step-by-step format.

Coordination for Cumulative Water Quality Improvements:

With the appropriate level of centralized authority comes the opportunity to coordinate citizen activities for cumulative water quality improvements. Though slow in diffusion, the LID program continues to grow. However, there currently exists the lost potential to coordinate LID activities within counties, with other LIDs, or with other water quality improvement activities. Lacking clear guidance, the inclination is to pursue site-specific activities as opposed to coordinated water management activities involving multiple initiatives and the local, county, and state level.

Conclusion

The point of public participation is that by adding the value-rich perspective of citizens to the information-rich perspectives of experts, we can create a wiser public policy.

-Adapted from Daniel Yankelovich, *The Magic of Dialogue*

As water quality and water quantity emerge as critical issues of the 21st century for Minnesota and beyond, it is more important than ever that water policy be created with an eye for on-the-ground implementation. Connected to this, policymakers must make a concerted effort to reincorporate citizens as active partners in water stewardship activities. In a state where surface waters outnumber agency staff, gone is the era where only the technical experts and trained practitioners can shoulder the burden of lake management activities. Though often discounted as a failed program due to its slow rate of diffusion, Minnesota's Lake Improvement District program provides a valuable inroad to examining the link between policy and citizen participation and ways to configure policy to facilitate accomplishment of local water management objectives. As indicated by the research findings, for policies that attempt to incorporate citizen participation as a policy outcome, it is vital that policymakers pay attention to the institutional arrangements surrounding the implementation of the program. Furthermore, as this project demonstrates, when at a loss for how to improve citizen participation the best place to go for advice is to the citizens themselves.

Literature Cited

- Armitage, D. 2005. Adaptive capacity and community-based natural resource management. *Environmental Management* 35(6):703-715.
- Arnstein, S. 1969. A ladder of citizen participation. *JAIP* 35(4):216-224.
- Berkes, F. 2002. Cross-scale institutional linkages: Perspectives from the bottom up. In *The Drama of the Commons*, eds., E. Ostrom, T. Dietz, N. Dolsak, P. C. Stern, S. Stonich, and E. U. Weber, 293. Washington, D.C.: National Academy Press.
- Kettl, D.F. 2000. The transformation of governance: Globalization, devolution, and the role of government. *Public Administration Review* 60(6):488-497.

- Kincaid, J. 1998. The devolution tortoise and the centralization hare. *New England Economic Review*, May/June, 13-52.
- Raik, D.B., A.L. Wilson, and D.J. Decker. 2008. Power in natural resources management: An application of theory. *Society and Natural Resources* 21(8):729-739.
- Wisconsin Department of Natural Resources. 2006. *People of the Lakes: A Guide for Wisconsin Lake Organizations*. (WI DNR Publication No.PUB-FH-821-2006). Madison, WI.
Retrieved from <http://learningstore.uwex.edu/pdf/G3818.pdf>.

APPENDIX A — LID MANAGEMENT ACTIVITIES

Name	County	Auth. LID	Year formed	How formed	Major activities
Coon Lake LID	Anoka	Anoka	2008	Property owners petition	Aquatic vegetation control
Chisago LID	Chisago	Chisago	1976	Property owners petition	Water quality, preservation of area lake, level of the lake, phosphorous load study
Kimble Lake LID	Crow Wing	Crow Wing	2008	Property owners petition	Eurasian water milfoil management
Ossawinnamakee LID	Crow Wing	Crow Wing	2007	Property owners petition	Water quality, aquatic plant management
Round LID	Crow Wing	Crow Wing	2004	Property owners petition	Aquatic vegetation control
Sibley Lake LID	Crow Wing	Crow Wing	2008	Property owners petition	Curly leaf pondweed management, fisheries, water quality, and quality of life
Indianhead LID	Hennepin	City of Edina	Unknown	Unknown	Water quality
Green Lake LID	Isanti	Isanti	2000	Property owners petition	Water quality and looking into weed control
Long Lake LID	Isanti	Isanti	2005	Property owners petition	Curly leaf pondweed invasive aquatic plants, water quality, improve habitat
Knife Lake LID	Kanebec	Kanebec	1977	Property owners petition	Water quality, funding for the new Knife Lake Dam, dam maintenance, annual curly leaf pondweed control improvements
Crookneck Lake LID	Morrison	Morrison	2005	County resolution	Water quality, curly pondweed, prevention and treatment of exotic plants
Fish Trap Lake	Morrison	Morrison	2008	County resolution	Curly leaf pondweed
Lake Alexander LID	Morrison	Morrison	2006	County resolution	Aquatic vegetation control
Sullivan Lake LID	Morrison	Morrison	2005	County resolution	Water quality, curly leaf pondweed, prevention and treatment of exotic plants
Little McDonald-Paul-Kerbs LID	Otter Tail	Otter Tail	2000	County resolution	Water level maintenance
Otter Tail County Pine Lakes LID	Otter Tail	Otter Tail	2005	Property owners petition	Eurasian water milfoil control
Pelican Group of Lakes	Otter Tail	Otter Tail	1999	County resolution	Water quality

APPENDIX A — Continued

Name	County	Auth. LID	Year formed	How formed	Major activities
South Turtle LID	Otter Tail	Otter Tail	2001	Property owners petition	Lowering the lake level
Maple Lake LID	Polk	Polk	1980s	Property owners petition	Improve sewer system to improve water quality, street lighting for lake security, winter aeration to protect fish populations
Union/Lake Sarah LID	Polk	Polk	Unknown	Unknown	Lake stabilization, flooding mitigation
Birch Lake LID	Ramsey	City of White Bear Lake	2006	Property owners petition	Control of aquatic vegetation
Karth Lake LID	Ramsey	City of Arden Hills	2003	City resolution	Lake level management lacking outlet
Snail Lake LID	Ramsey	City of Shoreview	1990	City resolution	Augmentation of Snail Lake, lake level monitoring, pump water from Sucker Lake, annual maintenance of pumps
Cedar Lake LID	Scott	Scott	1981	Property owners petition	Water quality and working on sewer districts
Grand Lake LID	Stearns	Stearns	2007	Property owners petition	Water quality, aquatic plant management
Little Cedar Island LID	Stearns	Stearns	1984	Unknown	Maintain navigation channel between Little Cedar Island and Cedar Island
Big Swan LID	Todd	Todd	2006	County resolution	Control of curly leaf pondweed
Indian Lake LID	Wright	Wright	1991	Property owners petition	Water quality, planting lake plants
Lake Charlotte LID	Wright	Wright	1990	County resolution	High water management
Mink-Somers LID	Wright	Wright	2007	Property owners petition	Water quality, aquatic plant management
Pulaski LID	Wright	Wright	mid 1980s	Property owners petition/ resolution	Lake level rising and damage to homes, maintain pumping and permits, treat milfoil

Table adapted from working files held by the Minnesota Department of Natural Resources, Division of Waters (2009).

The following are summaries of activities and resources mobilized by the LIDs who participated in this project.

Chisago, Chisago County: Formed in 1976, Chisago Lakes LID is one of the oldest in the state and by far the largest to participate in the project. As an older LID, there was a time when it was suspended, though not dissolved. The County Board officially reactivated the LID in 1984 to include goals to enhance water quality and quantity level, encouraging environmentally sound agricultural practices on the watershed, promoting sustainable land-use to accommodate environmentally friendly economic development, protecting the surrounding lake environment and wildlife, and supporting environmental awareness activities in the county. Unlike many other LIDs, the Chisago LID and its chain of lakes assess residents on the watershed who are not riparian landowners. Participants observed the need for more frequent planning meetings to coordinate activities. Whereas many LIDs only meet a few times a year, Chisago LID meets on a monthly basis. Current activities include extensive water quality monitoring, lake level control, and shoreland restoration and runoff mitigation projects. The LID commands an annual operating budget of around \$250,000 and as of 2007 had an account balance of over \$700,000.

Lake Ossawinnamakee, Crow Wing County: In 2000, Eurasian water milfoil was found in Lake Ossawinnamakee. Subsequent consultation with the MN DNR led residents to suggest that milfoil was never going to be eradicated, but had to be managed somehow. The riparian landowners persevered and began raising funds through voluntary contributions to pay for herbicide treatments, but after a few years two major issues occurred. One, citizens were finding that raising large quantities of money through voluntary contributions was time intensive and frustrating. Second, they encountered the free-rider dilemma where only half of the lake residents were paying for treatments, but everyone was enjoying the benefits. Thus a LID was formed but identifying appropriate tax assessment levels was a point of conflict. It was decided that all landowners would be equally assessed, with two caveats. If an owner owns three contiguous lots, that owner gets assessed once. Or, if there are condos, every unit gets assessed. Average assessment at the time of interviews was around \$200 per household, which provided an annual operating budget of \$60,000-\$70,000 on approximately 300 parcels. Of note, this LID set up a LLC to protect individuals from liability. The LID is active today pursuing invasive aquatic plant management.

Green Lake, Isanti County: Green Lake LID was started in 2000. Public meetings and preliminary citizen petition processes began in 1998 and 1999. The current Lake Association at the time became a LID to prevent homes situated around the lake from being flooded. A log structure with a flat gate had been keeping the Rum River from flooding the lake during peak flood times. Decades old by the 21st century, the structure was to be removed during the reconstruction of State Highway 47. Without the flood control structure half of the houses on the lake would be flooded. Working with the MN DNR, FEMA, MPCA, and US Army Corp of Engineers, residents on the lake were told that the new structure would be a half million dollar expense. State and federal agencies would cover half, but the residents had to provide \$250,000 of the costs. To be eligible for a county loan, they formed a LID. Repayment of the loan was split between approximately 177 properties over the course of five years. The LID formation process was mired in conflict because half the residents, whose homes sat upon a hill above the lake's flood plain, did not want the extra tax placed upon their property. Citizens came to a

consensus by creating a formula for calculating taxes based on property value. Still active today, the LID is currently exploring ways to protect the lake by influencing activities taking place on the watershed level as well as pursuing weed control measures.

Long Lake, Isanti County: Long Lake was home to a Lake Association since the 1950s. The Association was constant throughout time, but with a dwindling number of participants over the years. In the 1990s it received a small grant to study ways to improve the water quality. These activities stalled because volunteers had a hard time determining what representatives from which state agencies they needed to partner with. At the time the Lake Association considered becoming a LID, but thought that it was a political tool having too many hoops to jump through. In May of 2005 the members of the Lake Association changed their minds and revisited the LID option, this time deciding to pursue it. By July they had created their formal petition with more than 60% of Long Lake residents supporting the LID. The county officially voted to form the LID in August/September of 2005. The motivating factor regarding the action of citizens living around the lake was the growing infestation of curly leaf pondweed. Recent findings of milfoil underscored the need for more aggressive management techniques. The LID, which encompasses approximately 226 properties, became a test case in a MN DNR program for vegetative management. Still active today, the Long Lake LID continues in its invasive aquatic plant management activities to improve the lake's environment.

Lake Francis, Isanti County: (Lake Francis was attempting to form a LID when this project was underway. As of 2009, they were denied LID status for errors in filing paperwork. Participants interviewed for this project were included in the analysis because of their valuable insight, specifically on the hurdles to LID formation). A small group of motivated residents on Lake Francis have tried multiple times to create a LID, each time unsuccessfully. Currently the lake is eutrophic with nutrients causing excess algal growth. The surface is so scummy that it impairs boating. Aesthetically the lake is also displeasing to look at. Residents hope to eventually draw down the lake for one season to address related problems. This has been met with resistance from some who want to leave the lake as is and residents who use their lake house as a summer home and who do not want to miss an entire season. In the meantime, some of the residents around the lake have taken it upon themselves to begin working to improve the water quality through shoreland management BMPs (largely self-taught). Using social-norming techniques, some have begun to lead by example by establishing native plants and vegetation along their shoreline, and to request that the county stop mowing down the vegetation that runs between the lake and county roads. Also, to get people excited and involved, they have partnered with the MN DNR to construct a new public-access boat ramp. As a small lake with fewer property owners than many other LIDs (73 taxable properties), residents of Lake Francis are slightly limited in their ability to generate funds.

Knife Lake, Kanebec County: The LID began in 1977, which makes Knife Lake one of the earliest LIDs in the state. Placing an assessment on its approximately 337 properties, it was created solely as a funding mechanism to finance the construction of the new Knife Lake Dam. The previous dam was damaged in 1972 or 1973 due to heavy rains. By 1982 the new dam was being built, which ultimately raised the lake's water level by 18 inches and subsequently damaged some properties. Following the construction of the dam, the water quality of Knife Lake steadily declined in part because the high lake level was increasing erosion rates of

phosphorous-rich soils. Algae and curly leaf pondweed took over, followed by a large carp population that destroyed the game fish population. In 1989, the LID pursued a lake reclamation project in partnership with the MN DNR that involved rotenone treatments. The treatments involved a drawdown of around five feet, but the lake level rose to normal levels within a year or two. In the early 1990s, the LID was involved in a court case where they opposed the creation of a regional Watershed District. There were fears that their autonomy would be threatened and that another layer of governance would be placed between the LID and the county, which was considered unfavorable. The formation of the Watershed District was successfully halted by the court. A five county joint powers board, called the Snake River Water Management Board, was subsequently created. In the mid to late 1990s the LID partnered with Blue Science to undertake experimental phosphorus mitigation techniques. Throughout its existence the LID has maintained constant and consistent water quality monitoring data. In the early 2000s the LID partnered with its county's Soil and Water Conservation District on feedlot management and feedlot surveys to identify any type of land-use issues that were a negative impact to the lake. The LID is active today and focused on aquatic plant management.

Lake Sullivan, Morrison County: The Lake Sullivan LID was started in 2005 because invasive aquatic plants were found in the lake. The LID is comprised of the 260 parcels of property around the lake that can be taxed. There is also a Sullivan Lake Lake Association, which is an official 501 (c) 3 nonprofit, and has been in existence for over five decades and remains active to this day. As a Lake Association, residents obtained a permit from the MN DNR and contracted with a private vendor to treat the lake with an approved herbicide applicator to kill invasive plant species. These activities were continued after the creation of the LID, with the intent to eventually decrease the concentration of herbicide applied. The LID estimated that the herbicide treatment program to eradicate curly leaf pondweed had a price tag of \$100,000 spent over five years. Unlike many Lake Associations, the Sullivan association gets money from pull-tabs. As a result, the Lake Association has been active in making water quality improvements around the lake. For some, the LID is believed to be a back up to insure funding in lean charitable years. The lake is mainly used for fishing and boating. Water quality samples are taken twice a year.

Lake Alexander, Morrison County: The Initiative Foundation based out of Little Falls, Minnesota, serves a 14 county region. It began offering a Healthy Lakes Partnership Program that stressed the importance of community building and civic engagement to mitigate local problems that state agencies and grants alone may not be able to fix. Residents from Lake Alexander participated in the program and decided to form a LID to combat invasive aquatic plants. County officials were surprised when citizens came to them requesting the new taxing districts, yet embraced the opportunity. Of note is the fact that for three lakes in the county, Crookneck, Sullivan, and Alexander, citizens chose a less used path for LID formation. Instead of forming by citizen petition, a process that is cumbersome and time intensive, citizens requested the LIDs be formed by the county board. The county board, though open to the idea, wanted to make sure that citizens truly were supportive so they requested that all lakes demonstrate that at least 25 percent of residents were interested in forming LIDs. If this was accomplished, the county board would agree to hold a public hearing on the topic. The response from the citizens was described as overwhelming in favor of LID creation. In the instance of the Lake Alexander LID, the older Lake Association remains separate and operational.

Little McDonald-Paul-Kerbs, Otter Tail County: The Little McDonald-Paul-Kerbs LID was formed in 2000 to deal with issues of flooding. The chain of lakes has no natural outlet and high water levels were killing trees, causing shoreline erosion and increasing the water's turbidity. The LID was created to assess approximately 250 riparian properties to pay for a network of drains. More broadly the LID was interested in influencing land-use and zoning around the lake, water quality improvement projects, and invasive species control. The LID has an annual operating budget of between \$7,000-\$8,000, which pays for mailings, liability insurance, meetings and travel expenses and water quality monitoring. The LID is active and at the time of this project was in the process of determining where best to put the drains and to what extent state agencies, such as the MN DNR, would participate in cost-sharing ventures. In 2007, the LID had a project budget of around \$24,000 to pay for the creation of water outlets.

Karth Lake, Ramsey County: The Karth Lake LID started in 2003 because of high lake levels. After emergency pumping by the city to protect homes on the lake in a year of heavy rainfall, it was decided that because Karth Lake had no natural outlets a permanent pumping system needed to be installed. The lake had a history of dangerously high levels, in part because it was surrounded by large tracks of impermeable surfaces caused by development activities. Residents of Karth Lake approached the city for a solution. The pumps purchased and installed were estimated to cost lake residents \$50,000 split between all the property owners and paid over the course of the three years. The city covered up to \$50,000 of the additional expenses. The recreational uses of the lake include fishing, canoeing, paddleboats, and kayaks. There is a public access point to the lake from the park, but the lake is too small for motorized boating, though not banned). The city created bylaws pertaining to the LID, with citizen input for changes only after the LID was formed. Water pumped out of Karth Lake is put into the storm sewer system that feeds into Valentine Lake, which is downstream in the Rice Creek Watershed. One of the smallest lakes involved in this project, Karth Lake has approximately 52 taxable properties and is active today.

Snail Lake, Ramsey County: Since the 1920s, the city of Shorview has augmented Snail Lake using groundwater because the lake in a sense "leaks." In addition to evaporation, it is believed that there exists a fissure causing it to lose water. In the 1990s, the MN DNR said that the lake could no longer use groundwater for lake augmentation purposes. The homeowners association partnered with the city to find alternative water sources, and subsequently established a LID in 1992 with the purpose of figuring out a way to retain normal lake levels without the use of groundwater. In the beginning there was controversy concerning the true high-level water mark. Historic boat houses on the lake were endangered by flooding when the water level got too high. In 1993 the LID built an intake at Sucker Lake with a pump and a pipe that feeds water into Snail Lake. A contract was established with St. Paul Water Utilities, and Snail Lake purchases water from St. Paul to augment the lake. Prior to May 1, pumps can be used to raise lake levels. During the summer months, permission must be received from St. Paul, and after August 15, the lake can again pump without needing permission. The total cost to run the pump, including water and electricity, is approximately \$16,000 a year. In dry summers the lake normally does not receive permission to pump. After these issues with lake levels were resolved, LID-related activities stopped. Though considered an active LID with 72 taxable properties, Snail Lake's homeowners association is pursuing weed control measures and related management activities. As of the time of this project, citizen involvement in the LID was minimal.

Lake Charlotte, Wright County: The Lake Charlotte LID was started in the 1990s to deal with flooding issues. The LID installed a pump with the help and financial assistance of the MN DNR, who split the cost with the citizens. Before the pump installation, a study by the US Army Corp of Engineers took place recommending mitigation plans that were ultimately rejected because of proposals to pump excess water into a neighboring lake. To do so they needed unanimous agreement from that neighboring lake's landowners, which was perceived impossible. Also, the US Army Corp of Engineers' price tag was more than a million dollars. Instead the LID chose to contract with a private irrigation company to install 10 inch plastic irrigation pipe to pump water three miles into the Crow River for approximately \$250,000 split between the lake's roughly 100 properties. The assessment for this project was based on house elevation and amount of shoreline so that those who would benefit the most from the lower lake levels would pay more. Assessments ranged from \$1,500-\$2,500 per property. Following the pump installation, the LID expanded its charter to build a sewer line around the lake to replace septic tank systems that cost around \$2.5 million. The sewer was installed in 2002 and today the LID continues to undergo water quality monitoring four times a year. Pump maintenance also creates ongoing expenses that the LID pays for, which was estimated to be around \$5,000 a year.

Lake Pulaski, Wright County: The Lake Pulaski LID began in mid-1980s. The lake does not have a natural outlet and is fed by an aquifer by Lake Mille Lacs. The lake is considerably deep, going as far as 95 feet in some places. In the late 1980s the lake level began rising and destroyed eighty homes. As a result, people started moving their homes back, but such options were not available to all landowners, particularly those of for lower-incomes. The US Army Corp of Engineers offered assistance and designed a pumping system where stormwater from Pulaski was fed into the Buffalo stormwater pipes into Buffalo Lake, and from there into the Crow River. The LID, which was started because of the flooding, calculates its assessments according to the market value of each property, of which there are more than 200 property owners. After the pumps and pump house were built, milfoil was found on the lake, and due to the interconnected nature of the pumping system, Buffalo Lake was confirmed to have milfoil in 2003 even though pump screens were installed. The LID is active today with an annual budget over the past few years of between \$30,000 and \$40,000.

APPENDIX B— INTERVIEW GUIDE

The project employed qualitative research tools, mainly in-person, in-depth, semi-structured interviews, to gain participant insight into the LID program. Interviews were structured around the following operational themes to elucidate strategic issues of power, scale, knowledge, community and culture (*Built from adaptive capacity framework; Armitage 2005*):

- 1) Technical:
 - a. How citizens identify water quality impairments.
 - b. How they collect, store, and share water quality data.
 - c. How they create and implement management plans.

- 2) Financial:
 - a. Sources of funding.
 - b. Consistency of funding.
 - c. Level of control over resources and funds.

- 3) Social:
 - a. Awareness of conservation activities and issues among resource users.
 - b. Who participates in conservation activities and what is their motivation.

- 4) Institutional:
 - a. Perceptions of the roles and responsibilities of citizens, state agency representatives, NGOs, and township, state and county governance structures.
 - b. Understanding and awareness of enabling legislation that supports conservation activities.
 - c. Organizational accountability.

- 5) Political:
 - a. Leadership and who they look to for guidance when trying to improve their lake's water quality.
 - b. Motivation of key instigators/leaders of change.
 - c. Political support at township, county, and state level for local stakeholder activities.